Background Report Reference

AP-42 Section Number: 11.21

Background Chapter: 4

Reference Number: 10

Title: Emission Test Report: Monsanto Elemental Phosphorus Plant, Soda Springs, Idaho

US EPA

January 1989

10

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park, NC 27711

EMB Report No. 88-EPP-01
Volume I
January 1989

Air

EPA

Elemental Phosphorus Production - Calciner Off-Gases

Emission Test Report

Monsanto
Soda Springs, Idaho

DRAFT/WP
d3006-4/971130
03/30/92 1

Process Data CBI 10

Emission Test Report
Review Checklist

Reviewer: Michelle Ramsey
Review Date: 4 May 1992

A. Background Information

1. Facility name: Monsanto Elemental Phosphorus Plant

   Location: Soda Springs, Idaho

2. Source category: Phosphate Rock

3. Test date: January 1989 / actual testing 8/88

4. Test sponsor: USEPA (EMB)

5. Testing contractor: Radian

6. Purpose of test: ____________________

7. Pollutants measured

   PM PM-10 CO SO_2 NO_x VOC Pb CO_2

   Others (list): ____________________

8. Process overview: On an attached page provide a block diagram of the unit operations and associated air pollution control systems at the facility. Identify process tested with letters from the beginning of the alphabet (A, B, C, etc.) and APC systems with letters from end of alphabet (V, W, X, etc.). Also identify test locations with Arabic numerals (1,2,3, ...). Using the ID symbols from that sketch complete the table below that identifies processes or unit operations tested.

Test ID	Process	Process ID	Emissions tested		APCD (controlled emissions only)
			Uncontrolled	Controlled	

B. Process Information

1. Provide a brief narrative description of the process. With as much detail as possible, (e.g., if a furnace or conveyor system is used, identify the type of unit) describe the equipment used for those operations tested. (Note: If process description provided in test report is adequate, attach copy or reproduce here.)

2. For each process tested list feedstock materials and products. Indicate if activity factors are for feed (F) rate or product (P) rate.

Process ID	Feedstock materials	Products	Basis for activity factor	F/P

Basis for data: ____________________
(Indicate page/table Nos. in test report)

3. For each process or operation tested and each test run note process capacity and operating rate during test.

Process ID	Capacity	Units	Test run	Process rate	Units
			1		
			2		
			3		
			4		
			1		
			2		
			3		
			4		
			1		
			2		
			3		
			4		
			1		
			2		
			3		
			4		

Basis for data: ____________________

C. Air Pollution Control Systems Tested

1. For each air pollution control system pollution control system identified in A.8, note the following

ID	Type of APCD	Manufacturer	Model No.

Note: Be as specific as possible in identifying APCD. For example, indicate "pulse jet fabric filter" rather than simply "fabric filter."

2. For each system identified above, provide a narrative description. For fugitive systems describe capture techniques as well as the removal techniques (use a separate page if necessary)

3. Using the attached parameter list for guidance complete the table below. (Use additional pages as needed.)

			Readings			
APCD ID	Parameter	Units	Run 1	Run 2	Run 3	Run 4
Type of APCD:						
Type of APCD:						
Type of APCD:						

D. Sampling and Analysis Methods

1. Complete the following table

Test location	Pollutant	S & A method	Reference/ conditional method	Deviations noted
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N
			Y/N	Y/N

2. If a method used was not a reference or conditional method, provide a narrative discussion including any data manipulation needed to make results correspond to reference or conditional method results.

3. Describe any deviations identified above.

E. Emission Data Documentation

1. Tabulate the following stack gas data from the test report. (Use additional pages as needed.)

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
	Stack temperature					
	Moisture					
	Oxygen					
	Volumetric flow, actual					
	Volumetric flow, standard					
	Percent isokinetic					
	Pollutant concentration:					
	Stack temperature					
	Moisture					
	Oxygen					
	Volumetric flow, actual					
	Volumetric flow, standard					
	Percent isokinetic					
	Pollutant concentration:					
	Stack temperature					
	Moisture					
	Oxygen					
	Volumetric flow, actual					
	Volumetric flow, standard					
	Percent isokinetic					
	Pollutant concentration:					

2. Tabulate pollutant mass flux rates

Test ID	Pollutant	Units	Mass flux rates			
			Run 1	Run 2	Run 3	Run 4

3. Present example emission factor calculations below.

4. Tabulate emission factors

Process	Pollutant	Units	Average emission factor: Uncontrolled	Average emission factor: Controlled

ATTACHMENT A
APCD PARAMETERS

Type of APCD	Parameters
Fabric filter	Cleaning mechanism Bag type Cleaning frequency Air to cloth ratio (A/C) Pressure drop Inlet temperature
ESP	Type (wet or dry) Number of fields Rapping cycle (if dry) Specific Collection Area (SCA) Particulate resistivity (if known) Spark rate Current and power levels
Venturi (or other high energy) scrubber	Pressure drop Liquid/gas (L/G) ratio Mist eliminator type
Packed-bed scrubber	Packing depth L/G ratio Caustic use (Y/N) pH Mist eliminator type
Carbon absorber	Bed depth Superficial gas velocity Bed temperature Desorption mechanism (media) Flue-gas moisture Cycle length Time-on-line after breakthrough

DCN 89-222-124-20-08
Radian No. 222-124-20

EMB Report No. 88-EPP-01

EMISSION TEST REPORT
MONSANTO ELEMENTAL PHOSPHORUS PLANT
SODA SPRINGS, IDAHO

VOLUME I

EPA Contract No. 68-02-4338
Work Assignment Nos. 20/26

Prepared for:

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January 1989

JES/055

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1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION/BACKGROUND

The Environmental Protection Agency is currently developing additional data on the quantities of radionuclide emissions released during the phosphate rock processing operation (calcining). The data generated during this program will form the basis for a National Emission Standard for Hazardous Air Pollutants (NESHAP) which will limit the quantities of radionuclide emissions from this industry. EPA's Office of Radiation Programs (ORP) and Office of Air Quality Planning and Standards (OAQPS) are jointly participating in this regulatory effort.

Emission tests at two elemental phosphorus plants, calciner emission control systems were performed for this program. The results from the first of these tests, which was conducted at the Monsanto Soda Springs, Idaho, plant are the subject of this report. Since the radionuclides in the offgas streams are associated with the particulate matter (PM), emission testing procedures involved collection of PM from these streams and subsequent analyses of these samples for their radionuclide content. The emissions that are being studied include particulate matter, particle size distribution (PSD) and two specific radionuclides: Polonium-210 (Po-210) and lead-210 (Pb-210).

1.1.1 Test Program Objectives

The purpose of this document is to present the results from the August 1988 test program at the Monsanto phosphorus plant in Soda Springs, Idaho. The focus of this report is on the presentation of measured emissions. No attempt is made to perform rigorous analyses of these data such as are commonly performed in support of NESHAP development. The ORP AND OAQPS will analyze the data generated during this test program to develop the specific information needed to support regulatory development. The primary objectives of the Monsanto test program were:

- to quantify the particulate matter, polonium-210, and lead-210 emission rates in the calciner offgases including both the venturi scrubber inlet and outlet streams, and
- to determine the distribution of particulate matter, polonium-210, and lead-210 by particle size in both these streams.

In addition, grab samples were collected to quantify the concentration of polonium-210 and lead-210 in the calciner feedstock. Testing was performed using a single set of process and control device operating conditions.

1.1.2 Overview of Testing Activities

On-site activities began on August 15 and were completed on August 20, 1988. The sampling and analysis matrix as planned and presented in the project test plan is included in Table 1-1. During the test program, slight deviations from the planned approach were made to compensate for sampling difficulties encountered during the first and second day of testing. These difficulties and the corrective actions taken are discussed in detail in Sections 3.0 and 4.0 of this document.

Samples were collected simultaneously at both the venturi scrubber inlet and each of the calciner's four venturi scrubber stack outlet locations, which were designated A, B, C, and D. Thus, for each run, five samples were collected; one at the inlet and one at each of the four scrubber outlet stacks.

The sampling intervals are summarized for each test run in Table 1-2. In order to collect at least three MM 111 samples at each location that met isokinetic QA requirements, four test runs at the inlet and outlet were conducted. Also, a fifth outlet D test run was conducted since two previous outlet D test runs did not meet isokinetic QA requirements.

Three test runs were performed where inlet and outlet particle size samples were collected simultaneously using in-stack Andersen impactors.

TABLE 1-1. PLANNED SAMPLING AND ANALYSIS MATRIX FOR MONSANTO ELEMENTAL PHOSPHORUS PLANT

Sampling Location	Sampling Method	Target Emission or Stack Parameter	Analytical Method	Number of Test Runs	Number of Sample Fractions Per Test Run	Number of Radionuclide Samples
Scrubber Inlet	Modified Method 111[a]	Particulate Matter Radionuclides[b]	Gravimetric alpha spec.	3	2 (front/back)[c]	6
	Andersen Impactor	Particulate size Radionuclides[b]	Gravimetric alpha spec.	3	6[d]	18
Outlet Stack #1	Modified Method 111[a]	Particulate Matter Radionuclides[b]	Gravimetric alpha spec.	3	2 (front/back)[c]	6
	Andersen Impactor	Particulate size Radionuclides[b]	Gravimetric alpha spec.	3	6[d]	18[e]
Outlet Stack #2	Modified Method 111[a]	Particulate Matter Radionuclides[b]	Gravimetric alpha spec.	3	2 (front/back)[c]	6
	Andersen Impactor	Particulate size Radionuclides[b]	Gravimetric alpha spec.	3	6[d]	e
Outlet Stack #3	Modified Method 111[a]	Particulate Matter Radionuclides[b]	Gravimetric alpha spec.	3	2 (front/back)[c]	6
	Andersen Impactor	Particulate size Radionuclides[b]	Gravimetric alpha spec.	3	6[d]	e
Outlet Stack #4	Modified Method 111[a]	Particulate Matter Radionuclides[b]	Gravimetric alpha spec.	3	2 (front/back)[c]	6
	Andersen Impactor	Particulate size Radionuclides[b]	Gravimetric alpha spec.	3	6[d]	e
Process Feed	Grab	Radionuclides[b]	Alpha spec.	3	1	3

TABLE 1-1. (Continued)

Sampling Location	Sampling Method	Target Emission or Stack Parameter	Analytical Method	Number of Test Runs	Number of Sample Fractions Per Test Run	Number of Radionuclide Samples
Field Blanks	Modified Method 111[a]	Particulate Matter Radionuclides[b]	Gravimetric alpha spec.	1	2 (front/back)	2
	Andersen Impactor	Particulate size Radionuclides[b]	Gravimetric alpha spec.	1	6[d]	6
Reagent Blanks	Modified Method 111[a] Filters, Acetone, Nitric Acid	Radionuclides[b]	Alpha spec.	NA	NA	0[f]
	Andersen Impactor Substrates	Radionuclides[b]	Alpha spec.	NA	NA	0[f]
Performance Audit Samples	NA	Radionuclides[b]	Alpha spec.	NA	NA	5
TOTAL						82

[a] Impinger solutions of the Method 111 train were 0.1 N nitric acid.

[b] Target radionuclides included Polonium-210 and Lead-210.

[c] Front half consisted of filter and probe and nozzle rinses, back half consisted of impinger contents and rinses.

[d] Andersen impactor stages were combined into 6 fractions as follows: No. 1 - precutter stages 0 and 1; No. 2 - stages 2, 3, 4, and 5; No. 3 - stage 6; No. 4 - stage 7; No. 5 - stage 8; and No. 6 - stage 9 (back-up filter).

[e] Radionuclide analyses were performed on particle size samples collected at only one of the four outlet stacks. This particle size sample was selected after reduction of the particle size distributions for all four stacks.

[f] Reagent blanks (filters and solvents) were collected and archived. Radionuclide analysis was performed on these samples if the field blanks showed contamination.

TABLE 1-2. SUMMARY OF THE SAMPLING INTERVALS FOR THE MONSANTO TEST PROGRAM

(24-hour clock)

Date	Run	Inlet	Outlet A	Outlet B	Outlet C	Outlet D	Comments
Method 111							
8/16/88	1	16:25-18:10	16:25-18:40	16:25-18:40	16:24-18:40	16:25-18:40	The inlet sample and outlet D sample did not meet isokinetic requirements.
8/17/88	2	09:40-10:55	09:40-11:15	09:40-11:15	09:42-11:15	09:40-11:15	The outlet D sample did not meet isokinetic QA requirements.
8/17/88	3	15:25-16:35	15:25-17:05	15:25-17:05	15:25-17:05	15:25-17:05	
8/18/88	4	10:35-11:43	10:35-12:00	10:35-12:00	10:35-12:00	10:35-12:00	
8/18/88	5	---	---	---	---	11:35-12:55	
Particle Sizing							
8/17/88	1	19:01:30-19:16:30	20:00-22:00	19:28-21:28	19:27-21:27	19:31-21:31	A buttonhook nozzle was used to collect the inlet sample.
8/18/88	2	14:50-15:05	15:25-19:04	14:45-18:36	14:45-18:36	14:50-18:44	
8/19/88	3	12:00-12:10	13:15-17:05	13:15-17:15	13:02-17:02	13:17-17:17	
8/18/88	blank	17:20-17:35	---	---	---	16:45-19:45	

Particulate emissions and associated radionuclides were collected from the streams using a modification of EPA Method 111. The specific sampling portion of Method 111 is identical to those procedures described in EPA Method 5.

The modifications made to the Method 111 train for this program included using 0.1 N nitric acid for impinger solutions instead of water, and recovery and analysis of all sampling train fractions. The purpose of the nitric acid impinger solutions was to minimize surface effects that might inhibit recovery of radionuclides (gaseous metals) from sampling train glassware. The use of nitric acid as an impinger solution and recovery solvent was implemented for quality assurance purposes.

The purpose for analyzing all train components was to quantify total radionuclide content of the offgas streams. The MM 111 sampling trains were recovered in two fractions (front and back halves). The front half consisted of the filter and rinses from the probe, nozzle and filter holder; whereas, the back half consisted of the impinger contents and rinses. Both front and back half sample fractions were analyzed separately by EPA's Eastern Environmental Radiation Facility (EERF) for radionuclide content. (All Method 111 radionuclide results presented in this report include both front half and back half sample train fractions.)

Particle sizing samples were collected using heated Andersen MK-III in-stack cascade impactors with right angle precutter. Impactor operating parameters were selected to optimize the separation of the fine particulate fraction (less than 2 microns). Particle size distributions were determined at all five sampling locations for a total of 15 distinct particle collection episodes. However, radionuclide analysis of the particle size fraction was done for only a selected portion of the samples to reduce the number of radionuclide analyses. Several of the impactor stages for the larger particle size cuts were composited into a single sample for radionuclide analysis. The final four impactor stages were analyzed for radionuclides as individual samples. The particle size samples collected at outlet C were chosen as representative of the outlet and were submitted for radionuclide analysis.

Process feed samples were collected during the testing and composited to determine the activity in the blended feedstock ore. Field blanks and reagent blanks were collected during the Monsanto test program and are presented and discussed in the Quality Assurance/Quality Control (QA/QC) section of this document.

1.1.3 Uncertainties in Radionuclide Analysis

For the polonium-210 (Po-210) measurements, there is a high degree of confidence in the data. The analytical errors in the polonium-210 measurement were less than 10 percent at the 95 percent confidence level for the test program.

For the lead-210 (Pb-210) measurements, there is an acceptable level of confidence in the data. All Method 111 Pb-210 measurements were above the minimum detection limit (MDL). Six (6%) of particle size fraction radionuclide measurements were below the MDL (see footnote in Table 1-8).

1.2 SUMMARY OF EMISSION RESULTS

Emission testing was performed while operating the process was operating at normal conditons. A constant pressure drop was maintained across each of the venturi scrubbers during each of the testing periods. The measured pressure drop is considered confidential by the facility.

1.2.1 PM and Radionuclides (MM 111)

Table 1-3 contains a summary of the particulate matter and radionuclide emissions measured during the program. As seen in the table, particulate matter concentrations at the inlet for the three valid test runs (runs 2, 3 and 4) averaged 595 mg/dscm (0.26 gr/dscf). The outlet particulate matter concentration averaged 27.3 mg/dscm (0.012 gr/dscf) during these test runs. On a mass emission rate basis, particulate matter emission rates at the inlet averaged 104 kg/hr (230 lbs/hr) and the outlet averaged 4.90 kg/hr (10.8 lbs/hr).

TABLE 1-3. SUMMARY OF PARTICULATE MATTER AND RADIONUCLIDE EMISSION RESULTS, CALCINER OFFGASES, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Location	Run Number	Particulate Matter Concentration gr/dscf	Particulate Matter Concentration mg/dscm	Particulate Matter Mass Rate lb/hr	Particulate Matter Mass Rate kg/hr	Polonium-210 Concentration pCi/dscf	Polonium-210 Concentration pCi/dscm	Polonium-210 Emission Rate uCi/hr	Lead-210 Concentration pCi/dscf	Lead-210 Concentration pCi/dscm	Lead-210 Emission Rate uCi/hr
Inlet	1	0.2106	482	213	96.5	NA	NA	NA	NA	NA	NA
	2	0.2530	579	228	103	693	24484	4370	256	9051	1615
	3	0.2556	585	224	102	594	20977	3644	159	5629	978
	4	0.2714	621	237	107	678	23959	4142	204	7212	1247
	Average Runs 2-4	0.2600	595	230	104	655	23140	4052	207	7297	1280
Outlet[a]	2[b]	0.01249	28.6	11.5	5.20	35.4	1250	227	7.7	273	49.6
	3	0.01129	25.8	10.1	4.58	21.3	751	133	5.3	187	33.1
	4	0.01206[c]	27.6[c]	10.9[c]	4.93[c]	24.4	862	155	6.1	216	39.0
	Average Runs 2-4	0.01195	27.3	10.8	4.90	27.0	954	172	6.4	225	40.6
	Annual Emissions	44.9 tons/yr				1.43 Ci/yr			0.338 Ci/yr		

[a]Outlet concentration values for each run are the averages of the four outlet locations, and the mass rate values are the sum of the four outlet locations.

[b]Outlet D values were not used due to nonisokinetic sampling, run 5 outlet D values were used to calculate average results for run 2.

[c]Outlet D PM results for run 4 not included in average because of suspected contamination.

[d]Annual Emissions - Calculated based upon typical production and maximum expected hours of operation of 8,322 hr/yr.

NA = Not analyzed.

The Po-210 and Pb-210 concentrations in the inlet flue gas stream averaged 23,140 and 7,297 pCi/dscm (655 and 207 pCi/dscf), respectively, for the three valid test runs (see footnotes b and c in Table 1-2). The concentration of Po-210 and Pb-210 in the outlet streams averaged 954 and 225 pCi/dscm (27 and 6.4 pCi/dscf), respectively. On an emission rate basis, Po-210 and Pb-210 emissions at the inlet averaged 4,050 and 1,280 uCi/hr, and at the outlet, 172 and 41 uCi/hr, respectively.

1.2.2 Particle Size Distribution

Particle size analysis quantifies the particle mass in a given size range. The mass collected on each stage are presented for each run in Tables 1-4 and 1-5 for the venturi inlet and outlet, respectively.

The particle size results are presented in two ways in this report. The first is a plot of the cumulative mass fraction versus the interval endpoint (Dp_{50}) as shown in Figure 1-1. Dp_{50} represents the effective stage cut diameter calculated for the specified sampling run. Ideally, each impactor stage collects all particles having an aerodynamic diameter greater than the stage cut diameter (Dp_{50}). In reality, the effective stage cut diameter (Dp_{50}) is assumed to be equal to the particle diameter for which the stage collection efficiency is 50 percent. The stage cut diameter is calculated from the sampling run conditions, the physical dimensions of the impactor, and a theoretical calibration value (Stokes number). This curve is used to estimate the fraction of the particulate less than a specific particle diameter.

For the inlet location, 50 percent of the particulate mass is composed of particles that are less than 0.5 microns in diameter. For the outlet locations, 50 percent of the particulate mass comprises particles that are less than about 0.3 microns in diameter. The particulate mass at the inlet consists of approximately 99 percent PM_{10} (i.e., particulate matter less than 10 microns in diameter). At the outlet, PM_{10} accounts for about 97.6 percent of the particulate mass. Considering the precision of the measurements methods, the mass fraction of PM_{10} at the inlet and outlet is considered equivalent.

TABLE 1-4. VENTURI INLET PARTICLE SIZING - MASS COLLECTED PER STAGE, CALCINER OFFGASES, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Stage	Mass collected per stage (grams)		
	Run 1	Run 2	Run 3
1[a]	0.00041	0.00030	0.00042
2	0.00040	0.00038	0.00004
3	0.00074	0.00053	0.00004
4	0.00043	0.00074	0.00021
5	0.00147	0.00253	0.00016
6	0.00596	0.01024	0.00063
7	0.00970	0.01377	0.00245
8	0.01719	0.01925	0.00417
Back-up	0.01302	0.01580	0.01145
Total	0.04932	0.06354	0.01957

[a]Stage 1 includes the pre-impactor stage.

TABLE 1-5. VENTURI OUTLET PARTICLE SIZING - MASS COLLECTED PER STAGE, CALCINER OFFGASES, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Mass collected per stage (grams)											
	Outlet A			Outlet B			Outlet C			Outlet D		
Stage	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
1[a]	0.00031	0.00032	0.00150	0.00067	0.00065	0.00155	0.00027	0.00021	0.00046	0.00000	0.00069	0.00048
2	0.00000	0.00014	0.00017	0.00000	0.00025	0.00031	0.00017	0.00005	0.00036	0.00000	0.00020	0.00016
3	0.00000	0.00029	0.00009	0.00000	0.00047	0.00047	0.00018	0.00022	0.00042	0.00000	0.00027	0.00030
4	0.00000	0.00030	0.00035	0.00000	0.00056	0.00040	0.00017	0.00007	0.00044	0.00000	0.00031	0.00024
5	0.00021	0.00033	0.00132	0.00006	0.00093	0.00121	0.00011	0.00000	0.00070	0.00000	0.00051	0.00045
6	0.00137	0.00215	0.00327	0.00038	0.00268	0.00554	0.00053	0.00037	0.00395	0.00192	0.00191	0.00188
7	0.00152	0.00228	0.00356	0.00204	0.00335	0.00488	0.00176	0.00108	0.00600	0.00169	0.00320	0.00334
8	0.00170	0.00283	0.00414	0.00247	0.00456	0.00599	0.00264	0.00173	0.00778	0.00264	0.00433	0.00491
Back-up	0.00910	0.01466	0.01227	0.00794	0.01453	0.08875	0.01000	0.00675	0.01117	0.00737	0.01159	0.01272
Total	0.01421	0.02330	0.02667	0.01356	0.02798	0.10910	0.01583	0.01048	0.03128	0.01362	0.02301	0.02448

[a]Stage 1 includes the pre-impactor stage.

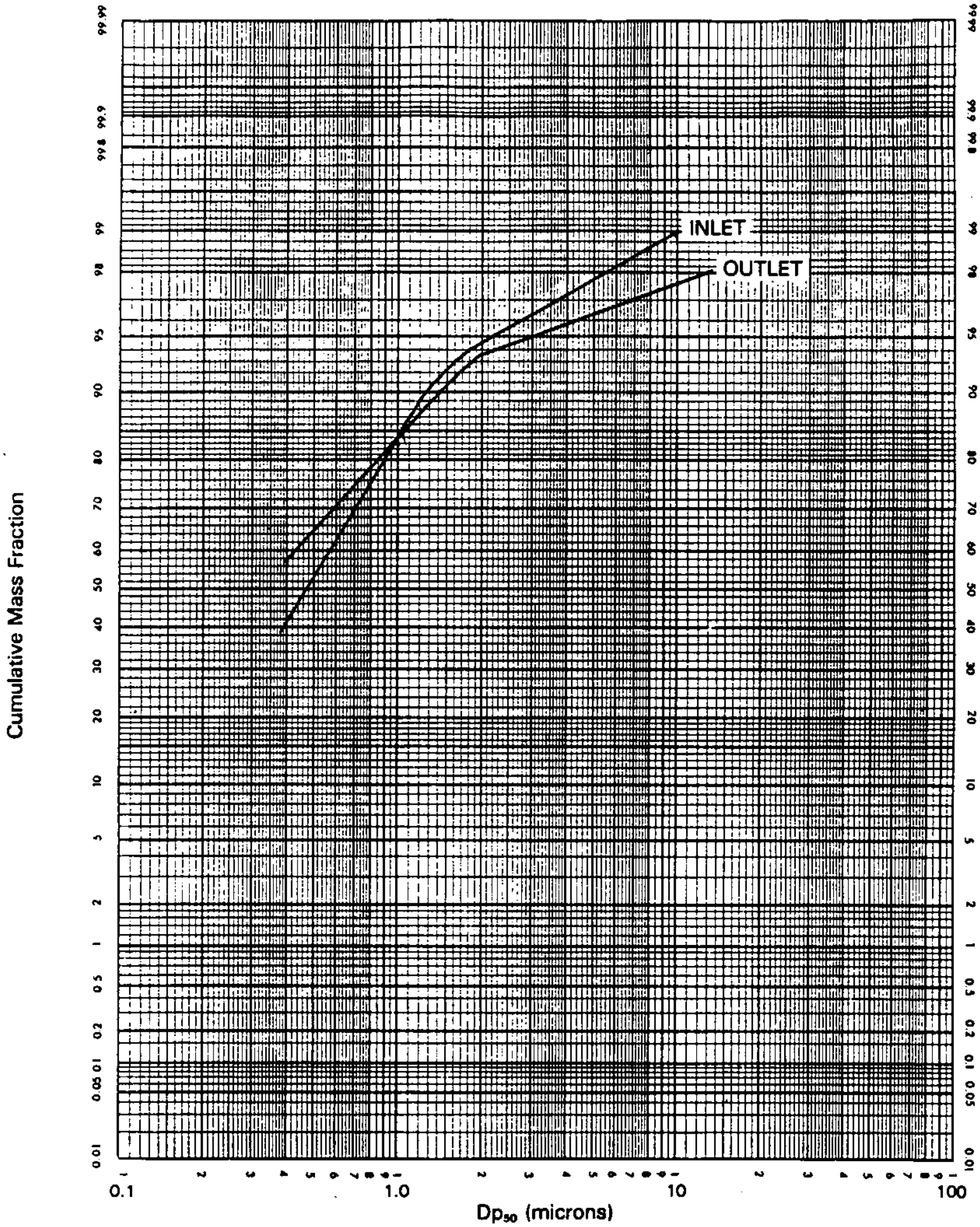

Figure 1-1. Composite curves of cumulative mass fraction as a function of particle size.
Probability-Log plot.
Monsanto, Soda Springs, Idaho.

The second presentation method is to plot differential mass concentration versus the particle geometric mean diameter as shown in Figure 1-2. The differential mass concentration is the particulate concentration in the flue gas normalized per unit of particle size. This curve is used to estimate the particulate concentration in the flue gas for a specific particle diameter. The majority of particulate matter at both the inlet and outlet locations is distributed in the less than 1 micron range with evidence of bimodal distributions. The figure also provides an indication of venturi scrubber removal efficiency by particle size fraction. The data used to prepare these curves are presented in Tables 1-6 and 1-7.

Radionuclide activity was measured for the samples collected from the inlet and outlet C. For each test run, stages 2 through 5 were combined into one sample for analysis. Stages 1, 6, 7, 8 and the backup filter were each analyzed individually. The results are summaries as pico Curies per sample in Table 1-8.

In order to present an overall summary of the radionuclide data, the cumulative activity fraction was plotted against the interval endpoint (Dp_{50}) determined from the PSD run. The cumulative activity fraction is plotted in Figure 1-3 for polonium-210 and in Figure 1-4 for lead-210. The data plotted in these figures is summarized in Table 1-9. Figures 1-3 and 1-4 represent a composite of the data consolidated from individual PSD test runs.

These data indicate that the radioactivity is associated with small particles. Particles less than 1 micron contained 90 percent of the radioactivity for both Po-210 and Pb-210. Particles less than 0.5 micron contained 60 to 70 percent of the radioactivity.

1.3 TEST REPORT ORGANIZATION

This emission test report is presented in ~~three~~ two volumes. Information presented in this document (Volume I) is organized as follows: Section 2.0 contains a brief description of the calcining process and the air pollution control systems at the plant; Section 3.0 presents a summary and discussion of the results; Section 4.0 describes the specific sampling locations and

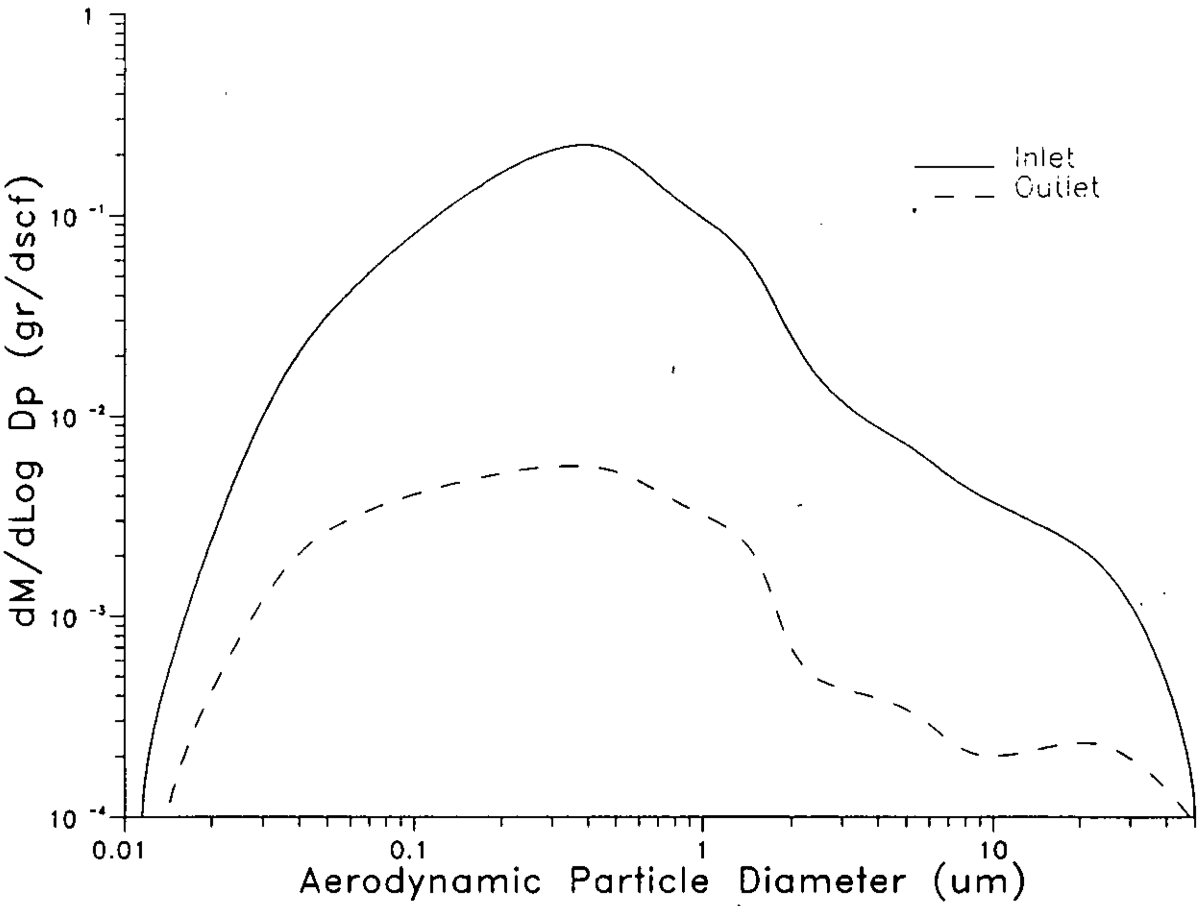

Figure 1-2. Composite curves of differential mass concentration as a function of particle size. Calciner offgases. Monsanto, Soda Springs, Idaho.

TABLE 1-6. CONSOLIDATED CUMULATIVE MASS FRACTION RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Interval[a] Endpoint Dp_{50} (microns)	Mass fraction less than (%)	
	Inlet	Outlet
0.5	55	64
1	83	84
2.5	96	94
5	98	96.5
10	98.9	97.5

[a] Dp_{50} = the theoretical stage endpoint (interval endpoint) is the aerodynamic diameter of the smallest particles collected on a stage with an efficiency of 50 percent.

TABLE 1-7. CONSOLIDATED DIFFERENTIAL MASS CONCENTRATION RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Geometric Midpoint (microns)	Interval Range (microns)	Differential Mass Concentration (gr/dscf/interval)	
		Inlet	Outlet
0.5	0.4 - 0.6	0.200	0.005
1	0.6 - 1.7	0.100	0.003
2.5	1.7 - 3.0	0.015	0.0006
5	3.0 - 6.5	0.006	0.0003
10	6.5 - 50	0.004	0.0002

TABLE 1-8. SUMMARY OF PSD-RADIONUCLIDE RESULTS AT THE INLET AND OUTLET C, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Radioactivity (pico Curies per sample)[a]					
	Run 1		Run 2		Run 3	
Stage	Po-210	Pb-210	Po-210	Pb-210	Po-210	Pb-210
Inlet						
1	1.2089E+01	ND[b] [1.2284E+00]	1.7832E+01	4.6583E+00	8.8912E+00	ND
2-5	1.0907E+02	2.3146E+01	1.1942E+02	4.1654E+01	4.5394E+01	1.0126E+01
6	1.4688E+02	5.4986E+01	2.3206E+02	8.2314E+01	4.2332E+01	9.1078E+00
7	4.1752E+02	1.5248E+02	4.1396E+02	2.4539E+00	1.4775E+02	3.3080E+01
8	8.2206E+02	2.9061E+02	8.4784E+02	3.1207E+02	2.9479E+02	6.4943E+01
Back-up	7.8091E+02	2.2684E+02	8.8097E+02	2.8405E+02	8.0629E+02	1.2710E+02
Total	2.2885E+03	7.4929E+02	2.5121E+03	7.2720E+02	1.3454E+03	2.4436E+02
Outlet C						
1	3.4873E+00	ND [9.4110E-01]	3.8732E+00	ND	1.1181E+01	2.9967E+00
2-5	2.6530E+01	0.0000E+00	1.7920E+01	4.4086E+00	8.1826E+01	1.5440E+01
6	2.6630E+01	9.6510E+00	2.6446E+01	7.5207E+00	1.1456E+02	3.9859E+01
7	7.0923E+01	1.8104E+01	5.3508E+01	1.7671E+01	2.0381E+02	7.9302E+01
8	5.2845E+01	1.7854E+02	1.1692E+02	3.0524E+01	4.0921E+02	1.2205E+02
Back-up	5.6920E+02	1.0075E+02	3.9526E+02	7.6876E+01	6.0003E+02	1.6909E+02
Total	7.4962E+02	3.0799E+02	6.1393E+02	1.3700E+02	1.4206E+03	4.2874E+02

[a]The data should be considered significant to three figures.

[b]ND = Not detected. Value in brackets is the minimum detection limit. When no value is presented in brackets, the minimum detection limit was essentially zero.

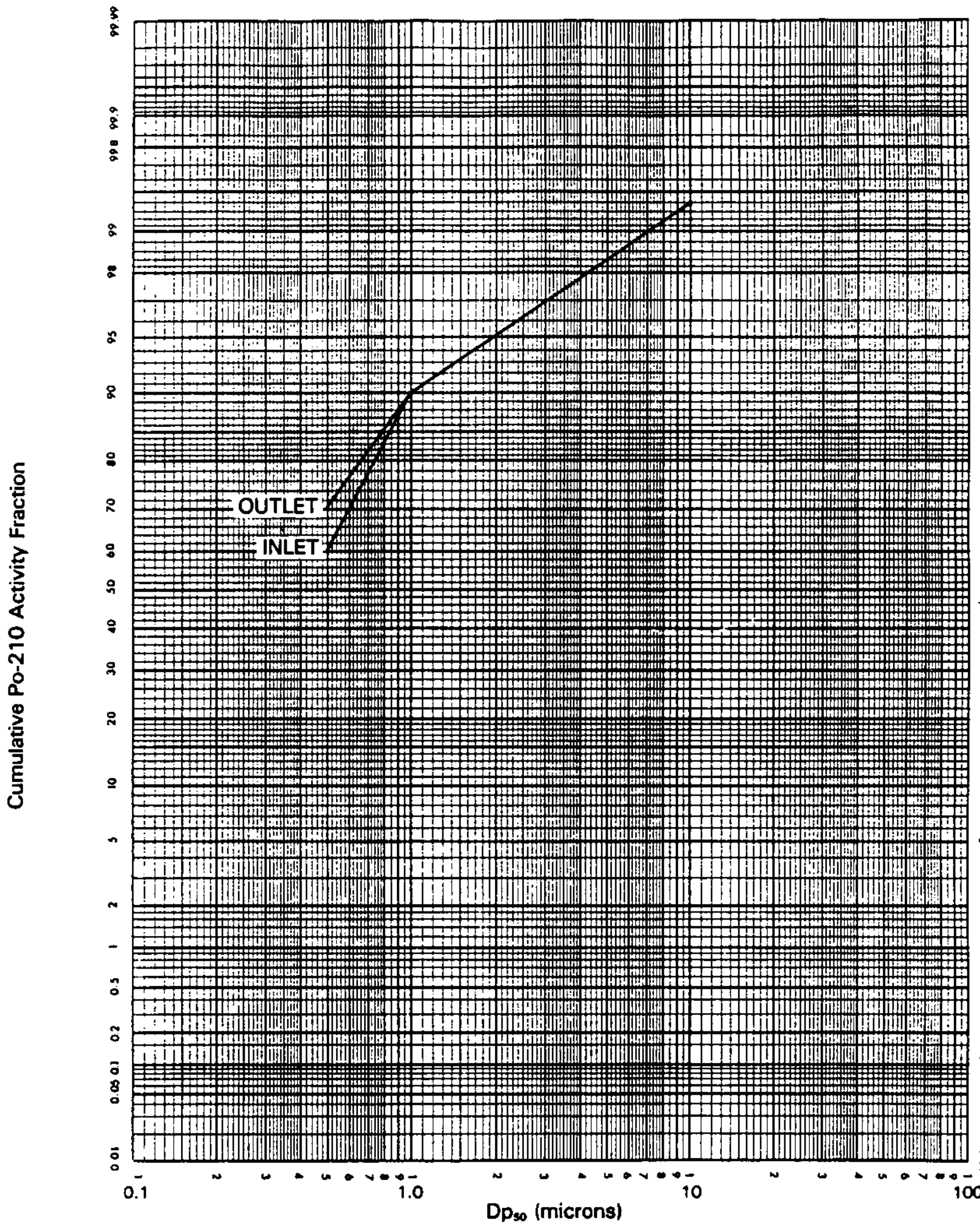

Figure 1-3. Composite curves of cumulative Polonium-210 activity fraction as a function of particle size.
Probability-Log plot.
Monsanto, Soda Springs, Idaho.

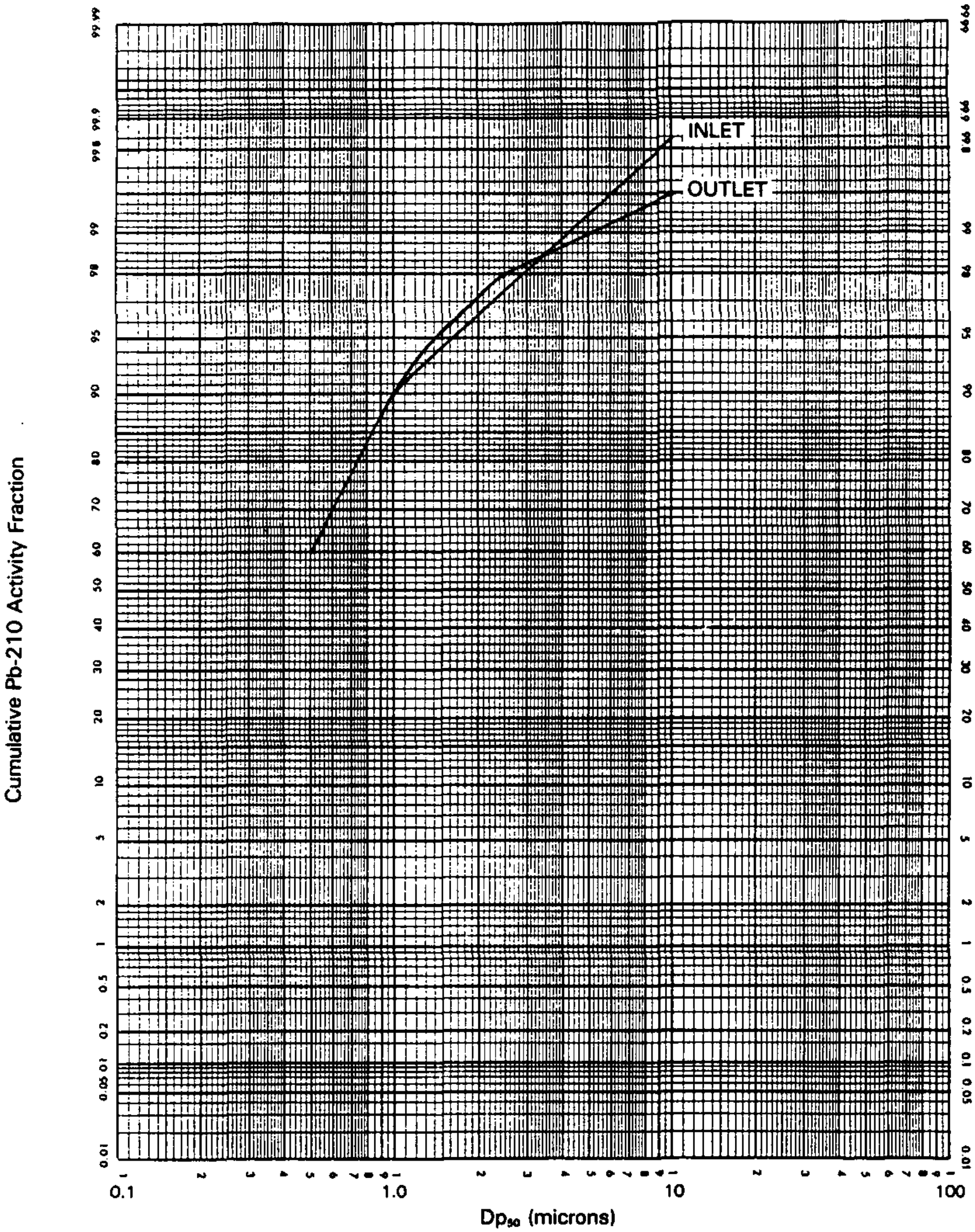

Figure 1-4. Composite curves of cumulative Lead-210 activity fraction as a function of particle size. Probability-Log plot. Monsanto, Soda Springs, Idaho.

TABLE 1-9. CONSOLIDATED[a] CUMULATIVE ACTIVITY FRACTION RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Interval Endpoint Dp_{50}[b] (microns)	Activity Fraction Less than (%)			
	Po-210		Pb-210	
	Inlet	Outlet C	Inlet	Outlet C
0.5	60	70	60	60
1	90	90	90	90
2.5	96	96	97	98.0
5	98.5	98.5	99.3	99.0
10	99.4	99.4	99.85	99.5

[a]Developed from all valid particle size samples collected and analyzed for Po-210 and Pb-210, then, plotted in Figures 1-3 and 1-4.

[b]Selected particle sizes.

the sampling and analysis procedures that were used; and Section 5.0 describes the specific quality assurance and quality control measures that were taken to ensure useful and valid data.

The supporting data for the results presented in this volume are included as appendices. ~~The appendices are presented in two volumes.~~ Volume II contains sampling and analytical protocols, all field and lab data sheets, data reduction summaries, ~~and~~ calibration data, and ~~Volume III contains confidential~~ process data gathered during the emission testing program.

2.0 DESCRIPTION OF PROCESS AND AIR POLLUTION CONTROL SYSTEMS

2.1 PROCESS DESCRIPTION

The Monsanto, Soda Springs, Idaho, plant produces elemental phosphorus from phosphate ore. Phosphate rock is continuously fed to a large rotary kiln calciner where the rock is heated for the purpose of removing organic material and forming heat hardened nodules. The phosphate rock nodules produced by the calcining process are subsequently cooled, crushed, and blended with coke and silica and fed into an electric reducing furnace. High temperature reactions in the reducing furnace drive off gaseous phosphorus and carbon monoxide and leave molten residues of slag and ferrophosphorus. The offgases from the reducing furnace pass through electrostatic precipitators for dust removal before entering a condenser, where the phosphorus is condensed and collected. The carbon monoxide generated from the phosphorus reduction process is vented from the reducing furnace to the rotary kiln where it is used as fuel.

The emission test program described in this document focused on the offgases from the calcining process. Figure 2-1 contains a simple process flow schematic showing feed and offgas streams around the rotary kiln and related air pollution control equipment.

2.2 AIR POLLUTION CONTROL EQUIPMENT (CALCINING OPERATION)

The offgases from the kiln are vented to a settling chamber and a spray tower and then split into four parallel streams each containing a venturi scrubber, dual cyclone demisters and an induction (ID) fan. After passing through their respective ID fans, the exhaust gases are discharged to the atmosphere through four similar 27 m (90 ft) tall stacks.

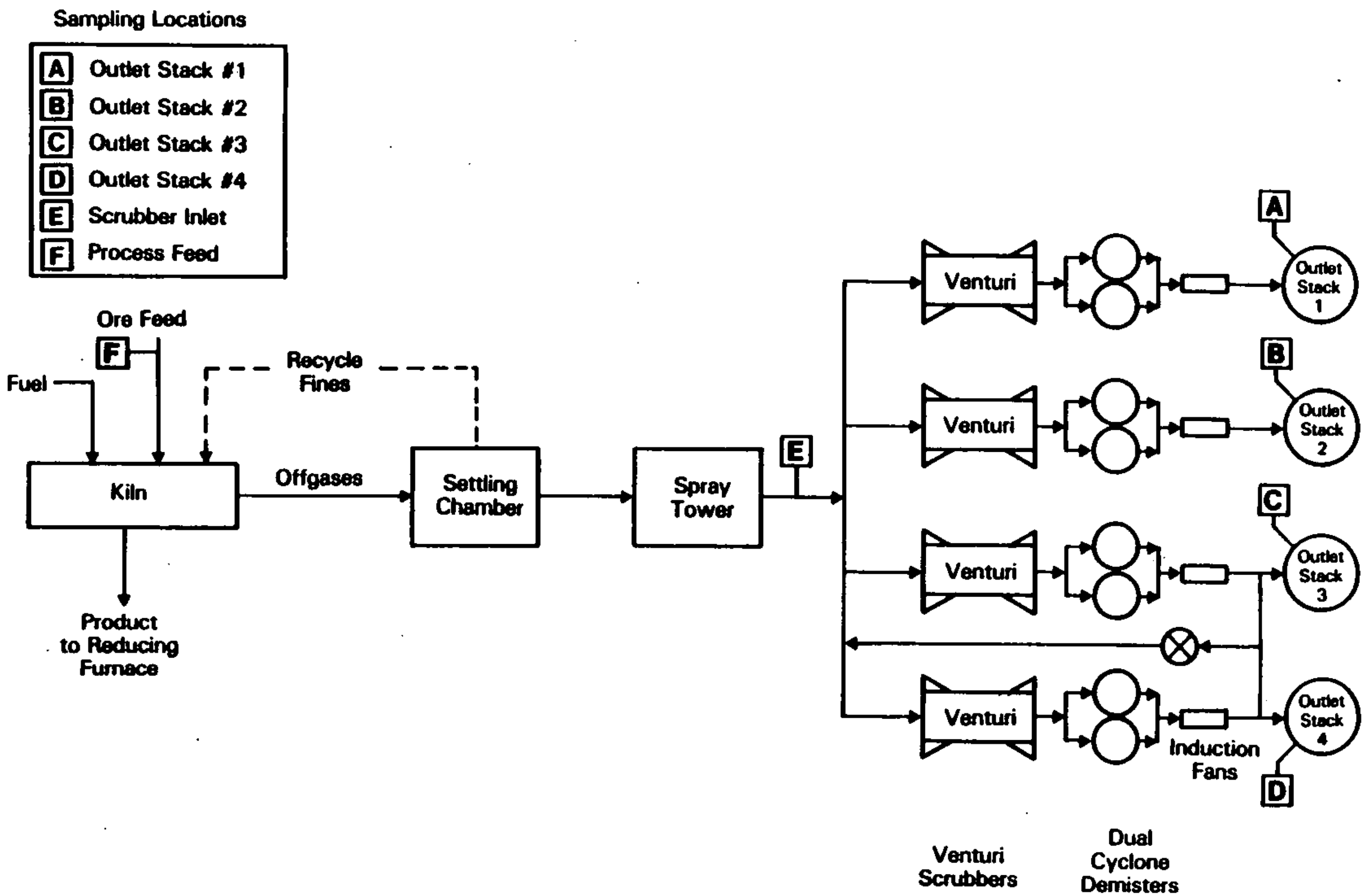

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Figure 2-1. Schematic of Monsanto Rotary Kiln and Pollution Control System

2.3 PROCESS AND POLLUTION CONTROL DATA

The radionuclide emission test program at Monsanto was performed while process and pollution control systems were operated at "normal" operating conditions. Normal operational ranges for each parameter were established by EPA's Industrial Studies Branch (ISB) and Monsanto personnel prior to testing based on historical plant data and full production capacity. Key parameters were monitored throughout the testing period by both Monsanto's automated data acquisition system and by manual readings. During testing periods, Radian personnel periodically monitored these data from the plant's control room to ensure the sample collection activities occurred at the correct process/control device conditions. The key process parameters that were monitored are reported in Volume II - Appendix N because they are considered confidential by Monsanto. The following is a listing of the process parameters recorded:

- Kiln speed
- Bed depth
- Ore feed rate
- Primary air flow
- Carbon monoxide feed rate
- Coal feed rate
- Kiln offgas temperature
- Dust chamber gas temperature
- Spray tower pH
- Venturi P (per scrubber train)
- Venturi fan amperage (per scrubber train)
- Venturi liquid flow rate (per scrubber train)

3.0 SUMMARY AND DISCUSSION OF RESULTS

The results of the August 1988 test program conducted at the Monsanto facility are presented in this section. The particulate matter data presented are adjusted for blanks. However, radionuclide data presented are not blank corrected. Field blanks were collected on both inlet and outlet MM 111 trains and the results are presented and discussed in Section 5.0 of this document. For reference purposes, the radionuclide activities in the field blank collected at the inlet location were less than 1 percent of the average activities of the samples collected at that location (0.7% for Po-210, 0.1% for Pb-210). At the outlet, the field blank activities for Po-210 and Pb-210 were approximately 3.4 percent and 2.7 percent, respectively, of the average outlet sample activities.

Dual units (metric and English) are presented in each table where applicable. The supporting data for the results are included in the appendices (Volume II) of this report.

3.1 PARTICULATE MATTER AND RADIONUCLIDE RESULTS

Particulate matter and associated radionuclide emissions were collected simultaneously at each of the inlet/outlet offgas sampling locations using a modification of EPA Method 111. An overview of results from the four inlet/outlet test runs is presented in Table 3-1. Specific sampling measurements from each individual test run are presented in Tables 3-2 through 3-5 for runs 1 through 4, respectively. As mentioned in Section 1.0 of this document, slight deviations from the planned test matrix were made to compensate for sampling difficulties encountered during the first and second day of testing. Sampling difficulties during the first day of testing included unacceptable leak rates at the inlet location and non-isokinetic sampling at two of the five sampling locations. The specific problem on the second test day was nonisokinetic sampling at one of the four outlet locations (outlet D). To compensate for these difficulties, a fourth

TABLE 3-1. SUMMARY OF PARTICULATE MATTER AND RADIONUCLIDE EMISSION RESULTS, CALCINER OFFGASES, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Location	Run Number	Particulate Matter: Concentration gr/dscf	Particulate Matter: Concentration mg/dscm	Particulate Matter: Mass Rate lb/hr	Particulate Matter: Mass Rate kg/hr	Polonium-210: Concentration pCi/dscf	Polonium-210: Concentration pCi/dscm	Polonium-210: Emission Rate uCi/hr	Lead-210: Concentration pCi/dscf	Lead-210: Concentration pCi/dscm	Lead-210: Emission Rate uCi/hr
Inlet	1	0.2106	482	213	96.5	NA	NA	NA	NA	NA	NA
	2	0.2530	579	228	103	693	24484	4370	256	9051	1615
	3	0.2556	585	224	102	594	20977	3644	159	5629	978
	4	0.2714	621	237	107	678	23959	4142	204	7212	1247
	Average Runs 2-4	0.2600	595	230	104	655	23140	4052	207	7297	1280
Outlet[a]	1	0.01053	24.1	7.6	3.45	NA	NA	NA	NA	NA	NA
	2[b]	0.01249	28.6	11.5	5.20	35.4	1250	227	7.7	273	49.6
	3	0.01129	25.8	10.1	4.58	21.3	751	133	5.3	187	33.1
	4	0.01206[c]	27.6[c]	10.9[c]	4.93[c]	24.4	862	155	6.1	216	39.0
	Average Runs 2-4	0.01195	27.3	10.8	4.90	27.0	954	172	6.4	225	40.6

[a] Outlet concentration values for each run are the averages of the four outlet locations, and the mass rate values are the sum of the four outlet locations.

[b] Outlet D values were not used due to nonisokinetic sampling, run 5 outlet D values were used to calculate average results for run 2.

[c] Outlet D PM results for run 4 not included in average because of suspected contamination.

NA = Not analyzed.

TABLE 3-2. SUMMARY OF RUN 1 METHOD 111 RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Inlet	Outlet A	Outlet B	Outlet C	Outlet D	Average Outlet A-D
Sampling Parameters						
Volume gas sampled (dscf)	29.31	34.37	33.92	34.51	35.64	-
Volume gas sampled (dscm)	0.8300	0.9730	0.9610	0.9770	1.009	-
Stack gas flowrate (dscfm)	31299	27156	26639	27126	26258	26795
Stack gas flowrate (dscmm)	886.4	769.1	754.4	768.2	743.6	758.8
Stack temperature (F)	160.8	157.8	158.5	156.8	159.3	158.1
Stack temperature (C)	71.55	69.91	70.28	69.31	70.69	70.05
Percent Moisture (% vol)	33.53	38.09	38.26	38.66	39.41	38.61
Percent Isokinetic (%)	78.6	104.5	105.1	105.0	112.0	-
Particulate Emission Results						
Particulate concentration (gr/dscf)	0.2106	0.01064	0.009050	0.006930	0.006490	0.008278
Particulate concentration (mg/dscm)	481.8	24.35	20.72	15.86	14.86	18.95
Particulate rate (lbs/hr)	56.49	2.477	2.066	1.611	1.461	1.904
Particulate rate (kg/hr)	25.62	1.123	0.9373	0.7309	0.6625	0.8635
Radionuclide Emission Results						
Polonium-210						
(pCi/dscf)						
(pCi/dscm)						
(uCi/hr)						
(pCi/g particulate)						
Lead-210		[Not Analyzed]				
(pCi/dscf)						
(pCi/dscm)						
(uCi/hr)						
(pCi/g particulate)						

TABLE 3-3. SUMMARY OF RUN 2 MODIFIED METHOD 111 RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Inlet	Outlet A	Outlet B	Outlet C	Outlet D Run 5	Average Outlet A-C, and D Run 5
Sampling Parameters						
Volume gas sampled (dscf)	32.57	32.77	30.72	32.23	32.80	-
Volume gas sampled (dscm)	0.9220	0.9280	0.8700	0.9130	0.9290	-
Stack gas flow rate (dscfm)	105051	27581	26237	26113	27047	26744
Stack gas flow rate (dscmm)	2975	781.1	743.0	739.5	766.0	757.4
Stack temperature (F)	161.2	161.2	158.5	155.9	160.7	159.1
Stack temperature (C)	71.78	71.76	70.28	68.84	71.48	70.59
Percent Moisture (% vol)	40.66	37.70	38.48	38.38	39.76	38.58
Percent Isokinetic (%)	97.9	97.3	96.6	101.9	100.1	-
Particulate Emission Results						
Particulate concentration (gr/dscf)	0.2530	0.0102	0.0127	0.0116	0.0155	0.0125
Particulate concentration (mg/dscm)	578.78	23.38	29.08	26.51	35.42	28.60
Particulate rate (lbs/hr)	227.76	2.416	2.858	2.594	3.589	2.864
Particulate rate (kg/hr)	103.31	1.096	1.296	1.177	1.628	1.299
Radionuclide Emission Results[a]						
Polonium-210						
(pCi/dscf)	693.3	22.19	44.53	15.84	59.00	35.39
(pCi/dscm)	24484	783.6	1572.6	559.4	2083	1250
(uCi/hr)	4370	36.72	70.10	24.82	95.74	56.85
(pCi/g particulate)	42302	33517	54077	21101	58822	41879
Lead-210						
(pCi/dscf)	256.3	6.602	8.881[b]	4.754	10.64	7.719
(pCi/dscm)	9051.1	233.1	313.6[b]	167.9	375.7	272.6
(uCi/hr)	1615.5	10.93	13.98[b]	7.448	17.26	12.40
(pCi/g particulate)	15638	9972	10785[b]	6333	10607	9424

[a]All radionuclide data significant to 3 places.

[b]Lead-210 was not detected in the back half fraction.

TABLE 3-4. SUMMARY OF RUN 3 MODIFIED METHOD 111 RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Inlet	Outlet A	Outlet B	Outlet C	Outlet D	Average Outlet A-D
Sampling Parameters						
Volume gas sampled (dscf)	31.17	29.15	31.73	31.56	33.11	-
Volume gas sampled (dscm)	0.8830	0.8260	0.8990	0.8940	0.9380	-
Stack gas flow rate (dscfm)	102240	24864	26323	26776	26417	26095
Stack gas flow rate (dscmm)	2895	704.1	745.5	758.3	748.1	739.0
Stack temperature (F)	161.7	158.0	158.4	157.1	159.8	158.3
Stack temperature (C)	72.06	70.00	70.23	69.49	71.02	70.18
Percent Moisture (% vol)	41.00	38.61	39.67	39.18	39.77	39.31
Percent Isokinetic (%)	96.3	96.0	99.5	97.3	103.5	-
Particulate Emission Results						
Particulate concentration (gr/dscf)	0.2556	0.01175	0.01342	0.01115	0.00886	0.01130
Particulate concentration (mg/dscm)	584.9	26.89	30.71	25.51	20.26	25.84
Particulate rate (lbs/hr)	224.0	2.504	3.028	2.559	2.006	2.524
Particulate rate (kg/hr)	101.6	1.136	1.373	1.161	0.910	1.145
Radionuclide Emission Results[a]						
Polonium-210						
(pCi/dscf)	594.0	13.79	22.87	21.37	26.45	21.12
(pCi/dscm)	20977	487.0	807.6	754.7	934.1	745.8
(uCi/hr)	3644	20.57	36.12	34.33	41.92	33.24
(pCi/g particulate)	35864	18110	26299	29583	46104	30024
Lead-210						
(pCi/dscf)	159.4[b]	4.249[c]	5.731[d]	5.188	6.009[e]	5.294
(pCi/dscm)	5629[b]	150.1[c]	202.4[d]	183.2	212.2[e]	187.0
(uCi/hr)	977.8[b]	6.339[c]	9.051[d]	8.335	9.524[e]	8.312
(pCi/g particulate)	9624[b]	5580[c]	6590[d]	7182	10474[e]	7457

[a] All radionuclide data significant to 3 places.

[b] Lead-210 was not detected in the back half fraction. The minimum detection limit for the Inlet-Run 3 back hald sample was 0.297 pCi/dscf.

[c] Lead-210 was not detected in the back half fraction. The minimum detection limit for the Outlet A-Run 3 back halfsample was 0.979 pCi/dscf.

[d] Lead-210 was not detected in the back half fraction. The minimum detection limit for the Outlet B-Run 3 back half sample was 0.0493 pCi/dscf.

[e] Lead-210 was not detected in the back half fraction. The minimum detection limit for the Outlet D-Run 3 back half sample was 0.0060 pCi/dscf.

TABLE 3-5. SUMMARY OF RUN 4 MODIFIED METHOD 111 RESULTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Inlet	Outlet A	Outlet B	Outlet C	Outlet D	Average Outlet A-D
Sampling Parameters						
Volume gas sampled (dscf)	31.60	30.02	31.32	31.69	33.19	-
Volume gas sampled (dscm)	0.8950	0.8500	0.8870	0.8980	0.9400	-
Stack gas flow rate (dscfm)	101759	25883	26466	26647	27106	26526
Stack gas flow rate (dscmm)	2882	733.0	749.5	754.7	767.6	751.2
Stack temperature (F)	161.1	161.1	158.3	157.0	159.6	159.0
Stack temperature (C)	71.74	71.71	70.18	69.44	70.88	70.55
Percent Moisture (% vol)	42.62	37.93	39.12	38.91	39.27	38.81
Percent Isokinetic (%)	98.1	95.0	97.7	98.2	101.1	-
Particulate Emission Results						
Particulate concentration (gr/dscf)	0.2714	0.01383	0.01153	0.01081	0.03953	0.01206[a]
Particulate concentration (mg/dscm)	621.1	31.64	26.38	24.73	90.44	27.58[a]
Particulate rate (lbs/hr)	236.7	3.068	2.616	2.469	9.184	2.718[a]
Particulate rate (kg/hr)	107.4	1.392	1.186	1.120	4.166	1.233[a]
Radionuclide Emission Results[a]						
Polonium-210						
(pCi/dscf)	678.4	22.33	27.59	23.84	23.87	24.41
(pCi/dscm)	23959	788.6	974.3	841.9	843.0	861.9
(uCi/hr)	4142	34.68	43.81	38.12	38.82	38.86
(pCi/g particulate)	38578	24923	36934	34044	9321	31967[a]
Lead-210						
(pCi/dscf)	204.2[c,d]	5.580	7.436	4.949	6.528[c,e]	6.123
(pCi/dscm)	7212[c,d]	197.1	262.6	174.8	230.5[c,e]	216.2
(uCi/hr)	1247[c,d]	8.666	11.81	7.913	10.62[c,e]	9.751
(pCi/g particulate)	11613[c,d]	6228	9954	7067	2549[c,e]	7750[a]

[a]All radionuclide data significant to 3 places.

[b]Average values do not include Outlet D results because of suspected PM contamination. If Outlet D results are included, the average PM concentration is 0.01893 gr/dscf (43.30 mg/dscm), average mass rate is 4.334 lb/hr (1.966 lb/hr) per stack, average Po-210 activity to PM ratio is 26305 and average Pb-210 activity to PM ratio is 6450.

[c]Lead-210 was not detected in the back half fraction.

[d]The minimum detection limit for the Inlet-Run 4 back half sample was 0.123 pCi/dscf.

[e]The minimum detection limit for the Outlet D-Run 4 back half sample was 0.0064 pCi/dscf.

test run was performed at each of the inlet and outlet locations to replace run 1. A fifth test run at outlet D was performed to replace run 2. The outlet D run 5 test results are included in Table 3-3.

Data from all test runs are presented in the summary tables of this report, although only those runs meeting the specified quality assurance criteria were used in calculating the average results reported.

3.1.1 Inlet

Particulate matter concentrations at the inlet to the venturi scrubber averaged 595 mg/dscm (0.26 gr/dscf) for the three valid test runs. As described in Section 2.0 of this document, the venturi scrubber inlet location is actually the midpoint of the pollution control system and, therefore, these values do not represent uncontrolled emissions.

Po-210 concentrations in flue gases at the inlet location averaged 23,100 pCi/dscm (655 pCi/dscf) for the three test runs. On an activity per gram of particulate basis, values for the three inlet runs averaged 38,900 pCi/g PM.

Pb-210 concentrations in flue gases at the inlet location averaged 7,300 pCi/dscm (207 pCi/dscf). On an activity per gram of particulate basis, values for the three inlet runs averaged 12,300 pCi/g PM.

3.1.2 Outlet

As shown in Table 3-1, particulate matter concentration at the outlet averaged 27.3 mg/dscm (0.012 gr/dscf). This average does not include the results for the outlet D stack sample for run 4. The results for this sample were excessively high and are suspected to be an outlier. The emissions measured at outlet D were approximately three times higher than those of the other stacks (see Table 3-5 for run 4). This affected the overall outlet average for run 4 which was approximately 50 percent higher than the other valid runs.

Additional evidence for this assumption is supported by examination of the raw analytical weights. For this particular test run, the probe rinse for outlet D contributed approximately 85 percent of the total particle mass collected compared to the 50 percent contribution which was the average from all other runs at the outlet locations. Further, examination of the radionuclide concentration (pCi/g PM) of the collected particulate for run 4 is approximately 3.5 times lower at outlet D than at the other outlet locations for the same test period. These evidences strongly suggest that the probe rinse particulate values were biased high, either by contamination during recovery procedures, contamination during acetone dry down activities, or possibly by accidental bumping of the nozzle against the interior stack wall during sampling. The remainder of the results were fairly evenly distributed among the stacks and were relatively constant across the runs.

Po-210 concentrations in flue gases at the outlet location averaged 954 pCi/dscm (27.0 pCi/dscf) for the three test runs. On an activity per gram of particulate basis, the average Po-210 activity for the three outlet runs was 34,600 pCi/g PM.

Pb-210 concentrations in flue gases at the outlet location averaged 225 pCi/dscm (6.38 pCi/dscf). On an activity per gram of particulate basis, Pb-210 activity averaged 8,210 pCi/g PM.

3.1.3 Venturi Scrubber Efficiencies - Method 111

Table 3-6 summarizes the incremental efficiencies of the venturi scrubber control systems for removal of particulate, Po-210, and Pb-210. Efficiencies are reported as incremental since the venturi scrubber system is located at the midpoint in the series of air pollution control equipment. Prior to entering the venturi scrubber system, emissions have already been reduced by both the settling chamber and the spray tower. Therefore, "incremental" refers to the additional removal afforded by the venturi system. As apparent from the individual values presented in the table, the average particulate matter reduction was approximately 94 percent, while the reduction for Po-210 and Pb-210 averaged 96 and 97 percent, respectively.

TABLE 3-6. VENTURI SCRUBBER REMOVAL EFFICIENCY FOR PM, Po-210, AND Pb-210, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Run No.	Parameter	Emission Concentration Inlet	Emission Concentration Outlet[a]	Removal Efficiency[b] (percent)
2	PM (gr/dscf)	0.2530	0.01249	94.97
	Po-210 (pCi/dscf)	693.3	26.21	96.15
	Pb-210 (pCi/dscf)	256.3	6.067	97.60
3	PM (gr/dscf)	0.2556	0.01129	95.49
	Po-210 (pCi/dscf)	594.0	21.26	96.35
	Pb-210 (pCi/dscf)	159.4	5.290	96.60
4	PM (gr/dscf)	0.2714	0.01906	92.68
	Po-210 (pCi/dscf)	653.8	24.41	96.11
	Pb-210 (pCi/dscf)	204.1	6.103	96.87

[a]Average outlet concentration of four stacks.

[b]Removal efficiency calculated based on mass rates at the venturi inlet and sum of mass rates at the four venturi outlet stacks.

3.1.4 Front/Back Half Distribution of Emissions in MM 111 Trains

Table 3-7 presents a summary of the distribution of emissions as collected in the MM 111 sampling trains during the Monsanto test program. As seen in the table, approximately 93 percent of the Po-210 collected was present in the front half of the train. This percentage was consistent for samples collected at both inlet and outlet locations. The distribution for Pb-210 is similar in that on average about 99 percent is collected in the front half.

Because nitric acid was used in the impingers, the back half particulate weights could not be evaluated and front/back half distributions could not be determined. However, a distribution of PM between the front half components was evaluated. As seen in the footnotes to Table 3-5, this distribution varied by the sampling location. On average, 80 percent of the PM collected at the inlet was found on the filter, while the remaining 20 percent was collected in the probe and nozzle. At the outlet, the average distribution was approximately 50 percent on the filter and 50 percent in the probe and nozzle.

3.2 PARTICLE AND RADIONUCLIDE SIZE DISTRIBUTION DATA

The PSD samples were analyzed for both particulate mass and Po-210/ Pb-210 radioactivity. For the particulate mass analyses, each of the nine individual stages were analyzed separately. For the radionuclide analyses, stages 2-5 were combined and stages 1, 6, 7, 8, and 9 were analyzed individually. The particulate and radionuclide results are discussed below.

3.2.1 Particle Size Distribution Data

The mass collected on each stage was presented previously in Tables 1-4 and 1-5. These data were presented two ways: first as a plot of cumulative mass fraction versus the particle interval endpoint (Dp_{50}) and second as a plot of differential mass concentration versus the geometric mean particle diameter. The individual data points were plotted and curves were fitted to the data to represent the characteristics of the particulate at each

TABLE 3-7. SUMMARY OF FRONT/BACK HALF DISTRIBUTION OF EMISSIONS, MM 111 SAMPLING TRAINS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Location	Parameter	Front Half	Back Half
Inlet	Particulate	100[a]	NA[b]
	Po-210	93.4	6.6
	Pb-210	99.6	0.4
Outlet	Particulate	100[c]	NA
	Po-210	92.5	7.5
	Pb-210	98.9	1.1

[a]On average, 80 percent of the particulate matter collected at the inlet was found on the filter, while the remaining 20 percent was collected in the probe and nozzle.

[b]NA = Not applicable. The addition of 0.1 N HNO_3 in the impingers prevented drying and weighing of the impinger catch.

[c]On average, 50 percent of the particulate matter collected at the outlet was found on the filter, and 50 percent was collected in the probe and nozzle.

sampling location. The data were evaluated for the following particle size intervals: 0.5, 1, 2.5, 5, and 10 microns. The representative curves were presented previously in Figures 1-1 and 1-2.

For the cumulative mass fraction results, the individual inlet data are shown in Figure 3-1 and outlet data are shown in Figure 3-2. The inlet test runs agreed well. The outlet data show that particle characteristics were similar at all four outlet locations and also formed a linear curve. The data are presented in tabular form in Tables 3-8 through 3-10.

For the differential mass concentrations, the individual inlet data pairs are plotted in Figure 3-3 and the outlet pairs are plotted in Figure 3-4. Both the inlet and outlet data formed a linear curve and agreed well. The data are presented in tabular form in Tables 3-11 through 3-13.

3.2.2 Radionuclide Distribution Data

The radioactivity collected on each stage was presented previously in Table 1-8. In order to evaluate the radionuclide data, the cumulative activity fraction was plotted against the interval endpoint (Dp_{50}) determined from the PSD data.

The polonium-210 and lead-210 data were plotted separately. The inlet and outlet polonium-210 cumulative activities are plotted in Figures 3-5 and 3-6, respectively. The data showed good agreement between runs and formed a linear curve.

The inlet and outlet lead-210 cumulative activities are plotted in Figures 3-7 and 3-8, respectively. These data also showed good agreement between runs and formed a linear curve. The inlet and outlet data are presented in tabular form in Table 3-14.

3.3 PROCESS SAMPLES

Table 3-15 presents the measured concentrations of Po-210 and Pb-210 in the feedstock samples. The average concentrations of these radionuclides in the feedstock samples were 126 and 127 pCi/g, respectively. The concentrations varied between runs by 10 percent for Po-210 and 12 percent for Pb-210, indicating a constant level of radioactivity in the feedstock.

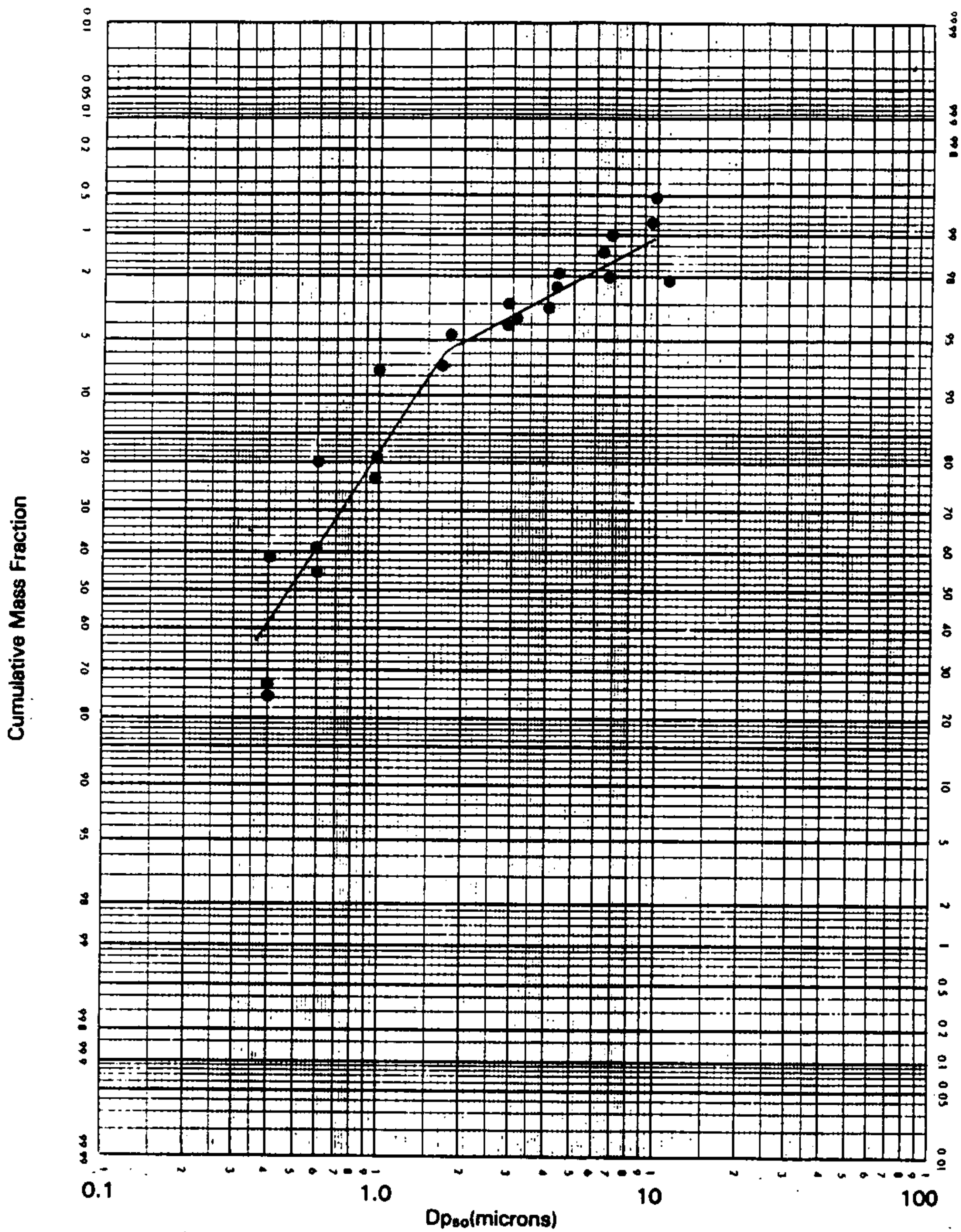

Figure 3-1. Cumulative mass fraction as a function of particle size for venturi inlet particulate matter. Probability-Log plot. Monsanto, Soda Springs, Idaho.

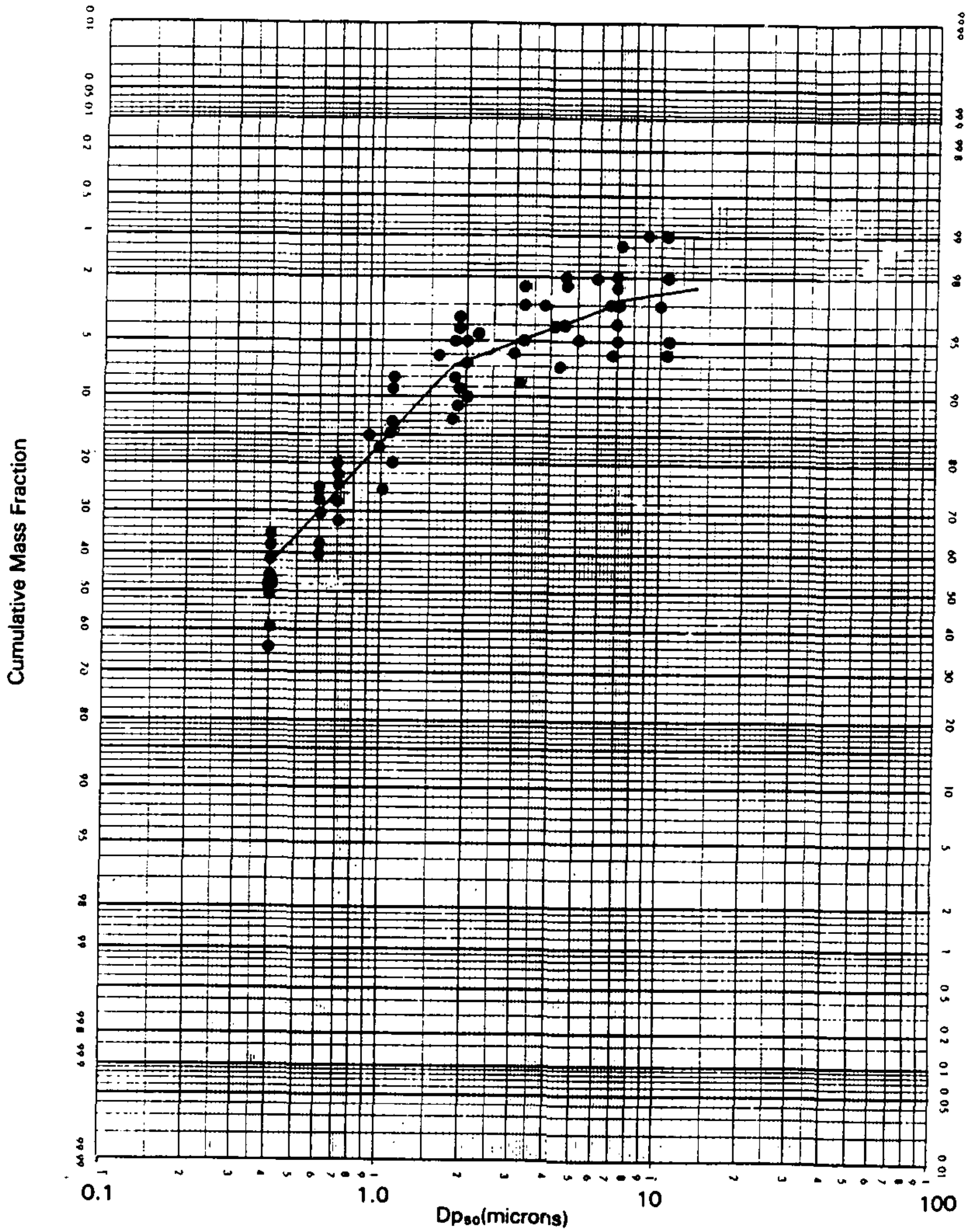

Figure 3-2. Cumulative mass fraction as a function of particle size for controlled particulate matter. Probability-Log plot. Monsanto, Soda Springs, Idaho

TABLE 3-8. INLET DATA FOR CUMULATIVE MASS FRACTION VS. PARTICLE SIZE, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Run 1		Run 2		Run 3	
Stage	Dp_{50}[a]	Mass Fraction[b] Less Than	Dp_{50}[a]	Mass Fraction[b] Less Than	Dp_{50}[a]	Mass Fraction[b] Less Than
1	9.48	0.99	9.77	1.00	10.20	0.98
2	6.19	0.98	6.38	0.99	6.66	0.98
3	4.04	0.97	4.16	0.98	4.35	0.97
4	2.85	0.96	2.94	0.97	3.07	0.96
5	1.69	0.93	1.74	0.93	1.82	0.96
6	0.96	0.81	0.99	0.77	1.03	0.92
7	0.59	0.61	0.61	0.55	0.63	0.80
8	0.37	0.26	0.38	0.25	0.40	0.59

[a] Dp_{50} = The theoretical stage endpoint (interval endpoint) is the aerodynamic diameter of the smallest particles that are collected on a stage with an efficiency of 50 percent.

[b] The cumulative mass fraction equals the mass fraction of particulate collected less than a given interval endpoint.

TABLE 3-9. OUTLET A AND OUTLET B DATA FOR CUMULATIVE MASS FRACTION VS. PARTICLE SIZE, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Stage	Outlet A - Run 1		Outlet A - Run 2		Outlet A - Run 3		Outlet B - Run 1		Outlet B - Run 2		Outlet B - Run 3	
	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]
1	10.61	0.98	8.98	0.99	10.32	0.94	10.74	0.95	10.69	0.98	10.47	0.99
2	6.93	0.98	5.86	0.98	6.74	0.94	7.01	0.95	6.98	0.97	6.84	0.98
3	4.52	0.98	3.83	0.97	4.40	0.93	4.57	0.95	4.56	0.95	4.46	0.98
4	3.19	0.98	2.70	0.95	3.11	0.92	3.23	0.95	3.22	0.93	3.15	0.97
5	1.89	0.96	1.60	0.94	1.84	0.87	1.91	0.95	1.90	0.90	1.87	0.96
6	1.07	0.87	0.91	0.85	1.04	0.75	1.08	0.92	1.08	0.80	1.06	0.91
7	0.66	0.76	0.56	0.75	0.64	0.62	0.66	0.77	0.66	0.68	0.65	0.87
8	0.41	0.64	0.35	0.63	0.40	0.46	0.41	0.59	0.42	0.52	0.41	0.81

[a] Dp_{50} = The theoretical stage endpoint (interval endpoint) is the aerodynamic diameter of the smallest particles that are collected on a stage with an efficiency of 50 percent.

[b] The cumulative mass fraction equals the mass fraction of particulate collected less than a given interval endpoint.

TABLE 3-10. OUTLET C AND OUTLET D DATA FOR CUMULATIVE MASS FRACTION VS. PARTICLE SIZE, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Stage	Outlet C - Run 1		Outlet C - Run 2		Outlet C - Run 3		Outlet D - Run 1		Outlet D - Run 2		Outlet D - Run 3	
	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]	Dp_{50}[a]	Mass Fraction Less Than[b]
1	10.60	0.98	10.43	0.98	10.35	0.99	10.35	1.00	10.00	0.97	10.48	0.98
2	6.92	0.97	6.81	0.98	6.76	0.97	6.76	1.00	6.53	0.96	6.84	0.97
3	4.52	0.96	4.44	0.95	4.41	0.96	4.41	1.00	4.26	0.95	4.46	0.96
4	3.19	0.95	3.14	0.95	3.12	0.95	3.12	1.00	3.01	0.94	3.15	0.95
5	1.89	0.94	1.86	0.95	1.84	0.92	1.84	1.00	1.78	0.91	1.87	0.93
6	1.07	0.91	1.05	0.91	1.05	0.80	1.05	0.86	1.01	0.83	1.06	0.86
7	0.65	0.80	0.65	0.81	0.64	0.61	0.64	0.73	0.62	0.69	0.65	0.72
8	0.41	0.63	0.41	0.64	0.40	0.36	0.40	0.54	0.39	0.50	0.41	0.52

[a] Dp_{50} = The theoretical stage endpoint (interval endpoint) is the aerodynamic diameter of the smallest particles that are collected on a stage with an efficiency of 50 percent.

[b] The cumulative mass fraction equals the mass fraction of particulate collected less than a given interval endpoint.

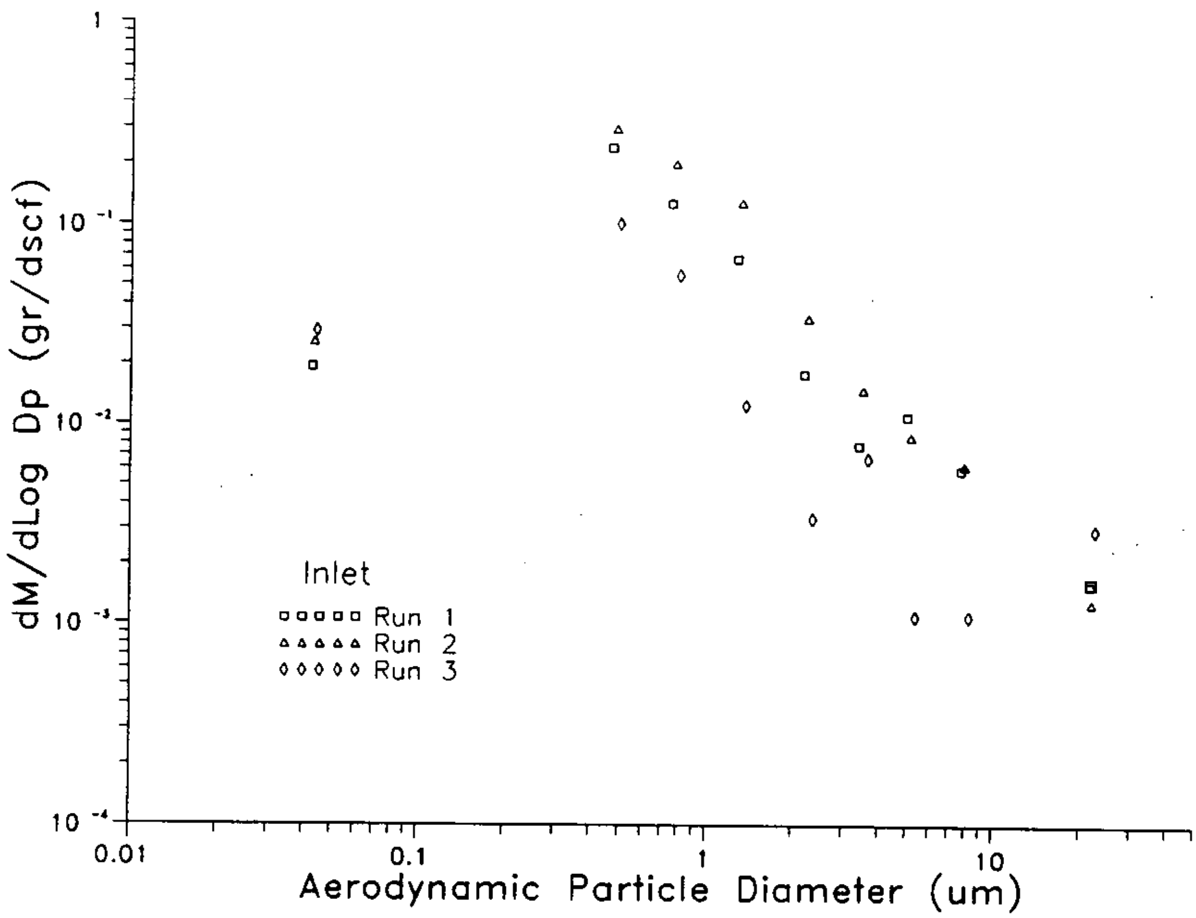

Figure 3-3. Differential mass concentration as a function of particle size for venturi inlet particulate matter. Calciner offgases. Monsanto, Soda Springs, Idaho.

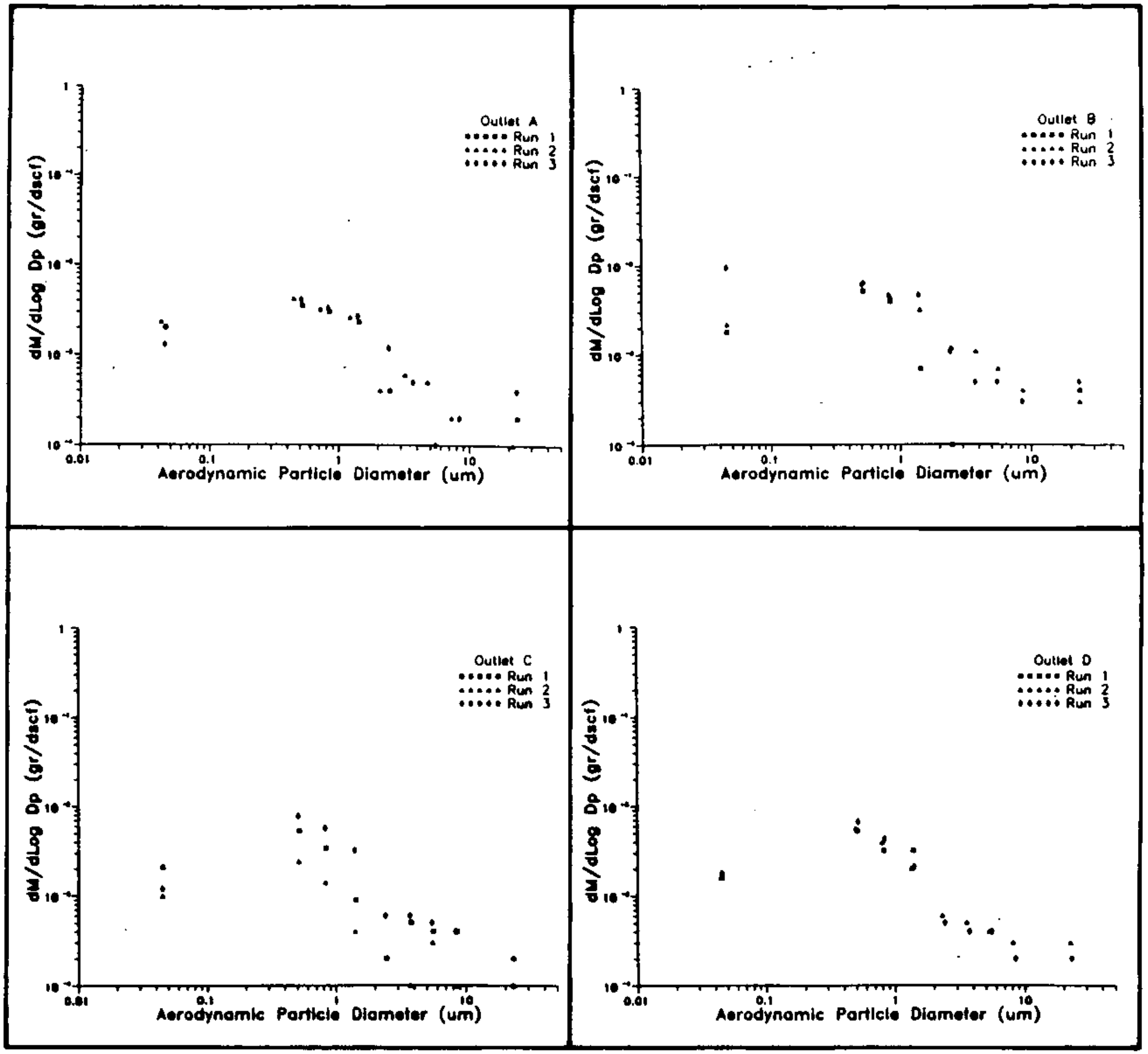

Figure 3-4. Differential mass concentration as a function of particle size for controlled particulate matter. Calciner offgases. Monsanto, Soda Springs, Idaho.

TABLE 3-11. INLET DATA FOR DIFFERENTIAL CONCENTRATION VS. PARTICLE SIZE, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Run 1		Run 2		Run 3	
Stage	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]
1	21.7	0.0016	22.1	0.0013	22.6	0.0030
2	7.67	0.0060	7.90	0.0063	8.24	0.0011
3	5.00	0.0111	5.15	0.0088	5.38	0.0011
4	3.39	0.0079	3.50	0.0151	3.65	0.0068
5	2.20	0.0180	2.26	0.0343	2.36	0.0034
6	1.27	0.0675	1.31	0.1286	1.37	0.0125
7	0.75	0.1267	0.77	0.1995	0.80	0.0558
8	0.47	0.2389	0.48	0.2971	0.50	0.1004
Back-up	0.04	0.0194	0.04	0.0259	0.04	0.0294

[a]Geometric midpoint is defined as:

$$[(Dp_{50})_{n+1} \bullet (D_{50})_n]^{1/2}$$

[b]Differential mass concentration is defined as:

$$\frac{\text{mass on stage "n"}}{\log (Dp_{50})_{n+1} - \log (Dp_{50})_n} = \frac{\Delta M}{\Delta(\log Dp_{50})}$$

TABLE 3-12. OUTLET A AND OUTLET B DATA FOR DIFFERENTIAL CONCENTRATION VS. PARTICLE SIZE, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Outlet A - Run 1		Outlet A - Run 2		Outlet A - Run 3		Outlet B - Run 1		Outlet B - Run 2		Outlet B - Run 3	
Stage	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]
1	23.0	0.0002	21.2	0.0001	22.7	0.0004	23.2	0.0004	23.1	0.0003	22.9	0.0005
2	8.57	0.0000	7.26	0.0002	8.34	0.0002	8.68	0.0000	8.64	0.0004	8.46	0.0003
3	5.60	0.0000	4.74	0.0005	5.45	0.0001	5.66	0.0000	5.66	0.0007	5.53	0.0005
4	3.80	0.0000	3.22	0.0006	3.70	0.0005	3.84	0.0000	3.83	0.0011	3.75	0.0005
5	2.46	0.0004	2.08	0.0004	2.39	0.0012	2.48	0.0001	2.48	0.0012	2.42	0.0011
6	1.42	0.0023	1.21	0.0026	1.39	0.0027	1.44	0.0007	1.43	0.0032	1.40	0.0047
7	0.84	0.0030	0.71	0.0032	0.82	0.0033	0.85	0.0040	0.85	0.0045	0.83	0.0047
8	0.52	0.0035	0.44	0.0042	0.51	0.0041	0.52	0.0052	0.52	0.0066	0.51	0.0062
Back-up	0.05	0.0020	0.04	0.0023	0.04	0.0013	0.05	0.0018	0.05	0.0022	0.05	0.0096

[a]Geometric midpoint is defined as:

$$[(Dp_{50})_{n+1} * (D_{50})_n]^{1/2}$$

[b]Differential mass concentration is defined as:

$$\frac{\text{mass on stage "n"}}{\log (Dp_{50})_{n+1} - \log (Dp_{50})_n} = \frac{\Delta M}{\Delta(\log Dp_{50})}$$

TABLE 3-13. OUTLET C AND OUTLET D DATA FOR DIFFERENTIAL CONCENTRATION VS. PARTICLE SIZE, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Outlet C - Run 1		Outlet C - Run 2		Outlet C - Run 3		Outlet D - Run 1		Outlet D - Run 2		Outlet D - Run 3	
Stage	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]	Geometric Midpoint[a]	Differential Mass[b]
1	23.1	0.0002	22.8	0.0001	22.8	0.0001	22.8	0.0000	22.4	0.0003	22.9	0.0002
2	8.56	0.0004	8.43	0.0001	8.37	0.0004	8.37	0.0000	8.08	0.0003	8.47	0.0002
3	5.59	0.0004	5.50	0.0003	5.46	0.0005	5.46	0.0000	5.27	0.0004	5.53	0.0004
4	3.79	0.0005	3.73	0.0001	3.71	0.0006	3.71	0.0000	3.58	0.0005	3.75	0.0004
5	2.45	0.0002	2.41	0.0000	2.40	0.0006	2.40	0.0000	2.31	0.0006	2.43	0.0005
6	1.42	0.0009	1.40	0.0004	1.39	0.0032	1.39	0.0032	1.34	0.0020	1.41	0.0021
7	0.84	0.0034	0.83	0.0014	0.82	0.0057	0.82	0.0032	0.79	0.0039	0.83	0.0043
8	0.52	0.0053	0.51	0.0024	0.51	0.0078	0.51	0.0053	0.49	0.0056	0.51	0.0067
Back-up	0.05	0.0021	0.05	0.0010	0.05	0.0012	0.05	0.0016	0.04	0.0016	0.05	0.0018

[a]Geometric midpoint is defined as:

$$[(Dp_{50})_{n+1} * (D_{50})_n]^{1/2}$$

[b]Differential mass concentration is defined as:

$$\frac{\text{mass on stage "n"}}{\log (Dp_{50})_{n+1} - \log (Dp_{50})_n} = \frac{\Delta M}{\Delta(\log Dp_{50})}$$

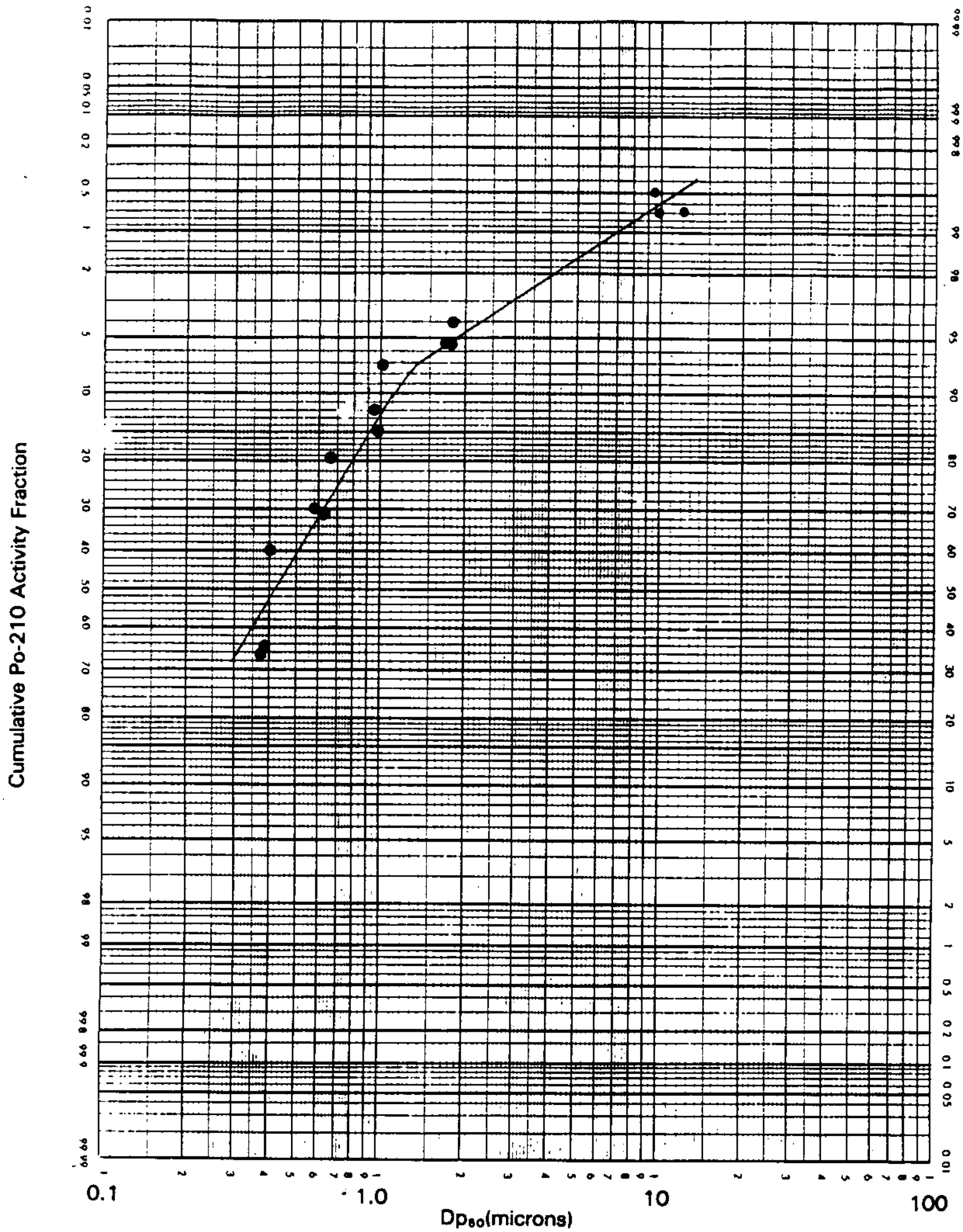

Figure 3-5. Cumulative Polonium-210 activity fraction as a function of particle size for venturi inlet particulate matter. Probability-Log plot
Monsanto, Soda Springs, Idaho.

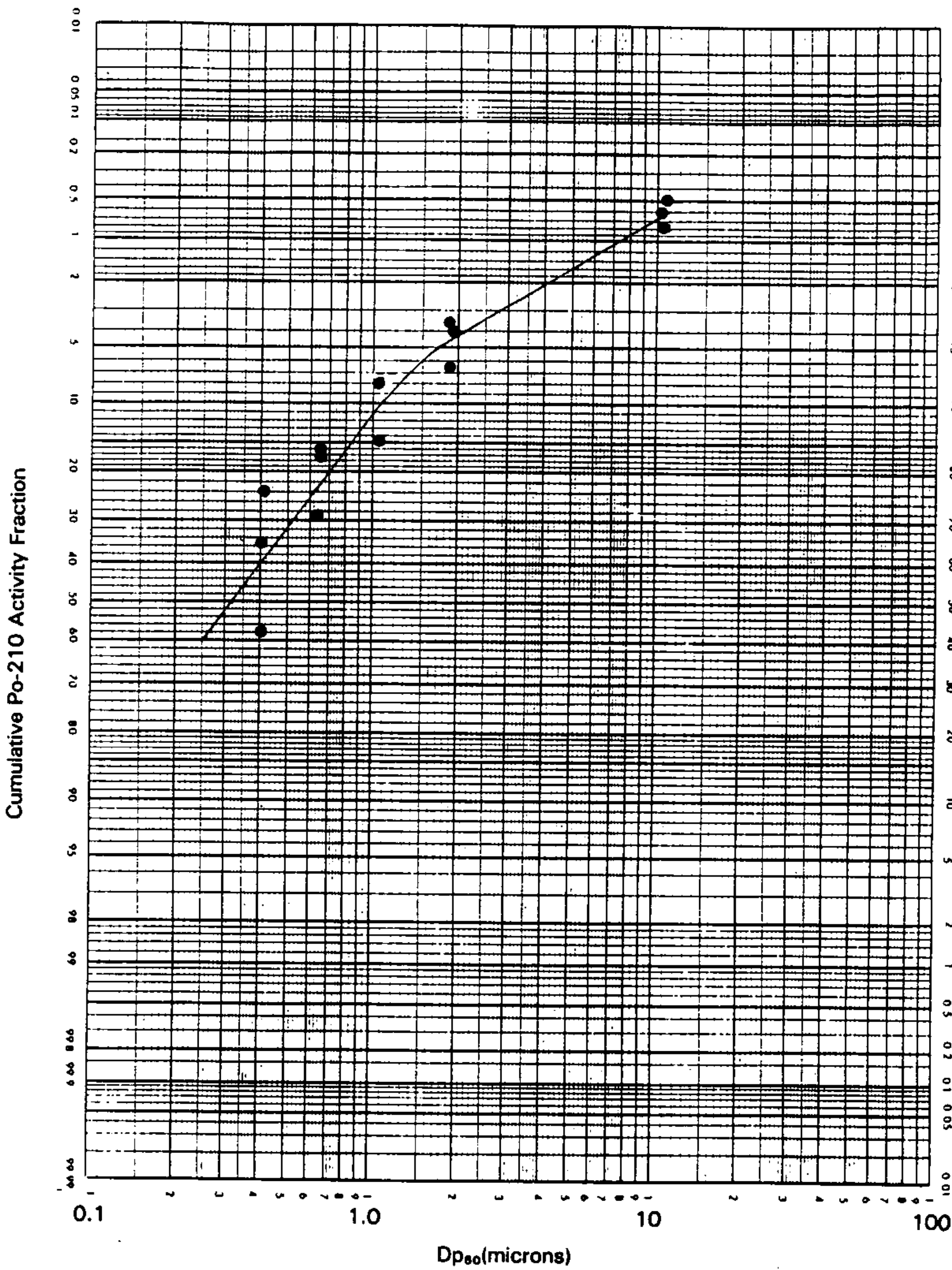

Figure 3-6. Cumulative Polonium-210 activity fraction as a function of particle size for controlled particulate matter.
Probability-Log plot
Monsanto, Soda Springs, Idaho.

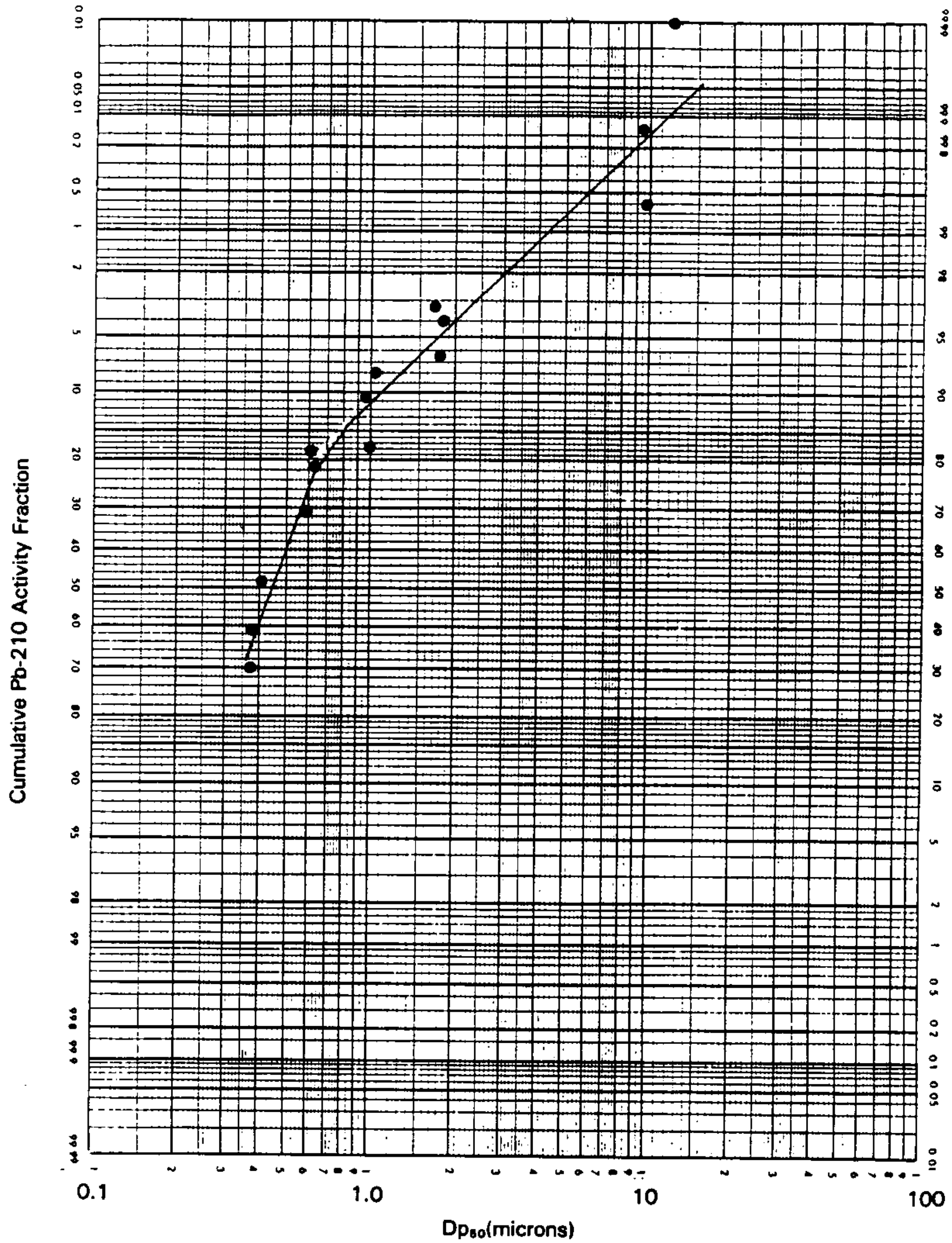

Figure 3-7. Cumulative Lead-210 activity fraction as a function of particle size for venturi inlet particulate matter. Probability-Log plot. Monsanto, Soda Springs, Idaho.

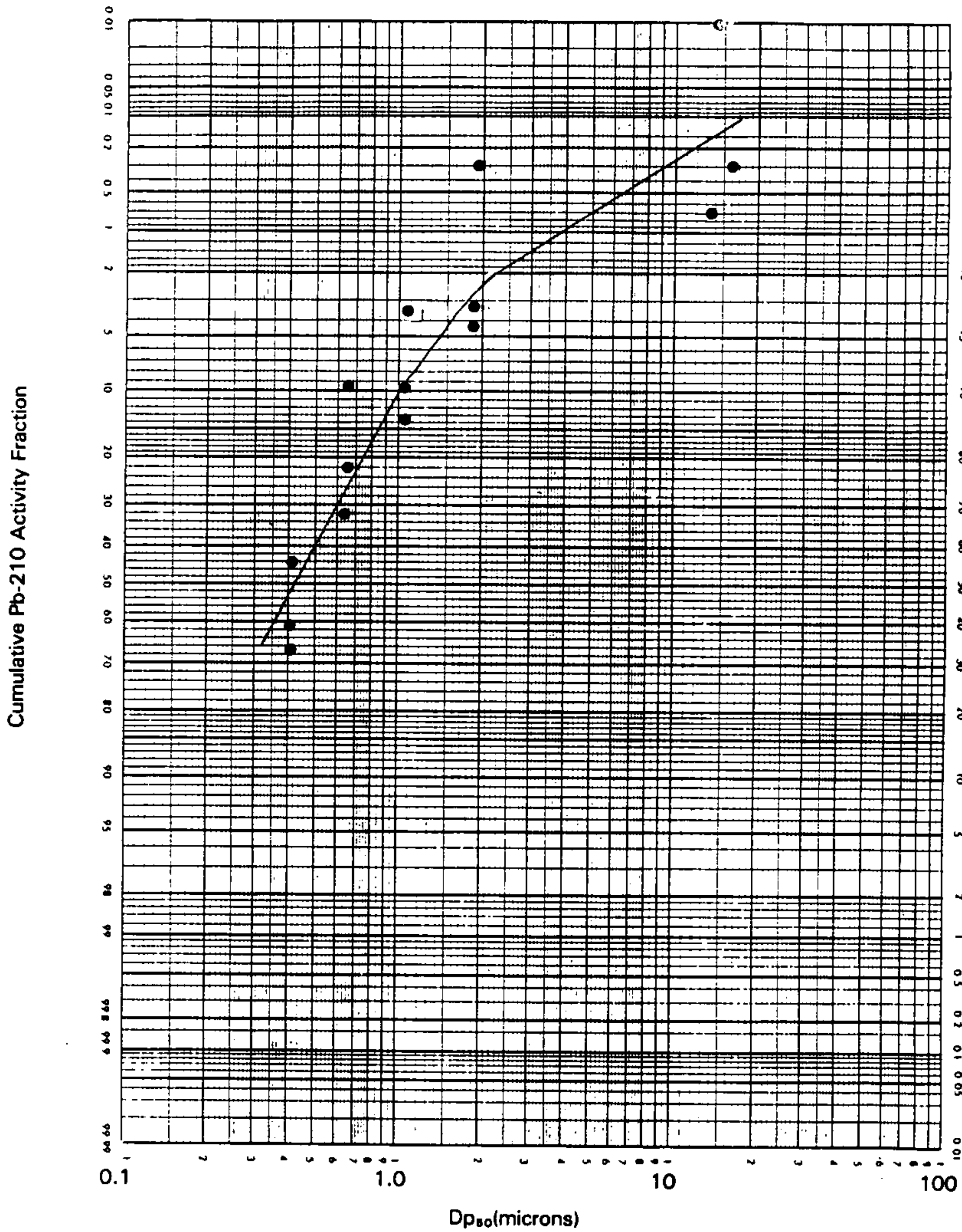

Figure 3-8. Cumulative Lead-210 activity fraction as a function of particle size for controlled particulate matter. Probability-Log plot. Monsanto, Soda Springs, Idaho.

TABLE 3-14. CUMULATIVE ACTIVITY FRACTIONS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

	Inlet - Run 1 Cumulative Activity Fraction			Inlet - Run 2 Cumulative Activity Fraction			Inlet - Run 3 Cumulative Activity Fraction			Outlet C - Run 1 Cumulative Activity Fraction			Outlet C - Run 2 Cumulative Activity Fraction			Outlet C - Run 3 Cumulative Activity Fraction		
Stage	Dp_{50}	Po-210	Pb-210	Dp_{50}	Po-210	Pb-210	Dp_{50}	Po-210	Pb-210	Dp_{50}	Po-210	Pb-210	Dp_{50}	Po-210	Pb-210	Dp_{50}	Po-210	Pb-210
1	9.48	0.9947	0.9984	9.77	0.9929	0.9936	10.20	0.9934	1.0000	10.60	0.9953	0.9969	10.43	0.9937	1.0000	10.35	0.9921	0.9930
2-5	1.69	0.9471	0.9675	1.74	0.9454	0.9363	1.82	0.9597	0.9586	1.89	0.9600	0.9969	1.86	0.9645	0.9678	1.84	0.9345	0.9570
6	0.96	0.8829	0.8941	0.99	0.8530	0.8231	1.03	0.9282	0.9213	1.07	0.9244	0.9656	1.05	0.9214	0.9129	1.05	0.8539	0.8640
7	0.59	0.7004	0.6906	0.61	0.6882	0.8197	0.63	0.8184	0.7859	0.65	0.8298	0.9068	0.65	0.8343	0.7839	0.64	0.7104	0.6791
8	0.37	0.3412	0.3027	0.38	0.3507	0.3906	0.40	0.5993	0.5201	0.41	0.7593	0.3271	0.41	0.6438	0.5611	0.40	0.4224	0.3944

TABLE 3-15. RADIONUCLIDE CONCENTRATIONS IN PROCESS FEEDSTOCK SAMPLES, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Type of Sample	MM 111 Run No.	Date	Radionuclide Concentration Po-210 (pico Curies per gram, dry basis)	Radionuclide Concentration Pb-210 (pico Curies per gram, dry basis)
Feedstock	1	8/16/88	NA	NA
Feedstock	2	8/17/88	142	147
Feedstock	3	8/17/88	112	114
Feedstock	4	8/18/88	124	118
Feedstock	5	8/19/88	125	127
Average			126	127
Relative standard deviation (%)			10	12

NA = Not analyzed.

4.0 SAMPLING AND ANALYSIS

This section describes specific sampling and analysis activities performed during the August 15-20, 1988, test program at the Monsanto facility. As described in the Executive Summary of this document (see Table 1-1) the test matrix consisted of test runs at the venturi scrubber inlet and each of the four outlet stacks to collect particulate matter and particulate size samples for subsequent radionuclide analysis.

The following subsections describe the sampling locations at the Monsanto site (Section 4.1), the sampling procedures that were used (Section 4.2), the recovery and analysis procedure for each of the collected samples (Section 4.3), and the sample custody procedures (Section 4.4).

4.1 SAMPLING LOCATIONS

Figure 4-1 identifies each of the sampling locations during the Monsanto test program. The following subsections present a description of each of these locations.

4.1.1 Scrubber Inlet

The scrubber inlet sampling location is the common duct point at which the kiln offgases leave the spray tower prior to being split into the four streams feeding the venturi scrubbers. The emissions measured at this location do not represent uncontrolled emissions since this location is actually the midpoint (after the spray tower) in the air pollution control system.

The scrubber inlet sampling was performed in a vertical 2.7 m (9 ft) diameter duct. A schematic of the inlet sampling location is shown in Figure 4-2. The sampling location was recognized as a nonideal location due to flow disturbances both up and down stream. During each MM 111 test run, 24 traverse points were sampled in order to minimize the effect of these disturbances on sample representativeness. There was no evidence of cyclonic flow based on preliminary velocity traverse data.

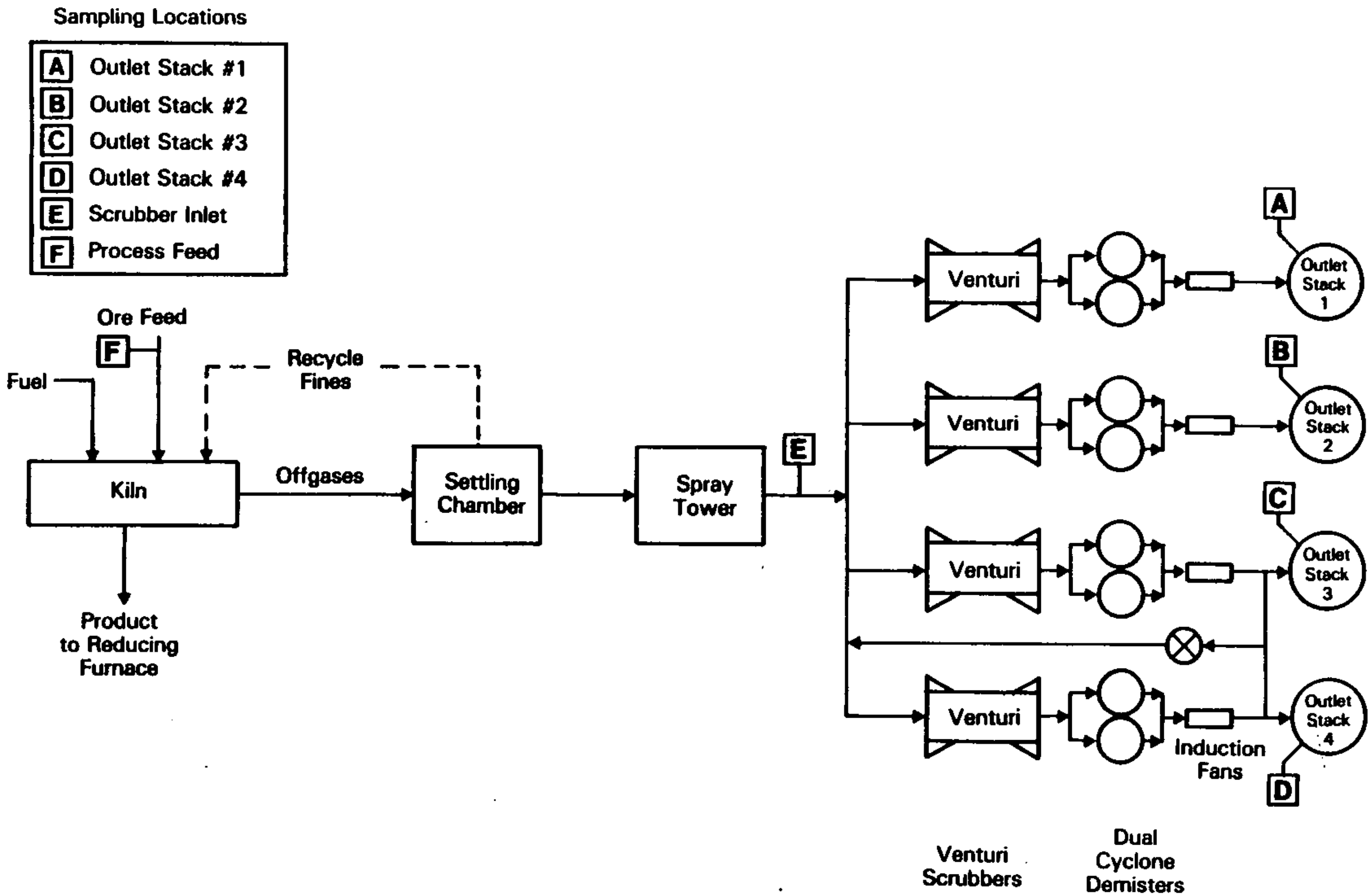

Figure 4-1. Schematic of Monsanto Rotary Kiln and Pollution Control System

1181723R

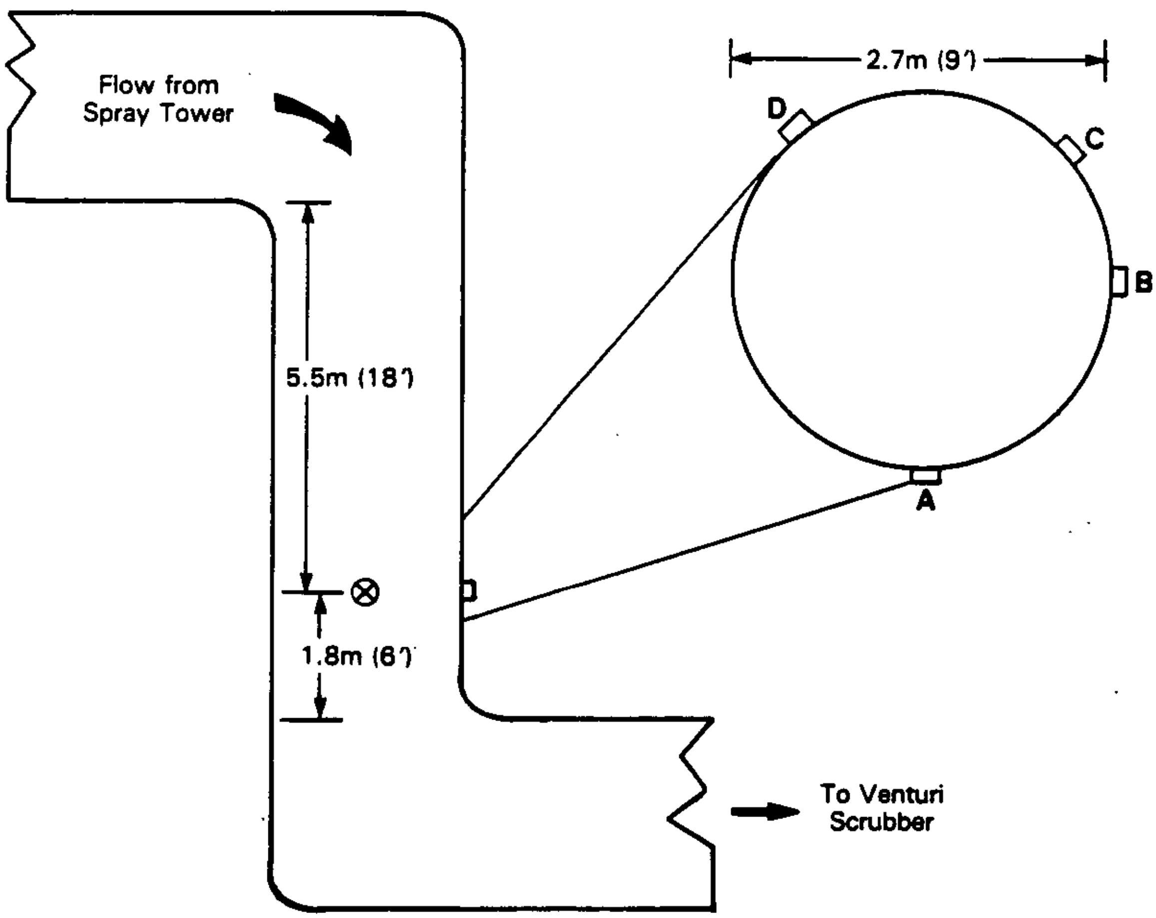

Figure 4-2. Schematic of the Inlet Sampling Location

1181772R

4.1.2 Outlet Stacks

Controlled flue gases are discharged to the atmosphere through four separate stacks. Outlet sampling was performed at each of the four stacks. All four of the outlet stacks shared a common sampling platform. A schematic showing the outlet location is shown in Figure 4-3. The outlet stacks were ideal sampling locations which required 12 points, 6 from each port. There was no evidence of cyclonic flow based on the preliminary velocity profiles conducted at each outlet stack.

4.1.3 Process Feed Sampling Location

Blended phosphate rock feedstock was collected from the conveyor belt (#114) assembly, just prior to the kiln feed hood.

4.2 SAMPLING PROCEDURES

EPA reference sampling methods were used during this test program to collect flue gas samples for particulate matter and particulate size distribution. These particulate samples were analyzed for radiation from radionuclides, specifically polonium-210 and lead-210. EPA reference sampling methods were also used to measure stack gas velocity/volumetric flow, moisture content, and molecular weight.

Each sampling method used during the test program is described in detail in the following subsections.

4.2.1 Particulate Matter and Radionuclides - Modified EPA Method 111

Particulate matter in both the inlet and outlet streams was collected using a modification of EPA Method 111. For reference purposes, EPA Method 111 is included in Appendix A of this document. The specific modifications included:

- use of 0.1 N HNO_3 in the impingers instead of water;

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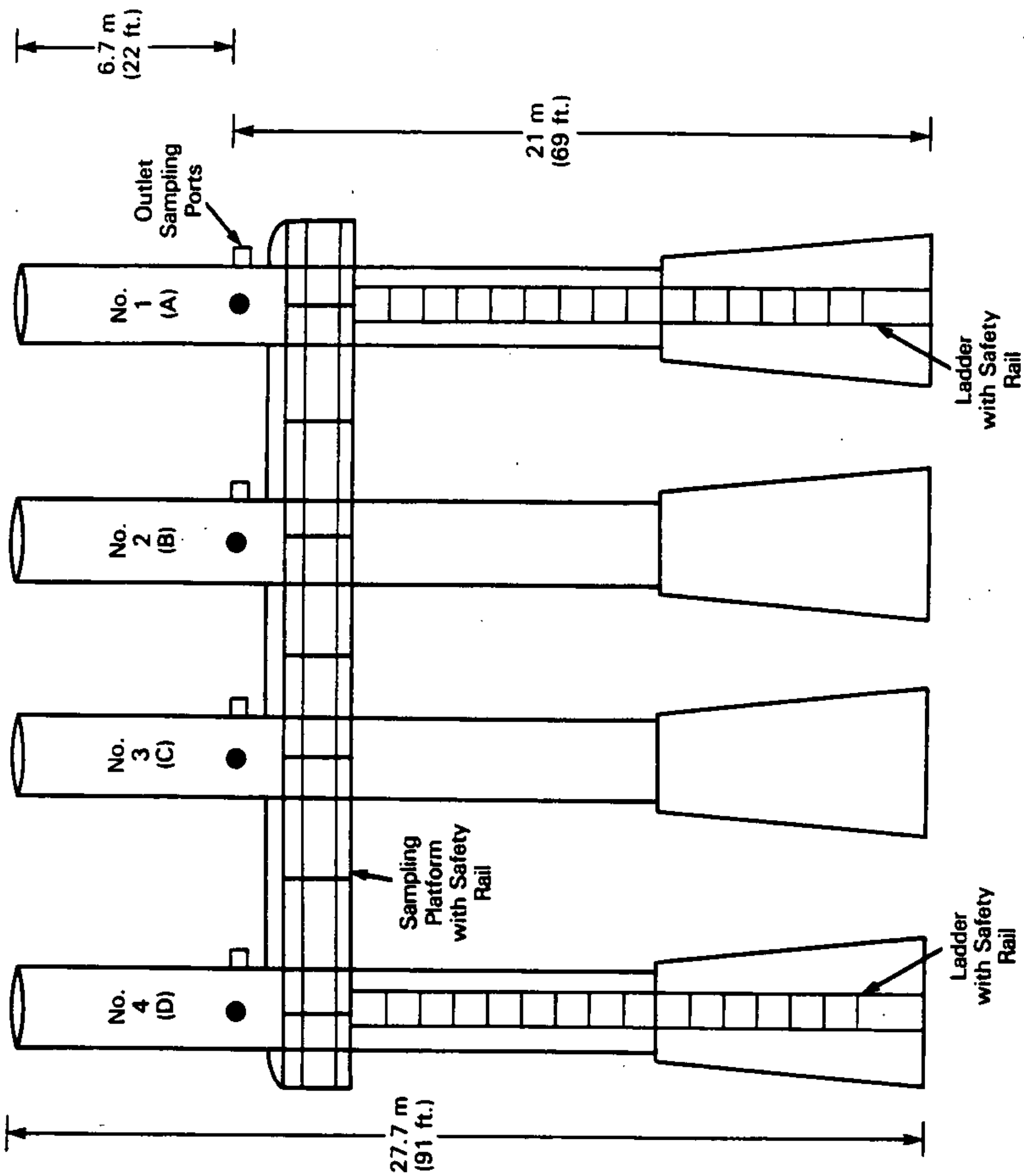

Figure 4-3. Schematic Showing the Outlet Sampling Locations

- insertion of an extra impinger (empty) following the filter and heater box (due to the high moisture content of the streams); and
- modification in recovery procedures (discussed in Section 4.3).

A schematic of the Modified Method 111 (MM 111) train that was used in this test program is shown in Figure 4-4. Flue gas was pulled from the stack through a stainless steel nozzle and a glass-lined probe. Particulate matter was removed from the gas stream by a glass fiber filter housed in a Teflon® sealed, glass filter holder maintained at 120 $\pm$ 14^{o}C (248 $\pm$ 25^{o}F). The filter holder contained a Teflon®-coated stainless steel screen to support the filter. After the filter box, an empty knockout condenser was used to remove excess moisture, followed by two impingers containing 0.1 N HNO_3, another empty knockout condenser, and a silica gel impinger.

4.2.2 <u>Particle Size Distribution - Andersen MK III</u>

Particle size distribution (PSD) measurements at both the inlet and outlet locations were made using in-stack Andersen MK III cascade impactors, equipped with right angle preseparators. The Andersen MK III impactor is an eight-stage cascade impactor which classifies particles according to their aerodynamic diameter. Inlet and outlet PSD sampling required different sampling durations due to the different mass loading rates at each of these locations.

An example of the sampling train is shown in Figure 4-5. Many of the components are similar to those used in EPA Method 5 sampling. Stack gas velocity and temperature profiles were obtained from pretest stack gas traverses at each sampling location. Based on the resulting profile data, two points that were representative of the stack gas velocity and temperature profile were selected for collecting the PSD sample. For each test run (both inlet and outlet), all traverse points were selected from a single port. Subsequent test runs were sampled using similar point selection criteria; although points were selected from the opposite port. Stack gas moisture content was based on data from the preceding MM 111 test runs. Sampling train flow rates were maintained at constant rates and were selected to optimize the particle size definitions for the lower size

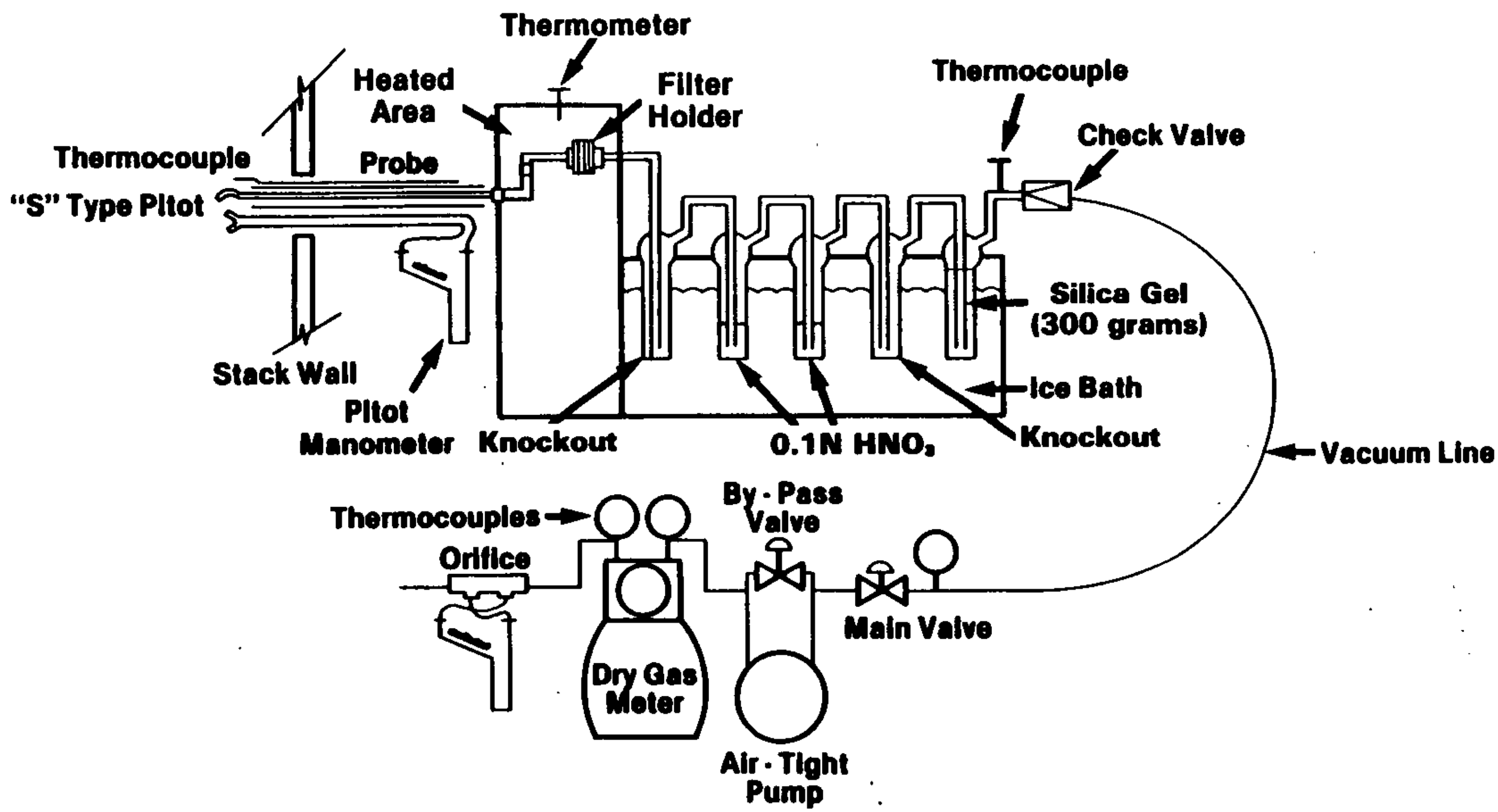

Figure 4-4. Schematic of the Modified Method 111 Sampling Train

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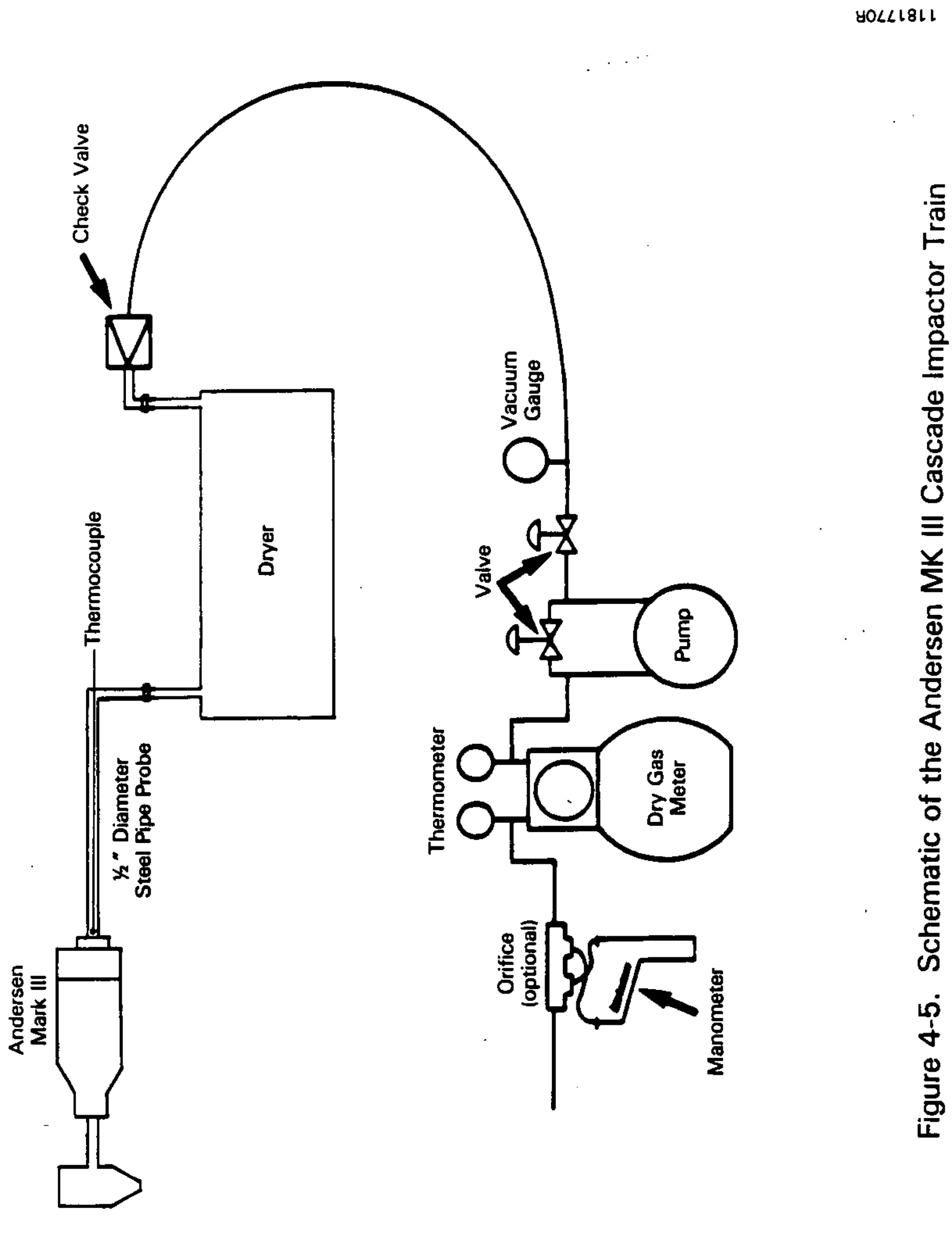

Figure 4-5. Schematic of the Andersen MK III Cascade Impactor Train

ranges (less than 2 microns). The goal of each PSD run was to achieve isokinetic sampling (100 ± 20%) and to achieve good size separation in the less than 2 microns particle size.

Due to the high moisture content at each of the sampling locations, both the preseparator and the impactor were pre-heated above the flue gas dew point temperature prior to testing. During the test run, heating was accomplished by wrapping the impactor with heating tape, insulating the impactor body and waterproofing the entire assembly. Impactor temperatures during the test runs were maintained above the stack gas dew point using a variac to regulate electrical current to the heat tape. Impactor outlet temperatures were monitored and recorded throughout each run with a type K thermocouple. A condenser system was used to remove moisture and deliver dry gas to the metering system. Rieve Angel 934 AH glass fiber substrates were used to collect the samples. The final filter (back-up filter) met the requirements of ASTM Standard Method D (99.95% collection efficiency on 0.3 micron dioctylphthalate particles).

Preliminary PSD samples were collected at each location to determine and establish proper sampling collection parameters. These preliminary samples were evaluated for evidence of particle bounce, reentrainment, overloading or underloading. Based on analyses of these preliminary test runs, sampling rates and durations were established for each of the subsequent test runs.

4.2.3 Flue Gas Volumetric Flow Rate - EPA Method 2

The volumetric stack gas flow rate for both stack outlet and inlet locations was determined using procedures described in EPA Method 2. Based on this method, the volumetric flow rate is determined by measuring the cross-sectional area of the stack and average velocity of the flue gas through this cross-sectional area.

The average velocity of the flue gas was calculated from the average gas velocity pressure, the average flue gas temperature, the wet molecular weight, and the absolute static pressure. Pressure and temperature profiles were obtained by traversing the stack.

Pressure and temperature profiles were obtained by an S-type pitot tube and type K thermocouple at each of the traverse points. An inclined oil manometer was used to measure pressure differential across the S-type pitot tube. A calibrated aneroid barometer was used to obtain barometric pressure. Static gas pressure was measured by an S-type pitot tube with the face aligned at right angles to the gas stream flow. One side of the pitot was disconnected after proper placement and static pressure determined using an inclined manometer.

4.2.4 Flue Gas Molecular Weight Determination - EPA Method 3

The molecular weight of the flue gas at each location was determined during each MM 111 run using a single point grab sample collected in Tedlar® bags. The molecular weight analysis was performed using Orsat procedures as described in EPA Method 3.

4.2.5 Flue Gas Moisture Content - EPA Method 4

The moisture content of the flue gases at both the stack outlet and inlet locations was determined using procedures described in EPA Method 4. Based on this method, a known volume of particulate-free gas is pulled through a chilled impinger train. The quantity of condensed water is gravimetrically determined and then related to the volume of gas sampled.

The moisture content of the flue gas was determined simultaneously during the operation of the MM 111 trains. The impingers used with these trains were weighed before and after sampling. The mass increase in moisture was related to the volume of gas sampled to calculate the moisture content of the flue gas.

4.2.6 Process Feed Samples - Composite Grab

Grab samples of the blended ore feedstock were collected periodically during flue gas sampling periods. The samples were collected from the conveyor belt assembly just prior to discharging into the kiln. Approximately 1 kg (2.2 lbs) of sample was collected in each grab. At the end of each flue gas sampling period, the grab samples were combined, mixed and quartered. A single 1 kg (2.2 lbs) composite grab sample corresponding to each sampling period was retained for radionuclide analysis.

4.3 SAMPLE RECOVERY AND ANALYSIS

4.3.1 Particulate Matter and Radionuclides

Upon completion of each test run, the MM 111 trains were leak checked, disassembled and filter and impingers were transported to the on-site recovery trailer. Probes and nozzles were recovered at each of the sampling locations. (The environment in the vicinity of the sampling platforms was relatively free of dust.) Openings on each of the disassembled sampling train components were covered with Teflon® tape or parafilm® prior to transporting to the recovery site. As soon as possible after completion of the testing, the trains were recovered. The MM 111 recovery and analytical scheme is shown in Figure 4-6. The modifications from EPA Method 111 are as follows:

- the back half of the sampling train (impingers) were recovered for subsequent radionuclide analyses;
- the front half (probe and filter holder) acetone rinses were followed by rinses with 0.1 N HNO_3; and
- radionuclide analyses were performed on the total train catch. Front half consisted of both the filter and the probe, nozzle and filter holder rinses; back half consisted of impinger contents and rinses.

Train recovery and gravimetric determinations were performed by Radian. The gravimetric determinations were done on-site for the filter and probe rinse acetone (PRA) components of the sampling train. For each of the MM 111 trains, samples for radionuclide analyses were sent to EERF in four components. These four components are listed in Table 4-1. During the analytical digestion procedures the front half nitric acid rinses (PRN) were combined with the dried acetone rinses (PRA) and both were combined with the filter (F) to provide a front half sample for analysis. Radionuclide

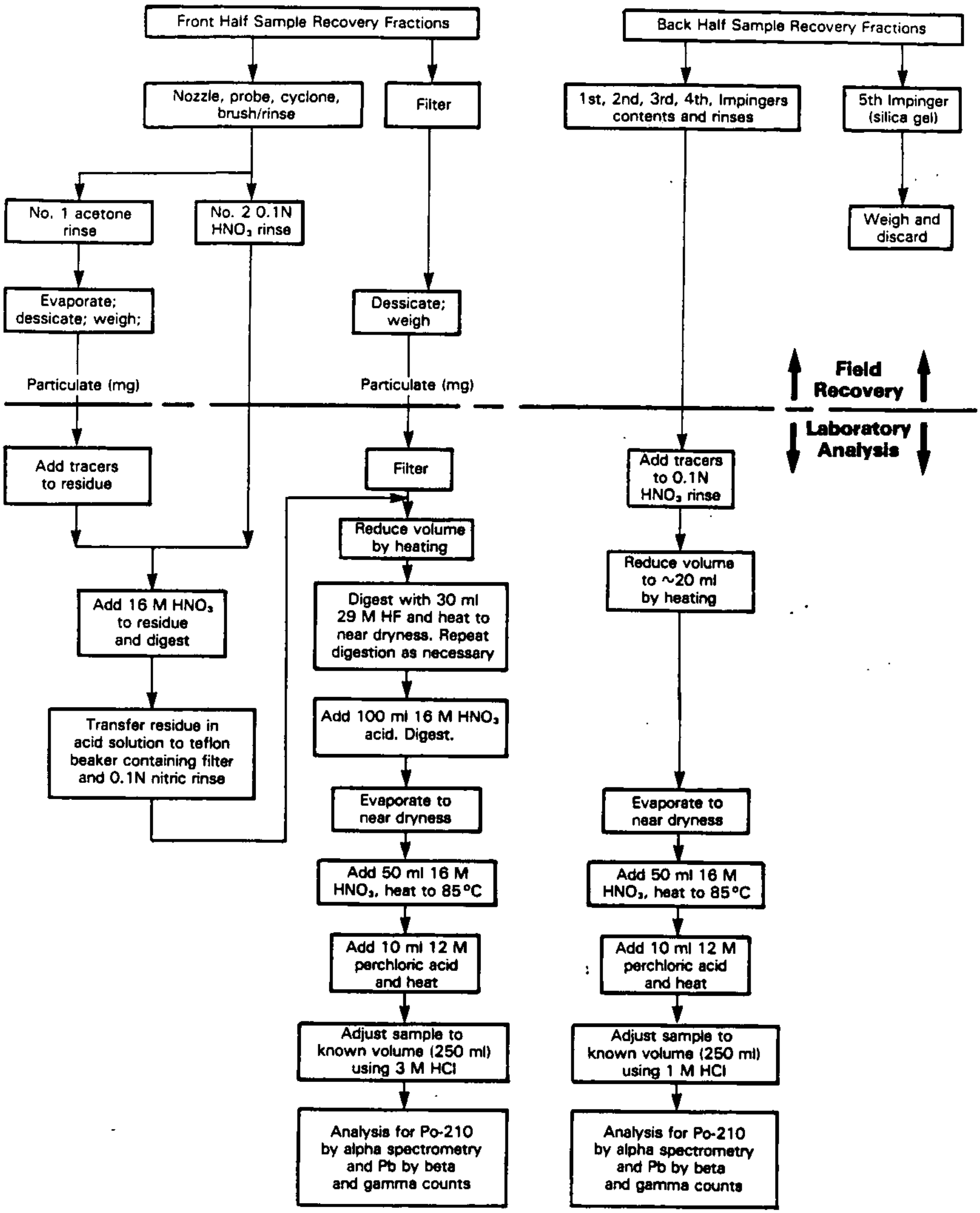

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Figure 4-6. Modified Method 111 Recovery and Analysis Scheme analyses were performed separately for front and back half train catches. The specific analytical protocol used by EERF for radionuclide analysis is included in Appendix B.

4.3.2 Particulate Size Distribution and Radionuclides

Upon completion of each test run, the impactors were removed from the duct, oriented vertically and purged for approximately 10 minutes to prevent water condensation in the impactor assembly. The nozzles were loosely covered with aluminum foil or Teflon® tape and the impactor placed in a vertical position where it would not be bumped. After the impactors had cooled, they were transported to the field laboratory for recovery.

Each stage was inspected for particles that might have accumulated on surfaces other than the stage collection substrate. By convention, any particles lost to surfaces upstream of a stage substrate were added to that substrate's catch. A camel hair brush was used to clean the surfaces.

The substrates were removed from the impactor and placed in their respective petri dishes using a flat-ended set of forceps and flat-bladed spatula. Particles from the preseparator were brushed onto the first stage collection substrate.

After each test run, the substrates were closely examined to determine if the selected operating conditions were effective. The following criteria were used to determine if the test run was valid:

- no signs of particle bounce or reentrainment,
- no signs of overloaded deposits or secondary deposition,
- dry filters with no condensed water, and
- minimal particle catch (approximately 2-5 mg per lower stages).

Both reentrainment and overloaded deposits are typically characterized by increased internal losses to the inner surfaces of the impactor. When reentrainment and/or overloading occur, primary depositions (from impaction) are ill-defined and secondary deposition is evident around the primary deposits. Particle deposition on the substrate should be due to impaction

TABLE 4-1. MODIFIED METHOD 111 SAMPLING TRAIN COMPONENTS TO BE SENT TO EERF FOR RADIONUCLIDE ANALYSIS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Container/Component	Code	Description
Component Number 1	F	Filter
Component Number 2	PRA	Acetone rinses of nozzle, probe, and front half of filter holder
Component Number 3	PRN	Nitric rinses of probe, and front half of filter holder
Component Number 4	IR	Rinses of back half of filter holder, filter support; and first, second, third, and fourth impinger contents and rinses

only. Consequently, when reentrainment and/or overloading do not occur, deposits are uniform and well-defined (conical) with no evidence of disturbance. The collected particle size samples were uniform and well-defined.

Impactor recovery and gravimetric determinations were performed in the field by Radian. For each of the Andersen impactor trains, samples for radionuclide analyses were sent to EERF in six components. These six components are listed in Table 4-2. Radionuclide analyses were performed on each of these components, separately. Analytical digestion procedures were identical to those described in Figure 4-6 for the MM 111 filters. The specific analytical protocol used by EERF for radionuclide analysis is included in Appendix B.

4.4 SAMPLE CUSTODY

Sample custody procedures followed during this program are based on EPA recommended procedures. The custody procedures emphasize careful documentation of sample collection and field analytical data and the use of chain-of-custody records for samples being transported.

The team leader for the field testing effort was Mr. R. F. Jongleux. The team leader was responsible for ensuring that proper custody and documentation procedures were followed for the field sampling and field analytical efforts.

All sampling data, including information regarding sampling times, locations, and any specific considerations associated with sample acquisition were recorded on preformatted data sheets.

A master sample logbook was used to document all sample collection activities (Notebook #21088).

Following sample collection, all samples were given a unique alphanumeric (Radian) sample identification code. Figure 4-7 contains an example of the alphanumeric ID codes and abbreviations used for the Monsanto samples. Sample labels and integrity seals were completed and affixed to the sample container. As the samples were packed for shipment, chain-of-custody forms were completed for each shipment box specifying treatment of samples.

TABLE 4-2. ANDERSEN IMPACTOR SAMPLING TRAIN COMPONENTS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Container/Component	Code	Description
Component Number 1	PSD-1	Preseparator Stages 0 and 1
Component Number 2	PSD-2	Stages 2, 3, 4, and 5
Component Number 3	PSD-3	Stage 6
Component Number 4	PSD-4	Stage 7
Component Number 5	PSD-5	Stage 8
Component Number 6	PSD-6	Stage 9 (back-up filter)

MSS-081688-MM111-IN-1-F

Plant:

Date:

Sampling Method:
Modified Method 111
PSD = Particle Size Distribution
GR = Grab

Sampling Location:
Inlet
OTA = Outlet A
OTB = Outlet B
OTC = Outlet C
OTD = Outlet D

Run:

Sample Fraction:
Filter
PR = Probe Rinse
IR = Impinger Contents and Rinses
ST1 = PSD Stage 0,1 and Preseparator
ST2-5 = PSD Stages 2, 3, 4, and 5
ST6 = PSD Stage 6
ST7 = PSD Stage 7
ST8 = PSD Stage 8
ST9 = PSD Stage 9 (Back-up filter)

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Figure 4-7. Example of Alphanumeric ID Codes for the Monsanto Test Program

5.0 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Specific quality assurance and quality control procedures were incorporated into the Monsanto test program to ensure the production of useful and valid data. The overall quality assurance/quality control (QA/QC) objective is to ensure precision, accuracy, completeness, comparability, and representativeness for each parameter measured in this test program. The QA/QC procedures and results described in this section represent an integral part of the overall sampling and analysis scheme. The acceptance criteria, control limits and corrective action that were used for the test program and the results achieved are summarized in Table 5-1.

Section 5.1 presents QA/QC results for the particulate and PSD sampling activities, Section 5.2 presents QA/QC results for radionuclide analysis, and Section 5.3 presents QA/QC results for particulate analysis.

5.1 QUALITY ASSURANCE/QUALITY CONTROL FOR SAMPLING AND RECOVERY

The isokinetic results for the modified Method 111 (MM 111) and particle sizing sampling trains are summarized in Tables 5-2 and 5-3, respectively. Of the 36 sampling trains operated, three MM 111 trains did not meet the QA/QC isokinetic objective of 100 $\pm$ 10 percent. The inlet train isokinetics for MM 111 run 1 was 79 percent. The isokinetics from outlet D run 1 and outlet D run 2 were 112 percent and 77 percent, respectively. Therefore, one additional run at all locations and two at outlet D were performed to ensure representative particulate matter data.

The leak check results for the MM 111 and particle sizing sampling trains are summarized in Tables 5-4 and 5-5. All of the final leak rates met the QA/QC leak rate criteria of less than 0.02 acfm for the particulate sampling trains. Particle size operating procedures dictate that no final leak check is performed on the impactor because to do so may dislodge the particles impacted on the individual substrates and bias the data. Therefore, only pretest leak checks were performed on PSD trains.

TABLE 5-1. SUMMARY OF ACCEPTANCE, CRITERIA, CONTROL LIMITS AND CORRECTIVE ACTION AND ACHIEVED RESULTS

Criteria	Control Limits	Achieved (%)[a]	Corrective Action
Particulate Sampling			
Isokinetics			
- Method 5	100 ± 10%	100[b]	Performed additional test run.
- Particle Size[c]	100 ± 20%	100	
Final leak rate (after each port)	≤ 0.02 acfm or 4% of sampling rate, whichever is less	100	None required, criteria met.
Dry gas meter calibration	Post average factor (Y) agree ± 5% of prefactor	100	None required, criteria met.
Individual correction factors (Yi)	Agree within 2% of average factor	100	None required, criteria met.
Average correction factor	1.00 ± 1%	100	None required, criteria met.
Nozzles	Any two diameter measurements should agree within 0.004 inches	100	None required, criteria met.
Radionuclide Analysis			
Duplicate analysis	80% should agree within 2 sigma as determined in EPA 620/5-82-012	91	Met criteria. Rerun sample, check reagents and procedure.
Performance standards	90% should agree within 2 sigma as determined in EPA 620/5-82-012	>90	Met criteria. Rerun sample, check reagents and procedure JMW 88.5355 RERUN.
Analytical reagent blanks	Below MDL	100	Met criteria. Check glassware and reagents.
Yield	50%	91	Met criteria. Rerun low yield samples to confirm yield and results.

[a] Percentage represents fraction of test runs for which the QA objective was achieved.

[b] Additional test runs were conducted to meet the quality objective.

[c] For the PSD trains, a constant sampling rate was maintained at point of average velocity.

TABLE 5-2. SUMMARY OF ISOKINETIC RESULTS FOR MODIFIED METHOD 111 SAMPLING TRAINS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Run	Date	Location	Isokinetics (%)[a]
1	8/16/88	Inlet	78.6[b]
		Outlet A	104.5
		Outlet B	105.1
		Outlet C	105.0
		Outlet D	112.0[b]
2	8/17/88	Inlet	97.9
		Outlet A	97.3
		Outlet B	96.6
		Outlet C	101.9
		Outlet D	76.6[b]
3	8/17/88	Inlet	96.3
		Outlet A	96.0
		Outlet B	99.5
		Outlet C	97.3
		Outlet D	103.5
4	8/18/88	Inlet	98.1
		Outlet A	95.0
		Outlet B	97.7
		Outlet C	98.2
		Outlet D	101.1
5	8/19/88	Outlet D	100.1

[a]Isokinetic QA/QC objective is 100 ± 10%.

[b]Isokinetics did not meet QA/QC criteria.

TABLE 5-3. SUMMARY OF ISOKINETIC RESULTS FOR PARTICLE SIZING SAMPLING TRAINS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Run	Date	Location	Isokinetics (%)[a]
1	8/17/88	Inlet	120.1
		Outlet A	99.1
		Outlet B	99.9
		Outlet C	102.1
		Outlet D	104.9
2	8/18/88	Inlet	116.8
		Outlet A	99.8
		Outlet B	101.5
		Outlet C	102.2
		Outlet D	109.5
3	8/19/88	Inlet	108.4
		Outlet A	103.7
		Outlet B	97.8
		Outlet C	101.9
		Outlet D	103.9

[a]Isokinetic QA/QC objective is 100 ± 20 percent. The sampling points selected allowed the isokinetics to be within 100 ± 20 percent, while maintaining a constant sampling rate.

TABLE 5-4. SUMMARY OF LEAK CHECK RESULTS FOR PARTICLE SIZING SAMPLING TRAINS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Run	Date	Location	Initial Leak Rate[a] (acfm)	Vacuum[c] (in. Hg)
1	8/17/88	Inlet	0.010	10
		Outlet A	0.015	15
		Outlet B	0.020	4
		Outlet C	0.010	7
		Outlet D	0.010	7
2	8/18/88	Inlet	0.010	10
		Outlet A[b]	0.030	4
		Outlet B	0.018	4
		Outlet C	< 0.020	> 3
		Outlet D	< 0.020	> 3
3	8/19/88	Inlet	0.001	10
		Outlet A	0.010	15
		Outlet B	0.016	4
		Outlet C	0.004	7
		Outlet D	0.008	> 3

[a] Leak rate QA/QC objective is less than 0.02 acfm or 4 percent of sampling rate whichever is less.

[b] Leak rate through impingers and probe was 0.010 acfm @ 4 in. Hg.

[c] Vacuum at which leak check was performed. Highest vacuum encountered during test runs was less than the selected leak check vacuum.

TABLE 5-5. SUMMARY OF LEAK CHECK RESULTS FOR MODIFIED METHOD 111 SAMPLING TRAINS, MONSANTO, SODA SPRINGS, IDAHO[a] (August 1988)

			Initial - 1st Port		Final - 1st Port		Initial - 2nd Port		Final - 2nd Port	
Run	Date	Location	Leak Rate (acfm)	Vacuum (in. Hg)	Leak Rate (acfm)	Vacuum (in. Hg)	Leak Rate (acfm)	Vacuum (in. Hg)	Leak Rate (acfm)	Vacuum (in. Hg)
1	8/16/88	Inlet	0.016	15	ND	ND	> 0.04	5	0.014	5
		Outlet A	0.010	15	0.012	ND	0.015	5	0.015	8
		Outlet B	0.010	10	0.008	8	0.010	10	0.005	8
		Outlet C	0.016	10	0.010	10	0.015	10	0.005	15
		Outlet D	0.008	9	0.004	5	0.009	5	0.011	7
2	8/17/88	Inlet	0.010	15	ND	ND	< 0.020	5	0.010	9
		Outlet A	0.020	4	0.010	8	0.01	8	0.001	8
		Outlet B	0.016	15	0.010	6	0.008	6	0.008	6
		Outlet C	0.020	10	0.020	11	0.012	5	0.010	5
		Outlet D	0.005	7	0.008	6	0.008	5	0.010	9
3	8/17/88	Inlet	0.01	10	ND	ND	0.010	10	0.015	10
		Outlet A	0.016	15	0.015	6	0.016	6	0.010	8
		Outlet B	0.016	8	0.010	5	0.010	5	0.005	6
		Outlet C	0.008	5	0.010	5	0.012	10	0.012	5
		Outlet D	0.006	9	0.008	4	0.008	4	0.007	5
4	8/18/88	Inlet	0.010	10	ND	ND	0.010	10	0.010	12
		Outlet A	0.019	10	0.011	8	0.010	8	0.016	12
		Outlet B	0.012	6	0.010	8	0.010	8	0.018	5
		Outlet C	0.012	5	0.016	9	0.008	5	0.008	5
		Outlet D	0.008	6	0.006	5	0.008	6	0.005	5
5	8/19/88	Outlet D	0.012	11	0.018	5	0.010	5	0.014	5

[a]Leak rate QA/QC objective is less than 0.02 acfm or 4 percent of sampling rate, whichever is less. All final leak checks performed at highest vacuum encountered during test run.

ND = Not determined.

In addition, to isokinetics and the leak check criteria, the following QA/QC procedures were satisfied for the purpose of ensuring valid results:

- All sampling equipment passed a thorough visual and operation check prior to and after shipment to ensure clean and operable parts. Equipment which failed to pass this check was not used in the field.
- Manometers were leveled and zeroed (no drift allowed) before measuring the pressure across the S-type pitot tubes.
- The temperature measurement system was capable of measuring the ambient temperature prior to each traverse to within $\pm$ 2°C of the average measured ambient temperature.
- The field personnel reviewed sampling data forms daily on-site during testing. Data that were incomplete or inaccurate were not considered acceptable.
- A Modified Method 111 field blank was collected for both the inlet and outlet locations during the test period to evaluate any background contamination. This field blank train (FB) was recovered from a sampling train that had been previously used to collect particulate and radionuclide samples at a particular sampling location. The purpose of the field blanks was to identify background contamination levels introduced to the sample from the glassware, sample recovery, recovery solvents, or from handling of the train and components in the field during typical situations.
- Blanks of filters and reagents were collected and archived. Filter and reagent blanks were analyzed for radionuclides. No unacceptable levels of contamination were found.
- The trains were assembled and recovered in a laboratory trailer. The trailer was swept daily to minimize dust. Filters were recovered without drafts and glassware was covered or capped prior to assembly.
- Ice was maintained in the impinger baths at all times, exit temperatures were maintained less than 20°C (< 68°F).
- Any unusual occurrences during testing were noted on the field data forms or recovery notebooks.
- Sampling nozzles and S-type pitot tubes were measured and passed the required inspection.

- The roll and pitch axis of the S-type pitot tube and the sampling nozzle were maintained at 90° to the flow during sampling.
- Each leg of the S-type pitot tube achieved the prescribed leak check criterion described in EPA Method 2.
- The entire sampling train was checked to ensure that the leakage rate was less than or equal to 0.02 cfm or 4 percent of the average sampling rate (whichever is less) before and after moves from one sampling port to another during a run.
- Readings of the dry gas meter, ΔP, ΔH, temperature, and vacuum pump were made during sampling at each traverse point.
- Filters were handled out of drafts and transferred with tweezers.
- Sample trains were disassembled and the samples recovered in clean areas to prevent contamination.
- The nozzle was capped prior to and following recovery.
- The samples were transferred to appropriate storage containers and clearly labeled.
- Reagent dispenser bottles were clearly labeled.
- Sampling glassware was routinely rinsed three times with each reagent to remove all of the sample.
- Reagent lot numbers were recorded.
- All sampling and recovery glassware was capped or covered when not in use.
- Probe and nozzle brushes, tweezers, and scrapers were rinsed before use with the proper reagent(s) to minimize any possible sample contamination.

The particle sizing results were of high quality because the following QA/QC procedures were implemented and achieved:

- All substrates were desiccated and weighed to a constant weight (to the nearest 0.05 mg).
- Each impactor stage was visually inspected for proper alignment and uniform seating by an experienced technician.

- Preliminary test runs were conducted at each location (inlet and outlet) to define operating conditions. Substrates from these runs were evaluated for evidence of particle bounce, or reentrainment and sampling parameters for subsequent runs were modified to reflect the necessary corrective actions.

- All impactor stages were visually inspected for proper peak shape and substrate loading by a qualified, experienced individual.

- The impactor stages were characterized by well-defined, tall piles. There was little evidence of particle bounce on the impactor substrates.

- Impactors were heated and insulated specifically to prevent moisture condensation on the impactor substrates. The impactor exit temperature was maintained above the water dew point of the flue gas stream. Impactor runs with wet substrates were rejected if water condensation occurred and filter substrate recovery was compromised.

- Blank impactor runs were performed at each location to identify interactions with substrates.

- Every tenth filter was weighed in duplicate.

- The balance zero was adjusted every tenth weighing.

5.2 RADIONUCLIDE ANALYSIS QA/QC

During the radionuclide analyses, every tenth sample was analyzed in duplicate. The duplicate results are presented in Table 5-6.

Statistical analyses were performed on duplicate samples in accordance with EPA 620/5-82-012. Ninety-one (91) percent of the Monsanto samples agreed within the 2 sigma error. Analyses with error terms over 100 percent were not included in the statistical analyses.

Yields for the radionuclide analyses for Po-10 and Pb-210 were above the QA criteria (50%) for 91 percent of the samples analyzed during the program. (Refer to Appendix L for the yield results.)

The minimum detectable level was calculated by EERF as 1.2 pCi/analysis for Po-210. The minimum detectable level was calculated by EERF as 1.7 pCi/analysis for Pb-210. The equation for calculating the minimum detectable level is in Appendix L. An extensive list of EERF internal QA samples were analyzed during the project. This list of crosscheck samples (internal to EERF) is contained in Appendix L.

TABLE 5-6. DUPLICATE RESULTS FOR RADIONUCLIDE ANALYSES AT MONSANTO, SODA SPRINGS, IDAHO (August 1988)

EERF No.	Run No.	Po-210 Analysis 1 (pCi/sample)	Po-210 Analysis 2 (pCi/sample)	Po-210 Difference[a] (%)	Pb-210 Analysis 1 (pCi/sample)	Pb-210 Analysis 2 (pCi/sample)	Pb-210 Difference[a] (%)
88.05650	OTB-2-FH	1364	1233	10.1	273	271	0.9
88.05800	IN-FB-FH	127	117	8.1	8.89	8.06	9.8
88.05660	OTA-3-BH	27.0	28.0	3.3	0.888	4.82	138
88.05663	OTC-3-FH	533	540	1.3	155	171	9.4
88.05670	OTA-4-FH	601	654	8.5	147	184	22.6
88.05820	PSD-IN-2-ST8	820	876	6.6	315	309	1.8
88.05830	PSD-IN-3-ST6	42.5	42.2	0.9	9.28	8.94	3.7
88.06080	HNO_3 Blank	0.426	1.12	---	<MDL	1.33	---
88.05800	IN-FB-FH	127	117	8.1	8.90	8.06	9.8

[a] $\text{Difference(\%)} = \dfrac{\text{First value - second value}}{0.5\text{ (first + second value)}} \times 100$

As described in the previous sections, a field blank was collected at each of the two sampling locations (inlet and outlet). A field blank is a complete sampling train that is equipped, prepared, and handled in a manner identical to those trains used to collect samples. The one difference between field blank trains and test sampling trains is that the field blank trains are not inserted into the stack and do not pull sample. The field blank trains for Monsanto were prepared using glassware and components previously used at that location during the test program to collect actual flue gas samples. The field blank train components were assembled and handled in the same fashion and recovery environment as the standard sampling train components. The field blank train components were then recovered using the same solvents and sample containers as the field samples.

Table 5-7 contains the field blank results from each location. As seen in the table, radionuclide activities in the inlet field blank were less than 1 percent of the average activities for that location. At the outlet, the field blank activities were approximately 3.4 percent for Po-210 and 2.7 percent for Pb-210. These results are within the acceptance criteria for this program.

5.3 QA/QC RESULTS FOR PARTICLE SIZE SAMPLING

A blank (substrate media interaction) impactor run was performed to assess the degree of substrate-flue gas interaction. The blank PSD train was operated for the same time interval as the sample trains. Flue gas constituents can react with substrate materials and, therefore, bias the final filter weights. Where bias occurs, it may be either negative or positive. The flue gases' interaction with substrate materials will be uniform; that is, it effects all substrates not just one or two. This interaction ideally will be negligible. The criterion for determining if bias exists is that the average recorded blank substrate weight loss/gain should be no greater than 10 percent of the minimum acceptable substrate weight gain. The minimum weight gain was 2-5 mg $\pm$ 0.05 mg. Thus, a significant weight gain or loss would be 0.2 mg (0.0002 g) $\pm$ 0.05 mg.

TABLE 5-7. SUMMARY OF MM 111 RADIONUCLIDE FIELD BLANK VALUES FOR THE TEST PROGRAM, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Description	Inlet Po-210 (pCi/train)	Inlet Pb-210 (pCi/train)	Outlet Po-210 (pCi/train)	Outlet Pb-210 (pCi/train)
Field Blank	158.9	8.8	26.9	5.1
Average Test Value	21,274	6,589	797	192
Minimum Test Value	18,516	4,968	402	124
Field Blank Expressed as Percentage of Average Test Value	0.7%	0.13%	3.4%	2.7%
Field Blank Expressed as Percentage of Minimum Test Value	0.9%	0.18%	6.7%	4.1%

Filter interaction impactor runs were performed at both the inlet and outlet locations. The run was performed identically to a standard run except that the nozzle of the train was oriented opposite of the flue gas flow direction and a regular filter (back-up filter) replaced the substrate on the zero stage. The weight gains for the blank interaction runs are presented in Table 5-8.

The average net gain was -0.00011 grams for the outlet blank and 0.00001 grams for the inlet blank. Both these blanks are below the weight gain criteria, indicating that there was no consistent positive or negative bias. Thus, the variability of the net weights is due to the imprecision of weighing and substrate handling. However, the back-up filter weight gain is real. The weight gain exhibited by the back-up filter is most likely due to condensing moisture running back from the probe. The PSD data was not adjusted for flue gas interaction.

5.4 DUPLICATE ANALYSES BY AN INDEPENDENT LABORATORY

Extracts prepared by EERF for four samples were split into two aliquots and sent to TMA Norcal Laboratories for additional independent analyses. The samples were analyzed for polonium-210 only by TMA Norcal Laboratories. The results are presented in Table 5-9. The difference between the duplicate analyses ranged between 5 to 19 percent, indicating good agreement between the analyses performed by the two laboratories.

TABLE 5-8. FLUE GAS INTERACTION SAMPLE WEIGHT GAINS, MONSANTO, SODA SPRINGS, IDAHO (August 1988)

Filter Number	Sample Weight[a] (g)	Tare Weight[a] (g)	Net Gain[b] (g)
Outlet - Blank			
MB-0[c]	0.67148	0.67103	0.00045
MB-1	0.85016	0.84995	0.00021
MB-2	0.81748	0.81788	-0.00040
MB-3	0.84369	0.84368	0.00001
MB-4	0.82486	0.82545	-0.00059
MB-5	0.84493	0.84505	-0.00012
MB-6	0.82623	0.82622	0.00001
MB-7	0.85018	0.85002	0.00016
MB-8	0.81092	0.81106	-0.00014
MB-9	0.95828	0.95513	0.00315
Average (stages 1-8)[d]			-0.00011
Inlet - Blank			
AH-0[c]	0.52915	0.52904	0.00011
AH-1	0.67834	0.67842	-0.00008
AH-2	0.66543	0.66531	0.00012
AH-3	0.68831	0.68818	0.00013
AH-4	0.67097	0.67083	0.00014
AH-5	0.68916	0.68927	-0.00011
AH-6	0.65634	0.65647	-0.00013
AH-7	0.69941	0.69933	0.00008
AH-8	0.66602	0.66609	-0.00007
AH-9	0.79193	0.79004	0.00189
Average (stages 1-8)[d]			0.00001

[a] Weighed to a constant weight (± 0.00005 g).
[b] Average net gain should be less than 0.0002 + 0.00005 g to meet the QA criteria.
[c] These stages were not evaluated for flue gas interaction. Weight gain on these stages is expected during the flue gas interaction run.
[d] Weight gain on stage 9 is suspected to be condensing moisture running back from the probe.

TABLE 5-9. DUPLICATE ANALYSES FOR POLONIUM-210 PERFORMED BY AN INDEPENDENT LABORATORY

EERF No.	Run No.	pico Curies per sample: Analysis 1 (by EERF)	Analysis 2[a] (by TMA Norcal)	Difference[b] (%)
88.5659	OTA-2-FH	375	425	12.5
88.5661	OTB-3-FH	652	689	5.5
88.5663	OTC-3-FH	533	505	5.4
88.5665	OTD-3-FH	810	977	18.7

[a]Norcal Po-210 results at analysis (10/4/88) were decayed to collection date (8/17/88) for comparison with EERF data using this equation.

$$ACT_{Po@c} = ACT_{Po@a} \bullet e^{\lambda_{Po} T} - \left(ACT_{Pb@a} \bullet \frac{\lambda_{Po}}{\lambda_{Po} - \lambda_{Pb}} \bullet (e^{\lambda_{Po} T} - e^{\lambda_{Pb} T}) \right)$$

where:

$ACT_{Po@c}$ = Activity of Po at collection.

$ACT_{Po@a}$ = Activity of Po at analysis.

λ_{Po} = Radiological decay constant (fraction/day) of Po.

$ACT_{Pb@a}$ = Activity of Pb at analysis.

λ_{Pb} = Radiological decay constant (fraction/day) of Pb.

T = Time between analysis and collection (days). Since no Pb data was associated with the Norcal data, the EERF Pb data was decayed to 10/4/88 using the following equation and entered into the first equation for $ACT_{Pb@a}$.

$A = A_o e^{-\lambda_{Pb} t}$.

A_o = Activity on EERF analysis date.

t = Days between EERF analysis and 10/4/88.

[b]Difference (%) = $\frac{\text{First value - second value}}{\text{0.5 (first + second value)}} \times 100$

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park, NC 27711

EMB Report No. 88-EPP-01
Volume II
January 1989

Air

EPA

Elemental Phosphorus Production - Calciner Off-Gases

Emission Test Report

Monsanto
Soda Springs, Idaho

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

15 MAR 1990

MEMORANDUM

SUBJECT: Source Test Report

FROM: J. E. McCarley, Chief
Field Testing Section, EMB, TSD (MD-14)

TO: Addressees

The enclosed final source test report is submitted for your information. Any questions regarding the test should be directed to the Task Manager (Telephone: FTS 629-5233). Additional copies of this report are available from ERC Library, MD-35, Research Triangle Park, North Carolina 27711.

Industry: Elemental Phosphorus Production

Process: Calciner

Company: Monsanto

Location: Soda Springs, Idaho

Project Report Number: 88-EPP-01

Task Manager: Terry Harrison

Project Officer: K. William Grimley

Enclosure

cc: Terry Harrison (MD-14)

Addressees:

Ken Knapp, ASRL/SSERB (MD-46)
Arch MacQueen, TSD/MRB (MD-14)
Rodney Midgett, EMSL (MD-77A)
Ron Shafer, SSCD/TSB (EN-341)
Rosemary Thorn, EPA Library Services (MD-35)
Director, Air and Toxics Division, Region X
(Copy enclosed for State agency)

DCN 89-222-124-20-08 EMB Report No. 88-EPP-01
Radian No. 222-124-20

EMISSION TEST REPORT
MONSANTO ELEMENTAL PHOSPHORUS PLANT
SODA SPRINGS, IDAHO

VOLUME II: APPENDICES A-N

EPA Contract No. 68-02-4338
Work Assignment Nos. 20/26

Prepared for:

Robert T. Harrison, Task Manager
Emissions Measurement Branch
Technical Support Division
U. S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

Prepared by:

Radian Corporation
Post Office Box 13000
Research Triangle Park, North Carolina 27709

February 3, 1989

JES/055

VOLUME II
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APPENDIX A - EPA METHOD 111 PROTOCOL

(c) "Electric furnace" means a unit in which the phosphate rock is heated with silica and coke to reduce the phosphate to elemental phosphorus.

(d) "Curie" is a unit of radioactivity equal to 37 billion nuclear transformations (decays) per second.

§ 61.152 Standard.

Emissions of polonium-210 to air from sources subject to this subpart shall not exceed 1 curie in a calendar year.

§ 61.153 Emission tests.

(a) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator required to comply with § 61.152 shall test emissions from his source within the following time limits:

(1) Within 90 days of the effective date of this rule in the case of an existing source or a new source that has an initial startup date preceding the effective date of this rule; or

(2) Within 90 days of startup in the case of a new source that did not have an initial startup date preceding the effective date of this rule.

(b) The Administrator shall be notified at least 30 days prior to an emission test so that EPA may, at its option, observe the test.

(c) Each emission test shall consist of three runs. The phosphate rock processing rate during each test shall be recorded. The averge of all three runs shall apply in computing the emission rate. For determining compliance with the emission standard of § 61.152, the annual polonium-210 emissions shall be determined by multiplying the polonium-210 emission rate in curies per metric ton of phosphate rock processed by the annual phosphate rock processing rate in metric tons. In determining the annual phosphate rock processing rate, the values used for operating hours and operating capacity shall be values that will maximize the expected production rate. If the owner or operator of a source subject to this subpart changes his operation in a way that could change his emissions of polonium-210, he may determine his compliance with the requirements of this subpart on the basis of calculations using data from previous emission tests.

(d) All samples shall be analyzed, and polonium-210 emissions shall be determined within 30 days after the source test. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following each determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available for inspection by the Administrator for a minimum of 2 years.

§ 61.154 Test methods and procedures.

(a) Each owner or operator of a source required to test emissions under § 61.153, unless an eqivalent or alternate method has been approved by the Administrator, shall use the following test methods:

1. Test Method 1 of Appendix A to Part 60 shall be used to determine sample and velocity traverses;
2. Test Method 2 of Appendix A to Part 60 shall be used to determine velocity and volumetric flow rate;
3. Test Method 5 of Appendix A to Part 60 shall be used to collect particulate matter containing the polonium-210;
4. Test Method 111 of Appendix B to this part shall be used to determine the polonium-210 emissions.

§ 61.155 Monitoring of operations.

(a) The owner or operator of any source subject to this subpart using a wet scrubbing emission control device shall install, calibrate, maintain, and operate a monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within ± 250 pascals (± 1 inch of water). Records of these measurements shall be maintained at the source and made available for inspection by the Administrator for a minimum of two years.

(b) For the purpose of conducting an emission test under § 61.153, the owner or operator of any source subject to the provisions of this subpart shall install, calibrate, maintain, and operate a device for measuring the phosphate rock feed to any affected nodulizing kiln. The measuring device used must be accurate to within ± 5 percent of the mass rate over its operating range.

Appendix B—[Amended]

6. By adding the following test method of Appendix B:

Method 111—Determination of Polonium-210 Emissions From Stationary Sources

Performance of this method should not be attempted by persons unfamiliar with the use of equipment for measuring radioactive disintegration rates.

1.0 Applicability and Principle

1.1 *Applicability.* This method is applicable to the determination of polonium-210 emissions in particulate samples collected in stack gases.

1.2 *Principle.* A particulate sample is collected from stack gases as described in Method 5 of Appendix A to 40 CFR Part 60. The polonium-210 in the sample is put in solution, deposited on a metal disc and the radioactive disintegration rate measured. Polonium in acid solution spontaneously deposits on surfaces of metals which are more electropositive than polonium. This principle is routinely used in the radiochemical analyses of polonium-210 (reference 1).

2.0 Apparatus

2.1 Alpha-counter photomultiplier tube, (5 cm), with associated electronics to record pulses.

2.2 Constant temperature bath at 85°C.

2.3 Polished nickel discs, 3.8 cm diameter, 0.8 mm thick.

2.4 Silver activated zinc sulfide screen.

2.5 Beakers, 400 ml, 150 ml.

2.6 Hot plate, electric.

2.7 Fume hood.

2.8 Teflon beakers, 150 ml.

Teflon is a registered trademark of DuPont Co.

3.0 Reagents

3.1 *Analysis.*

3.1.1 Ascorbic acid, reagent grade.

3.1.2 Distilled water.

3.1.3 Hydrochloric acid 12*M*, concentrated reagent grade.

3.1.4 Hydrofluoric acid 28*M*, reagent grade.

3.1.5 Nitric acid 16*M*, concentrated reagent grade.

3.1.6 Perchloric acid 12*M*, 72 percent reagent grade.

3.1.7 Sodium hydroxide 18*M*. Dissolve 720 g of sodium hydroxide pellets in distilled water and dilute to 1 liter.

3.1.8 Trichloroethylene.

3.2 *Standard solution.* Prepare calibrated solution of polonium-210 from supplier of this radionuclide. Known aliquots are to be used to establish efficiency of deposition.

4.0 Procedure

4.1 *Sample Preparation.*

4.1.1 Place filter collected by EPA Method 5 Part 60 in Teflon beaker, add 30 ml hydrofluoric acid and evaporate to dryness on hot plate in hood.

4.1.2 Repeat step 4.1.1 until glass fiber filter has been digested.

4.1.3 Add 100 ml 16*M* nitric acid to residue in Teflon beaker and evaporate to dryness. Do not overheat.

4.1.4 Add 50 ml 16*M* nitric acid to residue from step 4.1.3 and heat to 80°C.

4.1.5 Decant acid solution into glass beaker and add 10 ml 12*M* perchloric acid.

4.1.6 Heat acid mixture to perchloric acid fumes.

4.1.7 Adjust volume to 60 ml with distilled water and neutralize with 18*M* sodium hydroxide.

4.1.8 Dilute to 100 ml with distilled water and adjust solution to 0.5*M* in HCl by adding 4 ml 12*M* hydrochloric acid.

4.2 *Sample Analysis.* Analyze the solution for polonium-210 using any published method which involves the spontaneous electrodeposition of polonium-210, including the method described below:

4.2.1 Add 200 ml of ascorbic acid and heat solution to 85°C in constant temperature bath.

4.2.2. Melt a thin coating of polyethylene on the unpolished side of disc to prevent deposition. Adhesion of the polyethylene to the disc is enhanced by sanding the nickel surface with garnet paper.

4.2.3 Clean polished side with trichloroethylene, hydrochloric acid, and distilled water.

4.2.4 Suspended nickel disc in the solution using glass or plastic hook.

4.2.5 Maintain disc in solution for 3 hours while stirring the solution.

4.2.6 Remove nickel disc, rinse with distilled water and dry at room temperature.

4.3 Measurement of Polonium-210.

4.3.1 Position deposition side of nickel disc adjacent to zinc sulfide screen on photomultiplier tube and count pulses.

4.3.2 Establish background count rate by measuring counts over clean nickel discs.

4.3.3 Determine procedure efficiency by adding calibrated aliquots of polonium-210 to acid solution with clean filter and following procedure through radioassay step.

4.3.4 Determine counter efficiency by carefully evaporating known aliquots of polonium-210 on nickel disc and measuring count rate, comparing count rate to known disintegration rate as fraction.

5.0 Calculations

5.1 Calculate the curies of polonium-210 in the sample using the following equation:

$$A = \frac{C_T - C_B}{2.22\times 10^{-12}(E_C)(E_P)(T)(D)}$$

A = Curies of polonium-210 in sample.
C_T = total sample counts for counting period.
C_B = background counts for counting period.
E_P = procedure efficiency.
E_C = counting efficiency.
T = counting time in minutes.
D = decay correction.

5.1.1 Decay Correction

$$\text{Decay correction (D)} = e^{-\frac{0.693(T)}{t\frac{1}{2}}}$$

T = time in days from midpoint of collection time to the counting time.
t½ = radiological half life of polonium-210, 138.4 days.

5.2 Procedure for Calculating Emissions.

Calculate the polonium-210 emission per metric ton of rock processed using the following equation:

$$E = \frac{AQ_s}{V_t M}$$

E = Curies of polonium-210 per metric ton of rock processed.
A = Curies of polonium-210 in sample from 5.1.
Q_s = Volumetric flow rate of effluent stream in m^3/h.
V_t = Total volume of air sampled in m^3.
M = Rock processing rate during sampling in metric tons/hr.

6.0 References

1. Blanchard, Richard L., Rapid Determination of Lead-210 and Polonium-210 in Environmental Samples by Deposition on Nickel, Anal. Chem., 38, 189 (1966).

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BILLING CODE [illegible]

APPENDIX B - EERF RADIOCHEMICAL ANALYSIS PROCEDURES

"Radiochemical Determination of Lead-210 and Polonium-210 in Dry Inorganic and Biological Samples"
EPA 520/5-84-006, EERF Radiochemistry Procedures Manual
Modified for Phosphate Samples

1.0 Principle

Polonium-209 and bismuth-207 tracers are added to a sample in a teflon beaker, the sample is then solubilized by wet ashing. The radioelements are coprecipitated with ammonium hydroxide. The hydroxide is redissolved in an acid solution and the polonium and bismuth are deposited on a metal disc. Polonium and bismuth in acid solution spontaneously deposit on surfaces of metals that are more electropositive. This method is applicable to the determination of polonium-210 and lead-210 in particulate and liquid samples.

2.0 Apparatus

2.1 Alpha spectrometry system consisting of a multichannel analyzer, biasing electronics, silicon surface barrier detector, vacuum pump and chamber.
2.2 Constant temperature bath at 80°C.
2.3 Polished nickel discs, 2.2 cm diameter with a small hole near the edge.
2.4 Glass beakers, 400 ml, 150 ml.
2.5 Hot plate, electric.
2.6 Fume hood.
2.7 Teflon beakers, 150 ml.
2.8 Magnetic stirrer.
2.9 Stirring bar.
2.10 Plastic or glass hooks to suspend plating discs.
2.11 Internal proportional counter for measuring alpha particles.
2.12 Internal proportional counter for measuring beta particles.
2.13 Gamma detectors.

2.14 Nucleopore filter membranes, 25 mm diameter, 0.2 micrometer pore size or equivalent.

2.15 Planchets, stainless steel, 32 mm diameter with 1.5 mm lip.

2.16 Transparent plastic tape, 2.5 cm wide with adhesive on both sides.

2.17 Epoxy spray enamel.

2.18 Suction filter apparatus for 25 mm diameter filter.

2.19 Wash bottles, 250 ml capacity.

2.20 Plastic graduated cylinder, 25 ml capacity.

2.21 250 ml glass centrifuge bottles.

2.22 Volumetric flasks.

3.0 Reagents

3.1 Ascorbic acid, Reagent grade.

3.2 Ammonium hydroxide (NH_4OH) 15 M, Reagent grade.

3.3 Distilled water.

3.4 Ethanol (C_2H_5OH), 95 percent, Reagent grade.

3.5 Hydrochloric acid (HCl), 12 M, Reagent grade.

3.6 Hydrochloric acid - 3 M, dilute 250 ml of the 12 M Reagent grade HCl to 1 liter with distilled water.

3.7 Hydrochloric acid, 1 M, dilute 83 ml of the 12 M Reagent grade HCl to 1 liter with distilled water.

3.8 Hydrofluoric acid (HF), 29 M, Reagent grade.

3.9 Lanthanum carrier, 10 mg La^{+3}/ml. Dissolve 7.8 g high purity $La(NO_3)_3 \cdot 6\ H_2O$ in 250 ml of distilled water.

3.10 Lanthanum carrier, 0.1 mg La^{+3}/ml. Dissolve 0.078 gram Reagent grade lanthanum nitrate, $La(NO_3)_3 \cdot 6\ H_2O$ in 250 ml of 1 M HCl.

3.11 Nitric acid (HNO_3), 16 M, Reagent grade.

3.12 Perchloric acid ($HClO_4$), 12 M, Reagent grade.

3.13 Polonium-209 solution.

3.14 Bismuth-207 solution.

3.15 Sandpaper.

3.16 Degreaser.

4.0 Procedure

4.1 Sample preparation.

4.1.1 Place sample in Teflon beaker. Add a measured aliquot of Bi-207 and Po-209 tracers. For filter samples, add 30 ml of 29 M hydrofluoric acid. For liquid samples, add nitric acid. Evaporate to near dryness on hot plate in a properly operating fume hood. Caution: Do not allow residue to go to dryness and overheat. This will result in a loss of polonium.

4.1.2 Repeat the procedure described in Section 4.1.1 until the glass fiber filter is dissolved.

4.1.3 Add 100 ml of 16 M nitric acid to residue in Teflon beaker and evaporate to near dryness. Caution: Do not allow residue to go to dryness and overheat.

4.1.4 Add 50 ml of 16 M nitric acid to residue. Add 10 ml of 12 M perchloric acid. Heat mixture until dense perchloric acid fumes are evolved.

4.1.5 Add 10 ml 12 M HCl and evaporate to near dryness. Repeat the HCl addition several times.

4.1.6 Dilute the sample with 3 M HCl in a volumetric flask.

4.2 Sample Screening.

The samples are checked for radioactivity levels to avoid contamination of the alpha spectrometry system. Use the following screening method:

4.2.1 Add 20 ml of 1 M HCl to a 150 ml beaker.

4.2.2 Add 1 ml of the lanthanum carrier solution, 0.1 mg lanthanum per ml.

4.2.3 Add a 1 ml aliquot of solution from Section 4.1.6 to the beaker.

4.2.4 Add 3 ml of 15 M ammonium hydroxide.

4.2.5 Allow the solution from Section 4.2.4 to stand for a minimum of 30 minutes.

4.2.6 Filter the solution through a filter membrane using suction.

4.2.7 Wash the membrane with 10 ml of distilled water and 5 ml of ethanol.

4.2.8 Air dry the membrane and mount, filtration side up, on a planchet lined with double-side plastic tape. After 24 hours count the membrane for 5 minutes using an internal proportional alpha counter.

4.2.9 Determine the aliquot volume of solution from Section 4.1.6 to be analyzed for polonium-210 and lead-210. The aliquot used should contain approximately 50 picocuries.

$$P = \frac{C_S - C_B}{2.22 \; E_I \; A_L \; T}$$

where:

P= activity per milliliter of the original solution in pCi.

C_S= total counts of screening sample.

C_B= total counts of instrument background.

E_I= counting efficiency, counts per minute per disintegration per minute.

2.22= disintegrations per minute per picocurie.

A_L= aliquot used in Section 4.2.3 in ml if different from 1 ml.

T= counting time in minutes for sample and background (which must be equal).

4.3 Preparation of Nickel Discs for Spontaneous Deposition

4.3.1 Clean both sides of disc with a mild abrasive cleanser. Sand disc to prepare for painting.

4.3.2 Clean both sides of disc with degreaser.

4.3.3 Place disc on absorbent paper and spray one side with epoxy spray enamel.

4.3.4 Allow paint to dry for 24 hours before using disc for deposition.

4.4 Sample Analysis

4.4.1 Add the aliquot of solution from Section 4.1.6 to be analyzed as determined in Section 4.2.9 to a 250 ml centrifuge bottle. Note, aliquot volume may require a larger container.

4.4.2 If a small aliquot of the original volume was taken for analysis, additional Po-209 and Bi-207 tracers must be added at this time to determine plating yield.

4.4.3 If necessary, bring the volume to 100 ml with 3 M HCl. If the aliquot volume exceeds 100 ml, use total aliquot.

4.4.4 Add 1 ml of lanthanum carrier, 10 mg lanthanum per ml.

4.4.5 Make sample basic to pH 9 by the addition of 15 M NH_4OH with stirring. Check the pH of the solution with indicator paper.

4.4.6 Allow sample to stand for a minimum of 30 minutes.

4.4.7 Centrifuge the sample for 30 minutes at 2000 rpm. Discard supernate.

4.4.8 Add 100 ml distilled water to the centrifuge bottle. Break up the precipitate with a stirring rod.

4.4.9 Centrifuge the sample for 10 minutes at 2000 rpm. Discard supernate.

4.4.10 Dissolve precipitate in 3 ml 12 M HCl.

4.4.11 Add 200 mg of ascorbic acid, with stirring.

4.4.12 Add 100 ml distilled water and heat solution to 80°C in a constant temperature bath. Stirring of the solution must be maintained while the solution is in the constant temperature bath for plating.

4.4.13 Suspend a nickel disc in the heated solution using a glass or plastic rod with a hook inserted through the hole in the disc. The disc should be totally immersed in the solution at all times.

4.4.14 Maintain the disc in solution for 4 hours while stirring. Wash down the sides of the centrifuge bottle with distilled water after 2 hours.

4.4.15 Remove the nickel disc, rinse with distilled water and allow to air dry at room temperature.

4.4.16 Mount the nickel disc with deposition side (unpainted side) up on planchet with double stick tape for radioassay.

4.5 Measurement of Polonium-210

4.5.1 Place the planchet with disc in the beta proportional counter. Cover the planchet with an absorber to eliminate counting the alpha particles. Beta count for 1000 minutes. Bismuth-210 has a 5 day half life; therefore, the beta count should be the first count.

4.5.2 Count the disc in the alpha spectrometry system for 1000 minutes.

4.5.3 Count the disc on the gamma detector for 1000 minutes.

Calculate the chemical yield of Po.

$$Y_{Po} = \frac{T_{Po} \cdot L_s}{S_{Po} \cdot L_T}$$

T_{Po} = Net counts of Po-209 tracer

L_s = Length of Po-209 standard count

S_{Po} = Net counts of Po-209 standard

L_T = Length of Po-209 tracer count

Calculate the activity of Po-210 at time of counting.

$$ACT_{Po(1)} = \frac{C}{(2.22)\,(Y_{Po})\,(L_c)\,(E_A)\,(A)}$$

C = Net counts in Po-210 energy region

Y_{Po} = Calculated Po yield

L_c = Length of count

E_A = Alpha spec efficiency

A = Sample size for analysis

Subtract the Po-210 contributed from the decay of plated Bi-210 between time of plating and counting.

$$ACT_{Po(2)} = ACT_{Po(1)} - ACT_{Bi(1)} \quad \frac{\lambda_{Po}}{\lambda_{Po} - \lambda_{Bi}} \cdot \left(e^{-\lambda_{Bi} t} - e^{-\lambda_{Po} t}\right)$$

t = Time in minutes between mid- plating and mid- alpha spec count (minutes)

$ACT_{Bi(1)}$ = Calculated activity of Bi-210 at ~~counting~~ analysis

Decay the Po-210 to time of analysis.

$$ACT_{Po(3)} = \frac{ACT_{Po(2)}}{e^{-\lambda_{Po} t}}$$

This program added later
λ in days
T in days

Decay the Po-210 results to collection date.

$$ACT_{Po(4)} = ACT_{Po(3)} \cdot e^{\lambda_{Po} T} - \left(ACT_{Pb} \cdot \frac{\lambda_{Po}}{\lambda_{Po} - \lambda_{Pb}} \right.$$

$$\left. X \quad e^{\lambda_{Po} T} - e^{\lambda_{Pb} T} \right)$$

T = Time between collection and analysis. (days)

ACT_{Pb} = activity of Pb at analysis

Lead Calculation

Calculate the chemical yield of bismuth.

$$Y_{Bi} = \frac{T_{Bi} \cdot L_s}{S_{Bi} \cdot L_T}$$

T_{Bi} = Net gamma counts of Bi-207 tracer

L_s = Length of Bi-207 standard count

S_{Bi} = Net gamma counts of Bi-207 standard

L_T = Length of Bi-207 tracer count

Calculate the activity of Bi-210 at time of analysis.

$$ACT_{Bi(1)} = \frac{\frac{B}{L_B} - \left(B_c \cdot Y_{Bi}\right)}{(Y_{Bi})\ (E_B)\ (2.22)\ (A)\ (e^{-\lambda_{Bi} t})}$$

B = Net beta counts for Bi

L_B = Length of beta count

B_c = Beta contribution from Bi-207 tracer (cpm)

E_B = Beta counting efficiency

t = Time between mid plating and mid beta count (minutes)

A = Sample size for analysis

At time of analysis, the Pb-210 is in equilibrium with the Bi-210.

Decay the Pb-210 results to collection date.

$$ACT_{Pb(c)} = ACT_{Pb(1)} \cdot e^{\lambda_{Pb} T}$$

T = Time between collection and analysis

TOTAL P.07

APPENDIX C - METHOD 111 SAMPLING PARAMETER SUMMARIES

APPENDIX C.1 - Test Run No. 1, 8/16/88

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8/16/88	
LOCATION: INLET	
RUN NUMBER: 1.00	
SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	23.99
Absolute Stack Pressure,Ps(in. Hg)	23.44
Stack Static Pressure (in. H2O)	-7.50
Average Stack Temperature (F)	160.79
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	37.24
Average Meter Pressure (in.H2O)	1.19
Average Meter Temperature (F)	79.67
Moisture Collected (g)	313.60
Carbon Dioxide Concentration (%V)	20.70
Oxygen Concentration (%V)	6.00
Nitrogen Concentration (%V)	73.30
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84
Particulate Catch	0.3999
Average Sampling Rate (dscfm)	0.49
Standard Metered Volume,Vm(std) (dscf)	29.31
Standard Metered Volume,Vm(std) (dscm)	0.830
Standard Volume Water Vapor,Vw (scf)	14.79
Standard Volume Water Vapor,Vw (scm)	0.419
Stack Moisture (%V)	33.53
Mole Fraction Dry Stack Gas	0.665
Dry Molecular Weight	31.55
Wet Molecular Weight	27.01
Stack Gas Velocity,Vs (fpm)	4186.40
Stack Gas Velocity,Vs (mpm)	1276.01
Volumetric Flow Rate (acfm)	70712.81
Volumetric Flow Rate (acmm)	2002.587
Volumetric Flow Rate (dscfm)	31298.78
Volumetric Flow Rate (dscmm)	886.382
Percent Isokinetic	78.55
Percent Excess Air	44.89
Fuel Factor,Fo	0.720
Ultimate CO2	29.04
Concentration of Particulate (grains/acf)	1.45E-06
Concentration of Particulate (g/acm)	3.33E-06
Concentration of Particulate (grains/dscf)	0.21056
Concentration of Particulate (g/dscm)	0.48179

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8/16/88
LOCATION: OUTLET A
RUN NUMBER: 1.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	23.99
Absolute Stack Pressure,Ps(in. Hg)	23.95
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	157.83
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	43.63
Average Meter Pressure (in.H2O)	1.64
Average Meter Temperature (F)	81.67
Moisture Collected (g)	448.46
Carbon Dioxide Concentration (%V)	17.30
Oxygen Concentration (%V)	8.50
Nitrogen Concentration (%V)	74.20
Dry Gas Meter Factor	1.00300
Pitot Constant	0.84
Particulate Catch	0.0237
Average Sampling Rate (dscfm)	0.57
Standard Metered Volume,Vm(std) (dscf)	34.37
Standard Metered Volume,Vm(std) (dscm)	0.973
Standard Volume Water Vapor,Vw (scf)	21.14
Standard Volume Water Vapor,Vw (scm)	0.599
Stack Moisture (%V)	38.09
Mole Fraction Dry Stack Gas	0.619
Dry Molecular Weight	31.11
Wet Molecular Weight	26.12
Stack Gas Velocity,Vs (fpm)	3798.63
Stack Gas Velocity,Vs (mpm)	1157.82
Volumetric Flow Rate (acfm)	64163.05
Volumetric Flow Rate (acmm)	1817.098
Volumetric Flow Rate (dscfm)	27156.02
Volumetric Flow Rate (dscmm)	769.058
Percent Isokinetic	104.48
Percent Excess Air	76.55
Fuel Factor,Fo	0.717
Ultimate CO2	29.16
Concentration of Particulate (grains/acf)	9.50E-08
Concentration of Particulate (g/acm)	2.17E-07
Concentration of Particulate (grains/dscf)	0.01064
Concentration of Particulate (g/dscm)	0.02435

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8/16/88	
LOCATION: OUTLET B	
RUN NUMBER: 1.00	
SAMPLING PARAMETER PARTICULATE/RADIONUCLIDE	
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.06
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	158.25
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	43.54
Average Meter Pressure (in.H2O)	0.00
Average Meter Temperature (F)	82.83
Moisture Collected (g)	445.80
Carbon Dioxide Concentration (%V)	17.40
Oxygen Concentration (%V)	8.80
Nitrogen Concentration (%V)	73.80
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84
Particulate Catch	0.0199
Average Sampling Rate (dscfm)	0.57
Standard Metered Volume,Vm(std) (dscf)	33.92
Standard Metered Volume,Vm(std) (dscm)	0.961
Standard Volume Water Vapor,Vw (scf)	21.02
Standard Volume Water Vapor,Vw (scm)	0.595
Stack Moisture (%V)	38.26
Mole Fraction Dry Stack Gas	0.617
Dry Molecular Weight	31.14
Wet Molecular Weight	26.11
Stack Gas Velocity,Vs (fpm)	3722.24
Stack Gas Velocity,Vs (mpm)	1134.54
Volumetric Flow Rate (acfm)	62872.72
Volumetric Flow Rate (acmm)	1780.555
Volumetric Flow Rate (dscfm)	26639.10
Volumetric Flow Rate (dscmm)	754.419
Percent Isokinetic	105.10
Percent Excess Air	82.26
Fuel Factor,Fo	0.695
Ultimate CO2	30.05
Concentration of Particulate (grains/acf)	8.14E-08
Concentration of Particulate (g/acm)	1.86E-07
Concentration of Particulate (grains/dscf)	0.00905
Concentration of Particulate (g/dscm)	0.02072

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8/16/88
LOCATION: OUTLET C
RUN NUMBER: 1.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.06
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	156.75
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	43.90
Average Meter Pressure (in.H2O)	1.51
Average Meter Temperature (F)	81.63
Moisture Collected (g)	461.19
Carbon Dioxide Concentration (%V)	17.40
Oxygen Concentration (%V)	8.80
Nitrogen Concentration (%V)	73.80
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84
Particulate Catch	0.0155
Average Sampling Rate (dscfm)	0.58
Standard Metered Volume,Vm(std) (dscf)	34.51
Standard Metered Volume,Vm(std) (dscm)	0.977
Standard Volume Water Vapor,Vw (scf)	21.75
Standard Volume Water Vapor,Vw (scm)	0.616
Stack Moisture (%V)	38.66
Mole Fraction Dry Stack Gas	0.613
Dry Molecular Weight	31.14
Wet Molecular Weight	26.06
Stack Gas Velocity,Vs (fpm)	3805.44
Stack Gas Velocity,Vs (mpm)	1159.90
Volumetric Flow Rate (acfm)	64278.04
Volumetric Flow Rate (acmm)	1820.354
Volumetric Flow Rate (dscfm)	27126.25
Volumetric Flow Rate (dscmm)	768.215
Percent Isokinetic	105.01
Percent Excess Air	82.26
Fuel Factor,Fo	0.695
Ultimate CO2	30.05
Concentration of Particulate (grains/acf)	6.20E-08
Concentration of Particulate (g/acm)	1.42E-07
Concentration of Particulate (grains/dscf)	0.00693
Concentration of Particulate (g/dscm)	0.01586

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8/16/88	
LOCATION: OUTLET D	
RUN NUMBER: 1.00	
SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	0.25
Average Stack Temperature (F)	159.25
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	45.73
Average Meter Pressure (in.H2O)	0.00
Average Meter Temperature (F)	89.75
Moisture Collected (g)	491.77
Carbon Dioxide Concentration (%V)	17.40
Oxygen Concentration (%V)	8.80
Nitrogen Concentration (%V)	73.80
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84
Particulate Catch	0.0150
Average Sampling Rate (dscfm)	0.59
Standard Metered Volume,Vm(std) (dscf)	35.64
Standard Metered Volume,Vm(std) (dscm)	1.009
Standard Volume Water Vapor,Vw (scf)	23.19
Standard Volume Water Vapor,Vw (scm)	0.657
Stack Moisture (%V)	39.41
Mole Fraction Dry Stack Gas	0.606
Dry Molecular Weight	31.14
Wet Molecular Weight	25.96
Stack Gas Velocity,Vs (fpm)	3735.12
Stack Gas Velocity,Vs (mpm)	1138.46
Volumetric Flow Rate (acfm)	63090.22
Volumetric Flow Rate (acmm)	1786.715
Volumetric Flow Rate (dscfm)	26257.62
Volumetric Flow Rate (dscmm)	743.616
Percent Isokinetic	112.04
Percent Excess Air	82.26
Fuel Factor,Fo	0.695
Ultimate CO2	30.05
Concentration of Particulate (grains/acf)	6.12E-08
Concentration of Particulate (g/acm)	1.40E-07
Concentration of Particulate (grains/dscf)	0.00649
Concentration of Particulate (g/dscm)	0.01486

APPENDIX C.2 - Test Run No. 2, 8/17/88

FACILITY : MONSANTO-SODA SPRINGS

DATE: 3/17/88
LOCATION: INLET
RUN NUMBER: 2.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	23.60
Stack Static Pressure (in. H2O)	-7.30
Average Stack Temperature (F)	161.21
Stack Area (sq.in.)	9160.88
Metered Volume,Vm (cu.ft.)	41.35
Average Meter Pressure (in.H2O)	1.56
Average Meter Temperature (F)	83.21
Moisture Collected (g)	473.30
Carbon Dioxide Concentration (%V)	20.70
Oxygen Concentration (%V)	6.00
Nitrogen Concentration (%V)	73.30
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84
Particulate Catch	0.5338
Average Sampling Rate (dscfm)	0.54
Standard Metered Volume,Vm(std) (dscf)	32.57
Standard Metered Volume,Vm(std) (dscm)	0.922
Standard Volume Water Vapor,Vw (scf)	22.32
Standard Volume Water Vapor,Vw (scm)	0.632
Stack Moisture (%V)	40.66
Mole Fraction Dry Stack Gas	0.593
Dry Molecular Weight	31.55
Wet Molecular Weight	26.04
Stack Gas Velocity,Vs (fpm)	4152.61
Stack Gas Velocity,Vs (mpm)	1265.71
Volumetric Flow Rate (acfm)	264177.52
Volumetric Flow Rate (acmm)	7481.507
Volumetric Flow Rate (dscfm)	105051.01
Volumetric Flow Rate (dscmm)	2975.045
Percent Isokinetic	97.94
Percent Excess Air	44.89
Fuel Factor,Fo	0.720
Ultimate CO2	29.04
Concentration of Particulate (grains/acf)	5.20E-07
Concentration of Particulate (g/acm)	1.19E-06
Concentration of Particulate (grains/dscf)	0.25295
Concentration of Particulate (g/dscm)	0.57878

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8-17-88
LOCATION: OUTLET STACK A
RUN NUMBER: 2.00

SAMPLING PARAMETER PARTICULATE/RADIONUCLIDES

Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.10
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	161.17
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	40.98
Average Meter Pressure (in.H2O)	1.35
Average Meter Temperature (F)	76.83
Moisture Collected (g)	420.70
Carbon Dioxide Concentration (%V)	19.70
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.90
Dry Gas Meter Factor	1.00350
Pitot Constant	0.84
Particulate Catch	0.0217

Average Sampling Rate (dscfm)	0.55
Standard Metered Volume,Vm(std) (dscf)	32.77
Standard Metered Volume,Vm(std) (dscm)	0.928
Standard Volume Water Vapor,Vw (scf)	19.84
Standard Volume Water Vapor,Vw (scm)	0.562
Stack Moisture (%V)	37.71
Mole Fraction Dry Stack Gas	0.623
Dry Molecular Weight	31.45
Wet Molecular Weight	26.38
Stack Gas Velocity,Vs (fpm)	3831.31
Stack Gas Velocity,Vs (mpm)	1167.78
Volumetric Flow Rate (acfm)	64714.96
Volumetric Flow Rate (acmm)	1832.728
Volumetric Flow Rate (dscfm)	27580.96
Volumetric Flow Rate (dscmm)	781.093
Percent Isokinetic	97.29
Percent Excess Air	62.39
Fuel Factor,Fo	0.685
Ultimate CO2	30.50
Concentration of Particulate (grains/acf)	8.62E-08
Concentration of Particulate (g/acm)	1.97E-07
Concentration of Particulate (grains/dscf)	0.01022
Concentration of Particulate (g/dscm)	0.02338

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8-17-88	
LOCATION: OUTLET B	
RUN NUMBER: 2.00	
SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.50
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	39.26
Average Meter Pressure (in.H2O)	0.00
Average Meter Temperature (F)	81.42
Moisture Collected (g)	407.50
Carbon Dioxide Concentration (%V)	19.70
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.90
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84
Particulate Catch	0.0253
Average Sampling Rate (dscfm)	0.51
Standard Metered Volume,Vm(std) (dscf)	30.72
Standard Metered Volume,Vm(std) (dscm)	0.870
Standard Volume Water Vapor,Vw (scf)	19.21
Standard Volume Water Vapor,Vw (scm)	0.544
Stack Moisture (%V)	38.48
Mole Fraction Dry Stack Gas	0.615
Dry Molecular Weight	31.45
Wet Molecular Weight	26.27
Stack Gas Velocity,Vs (fpm)	3670.58
Stack Gas Velocity,Vs (mpm)	1118.79
Volumetric Flow Rate (acfm)	62000.10
Volumetric Flow Rate (acmm)	1755.843
Volumetric Flow Rate (dscfm)	26236.95
Volumetric Flow Rate (dscmm)	743.030
Percent Isokinetic	96.64
Percent Excess Air	62.39
Fuel Factor,Fo	0.685
Ultimate CO2	30.50
Concentration of Particulate (grains/acf)	1.05E-07
Concentration of Particulate (g/acm)	2.40E-07
Concentration of Particulate (grains/dscf)	0.01271
Concentration of Particulate (g/dscm)	0.02908

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8-17-88
LOCATION: OUTLET C
RUN NUMBER: 2.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	155.92
Stack Area (sq.in.)	2432.32
Metered Volume;Vm (cu.ft.)	41.05
Average Meter Pressure (in.H2O)	1.18
Average Meter Temperature (F)	82.67
Moisture Collected (g)	425.70
Carbon Dioxide Concentration (%V)	19.70
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.90
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84
Particulate Catch	0.0242
Average Sampling Rate (dscfm)	0.54
Standard Metered Volume,Vm(std) (dscf)	32.23
Standard Metered Volume,Vm(std) (dscm)	0.913
Standard Volume Water Vapor,Vw (scf)	20.07
Standard Volume Water Vapor,Vw (scm)	0.568
Stack Moisture (%V)	38.38
Mole Fraction Dry Stack Gas	0.616
Dry Molecular Weight	31.45
Wet Molecular Weight	26.29
Stack Gas Velocity,Vs (fpm)	3631.95
Stack Gas Velocity,Vs (mpm)	1107.02
Volumetric Flow Rate (acfm)	61347.55
Volumetric Flow Rate (acmm)	1737.362
Volumetric Flow Rate (dscfm)	26112.83
Volumetric Flow Rate (dscmm)	739.515
Percent Isokinetic	101.87
Percent Excess Air	62.39
Fuel Factor,Fo	0.685
Ultimate CO2	30.50
Concentration of Particulate (grains/acf)	1.01E-07
Concentration of Particulate (g/acm)	2.32E-07
Concentration of Particulate (grains/dscf)	0.01159
Concentration of Particulate (g/dscm)	0.02651

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8-17-88
LOCATION: OUTLET D
RUN NUMBER: 2.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.58
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	34.40
Average Meter Pressure (in.H2O)	0.90
Average Meter Temperature (F)	89.92
Moisture Collected (g)	378.70
Carbon Dioxide Concentration (%V)	19.85
Oxygen Concentration (%V)	6.90
Nitrogen Concentration (%V)	73.25
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84
Particulate Catch	0.0183
Average Sampling Rate (dscfm)	0.45
Standard Metered Volume,Vm(std) (dscf)	26.92
Standard Metered Volume,Vm(std) (dscm)	0.762
Standard Volume Water Vapor,Vw (scf)	17.86
Standard Volume Water Vapor,Vw (scm)	0.506
Stack Moisture (%V)	39.87
Mole Fraction Dry Stack Gas	0.601
Dry Molecular Weight	31.45
Wet Molecular Weight	26.09
Stack Gas Velocity,Vs (fpm)	4152.95
Stack Gas Velocity,Vs (mpm)	1265.82
Volumetric Flow Rate (acfm)	70147.84
Volumetric Flow Rate (acmm)	1986.587
Volumetric Flow Rate (dscfm)	29008.00
Volumetric Flow Rate (dscmm)	821.507
Percent Isokinetic	76.61
Percent Excess Air	55.41
Fuel Factor,Fo	0.705
Ultimate CO2	29.63
Concentration of Particulate (grains/acf)	6.71E-08
Concentration of Particulate (g/acm)	1.54E-07
Concentration of Particulate (grains/dscf)	0.01049
Concentration of Particulate (g/dscm)	0.02400

APPENDIX C.3 - Test Run No. 3, 8/17/88

JES/055

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8/17/88
LOCATION: INLET
RUN NUMBER: 3.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	23.60
Stack Static Pressure (in. H2O)	-7.30
Average Stack Temperature (F)	161.71
Stack Area (sq.in.)	9160.88
Metered Volume,Vm (cu.ft.)	39.98
Average Meter Pressure (in.H2O)	1.51
Average Meter Temperature (F)	88.77
Moisture Collected (g)	459.40
Carbon Dioxide Concentration (%V)	20.70
Oxygen Concentration (%V)	6.00
Nitrogen Concentration (%V)	73.30
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84
Particulate Catch	0.5163
Average Sampling Rate (dscfm)	0.52
Standard Metered Volume,Vm(std) (dscf)	31.17
Standard Metered Volume,Vm(std) (dscm)	0.883
Standard Volume Water Vapor,Vw (scf)	21.66
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	41.00
Mole Fraction Dry Stack Gas	0.590
Dry Molecular Weight	31.55
Wet Molecular Weight	26.00
Stack Gas Velocity,Vs (fpm)	4067.93
Stack Gas Velocity,Vs (mpm)	1239.90
Volumetric Flow Rate (acfm)	258790.22
Volumetric Flow Rate (acmm)	7328.939
Volumetric Flow Rate (dscfm)	102239.55
Volumetric Flow Rate (dscmm)	2895.424
Percent Isokinetic	96.31
Percent Excess Air	44.89
Fuel Factor,Fo	0.720
Ultimate CO2	29.04
Concentration of Particulate (grains/acf)	5.13E-07
Concentration of Particulate (g/acm)	1.17E-06
Concentration of Particulate (grains/dscf)	0.25562
Concentration of Particulate (g/dscm)	0.58489

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8-17-88

LOCATION: OUTLET STACK A

RUN NUMBER: 3

SAMPLING PARAMETER PARTICULATE/RADIONUCLIDES

Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.06
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	138.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	37.07
Average Meter Pressure (in.H2O)	1.12
Average Meter Temperature (F)	84.33
Moisture Collected (g)	388.80
Carbon Dioxide Concentration (%V)	19.03
Oxygen Concentration (%V)	8.03
Nitrogen Concentration (%V)	72.93
Dry Gas Meter Factor	1.00300
Pitot Constant	0.84
Particulate Catch	0.0222

Average Sampling Rate (dscfm)	0.49
Standard Metered Volume,Vm(std) (dscf)	29.15
Standard Metered Volume,Vm(std) (dscm)	0.826
Standard Volume Water Vapor,Vw (scf)	18.33
Standard Volume Water Vapor,Vw (scm)	0.519
Stack Moisture (%V)	38.61
Mole Fraction Dry Stack Gas	0.614
Dry Molecular Weight	31.36
Wet Molecular Weight	26.20
Stack Gas Velocity,Vs (fpm)	3492.43
Stack Gas Velocity,Vs (mpm)	1064.49
Volumetric Flow Rate (acfm)	58990.88
Volumetric Flow Rate (acmm)	1670.622
Volumetric Flow Rate (dscfm)	24863.63
Volumetric Flow Rate (dscmm)	704.138
Percent Isokinetic	96.00
Percent Excess Air	71.45
Fuel Factor,Fo	0.676
Ultimate CO2	30.90
Concentration of Particulate (grains/acf)	9.68E-08
Concentration of Particulate (g/acm)	2.21E-07
Concentration of Particulate (grains/dscf)	0.01175
Concentration of Particulate (g/dscm)	0.02689

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8-17-88
LOCATION: OUTLET B
RUN NUMBER: 3.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.42
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	40.65
Average Meter Pressure (in.H2O)	0.00
Average Meter Temperature (F)	82.71
Moisture Collected (g)	442.50
Carbon Dioxide Concentration (%V)	19.40
Oxygen Concentration (%V)	8.40
Nitrogen Concentration (%V)	72.30
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84
Particulate Catch	0.0276
Average Sampling Rate (dscfm)	0.53
Standard Metered Volume,Vm(std) (dscf)	31.73
Standard Metered Volume,Vm(std) (dscm)	0.899
Standard Volume Water Vapor,Vw (scf)	20.86
Standard Volume Water Vapor,Vw (scm)	0.591
Stack Moisture (%V)	39.67
Mole Fraction Dry Stack Gas	0.603
Dry Molecular Weight	31.47
Wet Molecular Weight	26.13
Stack Gas Velocity,Vs (fpm)	3754.67
Stack Gas Velocity,Vs (mpm)	1144.42
Volumetric Flow Rate (acfm)	63420.45
Volumetric Flow Rate (acmm)	1796.067
Volumetric Flow Rate (dscfm)	26322.79
Volumetric Flow Rate (dscmm)	745.461
Percent Isokinetic	99.50
Percent Excess Air	78.49
Fuel Factor,Fo	0.644
Ultimate CO2	32.44
Concentration of Particulate (grains/acf)	1.12E-07
Concentration of Particulate (g/acm)	2.56E-07
Concentration of Particulate (grains/dscf)	0.01342
Concentration of Particulate (g/dscm)	0.03071

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8-17-88	
LOCATION: OUTLET C	
RUN NUMBER: 3.00	
SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	157.08
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	40.69
Average Meter Pressure (in.H2O)	0.00
Average Meter Temperature (F)	87.46
Moisture Collected (g)	431.20
Carbon Dioxide Concentration (%V)	18.95
Oxygen Concentration (%V)	7.90
Nitrogen Concentration (%V)	73.15
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84
Particulate Catch	0.0228
Average Sampling Rate (dscfm)	0.53
Standard Metered Volume,Vm(std) (dscf)	31.56
Standard Metered Volume,Vm(std) (dscm)	0.894
Standard Volume Water Vapor,Vw (scf)	20.33
Standard Volume Water Vapor,Vw (scm)	0.576
Stack Moisture (%V)	39.18
Mole Fraction Dry Stack Gas	0.608
Dry Molecular Weight	31.35
Wet Molecular Weight	26.12
Stack Gas Velocity,Vs (fpm)	3780.60
Stack Gas Velocity,Vs (mpm)	1152.33
Volumetric Flow Rate (acfm)	63858.47
Volumetric Flow Rate (acmm)	1808.472
Volumetric Flow Rate (dscfm)	26775.90
Volumetric Flow Rate (dscmm)	758.293
Percent Isokinetic	97.28
Percent Excess Air	69.14
Fuel Factor,Fo	0.686
Ultimate CO2	30.47
Concentration of Particulate (grains/acf)	9.18E-08
Concentration of Particulate (g/acm)	2.10E-07
Concentration of Particulate (grains/dscf)	0.01115
Concentration of Particulate (g/dscm)	0.02551

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8-17-88	
LOCATION: OUTLET D	
RUN NUMBER: 3	
SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.08
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	159.83
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	42.53
Average Meter Pressure (in.H2O)	1.28
Average Meter Temperature (F)	92.50
Moisture Collected (g)	463.60
Carbon Dioxide Concentration (%V)	18.93
Oxygen Concentration (%V)	7.96
Nitrogen Concentration (%V)	73.10
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84
Particulate Catch	0.0190
Average Sampling Rate (dscfm)	0.55
Standard Metered Volume,Vm(std) (dscf)	33.11
Standard Metered Volume,Vm(std) (dscm)	0.938
Standard Volume Water Vapor,Vw (scf)	21.86
Standard Volume Water Vapor,Vw (scm)	0.619
Stack Moisture (%V)	39.77
Mole Fraction Dry Stack Gas	0.602
Dry Molecular Weight	31.34
Wet Molecular Weight	26.04
Stack Gas Velocity,Vs (fpm)	3789.02
Stack Gas Velocity,Vs (mpm)	1154.89
Volumetric Flow Rate (acfm)	64000.76
Volumetric Flow Rate (acmm)	1812.501
Volumetric Flow Rate (dscfm)	26417.10
Volumetric Flow Rate (dscmm)	748.132
Percent Isokinetic	103.46
Percent Excess Air	70.11
Fuel Factor,Fo	0.684
Ultimate CO2	30.57
Concentration of Particulate (grains/acf)	7.64E-08
Concentration of Particulate (g/acm)	1.75E-07
Concentration of Particulate (grains/dscf)	0.00886
Concentration of Particulate (g/dscm)	0.02026

APPENDIX C.4 - Test Run No. 4, 8/18/88

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8/18/88
LOCATION: INLET
RUN NUMBER: 4.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	23.60
Stack Static Pressure (in. H2O)	-7.30
Average Stack Temperature (F)	161.13
Stack Area (sq.in.)	9160.88
Metered Volume,Vm (cu.ft.)	40.80
Average Meter Pressure (in.H2O)	1.56
Average Meter Temperature (F)	92.52
Moisture Collected (g)	497.80
Carbon Dioxide Concentration (%V)	20.70
Oxygen Concentration (%V)	6.00
Nitrogen Concentration (%V)	73.30
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84
Particulate Catch	0.5557
Average Sampling Rate (dscfm)	0.53
Standard Metered Volume,Vm(std) (dscf)	31.60
Standard Metered Volume,Vm(std) (dscm)	0.895
Standard Volume Water Vapor,Vw (scf)	23.47
Standard Volume Water Vapor,Vw (scm)	0.665
Stack Moisture (%V)	42.62
Mole Fraction Dry Stack Gas	0.574
Dry Molecular Weight	31.55
Wet Molecular Weight	25.78
Stack Gas Velocity,Vs (fpm)	4159.43
Stack Gas Velocity,Vs (mpm)	1267.79
Volumetric Flow Rate (acfm)	264611.22
Volumetric Flow Rate (acmm)	7493.790
Volumetric Flow Rate (dscfm)	101758.79
Volumetric Flow Rate (dscmm)	2881.809
Percent Isokinetic	98.09
Percent Excess Air	44.89
Fuel Factor,Fo	0.720
Ultimate CO2	29.04
Concentration of Particulate (grains/acf)	5.40E-07
Concentration of Particulate (g/acm)	1.24E-06
Concentration of Particulate (grains/dscf)	0.27142
Concentration of Particulate (g/dscm)	0.62105

FACILITY : MONSANTO - SODA SPRINGS

DATE:	8-18-88
LOCATION:	OUTLET STACK A
RUN NUMBER:	4.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.06
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	161.08
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	38.10
Average Meter Pressure (in.H2O)	1.12
Average Meter Temperature (F)	83.67
Moisture Collected (g)	389.10
Carbon Dioxide Concentration (%V)	19.75
Oxygen Concentration (%V)	7.60
Nitrogen Concentration (%V)	72.65
Dry Gas Meter Factor	1.00350
Pitot Constant	0.84
Particulate Catch	0.0269

Average Sampling Rate (dscfm)	0.50
Standard Metered Volume,Vm(std) (dscf)	30.02
Standard Metered Volume,Vm(std) (dscm)	0.850
Standard Volume Water Vapor,Vw (scf)	18.35
Standard Volume Water Vapor,Vw (scm)	0.520
Stack Moisture (%V)	37.93
Mole Fraction Dry Stack Gas	0.621
Dry Molecular Weight	31.46
Wet Molecular Weight	26.36
Stack Gas Velocity,Vs (fpm)	3614.09
Stack Gas Velocity,Vs (mpm)	1101.58
Volumetric Flow Rate (acfm)	61045.95
Volumetric Flow Rate (acmm)	1728.821
Volumetric Flow Rate (dscfm)	25883.29
Volumetric Flow Rate (dscmm)	733.015
Percent Isokinetic	94.96
Percent Excess Air	65.55
Fuel Factor,Fo	0.673
Ultimate CO2	31.04
Concentration of Particulate (grains/acf)	1.13E-07
Concentration of Particulate (g/acm)	2.59E-07
Concentration of Particulate (grains/dscf)	0.01383
Concentration of Particulate (g/dscm)	0.03164

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8-18-88
LOCATION: OUTLET B
RUN NUMBER: 4.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDE
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.33
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	40.32
Average Meter Pressure (in.H2O)	0.00
Average Meter Temperature (F)	85.29
Moisture Collected (g)	426.90
Carbon Dioxide Concentration (%V)	20.05
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.60
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84
Particulate Catch	0.0234
Average Sampling Rate (dscfm)	0.52
Standard Metered Volume,Vm(std) (dscf)	31.32
Standard Metered Volume,Vm(std) (dscm)	0.887
Standard Volume Water Vapor,Vw (scf)	20.13
Standard Volume Water Vapor,Vw (scm)	0.570
Stack Moisture (%V)	39.12
Mole Fraction Dry Stack Gas	0.609
Dry Molecular Weight	
Wet Molecular Weight	
Stack Gas Velocity,Vs (fpm)	
Stack Gas Velocity,Vs (mpm)	
Volumetric Flow Rate (acfm)	
Volumetric Flow Rate (acmm)	
Volumetric Flow Rate (dscfm)	
Volumetric Flow Rate (dscmm)	
Percent Isokinetic	
Percent Excess Air	
Fuel Factor,Fo	
Ultimate CO2	
Concentration of Particulate (grains/acf)	
Concentration of Particulate (g/acm)	
Concentration of Particulate (grains/dscf)	
Concentration of Particulate (g/dscm)	

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8-18-88

LOCATION: OUTLET C

RUN NUMBER: 4.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	157.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	40.89
Average Meter Pressure (in.H2O)	1.21
Average Meter Temperature (F)	89.71
Moisture Collected (g)	428.10
Carbon Dioxide Concentration (%V)	19.90
Oxygen Concentration (%V)	7.35
Nitrogen Concentration (%V)	72.75
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84
Particulate Catch	0.0222
Average Sampling Rate (dscfm)	0.53
Standard Metered Volume,Vm(std) (dscf)	31.69
Standard Metered Volume,Vm(std) (dscm)	0.898
Standard Volume Water Vapor,Vw (scf)	20.18
Standard Volume Water Vapor,Vw (scm)	0.572
Stack Moisture (%V)	38.91
Mole Fraction Dry Stack Gas	0.611
Dry Molecular Weight	31.48
Wet Molecular Weight	26.23
Stack Gas Velocity,Vs (fpm)	3745.07
Stack Gas Velocity,Vs (mpm)	1141.50
Volumetric Flow Rate (acfm)	63258.39
Volumetric Flow Rate (acmm)	1791.478
Volumetric Flow Rate (dscfm)	26647.49
Volumetric Flow Rate (dscmm)	754.657
Percent Isokinetic	98.17
Percent Excess Air	61.92
Fuel Factor,Fo	0.681
Ultimate CO2	30.69
Concentration of Particulate (grains/acf)	9.03E-08
Concentration of Particulate (g/acm)	2.07E-07
Concentration of Particulate (grains/dscf)	0.01081
Concentration of Particulate (g/dscm)	0.02473

FACILITY : MONSANTO - SODA SPRINGS

DATE: 8-18-88
LOCATION: OUTLET D
RUN NUMBER: 4.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.08
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	159.58
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	42.59
Average Meter Pressure (in.H2O)	1.33
Average Meter Temperature (F)	92.17
Moisture Collected (g)	455.10
Carbon Dioxide Concentration (%V)	20.10
Oxygen Concentration (%V)	7.05
Nitrogen Concentration (%V)	72.70
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84
Particulate Catch	0.0850
Average Sampling Rate (dscfm)	0.55
Standard Metered Volume,Vm(std) (dscf)	33.19
Standard Metered Volume,Vm(std) (dscm)	0.940
Standard Volume Water Vapor,Vw (scf)	21.46
Standard Volume Water Vapor,Vw (scm)	0.608
Stack Moisture (%V)	39.27
Mole Fraction Dry Stack Gas	0.607
Dry Molecular Weight	31.46
Wet Molecular Weight	26.17
Stack Gas Velocity,Vs (fpm)	3854.48
Stack Gas Velocity,Vs (mpm)	1174.84
Volumetric Flow Rate (acfm)	65106.33
Volumetric Flow Rate (acmm)	1843.811
Volumetric Flow Rate (dscfm)	27105.97
Volumetric Flow Rate (dscmm)	767.641
Percent Isokinetic	101.06
Percent Excess Air	57.99
Fuel Factor,Fo	0.689
Ultimate CO2	30.33
Concentration of Particulate (grains/acf)	3.36E-07
Concentration of Particulate (g/acm)	7.68E-07
Concentration of Particulate (grains/dscf)	0.03953
Concentration of Particulate (g/dscm)	0.09044

APPENDIX C.5 - Test Run No. 5, Outlet D only

FACILITY : MONSANTO-SODA SPRINGS

DATE: 8/19/88
LOCATION: OUTLET D
RUN NUMBER: 5.00

SAMPLING PARAMETER	PARTICULATE/RADIONUCLIDES
Total Sampling Time (min.)	60.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	160.67
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	42.37
Average Meter Pressure (in.H2O)	1.32
Average Meter Temperature (F)	96.75
Moisture Collected (g)	459.10
Carbon Dioxide Concentration (%V)	15.93
Oxygen Concentration (%V)	10.30
Nitrogen Concentration (%V)	73.78
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84
Particulate Catch	0.0329
Average Sampling Rate (dscfm)	0.55
Standard Metered Volume,Vm(std) (dscf)	32.80
Standard Metered Volume,Vm(std) (dscm)	0.929
Standard Volume Water Vapor,Vw (scf)	21.65
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	39.76
Mole Fraction Dry Stack Gas	0.602
Dry Molecular Weight	30.96
Wet Molecular Weight	25.81
Stack Gas Velocity,Vs (fpm)	3877.92
Stack Gas Velocity,Vs (mpm)	1181.99
Volumetric Flow Rate (acfm)	65502.37
Volumetric Flow Rate (acmm)	1855.027
Volumetric Flow Rate (dscfm)	27046.89
Volumetric Flow Rate (dscmm)	765.968
Percent Isokinetic	100.09
Percent Excess Air	112.05
Fuel Factor,Fo	0.665
Ultimate CO2	31.41
Concentration of Particulate (grains/acf)	1.29E-07
Concentration of Particulate (g/acm)	2.96E-07
Concentration of Particulate (grains/dscf)	0.01548
Concentration of Particulate (g/dscm)	0.03542

APPENDIX D - MM 111 FIELD DATA SHEETS

APPENDIX D.1 - Test Run No. 1, 8/16/88

JES/055

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS	PROBE LENGTH AND TYPE ......15', STEEL
DATE 8/16/88	HEIGHT OF LOCATION(ft)...... 69.00
SAMPLING LOCATION ..INLET	NOZZLE I.D. 0.248
SAMPLE TYPE M111	ASSUMED MOISTURE, % 50.00
RUN NUMBER 1.00	SAMPLE BOX NUMBER 3.00
OPERATOR ....MWH/JTW	METER BOX NUMBER RAC-5
AMBIENT TEMPERATURE 70.00	METER DELTA H@ 1.91
BAROMETRIC PRESSURE 24.02	K FACTOR 1.18
STATIC PRESSURE (Ps) -7.50	PROBE HEATER SETTING 250.00
FILTER NUMBER N-5	HEATER BOX SETTING 250.00
MIN.SAMPLE VOLUME ..	REFERENCE DEL P ....N/A
INITIAL LEAK CHECK . 0.016	DRY/GAS METER FACTOR (Y) ... 0.99960
XAD TRAP NUMBER	FINAL LEAK CHECK .... 0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Temperature: deg. F Filter Skin	Temperature: deg. F Adsorbent Trap	Temperature: deg. F Dry Gas Meter Inlet (Tm in)	Temperature: deg. F Dry Gas Meter Outlet (Tm out)	Temperature: deg. F Impinger Exit	Pump Vacuum in. Hg
	0.00	16:25	500.401											
A-3	2.50		501.210	0.58	161	0.68	0.68				74.00	74.00		
A-3	5.00		502.350	0.58	159	0.68	0.68				74.00	74.00		
A-3	7.50		503.600	0.58	162	0.68	0.68				77.00	73.00		
A-4	10.00		504.900	0.48	160	0.56	0.56				77.00	73.00		
A-5	12.50		506.200	0.60	159	0.70	0.70				78.00	73.00		
A-6	15.00		507.600	0.80	159	0.94	0.94				77.00	74.00		
A-7	17.50		509.400	1.50	159	1.77	1.77				79.00	73.00		
A-8	20.00		511.600	1.60	161	1.88	1.88				80.00	75.00		
A-9	22.50		513.700	1.90	159	2.24	2.24				82.00	76.00		
A-10	25.00		515.850	1.90	159	2.25	2.25				83.00	75.00		
A-11	27.50		518.000	1.90	159	2.24	2.24				86.00	76.00		
A-12	30.00	16:55	520.031	1.60	158	1.88	1.88				86.00	77.00		
STOP	30.00	17:40	527.296											
B-1	32.50	17:42.5	529.600	1.30	161	1.53	1.53				77.00	83.00		
B-2	35.00		531.000	1.20	162	1.41	1.41				84.00	77.00		
B-3	37.50		532.600	0.96	162	1.13	1.13				83.00	77.00		
B-4	40.00		534.400	0.74	162	0.87	0.87				83.00	77.00		
B-5	42.50		535.200	0.70	162	0.82	0.82				83.00	77.00		
B-6	45.00		536.700	0.70	162	0.82	0.82				82.00	85.00		
B-7	47.50		538.700	0.90	162	1.06	1.06				85.00	83.00		
B-8	50.00		540.100	0.80	163	0.94	0.94				86.00	83.00		
B-9	52.50		541.000	0.72	162	0.85	0.85				86.00	83.00		
B-10	55.00		542.400	0.64	162	0.75	0.75				85.00	83.00		
B-11	57.50		543.600	0.84	162	0.99	0.99				85.00	83.00		
B-12	60.00	18:10	544.905	0.74	162	0.87	0.87				85.00	83.00		

FIELD DATA

PLANT: MONSANTO
DATE: 08-16-88
SAMPLING LOCATION: INLET
SAMPLE TYPE: M 111
RUN NUMBER: 1
OPERATOR: MWH/JTW
AMBIENT TEMPERATURE: 70°
BAROMETRIC PRESSURE: 610 mm
STATIC PRESSURE, (P_s): -7.5"
FILTER NUMBER (s): W-5

PROBE LENGTH AND TYPE: 15' GLASS
NOZZLE I.D.: .250 .248 Jw
ASSUMED MOISTURE, %: 50%
SAMPLE BOX NUMBER:
METER BOX NUMBER: RAC #5
METER $\Delta H_@$: 1.91
C FACTOR: 1.18
PROBE HEATER SETTING: 250°
HEATER BOX SETTING: 250°
REFERENCE Δp:

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe
	0	16:25	500.401										
A-3	2.5	16:27.5	501.21	.58	.68	.68	161	74	74	2.0	250	60°	250°
A-3	5.0	16:30	502.35	.58	.68	.68	159	74	74	2.0	291	72°	140
A-3	7.5	16:32.5	503.60	.58	.68	.68	162	77	73	2.0	290	75°	118
A-4	10.0	16:35	504.90	.48	.56	.56	160	77	73	2.0	298	72°	194
5	12.5	16:37.5	506.20	.60	.70	.70	159	78	73	2.0	290	72°	198
6	15.0	16:40	507.60	.80	.94	.94	159	77	74	2.0	300	73°	183
7	17.5	16:42.5	509.40	1.5	1.77	1.77	159	79	73	3.0	301	75°	183°
8	20.0	16:45	511.60	1.6	1.88	1.88	161	80	75	3.0	294	75°	83
9	22.5	16:47.5	513.70	1.9	2.24	2.24	159	82	76	3.0	277	77°	184
10	25	16:50	515.85	1.9	2.25	2.25	159	83	75	3.0	293	78°	183°
11	27.5	16:52.5	518.0	1.9	2.24	2.24	159	86	76	3.0	299	84	181
12	30	16:55	520.031	1.6	1.88	1.88	158	86	77	3.0	278	79°	184
	0	17:40	527.296		Leak discovered at meter box/umbilical connection								
B-1	2.5	17:42.5	529.6	1.3	1.53	1.53	161	77	83	4.5	258°	77	146
2	5	17:45	531.0	1.2	1.41	1.41	162	84	77	4.8	250°	75	146
3	7.5	17:47.5	532.6	0.96	1.13	1.13	162	83	77	4.0	250°	75	148
4	10	17:50	534.4	0.74	0.87	0.87	162	83	77	4.0	250°	76	149
5	12.5	17:52.5	535.2	0.70	0.82	0.82	162	83	77	4.0	250°	77	151
6	15.0	17:55	536.7	0.70	0.82	0.82	162	82	85	4.0	250°	76	151
7	17.5	17:57.5	538.7	0.90	1.06	1.06	162	85	83	4.5	250	77	151
8	20.0	18:00	540.1	0.80	0.94	0.94	163	86	83	4.0	250°	80.1	152
9	22.5	18:02.5	541.0	0.72	0.85	0.85	162	86	83	4.0	250°	79	151
10	25.0	18:05	542.4	0.64	0.75	0.75	162	85	83	4.0	250°	78	151

COMMENTS:

See over.

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PT	SAMP Time		GAS Meter	ΔP	ΔH	ΔH	Ts	Tm	Tm	VAC	Box T	Imp T	Probe T
	275	1807.5	543.6	.54	.99	.99	162	85	53	40	250	78	151
11	30	1810	544.905	.74	.87	.87	[illegible]	53	53	45	250	78	151
12													

M111, p. 2 of Run 1 inlet

'''''

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8/16/88
SAMPLING LOCATION ..OUTLET A
SAMPLE TYPE M111
RUN NUMBER 1.00
OPERATOR ....GDR
AMBIENT TEMPERATURE 82.00
BAROMETRIC PRESSURE 24.02
STATIC PRESSURE (Ps) -0.60
FILTER NUMBER M-1
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 30.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-7
METER DELTA HO 1.77
K FACTOR 2.05
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00300
FINAL LEAK CHECK .... 0.010 @ 5" Hg

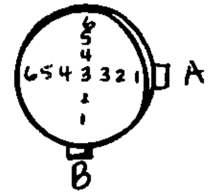
SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperatures deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	16:25	178.778											
B-1	5.00		181.800	0.60	157	1.20	1.20				76.00	76.00		
B-2	10.00		185.500	0.78	158	1.60	1.60				78.00	79.00		
B-3	15.00		189.000	0.82	158	1.70	1.70				80.00	76.00		
B-4	20.00		193.000	0.91	158	1.90	1.90				85.00	77.00		
B-5	25.00		196.650	0.95	158	2.00	2.00				88.00	79.00		
B-6	30.00	16:55	200.524	0.80	158	1.64	1.64				92.00	80.00		
STOP	30.00		201.059											
A-1	35.00	18:10	204.300	0.53	157	1.10	1.10				78.00	81.00		
A-2	40.00		207.800	0.80	158	1.60	1.60				81.00	81.00		
A-3	45.00		211.500	0.85	158	1.80	1.80				84.00	82.00		
A-4	50.00		215.500	0.90	158	1.85	1.85				86.00	81.00		
A-5	55.00		219.500	0.90	158	1.85	1.85				87.00	82.00		
A-6	60.00	18:40	222.938	0.67	158	1.40	1.40				89.00	82.00		
END														

'''''

FIELD DATA

PLANT MONSANTO SODA SPRINGS
DATE 08-16-88
SAMPLING LOCATION OUTLET A
SAMPLE TYPE MM111
RUN NUMBER 1
OPERATOR GDRIVES
AMBIENT TEMPERATURE 82°F
BAROMETRIC PRESSURE 24.02
STATIC PRESSURE, (P_s) -0.6 in. H_2O
FILTER NUMBER (s) W-1



SCHEMATIC OF TRAVERSE POINT LAYOUT

STARTED INTEGRATED BAG SAMPLE @ 1628
ENDED @ 1642

PROBE LENGTH AND TYPE 8 ft
NOZZLE I.D. 3
ASSUMED MOISTURE, % 30
SAMPLE BOX NUMBER N/A
METER BOX NUMBER KAC #7
METER $\Delta H_@$ 1.77
K FACTOR 2.05
PROBE HEATER SETTING
HEATER BOX SETTING
REFERENCE Δp

Leak check after port B = 0.012 cfm @

FINAL LEAK CHECK 0.015 cfm @ 8 in.

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F #1	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F #5	OUTLET ($T_{m\,out}$), °F #6	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F #3	IMPINGER TEMPERATURE, °F #4
	0	1625	178.778									
B-1	5	1630	181.9	0.6	1.2	1.2	157	76	76	1	261	61
B-2	10	1635	185.5	0.78	1.6	1.6	158	78	79	1	237	55
B-3	15	1640	187.0	0.82	1.7	1.7	158	80	76	1	247	55
B-4	20	1645	193	0.91	1.9	1.9	158	85	77	1	242	57
B-5	25	1650	196.65	0.95	2.0	2.0	158	88	79	1	237	57
B-6	30	1655	200.524	0.80	1.64	1.64	158	92	80	2	234	61
			~~200.630~~				~~157~~	~~83~~	~~81~~		~~271~~	
~~A-1~~	~~35~~	1810	201.059									
A-1	35	1815	204.3	0.53	1.1	1.1	157	78	81	2	285	57
A-2	40	1820	207.8	0.8	1.6	1.6	158	81	81	2	280	52
A-3	45	1825	211.5	0.85	1.8	1.8	158	84	82	2	274	54
A-4	50	1830	215.5	0.90	1.85	1.85	158	86	81	2	279	56
A-5	55	1835	219.5	0.90	1.85	1.85	158	87	82	2	240	58
A-6	60	1840	222.938	0.67	1.4	1.4	158	89	82	2	235	61

COMMENTS: AFTER PORT CHANGE, PROBE HEATER DEVELOPED A SHORT, DISASSEMBLED PROBE FROM TRAIN REPAIRED WIRING REASSEMBLED AND PERFORMED ANOTHER LEAK CHECK 1 0.015 cfm @ 5 in.

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SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8/16/89
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 1.00
OPERATOR ....FLG
AMBIENT TEMPERATURE   75.00
BAROMETRIC PRESSURE   24.13
STATIC PRESSURE (Ps)   -0.60
FILTER NUMBER N-2
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 30.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-12
METER DELTA H@ 1.79
K FACTOR 2.08
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ...   0.99430
FINAL LEAK CHECK ....   0.005 @ 8" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures: deg. F Probe	Temperatures: deg. F Filter Skin	Temperatures: deg. F Adsorbent Trap	Temperatures: deg. F Dry Gas Meter Inlet (Tm in)	Temperatures: deg. F Dry Gas Meter Outlet (Tm out)	Temperatures: deg. F Impinger Exit	Pump Vacuum in. Hg
	0.00	16:25	74.624											
B-1	5.00		77.900	0.57	158		1.20				78.00	77.00		
B-2	10.00		81.600	0.75	158		1.60				78.00	77.00		
B-3	15.00		85.400	0.80	158		1.70				81.00	77.00		
B-4	20.00		89.200	0.81	158		1.70				86.00	78.00		
B-5	25.00		93.100	0.90	158		1.90				90.00	80.00		
B-6	30.00	16:55	97.076	0.87	158		1.80				93.00	81.00		
STOP	30.00	18:10	97.194											
A-1	35.00	18:15	100.400	0.56	158		1.20				80.00	78.00		
A-2	40.00		103.400	0.68	159		1.40				81.00	80.00		
A-3	45.00		106.400	0.75	158		1.60				83.00	81.00		
A-4	50.00		110.400	0.77	158		1.60				87.00	82.00		
A-5	55.00		114.400	0.85	159		1.80				93.00	84.00		
A-6	60.00	18:40	118.281	0.84	159		1.80				97.00	86.00		
END														

switched 1st & 4th impinger for better sizing

FIELD DATA

PLANT MONSANTO SODA SPRINGS
DATE 08-16-85
SAMPLING LOCATION OUTLET B
SAMPLE TYPE MM III
RUN NUMBER 1
OPERATOR Ag
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) W-2

PROBE LENGTH AND TYPE
NOZZLE I.D. #2 (0.250 D)
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER B1
METER BOX NUMBER RAC #12
METER $\Delta H_@$ 1.79
K FACTOR 2.076
PROBE HEATER SETTING 60
HEATER BOX SETTING 250
REFERENCE Δp NA
Y = .9943

started bis 1645
end 1657

SCHEMATIC OF TRAVERSE POINT LAYOUT

initial leak ✓ .010 @ 10"

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		1625	74.624									
B 1	5	1630	77.9	.57		1.2	158	78	77	2	270	68
2	10	1635	81.6	.75		1.6	158	78	77	3	265	64
3	15	1640	85.4	.8		1.7	158	81	77	3	253	67
4	20	1645	89.2	.81		1.7	158	86	78	3	263	69
5	25	1650	93.1	.9		1.9	158	90	80	3	268	71
6	30	1655	97.076	.87		1.8	158	93	81	3	261	70
				end	of	port	leak	✓	.008	@ 8"		
		1810	97.194	changed	ports	leak		✓	.010	@ 10"		
A 1	35	1815	100.4	.56		1.2	158	80	78	3	272	72
2	40	1820	103.4	.68		1.4	159	81	80	3	264	56
3	45	1825	106.4	.75		1.6	158	83	81	3	265	58
4	50	1830	110.4	.77		1.6	158	87	82	3	250	64
5	55	1835	114.4	.85		1.8	159	93	84	3	263	66
6	60	1840	118.281	.84		1.8	159	97	86	3	256	69

COMMENTS:

final leak ✓ .005 @ 8"

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SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8/16/88
SAMPLING LOCATION ..OUTLET C
SAMPLE TYPE M5II
RUN NUMBER 1.00
OPERATOR ....CNR
AMBIENT TEMPERATURE 75.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.60
FILTER NUMBER ...... -1.00
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 50.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-8
METER DELTA H@ 1.69
K FACTOR 1.96
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99650
FINAL LEAK CHECK .... 0.005 @ 8" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	4:25	661.381											
B-1	5.00		664.700	0.61	152	1.20	1.20				74.00	74.00		
B-2	10.00		668.500	0.86	157	1.70	1.70				77.00	74.00		
B-3	15.00		672.200	0.86	157	1.70	1.70				82.00	75.00		
B-4	20.00		676.100	0.84	157	1.65	1.65				88.00	76.00		
B-5	25.00		679.800	0.73	157	1.40	1.40				88.00	78.00		
B-6	30.00	4:55	683.435	0.78	157	1.45	1.45				93.00	79.00		
STOP	30.00		684.625											
A-1	35.00	6:10	687.500	0.76	157	1.10	1.10				80.00	78.00		
A-2	40.00		691.100	0.76	157	1.50	1.50				80.00	80.00		
A-3	45.00		694.800	0.85	157	1.50	1.50				85.00	79.00		
A-4	50.00		698.700	0.87	157	1.70	1.70				89.00	80.00		
A-5	55.00		702.600	0.78	157	1.70	1.70				92.00	81.00		
A-6	60.00	6:40	706.470	0.84	159	1.50	1.50				94.00	83.00		
END														

INITIAL LEAK .015 @ 10" Hg
FINAL LEAK .005 @ 15" Hg } 3B

INITIAL LEAK .016 @ 10" Hg
FINAL LEAK .010 @ 6" Hg } A
.010 @ 10" Hg

10 min bag sample for ORSAT

FIELD DATA

PLANT MONSANTO SODA SPRINGS
DATE 08-16-88
SAMPLING LOCATION OUTLET C
SAMPLE TYPE M111
RUN NUMBER [illegible]
OPERATOR C. N. RANGARAJ
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s) -0.60
FILTER NUMBER (s) [illegible]

PROBE LENGTH AND TYPE 8' SS. W/ GLASS LINER
NOZZLE I.D.
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER
METER BOX NUMBER RAC #8
METER $\Delta H_@$ 1.69
C FACTOR 1.96
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	4.25	661.381									
B-1	5	4.30	664.7	.61		[illegible]	152	74	74	2	248	67
B-2	10	4.35	668.5	.86		1.70	157	77	74	3	225	67
B-3	15	4.40	672.2	.88		1.70	157	82	75	3	231	68
B-4	20	4.45	676.1	.84		1.65	157	88	76	3	234	72
B-5	25	4.50	679.8	.73		1.40	157	88	78	3	239	74
B-6	30	4.55	683.435	.78		1.45	157	93	79	3	246	75
A-1	35	6.15	687.5	.53		1.10	158	80	78	2	267	70
A-2	40	6.20	691.1	.76		1.50	157	60	80	3	251	66
A-3	45	6.25	694.8	.76		1.50	157	85	79	3	235	64
A-4	50	6.30	698.7	.85		1.70	157	89	80	3	240	64
A-5	55	6.35	702.6	.87		1.70	157	92	81	3	229	64
A-6	60	6.40	706.47	.78		1.50	157	94	83	3	245	65

.78 - .87
6.10 684.625
.7 - .95
.82 - .90
.68 - .91
.75 - .9

COMMENTS:

EPA (Dur) 235
4 72

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8/16/88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 1.00
OPERATOR ....JAE
AMBIENT TEMPERATURE 82.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) 0.25
FILTER NUMBER N-4
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.008
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 30.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-4
METER DELTA H@ 1.78
K FACTOR 2.06
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00750
FINAL LEAK CHECK .... 0.011 @ 7" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

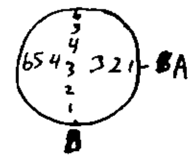
Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	16:25	482.458											
B-1	5.00		485.730	0.54	159		1.11				79.00	77.00		
B-2	10.00		489.530	0.78	158		1.61				89.00	79.00		
B-3	15.00		493.530	0.84	159		1.73				93.00	79.00		
B-4	20.00		497.410	0.78	159		1.61				96.00	80.00		
B-5	25.00		501.260	0.78	158		1.61				96.00	82.00		
B-6	30.00	16:55	504.966	0.67	158		1.38				98.00	83.00		
STOP	30.00	18:10	505.284											
A-1	35.00	18:15	508.690	0.56	160		1.15				88.00	88.00		
A-2	40.00		512.300	0.66	160		1.36				96.00	89.00		
A-3	45.00		515.940	0.68	160		1.40				99.00	89.00		
A-4	50.00		519.740	0.74	160		1.52				101.00	89.00		
A-5	55.00		524.080	1.10	160		2.27				102.00	89.00		
A-6	60.00	18:40	528.503	1.10	160		2.27				103.00	90.00		
END														

Initial LK ✓ = .008 @ 9"
Final LK✓ = .004 @ 5"
Initial LK✓ = .009 @ 5"
Final LK✓ = .011 @ 7"

ORSAT 1730 — 17.50

FIELD DATA

PLANT Monsanto Soda Springs
DATE 06-16-88
SAMPLING LOCATION Outlet D
SAMPLE TYPE M III
RUN NUMBER 1
OPERATOR JAE
AMBIENT TEMPERATURE 82
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s) .25
FILTER NUMBER (s) W-4



SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

PROBE LENGTH AND TYPE 8' S.S. w/ glass liner
NOZZLE I.D. #5 (D_N 0.250)
ASSUMED MOISTURE, % 30
SAMPLE BOX NUMBER N/A
METER BOX NUMBER RAC #4
METER $\Delta H_@$ 1.78
K FACTOR 2.06
PROBE HEATER SETTING 250
HEATER BOX SETTING 260
REFERENCE Δp N/A

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	16:25	482.458				# 1				# 3	# 4
B-1	5	16:30	485.73	0.54	1.11	1.11	159	79	77	1.5	273	74
B-2	10	16:35	489.53	0.78	[illegible]	[illegible]	158	89	79	2.0	248	56
B-3	15	16:40	493.53	0.84	1.73	1.73	159	93	79	2.5	259	57
A-4	20	16:45	497.41	0.78	1.61	1.61	159	96	80	2.5	265	61
B-5	25	16:50	501.26	0.78	1.61	1.61	158	96	82	2.5	269	64
B-6	30	16:55	504.966	0.67	1.38	1.38	158	98	83	2.0	271	64
[illegible]	[illegible]	18:10	505.284	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A-1	35	18:15	508.69	0.56	1.15	1.15	160	88	88	1.5	269	66
A-2	40	18:20	512.30	0.66	1.36	1.36	160	96	89	2.0	260	59
A-3	45	18:25	515.94	0.68	1.40	1.40	160	99	89	2.0	261	59
A-4	50	18:30	519.74	0.74	1.52	1.52	160	101	89	2.5	256	62
A-5	55	18:35	524.08	1.10	2.27	2.27	160	102	89	3.0	260	59
A-6	60	18:40	528.303	1.10	2.27	2.27	160	103	90	3.0	258	59

COMMENTS:

EPA (Dur) 235
4/72

APPENDIX D.2 - Test Run No. 2, 8/17/88

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/17/88
SAMPLING LOCATION ..INLET
SAMPLE TYPE M111
RUN NUMBER 2.00
OPERATOR ....MRN/JTW
AMBIENT TEMPERATURE   70.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -7.30
FILTER NUMBER H-10
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE 10.5FT,GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.248
ASSUMED MOISTURE, % 40.00
SAMPLE BOX NUMBER ....
METER BOX NUMBER RAC-3
METER DELTA H@ 1.91
K FACTOR 1.63
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99960
FINAL LEAK CHECK ....   0.015 @ 9" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	9:40	556.740											
B1	2.50		558.200	0.88	163	1.33	1.33		250		70.00	66.00	60.00	6.00
B2	5.00		559.630	0.88	162	1.33	1.33		265		70.00	69.00	52.00	6.00
B3	7.50		561.400	0.82	162	1.33	1.33		268		74.00	66.00	52.00	6.50
B4	10.00		562.700	0.82	162	1.33	1.33		269		74.00	67.00	52.00	6.50
B5	12.50		564.400	0.82	161	1.33	1.33		267		76.00	69.00	53.00	5.00
B6	15.00		566.100	0.93	161	1.54	1.54		266		80.00	70.00	57.00	5.00
B7	17.50		567.700	0.92	161	1.52	1.52		266		81.00	71.00	58.00	4.00
B8	20.00		569.400	0.74	161	1.22	1.22		262		85.00	73.00	61.00	3.00
B9	22.50		571.000	0.88	161	1.45	1.45		257		86.00	74.00	66.00	3.00
B10	25.00		572.800	1.05	159	1.73	1.73		254		91.00	77.00	69.00	3.00
B11	27.50		575.000	1.10	160	1.82	1.82		251		93.00	79.00	72.00	3.00
B12	30.00	10:10	576.660	0.82	157	1.33	1.33		249		97.00	81.00	72.00	3.00
STOP		10:25	576.867											
A1	32.50	10:27	579.100	1.65	159	2.72	2.72		241		89.00	86.00	57.00	4.50
A2	35.00		581.800	1.65	160	2.72	2.72		241		93.00	87.00	52.00	4.50
A3	37.50		583.300	1.50	161	2.47	2.47		235		91.00	87.00	50.00	4.50
A4	40.00		585.700	1.50	158	2.47	2.47		242		91.00	88.00	53.00	5.00
A5	42.50		587.700	1.30	161	2.15	2.15		234		92.00	88.00	55.00	5.50
A6	45.00		589.650	1.10	163	1.82	1.82		232		92.00	88.00	54.00	5.50
A7	47.50		591.400	0.73	163	1.20	1.20		231		93.00	88.00	55.00	5.00
A8	50.00		592.700	0.58	164	0.96	0.96		234		94.00	88.00	55.00	5.00
A9	52.50		594.400	0.50	164	0.83	0.83		236		94.00	88.00	57.00	5.00
A10	55.00		595.600	0.64	163	1.05	1.05		238		92.00	88.00	55.00	5.00
A11	57.50		597.100	0.68	163	1.09	1.09		242		91.00	87.00	55.00	5.00
A12	60.00	10:55	598.301	0.32	160	0.53	0.53		242		92.00	88.00	55.00	5.00

FIELD DATA

PLANT MONSANTO
DATE 08-17-88
SAMPLING LOCATION INLET
SAMPLE TYPE M 111
RUN NUMBER 2
OPERATOR MWH
AMBIENT TEMPERATURE 70°
BAROMETRIC PRESSURE "614 (24.17 "Hg)
STATIC PRESSURE, (P_s) -7.3" H_2O
FILTER NUMBER (s) W-10

SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 10' GLASS
NOZZLE I.D. 0.248
ASSUMED MOISTURE, % ~40%
SAMPLE BOX NUMBER 541
METER BOX NUMBER EAC #5
METER $\Delta H_@$ 1.91
C FACTOR
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp

1.12 @ 0/... 2.11

INIT Leak 0.01

READ AND RECORD ALL DATA EVERY 25 MINUTES

ORSAT 0947-949, 1002 - 10:03, 10:40-10:45

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Probe
	0	0940	556.748										
B-1	2.5	0942	558.2	.88	1.35	1.35	163	70	66	5.0	250	60°	195
2	5	945	559.63	.88	1.35	1.35	162	70	69	5.0	265	52	195
3	7.5	947	561.4	.82	1.35	1.35	162	74	66	5.0	268	52	200
4	10	950	562.7	.82	1.35	1.35	162	74	67	5.0	269	52	200
5	12.5	952	564.4	.82	1.35	1.35	161	76	69	5.0	267	53	200
6	15	955	566.1	.93	1.54	1.54	161	80	70	5.0	266	57	205
7	17.5	957	567.7	.92	1.52	1.52	161	81	71	5.0	266	58	200
8	20	1000	569.4	.74	1.22	1.22	161	85	73	5.0	262	61	200
9	22.5	1002	571.0	.88	1.45	1.45	161	86	74	6.0	257	66	200
10	25	10:05	572.8	1.05	1.73	1.73	159	91	77	5.0	254	69	200
11	27.5	10:07	575.0	1.10	1.82	1.82	160	93	79	5.0	251	72	200
12	30	10:10	576.66	0.82	1.35	1.35	157	97	81	6.0	249	72	205
	30	10:25	576.867				LEAK CHECK O/K						
A-1	32.5	10:27	579.1	1.65	2.72	2.72	159	89	86	10.0	241	57	202
2	35	10:30	581.8	1.65	2.72	2.72	160	93	86	10.0	241	52	"
3	37.5	10:32	583.5	1.5	2.47	2.47	161	91	87	10.0	235	50	"
4	40	10:35	585.7	1.5	2.47	2.47	158	91	87	10.0	242	53	"
5	42.5	10:37	587.7	1.3	2.15	2.15	161	92	88	10.0	234	55	"
6	45	10:40	589.65	1.1	1.82	1.82	163	92	88	9.0	232	54	"
7	47.5	10:42.5	591.4	0.73	1.20	1.20	163	93	88	6.5	231	55	"
8	50	10:45	592.7	0.58	0.96	0.96	164	94	88	5.5	234	55	
9	52.5	10:47	594.2	0.50	0.83	0.83	164	94	88	5.0	236	57	
10	55	10:50	595.6	0.64	1.05	1.05	163	92	88	5.5	238	55	

COMMENTS:

EPA (Dur) 235
4-72

PLANT MONSANTO - SODA SPRINGS
DATE 8/17/88
SAMPLING LOCATION INLET
SAMPLE TYPE M 111
RUN NUMBER 2
OPERATOR MWH / JTW

FINAL LEAK CK 0.01 CFM

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	55	10:50	595.6									
11	57.5	10:52.5	597.1	0.68	1.09	1.09	163	91	87	6.0	242	55
12	60	10:55	598.301	0.32	0.53	0.53	160	92	88	4.5	242	55
			AVG $\sqrt{\Delta P}$ 0.9559									

COMMENTS

6.65 A 1/500 1.26 A

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET STACK A
SAMPLE TYPE M111
RUN NUMBER 2.00
OPERATOR ....GDR
AMBIENT TEMPERATURE   84.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.60
FILTER NUMBER B-16
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.020
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.251
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-7
METER DELTA H@ 1.77
K FACTOR 1.65
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00350
FINAL LEAK CHECK ....   0.001 @ 8" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

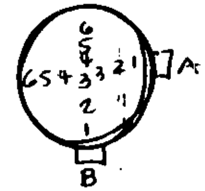
Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe Skin Filter	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	9:40	223.730										
A1	5.00		227.000	0.80	160	1.30	1.30	280		64.00	53.00	56.00	1.00
A2	10.00		230.300	0.83	161	1.40	1.40	280		72.00	56.00	48.00	2.00
A3	15.00		233.000	0.90	160	1.50	1.50	275		80.00	58.00	48.00	2.00
A4	20.00		237.300	0.88	160	1.40	1.40	273		86.00	63.00	53.00	3.00
A5	25.00		240.900	0.82	161	1.35	1.35	244		82.00	65.00	62.00	4.00
A6	30.00	10:10	244.234	0.70	158	1.20	1.20	235		76.00	68.00	62.00	4.00
STOP	30.00	10:10	244.455										
B1	35.00	10:50	247.850	0.70	162	1.20	1.20	245		81.00	73.00	65.00	2.00
B2	40.00		251.250	0.85	161	1.40	1.40	235		88.00	75.00	51.00	2.00
B3	45.00		254.800	0.90	162	1.50	1.50	235		93.00	77.00	52.00	3.00
B4	50.00		258.200	0.78	162	1.30	1.30	251		95.00	82.00	55.00	3.00
B5	55.00		261.600	0.82	163	1.40	1.40	251		96.00	81.00	58.00	4.00
B6	60.00	11:15	264.950	0.75	164	1.20	1.20	252		98.00	82.00	60.00	4.00
END													

CNR. TMP.

STARTED INTEGRATED BAG SAMPLE AT 940 ; ENDED @ 1000.

FIELD DATA

PLANT MONSANTO
DATE 06-17-88
SAMPLING LOCATION OUTLET A
SAMPLE TYPE M 110
RUN NUMBER 2
OPERATOR GD RNES
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 24.7
STATIC PRESSURE, (P_s) -0.6 in.
FILTER NUMBER (s) W-7



SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

PROBE LENGTH AND TYPE 8ft
NOZZLE I.D. #3
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER —
METER BOX NUMBER RAC #7
METER $\Delta H_@$ 1.77
K FACTOR 1.65
PROBE HEATER SETTING NA
HEATER BOX SETTING NA 54%
REFERENCE Δp —

INITIAL LEAK = 0.02 cfm @ 4in.

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F #1	DRY GAS METER TEMPERATURE #2 INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F #3	IMPINGER TEMPERATURE, °F #4
	0	940	223.75 @									
A-1	5	945	227	0.80	1.3	1.3	160	64	53	1	280	56
A-2	10	950	230.3	0.93	1.4	1.4	161	72	56	2	280	48
A-3	15	955	233.	0.90	1.5	1.5	160	80	58	2	275	48
A-4	20	1000	237.3	0.88	1.4	1.4	160	86	63	3	273	53
A-5	25	1005	240.9	0.82	1.35	1.35	161	82	65	4	244	62
A-6	30	1010	244.234	0.70	1.2	1.2	158	76	68	4	235	62
			LEAK CHECK	0.01	CFM	@ 8 in.	BEFORE PORT Δ					
			LEAK CHECK	0.01	CFM	@ 8 in.	AFTER PORT Δ					
B	35	1040	244.435									
B-1				0.65	1.1	1.1	162	78	70	3	272	65
	STOPPED @		1041:11 DUE TO	PROBLEMS AT			OUTLET D					
	STARTED	1046	245.230									
B-1	35	1050	247.85	0.70	1.2	1.2	162	81	73	3	245	65
B-2	40	1055	251.25	0.85	1.4	1.4	161	88	75	3	235	51
B-3	45	1100	254.80	0.9	1.5	1.5	162	93	77	4	235	52
B-4	50	1105	258.2	0.78	1.3	1.3	162	95	82	4	251	55
B-5	55	1110	261.6	0.82	1.4	1.4	163	96	81	4	251	58
B-6	60	1115	264.950	0.75	1.2	1.2	164	98	82	4	252	60
			FINAL LEAK CHECK	0.001	cfm @	8 in.						

COMMENTS:

EPA (Dur) 235

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 2.00
OPERATOR ....FLG
AMBIENT TEMPERATURE 76.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER N-6
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.016
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......11', GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER B2
METER BOX NUMBER RAC-3
METER DELTA H@ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 80%
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99430
FINAL LEAK CHECK .... 0.008 @ 6" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	9:40	18.554											
A1	5.00	9:45	21.400	0.54	159		0.89		231		70.00	66.00	70.00	2.00
A2	10.00	9:50	24.500	0.69	158		1.10		242		74.00	68.00	54.00	3.00
A3	15.00	9:55	27.700	0.74	160		1.20		238		83.00	71.00	55.00	3.00
A4	20.00	10:00	31.100	0.80	159		1.30		245		92.00	76.00	59.00	3.00
A5	25.00	10:05	34.700	0.86	157		1.40		251		86.00	75.00	59.00	3.00
A6	30.00	10:10	38.236	0.82	156		1.30		242		85.00	76.00	59.00	3.00
STOP		10:45	38.529											
B1	35.00	10:50	41.400	0.57	158		0.94		270		81.00	80.00	68.00	3.00
B2	40.00	10:55	44.700	0.72	159		1.20		260		83.00	80.00	54.00	3.00
B3	45.00	11:00	48.000	0.79	159		1.30		267		88.00	82.00	49.00	3.00
B4	50.00	11:05	51.400	0.82	159		1.30		258		92.00	84.00	54.00	3.00
B5	55.00	11:10	54.700	0.82	159		1.30		263		95.00	85.00	54.00	3.00
B6	60.00	11:15	58.110	0.80	159		1.30		261		96.00	86.00	55.00	3.00
END														

FIELD DATA

PLANT Monsanto
DATE 08-17-88
SAMPLING LOCATION OUTLET B
SAMPLE TYPE M 111
RUN NUMBER 2
OPERATOR flg
AMBIENT TEMPERATURE 76
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) W-6

PROBE LENGTH AND TYPE 11' glass
NOZZLE I.D. .250
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER 82
METER BOX NUMBER 12
METER $\Delta H_@$ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 80%
HEATER BOX SETTING 250
REFERENCE Δp NA

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES   Y = .9943

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		0940	18.554									
A 1	5	45	21.4	.54		.89	159	70	66	2	270	70
2	10	50	24.5	.69		1.1	158	74	68	3	260	54
3	15	55	27.7	.74		1.2	160	83	71	3	267	55
4	20	1000	31.1	.8		1.3	159	92	76	3	258	59
5	25	05	34.7	.86		1.4	157	86	75	3	263	59
6	30	1010	38.236	.82		1.3	156	85	76	3	261	59
				end of port leak ✓ .010 @ 6"								
		1045	38.529	changed port leak ✓ .008 @ 6"								
B 1	35	50	41.4	.57		.94	158	81	80	3	265	68
2	40	55	44.7	.72		1.2	159	83	80	3	270	54
3	45	1100	48.0	.79		1.3	159	88	82	3	265	49
4	50	05	51.4	.82		1.3	159	92	84	3	271	54
5	55	10	54.7	.82		1.3	159	95	85	3	261	54
6	60	1115	58.110	.8		1.3	159	96	86	3	270	55
									81.42			

COMMENTS: final leak ✓ .008 @ 6"

EPA (Dur) 235
4/72

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET C
SAMPLE TYPE M111
RUN NUMBER 2.00
OPERATOR ....CNR
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER N-9
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.015
IAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-8
METER DELTA HO 1.69
K FACTOR 1.53
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99650
FINAL LEAK CHECK .... 0.004 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	9:42	707.634											
A1	5.00	9:47	710.800	0.53	150	1.10	1.10		281		73.00	68.00	77.00	1.00
A2	10.00	9:52	714.000	0.64	157	1.10	1.10		228		80.00	70.00	64.00	2.00
A3	15.00	9:57	717.400	0.80	157	1.20	1.20		246		87.00	74.00	68.00	2.00
A4	20.00	10:02	720.200	0.80	158	1.20	1.20		241		88.00	76.00	77.00	3.00
A5	25.00	10:07	724.500	0.85	156	1.30	1.30		246		87.00	76.00	84.00	3.00
A6	30.00	10:12	728.217	0.80	156	1.20	1.20		239		87.00	78.00	73.00	2.00
STOP		10:45	728.603											
B1	35.00	10:50	732.000	0.54	151	1.10	1.10		292		81.00	80.00	64.00	2.00
B2	40.00	10:55	735.300	0.75	158	1.15	1.15		283		87.00	81.00	58.00	2.00
B3	45.00	11:00	738.700	0.75	157	1.15	1.15		280		90.00	83.00	59.00	2.00
B4	50.00	11:05	742.100	0.80	156	1.25	1.25		284		93.00	84.00	60.00	2.00
B5	55.00	11:10	745.600	0.82	157	1.30	1.30		286		95.00	85.00	62.00	3.00
B6	60.00	11:15	749.068	0.75	158	1.15	1.15		281		95.00	86.00	64.00	3.00
END														

M1
8/30

INITIAL LEAK .015@5", .02@10" } A   INITIAL LEAK .01@5", .02@10" } B
FINAL LEAK .004@5", .02@11" } A   FINAL LEAK .01@5", .016@10" } B

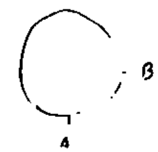
Bag sample start 11.08
end 11.23

FIELD DATA

K_1 = 1.46 × ΔH@ 80/140
K_2 = 0.61 × ΔH@ 90/170
K_3 = 1.10 × ΔH@ 90/150
K_4 = 0.92 × ΔH@ 90/160

K_1 = 2.47
K_2 = 1.03
K_3 = 2.01
K_4 = 1.55

PLANT MONSANTO
DATE 05-17-88
SAMPLING LOCATION OUTLET C
SAMPLE TYPE M III
RUN NUMBER 2
OPERATOR C.N. RANGARAJ
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) W-9



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 8', W/GLASS LINER
NOZZLE I.D. #7 - 0.230"
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER
METER BOX NUMBER EAC 8
METER $\Delta H_@$ 1.69
C FACTOR
PROBE HEATER SETTING 250
HEATER BOX SETTING 260
REFERENCE Δp

Y = 0.9965

READ AND RECORD ALL DATA EVERY ______ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	9.42	707.634									
A-1	5	9.47	710.8	.53		1.1	150	73	68	1	281	77
A-2	10	9.52	7.4?0	.64		1.1	157	80	70	2	228	64
A-3	15	9.57	717.4	~~.29~~ .60		1.2	N/A	87	74	2	246	68
A-4	20	10.02	720.2	.60		1.2	157	88	76	3	241	77
A-5	25	10.07	724.5	.65		1.3	156	87	76	3	246	84
A-6	30	10.12	729.217	.6		1.2	156	87	78	2	239	85
		10.45	728.603									
B-1	35	10.50	732.0	.54		1.1	151	81	80	2	292	64
B-2	40	10.55	735.3	.75		1.15	158	87	81	2	283	58
B-3	45	11.00	738.7	.75		1.15	157	90	83	2	280	59
B-4	50	11.05	742.1	.8		1.25	156	93	84	2	264	80
B-5	55	11.10	746.6	.82		1.3	157	96	85	3	286	82
B-6	60	11.15	749.068	.75		1.15	158	95	86	3	281	64
				.68-.8								

.5 - .55
1.55
1.15 / .75 / .85

COMMENTS:

D-25

EPA (Dur) 235
4 72

r
8

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 2.00
OPERATOR ....JAE
AMBIENT TEMPERATURE   80.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.25
FILTER NUMBER U-8
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.005
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-4
METER DELTA HO 1.78
K FACTOR 0.91
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00750
FINAL LEAK CHECK ....   0.000 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

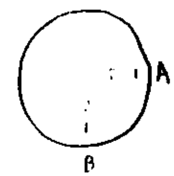
Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Temperature: deg. F Filter Skin	Temperature: deg. F Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	9:40	328.667											
A1	5.00	9:45	331.100	0.66	158	0.60	0.60		263		91.00	78.00	64.00	1.00
A2	10.00	9:50	333.600	0.74	158	0.68	0.68		270		99.00	81.00	61.00	1.50
A3	15.00	9:55	336.180	0.78	159	0.71	0.71		265		103.00	83.00	59.00	1.50
A4	20.00	10:00	338.910	0.84	159	0.77	0.77		270		104.00	85.00	60.00	1.50
A5	25.00	10:05	341.770	0.90	158	0.82	0.82		262		100.00	87.00	60.00	1.50
A6	30.00	10:10	344.330	0.82	157	0.75	0.75		265		95.00	86.00	61.00	1.50
STOP	30.00	10:45	344.600											
B1	35.00	10:50	347.310	0.78	159	0.71	0.71		285		88.00	85.00	56.00	1.00
B2	40.00	10:55	350.940	1.80	159	1.64	1.64		290		89.00	85.00	56.00	2.00
B3	45.00	11:00	355.190	2.20	159	2.00	2.00		280		95.00	85.00	56.00	2.50
B4	50.00	11:05	358.000	0.84	159	0.77	0.77		280		95.00	85.00	59.00	1.50
B5	55.00	11:10	360.750	0.82	159	0.75	0.75		283		94.00	85.00	63.00	1.50
B6	60.00	11:15	363.210	0.66	159	0.60	0.60		280		94.00	86.00	63.00	1.50
END														

/ 0.005 @ 7"
/ 0.008 @ 5
/ 0.008 @ 5
/ 0.0109

10:37

FIELD DATA

PLANT MONSANTO
DATE 08-17-88
SAMPLING LOCATION OUTLET D
SAMPLE TYPE M111
RUN NUMBER 2
OPERATOR JAE
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE, (P_s) -.35
FILTER NUMBER (s) W-8



PROBE LENGTH AND TYPE 8' GLASS   Y = 1.0075
NOZZLE I.D. .250
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER N/A
METER BOX NUMBER BAC # 4
METER $\Delta H_@$ 1.78
Y FACTOR .914
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp [illegible]

.914 @ [illegible]
.61 @ [illegible]
1.11 @ [illegible]

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F			
	0	9:40	528.667									
A 1	5	9:45	[illegible]	0.66	0.60	0.60	158	91	78	1.0	263	64
[illegible]	10	9:50	[illegible]	[illegible]	.68	.68	158	99	81	1.5	270	61
A [illegible]	15	9:55	[illegible]	0.78	.71	.71	159	103	83	1.5	265	59
A 4	20	10:00	538.91	0.84	.77	.77	[illegible]	104	85	1.5	270	60
A [illegible]	25	10:05	541.77	0.90	.82	.82	158	100	87	1.5	262	60
[illegible]	30	10:10	544.538	0.82	.75	.75	157	95	86	1.5	265	61
	30	10:45	544.680									
	35	10:50	547.31	0.78	.71	.71	159	88	85	1.0	285	56
[illegible]	40	10:55	550.94	1.80	1.64	1.64	159	89	85	2.0	290	56
B [illegible]	45	11:00	555.19	2.20	2.0	2.0	159	95	85	2.5	280	56
[illegible]	50	11:05	558.00	0.84	0.77	0.77	159	95	85	1.5	280	59
[illegible]	55	11:10	[illegible]	0.82	0.75	0.75	159	94	85	1.5	283	63
[illegible]	60	11:15	562.210	0.66	0.60	0.66	159	94	86	1.5	280	63

COMMENTS:

EPA (Dur) 235

APPENDIX D.3 - Test Run No. 3, 8/17/88

JES/055

PLANT ....MONSANTO-SODA SPRINGS	PROBE LENGTH AND TYPE 10.5FT,GLASS
DATE 8/17/88	HEIGHT OF LOCATION(ft)...... 69.00
SAMPLING LOCATION ..INLET	NOZZLE I.D. 0.248
SAMPLE TYPE M111	ASSUMED MOISTURE, % 39.00
RUN NUMBER 3.00	SAMPLE BOX NUMBER ....
OPERATOR ....MNM/JTH	METER BOX NUMBER RAC-5
AMBIENT TEMPERATURE 80.00	METER DELTA H@ 1.91
BAROMETRIC PRESSURE 24.17	K FACTOR 1.63
STATIC PRESSURE (Ps) -7.30	PROBE HEATER SETTING 250.00
FILTER NUMBER H-15	HEATER BOX SETTING 250.00
MIN.SAMPLE VOLUME ..	REFERENCE DEL P ....N/A
INITIAL LEAK CHECK . 0.010	DRY/GAS METER FACTOR (Y) ... 0.99960
XAD TRAP NUMBER	FINAL LEAK CHECK .... 0.015 @ 10" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F — Filter Probe Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	15:25	598.957										
B1	2.50		600.400	1.60	163	2.54	2.54	233		84.00	83.00	55.00	6.00
B2	5.00		602.600	1.70	162	2.80	2.80	239		86.00	83.00	55.00	6.00
B3	7.50		604.800	1.70	162	2.80	2.80	242		87.00	83.00	55.00	6.50
B4	10.00		607.000	1.50	161	2.47	2.47	250		89.00	83.00	57.00	6.50
B5	12.50		609.100	1.10	161	1.81	1.81	249		90.00	84.00	58.00	5.00
B6	15.00		610.900	1.10	161	1.81	1.81	234		91.00	85.00	59.00	5.00
B7	17.50		612.400	0.68	161	1.13	1.13	231		92.00	85.00	64.00	4.00
B8	20.00		613.900	0.48	161	0.79	0.79	233		91.00	86.00	64.00	3.00
B9	22.50		614.900	0.48	162	0.79	0.79	234		91.00	85.00	57.00	3.00
B10	25.00		616.300	0.42	160	0.69	0.69	232		94.00	86.00	57.00	3.00
B11	27.50		617.600	0.42	162	0.69	0.69	234		94.00	86.00	57.00	3.00
B12	30.00	15:55	618.990	0.34	162	0.56	0.56	234		94.00	87.00	64.00	3.00
STOP		16:05	619.320										
A1	32.50	16:07	621.100	0.88	163	1.45	1.45	314		94.00	87.00	64.00	4.50
A2	35.00		623.000	0.88	163	1.45	1.45	305		90.00	87.00	57.00	4.50
A3	37.50		623.900	0.88	163	1.45	1.45	291		90.00	88.00	57.00	4.50
A4	40.00		625.700	0.88	163	1.45	1.45	289		91.00	87.00	57.00	5.00
A5	42.50		627.300	0.96	161	1.58	1.58	279		91.00	88.00	57.00	5.50
A6	45.00		629.200	0.96	163	1.58	1.58	271		93.00	87.00	57.00	5.50
A7	47.50		631.100	0.88	163	1.45	1.45	276		92.00	88.00	59.00	5.00
A8	50.00		632.600	0.80	163	1.32	1.32	263		93.00	88.00	59.00	5.00
A9	52.50		634.200	0.85	160	1.40	1.40	232		93.00	87.00	60.00	5.00
A10	55.00		636.000	0.85	159	1.40	1.40	236		93.00	87.00	61.00	5.00
A11	57.50		638.000	0.88	161	1.45	1.45	230		95.00	89.00	62.00	5.00
A12	60.00	16:35	639.270	0.82	161	1.35	1.35	234		95.00	89.00	63.00	5.00

81

K = 1.64 × ΔP
1.12 @ 150
.85 @ 160
.57 @ 170

FIELD DATA

PLANT MONSANTO - SODA SPRINGS
DATE 8/17/89
SAMPLING LOCATION INLET
SAMPLE TYPE M 111
RUN NUMBER 3
OPERATOR MWH / JTW
AMBIENT TEMPERATURE 80°
BAROMETRIC PRESSURE 613
STATIC PRESSURE, (P_s) -7.3" H_2O
FILTER NUMBER (s) W-15

PROBE LENGTH AND TYPE 10.5' GLASS
NOZZLE I.D. .248
ASSUMED MOISTURE, % 39%
SAMPLE BOX NUMBER -
METER BOX NUMBER RAC #5
METER $\Delta H_@$ 1.91
γ FACTOR 1.65
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp N/A

SCHEMATIC OF TRAVERSE POINT LAYOUT

Init leak check .01

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

ORSAT 15:40-42, 16:19-16

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	15 25	598.957									
B-1	2.5	15 27	600.40	1.6	2.54	2.54	163	84	83	6.0	255	55
2	5	15 30	602 60	1.7	2.80	2.80	162	86	83	6 0	239	55
3	7.5	15 32	604.80	1.7	2.80	2.80	162	87	83	6.5	242	55
4	10	15 35	607.0	1.5	2.47	2.47	161	89	83	6.5	250	57
5	12.5	15:37	609.1	1.1	1.81	1.81	161	90	84	5.0	249	58
6	15	15:40	610.9	1.1	1.81	1.81	161	91	85	5.0	234	59
7	17.5	15:42	612 4	0.68	1.13	1.13	161	92	85	4.0	251	64
8	20	15:45	613.9	0.48	0.79	0.79	161	91	86	3.0	253	64
9	22.5	15:47	614.9	0.48	0.79	0.79	162	91	85	3.0	254	57
10	25	15:50	616.3	0.42	0.69	0.69	160	94	86	3.0	252	57
11	27.5	15:52	617.6	0.42	0.69	0.69	162	94	86	3.0	254	57
12	30	15:55	618.990	0.34	0.56	0.56	162	94	87	3.0	254	64
	30	16:05	619.320		leak	.01						
A-1	32.5	16:07	621.1	0.88	1.45	1.45	163	94	87	4.5	314	64
2	35	16:10	623.0	0.88	1.45	1.45	163	90	87	4.5	305	57
3	37.5	16:12	623.9	0.88	1.45	1.45	163	90	88	4.5	291	57
4	40	16:15	625.7	0.86	1.45	1.45	163	91	87	5.0	289	57
5	42	16:17	627.3	0.96	1.58	1.58	161	91	88	5.5	279	57
6	45	16:20	629.2	0.96	1.58	1.58	163	93	87	5.5	271	57
7	47	16:22	631.1	0.88	1.45	1.45	163	92	88	5.0	276	59
8	50	16:25	632.6	0.80	1.32	1.32	163	93	88	5.0	265	59
9	52	16:27	634.2	0.85	1.40	1.40	160	93	87	5.0	252	60
10	55	16:30	636 0	0.85	1.40	1.40	159	93	87	5.0	256	61

COMMENTS:

EPA (Dur) 235
4/72

IN3

Final leak rate 0.015 @ 10" Hg.

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
					DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F			
	55	16:30	636.0									
B-11	57.5	16:32	638.0	0.88	1.45	1.46	161	95	59	5.0	250	62
B-12	60	16:35	639.270	0.82	1.35	1.35	161	95	59	5.0	254	63

EPA (Dur) 236
4 72

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET STACK A
SAMPLE TYPE M111
RUN NUMBER 3
OPERATOR ....BDR
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.60
FILTER NUMBER U-12
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .0.016
IAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.251
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-7
METER DELTA HG 1.77
K FACTOR 1.63
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00300
FINAL LEAK CHECK .... 0.010 @ 6" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	15:25	265.300											
B1	5.00	15:30	268.000	0.33	156	0.60	0.60		240		76.00	73.00	73.00	1.00
B2	10.00	15:35	270.700	0.55	158	0.91	0.91		237		89.00	80.00	62.00	1.00
B3	15.00	15:40	273.600	0.61	157	1.00	1.00		236		84.00	81.00	60.00	1.00
B4	20.00	15:45	276.800	0.70	157	1.20	1.20		246		84.00	78.00	60.00	2.00
B5	25.00	15:50	280.000	0.75	158	1.20	1.20		246		86.00	82.00	61.00	3.00
B6	30.00	15:55	283.135	0.68	158	1.10	1.10		247		87.00	83.00	63.00	3.00
STOP	30.00	15:55	283.715											
A1	35.00	16:40	286.300	0.56	156	0.92	0.92		260		84.00	92.00	68.00	2.00
A2	40.00	16:45	289.800	0.73	158	1.20	1.20		253		87.00	84.00	62.00	2.00
A3	45.00	16:50	293.100	0.80	160	1.30	1.30		253		89.00	85.00	61.00	3.00
A4	50.00	16:55	296.400	0.83	159	1.40	1.40		250		90.00	84.00	62.00	3.00
A5	55.00	17:00	299.800	0.85	159	1.40	1.40		245		86.00	82.00	64.00	4.00
A6	60.00	17:05	303.128	0.73	160	1.20	1.20		260		92.00	86.00	63.00	4.00
END														

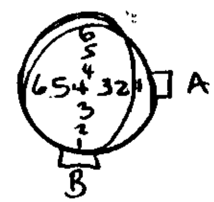
pr.
8/

ORSAT ~~BAG~~ BAG SAMPLE STARTED AT:

LEAK CHECK BEFORE PORT A
0.016 CFM

FIELD DATA

PLANT MONSANTO SODA SPRINGS
DATE 08-17-88
SAMPLING LOCATION OUTLET A
SAMPLE TYPE M III
RUN NUMBER 3
OPERATOR GD RIVES
AMBIENT TEMPERATURE 84 °F
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) W-12



SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

PROBE LENGTH AND TYPE 8 ft
NOZZLE I.D. #3
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER NA
METER BOX NUMBER RAC #17
METER $\Delta H_@$ 1.77
K FACTOR 1.65
PROBE HEATER SETTING
HEATER BOX SETTING 61%
REFERENCE Δp

Y = 1.003

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE #5 INLET ($T_{m\,in}$), °F	#6 OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F #3	IMPINGER TEMPERATURE, °F
	0	1525	265.500									
B-1	5	1530	268.0	0.35	0.6	0.6	156	76	73	1	240	73
B-2	10	1535	270.70	0.55	.91	0.91	158	84	80	1	237	62
B-3	15	1540	273.60	0.61	1.0	1.0	157	84	81	1	236	60
B-4	20	1545	276.8	0.70	1.2	1.2	157	84	78	2	246	60
B-5	25	1550	280.0	0.75	1.2	1.2	158	86	82	3	246	61
B-6	30	1555	283.155	0.68	1.1	1.1	158	87	83		247	63
	LEAK CHECK AFTER PORT CHANGE = 0.015 CFM @ 6 in. Hg											
		1630	283.715									
A-1	35											
	STOPPED @ 1631 284.300											
		1636	284.314									
A-1	35	1640	286.5[illegible]	0.56	0.92	0.92	156	84	92	2	260	68
A-2	40	1645	289.8	0.73	1.2	1.2	158	87	84	2	253	62
A-3	45	1650	293.1	0.8	1.3	1.3	160	89	85	3	253	61
A-4	50	1655	296.4	0.69	1.4	1.4	159	90	84	3	250	62
A-5	55	1700	299.8	0.85	1.4	1.4	159	86	82	4	245	64
A-6	60	1705	303.128	0.73	1.2	1.2	160	92	86	4	260	65
	FINAL LEAK CHECK = 0.010 CFM @ 5 in. Hg											

COMMENTS:

EPA (Dur) 235
4/72

''''

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 3.00
OPERATOR ....FLB
AMBIENT TEMPERATURE   85.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.25
FILTER NUMBER W-13
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.016
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......11' GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-3
METER DELTA H@ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 70%
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ...   0.99430
FINAL LEAK CHECK ....   0.005 @ 6" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Temperature: deg. F Filter Skin	Temperature: deg. F Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
----------	0.00	15:25	68.864											
B1	5.00	15:30	71.800	0.61	158		1.00		231		83.00	82.00	66.00	2.00
B2	10.00	15:35	73.100	0.76	158		1.30		242		84.00	83.00	61.00	2.00
B3	15.00	15:40	78.300	0.78	158		1.30		238		87.00	4.00	62.00	2.00
B4	20.00	15:45	81.800	0.76	158		1.30		245		87.00	85.00	64.00	2.00
B5	25.00	15:50	85.200	0.78	158		1.30		251		90.00	86.00	63.00	2.00
B6	30.00	15:55	88.944	0.83	158		1.40		242		91.00	87.00	67.00	2.00
STOP		16:35	89.159											
A1	35.00	16:40	92.300	0.63	159		1.00		271		83.00	82.00	68.00	2.00
A2	40.00	16:45	95.600	0.73	158		1.30		260		84.00	84.00	60.00	2.00
A3	45.00	16:50	99.000	0.81	159		1.30		251		88.00	85.00	60.00	3.00
A4	50.00	16:55	102.500	0.86	159		1.40		253		89.00	85.00	61.00	3.00
A5	55.00	17:00	106.100	0.89	159		1.50		232		92.00	85.00	66.00	3.00
A6	60.00	17:05	109.732	0.88	159		1.50		248		93.00	86.00	66.00	3.00
END														

''''

MODIFIED METHOD 111 DATA

PLANT Monsanto
DATE 8/17/88
SAMPLING LOCATION outlet
SAMPLE TYPE mm111
RUN NUMBER 3B
OPERATOR [illegible]
AMBIENT TEMPERATURE 85
BAROMETRIC PRESSURE
STATIC PRESSURE (P_s)
FILTER NUMBER (s)
MINIMUM SAMPLE VOLUME
INITIAL LEAK CHECK .016 @ 8"

PROBE LENGTH AND TYPE 11' glass
NOZZLE I.D. .250
ASSUMED MOISTURE, % 3?
SAMPLE BOX NUMBER 3
METER BOX NUMBER 12
METER ΔH@ 1.77
K FACTOR 1.65
PROBE HEATER SETTING 70%
HEATER BOX SETTING 250°
REFERENCE Δp N4
DRY/GAS METER FACTOR (Y) .9943
FINAL LEAK CHECK .005 @ 6"

SCHEMATIC OF TRAVERSE POINT LAYOUT
READ AND RECORD ALL DATA EVERY 5 MINUTES

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (V_m), ft³	Velocity Head (ΔP_s), in. H_2O	Stack T, °F	Orifice Pressure Differential (ΔH, in. H_2O) Desired	Actual	Probe	Filter Skin	Filter Out	Recirc. Water	Absorbent Trap	Dry Gas Meter Inlet ($T_{m\,in}$)	Dry Gas Meter Outlet ($T_{m\,out}$)	Impinger Exit	Pump Vacuum in. Hg
		1525	68.864													
B1	5	30	71.8	.61	158		1.0		331				83	82	66	2
2	10	35	75.1	.76	158		1.3		242				84	83	61	2
3	15	40	78.3	.78	158		1.3		238				87	84	62	2
4	20	45	81.8	.76	158		1.3		345				87	85	64	2
5	25	50	85.2	.78	158		1.3		351				90	86	63	2
6	30	1555	88.944	.83	158		1.4		342				91	87	67	2
						end of port leak ✓ .010 @ 5"										
		1635	84.159			changed ports leak ✓ .010 @ 5"										
A1	35	40	92.3	.63	159		1.0		371				83	82	68	2
2	40	45	95.6	.73	158		1.3		260				84	84	60	2
3	45	50	99.0	.81	159		1.3		351				88	85	60	3
4	50	55	102.5	.86	159		1.4		358				89	85	61	3
5	55	1700	106.1	.89	159		1.5		332				92	85	61	3
6	60	1705	109.732	.88	159		1.5		348				93	86	62	3

COMMENTS

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET C
SAMPLE TYPE M111
RUN NUMBER 3.00
OPERATOR ....CNR
AMBIENT TEMPERATURE 87.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER N-9
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.008
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-8
METER DELTA H@ 1.69
K FACTOR 1.55
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99650
FINAL LEAK CHECK .... 0.010 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	3:25	749.568											
B1	5.00	3:30	752.800	0.62	152		0.94		249		86.00	86.00	76.00	2.00
B2	10.00	3:35	756.200	0.82	157		1.25		241		89.00	86.00	73.00	3.00
B3	15.00	3:40	759.600	0.82	157		1.25		244		90.00	86.00	74.00	3.00
B4	20.00	3:45	763.100	0.85	157		1.30		248		90.00	86.00	76.00	3.00
B5	25.00	3:50	766.900	0.78	157		1.30		258		92.00	87.00	80.00	3.00
B6	30.00	3:55	770.170	0.80	157		1.20		262		90.00	87.00	78.00	3.00
STOP		4:35	770.380											
A1	35.00	4:40	773.300	0.72	158		0.87		297		83.00	82.00	62.00	2.00
A2	40.00	4:45	776.500	0.70	158		1.10		285		86.00	83.00	56.00	3.00
A3	45.00	4:50	779.700	0.85	158		1.05		254		89.00	84.00	57.00	3.00
A4	50.00	4:55	783.200	0.90	158		1.30		261		93.00	85.00	58.00	3.00
A5	55.00	5:00	786.900	0.85	158		1.40		274		92.00	85.00	58.00	3.50
A6	60.00	5:05	790.471	0.75	158		1.30		290		96.00	86.00	60.00	3.50
END														

INITIAL LEAK = .008 @ 5" Hg
FINAL LEAK = 0.01 @ 5" Hg } B

INITIAL LEAK = 0.012 @ 10" Hg
FINAL LEAK = 0.012 @ 5" Hg } A

ORSAT START 4.39
END 4.50

MODIFIED METHOD 5 DATA

.56 x 1.55" = .868
1.55 x 0.7 = 1.085
1.55 x .85 = 1.3175

PLANT MONSANTO
DATE 8/17/88
SAMPLING LOCATION OUTLET C
SAMPLE TYPE M111
RUN NUMBER 2
OPERATOR CNR
AMBIENT TEMPERATURE 87 °F
BAROMETRIC PRESSURE 29.17 "Hg
STATIC PRESSURE (P_s)
FILTER NUMBER (s)
MINIMUM SAMPLE VOLUME
INITIAL LEAK CHECK

PROBE LENGTH AND TYPE 96", W/ GLASS LINER
NOZZLE I.D. #7, 0.250"
ASSUMED MOISTURE, % 39%
SAMPLE BOX NUMBER N/A
METER BOX NUMBER 8
METER ΔH@ 1.69
C FACTOR K_3 = 1.55 K_4 = 2.03
PROBE HEATER SETTING 250 °F
HEATER BOX SETTING 250 °F
REFERENCE Δp
DRY/GAS METER FACTOR (Y) 0.9965
FINAL LEAK CHECK

1.55 x .8 = 1.24

SCHEMATIC OF TRAVERSE POINT LAYOUT
READ AND RECORD ALL DATA EVERY 5 MINUTES

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (V_m), ft³	Velocity Head (Δp), in. H_2O	Stack T, in °F	Orifice Pressure Differential (ΔH, in. H_2O) Desired	Actual	Probe	Filter Skin	Filter Out	Recirc. Water	Absorbent Trap	Dry Gas Meter Inlet ($T_{m\,in}$)	Dry Gas Meter Outlet ($T_{m\,out}$)	Impinger Exit	Pump Vacuum in. Hg
		3.25	749.568													
B-1	5	3.30	752.8	0.62	152		0.94	464	249	—	—	—	86	86	76	2
B-2	10	3.35	756.2	0.82	157		1.26	—	241	—	—	—	89	86	73	3
B-3	15	3.40	759.6	0.82	157		1.25	—	244	—	—	—	90	86	79	3
B-4	20	3.45	763.1	0.85	157		1.30	—	248	—	—	—	90	86	76	3
B-5	25	3.50	766.9	0.85	157		1.30	—	250	—	—	—	92	87	80	3
B-6	30	3.55	770.17	0.78	157		1.25	—	262	—	—	—	90	87	78	3
		4.35	770.38													
A-1	35	4.40	773.3	0.56	153		0.87	—	297	—	—	—	83	82	62	2
A-2	40	4.45	776.5	0.72	158		1.10	—	285	—	—	—	86	83	56	3
A-3	45	4.50	779.7	0.70	158		1.08	—	254	—	—	—	89	84	57	3
A-4	50	4.55	783.2	0.85	158		1.30	—	20	—	—	—	93	85	58	3
A-5	55	5.00	786.4	0.90	158		1.40	—	274	—	—	—	92	85	58	3.5
A-6	60	5.05	790.471	0.85	158		1.30	—	290	—	—	—	96	86	60	3.5

COMMENTS
K_3 = 1.55 @ 90/160
K_4 = 2.03 @ 80/150

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET 9
SAMPLE TYPE M111
RUN NUMBER 3
OPERATOR ....JAE
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER B-14
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.006
IAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-4
METER DELTA H0 .... 1.78
K FACTOR 1.63
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00730
FINAL LEAK CHECK .... 0.008 @ 4" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures deg. F: Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	13:25	563.378											
A1	5.00	13:30	566.470	0.98	159	0.95	0.95		245		91.00	89.00	66.00	1.00
A2	10.00	13:35	570.030	0.80	159	1.30	1.30		239		96.00	89.00	68.00	1.50
A3	15.00	15:40	573.600	0.78	159	1.27	1.27		248		97.00	89.00	68.00	1.50
A4	20.00	13:45	577.150	0.80	159	1.30	1.30		254		97.00	89.00	66.00	1.50
A5	25.00	15:50	580.900	0.90	159	1.47	1.47		255		99.00	89.00	66.00	1.50
A6	30.00	13:55	584.486	0.76	159	1.24	1.24		258		98.00	89.00	64.00	1.50
STOP	30.00	16:35	584.618											
B1	35.00	16:40	588.020	0.70	159	1.14	1.14		300		87.00	86.00	59.00	1.50
B2	40.00	16:45	591.680	0.86	160	1.40	1.40		264		97.00	88.00	55.00	1.50
B3	45.00	16:50	595.320	0.86	166	1.40	1.40		265		98.00	88.00	55.00	2.00
B4	50.00	16:55	598.930	0.82	160	1.34	1.34		267		99.00	89.00	58.00	1.50
B5	55.00	17:00	602.330	0.82	159	1.34	1.34		269		98.00	89.00	59.00	1.50
B6	60.00	17:05	606.036	0.74	160	1.21	1.21		274		100.00	89.00	61.00	2.00
END														

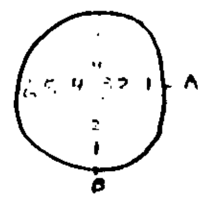
Outlet – 15:25 – 15:42

Initial LK ✓ = .00...
Final LK ✓ .005
Initial LK ✓ = .00...
Final LK ✓ .0072...

Y = 1.0075

FIELD DATA

PLANT Mu[illegible]
DATE 8/17/88
SAMPLING LOCATION Outlet D
SAMPLE TYPE M111
RUN NUMBER 3
OPERATOR JAF
AMBIENT TEMPERATURE 84
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s) –0.25
FILTER NUMBER (s) N/A W-14



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 8' GLASS
NOZZLE I.D. 0.25
ASSUMED MOISTURE, % 3%
SAMPLE BOX NUMBER ~~RAC #4~~
METER BOX NUMBER RAC #4
METER $\Delta H_@$ 1.78
K FACTOR 1.63
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp N/A

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	15:25	563.378									
A 1	5	15:30	566.47	.58	.95	.95	159	91	89	1.0	245	66
	10	15:35	570.03	.80	1.30	1.30	159	96	89	1.5	239	68
1	15	15:40	573.60	.78	1.27	1.27	159	97	89	1.5	246	68
1	20	15:45	577.15	.80	1.30	1.30	159	97	87	1.5	254	66
1	25	15:50	580.70	.90	1.47	1.47	159	99	89	1.5	255	66
1	30	15:55	584.486	.76	1.24	1.24	159	98	89	1.5	258	64
	30	16:37	584.618									
B 1	35	16:42	588.02	.70	1.14	1.14	159	87	86	1.5	301	54
1	40	16:47	591.68	.86	1.40	1.40	160	97	88	1.5	263	55
1	45	16:50	595.32	.86	1.40	1.40	166	98	88	2.0	265	55
1	50	16:55	598.93	.82	1.34	1.34	160	99	89	1.5	267	58
1	55	17:00	602.[illegible]	.82	1.34	1.34	159	98	89	1.5	269	59
1	60	17:05	606.036	.74	1.21	1.21	160	100	89	2.0	274	61

COMMENTS:

EPA (Dur) 235
4/72

APPENDIX D.4 - Test Run No. 4, 8/18/88

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/18/88
SAMPLING LOCATION ..INLET
SAMPLE TYPE M111
RUN NUMBER 4.00
OPERATOR ....MBN/JTM
AMBIENT TEMPERATURE 80.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -7.30
FILTER NUMBER N-19
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
IAD TRAP NUMBER ....

PROBE LENGTH AND TYPE 10.5FT,GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.248
ASSUMED MOISTURE, % 40.00
SAMPLE BOX NUMBER ....
METER BOX NUMBER RAC-5
METER DELTA HQ 1.91
K FACTOR 1.65
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99960
FINAL LEAK CHECK .... 0.010 @ 10" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	10:35	649.397											
B1	2.50		650.720	0.90	161	1.48	1.48		272		81.00	80.00	62.00	4.00
B2	5.00		652.400	0.84	161	1.39	1.39		281		82.00	80.00	58.00	4.00
B3	7.50		654.100	0.81	161	1.34	1.34		278		84.00	80.00	56.00	4.00
B4	10.00		655.700	0.75	161	1.24	1.24		278		87.00	81.00	56.00	4.00
B5	12.50		657.300	0.75	161	1.24	1.24		278		88.00	82.00	56.00	4.00
B6	15.00		658.900	0.81	161	1.34	1.34		272		90.00	83.00	57.00	4.00
B7	17.50		660.600	0.75	161	1.24	1.24		266		90.00	84.00	59.00	4.00
B8	20.00		662.200	0.75	161	1.24	1.24		257		93.00	85.00	60.00	4.00
B9	22.50		663.800	0.78	161	1.28	1.28		253		92.00	85.00	62.00	4.00
B10	25.00		665.700	0.96	161	1.58	1.58		255		96.00	87.00	65.00	5.00
B11	27.50		667.700	1.10	161	1.82	1.82		254		97.00	87.00	66.00	5.50
B12	30.00	11:05	669.381	0.86	161	1.41	1.41		254		100.00	89.00	67.00	5.00
STOP		11:12.5	669.606											
A1	32.50	11:15	671.700	1.60	161	2.64	2.64		265		96.00	91.00	60.00	8.50
A2	35.00		673.900	1.80	161	2.97	2.97		263		97.00	92.00	58.00	9.50
A3	37.50		673.900	1.60	161	2.64	2.64		255		104.00	93.00	54.00	9.50
A4	40.00		676.000	1.60	163	2.64	,2.64		255		108.00	95.00	54.00	9.50
A5	42.50		680.600	1.40	161	2.31	2.31		254		110.00	95.00	55.00	9.50
A6	45.00		683.100	1.10	161	1.82	1.82		255		109.00	97.00	56.00	7.50
A7	47.50		684.800	0.88	159	1.44	1.44		249		109.00	95.00	56.00	6.50
A8	50.00		686.500	0.59	163	0.97	0.97		248		102.00	95.00	57.00	6.00
A9	52.50		687.200	0.72	162	1.18	1.18		249		99.00	95.00	58.00	6.50
A10	55.00		688.900	0.56	161	0.92	0.92		249		99.00	95.00	59.00	6.00
A11	57.50		689.000	0.42	161	0.69	0.69		250		98.00	94.00	60.00	4.00
A12	60.00	11:42.5	690.421	0.42	161	0.69	0.69		250		96.00	94.00	60.00	4.00

FIELD DATA

PLANT Monsanto - Soda Springs
DATE 8-18-88
SAMPLING LOCATION INLET
SAMPLE TYPE M-111
RUN NUMBER 4
OPERATOR MWH / JTW
AMBIENT TEMPERATURE 80°
BAROMETRIC PRESSURE 614
STATIC PRESSURE, (P_s) -7.3
FILTER NUMBER (s) W-19

PROBE LENGTH AND TYPE 10' GLASS
NOZZLE I.D. .248
ASSUMED MOISTURE, % 40
SAMPLE BOX NUMBER N/A
METER BOX NUMBER RAC #5
METER $\Delta H_@$ 1.51
K FACTOR 1.65 x ΔP = ΔH
PROBE HEATER SETTING 250°F
HEATER BOX SETTING 250°F
REFERENCE Δp
Y = 0.9996

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

Init leak 0.01 @ 10" Hg.

1.21 ACFM

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	10:35	649.397									
B-1	2.5	:37.5	650.72	0.90	1.48	1.48	161	81	80	4.0	292	62
B-2	5	10:40	652.4	0.84	1.39	1.39	161	82	80	4.0	281	58
B-3	7.5	:42.5	654.1	0.81	1.34	1.34	161	84	80	4.0	278	56
B-4	10	10:45	655.7	0.75	1.24	1.24	161	87	81	4.0	278	56
B-5	12.5	:47.5	657.3	0.75	1.24	1.24	161	88	82	4.0	278	56
B-6	15	10:50	658.9	0.81	1.34	1.34	161	90	83	4.0	272	57
B-7	17.5	:52.5	660.6	0.75	1.24	1.24	161	90	84	4.0	266	59
B-8	20	10:55	662.2	0.75	1.24	1.24	161	93	85	4.0	257	60
B-9	22.5	:57	663.8	0.78	1.28	1.28	161	92	85	4.0	255	62
B-10	25	11:00	665.7	0.96	1.58	1.58	161	96	87	5.0	255	65
B-11	27.5	:02	667.87	1.1	1.82	1.82	161	97	87	5.5	254	66
B-12	30	11:05	669.381	0.86	1.41	1.41	161	100	89	5.0	254	67
	30	11:12.5	669.606				leak check =		0.01	@ 10" Hg.		
A-1	32.5	11:15	671.7	1.6	2.64	2.64	161	96	91	8.5	265	68
A-2	35	11:17	673.9	1.8	2.97	2.97	161	97	92	9.5	265	58
A-3	37	11:20	676.0	1.6	2.64	2.64	161	104	93	9.5	255	54
A-4	40	11:22	678.5	1.6	2.64	2.64	161	108	95	9.5	255	54
A-5	42	11:25	680.6	1.4	2.31	2.31	163	110	95	9.5	254	55
A-6	45	11:27.5	683.1	1.1	1.82	1.82	161	109	98	9.5	255	56
A-7	47	11:30	684.8	0.88	1.44	1.44	161	109	95	6.5	249	56
A-8	50	:32	686.5	0.59	0.97	0.97	159	102	95	6.0	248	57
A-9	52	11:35	687.2	0.72	1.18	1.18	163	99	95	6.5	249	55
A-10	55	:37.5	688.9	0.56	0.92	0.92	162	99	95	6.0	249	55

COMMENTS:

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.914 60ft³ ...

11/18/88 inlet M-111 Run #4

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET $(T_{m_{in}})$, °F	DRY GAS METER TEMPERATURE OUTLET $(T_{m_{out}})$, °F	PUMP VACUUM in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	55	37.5	688.9									
A-11	57.5	40	689.0	.42	.69	.69	161	98	94	4.0	250	60
A-12	60	42.5	690.421	.42	.69	.69	161	96	94	4.0	250	60
			FINAL	LEAK	CHECK		= 0.01	@	12" Hg.			

EPA (Dur) 236
4 72

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-18-88
SAMPLING LOCATION ..OUTLET STACK A
SAMPLE TYPE M111
RUN NUMBER 4.00
OPERATOR ....[illegible]
AMBIENT TEMPERATURE   84.00
BAROMETRIC PRESSURE   24.13
STATIC PRESSURE (Ps)   -0.60
FILTER NUMBER M-16
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.019
IAB TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.251
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-7
METER DELTA HQ 1.77
K FACTOR 1.65
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00350
FINAL LEAK CHECK ....   0.016 @ 12" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

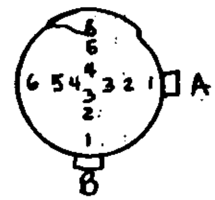
Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	10:35	365.545											
B1	5.00		368.390	0.56	162	0.60	0.92		250		81.00	72.00	65.00	2.00
B2	10.00		371.400	0.70	163	0.91	1.15		235		88.00	74.00	53.00	2.00
B3	15.00		374.600	0.75	162	1.00	1.20		235		90.00	79.00	53.00	3.00
B4	20.00		378.400	0.85	162	1.20	1.40		242		92.00	81.00	54.00	3.00
B5	25.00		381.150	0.83	162	1.20	1.40		248		95.00	84.00	61.00	3.00
B6	30.00	11:05	384.736	0.73	162	1.10	1.20		248		95.00	83.00	58.00	4.00
STOP	30.00	11:30	385.200											
A1	35.00	11:35	388.000	0.50	161	0.92	0.82		240		81.00	77.00	66.00	4.00
A2	40.00		391.100	0.75	160	1.20	1.20		235		84.00	81.00	61.00	4.00
A3	45.00		394.300	0.75	160	1.30	1.20		250		86.00	82.00	62.00	4.00
A4	50.00		397.600	0.80	160	1.40	1.30		246		87.00	80.00	63.00	5.00
A5	55.00		400.900	0.80	160	1.40	1.30		261		87.00	80.00	64.00	5.00
A6	60.00	12:00	404.114	0.65	159	1.20	1.00		263		88.00	81.00	65.00	5.00
END														

STARTED BAG SAMPLE @ 1035 - 1050
PORT B

INITIAL LEAK CHECK: 0.019 cfm [redacted]

FIELD DATA

PLANT MONSANTO
DATE 08-15-88
SAMPLING LOCATION OUTLET A
SAMPLE TYPE M111
RUN NUMBER 4
OPERATOR GDR
AMBIENT TEMPERATURE 84°F
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) W-16



SCHEMATIC OF TRAVERSE POINT LAYOUT

PROBE LENGTH AND TYPE 8ft
NOZZLE I.D. #3 (D_n = 0.251)
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER —
METER BOX NUMBER RAC #7
METER ΔH@ 1.77
K FACTOR 1.465
PROBE HEATER SETTING —
HEATER BOX SETTING —
REFERENCE Δp —
Y = 1.0035

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F #1	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, #3 °F	IMPINGER TEMPERATURE, #4 °F
	0	1035	365.545									
B-1	5	1040	368.39	0.56	.92	.92	162	81	72	2	250	65
B-2	10	1045	371.4	0.7	1.15	1.15	163	88	74	2	235	53
B-3	15	1050	374.6	0.75	1.2	1.2	162	90	79	3	235	53
B-4	20	1055	378.4	0.85	1.4	1.4	162	92	81	3	242	54
B-5	25	1100	381.15	0.83	1.4	1.4	162	95	84	3	248	61
B-6	30	1105	384.736	0.73	1.2	1.2	162	95	83	4	248	58
	LEAK CHECK		BEFORE PORT Δ	> 0.011 CFM @ 8 in. Hg								
	LEAK CHECK		AFTER PORT Δ	= 0.01 CFM @ 8 in. Hg								
			200									
		1120	385.200									
A-1	35	1135	388	0.50	.82	0.82	161	81	77	4	240	66
A-2	40	1140	391.1	0.75	1.2	1.2	160	84	81	4	235	61
A-3	45	1145	394.3	0.75	1.2	1.2	160	86	82	4	250	62
A-4	50	1150	397.6	0.8	1.3	1.3	160	87	80	5	246	63
A-5	55	1155	400.9	0.8	1.3	1.3	160	87	80	5	261	64
A-6	60	1200	404.114	0.65	1.0	1.0	159	88	81	5	263	65

FINAL LEAK CHECK: 0.016 CFM @ 12 in. Hg

COMMENTS:

EPA (Dur) 235
4/72

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-18-88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 4.00
OPERATOR ....FLG
AMBIENT TEMPERATURE   78.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.25
FILTER NUMBER OTB4
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.012
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......11', GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 4.00
METER BOX NUMBER 12.00
METER DELTA H@ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 70%
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ...   0.99430
FINAL LEAK CHECK ....   0.018 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
----------	0.00	10:35	58.932											
A1	5.00		62.000	0.57	158		0.94		272		82.00	82.00	69.00	2.00
A2	10.00		65.300	0.74	158		1.20		258		83.00	82.00	60.00	3.00
A3	15.00		68.700	0.78	158		1.30		265		88.00	83.00	61.00	3.00
A4	20.00		72.100	0.80	159		1.30		260		91.00	83.00	63.00	3.00
A5	25.00		75.600	0.85	159		1.40		255		94.00	85.00	68.00	3.00
A6	30.00	11:05	79.066	0.83	159		1.40		266		96.00	86.00	67.00	3.00
STOP		11:30	79.459											
B1	35.00	11:35	82.600	0.57	158		0.94		275		82.00	82.00	65.00	2.00
B2	40.00		85.900	0.81	158		1.30		270		84.00	84.00	58.00	3.00
B3	45.00		89.200	0.85	158		1.40		271		86.00	84.00	57.00	3.00
B4	50.00		92.700	0.84	158		1.40		258		86.00	84.00	50.00	3.00
B5	55.00		96.200	0.83	158		1.40		275		84.00	83.00	60.00	3.00
B6	60.00	12:00	99.642	0.83	159		1.40		247		88.00	85.00	61.00	3.00
END														

FIELD DATA

PLANT Monsanto
DATE 8/18/88
SAMPLING LOCATION outlet B
SAMPLE TYPE m 111
RUN NUMBER 4
OPERATOR flg
AMBIENT TEMPERATURE 78
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) OT B4

PROBE LENGTH AND TYPE 11' glass
NOZZLE I.D. .250
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER 4
METER BOX NUMBER 12
METER $\Delta H_@$ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 70%
HEATER BOX SETTING 250°
REFERENCE Δp NA

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

Y= .9943

initial leak ✓ .012 @ 6"

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		1035	58.932									
A 1	5	40	62.0	.57		.94	158	82	82	2	272	69
2	10	45	65.3	.74		1.2	158	83	82	3	258	60
3	15	50	68.7	.78		1.3	158	88	83	3	265	61
4	20	55	72.1	.8		1.3	159	91	83	3	260	63
5	25	1100	75.6	.85		1.4	159	94	85	3	255	68
6	30	1105	79.066	.83		1.4	159	96	86	3	266	67
					end of	port A		leak	✓	.010	@ 8"	
		1130	79.459		changed	ports		leak	✓	.010	@ 8"	
B 1	35	35	82.6	.67		.94	158	82	82	2	275	65
2	40	40	85.9	.81		1.3	158	84	84	3	270	58
3	45	45	89.2	.85		1.4	158	86	84	3	271	57
4	50	50	92.7	.84		1.4	158	86	84	3	258	50
5	55	55	96.2	.83		1.4	158	84	83	3	275	60
6	60	1200	99.642	.83		1.4	159	88	85	3	247	61

COMMENTS:

final leak ✓ .018 @ 5"

EPA (Dur) 235
4 72

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS		PROBE LENGTH AND TYPE ......96", GLASS	
DATE 8-18-88		HEIGHT OF LOCATION(ft)......	69.00
SAMPLING LOCATION ..OUTLET C		NOZZLE I.D.	0.250
SAMPLE TYPE M111		ASSUMED MOISTURE, %	39.00
RUN NUMBER	4.00	SAMPLE BOX NUMBER ....NA	
OPERATOR ....CMR		METER BOX NUMBER RAC-8	
AMBIENT TEMPERATURE	84.00	METER DELTA H@	1.69
BAROMETRIC PRESSURE	24.17	K FACTOR	1.55
STATIC PRESSURE (Ps)	-0.25	PROBE HEATER SETTING	250.00
FILTER NUMBER M-18		HEATER BOX SETTING	260.00
MIN.SAMPLE VOLUME ..		REFERENCE DEL P ....N/A	
INITIAL LEAK CHECK .	0.012	DRY/GAS METER FACTOR (Y) ...	0.99650
IAB TRAP NUMBER		FINAL LEAK CHECK	0.016 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperatures: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	10:35	840.830											
A1	5.00		843.800	0.56	156	0.87	0.87		290		87.00	86.00	61.00	2.00
A2	10.00		847.100	0.75	157	1.16	1.16		304		95.00	87.00	57.00	2.50
A3	15.00		850.400	0.77	158	1.20	1.20		302		98.00	89.00	58.00	2.50
A4	20.00		854.000	0.82	158	1.27	1.27		300		100.00	90.00	59.00	3.00
A5	25.00		857.200	0.90	158	1.40	1.40		302		102.00	90.00	60.00	3.00
A6	30.00	11:05	861.232	0.85	158	1.30	1.30		313		104.00	92.00	62.00	3.00
STOP		11:30	861.749											
B1	35.00	11:35	864.800	0.62	153	0.96	0.96		214		85.00	83.00	60.00	2.50
B2	40.00		868.200	0.80	157	1.24	1.24		235		86.00	85.00	57.00	3.00
B3	45.00		871.700	0.80	157	1.24	1.24		235		87.00	84.00	57.00	3.00
B4	50.00		875.250	0.84	157	1.30	1.30		245		88.00	84.00	57.00	3.00
B5	55.00		878.700	0.85	157	1.32	1.32		259		89.00	84.00	57.00	3.00
B6	60.00	12:00	882.234	0.78	158	1.21	1.21		307		91.00	85.00	59.00	3.00
END														

8/3
MI

INITIAL LEAK 0.012 CFM @ 5" Hg
FINAL LEAK 0.016 CFM @ 5" Hg
0.016 @ 9" Hg } A

INITIAL LEAK 0.008 CFM @ 5" Hg
0.02 CFM @ 10" Hg
FINAL LEAK 0.007 CFM @ 5" Hg
0.010 CFM @ 10" Hg } B

ORSAT SAMPLE START 11.50
STOP 12.05

FIELD DATA

PLANT Monsanto - Soda Springs
DATE 8/19/88
SAMPLING LOCATION OUTLET - C
SAMPLE TYPE M111
RUN NUMBER 4
OPERATOR CNR
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) W18

PROBE LENGTH AND TYPE 96" W/ GLASS LINER
NOZZLE I.D. #7, 0.250"
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER N/A
METER BOX NUMBER 8
METER $\Delta H_@$ 1.69
C FACTOR 1.55
PROBE HEATER SETTING 250
HEATER BOX SETTING 250
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F				
	0	10.30	840.850 ~~840.850~~										
A-1	5	10.40	843.8	0.56	0.87	0.87	156	89	86	2	290	61	.55 - .60
A-2	10	10.45	847.1	0.75	1.16	1.16	157	95	87	2.5	304	57	
A-3	15	10.50	850.4	0.77	1.20	1.20	158	98	89	2.5	302	58	
A-4	20	10.55	854.0	0.82	1.27	1.27	158	100	90	3	300	59	.8 - .87
A-5	25	11.00	857.7	0.90	1.40	1.40	156	102	90	3	302	60	.88 - .92
A-6	30	11.05	861.232	0.85	1.38	1.38	158	104	92	3	313	62	.70 - .85
		11.30	861.749									[illegible]	
B-1	35	11.35	864.8	0.62	0.96	0.96	153	85	83	2.5	214	60	
B-2	40	11.40	868.2	0.80	1.24	1.24	157	86	85	3	235	57	
B-3	45	11.45	871.7	0.80	1.24	1.24	157	87	84	3	235	57	
B-4	50	11.50	875.25	0.84	1.3	1.3	157	88	84	3	245	57	
B-5	55	11.55	878.7	0.84	1.32	1.32	157	89	84	3	259	57	.76 - .86
B-6	60	12.00	882.234	0.78	1.21	1.21	158	91	85	3	307	57	.7 - .8

COMMENTS:

INITIAL PITOT LEAK CHECK OK

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4/72

MAD
8/31/88

SAMPLING DATA

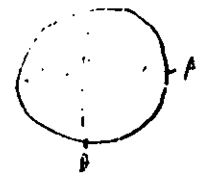
PLANT ....MONSANTO - SODA SPRINGS	PROBE LENGTH AND TYPE ......96", GLASS
DATE 8-18-88	HEIGHT OF LOCATION(ft)...... 69.00
SAMPLING LOCATION ..OUTLET B	NOZZLE I.D. 0.250
SAMPLE TYPE M111	ASSUMED MOISTURE, % 39.00
RUN NUMBER 4.00	SAMPLE BOX NUMBER 4.00
OPERATOR ....JAE	METER BOX NUMBER RAC-4
AMBIENT TEMPERATURE 82.00	METER DELTA HG 1.70
BAROMETRIC PRESSURE 24.13	K FACTOR 1.63
STATIC PRESSURE (Ps) -0.23	PROBE HEATER SETTING 250.00
FILTER NUMBER 20	HEATER BOX SETTING 260.00
MIN.SAMPLE VOLUME ..	REFERENCE DEL P ....N/A
INITIAL LEAK CHECK . 0.000	DRY/GAS METER FACTOR (Y) ... 1.00750
XAD TRAP NUMBER	FINAL LEAK CHECK .... 0.006 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperatures deg. F: Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	10:35	657.753											
A1	5.00		660.990	0.66	159	1.08	1.08		272		91.00	83.00	61.00	1.50
A2	10.00		664.460	0.80	159	1.30	1.30		272		96.00	86.00	61.00	1.50
A3	15.00		668.050	0.82	160	1.34	1.34		278		101.00	87.00	62.00	2.00
A4	20.00		671.720	0.88	161	1.43	1.43		280		103.00	89.00	64.00	2.50
A5	25.00		675.470	0.92	161	1.50	1.50		276		104.00	90.00	60.00	2.50
A6	30.00	11:05	679.204	0.88	161	1.43	1.43		274		105.00	90.00	60.00	2.50
STOP	30.00	11:30	679.336											
B1	35.00	11:35	682.990	0.66	159	1.08	1.08		273		90.00	88.00	58.00	2.00
B2	40.00		686.030	0.82	159	1.34	1.34		262		92.00	88.00	58.00	2.00
B3	45.00		689.710	0.88	159	1.43	1.43		254		93.00	88.00	59.00	2.50
B4	50.00		693.380	0.88	159	1.43	1.43		257		93.00	87.00	61.00	2.50
B5	55.00		696.990	0.84	159	1.37	1.37		260		94.00	87.00	64.00	2.50
B6	60.00	12:00	700.476	0.76	159	1.24	1.24		266		96.00	87.00	67.00	2.50
END														

FIELD DATA

PLANT ____
DATE 5-17-88
SAMPLING LOCATION Outlet D
SAMPLE TYPE ____
RUN NUMBER 4
OPERATOR JAE
AMBIENT TEMPERATURE 82
BAROMETRIC PRESSURE ____
STATIC PRESSURE, (P_s) -.25
FILTER NUMBER (s) 20



SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 5 MINUTES

PROBE LENGTH AND TYPE 7' GLASS
NOZZLE I.D. 0.2__
ASSUMED MOISTURE, % 27
SAMPLE BOX NUMBER N/A
METER BOX NUMBER EAC # 4
METER $\Delta H_@$ 1.72
K ~~C~~ FACTOR 1.63
PROBE HEATER SETTING 2__
HEATER BOX SETTING 2__
REFERENCE Δp N/A
Y = 1.0075

.___ @ 6'
.006 @ 5'
.___ @ 5
.005 @ __

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	10:35	657.753									
A-1	5	10:40	660.99	.66	1.08	1.08	159	91	85	1.5	272	61
A-2	10	10:45	664.46	.80	1.30	1.30	159	96	86	1.5	272	61
A-3	15	10:50	668.05	.82	1.34	1.34	160	101	87	2.0	278	62
A-4	[illegible]	10:55	671.72	.88	1.43	1.43	161	103	89	2.5	280	64
A-5	[illegible]	11:00	675.47	.92	1.52	1.52	161	104	90	2.5	276	68
A-6	30	11:05	679.204	.87	1.43	1.43	161	105	90	2.5	274	68
	30	11:30	679.336									
B-1	35	11:35	682.59	.66	1.08	1.08	159	90	88	2.0	275	58
B-2	40	11:40	686.03	.82	1.34	1.34	159	92	88	2.0	262	58
B-3	45	11:45	689.71	.88	1.43	1.43	159	93	88	2.5	254	59
B-4	50	11:50	693.38	.88	1.43	1.43	159	95	87	2.5	257	61
B-5	55	11:55	696.99	.84	1.37	1.37	159	94	87	2.5	260	64
B-6	60	12:00	700.476	.76	1.24	1.24	159	96	87	2.5	266	67

COMMENTS: off __ 11:30 - 11:42

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APPENDIX D.5 - Test Run No. 5, Outlet D only

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/19/88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE M111
RUN NUMBER 5.00
OPERATOR ....JAE
AMBIENT TEMPERATURE 73.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER N-10
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.012
IAB TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.250
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....
METER BOX NUMBER RAC-4
METER DELTA H@ 1.78
K FACTOR 1.63
PROBE HEATER SETTING 330.00
HEATER BOX SETTING 360.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00750
FINAL LEAK CHECK .... 0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperatures deg. F: Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	11:35	816.718											
B1	5.00		820.050	0.68	164	1.11	1.11		262		91.00	90.00	52.00	1.00
B2	10.00		823.560	0.80	161	1.30	1.30		270		89.00	88.00	51.00	1.00
B3	15.00		827.000	0.80	161	1.30	1.30		270		90.00	87.00	52.00	1.00
B4	20.00		830.930	1.00	161	1.63	1.63		267		95.00	85.00	54.00	1.50
B5	25.00		834.470	0.80	161	1.30	1.30		263		97.00	86.00	57.00	1.50
B6	30.00	12:05	837.925	0.74	161	1.21	1.21		271		100.00	86.00	59.00	1.50
STOP	30:00		838.272											
A1	35.00	12:30	841.440	0.64	159	1.04	1.04		285		104.00	94.00	56.00	1.00
A2	40.00		844.930	0.82	160	1.34	1.34		287		107.00	95.00	55.00	1.00
A3	45.00		848.620	0.89	160	1.45	1.45		271		110.00	96.00	56.00	1.50
A4	50.00		852.300	0.94	160	1.53	1.53		260		112.00	97.00	58.00	1.50
A5	55.00		855.860	0.84	160	1.34	1.34		261		114.00	97.00	59.00	1.50
A6	60.00	12:55	859.434	0.84	160	1.34	1.34		257		115.00	97.00	60.00	1.50
END														

INITIAL LK / = .012 @ 11"
.018 @ 5"
.01 @ 5"
.014 @ 5"

FIELD DATA

PLANT Monsanto
DATE 8-19-88
SAMPLING LOCATION Outlet D
SAMPLE TYPE M111
RUN NUMBER 5
OPERATOR JAE
AMBIENT TEMPERATURE 75
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s) -.25
FILTER NUMBER (s) 21

PROBE LENGTH AND TYPE 8' GLASS
NOZZLE I.D. .250
ASSUMED MOISTURE, % 39
SAMPLE BOX NUMBER RAC #4 N/A
METER BOX NUMBER ↓
METER $\Delta H_@$ 1.78
K FACTOR 1.63
PROBE HEATER SETTING 350
HEATER BOX SETTING 360
REFERENCE Δp N/A

Y = 1.0075

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY ______ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	11:35	816.718									
B-1	5	11:40	820.05	.68	1.11	1.11	164	91	90	1.0	262	52
B-2	10	11:45	823.56	.80	1.30	1.30	161	89	88	1.0	270	51
B-3	15	11:50	827.08	.80	1.30	1.30	161	90	87	1.0	270	52
B-4	20	11:55	830.93	1.0	1.63	1.63	161	95	85	1.5	267	54
B-5	25	12:00	834.47	.80	1.30	1.30	161	97	86	1.5	263	57
B-6	30	12:05	837.925	.74	1.21	1.21	161	100	86	1.5	271	59
		12:25	838.272									
A-1	35	12:30 12:25	841.44	.64	1.04	1.04	159	104	94	1.0	285	56
A-2	40	12:35 12:30	844.95	.82	1.34	1.34	160	107	95	1.0	287	55
A-3	45	12:40 12:35	848.62	.89	1.45	1.45	160	110	96	1.5	271	56
A-4	50	12:45 12:40	852.30	.94	1.53	1.53	160	112	97	1.5	260	58
A-5	55	12:50 12:45	855.86	.84	1.34	1.34	160	114	97	1.5	261	59
A-6	60	12:55 12:50	859.434	.84	1.34	1.34	160	115	97	1.5	257	60

COMMENTS:

EPA (Dur) 235
4/72

APPENDIX E.1 - Test Run No. 1, 8/17/88

APPENDIX E - Sampling Parameter Summaries

JES/055

APPENDIX E.1 - Test Run No. 1, 8/17/88

==
FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/17/88
LOCATION: INLET
RUN NUMBER: 1.00
==
SAMPLING PARAMETER PARTICLE SIZE
==

Total Sampling Time (min.)	15.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	23.56
Stack Static Pressure (in. H2O)	-7.30
Average Stack Temperature (F)	163.00
Stack Area (sq.in.)	9160.88
Metered Volume,Vm (cu.ft.)	7.15
Average Meter Pressure (in.H2O)	0.61
Average Meter Temperature (F)	89.50
Moisture Collected (g)	459.40
Carbon Dioxide Concentration (%V)	20.70
Oxygen Concentration (%V)	6.00
Nitrogen Concentration (%V)	73.30
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.37
Standard Metered Volume,Vm(std) (dscf)	5.54
Standard Metered Volume,Vm(std) (dscm)	0.157
Standard Volume Water Vapor,Vw (scf)	21.66
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	40.66
Mole Fraction Dry Stack Gas	0.593
Dry Molecular Weight	31.55
Wet Molecular Weight	26.04
Stack Gas Velocity,Vs (fpm)	4071.54
Stack Gas Velocity,Vs (mpm)	1241.01
Volumetric Flow Rate (acfm)	259020.15
Volumetric Flow Rate (acmm)	7335.451
Volumetric Flow Rate (dscfm)	102534.26
Volumetric Flow Rate (dscmm)	2903.770
Percent Isokinetic	120.10
Percent Excess Air	44.89
Fuel Factor,Fo	0.720

12-Oct-88

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, INLET RUN 1, 8/17/88
FILTER SET S

TIME	15.0000	TIME=MINUTES
VOLUME	7.1500	VOLUME=dcf MEASURED AT METER
Ts	692.0000	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	384.1111	T=IMPACTOR TEMPERATURE (K)
%M	0.4066	%M=STACK MOISTURE FRACTION (%/100)
MW	26.0400	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	23.5600	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4767	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	549.5000	Tm=AVERAGE METER TEMPERATURE (R)
Qa	488.3637	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	9.4059E-06	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	5.5400	Vm(std)=Standardized Metered Volume (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Fract. Less Than	Interval Geometric Midpoint	dM/dlogD (gr/dscf)
1	9.4846	0.00041	0.0083	0.9917	21.7768	1.582E-03
2	6.1947	0.00040	0.0081	0.9836	7.6651	6.023E-03
3	4.0419	0.00074	0.0150	0.9686	5.0038	1.112E-02
4	2.8541	0.00043	0.0087	0.9599	3.3965	7.926E-03
5	1.6895	0.00147	0.0298	0.9300	2.1959	1.798E-02
6	0.9590	0.00596	0.1208	0.8092	1.2729	6.751E-02
7	0.5869	0.00970	0.1967	0.6125	0.7502	1.267E-01
8	0.3699	0.01719	0.3485	0.2640	0.4659	2.389E-01
BACK-UP		0.01302	0.2640	0.0000	0.0430	1.940E-02
TOTAL		0.04932				

===
FACILITY : MONSANTO - SODA SPRINGS
DATE: 8-17-88
LOCATION: OUTLET A
RUN NUMBER: 1.00
===
SAMPLING PARAMETER PARTICLE SIZE
===

Total Sampling Time (min.)	120.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.06
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	161.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	47.33
Average Meter Pressure (in.H2O)	0.41
Average Meter Temperature (F)	84.33
Moisture Collected (g)	388.80
Carbon Dioxide Concentration (%V)	19.70
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.40
Dry Gas Meter Factor	1.00350
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.31
Standard Metered Volume,Vm(std) (dscf)	37.15
Standard Metered Volume,Vm(std) (dscm)	1.052
Standard Volume Water Vapor,Vw (scf)	18.33
Standard Volume Water Vapor,Vw (scm)	0.519
Stack Moisture (%V)	37.71
Mole Fraction Dry Stack Gas	0.623
Dry Molecular Weight	31.31
Wet Molecular Weight	26.29
Stack Gas Velocity,Vs (fpm)	3888.74
Stack Gas Velocity,Vs (mpm)	1185.29
Volumetric Flow Rate (acfm)	65684.99
Volumetric Flow Rate (acmm)	1860.199
Volumetric Flow Rate (dscfm)	27954.69
Volumetric Flow Rate (dscmm)	791.677
Percent Isokinetic	99.10
Percent Excess Air	63.10
Fuel Factor,Fo	0.685

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET A: RUN 1, 8-18-88
FILTER SET U

TIME	120.0000	TIME=MINUTES
VOLUME	47.3300	VOLUME=dcf MEASURED AT METER
Ts	756.8000	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	420.1111	T=IMPACTOR TEMPERATURE (K)
%M	0.3771	%M=STACK MOISTURE FRACTION (%/100)
MW	26.2900	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.0600	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.3944	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	544.3300	Tm=AVERAGE METER TEMPERATURE (R)
Qa	416.1723	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	37.1500	Vm(std)=STANDARD METER VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.6103	0.00031	0.0218	0.9782	23.0329	1.913E-04
2	6.9299	0.00000	0.0000	0.9782	8.5749	0.000E+00
3	4.5216	0.00000	0.0000	0.9782	5.5977	0.000E+00
4	3.1928	0.00000	0.0000	0.9782	3.7996	0.000E+00
5	1.8899	0.00021	0.0148	0.9634	2.4565	3.830E-04
6	1.0727	0.00137	0.0964	0.8670	1.4238	2.314E-03
7	0.6564	0.00152	0.1070	0.7600	0.8391	2.960E-03
8	0.4135	0.00170	0.1196	0.6404	0.5210	3.519E-03
BACK-UP		0.00910	0.6404	0.0000	0.0455	1.971E-03
	TOTAL	0.01421				

FACILITY : MONSANTO-SODA SPRINGS
DATE: 8-17-88
LOCATION: OUTLET B
RUN NUMBER: 1.00

SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION

Total Sampling Time (min.)	120.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.08
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.50
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	46.59
Average Meter Pressure (in.H2O)	0.40
Average Meter Temperature (F)	82.88
Moisture Collected (g)	442.50
Carbon Dioxide Concentration (%V)	19.70
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.90
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.30
Standard Metered Volume,Vm(std) (dscf)	36.34
Standard Metered Volume,Vm(std) (dscm)	1.029
Standard Volume Water Vapor,Vw (scf)	20.86
Standard Volume Water Vapor,Vw (scm)	0.591
Stack Moisture (%V)	38.48
Mole Fraction Dry Stack Gas	0.615
Dry Molecular Weight	31.45
Wet Molecular Weight	26.27
Stack Gas Velocity,Vs (fpm)	3797.32
Stack Gas Velocity,Vs (mpm)	1157.42
Volumetric Flow Rate (adcfm)	64140.85
Volumetric Flow Rate (adcmm)	1816.469
Volumetric Flow Rate (dscfm)	27098.05
Volumetric Flow Rate (dscmm)	767.417
Percent Isokinetic	99.98
Percent Excess Air	62.39
Fuel Factor,Fo	0.685

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET B: RUN 1, 8-17-88
FILTER SET M

TIME	120.0000	TIME=MINUTES
VOLUME	46.5900	VOLUME=dcf MEASURED AT METER
Ts	699.2500	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	388.1389	T=IMPACTOR TEMPERATURE (K)
%M	0.3848	%M=STACK MOISTURE FRACTION (%/100)
MW	26.2700	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.0800	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.3883	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	542.8800	Tm=AVERAGE METER TEMPERATURE (R)
Qa	383.9550	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	36.3400	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.7362	0.00067	0.0494	0.9506	23.1692	4.259E-04
2	7.0120	0.00000	0.0000	0.9506	8.6766	0.000E+00
3	4.5750	0.00000	0.0000	0.9506	5.6639	0.000E+00
4	3.2303	0.00000	0.0000	0.9506	3.8443	0.000E+00
5	1.9115	0.00006	0.0044	0.9462	2.4849	1.118E-04
6	1.0839	0.00038	0.0280	0.9181	1.4394	6.549E-04
7	0.6616	0.00204	0.1504	0.7677	0.8468	4.041E-03
8	0.4143	0.00247	0.1822	0.5855	0.5235	5.160E-03
BACK-UP		0.00794	0.5855	-0.0000	0.0455	1.758E-03
	TOTAL	0.01356				

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8-17-88
LOCATION: OUTLET C
RUN NUMBER: 1.00
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SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	120.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.10
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	159.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	48.27
Average Meter Pressure (in.H2O)	0.38
Average Meter Temperature (F)	84.71
Moisture Collected (g)	231.20
Carbon Dioxide Concentration (%V)	19.70
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.90
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.31
Standard Metered Volume,Vm(std) (dscf)	37.67
Standard Metered Volume,Vm(std) (dscm)	1.067
Standard Volume Water Vapor,Vw (scf)	10.90
Standard Volume Water Vapor,Vw (scm)	0.309
Stack Moisture (%V)	38.38
Mole Fraction Dry Stack Gas	0.616
Dry Molecular Weight	31.45
Wet Molecular Weight	26.29
Stack Gas Velocity,Vs (fpm)	3808.70
Stack Gas Velocity,Vs (mpm)	1160.89
Volumetric Flow Rate (adcfm)	64333.04
Volumetric Flow Rate (adcmm)	1821.912
Volumetric Flow Rate (dscfm)	27217.56
Volumetric Flow Rate (dscmm)	770.801
Percent Isokinetic	102.08
Percent Excess Air	62.39
Fuel Factor,Fo	0.685

11-Oct-88

MONSANTO SODA SPRINGS, OUTLET C: RUN 1, 8-17-88
FILTER SET W

TIME	120.0000	TIME=MINUTES
VOLUME	48.2700	VOLUME=dcf MEASURED AT METER
Ts	686.5800	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	381.1000	T=IMPACTOR TEMPERATURE (K)
%M	0.3838	%M=STACK MOISTURE FRACTION (%/100)
MW	26.2900	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1000	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4023	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	544.7100	Tm=AVERAGE METER TEMPERATURE (R)
Qa	388.9702	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	9.2725E-06	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	37.6700	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Fract. Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.5978	0.00027	0.0171	0.9829	23.0193	1.642E-04
2	6.9216	0.00017	0.0107	0.9722	8.5647	3.764E-04
3	4.5160	0.00018	0.0114	0.9608	5.5908	3.976E-04
4	3.1886	0.00017	0.0107	0.9501	3.7947	4.607E-04
5	1.8868	0.00011	0.0069	0.9431	2.4528	1.978E-04
6	1.0698	0.00053	0.0335	0.9097	1.4207	8.811E-04
7	0.6528	0.00176	0.1112	0.7985	0.8357	3.362E-03
8	0.4086	0.00264	0.1668	0.6317	0.5165	5.315E-03
BACK-UP		0.01000	0.6317	-0.0000	0.0452	2.142E-03
	TOTAL	0.01583				

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FACILITY : MONSANTO - SODA SPRINGS
DATE: 8-17-88
LOCATION: OUTLET D
RUN NUMBER: 1.00
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SAMPLING PARAMETER   PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	120.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.08
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	48.97
Average Meter Pressure (in.H2O)	0.42
Average Meter Temperature (F)	89.56
Moisture Collected (g)	463.60
Carbon Dioxide Concentration (%V)	19.85
Oxygen Concentration (%V)	6.90
Nitrogen Concentration (%V)	73.25
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.32
Standard Metered Volume,Vm(std) (dscf)	38.23
Standard Metered Volume,Vm(std) (dscm)	1.083
Standard Volume Water Vapor,Vw (scf)	21.86
Standard Volume Water Vapor,Vw (scm)	0.619
Stack Moisture (%V)	39.87
Mole Fraction Dry Stack Gas	0.601
Dry Molecular Weight	31.45
Wet Molecular Weight	26.09
Stack Gas Velocity,Vs (fpm)	3892.08
Stack Gas Velocity,Vs (mpm)	1186.31
Volumetric Flow Rate (adcfm)	65741.48
Volumetric Flow Rate (adcmm)	1861.799
Volumetric Flow Rate (dscfm)	27168.67
Volumetric Flow Rate (dscmm)	769.417
Percent Isokinetic	104.92
Percent Excess Air	55.41
Fuel Factor,Fo	0.705

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET D: RUN 1, 8-17-88
FILTER SET T

TIME	120.0000	TIME=MINUTES
VOLUME	48.9700	VOLUME=dcf MEASURED AT METER
Ts	729.8700	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	405.1500	T=IMPACTOR TEMPERATURE (K)
%M	0.3987	%M=STACK MOISTURE FRACTION (%/100)
MW	26.0900	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.0800	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4081	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	549.5600	Tm=AVERAGE METER TEMPERATURE (R)
Qa	425.7401	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	38.2300	

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.3536	0.00000	0.0000	1.0000	22.7526	0.000E+00
2	6.7623	0.00000	0.0000	1.0000	8.3674	0.000E+00
3	4.4122	0.00000	0.0000	1.0000	5.4623	0.000E+00
4	3.1155	0.00000	0.0000	1.0000	3.7076	0.000E+00
5	1.8441	0.00000	0.0000	1.0000	2.3969	0.000E+00
6	1.0465	0.00192	0.1410	0.8590	1.3892	3.150E-03
7	0.6401	0.00169	0.1241	0.7349	0.8184	3.195E-03
8	0.4029	0.00264	0.1938	0.5411	0.5078	5.300E-03
BACK-UP		0.00737	0.5411	-0.0000	0.0449	1.561E-03
	TOTAL	0.01362				

APPENDIX E.2 - Test Run No. 2, 8/18/88

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/18/88
LOCATION: INLET
RUN NUMBER: 2.00
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SAMPLING PARAMETER PARTICLE SIZE
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Total Sampling Time (min.)	15.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	23.56
Stack Static Pressure (in. H2O)	-7.30
Average Stack Temperature (F)	161.00
Stack Area (sq.in.)	9160.88
Metered Volume,Vm (cu.ft.)	6.40
Average Meter Pressure (in.H2O)	0.55
Average Meter Temperature (F)	85.25
Moisture Collected (g)	497.80
Carbon Dioxide Concentration (%V)	20.70
Oxygen Concentration (%V)	6.00
Nitrogen Concentration (%V)	73.30
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.33
Standard Metered Volume,Vm(std) (dscf)	5.00
Standard Metered Volume,Vm(std) (dscm)	0.142
Standard Volume Water Vapor,Vw (scf)	23.47
Standard Volume Water Vapor,Vw (scm)	0.665
Stack Moisture (%V)	42.62
Mole Fraction Dry Stack Gas	0.574
Dry Molecular Weight	31.55
Wet Molecular Weight	25.78
Stack Gas Velocity,Vs (fpm)	3895.75
Stack Gas Velocity,Vs (mpm)	1187.42
Volumetric Flow Rate (acfm)	247836.87
Volumetric Flow Rate (acmm)	7018.740
Volumetric Flow Rate (dscfm)	95171.89
Volumetric Flow Rate (dscmm)	2695.268
Percent Isokinetic	116.77
Percent Excess Air	44.89
Fuel Factor,Fo	0.720

12-Oct-88

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, INLET: RUN 2, 8-18-88
FILTER SET Q

TIME	15.0000	TIME=MINUTES
VOLUME	6.4000	VOLUME=dcf MEASURED AT METER
Ts	717.0000	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	398.0000	T=IMPACTOR TEMPERATURE (K)
%M	0.4262	%M=STACK MOISTURE FRACTION (%/100)
MW	25.7800	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	23.5600	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4267	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	545.2500	Tm=AVERAGE METER TEMPERATURE (R)
Qa	472.0515	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	9.87E-06	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	5.0000	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Fract. Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	9.7700	0.00030	0.0047	0.9953	22.1020	1.306E-03
2	6.3811	0.00038	0.0060	0.9893	7.8958	6.340E-03
3	4.1636	0.00053	0.0083	0.9810	5.1545	8.822E-03
4	2.9401	0.00074	0.0116	0.9693	3.4988	1.511E-02
5	1.7405	0.00253	0.0398	0.9295	2.2621	3.429E-02
6	0.9881	0.01024	0.1612	0.7683	1.3114	1.286E-01
7	0.6050	0.01377	0.2167	0.5516	0.7732	1.995E-01
8	0.3818	0.01925	0.3030	0.2487	0.4806	2.971E-01
BACK-UP		0.01580	0.2487	-0.0000	0.0437	2.590E-02
TOTAL		0.06354				

FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/18/88
LOCATION: OUTLET A
RUN NUMBER: 2

SAMPLING PARAMETER	PARTICLE SIZE DISTRIBUTION
Total Sampling Time (min.)	180.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure, Ps(in. Hg)	24.06
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	158.53
Stack Area (sq.in.)	2432.32
Metered Volume, Vm (cu.ft.)	67.33
Average Meter Pressure (in.H2O)	0.37
Average Meter Temperature (F)	91.54
Moisture Collected (g)	473.30
Carbon Dioxide Concentration (%V)	19.75
Oxygen Concentration (%V)	7.60
Nitrogen Concentration (%V)	72.65
Dry Gas Meter Factor	1.00350
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.29
Standard Metered Volume, Vm(std) (dscf)	52.16
Standard Metered Volume, Vm(std) (dscm)	1.477
Standard Volume Water Vapor, Vw (scf)	22.32
Standard Volume Water Vapor, Vw (scm)	0.632
Stack Moisture (%V)	29.97
Mole Fraction Dry Stack Gas	0.700
Dry Molecular Weight	31.46
Wet Molecular Weight	27.43
Stack Gas Velocity, Vs (fpm)	3587.50
Stack Gas Velocity, Vs (mpm)	1093.47
Volumetric Flow Rate (adcfm)	60596.82
Volumetric Flow Rate (adcmm)	1716.102
Volumetric Flow Rate (dscfm)	29111.55
Volumetric Flow Rate (dscmm)	824.439
Percent Isokinetic	89.06
Percent Excess Air	65.55
Fuel Factor, Fo	0.673

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET A: RUN 2, 8-18-88
FILTER SET N

TIME	120.0000	TIME=MINUTES
VOLUME	67.3300	VOLUME=dcf MEASURED AT METER
Ts	692.4000	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	384.3333	T=IMPACTOR TEMPERATURE (K)
%M	0.3891	%M=STACK MOISTURE FRACTION (%/100)
MW	26.2300	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.0600	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.5611	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	551.5400	Tm=AVERAGE METER TEMPERATURE (R)
Qa	545.0730	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	52.1600	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	8.9796	0.00032	0.0137	0.9863	21.1891	1.270E-04
2	5.8649	0.00014	0.0060	0.9803	7.2570	2.239E-04
3	3.8269	0.00029	0.0124	0.9678	4.7375	4.627E-04
4	2.7024	0.00030	0.0129	0.9549	3.2158	5.874E-04
5	1.5999	0.00033	0.0142	0.9408	2.0793	4.289E-04
6	0.9087	0.00215	0.0923	0.8485	1.2057	2.589E-03
7	0.5569	0.00228	0.0979	0.7506	0.7114	3.172E-03
8	0.3522	0.00283	0.1215	0.6292	0.4428	4.207E-03
BACK-UP		0.01466	0.6292	-0.0000	0.0420	2.347E-03
	TOTAL	0.02330				

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8-18-88
LOCATION: OUTLET B
RUN NUMBER: 2.00
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SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	180.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.22
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	69.10
Average Meter Pressure (in.H2O)	0.38
Average Meter Temperature (F)	90.03
Moisture Collected (g)	426.90
Carbon Dioxide Concentration (%V)	20.05
Oxygen Concentration (%V)	7.40
Nitrogen Concentration (%V)	72.60
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.30
Standard Metered Volume,Vm(std) (dscf)	53.27
Standard Metered Volume,Vm(std) (dscm)	1.509
Standard Volume Water Vapor,Vw (scf)	20.13
Standard Volume Water Vapor,Vw (scm)	0.570
Stack Moisture (%V)	39.12
Mole Fraction Dry Stack Gas	0.609
Dry Molecular Weight	31.52
Wet Molecular Weight	26.23
Stack Gas Velocity,Vs (fpm)	3687.48
Stack Gas Velocity,Vs (mpm)	1123.94
Volumetric Flow Rate (adcfm)	62285.60
Volumetric Flow Rate (adcmm)	1763.928
Volumetric Flow Rate (dscfm)	26095.20
Volumetric Flow Rate (dscmm)	739.016
Percent Isokinetic	101.48
Percent Excess Air	62.81
Fuel Factor,Fo	0.673

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET B: RUN 2, 8-18-88
FILTER SET AG

TIME	180.0000	TIME=MINUTES
VOLUME	69.1000	VOLUME=dcf MEASURED AT METER
Ts	758.0000	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	420.7778	T=IMPACTOR TEMPERATURE (K)
%M	0.3912	%M=STACK MOISTURE FRACTION (%/100)
MW	26.2300	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1200	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.3839	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	550.3000	Tm=AVERAGE METER TEMPERATURE (R)
Qa	410.2575	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	53.2700	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.6926	0.00065	0.0232	0.9768	23.1221	2.811E-04
2	6.9837	0.00025	0.0089	0.9678	8.6414	3.915E-04
3	4.5567	0.00047	0.0168	0.9510	5.6412	7.343E-04
4	3.2176	0.00056	0.0200	0.9310	3.8291	1.074E-03
5	1.9045	0.00093	0.0332	0.8978	2.4755	1.183E-03
6	1.0809	0.00268	0.0958	0.8020	1.4348	3.156E-03
7	0.6613	0.00335	0.1197	0.6823	0.8455	4.548E-03
8	0.4165	0.00456	0.1630	0.5193	0.5248	6.579E-03
BACK-UP		0.01453	0.5193	-0.0000	0.0456	2.192E-03
	TOTAL	0.02798				

FACILITY : MONSANTO-SODA SPRINGS
DATE: 8-18-88
LOCATION: OUTLET C
RUN NUMBER: 2.00

SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION

Total Sampling Time (min.)	180.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.10
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	158.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	73.12
Average Meter Pressure (in.H2O)	0.38
Average Meter Temperature (F)	93.26
Moisture Collected (g)	428.10
Carbon Dioxide Concentration (%V)	19.90
Oxygen Concentration (%V)	7.35
Nitrogen Concentration (%V)	72.75
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.31
Standard Metered Volume,Vm(std) (dscf)	56.17
Standard Metered Volume,Vm(std) (dscm)	1.591
Standard Volume Water Vapor,Vw (scf)	20.18
Standard Volume Water Vapor,Vw (scm)	0.572
Stack Moisture (%V)	38.91
Mole Fraction Dry Stack Gas	0.611
Dry Molecular Weight	31.48
Wet Molecular Weight	26.23
Stack Gas Velocity,Vs (fpm)	3809.46
Stack Gas Velocity,Vs (mpm)	1161.12
Volumetric Flow Rate (adcfm)	64345.98
Volumetric Flow Rate (adcmm)	1822.270
Volumetric Flow Rate (dscfm)	27032.46
Volumetric Flow Rate (dscmm)	765.559
Percent Isokinetic	102.18
Percent Excess Air	61.92
Fuel Factor,Fo	0.681

11-Oct-88

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET C: RUN 2, 8-18-88
FILTER SET R

TIME	180.0000	TIME=MINUTES
VOLUME	73.1200	VOLUME=dcf MEASURED AT METER
Ts	763.3700	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	423.7611	T=IMPACTOR TEMPERATURE (K)
%M	0.3891	%M=STACK MOISTURE FRACTION (%/100)
MW	26.2300	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1000	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4062	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	553.2600	Tm=AVERAGE METER TEMPERATURE (R)
Qa	433.7261	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	1.0564E-05	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	56.1700	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Fract. Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.4262	0.00021	0.0200	0.9800	22.8322	8.474E-05
2	6.8097	0.00005	0.0048	0.9752	8.4261	7.425E-05
3	4.4433	0.00022	0.0210	0.9542	5.5007	3.260E-04
4	3.1376	0.00007	0.0067	0.9475	3.7338	1.273E-04
5	1.8574	0.00000	0.0000	0.9475	2.4141	0.000E+00
6	1.0546	0.00037	0.0353	0.9122	1.3995	4.135E-04
7	0.6457	0.00108	0.1031	0.8092	0.8252	1.393E-03
8	0.4076	0.00173	0.1651	0.6441	0.5130	2.378E-03
BACK-UP		0.00675	0.6441	0.0000	0.0451	9.703E-04
	TOTAL	0.01048				

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FACILITY : MONSANTO - SODA SPRINGS
DATE: 8-18-88
LOCATION: OUTLET D
RUN NUMBER: 2.00
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SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	174.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	24.08
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	159.86
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	77.82
Average Meter Pressure (in.H2O)	0.44
Average Meter Temperature (F)	96.46
Moisture Collected (g)	455.10
Carbon Dioxide Concentration (%V)	20.10
Oxygen Concentration (%V)	7.05
Nitrogen Concentration (%V)	72.70
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.34
Standard Metered Volume,Vm(std) (dscf)	60.01
Standard Metered Volume,Vm(std) (dscm)	1.699
Standard Volume Water Vapor,Vw (scf)	21.46
Standard Volume Water Vapor,Vw (scm)	0.608
Stack Moisture (%V)	39.27
Mole Fraction Dry Stack Gas	0.607
Dry Molecular Weight	31.46
Wet Molecular Weight	26.17
Stack Gas Velocity,Vs (fpm)	4007.33
Stack Gas Velocity,Vs (mpm)	1221.43
Volumetric Flow Rate (adcfm)	67688.18
Volumetric Flow Rate (adcmm)	1916.929
Volumetric Flow Rate (dscfm)	28167.36
Volumetric Flow Rate (dscmm)	797.700
Percent Isokinetic	109.54
Percent Excess Air	57.99
Fuel Factor,Fo	0.689

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET D: RUN 2, 8-18-88
FILTER SET AF

TIME	174.0000	TIME=MINUTES
VOLUME	77.8200	VOLUME=dcf MEASURED AT METER
Ts	732.7400	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	406.7444	T=IMPACTOR TEMPERATURE (K)
%M	0.3927	%M=STACK MOISTURE FRACTION (%/100)
MW	26.1700	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.0800	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4472	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	556.4600	Tm=AVERAGE METER TEMPERATURE (R)
Qa	458.0482	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	60.0100	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	9.9960	0.00069	0.0300	0.9700	22.3562	2.538E-04
2	6.5287	0.00020	0.0087	0.9613	8.0784	2.780E-04
3	4.2599	0.00027	0.0117	0.9496	5.2737	3.744E-04
4	3.0081	0.00031	0.0135	0.9361	3.5797	5.276E-04
5	1.7807	0.00051	0.0222	0.9140	2.3144	5.760E-04
6	1.0109	0.00191	0.0830	0.8309	1.3417	1.998E-03
7	0.6189	0.00320	0.1391	0.6919	0.7910	3.862E-03
8	0.3905	0.00433	0.1882	0.5037	0.4916	5.566E-03
BACK-UP		0.01159	0.5037	-0.0000	0.0442	1.575E-03
	TOTAL	0.02301				

APPENDIX E.3 - Test Run No. 3, 8/19/88

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/19/88
LOCATION: INLET
RUN NUMBER: 3.00
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SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	10.00
Corrected Barometric Pressure (in. Hg)	24.10
Absolute Stack Pressure,Ps(in. Hg)	23.56
Stack Static Pressure (in. H2O)	-7.30
Average Stack Temperature (F)	161.00
Stack Area (sq.in.)	9160.88
Metered Volume,Vm (cu.ft.)	4.08
Average Meter Pressure (in.H2O)	0.55
Average Meter Temperature (F)	87.75
Moisture Collected (g)	497.80
Carbon Dioxide Concentration (%V)	19.45
Oxygen Concentration (%V)	6.85
Nitrogen Concentration (%V)	73.70
Dry Gas Meter Factor	0.99960
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.32
Standard Metered Volume,Vm(std) (dscf)	3.17
Standard Metered Volume,Vm(std) (dscm)	0.090
Standard Volume Water Vapor,Vw (scf)	23.47
Standard Volume Water Vapor,Vw (scm)	0.665
Stack Moisture (%V)	41.00
Mole Fraction Dry Stack Gas	0.590
Dry Molecular Weight	31.39
Wet Molecular Weight	25.90
Stack Gas Velocity,Vs (fpm)	3886.62
Stack Gas Velocity,Vs (mpm)	1184.64
Volumetric Flow Rate (adcfm)	247255.88
Volumetric Flow Rate (adcmm)	7002.286
Volumetric Flow Rate (dscfm)	97628.24
Volumetric Flow Rate (dscmm)	2764.832
Percent Isokinetic	108.37
Percent Excess Air	54.27
Fuel Factor,Fo	0.722

11-Oct-88

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, INLET: RUN 3, 8-19-88

TIME	10.0000	TIME=MINUTES
VOLUME	4.0800	VOLUME=dcf MEASURED AT METER
Ts	695.0000	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	385.7778	T=IMPACTOR TEMPERATURE (K)
%M	0.4100	%M=STACK MOISTURE FRACTION (%/100)
MW	25.9000	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	23.5600	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4080	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1000	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	547.7500	Tm=AVERAGE METER TEMPERATURE (R)
Qa	423.5926	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	9.4808E-06	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	3.1700	Vm(std)=STANDARD METER VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams	Mass Fraction	Mass Fract. Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.1995	0.00042	0.0215	0.9785	22.5826	2.962E-03
2	6.6615	0.00004	0.0020	0.9765	8.2428	1.053E-03
3	4.3464	0.00004	0.0020	0.9745	5.3809	1.050E-03
4	3.0690	0.00021	0.0107	0.9637	3.6523	6.764E-03
5	1.8163	0.00016	0.0082	0.9555	2.3610	3.419E-03
6	1.0303	0.00063	0.0322	0.9234	1.3680	1.246E-02
7	0.6296	0.00245	0.1252	0.7982	0.8054	5.575E-02
8	0.3953	0.00417	0.2131	0.5851	0.4989	1.004E-01
BACK-UP		0.01145	0.5851	0.0000	0.0445	2.937E-02
TOTAL		0.01957				

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/19/88
LOCATION: OUTLET A
RUN NUMBER: 3.00
==
SAMPLING PARAMETER PARTICLE SIZE
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Total Sampling Time (min.)	240.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.04
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	99.04
Average Meter Pressure (in.H2O)	0.42
Average Meter Temperature (F)	89.92
Moisture Collected (g)	459.10
Carbon Dioxide Concentration (%V)	15.93
Oxygen Concentration (%V)	10.30
Nitrogen Concentration (%V)	73.78
Dry Gas Meter Factor	1.00350
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.32
Standard Metered Volume,Vm(std) (dscf)	77.09
Standard Metered Volume,Vm(std) (dscm)	2.183
Standard Volume Water Vapor,Vw (scf)	21.65
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	39.76
Mole Fraction Dry Stack Gas	0.602
Dry Molecular Weight	30.96
Wet Molecular Weight	25.81
Stack Gas Velocity,Vs (fpm)	3956.90
Stack Gas Velocity,Vs (mpm)	1206.06
Volumetric Flow Rate (acfm)	66836.40
Volumetric Flow Rate (acmm)	1892.807
Volumetric Flow Rate (dscfm)	27715.43
Volumetric Flow Rate (dscmm)	784.901
Percent Isokinetic	103.70
Percent Excess Air	112.05
Fuel Factor,Fo	0.665

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET A: RUN 3, 8-19-88
FILTER SET AA

TIME	240.0000	TIME=MINUTES
VOLUME	99.0400	VOLUME=dcf MEASURED AT METER
Ts	721.9600	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	400.7556	T=IMPACTOR TEMPERATURE (K)
%M	0.3976	%M=STACK MOISTURE FRACTION (%/100)
MW	25.8100	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1200	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4127	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	549.9200	Tm=AVERAGE METER TEMPERATURE (R)
Qa	424.7995	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	77.0900	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.3245	0.00150	0.0562	0.9438	22.7206	4.383E-04
2	6.7432	0.00017	0.0064	0.9374	8.3439	1.840E-04
3	4.3998	0.00009	0.0034	0.9340	5.4469	9.716E-05
4	3.1067	0.00035	0.0131	0.9209	3.6972	4.636E-04
5	1.8388	0.00132	0.0495	0.8714	2.3901	1.160E-03
6	1.0435	0.00327	0.1226	0.7488	1.3852	2.660E-03
7	0.6381	0.00356	0.1335	0.6153	0.8160	3.337E-03
8	0.4015	0.00414	0.1552	0.4601	0.5062	4.119E-03
BCK-UP		0.01227	0.4601	0.0000	0.0448	1.290E-03
	TOTAL	0.02667				

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/19/88
LOCATION: OUTLET B
RUN NUMBER: 3.00
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SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	240.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	158.29
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	96.65
Average Meter Pressure (in.H2O)	0.45
Average Meter Temperature (F)	90.94
Moisture Collected (g)	459.10
Carbon Dioxide Concentration (%V)	15.93
Oxygen Concentration (%V)	10.30
Nitrogen Concentration (%V)	73.78
Dry Gas Meter Factor	0.99430
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.31
Standard Metered Volume,Vm(std) (dscf)	74.41
Standard Metered Volume,Vm(std) (dscm)	2.107
Standard Volume Water Vapor,Vw (scf)	21.65
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	39.76
Mole Fraction Dry Stack Gas	0.602
Dry Molecular Weight	30.96
Wet Molecular Weight	25.81
Stack Gas Velocity,Vs (fpm)	4049.75
Stack Gas Velocity,Vs (mpm)	1234.37
Volumetric Flow Rate (adcfm)	68404.78
Volumetric Flow Rate (adcmm)	1937.223
Volumetric Flow Rate (dscfm)	28354.33
Volumetric Flow Rate (dscmm)	802.995
Percent Isokinetic	97.84
Percent Excess Air	112.05
Fuel Factor,Fo	0.665

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET B: RUN 3, 8-19-88
FILTER SET AC

TIME	240.0000	TIME=MINUTES
VOLUME	96.6500	VOLUME=dcf MEASURED AT METER
Ts	715.6700	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	397.2611	T=IMPACTOR TEMPERATURE (K)
%M	0.3976	%M=STACK MOISTURE FRACTION (%/100)
MW	25.8100	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1200	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4027	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	550.9400	Tm=AVERAGE METER TEMPERATURE (R)
Qa	410.1759	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	74.4100	VM(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.4740	0.00155	0.0142	0.9858	22.8844	4.735E-04
2	6.8408	0.00031	0.0028	0.9830	8.4647	3.475E-04
3	4.4634	0.00047	0.0043	0.9786	5.5257	5.256E-04
4	3.1516	0.00040	0.0037	0.9750	3.7506	5.489E-04
5	1.8653	0.00121	0.0111	0.9639	2.4246	1.102E-03
6	1.0582	0.00554	0.0508	0.9131	1.4049	4.667E-03
7	0.6468	0.00488	0.0447	0.8684	0.8273	4.733E-03
8	0.4064	0.00599	0.0549	0.8135	0.5127	6.155E-03
BACK-UP		0.08875	0.8135	-0.0000	0.0451	9.637E-03
	TOTAL	0.10910				

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FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/19/88
LOCATION: OUTLET C
RUN NUMBER: 3.00
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SAMPLING PARAMETER PARTICLE SIZE DISTRIBUTION
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Total Sampling Time (min.)	240.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.10
Stack Static Pressure (in. H2O)	-0.60
Average Stack Temperature (F)	156.79
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	99.86
Average Meter Pressure (in.H2O)	0.41
Average Meter Temperature (F)	93.94
Moisture Collected (g)	459.10
Carbon Dioxide Concentration (%V)	15.93
Oxygen Concentration (%V)	10.30
Nitrogen Concentration (%V)	73.78
Dry Gas Meter Factor	0.99650
Pitot Constant	0.84
Average Sampling Rate (dscfm)	0.32
Standard Metered Volume,Vm(std) (dscf)	76.62
Standard Metered Volume,Vm(std) (dscm)	2.170
Standard Volume Water Vapor,Vw (scf)	21.65
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	39.76
Mole Fraction Dry Stack Gas	0.602
Dry Molecular Weight	30.96
Wet Molecular Weight	25.81
Stack Gas Velocity,Vs (fpm)	3955.01
Stack Gas Velocity,Vs (mpm)	1205.49
Volumetric Flow Rate (adcfm)	66804.39
Volumetric Flow Rate (adcmm)	1891.900
Volumetric Flow Rate (dscfm)	27728.68
Volumetric Flow Rate (dscmm)	785.276
Percent Isokinetic	101.92
Percent Excess Air	112.05
Fuel Factor,Fo	0.665

11-Oct-88

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET C: RUN 3, 8-19-88
FILTER SET AD

TIME	240.0000	TIME=MINUTES
VOLUME	99.8600	VOLUME=dcf MEASURED AT METER
Ts	729.5800	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	404.9889	T=IMPACTOR TEMPERATURE (K)
%M	0.3976	%M=STACK MOISTURE FRACTION (%/100)
MW	25.8100	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1000	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.4161	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	559.8600	Tm=AVERAGE METER TEMPERATURE (R)
Qa	425.5054	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	1.0075E-05	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	76.6200	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Fract. Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.3550	0.00046	0.0147	0.9853	22.7541	1.355E-04
2	6.7632	0.00036	0.0115	0.9738	8.3685	3.919E-04
3	4.4128	0.00042	0.0134	0.9604	5.4630	4.562E-04
4	3.1160	0.00044	0.0141	0.9463	3.7081	5.864E-04
5	1.8443	0.00070	0.0224	0.9239	2.3973	6.190E-04
6	1.0467	0.00395	0.1263	0.7976	1.3894	3.234E-03
7	0.6403	0.00600	0.1918	0.6058	0.8186	5.661E-03
8	0.4031	0.00778	0.2487	0.3571	0.5080	7.797E-03
BACK-UP		0.01117	0.3571	0.0000	0.0449	1.180E-03
	TOTAL	0.03128				

==
FACILITY : MONSANTO-SODA SPRINGS
DATE: 8/19/88
LOCATION: OUTLET D
RUN NUMBER: 3.00
==
SAMPLING PARAMETER   PARTICLE SIZE DISTRIBUTION
==

Total Sampling Time (min.)	180.00
Corrected Barometric Pressure (in. Hg)	24.14
Absolute Stack Pressure,Ps(in. Hg)	24.12
Stack Static Pressure (in. H2O)	-0.25
Average Stack Temperature (F)	160.00
Stack Area (sq.in.)	2432.32
Metered Volume,Vm (cu.ft.)	71.94
Average Meter Pressure (in.H2O)	0.38
Average Meter Temperature (F)	90.72
Moisture Collected (g)	459.10
Carbon Dioxide Concentration (%V)	15.93
Oxygen Concentration (%V)	10.30
Nitrogen Concentration (%V)	73.78
Dry Gas Meter Factor	1.00750
Pitot Constant	0.84

Average Sampling Rate (dscfm)	0.31
Standard Metered Volume,Vm(std) (dscf)	56.13
Standard Metered Volume,Vm(std) (dscm)	1.590
Standard Volume Water Vapor,Vw (scf)	21.65
Standard Volume Water Vapor,Vw (scm)	0.613
Stack Moisture (%V)	39.76
Mole Fraction Dry Stack Gas	0.602
Dry Molecular Weight	30.96
Wet Molecular Weight	25.81
Stack Gas Velocity,Vs (fpm)	3844.84
Stack Gas Velocity,Vs (mpm)	1171.91
Volumetric Flow Rate (adcfm)	64943.53
Volumetric Flow Rate (adcmm)	1839.201
Volumetric Flow Rate (dscfm)	26845.44
Volumetric Flow Rate (dscmm)	760.263
Percent Isokinetic	103.94
Percent Excess Air	112.05
Fuel Factor,Fo	0.665

PARTICLE SIZE DISTRIBUTION

MONSANTO SODA SPRINGS, OUTLET D: RUN 3, 8-19-88
FILTER SET Z

TIME	180.0000	TIME=MINUTES
VOLUME	71.9400	VOLUME=dcf MEASURED AT METER
Ts	733.0500	Ts=IMPACTOR TEMPERATURE (R) (F+460)
T	406.9167	T=IMPACTOR TEMPERATURE (K)
%M	0.3976	%M=STACK MOISTURE FRACTION (%/100)
MW	25.8100	MW=STACK GAS MOLECULAR WEIGHT WET BASIS
Ps	24.1200	Ps=ABSOLUTE STACK GAS PRESSURE
Qm	0.3997	Qm=SAMPLING RATE AT METER (DCFM)
Pm	24.1400	Pm=PRESSURE AT THE METER (BAROMETRIC) (IN. HG)
Tm	550.7200	Tm=AVERAGE METER TEMPERATURE (R)
Qa	417.1302	Qa=ACTUAL VOL. FLOW RATE THROUGH IMPACTOR (cm3/sec)
u	0.0002	u=STACK GAS VISCOSITY (poise)
Lambda	0.0000	Lambda=GAS MEAN FREE PATH (cm)
Pvac	2.0000	Pvac=PRESSURE DROP ACROSS IMPACTOR (in. Hg)
Vm(std)	56.1300	Vm(std)=STANDARD METERED VOLUME (dscf)

STAGE	Dp50 micron	Net Weight (grams)	Mass Fraction	Mass Frac Less Than	Interval Geometric Midpoint	dM/dlog dP (gr/dscf)
1	10.4763	0.00048	0.0196	0.9804	22.8870	1.944E-04
2	6.8424	0.00016	0.0065	0.9739	8.4666	2.378E-04
3	4.4645	0.00030	0.0123	0.9616	5.5270	4.448E-04
4	3.1524	0.00024	0.0098	0.9518	3.7515	4.366E-04
5	1.8659	0.00045	0.0184	0.9334	2.4253	5.432E-04
6	1.0589	0.00188	0.0768	0.8566	1.4056	2.101E-03
7	0.6476	0.00334	0.1364	0.7202	0.8281	4.301E-03
8	0.4076	0.00491	0.2006	0.5196	0.5138	6.712E-03
BACK-UP		0.01272	0.5196	0.0000	0.0451	1.830E-03
	TOTAL	0.02448				

APPENDIX F - PSD FIELD DATA SHEETS

JES/055

APPENDIX F.1 - Test Run No. 1, 8/17/88

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/17/88
SAMPLING LOCATION ..INLET
SAMPLE TYPE ....PSD
RUN NUMBER 1.00
OPERATOR ....MWH/JTW
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -7.30
FILTER NUMBER W-10
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
IAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......6', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.187
ASSUMED MOISTURE, % 50.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-5
METER DELTA H@ 1.91
K FACTOR 0.69
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P 0.88
DRY/GAS METER FACTOR (Y) ... 0.99960
FINAL LEAK CHECK .... 0.010 @ 10" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Temperature: deg. F Filter Skin	Temperature: deg. F Adsorbent Trap	Temperature: deg. F Dry Gas Meter Inlet (Tm in)	Temperature: deg. F Dry Gas Meter Outlet (Tm out)	Temperature: deg. F Impinger Exit	Pump Vacuum in. Hg
	0.00	19:01	640.062											
A4	7.50		643.600	0.88	163	0.61	0.61		212		88.00	87.00	60.00	4.00
A7	15.00	19:16	647.210	0.88	163	0.61	0.61		232		92.00	91.00	60.00	4.00
END														

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO SODA SPRINGS

Sample Identification Code: MSS-081698-MMIII OTA-1

Date 08-16-98

XAD Trap # NA

Sampling location OUTLET A

Filter No. W-1

Sample type M III

Run number 1

Sample box number

Clean-up person

Solvent rinses

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	819.1	475.1	344.0
2	0.1 N HNO_3	~100 ml	MGS	665.9	587.82	78.08
3	0.1 N HNO_3	~100 ml	GS	611.0	599.71	11.29
4	KNOCKOUT	EMPTY	MGS	473.9	472.71	1.19
5	SILICA GEL	~350g	MGS	750.3	736.4	13.9
6						
7						

Total Weight Gain (grams) 448.46

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS		PROBE LENGTH AND TYPE ......12', STEEL	
DATE 8-17-88		HEIGHT OF LOCATION(ft)......	69.00
SAMPLING LOCATION ..OUTLET A		NOZZLE I.D.	0.186
SAMPLE TYPE ....PSD		ASSUMED MOISTURE, %	37.71
RUN NUMBER	1.00	SAMPLE BOX NUMBER ....NA	
OPERATOR ....GDR		METER BOX NUMBER RAC-7	
AMBIENT TEMPERATURE	84.00	METER DELTA H@	1.77
BAROMETRIC PRESSURE	24.13	K FACTOR	0.49
STATIC PRESSURE (Ps)	-0.60	PROBE HEATER SETTING	250.00
FILTER NUMBER W-12		HEATER BOX SETTING	260.00
MIN.SAMPLE VOLUME ..		REFERENCE DEL P ....N/A	
INITIAL LEAK CHECK .	0.015	DRY/GAS METER FACTOR (Y) ...	1.00350
XAD TRAP NUMBER		FINAL LEAK CHECK	0.014 @ 8" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H20	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H20) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	20:00	312.864											
A2	10.00		316.850	0.83	161	0.41	0.41		238		81.00	82.00		1.00
A2	20.00		320.780	0.83	161	0.41	0.41		345		84.00	82.00		1.00
A2	30.00		324.680	0.83	161	0.41	0.41		375		83.00	81.00		1.00
A2	40.00		328.700	0.83	161	0.41	0.41		390		83.00	81.00		1.00
A2	50.00		332.500	0.83	161	0.41	0.41		390		84.00	82.00		1.00
A2	60.00	21:00	336.900	0.83	161	0.41	0.41		285		84.00	82.00		1.00
A5	70.00	21:10	340.400	0.83	161	0.41	0.41		280		85.00	82.00		1.00
A5	80.00		344.500	0.83	161	0.41	0.41		243		86.00	82.00		1.00
A5	90.00		348.500	0.83	161	0.41	0.41		237		90.00	83.00		1.00
A5	100.00		352.200	0.83	161	0.41	0.41		242		91.00	83.00		1.00
A5	110.00		356.300	0.83	161	0.41	0.41		269		93.00	86.00		1.00
A5	120.00	22:00	360.190	0.83	161	0.41	0.41		268		89.00	85.00		1.00
END														

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO SODA SPRINGS

Sample Identification Code: MSS-081688-MM111 OTC-1

Date 08-16-88

~~XAD Trap #~~ NA

Sampling location OUTLET C

Filter No. W-3

Sample type M111

Run number 1

Sample box number

Clean-up person

Solvent rinses

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	768.1	490.9	277.2
2	0.1N HNO_3	~100ml	MGS	706.0	586.81	119.19
3	0.1N HNO_3	~100ml	GS	644.1	607.7	36.4
4	KNOCKOUT	EMPTY	MGS	494.7	485.8	8.9
5	SILICA GEL	~350g	MGS	724.7	705.2	19.5
6						
7						

Total Weight Gain (grams) 461.19

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE ....PSD
RUN NUMBER 1.00
OPERATOR ....FLB
AMBIENT TEMPERATURE 85.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER N-12
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.020
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12, STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 37.71
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-3
METER DELTA H@ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 70%
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99430
FINAL LEAK CHECK .... 0.005 @ 6" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature, deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	19:28	10.741											
B3	10.00		14.700	0.79	158	0.40	0.40		280		80.00	79.00		2.00
B3	20.00		18.600	0.79	158	0.40	0.40		360		81.00	81.00		2.00
B3	30.00		22.500	0.79	158	0.40	0.40		290		83.00	82.00		2.00
B3	40.00		26.400	0.79	158	0.40	0.40		245		85.00	83.00		2.00
B3	50.00		30.300	0.79	158	0.40	0.40		222		84.00	84.00		2.00
B3	60.00		34.100	0.79	158	0.40	0.40		221		83.00	82.00		2.00
B3	70.00		38.000	0.80	159	0.40	0.40		190		82.00	82.00		2.00
B6	80.00		41.900	0.80	159	0.40	0.40		190		83.00	82.00		2.00
B6	90.00		45.800	0.80	159	0.40	0.40		205		83.00	83.00		2.00
B6	100.00		49.700	0.80	159	0.40	0.40		225		84.00	83.00		2.00
B6	110.00		53.600	0.80	159	0.40	0.40		221		85.00	84.00		2.00
B6	120.00	21:28	57.330	0.80	159	0.40	0.40		222		86.00	85.00		2.00
END														

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO Sample Identification Code: ______

Date 08-16-88 XAD Trap # N/A

Sampling location INLET Filter No. W-10

Sample type M111

Run number 2

Sample box number ______

Clean-up person ______

Solvent rinses ~~*~~ HNO_3 (.1N)

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
4*	KNOCKOUT	EMPTY	MGS	466.6	461.0	5.6
2	0.1N HNO_3	~100 ml	MGS	694.3	574.2	120.1
3	0.1N HNO_3	~100 ml	GS	608.3	567.1	41.2
1*	KNOCKOUT	EMPTY	MGS	779.1	487.6	291.5
5	SILICA GEL	~300g	MGS	710.3	695.4	14.9
6						
7						

* ORDER SWITCHED DUE TO HEAVY AMOUNT

Total Weight Gain (grams) ~~455.3~~ 473.3 ✓

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET C
SAMPLE TYPE ....PSD
RUN NUMBER 1.00
OPERATOR ....CMR
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.60
FILTER NUMBER W-8
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
IAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-8
METER DELTA H@ 0.42
K FACTOR 0.48
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P 0.84
DRY/GAS METER FACTOR (Y) ... 0.99650
FINAL LEAK CHECK .... 0.014 @ 4" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	7:27	790.928											
A3	10.00		795.400	0.80	159	0.38	0.38		260		80.00	80.00		
A3	20.00		799.100	0.80	159	0.38	0.38		293		82.00	81.00		
A3	30.00		803.100	0.80	159	0.38	0.38		270		83.00	81.00		
A3	40.00		807.100	0.80	159	0.38	0.38		220		85.00	82.00		
A3	50.00		811.100	0.80	159	0.38	0.38		215		85.00	83.00		
A3	60.00		815.100	0.80	159	0.38	0.38		212		85.00	83.00		
A4	70.00		819.100	0.80	159	0.38	0.38		212		86.00	84.00		
A4	80.00		823.100	0.80	159	0.38	0.38		213		86.00	84.00		
A4	90.00		827.100	0.80	159	0.38	0.38		214		87.00	84.00		
A4	100.00		831.100	0.80	159	0.38	0.38		205		88.00	85.00		
A4	110.00		835.100	0.80	159	0.38	0.38		202		91.00	86.00		
A4	120.00	9:27	839.200	0.80	159	0.38	0.38		203		95.00	87.00		
END														

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO
Date 08-17-88
Sampling location OUTLET B
Sample type M111
Run number 2
Sample box number
Clean-up person
Solvent rinses

Sample Identification Code:
XAD Trap #
FILTER NO. W-6

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY		762.0	477.6	~~284.4~~
2	0.1N HNO_3	~100 ml		684.7	593.3	~~115.4~~ 8 91.4
3	0.1N HNO_3	~100 ml		621.0	603.8	17.2
4	KNOCKOUT	EMPTY		485.0	480.9	4.1
5	SILICA GEL	~300 g		699.1	688.7	10.4
6						
7						

Total Weight Gain (grams) ~~431.5~~ 8 407.5

'''''

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-17-88
SAMPLING LOCATION ..OUTLET D
SAMPLE TYPE ....PSD
RUN NUMBER 1.00
OPERATOR ....JAE
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER N-9
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-4
METER DELTA H@ 0.42
K FACTOR 0.50
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P 0.84
DRY/GAS METER FACTOR (Y) ... 1.00750
FINAL LEAK CHECK .... 0.014 @ 4" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	19:31	607.329											
A4	5.00		609.420	0.84	158	0.42	0.42		325		87.00	85.00		4.00
A4	10.00		611.450	0.84	158	0.42	0.42		360		89.00	86.00		4.00
A4	15.00		613.490	0.84	158	0.42	0.42		354		89.00	86.00		4.00
A4	20.00		615.550	0.84	158	0.42	0.42		336		89.00	85.00		4.00
A4	25.00		617.600	0.84	158	0.42	0.42		323		90.00	85.00		4.00
A4	30.00		619.650	0.84	158	0.42	0.42		302		90.00	85.00		4.00
A4	35.00		621.690	0.84	158	0.42	0.42		282		90.00	85.00		4.00
A4	40.00		623.740	0.84	158	0.42	0.42		268		90.00	85.00		4.00
A4	45.00		625.780	0.84	158	0.42	0.42		253		90.00	85.00		4.00
A4	50.00		627.820	0.84	158	0.42	0.42		254		90.00	85.00		4.00
A4	55.00		629.860	0.84	158	0.42	0.42		268		91.00	85.00		4.00
A4	60.00		631.890	0.84	158	0.42	0.42		272		91.00	85.00		4.00
A6	65.00	20:36	633.920	0.82	158	0.41	0.41		274		91.00	85.00		4.00
A6	70.00		635.930	0.82	158	0.41	0.41		255		91.00	86.00		4.00
A6	75.00		637.940	0.82	158	0.41	0.41		241		91.00	86.00		4.00
A6	80.00		639.950	0.82	158	0.41	0.41		239		92.00	86.00		4.00
A6	85.00		641.970	0.82	158	0.41	0.41		238		94.00	86.00		4.00
A6	90.00		644.000	0.82	158	0.41	0.41		235		95.00	87.00		4.00
A6	95.00		646.040	0.82	158	0.41	0.41		234		87.00	97.00		4.00
A6	100.00		648.060	0.82	158	0.41	0.41		235		88.00	99.00		4.00
A6	105.00		650.100	0.82	158	0.41	0.41		236		89.00	100.00		4.50
A6	110.00		652.140	0.82	158	0.41	0.41		235		89.00	101.00		4.50
A6	115.00		654.180	0.82	158	0.41	0.41		232		89.00	101.00		4.50
A6	120.00	21:31	656.300	0.82	158	0.41	0.41		226		90.00	101.00		4.50
END														

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RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO

Sample Identification Code: ______

Date 08-17-88

XAD Trap # N/A

Sampling location OUTLET D

Filter No. W-8

Sample type M III

Run number 2

Sample box number ______

Clean-up person ______

Solvent rinses ______

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	742.4	505.5	236.9
2	0.1 N HNO_3	~100 ml	MGS	697.0	594.9	102.1
3	0.1 N HNO_3	~100 ml	GS	634.9	610.2	24.7
4	KNOCKOUT	EMPTY	MGS	470.9	466.7	4.2
5	SILICA GEL	~300g	MGS	794.2	783.4	10.8
6						X
7						

Total Weight Gain (grams) ~~378.7~~ 378.8

378.7

IMPACTOR FIELD DATA

A4 [illegible]
A6 [illegible]

SHEET 2/2

801 (1-3) Plant Name> Monsanto

Sampling Location> [illegible]   Sample Ident.> ______

#7 Type of Impactor> ______   Impactor Substrate> ______

802 (1-3) Date 8-17-88 (MMDDYY)   Time Start 19:31 (HHMM)   Time Finish 21:31 (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter .56" ft.

PTCF ______ DGMCF ______   Test Duration 120 min.

803 (1-3) Bar Press. 24.13 "Hg   Static Press. ______ "H_2O

#7 Nozzle Dia. 0.186 inches   Condensed Water ______ gms

Intake leak rate .01 cfm   Operator initials JAE

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Hot Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804	A-6	21:06	645.24	.82	.4		87	97	234		[illegible]
805		21:11	648.06				88	99	235		4.0
806		21:16	650.10				87	100	236		4.5
807		[illegible]	652.14				89	101	235		4.5
808		21:26	654.18				89	101	232		4.5
809		21:31	656.20				90	101	226		4.5
810											
811			P[illegible]	[illegible]	1.3	F[illegible]					
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console ______

Weather ______

822 Remarks ______

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant Monsanto

Date 8/17/88

Sampling location Outlet A

Sample type MMIII

Run number 3

Sample box number 4-2

Clean-up person

Solvent rinses 0.1N HNO3

Sample Identification Code:

XAD Trap #

filter W 12

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	Modified	615.0	493.5	121.5
2	0.1N HNO3	~100	Standard	815.8	567.7	248.1
3	0.1 NHNO3	~100	Modified	599.5	591.0	8.5
4	none	0	Modified	475.2	475.5	-0.3
5	Silica Gel	300	Modified	706.6	695.6	11.0
6						
7						

Total Weight Gain (grams) ~~0~~ 388.8

APPENDIX F.2 - Test Run No. 2, 8/18/88

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO

Date 8/17/85

Sampling location OUTLET C

Sample type MM III

Run number 3

Sample box number

Clean-up person

Solvent rinses 0.1N HNO_3

Sample Identification Code:

XAD Trap #

filter # W11

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	MOD	830.9	494.3	336.6
2	0.1N HNO_3	~100	MOD	639.7	574.0	65.7
3	0.1N HNO_3	~100	STD	632.0	622.1	9.9
4	none	0	MOD	492.8	488.1	4.7
5	Silica Gel	300	MOD	688.6	674.3	14.3
6						
7						

Total Weight Gain (grams) 431.2

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/18/88
SAMPLING LOCATION ..INLET
SAMPLE TYPE ....PSD
RUN NUMBER 2.00
OPERATOR ....MWH/JTW
AMBIENT TEMPERATURE 80.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -7.30
FILTER NUMBER W-33
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......6', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.187
ASSUMED MOISTURE, % 50.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-5
METER DELTA H@ 1.91
K FACTOR 1.65
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99960
FINAL LEAK CHECK .... 0.010 @ 10" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	14:50	693.328											
B4	7.50		696.640	0.80	161	0.55	0.55		223		85.00	84.00	60.00	3.00
B7	15.00	15:05	699.730	0.80	161	0.55	0.55		291		87.00	85.00	60.00	3.00
END														

RADIAN
CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO
Sample Identification Code:
Date 8/18/88
XAD Trap #
Sampling location INLET
Sample type MM III
Run number 4
Sample box number
Clean-up person
Solvent rinses 0.1 N HNO_3

filter W-19

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	MOD	800.3	460.2	340.1
2	0.1 N HNO_3	~100	STD	689.5	572.3	117.2
3	0.1 N HNO_3	~100	MOD	590.4	565.5	24.9
4	none	0	MOD	489.0	487.5	1.5
5	Silica Gel	300	MOD	742.6	728.5	14.1
6						
7						

Total Weight Gain (grams) 497.8

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/18/88
SAMPLING LOCATION ..OUTLET A
SAMPLE TYPE ....PSD
RUN NUMBER 2.00
OPERATOR ....GDR
AMBIENT TEMPERATURE 84.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.60
FILTER NUMBER W-12
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.030
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 37.93
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-7
METER DELTA H@ 1.91
K FACTOR 0.49
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00350
FINAL LEAK CHECK .... 0.014 @ 9" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperatures: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	15:15	439.180											
B6	10.00		443.200	0.73	162	0.36	0.36		200		88.00	88.00		1.00
B6	20.00		446.500	0.73	162	0.36	0.36		217		89.00	89.00		1.00
B6	30.00		450.400	0.73	162	0.36	0.36		225		91.00	89.00		1.00
B6	40.00		453.900	0.73	162	0.36	0.36		231		92.00	90.00		1.00
B6	49.00	16:04	456.990	0.73	162	0.36	0.36		230		92.00	90.00		1.00
STOP	49.00	16:53	479.320											
B6	59.00	17:03	483.050	0.73	158	0.36	0.36		233		96.00	93.00		1.00
B6	69.00		486.700	0.73	156	0.36	0.36		251		95.00	93.00		1.00
B6	79.00		490.400	0.73	157	0.36	0.36		247		95.00	93.00		1.00
B6	90.00		494.500	0.73	157	0.36	0.36		237		94.00	93.00		1.00
B3	100.00		498.400	0.75	157	0.37	0.37		236		94.00	93.00		2.00
B3	110.00		502.600	0.75	157	0.37	0.37		242		92.00	92.00		2.00
B3	120.00		506.000	0.75	157	0.37	0.37		235		92.00	91.00		2.00
B3	130.00		509.600	0.75	157	0.37	0.37		237		92.00	92.00		2.00
B3	140.00		513.400	0.75	157	0.37	0.37		233		92.00	91.00		2.00
B3	150.00		517.300	0.75	158	0.37	0.37		235		93.00	91.00		2.00
B3	160.00		521.200	0.75	158	0.37	0.37		233		91.00	90.00		2.00
B3	170.00		525.000	0.75	158	0.37	0.37		230		90.00	89.00		2.00
B3	180.00	19:04	528.835	0.75	157	0.37	0.37		229		91.00	89.00		2.00
END														

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CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant Monsanto

Date 8/18/88

Sampling location Outlet B

Sample type MM 111

Run number 4

Sample box number

Clean-up person

Solvent rinses 0.1 N HNO_3

Sample Identification Code:

XAD Trap #

filter W-17

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	None	0	MOD	772.9	477.3	295.6
2	0.1N HNO_3	~100	STD	676.1	592.5	83.6
3	0.1N HNO_3	~100	MOD	628.1	600.2	27.9
4	None	0	MOD	485.1	479.6	5.5
5	Silica Gel	300	MOD	747.3	733.0	14.3
6						
7						

Total Weight Gain (grams) 426.9

RUN –

SHEET 2/2

PT	MIN CLOCK TIME	(ft^3) DGM READING	ΔP in. H_2O	ΔH in. H_2O	STACK TEMP °F	DGM TEMP °F IN	OUT	IMPACTOR TEMP °F	CUM MIN.	VAC in Hg
B-3	1824	513.4	0.75	0.37	157	92	91	233	140	2
B-3	1834	517.3	0.75	0.37	158	93	91	235	150	2
B-3	1844	521.2	0.75	0.37	158	91	90	233	160	2
B-3	1854	525.0	0.75	0.37	158	90	89	230	170	2
B-3	1904	528.835	0.75	0.37	157	91	89	229	180	2

TOOK PROBE OUT OF STACK, ORIENTED VERTICALLY, PURGED FOR 12 MINUTES
~ 5 ft^3

$\bar{x} = 232.4$

DGM: 67.325

OUTLET A – SHEET 2/2
PSD RUN 2, PORT B
FILTER SET "N"
GD RIVES

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO
Date 8/18/88
Sampling location OUTLET D
Sample type MM III
Run number 4
Sample box number
Clean-up person
Solvent rinses 0.1 N HNO_3

Sample Identification Code:
XAD Trap #

Filter W-20

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	MOD	647.7	505.2	142.5
2	0.1 N HNO_3	~100	STD	862.4	603.0	259.4
3	0.1 N HNO_3	~100	MOD	640.8	606.5	34.3
4	none	0	MOD	471.5	465.4	6.1
5	Silica Gel	300	MOD	760.4	747.6	12.8
6						
7						

Total Weight Gain (grams) 455.1

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-18-88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE ....PSD
RUN NUMBER 2.00
OPERATOR ....FLB
AMBIENT TEMPERATURE 78.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER W-12
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.018
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-3
METER DELTA H@ 1.79
K FACTOR 1.65
PROBE HEATER SETTING 70%
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99430
FINAL LEAK CHECK .... 0.005 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	14:45	0.90											
A3	10.00		4.600	0.75	158	0.38	0.38		332		84.00	83.00		2.00
A3	20.00		8.500	0.75	158	0.38	0.38		345		86.00	84.00		2.00
A3	30.00		12.200	0.75	158	0.38	0.38		330		88.00	85.00		2.00
A3	40.00		16.100	0.75	158	0.38	0.38		321		92.00	87.00		2.00
A3	50.00		20.000	0.75	159	0.38	0.38		310		93.00	90.00		2.00
A3	60.00		23.700	0.75	159	0.38	0.38		297		95.00	91.00		2.00
A3	70.00		27.500	0.75	159	0.38	0.38		296		96.00	93.00		2.00
A3	80.00	16:05	31.450	0.75	159	0.38	0.38		296		97.00	94.00		2.00
STOP	80.00	16:54	38.490											
A2	90.00	16:56	42.800	0.75	159	0.38	0.38		320		86.00	84.00		2.00
A2	100.00		46.600	0.75	158	0.38	0.38		315		87.00	86.00		2.00
A2	110.00		50.500	0.75	158	0.38	0.38		313		91.00	88.00		2.00
A2	120.00		54.300	0.75	159	0.38	0.38		294		93.00	90.00		2.00
A2	130.00		58.200	0.75	157	0.38	0.38		271		94.00	92.00		2.00
A2	140.00		65.600	0.75	157	0.38	0.38		259		92.00	92.00		2.00
A2	150.00		66.900	0.75	158	0.38	0.38		265		92.00	91.00		2.00
A2	160.00		69.500	0.75	158	0.38	0.38		267		91.00	90.00		2.00
A2	170.00		73.300	0.75	158	0.38	0.38		268		91.00	91.00		2.00
A2	180.00	18:36	77.035	0.75	158	0.38	0.38		266		91.00	91.00		2.00
END														

801 (1-3) Plant Name> Mcn

Sampling Location> outlet B Sample Ident.>

Type of Impactor> Impactor Substrate>

802 (1-3) Date 8/18/84 (MMDDYY) Time Start (HHMM) Time Finish (HHMM)

Duct Dimensions x ft. or Diameter . ft.

PTCF DGMCF Test Duration min.

803 (1-3) Bar Press. . "Hg Static Press. "H_2O

Nozzle Dia. inches. Condensed Water gms

Intake leak rate cfm Operator initials

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Impacter Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804	A2	1826	73.3	.75	.38	158	91	91	268		2
805	A2	1836	77.035	.75	.38	158	91	91	266		2
806											
807											
808											
809											
810											
811											
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console

Weather

822 Remarks

RUN 2

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO - SODA SPRINGS

Sampling Location> OUTLET-C   Sample Ident.>

Type of Impactor> ANDERSEN   Impactor Substrate> GLASS FIBER

802 (1-3) Date 8/18/85 (MMDDYY) Time Start ____ (HHMM) Time Finish ____ (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter 56" ft.

PTCF ____ DGMCF ____ Test Duration 3 HOURS min.

803 (1-3) Bar Press. ____ "Hg Static Press. ____ "H_2O

Nozzle Dia. 0.187 inches Condensed Water ____ gms

Intake leak rate ____ cfm Operator initials CNL

		Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	IMP. Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Hot Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge	
	804		2.45	882.54									
10	805	B-2	2.55	887.1		0.38	344	86	83	—	—	3	
20	806	B-2	3.05	890.2		0.38	359	87	84	—	—	3	
30	807	B-2	3.15	894.23		0.38	380	90	85	—	—	3	
40	808	B-2	3.25	898.3		0.38	391	93	87	—	—	3	
50	809	B-2	3.35	902.4		0.38	384	93	90	—	—	3	
60	810	B-2	3.45	906.54		0.38	361	97	91	—	—	3	
70	811	B-2	3.55	910.72		0.38	327	98	93	—	—	3	
78	812	B-2	4.03	914.07		0.38	302	100	95	—	—	3	
	813	~~B-2~~	4.54	933.915									
84	814	B-2	5.00	936.120		0.38	331	94	94	—	—	3	
90	815	B-2	5.06	938.5		0.38	371	94	94	—	—	3	
100	816	B-3	5.16	942.65		0.38	303	97	94	—	—	3	T 524
110	817	B-3	5.26	946.5		0.38	254	98	95	—	—	3	15
120	818	B-3	5.36	950.9		0.38	228	101	96	—	—	3	15
130	819	B-3	5.46	955.1		0.38	243	100	98	—	—	3	15
140	820	B-3	5.56	959.23		0.38	258	97	96	—	—	3	15
150	821	B-3	6.06	963.24		0.38	252	96	96	—	—	3	15
160		B-3	6.16	967.4		0.38	240	94	92	—	—	3	15
170		B-3	6.26	971.4		0.38	295	94	92	—	—	3	15
180		B-3	6.36	975.5		0.38	251	92	91	—	—	3.5	15

* Dry air purge when sampling wet streams

Console RAC #8, Y = 0.9965, ΔH@ = 1.69

Weather SUNNY WINDY

822 Remarks Sample POINTS B2 + B3 1½ HOURS EACH

$\Delta P = 0.80 \quad \Delta H = 0.38$

$\Delta p \times K = \Delta H$ F-26 $\boxed{K = 0.48}$

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto
DATE 8/16/88
SAMPLING TIME (24 hr CLOCK)
SAMPLING LOCATION Outlet B
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Integrated
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE
OPERATOR

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	0.1 / 17.5	17.4	0.3 / 17.7	17.4			17.4	44/100	
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.3	8.8	26.4	8.7			8.75	32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	~~0.5~~ ~~17.7~~	~~17~~						28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)							73.85	28/100	
								TOTAL	

EPA (Dur) 230
4/72

RUN 2

IMPACTOR FIELD DATA

801 (1-3) Plant Name> M[illegible]

Sampling Location> OUTLET   Sample Ident.> ______

Type of Impactor> ______   Impactor Substrate> AF

802 (1-3) Date 8-18-[illegible] (MMDDYY)   Time Start ______ (HHMM)   Time Finish ______ (HHMM)

Duct Dimensions N/A x [illegible] ft. or Diameter .56 ft.

PTCF ______   DGMCF ______   Test Duration 180 min.

803 (1-3) Bar Press. ______ "Hg   Static Press. -.25 "H_2O ______

#7 Nozzle Dia. .186 inches   Condensed Water ______ gms

Intake leak rate ______ cfm   Operator initials TAE

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F 5	Dry Gas Meter Temperature Outlet °F 6	Impactor Temp. °F 7	Last Impinger Temp. °F	L. Vac. In. Hg Gauge
		14:5[illegible]	703.621								
804	B-4	15:00	707.86	.88	.44	159	93	93	320		2.0
805		15:10	712.08				95	91	315		2.0
806		15:20	716.32				97	91	285		2.0
807		[illegible]	720.57				100	92	271		2.0
808		[illegible]	724.26				99	93	269		2.0
809		15:50	729.09				99	93	271		2.0
STOP 810		15.53.30	732.76				100	93	272		2.0
811	B-4	16:50	756.40								
812		17:00	760.61			160	100	93	290		2.0
813		17:10	764.85			159	100	94	276		2.0
814		17:15	[illegible]7.00			161	103	95	260		2.0
815	B-3	17:25	771.24			161	102	95	260		2.0
816		17:35	775.50			161	102	95	266		2.0
817		17:45	779.77			161	104	96	267		2.0
818		17:55	784.03			161	98	95	262		2.0
819		18:05	788.28			160	98	94	260		2.0
820		18:15	792.63			160	99	94	260		2.5
821		18:25	796.90			160	99	94	260		2.0
		18:35	802.20			160	100	95	259		2.5
		14,	805.082			160	98	94	259		3.0

* Dry air purge when sampling wet streams

Console ______

Weather ______

822 Remarks 15:55 ID FAN QUIT
15:58 [illegible] READING + TOOK OUT PROBE
LA[illegible] P STARTED ↑ TO 4.5

DRY MOLECULAR WEIGHT DETERMINATION

VOID by use average values [illegible] ✓

PLANT Monsanto Soda Sp
DATE 8-17-88
SAMPLING TIME (24 hr CLOCK) 9:40 - 11:15
SAMPLING LOCATION OT stack A run 2
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD ORSAT
AMBIENT TEMPERATURE 70 °F
OPERATOR R. OLIN

COMMENTS: ORSAT BAG WAS OPEN FOR 2 MIN.

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	.3 12.5	12.2 ✓	.6 12.8	12.2 ✓	.1 12.2	12.1	12.16	44/100	5.35
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	22.7 23.8 .3 23.5	11.3 ✓	22.0 .6 24.7 24.1	11.9 ✓	22.6 24.0 24.1 24.0	11.9 ✓	11.7	32/100	3.744
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		76.5 ✓		75.9 ✓		76 ✓	76.13	28/100	21.317
								TOTAL	30.411 *

EPA (Dur) 230
4/72

APPENDIX F.3 - Test Run No. 3, 8/19/88

Checked GDR ✓

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS

DATE 8-17-88

SAMPLING TIME (24 hr CLOCK) 9:40-11:15

SAMPLING LOCATION OTC run 2

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 80 F

OPERATOR R. Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	19.1	19.6	0 19.5 19.9	19.9	.2 .95 19.2	19.5	19.667	44/100	8.653
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	25.9 26.7 27.2 27.1	7.5	25.7 27.1 27.2	7.3	27.2 27.0	7.5	7.433	32/100	2.379
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.9		72.8		73	72.9	28/100	20.412
								TOTAL	31.444

EPA (Dur) 230
4/72

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/19/88
SAMPLING LOCATION ..INLET
SAMPLE TYPE ....PSD
RUN NUMBER 3.00
OPERATOR ....MMH
AMBIENT TEMPERATURE 70.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -7.30
FILTER NUMBER N-10
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.001
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......6', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.187
ASSUMED MOISTURE, % 50.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-5
METER DELTA H@ 1.91
K FACTOR 1.65
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 250.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 0.99960
FINAL LEAK CHECK .... 0.015 @ 10" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H20	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	12:00	709.128											
B4	5.00		711.350	0.80	161	0.55	0.55		223		88.00	87.00	60.00	2.50
B7	10.00	12:10	713.210	0.80	161	0.55	0.55		231		89.00	87.00	60.00	3.00
END														

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS
DATE 8-19-88
SAMPLING TIME (24 hr CLOCK)
SAMPLING LOCATION ~~[illegible]~~ + PSD 3 + inlet
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 20 F
OPERATOR Rich Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	-.8 20.1 20.2	19.4	74.6	19.5			19.45	44/100	8.56
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.8 27.0 26.2	6.8	26.3 26.5 26.4	6.9			6.85	32/100	2.19
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.8		73.6			73.7	28/100	20.64
								TOTAL	31.39

EPA (Dur) 230
4/72

''''

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/19/88
SAMPLING LOCATION ..OUTLET A
SAMPLE TYPE ....PSD
RUN NUMBER 3.00
OPERATOR ....GDR
AMBIENT TEMPERATURE 75.00
BAROMETRIC PRESSURE 24.17
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER W-12
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.76
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-7
METER DELTA H@ 1.78
K FACTOR 0.49
PROBE HEATER SETTING 350.00
HEATER BOX SETTING 360.00
REFERENCE DEL P 0.85
DRY/GAS METER FACTOR (Y) ... 1.00350
FINAL LEAK CHECK .... 0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	13:05	535.610											
A6	10.00		539.700	0.85	163	0.42	0.42		350		85.00	82.00		1.00
A6	20.00		544.000	0.85	163	0.42	0.42		335		85.00	87.00		1.00
A6	30.00		548.100	0.85	158	0.42	0.42		293		88.00	85.00		1.00
A6	40.00		554.300	0.85	158	0.42	0.42		262		88.00	85.00		1.00
A6	50.00		557.000	0.85	159	0.42	0.42		250		90.00	91.00		1.00
A6	60.00		561.500	0.85	158	0.42	0.42		255		93.00	88.00		1.00
A6	70.00		565.100	0.85	157	0.42	0.42		257		92.00	89.00		1.00
A6	80.00		569.190	0.85	157	0.42	0.42		257		94.00	89.00		1.00
A6	90.00		573.300	0.85	157	0.42	0.42		258		91.00	90.00		1.00
A6	100.00		577.400	0.85	157	0.42	0.42		259		91.00	89.00		1.00
A6	110.00		581.420	0.85	157	0.42	0.42		258		92.00	89.00		1.00
A6	120.00		585.000	0.85	157	0.42	0.42		257		92.00	90.00		1.00
A2	130.00	15:15	589.500	0.85	157	0.42	0.42		253		91.00	90.00		1.00
A2	140.00		593.600	0.85	157	0.42	0.42		247		91.00	89.00		1.00
A2	150.00		597.600	0.85	157	0.42	0.42		244		91.00	89.00		2.00
A2	160.00		601.700	0.85	157	0.42	0.42		250		89.00	91.00		2.00
A2	170.00		605.100	0.85	158	0.42	0.42		255		91.00	85.00		2.00
A2	180.00		609.900	0.85	158	0.42	0.42		259		93.00	90.00		2.00
A2	190.00		614.020	0.85	158	0.42	0.42		259		95.00	91.00		2.00
A2	200.00		618.000	0.85	158	0.42	0.42		255		98.00	89.00		2.00
A2	210.00		622.240	0.85	158	0.42	0.42		249		90.00	90.00		2.00
A2	220.00		626.600	0.85	158	0.42	0.42		245		91.00	89.00		2.00
A2	230.00		630.600	0.85	158	0.42	0.42		241		93.00	90.00		2.00
A2	240.00	17:05	634.650	0.85	158	0.42	0.42		239		94.00	91.00		2.00
END														

''''

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SC

DATE 8-17-88

SAMPLING TIME (24 hr CLOCK) 1400 - 16:00

SAMPLING LOCATION OT-A run 3

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 75 F

OPERATOR R. OLIN

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	-.7 20.0	19.3	-.0 19.0	19.0	-.2 18.8	18.8	19.03	44/100	8.37
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.2 27.6 27.7 27.0	7.7	26.9 27.2	8.2	27 27.2	8.2	8.03	32/100	2.57
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73		72.8		73.0	72.93	28/100	20.42
								TOTAL	31.36

EPA (Dur) 230
4/72

SHEET ∠ OF ∟

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO

Sampling Location> OUTLET A Run 3 Sample Ident.> OUTLET A Run 3

Type of Impactor> Anderson Impactor Substrate>

802 (1-3) Date 08-1988 (MMDDYY) Time Start ____ (HHMM) Time Finish ____ (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter ____ ft.

PTCF ____ DGMCF 1.0035 Test Duration 240 min.

803 (1-3) Bar Press. ____ "Hg Static Press. ____ "H_2O

Nozzle Dia. 0.0001557 inches Condensed Water ____ gms

Intake leak rate ____ cfm Operator initials GD Rhea

V_c = 66.273
T_s = 618°R
V_{wtd} $\bar{x}$ = 61.62
61.011 ↓

Sheet 2/2

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	IMPACTOR Hot Box Temp. °F	Cum Sample Time	L. Vac. in. Hg Gauge
804	A-2	1615	614.02	0.85	0.42	158	95	91	259	190	2
805	A-2	1625	618	0.85	0.42	158	93	89	255	200	2
806	A-2	1635	622.24	0.86	0.42	158	90	90	249	210	2
807	A-2	1645	626.6	0.85	0.42	158	91	89	245	220	2
808	A-2	1655	630.6	0.85	0.42	158	93	90	241	230	2
809	A-2	1705	634.650	0.86	0.42	158	94	91	239	240	2
810											
811									$\bar{x}$ = 261.96		
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

• Dry air purge when sampling wet streams

Console

Weather

822 Remarks

Check ... [illegible]

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS

DATE 8-17-88

SAMPLING TIME (24-hr CLOCK) 14:00 - 16:00

SAMPLING LOCATION O T C run 3

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 25 F

OPERATOR R. OLIN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	19.4	19.0	19.8	18.9			18.95	44/100	8.34
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.3 27.2 26.9	7.9	27.4 27.7 26.8	7.9			7.90	32/100	2.53
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.1		73.2			73.15	28/100	20.48
								TOTAL	31.35

EPA (Dur) 230
4/72

IMPACTOR FIELD DATA

801 (1-3) Plant Name> Monsanto

Sampling Location> outlet B   Sample Ident.> ______

Type of Impactor> andersen mark III   Impactor Substrate> ______

802 (1-3) Date 8/19/88 (MMDDYY) Time Start ______ (HHMM) Time Finish ______ (HHMM)

Duct Dimensions ______ x ______ ft. or Diameter ______ ft.

PTCF .84 DGMCF .9943 Test Duration ______ min.

803 (1-3) Bar Press. ______ "Hg Static Press. ______ "H_2O

Nozzle Dia. .186 inches Condensed Water ______ gms

Intake leak rate .016 @4" cfm Operator initials [illegible]

	Pt.	Clock Time (1315)	Dry Gas Meter Reading ft³ (83.079)	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	impacter ~~Hot-Box~~ Temp. °F	elapsed time ~~Impinger Temp.~~	L. Vac. In. Hg Gauge
804	B6	1325	87.2	.89	.45	159	81	80	289	10	1.5
805	B6	35	91.3	.89	.45	159	83	82	280	20	1.5
806	B6	45	95.4	.89	.45	157	85	83	243	30	1.5
807	B6	55	99.3	.89	.45	158	89	85	252	40	1.5
808	B6	1405	103.3	.89	.45	158	92	87	231	50	1.5
809	B6	15	107.4	.89	.45	158	92	88	243	60	1.5
810	B6	25	111.5	.89	.45	158	93	89	263	70	1.5
811	B6	35	115.6	.89	.45	158	94	91	227	80	1.5
812	B6	45	119.4	.89	.45	158	94	92	268	90	1.5
813	B6	55	123.2	.89	.45	159	95	93	263	100	1.5
814	B6	1505	127.2	.89	.45	159	94	93	233	110	2
815	B6	15	131.4	.89	.45	159	93	93	290	120	2
816	B36	25	135.6	.89	.45	158	94	92	274	130	2
817	B36	35	139.8	.89	.45	158	95	93	247	140	2
818	B36	45	143.8	.89	.45	158	93	92	223	150	2
819	B36	55	147.6	.89	.45	158	92	91	280	160	2
820	B36	1605	151.6	.89	.45	158	95	93	265	170	2
821	B36	15	159.6	.89	.45	159	96	94	250	180	2

* Dry air purge when sampling wet streams

Console 12

Weather ______

822 Remarks ______

Checked GDN

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS
DATE 8-18-88
SAMPLING TIME (24 hr CLOCK) 10:00
SAMPLING LOCATION INLET Run 4 bag #1
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD ORSAT
AMBIENT TEMPERATURE 70 F
OPERATOR R. OLIN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	-.3 20.2 20.2	19.9	.1 20.0 20.0	~~20.1~~ 19.9			~~20.0~~ 19.9	44/100	8.76
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.2 26.3 26.0	6.1	26.2 26.2 26.1	6.2			6.15	32/100	1.98
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		74.0		73.9			73.95	28/100	20.71
								TOTAL	31.45

EPA (Dur) 230
4/72

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS	
DATE 8-19-88	
SAMPLING LOCATION ..OUTLET C	
SAMPLE TYPE ....PSD	
RUN NUMBER	3.00
OPERATOR ....CNR	
AMBIENT TEMPERATURE	84.00
BAROMETRIC PRESSURE	24.17
STATIC PRESSURE (Ps)	-0.60
FILTER NUMBER	
MIN.SAMPLE VOLUME ..	
INITIAL LEAK CHECK .	0.010
XAD TRAP NUMBER	

PROBE LENGTH AND TYPE ......12', STEEL	
HEIGHT OF LOCATION(ft)......	69.00
NOZZLE I.D.	0.187
ASSUMED MOISTURE, %	39.00
SAMPLE BOX NUMBER ....NA	
METER BOX NUMBER RAC-8	
METER DELTA H@	1.69
K FACTOR	0.48
PROBE HEATER SETTING	250.00
HEATER BOX SETTING	260.00
REFERENCE DEL P	0.85
DRY/GAS METER FACTOR (Y) ...	0.99650
FINAL LEAK CHECK	0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H20	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	1:02	981.105											
B2	10.00		985.100	0.85	153	0.41	0.41		294		92.00	91.00		
B2	20.00		989.700	0.85	153	0.41	0.41		308		97.00	93.00		
B2	30.00		993.620	0.85	156	0.41	0.41		278		93.00	92.00		
B2	40.00		997.850	0.85	156	0.41	0.41		276		93.00	92.00		
B2	50.00		1002.010	0.85	156	0.41	0.41		264		95.00	91.00		
B2	60.00		1006.970	0.85	156	0.41	0.41		272		95.00	92.00		
B2	70.00		1010.275	0.85	156	0.41	0.41		280		95.00	92.00		
B2	80.00		1014.420	0.85	156	0.41	0.41		277		97.00	93.00		
B2	90.00		1018.595	0.85	157	0.41	0.41		273		97.00	93.00		
B2	100.00		1022.720	0.85	157	0.41	0.41		271		95.00	93.00		
B2	110.00		1026.900	0.85	157	0.41	0.41		269		98.00	94.00		
B2	120.00		1031.175	0.85	157	0.41	0.41		266		96.00	94.00		
B5	131.00		1035.680	0.85	157	0.41	0.41		258		93.00	93.00		
B5	140.00		1039.410	0.85	157	0.41	0.41		258		95.00	93.00		
B5	150.00		1043.520	0.85	157	0.41	0.41		250		96.00	94.00		
B5	160.00		1047.690	0.85	157	0.41	0.41		230		93.00	93.00		
B5	170.00		1051.800	0.85	158	0.41	0.41		234		93.00	92.00		
B5	180.00		1056.000	0.85	158	0.41	0.41		240		97.00	93.00		
B5	190.00		1060.100	0.85	158	0.41	0.41		238		100.00	95.00		
B5	200.00		1064.270	0.85	158	0.41	0.41		236		95.00	94.00		
B5	210.00		1068.445	0.85	158	0.41	0.41		234		93.00	93.00		
B5	220.00		1072.650	0.85	158	0.41	0.41		233		93.00	92.00		
B5	230.00		1076.950	0.85	158	0.41	0.41		232		95.00	92.00		
B5	240.00	5:02	1080.960	0.85	158	0.41	0.41		229		96.00	93.00		
END														

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS
DATE: 8-18-88
SAMPLING TIME (24 hr CLOCK): 11:00
SAMPLING LOCATION: OUT Stack A run 4
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS): INTEGRATED
ANALYTICAL METHOD: Orsat
AMBIENT TEMPERATURE: 78 F
OPERATOR: R. Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	-.2 19.8 19.8	19.6	-.4 20.2 20.3	19.9			19.75	44/100	8.69
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.2 27.4 27.2	7.6	27.8 27.9 27.5	7.6			7.6	32/100	2.43
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	20.34
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.8		72.5			72.65	28/100	
								TOTAL	31.46

EPA (Dur) 230
4/72

RUN 3

MONSANTO - SODA SPRINGS
OUTLET - C , PORT B
8/19/88

CNR

ANDERSEN IMPACTOR RUN 3

ELAPSED TIME	PT.	CLOCK TIME	DGM READING	ΔH	T_S	DGM TEMP. IN.	DGM TEMP. OUT	T_I	VAC
190	B-5	4.12	060.1	0.41	158	100	95	238	3.8
200	B-5	4.22	064.27	0.41	159	95	94	236	3.9
210	B-5	4.32	068.445	0.41	158	93	93	234	4.0
220	B-5	4.42	072.65	0.41	158	93	92	233	4.0
230	B-5	4.52	076.95	0.41	158	95	92	232	4.0
240	B-5	5.02	080.96	0.41	158	96	93	229	4.0

Purge till 5.13 p.m. 086.6

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS
DATE 8-18-88
SAMPLING TIME (24 hr CLOCK) 11:00
SAMPLING LOCATION OUT Stack C run 4
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 78 F
OPERATOR R. Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	-.4 20.4 20.4	20.0	-.0 19.8 19.8	19.8			19.9	44/100	8.76
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.5 27.7 27.3	7.3	27.2 27.2	7.4			7.35	32/100	2.35
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.7		72.8			72.75	28/100	20.37
								TOTAL	31.48

EPA (Dur) 230
4/72

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/19/88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE ....PSD
RUN NUMBER 3.00
OPERATOR ....JAE
AMBIENT TEMPERATURE   75.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.25
FILTER NUMBER W-10
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.008
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-4
METER DELTA H@ 1.78
K FACTOR 0.48
PROBE HEATER SETTING 330.00
HEATER BOX SETTING 360.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ...   1.00750
FINAL LEAK CHECK ....   0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	13:17	167.358											
B5	10.00		171.310	0.80	160	0.38	0.38		330		98.00	97.00		3.00
B5	20.00		175.310	0.80	160	0.38	0.38		338		99.00	98.00		3.00
B5	30.00		179.330	0.80	161	0.38	0.38		322		98.00	97.00		3.00
B5	40.00		183.320	0.80	160	0.38	0.38		264		96.00	95.00		3.00
B5	50.00		187.300	0.80	160	0.38	0.38		272		95.00	94.00		3.00
B5	60.00		191.300	0.80	160	0.38	0.38		258		93.00	92.00		3.00
B5	70.00		195.300	0.80	160	0.38	0.38		249		91.00	89.00		3.00
B5	80.00		199.310	0.80	160	0.38	0.38		253		89.00	88.00		3.00
B5	90.00		203.320	0.80	159	0.38	0.38		261		90.00	89.00		3.00
B5	100.00		207.300	0.80	160	0.38	0.38		259		88.00	87.00		3.50
B5	110.00		211.300	0.80	160	0.38	0.38		259		88.00	87.00		3.00
B5	120.00	15:17	215.300	0.80	159	0.38	0.38		259		88.00	87.00		3.50
B2	130.00	15:27	219.310	0.80	162	0.38	0.38		261		88.00	87.00		3.50
B2	140.00		223.310	0.80	160	0.38	0.38		257		88.00	87.00		3.50
B2	150.00		227.300	0.80	159	0.38	0.38		259		88.00	87.00		3.50
B2	160.00		231.300	0.80	160	0.38	0.38		268		88.00	88.00		3.50
B2	170.00		235.310	0.80	160	0.38	0.38		270		88.00	88.00		3.50
B2	180.00	16:17	239.300	0.80	160	0.38	0.38		256		88.00	88.00		3.50
END														

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS
DATE: 8-19-88
SAMPLING TIME (24 hr CLOCK): 11:00
SAMPLING LOCATION: outlet D
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS):
ANALYTICAL METHOD: Orsat
AMBIENT TEMPERATURE: 80 F
OPERATOR: R. Olin

COMMENTS: run 5 + PSO3 Gag #1

RUN / GAS	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	15.8 15.8	15.0	15.6 15.6	15.1			15.05	44/100	6.62
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	25.6 25.8 25.0	10.0	25.4 25.7 25.2	10.1			10.05	32/100	3.22
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		75.0		74.8			74.9	28/100	20.97
								TOTAL	30.81

EPA (Dur) 230
4/72

Pt.	Clock Time	Dry Gas Meter	ΔP	ΔH	Stack Temp	Dry Gas M Inlet	Dry Gas M Outlet	Impactor Temp	Vac.
B-2	16:27	243.13	.8	.38	160	87	87	248	4.0
	16:37	247.15			160	87	87	247	4.0
	16:47	251.16			159	87	86	247	4.0
	16:57	255.16			160.	88	86	251	4.0
	17:07	259.13			161	93	88	252	4.0
	17:17	263.17			160	95.	90	253	4.0

PURGED 3 FT^3

APPENDIX F.4 - Blank PSD Runs

~~B~~ BLANK

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MODESTO - SODA SPRINGS
Sampling Location> INLET   Sample Ident.> BLANK MBS-071888-PSA-BC
Type of Impactor> ANDERSON - B/H   Impactor Substrate> GLASS FIBER
802 (1-3) Date 08/15/88 (MMDDYY) Time Start 17:20 (HHMM) Time Finish 17:35 (HHMM)
Duct Dimensions ____ x ____ ft. or Diameter 9' ft.
PTCF 0.84 DGMCF 0.9996 Test Duration 15 min.
803 (1-3) Bar Press. 24.13 "Hg   Static Press. -7.3 "H_2O
Nozzle Dia. 0.187 inches   Condensed Water ____ gms
Intake leak rate 0.001 cfm   Operator initials MWH JTW

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	IMPACTOR Hot-Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804	B4	0/	701.412								
805	B4	7.5/27.5	704.45	0.80	.55	161	85	85	192	60°	4.0
806	B4	15/35	707.41	0.80	.55	161	84	84	268	60°	8.0
807									292	60°	9.0
808											
809											
810											
811											
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console

Weather Note a lot of water in the turkey Bag.
Slight blockage on the nozzle by the turkey bag caused High Vacuum

822 Remarks Blank run. Nozzle out of the flow.
Run A4

Run 1

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO - SODA SPRINGS

Sampling Location> INLET   Sample Ident.> MSS - 08 [illegible]

Type of Impactor> ANDERSON   Impactor Substrate> GLASS FIBER

802 (1-3) Date 08/11/88 (MMDDYY)   Time Start 1901.5 (HHMM)   Time Finish 1916.5 (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter .9' ft.

PTCF 0.84   DGMCF 0.9996   Test Duration 15 min.

803 (1-3) Bar Press. 613 mm "Hg   Static Press. -7.3 "H_2O

Nozzle Dia. 0.187 inches   Condensed Water ____ gms

Intake leak rate 0.01 cfm   Operator initials MWH / JTW.

leak check ok

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	@ 60% U. Impactor Hot-Box Temp. °F	Last Impinger Temp. °F	L. Vac. In. Hg Gauge
		1901 30									
804	A-4	0 2	.640.062								
805	A-4	7.5	643.60	0.88	0.61	163	88	87	212	60°	40
806	A-7	150	647.21	0.88	0.61	163	92	91	232	60°	4.0
807		1916 30s							252		
808											
809									x̄=232		
810											
811											
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console ____

Weather ____

822 Remarks PT A-7 ΔP 0.88 T 163   ButtonHook Nozzle
PT A-4 " "   K = .76 x 1.91 x .88

APPENDIX G - MOISTURE AND ORSAT ANALYSIS FIELD DATA

JES/055

APPENDIX G.1 - Moisture Recovery

RUN 1

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO

Sampling Location> OUTLET A Sample Ident.> FILTER SET U

Type of Impactor> ANDERSON MK III Impactor Substrate> ____

802 (1-3) Date 05-R-88 (MMDDYY) Time Start 2000 (HHMM) Time Finish ____ (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter ____ ft.

PTCF N/A DGMCF 1.0035 Test Duration 120 min.

803 (1-3) Bar Press. 24.13 "Hg Static Press. ____ "H_2O ____

Nozzle Dia. 0.186 inches Condensed Water ____ gms

Intake leak rate 0.015 cfm@ 15 in. Operator initials GD R...

NOZZLE ID = #10

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	IMPACTOR #1 Hot-Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804	~~A-5~~	2000	312.864	~~0.83~~	~~0.41~~	~~161~~				—	
805	A-2	2010	316.85	0.83	0.41	161	81	82	238	—	+
806	A-2	2020	320.78	0.83	0.41	161	84	82	345		1
807	A-2	2030	324.68	0.83	0.41	161	83	81	375		1
808	A-2	2040	328.7	0.83	0.41	161	83	81	390		1
809	A-2	2050	332.5	0.83	0.41	161	84	82	390		1
810	A-2	2100	336.9	0.83	0.41	161	84	82	285		1
811	A-5	2110	340.4	0.83	0.41	161	85	82	280		1
812	A-5	2120	344.5	0.83	0.41	161	86	82	243		1
813	A-5	2130	348.5	0.83	0.41	161	90	83	237		1
814	A-5	2140	352.2	0.83	0.41	161	91	83	242		1
815	A-5	2150	356.3	0.83	0.41	161	93	86	269		1
816	A-5	2200	360.190	0.83	0.41	161	89	85	268		
817							$\bar{x}$	84.3	$\bar{x}$=296.8		
818											
819											
820											
821											

• Dry air purge when sampling wet streams

Console ____

Weather ____

822 Remarks ____

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO SODA SPRINGS

Sample Identification Code: MSS-081688-MM111-IN-1

Date 08-16-88

~~XAD Trap~~ #

Filter NO. W-5

Sampling location INLET

Sample type M111

Run number 1

Sample box number

Clean-up person D

Solvent rinses

351.
-
313.6

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	420.6	458.9	-38.3
2	0.1N HNO_3	~100ml	GS	633.8	566.6	67.2
3	0.1N HNO_3	~100ml	MGS	574.2	566.2	8.0
4	N/A	EMPTY	MGS	755.0	486.4	268.6
5	SILICA GEL	~350g	MGS	667.7	657.6	10.10
6						
7						

Total Weight Gain (grams) 313.60

UN I

IMPACTOR FIELD DATA

K = .5

801 (1-3) Plant Name> Monsanto

Sampling Location> outlet B   Sample Ident.> ______

Type of Impactor> ______   Impactor Substrate> ______

802 (1-3) Date 8/17/88 (MMDDYY) Time Start ______ (HHMM) Time Finish ______ (HHMM)

Duct Dimensions ______ x ______ ft. or Diameter ______ ft.

PTCF .84 DGMCF ______   Test Duration ______ min.

803 (1-3) Bar Press. 24.13 "Hg   Static Press. ______ "H_2O

Nozzle Dia. .166 #8 inches   Condensed Water ______ gms

Intake leak rate .0204 cfm   Operator initials ______

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	impactor Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
		1928	10,741								
804	B3	38	14.7	.79	.4		80	79	280		2
805	3	48	18.6	.79	.4		81	81	360		2
806	3	58	22.5	.79	.4		83	82	290		2
807	3	2008	26.4	.79	.4		85	83	245		2
808	3	18	30.3	.79	.4		84	84	222		2
809	3	28	34.1	.79	.4		83	82	221		2
810	D6	38	38.0	.8	.4		82	82	190		2
811	6	48	41.9	.8	.4		83	82	190		2
812	6	58	45.8	.8	.4		83	83	205		2
813	6	2108	49.7	.8	.4		84	83	225		2
814	6	18	53.6	.8	.4		85	84	221		2
815	6	2128	57.33	.8	.4		86	85	222		2
816											
817									X239.25		
818											
819											
820											
821											

• Dry air purge when sampling wet streams

Console ______

Weather ______

822 Remarks ______

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO SODA SPRINGS

Date 08-16-88

Sampling location OUTLET B

Sample type M 111

Run number 1

Sample box number

Clean-up person RFJ

Solvent rinses HNO_3

Sample Identification Code: MSS-081688-MM111-OTB-1

XAD Trap # NA

Filter No. W-2

NOTE: Additional Acid to PR(HNO_3) by mistake

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	-0- EMPTY	M GS	505.1 ~~630.4~~	474.5	30.6
2	0.1 N HNO_3	~100ml	GS	735.2	589.7	145.5
3	0.1 N HNO_3	~100ml	MGS	689.1 ~~524.1~~	598.1	91.0
4	0.1 N HNO_3	~~~100ml~~ EMPTY	MGS	630.4 ~~370.5~~	479.3 ~~522.0~~	151.1
5	SILICA GEL	~350g	MGS	727.0	699.4	27.6
6						
7						

Total Weight Gain (grams) 445.8

RUN 1 c c' 1 @ 7 " Hg [illegible]

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO - SODA SPRINGS

Sampling Location> OUTLET - C Sample Ident.>

Type of Impactor> ANDERSEN Impactor Substrate> GLASS FIBER

802 (1-3) Date 8/17/58 (MMDDYY) Time Start 7.27 (HHMM) Time Finish 9.27 (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter 56" ft.

PTCF ____ DGMCF ____ Test Duration 2 40 HRS min.

803 (1-3) Bar Press. ____ "Hg Static Press. ____ "H_2O

Nozzle Dia. 0.187 (#6) inches Condensed Water ____ gms

Intake leak rate ____ cfm Operator initials CNR

	Pt.	Clock Time	Dry Gas Meter Reading ft^3	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Hot Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804		7.27	790.928								
805	A3	7.37	795.4	2	.38	260	80	80	—	—	2
806	A3	7.47	799.1		.38	293	82	81	—	—	3
807	A3	7.57	803.1		.38	270	83	81	—	—	3
808	A3	8.07	807.1		.38	220	85	82	—	—	3
809	A3	8.17	811.1		.38	215	85	83	—	—	3
810	A3	8.27	815.1		.38	212	85	83	—	—	3
811	A4	8.37	819.1		.38	212	86	84	—	—	3
812	A4	8.47	823.1		.38	213	86	84	—	—	3
813	A4	8.57	827.1		.38	214	87	84	—	—	3
814	A4	9.07	831.1		.38	205	88	85	—	—	3
815	A4	9.17	835.1		.38	202	91	86	—	—	3
816	A4	9.27	839.2		.38	203	95	87	—	—	3
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console $\Delta p = 0.8$ $K = 0.48$

Weather

822 Remarks

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO SODA SPRINGS

Sample Identification Code: MSS-081658-MM111 OTD-1

Date 08-16-88

XAD Trap # NA

Sampling location OUTLET D

Filter No. W-4

Sample type M 111

Run number 1

Sample box number

Clean-up person

Solvent rinses

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	821.60	500.82	320.78
2	0.1N HNO_3	~100ml	MGS	725.00	598.77	126.23
3	0.1N HNO_3	~100ml	GS	631.8	604.8	27.00
4	KNOCKOUT	EMPTY	MGS	467.4	464.24	03.16
5	SILICA GEL	~350g	MGS	743.5	728.9	14.6
6						
7						

Total Weight Gain (grams) 491.77

K= .41 SHEET/2
ΔH= .42 @ A4
.41 @ A5

IMPACTOR FIELD DATA

RUN 1 801 (1-3) Plant Name> [illegible]

Sampling Location> Outlet [illegible] Sample Ident.>

7 Type of Impactor> [illegible] Impactor Substrate>

802 (1-3) Date 5-17-[illegible] (MMDDYY) (4:6) Time Start 19:31 (HHMM) (11:4) Time Finish 21:31 (HHMM) (15:4)

Duct Dimensions ______ (25:3) x ______ (32:3) ft. or Diameter .5[illegible] (39:5) ft.

PTCF ______ (46:5) DGMCF ______ (53:5) Test Duration 120 (60:5) min.

803 (1-3) Bar Press. ______ (4:5) "Hg Static Press. -2.25 (11:5) "H_2O ______ (18)

7 Nozzle Dia. 0.186 (25:5) inches Condensed Water ______ (32:5) gms

Intake leak rate .01 (39:5) cfm Operator initials JAE (46:7)

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	IMPACTOR Hot Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
		19:31	607.329								
804	A-4	19:36	609.42	.84	.42		87	85	325		4.0
805		19:41	611.45				89	86	360		4.0
806		19:46	613.49				89	86	354		4.0
807		19:51	615.55				89	85	336		4.0
808		19:5[illegible]	617.[illegible]0				90	85	323		4.0
809		20:[illegible]1	619.[illegible]				9[illegible]	85	302		4.0
810		20:[illegible]	621.69				90	85	282		4.0
811		20:11	623.74				90	85	268		4.0
812		20:16	625.78				90	85	253		4.0
813		20:21	627.82				90	85	254		4.0
814		20:26	629.86				91	85	268		4.0
815		20:31	631.89				91	85	272		4.0
816	A-6	20:36	633.92	.82	.41		91	85	274		4.0
817		20:41	635.93				91	86	255		4.0
818		20:46	637.94				91	86	241		4.0
819		20:51	639.95				92	86	239		4.0
820		20:56	641.97				94	86	238		4.0
821		21:01	644.00				95	87	235		4.0
	(4:2)	(11:4)	(15:7)	(25:5)	(32:5)	(39:5)	(46:5)	(53:5)	(60:5)	(67:5)	(74:5)

* Dry air purge when sampling wet streams

Console ______

Weather ______

822 Remarks ______

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO

Sample Identification Code:

Date 08-16-88

XAD Trap #

Sampling location OUTLET A

Filter No. W-7

Sample type M 111

Run number 2

Sample box number

Clean-up person

Solvent rinses

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	733.0	478.1	254.9
2	0.1 N HNO_3	~100ml	MGS	700.9	594.3	106.6
3	0.1 N HNO_3	~100ml	GS	631.5	598.6	32.9
4	KNOCKOUT	EMPTY	MGS	484.3	472.1	12.2
5	SILICA GEL	~300g	MGS	698.9	684.8 ~~598.6~~	14.1
6						
7						

Total Weight Gain (grams) 420.7

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO

Sample Identification Code: ____

Date 08-17-88

XAD Trap # ____

Sampling location OUTLET C

FILTER NO. W-9

Sample type M111

Run number 2

Sample box number ____

Clean-up person ____

Solvent rinses ____

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	KNOCKOUT	EMPTY	MGS	760.4	492.9	267.5
2	0.1 N HNO_3	~100 ml	MGS	683.2	594.4	88.8
3	0.1 N HNO_3	~100 ml	GS	648.8	610.7	38.1
4	KNOCKOUT	EMPTY	MGS	500.7	487.9	12.8
5	SILICA GEL	~300g	MGS	~~739.9~~ 729.9	721.4	~~38.5~~ 8.5
6						
7						

Total Weight Gain (grams) ~~445.7~~ 425.7

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant Monsanto

Sample Identification Code: MMS-0817-MMIII-IN-3

Date 8/17/88

XAD Trap # NA

Sampling location Inlet

Filter # ~~15~~ W15 R2

Sample type MMIII

Run number 3

Sample box number NA

Clean-up person RFJ

Solvent rinses HNO_3 (0.1N)

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1 (4th)	none	0	K.O.	462.7	461.2	1.5
2	.1N HNO_3	101	Standard	641.0	575.9	65.1
3	.1N HNO_3	~110 ml	Modified	576.8	569.4	7.4
4 (1st)	none	0	Modified	864.8	497.8	374.0
5	Silica gel	200g	Modified	716.2	704.8	11.4
6						
7						

Total Weight Gain (grams) ~~18~~ 459.4

Run 2

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO - SODA SPRINGS

Sampling Location> INLET Sample Ident.> RUN # 2 MSS-81588-PSD-IN

Type of Impactor> ANDERSON - BUTTON HOOK Impactor Substrate> GLASS FIBER

802 (1-3) Date 08/15/88 (MMDDYY) Time Start 14:50 (HHMM) Time Finish 15:05 (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter 9' (108") ft.

PTCF 0.84 DGMCF 0.9996 Test Duration 15 min.

803 (1-3) Bar Press. (613mm) 24.13 "Hg Static Press. -7.3 "H_2O

Nozzle Dia. 0.187 inches Condensed Water ____ gms

Intake leak rate 0.01 cfm Operator initials MWH / JTW

0.69 × ΔP = ΔH.

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Impactor Hot-Box Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804		0 1450	693.328						250		
805	B-4	7.5 1457	696.64	.80	.55	161	85	84	223°	60°	3.0
806	B-7	15 1505	699.73	.80	.55	161	87	85	291	60°	3.0
807											
808											
809									x̄=257		
810											
811											
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console RAC #5

Weather Nice. ambient 80° PC winds out of S at 10-20

822 Remarks Filter Set "S"

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant Monsanto
Date 8/17/88
Sampling location Outlet B
Sample type MM111
Run number 3
Sample box number
Clean-up person
Solvent rinses 0.1 N HNO_3

Sample Identification Code:
XAD Trap #

filter W 13

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	Modified	820.6	477.4	343.2
2	0.1 N HNO_3	~100	Standard	668.0	594.8	73.2
3	0.1 N HNO_3	~100	Modified	615.3	606.4	8.9
4	none	0	Modified	482.6	480.1	2.5
5	Silica Gel	300 g	Modified	724.1	709.4	14.7
6						
7						

Total Weight Gain (grams) 442.5

RUN 2 SHEET 1/2

IMPACTOR FIELD DATA

K FACTOR = 0.495

801 (1-3) Plant Name> MONSANTO RUN 2

Sampling Location> OUTLET A Sample Ident.> FILTER SET N

Type of Impactor> ANDERSON MK III Impactor Substrate> GLASS FIBER

802 (1-3) Date 08-18-88 (MMDDYY) Time Start 1515 (HHMM) Time Finish ______ (HHMM)

Duct Dimensions ______ x ______ ft. or Diameter ______ ft.

PTCF ______ DGMCF 1.0035 Test Duration ______ min.

803 (1-3) Bar Press. ______ "Hg Static Press. ______ "H_2O

B-3 .75 Nozzle Dia. 0.186 inches Condensed Water ______ gms

B-6 .73 Intake leak rate ______ cfm Operator initials GBR

0.03 cfm @ 4 in Hg ; Leak 0.01 cfm through impingers and probe

	Pt.	1515 Clock Time	439.180 Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Impactor Temp. °F	Cum sample time minutes	L. Vac. in. Hg Gauge
804	B-6	1525	443.2	0.73	0.36	162	88	88	200	10	1
805	B-6	1535	446.5	0.73	0.36	162	89	89	217	20	1
806	B-6	1545	450.4	0.73	0.36	162	91	89	225	30	1
807	B-6	1555	453.9	0.73	0.36	162	92	90	231	40	1
808	B-6	1604	456.990	STOPPED		– PULLED IMPACTOR OUT				49	
809	~~B-6~~	STACK TEMP MEASUREMENTS									
810		1625				156					
811		1630				157					
812		1641				142					
813	STARTED @ 1653			DGM = 479.320							
814	B-6	1703	483.05	0.73	0.36	[illegible]	96	93	233	59	1
815	B-6	1713	486.7	0.73	0.36	156	95	93	261	69	1
816	B-6	1723	490.4	0.73	0.36	157	95	93	247	79	1
817	B-6	1734	494.5	0.73	0.36	157	94	93	237	90	1
818	B-3	1744	498.4	0.75	0.37	157	94	93	236	100	2
819	B-3	1754	502.6	0.75	0.37	157	92	92	242	110	2
820	B-3	1804	506	0.75	0.37	157	92	91	235	120	2
821	B-3	1814	509.60	0.75	0.37	157	92	92	237	130	2

* Dry air purge when sampling wet streams

~~Console~~ ID FAN ON OUTLET D WENT DOWN ~1600. PULLED PROBE

Weather PLACED VERTICALLY AND MAINTAINED TEMP DURING PURGE

* STARTED ACTUAL STACK TEMP MEASUREMENTS @ 1653

822 Remarks ______

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant Monsanto

Date 8/17/88

Sampling location Outlet D

Sample type MMIII

Run number 3

Sample box number

Clean-up person W2 et. al

Solvent rinses 0.1N HNO_3

Sample Identification Code:

XAD Trap #

filter W14

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	Modified	816.8	505.8	311.0
2	0.1N HNO_3	~100 g	Modified	721.5	600.2	121.3
3	0.1N HNO_3	~100 g	Standard GS	609.3	593.1	16.2
4	none	0	Modified	469.0	465.8	3.2
5	Silica gel	250	Modified	699.9	688.3	11.6
6						
7						

Total Weight Gain (grams) 463.3

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO

Date 8/18/88

Sampling location Outlet A

Sample type MM III

Run number 4

Sample box number

Clean-up person

Solvent rinses 0.1 N HNO_3

Sample Identification Code:

XAD Trap #

filter W-16

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	MOD	791.0	478.2	312.8
2	0.1 N HNO_3	~100	STD	599.7	593.5	6.2
3	0.1 N HNO_3	~100	MOD	674.5	616.5	58.0
4	none	0	MOD	475.2	473.8	1.4
5	Silica Gel	300	MOD	731.0	720.3	10.7
6						
7						

Total Weight Gain (grams) 389.1

RUN 2

IMPACTOR FIELD DATA

801 (1-3) Plant Name> Monsanto

Sampling Location> outlet B Sample Ident.> AG

Type of Impactor> andersen Impactor Substrate> ______

802 (1-3) Date 8/18/88 (MMDDYY) Time Start 1445 (HHMM) Time Finish ______ (HHMM)

Duct Dimensions ______ x ______ ft. or Diameter ______ . ______ ft.

PTCF .84 DGMCF .9943 Test Duration 180 min.

803 (1-3) Bar Press. ______ "Hg Static Press. ______ "H_2O

Nozzle Dia. .186 inches Condensed Water ______ gms

Intake leak rate .018@4" cfm Operator initials Flz

	Pt.	1445 Clock Time	0.900 Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Outlet °F	Impactor Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804	A 3	55	4.6	.75	.38		84	83	332		2
805	A 3	1505	8.5	.75	.38		86	84	345		2
806	A 3	15	12.2	.75	.38		88	85	330		2
807	A 3	25	16.1	.75	.38		92	87	321		2
808	A 3	35	20.0	.75	.38		93	90	310		2
809	A 3	45	23.7	.75	.38		95	91	297		2
810	A 2	55	27.5	.75	.38		96	93	296		2
811	A 2	1605	31.450	.75	.38		97	94	296		2
812	A 2	~~1651~~	~~35.490~~	nozzle blocked			by turkey		bag		
813	A 2	1656	38.850		restart						
814	A 3	1706	42.8	.75	.38	159	86	84	320		2
815	A 2	16	46.6	.75	.38	158	87	86	317		2
816	A 2	26	50.5	.75	.38	158	91	88	313		2
817	A 2	36	54.3	.75	.38	159	93	90	294		2
818	A 2	46	58.2	.75	.38	157	94	92	271		2
819	A 2	56	61.9	.75	.38	157	92	92	259		2
820	A 2	1806	65.6	.75	.38	158	92	91	265		2
821	A 2	16	69.5	.75	.38	158	91	90	267		2

• Dry air purge when sampling wet streams

Console # 12

Weather ______

822 Remarks ______

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO

Date 8/18/88

Sampling location OUTLET C

Sample type MM III

Run number 4

Sample box number

Clean-up person

Solvent rinses 0.1 N HNO_3

Sample Identification Code:

XAD Trap #

filter W-18

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	MOD	832.7	494.0	338.7
2	0.1 N HNO_3	~100	STD	657.8	590.3	67.5
3	0.1 N HNO_3	~100	MOD	619.8	610.5	9.3
4	none	0	MOD	489.5	487.8	1.7
5	Silica Gel	300	MOD	727.6	716.7	10.9
6						
7						

Total Weight Gain (grams) 428.1

SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8-18-88
SAMPLING LOCATION ..OUTLET C
SAMPLE TYPE ....PSD
RUN NUMBER 2.00
OPERATOR ....CMR
AMBIENT TEMPERATURE   84.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.60
FILTER NUMBER W-9
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.010
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.187
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER ....NA
METER BOX NUMBER RAC-8
METER DELTA H@ 1.69
K FACTOR 0.48
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P 0.80
DRY/GAS METER FACTOR (Y) ...   0.99650
FINAL LEAK CHECK ....   0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Orifice Pressure Differential (del H, in. H2O) Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	2:45	882.540											
B2	12.00		887.100	0.80	158	0.38	0.38		344		86.00	83.00		3.00
B2	20.00		890.200	0.80	158	0.38	0.38		359		87.00	84.00		3.00
B2	30.00		894.230	0.80	158	0.38	0.38		380		90.00	85.00		3.00
B2	40.00		898.300	0.80	158	0.38	0.38		391		93.00	87.00		3.00
B2	50.00		902.400	0.80	158	0.38	0.38		394		93.00	90.00		3.00
B2	60.00		906.540	0.80	158	0.38	0.38		361		97.00	91.00		3.00
B2	70.00		910.720	0.80	158	0.38	0.38		327		98.00	93.00		3.00
B2	78.00	4:03	914.070	0.80	158	0.38	0.38		302		100.00	95.00		3.00
STOP			933.915											
B3	84.00	5:00	936.120	0.80	158	0.38	0.38		331		94.00	94.00		3.00
B3	90.00		938.500	0.80	158	0.38	0.38		311		94.00	94.00		3.00
B3	100.00		942.650	0.80	158	0.38	0.38		303		97.00	94.00		3.00
B3	110.00		946.800	0.80	158	0.38	0.38		254		98.00	95.00		3.00
B3	120.00		950.900	0.80	158	0.38	0.38		228		101.00	96.00		3.00
B3	130.00		955.100	0.80	158	0.38	0.38		243		100.00	98.00		3.00
B3	140.00		959.230	0.80	158	0.38	0.38		258		97.00	96.00		3.00
B3	150.00		963.340	0.80	158	0.38	0.38		252		96.00	96.00		3.00
B3	160.00		967.400	0.80	158	0.38	0.38		240		94.00	92.00		3.00
B3	170.00		971.400	0.80	158	0.38	0.38		295		94.00	92.00		3.00
B3	180.00	6:36	975.500	0.80	158	0.38	0.38		251		92.00	91.00		3.50
END														

RADIAN CORPORATION

MOISTURE RECOVERY FORM FOR METHODS 4, 5, 6

Plant MONSANTO Sample Identification Code: ______

Date 8/19/98 XAD Trap # ______

Sampling location OUTLET D

Sample type MM III

Run number 5

filter # W21

Sample box number ______

Clean-up person [illegible] / FW

Solvent rinses 0.1 N HNO_3

Impinger Number	Impinger Solution	Amount of Solution (g)	Impinger Tip Configuration	Impinger Weight (grams) Final	Initial	Weight Gain
1	none	0	MOD	754.2	504.0	250.2
2	0.1 N HNO_3	~100	STD	751.3	603.0	148.3
3	0.1 N HNO_3	~100	MOD	648.5	607.1	41.4
4	None	0	MOD	471.0	465.0	~~41.0~~ 6.0
5	Silica Gel	300	MOD	737.2	724.0	13.2
6						
7						

Total Weight Gain (grams) ~~497.1~~ ~~445.9~~ 459.1 ✓

SAMPLING DATA

PLANT ....MONSANTO - SODA SPRINGS
DATE 8-18-88
SAMPLING LOCATION ..OUTLET D
SAMPLE TYPE ....PSD
RUN NUMBER 2.00
OPERATOR ....JAE
AMBIENT TEMPERATURE 82.00
BAROMETRIC PRESSURE 24.13
STATIC PRESSURE (Ps) -0.25
FILTER NUMBER 20
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK . 0.008
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......96", GLASS
HEIGHT OF LOCATION(ft)...... 69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 4.00
METER BOX NUMBER RAC-4
METER DELTA H@ 1.78
K FACTOR 0.50
PROBE HEATER SETTING 250.00
HEATER BOX SETTING 260.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ... 1.00750
FINAL LEAK CHECK .... 0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
----------	0.00	14:50	703.621											
B4	10.00		707.860	0.88	159	0.44	0.44		320		93.00	93.00		2.00
B4	20.00		712.080	0.88	159	0.44	0.44		315		95.00	91.00		2.00
B4	30.00		716.320	0.88	159	0.44	0.44		285		97.00	91.00		2.00
B4	40.00		720.570	0.88	159	0.44	0.44		271		100.00	92.00		2.00
B4	50.00		724.860	0.88	159	0.44	0.44		269		99.00	93.00		2.00
B4	60.00		729.090	0.88	159	0.44	0.44		271		99.00	93.00		2.00
B4	69.00	15:58.3	732.760	0.88	159	0.44	0.44		272		100.00	93.00		2.00
STOP		16:50	756.400											
B4	69.00	17:00	760.610	0.88	160	0.44	0.44		290		100.00	93.00		2.00
B4	74.00		764.850	0.88	159	0.44	0.44		276		100.00	94.00		2.00
B4	84.00		767.000	0.88	161	0.44	0.44		260		103.00	95.00		2.00
B3	94.00	17:25	771.240	0.88	161	0.44	0.44		260		102.00	95.00		2.00
B3	104.00		775.770	0.88	161	0.44	0.44		266		102.00	95.00		2.00
B3	114.00		779.770	0.88	161	0.44	0.44		267		104.00	96.00		2.00
B3	124.00		784.030	0.88	161	0.44	0.44		262		98.00	95.00		2.00
B3	134.00		788.280	0.88	160	0.44	0.44		260		98.00	94.00		2.00
B3	144.00		792.630	0.88	160	0.44	0.44		260		99.00	94.00		2.50
B3	154.00		796.900	0.88	160	0.44	0.44		260		99.00	94.00		2.00
B3	164.00		801.200	0.88	160	0.44	0.44		259		100.00	95.00		2.50
B3	174.00	18:44	805.080	0.88	160	0.44	0.44		259		98.00	94.00		3.00
END														

APPENDIX G.2 - Orsat

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto
DATE 8/16/88
SAMPLING TIME (24-hr CLOCK) 16:28 → 16:42
SAMPLING LOCATION Outlet A
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Integrated
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE
OPERATOR GDR

COMMENTS: Started at 1628 } integrated bag
ended at 16:42 } sample

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	17.2	17.2	0.4 / 17.7	17.3	0.6 / 17.9	17.3	17.3	44/100	
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	23.8	6.6	26.2	8.5	26.3	8.4	8.45	32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							0	28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)							74.25	28/100	
								TOTAL	

EPA (Dur) 230
4/72

Checked GJR ✓ ✓

DRY MOLECULAR WEIGHT DETERMINATION

PLANT [redacted]ANTO
DATE [redacted]7-88
SAMPLING TIME (24-hr CLO[redacted]:40 11:15
SAMPLING LOCATION [redacted]T Run 2
SAMPLE TYPE (BAG, INTEG[redacted]OUS)
ANALYTICAL METHOD [redacted] ORSAT
AMBIENT TEMPERATURE [redacted] 80 F
OPERATOR [redacted]. OLYN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	48	14.2	[illegible]	[redacted]	13.9	13.8	13.9 ✓	44/100	6.12
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	22 22.1 21.7	7.5	21.6	[redacted]	21.4	7.6	7.60	32/100	2.45
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		78.3		78.4	[illegible]	78.6	78.43	28/100	21.96
								TOTAL	30.53 ✓

EPA (Dur) 230
4/72

Run 3

IMPACTOR FIELD DATA

3

801 (1-3) Plant Name> MONSANTO – SODA SPRINGS

Sampling Location> INLET Sample Ident.> MSS-081989-PSD-IN-4

Type of Impactor> ANDERSON W/PRECUTTER Impactor Substrate> GLASS FIBER - AD

802 (1-3) Date 081989 (MMDDYY) Time Start 12:00 (HHMM) Time Finish 12:10 (HHMM)

Duct Dimensions ____ x ____ ft. or Diameter 9' ft.

PTCF 0.84 DGMCF 0.9996 Test Duration 10 min.

803 (1-3) Bar Press. 6/3 "Hg Static Press. -7.3" "H_2O

Nozzle Dia. 0.187 inches Condensed Water ____ gms

Intake leak rate 0.001 cfm Operator initials MWH

	Pt.	Clock Time	Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	Stack Temp. °F	Dry Gas Meter Temperature Inlet °F	Dry Gas Meter Temperature Outlet °F	Wet Gas Temp. °F	Last Impinger Temp. °F	L. Vac. in. Hg Gauge
804		0	709.128								
805	B4	5	711.35	0.80	0.55	161	88	87	223 ST.	60°	2.5
806	B7	10	713.21	0.80	0.55	161	89	87	231	60°	3.0
807									252		
808											
809											
810											
811											
812											
813											
814											
815											
816											
817											
818											
819											
820											
821											

* Dry air purge when sampling wet streams

Console ____

Weather ____

822 Remarks ____

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto Soda Sp

DATE 8-17-88

SAMPLING TIME (24 hr CLOCK) 9:40 - 11:15

SAMPLING LOCATION OT Stack B run 2

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 78

OPERATOR R. OLIN

COMMENTS: No good — Bag tube was loose. [use ~~any~~ values from Run 2 Outlet D]

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	.2 / 0.3							44/100	
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)								32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)								28/100	
								TOTAL	N/G

EPA (Dur) 230
4/72

RUN 3

SHEET 1 OF 2

IMPACTOR FIELD DATA

801 (1-3) Plant Name> MONSANTO

Sampling Location> OUTLET A Run 3   Sample Ident.> FILTER SET AA

Type of Impactor> ANDERSON MK III   Impactor Substrate> Glass fiber

802 (1-3) Date 04-19-88 (MMDDYY)   Time Start 1305 (HHMM)   Time Finish ______ (HHMM)

Duct Dimensions ______ x ______ ft. or Diameter ______ ft.

K^2 K^6

PTCF ______   DGMCF 1.0035   Test Duration ______ min.

803 (1-3) Bar Press. ______ "Hg   Static Press. ______ "H_2O

ΔP = 0.85

Nozzle Dia. 0.286 inches   Condensed Water ______ gms

Intake leak rate ______ cfm   Operator initials GDRiley

0.01 cfm @ 15 in.   K = 0.493

	Pt.	305 Clock Time	535.610 Dry Gas Meter Reading ft³	ΔP in. H_2O	ΔH in. H_2O	2 Stack Temp. °F	Dry Gas Meter Temperature 5 Inlet °F	6 Outlet °F	Impactor 1 Hot Box Temp. °F	Cumulative Sample Time	L. Vac. in. Hg Gauge
804	A-6	1315	539.7	0.85	0.42	163	85	82	350	10	1
805	A-6	1325	544.0	0.85	0.42	163	85	87	335	20	1
806	A-6	1335	548.1	0.85	0.42	158	88	85	293	30	1
807	A-6	1345	554.3	0.85	0.42	158	88	85	262	40	1
808	A-6	1355	557.0	0.85	0.42	159	90	91	250	50	1
809	A-6	1405	561.5	0.85	0.42	158	93	88	255	60	1
810	A-6	1415	565.1	0.85	0.42	157	92	89	257	70	1
811	A-6	1425	569.19	0.85	0.42	157	94	89	257	80	1
812	A-6	1435	573.3	0.85	0.42	157	91	90	258	90	1
813	A-6	1445	577.4	0.85	0.42	157	91	89	259	100	1
814	A-6	1455	581.42	0.85	0.42	157	92	89	258	110	1
815	A-6	1505	585	0.85	0.42	157	92	90	257	120	1
816	A-2	1515	589.5	0.85	0.42	157	91	90	253	130	1
817	A-2	1525	593.6	0.85	0.42	157	91	89	247	140	1
818	A-2	1535	597.6	0.85	0.42	157	91	89	244	150	2
819	A-2	1545	601.7	0.85	0.42	157	89	91	250	160	2
820	A-2	1555	605.1	0.85	0.42	158	91	85	255	170	2
821	A-2	1605	609.9	0.85	0.42	158	93	90	259	180	2

* Dry air purge when sampling wet streams

Console ______

Weather ______

822 Remarks ______

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto Soda Sp.
DATE 8-17-88
SAMPLING TIME (24-hr CLOCK) 9:40 - 11:15
SAMPLING LOCATION OT Stack O run 2
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD ORSAT
AMBIENT TEMPERATURE 76
OPERATOR R. OLIN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	-.2 ~~20.2~~ 20.1 20.1	19.9	-.4 20.1 20.2 19.8	19.8			19.85	44/100	8.734
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	25.6 26.9 27.2 26.8	6.9	26.9 27.1 26.7	6.9			6.9	32/100	2.208
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.2		73.3			73.25	28/100	20.51
								TOTAL	31.452

EPA (Dur) 230
4/72

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SAMPLING DATA

PLANT ....MONSANTO-SODA SPRINGS
DATE 8/19/88
SAMPLING LOCATION ..OUTLET B
SAMPLE TYPE ....PSD
RUN NUMBER 3.00
OPERATOR ....JAE
AMBIENT TEMPERATURE   75.00
BAROMETRIC PRESSURE   24.17
STATIC PRESSURE (Ps)   -0.25
FILTER NUMBER N-12
MIN.SAMPLE VOLUME ..
INITIAL LEAK CHECK .   0.016
XAD TRAP NUMBER ....

PROBE LENGTH AND TYPE ......12', STEEL
HEIGHT OF LOCATION(ft)......   69.00
NOZZLE I.D. 0.186
ASSUMED MOISTURE, % 39.00
SAMPLE BOX NUMBER 3.00
METER BOX NUMBER RAC-3
METER DELTA H@ 1.78
K FACTOR 1.63
PROBE HEATER SETTING 350.00
HEATER BOX SETTING 360.00
REFERENCE DEL P ....N/A
DRY/GAS METER FACTOR (Y) ...   0.99430
FINAL LEAK CHECK ....   0.014 @ 5" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT

Traverse Point Number	Sampling Time Min.	Clock Time (24-hr Clock)	Gas Meter Reading (Vm), cu.ft	Velocity Head (del Ps), in. H2O	Stack Ts, in std. deg. F	Orifice Pressure Differential (del H, in. H2O) Desired	Actual	Temperature: deg. F Probe	Filter Skin	Adsorbent Trap	Dry Gas Meter Inlet (Tm in)	Outlet (Tm out)	Impinger Exit	Pump Vacuum in. Hg
	0.00	13:15	83.079											
B6	10.00		87.200	0.89	159	0.45	0.45		289		81.00	80.00		1.50
B6	20.00		91.300	0.89	159	0.45	0.45		280		83.00	82.00		1.50
B6	30.00		95.400	0.89	157	0.45	0.45		243		85.00	83.00		1.50
B6	40.00		99.300	0.89	158	0.45	0.45		252		89.00	85.00		1.50
B6	50.00		103.300	0.89	158	0.45	0.45		231		92.00	87.00		1.50
B6	60.00		107.400	0.89	158	0.45	0.45		243		92.00	88.00		1.50
B6	70.00		111.500	0.89	158	0.45	0.45		263		93.00	89.00		1.50
B6	80.00		115.600	0.89	158	0.45	0.45		227		94.00	91.00		1.50
B6	90.00		119.400	0.89	158	0.45	0.45		268		94.00	92.00		1.50
B6	100.00		123.200	0.89	159	0.45	0.45		263		95.00	93.00		1.50
B6	110.00		127.200	0.89	159	0.45	0.45		233		94.00	93.00		2.00
B6	120.00		131.400	0.89	159	0.45	0.45		290		93.00	93.00		2.00
B3	130.00		135.600	0.89	158	0.45	0.45		274		94.00	92.00		2.00
B3	140.00		139.800	0.89	158	0.45	0.45		247		95.00	93.00		2.00
B3	150.00		143.800	0.89	158	0.45	0.45		223		93.00	92.00		2.00
B3	160.00		147.600	0.89	158	0.45	0.45		280		92.00	91.00		2.00
B3	170.00		151.600	0.89	158	0.45	0.45		265		95.00	93.00		2.00
B3	180.00		159.600	0.89	159	0.45	0.45		250		96.00	94.00		2.00
B3	190.00		159.500	0.89	159	0.45	0.45		262		93.00	92.00		2.50
B3	200.00		163.500	0.89	158	0.45	0.45		265		92.00	89.00		2.50
B3	210.00		168.000	0.89	158	0.45	0.45		280		91.00	90.00		3.00
B3	220.00		171.800	0.89	159	0.45	0.45		248		94.00	91.00		3.00
B3	230.00		175.900	0.89	158	0.45	0.45		226		94.00	92.00		3.00
B3	240.00	17:15	179.730	0.89	158	0.45	0.45		234		94.00	92.00		3.00
END														

''''

checked GDR ✓

DRY MOLECULAR WEIGHT DETERMINATION

VOID – Leaky pump/ condenser system prior to test. Switched to squeeze bulb. for Run #4

PLANT: MONSANTO [illegible] SS
DATE: 8 – [illegible]
SAMPLING TIME (24-hr CLOCK): 14:00 – 16:00
SAMPLING LOCATION: IN – Run 3
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS):
ANALYTICAL METHOD: ORSAT
AMBIENT TEMPERATURE: 75
OPERATOR: [illegible] Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	9.2 / 9.3 / 10.6	9.3	9.4	9.3			9.3	44/100	4.09
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	23.6 / 23.8 / 24.0	14.8	23.3 / 24 / 23.9	14.6			14.7	32/100	4.70
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		75.9		76.1			76.0	28/100	21.28
								TOTAL	30.07

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SC

DATE 8-17-88

SAMPLING TIME (24 hr CLOCK) 14:00 - 16:00

SAMPLING LOCATION OT - A run 3

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 75 F

OPERATOR R. OLIN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	-.7 20.0	19.3	-.0 19.0	19.0	-.2 18.8	18.8	19.03	44/100	8.37
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.2 27.6 22.7 27.0	7.7	26.9 27.2	8.2	27 27.2	8.2 8	8.03 8	32/100	2.57 8
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73		72.8		73.0	72.93 8	28/100	20.42 8
								TOTAL	31.36 8

EPA (Dur) 230
4/72

Checked GDR ✓

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS

DATE: 8-17-88

SAMPLING TIME (24-hr CLOCK): 1400-1600

SAMPLING LOCATION: OT B run 3

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS):

ANALYTICAL METHOD: ORSAT

AMBIENT TEMPERATURE: 75

OPERATOR: R. OLIN

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	-.4 19.7 19.8	19.4	-.7 19.8 ~~20.0~~	19.3			19.35	44/100	8.51
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.9 28.2 27.8	8.4	28.2 28.4 27.7	8.4			8.40	32/100	2.69
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.2		72.3			72.25	28/100	20.23
								TOTAL	31.43

EPA (Dur) 230
4/72

Checked DWR ✓

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS

DATE 8-17-88

SAMPLING TIME (24-hr CLOCK) 14:00 - 16:00

SAMPLING LOCATION O T C run 3

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 75 F

OPERATOR R. OLIN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	19.4	19.0	19.8	18.9			18.95	44/100	8.34
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.3 / 27.2 / 26.9	7.9	27.4 / 27.7 / 26.8	7.9			7.90	32/100	2.53
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.1		73.2			73.15	28/100	20.48
								TOTAL	31.35

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS

DATE 8-17-88

SAMPLING TIME (24 hr CLOCK) 14:00 - 16:00

SAMPLING LOCATION OT D - run 3

SAMPLE TYPE (BAG, ~~INTEGRATED~~, CONTINUOUS)

ANALYTICAL METHOD ORSAT

AMBIENT TEMPERATURE 78 F

OPERATOR R. OLIN

COMMENTS: CO2 reagent changed before run 1

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	-.4 19.3	18.9	-.4 14.5	14.1	.2 20	19.8	18.93	44/100	8.33
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.8 26.5 26.1	72	27.4 27.9 27.5	9.4	26.4 27.3 27.1	7.3	7.96	32/100	2.55
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.9		72.6		72.9	73.10	28/100	20.47
								TOTAL	31.35

EPA (Dur) 230
4/72

Checked GDK ✓ ✓

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS
DATE: 8-18-88
SAMPLING TIME (24 hr CLOCK): 10:00
SAMPLING LOCATION: INLET Dum 4 Gas #1
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD: ORSAT
AMBIENT TEMPERATURE: 70 F
OPERATOR: R. OLIN

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb mole
CO_2	.3 20.2 20.2	19.9	.1 20.0 20.0	~~20.1~~ 19.9			~~20.0~~ 19.9	44/100	8.76
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.2 26.3 26.0	6.1	26.2 26.2 26.1	6.2			6.15	32/100	1.98
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		74.0		73.9			73.95	28/100	20.71
								TOTAL	31.45

EPA (Dur) 230
4/72

Checked GDR

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS

DATE 8-18-88

SAMPLING TIME (24 hr CLOCK) 11:30

SAMPLING LOCATION INLET Run 4 bag #2

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)

ANALYTICAL METHOD ORsat

AMBIENT TEMPERATURE 75 F

OPERATOR R. Olin

COMMENTS: Integrated during run 1

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	18.9 21.4 21.4	21.4	3 21.8	21.5	.6 22 22.1	21.5	21.5	44/100	9.46
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.3 26.4	5.0	27.8 27.5	6.0	28.0 27.1 27.5	6.0	5.67	32/100	1.81
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	20.39
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.6		72.5		72.5	72.83	28/100	
								TOTAL	31.66

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS
DATE 8-18-88
SAMPLING TIME (24 hr CLOCK) 11:00
SAMPLING LOCATION OUT Stack A run 4
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 78 F
OPERATOR R. Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	-.2 19.8 19.8	19.6	-.4 20.2 20.3	19.9			19.75	44/100	8.69
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.2 27.4 27.2	7.6	27.8 27.9 27.5	7.6			7.6	32/100	2.43
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	20.34
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.8		72.5			72.65	28/100	
								TOTAL	31.46

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS
DATE: 8-18-88
SAMPLING TIME (24-hr CLOCK): 11:00
SAMPLING LOCATION: OUT STack B run 4
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD: Orsat
AMBIENT TEMPERATURE: 80 F
OPERATOR: R. Olin

COMMENTS: Run 1 – leak in orsat Tube

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	.6 31.1 31.2	30.6	.6 20.4 20.5	19.9	.6 20.8 20.8	20.2	20.05	44/100	8.82
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	28.0 28.3 27.7	7.1	27.9 28.0 27.4	7.5	28.0 28.1 27.5	7.3	7.40	32/100	2.37
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.3		72.6		72.5	72.55	28/100	20.31
								TOTAL	31.50

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS
DATE 8-18-89
SAMPLING TIME (24 hr CLOCK) 11:00
SAMPLING LOCATION OUT Stack C run 4
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 78F
OPERATOR R. Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	-.4 20.1 20.1	20.0	-.0 19.8 19.8	19.8			19.9	44/100	8.76
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.5 27.7 27.3	7.3	27.2 27.2	7.4			7.35	32/100	2.35
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.7		72.8			72.75	28/100	20.37
								TOTAL	31.48

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS
DATE: 8-18-88
SAMPLING TIME (24-hr CLOCK): 11:00 –
SAMPLING LOCATION: OUT stack D run 4
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD: Orsat
AMBIENT TEMPERATURE: 80 F
OPERATOR: R. Olin

COMMENTS:

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	.2 20.2 20.1	20.2	.5 20.4 20.5	20.0			20.10	44/100	8.84
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	27.4 27.6 27.4	~~6.9~~ 7.2	27.5 27.7 27.2	7.2			~~20.5~~ 7.2	32/100	2.304 ~~2.56~~
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		72.6		72.8			72.7	28/100	20.356
								TOTAL	31.5

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT Monsanto SS
DATE 8-19-88
SAMPLING TIME (24 hr CLOCK) ~~[illegible]~~ 11:00
SAMPLING LOCATION ~~[illegible]~~ outlet D
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS)
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE ~~[illegible]~~ 80 F
OPERATOR R. Olin

COMMENTS:
run 5 + PSD 3
Bag #1

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	.8 15.8 15.8	15.0	.6 15.6 15.6	15.1			15.05	44/100	6.62
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	25.6 25.8 25.0	10.0	25.4 25.7 25.2	10.1			10.05	32/100	3.22
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		75.0		74.8			74.9	28/100	20.97
								TOTAL	30.81

EPA (Dur) 230
4/72

DRY MOLECULAR WEIGHT DETERMINATION

PLANT: Monsanto SS
DATE: 8-19-88
SAMPLING TIME (24-hr CLOCK): ~~[illegible]~~ 16:00
SAMPLING LOCATION: Outlet D run 5
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS):
ANALYTICAL METHOD: Orsat
AMBIENT TEMPERATURE: 80 F
OPERATOR: R. Olin

COMMENTS:

bag #2

repaired leak in O2 valve after run 2
leaky bag — run 3

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d, lb/lb-mole
CO_2	7.8 13.1 13.4	16.6	7.8 17.2 17.2	17.0	7.6 11.4 11.8	10.8	16.8	44/100	7.39
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	26.8 27.0 26.2	9.6	28.4 28.7 28.5	11.5	28.8 24.5 24.7 24.1	13.3	10.55	32/100	3.38
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)								28/100	
N_2 (NET IS 100 MINUS ACTUAL CO READING)		73.8		71.5		75.9	72.65	28/100	20.34
								TOTAL	31.11

EPA (Dur) 230
4/72

APPENDIX H - MM 111 ANALYTICAL WEIGHTS

RADIAN CORPORATION

METHOD 5 ANALYSIS DATA SHEET

Client EMB Phos.
Plant Monsanto
Sample Type [illegible]

Run # ______
Date [illegible]
Technician [illegible]
Sheet ____ of ____

Run #	Sample ID#	Sample Vol. ml	Blank Corr. ml	Tare Weight (g)	Final Weight (g)	Sample Weight (g)	Comments
OTA1	W1			6165	.6284 .6278 .6254	.0119	
OTB1	W2			6193	.6342 .6333 .6340	.0147	
OTC1	W3			6166	.6261 .6252 .6261	.0095	
OTD1	W4			.6157	.6306 .6299 .6297	.0110	
IN1	W5			.6279	.9946 .9942	.3663	
OTB2	W6			6257	.6422 .6421	.0164	
OTA2	W7			6190	.6327 .6320 .6317	.0127	
OTD2	W8			6137	.6246 .6250	.0113	
OTC2	W9			6190	.6280 .6278	.0088	
INO2	W10			.6201	1.0807 1.0804	.4603	
OTC3	W11			.6177	.6267 .6264	.0087	

RADIAN CORPORATION

METHOD 5 ANALYSIS DATA SHEET

Client: ZMB-Phos.
Plant: Monsanto
Sample Type: FM/Rad.

Run #:
Date: 8/16 → 8/19
Technician: [illegible]
Sheet ___ of ___

Run #	Beaker Sample ID#	Sample Vol. ml	Blank Corr. ml	Tare Weight (g)	Final Weight (g)	Sample Weight (g)	Blank corrected ~~Comments~~
OTA1	1	200		111.4158	111.4286 111.4274 111.4278	.0120	.0118
OTB1	2	225		111.5318	111.5370 111.5372	.0054	.0052
OTC1	3	200+ 75		110.8546	110.8613 110.8609	.0063	.0060
OTD1	4	200+ 75		107.3690	107.3740 107.3740	.0043	.0040
IN1	5	175		109.9492	109.9829 109.9830	.0338	.0336
OTA2	6	200+ 140		110.3183	110.3275 110.3276	.0093	.0090 ✓
OTB2	7	200+ 130		107.1908	107.2003 107.2000	.0092	.0089 ✓
OTC2	8	200+ 125+ 50		106.9175	106.9344 106.9336 106.9333	.0158	.0154 ✓
OTD2	9	200		105.6585	105.6665 105.6659 105.6657	.0072	.0070 ✓
IN2	10	200+ 125+ 75		109.9441	110.0205 110.0185 110.0180	.0739	.0735 ✓
Blank	11	200		111.2847	111.2849 111.2856 111.2849	.0002	correction factor = $\frac{.0002g}{200ml} = 1\times10^{-6}$ g/ml

RADIAN CORPORATION

METHOD 5 ANALYSIS DATA SHEET

Client Enviro-Plus
Plant Monsanto
Sample Type PM/Rab

Run # ____
Date ____
Technician ____
Sheet ____ of ____

from Log

Run #	Sample ID#	Sample Vol. ml	Blank Corr. ml	Tare Weight (g)	Final Weight (g)	Sample Weight * (g)	Comments
OTA3	W12			.6276	.6387 .6387	.0111	
OTB3	W13			.6341	.6493 .6496 .6493	.0152	
OTD3	W14			.6304	.6417 .6419	.0113	0.0115
IN3	W15			.6291	1.0220 ~~1.022~~04 1.0218	.3927	
OTA4	W16			.6212	.6435 .6437	~~.00~~ .0125	
OTB4	W17			.6358	.6518 .6516	.0158	
OTC4	W18			.6274	.6367 .6366	.0092	Glass in filter holder during clean up
IN4	W19			.6299	1.0661 1.0650 1.0650	.4351	
~~OTD4~~ OTD4	W20			.6338	.6466 .6467	.0129	
OTD5	W21			.6247	.6358 .6357	.0110	

RADIAN CORPORATION

METHOD 5 ANALYSIS DATA SHEET

Client Monsanto EMB
Plant Monsanto
Sample Type PM/Rad

Run #
Date 8/16→8/19
Technician
Sheet ___ of ___

from Log

Run #	Beaker Sample ID#	Sample Vol. ml	Blank Corr. ml	Tare Weight (g)	Final Weight (g)	Sample Weight (g)	Blank Corrected ~~Comments~~
OTA3	12	200+ 100		109.9012	109.9124 109.9126	.0114	.0111
OTB3	13	200+ 125+ 50		106.8373	106.8501 106.8504	.0128	.0124
OTC3	14	200+ 50		111.1520	111.1667 111.1663	.0143	.0141
OTD3	15	200+ 125		104.9867	104.9949 105.0035 104.9945	.0078	.0075
IN3	16	200+ 75		108.7483	108.8746 108.8721 108.8722	.1239	.1236
OTA4	17	~~250~~ 200+ 100+ 50		107.9770	107.9916 107.9917	.0147	.0144
OTB4	18	200+ 100+ 50		109.6478	109.6560 109.6557	.0079	.0076
OTC4	19	200+ 125+ 100		108.7432	108.7567 108.7566	.0134	.0130
OTD4	20	200+ 100+ 150		109.2515	109.3238 109.3240	.0725	.0721
IN4	21	200+ 100+ 100		105.2189	105.3420 105.3401 105.3399	.1210	~~0~~ 0.1208
ID5	22	200+ 200		105.4754	105.4982 105.4977	.0223	.0219

RADIAN CORPORATION

METHOD 5 ANALYSIS DATA SHEET

Client EMB Phos
Plant Monsanto
Sample Type

Run #
Date
Technician
Sheet ___ of ___

Run #	Sample ID#	Sample Vol. ml	Blank Corr. ml	Tare Weight (g)	Final Weight (g)	Sample Weight (g)	Comments
IN 02 PSD Nozzle Rinse	23	25		106.2211 ~~106.2204~~	106.2243 106.2234		

Project No.______
Book No. 21087 TITLE Beaker tare weights - Monsanto

From Page No. __

Beaker #	Tare (8/16) 0915	(8/16) 1930	(8/17-1030)	1800	8/18 1300
1	111.4160	111.4157	111.4158		
2	111.5617	111.5311	111.5318		
3	110.8550	110.8540	110.8546		
4	107.3697	107.3694	107.3697		
5	109.9493	109.9492	109.9492		
6			110.3194	110.3186	110.3183
7			107.1914	107.1908	107.1908
8			106.9178	106.9175	
9			105.6589	105.6575	105.6585
10			109.9445	109.9439	109.9441
11			111.2952	111.2949	111.2947
12			109.7022	109.9013	109.9012
13			106.8390	106.8383	106.8378
14			111.1524	111.1520	
15			104.9876	104.9864	104.9867
16			108.7488	108.7486	108.7483

Beaker #	1530 (8/18)	1745	0915
17	107.4773	107.4770	
18	109.6475	109.6498	109.6478
19	108.7428	108.7432	
20	109.2514	109.2515	
21	105.2192	105.2189	
22	105.4748	105.4745	
23	106.2211	106.2210	
24			

Witnessed & Understood by me. Date Date

T11

TITLE Baker final wts Monsanto — Project No. — Book No. 21087

From Page No.

1330 (8/18)

~~1~~	~~111.4276~~
~~2~~	~~111.5372~~
~~3~~	~~110.8610~~
~~4~~	~~107.3742~~
~~5~~	~~109.9830~~

incomplete

0 = cyclone #9 - back

8/19/88 PSD final weights (all filter #'s run 0 → 9, top → bottom)

Time	(1100)	1530	2015	NET
AG-0	.54601	.54579	.54600	.00031
-1	~~.54601~~ .68291	.68287		.00034
-2	.67062	.67062		.00025
-3	.67758	.67757		.00047
-4	.68661	.68665		.00056
-5	.69765	.69760		.0009[illegible]
-6	.69277	.69277		.00268
-7	.70554	.70545	.70545	.0033[illegible]
-8	.69477	.69453	.69450	.0045
-9	.77980	.77969	~~.7780~~ .77980	.0115[illegible]
	(1115)	1545	2020	
N-0	.48802	.48805		.0001[illegible]
1	.63806	.63801		.0002[illegible]
2	.65639	.65635		.00014
3	.66953	.66944	.66940	.0002[illegible]
4	.65047	.65036	.65037	.0003[illegible]
5	.67488	.67479	~~.67492~~ .67474	.000[illegible]
6	.65847	.65836	.65852	.0021[illegible]
7	.66804	.66800		.0022
8	.65693	.65678	.65681	.0029
9	.78610	.78600	.78612	.014[illegible]

QTB-2

QTA-N

Witnessed & Understood by me. | Date | ...d by | Date

Project No.______
Book No.______ TITLE filter weights

From Page No. 44

Glass Fiber Whatman 934AH
Baked to 400°F before dessicating

8/8/88 1800 hours
wet bulb ~~[illegible]~~ 77 dry bulb = 68°F
Calibration: 1g = .9990 g
500mg = .4999 g
200mg = .1998 g

filter #	Tare 1800	TARE 2230
W 1	.6164	.6165 ✓
W 2	.6193	.6193 ✓
W 3	.6165	.6166 ✓
W 4	.6185	.6187 ✓
W 5	.6277	.6279 ✓
W 6	.6258	.6257
W 7	.6193	.6190
W 8	.6138	.6157
W 9	.6193	.6190
W 10	.6206	.6201
W 11	.6179	.6177
W 12	.6280	.6276
W 13	.6345	.6341
W 14	.6306	.6304
W 15	.6295	.6291 ~~.6290~~
W 16	.6316	.6312
W 17	.6361	.6358
W 18	.6276	.6274
W 19	.6303	.6299
W 20	.6338	.6338
W 21	.6246	.6247
W 22	.6235	.6236
W 23	.6248	.6249
W 24	.6264	.6266
W 25	.6279	.6281
W 26	.6271	.6273
W 27	.6232	.6232
W 28	.6236	.6236
W 29	.6241	.6243
W 30	.6225	.6224

Witnessed & Understood by me, | Date | Invented by

Recorded by [signature]

TITLE Set W weights

Project No.

Book No.

From Page No. 30	(1800)	(2230)
W31	.6263	.6264
W32	.6225	.6227
W33	.6242	.6243
W34	.6257	.6258
W35	.6315	.6315
W36	.6254	.6257
W37	.6340	.6341
W38	.6327	.6330
W39	.6267	.6270
W40	.6342	.6345
W41	.6314	.6317
W42	.6282	.6284
W43	.6293	.6294
W44	.6233	.6236
W45	.6322	.6324
W46	.6345	.6344
W47	.6342	.6342
W48	.6359	.6360
W49	.6316	.6317
W50	.6197	.6195
W51	.6203	.6199
W52	.6175	.6172
W53	.6199	.6197
W54	.6229	.6227
W55	.6253	.6249
W56	.6219	.6217
W57	.6240	.6239
W58	.6222	.6220
W59	.6206	.6204
W60	.6345	.6345
W61	.6229	.6226
W62	.6262	.6260
W63	.6338	.6336
W64	.6348	.6346
W65	.6377	.6374
W66	.6326	.6324
W67	.6179	.6176

To Page No.

Witnessed & Understood by me.	Date	Invented by	Date
		Recorded by	

APPENDIX I - PSD ANALYTICAL WEIGHTS

From Page No.

1330 (8/18)

1	111.4276
2	111.5372
3	110.8610
4	107.3742
5	109.9830

incomplete

O = cyclone #9 - backup

8/19/88 PSD final weights (all filter #'s run 0 → 9, top → bottom)

Time	(1100)	1530	2015	NET
AG-0	.54601	.54579	.54600	.00031
-1	~~.54601~~ .68291	.68287		.00034
-2	.67062	.67062		.00025
-3	.67758	.67757		.00047
-4	.68661	.68665		.00056
-5	.69765	.69760		.00093
-6	.69277	.69277		.00268
-7	.70554	.70545	.70545	.00335
-8	.69477	.69453	.69450	.00456
-9	.77980	.77969	~~.77980~~ .77980	.01153

AB-2

	(115)	1545	2020	
N-0	.48802	.48805		.00010
1	.63806	.63801		.00022
2	.65639	.65635		.00014
3	.66953	.66944	.66940	.00029
4	.65047	.65036	.65037	.00030
5	.67488	.67479	~~.67472~~ .67474	.00033
6	.65847	.65836	.65852	.00215
7	.66804	.66800		.00228
8	.65693	.65678	.65681	.00283
9	.78610	.78600	.78612	.01466
~~10~~				

AA-N

Project No.______
Book No. 21087 TITLE PSD final wts cont

From Page No. 3

	(1130)	1600	2030	NET
M-9	.78359	.78336	.78354	.00794
8	.65311	.65302	.65307	.00247
7	.70224	.70213	.70224	.00204
6	.64164	.64143	.64148	.00038
5	.71518	.71526	.71523	.00006
4	.63058	.63055		(-.00010)
3	.65310	.65309		(-.00012)
2	.70148	.70149		(-.00004)
1	.66827	.66830		.00052
0	.54519	.54517		.00015

OT-X

	(1145)	1615	2040	
				.01000
W-9	.75946	.75934	.75934	.00264
8	.65928	.65920	.65918	.00176
7	.68284	.68283	~~.68280~~	.00053
6	.65064	.65067		.00011
5	.66221	.66213	.66211	.00017
4	.64238	.64235		.00018
3	.67859	.67852	.67858	.00017
2	.65500	~~.655~~ .65498		.00017
1	.67814	.67814		.00010
0	.50366	.50368		

OTC-1

	(1200)	1830	2050	
U 0	.49330	.49332		.00031
1	.64425	.64417	.64421	(-.00062)
2	.64469	.64454	.64458	(-.00019)
3	.65502	.65501		(-.00006)
4	.66476	.66473		0.0000
5	.69879	.69878		.00021
6	.67642	.67637		.00137
7	.68002	.67989	.68005	.00152
8	.62737	.62733		.00170
9	.76129	.76108	.76104	.00910

OTA-1

* Initial wts. recorded in weigh log book # 13523

LE

Project No.
Book No. 21087

From Page No. 4

	(1220)	1645	400	8/20-0930	NET
AF 9	.79104	.79115	.79120		.01159
8	.68562	.68558			.00433
7	.69998	.69995			.00320
6	.67405	.67408			.00191
5	.69010	.69014			.00051
4	.66187	.66177	.66183		.00031
3	.68879	.68862	.68856	.68867	.00027
2	.69230	.69221	.69212	~~.692~~ .69222	.00020
1	.69177	.69164	.69155	69166	.00043
0	.52689	.52686			.00026

U/D-2

	(1233)	(1700)	2110	0930	
AH 9	.79196	.79193			.00194
8	.66610	.66598	.66602		(-.00006
7	.69953	.69932	.69944	.69941	.00009
6	.65648	.65634	.65634		(-.00010
5	.68906	.68914	.68916		(-.00010
4	.67097	.67097			.00015
3	.68828	.68831			.00016
2	.66547	.66543			.00014
1	.67832	.67834			(-.00008
0	.52912	.52915			.00014

Blank

	(1300)	1715	2120	0930	
S9	.78154	.78144	.78140		.01302
8	.66359	.66355			.01719
7	.67319	.67314			0².00990
6	.66105	0² ~~.660~~ .66102			.00596 ~~(-.00134~~
5	.68632	.68622	.68633		.00147
4	.66660	.66643	.66653	.66646	.00043
3	.67407	.67411			.00074
2	.63559	.63550	.63553		.00010
1	.66963	.66968			.00013
0	.50419	.50414			.00025

1

Project No.______
Book No. 21087 TITLE TSD final weights - Monsanto

From Page No. 5

	(1330)	1735	2125	0945	Net
T-9	.76134	.76104	.76115	.76130	.00737
8	.66222	.66209	.66217		.00264
7	.66546	.66526	.66547		.00169
6	.65478	.65469	.65474		.00192
5	.69045	.69025	.69023		(-.00014)
OT 4	.64209	.64206			(-.00022)
3	.65752	.65756			(-.00014)
2	.66754 C2	.66758			(-.00029)
1	.66554 62	.66563			(-.00055)
0	.51523	.51508	.51510		0.00000

	(1345)	1750	2145	Net
Q9	.76654	.76642	.76659	Ø01580
8	.67220	.67232	.67218	.01925
7	.69087	.69084		.01377
IN-2 6	.67062	.67068	.67069	.01024
5	.68733	.68729		.00253
4	.65230	.65227		.00074
3	.65104	.65092	.65102	.00053
2	.64746	.64746		.00038
1	.67850	.67852 D2		.00003
0	.50533	~~.5029~~ .50529		.00027

	1400	1810	2155	Net
				~~.00675~~
A9	.75955	.75930	.75952	.00675
8	.66304	.66306		.00173
OTC-2 7	.67406	.67388	.67392	.00108
6	.65051	.65040	.65041	.00037
5	.67895	.67887	.67885	6.00008
4	.65539	.65536	.65529	.00007
3	.66099	.66101		.00022
2	.65017	.65017		.00005
1	.65338	.65334		.00013
0	.49779	.49781		.00008

To Page No. ___

11

TITLE PSD final Weights 8/20/88

Project No.

Book No 21087

From Page No.

	0950	1350	1800	NET
MB	.67148	.67157	.67148	.00045
MB-1	.85013	.85023	.85016	.00021
2	.81748	.81748		(-.00040)
3	.84371	.84369		.00013
4	.82500	.82489	.82486	(-.00059)
Blank 5	.84525	.84496	.84493	(-.00012)
6	.82626	.82602	.82623	.00001
7	.85018	.85018		.00016
8	.81098	.81089	.81092	(-.00014)
MBB	.95832	.9583		.00315

~~ACO~~	1010	1420	1815	
AC-0	.54595	.54607	.54607	.00125
1	.69450	.69454		.00030
2	.67473	.67489		.00031
DT 3	.69119	.69115		.00047
4	.68346	.68327	.68322	.00040
5	.68080	.68074	.68072	.00121
6	.68350	.68354		.00554
7	.69951	.69941	.69940	.00488
8	.69754	.69751		.00599
9	.79301	.79300		.08875

	1035	1410	1855	
VI	.68929	.68927	~~0.22~~	.00001
2	.65957	.65954		.00004
-3 3	.67259	.67260		.00004
4	.64848	.64855	.64846	.00021
5	.67428	.67428		.00016
6	.67177	.67173		.00063
7	.67365	.67369		.00245
8	.66083	.66064	.66059	.00417
9	.75854	.75845	.75843	.01145
0	.52238	.52227	S .52222	.00041

Witnessed & Understood by me. Date

Date

Monsanto Project No.______ Book No. 21087 TITLE [illegible] to 8/20/88

From Page No. 2

A-3

	1055	1430	1855	NET
AA-0	.54994	.54993		.00120
1	.68529	.68525		.00030
2	.68069	.68064		.00017
3	.69537	.69533		.00009
4	.66813	.66809		.00035
5	.70149	.70150		.00132
6	.66531	.66533		.00327
7	.70988	.70983		.00356
8	.66492	.66474	.66478	.00414
9	.80706	.80687	.80682	.01227

AD	1120	1530	1850	NET
AD 0	.54090	.54082	.54093	.00028
1	.67723	.67719		.00018
2	.67385	.67381		.00036
3	.68740	.68742		.00042
4	.67789	.67790		.00044 ~~.00054~~
5	.70075	.70070		.00070
6	.70250	.70251		.00395 ~~.00251~~
7	.70604	.70592	.70600	.00600
8	.69641	.69650	.69641	.00778
9	.81163	.81168		.01117

	1140	1510	1830	.00012
2-0	.55750	.55752		.00036
1	.69117	.69121		.00016
2	.69486	.69482		.00030
3	.69332	.69330		.00024
4	.67041	.67049	.67038	.00045
5	.69767	.69777	.69774	.00188
6	.66750	.66752		.00334
7	.68900	.68898		.00491
8	.66556	.66543	.66547	.01272
9	.78128	.78120	.78110	

Witnessed & Understood by | Date | I-8 | By | Date

Project No.______

Book No.______ TITLE ______

From Page No.__ Set and Number	8/5/88 wt #1	8/6/88 wt #2	8/8/88 wt #3	8/9/88 wt 4	Tape Value
L-zero	.55983	.55996 ✓	.55998 ✓		.55996
L 1	.70120 ✓	.70145	.70125 ✓		.7012[illegible]
L 2	.66904	.66902 ✓	.66897 ✓		.66897
L 3	.68731	.68721 ✓	.68721 ✓		.68721
L 4	.68267	.68250 ✓	.68232	.68253 ✓	.6825[illegible]
L 5	.68199	.68206 ✓	.68208 ✓		.68206
L 6	.68694 ✓	.68709	.68686	.68694 ✓	.68694
L 7	.70025 ✓	.70030 ✓	.70011	Set L done	.7[illegible]25
L 8	.66098	.66102 ✓	.66097 ✓		.66[illegible]
L 9	.81969	.81966 ✓	.81963 ✓		.819[illegible]
M zero	.54518	.54504 ✓	.54502 ✓		.545
m 1	.66777 ✓	.66764	.66750	.66778 ✓	.667[illegible]
m 2	.70157 ✓	.70145	.70137	.70153 ✓	.7015[illegible]
m 3	.65321 ✓	.65323 ✓	.65302		.6532[illegible]
m 4	.63065 ✓	.63073	.63067 ✓		.63065
m 5	.71520 ✓	.71533	.71507	.71517 ✓ Set M done	.71517
m 6	.64110 ✓	.64122	.64113 ✓		.64110
m 7	.70040	.70047	.70023 ✓	.70020 ✓	.70020
m 8	.65060 ✓	.65063 ✓	.65044		.65060
m 9	.77587	.77576	.77560 ✓	.77565 ✓	.77[illegible]
N zero	.48810	.48801	.48~~795~~ ✓	.48797 ✓	.4879[illegible]
N1	.63790	.63780 ✓	.63779 ✓		.6377[illegible]
N2	.65635	.65621 ✓	.65622 ✓		.656[illegible]
N3	.66936	.66878	.66911 ✓	.66915 ✓	.66911
N4	.65040	.65012 ✓	.65007 ✓		.65007
N5	.67445 ✓	.67441 ✓	.67419		.67441
N6	.65648	.65642 ✓	.65637 ✓	Set N done	.65637
N7	.66572 ✓	.66573 ✓	.66568		.66572
N8	.65398 ✓	.65400 ✓	.65389		.65398
N9	.77158	.77146 ✓	.77149 ✓		.77146

Note to avoid confusion there is no Set of the letter "O" as in oops!

Witnessed & Understood by me. | Date | Invented by

Recorded by

P3U [illegible]

TITLE

Project No. ______
Book No. ______

From Page No.__ Set and number	8/5/88 wt#1	8/6/88 wt#2	8/8/88 wt#3		TARG Val:
P zero	.50846 ✓	.50832	.50841 ✓		.50841
P1	.66949	.66929 ✓	.66934 ✓		.66929
P2	.63586	.63572 ✓	.63573 ✓	Set P	.63572
P3	.66813	.66801 ✓	.66801 ✓	done	.66801
P4	.64823 ✓	.64816	.64825 ✓		.64823
P5	.67313 ✓	.67299	.67308 ✓		.67308
P6	~~.63919~~ [illegible]	.63761 ✓	.63762 ✓		.63761
P7	.66621 ✓	.66619 ✓	.66618 ✓		.66618
P8	.65150	.65145 ✓	.65144 ✓		.65144
P9	.76222	.76219 ✓	.76218 ✓		.76218
Q zero	.50502 ✓	.50504 ✓	—		.50502
Q1	.67849 ✓	.67850 ✓	—		.67849
Q2	.64708 ✓	.64708 ✓	—		.64708
Q3	.65071	.65051 ✓	.65049 ✓	Set Q	.65049
Q4	.65153 ✓	.65155 ✓	—	done	.65153
Q5	.68476 ✓	.68477 ✓	—		.68476
Q6	.66050 ✓	.66063	.66045 ✓		.66045
Q7	.67711 ✓	.67728	.67707 ✓		.67707
Q8	.65295 ✓	.65293 ✓	—		.65293
Q9	.75079 ✓	.75094	.75083 ✓		.75079
R zero	.49773 ✓	.49777 ✓	—		.49773
R1	.65321 ✓	.65324 ✓	—		.65321
R2	.65017 ✓	.65012 ✓	—		.65012
R3	.66083 ✓	.66107	.66063 [illegible] .66079 ✓		.66079
R4	.65531	.65523 ✓	~~[illegible]~~ .65522 ✓		.65522
R5	.67887	.67894 ✓	.67893 ✓		.67893
R6	.65004 ✓	.65005 ✓	—		.65004
R7	.67287 ✓	.67284 ✓	—	Set R	.67284
R8	.66135 ✓	.66133 ✓	—	done	.66133
R9	.75281 ✓	.75277 ✓	—		.75277

Witnessed & Understood by me | Date | Invented by

Project No.______

Book No.______ TITLE PSD filters 8/88

From Page No.___

Set and number	wt 1 (8/5/88)	wt 2 (8/6/88)	wt #3 (8/8/88)	wt 4 (8/9/88)	TAPE Value
S zero	.50396	.50428	.50386	.50385	.50386
S 1	.66972	.66984	.66953	.66957	.66953
S 2	.63556	.63563	.63514	.63513	.63513
S 3	.67367	.67402	.67369		.67367
S 4	.66608	.66628	.66603	Set S	.66603
S 5	.68486	.68505	.68486	done	.68486
S 6	.65506	.65520	.65506		.66506
S 7	.66357	.66372	.66344	.66348	.66344
S 8	.64646	.64652	.69638	.64636	.64636
S 9	.76838	.76843	.76839		.76838
T zero	.51515	.51523	.51497	.51510	.51510
T 1	.66633	.66621	.66618		.66618
T 2	.66811	.66787	.66781	.66787	.66787
T 3	.65830	.65800	.65800		.65800
T 4	.64268	.64228	.64229	Set T	.64228
T 5	.69037	.69041	—	done	.69037
T 6	.65286	.65282	—		.65282
T 7	.66378	.66383	.66385	.66378	.66378
T 8	.65958	.65953	—		.65953
T 9	.75409	.75399	.75393		.75393
U zero	.49301	.49303	—		.49301
U-1	.64487	.64483	—		.64483
U 2	.64481	.64477	—		.64477
U 3	.65507	.65508	—	Set U	.65507
U 4	.66478	.66473	—	done	.66473
U 5	.69848	.69857	~~[illegible]~~ .69862		.69857
U 6	.67504	.67500	—		.67500
U 7	.67867	.67853	.67857		.67853
U 8	.62579	.62563	.62567		.62563
U 9	.75211	.75194	.75198		.75194

Witnessed & Understood by me.	Date	Invented by

PSD filter 8/88

Project No.______
Book No.______

Set and number	8/5/88 wt#1	8/6/88 wt#2	8/8/88 wt#3	8/9/88 wt4	True value
V zero	.52186 ✓	.521173	.52181 ✓	Set V done	.52181
V1	.65926 ✓	.68902	.68928 ✓		.68926
V2	.65950 ✓	.65919	.65951 ✓		.65950
V3	.67261 ✓	.67217	.67256 ✓		.67256
V4	.64859	.64809	.64825 ✓	.64825 ✓	.64825
V5	.67413 ✓	.67388	.67412 ✓		.67412
V6	.67114 ✓	.67081	.67110 ✓		.67110
V7	.6715[illegible]	.67124 ✓	.67138	.67128 ✓	.67124
V8	.65674	.65642 ✓	.65647 ✓		.65642
V9	.74733	.74698 ✓	.74699 ✓		.74698
W zero	.50359 ✓	.50337	.503[illegible] ✓		.50358
W1	.67867	.67787	.67797 ✓	.67791 ✓	.67797
W2	.65511	.65483 ✓	.65496	.65481 ✓	.65481
W3	.67866	.67823	.67840 ✓	.67840 ✓	.67840
W4	.64252	.64206	.64218 ✓	.64222 ✓	.64218
W5	.66200 ✓	.66189	.66205 ✓	Set W done	.66200
W6	.65019 ✓	.64985	.65014 ✓		.65014
W7	.68137	.68107 ✓	.68118	.68109 ✓	.68107
W8	.65693	.65654 ✓	.65659 ✓		.65654
W9	.74991	.74964	.74944 ✓	.74943 ✓	.74943

	8/8/88 wt#1	8/9/88 wt#2 (AM)	8/9/88 wt 3 (PM)	8/10/88 wt4	true value
X zero	.52170	.52148 ✓	.52152 ✓	—	.52148
X1	.69614 ✓	.69602	~~[illegible]~~	.69619 ✓	.69614
X2	.66343	.66316	.66329 ✓	.66326 ✓	.66326
X3	.69831 ✓	.69834 ✓	—	—	.69831
X4	.66893 ✓	.66881	.66895 ✓	—	.66893
X5	.67268 ✓	.67248	.67263 ✓	—	.67263
X6	.67272 ✓	.67263	.67270 ✓	—	.67270
X7	.68966	.68939 ✓	.68950	.68939 ✓	.68939
X8	.69858 ✓	.69841	.69859 ✓	—	.69855
X9	.78303 ✓	.78302 ✓	—		.78302

Set X done

To Page No.____

Invented by | Date

Project No.______
Book No.______ TITLE PSW fillers 0/18

From Page No. 8/8/88 Cat# Number	wt#1	8/9/88 wt#2	8/9/88 wt 3	wt 4 8/10/88	Tare Val
Y zero	.52210 ✓	.522091 ✓	—	—	.52207
Y 1	.69289	.69244 ✓	.69239	.69239 ✓	.69239
Y 2	.67356 ✓	.67361 ✓	—	—	.67356
Y 3	.69398 —	.69393 ✓	—	—	.69393
Y 4	.67249 ✓	.67250 ✓	—	—	.67249
Y 5	.69731 ✓	.69733 ✓	—	—	.69733
Y 6	.68177 ✓	.68179 ✓	—	—	.68177
Y 7	.69612	.69595 ✓	.69600 ✓	—	.69595
Y 8	.68155	.68136 ✓	.68140 ✓	—	.681
Y 9	.76907 ✓	.76905 ✓	—	—	.7690
Z zero	.55760 ✓	.55744 ✓	—		.55.
Z 1	.69088 ✓	.69085 ✓	—		.69.
Z 2	.69467 —	.69466 —	—		.694..
Z 3	.69303 ✓	.69300 ✓	—		.69300
Z 4	.67014 ✓	.66997	.67015 ✓		.67014
Z 5	.69736 ✓	.69716	.69731 ✓		.69731
Z 6	.66566 ✓	.66564 ✓	—		.66564
Z 7	.68564 ✓	.68564 ✓	—		.68564
Z 8	.66060 ✓	.66042	.66056 ✓		.66056
Z 9	.76895 ✓	.76894 ✓	—		.76894
AA zero	.54883	.54874 ✓	.54873 ✓	.54873	~~.54875~~
AA 1	.68495 ✓	.68499 ✓	—		.68495
AA 2	.68049 ✓	.68047 ✓	—		.68047
AA 3	.69526 ✓	.69510	.69524 ✓		.69524
AA 4	.66774 ✓	.66781 ✓	.66779 ✓		.66774
AA 5	.70018 ✓	.70018 ✓	—		.70018
AA 6	.66206 ✓	.66214 ✓	.66210 ✓		.66206
AA 7	.70627 ✓	.70632 ✓	—		.70627
AA 8	.66056	.66064 ✓	.66069 ✓		.66064
AA 9	.79458 ✓	.79455 ✓	—		.79455

Set Y done

Set Z done

Set AA done

Start with Set 28 and tared on 8/9/88

Witnessed & Understood by me	Date	Invented by
		Recorded by

PSD filters 8/88

Project No.______

Book No.______

Number	8/9/88 wt#1 (AM)	(pm) 8/9/88 wt#2	8/10/88 wt 3	8/11/88 wt 4	tare value
B zero	.56524	.56535	.56508	.56509	.56508
B1	.70427	.70417	.70400	.70395	.70395
B2	.66576	.66591	.66579	—	.66576
B3	.69420	.69439	.69425	—	.69420
B4	.66936	.66941	—	—	.66936
B5	.69199	.69187	.69182	—	.69182
B6	.68802	.68800	—	—	.68800
B7	.69965	.69953	.69949	—	.69949
B8	.68009	.67997	.67993	—	.67993
B9	.80567	.80570	—	—	.80567
zero	.54487	.54498	.54482		.54482
1	.69424	.69429	—		.69424
2	.67460	.67484	.67458		.67458
3	.69068	.69086	.69073		.69068
4	.68282	.68295	.68262		.68282
5	.67953	.67951	—		.67951
6	.67881	.67880	—		.67880
7	.69452	.69467	.69454		.69452
8	.69152	.69153	—		.69152
9	.77439	.77430	.77425		.77425
zero	.54065	.54069	—		.54065
1	.67699	.67704	—		.67699
2	.67345	.67349	—		.67345
3	.68700	.68705	—		.68700
4	.67746	.67750	—		.67746
5	.69962	.69964	—		.69962
6	.69865	.69870	—		.69865
7	.70001	.70012	.70000		.70000
8	.68867	.68863	—		.68863
9	.80035	.80056	.80051		.80051

Set AC done

Set AD done

To Page No.______

Date | Invented by | Date

Project No.______ PSD pellets 8/87

Book No.______ TITLE ______

From Page No.__ 8/9/88 Set number wt #1 (PP)	8/9/88 wt 2 (PP)	8/10/88 wt #3		Tare value
AE zero .54594 ✓	.54590 ✓	—		.54590
AE 1 .68040 ✓	.68043 ✓	—	Set AE done	.68040
AE 2 .66978 ✓	.66978 ✓	—		.66978
AE 3 .67395 ✓	.67392 ✓	—		.67392
AE 4 .66201	.66187 ✓	.66191 ✓		.66187
AE 5 .70359 ✓	.70358 ✓	—		.70358
AE 6 .67911 ✓	.67911 ✓	—		.67911
AE 7 .69098 ✓	.69086	.69093 ✓		.69093
AE 8 .67524	.67515 ✓	.67511 ✓		.67511
AE 9 .75674 ✓	.75676 ✓	—		.75674
AF zero .52664 ✓	.52672	.52660 ✓		.52660
AF 1 .69133 ✓	.69140	.69128 ✓	Set AF done	.69123
AF 2 .69202 ✓	.69207 ✓	—		.69202
AF 3 .68840 ✓	.68844 ✓	—		.68840
AF 4 .66152 ✓	.66157 ✓	—		.66152
AF 5 .68979	.68968 ✓	.68963 ✓		.68963
AF 6 .67218 ✓	.67221 ✓	—		.67218
AF 7 .69680 ✓	.69693	.69675 ✓		.69675
AF 8 .68125 ✓	.68134	.68125 ✓		.68125
AF 9 .77947	.77965 ✓	.77961 ✓		.77961
AG zero .54571 ✓	.54597	.54569 ✓		.54569
AG 1 .68252 ✓	.68266	.68253 ✓		.68253
AG 2 .67038 ✓	.67051	.67034 ✓		.67034
AG 3 .67710 ✓	.67715 ✓	—	Set AG done	.67710
AG 4 .6864 ✓	.68620	.68609 ✓		.68609
AG 5 .69667 ✓	.69686	.69669 ✓		.69669
AG 6 .69009 ✓	.69012 ✓	—		.69009
AG 7 .70212 ✓	.70220	.70210		.70210
AG 8 .68994 ✓	.68999 ✓	—		.68994
AG 9 .76527 ✓	.76550	.76532 ✓		.76527

Witnessed & Understood by me	Date	Invented by
		Recorded by

[illegible] P-D [illegible] 0/3

Project No.______
TITLE______ ______ Book No.______

From Page No.___ Set/Number	8/9/88 wt 1	8/9/88 wt 2	8/10/88 wt 3		True Value
AH zero	.52906 ✓	.52901 ✓	—		.529
AH 1	.67842 ✓	.67842 ✓	—		.678
AH 2	.66533 ✓	.66529 ✓	—	Set AH done	.665
AH 3	.66835	.68820 ✓	.68815 ✓		.688
AH 4	.67099	.67084 ✓	.67082 ✓		.670
AH 5	.68928 ✓	.68926 ✓	—		.689
AH 6	.65649 ✓	.65644 ✓	—	[illegible] 010	.656
AH 7	.69932 ✓	.69934 ✓	—		.699
AH 8	.66608 ✓	.66609 ✓	—		.66.
AH 9	.79002 ✓	.79006 ✓	—	[illegible]	.79

Notes on weighings of filters - post

All weights determined using new (purchased 8/88) Fisher 5 place 30g/200g balance in Balance Room. From wt set X only the 4th and some of the 3rd were determined by Mettler H 20T in Balance Room.

<u>Note Good agreement between 2 balances.</u>

Operation notes for Fisher/[illegible] 5 place -
allow 24 Hours to warm up. Some zero drift still noted up to 72 HRS after plugging into power.
Be <u>VERY Careful</u> in taring balance - go Slowly.
Each weighing takes ~1 minute. Wait until "g" shows up on left part of display before even considering a given value.

Witnessed & Understood by me. | Date | Invented by [signature] 8/10/88 | Date

Recorded by

APPENDIX J - PRELIMINARY SAMPLING POINT LOCATION AND TRAVERSE DATA

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Monsanto Outlet A/B/C/D

DATE 8-15-88

SAMPLING LOCATION Outlet ~~B~~ A/B/CD

INSIDE OF FAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE A) ____

INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE B) ____

STACK I.D., (DISTANCE A - DISTANCE B) ____

NEAREST UPSTREAM DISTURBANCE ____

NEAREST DOWNSTREAM DISTURBANCE ____

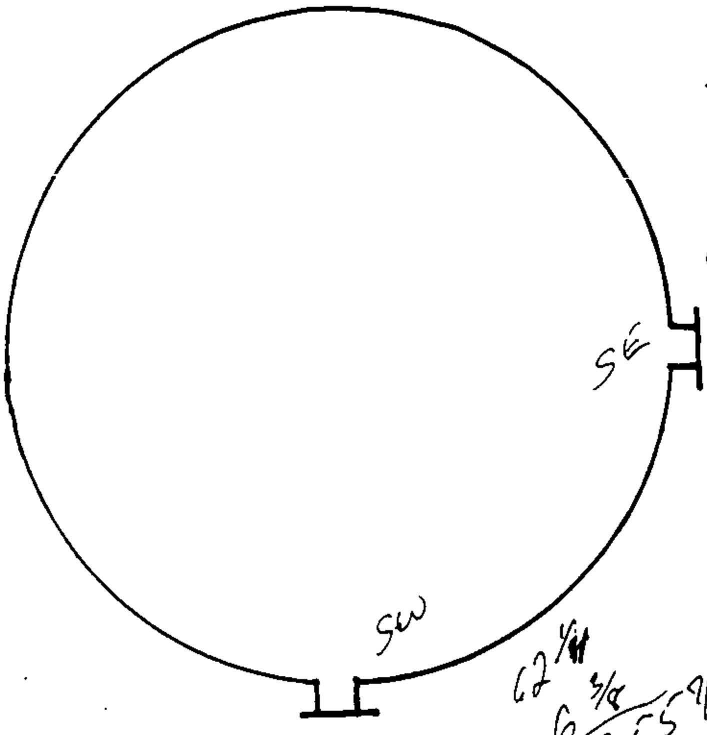
CALCULATOR ____

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
A-1	0.044	56.0 in	2.46	6.5	~~8~~ 9
A-2	0.146	56.0 in	8.18	6.5	14.68
A-3	0.296	56.0	16.58	6.5	23.1
A-4	0.704	56.0	39.42	6.5	45.9
A-5	0.854	56.0	47.82	6.5	54.32
A-6	0.956	56.0	53.54	6.5	60.04

EPA (Dur) 232
4/72

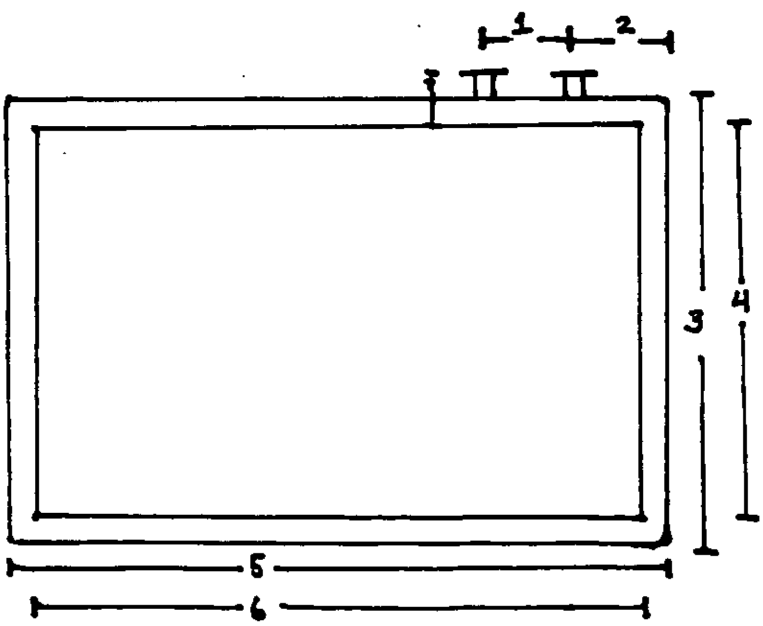
DIAMETER=
port depth= flush



61 7/16 − 6 = 55 7/16" = d

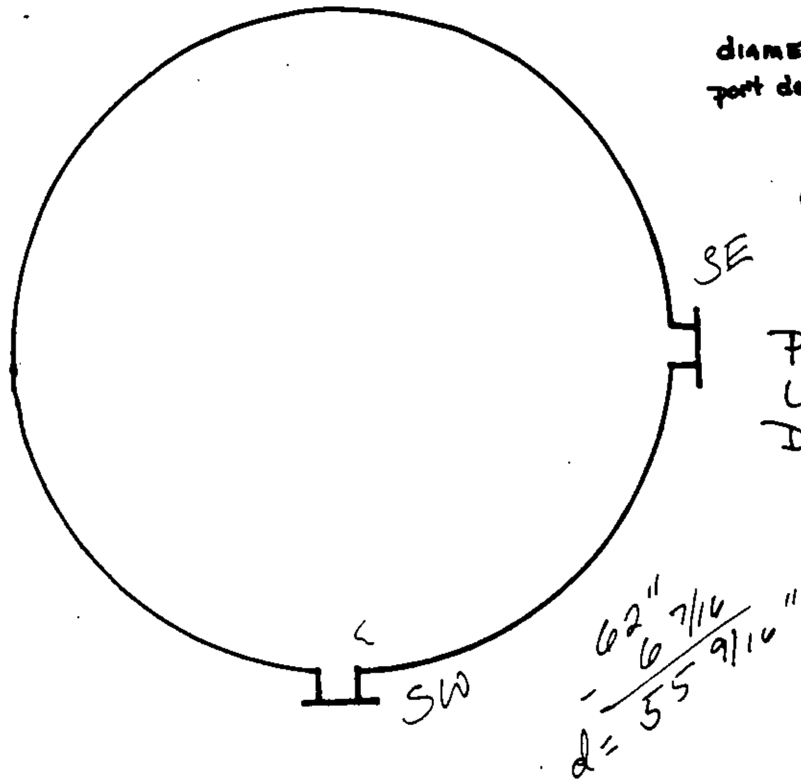
62 1/4 − 6 3/8 = 55 7/8" = d

PLANT Monsanto
LOCATION Stack A (west)
DATE 8/15

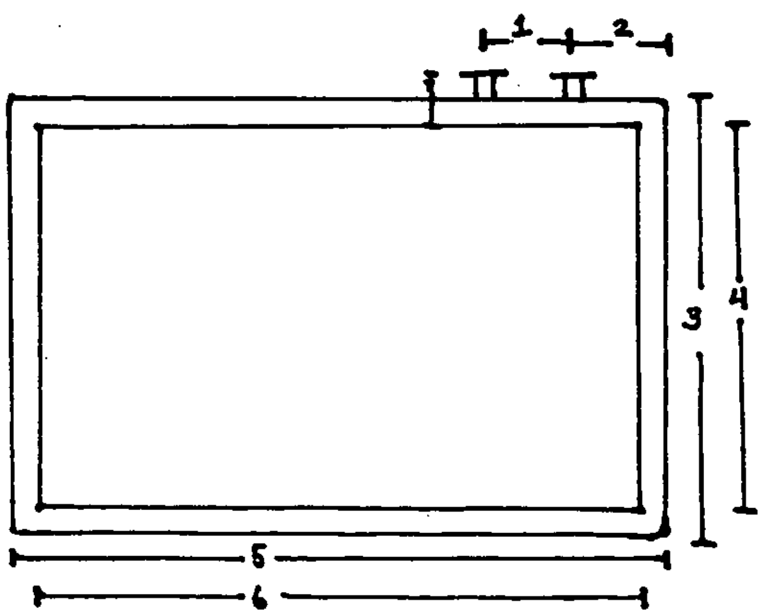


1. ______
2. ______
3. ______
4. ______
5. ______
6. ______
7. ______

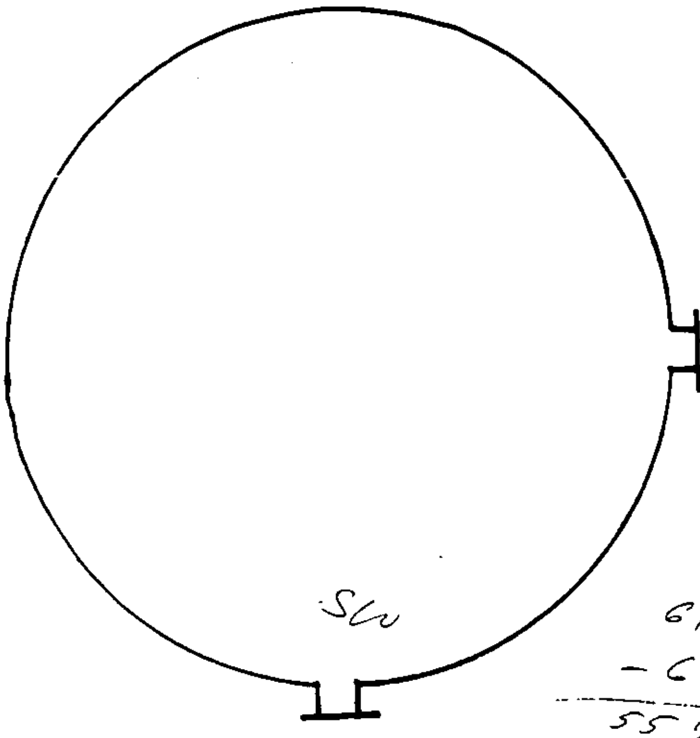
diameter=
port depth= flush



PLANT Monsanto
LOCATION Stack B
DATE 8/15/88



1. ____________
2. ____________
3. ____________
4. ____________
5. ____________
6. ____________
7. ____________

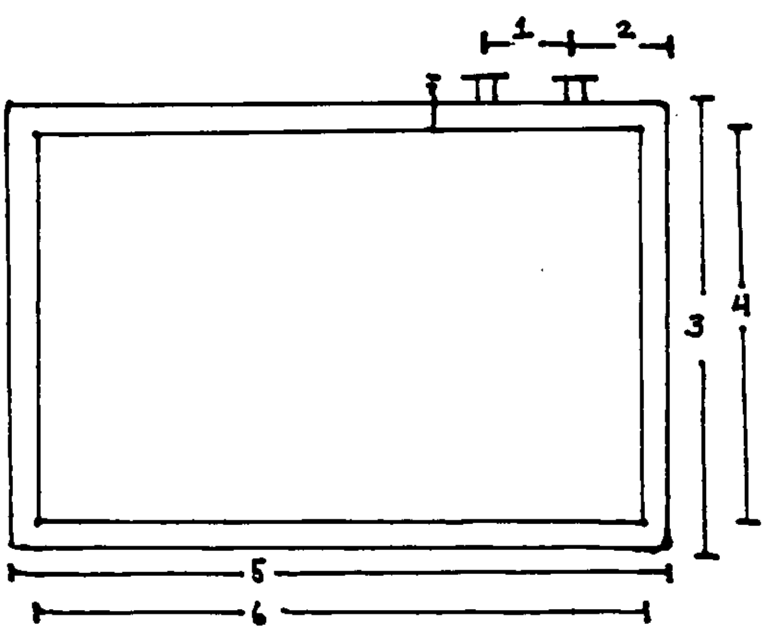


diameter =
port depth = flush

61 15/16
− 6 7/16
55 1/2" = d

PLANT Monsanto
LOCATION Stack C
DATE 8/15/87

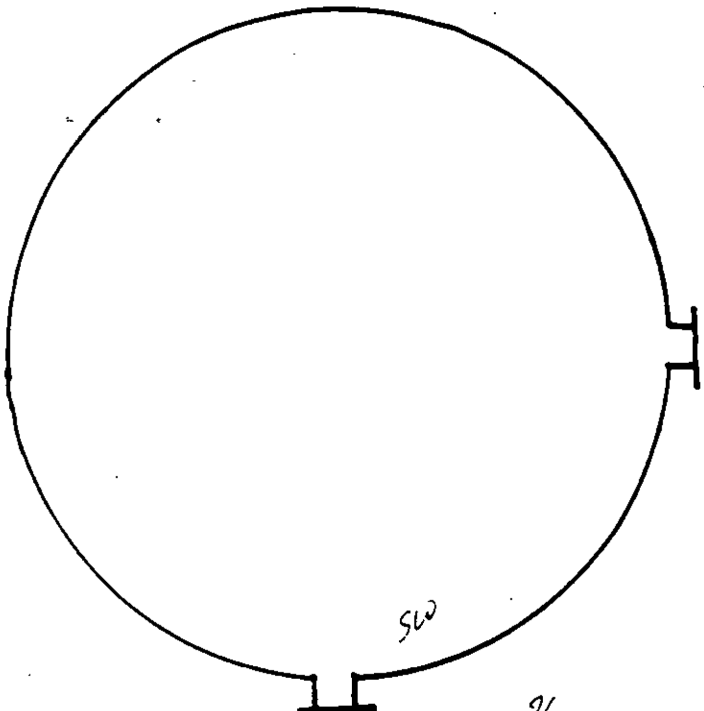
61 15/16
− 6 7/16
55 1/2" = d



1. ______
2. ______
3. ______
4. ______
5. ______
6. ______
7. ______

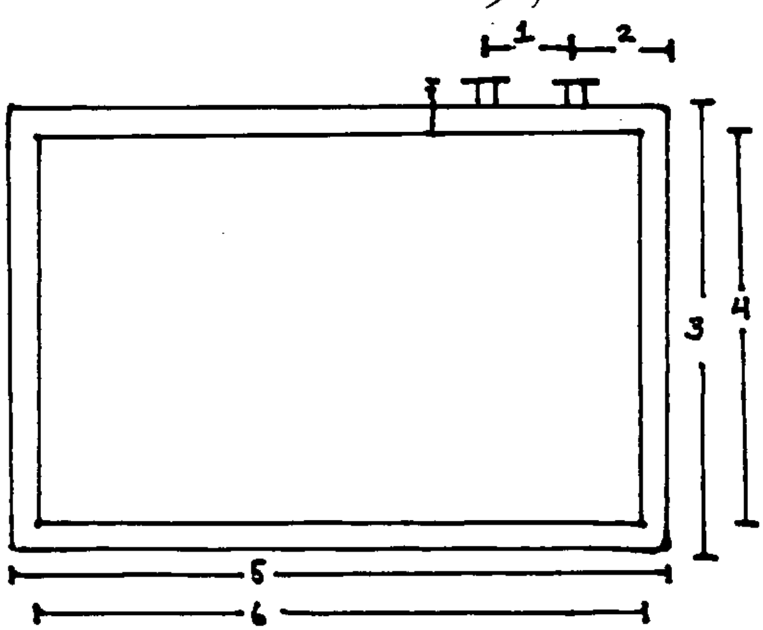
diameter =
port depth = flush

62 1/8
-6 7/8
55 3/4"



FLANT Monsanto
LOCATION State D (east
DATE 8/15/88

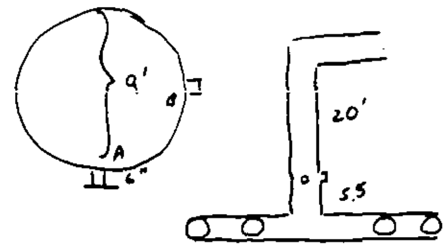
61 7/8
-6 7/16
55 7/16



1. ______
2. ______
3. ______
4. ______
5. ______
6. ______
7. ______

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Modecto - Soda Springs
DATE 8-15-88
SAMPLING LOCATION Inlet
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) 9' 6"
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) 6"
STACK I.D., (DISTANCE A - DISTANCE B) 9'
NEAREST UPSTREAM DISTURBANCE 20'
NEAREST DOWNSTREAM DISTURBANCE 5.5'
CALCULATOR M.W.H.



SCHEMATIC OF SAMPLING LOCATION

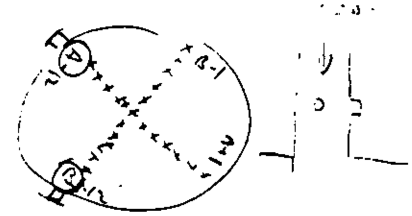
TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
A-1	.021	108"	2.25	6"	8.25"
2	.067	108"	7.25	6"	13.25
3	.118	108"	12.75	6"	18.75
4	.177	108"	19.125	6"	25.125
5	.250	108"	27.0	6"	33.0
6	.356	108"	38.5	6"	44.5
7	.644	108"	69.5	6"	75.5
8	.750	108"	81.0	6"	87.0
9	.823	108"	88.875	6"	94.875
10	.882	108"	95.25	6"	101.25
11	.933	108"	100.75	6"	106.75
12	.979	108"	105.75	6"	111.75

EPA (Dur) 232
4/72

RADIAN
CORPORATION

PRELIMINARY VELOCITY TRAVERSE

PLANT MONSANTO - SODA SPRINGS
DATE 5/15/88
LOCATION INLET TO - VENTURI - SCRUBBERS
STACK I.D. 7'
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O -7.3" H_2O, -7.8" H_2O
OPERATORS MWH / JTN



FLOW DOWN

SCHEMATIC OF TRAVERSE POINT LAYOUT

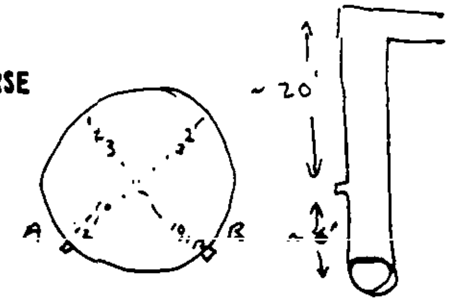
"S" TYPE PITOT
~.84 Cp

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F	cyclonic check.
A-1	0.42	160°	
2	0.56	163°	
3	0.58	164°	
4	0.52	166	
5	0.56	167	
6	0.76	169	
7	1.40	180	
8	1.50	185	
9	1.70	185	
10	1.90	189	
11	1.80	191	
12	1.80	195	0°
12	1.80	196	
11	1.90	194	0°
10	1.70	190	0°
9	1.60	188	0°
8	1.60	184	0°
7	1.50	179	0°
6	0.78	168	0°
5	0.62	167	0°
4	0.52	165	0°
3	0.54	164	0°
2	0.62	162	25°
1	0.35	162	25°
AVERAGE			

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F	Cyclonic check
B-1	0.90	187	
2	0.99	186	
3	0.85	182	
4	0.87	182	
5	0.98	182	
6	1.15	178	
7	0.90	167	
8	0.70	167	
9	0.78	163	
10	0.96	162	
11	1.10	161	
12	0.98	161	
12	0.98	161	0°
11	1.10	161	0°
10	0.96	163	0°
9	0.78	163	0°
8	0.70	165	0°
7	0.90	166	0°
6	1.10	171	0°
5	0.95	176	0°
4	0.85	178	0°
3	0.92	180	0°
2	0.88	182	0°
1	0.95	185	0°
AVERAGE			

PRELIMINARY VELOCITY TRAVERSE

PLANT Monsanto - Soda Springs
DATE 8/19/68
LOCATION INLET
STACK I.D. 108" (9')
BAROMETRIC PRESSURE, in. Hg 613 mm Hg.
STACK GAUGE PRESSURE, in. H_2O − 7.5" ~~Hg~~ H_2O
OPERATORS MWH JTW.
TIME:



SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
B-1	0.70	162
2	0.97	162
3	0.88	163
4	0.96	162
5	0.94	162
6	0.97	162
7	0.81	162
8	0.82	162
9	0.90	162
10	0.98	162
11	1.1	162
12	0.92	160
AVERAGE		

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A-1	1.6	163
2	1.8	163
3	1.7	163
4	1.6	163
5	1.5	162
6	1.1	163
7	0.60	164
8	0.58	163
9	0.50	163
10	0.45	162
11	0.48	161
12	0.40	160
AVERAGE		

EPA (Dur) 233
4/72

Velocity traverse stack B 8/19/88 [illegible]

B 1-.67	A 1-.61
2-.82	2-.82
3-.89	3-.87
4-.96	4-.95
5-.97	5-1.0
6-.89	6-.92

RADIAN
CORPORATION

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT MONSANTO - SODA SPRINGS
DATE 8/19/88
SAMPLING LOCATION OUTLET - C PORT A
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A)
CNR
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B)
STACK I.D., (DISTANCE A - DISTANCE B) 56"
NEAREST UPSTREAM DISTURBANCE
NEAREST DOWNSTREAM DISTURBANCE
CALCULATOR

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	ΔP ~~FRACTION OF STACK I.D.~~	Ts STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
A-1	0.62	156			
A-2	0.80	159			
A-3	0.82	159			
A-4	0.84	159			
A-5	0.92	159			
A-6	0.80	160			
B-1	0.64	147			
B-2	0.85	159			
B-3	0.84	159			
B-4	0.85	159			
B-5	0.85	159			
B-6	0.71	159			

EPA (Dur) 232
4/72

RADIAN
CORPORATION

PRELIMINARY VELOCITY TRAVERSE

PLANT Monsanto
DATE 8-15-88
LOCATION Stack #4 Outlet D
STACK I.D.
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O -0.25
OPERATORS JAE/RK

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A-1	0.61	158
A-2	0.77	158
A-3	0.83	158
A-4	0.87	158
A-5	0.91	158
A-6	0.77	158
A-6	0.74	158
A-5	0.85	158
A-4	0.85	158
A-3	0.80	158
A-2	0.78	158
A-1	0.63	158
B-1	0.53	158
B-2	0.74	158
B-3	0.79	158
B-4	0.84	158
B-5	0.87	158
B-6	0.68	158
B-6	0.73	158
B-5	0.81	158
B-4	0.84	158
B-3	0.80	158
B-2	0.72	158
B-1	0.51	157
AVERAGE	$(\sqrt{\Delta p}) = 0.87$	

30° - 0.83
45° - 0.52
60° - 0.20
90° - (-)

30° - 0.80
45° - 0.38
60° - 0.20
90° - (-)

30° - 0.65
45° - 0.36
60° - 0.07
90° - (-)

30° - 0.73
45° - 0.55
60° - 0.31
90° - (-)

$\Delta p_{avg} = 0.76$

APPENDIX K - SAMPLE CUSTODY LOG

JES/055

TITLE SAMPLE LOG

Project No.______

Book No. 21088

From Page No.__

Field #	Sample Code	Sample wt	analysis	COC (DATE) DISPOSITION	comments	
ms-1	MSS-081688-MMIII-OTD-1-PR-Ace	174.3	Particulate/Radionuclides	8/27 ①	Acetone F½	A
ms-2	MSS-081688-MMIII-OTD-1-PR-HNO	147.8	Radionuclides	8/27 ①	F½ HNO_3	
ms-3	MSS-081688-MMIII-OTD-1-IR	935.6	"	8/27 ①	B½ HNO_3	
ms-4	MSS-081688-MMIII-OTC-1-PR-Ace	201	Particulate/Radionuclides	0055	F½ acetone	A
ms-5	MSS-081688-MMIII-OTC-1PR-HNO	228.6	"	8/27 ①	F½ HNO_3	
ms-6	MSS-081688-MMIII-OTC-1-IR	992.4	"	8/27 ①	B½ HNO_3	
ms-7	MSS-081688-MMIII-OTB-1-PR	135.0	"	8/27 ①	F½ Acetone	A
ms-8	MSS-081688-MMIII-OTB-1-PR	121.37	"	8/27 ①	F½ HNO_3	
ms-9	MSS-081688-MMIII-OTB-1-IR	891.7	"	8/27 ①	B½ HNO_3	
ms-10	MSS-081688-MMIII-OTA-1-PR		"	0055	F½ Acetone	A
ms-11	MSS-081688-MMIII-OTA-1-PR	134.65	"	8/27 ①	F½ HNO_3	
ms-12	MSS-081688-MMIII-OTA-1-IR	963.3	"	8/27 ①	B½ HNO_3	
ms-13	MSS-081688-MMIII-~~IN~~-T-PR	68.14	"	0055	F½ Acetone	A
ms-14	MSS-081688-MMIII-IN-1-PR	95.98	"	8/27 ①	F½ Nitric	
ms-15	MSS-081688-MMIII-IN-1-IR	890.2	"	8/27 ①	B½ Nitric	
ms-16	MSS-081688-MMIII-FS-1-C	587.6	Radionuclides	8/27 ①	BLEND FEEDSTOCK COMPOSITE	
MS-17	MSS-081788-MMIII-IN-02-IR	923.7	"	8/20 ①	B½ Nitric	
ms-18	MSS-081788-MMIII-IN-02-PR-Ace	264.3	Particulate/Radionuclides	8/20 ①	F½ acetone	
MS19	MSS-081788-MMIII-OTC-2-PR-Ace	253.2	PM/Radionuclides	8/20 ①	F½ acetone	
MS20	MSS-081788-MMIII-OTA-2-PR-Ace	241.8	"	8/20 ①	F½ acetone	
MS21	MSS-081788-MMIII-OTB-2-PR-Ace	232.3	"	8/20 ①	F½ acetone	
MS22	MSS-081788-MMIII-OTD-2-PR-Ace	110.9	"	8/20 ①	F½ acetone	
MS23	MSS-081788-MMIII-IN-HNO_3-PR	303.2	"	8/20 ①	F½ Nitric	
MS24	MSS-081788-MMIII-OTA-2-PR-HNO_3	181.19	"	8/20 ①	F½ Nitric	
MS25	MSS-081788-MMIII-OTB-2-PR-HNO_3	174.5	"	8/20 ①	F½ Nitric	
MS26	MSS-081788-MMIII-OTC-2-PR-HNO_3	129.6	"	8/20 ①	F½ Nitric	
MS27	MSS-081788-MMIII-OTD-2-PR-HNO_3	110.53	"	8/20 ①	F½ Nitric	
MS28	MSS-081788-MMIII-OTA-2-IR	989.6	"	8/20 ①	B½ HNO_3	
MS29	MSS-081788-MMIII-OTB-2-IR	953.6	"	8/20 ①	B½ HNO_3	
MS30	MSS-081788-MMIII-OTC-2-IR	912.1	"	8/20 ①	B½ HNO_3	
MS31	MSS-081788-MMIII-OTD-2-IR	807.4	"	8/20 ①	B½ HNO_3	
MS32	MSS-081788-MMIII-IN-03-PR-Ace	180.6	"	8/20 ①	F½ Acetone	
MS33	MSS-081788-MMIII-IN-03-PR-HNO_3	150.3	"	8/20 ①	F½ Nitric	
MS34	MSS-081788-MMIII-IN-3-IR	954.0	"	8/20 ①	B½ HNO_3	

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Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Page No.

Field #	Sample Code	Sample Wt	Analysis	Shipped	Comments
MS-35	MSS-081788-MMIII-OTB-3-IR	881.92	particulate/radionuclides	8/20	B½ HNO_3
MS-36	MSS-081788-MMIII OTC-3-PR	133.8	"	8/20 ④	F½ acetone
MS-37	MSS-081788-MMIII-OTD-3 PR	209.5	"	" 8/20 ④	F½ acetone
MS-38	MSS-081788-MMIII-OTB-3 PR	262.96	"	" 8/20 ④	F½ acetone
MS-39	MSS-081788 MMIII OTA 3 PR	204.1	"	8/20 ④	F½ acetone
MS 40	MSS-081788-MMIII-OTD-3-PR	155.1	"	" 8/20 ①	F½ Nitric
MS 41	MSS-081788-MMIII-OTB-3-PR	251.16	"	" 8/20 ①	F½ Nitric
MS 42	MSS-081788-MMIII-OTC-3-PR	143.2	"	" 8/20 ①	F½ Nitric
MS 43	MSS-081788-MMIII-OTA-3-PR	108.3	"	" 8/20 ①	F½ Nitric
MS44	MSS-081788-MMIII-OTD-3-IR	902.8	"	" 8/20 ①	B½ Nitric
MS45	MSS-081788-MMIII-OTC-3-IR	886.5	"	8/20 ①	B½ Nitric
MS46	MSS-081788-MMIII-OTA-3-IR	710.6	"	8/20 ①	B½ Nitric
MS47	MSS-0818-88-ACE-BLANK	29.25		8/22 ⑤	Acetone Blank
MS48	MSS-081888-NIT-BLANK	105.36		8/22 ⑤	Nitric Blank
MS49	MSS-081688-FS-2	565.3	"	" 8/20 ①	Process Grab
MS50	MSS-081788-FS-3	889.8	"	" 8/20 ①	Process Grab
MS-51	MSS-081888-MMIII-OTB-4-IR	~~897.8~~ 910½	"	8/20 ①	B½ nitric
MS-52	MSS-081888-MMIII-OTA-4-PR	137.9	"	8/20 ①	F½ nitric
MS-53	MSS 081888 MMIII-OTA-4 PR	238.35 (0.0147)		8/20 ⑤	F½ acetone
MS-54	MSS-081888 MMIII-OTB-4-PR	230.4 (0.0079)		" —	F½ acetone
MS-55	MSS-081888 MMIII-IN-4-PR	268.9	"	"	F½ acetone
MS-56	MSS-081888 MMIII-OTC-4-PR	160.2		8/20 ⑤	F½ nitric
MS-57	MSS-081888 MMIII-IN-4-PR	291.09		8/20 ⑤	F½ nitric
MS 58	MSS 081888 MMIII-OTC-4-PR	281.2 (0.0134)		8/20 ④	F½ acetone
MS 59	MSS 081888 MMIII-IN-4-IR	~~874.6~~ 890½	"	" 8/20 ①	B½ HNO_3 (nitric)
MS-60	MSS-081888-MMIII-OTA-4-IR	~~826.2~~ 840½	"	" 8/20 ①	B½ nitric
MS-61	MSS-081888 MMIII-OTD-4-IR	906.5 8930½	"	" 8/20 ①	B½ nitric
MS-62	MSS-081888 MMIII-OTC-4-IR	~~842.3~~ 860½	"	" 8/20 ①	B½ nitric
MS-63	MSS-081888-MMIII-OTD-4-PR	186.2	"	" 8/20 ①	F½ nitric 8/20
MS-64	MSS-081888 MMIII OTD-4PR	303.3 (0.0725)	"	8/20 ⑤	F½ acetone
MS-65	MSS-081988-MMIII-OTB-4-PR	151.5	"	" 8/20 ①	F½ Nitric
MS-66	MSS-081688-MMIII-OTA-1-F	0.0019	"	" 8/24 ⑥	# W-1 filter
MS-67	MSS-081688-MMIII-OTB-1-F	0.0147	"	" 8/24 ⑥	# W-2 filter

To Page No. 15

Witnessed & Understood by me,	Date	Invented by * values in "( )" are desiccated crucible weights	Date
		Recorded by	

TITLE Sample Log (cont.)

Project No.
Book No. 21088

From Page No.

Field #	Sample Code	Sample wt.	Analysis	Shipped Date (Box)	Comments	Archive
MS-68	MSS-081688-OTC-1-F	0.0095	particulates/radionuclides	8/27 ①	filter # W-3	A
MS-69	MSS-081688-OTD-1-F	0.0010	"	" 8/27 ①	filter # W-4	A
MS-70	MSS-081688-MMIII-IN-1-F	0.3663	"	" 8/27 ①	Filter # W-5	A
MS-71	MSS-081788-MMIII-OTA-2-F	0.0127	"	8/20 ②	filter # W7	
MS-72	MSS-081788-MMIII-OTB-2-F	0.0164	"	8/20 ②	filter # W6	
MS-73	MSS-081788-MMIII-OTC-2-F	0.0098	"	8/20 ②	filter # W9	
MS-74	MSS-081788-MMIII-OTD-2-F	0.0113	"	" 8/29 ①	filter # W8	A
MS-75	MSS-081788-MMIII-IN-2-F	0.4603	"	8/20 ②	filter # W10	
MS-76	MSS-081788-MMIII-OTA-3-F	0.0111	"	8/20 ②	filter # W12	
MS-77	MSS-081788-MMIII-OTB-3-F	0.0113	"	8/20 ②	filter # W14	
MS-78	MSS-081788-MMIII-OTC-3-F	0.0087	"	8/20 ②	filter # W11	
MS-79	MSS-081788-MMIII-OTD-3-F	0.0152	"	8/20 ②	filter # W13	
MS-80	MSS-081788-MMIII-IN-3-F	0.3927	"	8/20 ②	filter # W15	
MS-81	MSS-081988-GR-3	1220.7	"	" 8/20 ①	Process Grab	
* MS-82	MSS-081988-MMIII-OTD-5-PRN	248.56	"	" 8/27 ①	F½ Nitric	
MS-83	MSS-081988-MMIII-OTD-5-IR	871.0	"	" 8/27 ①	B½ Nitric	
MS-84	MSS-081988-MMIII-OTD-5-F	~~0.0095~~ 0.0110	"	" 8/20 ②	Filter # 21	
MS-85	MSS-081988-MMIII-IN-FB-PRA	178.55	"	" 0049	F½ Acetone	
MS-86	MSS-081988-MMIII-IN-FB-IR	408.25	"	" 8/29 ①	B½ Nitric	
MS-87	MSS-081988-MMIII-IN-FB-PRN	196.07	"	" 8/29 ①	F½ Nitric	
MS-88	MSS-081988-MMIII-OTA-FB-PRA	190.5	"	" 8/29 ①	F½ Acetone	A
MS-89	MSS-081988-MMIII-OTA-FB-PRN	153.85	"	" 8/29 ①	F½ Nitric	
MS-90	MSS-081988-MMIII-OTA-FB-IR	365.11	"	" 8/29 ①	B½ Nitric	
MS-91	MSS-081988-MMIII-OTA-FB-F		"	" 8/29 ①	Filter # W-23	
MS-92	MSS-081988-MMIII-IN-FB-F		"	" 8/29 ①	Filter # W-22	
MS-93	MSS-081988-FS-5	894.3	"	" 8/27 ①	Blend Feedstock	A
MS-94	MSS-081888-MMIII-OTA-4-F	0.0125	"	" 8/20 ②	Filter # W-16	
MS-95	MSS-081888-MMIII-OTB-4-F	0.0158	"	" 8/20 ②	Filter # W-17	
MS-96	MSS-081888-MMIII-OTC-4-F	0.0092	"	" 8/20 ②	Filter # W-18	
MS-97	MSS-081888-MMIII-OTD-4-F	0.0129	"	" 8/20 ②	Filter # W-20	
MS-98	MSS-081888-MMIII-IN-4-F	0.4351	"	" 8/20 ②	Filler # W-19	
B MS-99	MSS-081988-MMIII-OTD-5-PR	27.90	mislabelled as MS-84 (twice)	①	Front half Probe - 9.0819 g	

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

From Page No.

FIELD #	SAMPLE CODE	SAMPLE WT. g	ANALYSIS/	COC #	COMMENTS	
MS-100	MSS-081788-PSD-IN-1-ST1		PM; pC: (α radiation) ✓		NO PM on Stg 0,1	FILTER SET
MS-101	MSS-081788-PSD-IN-1-ST2-5		" "	0055	NO PM ON STG 2,3+4	"
MS-102	MSS-081788-PSD-IN-1-ST6	0.00896	" "	0055		"
MS-103	MSS-081788-PSD-IN-1-ST7	0.00970	" "	0055		"
MS-104	MSS-081788-PSD-IN-1-ST8	0.1719	" "	0055		"
MS-105	MSS-081788-PSD-IN-1-ST9	0.1302	" "	0055	BACKUP FILTER	"
MS-106	MSS-081788-PSD-OTC-1-ST1		" "	0055	STG 0,+1	FILTER W
MS-107	MSS-081788-PSD-OTC-1-ST2-5		" "	0055	STG. 2,3,4+5	"
MS-108	MSS-081788-PSD-OTC-1-ST6	0.00053	" "	0055	STG. 6	"
MS-109	MSS-081788-PSD-OTC-1-ST7	0.0176	" "	0055	STG. 7	"
MS-110	MSS-081788-PSD-OTC-1-ST8	0.00264	" "	0055	STG. 8	"
MS-111	MSS-081788-PSD-OTC-1-ST9	0.01000 ~~0.1002~~	" "	0055	BACKUP FILTER	"
MS-112	MSS-081888-PSD-IN-2-ST1		" "	0055	NO VISIBLE PM ON STG. 0,1	SET FILTER Q
MS-113	MSS-081888-PSD-IN-2-ST2-5		" "	0055	NO VISIBLE PM ON STG 2,3+4	"
MS-114	MSS-081888-PSD-IN-2-ST6	0.01024	" "	0055		"
MS-115	MSS-081888-PSD-IN-2-ST7	0.01577	" "	0055		"
MS-116	MSS-081888-PSD-IN-2-ST8	0.01925	" "	0055		"
MS-117	MSS-081888-PSD-IN-2-ST9	0.01580	" "	0055		"
MS-118	MSS-081888-PSD-OTC-2-ST1		" "	0055		FILTER SET R
MS-119	MSS-081888-PSD-OTC-2-ST2-5		" "	0055		"
MS-120	MSS-081888-PSD-OTC-2-ST6	0.00037	" "	0055		"
MS-121	MSS-081888-PSD-OTC-2-ST7	0.00108	" "	0055		"
MS-122	MSS-081888-PSD-OTC-2-ST8	0.00173	" "	0055		"
MS-123	MSS-081888-PSD-OTC-2-ST9	0.00675	" "	0055		"
MS-124	MSS-081988-PSD-IN-3-ST1	~~0.00041~~	" "	0055		FILTER # V
MS-125	MSS-081988-PSD-IN-3-ST2-5	~~0~~	" "	0055		FILTER SET V
MS-126	MSS-081988-PSD-IN-3-ST6	0.00063	" "	0055		"
MS-127	MSS-081988-PSD-IN-3-ST7	0.00245	" "	0055		"
MS-128	MSS-081988-PSD-IN-3-ST8	0.00417	" "	0055		"
MS-129	MSS-081988-PSD-IN-3-ST9	0.01145	" "	0055		"
MS-130	MSS-081988-PSD-OTC-3-ST1		" "	0055		FILTER SET AP

$\boxed{\text{COC / 0055 shipped 8/27/88 BW}}$

To Page No.

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No.

Book No. 21088 TITLE

From Page No. MONSANTO SAMPLE LOG

FIELD #	SAMPLE CODE	SAMPLE WEIGHT	ANALYSIS COC	COMMENTS	
MS-131	MSS-081988-PSD-OTC-3-ST45		PM + pCi (α radiation)	STG 2,3,4+5	FILTERSET AD
MS-132	MSS-081988-PSD-OTC-3-ST6	0.00395	" " 0055	STG 6	"
MS-133	MSS-081988-PSD-OTC-3-ST7	0.00600	" " 0055	STG	"
MS-134	MSS-081988-PSD-OTC-3-ST8	0.00778	" " 0055		"
MS-135	MSS-081988-PSD-OTC-3-ST9	0.01117	" " 0055		"
MS-136	MSS-081788-PSD-OTA-1		ARCHIVE AT RADIAN	ENTIRE FILTERSET	U
MS-137	MSS-081788-PSD-OTB-1		" " "	" " "	
MS-138	MSS-081788-PSD-OTD-1		" " "	" " "	
MS-139	MSS-081888-PSD-OTA-2		" " "	" " "	N
MS-140	MSS-081888-PSD-OTB-2		" " "	" " "	AG
MS-141	MSS-081888-PSD-OTD-2		" " "	" " "	AF
MS-142	MSS-081988-PSD-OTA-3		" " "	" " "	AA
MS-143	MSS-081988-PSD-OTB-3		" " "	" " "	
MS-144	MSS-081988-PSD-OTD-3		" " "	" " "	

To Page No.

Witnessed & Understood by me,	Date	Inventor K-6 Recorded by	Date

APPENDIX L - RADIONUCLIDE ANALYTICAL DATA

APPENDIX L.1 - MM 111 Radionuclide Data

Sample ID	PS 88.05646
Sample type	MISC
Collection date, time	8/17/88 0:00
Receipt date	8/23/88
Completion date	9/ 9/88
Flag date	10/27/88
Location	ID:SODA SPRINGS
Other ID's	MS1H,23,75: FRONT HALF
Comments	MSS081788-MM111-IN-2-PRA, MSS081788-MM111-IN-2-PRN, MS6081788-MM111-IN-2-F, PROBE RINSE AND FILTER
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/ 9/88) and GL (9/ 9/88)
Date, time counted	9/ 5/88 14:30
Length of count	1000 min
Preparer	ASVL
Counting system	TN2A
Sample size	0.002000 SAMP
Comments	2 ML OF 1000 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	8.3162E+03	14.73 %	PCI/SAMP	9/ 5/88	ANALYSIS
PB-210	8.3305E+03	14.73 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.0220E+01	11.49 %	PER CENT	9/ 5/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/ 9/88) and GL (9/ 9/88)
Date, time counted	9/ 6/88 15:11
Length of count	1000 min
Preparer	ASVL
Counting system	AS17
Sample size	0.002000 SAMP
Comments	2 ML OF 1000 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	2.1371E+04	9.66 %	PCI/SAMP	9/ 5/88	ANALYSIS
PO-210	2.2678E+04	9.66 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.5390E+01	9.36 %	PER CENT	9/ 5/88	

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Sample ID                 PS  86.05647
Sample type               MISC
Collection date, time      8/17/88    0:00
Receipt date               8/23/88
Completion date            9/ 8/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS17: BACK HALF
Comments                  MSS081788-MM111-IN-2-IR, IMPINGER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB         **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 2/88  15:05
  Length of count         1000 min
  Preparer                ERVL
  Counting system         TN2B
  Sample size               0.030000 SAMP
  Comments                3 ML OF 100 ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     1.8213E+01      62.28 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PB-210     1.8239E+01      62.28 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      8.1456E+01       8.00 %  PER CENT   9/ 2/88

Type of analysis          ********** PO-AUTO  **********
 Verified by             GL ( 9/ 8/88) and GL ( 9/ 8/88)
 Date, time counted        9/ 3/88  12:00
 Length of count          1000 min
 Preparer                 ERVL
 Counting system          AS22
 Sample size                0.030000 SAMP
 Comments                 3 ML OF 100 ML
   NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
   PO-210     1.8175E+03       8.71 %  PCI/SAMP   9/ 2/88 ANALYSIS
   PO-210     1.9681E+03       8.71 %  PCI/SAMP   8/17/88 COLLECTION
   YIELD      8.1229E+01       8.50 %  PER CENT   9/ 2/88
```

Sample ID PS 88.05618
Sample type MISC
Collection date, time 8/17/88 0:00
Receipt date 8/23/88
Completion date 9/ 8/88
Flag date 10/22/88
Location ID:SODA SPRINGS
Other ID's MS20,24,71: FRONT HALF
Comments MSS081788-MM111-OTA-2-PRA, MSS081788-MM111-OTA-2-PRN, MSS081788-MM111-OTA-2-F, PROBE RINSE AND FILTER
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/ 8/88) and GL (9/ 8/88)
Date, time counted 8/30/88 12:10
Length of count 1000 min
Preparer ASVL
Counting system TN3D
Sample size 0.160000 SAMP
Comments 16 ML OF

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	2.1333E+02	7.56 %	PCI/SAMP	8/29/88	ANALYSIS
PB-210	2.1356E+02	7.56 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	6.2658E+01	6.23 %	PER CENT	8/29/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/ 8/88) and GL (9/ 8/88)
Date, time counted 8/31/88 14:13
Length of count 1000 min
Preparer ASVL
Counting system AS18
Sample size 0.160000 SAMP
Comments 16 ML OF

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	6.6633E+02	5.82 %	PCI/SAMP	8/29/88	ANALYSIS
PO-210	6.9447E+02	5.82 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	4.9696E+01	5.67 %	PER CENT	8/29/88	

```
Sample ID                  PS  88.05649
Sample type                MISC
Collection date, time       8/17/88    0:00
Receipt date                8/23/88
Completion date             9/ 9/88
Flag date                  10/22/88
Location                   ID:SODA SPRINGS
Other ID's                 MS28: BACK HALF
Comments                   MSS081788-MM111-OTA-2-IR, IMPINGER
Report to                  GERRY LUSTER

 Type of analysis          ********** PO        **********
  Verified by             GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted        9/ 4/88   9:46
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          AS20
  Sample size                0.500000 SAMP
  Comments                 RECALCULATION
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS      DATE
    PO-210     3.0599E+01       6.34 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PO-210     3.2775E+01       6.34 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      4.4415E+01       5.33 %  PER CENT   9/ 1/88

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted        9/ 1/88  15:05
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          SH2B
  Sample size                0.500000 SAMP
  Comments                 50 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS      DATE
    PB-210     2.7940E+00      46.59 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PB-210     2.7978E+00      46.59 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      5.8742E+01       6.03 %  PER CENT   9/ 1/88
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Sample ID                 PS  88,05650
Sample type               MISC
Collection date, time      8/17/88   0:00
Receipt date               8/23/88
Completion date            0/ 0/00
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS21,25,72: FRONT HALF
Comments                  MSS081788-MM111-OTB-2-PRA, MSS081788-MM111-OTB-2-PRN, MSS081788-MM111-OTB-2-F, PROBE RINSE AND FILTER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 7/88  14:35
  Length of count         1000 min
  Preparer                ASVL
  Counting system         SH1A
  Sample size               0,250000 SAMP
  Comments                C
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     2,7251E+02      12,84 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PB-210     2,7302E+02      12,84 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      5,9808E+01      12,11 %  PER CENT   9/ 7/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 8/88  14:42
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS21
  Sample size               0,250000 SAMP
  Comments                C
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     1,2546E+03      16,90 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PO-210     1,3639E+03      16,90 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      1,5909E+01      16,78 %  PER CENT   9/ 7/88
```

```
Sample ID                PS  88.05650X
Sample type              MISC
Collection date, time     8/17/88    0:00
Receipt date              8/23/88
Completion date           0/ 0/00
Flag date                10/22/88
Location                 ID:SODA SPRINGS
Other ID's               MS21,25,72: FRONT HALF
Comments                 MSS081788-MM111-OTB-2-PRA, MSS081788-MM111-OTB-2-PRN, MSS081788-MM111-OTB-2-F, PROBE RINSE AND FILTER
Report to                GERRY LUSTER

 Type of analysis        ********** PB         **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      8/30/88  12:10
  Length of count        1000 min
  Preparer               ASVL
  Counting system        TN2B
  Sample size              0.250000 SAMP
  Comments               25 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     2.7029E+02       9.55 %  PCI/SAMP   8/29/88 ANALYSIS
    PB-210     2.7058E+02       9.55 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.7561E+01       8.85 %  PER CENT   8/29/88

 Type of analysis        ********** PO-AUTO  **********
  Verified by            GL ( 9/15/88) and GL ( 9/15/88)
  Date, time counted      8/31/88  14:13
  Length of count        1000 min
  Preparer               ASVL
  Counting system        AS20
  Sample size              0.250000 SAMP
  Comments               25 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     1.1763E+03      10.72 %  PCI/SAMP   8/29/88 ANALYSIS
    PO-210     1.2326E+03      10.72 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      1.8303E+01      10.62 %  PER CENT   8/29/88
```

```
Sample ID                  PS  88,05651
Sample type                MISC
Collection date, time       8/17/88    0:00
Receipt date                8/23/88
Completion date             9/ 8/88
Flag date                  10/22/88
Location                   ID:SODA SPRINGS
Other ID's                 MS29: BACK HALF
Comments                   MSS081788-MM111-UTB-2-IR, IMPINGER
Report to                  GERRY LUSTER

 Type of analysis          *********** PB        **********
  Verified by             GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted        9/ 1/88  15:05
  Length of count         1000 min
  Preparer                ERVL
  Counting system         SH3A
  Sample size                0.300000 SAMP
  Comments                 30 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210   -1.0364E+00     166.89 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PB-210   -1.0378E+00     166.88 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.7273E+01      10.66 %  PER CENT   9/ 1/88

 Type of analysis          *********** PO-AUTO   **********
  Verified by             GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted        9/ 4/88   9:46
  Length of count         1000 min
  Preparer                ERVL
  Counting system         AS21
  Sample size                0.300000 SAMP
  Comments                 30 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    6.4482E+01       6.60 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PO-210    6.9610E+01       6.60 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.9138E+01       6.12 %  PER CENT   9/ 1/88
```

```
Sample ID               PS  88.05652
Sample type             MISC
Collection date, time    8/17/88   0:00
Receipt date             8/23/88
Completion date          0/ 0/00
Flag date               10/22/88
Location                ID:SODA SPRINGS
Other ID's              MS19,26,73: FRONT HALF
Comments                MSS081788-MM111-OTC-2-PRA, MSS081788-MM111-OTC-2-PRN, MSS081788-MM111-OTC-2-F, PROBE RINSE AND FILTER
Report to               GERRY LUSTER

 Type of analysis       ********** PO       **********
  Verified by          GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted     9/ 8/88  14:42
  Length of count       1000 min
  Preparer              ASVL
  Counting system       AS22
  Sample size             0.300000 SAMP
  Comments              RECALCULATION, 30 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     4.4371E+02      12.28 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PO-210     4.7674E+02      12.28 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      2.6240E+01      12.06 %  PER CENT   9/ 7/88

 Type of analysis       ********** PB       **********
  Verified by          GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted     9/ 7/88  14:35
  Length of count       1000 min
  Preparer              ASVL
  Counting system       SH1B
  Sample size             0.300000 SAMP
  Comments              30 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     1.4668E+02       8.73 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PB-210     1.4696E+02       8.72 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      5.3086E+01       7.68 %  PER CENT   9/ 7/88
```

Sample ID PS 98,05653
Sample type MISC
Collection date, time 8/17/88 0:00
Receipt date 8/23/88
Completion date 9/ 8/88
Flag date 10/22/88
Location ID:SODA SPRINGS
Other ID's MS30: BACK HALF
Comments MSS081788-MM111-OTC-2-1R, IMPINGER
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/ 8/88) and GL (9/ 8/88)
Date, time counted 9/ 1/88 15:05
Length of count 1000 min
Preparer ERVL
Counting system SH3R
Sample size 0.250000 SAMP
Comments 25 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	6.2527E+00	34.85 %	PCI/SAMP	9/ 1/88	ANALYSIS
PB-210	6.2612E+00	34.85 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	6.2630E+01	7.98 %	PER CENT	9/ 1/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/ 8/88) and GL (9/ 8/88)
Date, time counted 9/ 4/88 9:46
Length of count 1000 min
Preparer ERVL
Counting system AS22
Sample size 0.250000 SAMP
Comments 25 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	3.1824E+01	7.94 %	PCI/SAMP	9/ 1/88	ANALYSIS
PO-210	3.3825E+01	7.94 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	5.9997E+01	6.82 %	PER CENT	9/ 1/88	

```
Sample ID                PS  88.05657
Sample type              MISC
Collection date, time     8/17/88   0:00
Receipt date              8/23/88
Completion date           0/ 0/00
Flag date                10/22/88
Location                 ID:SODA SPRINGS
Other ID's               MS32,33,80: FRONT HALF
Comments                 MSS081788-MM111-IN-3-PRA, MSS081788-MM111-IN-3-PRN, MSS081788-MM111-IN-3-F, PROBE RINSE AND FILTER
Report to                GERRY LUSTER

 Type of analysis        ********** PO        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 3/88  12:00
  Length of count        1000 min
  Preparer              ASVL
  Counting system       AS23
  Sample size              0.004000 SAMP
  Comments               RECALCULATION, 4 ML OF 1000
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     1.6054E+04      9.47 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PO-210     1.6983E+04      9.47 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.5740E+01      9.27 %  PER CENT   9/ 2/88

 Type of analysis        ********** PB        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 2/88  15:05
  Length of count        1000 min
  Preparer              ASVL
  Counting system       TN2C
  Sample size              0.004000 SAMP
  Comments               RECALCULATION, 4 ML OF 1000
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     4.9513E+03     10.78 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PB-210     4.9584E+03     10.78 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      8.2436E+01      9.21 %  PER CENT   9/ 2/88
```

Sample ID PS 88,05658
Sample type MISC
Collection date, time 8/17/88 0:00
Receipt date 8/23/88
Completion date 9/ 8/88
Flag date 10/22/88
Location ID:SODA SPRINGS
Other ID's MS34: BACK HALF
Comments MSS081788-MM111-IN-3-IR, IMPINGER
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/ 8/88) and GL (9/ 8/88)
Date, time counted 9/ 2/88 15:05
Length of count 1000 min
Preparer ERVL
Counting system TN2D
Sample size 0.030000 SAMP
Comments 3 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	9.2612E+00	139.27 %	PCI/SAMP	9/ 2/88	ANALYSIS
PB-210	9.2746E+00	139.27 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	8.3328E+01	8.05 %	PER CENT	9/ 2/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/ 8/88) and GL (9/ 8/88)
Date, time counted 9/ 3/88 12:00
Length of count 1000 min
Preparer ERVL
Counting system AS24
Sample size 0.030000 SAMP
Comments 3 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.4150E+03	9.34 %	PCI/SAMP	9/ 2/88	ANALYSIS
PO-210	1.5327E+03	9.34 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.3002E+01	9.04 %	PER CENT	9/ 2/88	

```
Sample ID                  PS  88.05659
Sample type                MISC
Collection date, time      8/17/88    0:00
Receipt date               8/23/88
Completion date            9/ 9/88
Flag date                  10/22/88
Location                   ID;SODA SPRINGS
Other ID's                 MS39,43,76; FRONT HALF
Comments                   MSS081788-MM111-OTA-3-PRA, MSS081788-MM111-OTA-3-PRN, MSS081788-MM111-OTA-3-F, PROBE RINSE AND FILTER
Report to                  GERRY LUSTER

 Type of analysis          ********** PO        **********
  Verified by              GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted        9/ 5/88   8:38
  Length of count          1000 min
  Preparer                 ASVL
  Counting system          AS17
  Sample size                0.160000 SAMP
  Comments                 RECALCULATION
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     3.5724E+02      8.13 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210     3.7446E+02      8.13 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.1959E+01      7.78 %  PER CENT   8/31/88

 Type of analysis          ********** PB        **********
  Verified by              GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted        8/31/88  14:05
  Length of count          1000 min
  Preparer                 ASVL
  Counting system          TN3B
  Sample size                0.160000 SAMP
  Comments                 16 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     1.2086E+02     10.33 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210     1.2102E+02     10.33 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.2592E+01      7.75 %  PER CENT   8/31/88
```

```
Sample ID                 PS  88.05660
Sample type               MISC
Collection date, time      8/17/88   0:00
Receipt date               8/23/88
Completion date            9/ 8/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS46: BACK HALF
Comments                  MSS081788-MM111-OTA-3-IR, IMPINGER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 1/88  15:05
  Length of count         1000 min
  Preparer                ERVL
  Counting system         TN3B
  Sample size               0.250000 SAMP
  Comments                25 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     8.8714E-01    213.79 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PB-210     8.8834E-01    213.79 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.8466E+01      9.65 %  PER CENT   9/ 1/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 4/88    9:46
  Length of count         1000 min
  Preparer                ERVL
  Counting system         AS23
  Sample size               0.250000 SAMP
  Comments                25 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     2.5140E+01      7.72 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PO-210     2.7038E+01      7.72 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.6046E+01      6.52 %  PER CENT   9/ 1/88
```

```
Sample ID                  PS  88,05660X
Sample type                MISC
Collection date, time       8/17/88    0:00
Receipt date                8/23/88
Completion date             9/ 8/88
Flag date                  10/22/88
Location                   ID:SODA SPRINGS
Other ID's                 MS46: BACK HALF
Comments                   MSS081788-MM111-OTA-3-IR, IMPINGER
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted        9/ 1/88  15:05
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          TN3D
  Sample size                0.250000 SAMP
  Comments                 25 ML OF 100 ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PB-210     4.8101E+00      42.75 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PB-210     4.8166E+00      42.75 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.9534E+01       8.77 %  PER CENT   9/ 1/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted        9/ 4/88   9:46
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          AS24
  Sample size                0.250000 SAMP
  Comments                 25 ML OF 100 ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PO-210     2.6255E+01       7.71 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PO-210     2.7933E+01       7.71 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.2248E+01       6.52 %  PER CENT   9/ 1/88
```

```
Sample ID                 PS  88.05661
Sample type               MISC
Collection date, time      8/17/88    0:00
Receipt date               8/23/88
Completion date            9/ 8/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS38,41,77: FRONT HALF
Comments                  MSS081788-MM111-OTB-3-PRA, MSS081788-MM111-OTB-3-PRN, MSS081788-MM111-OTB-3-F, PROBE RINSE AND FILTER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       8/31/88  14:05
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TN3D
  Sample size               0.120000 SAMP
  Comments                12 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR     UNITS     DATE
    PB-210     1.8005E+02       9.14 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210     1.8028E+02       9.14 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.7994E+01       7.26 %  PER CENT   8/31/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 5/88    8:38
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS18
  Sample size               0.120000 SAMP
  Comments                12 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR     UNITS     DATE
    PO-210     6.1975E+02       8.24 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210     6.5178E+02       8.24 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.0858E+01       7.98 %  PER CENT   8/31/88
```

```
Sample ID                PS  88,05662
Sample type              MISC
Collection date, time     8/17/88   0:00
Receipt date              8/23/88
Completion date           9/ 8/88
Flag date                10/22/88
Location                 ID:SODA SPRINGS
Other ID's               MS35: BACK HALF
Comments                 MSS081788-MM111-UTB-3-IR, IMPINGER
Report to                GERRY LUSTER

 Type of analysis        ********** PB        **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 1/88  15:05
  Length of count        1000 min
  Preparer               ERVL
  Counting system        SH2A
  Sample size               0.500000 SAMP
  Comments               50 ML OF 100 ML
    NUCLIDE     ACTIVITY    2 SIG ERROR     UNITS      DATE
    PB-210     1.5622E+00      113.60 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PB-210     1.5643E+00      113.60 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.4168E+01        6.49 %  PER CENT   9/ 1/88

 Type of analysis        ********** PO-AUTO   **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 4/88   9:46
  Length of count        1000 min
  Preparer               ERVL
  Counting system        AS19
  Sample size               0.500000 SAMP
  Comments               50 ML OF 100 ML
    NUCLIDE     ACTIVITY    2 SIG ERROR     UNITS      DATE
    PO-210     6.8700E+01        7.31 %  PCI/SAMP   9/ 1/88 ANALYSIS
    PO-210     7.3954E+01        7.31 %  PCI/SAMP   8/17/88 COLLECTION
    YIFLD      6.9325E+01        6.81 %  PER CENT   9/ 1/88
```

```
Sample ID                PS  88,05663
Sample type              MISC
Collection date, time     8/17/88    0:00
Receipt date              8/23/88
Completion date           9/ 8/88
Flag date                10/22/88
Location                 ID:SODA SPRINGS
Other ID's               MS36,42,78; FRONT HALF
Comments                 MSS081788-MM111-OTC-3-PRA, MSS081788-MM111-OTC-3-PRN, MSS081788-MM111-OTC-3-F, PROBE RINSE AND FILTER
Report to                GERRY LUSTER

 Type of analysis        ********** PB         **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 2/88  15:05
  Length of count        1000 min
  Preparer               ASVL
  Counting system        SH1A
  Sample size              0.120000 SAMP
  Comments               A, 12 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    1.5499E+02        8.62 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PB-210    1.5521E+02        8.62 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     7.1793E+01        6.59 %  PER CENT   9/ 2/88

 Type of analysis        ********** PO-AUTO    **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 3/88  12:00
  Length of count        1000 min
  Preparer               ASVL
  Counting system        AS17
  Sample size              0.120000 SAMP
  Comments               A, 12 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    5.0364E+02        8.35 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PO-210    5.3281E+02        8.35 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.4786E+01        8.08 %  PER CENT   9/ 2/88

 Type of analysis        ********** PB         **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 2/88  15:05
  Length of count        1000 min
  Preparer               ASVL
  Counting system        SH1B
  Sample size              0.120000 SAMP
  Comments               B, 12 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    1.7035E+02       12.27 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PB-210    1.7060E+02       12.27 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.6270E+01        9.64 %  PER CENT   9/ 2/88

 Type of analysis        ********** PO-AUTO    **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 3/88  12:00
  Length of count        1000 min
  Preparer               ASVL
  Counting system        AS18
  Sample size              0.120000 SAMP
  Comments               B, 12 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    5.1106E+02        7.90 %  PCI/SAMP   9/ 2/88 ANALYSIS
```

PO-210	5.3957E+02	7.90 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	6.9932E+01	7.65 %	PER CENT	9/ 2/88	

```
Sample ID              PS  88.05664
Sample type            MISC
Collection date, time   8/17/88   0:00
Receipt date            8/23/88
Completion date         9/ 8/88
Flag date              10/22/88
Location               ID:SODA SPRINGS
Other ID's             MS45: BACK HALF
Comments               MSS081788-MM111-OTC-3-IR, IMPINGER
Report to              GERRY LUSTER

 Type of analysis      ********** PB       **********
  Verified by         GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted    8/30/88  12:10
  Length of count      1000 min
  Preparer             ZSVL
  Counting system      TN2D
  Sample size            0.500000 SAMP
  Comments             50 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    8.2760E-01     129.33 %  PCI/SAMP   8/29/88 ANALYSIS
    PB-210    8.2850E-01     129.33 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     7.5322E+01       6.12 %  PER CENT   8/29/88

 Type of analysis      ********** PO-AUTO  **********
  Verified by         GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted    8/31/88  14:13
  Length of count      1000 min
  Preparer             ZSVL
  Counting system      AS22
  Sample size            0.500000 SAMP
  Comments             50 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    1.3027E+02       8.07 %  PCI/SAMP   8/29/88 ANALYSIS
    PO-210    1.3831E+02       8.07 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     4.3865E+01       7.72 %  PER CENT   8/29/88
```

```
Sample ID                 PS  88.05665
Sample type               MISC
Collection date, time      8/17/88   0:00
Receipt date               8/23/88
Completion date            0/ 0/00
Flag date                 10/22/88
Location                  ID;SODA SPRINGS
Other ID's                MS37,40,79; FRONT HALF
Comments                  MSS081788-MM111-OTD-3-PRA, MSS081788-MM111-OTD-3-PRN, MSS081788-MM111-OTD-3-F, PROBE RINSE AND FILTER
Report to                 GERRY LUSTER

 Type of analysis         ********** PO       **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/10/88  10:31
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS21
  Sample size               0.070000 SAMP
  Comments                RECALCULATION, 7 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     7.4641E+02        9.71 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PO-210     8.1043E+02        9.71 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      5.2536E+01        9.36 %  PER CENT   9/ 8/88

 Type of analysis         ********** PB       **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 8/88  14:00
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TH1A
  Sample size               0.070000 SAMP
  Comments                7 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     1.9835E+02       10.39 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PB-210     1.9875E+02       10.39 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.2699E+01        7.65 %  PER CENT   9/ 8/88
```

```
Sample ID                PS  88.05666
Sample type              MISC
Collection date, time     8/17/88    0:00
Receipt date              8/23/88
Completion date           9/ 8/88
Flag date                10/22/88
Location                 ID:SODA SPRINGS
Other ID's               MS44: BACK HALF
Comments                 MSS081788-KM111-OTD-3-IR, IMPINGER
Report to                GERRY LUSTER

 Type of analysis        ********** PB        **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      8/31/88  14:05
  Length of count        1000 min
  Preparer               ZSVL
  Counting system        TN2A
  Sample size              0.500000 SAMP
  Comments               50 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    1.9984E-01     535.38 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210    2.0009E-01     535.36 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     7.1158E+01       6.22 %  PER CENT   8/31/88

 Type of analysis        ********** PO-AUTO  **********
  Verified by           GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted      9/ 5/88    8:38
  Length of count        1000 min
  Preparer               ZSVL
  Counting system        AS19
  Sample size              0.500000 SAMP
  Comments               50 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    6.1031E+01       8.16 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210    6.5463E+01       8.16 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     5.1510E+01       7.47 %  PER CENT   8/31/88
```

Sample ID PS 88,05668
Sample type MISC
Collection date, time 8/18/88 0:00
Receipt date 8/23/88
Completion date 0/ 0/00
Flag date 10/22/88
Location ID:SODA SPRINGS
Other ID's MS55,57,98: FRONT HALF
Comments MSS081888-MM111-IN-4-PRA, MSS081888-MM111-IN-4-PRN, MSS081888-MM111-IN-4-F, PROBE RINSE AND FILTER
Report to GERRY LUSTER

Type of analysis ********** PO **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 6/88 15:11
Length of count 1000 min
Preparer ASVL
Counting system AS19
Sample size 0.002000 SAMP
Comments RECALCULATION

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.9432E+04	9.78 %	PCI/SAMP	9/ 5/88	ANALYSIS
PO-210	2.0661E+04	9.78 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.2758E+01	9.45 %	PER CENT	9/ 5/88	

Type of analysis ********** PB **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 5/88 14:30
Length of count 1000 min
Preparer ASVL
Counting system TN2C
Sample size 0.002000 SAMP
Comments 2 ML OF 1000 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	6.4392E+03	12.10 %	PCI/SAMP	9/ 5/88	ANALYSIS
PB-210	6.4497E+03	12.10 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.2056E+01	9.47 %	PER CENT	9/ 5/88	

Sample ID	PS 88,05669
Sample type	MISC
Collection date, time	8/18/88 0:00
Receipt date	8/23/88
Completion date	9/26/88
Flag date	10/22/88
Location	ID:SODA SPRINGS
Other ID's	MS59; BACK HALF
Comments	MSS081888-MM111-IN-4-IR, IMPINGER
Report to	GERRY LUSTER

Type of analysis	********** PO **********
Verified by	GL (9/26/88) and GL (9/26/88)
Date, time counted	9/21/88 14:38
Length of count	1000 min
Preparer	ZSVL
Counting system	AS24
Sample size	0.150000 samp
Comments	RECALCULATION, 15 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	6.5963E+02	7.67 %	PCI/samp	9/20/88	ANALYSIS
PO-210	7.7787E+02	7.67 %	PCI/samp	8/18/88	COLLECTION
YIELD	7.4336E+01	7.53 %	PER CENT	9/20/88	

Type of analysis	********** PB **********
Verified by	GL (9/26/88) and GL (9/26/88)
Date, time counted	9/20/88 14:25
Length of count	1000 min
Preparer	ZSVL
Counting system	SH3B
Sample size	0.150000 SAMP
Comments	15ML OF 100ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	3.8853E+00	107.74 %	PCI/SAMP	9/20/88	ANALYSIS
PB-210	3.8969E+00	107.74 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6.1771E+01	9.48 %	PER CENT	9/20/88	

```
Sample ID                 PS  88.05670
Sample type               MISC
Collection date, time      8/18/88   0:00
Receipt date               8/23/88
Completion date            9/ 9/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS53,52,94: FRONT HALF
Comments                  MSS081888-MM111-OTA-4-PRA, MSS081888-MM111-OTA-4-PRN, MSS081888-MM111-OTA-4-F, PROBE RINSE AND FILTER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       8/31/88  14:05
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TN2B
  Sample size               0.070000 SAMP
  Comments                7 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     1.4680E+02      10.18 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210     1.4698E+02      10.18 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.8335E+01       6.92 %  PER CENT   8/31/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 5/88    8:38
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS20
  Sample size               0.070000 SAMP
  Comments                7 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     5.7204E+02       8.54 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210     6.0073E+02       8.54 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.0976E+01       8.18 %  PER CENT   8/31/88
```

```
Sample ID                 PS  88.05670X
Sample type               MISC
Collection date, time      8/18/88   0:00
Receipt date               8/23/88
Completion date            9/ 9/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS53,52,94; FRONT HALF
Comments                  MSS081888-MM111-OTA-4-PRA, MSS081888-MM111-OTA-4-PRN, MSS081888-MM111-OTA-4-F, PROBE RINSE AND FILTER
Report to                 GERRY LUSTER

 Type of analysis         ********** PO        **********
  Verified by             GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted        9/ 5/88   8:38
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS21
  Sample size               0.070000 SAMP
  Comments                RECALCULATION
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     6.2456E+02       5.71 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210     6.5428E+02       5.71 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      9.0799E+01       5.49 %  PER CENT   8/31/88

 Type of analysis         ********** PB        **********
  Verified by             GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted        8/31/88  14:05
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TN2C
  Sample size               0.070000 SAMP
  Comments                7 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     1.8413E+02      13.47 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210     1.8435E+02      13.47 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.2090E+01       9.75 %  PER CENT   8/31/88
```

```
Sample ID                 PS  88.05671
Sample type               MISC
Collection date, time      8/18/88   0:00
Receipt date               8/23/88
Completion date            9/ 8/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS60: BACK HALF
Comments                  MSS081888-MM111-OTA-4-IR, IMPINGER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       8/31/88  14:05
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN2D
  Sample size               0.500000 SAMP
  Comments                50 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     1.8583E+00      59.13 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210     1.8605E+00      59.13 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      5.5610E+01       5.86 %  PER CENT   8/31/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 5/88    8:38
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS22
  Sample size               0.500000 SAMP
  Comments                50 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     4.0378E+01       8.20 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210     4.2978E+01       8.20 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      5.3538E+01       7.21 %  PER CENT   8/31/88
```

```
Sample ID                 PS  88.05672
Sample type               MISC
Collection date, time      8/18/88   0:00
Receipt date               8/23/88
Completion date            9/ 9/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MSS4,65,95: FRONT HALF
Comments                  MSS081888-MM111-OTB-4-PRA, MSS081888-MM111-OTB-4-PRN, MSS081888-MM111-OTB-4-F, PROBE RINSE AND FILTER
Report to                 GERRY LUSTER

 Type of analysis         ********** PO        **********
  Verified by            GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted       9/ 5/88   8:38
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS23
  Sample size               0.070000 SAMP
  Comments                7 ML OF 100
    NUCLIDE   ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    7.4588E+02       8.58 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210    7.8065E+02       8.58 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     7.6067E+01       8.25 %  PER CENT   8/31/88

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted       8/31/88  14:05
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TN1A
  Sample size               0.070000 SAMP
  Comments                7 ML OF 100
    NUCLIDE   ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    2.3045E+02      11.29 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210    2.3072E+02      11.29 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     6.9543E+01       8.49 %  PER CENT   8/31/88
```

```
Sample ID                  PS  88.05673
Sample type                MISC
Collection date, time       8/18/88    0:00
Receipt date                8/23/88
Completion date             9/ 9/88
Flag date                  10/22/88
Location                   ID:SODA SPRINGS
Other ID's                 MS51: BACK HALF
Comments                   MSS081888-MM111-OTB-4-IR, IMPINGER
Report to                  GERRY LUSTER

 Type of analysis       ********** PB       **********
  Verified by          GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted     9/ 5/88  14:30
  Length of count       1000 min
  Preparer              ZSVL
  Counting system       TN2D
  Sample size             0.400000 SAMP
  Comments              40 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     2.1586E+00      54.49 %  PCI/SAMP   9/ 5/88 ANALYSIS
    PB-210     2.1621E+00      54.50 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.0689E+01       6.90 %  PER CENT   9/ 5/88

 Type of analysis       ********** PO-AUTO  **********
  Verified by          GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted     9/ 6/88  15:11
  Length of count       1000 min
  Preparer              ZSVL
  Counting system       AS20
  Sample size             0.400000 SAMP
  Comments              40 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     7.6429E+01       8.06 %  PCI/SAMP   9/ 5/88 ANALYSIS
    PO-210     8.3458E+01       8.06 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.1941E+01       7.57 %  PER CENT   9/ 5/88
```

Sample ID	PS 88.05674
Sample type	MISC
Collection date, time	8/18/88 0:00
Receipt date	8/23/88
Completion date	9/ 9/88
Flag date	10/22/88
Location	ID:SODA SPRINGS
Other ID's	MS58,56,96: FRONT HALF
Comments	MSS081888-MM111-OTC-4-PRA, MSS081888-MM111-OTC-4-PRN, MSS081888-MM111-OTC-4-F, PROBE RINSE AND FILTER
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/ 9/88) and GL (9/ 9/88)
Date, time counted	9/ 5/88 14:05
Length of count	1000 min
Preparer	ASVL
Counting system	TN1A
Sample size	0.070000 SAMP
Comments	7 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.5421E+02	14.16 %	PCI/SAMP	9/ 5/88	ANALYSIS
PB-210	1.5446E+02	14.16 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.5982E+01	9.96 %	PER CENT	9/ 5/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/ 9/88) and GL (9/ 9/88)
Date, time counted	9/ 7/88 14:46
Length of count	1000 min
Preparer	ASVL
Counting system	AS21
Sample size	0.070000 SAMP
Comments	7 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	6.7002E+02	9.14 %	PCI/SAMP	9/ 5/88	ANALYSIS
PO-210	7.1882E+02	9.14 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6.3801E+01	8.80 %	PER CENT	9/ 5/88	

```
Sample ID                  PS  88.05675
Sample type                MISC
Collection date, time       8/18/88   0:00
Receipt date                8/23/88
Completion date             9/ 8/88
Flag date                  10/22/88
Location                   ID:SODA SPRINGS
Other ID's                 MS62: BACK HALF
Comments                   MSSO818B8-MM111-UTC-4-IR, IMPINGER
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted        8/31/88  14:05
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          TN1A
  Sample size                0.250000 SAMP
  Comments                 25 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     2.3618E+00      76.23 %  PCI/SAMP   8/31/88 ANALYSIS
    PB-210     2.3646E+00      76.22 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.0718E+01       8.73 %  PER CENT   8/31/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL ( 9/ 8/86) and GL ( 9/ 8/88)
  Date, time counted        9/ 5/88   8:38
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          AS24
  Sample size                0.250000 SAMP
  Comments                 25 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     3.4585F+01       8.08 %  PCI/SAMP   8/31/88 ANALYSIS
    PO-210     3.6759F+01       8.08 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      5.7270E+01       7.00 %  PER CENT   8/31/88
```

```
Sample ID                 PS  88.05676
Sample type               MISC
Collection date, time      8/18/88   0:00
Receipt date               8/23/88
Completion date            9/ 8/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS64,63,97: FRONT HALF
Comments                  MSS081888-MM111-OTD-4-PRA, MSS081888-MM111-OTD-4-PRN, MSS081888-MM111-OTD-4-F, PROBE RINSE AND FILTER
Report to                 SAM WINDHAM

 Type of analysis         ********** PB         **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 2/88  15:05
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TN2A
  Sample size               0.060000 SAMP
  Comments                6 ML OF 100 ML
    NUCLIDE    ACTIVITY    2 SIG ERROR     UNITS     DATE
    PB-210     2.1525E+02      10.43 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PB-210     2.1555E+02      10.43 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.3509E+01       7.48 %  PER CENT   9/ 2/88

 Type of analysis         ********** PO-AUTO    **********
  Verified by            GL ( 9/ 8/88) and GL ( 9/ 8/88)
  Date, time counted       9/ 3/88  12:00
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS21
  Sample size               0.060000 SAMP
  Comments                6 ML OF 100 ML
    NUCLIDE    ACTIVITY    2 SIG ERROR     UNITS     DATE
    PO-210     7.0239E+02       8.54 %  PCI/SAMP   9/ 2/88 ANALYSIS
    PO-210     7.4050E+02       8.54 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.4858E+01       8.24 %  PER CENT   9/ 2/88
```

```
Sample ID                 PS  88.05677
Sample type               MISC
Collection date, time      8/18/88    0:00
Receipt date               8/23/88
Completion date            9/ 9/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS61: BACK HALF
Comments                  MSS081888-MM111-OTD-4-IR, IMPINGER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted       9/ 5/88  14:05
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN1D
  Sample size               0.500000 SAMP
  Comments                50 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    1.1236E+00      81.33 %  PCI/SAMP   9/ 5/88 ANALYSIS
    PB-210    1.1254E+00      81.33 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     5.9258E+01       5.74 %  PER CENT   9/ 5/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/ 9/88) and GL ( 9/ 9/88)
  Date, time counted       9/ 7/88  14:46
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS22
  Sample size               0.500000 SAMP
  Comments                50 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    4.7408E+01       8.12 %  PCI/SAMP   9/ 5/88 ANALYSIS
    PO-210    5.1788E+01       8.12 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     5.2215E+01       7.27 %  PER CENT   9/ 5/88
```

Sample ID	PS 88.05654
Sample type	MISC
Collection date, time	8/19/88 0:00
Receipt date	8/23/88
Completion date	0/ 0/00
Flag date	10/22/88
Location	ID:SODA SPRINGS
Other ID's	MS99,82,84: FRONT HALF
Comments	MSS081988-MM111-OTD-5-PRA, MSS081988-MM111-OTD-5-PRN, MSS081988-MM111-OTD-5-F, PROBE RINSE AND FILTER
Report to	GERRY LUSTER

Type of analysis	********** PO **********
Verified by	GL (9/14/88) and GL (9/14/88)
Date, time counted	9/ 6/88 15:11
Length of count	1000 min
Preparer	ASVL
Counting system	AS18
Sample size	0.050000 SAMP
Comments	RECALCULATION, 5 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	6.6654E+02	8.72 %	PCI/SAMP	9/ 5/88	ANALYSIS
PO-210	7.1435E+02	8.72 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	7.4429E+01	8.34 %	PER CENT	9/ 5/88	

Type of analysis	********** PB **********
Verified by	GL (9/14/88) and GL (9/14/88)
Date, time counted	9/ 5/88 14:30
Length of count	1000 min
Preparer	ASVL
Counting system	TN2B
Sample size	0.050000 SAMP
Comments	5 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.3034E+02	10.51 %	PCI/SAMP	9/ 5/88	ANALYSIS
PB-210	1.3054E+02	10.51 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	8.2133E+01	6.73 %	PER CENT	9/ 5/88	

```
Sample ID               PS  88.05655
Sample type             MISC
Collection date, time    8/19/88   0:00
Receipt date             8/25/88
Completion date          0/ 0/00
Flag date               10/24/88
Location                ID:SODA SPRINGS
Other ID's              MS83: BACK HALF
Comments                MSS0819-MM111-OTD-5-IR, IMPINGER
Report to               GERRY LUSTER

 Type of analysis       ********** PO       **********
  Verified by          GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted     9/12/88  13:44
  Length of count       1000 min
  Preparer              ASVL
  Counting system       AS17
  Sample size             0.500000 SAMP
  Comments              RECALCULATION, 50 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     2.4972E+01       5.38 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PO-210     2.7727E+01       5.37 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.5387E+01       4.53 %  PER CENT   9/ 9/88

 Type of analysis       ********** PB       **********
  Verified by          GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted     9/ 9/88  15:00
  Length of count       1000 min
  Preparer              ASVL
  Counting system       SH1A
  Sample size             0.500000 SAMP
  Comments              50 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     2.1279E-01     445.10 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PB-210     2.1319E-01     445.11 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.5806E+01       5.77 %  PER CENT   9/ 9/88
```

Sample ID PS 88.05800
Sample type MISC
Collection date, time 8/19/88 0:00
Receipt date 8/29/88
Completion date 0/ 0/00
Flag date 10/28/88
Location ID;SODA SPRINGS
Other ID's MS85,87,92; FRONT HALF
Comments MSS081988-MM111-IN-FB-PHA, MSS081988-MM111-IN-FB-PRN, MSS081988-MM111-IN-FB-F, PROBE RINSE AND FILTER
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 6/88 14:35
Length of count 1000 min
Preparer ASVL
Counting system SH1A
Sample size 0.250000 SAMP
Comments 25 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	8.8803E+00	33.65 %	PCI/SAMP	9/ 6/88	ANALYSIS
PB-210	8.8948E+00	33.65 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	6.6667E+01	11.71 %	PER CENT	9/ 6/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 7/88 14:46
Length of count 1000 min
Preparer ASVL
Counting system AS17
Sample size 0.250000 SAMP
Comments 25 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.1703E+02	10.15 %	PCI/SAMP	9/ 6/88	ANALYSIS
PO-210	1.2727E+02	10.15 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	6.7261E+01	9.71 %	PER CENT	9/ 6/88	

```
Sample ID                PS  88.05R00X
Sample type              MISC
Collection date, time     8/19/88    0:00
Receipt date              8/29/88
Completion date           0/ 0/00
Flag date                10/28/88
Location                 ID:SODA SPRINGS
Other ID's               MS85,87,92: FRONT HALF
Comments                 MSS081988-MM111-IN-FB-PRA, MSS081988-MM111-IN-FB-PRN, MSS081988-MM111-IN-FB-F, PROBE RINSE AND FILTER
Report to                GERRY LUSTER

 Type of analysis        ********** PB       **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 6/88  14:35
  Length of count        1000 min
  Preparer               ASVL
  Counting system        SH1B
  Sample size              0.250000 SAMP
  Comments               25 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     8.0477E+00       26.56 %  PCI/SAMP   9/ 6/88 ANALYSIS
    PB-210     8.0609E+00       26.56 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.2348E+01        7.64 %  PER CENT   9/ 6/88

 Type of analysis        ********** PO-AUTO  **********
  Verified by           GL ( 9/15/88) and GL ( 9/15/88)
  Date, time counted      9/ 7/88  14:46
  Length of count        1000 min
  Preparer               ASVL
  Counting system        AS18
  Sample size              0.250000 SAMP
  Comments               25 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     1.0787E+02        9.71 %  PCI/SAMP   9/ 6/88 ANALYSIS
    PO-210     1.1732E+02        9.71 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.0637E+01        9.28 %  PER CENT   9/ 6/88
```

```
Sample ID                 PS  88.05801
Sample type               MISC
Collection date, time      8/19/88   0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS86: BACK HALF
Comments                  *SS081988-MM111-IN-FB-IR, IMPINGER
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 6/88  14:35
  Length of count         1000 min
  Preparer                ASVL
  Counting system         SH2A
  Sample size               0.500000 SAMP
  Comments                50 ML OF 100 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS    DATE
    PB-210     3.5816E-01    479.62 %  PCI/SAMP   9/ 6/88 ANALYSIS
    PB-210     3.5874E-01    479.62 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      6.9318E+01      6.80 %  PER CENT   9/ 6/88

 Type of analysis         ********** PO        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 7/88  14:46
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS19
  Sample size               0.500000 SAMP
  Comments                RECALCULATION, 50 ML OF 100
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS    DATE
    PO-210     3.3439E+01      7.86 %  PCI/SAMP   9/ 6/88 ANALYSIS
    PO-210     3.6570E+01      7.86 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      6.7505E+01      6.86 %  PER CENT   9/ 6/88
```

```
Sample ID                PS  88.05802
Sample type              MISC
Collection date, time     8/19/88    0:00
Receipt date              8/29/88
Completion date           0/ 0/00
Flag date                10/28/88
Location                 ID:SODA SPRINGS
Other ID's               MS88,89,91: FRONT HALF
Comments                 MSS081988-MM111-OTA-FB-PRA, MSS081988-MM111-OTA-FB-PRN, MSS081988-MM111-OTA-FB-F, PROBE RINSE AND FILTE
Report to                GERRY LUSTER

 Type of analysis        ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 6/88  14:35
  Length of count        1000 min
  Preparer               ASVL
  Counting system        SH2B
  Sample size              0.500000 SAMP
  Comments               50 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     3.2088E+00      37.30 %   PCI/SAMP   9/ 6/88 ANALYSIS
    PB-210     3.2140E+00      37.31 %   PCI/SAMP   8/19/88 COLLECTION
    YIELD      8.3090E+01       5.90 %   PER CENT   9/ 6/88

 Type of analysis        ********** PO-AUTO   **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 7/88  14:46
  Length of count        1000 min
  Preparer               ASVL
  Counting system        AS20
  Sample size              0.500000 SAMP
  Comments               50 ML OF 100
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     2.2029E+01       7.77 %   PCI/SAMP   9/ 6/88 ANALYSIS
    PO-210     2.3810E+01       7.77 %   PCI/SAMP   8/19/88 COLLECTION
    YIELD      8.3864E+01       6.48 %   PER CENT   9/ 6/88
```

Sample ID PS 88.05803
Sample type MISC
Collection date, time 8/19/88 0:00
Receipt date 8/29/88
Completion date 9/ 9/88
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's MS90: BACK HALF
Comments MSS081988-MM111-OTA-FB-IR, IMPINGER
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/ 9/88) and GL (9/ 9/88)
Date, time counted 9/ 5/88 14:10
Length of count 1000 min
Preparer ASVL
Counting system TN3B
Sample size 0.500000 SAMP
Comments 50 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.8554E+00	56.95 %	PCI/SAMP	9/ 5/88	ANALYSIS
PB-210	1.8583E+00	56.95 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	7.1402E+01	6.74 %	PER CENT	9/ 5/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/ 9/88) and GL (9/ 9/88)
Date, time counted 9/ 7/88 14:46
Length of count 1000 min
Preparer ASVL
Counting system AS23
Sample size 0.500000 SAMP
Comments 50 ML OF 100 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	2.9840E+00	9.58 %	PCI/SAMP	9/ 5/88	ANALYSIS
PO-210	3.0845E+00	9.58 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	7.7725E+01	4.58 %	PER CENT	9/ 5/88	

Sample ID	PS 88,06080
Sample type	MISC
Collection date, time	8/18/88 0:00
Receipt date	8/29/88
Completion date	9/26/88
Flag date	10/28/88
Location	ID:SODA SPRINGS
Other ID's	MS48
Comments	MSS081888, HNO3 BLANK: ARCHIVED SAMPLE
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/26/88) and GL (9/26/88)
Date, time counted	9/17/88 14:10
Length of count	1000 min
Preparer	ERVL
Counting system	TN2A
Sample size	0,500000 SAMP
Comments	50 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	-2,4724E-01	384,44 %	PCI/SAMP	9/17/88	ANALYSIS
PB-210	-2,4792E-01	384,43 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6,8939E+01	9,63 %	PER CENT	9/17/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/26/88) and GL (9/26/88)
Date, time counted	9/20/88 14:21
Length of count	1000 min
Preparer	ERVL
Counting system	A819
Sample size	0,500000 SAMP
Comments	50 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	3,3136E-01	28,20 %	PCI/SAMP	9/17/88	ANALYSIS
PO-210	4,2553E-01	28,20 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6,6167E+01	6,75 %	PER CENT	9/17/88	

Sample ID	PS 88.06080X
Sample type	MISC
Collection date, time	8/18/88 0:00
Receipt date	8/29/88
Completion date	9/26/88
Flag date	10/28/88
Location	ID:SODA SPRINGS
Other ID's	MS48
Comments	MSS081888, HNO3 BLANK: ARCHIVED SAMPLE
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/26/88) and GL (9/26/88)
Date, time counted	9/17/88 14:10
Length of count	1000 min
Preparer	ERVL
Counting system	TN2B
Sample size	0.500000 SAMP
Comments	50 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.3284E+00	51.93 %	PCI/SAMP	9/17/88	ANALYSIS
PB-210	1.3320E+00	51.93 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.5138E+01	8.58 %	PER CENT	9/17/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/26/88) and GL (9/26/88)
Date, time counted	9/20/88 14:21
Length of count	1000 min
Preparer	ERVL
Counting system	AS20
Sample size	0.500000 SAMP
Comments	50 ML OF 100

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.1527E+00	14.70 %	PCI/SAMP	9/17/88	ANALYSIS
PO-210	1.1239E+00	14.70 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	8.0652E+01	6.25 %	PER CENT	9/17/88	

```
Sample ID                  PS  88,06081
Sample type                MISC
Collection date, time       8/18/88    0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS47
Comments                   MSS081888, ACETONE REAGENT BLANK; ARCHIVED SAMPLE
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL (10/ 6/88) and GL (10/ 6/88)
  Date, time counted        9/28/88  14:00
  Length of count          1000 min
  Preparer                 ERAS
  Counting system          TN2C
  Sample size                0.490000 SAMP
  Comments                 49ML OF 100ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    -8.6877E-01     172.22 %  PCI/SAMP   9/28/88 ANALYSIS
    PB-210    -8.7200E-01     172.22 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      3.7311E+01      11.81 %  PER CENT   9/28/88

 Type of analysis          ********** PO-AUTO   **********
  Verified by             GL (10/ 6/88) and GL (10/ 6/88)
  Date, time counted       10/ 1/88  10:32
  Length of count          1000 min
  Preparer                 ERAS
  Counting system          AS19
  Sample size                0.490000 SAMP
  Comments                 49ML OF 100ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     2.0562E-01      44.30 %  PCI/SAMP   9/28/88 ANALYSIS
    PO-210     4.5172E-01      44.30 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      4.4140E+01       7.70 %  PER CENT   9/28/88
```

APPENDIX L.2 - PSD Radionuclide Data

(data to be supplied)

```
Sample ID                 PS  88.05804
Sample type               FILTER
Collection date, time      8/17/88   0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS100: ANDERSEN
Comments                  MSS081788-PSD-IN-1-ST1
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 9/88  15:00
  Length of count         1000 min
  Preparer               ERVL
  Counting system        SH1B
  Sample size              0.500000 SAMP
  Comments                100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     1.2258E+00    103.97 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PB-210     1.2284E+00    103.96 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.4320E+01      6.41 %  PER CENT   9/ 9/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/12/88  13:44
  Length of count         1000 min
  Preparer               ERVL
  Counting system        AS18
  Sample size              0.500000 SAMP
  Comments                100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     1.0904E+01      6.42 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PO-210     1.2089E+01      6.42 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.1251E+01      4.59 %  PER CENT   9/ 9/88
```

```
Sample ID                  PS  88,05805
Sample type                FILTER
Collection date, time       8/17/88   0:00
Receipt date                8/29/88
Completion date            10/ 5/88
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS101: ANDERSEN
Comments                   MSS081788-PSD-IN-1-ST2 TO 5
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted        9/28/88  14:00
  Length of count          1000 min
  Preparer                 ASGL
  Counting system          TN2D
  Sample size                0.250000 SAMP
  Comments                 50ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PB-210     2.3059E+01       16.16 %  PCI/SAMP   9/28/88 ANALYSIS
    PB-210     2.3146E+01       16.16 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.5904E+01        8.91 %  PER CENT   9/28/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       10/ 1/88  10:32
  Length of count          1000 min
  Preparer                 ASGL
  Counting system          AS20
  Sample size                0.250000 SAMP
  Comments                 50ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PO-210     9.2717E+01        7.31 %  PCI/SAMP   9/28/88 ANALYSIS
    PO-210     1.0907E+02        7.31 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      5.8724E+01        6.87 %  PER CENT   9/28/88
```

```
Sample ID                 PS  88.05806
Sample type               FILTER
Collection date, time      8/17/88    0:00
Receipt date               8/29/88
Completion date           10/ 5/88
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS102: ANDERSEN
Comments                  MSS081788-PSD-IN-1-ST6
Report to                 GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       9/29/88  14:15
  Length of count         1000 min
  Preparer                ERVL
  Counting system         TN2A
  Sample size               0.125000 SAMP
  Comments                25ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PB-210     5.4773E+01      13.56 %  PCI/SAMP    9/29/88 ANALYSIS
    PB-210     5.4986E+01      13.56 %  PCI/SAMP    8/17/88 COLLECTION
    YIELD      5.4923E+01       5.26 %  PER CENT    9/29/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted      10/ 2/88  12:56
  Length of count         1000 min
  Preparer                ERVL
  Counting system         AS19
  Sample size               0.125000 SAMP
  Comments                25ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PO-210     1.2901E+02       5.27 %  PCI/SAMP    9/29/88 ANALYSIS
    PO-210     1.4688E+02       5.27 %  PCI/SAMP    8/17/88 COLLECTION
    YIELD      6.0400E+01       4.39 %  PER CENT    9/29/88
```

```
Sample ID                  PS  88.05807
Sample type                FILTER
Collection date, time       8/17/88   0:00
Receipt date                8/29/88
Completion date            10/ 5/88
Flag date                  10/28/88
Location                   ID;SODA SPRINGS
Other ID's                 MS103; ANDERSEN
Comments                   MSS081788-PSD-IN-1-ST7
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted        9/28/88  14:00
  Length of count          1000 min
  Preparer                 ASGL
  Counting system          TN2A
  Sample size                0.125000 SAMP
  Comments                 25ML OF 200ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    1.5190E+02      12.96 %  PCI/SAMP   9/28/88 ANALYSIS
    PB-210    1.5248E+02      12.96 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.5386E+01       9.62 %  PER CENT   9/28/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       10/ 1/88  10:32
  Length of count          1000 min
  Preparer                 ASGL
  Counting system          AS17
  Sample size                0.125000 SAMP
  Comments                 25ML OF 200ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    3.6704E+02       8.22 %  PCI/SAMP   9/28/88 ANALYSIS
    PO-210    4.1752E+02       8.22 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.9823E+01       7.84 %  PER CENT   9/28/88
```

Sample ID PS 88.05808
Sample type FILTER
Collection date, time 8/17/88 0:00
Receipt date 8/29/88
Completion date 0/ 0/00
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's MS104: ANDERSEN
Comments MSS081788-PSD-IN-1-ST8
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 6/88 14:35
Length of count 1000 min
Preparer ERVL
Counting system SH3A
Sample size 0.040000 SAMP
Comments 10 ML OF 250

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	2.9008E+02	13.13 %	PCI/SAMP	9/ 6/88	ANALYSIS
PB-210	2.9061E+02	13.13 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.0987E+01	8.99 %	PER CENT	9/ 6/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 8/88 14:42
Length of count 1000 min
Preparer ERVL
Counting system AS17
Sample size 0.040000 SAMP
Comments 10 ML OF 250

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	7.7123E+02	9.24 %	PCI/SAMP	9/ 6/88	ANALYSIS
PO-210	8.2206E+02	9.24 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.3349E+01	8.79 %	PER CENT	9/ 6/88	

```
Sample ID                 PS  88.05809
Sample type               FILTER
Collection date, time      8/17/88   0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/29/88
Location                  ID:SODA SPRINGS
Other ID's                MS105: ANDERSEN
Comments                  MSS081788-PSD-IN-1-ST9
Report to                 GERRY LUSTER

 Type of analysis        ********** PB        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 6/88  14:35
  Length of count       1000 min
  Preparer              ERVL
  Counting system       SH3B
  Sample size             0.050000 SAMP
  Comments              25 OF 500 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    2.2643E+02       11.24 %  PCI/SAMP   9/ 6/88 ANALYSIS
    PB-210    2.2684E+02       11.24 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     7.5087E+01        7.91 %  PER CENT   9/ 6/88

 Type of analysis        ********** PO-AUTO  **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 8/88  14:42
  Length of count       1000 min
  Preparer              ERVL
  Counting system       AS1R
  Sample size             0.050000 SAMP
  Comments              25 OF 500 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    7.2792E+02        8.92 %  PCI/SAMP   9/ 6/88 ANALYSIS
    PO-210    7.8091E+02        8.92 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD     6.8812E+01        8.53 %  PER CENT   9/ 6/88
```

```
Sample ID                  PS  88.05810
Sample type                FILTER
Collection date, time       8/17/88    0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 *S106; ANDERSEN
Comments                   *SS081788-PSD-GTC-1-ST1
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 9/88  15:00
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          SH2A
  Sample size                0.500000 SAMP
  Comments                 100 ML OF 200
    NUCLIDE     ACTIVITY    2 SIG ERROR     UNITS      DATE
    PB-210     1.8783E+00     112.64 %   PCI/SAMP   9/ 9/88 ANALYSIS
    PB-210     1.8822E+00     112.64 %   PCI/SAMP   8/17/88 COLLECTION
    YIELD      6.3765E+01       7.07 %   PER CENT   9/ 9/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/12/88  13:44
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          AS19
  Sample size                0.500000 SAMP
  Comments                 100 ML OF 200
    NUCLIDE     ACTIVITY    2 SIG ERROR     UNITS      DATE
    PO-210     2.8521E+00       9.30 %   PCI/SAMP   9/ 9/88 ANALYSIS
    PO-210     2.9711E+00       9.30 %   PCI/SAMP   8/17/88 COLLECTION
    YIELD      8.6716E+01       4.42 %   PER CENT   9/ 9/88
```

```
Sample ID                   PS  88,05810X
Sample type                 FILTER
Collection date, time        8/17/88    0:00
Receipt date                 8/29/88
Completion date              0/ 0/00
Flag date                   10/28/88
Location                    ID:SODA SPRINGS
Other ID's                  MS106: ANDERSEN
Comments                    MSS081788-PSD-CTC-1-ST1
Report to                   GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 9/88  15:00
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          SH2B
  Sample size                0.495000 SAMP
  Comments                 99 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PB-210    -4.9133E-01     246.90 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PB-210    -4.9235E-01     246.92 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.5383E+01       6.22 %  PER CENT   9/ 9/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/12/88  13:44
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          AS20
  Sample size                0.495000 SAMP
  Comments                 99 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PO-210     3.5131E+00       9.13 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PO-210     4.0036E+00       9.13 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.3772E+01       4.56 %  PER CENT   9/ 9/88
```

Sample ID	PS 88.05811
Sample type	FILTER
Collection date, time	8/17/88 0:00
Receipt date	8/29/88
Completion date	0/ 0/00
Flag date	10/28/88
Location	ID:SODA SPRINGS
Other ID's	AS107: ANDERSEN
Comments	SS081788-PSD-OTC-1-ST2 TO 5
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/20/88) and GL (9/20/88)
Date, time counted	9/12/88 14:10
Length of count	1000 min
Preparer	ERVL
Counting system	TH1A
Sample size	0.500000 SAMP
Comments	100ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	-2.8547E+00	23.97 %	PCI/SAMP	9/12/88	ANALYSIS
PB-210	-2.8614E+00	23.97 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	6.6186E+01	5.55 %	PER CENT	9/12/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/20/88) and GL (9/20/88)
Date, time counted	9/14/88 14:28
Length of count	1000 min
Preparer	ERVL
Counting system	AS17
Sample size	0.500000 SAMP
Comments	100ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	2.2931E+01	5.73 %	PCI/SAMP	9/12/88	ANALYSIS
PO-210	2.6530E+01	5.73 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	6.5241E+01	4.73 %	PER CENT	9/12/88	

Sample ID PS 88,05812
Sample type FILTER
Collection date, time 8/17/88 0:00
Receipt date 8/29/88
Completion date 0/ 0/00
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's 45108; ANDERSEN
Comments 4SS081788-PSP-OTC-1-ST6
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 7/88 14:35
Length of count 1000 min
Preparer ERVL
Counting system SH2A
Sample size 0.500000 SAMP
Comments 100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	9.6327E+00	30.12 %	PCI/SAMP	9/ 7/88	ANALYSIS
PB-210	9.6510E+00	30.12 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	4.4355E+01	6.83 %	PER CENT	9/ 7/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/10/88 10:31
Length of count 1000 min
Preparer ERVL
Counting system AS17
Sample size 0.500000 SAMP
Comments 100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	2.4929E+01	5.45 %	PCI/SAMP	9/ 7/88	ANALYSIS
PO-210	2.6630E+01	5.45 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.3350E+01	4.57 %	PER CENT	9/ 7/88	

Sample ID	PS 88,05813
Sample type	FILTER
Collection date, time	8/17/88 0:00
Receipt date	8/29/88
Completion date	0/ 0/00
Flag date	10/28/88
Location	ID;SODA SPRINGS
Other ID's	MS109; ANDERSEN
Comments	MSS081788-PSD-OTC-1-ST7
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/14/88) and GL (9/14/88)
Date, time counted	9/ 7/88 14:35
Length of count	1000 min
Preparer	ERVL
Counting system	SH2B
Sample size	0.500000 SAMP
Comments	100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.8070E+01	12.36 %	PCI/SAMP	9/ 7/88	ANALYSIS
PB-210	1.8104E+01	12.36 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.0555E+01	6.24 %	PER CENT	9/ 7/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/14/88) and GL (9/14/88)
Date, time counted	9/10/88 10:31
Length of count	1000 min
Preparer	ERVL
Counting system	AS1B
Sample size	0.500000 SAMP
Comments	100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	6.5633E+01	6.98 %	PCI/SAMP	9/ 7/88	ANALYSIS
PO-210	7.0923E+01	6.98 %	PCI/SAMP	8/17/88	COLLECTION
YIELD	7.3933E+01	6.47 %	PER CENT	9/ 7/88	

```
Sample ID                 PS  88,05814
Sample type               FILTER
Collection date, time      8/17/88    0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS110: ANDERSEN
Comments                  PSS081788-PSD-OTC-1-STR
Report to                 GERRY LUSTER

 Type of analysis        ********** PO        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/10/88  10:31
  Length of count         1000 min
  Preparer                ERVL
  Counting system         AS19
  Sample size               0.500000 SAMP
  Comments                RECALCULATION,100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     1.6595E+02       6.83 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PO-210     1.7854E+02       6.83 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.7135E+01       6.60 %  PER CENT   9/ 7/88

 Type of analysis        ********** PB        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 7/88  14:35
  Length of count         1000 min
  Preparer                ERVL
  Counting system         SH3A
  Sample size               0.500000 SAMP
  Comments                100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     5.2745E+01       9.68 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PB-210     5.2845E+01       9.68 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      5.5545E+01       7.38 %  PER CENT   9/ 7/88
```

```
Sample ID                  PS  88,05815
Sample type                FILTER
Collection date, time       8/17/88    0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID;SODA SPRINGS
Other ID's                 MS111; ANDERSEN
Comments                   MSS081788-PSD-OTC-1-ST9
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 7/88  14:35
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          SH3B
  Sample size                0.075000 SAMP
  Comments                 15 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     1.0056E+02      13.66 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PB-210     1.0075E+02      13.66 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.5321E+01       8.24 %  PER CENT   9/ 7/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/10/88  10:31
  Length of count          1000 min
  Preparer                 ERVL
  Counting system          AS20
  Sample size                0.075000 SAMP
  Comments                 15 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     5.2226E+02       8.62 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PO-210     5.6920E+02       8.62 %  PCI/SAMP   8/17/88 COLLECTION
    YIELD      7.6137E+01       8.26 %  PER CENT   9/ 7/88
```

```
Sample ID                PS  88.05816
Sample type              FILTER
Collection date, time     8/18/88    0:00
Receipt date              8/29/88
Completion date          10/ 5/88
Flag date                10/28/88
Location                 ID:SODA SPRINGS
Other ID's               MS112: ANDERSEN
Comments                 MSS081888-PSD-IN-2-ST1
Report to                GERRY LUSTER

 Type of analysis        ********** PB        **********
  Verified by           GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted      9/28/88  14:00
  Length of count        1000 min
  Preparer               ASGL
  Counting system        SH1A
  Sample size              0.500000 SAMP
  Comments               100ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     4.6411E+00      26.83 %  PCI/SAMP   9/28/88 ANALYSIS
    PB-210     4.6583E+00      26.83 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      6.5484E+01       6.02 %  PER CENT   9/28/88

 Type of analysis        ********** PO-AUTO   **********
  Verified by           GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted     10/ 1/88  10:32
  Length of count        1000 min
  Preparer               ASGL
  Counting system        AS21
  Sample size              0.500000 SAMP
  Comments               100ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     1.5378E+01       5.74 %  PCI/SAMP   9/28/88 ANALYSIS
    PO-210     1.7832E+01       5.74 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.4071E+01       4.49 %  PER CENT   9/28/88
```

```
Sample ID               PS  88.05817
Sample type             FILTER
Collection date, time    8/18/88   0:00
Receipt date             8/29/88
Completion date         10/ 5/88
Flag date               10/28/88
Location                ID:SODA SPRINGS
Other ID's              MS113: ANDERSEN
Comments                MSS081688-PSD-IN-2-ST2 TO 5
Report to               GERRY LUSTER

 Type of analysis       ********** PB        **********
  Verified by          GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted     9/28/88  14:00
  Length of count       1000 min
  Preparer              ASGL
  Counting system       SH1B
  Sample size             0.500000 SAMP
  Comments              100ML OF 200ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    4.1499E+01       9.21 %  PCI/SAMP   9/28/88 ANALYSIS
    PB-210    4.1654E+01       9.21 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     5.9413E+01       6.57 %  PER CENT   9/28/88

 Type of analysis       ********** PO-AUTO  **********
  Verified by          GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted    10/ 1/88  10:32
  Length of count       1000 min
  Preparer              ASGL
  Counting system       AS22
  Sample size             0.500000 SAMP
  Comments              100ML OF 200ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    1.0493E+02       7.56 %  PCI/SAMP   9/28/88 ANALYSIS
    PO-210    1.1942E+02       7.56 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     5.5262E+01       7.14 %  PER CENT   9/28/88
```

```
Sample ID                 PS  88,05818
Sample type               FILTER
Collection date, time     8/18/88   0:00
Receipt date              8/29/88
Completion date           0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                GS114: ANDERSEN
Comments                  -SS081888-PSD-IN-2-ST6
Report to                 GERRY LUSTER

 Type of analysis         ********** PO        **********
  Verified by             GL ( 9/20/88) and GL ( 9/20/88)
  Date, time counted       9/13/88  13:40
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS17
  Sample size              0.250000 SAMP
  Comments                RECALCULATION, 50 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     2.1571E+02       9.30 %  PCI/SAMP   9/10/88 ANALYSIS
    PO-210     2.3206E+02       9.30 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.6338E+01       9.05 %  PER CENT   9/10/88

 Type of analysis         ********** PB        **********
  Verified by             GL ( 9/20/88) and GL ( 9/20/88)
  Date, time counted       9/10/88  13:50
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TM1A
  Sample size              0.250000 SAMP
  Comments                50ML OF 200ML
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     8.2143E+01      13.12 %  PCI/SAMP   9/10/88 ANALYSIS
    PB-210     8.2314E+01      13.12 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.2647E+01      11.01 %  PER CENT   9/10/88
```

Sample ID PS 88,05819
Sample type FILTER
Collection date, time 8/18/88 0:00
Receipt date 8/29/88
Completion date 0/ 0/00
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's 4S115: ANDERSEN
Comments USSOH1388-PSD-IN-2-ST7
Report to GERRY LUSTER

Type of analysis ********** PO **********
Verified by GL (9/20/88) and GL (9/20/88)
Date, time counted 9/14/88 14:28
Length of count 1000 min
Preparer ZSVL
Counting system ASIR
Sample size 0.250000 SAMP
Comments RECALCULATION, 50 ML OF 200 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	3.6539E+02	14.17 %	PCI/SAMP	9/12/88	ANALYSIS
PO-210	4.1396E+02	14.17 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	2.2618E+01	13.90 %	PER CENT	9/12/88	

Type of analysis ********** PB **********
Verified by GL (9/20/88) and GL (9/20/88)
Date, time counted 9/12/88 14:10
Length of count 1000 min
Preparer ZSVL
Counting system TNID
Sample size 0.250000 SAMP
Comments 50ML OF 200ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	2.4484E+00	77.03 %	PCI/SAMP	9/12/88	ANALYSIS
PB-210	2.4539E+00	77.02 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6.6067E+01	9.73 %	PER CENT	9/12/88	

```
Sample ID                 PS  88,05820
Sample type               FILTER
Collection date, time      8/18/88    0:00
Receipt date               8/29/88
Completion date           10/ 5/88
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS116: ANDERSEN
Comments                  MSS081888-PSD-IN-2-ST8
Report to                 GERRY LUSTER

 Type of analysis         ********** PB       **********
  Verified by            GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       9/29/88  14:15
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN2C
  Sample size               0.100000 SAMP
  Comments                25ML OF 250ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    3.1364E+02       7.02 %  PCI/SAMP   9/29/88 ANALYSIS
    PB-210    3.1484E+02       7.02 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     6.7252E+01       5.72 %  PER CENT   9/29/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted      10/ 2/88  12:57
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS21
  Sample size               0.100000 SAMP
  Comments                25ML OF 250ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    7.2367E+02       6.56 %  PCI/SAMP   9/29/88 ANALYSIS
    PO-210    8.1986E+02       6.56 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD     6.9569E+01       6.27 %  PER CENT   9/29/88
```

```
Sample ID                 PS  88.05820X
Sample type               FILTER
Collection date, time      8/18/88   0:00
Receipt date               8/29/88
Completion date           10/ 5/88
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS116: ANDERSEN
Comments                  MSS081888-PSD-IN-2-ST8
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by           GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       9/29/88  14:15
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN2B
  Sample size               0.100000 SAMP
  Comments                25ML OF 250ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     3.0812E+02       7.43 %  PCI/SAMP   9/29/88 ANALYSIS
    PB-210     3.0930E+02       7.43 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.7809E+01       6.01 %  PER CENT   9/29/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by           GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted      10/ 2/88  12:56
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS20
  Sample size               0.100000 SAMP
  Comments                25ML OF 250ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     7.6793E+02       6.49 %  PCI/SAMP   9/29/88 ANALYSIS
    PO-210     8.7581E+02       6.49 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.0620E+01       6.21 %  PER CENT   9/29/88
```

Sample ID	PS 88,05821
Sample type	FILTER
Collection date, time	8/18/88 0:00
Receipt date	8/29/88
Completion date	0/ 0/00
Flag date	10/28/88
Location	ID:SODA SPRINGS
Other ID's	MS117: ANDERSEN
Comments	MSS081888-PSD-IN-2-ST9
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (10/ 6/88) and GL (10/ 6/88)
Date, time counted	9/29/88 14:15
Length of count	1000 min
Preparer	ZSVL
Counting system	TN2D
Sample size	0.100000 SAMP
Comments	50ML OF 500ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	2.8298E+02	7.13 %	PCI/SAMP	9/29/88	ANALYSIS
PB-210	2.8405E+02	7.13 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6.5099E+01	5.50 %	PER CENT	9/29/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (10/ 6/88) and GL (10/ 6/88)
Date, time counted	10/ 2/88 12:57
Length of count	1000 min
Preparer	ZSVL
Counting system	AS22
Sample size	0.100000 SAMP
Comments	50ML OF 500ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	7.6731E+02	6.47 %	PCI/SAMP	9/29/88	ANALYSIS
PO-210	8.8097E+02	6.47 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	6.5573E+01	6.18 %	PER CENT	9/29/88	

```
Sample ID                  PS  88,05822
Sample type                FILTER
Collection date, time       8/18/88    0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MSJ181 ANDERSEN
Comments                   MSS081888-PSD-OTC-2-ST1
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 9/88  15:00
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          SH3A
  Sample size                0,500000 SAMP
  Comments                 100 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR     UNITS     DATE
    PB-210    -1,1272E-01     822.17 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PB-210    -1,1295E-01     822.13 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7,6846E+01       5.74 %  PER CENT   9/ 9/88

 Type of analysis          ********** PO-AUTO   **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/12/88  13:44
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          AS21
  Sample size                0,500000 SAMP
  Comments                 100 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR     UNITS     DATE
    PO-210     3,4561E+00       8,50 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PO-210     3,8732E+00       8,50 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8,9521E+01       4,41 %  PER CENT   9/ 9/88
```

Sample ID	PS 88.05823
Sample type	FILTER
Collection date, time	8/18/88 0:00
Receipt date	8/29/88
Completion date	0/ 0/00
Flag date	10/28/88
Location	ID:SODA SPRINGS
Other ID's	MS119: ANDERSEN
Comments	MSS081888-PSD-UTC-S-ST2 TO 5
Report to	GERRY LUSTER

Type of analysis	*********** PB ***********
Verified by	GL (9/14/88) and GL (9/14/88)
Date, time counted	9/ 9/88 15:00
Length of count	1000 min
Preparer	ZSVL
Counting system	SH3B
Sample size	0.500000 SAMP
Comments	100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	4.3998E+00	25.67 %	PCI/SAMP	9/ 9/88	ANALYSIS
PB-210	4.4086E+00	25.67 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.7816E+01	6.06 %	PER CENT	9/ 9/88	

Type of analysis	*********** PO-AUTO ***********
Verified by	GL (9/14/88) and GL (9/14/88)
Date, time counted	9/12/88 13:44
Length of count	1000 min
Preparer	ZSVL
Counting system	AS22
Sample size	0.500000 SAMP
Comments	100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.6506E+01	5.63 %	PCI/SAMP	9/ 9/88	ANALYSIS
PO-210	1.7920E+01	5.63 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.9629E+01	4.44 %	PER CENT	9/ 9/88	

Sample ID	PS 88.05824
Sample type	FILTER
Collection date, time	8/19/88 0:00
Receipt date	8/29/88
Completion date	0/ 0/00
Flag date	10/28/98
Location	ID:SODA SPRINGS
Other ID's	MS120: ANDERSEN
Comments	%SS091888-PSD-GTC-~~5~~2-ST6
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/20/88) and GL (9/20/88)
Date, time counted	9/ 7/88 14:35
Length of count	1000 min
Preparer	ZSVL
Counting system	TN1A
Sample size	0.500000 SAMP
Comments	100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	7.5072E+00	21.12 %	PCI/SAMP	9/ 7/88	ANALYSIS
PB-210	7.5207E+00	21.12 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	7.8224E+01	7.91 %	PER CENT	9/ 7/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/20/88) and GL (9/20/88)
Date, time counted	9/ 8/88 14:42
Length of count	1000 min
Preparer	ZSVL
Counting system	AS23
Sample size	0.500000 SAMP
Comments	100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	2.4636E+01	5.27 %	PCI/SAMP	9/ 7/88	ANALYSIS
PO-210	2.6446E+01	5.27 %	PCI/SAMP	8/18/88	COLLECTION
YIELD	8.5313E+01	4.47 %	PER CENT	9/ 7/88	

```
Sample ID                 PS  88.05825
Sample type               FILTER
Collection date, time      8/18/88    0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/26/88
Location                  ID:SODA SPRINGS
Other ID's                #SI21: ANDERSEN
Comments                  #SS081888-PSD-UTC-2-ST7
Report to                 GERRY LUSTER

 Type of analysis        ********** PB       **********
  Verified by           GL ( 9/20/88) and GL ( 9/20/88)
  Date, time counted      9/ 7/88  14:35
  Length of count        1000 min
  Preparer               ZSVL
  Counting system        TN1D
  Sample size              0.500000 SAMP
  Comments               100 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PB-210     1.7639E+01       9.57 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PB-210     1.7671E+01       9.57 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      7.5935E+01       5.33 %  PER CENT   9/ 7/88

 Type of analysis        ********** PO-AUTO  **********
  Verified by           GL ( 9/20/88) and GL ( 9/20/88)
  Date, time counted      9/ 8/88  14:42
  Length of count        1000 min
  Preparer               ZSVL
  Counting system        AS24
  Sample size              0.500000 SAMP
  Comments               100 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS      DATE
    PO-210     5.0080E+01       7.20 %  PCI/SAMP   9/ 7/88 ANALYSIS
    PO-210     5.3508E+01       7.20 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      8.0048E+01       6.59 %  PER CENT   9/ 7/88
```

```
Sample ID                 PS  88.05826
Sample type               FILTER
Collection date, time      8/18/88    0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS122: ANDERSEN
Comments                  MSS081888-PSD-OTC-2-STR
Report to                 GERRY LUSTER

 Type of analysis         ********** PO       **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/11/88  11:29
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS21
  Sample size               0.500000 SAMP
  Comments                RECALCULATION,100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS    DATE
    PO-210     1.0827E+02       7.57 %  PCI/SAMP  9/ 8/88 ANALYSIS
    PO-210     1.1692E+02       7.57 %  PCI/SAMP  8/18/88 COLLECTION
    YIELD      5.9710E+01       7.19 %  PER CENT  9/ 8/88

 Type of analysis         ********** PB       **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 8/88  14:00
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN2C
  Sample size               0.500000 SAMP
  Comments                100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS    DATE
    PB-210     3.0466E+01      11.43 %  PCI/SAMP  9/ 8/88 ANALYSIS
    PB-210     3.0524E+01      11.43 %  PCI/SAMP  8/18/88 COLLECTION
    YIELD      6.5638E+01       8.32 %  PER CENT  9/ 8/88
```

```
Sample ID                 PS  88,05827
Sample type               FILTER
Collection date, time      8/18/88   0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS123: ANDERSEN
Comments                  MSS081888-PSD-UTC-2-ST9
Report to                 GERRY LUSTER

 Type of analysis        ********** PO        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/11/88  11:29
  Length of count        1000 min
  Preparer               ZSVL
  Counting system        AS22
  Sample size              0.325000 SAMP
  Comments               RECALCULATION, 65 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     3.6337E+02      10.83 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PO-210     3.9526E+02      10.83 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      3.3017E+01      10.61 %  PER CENT   9/ 8/88

 Type of analysis        ********** PB        **********
  Verified by           GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted      9/ 8/88   1:04
  Length of count        1000 min
  Preparer               ZSVL
  Counting system        TN2D
  Sample size              0.325000 SAMP
  Comments               65 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     7.6730E+01      10.82 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PB-210     7.6876E+01      10.82 %  PCI/SAMP   8/18/88 COLLECTION
    YIELD      3.4476E+01       8.58 %  PER CENT   9/ 8/88
```

```
Sample ID                 PS  88.05828
Sample type               FILTER
Collection date, time      8/19/88   0:00
Receipt date               8/29/88
Completion date           10/ 5/88
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS124: ANDERSEN
Comments                  MSS081988-PSD-IN-3-ST1
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       9/29/88  14:15
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         SH3A
  Sample size               0.500000 SAMP
  Comments                100ML OF 200ML
    NUCLIDE   ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210   -8.6217E-01     142.23 %  PCI/SAMP   9/29/88 ANALYSIS
    PB-210   -8.6538E-01     142.24 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD     5.8246E+01       6.61 %  PER CENT   9/29/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted      10/ 2/88  12:57
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS23
  Sample size               0.500000 SAMP
  Comments                100ML OF 200ML
    NUCLIDE   ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    7.0753E+00       7.49 %  PCI/SAMP   9/29/88 ANALYSIS
    PO-210    8.8912E+00       7.49 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD     6.8793E+01       4.75 %  PER CENT   9/29/88
```

```
Sample ID                 PS  88.05829
Sample type               FILTER
Collection date, time      8/19/88   0:00
Receipt date               8/29/88
Completion date           10/ 5/88
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS125: ANDERSEN
Comments                  MSS081988-PSD-IN-3-ST2 TO 5
Report to                 GERRY LUSTER

 Type of analysis         ********** PB       **********
  Verified by            GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted        9/29/88  14:15
  Length of count         1000 min
  Preparer               ZSVL
  Counting system        SH3B
  Sample size               0.500000 SAMP
  Comments                100ML OF 200ML
    NUCLIDE   ACTIVITY   2 SIG ERROR    UNITS    DATE
    PB-210    1.0089E+01     18.12 %  PCI/SAMP   9/29/88 ANALYSIS
    PB-210    1.0126E+01     18.12 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD     6.0311E+01      7.19 %  PER CENT   9/29/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted      10/ 2/88  12:57
  Length of count         1000 min
  Preparer               ZSVL
  Counting system        AS24
  Sample size               0.500000 SAMP
  Comments                100ML OF 200ML
    NUCLIDE   ACTIVITY   2 SIG ERROR    UNITS    DATE
    PO-210    3.8825E+01      5.28 %  PCI/SAMP   9/29/88 ANALYSIS
    PO-210    4.5394E+01      5.28 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD     6.9122E+01      4.67 %  PER CENT   9/29/88
```

Sample ID PS 88.05830
Sample type FILTER
Collection date, time 8/19/88 0:00
Receipt date 9/29/88
Completion date 10/ 5/88
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's MS126: ANDERSEN
Comments MSS081988-PSD-IN-3-ST6
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (10/ 5/88) and GL (10/ 5/88)
Date, time counted 9/29/88 14:15
Length of count 1000 min
Preparer ZSVL
Counting system SH1B
Sample size 0.500000 SAMP
Comments 100ML OF 200ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	9.2437E+00	22.56 %	PCI/SAMP	9/29/88	ANALYSIS
PB-210	9.2781E+00	22.56 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	6.8416E+01	8.22 %	PER CENT	9/29/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (10/ 5/88) and GL (10/ 5/88)
Date, time counted 10/ 3/88 14:21
Length of count 1000 min
Preparer ZSVL
Counting system AS18
Sample size 0.500000 SAMP
Comments 100ML OF 200ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	3.6324E+01	5.13 %	PCI/SAMP	9/29/88	ANALYSIS
PO-210	4.2514E+01	5.13 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	7.5478E+01	4.51 %	PER CENT	9/29/88	

```
Sample ID                  PS  88.05830X
Sample type                FILTER
Collection date, time       8/19/88    0:00
Receipt date                8/29/88
Completion date            10/ 5/88
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS126: ANDERSEN
Comments                   MSS081988-PSD-IN-3-ST6
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted        9/29/88  14:15
  Length of count          1000 min
  Preperer                 ZSVL
  Counting system          SH1A
  Sample size               0.500000 SAMP
  Comments                 100ML OF 200ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS      DATE
    PB-210     8.9044E+00      17.47 %  PCI/SAMP   9/29/88 ANALYSIS
    PB-210     8.9375E+00      17.47 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      5.9718E+01       6.00 %  PER CENT   9/29/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       10/ 3/88  14:21
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          AS17
  Sample size               0.500000 SAMP
  Comments                 100ML OF 200ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS      DATE
    PO-210     3.5964E+01       7.81 %  PCI/SAMP   9/29/88 ANALYSIS
    PO-210     4.2150E+01       7.81 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      6.8770E+01       6.82 %  PER CENT   9/29/88
```

```
Sample ID                  PS  88.05831
Sample type                FILTER
Collection date, time       8/19/88   0:00
Receipt date                8/29/88
Completion date            10/ 5/88
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS127: ANDERSEN
Comments                   MSS081988-PSD-IN-3-ST7
Report to                  GERRY LUSTER

 Type of analysis          ********** PB        **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted        9/30/88  13:25
  Length of count          1000 min
  Preparer                 ZSAS
  Counting system          TN2D
  Sample size                0.340000 SAMP
  Comments                 170ML OF 500ML
    NUCLIDE     ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     3.2955E+01       11.98 %  PCI/SAMP   9/30/88 ANALYSIS
    PB-210     3.3080E+01       11.98 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      4.3254E+01        6.34 %  PER CENT   9/30/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL (10/ 5/88) and GL (10/ 5/88)
  Date, time counted       10/ 3/88  14:21
  Length of count          1000 min
  Preparer                 ZSAS
  Counting system          AS22
  Sample size                0.340000 SAMP
  Comments                 170ML OF 500ML
    NUCLIDE     ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     1.2592E+02        7.33 %  PCI/SAMP   9/30/88 ANALYSIS
    PO-210     1.4775E+02        7.33 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      5.0411E+01        6.77 %  PER CENT   9/30/88
```

Sample ID PS 88,05832
Sample type FILTER
Collection date, time 8/19/88 0:00
Receipt date 8/29/88
Completion date 0/ 0/00
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's MS128: ANDERSEN
Comments MSS081988-PSD-IN-3-ST8
Report to GERRY LUSTER

Type of analysis ********** PO **********
Verified by GL (10/ 6/88) and GL (10/ 6/88)
Date, time counted 10/ 3/88 14:21
Length of count 1000 min
Preparer ZSAS
Counting system AS23
Sample size 0.300000 SAMP
Comments 75ML OF 250ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	2.5104E+02	8.57 %	PCI/SAMP	9/30/88	ANALYSIS
PO-210	2.9479E+02	8.57 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	8.0825E+01	8.38 %	PER CENT	9/30/88	

Type of analysis ********** PB **********
Verified by GL (10/ 6/88) and GL (10/ 6/88)
Date, time counted 9/30/88 13:25
Length of count 1000 min
Preparer ZSAS
Counting system TN1A
Sample size 0.300000 SAMP
Comments 75ML OF 250ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	6.4696E+01	9.96 %	PCI/SAMP	9/30/88	ANALYSIS
PB-210	6.4943E+01	9.96 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	7.0025E+01	8.07 %	PER CENT	9/30/88	

```
Sample ID                 PS  88,05833
Sample type               FILTER
Collection date, time      8/19/88   0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS129: ANDERSEN
Comments                  MSS081988-PSD-IN-3-ST9
Report to                 GERRY LUSTER

Type of analysis          ********** PB       **********
 Verified by             GL (10/ 6/88) and GL (10/ 6/88)
 Date, time counted        9/30/88  13:25
 Length of count          1000 min
 Preparer                 ZSAS
 Counting system          TN2A
 Sample size                0.125000 SAMP
 Comments                 25ML OF 200ML
   NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
   PB-210     1.2662E+02       9.34 %  PCI/SAMP   9/30/88 ANALYSIS
   PB-210     1.2710E+02       9.34 %  PCI/SAMP   8/19/88 COLLECTION
   YIELD      6.4786E+01       6.45 %  PER CENT   9/30/88

Type of analysis          ********** PO-AUTO  **********
 Verified by             GL (10/ 6/88) and GL (10/ 6/88)
 Date, time counted       10/ 3/88  14:21
 Length of count          1000 min
 Preparer                 ZSAS
 Counting system          AS19
 Sample size                0.125000 SAMP
 Comments                 25ML OF 200ML
   NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
   PO-210     6.7704E+02       8.49 %  PCI/SAMP   9/30/88 ANALYSIS
   PO-210     8.0629E+02       8.49 %  PCI/SAMP   8/19/88 COLLECTION
   YIELD      5.8744E+01       8.27 %  PER CENT   9/30/88
```

Sample ID PS 88.05834
Sample type FILTER
Collection date, time 8/19/88 0:00
Receipt date 8/29/88
Completion date 0/ 0/00
Flag date 10/28/88
Location ID:SODA SPRINGS
Other ID's MS130: ANDERSEN
Comments MSSOH1988-PSD-OTC-3-ST1
Report to GERRY LUSTER

Type of analysis ********** PB **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/ 9/88 15:00
Length of count 1000 min
Preparer ZSVL
Counting system TN1A
Sample size 0.500000 SAMP
Comments 100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	2.9910E+00	38.98 %	PCI/SAMP	9/ 9/88	ANALYSIS
PB-210	2.9967E+00	38.98 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	7.0817E+01	6.85 %	PER CENT	9/ 9/88	

Type of analysis ********** PO-AUTO **********
Verified by GL (9/14/88) and GL (9/14/88)
Date, time counted 9/12/88 13:44
Length of count 1000 min
Preparer ZSVL
Counting system AS23
Sample size 0.500000 SAMP
Comments 100 ML OF 200

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.0362E+01	6.32 %	PCI/SAMP	9/ 9/88	ANALYSIS
PO-210	1.1181E+01	6.32 %	PCI/SAMP	8/19/88	COLLECTION
YIELD	8.1657E+01	4.52 %	PER CENT	9/ 9/88	

```
Sample ID                  PS  88.05835
Sample type                FILTER
Collection date, time       8/19/88    0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS131: ANDERSEN
Comments                   MSS081988-PSD-OTC-3-ST2 TO 5
Report to                  GERRY LUSTER

 Type of analysis          ********** PO        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/12/88  13:44
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          AS24
  Sample size                0.500000 SAMP
  Comments                 RECALCULATION, 100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR     UNITS     DATE
    PO-210     7.5177E+01       6.43 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PO-210     8.1826E+01       6.43 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      3.4218E+01       5.91 %  PER CENT   9/ 9/88

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 9/88  15:00
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          TN1D
  Sample size                0.500000 SAMP
  Comments                 100 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR     UNITS     DATE
    PB-210     1.5410E+01      11.35 %  PCI/SAMP   9/ 9/88 ANALYSIS
    PB-210     1.5440E+01      11.35 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.3558E+01       6.23 %  PER CENT   9/ 9/88
```

```
Sample ID                 PS  88.05836
Sample type               FILTER
Collection date, time      8/19/88    0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS132: ANDERSEN
Comments                  MSS0R1988-PSD-OTC-3-ST6
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 8/88    1:04
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN3B
  Sample size               0.250000 SAMP
  Comments                50 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210    3.9787E+01      13.92 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PB-210    3.9859E+01      13.92 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD     6.3731E+01       9.86 %  PER CENT   9/ 8/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/11/88  11:29
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS23
  Sample size               0.250000 SAMP
  Comments                50 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210    1.0741E+02       6.98 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PO-210    1.1456E+02       6.98 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD     7.1653E+01       6.64 %  PER CENT   9/ 8/88
```

```
Sample ID                  PS  88,05837
Sample type                FILTER
Collection date, time       8/19/88   0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS131: ANDERSEN
Comments                   MSS081988-PSD-OTC-3-ST7
Report to                  GERRY LUSTER

 Type of analysis          ********** PO        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/11/88  11:29
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          AS24
  Sample size                0.250000 SAMP
  Comments                 RECALCULATION, 50 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     1.9190E+02     10.05 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PO-210     2.0381E+02     10.05 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      6.8599E+01      9.75 %  PER CENT   9/ 8/88

 Type of analysis          ********** PB        **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 8/88  14:00
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          TN3D
  Sample size                0.250000 SAMP
  Comments                 50 ML OF 200
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     7.9159E+01     10.51 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PB-210     7.9302E+01     10.51 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.0205E+01      8.75 %  PER CENT   9/ 8/88
```

```
Sample ID                 PS  88.05838
Sample type               FILTER
Collection date, time      8/19/88   0:00
Receipt date               8/29/88
Completion date            0/ 0/00
Flag date                 10/28/88
Location                  ID:SODA SPRINGS
Other ID's                MS134: ANDERSEN
Comments                  MSS081988-PSD-OTC-3-ST8
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/ 8/88   1:04
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         TN2A
  Sample size               0.125000 SAMP
  Comments                25 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PB-210     1.2183E+02       9.53 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PB-210     1.2205E+02       9.53 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.8842E+01       6.98 %  PER CENT   9/ 8/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted       9/10/88  10:31
  Length of count         1000 min
  Preparer                ZSVL
  Counting system         AS23
  Sample size               0.125000 SAMP
  Comments                25 ML OF 200
    NUCLIDE    ACTIVITY    2 SIG ERROR    UNITS     DATE
    PO-210     3.8175E+02       7.95 %  PCI/SAMP   9/ 8/88 ANALYSIS
    PO-210     4.0921E+02       7.95 %  PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.5626E+01       7.63 %  PER CENT   9/ 8/88
```

```
Sample ID                  PS  88.05839
Sample type                FILTER
Collection date, time       8/19/88    0:00
Receipt date                8/29/88
Completion date             0/ 0/00
Flag date                  10/28/88
Location                   ID:SODA SPRINGS
Other ID's                 MS135: ANDERSEN
Comments                   MSS081988-PSD-OTC-3-ST9
Report to                  GERRY LUSTER

 Type of analysis          ********** PB       **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/ 8/88  14:00
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          TN28
  Sample size                0.050000 SAMP
  Comments                 25 ML OF 200
    NUCLIDE     ACTIVITY    2 SIG ERROR     UNITS      DATE
    PB-210     1.6879E+02       12.36 %   PCI/SAMP   9/ 8/88 ANALYSIS
    PB-210     1.6909E+02       12.36 %   PCI/SAMP   8/19/88 COLLECTION
    YIELD      7.5146E+01        8.69 %   PER CENT   9/ 8/88

 Type of analysis          ********** PO-AUTO  **********
  Verified by             GL ( 9/14/88) and GL ( 9/14/88)
  Date, time counted        9/10/88  10:31
  Length of count          1000 min
  Preparer                 ZSVL
  Counting system          AS24
  Sample size                0.050000 SAMP
  Comments                 25 ML OF 200
    NUCLIDE     ACTIVITY    2 SIG ERROR     UNITS      DATE
    PO-210     5.5882E+02        8.84 %   PCI/SAMP   9/ 8/88 ANALYSIS
    PO-210     6.0003E+02        8.84 %   PCI/SAMP   8/19/88 COLLECTION
    YIELD      8.3752E+01        8.41 %   PER CENT   9/ 8/88
```

APPENDIX L.3 - Blended Feedstock Radionuclide Data

Sample ID	PS 88,05656
Sample type	MISC
Collection date, time	8/17/88 0:00
Receipt date	8/23/88
Completion date	0/ 0/00
Flag date	10/22/88
Location	ID:SODA SPRINGS
Other ID's	MS49
Comments	MSS081788-FS-2-C, FEEDSTOCK
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (10/ 8/88) and GL (10/ 8/88)
Date, time counted	10/ 5/88 13:30
Length of count	1000 min
Preparer	ASVL
Counting system	TN2A
Sample size	0.250000 GDRY
Comments	B,125 ML OF 500

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.4681E+02	12.66 %	PCI/GDRY	10/ 4/88	ANALYSIS
PB-210	1.4745E+02	12.66 %	PCI/GDRY	8/17/88	COLLECTION
YIELD	8.0247E+01	11.10 %	PER CENT	10/ 4/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (10/ 8/88) and GL (10/ 8/88)
Date, time counted	10/ 6/88 14:43
Length of count	1000 min
Preparer	ASVL
Counting system	AS17
Sample size	0.250000 GDRY
Comments	B,125 ML OF 500

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.4312E+02	9.59 %	PCI/GDRY	10/ 4/88	ANALYSIS
PO-210	1.4203E+02	9.59 %	PCI/GDRY	8/17/88	COLLECTION
YIELD	8.1967E+01	9.18 %	PER CENT	10/ 4/88	

```
Sample ID                 PS  88.05667
Sample type               MISC
Collection date, time      8/17/88   0:00
Receipt date               8/23/88
Completion date            0/ 0/00
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS50
Comments                  MSS081788-FS-3-C, FEEDSTOCK
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by            GL (10/ 8/88) and GL (10/ 8/88)
  Date, time counted      10/ 5/88  13:30
  Length of count         1000 min
  Preparer                ASVL
  Counting system         TN2B
  Sample size               0.252500 GDRY
  Comments                8,125 ML OF 500 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PB-210     1.1335E+02      8.85 %  PCI/GDRY  10/ 4/88 ANALYSIS
    PB-210     1.1384E+02      8.85 %  PCI/GDRY   8/17/88 COLLECTION
    YIELD      7.1490E+01      7.67 %  PER CENT  10/ 4/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by            GL (10/ 8/88) and GL (10/ 8/88)
  Date, time counted      10/ 6/88  14:43
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS18
  Sample size               0.252500 GDRY
  Comments                8,125 ML OF 500 ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS     DATE
    PO-210     1.1271E+02      9.74 %  PCI/GDRY  10/ 4/88 ANALYSIS
    PO-210     1.1247E+02      9.74 %  PCI/GDRY   8/17/88 COLLECTION
    YIELD      7.1835E+01      9.23 %  PER CENT  10/ 4/88
```

```
Sample ID                 PS  88.05678
Sample type               MISC
Collection date, time      8/18/88   0:00
Receipt date               8/23/88
Completion date            9/28/88
Flag date                 10/22/88
Location                  ID:SODA SPRINGS
Other ID's                MS81
Comments                  MSS081888-FS-4-C, FEEDSTOCK
Report to                 GERRY LUSTER

 Type of analysis         ********** PB        **********
  Verified by             GL ( 9/28/88) and GL ( 9/28/88)
  Date, time counted       9/23/88  14:10
  Length of count         1000 min
  Preparer                ASVL
  Counting system         SH1B
  Sample size               0.253300 GDRY
  Comments                125ML OF 500ML 1.013GDRY DISS IN 500ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS    DATE
    PB-210     1.1731E+02     10.03 %  PCI/GDRY   9/23/88 ANALYSIS
    PB-210     1.1769E+02     10.03 %  PCI/GDRY   8/18/88 COLLECTION
    YIELD      7.6480E+01      8.54 %  PER CENT   9/23/88

 Type of analysis         ********** PO-AUTO  **********
  Verified by             GL ( 9/28/88) and GL ( 9/28/88)
  Date, time counted       9/26/88  14:13
  Length of count         1000 min
  Preparer                ASVL
  Counting system         AS18
  Sample size               0.253300 GDRY
  Comments                125ML OF 500ML 1.013GDRY DISS IN 500ML
    NUCLIDE    ACTIVITY   2 SIG ERROR    UNITS    DATE
    PO-210     1.2278E+02      9.70 %  PCI/GDRY   9/23/88 ANALYSIS
    PO-210     1.2383E+02      9.70 %  PCI/GDRY   8/18/88 COLLECTION
    YIELD      7.2730E+01      9.20 %  PER CENT   9/23/88
```

Sample ID	PS 88.06095
Sample type	MISC
Collection date, time	8/19/88 0:00
Receipt date	8/29/88
Completion date	9/28/88
Flag date	10/28/88
Location	ID:SODA SPRINGS
Other ID's	MS93
Comments	MSS081988-MM111-F5-5-C, FEEDSTOCK
Report to	GERRY LUSTER

Type of analysis	********** PB **********
Verified by	GL (9/28/88) and GL (9/28/88)
Date, time counted	9/23/88 14:10
Length of count	1000 min
Preparer	ASVL
Counting system	TN1D
Sample size	0.251200 GDRY
Comments	125 ML OF 500 ML; 1.0050 GDRY IN 500 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PB-210	1.2666E+02	10.08 %	PCI/GDRY	9/23/88	ANALYSIS
PB-210	1.2706E+02	10.08 %	PCI/GDRY	8/19/88	COLLECTION
YIELD	8.9441E+01	8.96 %	PER CENT	9/23/88	

Type of analysis	********** PO-AUTO **********
Verified by	GL (9/28/88) and GL (9/28/88)
Date, time counted	9/26/88 14:13
Length of count	1000 min
Preparer	ASVL
Counting system	AS24
Sample size	0.251200 GDRY
Comments	125 ML OF 500; 1.005 GDRY IN 500 ML

NUCLIDE	ACTIVITY	2 SIG ERROR	UNITS	DATE	
PO-210	1.2561E+02	9.68 %	PCI/GDRY	9/23/88	ANALYSIS
PO-210	1.2537E+02	9.68 %	PCI/GDRY	8/19/88	COLLECTION
YIELD	8.3584E+01	9.21 %	PER CENT	9/23/88	

APPENDIX L.4 - Summary of Analytical Data

TABLE L.4-1.

COMPLETE LIST OF RADIAN SAMPLES RECEIVED BY EERF

9/14/88

EERF NUMBER	COLLECTION	RADIAN NO.	RADIAN DESCRIPTION
PS 88.05646	8/17/88	MS18,23,75	MSS081788-MM111-IN-2-PRA MSS081788-MM111-IN-2-PRN MSS081788-MM111-IN-2-F PROBE RINSE AND FILTER
PS 88.05647	8/17/88	MS17	MSS081788-MM111-IN-2-IR IMPINGER
PS 88.05648	8/17/88	MS20,24,71	MSS081788-MM111-OTA-2-PRA MSS081788-MM111-OTA-2-PRA MSS081788-MM111-OTA-2-F PROBE RINSE AND FILTER
PS 88.05649	8/17/88	MS28	MSS081788-MM111-OTA-2-IR IMPINGER
PS 88.05650	8/17/88	MS21,25,72	MSS081788-MM111-OTB-2-PRA MSS081788-MM111-OTB-2-PRN MSS081788-MM111-OTB-2-F PROBE RINSE AND FILTER
PS 88.05650X	8/17/88	MS21,25,72	MSS081788-MM111-OTB-2-PRA MSS081788-MM111-OTB-2-PRN MSS081788-MM111-OTB-2-F PROBE RINSE AND FILTER
PS 88.05651	8/17/88	MS29	MSS081788-MM111-OTB-2-IR IMPINGER
PS 88.05652	8/17/88	MS19,26,73	MSS081788-MM111-OTC-2-PRA MSS081788-MM111-OTC-2-PRN MSS081788-MM111-OTC-2-F PROBE RINSE AND FILTER
PS 88.05653	8/17/88	MS30	MSS081788-MM111-OTC-2-IR IMPINGER
PS 88.05654	8/19/88	MS99,82,84	MSS081988-MM111-OTD-5-PRA MSS081988-MM111-OTD-5-PRN MSS081988-MM111-OTD-5-F PROBE RINSE AND FILTER
PS 88.05655	8/19/88	MS83	MSS0819-MM111-OTD-5-IR IMPINGER
PS 88.05656	8/17/88	MS49	MSS081788-FS-2-C FEEDSTOCK
PS 88.05657	8/17/88	MS32,33,80	MSS081788-MM111-IN-3-PRA MSS081788-MM111-IN-3-PRN MSS081788-MM111-IN-3-F PROBE RINSE AND FILTER
PS 88.05658	8/17/88	MS34	MSS081788-MM111-IN-3-IR IMPINGER

PS	88.05659	8/17/88	MS39,43,76	MSS081788-MM111-OTA-3-PRA MSS081788-MM111-OTA-3-PRN MSS081788-MM111-OTA-3-F PROBE RINSE AND FILTER
PS	88.05660	8/17/88	MS46	MSS081788-MM111-OTA-3-IR IMPINGER
PS	88.05660X	8/17/88	MS46	MSS081788-MM111-OTA-3-IR IMPINGER
PS	88.05661	8/17/88	MS38,41,77	MSS081788-MM111-OTB-3-PRA MSS081788-MM111-OTB-3-PRN MSS081788-MM111-OTB-3-F PROBE RINSE AND FILTER
PS	88.05662	8/17/88	MS35	MSS081788-MM111-OTB-3-IR IMPINGER
PS	88.05663	8/17/88	MS36,42,78	MSS081788-MM111-OTC-3-PRA MSS081788-MM111-OTC-3-PRN MSS081788-MM111-OTC-3-F PROBE RINSE AND FILTER
PS	88.05664	8/17/88	MS45	MSS081788-MM111-OTC-3-IR IMPINGER
PS	88.05665	8/17/88	MS37,40,79	MSS081788-MM111-OTD-3-PRA MSS081788-MM111-OTD-3-PRN MSS081788-MM111-OTD-3-F PROBE RINSE AND FILTER
PS	88.05666	8/17/88	MS44	MSS081788-MM111-OTD-3-IR IMPINGER
PS	88.05667	8/17/88	MS50	MSS081788-FS-3-C FEEDSTOCK
PS	88.05668	8/18/88	MS55,57,98	MSS081888-MM111-IN-4-PRA MSS081888-MM111-IN-4-PRN MSS081888-MM111-IN-4-F PROBE RINSE AND FILTER
PS	88.05669	8/18/88	MS59	MSS081888-MM111-IN-4-IR IMPINGER
PS	88.05670	8/18/88	MS53,52,94	MSS081888-MM111-OTA-4-PRA MSS081888-MM111-OTA-4-PRN MSS081888-MM111-OTA-4-F PROBE RINSE AND FILTER
PS	88.05670X	8/18/88	MS53,52,94	MSS081888-MM111-OTA-4-PRA MSS081888-MM111-OTA-4-PRN MSS081888-MM111-OTA-4-F PROBE RINSE AND FILTER
PS	88.05671	8/18/88	MS60	MSS081888-MM111-OTA-4-IR IMPINGER

PS	88.05672	8/18/88	MS54,65,95	MSS081888-MM111-OTB-4-PRA MSS081888-MM111-OTB-4-PRN MSS081888-MM111-OTB-4-F PROBE RINSE AND FILTER
PS	88.05673	8/18/88	MS51	MSS081888-MM111-OTB-4-IR IMPINGER
PS	88.05674	8/18/88	MS58,56,96	MSS081888-MM111-OTC-4-PRA MSS081888-MM111-OTC-4-PRN MSS081888-MM111-OTC-4-F PROBE RINSE AND FILTER
PS	88.05675	8/18/88	MS62	MSS081888-MM111-OTC-4-IR IMPINGER
PS	88.05676	8/18/88	MS64,63,97	MSS081888-MM111-OTD-4-PRA MSS081888-MM111-OTD-4-PRN MSS081888-MM111-OTD-4-F PROBE RINSE AND FILTER
PS	88.05677	8/18/88	MS61	MSS081888-MM111-OTD-4-IR IMPINGER
PS	88.05678	8/18/88	MS81	MSS081888-FS-4-C FEEDSTOCK
PS	88.05800	8/19/88	MS85,87,92	MSS081988-MM111-IN-FB-PRA MSS081988-MM111-IN-FB-PRN MSS081988-MM111-IN-FB-F PROBE RINSE AND FILTER
PS	88.05800X	8/19/88	MS85,87,92	MSS081988-MM111-IN-FB-PRA MSS081988-MM111-IN-FB-PRN MSS081988-MM111-IN-FB-F PROBE RINSE AND FILTER
PS	88.05801	8/19/88	MS86	MSS081988-MM111-IN-FB-IR IMPINGER
PS	88.05802	8/19/88	MS88,89,91	MSS081988-MM111-OTA-FB-PRA MSS081988-MM111-OTA-FB-PRN MSS081988-MM111-OTA-FB-F PROBE RINSE AND FILTER
PS	88.05803	8/19/88	MS90	MSS081988-MM111-OTA-FB-IR IMPINGER
PS	88.05804	8/17/88	MS100	MSS081788-PSD-IN-1-ST1
PS	88.05805	8/17/88	MS101	MSS081788-PSD-IN-1-ST2 TO 5
PS	88.05806	8/17/88	MS102	MSS081788-PSD-IN-1-ST6
PS	88.05807	8/17/88	MS103	MSS081788-PSD-IN-1-ST7
PS	88.05808	8/17/88	MS104	MSS081788-PSD-IN-1-ST8
PS	88.05809	8/17/88	MS105	MSS081788-PSD-IN-1-ST9

PS	88.05810	8/17/88	MS106	MSS081788-PSD-OTC-1-ST1
PS	88.05810X	8/17/88	MS106	MSS081788-PSD-OTC-1-ST1
PS	88.05811	8/17/88	MS107	MSS081788-PSD-OTC-1-ST2 TO 5
PS	88.05812	8/17/88	MS108	MSS081788-PSD-OTC-1-ST6
PS	88.05813	8/17/88	MS109	MSS081788-PSD-OTC-1-ST7
PS	88.05814	8/17/88	MS110	MSS081788-PSD-OTC-1-ST8
PS	88.05815	8/17/88	MS111	MSS081788-PSD-OTC-1-ST9
PS	88.05816	8/18/88	MS112	MSS081888-PSD-IN-2-ST1
PS	88.05817	8/18/88	MS113	MSS081888-PSD-IN-2-ST2 TO 5
PS	88.05818	8/18/88	MS114	MSS081888-PSD-IN-2-ST6
PS	88.05819	8/18/88	MS115	MSS081888-PSD-IN-2-ST7
PS	88.05820	8/18/88	MS116	MSS081888-PSD-IN-2-ST8
PS	88.05820X	8/18/88	MS116	MSS081888-PSD-IN-2-ST8
PS	88.05821	8/18/88	MS117	MSS081888-PSD-IN-2-ST9
PS	88.05822	8/18/88	MS118	MSS081888-PSD-OTC-2-ST1
PS	88.05823	8/18/88	MS119	MSS081888-PSD-OTC-S-ST2 TO 5
PS	88.05824	8/18/88	MS120	MSS081888-PSD-OTC-S-ST6
PS	88.05825	8/18/88	MS121	MSS081888-PSD-OTC-2-ST7
PS	88.05826	8/18/88	MS122	MSS081888-PSD-OTC-2-ST8
PS	88.05827	8/18/88	MS123	MSS081888-PSD-OTC-2-ST9
PS	88.05828	8/19/88	MS124	MSS081988-PSD-IN-3-ST1
PS	88.05829	8/19/88	MS125	MSS081988-PSD-IN-3-ST2 TO 5
PS	88.05830	8/19/88	MS126	MSS081988-PSD-IN-3-ST6
PS	88.05830X	8/19/88	MS126	MSS081988-PSD-IN-3-ST6
PS	88.05831	8/19/88	MS127	MSS081988-PSD-IN-3-ST7
PS	88.05832	8/19/88	MS128	MSS081988-PSD-IN-3-ST8
PS	88.05833	8/19/88	MS129	MSS081988-PSD-IN-3-ST9
PS	88.05834	8/19/88	MS130	MSS081988-PSD-OTC-3-ST1
PS	88.05835	8/19/88	MS131	MSS081988-PSD-OTC-3-ST2 TO 5
PS	88.05836	8/19/88	MS132	MSS081988-PSD-OTC-3-ST6

PS	88.05837	8/19/88	MS133	MSS081988-PSD-OTC-3-ST7
PS	88.05838	8/19/88	MS134	MSS081988-PSD-OTC-3-ST8
PS	88.05839	8/19/88	MS135	MSS081988-PSD-OTC-3-ST9
PS	88.05858	8/24/88	FMC1,2,3	FMC082488-MM111-IN-1-PRA FMC082488-MM111-IN-1-PRN FMC082488-MM111-IN-1-F PROBE RINSE AND FILTER
PS	88.05859	8/24/88	FMC4	FMC082488-MM111-IN-1-IR IMPINGER
PS	88.05860	8/24/88	FMC5,6,7	FMC082488-MM111-OTA-1-PRA FMC082488-MM111-OTA-1-PRN FMC082488-MM111-OTA-1-F PROBE RINSE AND FILTER
PS	88.05860X	8/24/88	FMC5,6,7	FMC082488-MM111-OTA-1-PRA FMC082488-MM111-OTA-1-PRN FMC082488-MM111-OTA-1-F PROBE RINSE AND FILTER
PS	88.05861	8/24/88	FMC8	FMC082488-MM111-OTA-1-IR IMPINGER
PS	88.05862	8/24/88	FMC9,10,11	FMC082488-MM111-OTB-1-PRA FMC082488-MM111-OTB-1-PRN FMC082488-MM111-OTB-1-F PROBE RINSE AND FILTER
PS	88.05863	8/24/88	FMC12	FMC082488-MM111-OTB-1-IR IMPINGER
PS	88.05864	8/24/88	FMC82	FMC082488-FS-1 FEEDSTOCK
PS	88.05865	8/24/88	FMC13,14,15	FMC082488-MM111-IN-2-PRA FMC082488-MM111-IN-2-PRN FMC082488-MM111-IN-2-F PROBE RINSE AND FILTER
PS	88.05866	8/24/88	FMC16	FMC082488-MM111-IN-2-IR IMPINGER
PS	88.05867	8/24/88	FMC17,18,19	FMC082488-MM111-OTA-2-PRA FMC082488-MM111-OTA-2-PRN FMC082488-MM111-OTA-2-F PROBE RINSE AND FILTER
PS	88.05868	8/24/88	FMC20	FMC082488-MM111-OTA-2-IR IMPINGER
PS	88.05869	8/24/88	FMC21,22,23	FMC082488-MM111-OTB-2-PRA FMC082488-MM111-OTB-2-PRN FMC082488-MM111-OTB-2-F PROBE RINSE AND FILTER

PS	88.05870	8/24/88	FMC24	FMC082488-MM111-OTB-2-IR IMPINGER
PS	88.05870X	8/24/88	FMC24	FMC082488-MM111-OTB-2-IR IMPINGER
PS	88.05871	8/24/88	FMC83	FMC082488-FS-2 FEEDSTOCK
PS	88.05872	8/25/88	FMC26,27,28	FMC082588-MM111-IN-3-PRA FMC082588-MM111-IN-3-PRN FMC082588-MM111-IN-3-F PROBE RINSE AND FILTER
PS	88.05873	8/25/88	FMC29	FMC082588-MM111-IN-3-IR IMPINGER
PS	88.05874	8/25/88	FMC30,31,32	FMC082588-MM111-OTA-3-PRA FMC082588-MM111-OTA-3-PRN FMC082588-MM111-OTA-3-F PROBE RINSE AND FILTER
PS	88.05875	8/25/88	FMC73	FMC082588-MM111-OTA-3-IR IMPINGER
PS	88.05876	8/25/88	FMC33,34,35	FMC082588-MM111-OTB-3-PRA FMC082588-MM111-OTB-3-PRN FMC082588-MM111-OTB-3-F PROBE RINSE AND FILTER
PS	88.05877	8/25/88	FMC36	FMC082588-MM111-OTB-3-IR IMPINGER
PS	88.05878	8/25/88	FMC84	FMC082588-FS-3 FEEDSTOCK
PS	88.05879	8/25/88	FMC37,38,39	FMC082588-MM111-IN-4-PRA FMC082588-MM111-IN-4-PRN FMC082588-MM111-IN-4-F PROBE RINSE AND FILTER
PS	88.05880	8/25/88	FMC40	FMC082588-MM111-IN-4-IR IMPINGER
PS	88.05880X	8/25/88	FMC40	FMC082588-MM111-IN-4-IR IMPINGER
PS	88.05881	8/25/88	FMC41,42,43	FMC082588-MM111-OTA-4-PRA FMC082588-MM111-OTA-4-PRN FMC082588-MM111-OTA-4-F PROBE RINSE AND FILTER
PS	88.05882	8/25/88	FMC44	FMC082588-MM111-OTA-4-IR IMPINGER
PS	88.05883	8/25/88	FMC45,46,47	FMC082588-MM111-OTB-4-PRA FMC082588-MM111-OTB-4-PRN FMC082588-MM111-OTB-4-F

				PROBE RINSE AND FILTER
PS	88.05884	8/25/88	FMC48	FMC082588-MM111-OTB-4-IR IMPINGER
PS	88.05885	8/25/88	FMC85	FMC082588-FS-4 FEEDSTOCK
PS	88.05886	8/26/88	FMC49,50,51	FMC082688-MM111-OTA-5-PRA FMC082688-MM111-OTA-5-PRN FMC082688-MM111-OTA-5-F PROBE RINSE AND FILTER
PS	88.05887	8/26/88	FMC52	FMC082688-MM111-OTA-5-IR IMPINGER
PS	88.05888	8/26/88	FMC53,54,55	FMC082688-MM111-OTB-5-PRA FMC082688-MM111-OTB-5-PRN FMC082688-MM111-OTB-5-F PROBE RINSE AND FILTER
PS	88.05889	8/26/88	FMC56	FMC082688-MM111-OTB-5-IR IMPINGER
PS	88.05890	8/26/88	FMC57,58,59	FMC082688-MM111-OTA-6-PRA FMC082688-MM111-OTA-6-PRN FMC082688-MM111-OTA-6-F PROBE RINSE AND FILTER
PS	88.05890X	8/26/88	FMC57,58,59	FMC082688-MM111-OTA-6-PRA FMC082688-MM111-OTA-6-PRN FMC082688-MM111-OTA-6-F PROBE RINSE AND FILTER
PS	88.05891	8/26/88	FMC60	FMC082688-MM111-OTA-6-IR IMPINGER
PS	88.05892	8/26/88	FMC61,62,63	FMC082688-MM111-OTB-6-PRA FMC082688-MM111-OTB-6-PRN FMC082688-MM111-OTB-6-F PROBE RINSE AND FILTER
PS	88.05893	8/26/88	FMC64	FMC082688-MM111-OTB-6-IR IMPINGER
PS	88.05894	8/26/88	FMC65,66,67	FMC082688-MM111-OTA-7-PRA FMC082688-MM111-OTA-7-PRN FMC082688-MM111-OTA-7-F PROBE RINSE AND FILTER
PS	88.05895	8/26/88	FMC68	FMC082688-MM111-OTA-7-IR IMPINGER
PS	88.05896	8/26/88	FMC69,70,71	FMC082688-MM111-OTB-7-PRA FMC082688-MM111-OTB-7-PRN FMC082688-MM111-OTB-7-F PROBE RINSE AND FILTER
PS	88.05897	8/26/88	FMC72	FMC082688-MM111-OTB-7-IR IMPINGER

PS	88.05898	8/26/88	FMC74,75,76A	FMC082688-MM111-IN-FB-PRA FMC082688-MM111-IN-FB-PRN FMC082688-MM111-IN-FB-F PROBE RINSE AND FILTER
PS	88.05899	8/26/88	FMC77	FMC082688-MM111-IN-FB-IR IMPINGER
PS	88.05900	8/26/88	FMC78,79,80A	FMC082688-MM111-OUT-FB-PRA FMC082688-MM111-OUT-FB-PRN FMC082688-MM111-OTB-FB-F PROBE RINSE
PS	88.05900X	8/26/88	FMC78,79	FMC082688-MM111-OUT-FB-PRA FMC082688-MM111-OUT-FB-PRN PROBE RINSE
PS	88.05901	8/26/88	FMC81	FMC082688-MM111-OUT-FB-IR IMPINGER
PS	88.05902	8/27/88	FMC140	FMC082788-MM111-RB-F
PS	88.05903	8/23/88	FMC25	FMC082388-PROBE BLANK
PS	88.05904	8/24/88	FMC86	FMC082488-PSD-IN-1-ST1
PS	88.05905	8/24/88	FMC87	FMC082488-PSD-IN-1-ST2-5
PS	88.05906	8/24/88	FMC88	FMC082488-PSD-IN-1-ST6
PS	88.05907	8/24/88	FMC89	FMC082488-PSD-IN-1-ST7
PS	88.05908	8/24/88	FMC90	FMC082488-PSD-IN-1-ST8
PS	88.05909	8/24/88	FMC91	FMC082488-PSD-IN -1-ST9
PS	88.05910	8/24/88	FMC92	FMC082488-PSD-OTA-1-ST1
PS	88.05910X	8/24/88	FMC92	FMC082488-PSD-OTA-1-ST1
PS	88.05911	8/24/88	FMC93	FMC082488-PSD-OTA-1-ST2-5
PS	88.05912	8/24/88	FMC94	FMC082488-PSD-OTA-1-ST6
PS	88.05913	8/24/88	FMC95	FMC082488-PSD-OTA-1-ST7
PS	88.05914	8/24/88	FMC96	FMC082488-PSD-OTA-1-ST8
PS	88.05915	8/24/88	FMC97	FMC082488-PSD-OTA-1-ST9
PS	88.05916	8/24/88	FMC98	FMC082488-PSD-OTB-1-ST1
PS	88.05917	8/24/88	FMC99	FMC082488-PSD-OTB-1-ST2-5
PS	88.05918	8/24/88	FMC100	FMC082488-PSD-OTB-1-ST6
PS	88.05919	8/24/88	FMC101	FMC082488-PSD-OTB-1-ST7

PS	88.05920	8/24/88	FMC102	FMC082488-PSD-OTB-1-ST8
PS	88.05920X	8/24/88	FMC102	FMC082488-PSD-OTB-1-ST8
PS	88.05921	8/24/88	FMC103	FMC082488-PSD-OTB-1-ST9
PS	88.05922	8/24/88	FMC104	FMC082488-PSD-IN-2-ST1
PS	88.05923	8/24/88	FMC105	FMC082488-PSD-IN-2-ST2-5
PS	88.05924	8/24/88	FMC106	FMC082488-PSD-IN-2-ST6
PS	88.05925	8/24/88	FMC107	FMC082488-PSD-IN-2-ST7
PS	88.05926	8/24/88	FMC108	FMC082488-PSD-IN-2-ST8
PS	88.05927	8/24/88	FMC109	FMC082488-PSD-IN-2-ST9
PS	88.05928	8/24/88	FMC110	FMC082488-PSD-OTA-2-ST1
PS	88.05929	8/24/88	FMC111	FMC082488-PSD-OTA-2-ST2-5
PS	88.05930	8/24/88	FMC112	FMC082488-PSD-OTA-2-ST6
PS	88.05930X	8/24/88	FMC112	FMC082488-PSD-OTA-2-ST6
PS	88.05931	8/24/88	FMC113	FMC082488-PSD-OTA-2-ST7
PS	88.05932	8/24/88	FMC114	FMC082488-PSD-OTA-2-ST8
PS	88.05933	8/24/88	FMC115	FMC082488-PSD-OTA-2-ST9
PS	88.05934	8/24/88	FMC116	FMC082488-PSD-OTB-2-ST1
PS	88.05935	8/24/88	FMC117	FMC082488-PSD-OTB-2-ST2-5
PS	88.05936	8/24/88	FMC118	FMC082488-PSD-OTB-2-ST6
PS	88.05937	8/24/88	FMC119	FMC082488-PSD-OTB-2-ST7
PS	88.05938	8/24/88	FMC120	FMC082488-PSD-OTB-2-ST8
PS	88.05939	8/24/88	FMC121	FMC082488-PSD-OTB-2-ST9
PS	88.05940	8/25/88	FMC122	FMC082588-PSD-IN-3-ST1
PS	88.05940X	8/25/88	FMC122	FMC082588-PSD-IN-3-ST1
PS	88.05941	8/25/88	FMC123	FMC082588-PSD-IN-3-ST2-5
PS	88.05942	8/25/88	FMC124	FMC082588-PSD-IN-3-ST6
PS	88.05943	8/25/88	FMC125	FMC082588-PSD-IN-3-ST7
PS	88.05944	8/25/88	FMC126	FMC082588-PSD-IN-3-ST8
PS	88.05945	8/25/88	FMC127	FMC082588-PSD-IN-3-ST9
PS	88.05946	8/25/88	FMC128	FMC082588-PSD-OTA-3-ST1

PS	88.05947	8/25/88	FMC129	FMC082588-PSD-OTA-3-ST2-5
PS	88.05948	8/25/88	FMC130	FMC082588-PSD-OTA-3-ST6
PS	88.05949	8/25/88	FMC131	FMC082588-PSD-OTA-3-ST7
PS	88.05950	8/25/88	FMC132	FMC082588-PSD-OTA-3-ST8
PS	88.05950X	8/25/88	FMC132	FMC082588-PSD-OTA-3-ST8
PS	88.05951	8/25/88	FMC133	FMC082588-PSD-OTA-3-ST9
PS	88.05952	8/25/88	FMC129	FMC082588-PSD-OTB-3-ST1
PS	88.05953	8/25/88	FMC130	FMC082588-PSD-OTB-3-ST2-5
PS	88.05954	8/25/88	FMC131	FMC082588-PSD-OTB-3-ST6
PS	88.05955	8/25/88	FMC132	FMC082588-PSD-OTB-3-ST7
PS	88.05956	8/25/88	FMC133	FMC082588-PSD-OTB-3-ST8
PS	88.05957	8/25/88	FMC134	FMC082588-PSD-OTB-3-ST9
PS	88.05958	8/26/88	FMC141	FMC082688-PSD-FB-ST1
PS	88.05959	8/26/88	FMC142	FMC082688-PSD-FB-ST2-5
PS	88.05960	8/26/88	FMC143	FMC082688-PSD-FB-ST6
PS	88.05960X	8/26/88	FMC143	FMC082688-PSD-FB-ST6
PS	88.05961	8/26/88	FMC144	FMC082688-PSD-FB-ST7
PS	88.05962	8/26/88	FMC145	FMC082688-PSD-FB-ST8
PS	88.05963	8/26/88	FMC146	FMC082688-PSD-FB-ST9
PS	88.06080	8/18/88	MS48	MSS081888 HNO3 BLANK
PS	88.06080X	8/18/88	MS48	MSS081888 HNO3 BLANK
PS	88.06081	8/18/88	MS47	MSS081888 ACETONE REAGENT BLANK ARCH~~IVED SAMPLE~~
PS	88.06082	8/16/88	MS16	MSS081688-FS-1-C COMPOSITE ARCHIVED SAMPLE
PS	88.06083	8/16/88	MS13,14,70	MSS081688-MM111-IN-1-PRA MSS081688-MM111-IN-1-PRN MSS081688-MM111-IN-1-F PROBE RINSE AND FILTER ARCHIVED SAMPLE
PS	88.06084	8/16/88	MS15	MSS0 81688-MM111-IN-1-IR IMPINGER

				ARCHIVED SAMPLE
PS	88.06085	8/16/88	MS10,11,66	MSS081688-MM111-OTA-1-PRA MSS081688-MM111-OTA-1-PRN MSS081688-MM111-OTA-1-F PROBE RINSE AND FILTER ARCHIVED SAMPLE
PS	88.06086	8/16/88	MS12	MSS0 81688-MM111-OTA-1-IR IMPINGER ARCHIVED SAMPLE
PS	88.06087	8/16/88	MS7,8,67	MSS081688-MM111-OTB-1-PRA MSS081688-MM111-OTB-1-PRN MSS081688-MM111-OTB-1-F PROBE RINSE AND FILTER ARCHIVED SAMPLE
PS	88.06088	8/16/88	MS9	MSS08 1688-MM111-OTB-1-IR IMPINGER ARCHIVED SAMPLE
PS	88.06089	8/16/88	MS4,5,68	MSS081688-MM111-OTC-1-PRA MSS081688-MM111-OTC-1-PRN MSS081688-MM111-OTC-1-F PROBE RINSE AND FILTER ARCHIVED SAMPLE
PS	88.06090	8/16/88	MS6	MSS08 1688-MM111-OTC-1-IR IMPINGER ARCHIVED SAMPLE
PS	88.06090X	8/16/88	MS6	MSS08 1688-MM111-OTC-1-IR IMPINGER ARCHIVED SAMPLE
PS	88.06091	8/16/88	MS1,2,69	MSS081688-MM111-OTD-PRA, MSS081688-MM111-OTD-1-PRN MSS081688-MM111-OTD-F, PROBE RINSE AND FILTER ARCHIVED SAMPLE
PS	88.06092	8/16/88	MS3	MSS08 1688-MM111-OTD-1-IR IMPINGER ARCHIVED SAMPLE
PS	88.06093	8/17/88	MS22,27,74	MSS081788-MM111-OTD-2-PRA MSS081788-MM111-OTD-2-PRN MSS081788-MM111-OTD-2-F PROBE RINSE AND FILTER ARCHIVED SAMPLE
PS	88.06094	8/17/88	MS31	MSS081788-MM111-OTD-2-IR IMPINGER ARCHIVED SAMPLE
PS	88.06095	8/19/88	M93	MSS081988-MM111-FS-5-C FEEDSTOCK

TABLE L.4.2. SUMMARY OF RADIONUCLIDE ANALYTICAL DATA
MONSANTO, SODA SPRINGS, IDAHO (August 1988)

EERF[a] Sample Number	Pb-210 Activity at Collection	Pb-210 2 σ(%)[b]	Po-210 Activity at Collection	Po-210 2 σ(%)[b]
88.05646	8.3305E+03	14.73	2.2678E+04	9.66
88.05647	1.8239E+01	62.28	1.9681E+03	8.71
88.05648	2.1356E+02	7.56	6.9447E+02	5.82
88.05649	2.7978E+00	46.59	3.2775E+01	6.34
88.0560	2.7302E+02	12.84	1.3639E+03	16.90
88.05650X	2.7058E+02	9.55	1.2326E+03	10.72
88.05651	-1.0378E+00	166.88	6.9610E+01	6.60
88.05652	1.4696E+02	8.72	4.7674E+02	12.28
88.05653	6.2612E+00	34.85	3.3825E+01	7.94
88.05654	1.3054E+02	10.51	7.1435E+02	8.72
88.05655	2.1319E-01	445.11	2.7727E+01	5.37
88.05656	1.4745E+02	12.66	1.4203E+02	9.59
88.05657	4.9584E+03	10.78	1.6983E+04	9.47
88.05658	9.2746E+00	139.27	1.5327E+03	9.34
88.05659	3.7446E+02	8.13	1.2102E+02	10.33
88.05660	8.8834E-01	213.79	2.7038E+01	7.72
88.05660X	4.8166E+00	42.75	2.7933E+01	7.71
88.05661	1.8028E+02	9.14	6.5178E+02	8.24
88.05662	1.5643E+00	113.60	7.3954E+01	7.31
88.05663	1.5521E+02	8.62	5.3281E+02	8.35
88.05664	8.2850E-01	129.33	1.3831E+02	8.07
88.05665	1.9875E+02	10.39	8.1043E+02	9.71
88.05666	2.0009E-01	535.36	6.5463E+01	8.16
88.05667	1.1384E+02	8.85	1.1247E+02	9.74
88.05668	6.4497E+03	12.10	2.0661E+04	9.78
88.05669	3.8969E+00	107.74	7.7787E+02	7.67
88.05670	1.4698E+02	10.18	6.0073E+02	8.54
88.05670X	1.8435E+02	13.47	6.5428E+02	5.71
88.05671	1.8605E+00	59.13	4.2978E+01	8.20

TABLE L.4.2. SUMMARY OF RADIONUCLIDE ANALYTICAL DATA
MONSANTO, SODA SPRINGS, IDAHO (August 1988)
(continued)

EERF[a] Sample Number	Pb-210 Activity at Collection	Pb-210 2σ (%)[b]	Po-210 Activity at Collection	Po-210 2σ (%)[b]
88.05672	2.3072E+02	11.29	7.8065E+02	8.58
88.05673	2.1621E+00	54.50	8.3458E+01	8.06
88.05674	1.5446E+02	14.16	7.1882E+02	9.14
88.05675	2.3646E+00	76.22	3.6759E+01	8.08
88.05676	2.1555E+02	10.43	7.4050E+02	8.54
88.05677	1.1254E+00	81.33	5.1788E+01	8.12
88.05678	1.1769E+02	10.03	1.2383E+02	9.70
88.05800	8.8948E+00	33.65	1.2727E+02	10.15
88.05800X	8.0609E+00	26.56	1.1732E+02	9.71
88.05801	3.5874E-01	479.62	3.6570E+01	7.86
88.05802	3.2140E+00	37.31	2.3810E+01	7.77
88.05803	1.8583E+00	56.95	3.0845E+00	9.58
88.05804	1.2284E+00	103.96	1.2089E+01	6.42
88.05805	2.3146E+01	16.16	1.0907E+02	7.31
88.05806	5.4986E+01	13.56	1.4688E+02	5.27
88.05807	1.5248E+02	12.96	4.1752E+02	8.22
88.05808	2.9061E+02	13.13	8.2206E+02	9.24
88.05809	2.2684E+02	11.24	7.8091E+02	8.92
88.05810	1.8822E+02	112.64	2.9711E+00	9.30
88.05810x	-4.9235E-01	246.92	4.0036E+00	9.13
88.05811	-2.8614E+00	23.97	2.6530E+01	5.73
88.05812	9.6510E+00	30.12	2.6630E+01	5.45
88.05813	1.8104E+01	12.36	7.0923E+01	6.98
88.05814	5.2845E+01	9.68	1.7854E+02	6.83
88.05815	1.0075E+02	13.66	5.6920E+02	8.62
88.05816	4.6583E+00	26.83	1.7832E+01	5.74
88.05817	4.1654E+01	9.21	1.1942E+02	7.56
88.05818	8.2314E+01	13.12	2.3206E+02	9.30
88.05819	2.4539E+00	77.02	4.1396E+02	14.17
88.05820	3.1484E+02	7.02	8.1986E+02	6.56

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TABLE L.4.2. SUMMARY OF RADIONUCLIDE ANALYTICAL DATA
MONSANTO, SODA SPRINGS, IDAHO (August 1988)
(continued)

EERF[a] Sample Number	Pb-210 Activity at Collection	Pb-210 2σ (%)[b]	Po-210 Activity at Collection	Po-210 2σ (%)[b]
88.05820X	3.0930E+02	7.43	8.7581E+02	6.49
88.05821	2.8405E+02	7.13	8.8097E+02	6.47
88.05822	-1.1295E-01	822.13	3.8732E+00	8.50
88.05823	4.4086E+00	25.67	1.7920E+01	5.63
88.05824	7.5207E+00	21.12	2.6446E+01	5.27
88.05825	1.7671E+01	9.57	5.3508E+01	7.20
88.05826	3.0524E+01	11.43	1.1692E+02	7.57
88.05827	7.6876E+01	10.82	3.9526E+02	10.83
88.05828	-8.6538E-01	142.24	8.8912E+00	7.49
88.05829	1.0126E+01	18.12	4.5394E+01	5.28
88.05820	9.2781E+00	22.56	4.2514E+01	5.13
88.05830X	8.9375E+00	17.47	4.2150E+01	7.81
88.05831	3.3080E+01	11.98	1.4775E+02	7.33
88.05832	6.4943E+01	9.96	2.9479E+02	8.57
88.05833	1.2710E+02	9.34	8.0629E+02	8.49
88.05834	2.9967E+00	38.98	1.1181E+01	6.32
88.05835	1.5440E+01	11.35	8.1826E+01	6.43
88.05836	3.9859E+01	13.92	1.1456E+02	6.98
88.05837	7.9302E+01	10.51	2.0381E+02	10.05
88.05838	1.2205E+02	9.53	4.0921E+02	7.95
88.05839	1.6909E+02	12.36	6.003E+02	8.84
88.06080	-2.4792E-01	384.43	4.2553E-01	28.20
88.06080X	1.3320E+00	51.93	1.1239E+00	14.70
88.06081	-8.7200E-01	172.22	4.5172E-01	44.30
88.06095	1.2706E+02	10.08	1.2537E+02	9.68

[a] An "x" in the sample number indicates a duplicate analysis. Refer to Table L.1.1. to determine corresponding Radian sample number.

[b] A 2σ value near or over 100 indicates that the target radionuclide was not detected.

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TABLE L.4.3. EERF INTERNAL - PERFORMANCE (QC) SAMPLES[a]

Sample No.	Po-210	Pb-210	Known (2σ)
JMS-88.5157[b]			
A	481 ± 24	464 ± 40	435 ± 45
B-1	379 ± 24	397 ± 44	"
B-2	435 ± 33	493 ± 33	"
C-1	411 ± 31	463 ± 77	"
C-2	389 ± 31	442 ± 38	"
D	415 ± 37	409 ± 73	"
E	421 ± 24	501 ± 54	"
JMW-88.5352	14 ± 1	15 ± 2	12 ± 1
JMW-88.5353	13 ± 1	16 ± 2	12 ± 1
JMW-88.5354	13 ± 1	15 ± 2	12 ± 1
JMS-88.5840[b]			
A	445 ± 42	444 ± 53	435 ± 45
B	419 ± 40	442 ± 55	"
C	390 ± 53	438 ± 117	"
D	424 ± 41	352 ± 55	"
JMW-88.5355	108 ± 7	2 ± 1	105 ± 11
"	121 ± 9	122 ± 9	"
JMW-88.5841	10 ± 1	7 ± 2	7.4 ± 1
JMW-88.5842	19 ± 1	23 ± 2	19 ± 2
JMW-88.5971	117 ± 9	125 ± 12	105 ± 11
JMW-88.6025	0 ± 0	1 ± 1	0 ± 0
JMW-88.6026	468 ± 43	442 ± 51	433 ± 45
JMW-88.6027	566 ± 52	573 ± 51	524 ± 52
JMW-88.6028	286 ± 24	344 ± 41	262 ± 26

[a]Source: November 21, 1988, Memorandum from James B. Moore to Jon A. Broadway, Acting Chief, Monitoring and Analytical Services Branch, EPA, Eastern Environmental Radiation Facility (EERF).
[b]Replicate analysis of mill tailings.

APPENDIX M - CALIBRATION DATA

Date: 8/9/88 Operator Initials: [illegible]

Pitot Tube I.D. No.: P-1 Length: ______

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

Quick connects attached, leak free? ______ yes ✓ no

α_1 = 1.0 ° α_2 = 1.0 °

β_1 = 0.0 ° β_2 = 1.0 °

γ = 4.0 °, θ = 1.0 °, A = .572 cm (in.)

z = A sin γ = 0.040 cm (in.);

w = A sin θ = .010 cm (in.);

P_A = .286 cm (in.);

P_b = .289 cm (in.);

D_t = .250 cm (in.)

Acceptance Criteria:

α_1 and α_2 < 10° ✓ yes ______ no

β_1 and β_2 < 5° ✓ yes ______ no

z < 0.32 cm (1/8 in.) ✓ yes ______ no

w < 0.08 cm (1/32 in.) ✓ yes ______ no

P_A and P_b, 1.05 D_t < P < 1.50 D_t ✓ yes ______ no

D_t, 0.48 cm (3/16 in) ≤ D_t ≤ 0.95 cm (3/8 in) ✓ yes ______ no

Pitot Tube Acceptable? ✓ yes ______ no

Comments: New pitot - 8' effective EMB Phra

Pitot [in]spection sheet.

Date: 8/8/88 Operator Initials: [illegible]

Pitot Tube I.D. No.: P-2 Length: 8 effective

Pitot tube assembly level? ✓ yes ____ no

Pitot tube openings damaged? ____ yes (explain below) ✓ no

Quick connects attached, leak free? ____ yes ✓ no

α_1 = 2.0 ° α_2 = 3.0 °

β_1 = 1.0 ° β_2 = 1.0 °

γ = 2.0 °, θ = 1.0 °, A = (.550) cm (in.)

z = A sin γ = (.019) cm (in.);

w = A sin θ = (.010) cm (in.);

P_A = (.275) cm (in.);

P_b = (.275) cm (in.);

D_t = (.250) cm (in.)

Acceptance Criteria:

α_1 and α_2 < 10° ✓ yes ____ no

β_1 and β_2 < 5° ✓ yes ____ no

z < 0.32 cm (1/8 in.) ✓ yes ____ no

w < 0.08 cm (1/32 in.) ✓ yes ____ no

P_A and P_b, 1.05 D_t < P < 1.50 D_t ✓ yes ____ no

D_t, 0.48 cm (3/16 in) ≤ D_t ≤ 0.95 cm (3/8 in) ✓ yes ____ no

Pitot Tube Acceptable? ✓ yes ____ no

Comments: New Pitot Emb Pho

M-4

Pitot tube inspection sheet.

Date: 8/8/88 Operator Initials: Q2

Pitot Tube I.D. No.: P3 Length: 8' effective

Pitot tube assembly level? ✓ yes ____ no

Pitot tube openings damaged? ____ yes (explain below) ____ no

Quick connects attached, leak free? ____ yes ✓ no

α_1 = 1.0 ° α_2 = 1.0 °

β_1 = 0.0 ° β_2 = 1.0 °

γ = 0.0 °, θ = 0.0 °, A = (.569) cm (in.)

z = A sin γ = 0 cm (in.);

w = A sin θ = 0 cm (in.);

P_A = (.284) cm (in.);

P_b = (.285) cm (in.);

D_t = (.250) cm (in.)

Acceptance Criteria:

α_1 and α_2 < 10° ✓ yes ____ no

β_1 and β_2 < 5° ✓ yes ____ no

z < 0.32 cm (1/8 in.) ✓ yes ____ no

w < 0.08 cm (1/32 in.) ✓ yes ____ no

P_A and P_b, 1.05 D_t < P < 1.50 D_t ✓ yes ____ no

D_t, 0.48 cm (3/16 in) ≤ D_t ≤ 0.95 cm (3/8 in) ✓ yes ____ no

Pitot Tube Acceptable? ✓ yes ____ no

Comments: EMB Phosphate - New Pitot

Pitot tube inspection sheet.

Date: 8/8/88 Operator Initials: [illegible]

Pitot Tube I.D. No.: P4 Length: 8' effective

Pitot tube assembly level? ✓ yes ____ no

Pitot tube openings damaged? ____ yes (explain below) ✓ no

Quick connects attached, leak free? ✓ yes ____ no

α_1 = 0.0 ° α_2 = 2.0 °

β_1 = 1.0 ° β_2 = 1.0 °

γ = 3.0 °, θ = 2.0 °, A = (.562) cm (in.)

z = A sin γ = (.029) cm (in.);

w = A sin θ = (.020) cm (in.);

P_A = (.281) cm (in.);

P_b = (.281) cm (in.);

D_t = (.250) cm (in.)

Acceptance Criteria:

α_1 and α_2 < 10° ✓ yes ____ no

β_1 and β_2 < 5° ✓ yes ____ no

z < 0.32 cm (1/8 in.) ____ yes ____ no

w < 0.08 cm (1/32 in.) ____ yes ____ no

P_A and P_b, 1.05 D_t < P < 1.50 D_t ✓ yes ____ no

D_t, 0.48 cm (3/16 in) ≤ D_t ≤ 0.95 cm (3/8 in) ✓ yes ____ no

Pitot Tube Acceptable? ✓ yes ____ no

Comments: EMB Phx - New Pitot

Pitot tube inspection sheet.

Date: 8/8/88 Operator Initials: [illegible]

Pitot Tube I.D. No.: P-5 Length: 14' [illegible]

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

Quick connects attached, leak free? ______ yes ✓ no

α_1 = 2.0 ° α_2 = 1.0 °

β_1 = 1.0 ° β_2 = 1.0 °

γ = 1.0 °, θ = 2.0 °, A = (.584) cm (in.)

z = A sin γ = (.010) cm (in.);

w = A sin θ = (.020) cm (in.);

P_A = (.292) cm (in.);

P_b = (.292) cm (in.);

D_t = (.250) cm (in.)

Acceptance Criteria:

α_1 and α_2 < 10° ✓ yes ______ no

β_1 and β_2 < 5° ✓ yes ______ no

z < 0.32 cm (1/8 in.) ✓ yes ______ no

w < 0.08 cm (1/32 in.) ✓ yes ______ no

P_A and P_b, 1.05 D_t < P < 1.50 D_t ✓ yes ______ no

D_t, 0.48 cm (3/16 in) ≤ D_t ≤ 0.95 cm (3/8 in) ✓ yes ______ no

Pitot Tube Acceptable? ✓ yes ______ no

Comments: [illegible] - New Pitot

Pitot tube inspection sheet.

Date: 8/8/88 Operator Initials: [illegible]

Pitot Tube I.D. No.: P6 Length: 14' effective

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

Quick connects attached, leak free? ______ yes ✓ no

α_1 = 1.0 ° α_2 = 3.0 °

β_1 = 0.0 ° β_2 = 1.0 °

γ = 1.0 °, θ = 1.0 °, A = (.584) cm (in.)

z = A sin γ = (.010) cm (in.);

w = A sin θ = (.010) cm (in.);

P_A = (.292) cm (in.);

P_b = (.292) cm (in.);

D_t = (.250) cm (in.)

Acceptance Criteria:

α_1 and α_2 < 10° ✓ yes ______ no

β_1 and β_2 < 5° ✓ yes ______ no

z < 0.32 cm (1/8 in.) ✓ yes ______ no

w < 0.08 cm (1/32 in.) ✓ yes ______ no

P_A and P_b, 1.05 D_t < P < 1.50 D_t ✓ yes ______ no

D_t, 0.48 cm (3/16 in) ≤ D_t ≤ 0.95 cm (3/8 in) ✓ yes ______ no

Pitot Tube Acceptable? ✓ yes ______ no

Comments: EMB phase - New pitot

Pitot tube inspection sheet.

8/15/88 Monsanto @ Soda Springs
– Nozzle Calibrations

Location	Nozzle #	D_1	D_2	D_3	D_4	$\bar{D}_n$
Outlet	2	.250	.250	.251	.250	.250
Outlet	3	.251	.250	.250	.251	.251
Outlet	5	.249	.250	.250	.251	.250
Outlet	7	.250	.250	.250	.248	.250
Inlet	6	.248	.249	.247	.248	.248

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. ______

SIGNATURE ______ DATE ______ CHECKED ______ DATE ______

PROJECT ______ JOB NO. ______

SUBJECT ______ SHEET ______ OF ______ SHEETS

Meter box #	Pre γ	Post γ	Agree ± 5% of pre factor?
4	1.0044	0.9907	yes
5	0.9996	1.0030	yes
7	1.0035	0.9926	yes
8	1.0045	1.0440	yes
12	0.9943	1.0136	yes

4-81-3361

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # D6M6037014 Y = .9956

Date 6/4/87

Barometric Pressure, Bp = 29.69

Meter Box # 4

Dry Gas Meter # ______

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft³		Gas Volume Dry Gas Meter Vd ft³ 22.700		Temperature Calibration Meter	In	Out	Temperature Dry Gas Meter	In	Out	Time θ Min. .00	Y	ΔH@
0.5	-.02	final	59.443	final	~~16.200~~	initial	82	80	initial	95	87	15.79	9421 ~~9965~~	1.753
		initial	53.089	initial	16.200	std.			std.					
		total	6.354	total	6.500	final	83	81	final	103	89			
						ave.	82		ave.	94				
0.5	-.02	final	64.721	final	28.100	initial	83	81	initial	103	89	13.00	.9970	1.711
		initial	59.443	initial	22.700	std.			std.					
		total	5.278	total	5.400	final	83	81	final	104	89			
						ave.	82		ave.	96				
1.8	-.08	final	73.210	final	36.700	initial	83	81	initial	104	89	10.98	1.0088	1.685
		initial	64.721	initial	28.100	std.	84	82	std.	112	90			
		total	8.489	total	8.600	final	84	82	final	114	92			
						ave.	83		ave.	100				
1.8	-0.08	final	85.256	final	48.950	initial	84	82	initial	114	92	15.58	1.0074	1.684
		initial	73.210	initial	36.700	std.	84	82	std.	114	91			
		total	12.046	total	12.250	final	83	82	final	115	92			
						ave.	83		ave.	103				
3.0	-0.1	final	103.841	final	67.800	initial	83	82	initial	115	92	19.95	1.0155	1.919
		initial	85.256	initial	48.950	std.	83	81	std.	119	94			
		total	18.585	total	18.850	final	83	81	final	117	94			
						ave.	82		ave.	105				
3.0	-0.1	final	56.130	final	121.000	initial	83	81	initial	117	94	52.33	1.0240	1.919
		initial	3.841	initial	67.800	std.	83	81	std.	120	96			
		total	52.289	total	53.200	final	83	81	final	124	103			
						ave.	82		ave.	109				
		final		final		initial			initial				~~1.0075~~	1.780
		initial		initial		std.			std.					
		total		total		final			final					
						ave.			ave.					
												ave.	1.0075	1.780

Meter leak check front ____ back ____

Pitot leak check ____

Electrical check ____

Vacuum gauge check
5" Hg = ____
10" Hg = ____
15" Hg = ____

Calibrating technician ____________

Thermocouple calibrations

DGM: std. test

ice ______; ______

ambient ______ ______

DGM:

ice ______; ______

ambient ______ ______

EMB Phosphorous Pre-Cal

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # 6837014 Y = .9956

Date 5/6/88

Barometric Pressure, Bp = 29.57

Meter Box # 5

Dry Gas Meter # 5

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter V_w ft^3	Gas Volume Dry Gas Meter V_d ft^3	Temperature: Calibration Meter	In	Out	Temperature: Dry Gas Meter	In	Out	Time θ Min. .00	Y
.5	-.01	final 37.491	final 62.249	initial	80	78	initial	86	80	1341.7	
		initial 32.107	initial 56.807	std.			std.				
		total 5.384	total 5.442	final	78	77	final	91	84	13.7	.9964
				ave.	78.3		ave.	85.3			
1.0	-.03	final 42.818	final 67.667	initial	78	77	initial	91	84	9:40.8	
		initial 37.491	initial 62.249	std.			std.				
		total 5.327	total 5.418	final	78	77	final	96	86	9.68	.9980
				ave.	77.5		ave.	89.3			
3.0	-.08	final 48.781	final 73.709	initial	78	77	initial	96	86	6:30.6	
		initial 42.818	initial 67.667	std.			std.				
		total 5.963	total 6.042	final	78	77	final	104	88	6.51	1.0044
				ave.	77.5		ave.	93.5			
		final	final	initial			initial				
		initial	initial	std.			std.				
		total	total	final			final				
										ave	.9996

$$\frac{V_w \left(P_b - \frac{\Delta H w}{13.6}\right)(t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(T_w + 460)} \qquad \frac{0.0317\ \Delta H}{P_b\ \ t_d + 460}\left[\frac{t_w + 460\ \theta}{V_w}\right]^2$$

ΔH		
.5	$\frac{5.384 \times 29.57 \times 545.3 \times .9956}{5.442 \times 29.61 \times 538.3} = .9964$	$\frac{.0317 \times .5}{29.57 \times 545.3}\left(\frac{538.3 \times 13.7}{5.384}\right)^2 = 1.844$
1.0	$\frac{5.327 \times 29.57 \times 549.3 \times .9956}{5.418 \times 29.64 \times 537.5} = .9980$	$\frac{.0317}{29.57 \times 545.3}\left(\frac{537.5 \times 9.68}{5.327}\right)^2 = 1.875$
3.0	$\frac{5.963 \times 29.57 \times 553.5 \times .9956}{6.042 \times 29.79 \times 537.5} = 1.0044$	$\frac{.0317 \times 3}{29.57 \times 553.5}\left(\frac{537.5 \times 6.51}{5.963}\right)^2 = 2.000$

Meter leak check front ✓ back ✓

Pitot leak check ✓

Electrical check ✓

Calibrating technician [signature]

EMB Phosphorus Pre-Cal

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # 6237014 Y = .9956

Date 4/6/88 Barometric Pressure, Bp = 29.33

Meter Box # 7 Dry Gas Meter # 7

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft^3	Gas Volume Dry Gas Meter Vd ft^3	Temperature: Calibration Meter	In	Out	Temperature: Dry Gas Meter	In	Out	Time @ Min. .00	Y	ΔH@
.5	-.02	final 32.47	final 41.806	initial	77	78	initial	92	86	10.14		
		initial 27.47	initial 36.714	mid.			mid.					
		total 5	total 5.092	final	77	78	final	95	87			
				ave.	77.5		ave.	90				
1.5	-.04	final 37.468	final 46.886	initial	77	78	initial	95	87	7.28		
		initial 32.47	initial 41.806	mid.			mid.					
		total 4.998	total 5.08	final	77	78	final	102	88			
				ave.	77.5		ave.	93				
3.0	-.08	final 42.467	final 51.956	initial	77	78	initial	100	88	5.19		
		initial 37.468	initial 46.886	mid.			mid.					
		total 4.999	total 5.07	final	77	78	final	107	89			
				ave.	77.5		ave.	96				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
											ave 1.0035	1.7

$$\frac{V_w\left(P_b - \frac{\Delta Hw}{13.6}\right)(td + 460)}{Vd\left(P_b + \frac{\Delta H}{13.6}\right)(Tw + 460)}$$

$$\frac{0.0317\ \Delta H}{P_b\ \ td + 460}\left[\frac{Tw + 460\ \theta}{Vw}\right]^2$$

ΔH		
.5	$\frac{5 \times 29.33 \times 550 \times .9956}{5.092 \times 29.37 \times 537.5} = .9990$	$\frac{.5 \times .0317}{29.33 \times 550}\left(\frac{537.5 \times 10.23}{5}\right)^2 = 1.76$
1.5	$\frac{4.998 \times 29.33 \times 553 \times .9956}{5.08 \times 29.44 \times 537.5} = 1.0040$	$\frac{1.5 \times .0317}{29.33 \times 553}\left(\frac{537.5 \times 7.28}{4.998}\right)^2 = 1.80$
3.0	$\frac{4.999 \times 29.32 \times 556 \times .9956}{5.07 \times 29.55 \times 537.5} = 1.0075$	$\frac{3 \times .0317}{29.33 \times 556}\left(\frac{537.5 \times 5.19}{4.999}\right)^2 = 1.82$

Meter leak check front ✓ back ✓

Pitot leak check ____

Electrical check ____

EMB Phosphorous Pre-Cal

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # 687C14 Y = .9956

Date 12/17/87 Barometric Pressure, Bp = 30.02

Meter Box # 8 Dry Gas Meter # 8

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft³	Gas Volume Dry Gas Meter Vd ft³	Temperature: Calibration Meter	In	Out	Dry Gas Meter	In	Out	Time θ Min. .00	Y	ΔH@
.5	-.02	final 51.438	final 19.774	initial	76	76	initial	78	78	13:27.8		
		initial 46.281	initial 14.600	mid.			mid.					
		total 5.157	total 5.174	final	75	76	final	91	79		1.0021	1.90
				ave.	75.8		ave.	81.5				
1.0	-.04	final 56.436	final 24.83	initial	75	76	initial	91	79	9:27.9		
		initial 51.438	initial 19.774	mid.			mid.					
		total 4.998	total 5.056	final	75	76	final	100	81		1.0044	1.98
				ave.	75.5		ave.	87.8				
2.5	-.07	final 62.249	final 30.731	initial	75	76	initial	100	81	7:05.2		
		initial 56.436	initial 24.83	mid.			mid.					
		total 5.813	total 5.901	final	76	76	final	110	83		1.0071	2.03
				ave.	75.8		ave.	93.5				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
										ave	1.0045	1.97

$$\frac{V_w\left(P_b - \frac{\Delta Hw}{13.6}\right)(td + 460)}{Vd\left(P_b + \frac{\Delta H}{13.6}\right)(Tw + 460)} \qquad \frac{0.0317\ \Delta H}{P_b\ \ td + 460}\left[\frac{Tw + 460\ \theta}{Vw}\right]^2$$

ΔH	Y	ΔH@
.5	$\frac{5.157 \times 30.02 \times 541.5 \times .9956}{5.174 \times 30.06 \times 535.8} = 1.0021$	$\frac{.0317 \times .5}{30.02 \times 541.5}\left(\frac{535.8 \times 13.46}{5.157}\right)^2 = 1.907$
1.0	$\frac{4.998 \times 30.02 \times 547.8 \times .9956}{5.056 \times 30.09 \times 535.5} = 1.0044$	$\frac{.0317}{30.02 \times 547.8}\left(\frac{535.5 \times 9.47}{4.998}\right)^2 = 1.985$
2.5	$\frac{5.813 \times 30.02 \times 553.5 \times .9956}{5.901 \times 30.2 \times 535.8} = 1.0071$	$\frac{.0317 \times 2.5}{30.02 \times 553.5}\left(\frac{535.8 \times 7.09}{5.813}\right)^2 = 2.037$

Meter leak check front ✓ back ✓

Pitot leak check ✓

Electrical check needs heater switch

Calibrating technician [signature]

EMB Phosphorous Pre-Cal

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # 6837814 Y = .9956

Date 6/16/88 Barometric Pressure, Bp = 29.57

Meter Box # 12 Dry Gas Meter # 12

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft^3	Gas Volume Dry Gas Meter Vd ft^3	Temperature: Calibration Meter	In	Out	Dry Gas Meter	In	Out	Time @ Min. .00	Y	
.5	-.01	final 53.949	final 50.141	initial	78	78	initial	86	81	12:57		
		initial 48.808	initial 44.923	mid.			mid.					
		total 5.141	total 5.218	final	81	80	final	91	83	12.95	.9905	1.
				ave.	79.2		ave.	85.3				
1.0	-.03	final 59.431	final 55.705	initial	80	80	initial	91	85	9:24.7		
		initial 53.949	initial 50.141	mid.			mid.					
		total 5.482	total 5.564	final	84	81	final	98	85	9.41	.9931	1.
				ave.	81.3		ave.	89.3				
3.0	-.08	final 64.980	final 61.300	initial	83	81	initial	98	85	5:48.4		
		initial 59.431	initial 55.705	mid.			mid.					
		total 5.549	total 5.595	final	86	81	final	105	86	5.81	.9994	1.
				ave.	82.8		ave.	93.5				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
										ave	.9943	

$$\frac{V_w \left(P_b - \frac{\Delta H_w}{13.6}\right) (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right) (t_w + 460)}$$

$$\frac{0.0317\ \Delta H}{P_b\ \ (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$$

ΔH		
.5	$\frac{5.141 \times 29.57 \times 545.3 \times .9956}{5.218 \times 29.61 \times 539.3} = .9905$	$\frac{.0317 \times .5}{29.57 \times 545.3} \left(\frac{539.3 \times 12.95}{5.141}\right)^2 = 1.814$
1.0	$\frac{5.482 \times 29.57 \times 549.3 \times .9956}{5.564 \times 29.64 \times 541.3} = .9931$	$\frac{.0317}{29.57 \times 549.3} \left(\frac{541.3 \times 9.41}{5.482}\right)^2 = 1.685$
3.0	$\frac{5.549 \times 29.57 \times 553.5 \times .9956}{5.595 \times 29.79 \times 542.8} = .9994$	$\frac{.0317 \times 3}{29.57 \times 553.5} \left(\frac{542.8 \times 5.81}{5.549}\right)^2 = 1.677$

Meter leak check front ✓ back ✓

Pitot leak check ✓

Electrical check ✓

Calibrating technician: [illegible]

EMB Phosphate Post Cal.

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # 6837014 Y = .9956

Date 8/30/88 Barometric Pressure: Pb = 29.87

Meter Box # 4 Dry Gas Meter # 4

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft³	Gas Volume Dry Gas Meter Vd ft³	Temperature Calibration Meter	In	Out	Temperature Dry Gas Meter	In	Out	Time θ Min. .00	Y	ΔH@
2.0	-.06	final 16.254	final 60.243	initial	71	71	initial	76	73			
		initial 759.7	initial 51.980	mid.			mid.					
		total 2.647	total 2.863	final	71	70	final	93	75			
				ave.	70.8		ave.	79.3				
2.0	-.06	final 21.413	final 66.155	initial	71	70	initial	93	75			
		initial 16.254	initial 60.243	mid.			mid.					
		total 5.159	total 5.312	final	71	71	final	100	79			
				ave.	70.5		ave.	86.8				
2.0	-.06	final 26.218	final 71.110	initial	71	70	initial	100	79			
		initial 21.413	initial 66.155	mid.			mid.					
		total 4.805	total 4.955	final	71	70	final	108	80			
				ave.	70.5		ave.	90.7				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
										ave		

$$\frac{V_w \left(P_b - \frac{\Delta H_w}{13.6}\right)(t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(T_w + 460)}$$

$$\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)} \left[\frac{(T_w + 460)\ \theta}{V_w}\right]^2$$

ΔH	
2.0	$\frac{8.657 \times 29.87 \times 539.3 \times .9956}{2.263 \times 30.02 \times 530.8} = .9831$
2.0	$\frac{5.159 \times 29.87 \times 546.2 \times .9956}{5.312 \times 30.02 \times 530.5} = .9917$
2.0	$\frac{4.805 \times 29.87 \times 550.8 \times .9956}{4.955 \times 30.02 \times 530.5} = .9974$
	Y = .9907

Meter leak check front ✓ back ✓

Pitot leak check ✓

Electrical check ✓

Calibrating technician [signature]

A.1.91
0.9996

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Calibration Meter # 6537014 Y = .9956

Date 25 Sept 88 Barometric Pressure, Bp = 30.02

Meter Box # 5 Dry Gas Meter # ____

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft^3	Gas Volume Dry Gas Meter Vd ft^3	Temperature Calibration Meter	In	Out	Temperature Dry Gas Meter	In	Out	Time θ Min. .00	Y
2.0"	.06"	final 68.462	final 44.175	initial	74	72	initial	99	54	15.0	1.0032
		initial 57.191	initial 33.362	mid.	73	72	mid.	105	55		
		total 11.271	total 11.613	final	73	72	final	103	71		
9" VACUUM				ave.	72.67		ave.	75.83			
2.0"	.06"	final 78.670	final 56.130	initial	73	72	initial	108	71	15.0	1.0017
		initial 68.462	initial 44.575	mid.	73	72	mid.	111	94		
		total 11.208	total 11.705	final	73	72	final	113	97		
9" VACUUM				ave.	72.5		ave.	102.33			
2.0"	0.06"	final 87.149	final 64.237	initial	73	72	initial	113	97	10	1.0023
		initial 79.670	initial 56.680	mid.	72	72	mid.	114	98		
		total 7.479	total 7.557	final	72	72	final	114	99		
9" VACUUM				ave.	72.17		ave.	105.67			
2.0"	0.06"	final 98.358	final 76.349	initial	72	72	initial	112	99	15	1.0046
		initial 87.149	initial 64.537	mid.	72	72	mid.	115	100		
		total 11.239	total 11.812	final	72	72	final	115	101		
9" VACUUM					72			107	ΔH@	Avg	1.00295

$$\frac{V_w \left(P_b - \frac{\Delta H_w}{13.6}\right)(t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$$

$$\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$$

ΔH

ΔH@ = 1.926

ΔH@ = 1.924

ΔH@ = 1.907

ΔH@ = 1.894

Meter leak check front 13" back ____

Pitot leak check ✓

Electrical check ____

Calibrating technician [signature]

#835

1-77

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Date 8 Sept 88

Meter Box # 7

Calibration Meter # 6837014 Y = .9956

Barometric Pressure, Bp = 30.14

Dry Gas Meter # ______

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter Vw ft^3		Gas Volume Dry Gas Meter Vd ft^3		Temperature: Calibration Meter	In	Out	Temperature: Dry Gas Meter	In	Out	Time θ Min. .00	Y
2.0	0.06"	final	17.558	final	13.818	initial	58	57	initial	77	60	15	,9923
		initial	6.978	initial	2.519	mid.	57	59	mid.	86	63		
		total	10.450	total	11.299	final	60	60	final	95	70		
11" VACUUM						ave.	59.17		ave.	75.17			
2.0"	0.06"	final	28.912	final	25.430	initial	60	60	initial	95	70	15	,9922
		initial	17.558	initial	13.818	mid.	61	60	mid.	101	75		
		total	11.054	total	11.612	final	61	61	final	106	79		
11" VACUUM						ave.	60.5		ave.	97.67			
2.0	0.06"	final	40.117	final	37.394	initial	62	61	initial	109	81	15	,9932
		initial	28.912	initial	25.430	mid.	62	62	mid.	112	87		
		total	11.205	total	11.964	final	63	62	final	115	90		
						ave.	62		ave.	98.93			
2.0	0.06"	final	51.338	final	49494	initial	63	62	initial	115	90	15	,9921
		initial	40.117	initial	37.394	mid.	63	63	mid.	117	93		
		total	11.221	total	12.100	final	63	64	final	119	95		
							63			104.13			0.9925

$$Y = \frac{V_w \left(P_b - \frac{\Delta H_w}{13.6}\right)(t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(T_w + 460)}$$

$$\Delta H@ = \frac{0.0317\,\Delta H}{P_b\,(t_d + 460)}\left[\frac{(t_w + 460)\,\theta}{V_w}\right]^2$$

ΔH

ΔH@ = 1.995

ΔH@ = 1.933

ΔH@ = 1854

ΔH@ = 1.837

Meter leak check front 12" back ____

Pitot leak check ✓

Electrical check ____

Calibrating technician ____________

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Date 9/10/88

Meter Box # 8

Calibration Meter # 6837014 Y = .9956

Barometric Pressure, Bp = 751mm

Dry Gas Meter # 8

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHc	Gas Volume Calibration Meter Vc ft^3	Gas Volume Dry Gas Meter Vd ft^3	Temperature: Calibration Meter	In	Out	Temperature: Dry Gas Meter	In	Out	Time θ Min. .00	Y	ΔH@
0.50	0.02	final 969.761	final 803.626	initial	77	76	initial	117	89	26.00	1.0350	1.714
		initial 959.272	initial 793.000	mid.	78	77	mid.	119	94			
		total 10.489	total 10.626	final	78	78	final	122	99			
				avg.	77.33		avg.	106.67				
1.0	0.04	final 988.565	final 822.604	initial	79	79	initial	128	103	24.00	1.0537 ~~1.0533~~	1.75
		initial 975.100	initial 809.000	mid.	80	79	mid.	131	106			
		total 13.465	total 13.604	final	80	80	final	132	109			
				avg.	79.5		avg.	118.17				
2.0	0.06	final 1012.115	final 846.094	initial	81	81	initial	138	112	18.00	1.0750	1.79
		initial 998.080	initial 832.000	mid.	81	81	mid.	139	114			
		total ~~14.463~~ 14.115	total 14.094	final	82	81	final	140	115			
				avg.	81.17		avg.	126.33				
3.~~0~~	0.09	final 72.361	final 906.389	initial	76	75	initial	131	96	20.00	1.0637	1.74
		initial 52.972	initial 887.000	mid.	77	76	mid.	135	101			
		total 19.389	total 19.389	final	78	77	final	137	106			
				avg.	76.5		avg.	117.67				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
				avg.			avg.					
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
				avg.			avg.					
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
				avg.			avg.					
										avg.	1.0568	

for ΔH = 0.5 + 1.0
avg = 1.044

Meter leak check front ____ back ____
Pitot leak check ____
Electrical check ____
Vacuum gauge check
5" Hg = ____
10" Hg = ____
15" Hg = ____
Calibrating technician ____________

Thermocouple calibrations
DGM: std. test
ice ______ ; ______
ambient ______ ______
DGM:
ice ______ ; ______
ambient ______ ______

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test

Date 9/9/88

Meter Box # 12

Calibration Meter # 6837014 Y = .9956

Barometric Pressure, Bp = 742mm

Dry Gas Meter # 12

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHr	Gas Volume Calibration Meter Vr ft³	Gas Volume Dry Gas Meter Vd ft³	Temperature: Calibration Meter	In	Out	Dry Gas Meter	In	Out	Time θ Min. .00	Y	Ai
.50	0.02	final 831.003	final 472.267	initial	77	78	initial	99	83	16.00	1.0044	[illegible]
		initial 823.91	initial 465.000	mid.	77	78	mid.	105	86			
		total 7.093	total 7.257	final	77	78	final	109	91			
				ave.	77.5		ave.	95.5				
1.0	0.04	final 853.553	final 495.422	initial	76	77	initial	90	97	21.00	1.0080	[illegible]
		initial 841.463	initial 483.000	mid.	75	76	mid.	92	106			
		total 12.090	total 12.422	final	74	75	final	95	114			
				ave.	75.5		ave.	98.5				
2.0	0.06	final 868.232	final 510.583	initial	74	75	initial	94	118	17.00	1.0197	[illegible]
		initial 855.091	initial 497.000	mid.	75	75	mid.	96	122			
		total 13.141	total 13.583	final	76	76	final	100	127			
				ave.	75.17		ave.	109.50				
3.0	0.09	final 902.292	final 545.868	initial	76	76	initial	101	130	15.00	1.0223	[illegible]
		initial [illegible].000	initial 531.000	mid.	76	76	mid.	103	131			
		total 14.292	total 14.868	final	76	76	final	104	133			
				ave.	76		ave.	117				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
				ave.			ave.					
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
				ave.			ave.					
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					
				ave.			ave.					
										ave.	1.0136	

Meter leak check front ____ back ____

Pitot leak check ____

Electrical check ✓

Vacuum gauge check

5" Hg = 4.5"

10" Hg = 9"

15" Hg = 14"

Calibrating technician WPG

10" Vacuum

Thermocouple calibrations

DGM: std. test

ice ____ ; ____

ambient ____ ____

DGM:

ice ____ ____

ambient ____ ____

APPENDIX N - PROCESS DATA AND DESCRIPTION

APPENDIX N - PROCESS DATA AND DESCRIPTION

NOTE: Items claimed as confidential have been edited as noted by brackets [Claimed Confidential].

Key Operating Parameters

Operating parameters monitored and recorded during the August 1988 test program were those parameters that were identified (during the presurvey) by Monsanto personnel as being of key importance. The parameters identified were the same as those that were monitored and recorded during the 1984 EPA/ORP emission test effort. Normal operating ranges were established based upon Monsanto review comments of the 1988 Monsanto Site Specific Test Plan. Normal kiln operating conditions were characterized by monitoring kiln feed rates, kiln speed, bed depth, offgas temperature, and dust chamber temperature. Normal control system operating conditions were characterized by the monitoring venturi pressure drop and water flow rate of each train, spray tower deck pressures, scrubber water pH and venturi fan amperage.

The major kiln operating parameters are summarized in Table N-1. The kiln operating parameters were monitored from the plant control room data acquisition system (DAS) periodically during the test day. The averages for the emission testing period (August 16-19) represent the average of instantaneous values recorded by Radian personnel during each test period. The average values presented in the tables of this appendix are not intended to represent daily averages. The intention of the tables is to indicate consistent and normal plant operation during the emission testing. The key operating parameters monitored during the emission test period are discussed below.

Kiln Speed: Normal kiln speed is [Claimed Confidential]. Kiln speed is adjusted by the operator to increase or decrease ore residence time to obtain the desired nodule properties. The average kiln speed during the emission test period was [Claimed Confidential].

TABLE N-1. SUMMARY OF MAJOR KILN OPERATING PARAMETERS MEASURED DURING THE TEST PROGRAM, MONSANTO-SODA SPRINGS, IDAHO (August 1988)
[Claimed Confidential]

Date	Hour	Kiln Speed (rpm)	Bed Depth (DT/Hr)	Coal (klb/hr)	CO (klb/hr)	Primary Airflow (klb/hr)	Kiln Off Gas (oC)	Dust Chamber (oC)
08/16/88	1350							
	1525							
	1650							
	1740							
	1844							
	1917							
	AVERAGE							
08/17/88	0853							
	0953							
	1009							
	1030							
	1040							
	1120							
	1420							
	1515							
	1556							
	1516							
	1630							
	1718							
	1830							
	1900							
	2020							
	AVERAGE							
08/18/88	1020							
	1106							
	1206							
	1226							
	1430							
	1640							
	1715							
	1830							
	AVERAGE							
08/19/88	1030							
	1100							
	1130							
	1145							
	1215							
	1245							
	1330							
	1450							
	1500							
	1530							
	1615							
	1710							
	1740							
	AVERAGE							

Bed Depth: Bed depth is calculated as dry tons feed/kiln revolution. Normal bed depth is [Claimed Confidential]. The average bed depth during the emission test period was [Claimed Confidential].

Carbon Monoxide and Coal Feed Rates: Carbon monoxide (CO) availability is dependent upon furnace operation. When three furnaces are operating, about [Claimed Confidential] CO are delivered to the kiln. Coal is fed to the kiln, as necessary, to supplement the CO feed. The oxygen content of the kiln off-gas is monitored, and the coal feed is adjusted to maintain the off-gas oxygen concentration at about [Claimed Confidential] percent. The average CO feed rate and coal feed rate during the emission test period was [Claimed Confidential], respectively.

Kiln Off-Gas Temperature: Normal kiln off-gas temperature is about [Claimed Confidential]. The average kiln off-gas temperature during the emission test period was [Claimed Confidential].

Settling (Dust) Chamber Gas Temperature: The dust chamber (dust collector) gas temperature is monitored to help identify an "overfire" condition. An "overfire" condition (too much fuel) is indicated when the settling chamber gas temperature exceeds the kiln off-gas temperature. The average dust chamber gas temperature during the emission test period was [Claimed Confidential]. If an overfire situation existed for more than approximately 15 minutes the flue gas testing was temporarily halted.

Primary Air Flow Rate: Normal primary air flow rate is about [Claimed Confidential]. The average primary air flow rate during the emission test period was [Claimed Confidential].

Ore Feed Rate: Ore feed rate is increased or decreased to maintain a constant bed depth. Normal feed rate for a bed depth of [Claimed Confidential] with a kiln speed of [Claimed Confidential]. The average ore feed rate during the emission test period was [Claimed Confidential]. Table N-2 is a summary of the ore feed rate recorded from the operator's log during the test period.

TABLE N-2. KILN FEED RATE SUMMARY FROM OPERATOR LOG DURING THE TEST PROGRAM, MONSANTO-SODA SPRINGS, IDAHO (August 1988) [Claimed Confidential]

Date ---> Time	08/16/88 (wt/hr)	08/17/88 (wt/hr)	08/18/88 (wt/hr)	08/19/88 (wt/hr)
800				
900				
1000				
1100				
1200				
1300				
1400				
1500				
1600				
1700				
1800				
1900				
2000				
Average				

Spray Tower Water Flow: The water flow (overflow) to the spray tower is normally about [Claimed Confidential]. The spray tower water flow was not measured during the emission test period, because the plant's flow rate monitor was inoperable. As an alternative, the spray tower deck pressures were monitored. Spray tower deck pressures according to Monsanto plant personnel are historically one of the most consistent control system operating parameters. Deck pressures were monitored once each shift. The deck pressures were within their normal range during the four-day test period.

pH of Spray Tower, Hydroclarifier and Venturi: The pH of the spray tower, is monitored periodically by plant operators. The pH of the hydroclarifier was monitored automatically and recorded by the plant data acquisition system. The pH of the venturi water at the collection drum was monitored hourly and reported by the plant laboratory.

The pH of the spray tower ranged from [Claimed Confidential] during emission testing. The pH of the hydroclarifer ranged from [Claimed Confidential] during the emission testing. The pH of the venturi water at the collection drum ranged from [Claimed Confidential] during the emission test period.

Pressure Drop (Δp) Across Each Venturi Scrubber: The pressure drop across each venturi train was monitored during the testing. The original plan was to obtain these data from the plant DAS. It was determined on-site that the automated sensors were faulty. Therefore U-tube mercury manometers were installed on each venturi in order to monitor the pressure drop manually. The target value for pressure drop was [Claimed Confidential] inches water column (w.c.). The average pressure drop for all four venturis was [Claimed Confidential] inches w.c. during the emission test period. A summary of the venturi pressure drop data is contained in Table N-3.

Scrubber Liquid Flow Rate for Each Scrubber: The normal liquid flow rate for each venturi is approximately [Claimed Confidential]. There are two stages to each venturi scrubber train. The liquid flow rate to each scrubber

TABLE N-3. SUMMARY OF VENTURI PRESSURE DROP MEASURED, MONSANTO-SODA SPRINGS, IDAHO (August 1988) [Claimed Confidential]

Date	Hour	#1 Train (in. H20)	#2 Train (in. H20)	#3 Train (in. H20)	#4 Train (in. H20)	Average (Train 1-4)
08/16/88	1350					
	1525					
	1740					
	1844					
	1917					
	Average					
08/17/88	0853					
	1030					
	1556					
	1516					
	1718					
	1830					
	1900					
	Average					
08/18/88	1020					
	1430					
	1715					
	Average					
08/19/88	1215					
	1245					
	1330					
	1615					
	Average					

and stage were monitored during the test period. The liquid flow rate was either recorded manually at the scrubber deck transmitter or from the plant DAS in the control room. Table N-4 is a summary of the scrubber water flow rate. The average water flow rate for the venturi was [Claimed Confidential] (gpm) during the emission test period.

Induced Draft (ID) Fan Volumetric Flow: Exhaust gas volumetric flow through the kiln was monitored by measuring the ID fan amps. With three furnaces operating, the normal electrical current to the fan is [Claimed Confidential] amperes. Exhaust gas volumetric flow was maintained at a constant setting during the test periods. The average fan amperage during the emission testing period was [Claimed Confidential] amperes. The summary of the venturi fan amperage for the test period is contained in Table N-5.

TABLE N-4. SUMMARY OF VENTURI WATER FLOW (GPM) DURING THE TEST PROGRAM, MONSANTO-SODA SPRINGS, IDAHO (August 1988) [Claimed Confidential]

		Train A		Train B		Train C		Train D	
Date	Hour	#1	#2	#1	#2	#1	#2	#1	#2
08/16/88	1350								
	1420								
	1525								
	1650								
	1740								
	1844								
	1917								
Average Combined Flow									
08/17/88	0853								
	0953								
	1009								
	1040								
	1120								
	1420								
	1515								
	1556								
	1516								
	1718								
	1830								
	1900								
	2020								
Average Combined Flow									
08/18/88	1020								
	1106								
	1226								
	1430								
	1530								
	1640								
	1715								
	1830								
Average Combined Flow									

TABLE N-4. (Continued)

Date	Hour	Train A #1	Train A #2	Train B #1	Train B #2	Train C #1	Train C #2	Train D #1	Train D #2
08/19/88	1030								
	1100								
	1130								
	1145								
	1215								
	1245								
	1330								
	1450								
	1500								
	1615								
	1710								
	1740								
Average Combined Flow									

TABLE N-5. SUMMARY OF EXHAUST GAS ID FAN AMPERAGE MEASURED DURING THE TEST PROGRAM, MONSANTO-SODA SPRINGS, IDAHO (August 1988) [Claimed Confidential]

Date	Hour	Fan (amps) #1	#2	#3	#4	Daily Average
08/16/88	1350					
	1525					
	1650					
	1740					
	1844					
	1917					
	Average					
08/17/88	0853					
	0953					
	1030					
	1040					
	1120					
	1420					
	1515					
	1556					
	1516					
	1630					
	1718					
	1830					
	1900					
	2020					
	Average					
08/18/88	1020					
	1106					
	1206					
	1226					
	1430					
	1640					
	1715					
	1830					
	Average					

TABLE N-5. (Continued)

Date	Hour	Fan (amps) #1	#2	#3	#4	Daily Average
08/19/88	1030					
	1100					
	1130					
	1145					
	1215					
	1245					
	1330					
	1450					
	1500					
	1530					
	1615					
	1710					
	1740					
	Average					