Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP42 Section: 11.1

Reference Number: 82

Title: Results Of The September 9, 1993 Particulate And Visual Emission Compliance Test On The Baghouse Stack At The Ulland Brothers, Inc. Facility Located In Shellrock Township, Minnesota,

Pace, Inc., Golden Valley, MN,

September 21, 1993.

pace
INCORPORATED
THE ASSURANCE OF QUALITY

RESULTS OF THE SEPTEMBER 9, 1993
PARTICULATE AND VISUAL EMISSION
COMPLIANCE TEST ON THE BAGHOUSE
STACK AT THE ULLAND BROS. INC.
FACILITY LOCATED IN SHELLROCK
TOWNSHIP, MINNESOTA

Prepared For: Ms. Joan Ford
Ulland Bros. Inc.

Prepared By: PACE, Incorporated
1710 Douglas Drive North
Golden Valley, Minnesota 55422

PACE Project No.: 930721.401
Report Date: September 21, 1993

Field sampling was performed by me and personnel under my direct supervision.

Michael S. Loftus
Project Field Supervisor

All sampling, analysis and data reduction were performed by PACE, Incorporated under my supervision.

Curtis H. Stock
Supervisor, Air Sampling Section

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EXECUTIVE SUMMARY

PACE Incorporated was contracted by Ulland Bros. Inc. to perform particulate and visual emissions testing on the Baghouse Stack at the Ulland Bros. Hot Mix Asphalt facility located in Shellrock Township, Minnesota. This series of tests was performed on September 9, 1993. The results are summarized with pertinent process data in the following table:

Test Results Summary

	Run 1	Run 2	Run 3	Average
Volumetric Flow Rate				
ACFM	48700	46900	48200	47900
DSCFM	20500	19700	20100	20100
Average Stack Temp. (°F)	299	299	298	299
Average Moisture Content (%V/V)	36.2	36.2	36.9	36.4
Particulate Concentration GR/DSCF	0.025	0.026	0.032	0.028
Particulate Emission Rate LB/HR	4.4	4.4	5.4	4.8
Opacity %	0	0	0	0
Aggregate Mix Moisture %	5.0	4.8	5.4	5.1
Plant Reduction Rate TPH	321.4	316.1	311.3	316.2

INTRODUCTION

PACE, Incorporated personnel conducted particulate and visual emission compliance testing on the Baghouse Stack at the Ulland Bros. Hot Mix Asphalt facility located in Shellrock Township, Minnesota. On-site testing was performed by a three member team consisting of M. Loftus, M. McDermott and K. Lattery. Coordination between plant operations and testing activities was provided by Joan Ford of Ulland Bros. Inc. through direct contact with the test team leader. Testing was not witnessed by any representative of the Minnesota Pollution Control Agency. The test consisted of three independent one-hour samplings for particulate and visual emissions with concurrent integrated gas sampling for Orsat analyses.

The objectives of this project were to quantify particulate and visible emissions and compare them to applicable air emissions regulations stipulated by Minnesota Rules. Special provisions for this test program include operating at maximum capacity and firing distillate No. 2 fuel oil.

Results are summarized in the next section followed by descriptions of the process under investigation and test methods. All supporting data are included in subsequent appendices.

RESULTS SUMMARY

Results of particulate determinations and gas composition are summarized in Table 1. The particulate emission rate averaged 4.8 LB/HR at an average particulate concentration of 0.028 GR/DSCF. Federal New Source Performance Standards limit sources of this type to 0.04 GR/DSCF.

Opacity observations were recorded every 15 seconds for three one-hour time periods during the testing. These results are shown in Table 4-6. All of the observations were zero percent. Within any of the one-hour observation period, the highest average opacity for a consecutive six-minute time span was zero percent. The average opacity for the three one-hour periods was zero percent.

No problems were encountered in the sampling or analyses of emissions samples. On this and after complete review of the test results, we believe that the values reported herein are an accurate representation of the source conditions at the time of the test.

SUMMARY OF THE RESULTS

Ulland Bros. Inc.
Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 16, 1993

TABLE 1
SUMMARY OF THE RESULTS
TEST 1

Baghouse Stack

Parameter	**Run 1**	**Run 2**	**Run 3**	**Average**
Date of Run	9/9/93	9/9/93	9/9/93	
Time of Run	805-908	935-1037	1105-1208	
Production Rate (TPH)	321.4	316.1	311.3	316.2
Recycle Usage (Percent)	40.9	41.2	40.6	40.9
Agg. Mix Moisture Content (%v/v)	5.0	4.8	5.4	5.1
Volumetric Flow Rate				
ACFM	48700	46900	48200	47900
DSCFM	20500	19700	20100	20100
Gas Temperature (°F)	299	299	298	299
Gas Moisture Content (%v/v)	36.2	36.2	36.9	36.4
Gas Composition (%v/v,Dry)				
CO2	8.6	8.5	8.5	8.5
O2	9.6	10.0	9.8	9.8
N2	81.9	81.6	81.8	81.7
Isokinetic Variation (%)	100.7	101.4	101.0	
Particulate Emission Rate (LB/HR)	4.4	4.4	5.4	4.8
Particulate Concentration				
GR/ACF	0.011	0.011	0.013	0.012
GR/DSCF	0.025	0.026	0.032	0.028

RESULTS OF ORSAT AND MOISTURE DETERMINATIONS

Ulland Bros. Inc.
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 16, 1993

TABLE 2
RESULTS OF ORSAT AND MOISTURE DETERMINATIONS
TEST 1

Baghouse Stack

Parameter	**Run 1**	**Run 2**	**Run 3**
Date of Run	9/9/93	9/9/93	9/9/93
Time of Run	805-908	935-1037	1105-1208
ORSAT (%v/v)			
Dry Basis			
Carbon Dioxide	8.55	8.45	8.50
Oxygen	9.60	9.95	9.75
Carbon Monoxide*	•	•	•
Nitrogen	81.85	81.60	81.75
WetBasis			
Carbon Dioxide	5.46	5.39	5.36
Oxygen	6.13	6.35	6.15
Carbon Monoxide*	•	•	•
Nitrogen	52.23	52.10	51.57
Portable Oxygen Monitor Result			
Time Weighted Average (%O2)	9.5	9.6	9.7
Moisture Collected (ml)	415.0	402.0	421.0
Moisture Content (%v/v)	36.19	36.16	36.92
Molecular Weight of Flue Gas (lb/lb-mole)			
Dry	29.75	29.75	29.75
Wet	25.50	25.50	25.41
Fo	1.322	1.296	1.312

*Carbon monoxide was not measured, assumed concentrations less than 0.01%.

RESULTS OF PARTICULATE LOADING DETERMINATIONS

Ulland Bros. Inc.
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 16, 1993

TABLE 3
RESULTS OF PARTICULATE LOADING DETERMINATIONS
TEST 1

Baghouse Stack

Parameter	**Run 1**	**Run 2**	**Run 3**
Date of Run	9/9/93	9/9/93	9/9/93
Time of Run	805-908	935-1037	1105-1208
Sample Duration (Min.)	60.0	60.0	60.0
Average Flue Gas Temperature (°F)	298.9	299.0	298.3
Moisture Content of Flue Gas (%v/v)	36.19	36.16	36.92
Particulate Collected (Mg)*			
Wet Catch	40.6	41.1	56.5
Dry Catch	15.4	15.6	12.6
Total	56.0	56.7	69.1
Volumetric Flow Rate			
ACFM	48670	46870	48200
SCFM	32110	30920	31830
DSCFM	20490	19740	20080
Sample Volume (Cubic Feet)			
Meter Conditions	36.25	35.23	35.81
Dry Standard	34.44	33.41	33.86
Isokinetic Variation (%)	100.7	101.4	101.0
Particulate Concentration*			
Wet Catch, GR/DSCF	0.018	0.019	0.026
Dry Catch, GR/DSCF	0.007	0.007	0.006
Total, GR/DSCF	0.025	0.026	0.032
Particulate Emission Rate*			
Total, LB/HR	4.41	4.43	5.42

*Dry catch plus organic/residual wet catch

RESULTS OF OPACITY OBSERVATIONS

Ulland Brothers, Inc.
Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 23, 1993

TABLE 4
RESULTS OF OPACITY OBSERVATIONS
TEST 1

Baghouse Stack

Percent Opacity	Optical Density	Relative Frequency
0	0.000	100.00
5	0.022	0.00
10	0.046	0.00
15	0.071	0.00
20	0.097	0.00
25	0.125	0.00
30	0.155	0.00
35	0.187	0.00
40	0.222	0.00
45	0.260	0.00
50	0.301	0.00
55	0.347	0.00
60	0.398	0.00
65	0.456	0.00
70	0.523	0.00
75	0.602	0.00
80	0.699	0.00
85	0.824	0.00
90	1.000	0.00
95	1.301	0.00
99	2.000	0.00
Average > 0.0	0.000	**Total >** 100

Average Opacity Per Six Minute Period:

Period	Opacity	Period	Opacity
1	0.0	6	0.0
2	0.0	7	0.0
3	0.0	8	0.0
4	0.0	9	0.0
5	0.0	10	0.0

High Six Minute Average: 0.0
Maximum reading: 0.0
Minumum reading: 0.0

Observer: M. Loftus
Date of test: 9/9/93
Time of test: 805-905

NOTE: The high six minute average opacity might not coincide with any of the 10 reported six minute periods. The high value is the maximum consecutive period possible and may overlap two of the ten consecutive six-minute periods.

Ulland Brothers, Inc.
Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 23, 1993

TABLE 5
RESULTS OF OPACITY OBSERVATIONS
TEST 1

Baghouse Stack

Percent Opacity	Optical Density	Relative Frequency
0	0.000	100.00
5	0.022	0.00
10	0.046	0.00
15	0.071	0.00
20	0.097	0.00
25	0.125	0.00
30	0.155	0.00
35	0.187	0.00
40	0.222	0.00
45	0.260	0.00
50	0.301	0.00
55	0.347	0.00
60	0.398	0.00
65	0.456	0.00
70	0.523	0.00
75	0.602	0.00
80	0.699	0.00
85	0.824	0.00
90	1.000	0.00
95	1.301	0.00
99	2.000	0.00
Average > 0.0	0.000	**Total >** 100

Average Opacity Per Six Minute Period:

Period	Opacity	Period	Opacity
1	0.0	6	0.0
2	0.0	7	0.0
3	0.0	8	0.0
4	0.0	9	0.0
5	0.0	10	0.0

High Six Minute Average: 0.0
Maximum reading: 0.0
Minumum reading: 0.0

Observer: M. Loftus
Date of test: 9/9/93
Time of test: 935-1035

NOTE: The high six minute average opacity might not coincide with any of the 10 reported six minute periods. The high value is the maximum consecutive period possible and may overlap two of the ten consecutive six-minute periods.

Ulland Brothers, Inc.
Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 23, 1993

TABLE 6
RESULTS OF OPACITY OBSERVATIONS
TEST 1

Baghouse Stack

Percent Opacity	Optical Density	Relative Frequency
0	0.000	100.00
5	0.022	0.00
10	0.046	0.00
15	0.071	0.00
20	0.097	0.00
25	0.125	0.00
30	0.155	0.00
35	0.187	0.00
40	0.222	0.00
45	0.260	0.00
50	0.301	0.00
55	0.347	0.00
60	0.398	0.00
65	0.456	0.00
70	0.523	0.00
75	0.602	0.00
80	0.699	0.00
85	0.824	0.00
90	1.000	0.00
95	1.301	0.00
99	2.000	0.00
Average > 0.0	0.000	**Total >** 100

Average Opacity Per Six Minute Period:

Period	Opacity	Period	Opacity
1	0.0	6	0.0
2	0.0	7	0.0
3	0.0	8	0.0
4	0.0	9	0.0
5	0.0	10	0.0

High Six Minute Average: 0.0
Maximum reading: 0.0
Minumum reading: 0.0

Observer: M. Loftus
Date of test: 9/9/93
Time of test: 1105-1205

NOTE: The high six minute average opacity might not coincide with any of the 10 reported six minute periods. The high value is the maximum consecutive period possible and may overlap two of the ten consecutive six-minute periods.

Ulland Brothers, Inc.
Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
930721.401

PACE Incorporated
September 22,1993

TABLE 7
RESULTS OF FUEL ANALYSIS
TEST 1

Baghouse Stack

Analyte	Results
Ash Content: (weight %)	< 0.01
Sulfur Content: (weight %)	0.06
Heating Value: (BTU/LB)	19386

RESULTS OF PRELIMINARY SOURCE DETERMINATIONS

Ulland Bros. Inc.
Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 16, 1993

TABLE 8
RESULTS OF AIR FLOW DETERMINATIONS
TEST 1

Baghouse Stack

Date of Run	9/9/93
Time of Measurement	0740
Number of Sampling Ports	2
Number of Points Sampled	24
Barometric Pressure (In. Hg)	28.33
Static Pressure (In. WC)	0.62
Absolute Flue Gas Pressure (In. Hg)	28.38
Average Flue Gas Temperature (F)	260
Average Moisture Content (%v/v)	33
Flue Gas Average Velocity (Feet/Second)	62.83
Duct Dimension (Inches)	47
Duct Cross-sectional Area (Square Feet)	12.05
Volumetric Flow Rate	
ACFM	45420
SCFM	31590
DSCFM	21170

PROCESS DESCRIPTION

The Ulland Bros. Inc. Hot Mix Asphalt facility located in Shellrock Township, Minnesota is a portable drum mix Gencor Model 300 Mixer. It fires propane or distillate fuel oil

Manufacturer's rated heat input is 80.6 MKB BTU/HR when burning No. 2 fuel oil and its rated capacity is 300 TPH @ 5% moisture content. Pollution control is facilitated with a Gencor 55000 CEM Baghouse. This baghouse contains 672 filter bags with an air to cloth ratio of 5.26 to 1. It has a pulse air cleaning mechanism and operates at a normal pressure drop of 4 inches of water column. The last inspection date was on September 8, 1993. A relational flow diagram is represented by Figure 1.

For this series of tests, the average asphalt production rate was 316.2 TPH while using 40% recycled materials. No. 2 fuel oil was fired as fuel.

Ulland Brothers, Inc.
Shellrock Township, Minnesota
Glenville Pit Hot Mix Facility

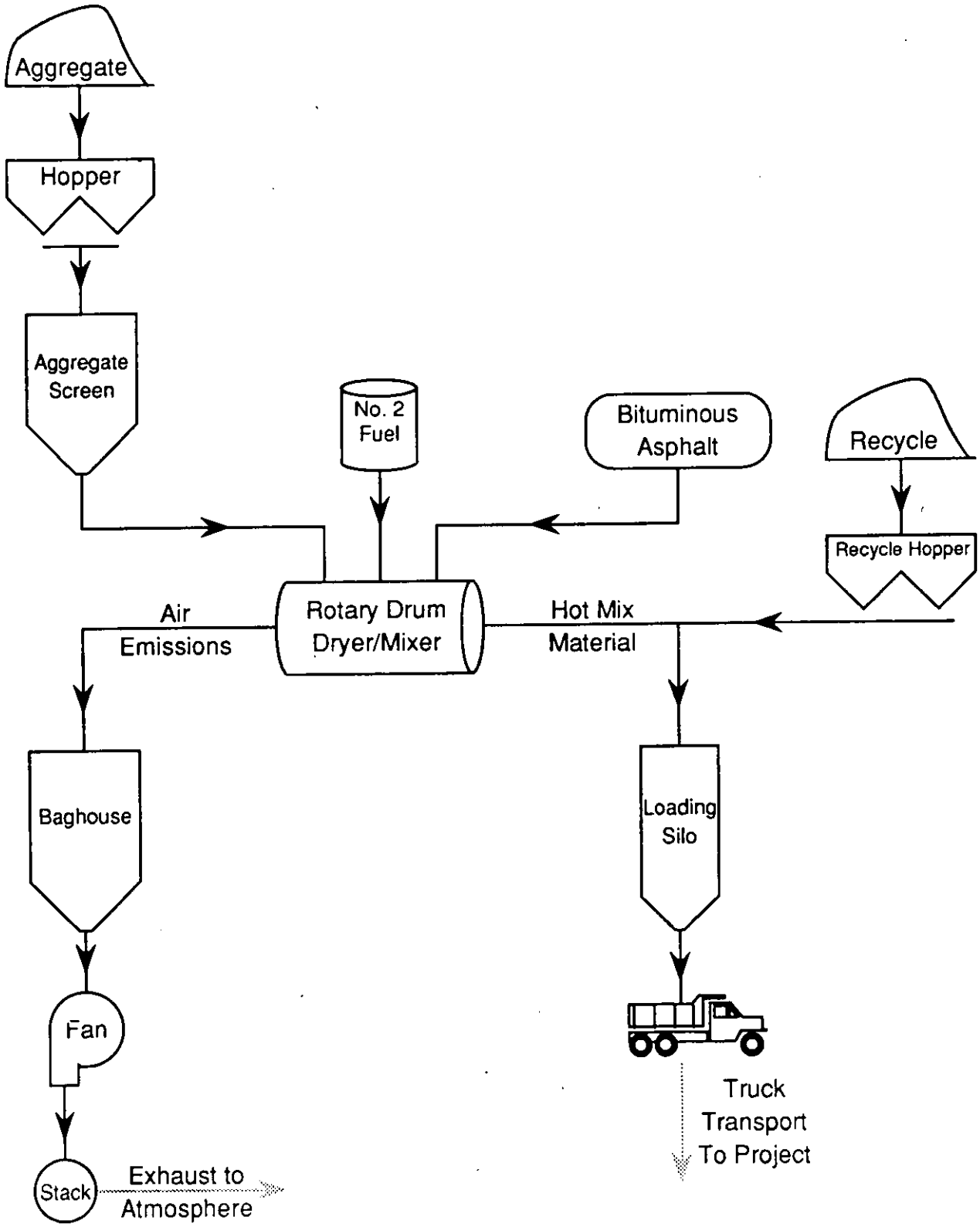


Figure 1

TEST PROCEDURES SUMMARY

Testing on the Baghouse Stack was performed from two test ports oriented at 90 degrees, approximately 4.11 duct diameters downstream of the nearest flow disturbance and .77 duct diameters upstream of the stack outlet. The duct dimension at this point was verified on-site and measures 47.0 inches in diameter. A 24 point traverse was used to extract representative flue gas samples. Each point was sampled 2.5 minutes for a run duration of 60 minutes. Test port and traverse point locations are displayed in Figures 2 and 3.

Particulate testing was performed in accordance with EPA Methods 1 - 5, 40 CFR 60, Appendix A. A preliminary velocity traverse and moisture estimation were conducted so that an appropriate sampling nozzle required for isokinetic sample withdrawal could be selected. A PACE sampling train that meets or exceeds the specifications outlined in the above reference was used to collect particulate samples. A temperature controlled glass-lined sampling probe was used to extract flue gas samples and transport them to an all glass filter and cyclone assembly in a temperature controlled oven. The back half of the particulate sampling train consisted of a series of three glass impingers, each of the first two prepared with 100 mls of deionized water, followed by a desiccant packed drying column. In addition, integrated gas samples were collected concurrently with the three particulate runs so that gas composition (Orsat) could be determined. Gas samples were verified in the field with a portable oxygen analyzer to ensure that no leakage occurred between the site and the laboratory. The portable oxygen analyzer was also used to monitor the oxygen content of the flue gas throughout the test.

Opacity evaluations were performed in accordance with EPA Method 9, 40 CFR 60, Appendix A. After positioning himself with respect to the sun, the source and plume (wind) direction, the certified observer proceeds to record opacity readings at 15 second intervals for one hour. A total of 240 observations is recorded in 60 minutes. The readings are integrated to calculate a one-hour average opacity and ten successive six-minute averages. In addition, computer spreadsheets are used to search the data set to find a group of 24 consecutive

readings anywhere within the one-hour evaluation for the highest possible six-minute average.

Air flow determinations were performed in accordance with EPA Method 2 using traverse point protocols specified by EPA Method 1, 40 CFR 60, Appendix A. Point velocity measurements were conducted using a S-Type/standard pitot tube and a Neotronics Model EDM-1 Electronic Digital Manometer. Source gas moisture content was estimated using wet bulb/dry bulb temperature measurements.

Ulland Brothers, Inc.

Shellrock Township, Minnesota
Glenville Pit Hot Mix Facility
Drum Dryer Baghouse Stack

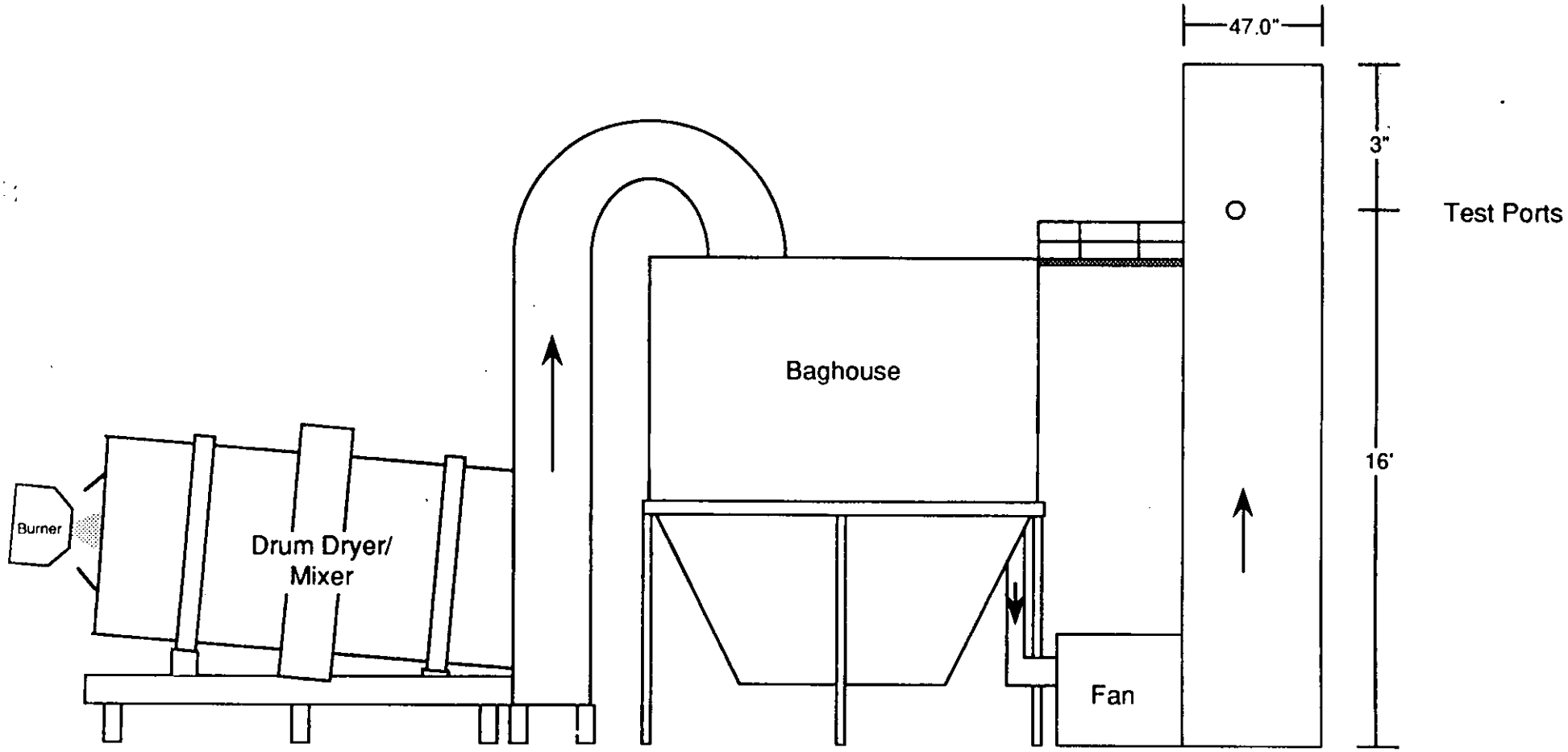
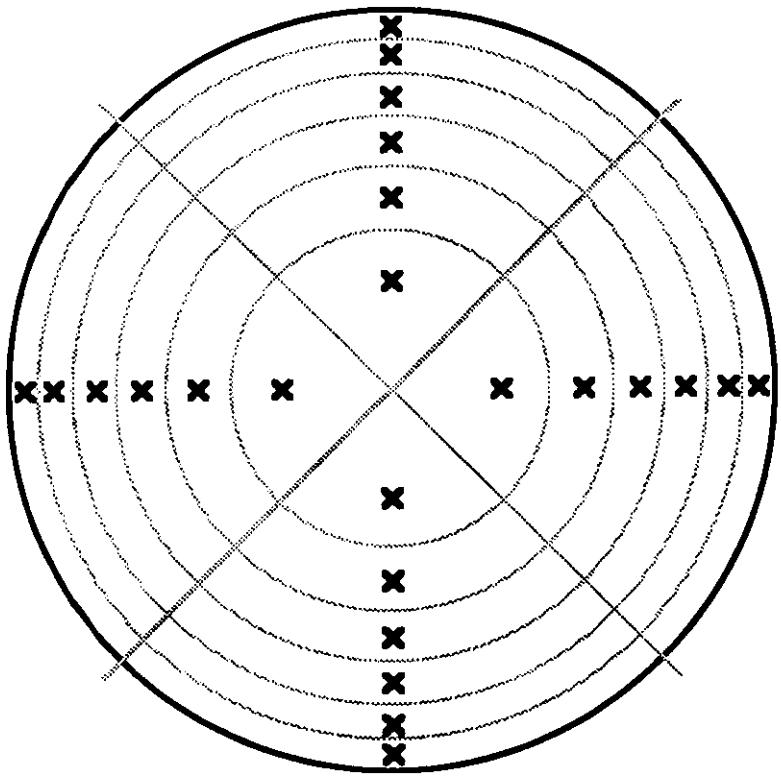


Figure 2

Ulland Brothers, Inc.

Glenville Pit Hot Mix Facility
Shellrock Township, Minnesota
Baghouse Stack

Location of Traverse Points



Number of Test Ports	2
Total Number of Traverse Points	24
Number of Traverse Points Per Traverse	12
Duct Diameter (Inches)	47.0

Figure 3

APPENDIX A

Field Data Sheets and Notes

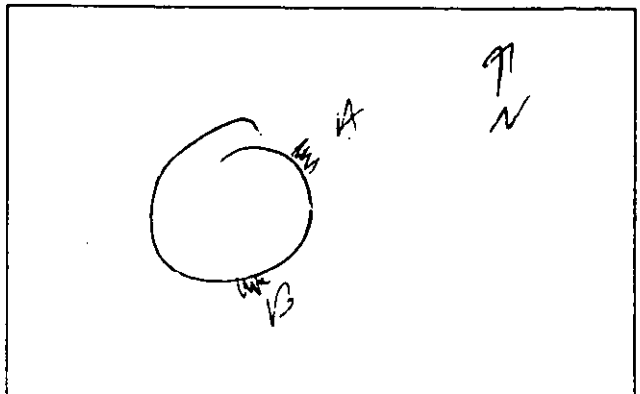
EPA METHODS 2-5 FIELD DATA SHEETS

EPA Method 2 Field Data Sheet

Project Ulland Albert Lea
Test Location Baghouse stack
Date 9-9-93 Test 1 Run
Operators MAM KJL
Barometric Pressure 28.33 Inches Hg
Static Pressure + .62 Inches H_2O
Pitot Leak Check - Positive OK Negative OK

Pitot Tube No. 4 C_p .841
Pressure Measurement Device oil manometer
Duct Dimensions 47 Inches
Port Length 3.25 Inches
Temp. - Dry Bulb 260 °F, Wet Bulb 165 °F
Moisture Content 33 %
320P Oxygen Concentration 14 %
Time of Measurement 0740 (24 Hr. Clock)

Traverse Point Identification				Cyclonic Flow Yaw Angle	Velocity Head ΔP Inches H_2O	Stack Temperature °F
Point Number	% Of Diameter	Inches From: Wall	Inches From: Port			
A 1		1.00	4.25	°	.42	
2		3.15	6.40	°	.49	Ave = .8
3		5.55	8.80	°	.56	
4		8.33	11.58	°	.57	Opt = .264
5		11.75	15.00	°	.56	1/4 INCH
6		16.72	19.97	°	.57	
7		30.28	33.53	°	1.05	1-2
8		35.25	38.50	°	1.15	.248
9		38.67	41.92	°	1.25	
10		41.45	44.70	°	1.20	
11		43.85	47.10	°	+ 1.25	
12		46.00	49.25	°	1.00	
B 1				°	.47	
2				°	.57	
3				°	.62	
4				°	.67	
5				°	.66	
6				°	.61	
7				°	.80	
8				°	.91	
9				°	.92	
10				°	.96	
11				°	1.00	
12				°	.94	



Schematic of Duct Cross-Section

Computer Data Summary:

Stack Pressure _____ Inches Hg
Duct Area _____ Square Feet
Molecular Weight - M_d _____
Molecular Weight - M_s _____
Avg. Duct Temperature _____ °F
Average $\sqrt{\Delta P}$ _____
Flue Gas Velocity _____ Feet/Sec.
Volumetric Flow Rate:
ACFM _____
DSCFM _____

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AIR SAMPLING DEPARTMENT

Field Computer Summary

Project Name: ULLAnd Albert Lea

Operator M. McDermott

Sampling Location: Baghouse stack

Date of Test: 9-9-93

Test Number: 1

Initialization Parameters

Meter Coef. - ∂	=	.9963
Orif. Coef. - ΔH@	=	2039
Pitot Coef. - C_p	=	.841
Nozzle Dia. - D_n	=	.248
Bar. Pres. - P_b	=	28.33
Time/Point - ΔT	=	2.5
Moisture Content	=	33
% Oxygen	=	14
Meter Temp. - t_m	=	60
Static Pres. - P_g	=	7.62

Run Specific Input Parameters

	Run 1	Run 2	Run 3	Run 4
V/O	112.40	149.00	184.50	
No. Of Points	24	24	24	
MC	33	35	36	
V/F	148.65	184.23	220.31	
Grams H_2O	415	402	421	
Run Time	60	60	60	
1-Rnd/2-Rect	1	1	1	
Diameter(Ins.)	47	47	47	
Length(Ins.)	x	x	x	
Width(Ins.)	x	x	x	

End Of Run Summary

	Run 1	Run 2	Run 3	Run 4
Avg. √ΔP	.915	.881	.904	
Avg. ΔH	1.277	1.213	1.249	
Avg. t_s	298.88	299.00	298.29	
Avg. t_m	66.00	66.85	68.54	
Standard Vol.	34.44	33.41	33.86	
Moist. Content	36.19	36.16	36.92	
Avg. Gas Vel.	67.67	64.34	66.20	
% Isokinetic	100.16	102.16	101.73	
ACFM	48914	46510	47855	
DSCFM	20595	19590	19934	

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AIR SAMPLING DEPARTMENT

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EPA Method 5 Field Data Sheet

Project Leland Albert LEA
Sample Location B.H. Stack
Date 9-9-93 Test 1 Run 1
Operators MAM, K.SL

Train No. C8, B2, P7
Meter Coef. ∂ .9963
Orifice Coef. ΔH@ 2.03"
Nozzle No. 1-2 D_n .248

Pitot Tube No. 4 C_p .841
Bar. Pres. 28.33 Ins. Hg
Static Pres. +.62 Ins. H_2O
Estimated MC 33 %

Sampling Train Leak Checks:
Pretest 0.00 @ 15 Ins. Hg
Posttest 0.00 @ 6.30 Ins. Hg
Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(0805)	(112.40)													
A 12		114.10	.98	1.57	169	409	3.8	295	249	240	53	63	61	10.0	
11	5	115.84	1.10	1.76	179	587	4.0	300	250	243	50	64	61	9.8	
10		117.56	1.05	1.55	168	755	4.0	302	250	249	51	65	61	9.8	w = 36
9	10	119.17	.96	1.42	161	916	3.8	301	252	252	52	66	61	9.9	
8		120.79	.99	1.47	164	079	3.9	299	250	251	50	67	61	9.8	
7	15	122.25	.78	1.16	145	225	3.2	299	249	248	50	68	61	9.5	
6		123.65	.71	1.06	139	364	3.0	298	249	249	51	69	62	9.7	
5	20	125.05	.73	1.09	141	505	3.0	297	251	251	52	69	62	9.4	
4		126.56	.84	1.25	151	656	3.2	299	249	249	51	70	62	9.3	
3	25	127.99	.75	1.12	143	799	3.1	298	248	249	51	70	63	9.7	
2		129.26	.58	.87	126	925	2.8	297	250	248	52	70	63	9.4	
1	30	130.55	.61	.91	129	055	2.8	298	249	246	52	70	63	9.3	
B 12		132.32	1.10	1.74	179	233	4.1	288	249	240	49	69	62	9.5	
11	35	134.15	1.25	1.85	184	417	4.5	302	239	244	47	71	64	9.6	
10		136.01	1.25	1.86	185	602	4.9	303	248	247	47	72	64	9.6	
9	40	137.81	1.30	1.93	189	791	5.0	303	250	250	49	72	64	9.2	
8		139.61	1.10	1.63	173	964	4.8	304	242	249	50	72	64	9.4	
7	45	141.33	1.05	1.56	169	133	4.7	304	249	249	51	73	64	9.6	
6		142.68	.63	.90	129	262	3.0	302	247	247	52	72	64	9.5	w = 32.5
5	50	143.95	.58	1.24	386	393	2.9	298	249	243	52	71	64	9.4	
4		145.18	.57	.82	123	509	2.9	298	251	242	51	70	64	9.4	
3	55	146.36	.55	.79	120	629	2.8	297	248	238	51	70	64	9.4	
2		147.51	.51	.73	116	745	2.8	296	250	240	51	69	64	9.6	
1	60	148.65	.54	.78	119	865	2.8	295	250	240	50	69	64	9.3	
	(0908)														
	Θ=60	V_m = 36.25	915	$\overline{\Delta H}$ 1.277				$\overline{T_s}$ 298.88					$\overline{T_m}$ 66.00		

Samples Recovered: Filter No. 2941 ; [X] Probe Wash; [X] Wet Catch; [ ] Other

Integrated Gas Sampling Data:

Box No. 2
Bag No. 1
Bag Vol. 40 Liters
Bag Material Tedlar
Leak Checks 0.00 cc/min. @ 25"Hg
Posttest O_2 Reading 9.6
320 P No. Ox-2

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	387	211	4	—	1432	
Initial Volume	100	100	0	—	1419	
Difference	287	111	4	—	13	415

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AIR SAMPLING DEPARTMENT

EPA Method 5 Field Data Sheet

Project: Ulland Albert LGA
Sample Location: B H. Stack
Date: 9-9-93 Test: 1 Run: 2
Operators: MAM, KJL

Train No.: C8, B2, P7
Meter Coef. ∂: 9963
Orifice Coef. ΔH@: 2035
Nozzle No.: 1-2 D_n: .248

Pitot Tube No.: 4 C_p: 841
Bar. Pres.: 28.33 Ins. Hg
Static Pres.: +.62 Ins. H_2O
Estimated MC: 35 %

Sampling Train Leak Checks:
Pretest: 0.00 @ 15 Ins. Hg
Posttest: 0.00 @ 6.40 Ins. Hg
Pitot - Positive: ok Negative: ok

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(0935)	(149.00)													
B 12		150.74	1.05	1.59	171	071	3.9	305	240	230	57	64	63	9.9	
11	5	152.45	1.05	1.60	171	241	4.0	300	245	233	51	65	63	10.0	
10		154.22	1.05	1.58	170	411	4.0	302	247	231	50	67	63	9.6	0=10.0
9	10	155.80	.96	1.44	162	573	3.5	303	248	235	49	68	63	9.6	
8		157.31	.90	1.36	157	731	3.4	301	251	241	49	69	63	9.8	
7	15	158.87	.84	1.27	152	883	3.4	300	250	246	50	70	63	9.6	
6		160.20	.64	.97	133	016	2.9	298	249	245	50	70	63	9.8	
5	20	161.47	.58	.88	127	143	2.8	297	249	249	51	70	63	9.7	
4		162.64	.48	.73	116	259	2.5	296	249	247	49	70	64	9.7	
3	25	163.70	.41	.62	107	366	2.2	299	248	248	49	69	64	9.7	
2		164.75	.40	.61	105	471	2.2	299	248	249	49	69	64	9.9	
1	30	165.75	.39	.59	104	575	2.2	299	249	247	50	69	64	9.6	
A 12		167.44	.99	1.49	165	741	3.9	301	250	245	53	67	64	9.9	
11	35	169.13	1.20	1.82	183	923	4.4	297	251	244	48	70	64	9.5	
10		171.04	1.30	1.97	190	113	5.1	298	250	246	48	71	65	9.8	
9	40	173.00	1.25	1.90	187	300	5.2	298	250	247	49	72	65	9.3	
8		174.77	1.10	1.67	175	476	5.1	298	242	251	51	73	65	9.4	
7	45	176.43	.95	1.44	163	639	4.3	300	244	251	52	73	65	9.5	
6		177.68	.59	.90	128	767	3.1	300	244	247	53	72	65	9.6	
5	50	179.07	.67	1.02	137	904	3.1	298	249	246	53	72	65	9.7	
4		180.36	.60	.91	130	034	3.0	297	249	244	53	71	65	9.3	
3	55	181.65	.62	.94	132	165	3.0	296	250	241	53	70	65	9.4	
2		182.99	.64	.97	134	299	3.1	297	251	244	53	70	65	9.5	
1	60	184.23	.55	.84	124	423	3.0	299	250	243	53	70	65	9.5	
	(1037)														
	Θ=60	V_m = 3523	.771	$\overline{\Delta H}$=1.213				$\overline{T_s}$=299.00					$\overline{T_m}$=66.85		

Samples Recovered: Filter No. 2942 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. 2
Bag No. 2
Bag Vol. 40 Liters
Bag Material: tedlar
Leak Checks: 0.00 cc/min. @ 25"Hg
Posttest O_2 Reading: 9.9
320 P No. OK-2

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	384	207	3	–	1352	
Initial Volume	100	100	0	–	1344	
Difference	284	107	3	–	9	402

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AIR SAMPLING DEPARTMENT

EPA Method 5 Field Data Sheet

Project Ulland Albert IOA
Sample Location B.H. STACK
Date 9-9-93 Test 1 Run 3
Operators MAM KJL

Train No. C8, B3, P7
Meter Coef. ∂ 9963
Orifice Coef. ΔH@ 2039
Nozzle No. 1-2 D_n 248

Pitot Tube No. 4 C_p 841
Bar. Pres. 28.33 Ins. Hg
Static Pres. +.62 Ins. H_2O
Estimated MC 36 %

Sampling Train Leak Checks:
Pretest 0.00 @ 15 Ins. Hg
Posttest 0.00 @ 6.70 Ins. Hg
Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent
	(1105)	(184.50)												
A 12		186.24	1.10	1.62	173	623	4.1	299	245	235	59	66	64	10.3
11	5	187.97	1.10	1.62	172	795	4.2	298	245	235	63	67	65	10.0
10		189.67	1.05	1.54	168	963	4.1	300	242	241	54	68	65	9.6
9	10	191.36	1.05	1.55	168	131	4.1	300	249	243	48	69	65	9.8
8		192.96	.96	1.42	161	292	4.0	299	250	246	53	71	65	9.6
7	15	194.52	.90	1.33	156	449	3.9	298	249	247	54	71	65	9.3
6		195.86	.65	.96	133	582	3.0	298	249	247	54	71	65	9.7
5	20	197.04	.53	.79	120	702	2.8	297	250	250	55	71	66	9.5
4		198.09	.42	.62	107	809	2.8	296	250	249	55	71	66	9.7
3	25	199.20	.43	.64	108	917	2.5	297	248	248	55	70	66	9.7
2		200.32	.45	.67	101	028	2.6	298	250	250	55	70	66	9.9
1	30	201.47	.52	.77	119	147	2.8	298	250	250	55	71	66	9.4
B 12		203.28	1.20	1.78	181	328	4.8	295	250	250	56	71	66	9.9
11	35	205.06	1.30	1.93	188	516	5.0	297	250	250	55	71	66	9.8
10		207.00	1.30	1.92	188	705	5.1	298	250	243	50	72	66	9.7
9	40	208.80	1.20	1.77	181	885	5.1	300	250	249	51	73	66	9.8
8		210.60	1.15	1.70	177	062	5.1	302	251	251	51	74	67	9.7
7	45	212.35	1.05	1.67	170	232	5.1	300	249	249	54	74	67	9.8
6		213.76	.69	1.03	138	370	3.8	298	250	249	55	74	67	9.4
5	50	214.99	.60	.89	128	498	3.3	299	249	246	55	72	67	9.7
4		216.33	.64	.95	132	630	3.4	298	248	246	54	73	67	9.7
3	55	217.66	.64	.95	133	763	3.4	297	249	244	55	72	67	9.7
2		218.94	.63	.94	131	894	3.3	298	250	244	55	72	67	9.7
1	60	220.37	.69	1.02	137	031	3.8	298	247	243	55	72	67	9.5
	(1208)													
	θ=60	V_m = 35.81	.904	$\overline{\Delta H}$=1.249				$\overline{T_s}$=298.29					$\overline{T_m}$ 68.54	

Samples Recovered: Filter No. 2945 ; [X] Probe Wash; [X] Wet Catch; [ ] Other _____

Integrated Gas Sampling Data:

Box No. 2
Bag No. 3
Bag Vol. 40 Liters
Bag Material Tedlar
Leak Checks 0.00 cc/min. @ 25"Hg
Posttest O_2 Reading 9.7
320 P No. OX-2

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	366	242	4	=	1441	
Initial Volume	100	100	0	=	1432	
Difference	266	142	4	—	9	421

Company: Hland Bros. / Albert Lea, MN Date(s): 9-8, 9-9-93

Project No.: 930721.401

Significant Events & Notes

1) Arrived 9/8/93 @ 1500. Set up.
Arrived on site 9/9/93 @ 0545. No problems encountered during test except stack temp relay wasn't working on CM8. Had KJL Read them w/ digital right off the probe.

2)

Exhibit C will be faxed or mailed.

3)

4)

5)

6)

7)

8)

9)

10)

11)

EPA METHOD 9 FIELD DATA SHEETS

pace

AIR SAMPLING DEPARTMENT

EPA Method 9 Field Data Sheet

Project Ulland Albert Lea
Source No. 1 I.D. Baghouse stack Run 1
Source No. 2 I.D. Baghouse stack Run 2
Test No. 1

Evaluation Date 9-9-93
Observer M. Loftus
Certification Date 3-31-93

Source No. 1
Type of Source Asphalt mfg Control Device Baghouse
Fuel Type Fuel oil #2 Load ≈300 TPH

Source No. 2 See Source 1 (SAME)
Type of Source _____ Control Device _____
Fuel Type _____ Load _____

Source Height(s) 32 ft Outlet Dimensions 47"

Plume Description:
Type ☐ Coning ☐ Fanning ☐ Looping ☐ Lofting ☒ Fumigating
Color DARK white Length ≈200 ft
Steam Plume ☒ Attached ☐ Detached ☐ No Visible Steam

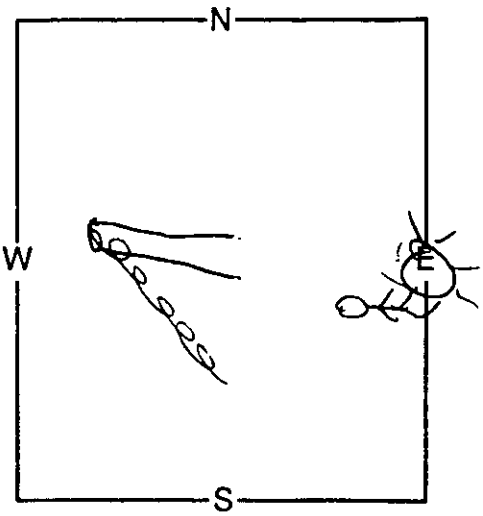
Background Description (Type, color) sky Gray (Run 1)
sky Blue (Run 2)

Meteorological Conditions (clear, % cloudy, etc.) cloudy (Run 1)
20% cloudy (Run 2)
Wind Direction from NW Speed 25-35 mph
Ambient Temp. 61 (Run 1) 64 (Run 2) °F

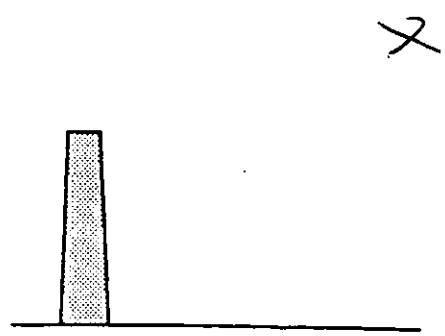
Location of Observer (direction and distance) E ≈300 ft

Personnel Present During Observation None.

Show Observer's Position In Relation to the Source, Plume and Lighting



Show Point Where Readings Were Evaluated In Relation to the Source Outlet and the Steam Plume



Comments (include any changes to the above during evaluation)
Occasional dust from trucks leaving would rise.

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AIR SAMPLING DEPARTMENT

EPA Method 9 Field Data Sheet

Project Ulland Brose ALBERT LEA
Source No. 1 I.D. BagHouse stack (Run3)
Source No. 2 I.D. —
Test No. 1

Evaluation Date 9-9-93
Observer M. Loftus ~~[illegible]~~
Certification Date 3-31-93

Source No. 1
Type of Source Asphalt Mfg. Control Device Baghouse
Fuel Type #2 oil Load ~300 TPH

Source No. 2
Type of Source — Control Device —
Fuel Type — Load —

Source Height(s) 32 ft Outlet Dimensions 47"

Plume Description:
Type ☐ Coning ☐ Fanning ☐ Looping ☐ Lofting ☒ Fumigating
Color Dark white Length ~200 ft
Steam Plume ☒ Attached ☐ Detached ☐ No Visible Steam

Background Description (Type, color) Sky Blue, clouds white & gray

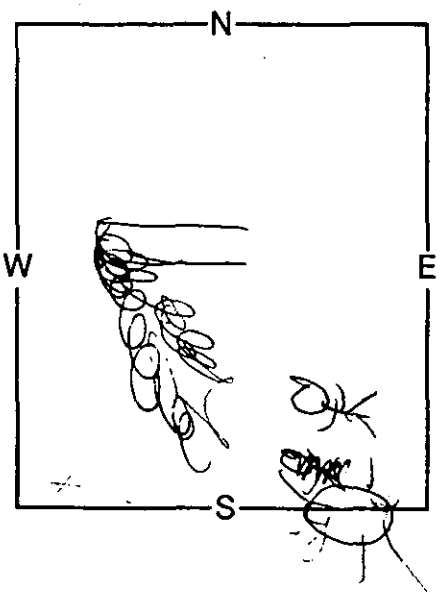
Meteorological Conditions (clear, % cloudy, etc.) 70% cloudy

Wind Direction from NNW Speed 25-35 mph
Ambient Temp. 64 °F
Run 2

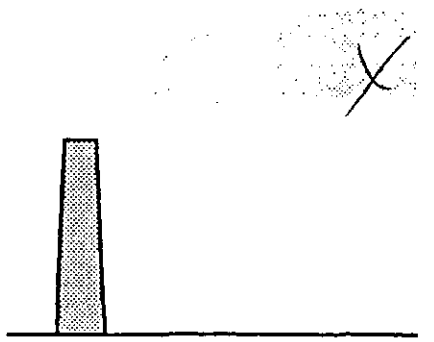
Location of Observer (direction and distance) SE ~300 ft

Personnel Present During Observation none

Show Observer's Position In Relation to the Source, Plume and Lighting



Show Point Where Readings Were Evaluated In Relation to the Source Outlet and the Steam Plume



Comments (include any changes to the above during evaluation)
Sun over Left shoulder

VISIBLE EMISSION EVALUATOR CERTIFICATION

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Mike Loftus

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Hoke President	238352 Certificate Number
[illegible] Vice President	Minneapolis Location
David B. Savage, Jr. Program Manager	April 1, 1993 Date of Issue

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APPENDIX B

Laboratory Data and Reports

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AIR SAMPLING DEPARTMENT

EPA Method 3 Laboratory Summary Sheet

Project ULLAND BROS.
Sampling Location BAGHOUSE STACK
Sampling Date 9/9/93
Project Number 930721.401

Analyst M. McDermott
Analysis Date 9/10/93
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification OB-01
Sample Type ☒ Integrated ☐ Grab

Test No.	Run No.	Orsat Analyzer Results			F_o	O_2 Analyzer Results		Sample Container
		% CO_2	% O_2	% CO		Field	Lab	
1	0	0.00	20.90					☐ Tedlar™ Bag ☐ Glass Bulb
1	1	8.55	9.60		1.324	9.60	9.60	☒ Tedlar™ Bag ☐ Glass Bulb
1	2	8.45	9.95		1.296	9.90	9.90	☒ Tedlar™ Bag ☐ Glass Bulb
1	3	8.50	9.75		1.312	9.70	9.70	☒ Tedlar™ Bag ☐ Glass Bulb
								☐ Tedlar™ Bag ☐ Glass Bulb
								☐ Tedlar™ Bag ☐ Glass Bulb
								☐ Tedlar™ Bag ☐ Glass Bulb
								☐ Tedlar™ Bag ☐ Glass Bulb
								☐ Tedlar™ Bag ☐ Glass Bulb
								☐ Tedlar™ Bag ☐ Glass Bulb

Calculate F_o before evacuating any samples. Compare F_o to expected fuel values. If discrepancies exist, reanalyze samples. Calculate F_o as follows:

$$F_o = \frac{20.9 - \%\,O_2}{\%\,CO_2}$$

Comments _____

F_o Ranges For Common Fuels	
Anthracite Coal & Lignite	1.016 - 1.130
Bituminous Coal	1.083 - 1.230
Distillate Oil	1.260 - 1.413
Residual Oil	1.210 - 1.370
Wood	1.000 1.120
Wood Bark	1.003 - 1.130
Natural Gas	1.600 - 1.836
Propane	1.434 - 1.586
Butane	1.405 - 1.553

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AIR SAMPLING DEPARTMENT

EPA Method 3 Laboratory Data Sheet

Project ULLAND BROS
Sampling Location BAGHOUSE STACK
Sampling Date 9/9/93
Project Number 930721.401

Analyst M. McDERMOTT
Analysis Date 9/10/93
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification 08-01

	Aliquot Volume	CO_2	O_2
Test 1 Run 0	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 0.00 ml Volume CO_2 0.00 ml % CO_2 0.00 %	Initial Reading 0.00 ml Final Reading 20.90 ml Volume O_2 20.90 ml % O_2 20.90 %
Duplicate	Zero Point ____ ml Sample Volume ____ ml	Initial Reading ____ ml Final Reading ____ ml Volume CO_2 ____ ml % CO_2 ____ %	Initial Reading ____ ml Final Reading ____ ml Volume O_2 ____ ml % O_2 ____ %
Average		% CO_2 0.00 %	% O_2 20.90 %
Test 1 Run 1	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 8.50 ml Volume CO_2 8.50 ml % CO_2 8.50 %	Initial Reading 8.50 ml Final Reading 18.10 ml Volume O_2 9.60 ml % O_2 9.60 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 8.60 ml Volume CO_2 8.60 ml % CO_2 8.60 %	Initial Reading 8.60 ml Final Reading 18.20 ml Volume O_2 9.60 ml % O_2 9.60 %
Average		% CO_2 8.55 %	% O_2 9.60 %

Comments: _____

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AIR SAMPLING DEPARTMENT

EPA Method 3 Laboratory Data Sheet

Project: Uland Bros.
Analyst: M. McDermott
Sampling Location: Baghouse Stack
Analysis Date: 9/10/93
Sampling Date: 9/9/93
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Project Number: 930721.401
Apparatus Identification: 03-C1

	Aliquot Volume	CO_2	O_2
Test 1 Run 2	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 8.40 ml Volume CO_2 8.40 ml % CO_2 8.40 %	Initial Reading 8.40 ml Final Reading 18.30 ml Volume O_2 9.90 ml % O_2 9.90 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 8.50 ml Volume CO_2 8.50 ml % CO_2 8.50 %	Initial Reading 8.50 ml Final Reading 18.50 ml Volume O_2 10.00 ml % O_2 10.00 %
Average		% CO_2 8.45 %	% O_2 9.95 %
Test 1 Run 3	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 8.50 ml Volume CO_2 8.50 ml % CO_2 8.50 %	Initial Reading 8.50 ml Final Reading 18.30 ml Volume O_2 9.80 ml % O_2 9.80 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.0 ml	Initial Reading 0.00 ml Final Reading 8.50 ml Volume CO_2 8.50 ml % CO_2 8.50 %	Initial Reading 8.50 ml Final Reading 18.20 ml Volume O_2 9.70 ml % O_2 9.70 %
Average		% CO_2 8.50 %	% O_2 9.75 %

Comments:

AS 100

INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet
Organic Condensibles

Project: Uland Bros Inc
Sampling Location: Baghouse Outlet Trial
Sampling Date: 9-8-93
Test Number: 1
Project Number: 930 910.515
BATCH 1043589

Analyst: BOL BOL 9-20-93
Analysis Date(s): ~~9-9-93~~ 9-16-93
Sampling Reagent: DI
LDMS Entry: _____ Initials: _____
LDMS Validation: 9-22-93 Initials: JMC

Sample No. 23112.6	Sample No. 23113.4	Sample No. 23114.2
Run Number 1	Run Number 2	Run Number 3
Dish Number Th	Dish Number 50	Dish Number P
Vol 600	Vol 600	Vol 610
Date/Time 9-20-93 1200	Date/Time 9-20-93 1200	Date/Time 9-20-93 1200
Gross Weight 107.9844 g	Gross Weight 115.3224 g	Gross Weight 108.7165 g
Date/Time 9-21-93 1036	Date/Time 9-21-93 1030	Date/Time 9-21-93 1030
Gross Weight 107.9839 g	Gross Weight 115.3220 g	Gross Weight 108.7161 g
Avg. Gross Wt. 107.9842 g	Avg. Gross Wt. 115.3222 g	Avg. Gross Wt. 108.7163 g
Dish Tare Wt. 107.9427 g	Dish Tare Wt. 115.2802 g	Dish Tare Wt. 108.6589 g
Difference 0.0415 g	Difference 0.0420 g	Difference 0.0574 g
Blank Weight +0.0009 g	Blank Weight +0.0009 g	Blank Weight +0.0009 g
Condensible Organic Wt. 0.0406 g	Condensible Organic Wt. 0.0411 g	Condensible Organic Wt. 0.0565 g
Transfer "Condensible Organic Wt." to Box Number 1.	Transfer "Condensible Organic Wt." to Box Number 2.	Transfer "Condensible Organic Wt." to Box Number 3.
WC 1 0.0406 g	WC 2 0.0411 g	WC 3 0.0565 g

AS 105 A

INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Particulate In Probe Wash

Project: Uland Bros Inc
Analyst: BOL
ampling Location: Baghouse Trial 1
Analysis Date(s): 9-16-93
Sampling Date: 9-8-93
Cleanup Reagent(s): Acetone
est Number: 1
LDMS Entry: _____ Initials: _____
Project Number: 930910.515
LDMS Validation: 9-22-93 Initials: JMC

Sample No. 23118.6	Sample No. 23118.7	Sample No. 23117.2
Run Number 1	Run Number 2	Run Number 3
Dish Number PO	Dish Number JSM	Dish Number BETE
Reagent Vol. 150 ml	Reagent Vol. 160 ml	Reagent Vol. 160 ml
Date/Time 9-20-93 1200	Date/Time 9-20-93 1200	Date/Time 9-20-93 1300
Gross Weight 116.8739 g	Gross Weight 106.3941 g	Gross Weight 112.6494 g
Date/Time 9-21-93 1030	Date/Time 9-21-93 1030	Date/Time 9-21-93 1030
Gross Weight 116.8735 g	Gross Weight 106.3937 g	Gross Weight 112.6492 g
Avg. Gross Wt. 116.8737 g	Avg. Gross Wt. 106.3939 g	Avg. Gross Wt. 112.6493 g
Dish Tare Wt. 116.8585 g	Dish Tare Wt. 106.3797 g	Dish Tare Wt. 112.6386 g
Difference 0.0152 g	Difference 0.0142 g	Difference 0.0107 g
Blank Weight +0.0002 g	Blank Weight +0.0002 g	Blank Weight +0.0002 g
Particulate In Rinse Weight 0.0150 g	Particulate In Rinse Weight 0.0140 g	Particulate In Rinse Weight 0.0105 g
Transfer "Particulate In Rinse Weight" to Box Number 1.	Transfer "Particulate In Rinse Weight" to Box Number 2.	Transfer "Particulate In Rinse Weight" to Box Number 3.
PW 1 0.0150 g	PW 2 0.0140 g	PW 3 0.0105 g

AS 105 A

INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Particulate On Filter

Project: Ulland Bros Inc
Analyst: BOL
Sampling Location: Baghouse Trial 1
Analysis Date(s): 9-16-93
Sampling Date: 9-9-93
Filter Type: Fiberglass
Test Number:
LDMS Entry: Initials:
Project Number: 930910.515
LDMS Validation: 9-22-93 Initials: [illegible]

Sample No. 23113.1	Sample No. 23113.4	Sample No. 23114.2
Run Number 1	Run Number 2	Run Number 3
Filter Number 2941	Filter Number 2942	Filter Number 2945
Date/Time 9-20-93 1200	Date/Time 9-20-93 1200	Date/Time 9-20-93 1200
Gross Weight 0.67268 g	Gross Weight 0.66581 g	Gross Weight 0.66619 g
Date/Time 9-21-93 1030	Date/Time 9-21-93 1030	Date/Time 9-21-93 1030
Gross Weight 0.67273 g	Gross Weight 0.66577 g	Gross Weight 0.66624 g
Avg. Gross Wt. 0.67270 g	Avg. Gross Wt. 0.66579 g	Avg. Gross Wt. 0.66622 g
Filter Tare Wt. 0.6723 g	Filter Tare Wt. 0.6642 g	Filter Tare Wt. 0.6641 g
Difference 0.00040 g	Difference 0.00159 g	Difference 0.00212 g
Particulate On Filter Weight 0.00040 g	Particulate On Filter Weight 0.00159 g	Particulate On Filter Weight 0.00212 g
Transfer "Particulate On Filter Weight" to Box Number 1.	Transfer "Particulate On Filter Weight" to Box Number 2.	Particulate On Filter Weight" to Box Number 3.
Sum particulate weights from each box labeled "1" and record in box labeled "T1."	Sum particulate weights from each box labeled "2" and record in box labeled "T2."	Sum particulate weights from each box labeled "3" and record in box labeled "T3."
AF 1 0.00040 g	AF 2 0.00159 g	AF 3 0.00212 g
Total T1 0.05600 g	Total T2 0.05669 g	Total T3 0.06912 g

AS 106 A

EPA Method 5 Particulate Gravimetric Sheet
Reagent Blanks

Project: Ulland Bros Inc.
Sampling Location: Baghouse Trial 1
Sampling Date: 9-9-93
Test Number: 1
Project Number: 930910.515

Analyst: BDL
Analysis Date(s): 9-16-93

Wet Catch

Type:
- [ ] Organic Condensibles (Extract.)
- [ ] Inorganic (Residual)
- [ ] Other
- [ ] Retain For Further Analyses

22

Reagent: DI
Volume: 600 ml

Date/Time: 9-20-93 1200
Gross Weight: 99.5734 g

Date/Time: 9-21-93 1030
Gross Weight: 99.5730 g

Avg. Gross Wt: 99.5732 g
Dish Tare Wt.: 99.5723 g
Difference: +0.0009 g

Blank Weight: +0.0009 g

Probe Wash

Type:
- [X] Gravimetric
- [ ] Other
- [ ] Retain For Further Analyses

BLK

Reagent: Acetone
Volume: 100 ml

Date/Time: 9-20-93 1200
Gross Weight: 115.5435 g

Date/Time: 9-21-93 1030
Gross Weight: 115.5430 g

Avg. Gross Wt.: 115.5432 g
Dish Tare Wt.: 115.5430 g
Difference: +0.0002 g

Blank Weight: +0.0002 g

AGGREGATE ANALYTICAL DATA

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Ulland Bros., Inc.
Route 1, Box 321
Austin, MN 55912

September 23, 1993
PACE Project Number: 930910515

Attn: Ms. Joan Ford

Client Reference: stack sampling 9/9/93

PACE Sample Number:			10 0231169	10 0231177	10 0231185
Date Collected:			09/09/93	09/09/93	09/09/93
Date Received:			09/10/93	09/10/93	09/10/93
Client Sample ID:			Baghouse T1 R1	Baghouse T1 R2	Baghouse T1 R3
Parameter	Units	MDL	Agg Mix	Agg Mix	Agg Mix
INORGANIC ANALYSIS					
INDIVIDUAL PARAMETERS					
Moisture content	%	0.1	5.0	4.8	5.4

1710 Douglas Drive North
Minneapolis, MN 55422
TEL: 612-544-5543
FAX: 612-525-3377

Offices Serving: Minneapolis, Minnesota
Tampa, Florida
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San Francisco, California
Kansas City, Missouri
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New York, New York
Pittsburgh, Pennsylvania
Denver, Colorado

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SUBCONTRACT LABORATORY REPORT

MVTL LABORATORIES, Inc.
P.O. BOX 1873, 1411 S. 12th STREET
BISMARCK, ND 58502
PHONE (701) 258-9720 WATS (800) 279-6885 FAX (701) 258-9724

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

FINAL ANALYSIS REPORT

Sample Number: 93-087

Report Date: 9/17/93

Mary Jo Connolly
PACE, Incorporated
1710 Douglas Drive North
Minneapolis, MN 55422

Work Order #: 81-0567
PO #: #930910-515

Date Received: 9/15/93

Sample Description: Fuel Oil #2
Sample Site: #23115.0
Sample Location: Ull & Bros.

Collection Date: 9/ 9/93

Analyte	Results	Units
Sulfated Ash % ASH	< 0.01	wt %
Calorific Value cal/g	10770	cal/gram
Calorific Value BTU/lb BTU	19386	BTU/lb
Total Sulfur % S	0.06	wt. %

Approved by:

Craig Gosch

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

APPENDIX C

Calculation Equations and Report Nomenclature

Ulland Bros. Inc.
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 16, 1993

APPENDIX C
METHOD 5 CALCULATION SUMMARY
TEST 1

Baghouse Stack

Parameter	**Run 1**	**Run 2**	**Run 3**
Date of Run	9/9/93	9/9/93	9/9/93
Sample Duration (Minutes)	60	60	60
Barometric Pressure (inches Hg)	28.33	28.33	28.33
Static Pressure Of Duct (Inches H2O)	0.62	0.62	0.62
Absolute Pressure Of Duct (Inches Hg)	28.38	28.38	28.38
Meter Coefficient	0.9963	0.9963	0.9963
Pitot Tube Coefficient	0.841	0.841	0.841
Nozzle Diameter (Inches)	0.248	0.248	0.248
Area Of Nozzle Opening (Square Feet)	0.000335	0.000335	0.000335
Average $\sqrt{\Delta P}$	0.9143	0.8805	0.9043
Average ΔH	1.29	1.21	1.25
Average Stack Temperature (°R)	758.88	759.00	758.29
Average Meter Temperature (°R)	526.00	526.85	528.54
Meter Volume (Cubic Feet)	36.25	35.23	35.81
Dry Standard Sample Volume (Cubic Feet)	34.44	33.41	33.86
Collected Condensate Volume (mls)	415.0	402.0	421.0
Volume Of Water Vapor (Standard Cubic Feet)	19.53	18.92	19.82
Moisture Content Of Flue Gas (% v/v)	36.19	36.16	36.92
Weight Of Particulate (mg)	56.0	56.7	69.1
Particulate Concentration (GR/DSCF)	0.02509135	0.02618387	0.03150558
Source Gas Velocity (Feet Per Second)	67.3	64.8	66.7
Isokinetic Variation (%)	100.7	101.4	101.0

Calculation Equations

Nomenclature

A = Cross-sectional area of duct

A_n = Cross-sectional area of nozzle

B_{ws} = Water vapor in gas stream, proportion by volume

C_a = Particulate concentration, actual, wet basis - GR/ACF

C_p = Pitot tube calibration coefficient

C_s = Particulate concentration at dry standard conditions - GR/DSCF

%EA = Excess air, percent by volume

F_o = Fuel factor

G_d = Specific gravity relative to air, dimensionless

I = Isokinetic variation, percent by volume

M_d = Molecular weight of flue gas, dry, lb/lb-mole

m_g = Mass flow of wet flue gas, LB/HR

m_n = Total particulate collected, grams

m_p = Particulate mass flow, LB/HR

M_s = Molecular weight of flue gas, wet, lb/lb-mole

P_b = Barometric pressure, uncompensated, inches of mercury

P_g = Static pressure of duct, inches of water

P_s = Absolute gas pressure of duct, inches of mercury

Q = Actual flue gas volumetric flow rate, ACFM

Q_{sd} = Dry flue gas volumetric flow rate corrected to standard conditions, DSCFM

$\overline{T_m}$ = Average dry gas meter temperature, °R

$\overline{T_s}$ = Average stack gas temperature, °R

$\emptyset$ = Total sampling time, minutes

V_{lc} = Total volume of liquid collected in impingers and desiccant, ml

V_m = Volume of gas sample measured by gas meter, cubic feet

V_{std} = Volume of gas sample corrected to standard conditions, dry standard cubic feet

V_w = Volume of water vapor in gas sample, corrected to standard conditions

V_s = Linear velocity of flue gas, feet per second

Y = Dry gas meter calibration factor

ΔH = Orifice meter differential pressure, inches of water

ΔP = Velocity pressure of flue gas, inches of water

β = Actual gas density, pounds per cubic foot

Calculation Equations

EPA Method 2 Calculations

Flue Gas Linear Velocity

$$V_s = 85.49 \times C_p \times \overline{\sqrt{\Delta P}} \times \sqrt{\frac{\overline{T_s}}{P_s \times M_s}}$$

Volumetric Flow Rates - ACFM, SCFM & DSCFM

$$Q = 60 \times v_s \times A$$

$$Q_s = Q \times \left(\frac{528}{T_s}\right) \times \left(\frac{P_s}{29.92}\right) = Q \times 17.647 \times \left(\frac{P_s}{T_s}\right)$$

$$Q_{sd} = Q_s \times (1 - B_{ws})$$

Mass Flow Rate of Wet Flue Gas

$$m_g = \frac{4.995 \times Q_{sd} \times G_d}{1 - B_{ws}}$$

Actual Gas Density

$$\rho = \frac{0.04585 \times P_s \times M_s}{\overline{T_s}}$$

Where:

A	=	Cross-sectional area of duct at sample point (sq. ft.).
B_{ws}	=	Water vapor in gas stream (proportion by volume).
C_p	=	Pitot tube calibration coefficient.
G_d	=	Flue gas specific gravity relative to air, dimensionless.
m_g	=	Mass flow rate of wet flue gas (LB/HR).
M_s	=	Molecular weight of wet flue gas (LB/LB-mole).
P_s	=	Absolute gas pressure of duct (Inches Hg).
ΔP	=	Velocity pressure measured by pitot tube (Inches WC).
Q	=	Actual flue gas volumetric flow rate (ACFM).
Q_s	=	Volumetric gas flow at standard conditions (SCFM).
Q_{sd}	=	Dry standard volumetric gas flow rate (DSCFM).
T_s	=	Flue gas temperature (°R).
V_s	=	Flue gas linear velocity (feet per second).
ρ	=	Actual flue gas density (LB/CF).

Calculation Equations

EPA Method 3 Calculations

Dry Molecular Weight of Flue Gas

$$M_d = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times (\%N_2 + \%CO))$$

Wet Molecular Weight of Flue Gas

$$M_s = M_d \times (1 - B_{ws}) + (18 \times B_{ws})$$

Percent Excess Air

$$\%EA = 100 \times \left(\frac{\%O_2 - (0.05 \times \%CO)}{(0.264 \times \%N_2) - \%O_2 + (0.5 \times \%CO)} \right)$$

Fuel F-factor (for comparison)

$$F_o = \frac{20.9 - \%O_2}{\%CO_2}$$

Where:

B_{ws}	=	Water vapor in gas stream (proportion by volume).
%CO	=	Carbon monoxide in gas stream (percent).
$\%CO_2$	=	Carbon dioxide in gas stream (percent).
%EA	=	Excess air for combustion (percent).
F_o	=	Fuel F-factor for results comparison.
M_d	=	Molecular weight of dry flue gas (LB/LB-mole).
M_s	=	Molecular weight of wet flue gas (LB/LB-mole).
$\%N_2$	=	Nitrogen in gas stream (percent).
$\%O_2$	=	Oxygen in gas stream (percent).

Calculation Equations

EPA Method 4 Calculations

Sample Volume, Standard Conditions

$$V_{std} = 17.647 \times V_m \times Y \times \left(\frac{P_b + \frac{\overline{\Delta H}}{13.6}}{\overline{T_m}} \right)$$

Volume of Water Vapor Sampled

$$V_w = 0.047070 \times V_{lc}$$

Proportion of Water Vapor in Sampled Gas

$$B_{ws} = \frac{V_w}{V_w + V_{std}}$$

Where:

B_{ws}	=	*Water vapor in gas stream (proportion by volume).*
ΔH	=	Orifice meter differential pressure (Inches WC).
P_b	=	Barometric pressure (Inches Hg).
T_m	=	*Sampling train meter temperature (°R).*
V_{lc}	=	Total volume of liquid collected in sampling train (mls).
V_m	=	Volume of gas sample measured by gas meter (CF).
V_{std}	=	Gas volume corrected to standard conditions (DSCF).
V_w	=	Volume of water vapor in gas sample (SCF).
Y	=	Dry gas meter calibration coefficient.

Calculation Equations

EPA Method 5 Calculations

Sample Volume, Standard Conditions

$$V_{std} = 17.647 \times V_m \times Y \times \left(\frac{P_b + \frac{\overline{\Delta H}}{13.6}}{\overline{T_m}} \right)$$

Isokinetic Variation

$$I = 0.09450 \times \left(\frac{\overline{T_s} \times V_m}{P_s \times V_s \times A_n \times \theta \times (1 - B_{ws})} \right)$$

Particulate Concentration

$$C_s = 15.432 \times \left(\frac{m_n}{V_{std}} \right)$$

Particulate Mass Rate

$$m_p = 0.008571 \times C_s \times Q_{sd}$$

Where:

A_n	=	Cross-sectional area of nozzle opening (square feet).
B_{ws}	=	Water vapor in gas stream (proportion by volume).
C_s	=	Particulate concentration of gas stream (GR/DSCF).
ΔH	=	Orifice meter differential pressure (Inches WC).
I	=	Isokinetic variation of sampling rate (percent).
m_n	=	Total particulate collected in sampling train (grams).
m_p	=	Particulate mass flow rate (LB/HR).
P_b	=	Barometric pressure (Inches Hg).
P_s	=	Absolute gas pressure of duct (Inches Hg).
Q_{sd}	=	Dry standard volumetric gas flow rate (DSCFM).
T_m	=	Sampling train meter temperature (°R).
T_s	=	Flue gas temperature (°R).
V_m	=	Volume of gas sample measured by gas meter (CF).
V_{std}	=	Gas volume corrected to standard conditions (DSCF).
V_s	=	Flue gas linear velocity (feet per second).
Y	=	Dry gas meter calibration coefficient.
θ	=	Total sampling time of run (minutes).

APPENDIX D

Test Procedures

OXYGEN AND CARBON DIOXIDE CONCENTRATION (ORSAT)

Integrated gas samples are collected in 40 liter Tedlar™ bags and ultimately transferred to an Orsat gas analyzer for oxygen and carbon dioxide analyses. A PACE sampling train which meets or exceeds the specifications of EPA Method 3, 40 CFR 60, Appendix A is used to collect gas samples. Normally, gas samples are collected at the exhaust of an EPA Method 4 or 5 sampling train since this gas stream is moisture conditioned. Method 4 and 5 sampling equipment is maintained and checked to assure no leaks occur between the flue and the integrated gas sampler.

Gas samples are collected by drawing a portion of the stream through a chemically resistant diaphragm pump and delivering it to the Tedlar™ bag at a constant, settable rate depending on expected sampling time. At the conclusion of sampling, the bag and associated hardware is sealed and labeled. When multiple tests are to be performed, gas samples are often transferred to glass gas collection tubes for storage. A portable oxygen analyzer is used for this to ensure sample integrity.

Samples are analyzed by chemical absorption using an Orsat gas analyzer. Following positive and negative leak checks of the gas analyzer, the system is purged with the gas to be analyzed. The burret is filled with approximately 100 mls of sample gas and the exact volume recorded. The sample line stopcock is closed and the stopcock for the first bubbler containing carbon dioxide absorbent is opened. Several passes are made, bubbling the sample gas through the reagent and the absorbent is returned to the initial mark. The new volume of the burret is recorded and an additional 1-2 passes are made to verify total absorption. Similar procedures are used to quantify oxygen with the same gas aliquot and oxygen absorbent.

PARTICULATE LOADINGS AND EMISSION RATES

Particulate emission rates were determined in accordance with EPA Methods 1-5, 40 CFR 60, Appendix A. Using traverse points determined with EPA Method 1, a preliminary velocity profile was obtained with respect to the velocity traverse, gas temperature, gas pressure and estimated moisture content. From this data sampling nozzles of the appropriate diameter to ensure isokinetic sampling were selected.

The particulate sampling train consists of a temperature controlled heat lined sampling probe equipped with a S-type pitot tube and Type K thermocouples to monitor stack temperature and probe liner temperature. The sampling probe is attached to a sample module which houses an all glass in-line filter and cyclone assembly in a temperature controlled oven. The back half of the sampling train consists of a series of three glass impingers followed by a tared desiccant-packed drying column. The sample train is connected by means of a control and sampling umbilical cord to the control module. The control module houses a temperature monitored dry test gas meter, a calibrated orifice, dual inclined manometers, temperature controllers, and necessary flow rate control devices.

Particulate samples are collected by isokinetically extracting a sample gas stream from the flue by means of the sampling probe and passing the stream through the cyclone which collects larger, heavier particles. The sample gas stream then passes through a 4 inch diameter Gelman Type A/E glass fiber filter to collect finer particulates. The filter is followed by an ice-cooled impinger train and a desiccant packed drying column which quantitatively collects all moisture from the sample gas stream. The gas then passes through a leak proof rotary vane sampling pump and a dry test gas meter which integrates the sample volume throughout the course of the test. A calibrated orifice is connected to the gas meter outlet to facilitate sample flow rate adjustment.

Representative particulate samples are collected by sampling the centroid of equal area sections of the duct for equal time periods. The sampling rate is adjusted at each traverse point to ensure isokinetic sampling. Pre-programmed

field computers are used to facilitate rapid determination of the correct sampling rate.

Integrated gas samples are collected concurrently with particulate samples to determine a representative gas composition of the flue gas. Gas samples are collected in Tedlar™ bags throughout the course of the particulate run and analyzed with an Orsat gas analyzer.

At the end of each particulate run, the sampling train is disassembled and the samples recovered. The sampling filter is transferred from the filter holder to its dedicated petri dish. The probe nozzle is acetone rinsed, brushed, rinsed again and the washings placed in a uniquely labeled polyethylene container. The probe is similarly cleaned; acetone rinsed, brushed several times, rinsed again and the washing transferred to the same polyethylene container. The filter holder and cyclone are wiped free of silicone grease, acetone rinsed, brushed, rinsed and these washings added to the probe wash container. The container is tightly capped and the liquid level marked for transport. The impinger catch volume is determined to the nearest milliliter using a graduated cylinder. If the impinger catch is to be analyzed it is transferred to a separate polyethylene container, capped, and the liquid level marked. The desiccant-packed drying column is weighed in the field to the nearest 0.5 g and the weight of absorbed moisture added to the condensate for moisture calculations.

Particulate samples are transported back to the laboratory, logged in, and prepared for analyses. Filters are desiccated for 24 hours and weighed to a constant weight and the results recorded to the nearest 0.1 mg. Probe wash samples are evaporated at ambient temperatures to dryness in tared evaporating dishes. They are then desiccated for 24 hours and weighed to a constant weight. Results are reported to the nearest 0.1 mg.

WET CATCH ANALYSIS - ORGANIC CONDENSIBLES

Particulate concentrations reported in this document include gravimetric results of both the dry catch and the organic wet catch. Organic condensibles were collected in a series of three ice-cooled all-glass impingers in the back half of the Method 5 sampling train. The first two impingers were initially prepared with 100 mls of deionized water in each and the third impinger was dry. After sampling, the volume of condensate in the impingers was determined and the contents transferred to an air-tight polyethylene sample container.

The wet catch was analyzed for condensible organic particulate with the chloroform/diethyl ether extraction. Three 25 ml portions of chloroform and three 25 ml portions of diethyl ether were used to extract condensed organics from the impinger catches (wet catch). The extractions were evaporated at room temperature and desiccated to a constant weight. Gravimetric results were then added to dry catch results to calculate particulate concentrations.

APPENDIX E

Quality Assurance Data

SAMPLING TRAIN CALIBRATION DATA

Ulland Brothers, Inc.
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 24, 1993

Air Sampling Department Calibration Report

Sampling Nozzle Calibration Data

Nozzle Number : 1-2

Date of Calibration : 9/3/93

Calibration Technician: M. Wilson

Measurement Position	Diameter Inches
1	0.249
2	0.248
3	0.248
4	0.248
5	0.247
Average	0.248

The sampling nozzle is rotated and measured at 36 degree increments. Diameters are measured to the nearest 0.001". All measurements must be within a range of 0.004".

Ulland Brothers, Inc.
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 24, 1993

Air Sampling Department Calibration Report

Pitot Tube Calibration Data

Pitot Tube Number : 4

Date of Calibration : 6/7/93

Calibration Technician: K. Lattery

A Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.510	0.710	0.839
2	0.805	1.115	0.841
3	1.110	1.550	0.838
4	1.310	1.810	0.842
		A Side Average	0.840

B Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.505	0.695	0.844
2	0.810	1.115	0.844
3	1.100	1.530	0.839
4	1.290	1.775	0.844
		B Side Average	0.843
		Pitot Tube Coefficient	**0.841**

Ulland Brothers, Inc.
Shellrock Township, Minnesota
PACE Project No. 930721.401

PACE Incorporated
September 24, 1993

Air Sampling Section Calibration Report

Dry Test Meter and Orifice Calibration Data

Control Module Number : C-8

Calibration Technician: M. Wilson

Date of Calibration : 8/31/93

Barometric Pressure : 29.14

Orifice Diff. Press., ΔH Inches WC	Dry Test Meter Vol. Cubic Ft.	Wet Test Meter Vol. Cubic Ft.	Dry Test Meter Temperatures, °F Inlet	Dry Test Meter Temperatures, °F Outlet	Wet Test Meter Temp., °F	Elapsed Time Minutes	Gas Meter Coefficient ∂	Orifice Coefficient ΔH@
0.50	5.180	5.000	94.0	79.0	72.0	13.423	0.9903	2.030
1.00	5.000	5.000	81.0	69.0	72.5	9.351	1.0022	2.017
1.75	4.925	5.000	74.0	66.5	72.5	6.979	1.0065	1.983
2.50	10.180	10.000	89.5	72.0	72.5	12.020	0.9913	2.060
3.50	10.280	10.000	99.5	75.5	72.5	10.333	0.9914	2.105

Average Meter Coefficient 0.9963

Average Orifice Coefficient 2.039

APPENDIX F

Process/Source Information

REQUIRED DATA
for
COMBUSTION SOURCES

Company Name Ulland Brothers, Inc.

C. Fuel Input

1. Itemize all fuels and materials that are added to the combustion process during the test period. Attach ultimate analysis of the fuel.

FUEL DESCRIPTION Coal:State, City, Mine Oil: Specify Grade	INPUT (LBS/HR) (GAL/HR)	& MOISTURE As Rec'd	As Rec'd (BTU/LB) (BTU/GAL)	HEAT INPUT (BTU/HR)
No. 1 #2 Diesel	492 GPH	>.02 %MAX	148,000	72.82 Million
No. 2				
No. 3				
			TOTAL	72.82 Million

2. Are the above fuels substantially the same as those normally burned? No . If not, explain Normal Fuel is LP .

3. Are the above fuels normally burned in the proportions shown above? yes . If not, explain _____ .

4. Describe any changes anticipated for procurement of fuels within the next twelve (12) months.

_____ .

D. Equipment & Operating Data

1. Furnace No. 1422 .
2. Furnace Mfg. Gencor .
3. Type of Firing LP .
4. Furnace operating under normal operating conditions: No _____ ;

Yes Y .

5. Specify normal soot blowing frequency:

   a) source operating time blowing soot: _____ minutes/shift

   b) number of shifts per day _____

6. Specify soot blowing time during the test: start _____ end _____.
   When was the last time before the test that you blew soot: (date & time)
   _____.

7. Specify normal ash pulling frequency:

   a) source operating time pulling ashes: _____ minutes/shift

   b) number of shifts per day _____

8. Specify ash pulling time during the test: start _____ end _____.
   When was the last time before the test that you pulled ashes: (date & time) _____.

9. Date and procedures of last maintenance/cleaning of the boiler (please attach) _____.

E. Instrument Data

1. Include a copy of chart records during test for the combustion efficiency indices (CO, O_2, CO_2, combustibles, steam flow, air flow, etc.)

F. Air Pollution Control Equipment

1. Type/model control equipment _____.

2. Air pressure drop across the control equipment _____.

3. Air flow through the control equipment _____.

4. Was the control equipment operating normally? _____.

5. Date and procedures of last maintenance/cleaning of control equipment.

   _____

   _____.

Plant Operator's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By _____, Position _____

REQUIRED DATA
for
PROCESS EMISSIONS

Company Name Ulland Brothers, Inc.

C. Equipment & Operating Data

1. Process Equipment No./Ident. 1424

2. Process Equipment Description Gencor 55000 Baghouse

3. Process equipment operating under normal operating conditions?

No _____. Yes X. Process rate during the test 300 TPH.
(raw materials or finished product)

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model of control equipment Gencor 55000 Baghouse.

2. Air pressure drop across the control equipment 4" Water Coulum.

3. Air flow through the control equipment 55000 acfm.

4. Was the control equipment operating normally? yes.

5. Data of last major maintenance/cleaning of control equipment 9-8-93

visual inspection / clean out air lines to monitoring instrume

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By Ford (Joan Ford), Position Asphalt Plant Supervisor

lmb1770

Asphalt Plant Operating Conditions During Stack Testing

Rev/YH/93

Test Date(s) 9-9-93

Plant Mfr. & Model Gencor 300

Type (circle one): (Drum Mix) Conventional

Other (list): _____

Pollution Control Equipment: (Baghouse) Venturi Scrubber wet scrubber cyclone multiclone
(circle one)

If wet scrubbing: ____ % scrubber water recycled

List model: Gencor 55000

Normal pressure drop across control equipment: 4 inches water

Air flow through control equipment: _____ acfm at ____ F

Was control equipment operating normally during testing? YES

Date & procedures of last maintenance/cleaning of control equipment _____

Fuel:

Itemize all fuels and materials added to the combustion process during the test period. List fuel type used during testing (if oil, specify grade) _____. If other units of measure are used, specify and calculate appropriate heat input.

Test No.___	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture (as received in aggregate) Virgin	recycle	combined
Run 1	551	140 778	[illegible]	6%	4%	5.2%
Run 2	540	140 778	[illegible]	6%	4%	5.2%
Run 3	526	140 778	74m	6%	4%	5.2%

Is the above fuel substantially the highest sulfur containing fuel normally burned? yes

Production specific fuel usage: (circle one) measured or calculated: _____ cubic foot/ ton hot mix

_____ gal/ton hot mix

No. of Burners: 1 Burner(s) rating: ____ MMBTU/HR = 100% setting

Operation:

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
8:05	75	177	132	9.5	268	4"		
8:20	75	180	131	9.6	260	4"		
8:35	75	181	131	9.6	268	4"		
8:50	80	180	133	9.6	265	4"		
9:05	80	180	134	9.5	260	4"		

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By: Mike Kellar, Phone: (507) 448-3372

Position: Operator

Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.

Company: Ulland Bro Inc.

Operation:

Test Date(s): 9-9-93

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
9:35	75%	178	129	9.2	270	4"		
9:50	75%	176	131	9.4	260	4"		
10:05	70%	173	131	9.1	262	4"		
10:20	75%	178	131	9.3	260	4"		
10:35	75%	178	129	9.4	260	4"		
11:05	70%	176	127	8.4	265	4"		
11:20	75%	177	128	8.9	260	4"		
11:35	75%	176	126	8.8	260	4"		
11:50	75%	178	125	8.8	265	4"		
12:05	75%	174	126	8.6	260	4"		

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By: Mike Kellar, Phone: (501) 448-3372

Position: Operator

Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.