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:	9.10.1.2
Background Chapter	4
Reference:	10
Title:	EPA Method 5 Particulate Emissions Tests Conducted on Western Sugar's Boiler and Pulp Dryer Stacks Located in Billings, Montana, American Environmental Testing Company, Inc., January 1990.

APPENDIX J

REPORT EXCERPTS FROM REFERENCE 10

(Western Sugar Company, January 1990)

1989-90

"EPA METHOD 5 PARTICULATE EMISSIONS TESTS CONDUCTED ON WESTERN SUGAR'S BOILER AND PULP DRYER STACKS LOCATED IN BILLINGS, MONTANA"

American Environmental Testing Company Inc.

801-266-7111

"EPA METHOD 5 PARTICULATE EMISSIONS TESTS CONDUCTED ON WESTERN SUGARS BOILER AND PULP DRYER STACKS LOCATED IN BILLINGS MONTANA"

Principal Chemist

V.Brent Benson
Technical Director

Technicians:

J. Paul Benson
Les D. Schwab

Test Dates:

Pulp Dryer
1/23-24/90
Boiler
1/25/90

Prepared for: Mr. Randy A. Mielke, Regional Engineer

Westen Sugar Company
P. O. Box 30878
Billings, Montana 59107

Prepared by: V. Brent Benson, Technical Director

American Enivironmental Testing, Inc.
565 South Birch Drive
Spanish Fork, Utah 84660

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

FIELD AND LABORATORY DATA
TABLE IVa

Plant or Job Description : Western Sugar Company - Located In Billings, Montana
Wet Scrubber On Pulp Dryer
Type : Compliance EPA #5
Date : 1/23-24/90

Symbol	Description	Units	1 South	2 North	3 South
Vm	Volume dry gas sampled @ meter conditions	Ft3	66.554	64.264	65.52
Pb	Barometric Pres	"Hg abs	26.38	26.42	26.79
ΔH	Average Pres drop across the orifice meter	"H2O	3.8189	3.57	3.7701
Tm	Average gas meter temp	°R	536.71	535.38	531.58
		°F	76.71	75.38	71.58
Yi	Meter Coefficient		1.07	1.07	1.07
Vw	Total H2O collected, impingers & silica gel	ml	268	249	229.1
CO2		%	2.6	2.4	2.73
O2		%	10.8	10.93	11.2
N2 + CO		%	86.6	86.67	86.07
Rn	Nozzle Dia.	in.	0.5037	0.5037	0.503
Ts	Stack Temp	°R	582.58	584.54	589.42
		°F	122.58	124.54	129.42
Sqr rt ΔP	Velocity head of stack gas	"H2O	0.242	0.2413	0.2509
Cp	Pitot Tube Coefficient		0.8484	0.8484	0.8484
Ps	Static Pres	"H2O	0.03	0.03	0.03
Pabs	Absolute Pres	"Hg	26.38	26.42	26.79
As	Area stack	Ft2	33.183	33.183	33.183
Tt	Net time of test	min.	72	72	72
Mgp	Total Particulate	mg	33.7	49.2	50.2

1. Calibration :

Calibration data are included in Appendix "A".

2. Traverse Points :

a) Pulp Dryer & Boiler :

The location of each of the points for the Pulp Dryer are given in Table II, the Boiler points in Table III.

IV. RESULTS AND CONCLUSIONS :

A. Method 5 Particulate Tests :

1. Pulp Dryer & Boiler

Tables IV,VI, summarizes the data that was collected on the field and laboratory data forms during compliance testing on the Boiler & Pulp Dryer Stacks. Compliance data calculated from this raw data is given in Tables V,VII.

B. Visible Opacity Determination :

As per requirements, 6.0 minutes of opacity readings were taken during each of the EPA Method 5 Particulate Compliance tests. VEO Field Sheets and the observer's current certification card are included in Appendix "C".

C. Cyclonic Flow Determination :

Prior to the EPA Method 5 Particulate Compliance Tests, a cyclonic flow determination was made on the CMI Baghouse stack. The average angle has to be ≤ 20° degrees, as per 40 CFR Part 60 - Method 2 criteria. The data forms for each of the tests are included in Appendix "D".

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

FIELD AND LABORATORY DATA
TABLE IVb

Plant or Job Description : Western Sugar Company - Located In Billings, Montana
Wet Scrubber On Pulp Dryer
Type : Compliance EPA #5
Date : 1/23-24/90

Symbol	Description	Units	4 North	5 South	6 North
Vm	Volume dry gas sampled @ meter conditions	Ft3	67.27	62.806	61.523
Pb	Barometric Pres	"Hg abs	26.79	26.79	26.78
ΔH	Average Pres drop across the orifice meter	"H20	3.9678	3.4535	3.3218
Tm	Average gas meter temp	°R	534.42	536.9	533.33
		°F	74.42	76.9	73.33
Yi	Meter Coefficient		1.07	1.07	1.07
Vw	Total H20 collected, impingers & silica gel	ml	271.2	302.2	295.1
CO2		%	1.96	2.2	2.37
O2		%	12.13	12.1	11.87
N2 + CO		%	85.91	85.7	85.76
Rn	Nozzle Dia.	in.	0.503	0.503	0.503
Ts	Stack Temp	°R	597.29	595.5	605.71
		°F	137.29	135.5	145.71
Sqr rt ΔP	Velocity head of stack gas	"H20	0.2531	0.2354	0.2335
Cp	Pitot Tube Coefficient		0.8484	0.8484	0.8484
Ps	Static Pres	"H20	0.03	0.03	0.03
Pabs	Absolute Pres	"Hg	26.79	26.79	26.78
As	Area stack	Ft2	33.183	33.183	33.183
Tt	Net time of test	min.	72	72	72
Mgp	Total Particulate	mg	53.9	85.2	63.6

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

DATA SUMMARY
TABLE Va

Plant : Western Sugar Company - Located In Billings, Montana
Wet Scrubber On Plup Dryer
Type : Compliance EPA #5
Date : 1/23-24/90

SYMBOL	DESCRIPTION	UNITS	1 South	2 North	3 South
Vm std	Volume dry gas	dscfm	0.8747	0.8453	0.8742
	sampled @ standard	dscf	62.9784	60.861	62.9451
	Conditions				
Vw gas	Volume water	scf	12.6148	11.7204	10.7837
	vapor collected @				
	standard conditions				
Bws	Proportion by		0.1669	0.1615	0.1463
	volume of water				
	vapor in gas stream				
	ddimensionless				
Md	Dry molecular	lb/lb mole	28.848	28.8212	28.8848
	weight				
Ms	Wet molecular	lb/lb mole	27.0377	27.0738	27.2928
	weight				
Vs	Stack gas	ft/sec	15.8635	15.818	16.3412
	velocity				
Qs	Volumetric flow	ft3/hr	1.2617	1.2639	1.3369
	rate dry basis		X 10 6	X 10 6	X 10 6
	standard conditions				
Iso	Isokinetic	%	99.3405	95.7276	94.4232
	variation				
Cs	Conc. particulat	lb/scf	5.351	8.084	7.9752
	matter in stack		X 10 -4	X 10 -4	X 10 -4
	gas, dry basis				
Emr	Emission rate	lbs/dscf	1.1797	1.7822	1.7582
			X 10 -6	X 10 -6	X 10 -6
		gr/dscf	0.0083	0.0125	0.0123
		lbs/hr	1.4884	2.2525	2.3505

AMERICAN ENVIRONMENTAL TESTING, INCORPORATED
565 So. Birch Drive 801-266-7111
Spanish Fork, Utah 84660

DATA SUMMARY
TABLE Vb

Plant : Western Sugar Company - Located in Billings, Montana
Wet Scrubber On Plup Dryer
Type : Compliance EPA #5
Date : 1/23-24/90

SYMBOL	DESCRIPTION	UNITS	4 North	5 South	6 North
Vm std	Volume dry gas	dscfm	0.8981	0.8373	0.8196
	sampled @ standard	dscf	64.661	60.2859	59.0114
	Conditions				
Vw gas	Volume water	scf	12.7654	14.2246	13.8904
	vapor collected @				
	standard conditions				
Bws	Proportion by		0.1649	0.1909	0.1905
	volume of water				
	vapor in gas stream				
	ddimensionless				
Md	Dry molecular	lb/lb mole	28.7988	28.836	28.854
	weight				
Ms	Wet molecular	lb/lb mole	27.0184	26.7673	26.7859
	weight				
Vs	Stack gas	ft/sec	16.6776	15.5576	15.5646
	velocity				
Qs	Volumetric flow	ft3/hr	1.317	1.1939	1.1744
	rate dry basis		X 10 6	X 10 6	X 10 6
	standard conditions				
Iso	Isokinetic	%	98.0207	100.4534	100.5011
	variation				
Cs	Conc. particulat	lb/scf	8.3358	1.4133	1.0778
	matter in stack		X 10 -4	X 10 -3	X 10 -3
	gas, dry basis				
Emr	Emission rate	lbs/dscf	1.8377	3.1157	2.376
			X 10 -6	X 10 -6	X 10 -6
		gr/dscf	0.0129	0.0218	0.0166
		lbs/hr	2.4203	3.7197	2.7903

DRYER STACK TESTS 1-23-90 (TEST #1)

PROCESS FEED RATE TO DRYER DURING TEST

= 42 TONS/HR.

PROCESS FEED RATE TO WEST DRUM DURING TEST

= 21 TONS/HR

DRYER STACK TESTS 1-24-90

TEST #2

PROCESS FEED RATE TO DRYER DURING TEST
= 32.2 TONS/HR
PROCESS FEED RATE TO WEST DRUM DURING TEST
= 16.1 TONS/HR

TEST # 3

PROCESS FEED RATE TO DRYER DURING TEST
= 37.6 TONS/HR
PROCESS FEED RATE TO WEST DRUM DURING TEST
= 18.8 TONS/HR

Filename: BEET10.WQ1
Date: 02-Feb-95
Facility: Western Sugar Company
Location: Billings, Montana
Source: West Pulp Dryer
Natural gas-fired rotary drum beet pulp dryer controlled with a wet scrubber
Test date: Jan. 23-25, 1990

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
1	Stack temperature	Deg F	124.54	137.29	145.71	
NORTH	Pressure	in. HG	26.42	26.79	26.78	
STACK	Moisture	%	16.15	16.49	19.05	
	Oxygen	%	10.93	12.13	11.87	
	Volumetric flow, actual	acfm	ND	ND	ND	
	Volumetric flow, standard*	dscfm	21065	21950	19573	
	Isokinetic variation	%	95.7	98.02	100.5	
Circle: Production or feed rate		TPH	42.00	32.20	37.60	
Feed to dryer						
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.0117	0.00972	0.0134	
	Condensible inorganic PM	G/dscf	0.000838	0.00318	0.00321	
	CO2	% vol	2.4	1.96	2.37	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	2.11	1.83	2.25	
	Condensible inorganic PM	lb/hr	0.151	0.599	0.539	
	CO2	lb/hr	3464	2948	3178	
	Emission factors (ENGLISH UNITS):					AVERAGE
	Filterable PM	lb/ton	0.050	0.057	0.060	0.056
	Condensible inorganic PM	lb/ton	0.0036	0.019	0.014	0.012
	CO2	lb/ton	55	61	56	57
	Emission factors (METRIC UNITS):					AVERAGE
	Filterable PM	kg/Mg	0.025	0.028	0.030	0.028
	Condensible inorganic PM	kg/Mg	0.0018	0.0093	0.0072	0.0061
	CO2	kg/Mg	28	31	28	29

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
2	Stack temperature	Deg F	122.58	129.42	135.5	
SOUTH	Pressure	in. HG	26.38	26.79	26.79	
STACK	Moisture	%	16.69	14.63	19.09	
	Oxygen	%	10.8	11.2	12.1	
	Volumetric flow, actual	acfm	ND	ND	ND	
	Volumetric flow, standard*	dscfm	21028	22282	19898	
	Isokinetic variation	%	99.34	94.42	100.45	
Circle: Production or feed rate		TPH	42.00	32.20	37.60	
Feed to dryer						
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.00660	0.00985	0.0166	
	Condensible inorganic PM	G/dscf	0.00170	0.00245	0.00522	
	CO2	% vol	2.6	2.73	2.2	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	1.19	1.88	2.83	
	Condensible inorganic PM	lb/hr	0.306	0.468	0.890	
	CO2	lb/hr	3746	4168	2999	
	Emission factors (ENGLISH UNITS):					AVERAGE
	Filterable PM	lb/ton	0.028	0.058	0.075	0.054
	Condensible inorganic PM	lb/ton	0.0073	0.015	0.024	0.015
	CO2	lb/ton	89	129	80	99
	Emission factors (METRIC UNITS):					AVERAGE
	Filterable PM	kg/Mg	0.014	0.029	0.038	0.027
	Condensible inorganic PM	kg/Mg	0.0036	0.0073	0.012	0.0076
	CO2	kg/Mg	45	65	40	50

TOTAL	Emission factors (ENGLISH UNITS):					AVERAGE
EMISSION	Filterable PM	lb/ton	0.078	0.12	0.13	0.11
FACTORS	Condensible inorganic PM	lb/ton	0.011	0.033	0.038	0.027
FOR BOTH	CO2	lb/ton	144	190	136	157
STACKS	Emission factors (METRIC UNITS):					AVERAGE
	Filterable PM	kg/Mg	0.039	0.058	0.067	0.055
	Condensible inorganic PM	kg/Mg	0.0054	0.017	0.019	0.014
	CO2	kg/Mg	72	95	68	78

"EPA METHOD 5 PARTICULATE EMISSIONS TESTS CONDUCTED ON WESTERN SUGARS BOILER AND PULP DRYER STACKS LOCATED IN BILLINGS MONTANA"

I. INTRODUCTION:

At the request of Western Sugar Company's Randy Mielke, American Environmental Testing, Inc., (AET) conducted EPA Method 5 Particulate Emissions Tests on the Boiler and Pulp Dryer Stacks. The testing was accomplished at their plant site, located in Billings, Montana. The tests were conducted on January 23,24 & 25 1990.

II. SUMMARY:

The results of the particulate emissions compliance tests for the Boiler and Pulp Dryer Stacks are summarized in Table I.

III. PROCEDURES AND METHODS:

A. General Plant Operations:

Figure I depicts the Pulp Dryer Stacks, Figure II depicts the Boiler Stack. Production data is included in Appendix "D" for the days when emissions compliance tests were conducted on the sources.

B. Emissions Testing:

All of the tests procedures employed were as specified in 40 CFR 60.424 (7-1-85 and as amended) and in the EPA's "Quality Assurance Handbook for Air Pollution Measurement Systems".

Table I
Particulate Summary

Pulp Dryer

Test No.	Particulate Collected (mg)	Volume DSCF	Emissions lbs/hr.	Rate grains/DSCF
1. South	33.7	62.98	1.4884	0.0083
2. North	49.2	60.86	2.2525	0.0125
3. South	50.2	62.95	2.3505	0.0123
4. North	53.9	64.66	2.4203	0.0129
5. South	85.2	60.29	3.7197	0.0218
6. North	63.6	59.01	2.7903	0.0166
Average =	**67.57**	**61.32**	**2.9768**	**0.0171**

Boiler

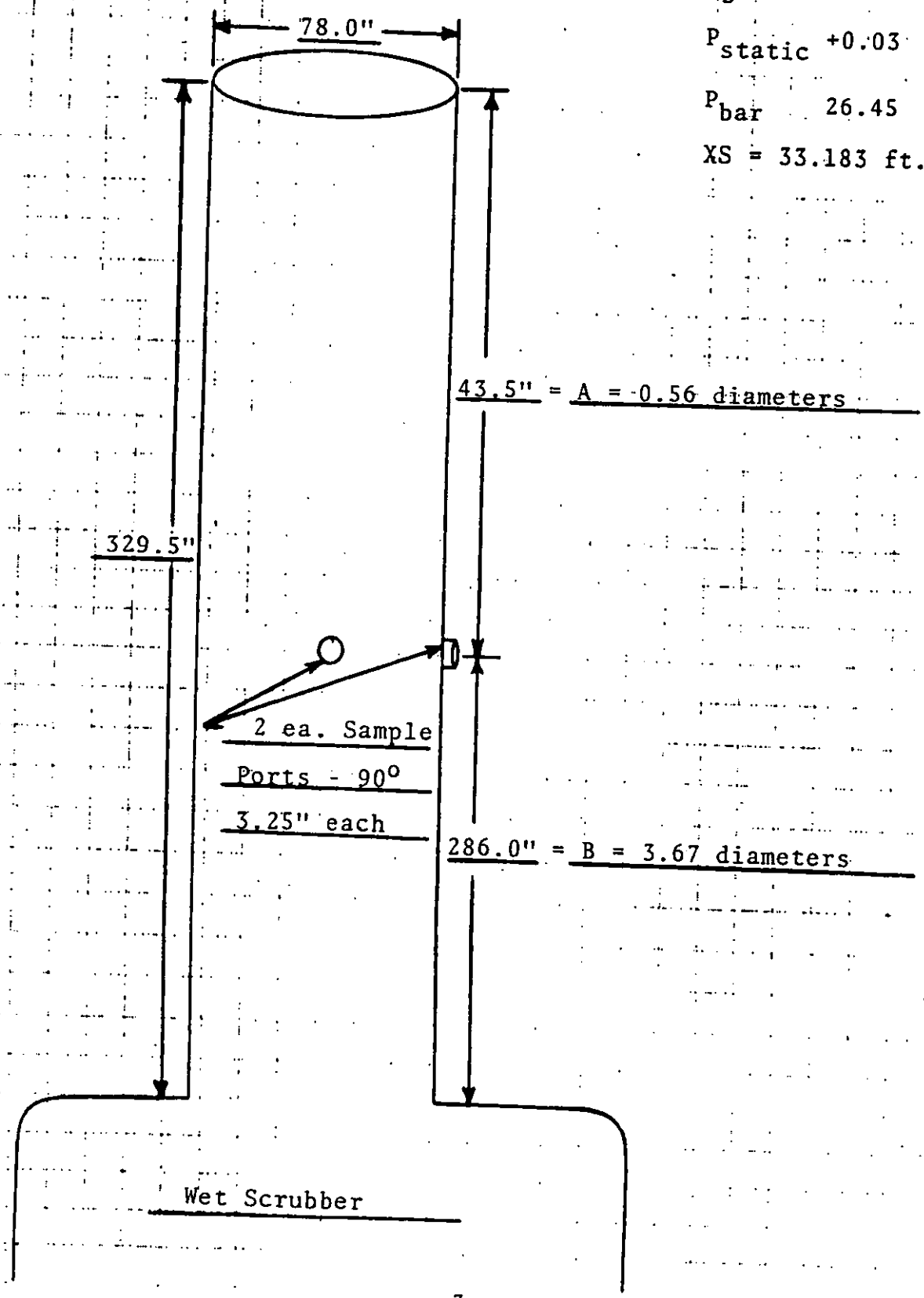
Test No.	Particulate Collected (mg)	Volume DSCF	Emissions lbs/hr.	Rate grains/DSCF
1. " " "	270.5	53.42	66.5697	0.0781
2. " " "	265.5	51.18	66.1117	0.0801
3. " " "	276.8	52.05	68.8066	0.0821
Average =	**270.93**	**52.22**	**67.1627**	**0.0801**

American Environmental Testing Co
565 South Birch Drive
Spanish Fork, Utah 84660
(801) 266-7111

JOB Western Sugar - Billings, Montana
SHEET NO. 1 OF 1
CALCULATED BY VB Benson DATE 1-22-90
CHECKED BY DATE
SCALE West bank of Dryers - Identical

Figure I

T_s 121 °F
P_{static} +0.03
P_{bar} 26.45
XS = 33.183 ft.^{2}



Montana Department of Health and Environmental Sciences
Air Quality Bureau

Visible Emission Field Documentation

RUN #2N - WEST
15:26 MST

SOURCE NAME: WESTERN SUGAR CO - WEST PULP DRYER STACKS (2) NORTH & SOUTH		
LOCATION: BILLINGS MT		
MAILING ADDRESS: PO BOX 30878	CITY: BILLINGS	STATE & ZIP: MT 59107
PHONE #: 406 245-3115	SOURCE CONTACT: N. SHYNE / R. MIELKE	
OBSERVATION DATE: 1/23/90	START TIME: 15 26	STOP TIME: 15:32
PROCESS EQUIPMENT: PULP DRYER	FUEL TYPE: NAT. GAS	OPERATING MODE: 21 T/HR
CONTROL EQUIPMENT: WET SCRUBBER - DEMISTER		OPERATING MODE: ✓
DESCRIBE EMISSION POINT: WEST DRYER PULP STACK		
HEIGHT ABOVE GROUND LEVEL: 75'	HEIGHT RELATIVE TO OBSERVER: 75-80'	
DISTANCE FROM OBSERVER: 250	DIRECTION FROM OBSERVER: NE	
DESCRIBE EMISSIONS: LACY		
EMISSION COLOR: WHITE	PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☐ YES ☒	IF WATER DROPLET PLUME: ATTACHED ☒ DETACHED ☐	
Point in the Plume at Which Opacity was Determined: WHERE STEAM DISSIPATES		
DESCRIBE BACKGROUND (Color, etc.): NEAR BLUE SKY		
SKY CONDITIONS AND COLOR: CLEAR -	WIND DIRECTION: NW	WIND SPEED: 15-20 MPH
AMBIENT TEMPERATURE: 43°F	WET BULB TEMP.: —	RH. percent: ≈ 65%

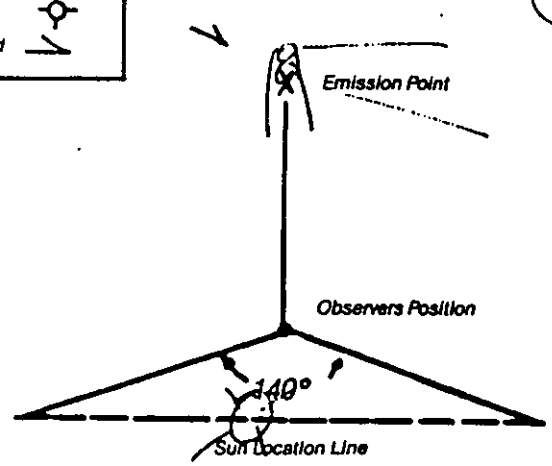
SEC / MIN	0	15	30	45
1	5	5	5	5
2	5	5	10	5
3	5	10	5	5
4	5	5	5	5
5	5	5	5	5
6	5	5	10	5
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

21.0 T/HR IN PRESSED PULP @ 74% H2O EACH DRYER
195 TON/HR BEET SLICED

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH

Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD: 5.4%

COMMENTS (Describe Observation Point)

CLOCK TIME 6 MINUTES FAST FROM ACTUAL TIME

V.B. BENSON - AET CO-VEO

OBSERVER'S NAME (Print): JIM HUGHES	
OBSERVER'S SIGNATURE: J. Hughes	DATE: 1/23/90
ORGANIZATION: MT DEPT. HLTH & ENV SCI - AQB	CERTIFIED BY: MAQB
	DATE: OCT-89

Montana Department of Health and Environmental Sciences
Air Quality Bureau

Visible Emission Field Documentation

SOURCE NAME: WESTERN SUGAR CO / WEST PULP DRYERS		
LOCATION: NORTA - WEST STACK		
MAILING ADDRESS: PO BOX 30878	CITY: BILLINGS	STATE & ZIP: MT.
PHONE #: 406 245-3115	SOURCE CONTACT: R MIELKE / N SHYNE	
OBSERVATION DATE: JAN 24 1990	START TIME: 12 52	STOP TIME: 1258
PROCESS EQUIPMENT: PULP DRYER	FUEL TYPE: NAT. GAS	OPERATING MODE:
CONTROL EQUIPMENT: WET SCRUBBER - DEMISTER		OPERATING MODE:
DESCRIBE EMISSION POINT: WEST PULP DRYER STACK		
HEIGHT ABOVE GROUND LEVEL: 75	HEIGHT RELATIVE TO OBSERVER: 95	
DISTANCE FROM OBSERVER:	DIRECTION FROM OBSERVER: E, NE	
DESCRIBE EMISSIONS: LACY		
EMISSION COLOR: WHITE	PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☐ YES ☒	IF WATER DROPLET PLUME: ATTACHED ☒ DETACHED ☐	
Point in the Plume at Which Opacity was Determined: WHERE STEAM DISSIPATES		
DESCRIBE BACKGROUND (Color, etc.): BLUE		
SKY CONDITIONS AND COLOR: CLEAR	WIND DIRECTION: NW	WIND SPEED: 15-20 MPH
AMBIENT TEMPERATURE: 43°F	WET BULB TEMP.: —	RH. percent: ≈ 45%

SEC / MIN	0	15	30	45
1	5	5	5	5
2	5	5	5	5
3	5	5	5	5
4	5	5	5	5
5	5	5	5	5
6	5	5	5	5
7				
8				
9				
10				
11				
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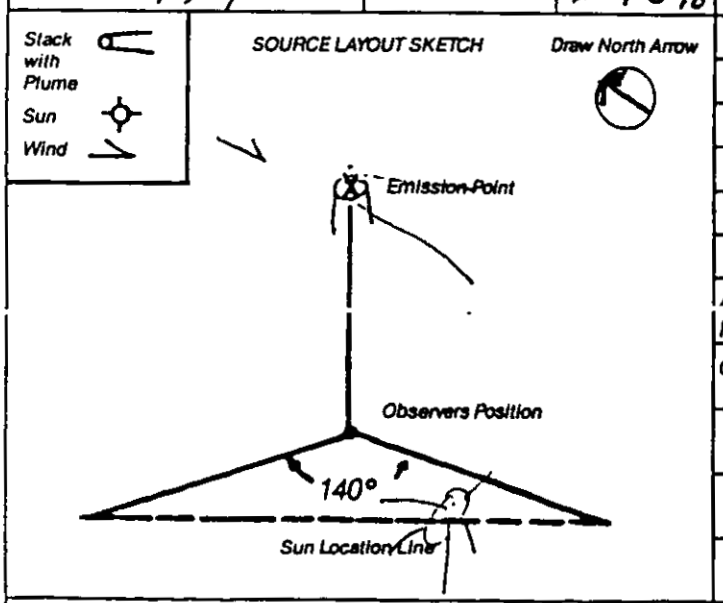
26				
27				
28				
29				
30				

16.1 TON/HR EACH DRUM
PULP TO DRUM
150 TONS/HR SLICERATE

SOURCE LAYOUT SKETCH



AVERAGE OPACITY FOR HIGHEST PERIOD: 5%

COMMENTS (Describe Observation Point)

RUN #4 NORTA ✓

CLOCK TIME 6 MINUTES FAST FROM ACTUAL TIME

V.B. BENSON - A.E.T. CO-VEO

OBSERVER'S NAME (Print): JIM HUGHES	
OBSERVER'S SIGNATURE: Jim Hughes	DATE: 1/24/90
ORGANIZATION: MT. DEPT. HLTH & ENV. CCI · AQB	CERTIFIED BY: MAQB — DATE: OCT. -89

American Environmental
Testing Company, Inc.
505 South Birch Drive
Spanish Fork, Utah 84660
801-266-7111

South #1

LABORATORY DATA
(METHOD 5)

Company Western Sugar Billings Mont. Run No. #1 Compliance

Sampling Location West Dryer - So. Date 1-23-90

MOISTURE COLLECTED

		GM/~~ML~~	Water Weight/~~Volume Gain~~ GM/~~ML~~
IMPINGER 1	Final Weight/Volume	741.4	
	Initial Weight/Vol.		
	Increase	577.4	+164.0
IMPINGER 2	Final Weight/Volume	667.6	
	Initial Weight/Vol.		
	Increase	594.3	+73.3
IMPINGER 3	Final Weight/Volume	464.9	
	Initial Weight/Vol.		
	Increase	455.9	+9.0
IMPINGER 4	Final Weight/Volume	823.4	
	Initial Weight/Vol.		
	Increase	801.7	+21.7

+268.0 g total

PARTICULATE COLLECTED

FRONT-HALF ANALYSIS (Nozzle, Probe, Filter, and Hot Box Glassware)

(1)	Filter & Particulates	0.7138
(2)	Filter Tare Weight	0.6990g WO-1
(3)	Net Dry Particulates (1&2)	0.0148 = 14.8mg.
(4)	Particulates Caught in Nozzle, Probe, Glassware	12.0 mg.
(5)	Total Front Catch (3&4)	26.8mg.

BACK-HALF ANALYSIS (Impingers, and Connecting Glassware)

(1)	Particulate Caught in Impingers Evaporated Down at Less Than 120 F	6.9 mg.

TOTAL PARTICULATE CATCH (Sum of Front and Back-Half Catches

33.7 mg.

MAB 1/23/90

American Environmental
Testing Company, Inc.
505 South Birch Drive
Spanish Fork, Utah 84660
801-266-7111

Run #2

LABORATORY DATA
(METHOD 5)

Company Western Sugar Billings Mont. Run No. #2 Compliance

Sampling Location West Dryer - #6 Date 1-23-90

MOISTURE COLLECTED

		GM/ML	Water Weight/Volume Gain GM/ML
IMPINGER 1	Final Weight/Volume	231.6	
	Initial Weight/Vol.		
	Increase	577.3	+154.3
IMPINGER 2	Final Weight/Volume	670.8	
	Initial Weight/Vol.		
	Increase	597.9	+72.9
IMPINGER 3	Final Weight/Volume	460.4	
	Initial Weight/Vol.		
	Increase	455.7	+4.7
IMPINGER 4	Final Weight/Volume	833.4	
	Initial Weight/Vol.		
	Increase	816.3	+17.1

PARTICULATE COLLECTED 249.0g

FRONT-HALF ANALYSIS (Nozzle, Probe, Filter, and Hot Box Glassware)

(1)	Filter & Particulates	0.6899
(2)	Filter Tare Weight	0.6655 W-0-2
(3)	Net Dry Particulates (1&2)	0.0244 = 24.4mg.
(4)	Particulates Caught in Nozzle, Probe, Glassware	21.5mg.
(5)	Total Front Catch (3&4)	45.9mg.

BACK-HALF ANALYSIS (Impingers, and Connecting Glassware)

(1)	Particulate Caught in Impingers Evaporated Down at Less Than 120 F	3.3mg.

TOTAL PARTICULATE CATCH (Sum of Front and Back-Half Catches

49.2 mg.

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South #3

LABORATORY DATA
(METHOD 5)

Company Western Sugar Billings Mont. Run No. #3 Compliance

Sampling Location #3 South. Date 1-24-90

MOISTURE COLLECTED

		GM/ML	Water Weight/Volume Gain GM/ML
IMPINGER 1	Final Weight/Volume	714.5	
	Initial Weight/Vol.		
	Increase	576.8	132.7
IMPINGER 2	Final Weight/Volume	663.2	
	Initial Weight/Vol.		
	Increase	598.1	65.1
IMPINGER 3	Final Weight/Volume	462.5	
	Initial Weight/Vol.		
	Increase	456.0	6.5
IMPINGER 4	Final Weight/Volume	843.4	
	Initial Weight/Vol.		
	Increase	823.6	19.8
			229.1 Total

PARTICULATE COLLECTED

FRONT-HALF ANALYSIS (Nozzle, Probe, Filter, and Hot Box Glassware)

(1)	Filter & Particulates	0.6857g.
(2)	Filter Tare Weight	0.6608g. WL-D-3
(3)	Net Dry Particulates (1&2)	0.0249 = 24.9mg
(4)	Particulates Caught in Nozzle, Probe, Glassware	15.3mg.
(5)	Total Front Catch (3&4)	40.2

BACK-HALF ANALYSIS (Impingers, and Connecting Glassware)

(1)	Particulate Caught in Impingers Evaporated Down at Less Than 120 F	10.0mg.

TOTAL PARTICULATE CATCH (Sum of Front and Back-Half Catches

50.2mg.

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North 4

LABORATORY DATA
(METHOD 5)

Company Western Sugar Billings Mont Run No. #4 Compliance

Sampling Location #4 North. West Bank of Flyer Date 1-24-90

MOISTURE COLLECTED

		GM/~~ML~~	Water Weight/~~Volume~~ Gain GM/~~ML~~
IMPINGER 1	Final Weight/Volume	694.9	
	Initial Weight/Vol.		
	Increase	577.1	+ 117.8
IMPINGER 2	Final Weight/Volume	708.1	
	Initial Weight/Vol.		
	Increase	597.4	+ 110.7
IMPINGER 3	Final Weight/Volume	479.5	
	Initial Weight/Vol.		
	Increase	456.0	+ 23.5
IMPINGER 4	Final Weight/Volume	813.9	
	Initial Weight/Vol.		
	Increase	794.7	+ 19.2

271.2g total

PARTICULATE COLLECTED

FRONT-HALF ANALYSIS (Nozzle,Probe,Filter,and Hot Box Glassware)

(1) Filter & Particulates	0.6868
(2) Filter Tare Weight	0.6683 W-D-4
(3) Net Dry Particulates (1&2)	0.0185 = 18.5mg.
(4) Particulates Caught in Nozzle,Probe,Glassware	~~21.8 mg.~~ 22.0mg.
(5) Total Front Catch (3&4)	~~40.3~~ 40.6mg.

BACK-HALF ANALYSIS (Impingers,and Connecting Glassware)

(1) Particulate Caught in Impingers Evaporated Down at Less Than 120 F	~~20.4 mg.~~ 13.3mg.

TOTAL PARTICULATE CATCH (Sum of Front and Back-Half Catches

~~60.7 mg.~~ 53.9mg.

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South #5

LABORATORY DATA
(METHOD 5)

Company Western Sugar - Billings Run No. #5 Compliance EPA 5

Sampling Location South Dryer Stack West Bank Date 1/24-90

MOISTURE COLLECTED

		GM/~~ML~~	~~Water Weight/Volume Gain~~ ~~GM/ML~~
IMPINGER 1	Final Weight/Volume	743.0	
	Initial Weight/Vol.		
	Increase	562.0	181.0
IMPINGER 2	Final Weight/Volume	669.4	
	Initial Weight/Vol.		
	Increase	578.5	90.9
IMPINGER 3	Final Weight/Volume	503.8	
	Initial Weight/Vol.		
	Increase	494.8	9.0
IMPINGER 4	Final Weight/Volume	784.9	
	Initial Weight/Vol.		
	Increase	763.6	21.3

302.2 Total

PARTICULATE COLLECTED

FRONT-HALF ANALYSIS (Nozzle, Probe, Filter, and Hot Box Glassware)

(1)	Filter & Particulates	0.7118
(2)	Filter Tare Weight	0.6688 WD-2
(3)	Net Dry Particulates (1&2)	0.0430 = 43.0mg.
(4)	Particulates Caught in Nozzle, Probe, Glassware	21.8mg.
(5)	Total Front Catch (3&4)	64.8mg.

BACK-HALF ANALYSIS (Impingers, and Connecting Glassware)

(1)	Particulate Caught in Impingers Evaporated Down at Less Than 120 F	20.4mg.

TOTAL PARTICULATE CATCH (Sum of Front and Back-Half Catches

85.2 mg.

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North #6

LABORATORY DATA
(METHOD 5)

Company Western Sugar Billings, Mont. Run No. #6 North.

Sampling Location West Dryer - North Stack. Date

MOISTURE COLLECTED

		~~GM/ML~~	Water Weight/~~Volume Gain~~ ~~GM/ML~~
IMPINGER 1	Final Weight/Volume	719.8	
	Initial Weight/Vol.		
	Increase	576.9	142.9
IMPINGER 2	Final Weight/Volume	713.2	
	Initial Weight/Vol.		
	Increase	597.6	115.6
IMPINGER 3	Final Weight/Volume	466.7	
	Initial Weight/Vol.		
	Increase	454.7	12.0
IMPINGER 4	Final Weight/Volume	830.0 805.4	
	Initial Weight/Vol.		
	Increase		24.6

295.1 = Total

PARTICULATE COLLECTED

FRONT-HALF ANALYSIS (Nozzle, Probe, Filter, and Hot Box Glassware)

(1)	Filter & Particulates	0.6894
(2)	Filter Tare Weight	0.6599 WD-6
(3)	Net Dry Particulates (1&2)	0.0295 = 29.5 mg.
(4)	Particulates Caught in Nozzle, Probe, Glassware	20.8 mg.
(5)	Total Front Catch (3&4)	51.3 mg.

BACK-HALF ANALYSIS (Impingers, and Connecting Glassware)

(1)	Particulate Caught in Impingers Evaporated Down at Less Than 120 F	12.3 mg.

TOTAL PARTICULATE CATCH (Sum of Front and Back-Half Catches

63.6 mg.