AP-42 Section	11.26	AP-42 Section	
Reference	12	Reference	
Report Sect.	2	Report Sect.	4
Reference	14	Reference	8

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.

INITIAL COMPLIANCE TEST FOR PARTICULATE EMISSIONS
LUZENAC AMERICA
THREE FORKS MILL
Montana Air Quality Permit #2282-02

JANUARY / FEBRUARY 1995

By

Bison Engineering, Inc.
P.O. Box 1703
30 S. Ewing
Helena, MT 59601
(406) 442-5768

Report Date: April 25, 1995

CERTIFICATION OF REPORT INTEGRITY

Bison Engineering, Inc. certifies this report represents the emissions tested January through February 1995. Every effort was made to obtain accurate and representative data. The test team complied with the procedures specified in Permit 2282-02.

Team Leader: Mitchell W. Anderson

Title: Staff Engineer

Signature: M W Anderson

Date: 4-24-95

Reviewer: David L. Kinghorn

Title: Senior Project Engineer

Signature: David L Kinghorn

Date: 4/18/95

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LIST OF APPENDICES

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1.0 INTRODUCTION

1.1 Purpose

Montana Air Quality Permit 2282-02 regulates the emission of particulates from Luzenac America's Three Forks mill talc processing facility. Section II.A.1 of the final permit dated October 16, 1994 lists the applicable equipment required to meet the emission limits of 0.02 g/dscf and 7% or less opacity. Permit Section I.A lists the existing processing equipment that are regulated under these emission limits.

Bison submitted a pretest protocol on August 10, 1994, followed by additional related correspondence, which summarized the proposed particulate emission testing. This protocol is referenced in Appendix A.

1.2 Emission Source Description

A listing of the dust collectors that were tested for particulate at the Three Forks mill can be found in Table 2 below. Additional information from Table 2 include the equipment manufacturer and corresponding model number.

Table 2: Three Forks Source Test and Manufacturer Listing

Dust Collector	Equipment Manufacturer	Model Number
Silo 4	Mikro Pulsaire	20-S-8-20
Silo 5	Mikro Pulsaire	36-S-8-20
Silo 6	Mikro Pulsaire	20-S-8-20
Silo 7	Mikro Pulsaire	20-S-8-20

1.3 Control Equipment Description

Luzenac America utilizes baghouses as its primary means for the control of particulate emissions from the Three Forks mill.

1.4 Source Test Dates

Bison personnel arrived on site January 31, 1995. The third and final test run of the second of two stationary sources was completed February 7, 1995. Jeff Briggs, Montana Air Quality Division, has verbally granted an extension on the 60-day reporting requirement.

1.5 Pollutants Tested

Bison tested two sources at the Three Forks mill for particulate emissions according to procedures outlined in Method 5 and conducted simultaneous Method 9 visual opacity determinations. Two additional sources were observed for opacity emissions only.

Bison tests conformed to EPA Code of Federal Regulations (40 CFR 60, Appendix A). The following EPA methods were employed in the field:

- Sampling Location and Traverse Points: Method 1, "Sample and Velocity Traverses for Stationary Sources".
- Velocity and Volume: Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube).
- Molecular Weight: Method 3, "Gas Analysis for the Determination of Dry Molecular Weight".
- Particulate: Method 5, "Determination of Particulate Emissions From Stationary Sources".
- Visible Opacity: Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources".

EPA Method 4, "Determination of Moisture Content in Stack Gases", is incorporated within Method 5. Test runs for Method 5 consisted of a minimum sampling time of 1 hour in duration and a minimum volume of 60 dscf. A total of 3 test runs were conducted for each source.

Visual opacity observations were conducted concurrently during each particulate test run and consisted of either a 10-minute continuous monitoring session followed by a 1-minute observation every 10 minutes or a continuous 60-minute session.

1.6 Operating Personnel

1.6.1 Bison Engineering, Inc.

Mitchell W. Anderson (Staff Engineer) was the manager of this project and authored this report. Robert G. Richards (Lead Engineer) assisted in the Method 9 opacity visuals for Silos 6 and 7. Laboratory analysis was accomplished by Jessie Holtman (Data Technician) at the Bison laboratory. Field and laboratory data were reviewed by Mr. Richards. This report was reviewed by David L. Kinghorn (Senior Project Engineer).

1.6.2 Luzenac America

William R. Kraemer (Environmental Coordinator) was the industry representative. An on-going dialogue between Bison test personnel and Luzenac mill personnel concerning process scheduling and coordination was maintained with Phil Hangas (Plant General Supervisor).

1.6.3 Montana Air Quality Division

Jeff Briggs (Environmental Engineer) was informed of the testing schedule for particulate testing of the two sources at the Three Forks mill.

2.0 TEST RESULTS SUMMARY

2.1 Emission Results

Section II.A.1 of Montana Air Quality Permit 2282-02 limit the emissions from the dust collectors at the Three Forks mill to 0.02 g/dscf. The following table summarizes particulate emissions from the Sappington mill for each test run. Method 5 test data are summarized in units of g/dscf and lbs/hr. Method 9 opacity results reflect the highest average for a 6-minute time period.

Table 3: Test Results from the Three Forks Mill

Source Description	Isokinetics (Percent)	Meter Volume (dscf)	Method 5		Method 9 (6 min. avg.)
			(g/dscf)	(lbs/hour)	
Silo 4					
Run 1	100.3	111.38	0.0004	0.01	0.0
Run 2	99.6	76.45	0.0011	0.02	0.0
Run 3	100.0	77.00	0.0006	0.01	0.0
Average	**100.0**	**88.28**	**0.0007**	**0.01**	**0.0**
Silo 5					
Run 2	100.0	73.00	0.0004	0.01	1.3
Run 3	99.6	75.30	0.0005	0.01	1.0
Run 4	100.5	73.83	0.0005	0.01	0.0
Average	**100.0**	**74.04**	**0.0005**	**0.01**	**0.8**
Silo 6					
Run 1	-	-	-	-	0.0
Run 2	-	-	-	-	0.0
Run 3	-	-	-	-	0.0
Average	-	-	-	-	0.0
Silo 7					
Run 1	-	-	-	-	0.0
Run 2	-	-	-	-	0.0
Run 3	-	-	-	-	0.0
Average	-	-	-	-	0.0

Appendix B contains raw field data and computer generated spreadsheets for each source test run, velocity traverse data, and traverse point calculations.

2.2 Production Data

Prior to each test run, communication with processing personnel was established as to whether a particular source was in operation. The plant processed talc under normal operating conditions during all Method 5 and Method 9 test runs. The Source Test Log in Table 4 displays the times and dates for each particulate and visual opacity test run for each of the two sources. The talc processing rates were obtained from the Three Forks mill and are included in Appendix B.

Table 4: Three Forks Source Test Log

Date	Source	Test Run	Start Time
1-31-95	Silo 4	1	1405
2-2-95	Silo 4	2	1115
2-2-95	Silo 4	3	1338
2-7-95	Silo 5	2	1101
2-7-95	Silo 5	3	1318
2-8-95	Silo 5	4	1025
2-23-95	Silo 6	1	1355
2-23-95	Silo 6	2	1456
2-23-95	Silo 6	3	1556
2-23-95	Silo 7	1	1000
2-23-95	Silo 7	2	1100
2-23-95	Silo 7	3	1215

2.3 Discussion of Deviations

During the first Method 5 test run of Silo 5, the round 12-inch portable stack pulled away from its supporting brackets, therefore, voiding the sampling run. Subsequent Runs 2, 3, and 4, however, are valid.

3.0 SAMPLING AND ANALYSIS

3.1 Sampling Location

For the 2 stationary sources at the Three Forks mill, a fabricated portable stack composed of compressed cardboard was constructed and connected to the outlet of the dust collector with flexible rubber hose. The inside diameter of the circular portable duct is 12 inches, and it is 10 feet in length. Eight total traverse points within the duct were accessible through 2 circular ports cut in the duct's sidewall. The two 4-inch ports were positioned at a distance of two feet from the outlet in order to satisfy the "8 and 2" downstream/upstream disturbance requirements specified by EPA methods. A schematic for the round portable stack is located in Appendix D.

3.2 Sampling Procedures

The pre-test protocol in Appendix A contains a schematic of the particulate sampling train. A Method 2 velocity traverse was performed before each particulate test run and on a per day basis. Method 2 data provided dwell time at each traverse point as well as sampling rate, average temperature, pressure differential, and optimum nozzle size.

The filter assembly at the end of the probe of a Method 5 sampling train captures particulate with a diameter greater than 10 microns. Particles smaller than 10 microns pass through the filter and are caught in the condensible impinger water.

Between each test run, an operator disassembled and washed down the probe and filter glassware into a sample bottle. Impinger water was preserved into a second bottle, and silica gel was deposited into a third separate bottle. The quartz fiber filter within the glass filter bell housing was preserved for laboratory analysis.

Stack gas moisture collected from the impingers and silica gel was weighed to within 0.1 grams accuracy in Bison's mobile laboratory. This data, in combination with temperature flow and gas composition measurements taken during the run, allowed instantaneous isokinetic calculations for each test run.

All samples were subsequently returned to the Bison laboratory in Helena for desiccation and mass analyses.

5.0 QUALITY ASSURANCE

Appendix F contains calibration sheets for the field equipment used during the Three Forks mill test. All field data was returned to Bison's office and lab in Helena for review and analysis.

Bison Engineering's practices conform to the requirements specified in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, published by the U.S. Environmental Protection Agency in August, 1977 as revised and amended (cat. #EPA-600/4-77-027b).

In reviewing the laboratory analysis data sheet for Runs 1, 2, and 3 for Silo 5, it can be observed the net particulate gain exhibits a negative value (See Appendix C). This negative particulate gain was assumed to be zero in the calculation of total front-half particulate loading.

APPENDIX A: PRE-TEST PROTOCOL

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
AIR QUALITY DIVISION

836 FRONT STREET

STATE OF MONTANA

(406) 444-3454
(406) 444-3671
FAX (406) 444-5275

PO BOX 200901
HELENA, MONTANA 59620-0901

November 9, 1994

RECEIVED
NOV 14 1994
BISON

Mitchell Anderson
Bison Engineering, Inc.
P. O. Box 1703
Helena, Montana 59624

Dear Mitch:

The Air Quality Division (AQD) has reviewed your request to include upcoming testing at Luzenac's Three Forks and Sappington mills under the protocol for the vacuum system at the Sappington mill submitted in August 1994. This inclusion is acceptable, with the following stipulations:

1. Ensure that the source test documents include complete process descriptions and flow diagrams, as well as sketches of sample port locations.

2. Compliance testing for opacity shall include three one-hour runs.

3. Systems must be operated at greater than 90% of their normal operating capacity during compliance testing.

As for reducing the NSPS testing requirements, the position of EPA Region VIII is that this will be done on a case-by-case basis after reviewing the completed source tests on similar equipment. Opacity testing, however, must be performed on all sources. A copy of Region VIII's response to the petitions is enclosed.

Please keep the AQD informed as to the testing dates so we may have a representative present. If you have any questions, please give me a call.

Sincerely,

Jeff Briggs
Environmental Engineer

JB:bjd

Enclosure

cc: William Kraemer

30 SOUTH EWING

P.O. BOX 1703

HELENA, MT 59624

BISON
ENGINEERING, INC.

PHONE: 406·442·5768

FAX: 406·449·6653

October 31, 1994

Mr. Jeff Briggs
MDHES Air Quality Division
P.O. Box 200901
Helena, MT 59620

Dear Jeff:

This letter summarizes our brief telephone conversation regarding Luzenac America's protocol for the Three Forks and Sappington mills. The Three Forks mill is currently in operation under Air Quality Permit #2282-02. Enclosed is a listing of the existing emission control equipment for the Sappington mill (see Attachment 1), and a source testing reduction petition for the testing of 12 dust collectors (see Attachment 2, in bold print).

Bison Engineering is requesting that the testing for particulate and opacity for silos 4 & 5 at the Three Forks mill and the 12 sources at the Sappington mill be included under the current protocol that was submitted to the Air Quality Division in August 1994.

Bison's objectives are to complete the required testing involving particulate emissions (Method 5), and the visual opacity of emissions (Method 9) from stationary sources according to the guidelines specified by The Code of Regulations, Title 40, Subchapter C, Part 60. Successful determinations of opacity emissions are dependant upon weather.

The testing for the Three Forks and Sappington mills is tentatively scheduled to begin as soon as possible and continue through the first week of January 1995, or until completion, whichever occurs first. Notification of the actual test dates for these two facilities will be submitted to the Air Quality Division no later than 7 days prior to each test. Sample port design and orientation of the 12 sources will be submitted with the final report.

The current addresses for the two facilities are listed below.

Three Forks Facility	Sappington Facility
Luzenac America Western Talc Operations 767 Old Yellowstone Trail Three Forks, MT 59752-9313	Luzenac America 28769 Sappington Road Three Forks, MT 59752

Please contact me or Dave Kinghorn if you have any questions or require additional information.

Sincerely,

/s/

Mitchell W. Anderson

cc: William R. Kraemer

Luzenac AMERICA
Western Talc Operations • 767 Old Yellowstone Trail • Three Forks, MT 59752-9313 • (406) 285-3271 • Fax:(406) 285-3323

September 8, 1994

Mr. Jeffrey T. Chaffee, Chief
Air Quality Division
Montana Department of Health
and Environmental Sciences
P.O. Box 200901
Helena, MT 59620-0901

Dear Mr. Chaffee:

Luzenac America Inc. (Luzenac) is preparing to initiate source testing on existing air pollution control equipment which is subject to NSPS at our Three Forks Mill. This equipment consists of low temperature, fabric filter, pulse-jet (Mikro Pulsaire) dust collectors used to control emissions from vents on four silos which were constructed during the 1980's. These silos and their air pollution control equipment were included in a preconstruction permit application submitted to the Air Quality Division on August 2, 1994. Source testing of these dust collectors is necessary to bring the facility into compliance with NSPS regulations.

In the permit application submitted on August 2, 1994, these silos were identified as product silo #4 - V404 (with dust collector DC-424), product silo #5 - V405 (with dust collector DC-425), product silo #6 - V406 (with dust collector DC-426) and product silo #7 - V407 (with dust collector DC-427). The dust collectors on product silos # 4, #6 and #7 are all Mikro Pulsaire, Model 25S-8-20, 25 bag dust collectors. Maximum particulate emissions from each of these identical dust collectors are estimated at 1.02 tons per year. Product silo #5 has a Mikro Pulsaire, Model 36S-8-20, 36 bag dust collector. Maximum particulate emissions from this dust collector are estimated at 1.56 tons per year (see attachments).

Product silo #4 is used for temporary storage of material ground in the roller mills, the air classifying mills, or the fluid energy mills. Product silos #5, #6 and #7 are used for temporary storage of material ground in the roller mills.

Luzenac is requesting that testing of dust collector DC-424 on silo #4 and dust collector DC-425 on silo #5 be deemed sufficient to prove compliance with NSPS for all four silo vent dust collectors. Dust collector DC-425 was chosen because it is a 36 bag model with the maximum potential emissions of the four untested collectors which are subject to

NSPS. DC-424 was chosen to represent the three 25 bag dust collectors because it may at times handle finer material than the other collectors.

Luzenac believes that testing these two silo vent dust collectors should satisfy the requirements of NSPS for all four silo vent dust collectors. Successful results should provide reasonable proof of the efficiency of both the 25 bag model and 36 bag model Mikro Pulsaire dust collectors when they are used in this application.

Luzenac plans to submit testing proposals as soon as we receive your response to this request. If you have any questions or concerns regarding this request, please contact me at (406) 285-3271, or John Close at (406) 285-3201.

Respectfully,

William R. Kraemer
Environmental Coordinator
Western Operations

Attachment

cc: R. J. Buettner
J. P. Close
R. F. Goff

PRODUCT SILOS #4,#6,#7 V-404, V-406, V-407

Vented by Mikro Pulsaire 25S-8-20 Dust Collector

Air Flow: 1600 acfm

Total Particulate:

Total Particulate Matter Grain Load: 0.02 gr/dscf (NSPS)

(1600 acfm)*(26.0" Hg/29.92" Hg)*((460+68°F)/(460+70°F))*
(1-(2% H_2O/100%))*(60 min/hr)*(1 lb/7000 gr/lb)*(0.02 gr)
PT = 0.233 lb/hr

Estimated emissions by operation time of 8640 hrs.

0.233 lb/hr * 8640 hrs / 2000 lbs/ton = 1.007 tons/year

Maximum potential

0.233 lb/hr * 8760 hrs / 2000 lbs/ton = 1.02 tons/year

PM-10:

PM-10 Grain Load: 0.02 gr/dscf

(1600 acfm)*(26.0" Hg/29.92" Hg)*((460+68°F)/(460+70°F))*
(1-(2% H_2O/100%))*(60 min/hr)*(1 lb/7000 gr/lb)*(0.02 gr)
PM-10 = 0.233 lb/hr

Estimated emissions by operation time of 8640 hrs.

0.233 lb/hr * 8640 hrs / 2000 lbs/ton = 1.007 tons/year

Maximum potential

0.233 lb/hr * 8760 hrs / 2000 lbs/ton = 1.02 tons/year

PRODUCT SILO #5 V-405

Vented by Mikro Pulsaire 36S-8-20 Dust Collector

Air Flow: 2500 acfm

Total Particulate:

Total Particulate Matter Grain Load: 0.02 gr/dscf (NSPS)

(2500 acfm)*(26.0" Hg/29.92" Hg)*((460+68°F)/(460+70°F))*
(1-(2% H_2O/100%))*(60 min/hr)*(1 lb/7000 gr/lb)*(0.02 gr)
PT = 0.357 lb/hr

Estimated emissions by operation time of 8640 hrs.

0.357 lb/hr * 8640 hrs / 2000 lbs/ton = 1.542 tons/year

Maximum potential

0.357 lb/hr * 8760 hrs / 2000 lbs/ton = 1.564 tons/year

PM-10:

PM-10 Grain Load: 0.02 gr/dscf

(2500 acfm)*(26.0" Hg/29.92" Hg)*((460+68°F)/(460+70°F))*
(1-(2% H_2O/100%))*(60 min/hr)*(1 lb/7000 gr/lb)*(0.02 gr)
PM-10 = 0.357 lb/hr

Estimated emissions by operation time of 8640 hrs.

0.357 lb/hr * 8640 hrs / 2000 lbs/ton = 1.542 tons/year

Maximum potential

0.357 lb/hr * 8760 hrs / 2000 lbs/ton = 1.564 tons/year

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
AIR QUALITY BUREAU
COGSWELL BUILDING
1400 BROADWAY
STATE OF MONTANA
(406) 444-3454
FAX (406) 444-1374
PO BOX 200901
HELENA, MONTANA 59620-0901

August 12, 1994

David Kinghorn
Senior Project Engineer
Bison Engineering
P.O. Box 1703
Helena, MT 59624

Dear Dave:

I have completed the review of the source test protocol for the compliance test of the vacuum system at Montana Talc - Luzenac.

The protocol is acceptable as written; however, please keep me informed if there is any change in the test date. If you have any questions please call me any time.

Sincerely,

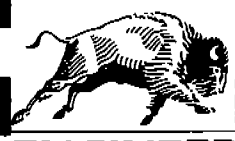
Jeff Briggs
Environmental Engineer

JB:bjd

30 SOUTH EWING

P.O. BOX 1703

HELENA, MT 59624



BISON
ENGINEERING, INC.

PHONE: 406•442•5768

FAX: 406•449•6653

August 10, 1994

Mr. Jeff Briggs
MDHES Air Quality Bureau
836 Front St.
P.O. Box 200901
Helena, MT 59620

Re: Montana Talc - Luzenac Source Test

Dear Mr. Briggs:

Enclosed is the pretest notification regarding the Method 5 and Method 9 compliance tests at the Montana Talc - Luzenac facility at Three Forks. The test will be conducted on September 15, 1994.

Sincerely,

/s/

David L. Kinghorn
Senior Project Engineer

Enc.
cc: Montana Talc - Luzenac

SOURCE TEST PROTOCOL

1.0 INTRODUCTION

Facility Name: Montana Talc - Luzenac

Mailing: 28769 Sappington Road
Three Forks, Montana 59752

Office: Phone (406) 285-3286
Fax (406) 285-3530

Contact: Randy Geiger

Permit Number: 1996-01

Location: The Luzenac facility is located in Section 31, Township 1 North, Range 1 West, Gallatin County, Montana.

Emission Sources and Testing Objectives: Bison Engineering intends to test the vacuum system for Total Suspended Particulate (TSP) and Visible Emissions.

2.0 EMISSION SOURCE INFORMATION

2.1 Facility Description

The Montana Talc-Luzenac is a typical talc plant.

2.2 Process Information

The vacuum system runs gas through a cyclone with screen, then to a Mikro-Pulsaire Vac Rated Receiver. The gas is then released to ambient and the particulate is moved to ACM #3 Feed Bin and to Finished Product. The product is talc.

2.3 Emission Source and Control Description

Vacuum system at Montana Talc-Luzenac. The gas is exhausted through a cyclone, baghouse and out a single vertical stack.

3.0 SOURCE TEST PROGRAM DESCRIPTION

3.1 Testing Contractor

Bison Engineering, Inc.
30 South Ewing, 59601
P.O. Box 1703
Helena, MT 59624
(406) 442-5768 Fax (406) 449-6653
Contact: Dave Kinghorn, Senior Project Engineer

3.2 Test Program Organization

BISON

Project Manager:	Dave Kinghorn, Senior Project Engineer
Testing Assistants:	Kelly Holshue, Senior Technician
	Calvin Loomis, Lead Engineer
Project Control:	Dave Kinghorn, Senior Project Engineer

Montana Talc-Luzenac

Contact:	Randy Geiger

MONTANA AIR QUALITY BUREAU

Contact:	Jeff Briggs

3.3 Test Program Objectives

Permit 1996-01, written and finalized July 13, 1994, stipulates that Luzenac America's talc plant (in Three Forks, Montana) is limited to a total suspended particulate (TSP) emission of 0.02 gr/dscf (grains/dry standard cubic feet) of particulate. The plant's visible emissions are limited to 7%.

Bison's objectives are to complete the required testing in accordance with Permit 1996-01. This involves TSP testing (Method 5) and visible observations (Method 9) on the vacuum system.

TEST DATES:

Bison proposes testing September 15, 1994.

Note: Testing is dependent on weather. If inclement weather postpones testing, it shall be conducted as soon as all parties are available.

REPORT DATE:

Bison anticipates report submittal to the Montana AQB no later than November 13, 1994.

4.0 SOURCE TESTING PROCEDURES

4.1 Instrumentation and Equipment Description

Operators will employ sample trains and instrumentation as specified in EPA testing methods. See attachments for sample train schematics.

Method 5 collects solid particulate larger than 0.3 μg diameter on a heated filter.

The chilled impinger water collects condensible particulate.

A stainless steel-lined heated probe with a suitable nozzle will be used. An integral type K thermocouple and type S pitot tube will be used for stack flow rate monitoring.

4.2 Test Methods

Test personnel will employ the following Title 40 CFR 60, Appendix A (EPA reference) methods:

Sampling Location and Traverse Points: Method 1, "Sample and Velocity Traverses for Stationary sources"

Velocity and Volume: Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)."

Molecular Weight: Method 3, "Gas Analysis for the Determination of Dry Molecular Weight." (Fyrites)

Note: Source moisture determination and calculations, Method 4, is incorporated within Method 5.

Particulate: Method 5, "Determination of Particulate Emissions From Stationary Sources".

Note: Method 5 test runs shall consist of a minimum 1 hour and 60 dscf.

Visible Opacity: Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources".

Note: Method 9 opacity observations shall be conducted concurrently with each Method 5 particulate run. Each Method 9 observation will last 60 minutes.

Plant Capacity:

The facility has a maximum operating capacity of 700 cfm and normally operates at 650 cfm. The facility will run at its maximum operating capacity.

4.3 Analytical Methods

The attachments include sample analytical data forms.

Water. Impinger water weight gain indicates stack moisture content. Moisture will be estimated prior to the first particulate run at each source from wet bulb/dry bulb temperature data or historical records. Immediately following each particulate run, operators will weigh the water collected. This data will provide on-site Method 4 moisture analysis and verification of isokinetic sampling rates.

5.0 QUALITY ASSURANCE PROCEDURES

Bison's mobile laboratory trailer or testing van provides controlled, clean environments for sample handling, pre- and post-test operations and paperwork.

Bison Engineering's test, laboratory, reporting, and quality assurance procedures conform to the requirements specified in the Quality Assurance Handbook for Air Pollution Measurement Systems, Vol. III, Stationary Source Specific Methods published by the U.S. Environmental Protection Agency in August, 1977 as revised and amended (cat. # EPA-600/4-77-027b).

5.1 Sample Handling Protocols

Operators shall complete and initial all field data sheets before leaving the site.

The individual test methods specify handling procedures for physical samples (liquids, traps, etc.).

5.2 Data Validation

Bison employs field lap-top computers for immediate data entry. This allows for checks of validity on each run. The data is then passed through Bison's quality control procedure and is validated by an additional person. Bison's Senior Project Engineer is responsible for all procedures being followed.

5.2 Equipment and Instrument Calibration and Maintenance.

Equipment and instruments are calibrated every 60 days. All equipment calibration documentation will be submitted within the formal report.

6.0 SOURCE TEST REPORT

6.1 Report Format

The Source Test Report will follow the general format outlined in the draft Montana Source Test Protocol and Procedures Manual, dated "July 1993." .

6.2 Data Reduction

Bison utilizes Quattro Pro, similar to Lotus 123, which has ready-made spreadsheets to allow for quick and accurate mathematical calculations.

7.0 SAFETY CONSIDERATIONS

Personal Safety

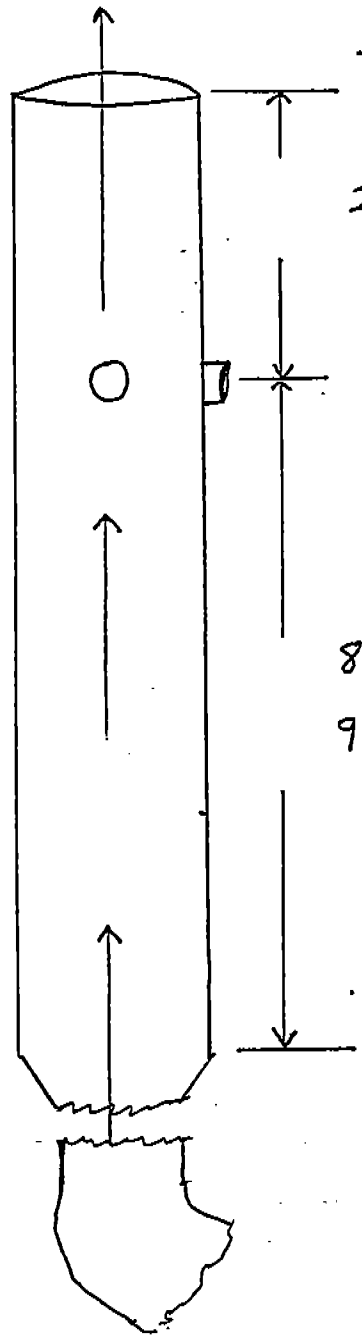
Bison Engineering personnel have available:

A. Hard hat,
B. Long sleeve shirts, coveralls or jacket,
C. Steel-toed boots,
D. Dust masks and goggles as required, and
E. Heat-resistant gloves for handling probe.

Sample Location and Access

The sample ports are located above a 1 to 12 pitch steel roof that is about 14 feet high.

Access will be obtained with a ladder and the equipment will be hoisted with a rope. Yellow caution tape will be placed around access area.



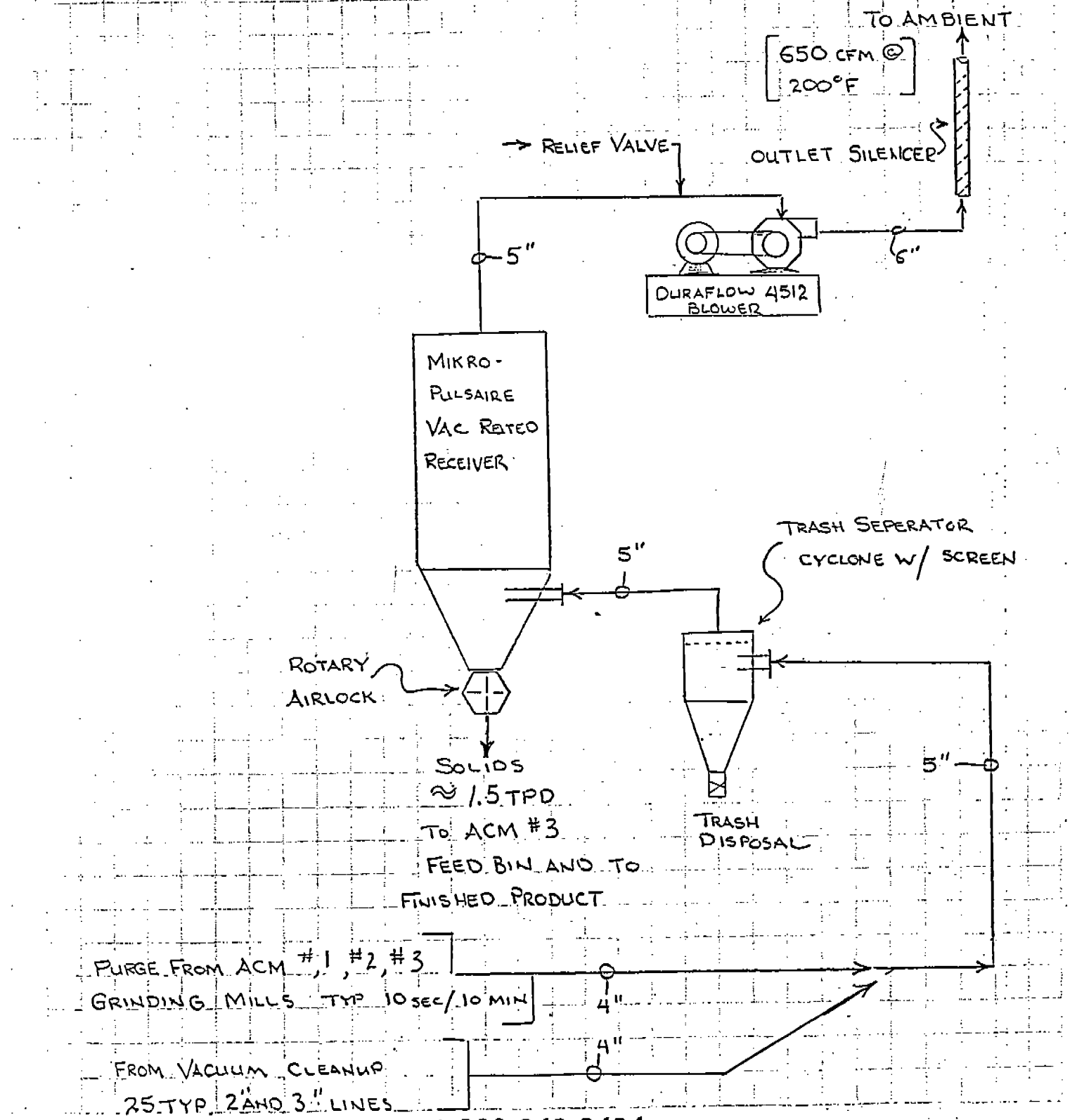
	Optimum	Minimum
	2 Diameters	.5 Diameters
	24 inches	6 inches
	8 Diameters	2 Diameters
	96 inches	24 inches

Figure Sketch of Sample port Location.

The
Montana Talc Company

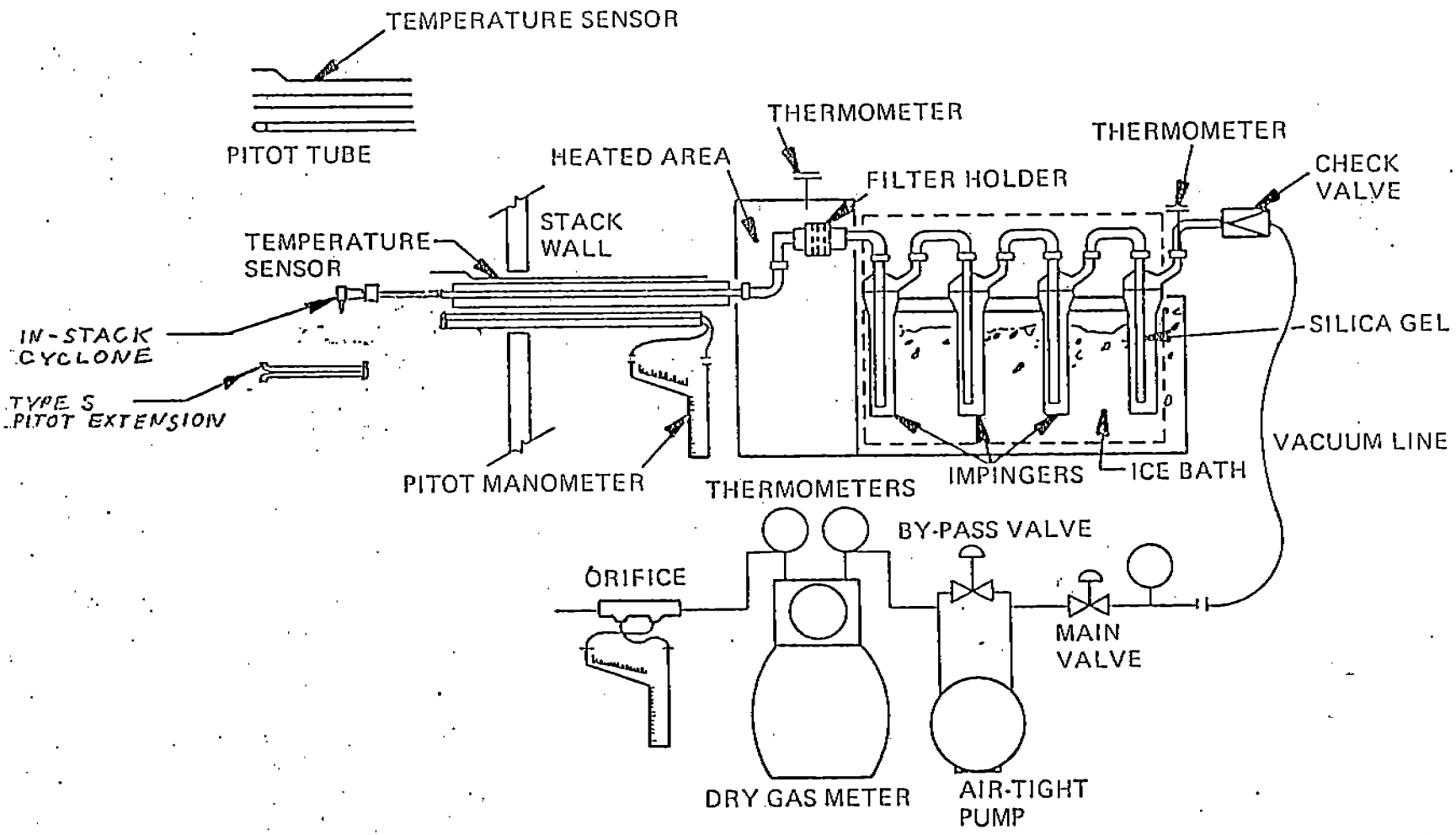
The best ingredients make the best products

Date_____ Project_____



1-800-343-3434

The Montana Talc Company • 28769 Sappington Road • Three Forks, MT 59752 • (406) 285-3286 • FAX: 406-285-3530



PM_{10} PARTICULATE SAMPLE APPARATUS

Form #M5-06

BEAKER/FILTER TARES AND FINAL WEIGHTS

NOTE: Report all weights to 0.0001 g. Record sample volumes in Column 3. "Constant Weight" means ≤ 0.0005 g difference between 2 weighings at least 6 hours apart OR 2 ≤ 1% of average total weight less average tare weight.

Plant	Location
Test Dates	Stack ID

ID NO.	SAMPLE DESCRIPTION (filter, probe/nozzle wash, impinger catch, blank, etc.)	DESCRIPTION (Tare 1, Tare 2, Final 1, etc.)					
		Date	Date	Date	Date	Date	Date
		Time	Time	Time	Time	Time	Time
		Initial	Initial	Initial	Initial	Initial	Initial

Rev. 5/94

Form #M5-07

PARTICULATE DATA WORKSHEET

Plant	Location	
Test Dates	Initials	Stack ID

Sample Description	ID No	Average Tare, G	Average Final, G	Net Particulate Gain, G
Filter				
Probe				
Impinger				
Cyclone				
Filter				
Probe				
Impinger				
Cyclone				
Filter				
Probe				
Impinger				
Cyclone				
Water Blank				
Acetone Blank				
Field Filter Blank				
System Filter Blank				

Form #M5-01

DO NOT WRITE ABOVE THIS LINE

Sheet No. ____ of ____

PARTICULATE FIELD DATA FORM

Plant		Location		Stack ID No.	Stack Dimension
Date	Operator	Run No.	Sample Box No.	Filter No.	Meter Box No.

Altitude _____ Alt. Corr. _____
Barometric Reading _____
Barometric Pres. _____
Stack Static Pres. _____

Assumed Moisture _____
Ambient Temp. _____
Meter ΔH@ _____
Meter Calib (Y) _____

Nozzle ID No. _____ Nozzle Dia. _____
Probe ID No. _____ Probe Length _____
Liner Material _____
Probe Heat Setting _____

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.)	Gas Sample Volume (cf)	Velocity Head (ΔP) (" H_2O)	Pressure Differential across Orifice Meter (ΔH) (" H_2O)	Vacuum, mm (" Hg)	#1	#3	#4	#6	#7
		Start	Start				Stack Temp. (°F)	Filter Temp. (°F)	Temp. of Gas Leaving Condenser or Last Impinger (°F)	Gas Sampler Temp at Dry Gas Meter (°F)	
										Inlet	Outlet

Rev. 12/92

Form #M4-02

IMPINGER CATCH AND SAMPLE TRAIN RINSE FORM
(for Pre-Weighed Sample Bottles)

Plant	Location	Stack ID
Project No.	Tested By	Test Dates

Note: All weights in grams

Run No.	Weight	Date	Impinger Catch Bottle	Silica Gel Bottle	Initials
1	Final				
	Initial				
		Net Gain			
			Total Gain		
2	Final				
	Initial				
		Net Gain			
			Total Gain		
3	Final				
	Initial				
		Net Gain			
			Total Gain		

RINSE VOLUMES, ml

Run No.	Cyclone	Probe/Front Half	Impingers	Other (describe)
1				
2				
3				

Form #M4-01

IMPINGER WATER CAPTURE FORM

Date Out _____ Initials _____

Date In _____ Initials _____

Company _____ Location _____

Stack Name _____

Run No. _____ Box No. _____ Filter No. _____

	Impinger 1 Std.	Impinger 2 Midg.	Impinger 3 Dry	Impinger 4 Silica
Final Weight				
Initial Weight				
Net Gain				
Total Gain (g):				

Units = Grams (milliliters)

COMMENTS: (Note: Weigh impingers without u-tubes, caps, or washers but with orifice tubes in place)

_____

_____

_____

_____

_____

_____

Rev. 6/92

Form #M3-02

GAS ANALYSIS DATA FORM - FYRITE

Plant _____ Sample Location _____

Date _____ By _____ Ambient Temp. _____

Sample Method (Bulb Pump, Integrated Bag, etc.) _____

Run	Clock Time	FYRITE READINGS			
		% CO_2	% O_2	(N_2 + CO) = 100 Minus Σ (CO_2, O_2)	
1 a					
b					
c					
Averages					
		x 44/100	x 32/100	x 28/100	
Dry Molecular Weight (M_d)					Total
2 a					
b					
c					
Averages					
		x 44/100	x 32/100	x 28/100	
Dry Molecular Weight (M_d)					Total
3 a					
b					
c					
Averages					
		x 44/100	x 32/100	x 28/100	
Dry Molecular Weight (M_d)					Total

Rev. 7/92

Form #M2-01

GAS VELOCITY AND VOLUME DATA FORM

Plant			Location	Stack ID No.
Date	Time	Operator	Run No.	Stack Dimension

Altitude	Alt. Corr.	Ambient Temp.
Barometric Reading		Molecular Weight
Local Barometric Pressure		Method
Stack Static Pressure		Pitot C_p

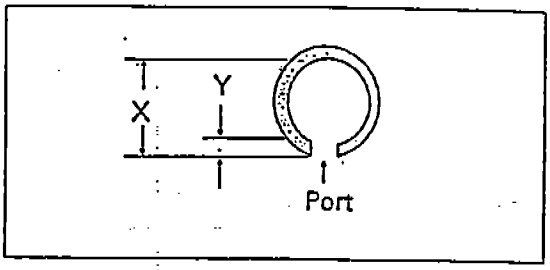
Field Data				
Traverse Point Number	Velocity Head (Δp_s), " H_2O	Stack Temp., °F	Cyclonic Flow Determination	
			Δp_s at 0° Reference	Angle (α) Yielding Null Δp
Average Δp_s			Average Stack Temp.	Average Angle (α)[1]
Mean Sqrt Δp_s				

[1] Average of α must be <10° to be acceptable.

Rev. 11/93

TRAVERSE POINT LOCATIONS, CIRCULAR STACKS

Plant	
Date	By
Sampling Location	
Inside of Far Wall to Outside of Port (distance, X)	
Port Depth (distance, Y)	
Stack I.D. (distance X - distance Y)	
Dist. to upstream disturbance ft/in. Diameters	Dist. to downstream disturbance ft/in. Diameters
No. of Traverse Points Req'd: Total	Per Port



SCHEMATIC OF SAMPLING LOCATION

1	2	3	4	5	6
Traverse Point Number	Percent of Stack I.D.	Stack I.D. Inches	Product of Columns 2 and 3 (to nearest 1/8 in.)	Distance Y	Traverse Point Location from Outside of Port (sum of columns 4 and 5)

Notes: _____

Rev. 5/92

APPENDIX B: FIELD DATA

Form #M2-01

GAS VELOCITY AND VOLUME DATA FORM

Plant	Location	Stack ID No.
LUZENAC AMERICA	3 FORKS	SILO 4
Date 1-31-95	**Operator** MKA/CWL	**Run No.** 1	**Stack Dimension** 12"

Altitude ✓	Alt. Corr. ✓	Ambient Temp. ~40°F	
Barometric Reading ✓		Molecular Weight 28.84	
Local Barometric Pressure 26.17" Hg		Method Fyrite - Estimated Ambient	
Stack Static Pressure -0.39		Pitot C_p 0.84	

Field Data				
Traverse Point Number	Velocity Head (Δp_s), "H_2O	Stack Temp., °F	Cyclonic Flow Determination: Δp_s at 0° Reference	Cyclonic Flow Determination: Angle (α) Yielding Null Δp
A 1	0.46	52		
2	0.55	51		
3	0.55	51		
4	0.54	51		
B 1	0.38	53		
2	0.46	53		
3	0.61	52		
4	0.62	54		
Average Δp_s		Average Stack Temp.		Average Angle (α)[1]
0.52 ✓				
Mean Sqrt Δp_s		52.13°F ✓		

[1] Average of α must be <10° to be acceptable.

Rev. 6/92

Form #M5-03

NOZZLE CALIBRATION DATA FORM

Date 1-31-95 Calibrated by MA

Nozzle Identification Number	Nozzle Diameter			ΔD,[a] mm (in.)	D_{avg}[b]
	D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)		
10-1	0.301	0.302	0.303	0.002	0.302
8-1	0.249	0.249	0.250	0.001	0.249

-Silo4

[a] ΔD = maximum difference between any two diameters, mm (in.), ΔD ≤0.10 mm (0.004 in.)

[b] D_{avg} = average of D_1, D_2, and D_3

Form #M5-01 DO NOT WRITE ABOVE THIS LINE Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

Plant LUZENAC AMERICA		Location THREE FORKS		Stack ID No. SILO4	Stack Dimension 12"
Date 1-31-95	Operator MWA/CWL	Run No. 1	Sample Box No. 3	Filter No. 1174	Meter Box No. 2

FILE = C:\LUZENAC\SILO4-1.WQ1

Altitude ✓ Alt. Corr. ✓	Assumed Moisture 1.1	Nozzle ID No. 10-1 Nozzle Dia. 0.302
Barometric Reading 877 mb	Ambient Temp. ~40°F	Probe ID No. 1 Probe Length 1.5'
Barometric Pres. 26.17 "Hg	Meter ΔH@ 1.92	Liner Material STAINLESS STEEL
Stack Static Pres. -0.39	Meter Calib (Y) 1.058	Probe Heat Setting 150°F

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf) Start	Velocity Head (ΔP) ("H_2O)	Pressure Differential across Orifice Meter (ΔH) ("H_2O)	Vacuum, mm ("Hg)	#1 Stack Temp. (°F)	#3 Filter Temp. (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sampler Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
		1405	125.074								
B 1	12		137.37	0.39	3.59	2	61	154	50	51	51
2	24		150.34	0.45	4.12	2.5	64	167	55	53	51
3	36		166.54	0.71	6.52	3.5	64	158	53	55	52
4	48		183.676	0.77	7.10	4	64	153	51	58	53
A 1	60		197.10	0.46	4.22	2.5	68	159	50	58	56
2	72		211.28	0.53	4.89	3	68	161	52	62	57
3	84		225.56	0.53	4.89	3	69	160	53	64	58
4	96		241.068	0.63	5.84	3	67	157	53	63	59
			MTR VOL=	Mean SQRT	$\overline{\Delta H}$		$\overline{t_s}$			$\overline{t_m}$	
			115.994	0.7429	5.144		65.6			56.3	

PRE-TEST LEAK CHECK: 0.004 ft^3/min @ 16"Hg POST-TEST LEAK CHECK: 0.00 ft^3/min @ 5"Hg

Rev. 12/92

FACILITY
Luzenac/3Forks
LOCATION
Silo 4
RUN #
One
DATE
1-31-95
START TIME
1405
STOP TIME

PRELIMINARY INFO.	
Bp (Pm) (in.Hg)	26.17
Stack Dia (rnd)	1
Stack Area (sq.ft.)	0.79
Yi	1.058
Delta H@	1.92

PRE TEST INFO	
Assumed moisture %	1.0
Assumed Meter Temp, F	49.0
Time per Point	12.00
Nozzle Dia (in.)	0.302
Total Number of Points	8

CALCULATED	
Stack press. (Ps)	26.14
Stack Area (rnd)	0.79
Meter Temp, R	509.0
Recommended Nz dia.	0.234
Nozzle area (ft^)	0.00050
Total Run Time	96.00

CALCULATED	
Actual % H2O in Stack	0.41
Actual Wet Molec. Wt	28.80
Actual Isokinetic Avg	99.80

EMISSIONS	
lb / dscf STD	6.337E-08
grains / dscf STD	0.0004
lb / hour STD	0.01
lb / ft^3 Act.	5.69E-08
grains / ft^3 Act.	0.0004

TRAVERSE INFO	
Static (use - if neg.)	-0.39
Stack Temp, F	52.0
Aquired avg. delta P	0.52
Oxygen	21.00
Carbon Dioxide	0.00

POST TEST INFO	
Impinger H2O Gain (g)	9.83
Particulate Gain (mg)	3.20

CALCULATED	
Stack Temp, R(Ts)	512.0
Wet mol. wt. (Ms)	28.73
Dry mol. wt. (Md)	28.84

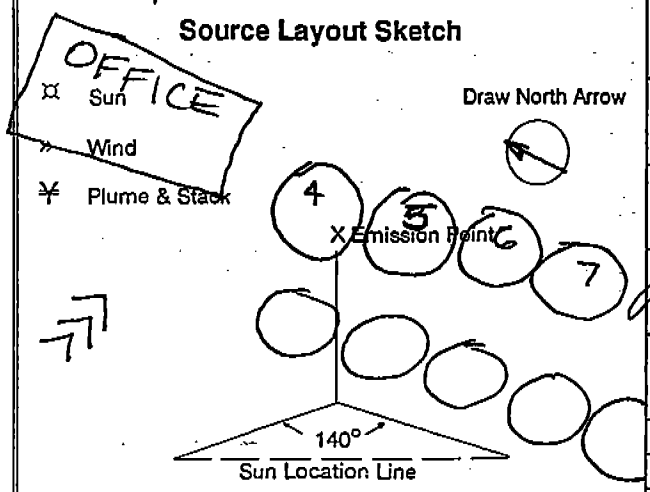
											TEST		STACK		METER		ACT
											Calc	SQRT	Stack Vel.	Stack Flow	Volume	Volume cu. ft.	Stack Vel
Trav Point	Sample Time	MetrVol 125.074	Vel head delta P	Calc. delta H	Actual delta H	Stack Temp	Meter Temp In	Meter Temp Out	Point % I	Accum. Iso %	K	dP	ft/sec	cuft/min	std	per min	ft/sec
1	12.0	137.370	0.39	3.587	3.50	61	51	51	101	101.3	9.197	0.62	37.35	1760	11.87	1.168	37.31
2	24.0	150.340	0.45	4.115	4.00	65	53	51	100	100.6	9.145	0.67	40.28	1898	12.52	1.259	40.23
3	36.0	166.540	0.71	6.524	6.40	64	55	52	100	100.2	9.189	0.84	50.54	2382	15.69	1.580	50.49
4	48.0	183.676	0.77	7.103	7.00	64	58	53	101	100.4	9.225	0.88	52.63	2480	16.56	1.645	52.58
5	60.0	197.100	0.46	4.223	4.10	68	58	56	102	100.6	9.182	0.68	40.84	1924	12.84	1.277	40.79
6	72.0	211.280	0.53	4.890	4.70	68	62	57	100	100.4	9.226	0.73	43.83	2066	13.52	1.370	43.79
7	84.0	225.560	0.53	4.895	4.70	69	64	58	100	100.4	9.235	0.73	43.87	2068	13.57	1.372	43.83
8	96.0	241.068	0.63	5.840	5.60	67	63	59	100	100.3	9.270	0.79	47.74	2250	14.78	1.493	47.69
9	108.0			0.000					ERR	ERR	9.377	0.00	0.00	0	******	0.000	0.00
10	120.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
11	132.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
12	144.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
13	156.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
14	168.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
15	180.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
16	192.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
17	204.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
18	216.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
19	228.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
20	240.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
21	252.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
22	264.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
23	276.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
24	288.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
25	300.0			0.000					ERR	ERR	9.377	0.00	0.00	0	0.00	0.000	0.00
Actual Vol		115.994	dP	avg	dH	Ts		Tm	%Iso			SQRT d	avg	avg	Vol std	dscf/m	avg
			0.56	5.147	5.00	66		56	ERR			0.74	44.64	2103	******	1.3954	44.59

VISIBLE EMISSION OBSERVATION FORM Run 1

Source Name: LUZENAC AMERICA	Observation Date: 1-31-95	Start Time: 1410 / Stop Time: 1510
Address: 767 Old Yellowstone Trail		
City: 3FORKS / State: MT / Zip: 59752		
Phone: (406) 285-3211	Source ID Number: SILO 4	
Process Equipment: Product Silo	Operating Mode: Normal	
Control Equipment: Baghouse	Operating Mode: Normal	
Describe Emission Point: Start Portable Stack Outlet Stop Same		
Height above Ground Level: Start ~40' Stop Same	Height Relative to Observer: Start ~2' Stop Same	
Distance from Observer: Start ~10' Stop Same	Direction from Observer: Start 90° Stop Same	
Describe Emissions: Start None Stop Same		
Emission Color: Start NA Stop Same	Plume Type: Continuous ☐ Fugitive ☐ Intermittent ☐	
Water Droplets Present? Yes ☐ No ☒	If Water Droplet Plume: Attached ☐ Detached ☐	
Point in the Plume at which Opacity was Determined: Start Near Outlet Stop Same		
Describe Background: Start Rail & Grassland Stop Same		
Background Color: Start White Brown Stop	Sky Conditions: Start — Stop	
Wind Speed: Start 10-20 Stop Same	Wind Direction: Start ~270° Stop Same	
Ambient Temp.: Start ~40°F Stop Same	Wet Bulb Temp. / RH Percent	

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1410	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
1420 10	0	0	0	0	1440 40	0	0	0	0
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
1430 20	0	0	0	0	1500 50	0	0	0	0
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
1440 30	0	0	0	0	1510 60	0	0	0	0

Source Layout Sketch



Average Opacity for Highest Period: 0

Number of Readings Above 20 % Were 0

Range of Opacity Readings: 0 Minimum 0 Maximum

Observer's Name (Print): Mitch Anderson

Observer's Signature: Mitch Anderson Date: 1-31-95

Organization: BKSON ENGINEERING

Comments: Sun behind baghouse. Portable Stack with flex hose.

Form #M2-01

GAS VELOCITY AND VOLUME DATA FORM

Plant		Location	Stack ID No.
LUZENAC		3FORKS	51L04
Date	**Time**	**Operator**	**Run No.**	**Stack Dimension**
2-2-95	1015	MA	2	12"

Altitude	Alt. Corr.	Ambient Temp.	~45° F
Barometric Reading	771mb	Molecular Weight	28.84
Local Barometric Pressure	25.97" Hg	Method	Fynite-Ambient
Stack Static Pressure	-0.22	Pitot C_p	0.84

Field Data				
Traverse Point Number	Velocity Head (Δp_s), " H_2O	Stack Temp., °F	Cyclonic Flow Determination	
			Δp_s at 0° Reference	Angle (α) Yielding Null Δp
A 1	0.52	60		
2	0.60	60		
3	0.65	62		
4	0.62	62		
B 1	0.45	63		
2	0.55	63		
3	0.65	63		
4	0.70	64		
Average Δp_s		Average Stack Temp.	Average Angle (α)[1]	
0.59 ✓				
Mean Sqrt Δp_s		62°F ✓		

[1] Average of α must be $<10°$ to be acceptable.

Rev. 11/93

Form #M5-01 DO NOT WRITE ABOVE THIS LINE Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

Plant LUZENAC		Location 3FORKS		Stack ID No. S1L04	Stack Dimension 12"
Date 2-2-95	Operator MNA	Run No. 2	Sample Box No. 3	Filter No. H75	Meter Box No. 2

→ FILE = C:\LUZENAC\S1L04-2.WQ1 ← 1176

Altitude ✓ Alt. Corr. ✓	Assumed Moisture 1.1	Nozzle ID No. B-1 Nozzle Dia. 0.249
Barometric Reading	Ambient Temp. ~40°F	Probe ID No. 1 Probe Length 1.5'
Barometric Pres. 25.97 "Hg	Meter ΔH@ 1.92	Liner Material STAINLESS STEEL
Stack Static Pres. -0.22 "H2O	Meter Calib (Y) 1.058	Probe Heat Setting 150°F

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf) Start	Velocity Head (ΔP) ("H2O)	Pressure Differential across Orifice Meter (ΔH) ("H2O)	Vacuum mm ("Hg)	#1 Stack Temp. (°F)	#3 Filter Temp. (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sampler Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
		1115	257.428								
A 1	12		267.19	0.55	2.32	1	67	164	48	53	51
2	24		277.13	0.55	2.32	1	68	159	56	56	53
3	36		287.04	0.55	2.34	1	68	161	50	62	56
4	48		297.864	0.60	2.59	1	69	160	49	65	58
B 1	60		306.14	0.42	1.80	1	70	162	49	65	61
2	~~72~~ 72		316.11	0.55	2.36	1	70	159	46	66	61
3	~~84~~		327.26	0.68	2.92	1	68	160	47	65	61
4	96		338.932	0.75	3.22	1.5	67	160	47	64	60
							—				
			MTR VOL	Mean SQRT	$\overline{\Delta H}$		t_s			$\overline{t_m}$	
			81.504	0.7600	2.475		68.4			59.8	

PRE-TEST LEAK CHECK: 0.004 ft³/min @ 23"Hg POST TEST LEAK CHECK: 0.002 ft³/min @ 3" Hg

Rev. 12/92

FACILITY
Luzenac/3Forks
LOCATION
Silo 4
RUN #
Two
DATE
2-2-95
START TIME
1115
STOP TIME

PRELIMINARY INFO.	
Bp (Pm) (in.Hg)	25.97
Stack Dia (rnd)	1
Stack Area (sq.ft.)	0.79
Yi	1.058
Delta H@	1.92

PRE TEST INFO	
Assumed moisture %	1.0
Assumed Meter Temp, F	55.0
Time per Point	12.00
Nozzle Dia (in.)	0.249
Total Number of Points	8

CALCULATED	
Stack press. (Ps)	25.95
Stack Area (rnd)	0.79
Meter Temp, R	515.0
Recommended Nz dia.	0.226
Nozzle area (ft^)	0.00034
Total Run Time	96.00

CALCULATED	
Actual % H2O in Stack	0.10
Actual Wet Molec. Wt	28.83
Actual Isokinetic Avg	98.89

EMISSIONS	
lb / dscf STD	1.529E-07
grains / dscf STD	0.0011
lb / hour STD	0.02
lb / ft^3 Act.	1.34E-07
grains / ft^3 Act.	0.0009

TRAVERSE INFO	
Static (use - if neg.)	-0.22
Stack Temp, F	62.0
Aquired avg. delta P	0.59
Oxygen	21.00
Carbon Dioxide	0.00

POST TEST INFO	
Impinger H2O Gain (g)	1.55
Particulate Gain (mg)	5.30

CALCULATED	
Stack Temp, R(Ts)	522.0
Wet mol. wt. (Ms)	28.73
Dry mol. wt. (Md)	28.84

											TEST		STACK		METER		ACT
Trav	Sample	MetrVol	Vel head	Calc.	Actual	Stack	Meter Temp		Point	Accum.	Calc	SQRT	Stack Vel.	Stack Flow	Volume	Volume cu. ft.	Stack Vel
Point	Time	257.428	delta P	delta H	delta H	Temp	In	Out	%I	Iso %	K	dP	ft/sec	cuft/min	std	per min	ft/sec
1	12.0	267.190	0.55	2.317	2.20	67	53	51	99	99.3	4.212	0.74	44.77	2110	9.30	0.951	44.70
2	24.0	277.130	0.55	2.324	2.20	68	56	53	101	100.0	4.225	0.74	44.81	2112	9.43	0.952	44.74
3	36.0	287.040	0.55	2.344	2.20	68	62	56	99	99.8	4.262	0.74	44.81	2112	9.32	0.952	44.74
4	48.0	297.264	0.60	2.589	2.40	69	65	68	97	99.1	4.315	0.77	46.85	2208	9.48	0.996	46.77
5	60.0	306.140	0.42	1.797	1.70	70	65	61	101	99.5	4.278	0.65	39.24	1849	8.27	0.834	39.17
6	72.0	316.110	0.55	2.355	2.20	70	66	61	99	99.5	4.282	0.74	44.90	2116	9.29	0.954	44.82
7	84.0	327.260	0.68	2.920	2.80	68	65	61	100	99.6	4.294	0.82	49.83	2348	10.42	1.059	49.74
8	96.0	338.932	0.75	3.221	3.10	67	64	60	100	99.6	4.294	0.87	52.28	2464	10.94	1.111	52.19
9	108.0			0.000					ERR	ERR	4.335	0.00	0.00	0	******	0.000	0.00
10	120.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
11	132.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
12	144.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
13	156.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
14	168.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
15	180.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
16	192.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
17	204.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
18	216.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
19	228.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
20	240.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
21	252.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
22	264.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
23	276.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
24	288.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
25	300.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
Actual Vol		81.504	dP	avg	dH	Ts		Tm	%Iso			SQRT d	avg	avg	Vol std	dscf/m	avg
			0.58	2.483	2.35	68		60	ERR			0.76	45.94	2165	76.45	0.9762	45.86

VISIBLE EMISSION OBSERVATION FORM Run 2

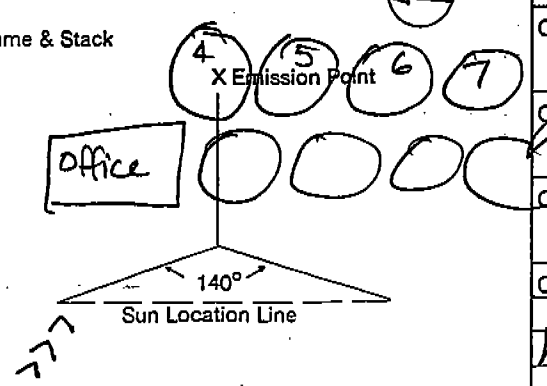
Source Name: LUZENAC AMERICA	Observation Date: ~~2-2-95~~ 2-1-95	Start Time: 1130	Stop Time: 1230
Address: 767 Old Yellowstone Trail			
City: 3FORKS	State: MT	Zip: 59752	
Phone: (406) 285-3271	Source ID Number: ~~SILO~~ 4		
Process Equipment: Product Silo	Operating Mode: Normal		
Control Equipment: Baghouse	Operating Mode: Normal		
Describe Emission Point — Start: Portable Stack	Stop: Same		
Height above Ground Level — Start: ~40'	Stop: Same	Height Relative to Observer — Start:	Stop:
Distance from Observer — Start:	Stop:	Direction from Observer — Start:	Stop:
Describe Emissions — Start: —	Stop: —		
Emission Color — Start: —	Stop: —	Plume Type: Continuous ☐ Fugitive ☐ Intermittent ☐	
Water Droplets Present? Yes ☐ No ☒		If Water Droplet Plume: Attached ☐ Detached ☐	
Point in the Plume at which Opacity was Determined — Start: Stack Outlet	Stop: Same		
Describe Background — Start: Ranching & Grassland	Stop: Same		
Background Color — Start: White/Brown	Stop: Same	Sky Conditions — Start: PC	Stop: Same
Wind Speed — Start: 5-10	Stop: Same	Wind Direction — Start: 280°	Stop: Same
Ambient Temp. — Start: ~40°F	Stop: Same	Wet Bulb Temp. / RH Percent	

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
1140 10	0	0	0	0	1210 40	0	0	0	0
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
1150 20	0	0	0	0	1220 50	0	0	0	0
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
1200 30	0	0	0	0	1230 60	0	0	0	0

Source Layout Sketch

☼ Sun
» Wind
⊀ Plume & Stack

Draw North Arrow



Average Opacity for Highest Period: 0	Number of Readings Above 20 % Were 0
Range of Opacity Readings — Minimum: 0	Maximum: 0
Observer's Name (Print): Mitch Anderson	
Observer's Signature: Mitch Anderson	Date: 2-1-95
Organization: BISON ENGINEERING	
Comments: Portable stack with flex hose in shade. Sun behind baghouse.	

Form #M5-01 DO NOT WRITE ABOVE THIS LINE Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

Plant LUZENAC		Location 3FORKS		Stack ID No. SILO4	Stack Dimension 12"
Date 2-2-95	Operator MNA	Run No. 3	Sample Box No. 3	Filter No. 1177	Meter Box No. 2

Altitude ✓	Alt. Corr. ✓
Barometric Reading	✓
Barometric Pres.	25.97 "Hg
Stack Static Pres.	-0.22 "H2O

Assumed Moisture	1%
Ambient Temp.	~50°F
Meter ΔH@	1.92
Meter Calib (Y)	1.058

Nozzle ID No.	B-1
Nozzle Dia.	0.249
Probe ID No.	✓
Probe Length	1.5'
Liner Material	STAINLESS STEEL
Probe Heat Setting	150°F

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf) Start	Velocity Head (ΔP) ("H2O)	Pressure Differential across Orifice Meter (ΔH) ("H2O)	Vacuum, mm ("Hg)	#1 Stack Temp (°F)	#3 Filter Temp. (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sampler Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
		1338	339.223								
B1	12		347.73	0.42	1.79	1	66	153	53	57	56
2	24		356.95	0.47	2.01	1	66	157	49	60	57
3	36		368.11	0.70	2.99	1.5	65	164	46	60	56
4	48		379.768	0.75	3.21	1.5	65	160	46	61	57
A1	60		389.81	0.53	2.27	1.5	65	160	50	59	57
2	72		399.88	0.55	2.36	1.5	66	161	47	62	57
3	84		410.33	0.60	2.58	1.5	67	160	49	65	~~65~~ 59
4	96	1518	421.153	0.65	2.80	1.5	68	160	50	67	61
			MTR VOL	Mean SQRT	$\overline{\Delta H}$ =		$\overline{t_s}$ =			$\overline{t_m}$ =	
			81.93	.7608	2.506		66.0			59.4	

PRE TEST LEAKAGE: 0.004 ft³/min @ 15"Hg POST-TEST LEAKAGE: 0.000 ft³/min @ 3"Hg

Rev. 12/92

FACILITY
Luzenac/3Forks
LOCATION
SILO 4
RUN #
Three
DATE
2-2-95
START TIME
1338
STOP TIME

PRELIMINARY INFO.	
Bp (Pm) (in.Hg)	25.97
Stack Dia (rnd)	1
Stack Area (sq.ft.)	0.79
Yi	1.058
Delta H@	1.92

PRE TEST INFO	
Assumed moisture %	1.0
Assumed Meter Temp, F	63.0
Time per Point	12.00
Nozzle Dia (in.)	0.249
Total Number of Points	8

CALCULATED	
Stack press. (Ps)	25.95
Stack Area (rnd)	0.79
Meter Temp, R	523.0
Recommended Nz dia.	0.226
Nozzle area (ft^)	0.00034
Total Run Time	96.00

CALCULATED	
Actual % H2O in Stack	-0.39
Actual Wet Molec. Wt	28.88
Actual Isokinetic Avg	98.86

EMISSIONS	
lb / dscf STD	8.877E-08
grains / dscf STD	0.0006
lb / hour STD	0.01
lb / ft^3 Act.	7.73E-08
grains / ft^3 Act.	0.0005

TRAVERSE INFO	
Static (use - if neg.)	-0.22
Stack Temp, F	68.0
Aquired avg. delta P	0.58
Oxygen	21.00
Carbon Dioxide	0.00

POST TEST INFO	
Impinger H2O Gain (g)	-6.3
Particulate Gain (mg)	3.10

CALCULATED	
Stack Temp, R(Ts)	528.0
Wet mol. wt. (Ms)	28.73
Dry mol. wt. (Md)	28.84

Trav	Sample	MetrVol	Vel head	Calc.	Actual	Stack	Meter Temp		Point	Accum.	TEST	STACK		METER		ACT
											Calc	SQRT	Stack Vel.	Stack Flow	Volume	Volume cu. ft.	Stack Vel
Point	Time	339.223	delta P	delta H	delta H	Temp	In	Out	% I	Iso %	K	dP	ft/sec	cuft/min	std	per min	ft/sec
1	12.0	347.730	0.42	1.788	1.70	66	57	56	98	97.9	4.257	0.65	39.09	1842	8.03	0.831	38.99
2	24.0	356.950	0.47	2.009	2.00	66	60	57	100	98.9	4.274	0.69	41.35	1948	8.67	0.879	41.24
3	36.0	368.110	0.70	2.994	2.90	65	60	56	99	99.1	4.278	0.84	50.41	2376	10.53	1.071	50.28
4	48.0	379.768	0.75	3.214	3.10	65	61	57	100	99.4	4.286	0.87	52.18	2459	10.99	1.109	52.05
5	60.0	389.810	0.53	2.267	2.20	65	59	57	103	100.0	4.278	0.73	43.87	2067	9.46	0.932	43.75
6	72.0	399.880	0.55	2.355	2.20	66	62	57	101	100.2	4.282	0.74	44.73	2108	9.46	0.951	44.61
7	84.0	410.330	0.60	2.577	2.40	67	65	59	100	100.1	4.294	0.77	46.76	2204	9.77	0.994	46.64
8	96.0	421.153	0.65	2.797	2.60	68	67	61	99	100.0	4.303	0.81	48.72	2296	10.09	1.035	48.59
9	108.0			0.000					ERR	ERR	4.335	0.00	0.00	0	******	0.000	0.00
10	120.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
11	132.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
12	144.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
13	156.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
14	168.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
15	180.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
16	192.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
17	204.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
18	216.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
19	228.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
20	240.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
21	252.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
22	264.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
23	276.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
24	288.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00
25	300.0			0.000					ERR	ERR	4.335	0.00	0.00	0	0.00	0.000	0.00

Actual Vol	81.930	dP	avg	dH	Ts	Tm	%Iso
		0.58	2.500	2.39	66	59	ERR

SQRT d	avg	avg	Vol std	dscf/m	avg
0.76	45.89	2162	77.00	0.9752	45.77

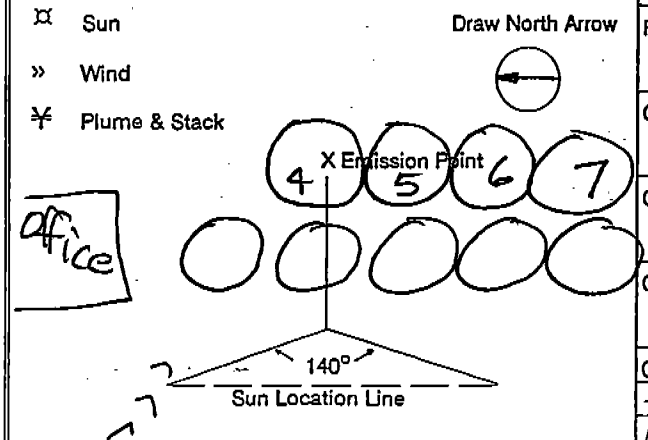
VISIBLE EMISSION OBSERVATION FORM Run 3

Source Name	Luzenac
Address	767 Old Yellowstone Trail
City	3 Forks
State	MT
Zip	59752
Phone	(406) 285-3271
Source ID Number	SILO4
Process Equipment	Product Silo
Operating Mode	Normal
Control Equipment	Baghouse
Operating Mode	Normal
Describe Emission Point Start	At Outlet
Stop	Same
Height above Ground Level Start	~40
Stop	Same
Height Relative to Observer Start	~2'
Stop	Same
Distance from Observer Start	~10'
Stop	Same
Direction from Observer Start	E
Stop	Same
Describe Emissions Start	—
Stop	—
Emission Color Start	—
Stop	—
Plume Type:	N/A Continuous ☐ Fugitive ☐ Intermittent ☐
Water Droplets Present?	Yes ☐ No ☒
If Water Droplet Plume:	N/A Attached ☐ Detached ☐
Point in the Plume at which Opacity was Determined Start	Stack Outlet
Stop	Same
Describe Background Start	Railing & Grassland
Stop	Same
Background Color Start	White/Brown
Stop	Same
Sky Conditions Start	PC
Stop	Same
Wind Speed Start	5-10
Stop	Same
Wind Direction Start	~270°
Stop	Same
Ambient Temp. Start	~60°F
Stop	Same
Wet Bulb Temp.	
RH Percent	

Observation Date: 2-2-95 | Start Time: 1350 | Stop Time: 1450

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
1420 10	0	0	0	0	1430 40	0	0	0	0
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
1430 20	0	0	0	0	1440 50	0	0	0	0
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
1440 30	0	0	0	0	1450 60	0	0	0	0

Source Layout Sketch



Average Opacity for Highest Period: 0

Number of Readings Above 20 % Were 0

Range of Opacity Readings: Minimum 0 Maximum 0

Observer's Name (Print): Mitch Anderson

Observer's Signature: MW Anderson

Date: 2-2-95

Organization: BKon Engineering

Comments: Portable Stack with flex hose. Sun location behind Baghouse

Form #M2-01

GAS VELOCITY AND VOLUME DATA FORM

Plant	Location	Stack ID No.
LUZENAC AMERICA	3FORKS	SIL05

Date	Time	Operator	Run No.	Stack Dimension
2-7-95	1030	MA	2	12" Portable

Altitude ✓	Alt. Corr. ✓	Ambient Temp.	~40°F
Barometric Reading	771mb	Molecular Weight	28.84
Local Barometric Pressure	25.97" Hg	Method	Fyrite-Ambient
Stack Static Pressure	-0.52	Pitot C_p	0.84

Field Data				
Traverse Point Number	Velocity Head (Δp_s), " H_2O	Stack Temp., °F	Cyclonic Flow Determination	
			Δp_s at 0° Reference	Angle (α) Yielding Null Δp
A 1	0.60	45		
2	0.73	45		
3	1.10	45		
4	1.10	45		
B 1	1.10	49		
2	1.10	50		
3	1.10	50		
4	1.05	52		
Average Δp_s			Average Stack Temp.	Average Angle (α)[1]
0.99				
Mean Sqrt Δp_s			48°F	

[1] Average of α must be < 10° to be acceptable.

Rev. 11/93

Form #M5-01

DO NOT WRITE ABOVE THIS LINE

Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

SILO5

Plant LUZENAC/AMERICA		Location 3 FORKS		Stack ID No. ~~SILO4~~	Stack Dimension 12"
Date 2-1-95	Operator MA/MRN	Run No. ~~2~~ 1	Sample Box No. 3	Filter No. 172	Meter Box No. 2

Altitude _____	Alt. Corr. _____	
Barometric Reading _____		
Barometric Pres. 25.83 "Hg		
Stack Static Pres. -0.06		

Assumed Moisture	1%
Ambient Temp.	~60°F
Meter ΔH@	1.92
Meter Calib (Y)	1.002

Nozzle ID No.	10-1	Nozzle Dia.	0.302
Probe ID No.		Probe Length	1.5'
Liner Material	STAINLESS STEEL		
Probe Heat Setting	150°F		

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf) Start	Velocity Head (ΔP) ("H_2O)	Pressure Differential across Orifice Meter (ΔH) ("H_2O)	Vacuum, mm ("Hg)	#1 Stack Temp. (°F)	#3 Filter Temp. (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sampler Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
		1340	241.944								
1	15		253.11	0.23	2.17	1	64	160	56	67	66
2	30			0.19	1.81	1	58	160	48	66	65
3	45			0.11							
4	60			0.08							
1											
2											
3											
4											

VOID

PORTABLE STACK CAME LOOSE DURING TEST. THIS RUN IS VOID.

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Form #M5-01 DO NOT WRITE ABOVE THIS LINE Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

Plant LUZENAC AMERICA		Location 3FORKS			Stack ID No. SILO5	Stack Dimension 12"	
Date 2-7-95	Operator MNA	Run No. 2	Sample Box No. 3		Filter No. 1189	Meter Box No. 2	

→ FILE = C:\LUZENAC\SILO5-2.WQ1 ←

Altitude ✓	Alt. Corr. ✓	Assumed Moisture 1%		Nozzle ID No. B-1	Nozzle Dia. 0.249
Barometric Reading 721 mb		Ambient Temp. ~40°F		Probe ID No. ✓	Probe Length 1.5'
Barometric Pres. 25.97 "Hg		Meter ΔH@ 1.92		Liner Material STAINLESS STEEL	
Stack Static Pres. -0.52 "H2O		Meter Calib (Y) 1.058		Probe Heat Setting 150°F	

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf) Start	Velocity Head (ΔP) ("H2O)	Pressure Differential across Orifice Meter (ΔH) ("H2O)	Vacuum, mm ("Hg)	#1 Stack Temp. (°F)	#3 Filter Temp. (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sample Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
B 1	9		429.61	0.65	2.79	1	48	160	54	43	43
2	18		439.48	1.00	4.34	2	46	161	48	48	45
3	27		449.85	1.10	4.65	2	65	160	57	55	49
4	36		460.268	1.10	4.68	2	64	161	60	58	51
A 1	45		467.77	0.53	2.33	1.5	50	165	57	58	56
2	54		476.21	0.68	3.00	1.5	51	156	54	62	58
3	63		486.87	1.20	5.14	2.5	69	160	55	66	60
4	72		498.123	1.20	5.21	2.5	65	160	57	70	63
			MTR VOL	Mean SQRT	$\overline{\Delta H}$		$\overline{Ts}$			$\overline{tm}$	
			76.720	0.9559	4.019		57.3			55.3	

PRE TEST LEAK TEST: 0.002 ft³/min @ 17" Hg POST TEST LEAK: 0.000 ft³/min @ 3" Hg

Rev. 12/92

FACILITY
Luzenac/3Forks
LOCATION
Silo 5
RUN #
Two
DATE
2-7-95
START TIME
1101
STOP TIME

PRELIMINARY INFO.	
Bp (Pm) (in.Hg)	25.97
Stack Dia (md)	1
Stack Area (sq.ft.)	0.79
Yi	1.058
Delta H@	1.92

PRE TEST INFO	
Assumed moisture %	1.0
Assumed Meter Temp, F	50.0
Time per Point	9.00
Nozzle Dia (in.)	0.249
Total Number of Points	8

CALCULATED	
Stack press. (Ps)	25.93
Stack Area (md)	0.79
Meter Temp, R	510.0
Recommended Nz dia.	0.198
Nozzle area (ft^)	0.00034
Total Run Time	72.00

CALCULATED	
Actual % H2O In Stack	0.37
Actual Wet Molec. Wt	28.80
Actual Isokinetic Avg	99.20

EMISSIONS	
lb / dscf STD	5.739E-08
grains / dscf STD	0.0004
lb / hour STD	0.01
lb / ft^3 Act.	5.15E-08
grains / ft^3 Act.	0.0004

TRAVERSE INFO	
Static (use - if neg.)	-0.52
Stack Temp, F	48.0
Aquired avg. delta P	0.99
Oxygen	21.00
Carbon Dioxide	0.00

POST TEST INFO	
Impinger H2O Gain (g)	5.77
Particulate Gain (mg)	1.90

CALCULATED	
Stack Temp, R(Ts)	508.0
Wet mol. wt. (Ms)	28.73
Dry mol. wt. (Md)	28.84

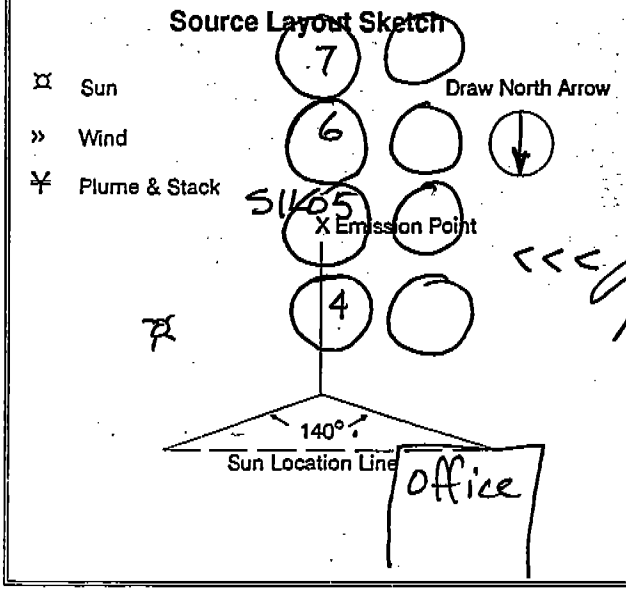
											TEST		STACK		METER		ACT
											Calc	SQRT	Stack	Stack	Volume	Volume	Stack
Trav	Sample	MetrVol	Vel head	Calc.	Actual	Stack	Meter Temp		Point	Accum.			Vel.	Flow		cu. ft.	Vel
Point	Time	421.403	delta P	delta H	delta H	Temp	In	Out	%I	Iso %	K	dP	ft/sec	cuft/min	std	per min	ft/sec
1	9.0	429.610	0.65	2.788	2.70	48	43	43	102	102.5	4.289	0.81	47.81	2253	7.97	1.016	47.75
2	18.0	439.480	1.00	4.336	4.20	46	48	45	99	100.7	4.336	1.00	59.18	2789	9.56	1.258	59.11
3	27.0	449.850	1.10	4.647	4.60	65	55	49	100	100.4	4.224	1.05	63.22	2979	9.95	1.344	63.15
4	36.0	460.268	1.10	4.679	4.60	64	58	51	100	100.3	4.253	1.05	63.16	2976	9.95	1.342	63.09
5	45.0	467.770	0.53	2.327	2.30	50	58	56	101	100.4	4.391	0.73	43.25	2038	7.08	0.919	43.20
6	54.0	476.210	0.68	2.997	2.95	51	62	58	100	100.4	4.408	0.82	49.04	2311	7.94	1.042	48.98
7	63.0	486.870	1.20	5.139	5.00	69	66	60	97	99.8	4.283	1.10	66.29	3124	10.02	1.409	66.21
8	72.0	498.123	1.20	5.213	5.20	65	70	63	101	100.0	4.344	1.10	66.03	3112	10.52	1.403	65.96
9	81.0			0.000					ERR	ERR	4.332	0.00	0.00	0	******	0.000	0.00
10	90.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
11	99.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
12	108.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
13	117.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
14	126.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
15	135.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
16	144.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
17	153.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
18	162.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
19	171.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
20	180.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
21	189.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
22	198.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
23	207.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
24	216.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
25	225.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
Actual Vol		76.720	dP	avg	dH	Ts		Tm	%Iso			SQRT d	avg	avg	Vol std	dscf/m	avg
			0.93	4.016	3.94	57		55	ERR			0.96	57.25	2698	73.00	1.2166	57.18

VISIBLE EMISSION OBSERVATION FORM Run 2

Source Name: Lucerne America	Observation Date: 2-7-95	Start Time: 1110	Stop Time: 1210
Address: 767 Old Yellowstone Trail			
City: 3Forks	State: MT	Zip: 59752	
Phone: (406) 285-3271	Source ID Number: SILO5		
Process Equipment: Product Silo	Operating Mode: Normal		
Control Equipment: Baghouse	Operating Mode: Normal		
Describe Emission Point: Start @portable Stack Outlet	Stop: Same		
Height above Ground Level: Start ~40' Stop Same	Height Relative to Observer: Start ~2' Stop Same		
Distance from Observer: Start ~8' Stop Same	Direction from Observer: Start 180° Stop Same		
Describe Emissions: Start Talc Clouds	Stop: Same		
Emission Color: Start White Stop	Plume Type: Continuous ☐ Fugitive ☐ Intermittent ☒		
Water Droplets Present? Yes ☐ No ☒	If Water Droplet Plume: Attached ☐ Detached ☐	NA	
Point in the Plume at which Opacity was Determined: Start Stack Outlet	Stop: Same		
Describe Background: Start White Tank	Stop: Same		
Background Color: Start White	Stop: Same	Sky Conditions: Start PC	Stop: Same
Wind Speed: Start 0-10	Stop: Same	Wind Direction: Start 270°	Stop: Same
Ambient Temp.: Start ~40°	Stop: Same	Wet Bulb Temp. / RH Percent	

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34	5	5	5	
5	0	0	0	0	35				
6	0	0	0	0	36				
7	5	5	0	0	37				
8	5	0	5	0	38				
9	0	0	0	0	39				
1120 10	0	0	0	0	1140 40	0	0	0	0
11					41	5	5	5	0
12					42				
13	5	5	5	0	43				
14					44				
15					45				
16					46				
17	5	5	0	0	47				5
18					48	5	5		
19					49				
1130 20	0	0	0	0	1200 50	0	0	0	0
21					51				
22					52		5	5	5
23					53				
24					54				
25					55				
26				5	56				
27	5	5	5	5	57				
28					58				
29					59				
1140 30	0	0	0	0	1210 60	0	0	0	0

Source Layout Sketch



Average Opacity for Highest Period: 5 @ 1.25 min

Number of Readings Above 0 % Were 24

Range of Opacity Readings: 0 Minimum 5 Maximum

Observer's Name (Print): Mitch Anderson

Observer's Signature: M Anderson Date: 2-7-95

Organization: BISON ENGINEERING

Comments: Occasional "puffs" of talc through duct outlet and leaks in bin + pipe at top of silo. (Rest of blanks = 0 opacity)

(cracked weld) → Silo 6 "puffing" also.

Form #M5-01 DO NOT WRITE ABOVE THIS LINE Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

Plant Luzenac America		Location 3Forks		Stack ID No. Silo 5	Stack Dimension 12"
Date 2-7-95	Operator MNA	Run No. 3	Sample Box No. 3	Filter No. 1192	Meter Box No. 2

→ File = C:\LUZENAC\SILO5-3.WQ1 ←

Altitude ✓	Alt. Corr. ✓	Assumed Moisture 1-1.	Nozzle ID No. 8-1 ✓	Nozzle Dia. 0.249
Barometric Reading 771 mb		Ambient Temp. ~45°F	Probe ID No. ✓	Probe Length 1.5'
Barometric Pres. 25.97" Hg		Meter ΔH@ 1.92	Liner Material Stainless Steel	
Stack Static Pres. -0.52		Meter Calib (Y) 1.058	Probe Heat Setting 150°F	

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf)	Velocity Head (ΔP) ("H2O)	Pressure Differential across Orifice Meter (ΔH) ("H2O)	Vacuum, mm ("Hg)	#1 Stack Temp (°F)	#3 Filter Temp (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sampler Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
		1318	~~498.809~~ ~~496.484~~								
A 1	9		506.56	0.63	~~3.44~~ 2.79	1	54	100	~~100~~ 53	64	65
2	18		515.32	0.72	3.17	1.5	55	166	44	64	63
3	27		526.02	1.10	4.78	2.5	63	161	46	66	64
4	36		537.56	1.30	5.67	2.5	64	161	48	70	66
B 1	45		548.24	1.10	4.70	2.5	77	160	48	73	67
2	54		558.46	1.00	4.30	2	77	161	49	76	69
3	63		569.16	1.10	4.73	2	76	160	50	75	69
4	72	1430	579.918	1.10	4.75	2	76	160	50	77	71
			MTR VOL	Mean SQRT	$\overline{\Delta H}$		$\overline{t_s}$			$\overline{t_m}$	
			81.109	0.9972	4.369		67.8			68.7	

PRE-TEST LEAK CHECK: 0.000 ft³/min @ 16"Hg POST TEST LEAK CHECK: 0.00 ft³/min @ 4"Hg

Rev. 12/92

FACILITY
Luzenac/3Forks
LOCATION
Silo 5
RUN #
THREE
DATE
2-7-95
START TIME
1318
STOP TIME

PRELIMINARY INFO.	
Bp (Pm) (in.Hg)	25.97
Stack Dia (rnd)	1
Stack Area (sq.ft.)	0.79
Yi	1.058
Delta H@	1.92

PRE TEST INFO	
Assumed moisture %	1.0
Assumed Meter Temp, F	60.0
Time per Point	9.00
Nozzle Dia (in.)	0.249
Total Number of Points	8

CALCULATED	
Stack press. (Ps)	25.93
Stack Area (rnd)	0.79
Meter Temp, R	520.0
Recommended Nz dia.	0.200
Nozzle area (ft^)	0.00034
Total Run Time	72.00

CALCULATED	
Actual % H2O in Stack	1.13
Actual Wet Molec. Wt	28.72
Actual Isokinetic Avg	99.73

EMISSIONS	
lb / dscf STD	6.735E-08
grains / dscf STD	0.0005
lb / hour STD	0.01
lb / ft^3 Act.	5.89E-08
grains / ft^3 Act.	0.0004

TRAVERSE INFO	
Static (use - if neg.)	-0.52
Stack Temp, F	57.0
Aquired avg. delta P	0.93
Oxygen	21.00
Carbon Dioxide	0.00

POST TEST INFO	
Impinger H2O Gain (g)	18.27
Particulate Gain (mg)	2.30

CALCULATED	
Stack Temp, R(Ts)	517.0
Wet mol. wt. (Ms)	28.73
Dry mol. wt. (Md)	28.84

											TEST		STACK		METER		ACT
											Calc	SQRT	Stack Vel.	Stack Flow	Volume	Volume cu. ft.	Stack Vel
Trav Point	Sample Time	MetrVol 498.809	Vel head delta P	Calc. delta H	Actual delta H	Stack Temp	Meter Temp In	Meter Temp Out	Point % I	Accum. Iso %	K	dP	ft/sec	cuft/min	std	per min	ft/sec
1	9.0	506.560	0.63	2.785	2.80	54	64	65	95	94.9	4.420	0.79	47.34	2231	7.22	1.006	47.35
2	18.0	515.320	0.72	3.170	3.20	55	64	63	101	97.8	4.403	0.85	50.66	2387	8.19	1.077	50.67
3	27.0	526.020	1.10	4.783	4.70	63	66	64	100	98.6	4.348	1.05	63.10	2974	10.02	1.341	63.12
4	36.0	537.560	1.30	5.674	5.60	64	70	66	99	98.8	4.365	1.14	68.67	3236	10.77	1.459	68.68
5	45.0	548.240	1.10	4.703	4.60	77	73	67	101	99.2	4.275	1.05	63.94	3013	9.90	1.359	63.96
6	54.0	558.460	1.00	4.295	4.20	77	76	69	100	99.4	4.295	1.00	60.97	2873	9.42	1.296	60.98
7	63.0	569.160	1.10	4.729	4.70	76	75	69	100	99.5	4.299	1.05	63.88	3010	9.88	1.358	63.90
8	72.0	579.918	1.10	4.747	4.70	76	77	71	100	99.6	4.316	1.05	63.88	3010	9.90	1.358	63.90
9	81.0			0.000					ERR	ERR	4.332	0.00	0.00	0	******	0.000	0.00
10	90.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
11	99.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
12	108.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
13	117.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
14	126.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
15	135.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
16	144.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
17	153.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
18	162.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
19	171.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
20	180.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
21	189.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
22	198.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
23	207.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
24	216.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
25	225.0			0.000					ERR	ERR	4.332	0.00	0.00	0	0.00	0.000	0.00
Actual Vol		81.109	dP	avg	dH	Ts		Tm	%Iso			SQRT d	avg	avg	Vol std	dscf/m	avg
			1.01	4.361	4.31	68		69	ERR			1.00	60.31	2842	75.30	1.2816	60.32

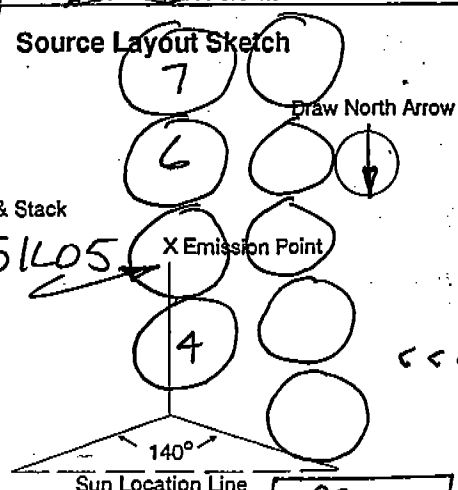
VISIBLE EMISSION OBSERVATION FORM Run 3

Source Name: Luzenac America	Observation Date: 2-7-95	Start Time: 1320 / Stop Time: 1420
Address: 767 Old Yellowstone Trail		
City: 3 Forks / State: MT / Zip: 59752		
Phone: (406) 285-3271 / Source ID Number: SILO5		
Process Equipment: Product Silo / Operating Mode: Normal		
Control Equipment: Baghouse / Operating Mode: Normal		
Describe Emission Point — Start: Portable Stack / Stop: Same		
Height above Ground Level — Start: ~40' / Stop: Same	Height Relative to Observer — Start: ~2' / Stop: Same	
Distance from Observer — Start: ~8' / Stop: Same	Direction from Observer — Start: 180° / Stop: Same	
Describe Emissions — Start: Occasional Fate Puffs / Stop: Same		
Emission Color — Start: White / Stop: Same	Plume Type: Continuous ☐ Fugitive ☐ Intermittent ☐	
Water Droplets Present? Yes ☐ No ☒	If Water Droplet Plume: Attached ☐ Detached ☐	
Point in the Plume at which Opacity was Determined — Start: Stack Outlet / Stop: Same		
Describe Background — Start: White Tank / Stop: Same		
Background Color — Start: White / Stop: Same	Sky Conditions — Start: PC / Stop: Same	
Wind Speed — Start: 0-10 / Stop: Same	Wind Direction — Start: 210° / Stop: Same	
Ambient Temp. — Start: ~40° / Stop: Same	Wet Bulb Temp. / RH Percent	

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
1330 10	0	0	0	0	1340 40	0	0	0	0
11					41				
12					42				
13					43				
14					44				
15					45		5	5	5
16					46				
17					47				
18					48			5	
19					49				
1350 20	0	0	0	0	1400 50	0	0	0	0
21					51				
22					52				
23					53	5	5	5	5
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
1400 30	0	0	0	0	1420 60	0	0	0	0

Source Layout Sketch

¤ Sun
» Wind
¥ Plume & Stack



Average Opacity for Highest Period: 5 @ 1 min

Number of Readings Above ~~%~~ Were ~~0~~ 20

Range of Opacity Readings — Minimum: 0 — Maximum: 5

Observer's Name (Print): Mitch Anderson

Observer's Signature: Mitch Anderson — Date: 2-7-95

Organization: Bison Engr.

Comments:
Time
1426 = Opacity ~10-15 for approx. 30 to 45 seconds.

Form #M5-01 DO NOT WRITE ABOVE THIS LINE Sheet No. 1 of 1

PARTICULATE FIELD DATA FORM

Plant Luzenac America		Location 3Forks		Stack ID No. Silo 5	Stack Dimension 12"
Date 2-8-95	Operator MNA	Run No. 4	Sample Box No. 3	Filter No. 1190	Meter Box No. 2

File = C:\Luzenac\Silo5-4.WQ1

Altitude ✓	Alt. Corr. ✓	Assumed Moisture 1%		Nozzle ID No. S-1	Nozzle Dia. 0.249
Barometric Reading 775 mbar		Ambient Temp. ~40°F		Probe ID No. ✓	Probe Length 1.5'
Barometric Pres. 26.10		Meter ΔH@ 1.92		Liner Material Stainless Steel	
Stack Static Pres. -0.69 "H2O		Meter Calib (Y) 1.058		Probe Heat Setting 150°F	

Traverse Point Number	Sampling Time (min.)	Clock Time (24 hr.) Start	Gas Sample Volume (cf) Start	Velocity Head (ΔP) ("H2O)	Pressure Differential across Orifice Meter (ΔH) ("H2O)	Vacuum, mm ("Hg)	#1 Stack Temp. (°F)	#3 Filter Temp. (°F)	#4 Temp. of Gas Leaving Condenser or Last Impinger (°F)	#6 Gas Sampler Temp at Dry Gas Meter (°F) Inlet	#7 Outlet
		1025	580.288								
A1	9		588.08	0.65	2.77	1	51	160	37	43	43
2	18		596.66	0.75	3.20	1.5	52	161	41	45	44
3	27		607.02	1.10	4.71	2.5	52	161	44	48	45
4	36		617.76	1.15	4.96	2.5	53	161	48	53	48
B1	45		627.97	0.99	4.27	2	57	159	52	58	52
2	54		637.51	0.88	3.86	1.5	53	161	53	56	55
3	63		647.27	0.88	3.84	2	56	161	54	66	58
4	72	1139	657.174	0.95	4.17	2	58	160	54	69	62
			MTR VOL=	Mean SQRT	ΔH		Ts			Tm	
			76.886	0.9549	3.981		54.3			53.2	

PRE-TEST LEAK CHECK: 0.002 ft³/min@15"Hg POST-TEST LEAK CHECK: 0.000 ft³/min@4"Hg

Rev. 12/92

FACILITY
Luzenac/3Forks
LOCATION
Silo 5
RUN #
Four
DATE
2-8-95
START TIME
1025
STOP TIME

PRELIMINARY INFO.	
Bp (Pm) (in.Hg)	26.1
Stack Dia (rnd)	1
Stack Area (sq.ft.)	0.79
Yi	1.058
Delta H@	1.92

PRE TEST INFO	
Assumed moisture %	1.0
Assumed Meter Temp, F	45.0
Time per Point	9.00
Nozzle Dia (in.)	0.249
Total Number of Points	8

CALCULATED	
Stack press. (Ps)	26.05
Stack Area (rnd)	0.79
Meter Temp, R	505.0
Recommended Nz dia.	0.211
Nozzle area (ft^)	0.00034
Total Run Time	72.00

CALCULATED	
Actual % H2O in Stack	0.37
Actual Wet Molec. Wt	28.80
Actual Isokinetic Avg	100.00

EMISSIONS	
lb / dscf STD	7.766E-08
grains / dscf STD	0.0005
lb / hour STD	0.01
lb / ft^3 Act.	6.93E-08
grains / ft^3 Act.	0.0005

TRAVERSE INFO	
Static (use - if neg.)	-0.69
Stack Temp, F	53.0
Aquired avg. delta P	0.80
Oxygen	21.00
Carbon Dioxide	0.00

POST TEST INFO	
Impinger H2O Gain (g)	5.86
Particulate Gain (mg)	2.60

CALCULATED	
Stack Temp, R(Ts)	513.0
Wet mol. wt. (Ms)	28.73
Dry mol. wt. (Md)	28.84

											TEST		STACK		METER		ACT
											Calc	SQRT	Stack Vel.	Stack Flow	Volume	Volume cu. ft.	Stack Vel
Trav Point	Sample Time	MetrVol 580.288	Vel head delta P	Calc. delta H	Actual delta H	Stack Temp	Meter Temp In	Meter Temp Out	Point % I	Accum. Iso %	K	dP	ft/sec	cuft/min	std	per min	ft/sec
1	9.0	588.080	0.65	2.770	2.80	51	43	43	98	97.9	4.262	0.81	47.84	2254	7.61	1.017	47.78
2	18.0	596.660	0.75	3.200	3.20	52	45	44	100	99.0	4.266	0.87	51.44	2424	8.36	1.093	51.38
3	27.0	607.020	1.10	4.712	4.70	52	48	45	100	99.4	4.283	1.05	62.29	2936	10.10	1.324	62.22
4	36.0	617.760	1.15	4.955	5.00	53	53	48	101	99.7	4.309	1.07	63.76	3004	10.40	1.355	63.68
5	45.0	627.970	0.99	4.270	4.30	57	58	52	103	100.3	4.313	0.99	59.39	2798	9.78	1.262	59.32
6	54.0	637.510	0.88	3.851	3.90	53	62	55	100	100.3	4.376	0.94	55.77	2628	9.07	1.185	55.71
7	63.0	647.270	0.88	3.840	3.90	58	66	58	103	100.6	4.363	0.94	56.04	2641	9.21	1.191	55.98
8	72.0	657.174	0.95	4.173	4.20	58	69	62	100	100.5	4.392	0.97	58.23	2744	9.29	1.237	58.16
9	81.0			0.000					ERR	ERR	4.330	0.00	0.00	0	******	0.000	0.00
10	90.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
11	99.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
12	108.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
13	117.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
14	126.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
15	135.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
16	144.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
17	153.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
18	162.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
19	171.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
20	180.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
21	189.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
22	198.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
23	207.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
24	216.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
25	225.0			0.000					ERR	ERR	4.330	0.00	0.00	0	0.00	0.000	0.00
Actual Vol		76.886	dP	avg	dH	Ts		Tm	%Iso			SQRT d	avg	avg	Vol std	dscf/m	avg
			0.92	3.971	4.00	54		53	ERR			0.95	56.84	2679	73.83	1.2081	56.78

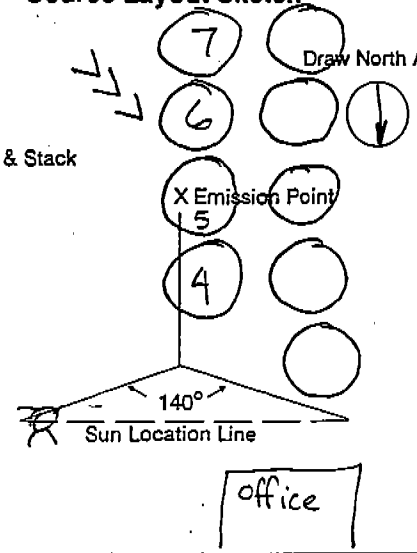
VISIBLE EMISSION OBSERVATION FORM Run 4

Source Name: Luzenac	Observation Date: 2-8-95	Start Time: 1030	Stop Time: 1130
Address: 767 Old Yellowstone Trail			
City: 3Forks	State: MT	Zip: 59752	
Phone: (406) 285-3271	Source ID Number: Silo 5		
Process Equipment: Product Silo	Operating Mode: Normal		
Control Equipment: Baghouse	Operating Mode: Normal		
Describe Emission Point: Start Portable Stack	Stop Same		
Height above Ground Level: Start ~40'	Stop Same	Height Relative to Observer: Start ~2'	Stop Same
Distance from Observer: Start ~8'	Stop Same	Direction from Observer: Start 180	Stop Same
Describe Emissions: Start Talc Dust	Stop Same		
Emission Color: Start White	Stop Same	Plume Type: Continuous ☐ Fugitive ☐ NA Intermittent ☐	
Water Droplets Present? Yes ☐ No ☒		If Water Droplet Plume: NA Attached ☐ Detached ☐	
Point in the Plume at which Opacity was Determined: Start Stack Outlet	Stop Same		
Describe Background: Start Bin	Stop Same		
Background Color: Start White	Stop	Sky Conditions: Start C-PC	Stop Same
Wind Speed: Start 0-5	Stop Same	Wind Direction: Start ~200°	Stop Same
Ambient Temp.: Start ~40°F	Stop Same	Wet Bulb Temp. / RH Percent	

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10 (1040)	0	0	0	0	40 (1119)	0	0	0	0
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20 (1050)	0	0	0	0	50 (1130)	0	0	0	0
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30 (1100)	0	0	0	0	60 (1130)	0	0	0	0

Source Layout Sketch

¤ Sun
» Wind
¥ Plume & Stack



Average Opacity for Highest Period: 0

Number of Readings Above 20 % Were 0

Range of Opacity Readings: Minimum 0 Maximum 0

Observer's Name (Print): Mitch Anderson

Observer's Signature: Mitch Anderson

Date: 2-8-95

Organization: BISON ENGINEERING

Comments: Portable Stack (12") set up on top of silo.

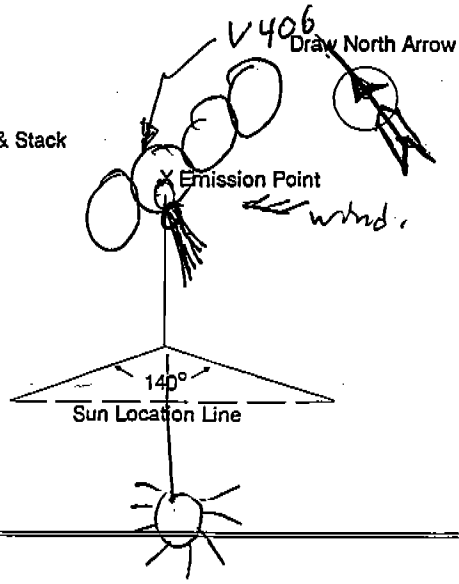
VISIBLE EMISSION OBSERVATION FORM Silo 6

Source Name: Luzenac - America	Observation Date: 2-23-95	Start Time: 1355	Stop Time: 1454 ~~1455~~
Address: 767 Old Yellowstone Trail			
City: Three Forks	State: MT	Zip: 59752-9313	
Phone: (406) 285-3271	Source ID Number: V406		
Process Equipment: Silo + pneu. conveyors	Operating Mode: Cont.		
Control Equipment: vent Pulsaire Baghouse fan.	Operating Mode: Cont.		
Describe Emission Point: Start vent fan exhaust Stop same			
Height above Ground Level: Start 66' Stop same	Height Relative to Observer: Start 66' Stop same		
Distance from Observer: Start 11C' Stop same	Direction from Observer: Start ENE Stop same		
Describe Emissions: Start invisible Stop same			
Emission Color: Start ? -WH. Stop	Plume Type: Continuous ☑ Fugitive ☐ Intermittent ☑		
Water Droplets Present? Yes ☐ No ☑	If Water Droplet Plume: N/A Attached ☐ Detached ☐		
Point in the Plume at which Opacity was Determined: Start ≈ 1-3 ø out. Stop same			
Describe Background: Start sky Stop same			
Background Color: Start Blue Stop same	Sky Conditions: Start Clear Stop		
Wind Speed: Start 2-5 Stop 5-10	Wind Direction: Start ESE Stop		
Ambient Temp.: Start 55 Stop 58	Wet Bulb Temp. 44 → 47 RH Percent 40%		

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch

¤ Sun
» Wind
Plume & Stack



Average Opacity for Highest Period: 0

Number of Readings Above 7 % Were 0

Range of Opacity Readings: 0 Minimum 0 Maximum

Observer's Name (Print): BOB RICHARDS

Observer's Signature: Robert Richards Date: 2-23-95

Organization: BISON ENGINEERING

Comments: SOME interference ~~with~~ from a plume passing behind the source

x

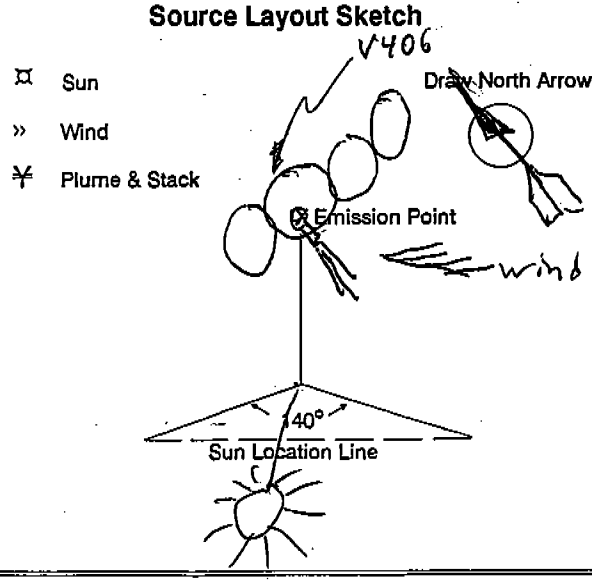
VISIBLE EMISSION OBSERVATION FORM - Silo 6

Source Name: Luzenac - America	Observation Date: 2-23-95	Start Time: 1456	Stop Time: 1555

Address: 767 OLD yellowstone Trail	
City: Three Forks	State: MT
Zip: 59752-9313	
Phone: (406) 285-3271	Source ID Number: V406
Process Equipment: Silo + pneu. conveyors	Operating Mode: Cont.
Control Equipment: pulsaire baghouse vent fan	Operating Mode: Cont.
Describe Emission Point: Start vent fan exhaust Stop Same	
Height above Ground Level: Start 66' Stop Same	Height Relative to Observer: Start 66' Stop Same
Distance from Observer: Start 110' Stop Same	Direction from Observer: Start ENE Stop Same
Describe Emissions: Start Invisible Stop Same	
Emission Color: Start ? Wht Stop	Plume Type: Continuous ☑ Fugitive ☐ ; Intermittent ☐
Water Droplets Present? Yes ☐ No ☑	If Water Droplet Plume: N/A, Attached ☐ Detached ☐
Point in the Plume at which Opacity was Determined: Start ≈1-4' out. Stop Same	
Describe Background: Start Sky Stop Same	
Background Color: Start Blue Stop Same	Sky Conditions: 30% Start clear Stop Cirrus
Wind Speed: Start 5-10 Stop 6-12	Wind Direction: Start ESE Stop SSE
Ambient Temp. Start 52 Stop 57	Wet Bulb Temp. 47→46 RH Percent 41%

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch



Average Opacity for Highest Period: 0

Number of Readings Above 7 % Were 0

Range of Opacity Readings: 0 Minimum 0 Maximum

Observer's Name (Print): BOB RICHARDS

Observer's Signature: Robert C Richards Date: 2-23-95

Organization: BISON ENGINEERING

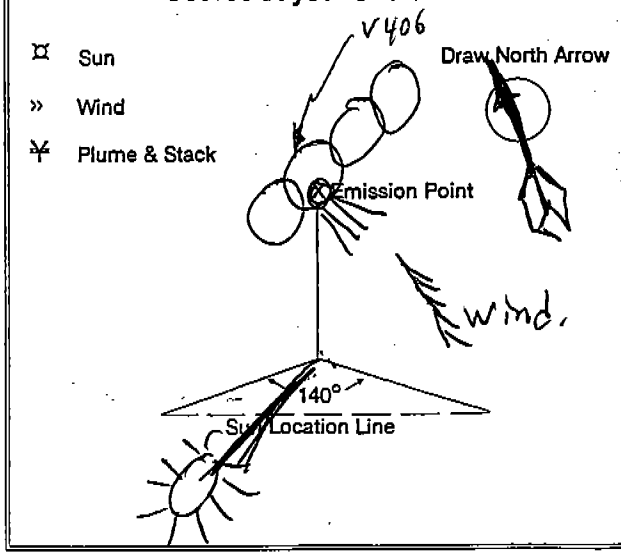
Comments: Some interference from fugitive dust - truck traffic.

VISIBLE EMISSION OBSERVATION FORM Silo 6

Source Name: Luzenac - America	Observation Date: 2-23-95	Start Time: 1556	Stop Time: 1655
Address: 76701d Yellowston Trail			
City: Three Forks	State: MT	Zip: 59752-9313	
Phone: (406) 285-3271	Source ID Number: V406		
Process Equipment: Silo + pneu. Conveyors	Operating Mode: cont.		
Control Equipment: Pulsaire baghouse vent fan	Operating Mode: cont.		
Describe Emission Point — Start: vent fan exhaust	Stop: same		
Height above Ground Level — Start: 66' Stop: same	Height Relative to Observer — Start: 66' Stop: same		
Distance from Observer — Start: 11 0' Stop: Same	Direction from Observer — Start: ENE Stop: Same		
Describe Emissions — Start: invisible	Stop: Same		
Emission Color — Start: wh ? Stop:	Plume Type: Continuous ☑ Fugitive ☐ Intermittent ☑		
Water Droplets Present? Yes ☐ No ☑	If Water Droplet Plume: N/A Attached ☐ Detached ☐		
Point in the Plume at which Opacity was Determined — Start: ≈ 1-4 ø out	Stop: 1-4 ø out.		
Describe Background — Start: sky Blue-	Stop: sky		
Background Color — Start: Blue Stop: very light haze	Sky Conditions — Start: 40% cirrus Stop: 80% very light haze		
Wind Speed — Start: 6-12 Stop: 4-8	Wind Direction — Start: SSE Stop: SSE		
Ambient Temp. — Start: 57 Stop: 56	Wet Bulb Temp.: 46 – 44 RH Percent: 41%		

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch



Average Opacity for Highest Period: 0

Number of Readings Above % Were: 7 % Were 0

Range of Opacity Readings: 0 Minimum 0 Maximum

Observer's Name (Print): BOB RICHARDS

Observer's Signature: Robert G. Richards Date: 2-23-95

Organization: BISON ENGINEERING

Comments:

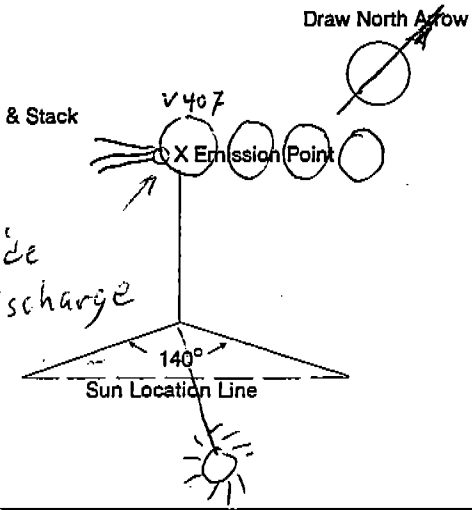
VISIBLE EMISSION OBSERVATION FORM Silo 7

Source Name: Lutenac America	Observation Date: 2-23-95	Start Time: 1000
Address: 767 Old Yellowstone Trail		Stop Time: 1059
City: Three Forks	State: MT	Zip: 59752-9313
Phone: (406) 285-3271	Source ID Number: V407	
Process Equipment: Silo-pneu. conveyors	Operating Mode: Cont.	
Control Equipment: VENT FAN - Baghouse Pulsaire	Operating Mode: Cont.	
Describe Emission Point: Start FAN EXH, VENT	Stop: Same	
Height above Ground Level: Start 66' Stop same	Height Relative to Observer: Start 66' Stop same	
Distance from Observer: Start 90' Stop same	Direction from Observer: Start NW Stop same.	
Describe Emissions: Start Invisible	Stop: same	
Emission Color: Can't tell. Start ? (WH) Stop	Plume Type: ? Continuous ☑ Fugitive ☐ ? Intermittent ☐	
Water Droplets Present? Yes ☐ No ☑	If Water Droplet Plume: N/A Attached ☐ Detached ☐	
Point in the Plume at which Opacity was Determined: Start ≈2-4' out.	Stop: ≈ 2-4' out	
Describe Background: Start Sky	Stop: same	
Background Color: Start Blue Stop same	Sky Conditions: Start clear Stop same	
Wind Speed: Start 0-3 Stop 3-5	Wind Direction: Start NE Stop ENE st stop	
Ambient Temp.: Start 39 Stop 47	Wet Bulb Temp. 36/39 RH Percent 83%	

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch

¤ Sun
» Wind
¥ Plume & Stack



Average Opacity for Highest Period: 0

Number of Readings Above ≠ % Were 0

Range of Opacity Readings: 0 Minimum 0 Maximum

Observer's Name (Print): BOB RICHARDS

Observer's Signature: Robert G. Richards Date: 2-23-95

Organization: BISON ENGINEERS

Comments: side discharge ⇒ Height above obs, isn't a problem. Viewing angle is perpindicular.

@ ~66' up. Joe - lub

V404 V405 V406 V407

Phil - Supv, Bill Kraemer - Enviro

VISIBLE EMISSION OBSERVATION FORM Silo 7

Source Name: Luzenac-America	Observation Date: 2-23-95	Start Time: 1100
Address: 767 Old Yellowstone Trail		Stop Time: 1159 + 200
City: Three Forks	State: MT	Zip: 59752-9313
Phone: (406) 285-3271	Source ID Number: V407	
Process Equipment: Pneu. Silo/Conveyors	Operating Mode: Cont.	
Control Equipment: Pulsaire Vent fan - Baghouse	Operating Mode: Cont.	
Describe Emission Point: Start Vent fan exhaust Stop		
Height above Ground Level: Start 66' Stop Same	Height Relative to Observer: Start 66' Stop Same	
Distance from Observer: Start 90' Stop Same	Direction from Observer: Start NW Stop Same	
Describe Emissions: Start Invisible Stop Same		
Emission Color: Start White Stop	Plume Type: Continuous ☐ Fugitive ☐ Intermittent ☑	
Water Droplets Present? Yes ☐ No ☑	If Water Droplet Plume: N/A Attached ☐ Detached ☐	
Point in the Plume at which Opacity was Determined: Start 1-3' out. Stop Same		
Describe Background: Start Sky Stop Same		
Background Color: Start Blue Stop Same	Sky Conditions: Start Clear Stop Same	
Wind Speed: Start 3-5 Stop 0	Wind Direction: Start ENE Stop N/A.	
Ambient Temp.: Start 47 Stop 55	Wet Bulb Temp. 39→42 / RH Percent 48%	

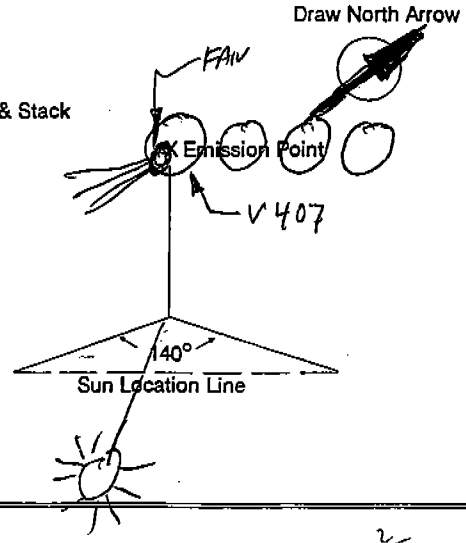
Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	5	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch

¤ Sun

» Wind

Plume & Stack



Average Opacity for Highest Period: <0.2	Number of Readings Above: 7 % Were 0
Range of Opacity Readings: 0 Minimum 5 Maximum	
Observer's Name (Print): BOB RICHARDS	
Observer's Signature: Robert G. Richards	Date: 2-23-95
Organization: BISON ENGINEERING	
Comments: See previous sheet.	

Rob Norman - Air Temp Station

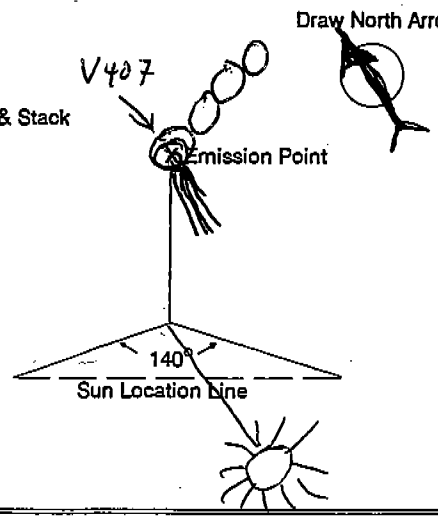
VISIBLE EMISSION OBSERVATION FORM - Silo 7

Source Name: Luzenac - America	Observation Date: 2-23-95	Start Time: 1215	Stop Time: 1314 / 1315
Address: 767 Old Yellowstone Trail			
City: Three Forks	State: MT	Zip: 59752-9313	
Phone: (406) 285-3271	Source ID Number: V407		
Process Equipment: Silo/pneu. conveyors	Operating Mode: CONT		
Control Equipment: Pulsaire Bagh. VENT Fan	Operating Mode: Cont.		
Describe Emission Point: Start Vent Fan exhaust Stop			
Height above Ground Level: Start 66' Stop same	Height Relative to Observer: Start 66' Stop Same.		
Distance from Observer: Start 90' Stop Same	Direction from Observer: Start ~~East~~ Stop SAME		
Describe Emissions: Start INVISIBLE Stop Same	NIVE		
Emission Color: Start Y-wh. Stop Same.	Plume Type: Continuous ☑ Fugitive ☐ Intermittent ☐		
Water Droplets Present: Yes ☐ No ☑	If Water Droplet Plume: Attached ☐ Detached ☐		
Point in the Plume at which Opacity was Determined: Start ~1-3 Out. Stop Same			
Describe Background: Start SKY Stop Same			
Background Color: Start Blue Stop Same	Sky Conditions: Start Clear Stop Same		
Wind Speed: Start 0-3 Stop 2-5	Wind Direction: Start E Stop ESE		
Ambient Temp.: Start 55 Stop 55	Wet Bulb Temp. 42-44 / RH Percent 30%		

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch

¤ Sun
» Wind
¥ Plume & Stack



Average Opacity for Highest Period: 0

Number of Readings Above 7 % Were 0

Range of Opacity Readings: 0 Minimum 0 Maximum

Observer's Name (Print): BOB RICHARDS

Observer's Signature: Robert Richards Date: 2-23-95

Organization: Bison Engineering

Comments: Climbed Silo & checked FAN Operation ~~Between~~ Before commencing Run. All OK

Ground Once
Stored Taylor Fluid Energy Mill

Table 4: Three Forks Source Test Log

Product

60" roller mill

Date	Source	Test Run	Start Time
1-31-95	Silo #4	1	1405
2-2-95	Silo #4	2	1115
2-2-95	Silo #4	3	1338
2-7-95	Silo #5	2	1101
2-7-95	Silo #5	3	1318
2-8-95	Silo #5	4	1025
2-23-95	Silo #6	1	1355
2-23-95	Silo #6	2	1456
2-23-95	Silo #6	3	1556
2-23-95	Silo #7	1	1000
2-23-95	Silo #7	2	1100
2-23-95	Silo #7	3	1215

- 6.0 VAPOR @ 4 TPH (2 mills)
- " " " "
- " " " "
- FEM Fd @ 11 TPH 60" RM
- " " " "
- " " " "
- M.V. Feed @ 8 TPH 54" RM
- " " " "
- " " " "
- M-100 Feed @ 4.5 TPH 54" RM
- " " " " " "
- " " " " " "

William R. K
4-6-95

Air

SILO 4 - PRODUCT
SILO 5 - INTERMEDIATE MATERIAL

APPENDIX C: LABORATORY DATA

Form #M5-06

BEAKER/FILTER TARES AND FINAL WEIGHTS

NOTE: Report all weights to 0.0001 g. Record sample volumes in Column 3.. "Constant Weight" means ≤ 0.0005 g difference between 2 weighings at least 6 hours apart OR 2 ≤ 1% of average total weight less average tare weight.

Plant Luzenac	Location Sappington
Test Dates 1-31 & 2-2-95	Stack ID method 5 Silo 4

ID NO.	SAMPLE DESCRIPTION (filter, probe/nozzle wash, impinger catch, blank, etc.)	DESCRIPTION (Tare 1, Tare 2, Final 1, etc.)					
		Tare #1	Tare #2	FINAL #1	FINAL #2	FINAL #3	
		Date 2/5	Date 2/6	Date 2/7	Date 2/7	Date 2/8	Date
		Time 6:55p	Time 9:15a	Time 11:15a	Time 8:00p	Time 9:45a	Time
C-4		Initial JCH	Initial JCH	Initial JCH	Initial JCH	Initial JCH	Initial
	Run #1						
1174	Filter	0.3516	0.3511	0.3517	0.3516		
4-1	Probe	96.0357	96.0357	96.0395	96.0383	96.0384	
4-1	Impinger	172.4881	172.4876	172.4905	172.4901		
	Run #2						
1176	Filter	0.3510	0.3505	0.3506	0.3505		
4-2	Probe	109.6806	109.6808	109.6858	109.6861		
4-2	Impinger	158.8815	158.8810	158.8848	158.8840	158.884	
	Run #3						
1177	Filter	0.3486	0.3482	0.3479	0.3479		
4-3	Probe	111.3732	111.3731	111.3765	111.3760		
4-3	Impinger	158.2505	158.2500	158.2524	158.2522		

Form #M5-07

PARTICULATE DATA WORKSHEET

Plant Luzenac	Location Sappington		
Test Dates 1-31 & 2-2-95	Initials MCH	Stack ID Mth. 5	SU 4

DC-4

Sample Description	ID No.	Average Tare, G	Average Final, G	Net Particulate Gain, G	
Filter	1174	0.3514	0.3517	+0.0003	.0032
Probe	4-1	96.0355	96.0384	0.0029	
Impinger	4-1	172.4879	172.4903	0.0024	
Cyclone					
Filter	1176	0.3508	0.3506	-0.0002	⇒0.
Probe	4-2	109.6807	109.6860	0.0053	.0053
Impinger	4-2	158.8813	158.8840	0.0027	
Cyclone					
Filter	1177	0.3484	0.3479	-0.0005	⇒0
Probe	4-3	111.3732	111.3763	0.0031	.0031
Impinger	4-3	158.2503	158.2523	0.0020	
Cyclone					
Water Blank					
Acetone Blank					
Field Filter Blank					
System Filter Blank					

Form #M4-02

IMPINGER CATCH AND SAMPLE TRAIN RINSE FORM
(for Pre-Weighed Sample Bottles)

Plant Luzerne	Location	Stack ID Method 5
Project No.	Tested By MWA / CWL	Test Dates

SILO 4

Note: All weights in grams

Run No.	Weight	Date	Impinger Catch Bottle	Silica Gel Bottle	Initials
1	Final	2/3/95	245.31g	261.28g	JCH
	Initial	1/19/95	257.64g	239.12g	JCH
		Net Gain	-12.33g	22.16g	JCH
			Total Gain 9.83g		JCH
2	Final	2/3/95	279.95g	266.24g	JCH
	Initial	1/9/95	298.56g	246.13g	JCH
		Net Gain	-18.56g	20.11g	JCH
			Total Gain 1.55g		JCH
3	Final	2/3/95	231.81g	242.32g	JCH
	Initial	1/19/95	252.76g	227.67g	JCH
		Net Gain	-20.95g	14.65g	JCH
			Total Gain -6.3g		JCH

RINSE VOLUMES, ml				
Run No.	Cyclone	Probe/Front Half	Impingers	Other (describe)
1		83mL	195mL	
2		47mL	220mL	
3		50mL	175mL	

Form #M5-06

BEAKER/FILTER TARES AND FINAL WEIGHTS

NOTE: Report all weights to 0.0001 g. Record sample volumes in Column 3. "Constant Weight" means ≤ 0.0005 g difference between 2 weighings at least 6 hours apart OR 2 ≤ 1% of average total weight less average tare weight.

Plant Luzenac America	Location Sappington
Test Dates 2-7 & 2-8-95	Stack ID Method 5 S1005

ID NO.	SAMPLE DESCRIPTION (filter, probe/nozzle wash, impinger catch, blank, etc.)	DESCRIPTION (Tare 1, Tare 2, Final 1, etc.)					
		TARE #1	TARE #2	FINAL #1	FINAL #2	FINAL #3	
		Date 2/13	Date 2/14	Date 2/15	Date 2/16	Date 2/20	Date
		Time 3:00p	Time 10:00a	Time 3:15p	Time 11:15a	Time 9:25a	Time
		Initial QKH	Initial QKH	Initial QKH	Initial QKH	Initial QKH	Initial
	RUN #2						
1189	FILTER	0.3476	0.3472	0.3472	0.3470		
5-2	PROBE	115.9162	115.9167	115.9191	115.9185	115.9183	
5-2	IMPINGER	171.5351	171.5354	171.5336	171.5326	171.5335	
				~~0.3472~~			
	RUN #3						
1192	FILTER	0.3469	0.3465	0.3464	0.3462		
5-3	PROBE	107.3735	107.3740	107.3759	107.3751	107.3762	
5-3	IMPINGER	158.4994	158.4990	158.4991	158.4978	158.4991	
	RUN #4						
1190	FILTER	0.3467	0.3463	0.3464	0.3463		
5-4	PROBE	112.9068	112.9066	112.9101	112.9093	112.9092	
5-4	IMPINGER	113.4252	113.4253	113.4245	113.4229	113.4232	

Form #M5-07

PARTICULATE DATA WORKSHEET

Plant Luzerac	Location Sappington		
Test Dates 27 & 28-95	Initials KH	Stack ID Method 5	S1105

Sample Description	ID No.	Average Tare, G	Average Final, G	Net Particulate Gain, G	
M-5 Filter	1189	0.3474	0.3471	-0.0003	⇒0
Probe	5-2	115.9165	115.9184	0.0019	>.0019
Impinger	5-2	171.5353	171.5336	-0.0017	
Cyclone					
Filter	1192	0.3467	0.3463	-0.0004	⇒0
Probe	5-3	107.3738	107.3761	0.0023	>.0023
Impinger	5-3	158.4992	158.4991	-0.0001	
Cyclone					
Filter	1190	0.3465	0.3464	-0.0001	⇒0
Probe	5-4	112.9067	112.9093	0.0026	>.0026
Impinger	5-4	113.4253	113.4231	-0.0022	
Cyclone					
Water Blank			0.3464		
Acetone Blank					
Field Filter Blank					
System Filter Blank					

Form #M4-02

IMPINGER CATCH AND SAMPLE TRAIN RINSE FORM
(for Pre-Weighed Sample Bottles)

Plant Luzenac	Location Sappington	Stack ID Method 5
Project No. 94183-1	Tested By MWA	Test Dates 2-7 & 2-8-95

S1605

Note: All weights in grams					
Run No.	Weight	Date	Impinger Catch Bottle	Silica Gel Bottle	Initials
1	Final	2-9-95	225.97g	250.30g	JKH
	Initial	2-3-95	234.12g ✓	236.38g ✓	JKH
		Net Gain	-8.15g ✓	13.92g ✓	JKH
			Total Gain 5.77g ✓		JKH
2	Final	2-9-95	224.17g	255.63g	JKH
	Initial	2-3-95	221.07g ✓	240.46g ✓	JKH
		Net Gain	3.1g ✓	15.17g ✓	JKH
			Total Gain 18.27g ✓		JKH
3	Final	2-10-95	241.71g	236.11g	JKH
	Initial	2-3-95	249.11g ✓	222.85g ✓	JKH
		Net Gain	-7.4g ✓	13.26g ✓	JKH
			Total Gain 5.86g ✓		JKH

RINSE VOLUMES, ml				
Run No.	Cyclone	Probe/Front Half	Impingers	Other (describe)
1		127 mL	190mL	
2		98 mL	195 mL	
3		78 mL	212 mL	

3-2-95 RAC

Rev. 5/94

APPENDIX D: SCHEMATICS

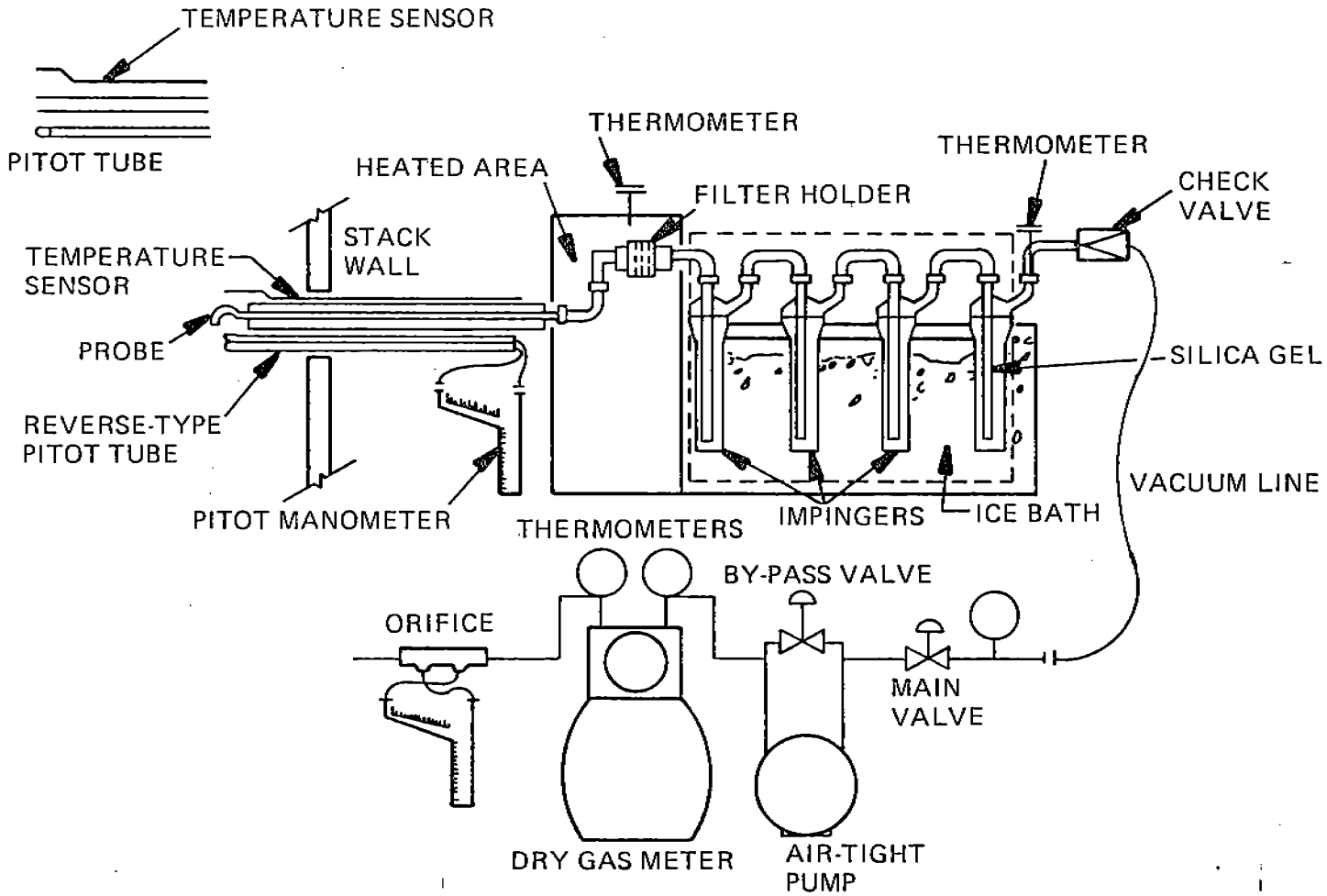
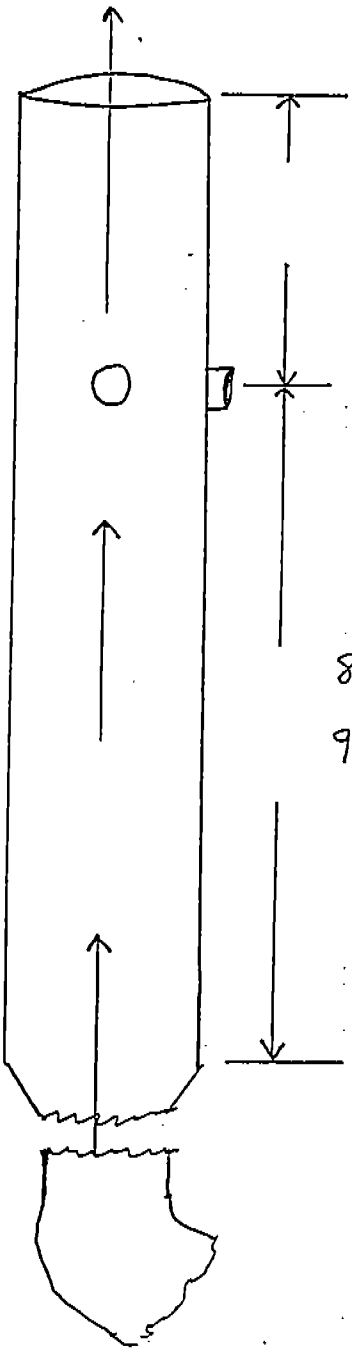


FIGURE 2
EPA METHOD 5 PARTICULATE SAMPLE APPARATUS

PORTABLE STACK DESIGN (ROUND)



	Optimum	Minimum
	2 Diameters	.5 Diameters
	24 inches	6 inches
	8 Diameters	2 Diameters
	96 inches	24 inches

Sketch of Sample port location.

APPENDIX E: NOMENCLATURE AND FORMULAE

NOMENCLATURE

Stack test standard conditions:
Pressure -- 29.92" Hg
Temperature -- 68°F

A_n	Nozzle cross sectional area; ft^2
A_s	Stack cross sectional area; ft^2
BHP	Brake Horsepower
B_{ws}	Water vapor in the gas stream; volume proportion
C_a	Concentration of acetone blank residue; mg/g
C_p	Pitot tube coefficient; 0.84 for type S pitot tube
C_s	Concentration of stack gas particulates; dry basis corrected to standard conditions; lb/dscf (pounds/dry std. ft^3) or gr/dscf (grains/dry std. cubic foot)
D_{50}	Aerodynamic diameter of particles with 50 percent probability of cyclone penetration; μ
e	Emission rate conversion factor (.002122 for NO; .0020 for CO; .00325 for NO_2)
E	Emission rate grams/BHP-hr
E_{hr}	Emission rate per hour; lb/hr
Fan HP	Actual cooling fan losses
FE	Frame Efficiency (= 1.05). Energy losses due to frame absorption.
I	Percent sampling rate variation, where 100% = ideal isokinetic conditions
K	1.2 = Specific Heat Ratio (C_p/C_v)
K_p	Pitot tube constant; 85.49

LF	Loss Factor (= 1.2). Energy losses due to compressor valves, etc.
m_a	Acetone residue weight after evaporation; mg
M_d	Stack gas dry molecular weight, from Fyrite or Orsat analysis; lb/lb-mole
m_f	Filter weight gain; mg
MMCFD	Million cubic feet of gas per day
m_n	Total weight of collected particulate; mg
$m_{n, PM10}$	Total weight of collected PM_{10} particulate; mg
M_W	Molecular weight of water; 18.0 lb/lb mole
M_s	Wet molecular weight of stack gas; lb/lb mole
P_{bar}	Barometric station pressure (at sampling site); in. Hg
P_g	Stack static pressure; in. H_2O
P_s	Absolute stack pressure; in. Hg
P_{std}	Absolute pressure @ standard conditions; 29.92" Hg
PPM	Parts per million
Q_s	Average stack gas wet volumetric flow rate; cfm (ft^3/min)
Q_{std}	Average stack gas dry volumetric flow rate, corrected to standard conditions; scfm (dry standard ft^3/min)
T_m	Average dry gas meter temperature, abs.; °R
t_s	Average stack gas temperature, °F
T_s	Suction Temperature (°R)
$T_{s(avg)}$	Average stack gas temperature, abs.; °R
T_{std}	Absolute temperature @ standard conditions; 520°R
R	Ideal gas constant; 21.85 in. hg-ft^3/°R-lb-mole
V_{lc}	Total volumes of water collected in impingers; ml

V_m	Indicated volume of gas sample measured at dry gas meter; dcf (dry ft^3)
$V_{m(std)}$	Volume of gas sample measured at dry gas meter, corrected to standard conditions; dscf (dry standard cubic feet)
v_s	Stack gas velocity from Method 2
$V_{w(std)}$	Volume of water vapor in the gas sample, corrected to standard conditions; scf (standard cubic feet)
W_{lc}	Weight of collected water; g
Y	Dry gas meter calibration factor
Δp	Stack velocity stagnation pressure recorded by the probe's type S pitot tube
ΔH	Average pressure differential across orifice meter at control box
μ_s	Stack gas absolute viscosity; μ poise
ρ_w	Density of water; 0.9982 g/ml (0.0022 lb/ml)
Θ	Total sampling time; min.
13.6	Specific gravity of mercury
60	Seconds per minute

FORMULAE

1. Dry Gas Volume - Corrected to STP (40 CFR 60, App. A, Eq.-5-1)

$$V_{m(std)} = V_m Y \left(\frac{T_{std}}{T_m} \right) \left[\frac{P_{b_{ar}} + \frac{\overline{\Delta H}}{13.6}}{P_{std}} \right]$$

Y is obtained from post test meter calibrations shown in Appendix E.

2. Water Vapor Volume - Corrected to STP (40 CFR 60, App. A, Eq. 5-2)

$$V_{w(std)} = V_{lc} \left(\frac{\rho_w}{M_w} \right) \left(\frac{R T_{std}}{P_{std}} \right)$$

Note: $W_{lc} = V_{lc} \rho_w$

3. Stack Gas Moisture Content (40 CFR 60 App. A, Eq. 5-3, modified)

$$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$$

4. Stack Gas Dry and Wet Molecular Weight (40 CFR 60 App. A, Eq. 3-1, 2-5)

$$M_d = 0.440 \, (\%CO_2) + 0.320 \, (\%O_2) + 0.280 \, (\%N_2 + \%CO)$$

$$M_s = M_d \, (1 - B_{ws}) + 18.0 \, B_{ws}$$

5. Average Stack Gas Velocity (40 CFR 60 App. A, Eq. 2-9)

$$v_s = K_p C_p \left(\frac{\sum_1^n \sqrt{\Delta p}}{n} \right) \sqrt{\frac{T_{s(avg)}}{P_S M_S}}$$

6. Average Stack Gas Wet Volumetric Flow Rate

$$Q_s = 60 v_s A_s$$

7. Average Stack Gas Dry Flow Rate Corrected to Standard Conditions (40 CFR 60 App. A, Eq. 2-10, modified)

$$Q_{std} = Q_s (1 - B_{ws}) \frac{T_{std}}{T_{s(avg)}} \frac{P_s}{P_{std}}$$

8. TSP Particulate Concentration Corrected to Standard Conditions (40 CFR 60 App. A, Eq. 5-6, modified)

$$c_{s_{lb}} = 2.205 \times 10^{-6} \frac{m_n}{V_{m(std)}}$$

$$c_{s_{gr}} = 15.43 \times 10^{-3} \frac{m_n}{V_{m(std)}}$$

Note: $C_{s,lb}$ = lb/dscf
$C_{s,gr}$ = grains/dscf
m_n = mg

APPENDIX F: CALIBRATION DATA

Form #M5-08

DRY GAS METER CALIBRATION DATA (English Units)

(60-Day Calibration)

Date October 19, 1994 Meter Box Number 3(80709)

Barometric Pressure, P_b = 25.73 " Hg Calibrated by JKH

Vacuum During Calibration 3.5 " Hg (should be at least 2½" Hg)

Orifice Manometer Setting (ΔH), " H_2O	Gas Volume			Temperatures			Time (Θ), min.
	Nom., ft^3	Wet Test Meter (V_w), ft^3	Dry Gas Meter (V_d), ft^3	Wet Test Meter (t_w), °F	Dry Gas Meter Inlet (t_{d_i}), °F	Dry Gas Meter Outlet (t_{d_i}), °F	
0.5	Start Read	253.517	465.049	80°	78°	78°	Ø
	End Read	258.517	470.104	79°	78°	78°	12.1
1.5	Start Read	268.311	479.890	78°	79°	78°	Ø
	End Read	273.314	484.899	78°	80°	78°	7.0
4.0	Start Read	274.263	485.836	78°	80°	79°	Ø
	End Read	279.264	490.776	78°	81°	79°	4.2

Y = 1.002

ΔH@ = 1.92

Rev. 11/93

Form #M5-08

DRY GAS METER CALIBRATION DATA (English Units)
(60-Day Calibration)

Date Oct. 12, 1994 Meter Box Number 2 (80575)

Barometric Pressure, P_b = 25.96 " Hg Calibrated by JKH

Vacuum During Calibration 4.5 " Hg (should be at least 2½" Hg)

Orifice Manometer Setting (ΔH), " H_2O	Gas Volume			Temperatures			Time (θ), min.
	Nom., ft^3	Wet Test Meter (V_w), ft^3	Dry Gas Meter (V_d), ft^3	Wet Test Meter (t_w), °F	Dry Gas Meter Inlet (t_{d_i}), °F	Dry Gas Meter Outlet (t_{d_o}), °F	
0.5	Start Read	236.092	731.556	72°	46°	43°	Ø
	End Read	241.093	735.586	72°	50°	46°	9.7
1.5	Start Read	241.854	736.321	72°	51°	47°	Ø
	End Read	246.854	741.159	71°	54°	49°	6.9
4.0	Start Read	248.009	742.276	72°	56°	52°	Ø
	End Read	253.014	747.030	72°	58°	53°	4.2

Y = 1.058

ΔH@ = 1.92

Rev. 11/93