United States
Environmental Protection
Agency

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

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January 1980

Air

EPA

Metallic Minerals

Emission Test Report
Anaconda
Butte, Montana

ANACONDA COPPER COMPANY
BUTTE, MONTANA

PROCESS ORE SAMPLES - ANALYTICAL RESULTS

Sample Description[1]	Percent Moisture	Percent Solids
Run I 10/25/79 5:01 PM (EP)	0.44	99.56
Run II 10/26/79 5:45 PM (EP)	0.36	99.64
Run I 10/26/79 3:09 PM (WB)	2.19	97.81
Run II 10/25/79 10:41 PM (WB)	0.14	99.86
Run III 10/26/79 9:00 PM (WB)	0.54	99.46
Run III 10/26/79 1:41 AM (EB)	3.69	96.31

[1] Description of samples were taken directly from sample bottles - no additional information is available.

SOURCE EMISSIONS TEST REPORT

Anaconda Copper Company
Butte Operations
Butte, Montana

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Contract No. 68-02-2816
Work Assignment No. 11

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SUMMARY

The Emission Measurement Branch of the U.S. Environmental Protection Agency contracted Roy F. Weston, Inc. to conduct a source testing and analysis program at Anaconda Copper Company's Butte, Montana copper processing facility.

The program was designed to determine various emission parameters associated with selected Primary Crusher and Truck Dumping Area test sites as indicated below:

	Number of Test Repetitions			
Source Description	Particulate	Particle Size	Visible Emission	Fugitive Emission
Grizzley East Duct	3	3	-	-
Crusher Hood Duct	3	3	-	-
Crusher Baghouse No. 1-2 Inlet Duct	3	3	-	-
Crusher Baghouse No. 1-2 Outlet Stack	3	1	1	-
Truck Dump Baghouse No. 3-4 Inlet Duct	3	3	-	-
Truck Dump Baghouse No. 3-4 Outlet Stack	3	1	2	-
Crusher Grizzley East	-	-	3	3
Crusher Grizzley West	-	-	3	3
Crusher Hood Area	-	-	3	3
Truck Dumping Area	-	-	3	3
Coarse Ore Stockpile	-	-	3	3
Coarse Ore Transfer Point	-	-	3	3
Fine Ore Feeder	-	-	-	2

The following test protocol was used during the survey:

Parameter	Test Method
Particulate	EPA 5[1]
Particle Size	Andersen 2000, Inc.[2]
Visible Emission	EPA 9[3]
Fugitive Emission	EPA 22[4]

[1] Code of Federal Regulations, Title 40, Part 60, Appendix A, "Standards of Performance for New Stationary Sources," August 18, 1977.

[2] Operating Manual for Andersen 2000, Inc., "Mark III Particle Sizing Stack Samplers," Andersen 2000, Inc., P.O. Box 20769, Atlanta, Georgia.

[3] Federal Register, Vol. 39, No. 219, November 12, 1974.

[4] Draft method, revised July 28, 1978.

The particulate matter concentration and mass rate results are summarized below:

GRIZZLEY EAST DUCT

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	10-25-79	0.129	19.2
2	10-25-79	0.058	9.67
3	10-26-79	0.068	11.5
Series Average		-	13.5

CRUSHER HOOD DUCT

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	10-25-79	1.55	251.
2	10-25-79	1.48	244.
3	10-26-79	1.00	166.
Series Average		-	220.

CRUSHER BAGHOUSE NO. 1-2 INLET DUCT

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	10-25-79	2.805	1,549.
2	10-25-79	2.624	1,558.
3	10-26-79	1.694	1,010.
Series Average		-	1,372.

CRUSHER BAGHOUSE NO. 1-2 OUTLET STACK

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	10-25-79	0.005	3.58
2	10-25-79	0.005	2.93
3	10-26-79	0.007	5.01
Series Average		-	3.84

TRUCK DUMP BAGHOUSE NO. 3-4 INLET DUCT

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	10-26-79	0.168	92.1
2	10-26-79	0.134	75.5
3	10-26-79	0.097	55.4
Series Average			74.3

TRUCK DUMP BAGHOUSE NO. 3-4 OUTLET STACK

Test Number	Date	Particulate Concentration Grains/DSCF	Particulate Mass Rate Pounds/Hour
1	10-26-79	0.020	12.0
2	10-26-79	0.019	11.0
3	10-26-79	0.014	8.56
Series Average			10.5

The measured particulate removal efficiency of the Crusher Area Baghouse was 99.69% and that of the Truck Dump Area Baghouse was 85.65%.

Detailed particulate test data and test result summaries are presented in Tables 1 through 12 in the Discussion of Test Results section of this report. Particle size distribution test results are shown in Tables 13 through 26. Data summaries for the visible emission tests are presented in Tables 10, 12, and 27 through 34. See Table 35 for summary of fugitive test data.

INTRODUCTION

The Emission Measurement Branch of the U.S. Environmental Protection Agency contracted Roy F. Weston, Inc. to conduct a source testing and analysis program at the Anaconda Copper Company's Butte, Montana copper processing facility. The objective of the testing program was to measure emission parameters relating to the ore crushing operations at the plant.

The locations tested, plus the number and types of tests performed at each site are listed below:

1. Crusher Grizzley East Duct
   a. Three particulate tests by EPA Method 5.
   b. Three particle size distribution tests by cascade impaction (Andersen).
2. Crusher Hood Duct
   a. Three particulate tests by EPA Method 5.
   b. Three particle size distribution tests by cascade impaction (Andersen).
3. Crusher Baghouse No. 1-2 Inlet Duct
   a. Three particulate tests by EPA Method 5.
   b. Three particle size distribution tests by cascade impaction (Andersen).
4. Crusher Baghouse No. 1-2 Outlet Stack.
   a. Three particulate tests by EPA Method 5.
   b. One particle size distribution test by cascade impaction (Andersen).
   c. One opacity test by EPA Method 9 simultaneous with particulate test run one.
5. Truck Dump Area Baghouse No. 3-4 Inlet Duct
   a. Three particulate tests by EPA Method 5.

b. Three particle size distribution tests by cascade impaction (Andersen).

6. Truck Dump Area Baghouse No. 3-4 Outlet Stack

   a. Three particulate tests by EPA Method 5.

   b. One particle size distribution test by cascade impaction (Andersen).

   c. Two opacity tests by EPA Method 9 simultaneous with particulate test runs one and two.

7. Crusher Grizzley East

   a. Three opacity tests by EPA Method 9 and three fugitive tests by Method 22. Visual determination of plume opacity and frequency performed concurrently with particulate tests.

8. Crusher Grizzley West

   a. Three opacity tests by EPA Method 9 and three fugitive tests by Method 22 performed in conjunction with particulate tests.

9. Crusher Hood Area

   a. Three EPA Method 9 and Method 22 tests performed in conjunction with the particulate tests.

10. Fine Ore Feeder

    a. Two EPA Method 22 tests conducted during particulate test runs two and three on the Crusher unit.

11. Truck Dumping Area

    a. Three EPA Method 9 and Method 22 tests performed in conjunction with the particulate tests at the truck dumping area.

12. Coarse Ore Transfer Point

    a. Three EPA Method 9 and Method 22 tests conducted independently of particulate tests.

13. Coarse Ore Stockpile

a. Three EPA Method 9 and Method 22 tests performed independently of particulate tests.

All tests were conducted during the period 24 through 26 October 1979 by Weston personnel and were observed by Mr. Dennis P. Holzschuh, EPA Technical Manager.

Test data and result summaries are presented in Tables 1 through 12 of this report. Particle size distribution results are shown in Tables 13 through 26. Data summaries for the visible emission tests are presented in Tables 10, 12, and 27 through 35. Also included is a description of the test locations, test equipment, test procedures, sample recovery, and analytical methods used during the test program. Raw test data, laboratory reports, sample calculations, equipment calibration records, and a list of project participants are provided in Appendices A though E, respectively.

PROCESS DESCRIPTION

GENERAL

A schematic flow diagram is presented in Figure 1. Copper ore is transferred from the open pit Berkley mine to the primary crusher by haul trucks with a capacity of 91 to 154 Mg (100 to 170 T), at an average rate of 40 trucks per hour. Haul trucks unload ore into one of two hoppers, with capacity of 363 Mg (400 T). From hopper, two vibrating grizzlies with critical size of ten centimeters (four inches) convey undersize to storage and eventually to secondary crushing. The oversize is transferred to a Traylor gyratory-type primary crusher with a capacity of 2,270 Mg (2,500 T) per hour which produces an ore of less than four inches. This ore is moved along with the undersize to one of six coarse ore bins with each having a capacity of 3,200 Mg (3,500 T) or to a storage area of 46,000 Mg (50,000 T). From these two storage facilities, ore is fed into a 680 Mg (750 T) surge bin. Vibrating screens, with a 2.5 centimeter (one inch) critical size, take oversize to one of three Symons secondary gyratory crushers. The crushed ore, along with the undersize, is conveyed at an hourly rate of 2,400 Mg (2,600 T) to one of twelve fine ore bins, each with a capacity of 900 Mg (1,000 T). The fine ore is fed to the rod mills where wet processing begins. The final mill product is a concentrate slurry of approximately 27 percent copper. The concentrate slurry is transported 33.5 kilometers (20 miles) in triple compartment railcars to a smelter in Anaconda, Montana.

Following are descriptions of the control equipment that was tested.

Truck Unloading

An hourly average of 1,900 Mg (2,000 T) of copper ore is unloaded. Emissions are ducted to a Fuller/Dracco, eight compartment, multi-bag, automatic filter unit. Operating parameters are an air flow rate of 3,200 m^3/minute (112,500 cfm), an air/cloth ratio of 2.9 feet/minute, shaking each compartment for seven minutes per hour, and nylon material.

Primary Crushing

Emissions are controlled by a Chem-jet wet suppression system and a baghouse. The Chem-jet system uses an aqueous solution of Nalco 8800 at a ratio of 1:3,000. Sprays are located near the grizzlies, at the entrance under the feeder belts to the crusher, and near the conveyor belt leaving the crusher. Emissions are vented from two grizzlies, primary crusher and conveyors leaving the crusher. Operating parameters are identical with the truck unloading unit.

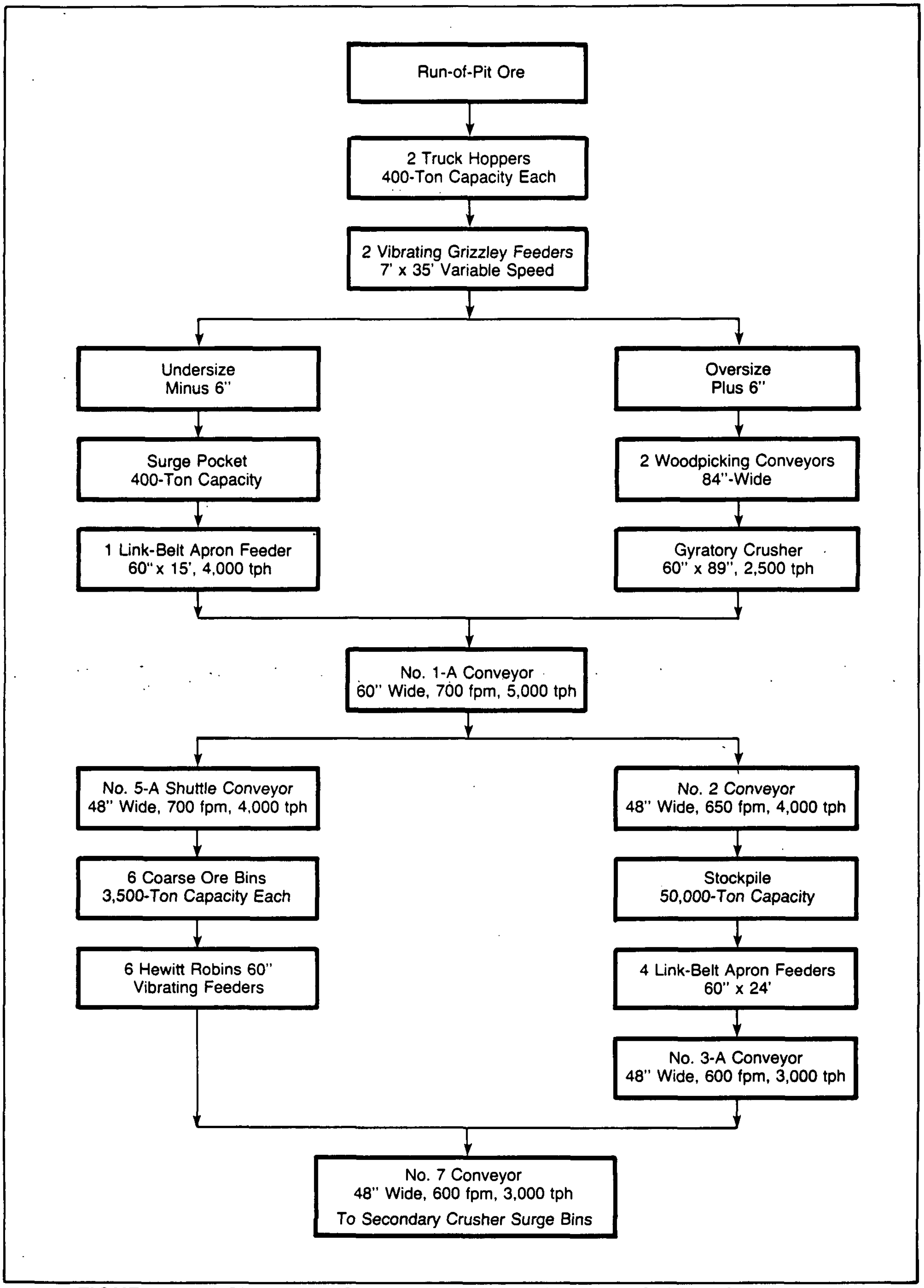

FIGURE 1 FLOWSHEET OF NEW PRIMARY CRUSHING PLANT (CRUSHING, STORAGE, AND CONVEYING SYSTEMS FROM THE BERKELEY PIT TO THE SECONDARY CRUSHING PLANT)

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PROCESS OPERATION

Primary Crusher

To determine if the process was representative, weight scale gauge readings for ore leaving the primary crusher were taken every half hour. Visual inspection of the crushing operation and of the two conveyor belts discharging into the crusher showed no gross abnormalities during the emission test period of October 25 and 26, 1979. The scale readings during testing are listed below:

Time	Metric tons	(tons/hour)
5:00 p.m.	2,130	(2,340)
6:00 p.m.	2,300	(2,530)
7:00 p.m.	2,050	(2,260)
8:00 p.m.	2,200	(2,420)
9:00 p.m.	950	(1,050)
10:00 p.m.	1,900	(2,090)
11:00 p.m.	2,150	(2,370)
12:00 p.m.	1,050	(1,160)
1:00 a.m.	2,380	(2,620)
2:00 a.m.	1,200	(1,320)
3:00 a.m.	2,050	(2,260)

Thus, during most of the test the crushing rate was close to the hourly design rate of 2,270 metric tons.

A summary of Methods 9 and 22 observations follows:

Method 9

Location	Date	Time	Opacity Readings (%) Average	Maximum
East Grizzley	10-25-79	1630-1837	0	3
East Grizzley	10-25-79	2050-2223	0	0
East Grizzley	10-26-79	0040-0228	0	1
West Grizzley	10-25-79	1630-1837	0	0
West Grizzley	10-25-79	2050-2224	0	0
West Grizzley	10-26-79	0040-0235	1	8
Crusher Hood	10-25-79	1645-1841	2	6
Crusher Hood	10-25-79	2050-2223	2	12
Crusher Hood	10-26-79	0036-0237	1	8
Baghouse Outlet	10-25-79	1630-1800	0	1

Method 22

Location	Date	Observation Period (minutes)	Fugitive Emissions Emission Time (minutes:secs)	%
East Grizzley	10-25-79	90	(0:00)	0
East Grizzley	10-25-79	79	(0:00)	0
East Grizzley	10-26-79	90	(0:16)	0
West Grizzley	10-25-79	93	(0:25)	0
West Grizzley	10-25-79	79	(0:00)	0
West Grizzley	10-26-79	90	(3:39)	4
Crusher Hood	10-25-79	86	(18:21)	21
Crusher Hood	10-25-79	80	(25:23)	31
Crusher Hood	10-26-79	79	(12:19)	15

Truck Unloading

To determine if the process was representative, visual inspections showed no problems and gauge readings were taken as mentioned for the primary crusher. The scale readings during the test period on October 26, 1979 follow:

Time	Metric tons	(tons/hour)
3:00 p.m.	2,800	(3,080)
4:00 p.m.	1,330	(1,460)
5:00 p.m.	2,250	(2,480)
6:00 p.m.	1,900	(2,090)
7:00 p.m.	2,080	(2,290)
8:00 p.m.	2,050	(2,260)
9:00 p.m.	950	(1,050)
10:00 p.m.	2,050	(2,260)

Thus, during most of the test the crushing rate was close to the hourly design rate of 2,270 metric tons.

A summary of Methods 9 and 22 observations follows:

Method 9

Location	Date	Time	Opacity Readings (%) Average	Maximum
Truck Dumping Area	10-26-79	1450-1549	2	5
Truck Dumping Area	10-26-79	1615-1714	1	6
Truck Dumping Area	10-26-79	1715-1814	2	6
Baghouse Outlet	10-26-79	1445-1628	1	5
Baghouse Outlet	10-26-79	1726-1836	1	5

Method 22

Location	Date	Observation Period (minutes)	Fugitive Emissions Emission Time (minutes:secs)	%
Truck Dumping Area	10-26-79	60	9:16	15
Truck Dumping Area	10-26-79	60	11:15	19
Truck Dumping Area	10-26-79	60	9:15	15

Process Samples

Grab ore samples were taken from conveyor belts that fed the primary crusher during testing of the two stacks. These samples were taken to ascertain if a correlation between ore moisture content and inlet emissions could be developed. The sampling is summarized below:

Date	Stack Tested	Test Run	Time	Sample Location
10-25-79	Primary Crusher	1	5:01 p.m.	East Conveyor
10-25-79	Primary Crusher	2	10:41 p.m.	West Conveyor
10-26-79	Primary Crusher	3	1:41 a.m.	East Conveyor
10-26-79	Truck Unloading	1	3:09 p.m.	West Conveyor
10-26-79	Truck Unloading	2	5:45 p.m.	East Conveyor
10-26-79	Truck Unloading	3	9:00 p.m.	West Conveyor

DESCRIPTION OF TEST LOCATIONS

Crusher Grizzley East Duct

Two 4" I.D. test ports, 90° apart, were placed on a straight section of the 32" I.D. metal stack at a location four diameters (10') downstream and four diameters (10') upstream from the nearest flow disturbances. EPA Method 1 criteria for this test location required a minimum of 36 traverse points. See Figure 2 for port and sampling point locations.

Crusher Hood Duct

Two 4" I.D. test ports were placed at right angles on the 38" I.D. metal stack 1.3 diameters from both upstream and downstream flow disturbances. Forty-eight sampling points (24 per axis) were required for testing. See Figure 3 for port and sampling point locations.

Crusher Baghouse No. 1-2 Inlet Duct

Four 4" I.D. test ports were located on the longest side of the 52" x 78" I.D. rectangular duct. The ports were placed one diameter from both downstream and upstream flow disturbances. The test site required a minimum of 48 traverse points (12 per port). Figure 4 illustrates port and sampling point locations.

Crusher Baghouse No. 1-2 Outlet Stack

Two 4" I.D. test ports were installed in a straight section of the 74" I.D. metal stack. The ports were placed five diameters downstream and two diameters upstream from the nearest gas stream flow disturbances. Method 1 criteria required a minimum of 32 traverse points (16 per axis) for this location. Figure 5 shows port and sampling point locations.

Truck Dump Baghouse No. 3-4 Inlet Duct

Two 4" I.D. test ports were placed 90° apart on the 72" I.D. metal duct leading from the truck dumping area. The ports were placed 8.33 diameters downstream and 2.0 diameters upstream from the nearest gas stream flow disturbances. EPA Method 1 required a minimum of 12 traverse points (6 per axis) for this ideal test location. See Figure 6 for port and sampling point locations.

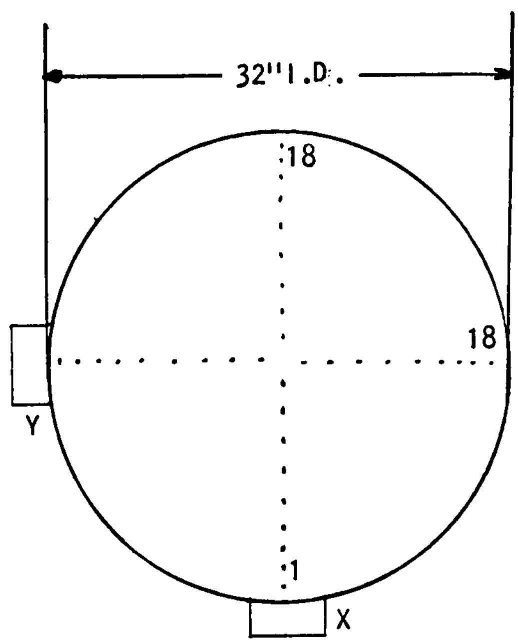
Truck Dump Baghouse No. 3-4 Outlet Stack

Two 4" I.D. test ports were placed 90° apart on a straight section of the 74" I.D. stack at a location five diameters downstream and two diameters upstream from the nearest flow disturbances. Thirty-two traverse points (16 per axis) were sampled during the testing program. See Figure 7 for port and sampling point locations.

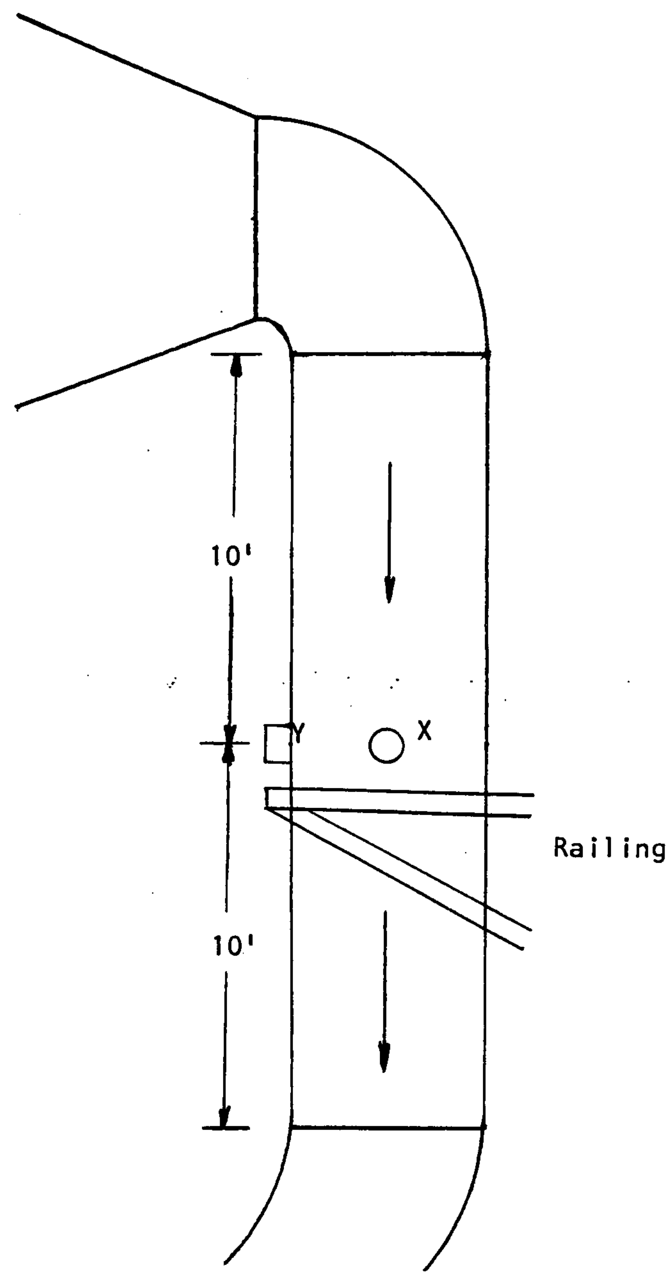
Anaconda Copper Company
Butte, Montana

Figure 2

Crusher Grizzley East Duct
Port and Sampling Point Locations



Duct Cross Sectional View



Traverse Point Number	Distance from Inside Near Wall, Inches
1	1/2
2	1-3/8
3	2-3/8
4	3-1/2
5	4-5/8
6	6
7	7-1/2
8	9-1/2
9	12-1/4
10	19-3/4
11	22-1/2
12	24-1/2
13	26
14	27-3/8
15	28-1/2
16	29-5/8
17	30-5/8
18	31-1/2

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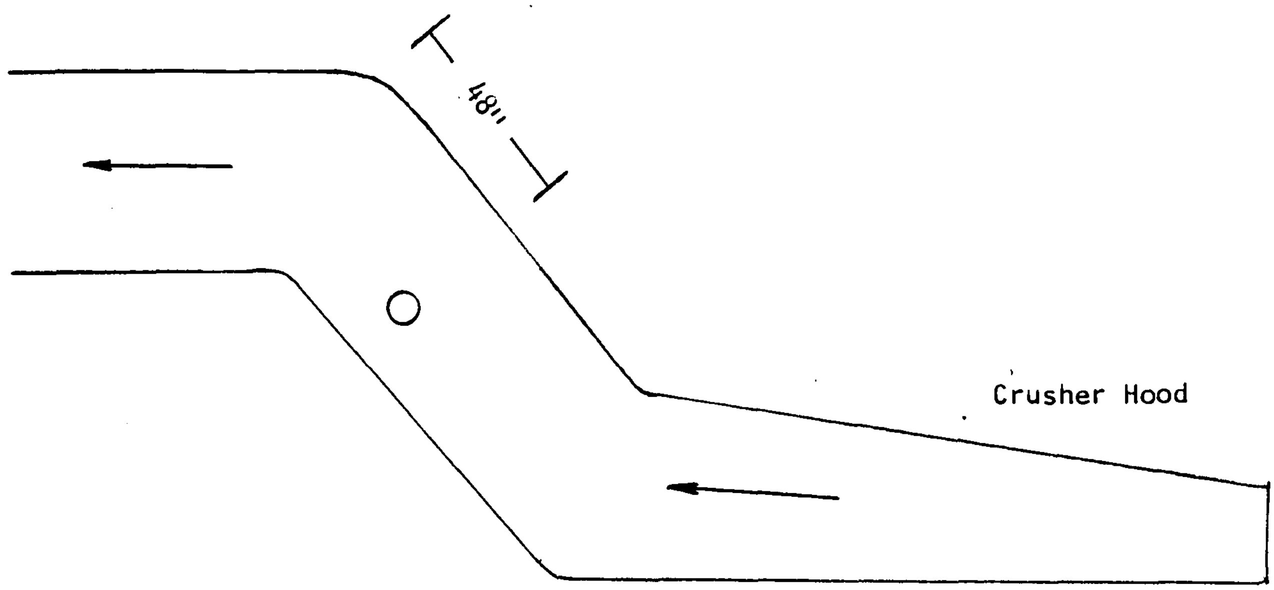
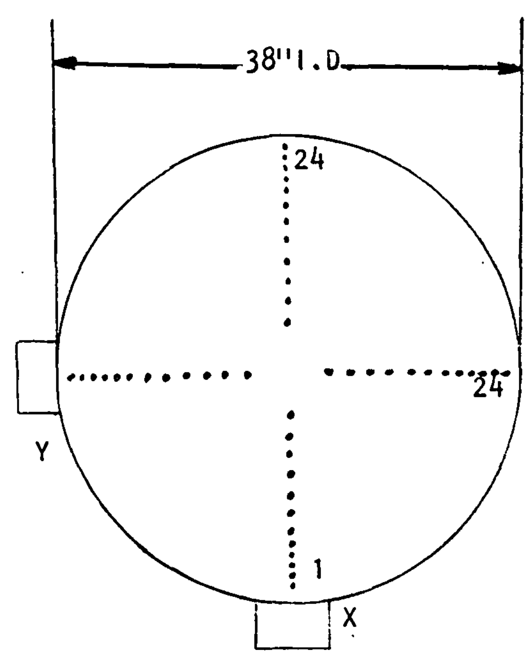
Figure 3

Crusher Hood Duct
Port and Sampling Point Locations





Duct Cross Sectional View

Traverse Point Number	Distance From Inside Near Wall, Inches
1	1/2
2	1-1/2
3	2-1/8
4	3
5	4
6	5
7	6-1/8
8	7-3/8
9	8-3/4
10	10-3/8
11	12-1/4
12	15-1/4
13	22-7/8
14	25-3/4
15	27-5/8
16	29-1/4
17	30-5/8
18	31-7/8
19	32-7/8
20	34
21	35
22	36
23	36-3/4
24	37-1/2

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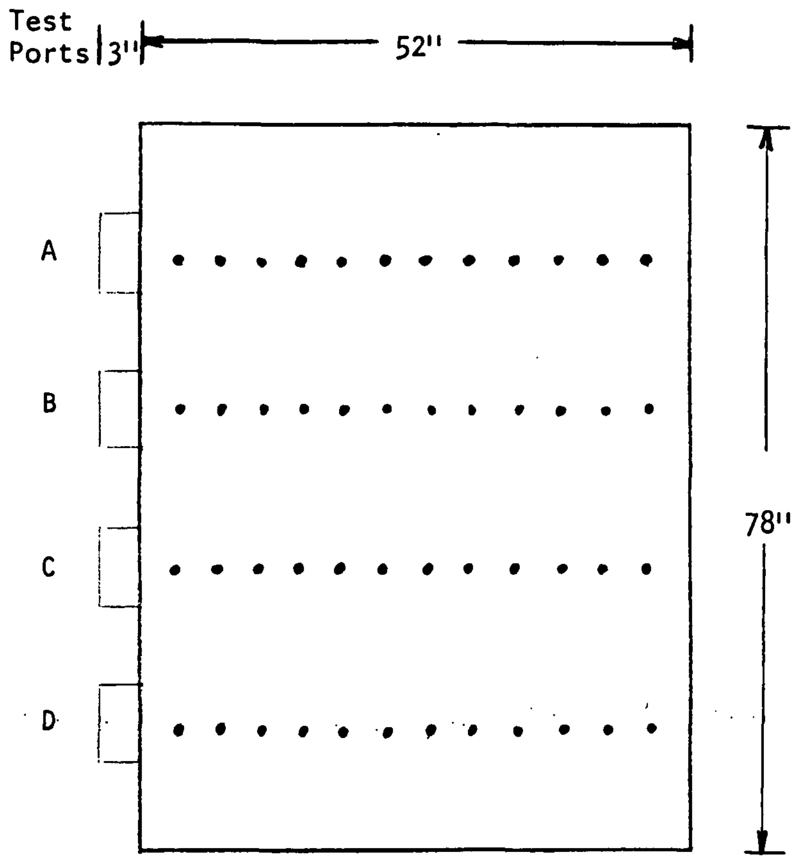
Figure 4

Crusher Baghouse No. 1-2 Inlet Duct
Port and Sampling Point Locations



Side Cross Sectional View

Traverse Point Number	Distance From Inside Near Wall, Inches
1	2-1/8
2	6-1/2
3	10-7/8
4	15-1/4
5	19-5/8
6	24
7	28-3/8
8	32-3/4
9	37-1/8
10	41-1/2
11	45-7/8
12	50-1/4

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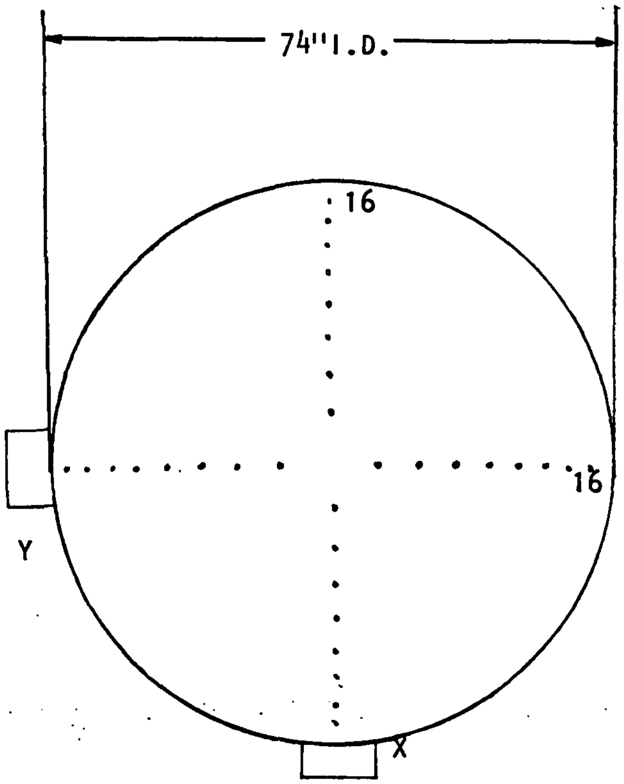
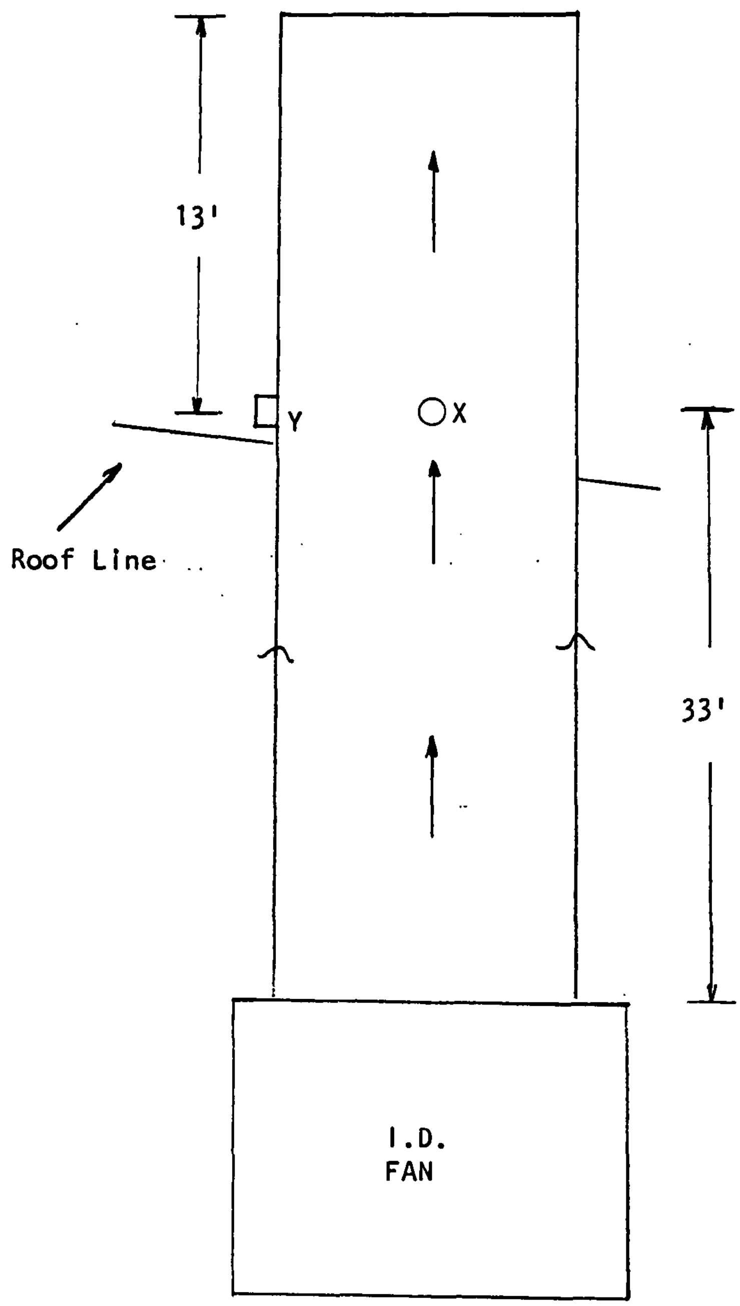
Figure 5

Crusher Baghouse No. 1-2 Outlet Stack
Port and Sampling Point Locations



Duct Cross Sectional View



Traverse Point Number	Distance From Inside Near Wall, Inches
1	1-1/4
2	3-5/8
3	6-1/4
4	9-1/4
5	12-1/2
6	16-1/4
7	21
8	27-3/4
9	46-1/4
10	53
11	57-3/4
12	61-1/2
13	64-3/4
14	67-3/4
15	70-3/8
16	72-3/4

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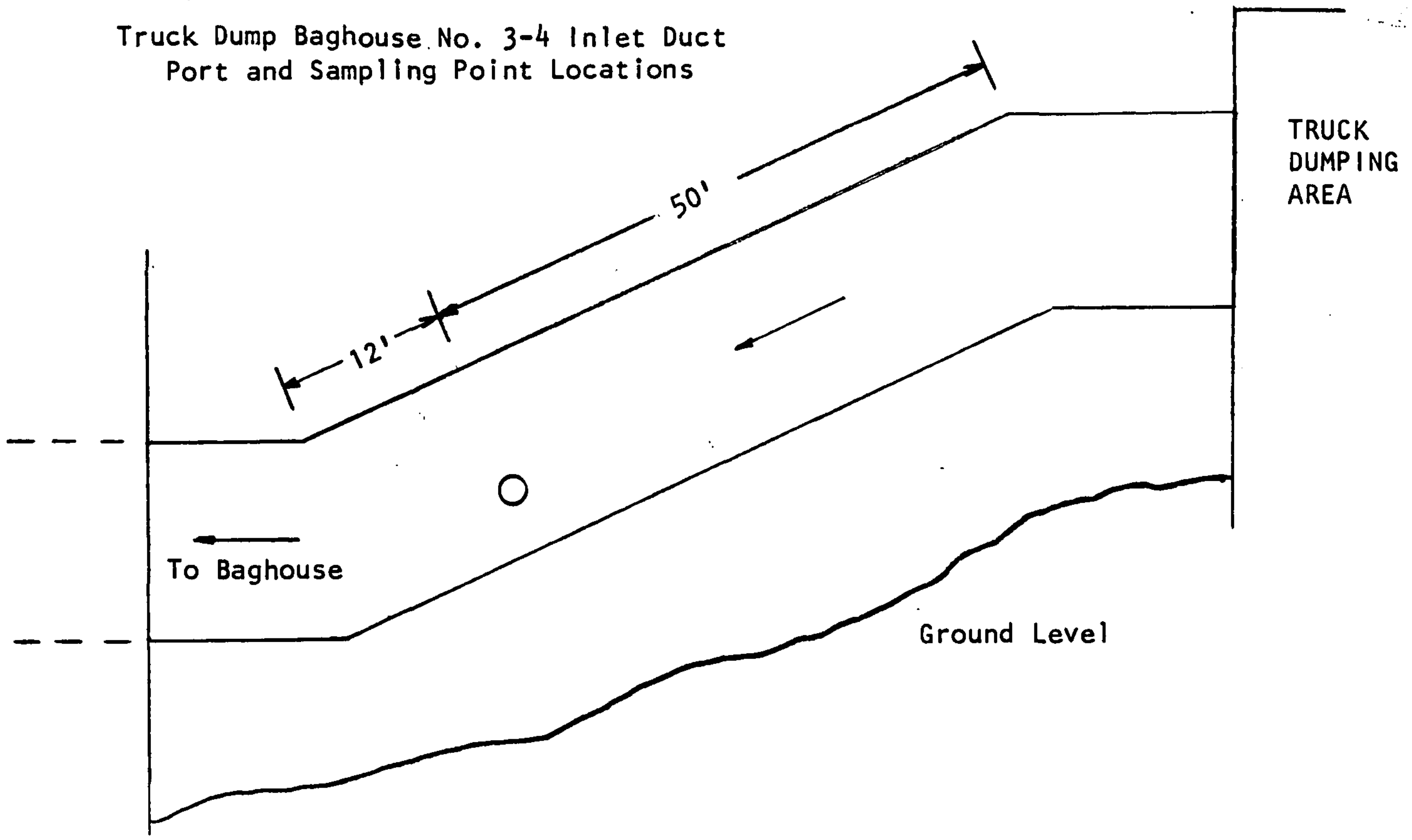
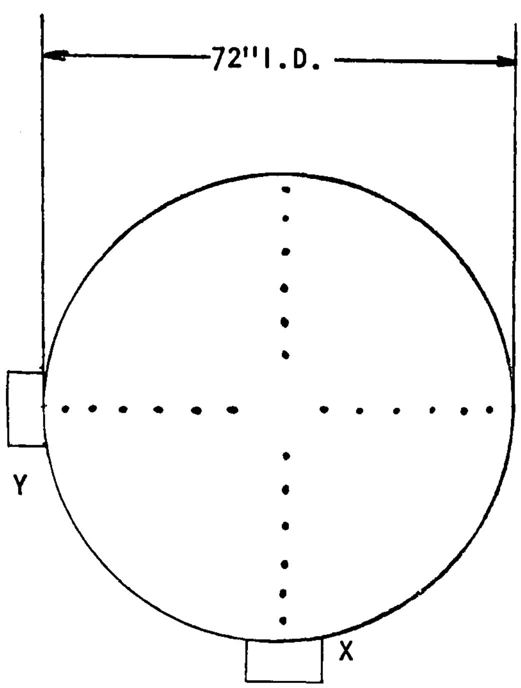
Figure 6

Truck Dump Baghouse No. 3-4 Inlet Duct
Port and Sampling Point Locations





Duct Cross Sectional View

Traverse Point Number	Distance From Inside Near Wall, Inches
1	3-1/8
2	10-1/2
3	21-1/4
4	50-3/4
5	61-1/2
6	68-7/8

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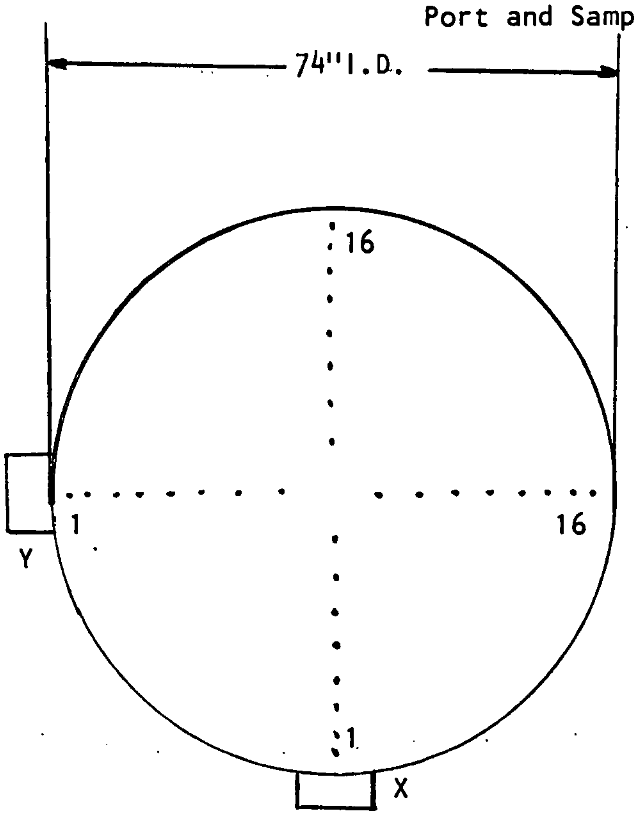
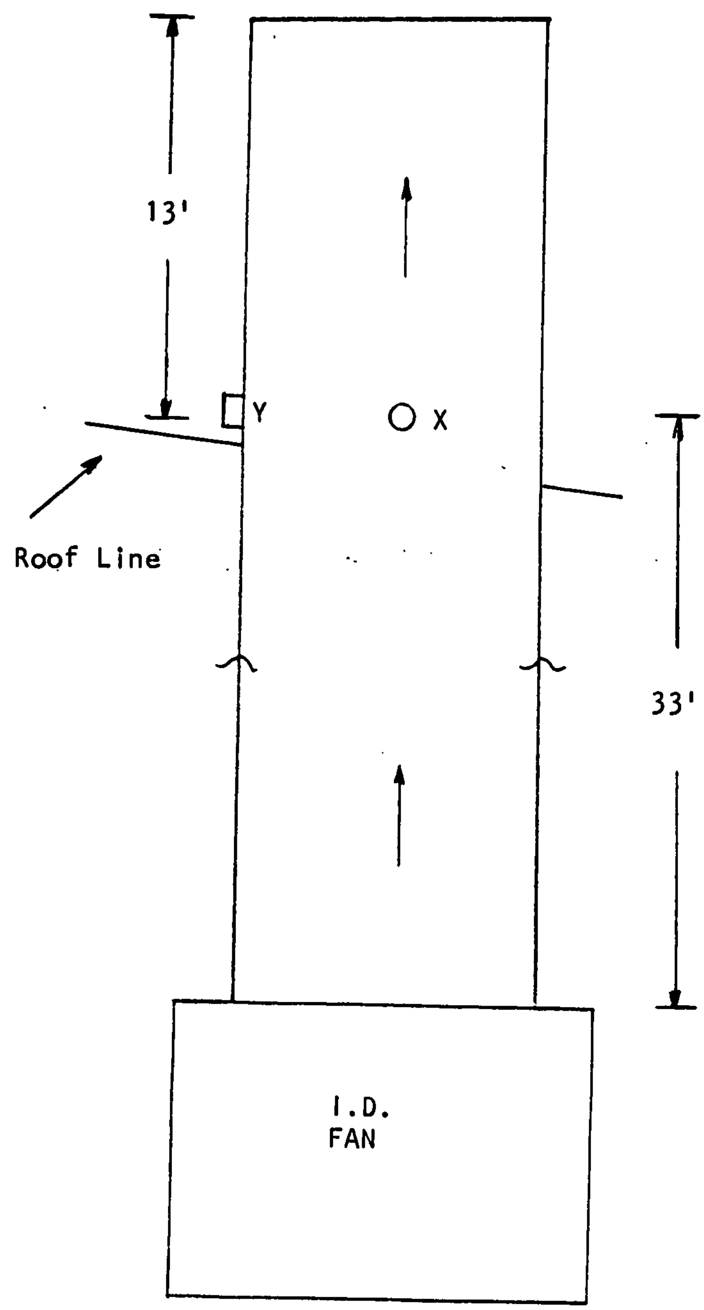
Figure 7

Truck Dump Baghouse No. 3-4 Outlet Stack
Port and Sampling Point Locations



Duct Cross Sectional View



Traverse Point Number	Distance From Inside Near Wall, Inches
1	1-1/4
2	3-5/8
3	6-1/4
4	9-1/4
5	12-1/2
6	16-1/4
7	21
8	27-3/4
9	46-1/4
10	53
11	57-3/4
12	61-1/2
13	64-3/4
14	67-3/4
15	70-3/8
16	72-3/4

DESCRIPTION OF SAMPLING TRAINS

Particulate Sampling Trains

The test train utilized for particulate sampling at all test locations was the standard EPA Method 5 train (see Figure 8).

A stainless steel nozzle was attached to a heated (~250°F) borosilicate glass probe which was connected directly to a borosilicate filter holder containing a 9-cm Reeve Angel 900 AF glass fiber filter. The filter holder was maintained at approximately 250°F in a heated chamber, and was connected by Tygon vacuum tubing to the first of four Greenburg-Smith impingers which were included in the train to condense the moisture in the gas stream. Each of the first two impingers contained 100 ml of distilled water, the third was dry and the final impinger contained 200 grams of dry preweighted silica gel. The first, third, and fourth impingers were modified Greenburg-Smith type; the second was a standard Greenburg-Smith impinger. All impingers were maintained in a crushed ice bath. A RAC control console with vacuum pump, dry gas meter, a calibrated orifice, and inclined manometers completed the sampling train.

Flue gas temperature was measured by means of a type K thermocouple which was connected to a direct readout pyrometer. The thermocouple sensor was positioned adjacent to the sampling nozzle.

Gas velocity was measured using a calibrated S-type pitot tube provided with extensions and fastened alongside the sampling probe. Gas stream composition (carbon dioxide, oxygen, and carbon monoxide content) was determined utilizing Orsat apparatus to analyze stack gas samples. Gas stream composition proved to be ambient air since no combustion products were found in any of the stack gas effluent samples.

Figure 9 shows the EPA Method 5 train utilized at the two Baghouse Outlet Stack locations. The test train shown is identical to the one described above, except a rigid glass connection is used between the back half of the filter holder and the first impinger, rather than the flexible vacuum tubing.

Particle Size Distribution Sampling Apparatus

A stainless steel nozzle was connected directly to an 8-stage Andersen cascade impaction device which separated the particles according to their effective aerodynamic particle diameters. A glass fiber filter was used to capture any particles that passed through the impactor substrates to permit the measurement of total particulate. The filter holder was maintained at stack temperature and was connected by Tygon vacuum tubing to the first of four Greenburg-Smith impingers which were included in the train to condense the moisture in the gas stream. All impingers were maintained in a crushed ice bath. A RAC control console with vacuum pump, dry gas meter, a calibrated orifice, and inclined manometers completed the sampling train.

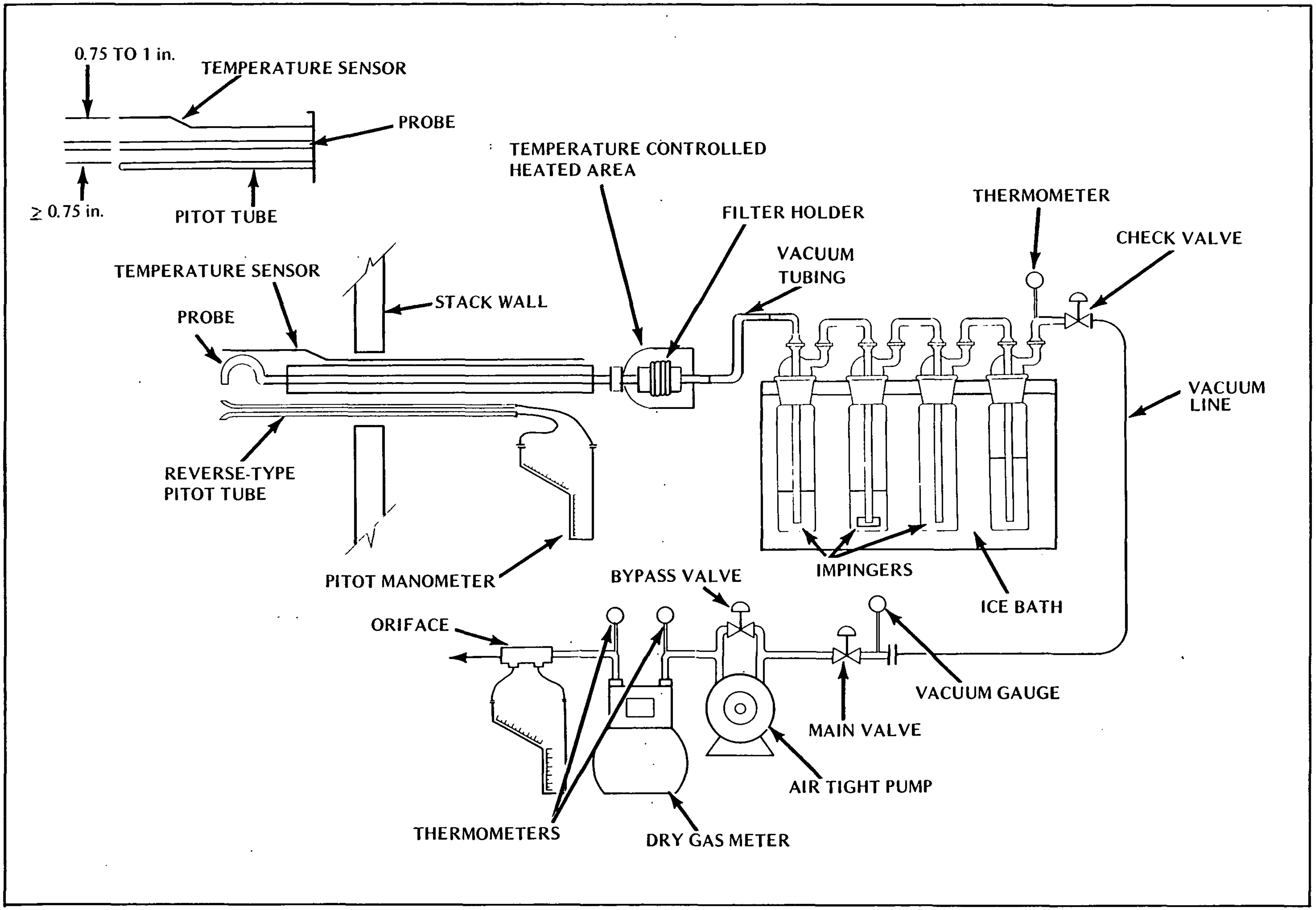


FIGURE 8 PARTICULATE SAMPLING TRAIN
EPA METHOD 5

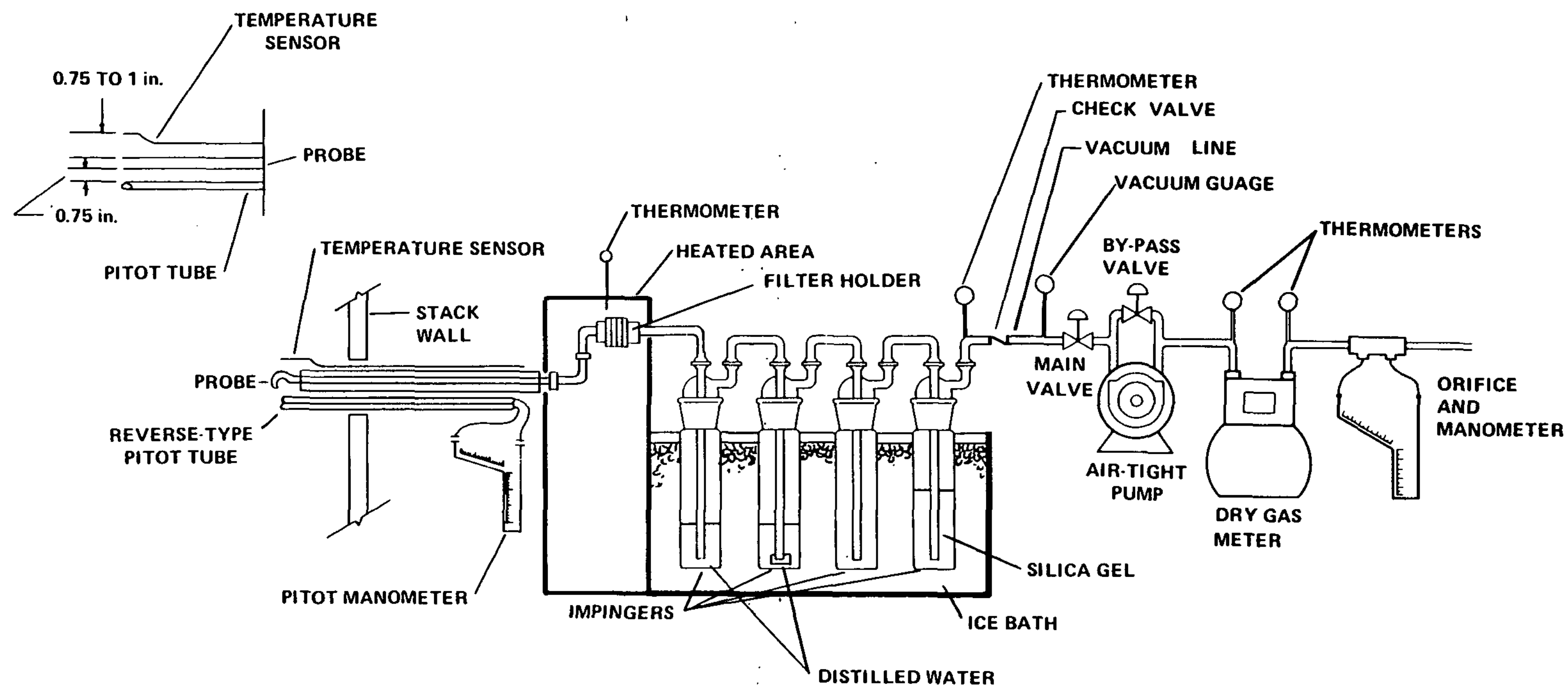


FIGURE 9 PARTICULATE SAMPLING TRAIN—EPA METHOD 5

TEST PROCEDURES

Preliminary Tests

Preliminary test data was obtained at each sampling location. Stack geometry measurements were recorded and sampling point distances calculated. A preliminary velocity traverse was performed at each test location utilizing a calibrated S-type pitot tube and a Dwyer inclined manometer to determine velocity profiles. A check for the presence or absence of cyclonic flow was conducted at each test location prior to formal testing. Stack gas temperatures were observed with a direct read-out pyrometer equipped with a chromel-alumel thermocouple.

Preliminary test data was used for nozzle sizing and nomagraph set-up for isokinetic sampling procedures.

Calibration of the probe nozzles, pitot tubes, metering systems, probe heaters, temperature gauges and barometer were performed as specified in Section 5 of EPA Method 5 test procedures (see Appendix D for calibration data).

Crusher Grizzley East Duct

A series of three tests were conducted at the Crusher Grizzley East Duct to measure the concentration and mass rate of particulate matter emissions. Thirty-six traverse points (18 per port axis) were sampled for 2.5 minutes each, resulting in a total test time of 90 minutes.

During particulate sampling, gas stream velocities were measured by inserting a calibrated S-type pitot tube into the stream adjacent to the sampling nozzle. The velocity pressure differential was observed immediately after positioning the nozzle at each point, and sampling rates were adjusted to maintain isokinetic sampling. Stack gas temperatures were also monitored at each point with the pyrometer and thermocouple. Additional temperature measurements were made at the final impinger and at the inlet and outlet of the dry gas meter.

Test data were recorded at each traverse point during all test periods. Leak checks were performed according to EPA Method 5 instructions prior to and after each run and/or component change. Table 1 presents a summary of test data for each of the three runs. Test result summarization appears on Table 7.

One sampling point located at a site of average velocity was selected from particulate traverse data for particle size distribution testing. The gas stream was sampled isokinetically at that point for 5 minutes, which permitted collection of sufficient samples for analysis without overloading the filter substrates. Sample volume, temperature, and pressure data were recorded every 2.5 minutes during sampling. See Tables 13 through 15 for distribution plots.

Crusher Hood Duct

Three Method 5 tests were performed on the Crusher Hood Duct. Forty-eight points were traversed (24 per axis) for two minutes each, yielding a test period of 96 minutes.

Procedures for isokinetic sampling were identical to those described in the Crusher Grizzley East Duct section.

See Tables 2 and 8 for test data and test result summaries, respectively.

Three particle size distribution tests were conducted at a point of average velocity. Each particle size distribution test was five minutes in length. Sample volume, temperature, and pressure data were recorded at 2.5 minute intervals. See Tables 16 through 18 for distribution plots.

Crusher Baghouse No. 1-2 Inlet Duct

Three 96-minute Method 5 test runs were performed at the baghouse inlet. A total of 48 points were sampled for two minutes each per test.

Isokinetic sampling procedures were identical to those previously described. Table 3 shows test data summarization and Table 9 presents test results.

Three particle size distribution tests were conducted at an average point of velocity in the gas stream. Test set one was four minutes in length, while tests two and three were three minutes long. Readings were recorded every minute during each test. See Tables 19 through 21 for distribution plots.

Crusher Baghouse No. 1-2 Outlet Stack

Three Method 5 test runs were conducted on the Crusher Baghouse No. 1-2 Outlet Stack. Thirty-two sampling points (16 per axis) were sampled for three minutes each, yielding a test period of 96 minutes.

Sampling procedures were identical to those previously described. See Tables 4 and 10 for test data and test result summaries, respectively.

One particle size distribution test was completed at an average point of velocity. Total test time was 60 minutes with readings taken every five minutes. See Table 22 for particle size distribution plot.

Visual determinations of plume opacity were performed by a certified observer according to Method 9 procedures during test run one. A summary of results is presented in Table 30.

Truck Dump Baghouse No. 3-4 Inlet Duct

Three test runs were conducted by EPA Method 5 procedures at the inlet to the No. 3-4 baghouse. A total of twelve traverse points (6 per axis) were sampled for five minutes each, resulting in a total test time of 60 minutes. Tables 5 and 11 show test data and test results, respectively.

Three particle size distribution tests were performed at a point of average velocity over a 15-minute period. Readings were taken every five minutes during sampling. Tables 23 through 25 show the particle size distribution.

Truck Dump Baghouse No. 3-4 Outlet Stack

Three EPA Method 5 tests were performed at the outlet simultaneously with particulate test runs at the inlet. Thirty-two points were traversed (16 per port axis) for two minutes each, yielding a test period 64 minutes in length.

Procedures for isokinetic sampling were identical to those described for the first test location. Test data and test result summaries are provided in Tables 6 and 12, respectively.

One particle size distribution test was performed at a point of average velocity. The sample time was 90 minutes in length and readings were taken every five minutes. Table 26 shows the particle size distribution plot.

Visual determination of plume opacity were performed by a certified observer according to Method 9 procedures. Opacity readings were taken during particulate test runs one and two. A summary of results is presented in Table 32.

ANALYTICAL PROCEDURES

Particulate Sample Recovery

At the conclusion of each test, the sampling trains were dismantled, openings sealed, and the components transported to the field laboratory. Sample integrity was assured by maintaining chain-of-custody records, which will be supplied upon request.

A consistent procedure was employed for sample recovery.

The glass fiber filter(s) was removed from its holder with tweezers and placed in its original container (petri dish), along with any loose particulate and filter fragments (Sample 1).

The probe (EPA 5) and nozzle were separated, and the internal particulate rinsed with acetone into a borosilicate container while brushing a minimum of three times until no visible particles remained. Particulate adhering to the brush was rinsed with acetone into the same container. The front half of the filter holder was rinsed with acetone while brushing a minimum of three times. The rinses were combined (Sample 2) and the container sealed with a Teflon-lined closure.

The total liquid in impingers one, two and three was measured, the value recorded, and the liquid discarded.

The silica gel was removed from the last impinger and immediately weighted.

An acetone sample was retained for blank analysis.

Particulate Analyses

The filters (Sample 1) and any loose fragments were desiccated for 24 hours and weighed to the nearest 0.1 milligram to a constant weight.

The acetone wash samples (Sample 2) were evaporated at ambient temperature and pressure in tared beakers, and desiccated to constant weight. All sample residue weights were adjusted by the acetone blank value.

The weight of the material collected on the glass fiber filter(s) plus the weight of the residue of the acetone nozzle/probe/front-half filter holder washes represents the total EPA Method 5 catch. Complete laboratory results are presented in Appendix B of this report.

Particle Size Sample Recovery and Analyses

The cascade impactor substrates and any loose fragments were carefully removed from their support plates with tweezers and placed in individual containers (petri dishes) for shipment to Weston's laboratory.

Each cascade impactor filter was fired at 525°C and preweighed to the nearest 0.1 milligram to constant weight at Weston's laboratory prior to on-site application. Subsequent to emissions exposure, the cascade impactor substrates, back-up filters and any loose fragments (Sample 4) were desiccated for 24 hours in the laboratory, and weighed to the nearest 0.1 milligram to constant weight.

DISCUSSION OF TEST RESULTS

Particulate test data and test result summaries are presented in Tables 1 through 12 of this section. Tables 13 through 26 list the particle size distribution of the particulate matter for all locations. Visible emission test data summaries are shown in Tables 10, 12 and 27 through 34. See Table 35 for fugitive emission test result summaries.

No unusual sampling difficulties or process operating problems were encountered during any of the test periods.

The quantity of particulate matter discharged to the atmosphere from the Crusher Baghouse No. 1-2 Outlet Stack was $\leq$ 0.007 grains/DSCF and $\leq$ 5.01 pounds/hour. The certified visible emission observer recorded plume opacities of $\leq$ 10 percent for this source.

The particulate matter discharged from the Truck Dump Baghouse No. 3-4 Outlet Stack was $\leq$ 0.020 grains/DSCF and 12.0 pounds/hour. Opacity readings recorded by the certified observer were $\leq$ 20 percent.

The particulate removal efficiency of the Crusher Baghouse No. 1-2 averaged 99.69 percent for the three test sets; efficiency of Truck Dump Baghouse No. 3-4 averaged 85.65 percent.

Note that the illumination at the Fine Ore Feeder was $<$ 10 foot-candles which is the level considered necessary for proper application of the method. Illumination was $\geq$ 10 foot-candles at all other test points.

The trace metals analysis results from samples supplied to York Research Corporation are included in Appendix B.

Anaconda Copper Company
Butte, Montana

Table 1

Crusher Grizzley East Duct

SUMMARY OF TEST DATA

Test Data				
Test Run Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Period	1630 - 1820	2050 - 2235	0040 - 0235	
Sampling Data				
Sampling Duration, minutes	90.0	90.0	90.0	-
Nozzle Diameter, inches	0.188	0.188	0.188	-
Barometric Pressure, inches mercury	24.04	24.04	24.04	-
Average Orifice Pressure Differential, inches water	1.57	1.90	1.91	-
Average Dry Gas Temperature at Meter, °F	96.	95.	94.	-
Total Water Collected by Train, ml	33.2	15.5	8.0	-
Standard Volume of Water Vapor Collected, cubic feet	1.56	0.73	0.38	-
Dry Gas Meter Calibration Factor, dimensionless	0.998	0.998	0.998	-
Sample Volume at Meter Conditions, cubic feet	72.88	80.83	80.63	-
Sample Volume at Standard Conditions, cubic feet[1]	55.73	61.95	61.94	-
Gas Stream Composition				
CO_2, percent by volume	0.0	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1	79.1
Moisture in Gas Stream, percent by volume	2.7	1.2	0.6	1.5
Mole Fraction of Dry Gas	0.973	0.988	0.994	0.985
Molecular Weight of Dry Gas	28.97	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.67	28.84	28.90	28.80
Gas Stream Velocity and Volumetric Flow				
Static Pressure, inches water	-1.7	-1.65	-1.7	-1.68
Absolute Pressure, inches mercury	23.92	23.92	23.92	23.92
Average Temperature, °F	76.	76.	70.	74.
Pitot Tube Calibration Coefficient, dimensionless	0.848	0.848	0.848	-
Total Number of Traverse Points	36.0	36.0	36.0	-
Velocity at Actual Conditions, feet/second	67.6	74.3	73.9	72.0
Stack/duct Cross-Sectional Area, square feet	5.59	5.59	5.59	-
Volumetric Flow at Actual Conditions, cubic feet/minute	22,700.	24,900.	24,800.	24,100
Volumetric Flow at Standard Conditions, cubic feet/minute	17,400.	19,400.	19,600.	18,800
Percent Isokinetic	103.3	103.0	101.6	102.6

Unit/Process Operations Data   Monitored by GCA/Technology Division

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Anaconda Copper Company
Butte, Montana

Table 2

Crusher Hood Duct

SUMMARY OF TEST DATA

Test Data				
Test Run Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Period	1638 - 1843	2047 - 2226	0040 - 0238	
Sampling Data				
Sampling Duration, minutes	96.0	96.0	96.0	-
Nozzle Diameter, inches	0.238	0.238	0.238	-
Barometric Pressure, inches mercury	24.04	24.04	24.04	-
Average Orifice Pressure Differential, inches water	2.43	2.51	2.43	-
Average Dry Gas Temperature at Meter, °F	95.	97.	83.	-
Total Water Collected by Train, ml	16.	26.5	18.	-
Standard Volume of Water Vapor Collected, cubic feet	0.75	1.25	0.85	-
Dry Gas Meter Calibration Factor, dimensionless	0.999	0.999	0.999	-
Sample Volume at Meter Conditions, cubic feet	90.07	92.49	90.20	-
Sample Volume at Standard Conditions, cubic feet[1]	69.29	70.95	70.91	-
Gas Stream Composition				
CO_2, percent by volume	0.0	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1	79.1
Moisture in Gas Stream, percent by volume	1.1	1.7	1.2	1.3
Mole Fraction of Dry Gas	0.989	0.983	0.988	0.986
Molecular Weight of Dry Gas	28.97	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.85	28.78	28.84	28.82
Gas Stream Velocity and Volumetric Flow				
Static Pressure, inches water	-1.7	-1.6	-1.6	-1.6
Absolute Pressure, inches mercury	23.92	23.92	23.92	23.92
Average Temperature, °F	75.	72.	64.	70.
Pitot Tube Calibration Coefficient, dimensionless	0.846	0.846	0.846	-
Total Number of Traverse Points	48.0	48.0	48.0	-
Velocity at Actual Conditions, feet/second	51.3	52.2	51.1	51.5
Stack/duct Cross-Sectional Area, square feet	7.88	7.88	7.88	-
Volumetric Flow at Actual Conditions, cubic feet/minute	24,200.	24,700.	24,200.	24,400.
Volumetric Flow at Standard Conditions, cubic feet/minute	18,900.	19,200.	19,200.	19,100.
Percent Isokinetic	97.4	98.0	97.9	97.8

Unit/Process Operations Data — Monitored by GCA/Technology Division

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Anaconda Copper Company
Butte, Montana

Table 3

Crusher Baghouse No. 1-2 Inlet Duct

SUMMARY OF TEST DATA

Test Data				
Test Run Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Period	1638 - 1835	2045 - 2230	0045 - 0250	
Sampling Data				
Sampling Duration, minutes	96.0	96.0	96.0	-
Nozzle Diameter, inches	0.179	0.179	0.179	-
Barometric Pressure, inches mercury	24.04	24.04	24.04	-
Average Orifice Pressure Differential, inches water	0.73	0.85	0.83	-
Average Dry Gas Temperature at Meter, °F	79.	71.	70.	-
Total Water Collected by Train, ml	14.7	14.1	13.4	-
Standard Volume of Water Vapor Collected, cubic feet	0.69	0.66	0.63	-
Dry Gas Meter Calibration Factor, dimensionless	1.032	1.032	1.032	-
Sample Volume at Meter Conditions, cubic feet	48.59	52.12	51.46	-
Sample Volume at Standard Conditions, cubic feet[1]	39.58	43.05	42.64	-
Gas Stream Composition				
CO_2, percent by volume	0.0	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1	79.1
Moisture in Gas Stream, percent by volume	1.7	1.5	1.5	1.6
Mole Fraction of Dry Gas	0.983	0.985	0.985	0.984
Molecular Weight of Dry Gas	28.97	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.78	28.80	28.81	28.80
Gas Stream Velocity and Volumetric Flow				
Static Pressure, inches water	-2.5	-2.7	-2.9	-2.7
Absolute Pressure, inches mercury	23.86	23.84	23.83	23.84
Average Temperature, °F	75.	72.	71.	73.
Pitot Tube Calibration Coefficient, dimensionless	0.848	0.848	0.848	-
Total Number of Traverse Points	48.0	48.0	48.0	-
Velocity at Actual Conditions, feet/second	49.3	52.6	52.8	51.6
Stack/duct Cross-Sectional Area, square feet	28.17	28.17	28.17	-
Volumetric Flow at Actual Conditions, cubic feet/minute	83,300.	89,000.	89,200.	87,200.
Volumetric Flow at Standard Conditions, cubic feet/minute	64,400.	69,300.	69,600.	67,800.
Percent Isokinetic	103.2	104.4	102.9	103.5

Unit/Process Operations Data — Monitored by GCA/Technology Division

[1]Standard Conditions ≈ 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Anaconda Copper Company
Butte, Montana

Table 4

Crusher Baghouse No. 1-2 Outlet Stack

SUMMARY OF TEST DATA

Test Data				
Test Run Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Period	1630 - 1805	2049 - 2237	0045 - 0240	
Sampling Data				
Sampling Duration, minutes	96.0	96.0	96.0	-
Nozzle Diameter, inches	0.197	0.197	0.197	-
Barometric Pressure, inches mercury	24.04	24.04	24.04	-
Average Orifice Pressure Differential, inches water	1.31	1.29	1.52	-
Average Dry Gas Temperature at Meter, °F	78.	68.	52.	-
Total Water Collected by Train, ml	16.5	26.7	26.0	-
Standard Volume of Water Vapor Collected, cubic feet	0.78	1.26	1.22	-
Dry Gas Meter Calibration Factor, dimensionless	1.036	1.036	1.036	-
Sample Volume at Meter Conditions, cubic feet	64.85	64.40	69.11	-
Sample Volume at Standard Conditions, cubic feet[1]	53.21	53.79	59.65	-
Gas Stream Composition				
CO_2, percent by volume	0.0	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1	79.1
Moisture in Gas Stream, percent by volume	1.4	2.3	2.0	1.9
Mole Fraction of Dry Gas	0.986	0.977	0.980	0.981
Molecular Weight of Dry Gas	28.97	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.81	28.72	28.75	28.76
Gas Stream Velocity and Volumetric Flow				
Static Pressure, inches water	-0.49	-0.26	-0.38	-0.38
Absolute Pressure, inches mercury	24.00	24.02	24.01	-
Average Temperature, °F	78.	76.	73.	76.
Pitot Tube Calibration Coefficient, dimensionless	0.848	0.848	0.848	-
Total Number of Traverse Points	32.0	32.0	32.0	-
Velocity at Actual Conditions, feet/second	55.4	55.1	58.8	56.4
Stack/duct Cross-Sectional Area, square feet	29.87	29.87	29.87	-
Volumetric Flow at Actual Conditions, cubic feet/minute	99,200.	98,700.	105,000.	101,000.
Volumetric Flow at Standard Conditions, cubic feet/minute	76,900.	76,300.	82,100.	78,400.
Percent Isokinetic	101.7	103.6	106.8	104.0

Unit/Process Operations Data — Monitored by GCA/Technology Division

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Anaconda Copper Company
Butte, Montana

Table 5

Truck Dump Baghouse No. 3-4 Inlet Duct

SUMMARY OF TEST DATA

Test Data				
Test Run Number	1	2	3	Average
Test Date	10-26-79	10-26-79	10-26-79	
Test Period	1445 - 1625	1730 - 1845	2037 - 2145	
Sampling Data				
Sampling Duration, minutes	60.0	60.0	60.0	-
Nozzle Diameter, inches	0.227	0.227	0.227	-
Barometric Pressure, inches mercury	24.44	24.44	24.44	-
Average Orifice Pressure Differential, inches water	1.69	1.69	1.75	-
Average Dry Gas Temperature at Meter, °F	65.	73.	72.	-
Total Water Collected by Train, ml	13.1	10.4	11.4	-
Standard Volume of Water Vapor Collected, cubic feet	0.62	0.49	0.54	-
Dry Gas Meter Calibration Factor, dimensionless	1.032	1.032	1.032	-
Sample Volume at Meter Conditions, cubic feet	41.91	45.27	45.46	-
Sample Volume at Standard Conditions, cubic feet[1]	35.68	38.02	38.26	-
Gas Stream Composition				
CO_2, percent by volume	0.0	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1	79.1
Moisture in Gas Stream, percent by volume	1.7	1.3	1.4	1.5
Mole Fraction of Dry Gas	0.983	0.987	0.986	0.985
Molecular Weight of Dry Gas	28.97	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.78	28.83	28.82	28.81
Gas Stream Velocity and Volumetric Flow				
Static Pressure, inches water	-0.53	-0.65	-0.45	-0.54
Absolute Pressure, inches mercury	24.40	24.39	24.41	24.40
Average Temperature, °F	43.	43.	38.	41.
Pitot Tube Calibration Coefficient, dimensionless	0.848	0.848	0.848	-
Total Number of Traverse Points	12.0	12.0	12.0	-
Velocity at Actual Conditions, feet/second	45.0	45.2	45.9	45.4
Stack/duct Cross-Sectional Area, square feet	28.27	28.27	28.27	-
Volumetric Flow at Actual Conditions, cubic feet/minute	76,300.	76,700.	77,900.	77,000.
Volumetric Flow at Standard Conditions, cubic feet/minute	64,100.	64,500.	66,400.	65,000.
Percent Isokinetic	93.3	98.4	96.6	96.1

Unit/Process Operations Data   Monitored by GCA/Technology Division

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Anaconda Copper Company
Butte, Montana

Table 6

Truck Dump Baghouse No. 3-4 Outlet Stack

SUMMARY OF TEST DATA

Test Data				
Test Run Number	1	2	3	Average
Test Date	10-26-79	10-26-79	10-26-79	
Test Period	1445-1630	1730-1845	2037-2145	
Sampling Data				
Sampling Duration, minutes	64.0	64.0	64.0	-
Nozzle Diameter, inches	0.197	0.197	0.197	-
Barometric Pressure, inches mercury	24.44	24.44	24.44	-
Average Orifice Pressure Differential, inches water	1.03	1.03	1.1	-
Average Dry Gas Temperature at Meter, °F	54.	54.	57.	-
Total Water Collected by Train, ml	8.0	3.2	5.0	-
Standard Volume of Water Vapor Collected, cubic feet	0.38	0.15	0.24	-
Dry Gas Meter Calibration Factor, dimensionless	1.036	1.036	1.036	-
Sample Volume at Meter Conditions, cubic feet	37.72	37.99	38.75	-
Sample Volume at Standard Conditions, cubic feet[1]	32.91	33.17	33.63	-
Gas Stream Composition				
CO_2, percent by volume	0.0	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1	79.1
Moisture in Gas Stream, percent by volume	1.1	0.45	0.70	0.75
Mole Fraction of Dry Gas	0.989	0.995	0.993	0.992
Molecular Weight of Dry Gas	28.97	28.97	28.97	28.97
Molecular Weight of Wet Gas	28.85	28.92	28.89	28.89
Gas Stream Velocity and Volumetric Flow				
Static Pressure, inches water	-0.34	-0.35	-0.27	-0.32
Absolute Pressure, inches mercury	24.42	24.41	24.42	24.42
Average Temperature, °F	55.	54.	51.	53.
Pitot Tube Calibration Coefficient, dimensionless	0.844	0.844	0.844	-
Total Number of Traverse Points	32.0	32.0	32.0	-
Velocity at Actual Conditions, feet/second	46.6	45.9	47.2	46.6
Stack/duct Cross-Sectional Area, square feet	29.87	29.87	29.87	-
Volumetric Flow at Actual Conditions, cubic feet/minute	83,600.	82,300.	84,600.	83,500.
Volumetric Flow at Standard Conditions, cubic feet/minute	69,200.	68,600.	70,900.	69,600.
Percent Isokinetic	104.9	106.6	104.7	105.4

Unit/Process Operations Data — Monitored by GCA/Technology Division

[1]Standard Conditions = 68°F (20°C) and 29.92 inches (760 mm) mercury, dry basis.

Anaconda Copper Company
Butte, Montana
Table 7
Grizzley East Duct
Summary of Test Results

Test Data				
Test Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Time	1630-1820	2050-2235	0040-0235	
Gas Flow				
Standard Cubic Feet/minute, dry	17,400.	19,400.	19,600.	18,800.
Actual Cubic Feet/minute, wet	22,700.	24,900.	24,800.	24,100.
Particulates				
Front Half Acetone Wash Fraction, g	0.1596	0.1142	0.2483	0.1740
Filter Catch Fraction, g	0.3067	0.1198	0.0251	0.1505
Total Particulates, g	0.4663	0.2340	0.2734	0.3246
Particulate Emissions[1]				
Grains/dry standard cubic foot[2]	0.129	0.058	0.068	0.085
Pounds/hour	19.2	9.67	11.5	13.5

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = $68^{o}F$ and 29.92 inches mercury.

Anaconda Copper Company
Butte, Montana
Table 8
Crusher Hood Duct
Summary of Test Results

Test Data				
Test Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Time	1638-1843	2047-2226	0040-0238	
Gas Flow				
Standard Cubic Feet/minute, dry	18,900.	19,200.	19,200.	19,100.
Actual Cubic Feet/minute, wet	24,200.	24,700.	24,200.	24,400.
Particulates				
Front Half Acetone Wash Fraction, g	0.3740	0.2108	0.2654	0.2834
Filter Catch Fraction, g	6.5815	6.5955	4.3482	5.8417
Total Particulates, g	6.9555	6.8063	4.6136	6.1251
Particulate Emissions[1]				
Grains/dry standard cubic foot[2]	1.55	1.48	1.00	1.34
Pounds/hour	251.	244.	166.	220.

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

Anaconda Copper Company
Butte, Montana
Table 9
Crusher Baghouse No. 1-2 Inlet Duct
Summary of Test Results

	1	2	3	Average
Test Data				
Test Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Time	1638-1835	2045-2230	0045-0250	
Gas Flow				
Standard Cubic Feet/minute, dry	64,400.	69,300.	69,600.	67,800.
Actual Cubic Feet/minute, wet	83,300.	89,000.	89,200.	87,200.
Particulates				
Front Half Acetone Wash Fraction, g	4.8837	3.0514	2.6282	3.5211
Filter Catch Fraction, g	2.3105	4.2701	2.0518	2.8775
Total Particulates, g	7.1942	7.3215	4.6800	6.3986
Particulate Emissions[1]				
Grains/dry standard cubic foot[2]	2.81	2.62	1.69	2.37
Pounds/hour	1,549.	1,558.	1,010.	1,372.

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

Anaconda Copper Company
Butte, Montana
Table 10
Crusher Baghouse No. 1-2 Outlet Stack
Summary of Test Results

Test Data				
Test Number	1	2	3	Average
Test Date	10-25-79	10-25-79	10-26-79	
Test Time	1630-1805	2049-2237	0045-0240	
Gas Flow				
Standard Cubic Feet/minute, dry	76,900.	76,300.	82,100.	78,400.
Actual Cubic Feet/minute, wet	99,200.	98,700.	105,400.	101,100.
Particulates				
Front Half Acetone Wash Fraction, g	0.0166	0.0127	0.0248	0.0180
Filter Catch Fraction, g	0.0021	0.0029	0.0027	0.0026
Total Particulates, g	0.0187	0.0156	0.0275	0.0206
Particulate Emissions[1]				
Grains/dry standard cubic foot[2]	0.005	0.005	0.007	0.006
Pounds/hour	3.58	2.93	5.01	3.84
Baghouse Particulate Removal Efficiency, percent	99.77	99.81	99.50	99.69
Visible Emissions[3]				
≥15 percent opacity, minutes observed	0	-	-	-
10 percent opacity, minutes observed	½	-	-	-
5 percent opacity, minutes observed	3	-	-	-
0 percent opacity, minutes observed	86½	-	-	-
Unobserved readings, minutes observed	0	-	-	-

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

[3] Opacity results listed are in minutes of the observed reading during the test period.

Anaconda Copper Company
Butte, Montana
Table 11
Truck Dump Baghouse No. 3-4 Inlet Duct
Summary of Test Results

Test Data				
Test Number	1	2	3	Average
Test Date	10-26-79	10-26-79	10-26-79	
Test Time	1445-1625	1730-1845	2037-2145	
Gas Flow				
Standard Cubic Feet/minute, dry	64,100.	64,800.	66,400.	65,100.
Actual Cubic Feet/minute, wet	76,300.	76,700.	77,900.	77,000.
Particulates				
Front Half Acetone Wash Fraction, g	0.0809	0.1144	0.0689	0.0881
Filter Catch Fraction, g	0.3064	0.2205	0.1724	0.2331
Total Particulates, g	0.3873	0.3349	0.2413	0.3212
Particulate Emissions[1]				
Grains/dry standard cubic foot[2]	0.168	0.134	0.097	0.133
Pounds/hour	92.1	75.5	55.4	74.3

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

Anaconda Copper Company
Butte, Montana
Table 12
Truck Dump Baghouse No. 3-4 Outlet Stack
Summary of Test Results

Test Data				
Test Number	1	2	3	Average
Test Date	10-26-79	10-26-79	10-26-79	
Test Time	1445-1630	1730-1845	2037-2145	
Gas Flow				
Standard Cubic Feet/minute, dry	69,200.	68,600.	70,900.	69,600.
Actual Cubic Feet/minute, wet	83,600.	82,300.	84,600.	83,500.
Particulates				
Front Half Acetone Wash Fraction, g	0.0373	0.0298	0.0272	0.0314
Filter Catch Fraction, g	0.0058	0.0104	0.0035	0.0066
Total Particulates, g	0.0431	0.0402	0.0307	0.0380
Particulate Emissions[1]				
Grains/dry standard cubic foot[2]	0.020	0.019	0.014	0.018
Pounds/hour	12.0	11.0	8.56	10.5
Baghouse Particulate Removal Efficiency, percent	86.97	85.43	84.55	85.65
Visible Emissions[3]				
≧ 25 percent opacity, minutes observed	0	0	-	0
20 percent opacity, minutes observed	½	½	-	½
15 percent opacity, minutes observed	3/4	3/4	-	3/4
10 percent opacity, minutes observed	1 3/4	2 1/4	-	2
5 percent opacity, minutes observed	12 1/4	6 1/2	-	9 3/8
0 percent opacity, minutes observed	54 3/4	52	-	53 3/8
Unobserved readings, minutes observed	0	0	-	0

[1]Based on Total Particulates captured by train.

[2]Standard Conditions = 68°F and 29.92 inches mercury.

[3]Opacity results listed are in minutes of the observed reading during the test period.

Anaconda Copper Company
Butte, Montana

TABLE 13

PARTICLE SIZE DISTRIBUTION

Run: 1

Date: 10-25-79

Location: Anaconda Copper Company

Sampling Location: Grizzley East Duct

Traverse Point No. Sampled: X-1

P_{bar} (in. Hg.) 24.04

Stack Temp (°F) 74.

Sample Time (Min.) 5.0

Sample Volume (cf) 3.79

Moisture (% H_2O) 1.0

Meter Temp (°F) 100.

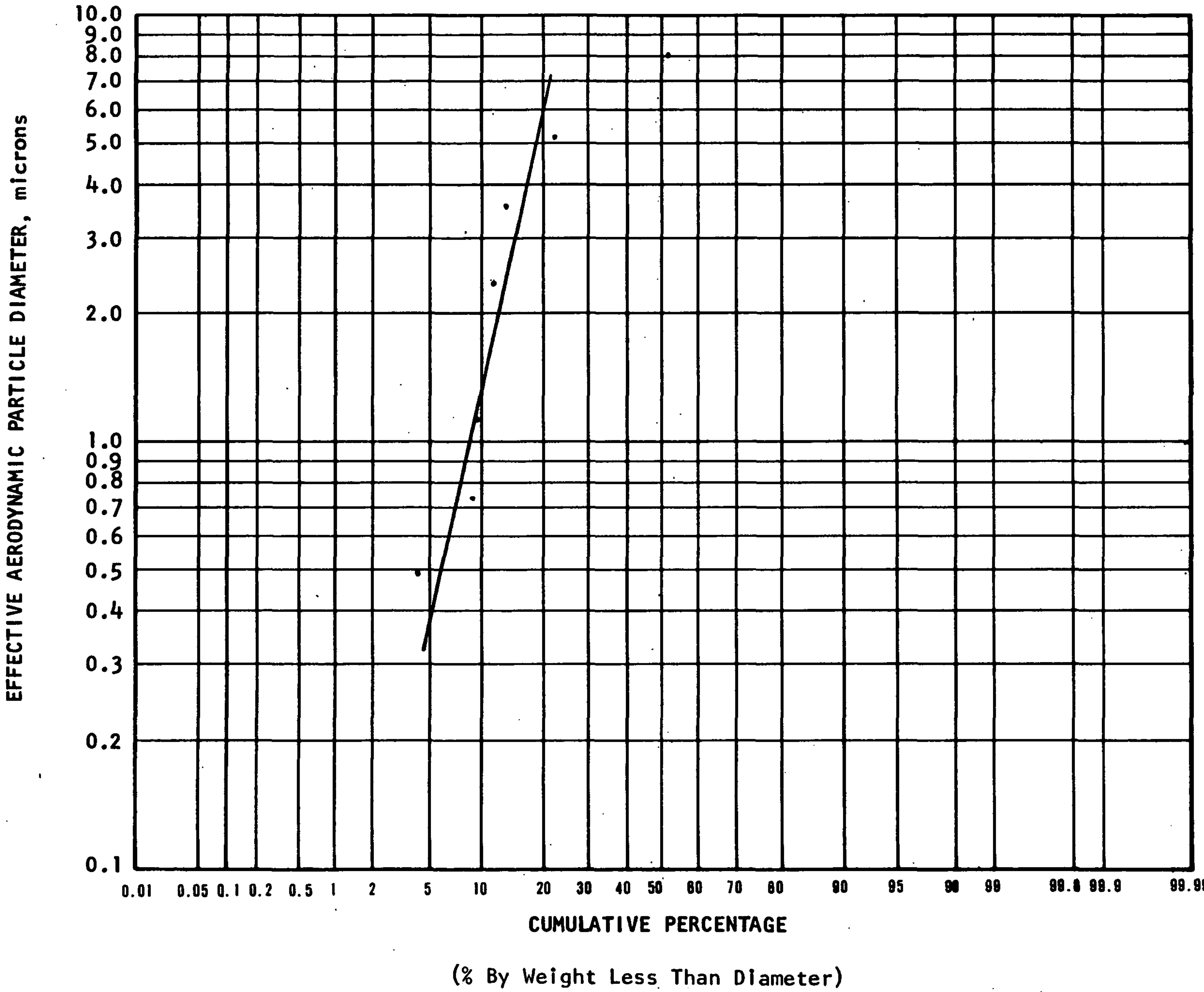
Flow Setting, ΔH (in. H_2O) 1.55

Nozzle Diameter (in.) 0.179

Sample Flow Rate (at stack conditions): 0.58 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	5.4	48.2	100	12.5
2	3.2	28.6	51.8	8.0
3	1.1	9.8	23.2	5.2
4	0.1	0.9	13.4	3.7
5	0.3	2.7	12.5	2.3
6	0.2	1.8	9.8	1.2
7	0.5	4.5	8.0	0.74
8	0.4	3.5	3.5	0.49
Backup Filter	0.0	0.0	0.0	--
TOTAL	11.2			

Crusher Grizzley East
Particle Size Distribution
Run 1



Anaconda Copper Company
Butte, Montana

TABLE 14

PARTICLE SIZE DISTRIBUTION

Run: 2

Date: 10-25-79

Location: Anaconda Copper Company

Sampling Location: Grizzley East Duct

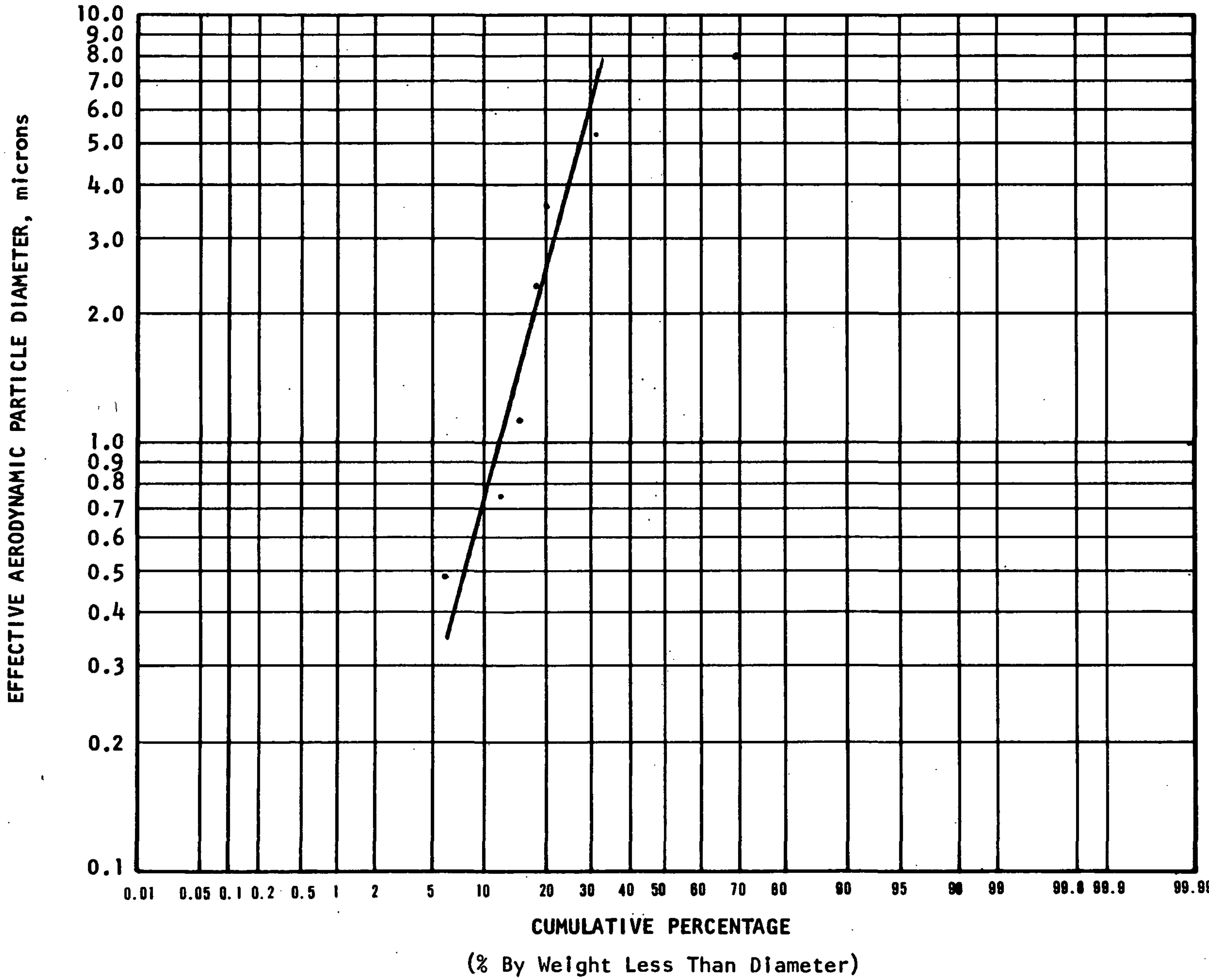
Traverse Point No. Sampled: X-9

P_{bar} (in. Hg.)	24.04
Stack Temp (^oF)	74.
Sample Time (Min.)	5.0
Sample Volume (cf)	3.74
Moisture (% H_2O)	1.0
Meter Temp (^oF)	97.
Flow Setting, ΔH (in. H_2O)	1.55
Nozzle Diameter (in.)	0.179

Sample Flow Rate (at stack conditions): 0.58 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	1.6	32.0	100.0	12.5
2	1.8	36.0	68.0	8.0
3	0.6	12.0	32.0	5.2
4	0.1	2.0	20.0	3.7
5	0.1	2.0	18.0	2.3
6	0.2	4.0	16.0	1.2
7	0.3	6.0	12.0	0.74
8	0.1	2.0	6.0	0.49
Backup Filter	0.2	4.0	4.0	--
TOTAL	5.0			

Crusher Grizzley East
Particle Size Distribution
Run 2



Anaconda Copper Company
Butte, Montana

TABLE 15

PARTICLE SIZE DISTRIBUTION

Run: 3

Date: 10-25-79

Location: Anaconda Copper Company

Sampling Location: Grizzley East Duct

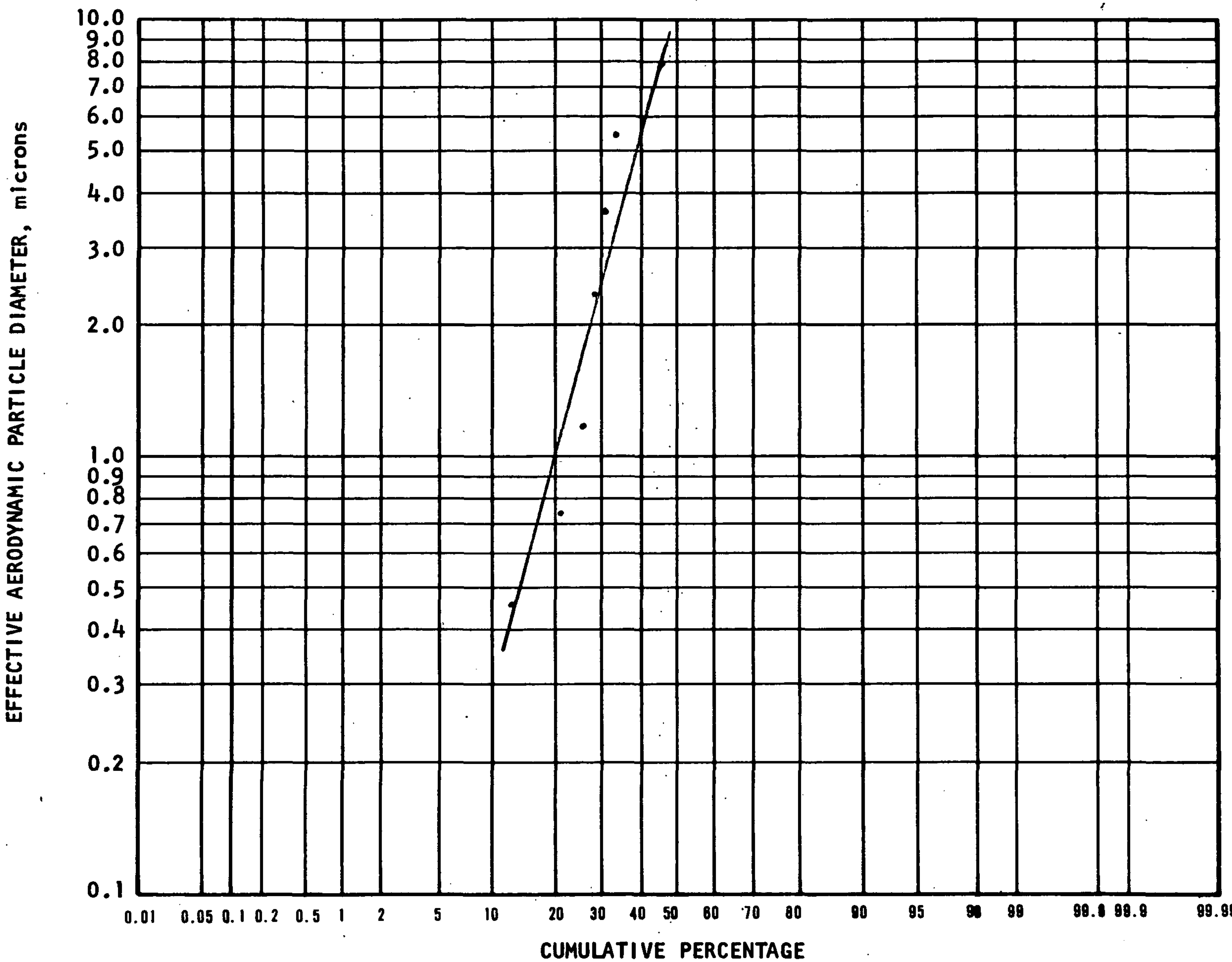
Traverse Point No. Sampled: X-2

P_{bar} (in. Hg.)	24.04
Stack Temp (°F)	74.
Sample Time (Min.)	5.0
Sample Volume (cf)	3.90
Moisture (% H_2O)	1.0
Meter Temp (°F)	97.
Flow Setting, ΔH (in. H_2O)	1.55
Nozzle Diameter (in.)	0.179

Sample Flow Rate (at stack conditions): 0.60 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	2.6	53.1	100.	12
2	0.6	12.2	46.9	7.8
3	0.2	4.1	34.7	5.3
4	0.1	2.0	30.6	3.7
5	0.1	2.0	28.6	2.3
6	0.3	6.1	26.6	1.2
7	0.4	8.2	20.5	0.73
8	0.2	4.1	12.3	0.47
Backup Filter	0.4	8.2	8.2	--
TOTAL	4.9			

Crusher Grizzley East
Particle Size Distribution
Run 3



Anaconda Copper Company
Butte, Montana

TABLE 16

PARTICLE SIZE DISTRIBUTION

Run: 1

Date: 10-25-79

Location: Anaconda Copper Company

Sampling Location: Crusher Hood Duct

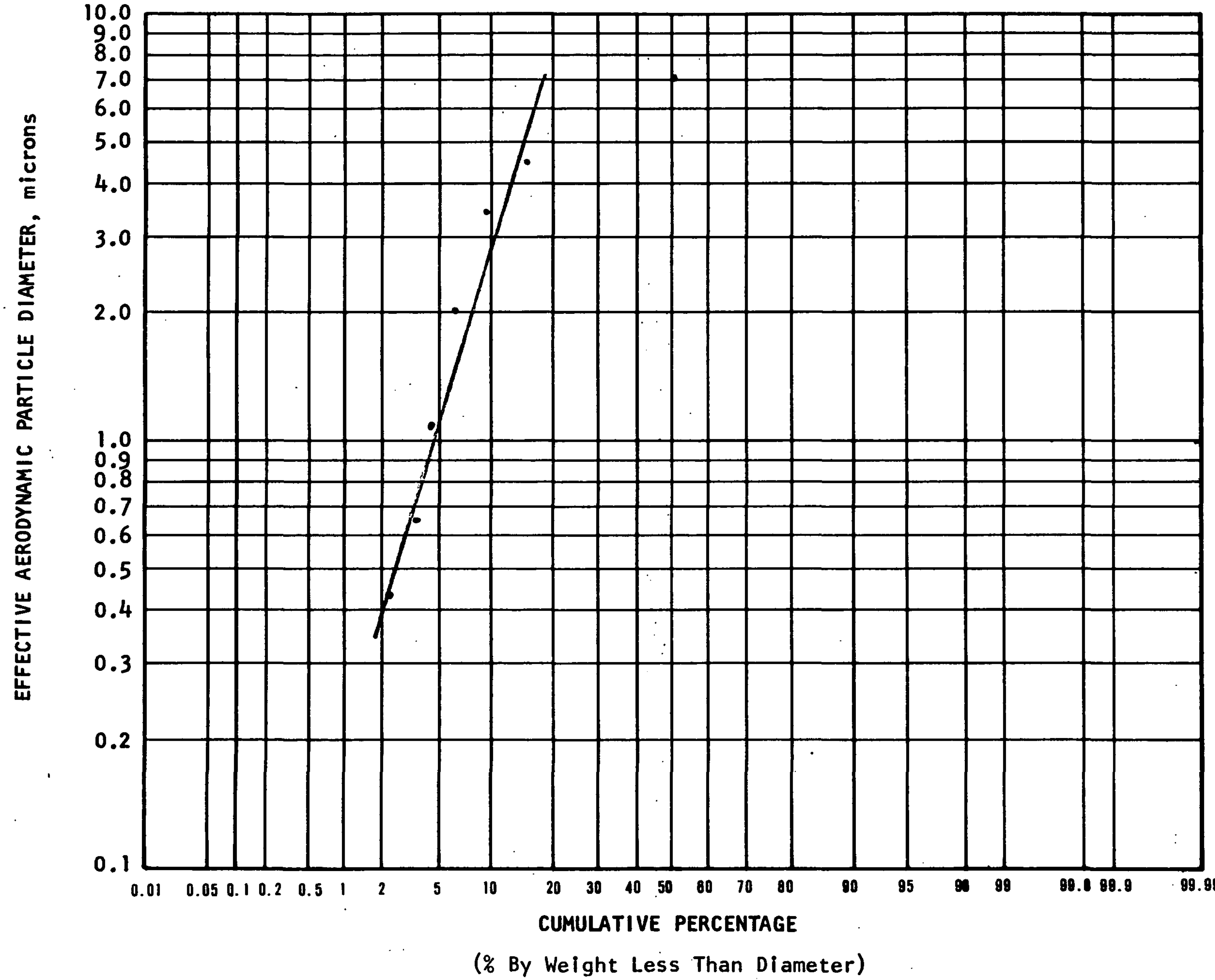
Traverse Point No. Sampled: X-3

P_{bar} (in. Hg.)	24.04
Stack Temp (°F)	70.
Sample Time (Min.)	5.
Sample Volume (cf)	4.89
Moisture (% H_2O)	1.3
Meter Temp (°F)	107
Flow Setting, ΔH (in. H_2O)	2.65
Nozzle Diameter (in.)	0.242

Sample Flow Rate (at stack conditions): 0.75cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	45.9	49.6	100.	11.3
2	31.3	33.8	50.4	7.0
3	7.0	7.6	16.6	4.5
4	2.7	2.9	9	3.5
5	1.4	1.5	6.1	2.1
6	1.2	1.3	4.6	1.1
7	0.6	0.6	3.3	0.64
8	0.8	0.9	2.7	0.43
Backup Filter	1.6	1.8	1.8	--
TOTAL	92.5			

Crusher Hood Duct
Particle Size Distribution
Run 1



Anaconda Copper Company
Butte, Montana

TABLE 17

PARTICLE SIZE DISTRIBUTION

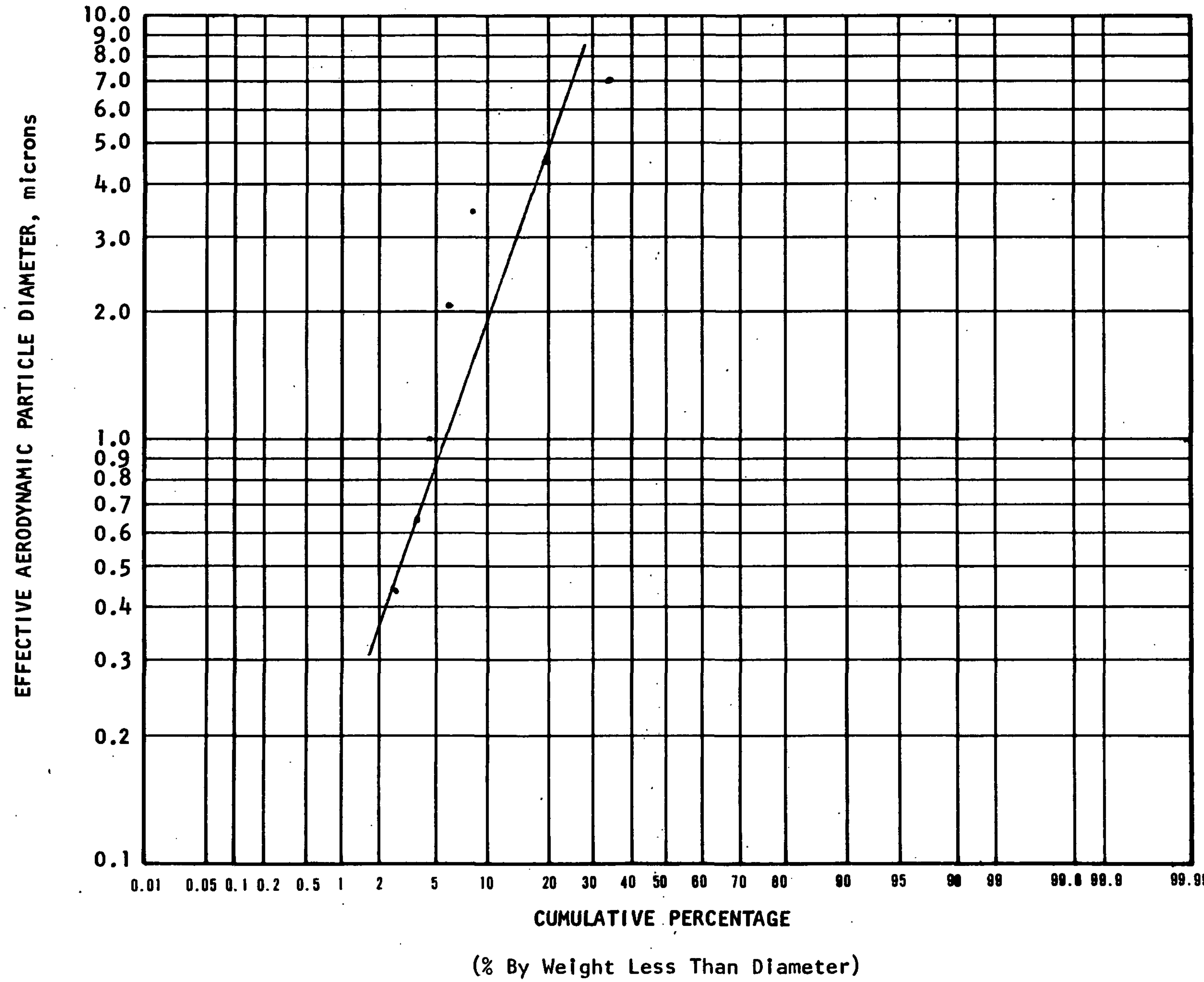
Run: 2

Date:	10-25-79	P_{bar} (in. Hg.)	24.04
Location:	Anaconda Copper Company	Stack Temp (°F)	70.
Sampling Location:	Crusher Hood Duct	Sample Time (Min.)	5.0
Traverse Point No. Sampled:	X-11	Sample Volume (cf)	4.89
		Moisture (% H_2O)	1.3
		Meter Temp (°F)	107
		Flow Setting, ΔH (in. H_2O)	2.65
		Nozzle Diameter (in.)	0.242

Sample Flow Rate (at stack conditions): 0.75 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	40.9	56.1	100.	11.3
2	17.6	24.1	43.9	7.0
3	8.4	11.5	19.8	4.5
4	1.3	1.8	8.3	3.5
5	1.4	1.9	6.5	2.05
6	0.6	0.8	4.6	1.05
7	0.6	0.8	3.8	0.64
8	0.4	0.6	3.0	0.43
Backup Filter	1.8	2.4	2.4	--
TOTAL	72.9			

Crusher Hood Duct
Particle Size Distribution
Run 2



Anaconda Copper Company
Butte, Montana

TABLE 18

PARTICLE SIZE DISTRIBUTION

Run: 3

Date: 10-25-79

Location: Anaconda Copper Company

Sampling Location: Crusher Hood Duct

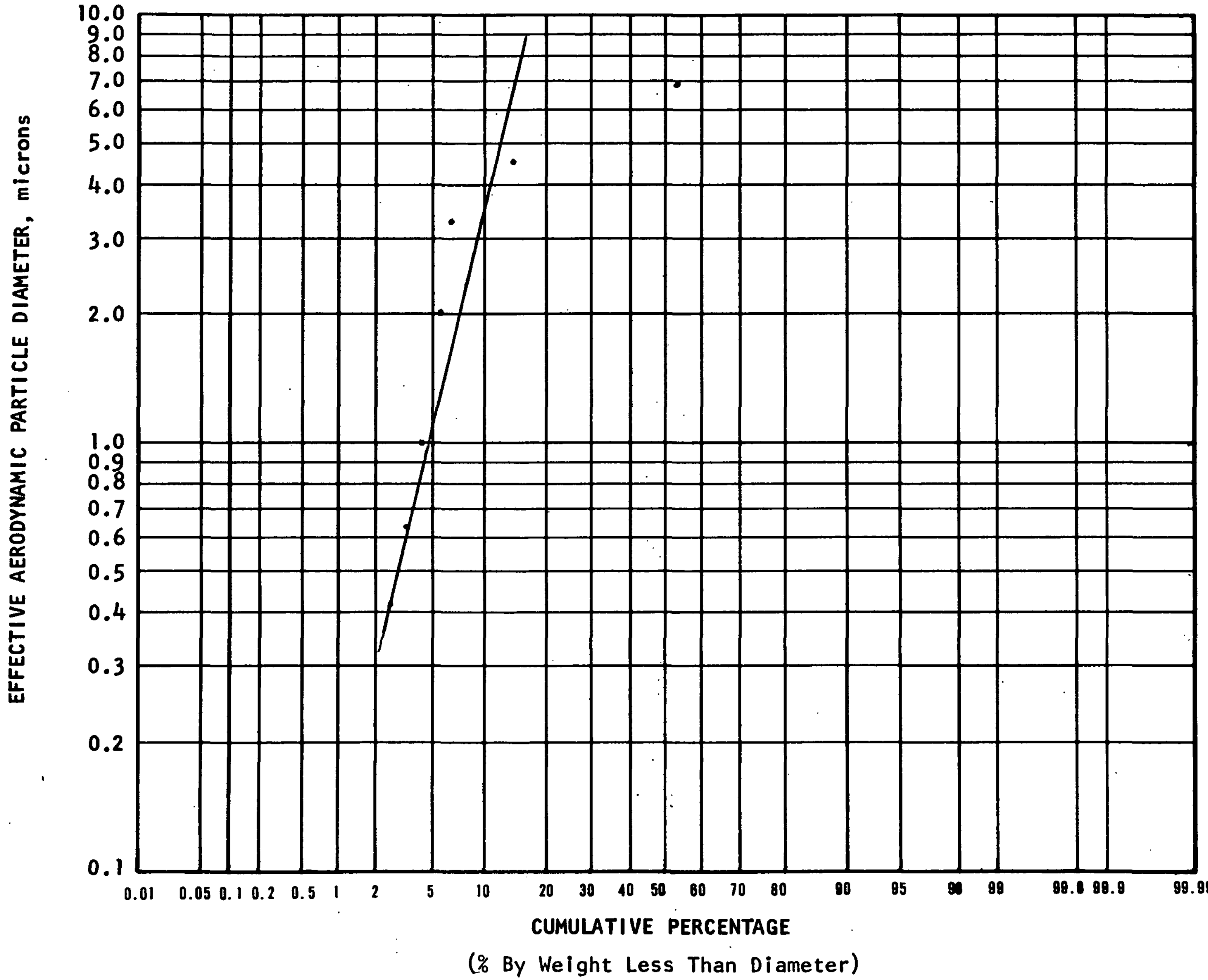
Traverse Point No. Sampled: X-6

P_{bar} (in. Hg.)	24.04
Stack Temp (°F)	70.
Sample Time (Min.)	4.
Sample Volume (cf)	3.99
Moisture (% H_2O)	1.3
Meter Temp (°F)	103.
Flow Setting, $\triangle H$ (in. H_2O)	2.65
Nozzle Diameter (in.)	0.242

Sample Flow Rate (at stack conditions): 0.77cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	33.8	47.5	100.	11.
2	27.0	37.9	52.5	6.8
3	4.9	6.9	14.6	4.6
4	1.8	2.5	7.7	3.2
5	0.7	1.0	5.2	2.0
6	0.3	0.4	4.2	1.0
7	0.5	0.7	3.8	0.63
8	0.6	0.8	3.1	0.42
Backup Filter	1.7	2.3	2.3	--
TOTAL	71.2			

Crusher Hood Duct
Particle Size Distribution
Run 3



Anaconda Copper Company
Butte, Montana

TABLE 19

PARTICLE SIZE DISTRIBUTION

Run: 1

Date: 10-26-79

Location: Anaconda Copper Company

Sampling Location: No. 1-2 Baghouse Inlet

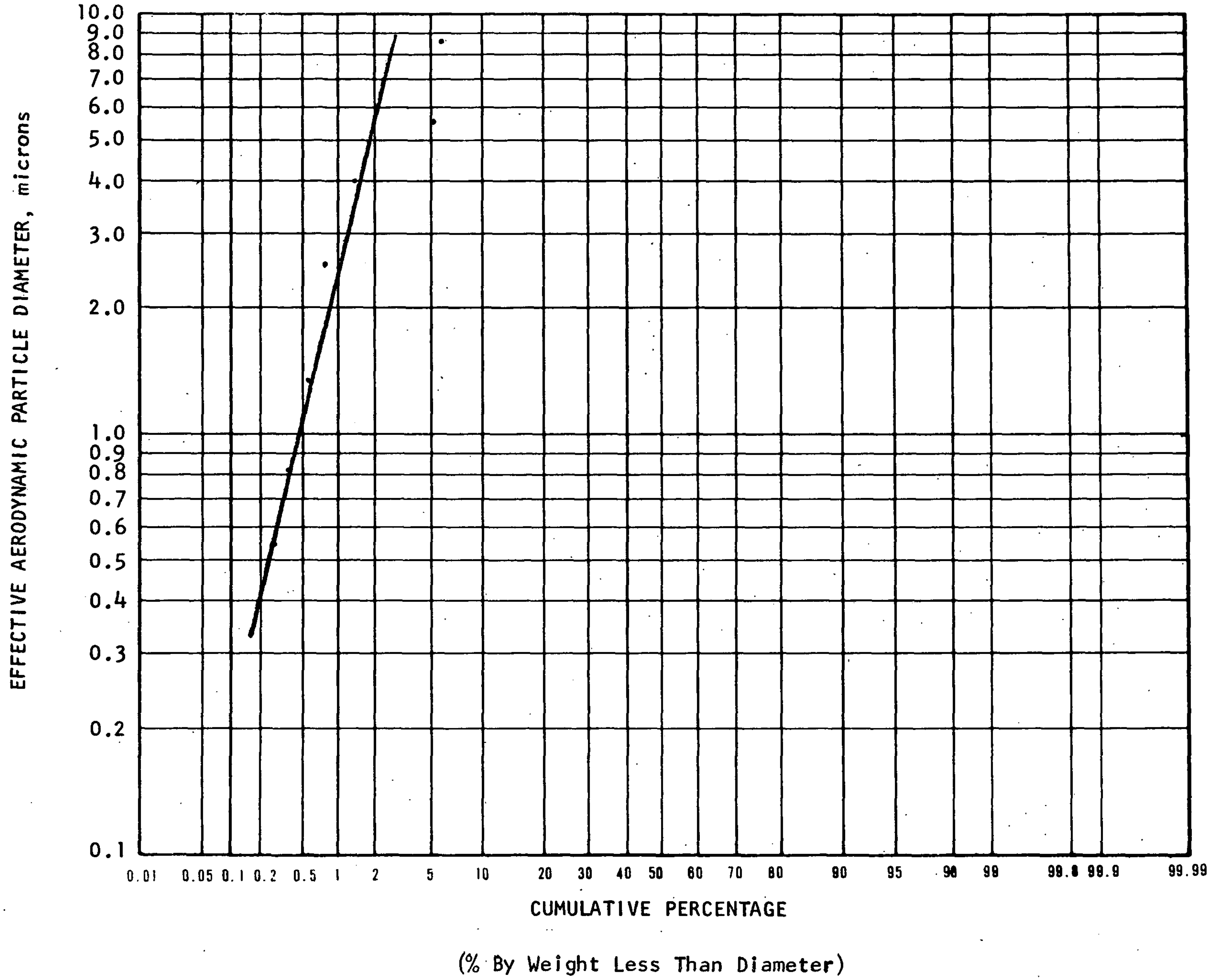
Traverse Point No. Sampled: A-8

P_{bar} (in. Hg.)	24.44
Stack Temp (°F)	73.
Sample Time (Min.)	4.0
Sample Volume (cf)	2.26
Moisture (% H_2O)	1.6
Meter Temp (°F)	55.
Flow Setting, ΔH (in. H_2O)	0.84
Nozzle Diameter (in.)	0.179

Sample Flow Rate (at stack conditions): 0.48cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	214.2	93.4	100.	14.0
2	3.2	1.4	6.6	8.6
3	8.7	3.8	5.2	5.6
4	1.4	0.6	1.4	4.0
5	0.5	0.2	0.8	2.6
6	0.5	0.2	0.6	1.3
7	0.2	0.1	0.4	0.82
8	0.1	0.1	0.3	0.55
Backup Filter	0.5	0.2	0.2	--
TOTAL	229.3			

No. 1-2 Baghouse Inlet
Particle Size Distribution
Run 1



Anaconda Copper Company
Butte, Montana

TABLE 20

PARTICLE SIZE DISTRIBUTION

Run: 2

Date: 10-26-79

Location: Anaconda Copper Company

Sampling Location: No. 1-2 Baghouse Inlet

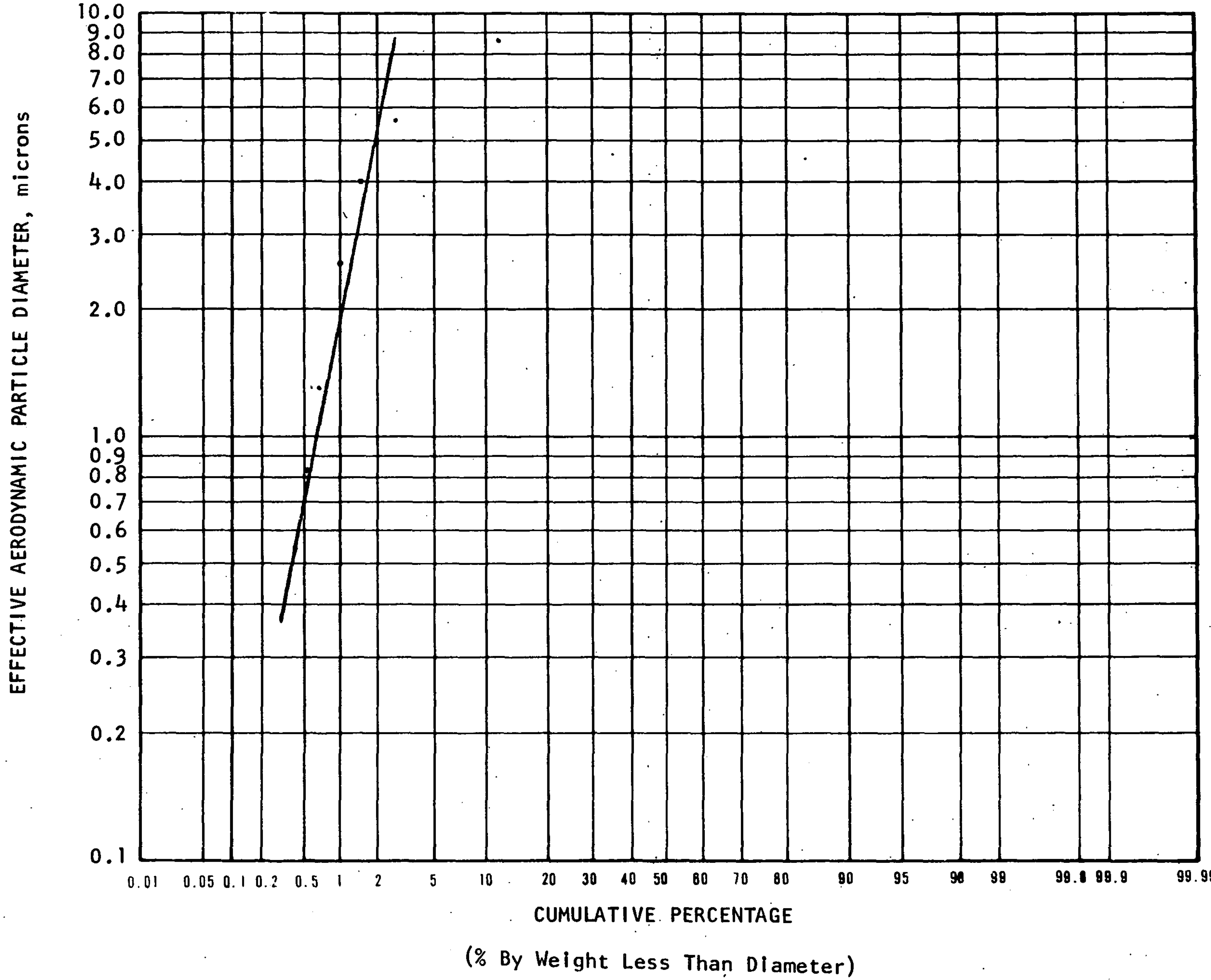
Traverse Point No. Sampled: B-8

P_{bar} (in. Hg.)	24.44
Stack Temp (°F)	73.
Sample Time (Min.)	3.0
Sample Volume (cf)	1.67
Moisture (% H_2O)	1.6
Meter Temp (°F)	50.
Flow Setting, ΔH (in. H_2O)	0.84
Nozzle Diameter (in.)	0.179

Sample Flow Rate (at stack conditions): 0.48cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	134.	88.9	100.	14.0
2	12.2	8.0	11.1	8.6
3	2.2	1.5	3.1	5.6
4	0.9	0.6	1.6	4.0
5	0.4	0.3	1.0	2.6
6	0.2	0.1	0.7	1.3
7	0.3	0.2	0.6	0.82
8	0.2	0.1	0.4	0.55
Backup Filter	0.4	0.3	0.3	--
TOTAL	150.8			

No. 1-2 Baghouse Inlet
Particle Size Distribution
Run 2



Anaconda Copper Company
Butte, Montana

TABLE 21

PARTICLE SIZE DISTRIBUTION

Run: 3

Date: 10-26-79

Location: Anaconda Copper Company

Sampling Location: No. 1-2 Baghouse Inlet

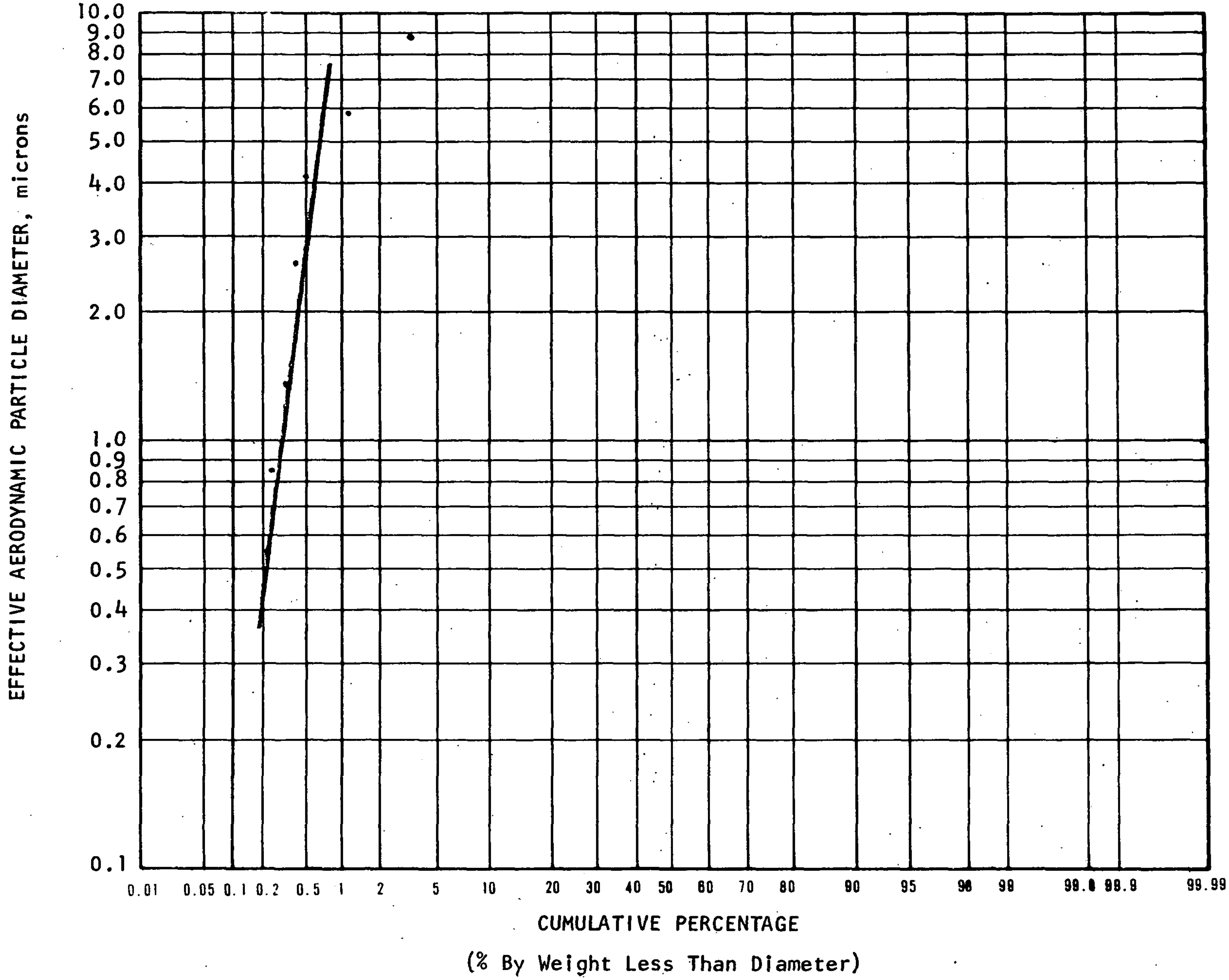
Traverse Point No. Sampled: A-1

P_{bar} (in. Hg.)	24.44
Stack Temp (°F)	73.
Sample Time (Min.)	3.0
Sample Volume (cf)	1.61
Moisture (% H_2O)	1.6
Meter Temp (°F)	49.
Flow Setting, ΔH (in. H_2O)	0.84
Nozzle Diameter (in.)	0.179

Sample Flow Rate (at stack conditions): 0.46cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	195.9	96.6	100.	13.8
2	4.5	2.2	3.4	8.8
3	1.4	0.7	1.2	5.9
4	0.2	0.1	0.5	4.1
5	0.1	0.05	0.4	2.7
6	0.1	0.05	0.35	1.3
7	0.1	0.05	0.3	0.9
8	0.4	0.2	0.25	0.6
Backup Filter	0.1	0.05	0.05	--
TOTAL	202.8			

No. 1-2 Baghouse Inlet
Particle Size Distribution
Run 3



Anaconda Copper Company
Butte, Montana

TABLE 22

PARTICLE SIZE DISTRIBUTION

Run: 1

Date: 10-25-79

Location: Anaconda Copper Company

Sampling Location: No. 1-2 Baghouse Outlet

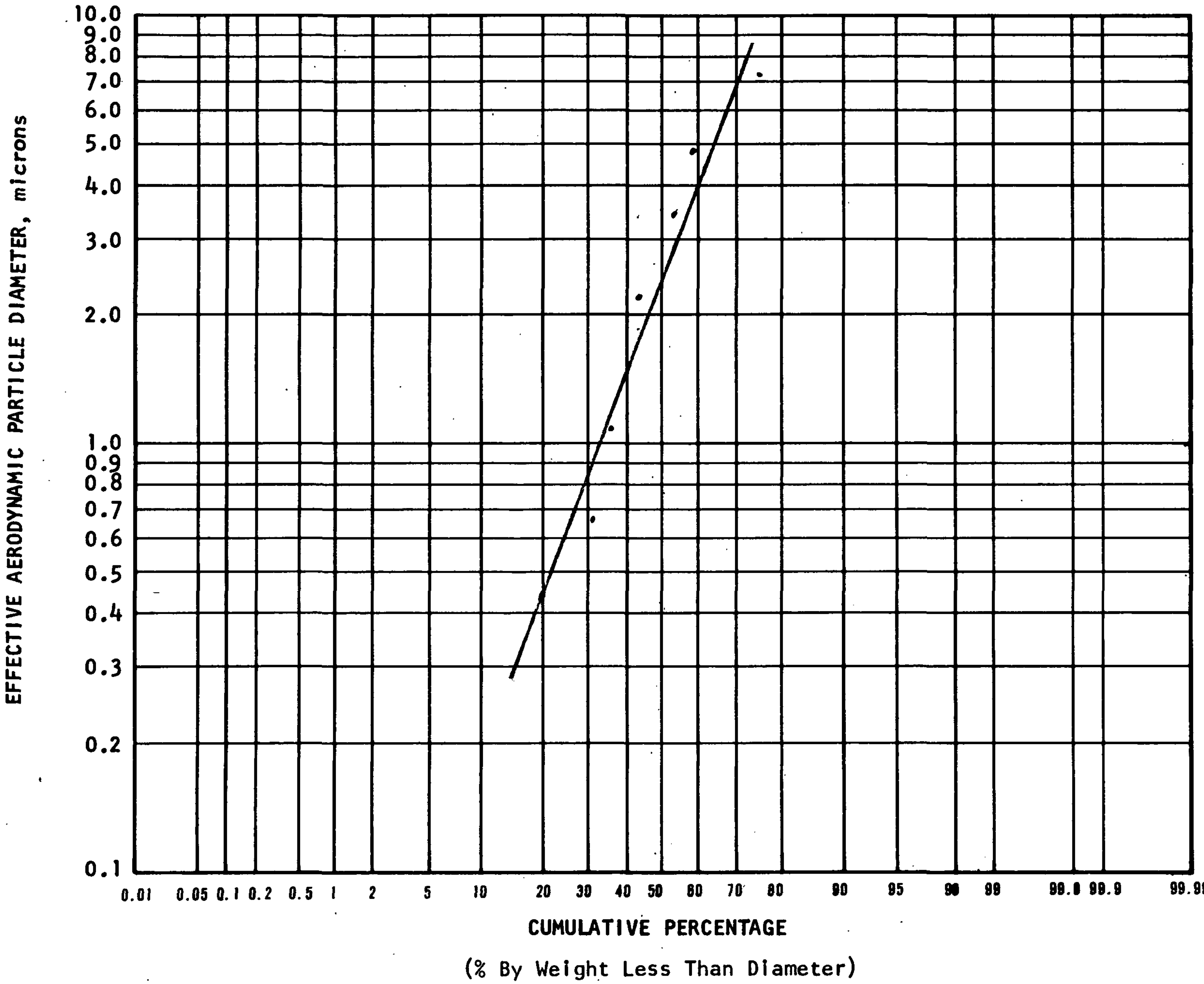
Traverse Point No. Sampled: B-6, A-6

P_{bar} (in. Hg.)	24.04
Stack Temp (^{o}F)	74.
Sample Time (Min.)	60.
Sample Volume (cf)	51.95
Moisture (% H_2O)	1.9
Meter Temp (^{o}F)	82.
Flow Setting, ΔH (in. H_2O)	2.1
Nozzle Diameter (in.)	0.232

Sample Flow Rate (at stack conditions): 0.69cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	1.3	25.5	100.	11.5
2	0.8	15.7	74.5	7.2
3	0.3	5.9	58.8	4.8
4	0.5	9.8	52.9	3.4
5	0.3	5.9	43.1	2.2
6	0.3	5.9	37.2	1.1
7	0.6	11.8	31.3	0.66
8	0.5	9.8	19.5	0.45
Backup Filter	0.5	9.7	9.7	--
TOTAL	5.1			

No. 1-2 Baghouse Outlet
Particle Size Distribution
Run 1



Anaconda Copper Company
Butte, Montana

TABLE 23

PARTICLE SIZE DISTRIBUTION

Run: 1

Date: 10-26-79

Location: Anaconda Copper Company

Sampling Location: No. 3-4 Baghouse Inlet

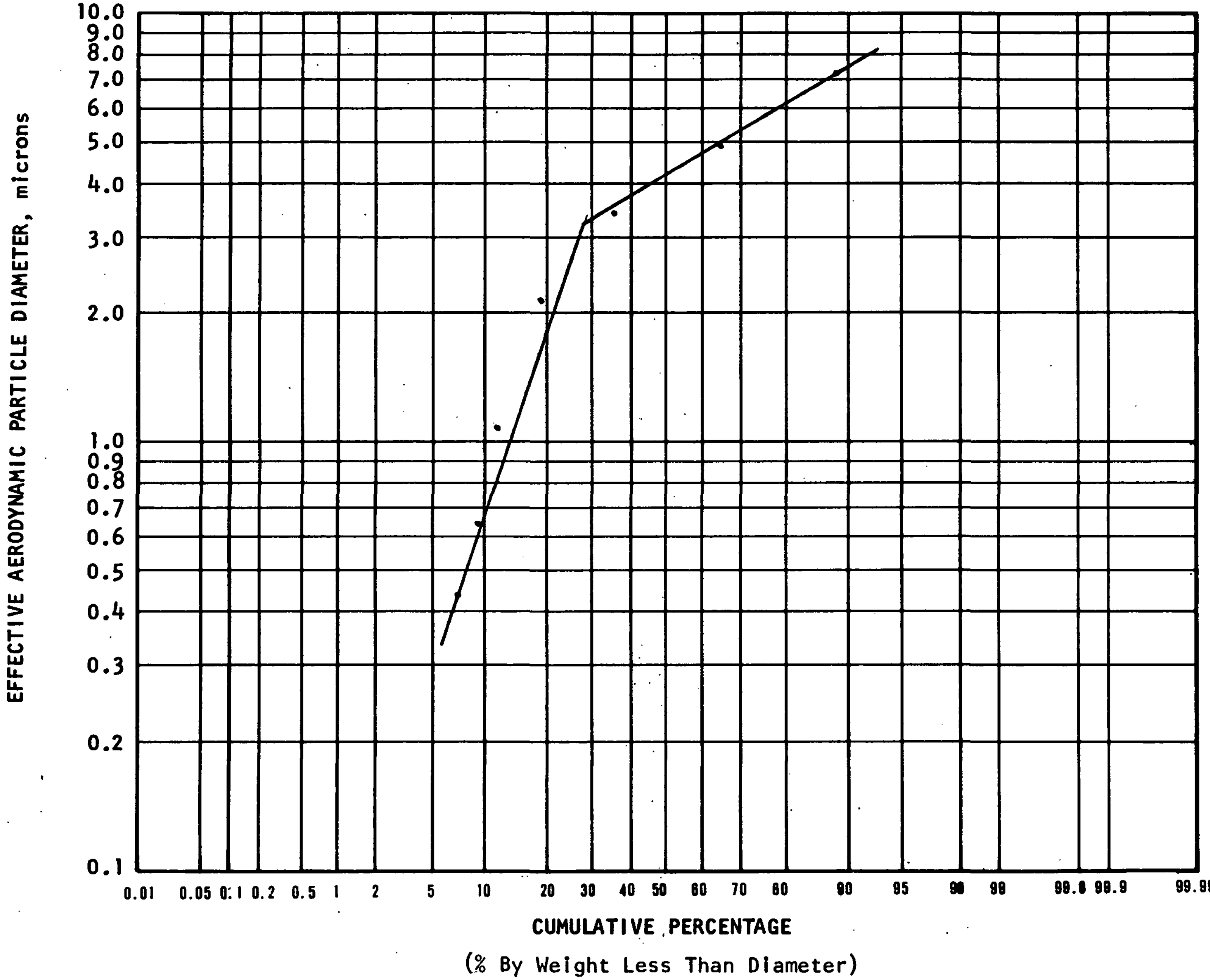
Traverse Point No. Sampled: X-4

P_{bar} (in. Hg.)	24.44
Stack Temp (°F)	40.
Sample Time (Min.)	15.
Sample Volume (cf)	12.06
Moisture (% H_2O)	1.5
Meter Temp (°F)	74.
Flow Setting, ΔH (in. H_2O)	1.9
Nozzle Diameter (in.)	0.227

Sample Flow Rate (at stack conditions): 0.66cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	3.3	11.8	100.0	11.4
2	6.4	22.9	88.2	7.2
3	8.1	29.	65.3	4.9
4	4.6	16.5	36.3	3.4
5	2.2	7.9	19.8	2.1
6	0.7	2.5	11.9	1.1
7	0.7	2.5	9.4	0.65
8	0.8	2.9	6.9	0.44
Backup Filter	1.1	4.0	4.0	--
TOTAL	27.9			

No. 3-4 Baghouse Inlet
Particle Size Distribution
Run 1



Anaconda Copper Company
Butte, Montana

TABLE 24

PARTICLE SIZE DISTRIBUTION

Run: 2

Date: 10-26-79

Location: Anaconda Copper Company

Sampling Location: No. 3-4 Baghouse Inlet

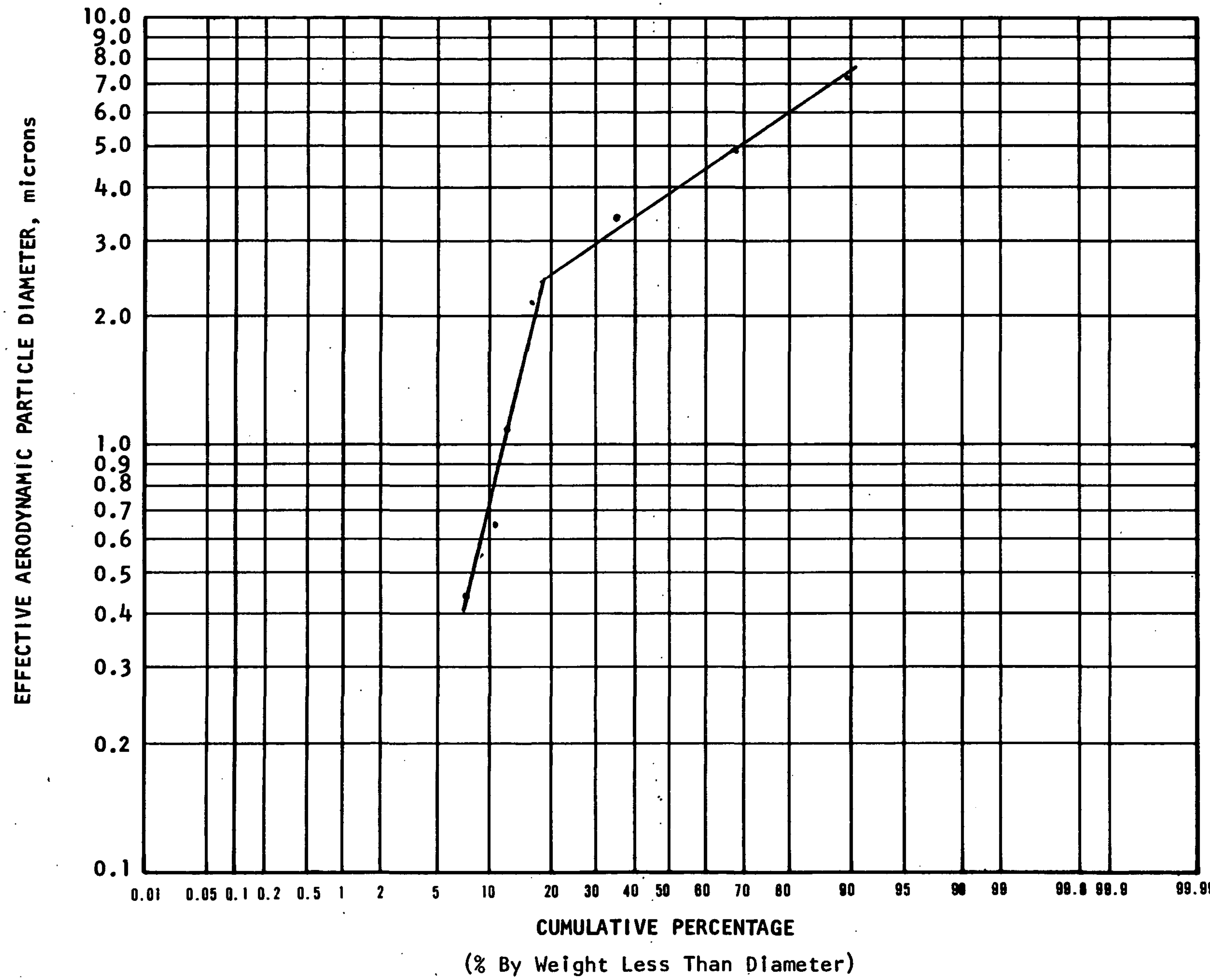
Traverse Point No. Sampled: X-6

P_{bar} (in. Hg.)	24.44
Stack Temp (^{o}F)	40.
Sample Time (Min.)	15.
Sample Volume (cf)	12.25
Moisture (% H_2O)	1.5
Meter Temp (^{o}F)	74.
Flow Setting, ΔH (in. H_2O)	1.9
Nozzle Diameter (in.)	0.227

Sample Flow Rate (at stack conditions): 0.67cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	2.2	10.5	100.	11.4
2	4.4	21.1	89.5	7.9
3	6.8	32.5	68.4	4.9
4	3.7	17.7	35.9	3.4
5	0.9	4.3	18.2	2.1
6	0.6	2.9	13.9	1.1
7	0.7	3.4	11.0	0.65
8	0.4	1.9	7.6	0.44
Backup Filter	1.2	5.7	5.7	--
TOTAL	20.9			

No. 3-4 Baghouse Inlet
Particle Size Distribution
Run 2



Anaconda Copper Company
Butte, Montana

TABLE 25

PARTICLE SIZE DISTRIBUTION

Run: 3

Date: 10-26-79

Location: Anaconda Copper Company

Sampling Location: No. 3-4 Baghouse Inlet

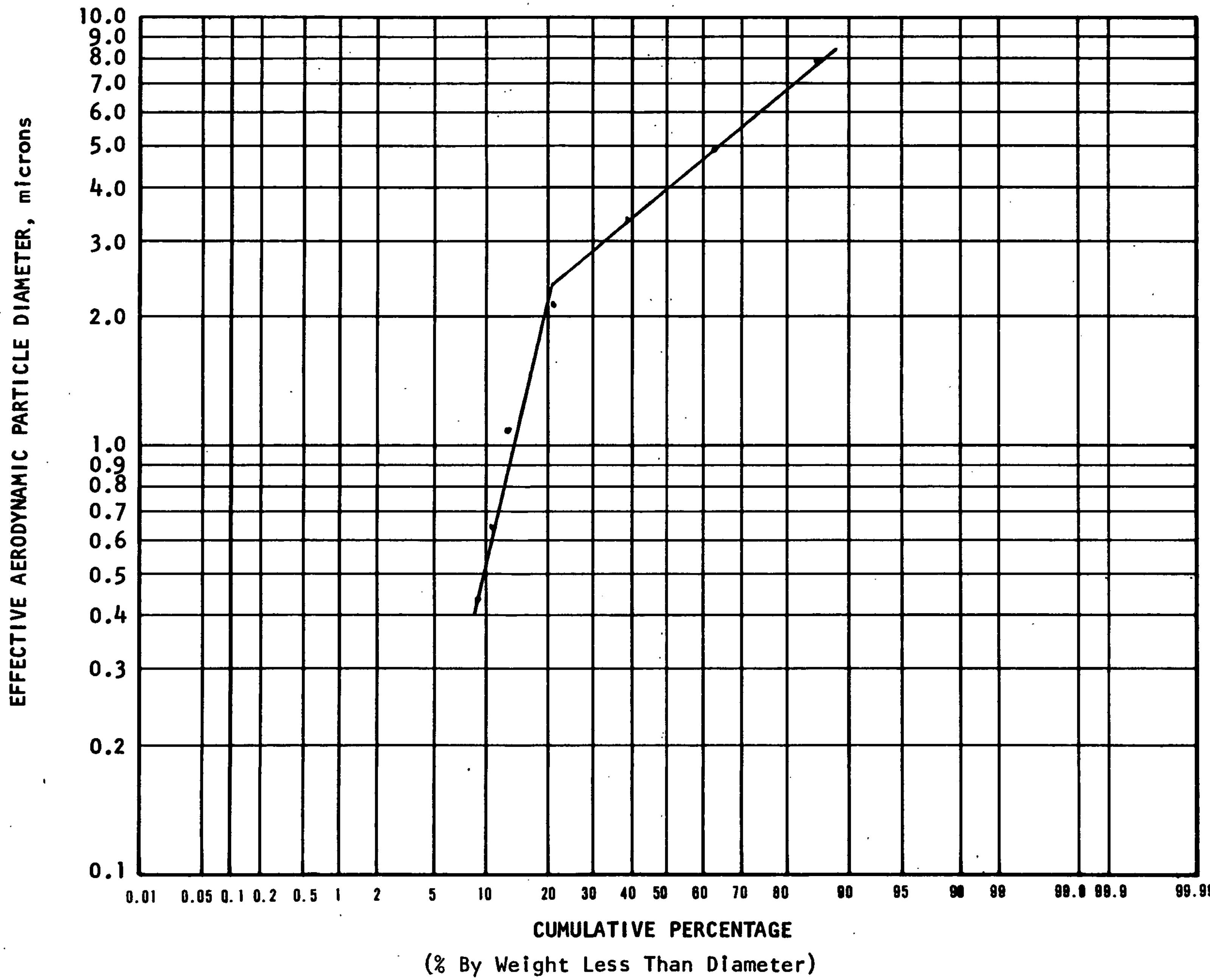
Traverse Point No. Sampled: Y-5

P_{bar} (in. Hg.)	24.44
Stack Temp (°F)	40.
Sample Time (Min.)	15.
Sample Volume (cf)	12.23
Moisture (% H_2O)	15.
Meter Temp (°F)	76.
Flow Setting, ΔH (in. H_2O)	1.9
Nozzle Diameter (in.)	0.227

Sample Flow Rate (at stack conditions): 0.67cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	3.6	15.5	100.	11.4
2	5.2	22.4	84.5	7.9
3	7.6	32.8	62.1	4.9
4	2.1	9.1	29.3	3.4
5	1.7	7.3	20.2	2.1
6	0.5	2.2	12.9	1.1
7	0.5	2.2	10.7	0.65
8	0.8	3.5	8.5	0.44
Backup Filter	1.2	5.0	5.0	--
TOTAL	23.2			

No. 3-4 Baghouse Inlet
Particle Size Distribution
Run 3



Anaconda Copper Company
Butte, Montana

TABLE 26

PARTICLE SIZE DISTRIBUTION

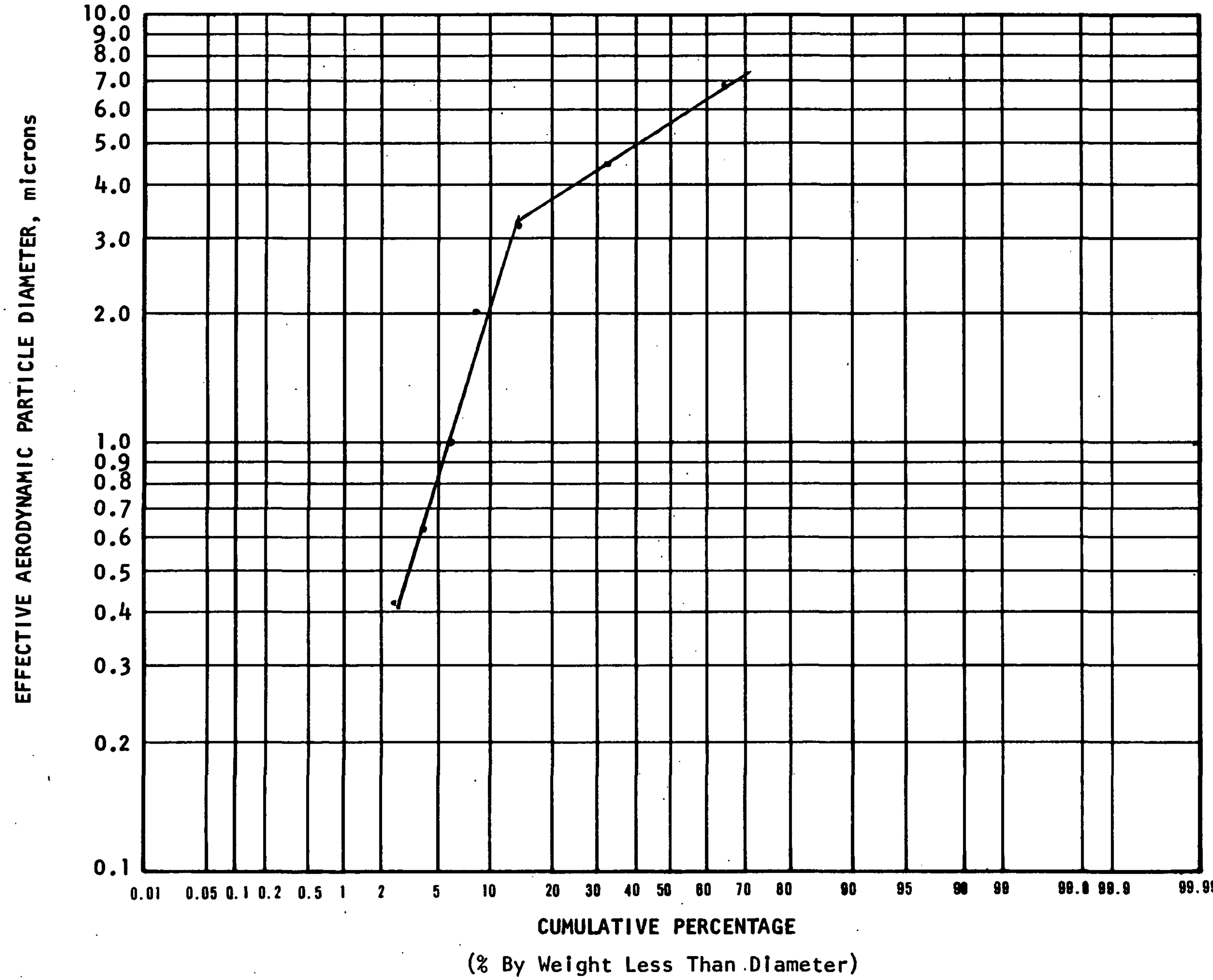
Run: 1

Date:	10-25-79	P_{bar} (in. Hg.)	24.04
Location:	Anaconda Copper Company	Stack Temp (°F)	52.
Sampling Location:	No. 3-4 Baghouse Outlet	Sample Time (Min.)	90.
Traverse Point No. Sampled:	A-6	Sample Volume (cf)	82.72
		Moisture (% H_2O)	0.75
		Meter Temp (°F)	82.
		Flow Setting, ΔH (in. H_2O)	2.2
		Nozzle Diameter (in.)	0.197

Sample Flow Rate (at stack conditions): 0.75 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	EAD (Microns)
1	11.3	35.0	100.	11.2
2	10.7	33.1	65.	6.8
3	5.5	17.0	31.9	4.5
4	1.8	5.6	14.9	3.2
5	1.0	3.1	9.3	2.0
6	0.5	1.6	6.2	1.0
7	0.4	1.2	4.6	0.62
8	0.3	0.9	3.4	0.42
Backup Filter	0.8	2.5	2.5	--
TOTAL	32.3			

No. 3-4 Baghouse Outlet
Particle Size Distribution
Run 1



SUMMARY OF VISIBLE EMISSIONS

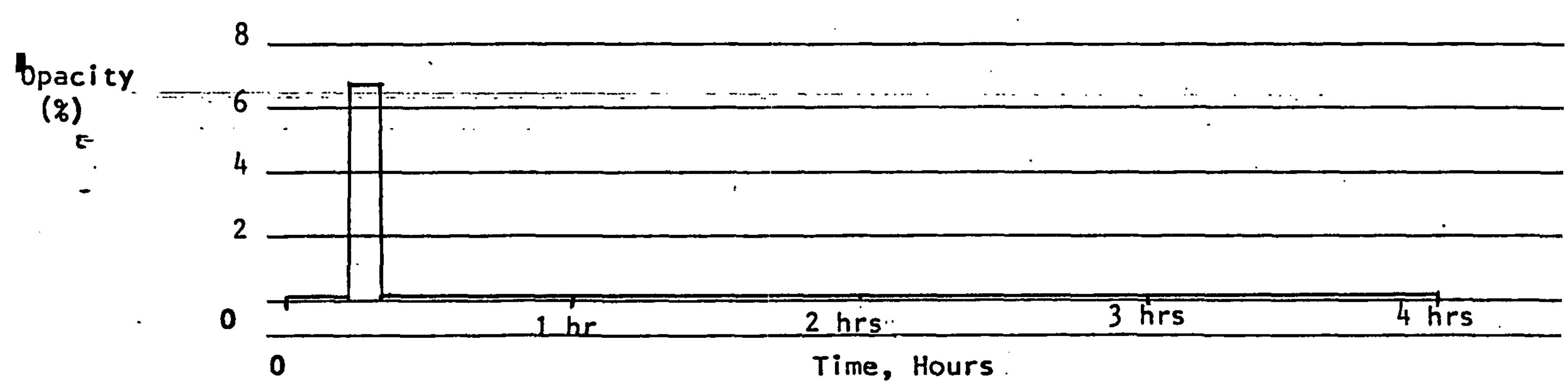
Table 27

Date: October 25-26, 1979
Type of Plant: Copper mine
Type of Discharge: Grizzley chute
Location of Discharge: East Grizzley
Height of Point of Discharge: 10-20' above flr.
Description of Sky: N/A
Wind Direction: N/A
Wind Velocity: N/A
Color of Plume: N/A
Detached Plume: N/A
Observer No.: N/A
Duration of Observation: 5-1/4 hours
Distance from Observer to Discharge Point: 10'
Direction of Observer from Discharge Point: East
Height of Observation Point: 10' above discharge point
Description of Background: Grey metal walls

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1630	1636	0	0	21	2056	2102	0	0
2	1636	1642	0	0	22	2102	2108	0	0
3	1642	1648	80	6.7	23	2108	2114	0	0
4	1648	1654	0	0	24	2114	2120	0	0
5	1654	1700	0	0	25	2120	2126	0	0
6	1700	1706	0	0	26	2126	2132	0	0
7	1706	1712	0	0	27	2132	2138	0	0
8	1712	1718	0	0	28	2138	2144	0	0
9	1718	1724	0	0	29	2144	2150	0	0
10	1724	1730	0	0	30	2150	2156	0	0
11	1742	1748	0	0	31	2156	2202	0	0
12	1748	1754	0	0	32	2202	2208	0	0
13	1754	1800	0	0	33	2208	2214	0	0
14	1800	1806	0	0	34	2214	2220	0	0
15	1806	1812	0	0	35	2220	2226	0	0
16	1812	1818	0	0	36	0040	0046	0	0
17	1824	1830	0	0	37	0046	0052	0	0
18	1830	1836	0	0	38	0052	0058	0	0
19	1836	1842	0	0	39	0058	0104	0	0
20	2050	2056	0	0	40	0104	0110	0	0

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

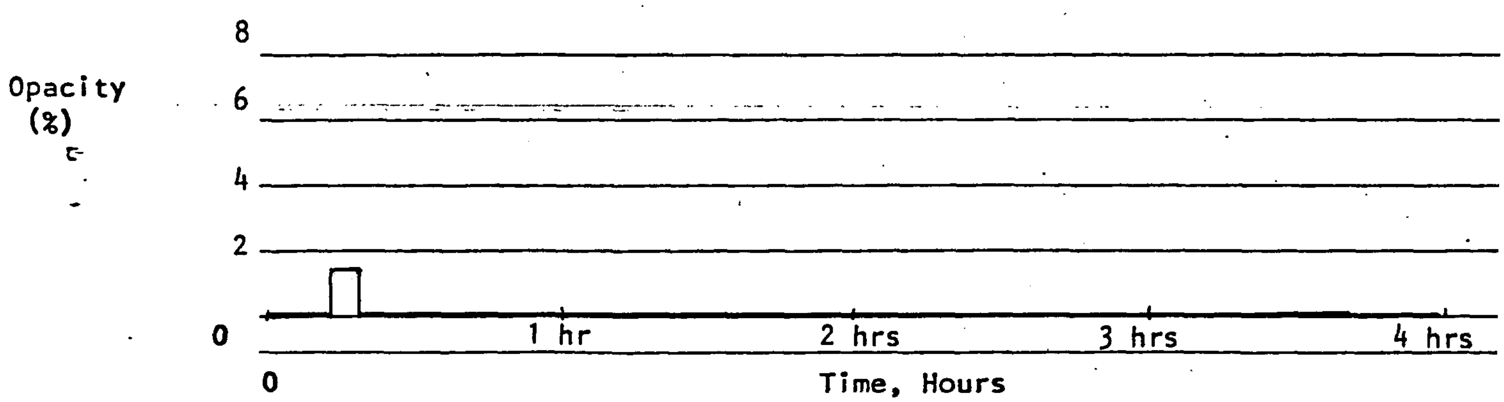
Table 27 (contd)

Date: October 25-26, 1979 Type of Plant: Copper mine
Type of Discharge: Grizzley chute Location of Discharge: East grizzley
Height of Point of Discharge: 10-20' above flr Description of Sky: N/A
Wind Direction: N/A Wind Velocity: N/A
Color of Plume: N/A Detached Plume: N/A
Observer No.: N/A Duration of Observation: 5-1/4 hours
Distance from Observer to Discharge Point: 10'
Direction of Observer from Discharge Point: East
Height of Observation Point: 10' above discharge point
Description of Background: Grey metal walls

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	0110	0116	0	0	21				
2	0116	0122	0	0	22				
3	0122	0128	30	1.5	23				
4	0128	0134	0	0	24				
5	0134	0140	0	0	25				
6	0140	0146	0	0	26				
7	0146	0152	0	0	27				
8	0152	0158	0	0	28				
9	0158	0204	0	0	29				
10	0204	0210	0	0	30				
11	0210	0216	0	0	31				
12	0216	0222	0	0	32				
13	0222	0228	0	0	33				
14					34				
15					35				
16					36				
17					37				
18					38				
19					39				
20					40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

Table 28

Date: October 25-26, 1979 — Type of Plant: Copper mine

Type of Discharge: Grizzley chute — Location of Discharge: Grizzley west

Height of Point of Discharge: 10-20' above flr — Description of Sky: N/A

Wind Direction: N/A — Wind Velocity: N/A

Color of Plume: N/A — Detached Plume: N/A

Observer No.: N/A — Duration of Observation: 4 hours

Distance from Observer to Discharge Point: 30'

Direction of Observer from Discharge Point: East

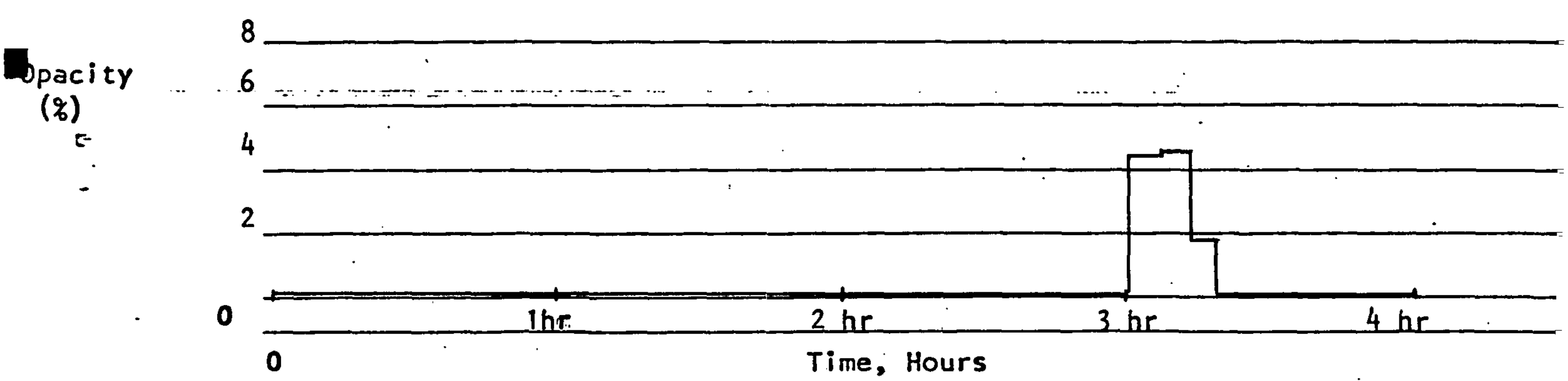
Height of Observation Point: 5' above discharge point

Description of Background: Grey metal walls

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1656	1702	0	0	21	2200	2206	0	0
2	1702	1708	0	0	22	2206	2212	0	0
3	1708	1714	0	0	23	2212	2218	0	0
4	1721	1727	0	0	24	2218	2224	0	0
5	1741	1747	0	0	25	0040	0046	0	0
6	1747	1753	0	0	26	0046	0052	0	0
7	1753	1759	0	0	27	0052	0058	0	0
8	1759	1805	0	0	28	0058	0104	0	0
9	1805	1811	0	0	29	0104	0110	0	0
10	1822	1828	0	0	30	0115	0121	105	4.4
11	1830	1836	0	0	31	0121	0127	95	4.5
12	2106	2112	0	0	32	0127	0133	45	1.9
13	2112	2118	0	0	33	0139	0145	0	0
14	2118	2124	0	0	34	0153	0159	0	0
15	2124	2130	0	0	35	0159	0205	0	0
16	2130	2136	0	0	36	0205	0211	0	0
17	2136	2142	0	0	37	0211	0217	0	0
18	2142	2148	0	0	38	0217	0223	0	0
19	2148	2154	0	0	39	0223	0229	0	0
20	2154	2200	0	0	40	0229	0235	0	0

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

Table 29

Date: October 25-26, 1979

Type of Plant: Copper mine

Type of Discharge: Process hood

Location of Discharge: Crusher hood

Height of Point of Discharge: Ground level

Description of Sky:

Wind Direction: N/A

Wind Velocity: N/A

Color of Plume: Brown

Detached Plume: N/A

Observer No.: N/A

Duration of Observation: Approximately 4-1/2 hours

Distance from Observer to Discharge Point: 5'

Direction of Observer from Discharge Point: East

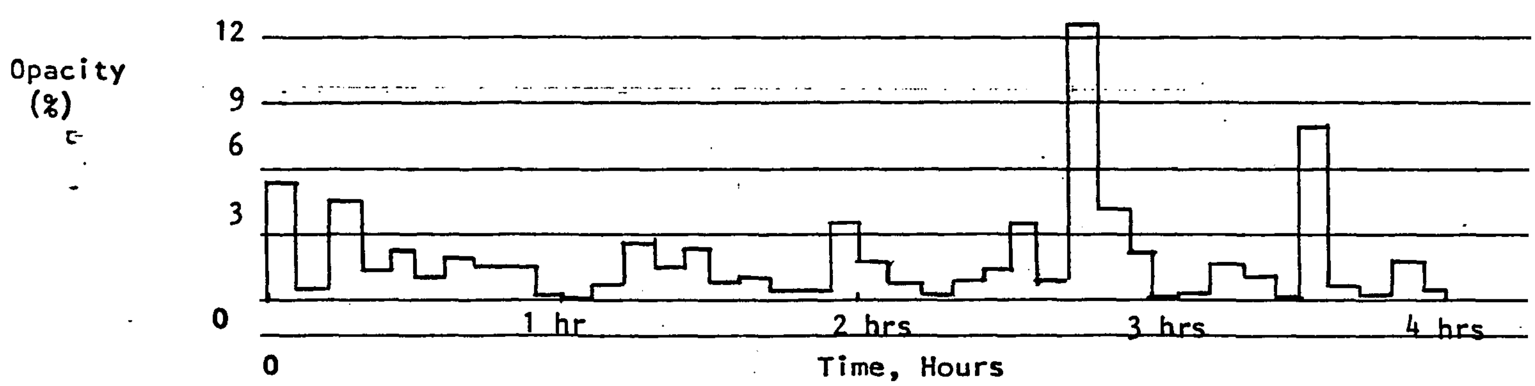
Height of Observation Point: Ground level

Description of Background: Indoors

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1645	1651	135	5.6	21	2120	2126	45	1.9
2	1651	1657	10	0.4	22	2126	2132	15	0.6
3	1657	1703	110	4.6	23	2132	2138	5	0.2
4	1703	1709	30	1.3	24	2138	2144	20	0.8
5	1709	1715	55	2.3	25	2144	2150	40	1.7
6	1720	1726	25	1.0	26	2150	2156	80	3.3
7	1726	1732	30	1.9	27	2156	2202	25	1.0
8	1745	1751	40	1.7	28	2202	2208	300	12.5
9	1751	1757	40	1.7	29	2208	2214	110	4.6
10	1757	1803	5	0.2	30	2214	2220	55	2.3
11	1803	1809	0	0	31	2220	2226	0	0
12	1809	1815	15	0.6	32	0036	0042	5	0.2
13	1821	1827	65	2.7	33	0042	0048	45	1.9
14	1827	1833	40	1.7	34	0048	0054	30	1.3
15	1833	1839	60	2.5	35	0054	0100	0	0
16	2050	2056	15	0.6	36	0111	0117	195	8.1
17	2056	2102	20	0.8	37	0147	0153	20	0.8
18	2102	2108	10	0.4	38	0153	0159	5	0.2
19	2108	2114	10	0.4	39	0159	0205	40	1.7
20	2114	2120	80	3.3	40	0205	0211	15	0.6

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

Table 29 (contd)

Date: October 25-26, 1979

Type of Plant: Copper mine

Type of Discharge: Process hood

Location of Discharge: ~~Crusher hood~~

Height of Point of Discharge: Ground level

Description of Sky:

Wind Direction: N/A

Wind Velocity: N/A

Color of Plume: Brown

Detached Plume: N/A

Observer No.: N/A

Duration of Observation: Approximately 4-1/2 hours

Distance from Observer to Discharge Point: 5'

Direction of Observer from Discharge Point: East

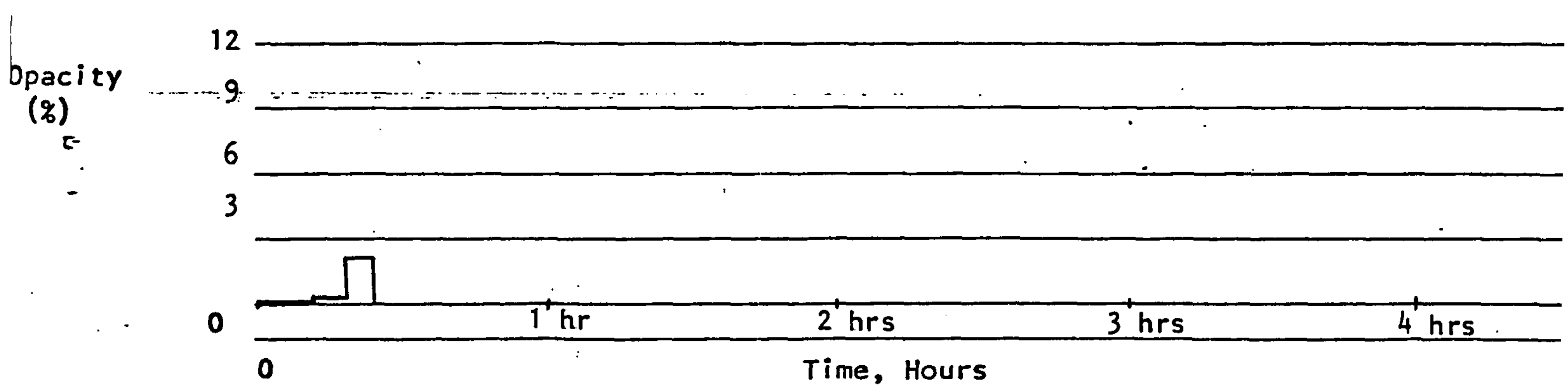
Height of Observation Point: Ground level

Description of Background: Indoors

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	0211	0217	0	0	21				
2	0217	0223	0	0	22				
3	0223	0229	5	0.2	23				
4	0229	0235	45	2.3	24				
5					25				
6					26				
7					27				
8					28				
9					29				
10					30				
11					31				
12					32				
13					33				
14					34				
15					35				
16					36				
17					37				
18					38				
19					39				
20					40				

Sketch Showing How Opacity Varied with Time:



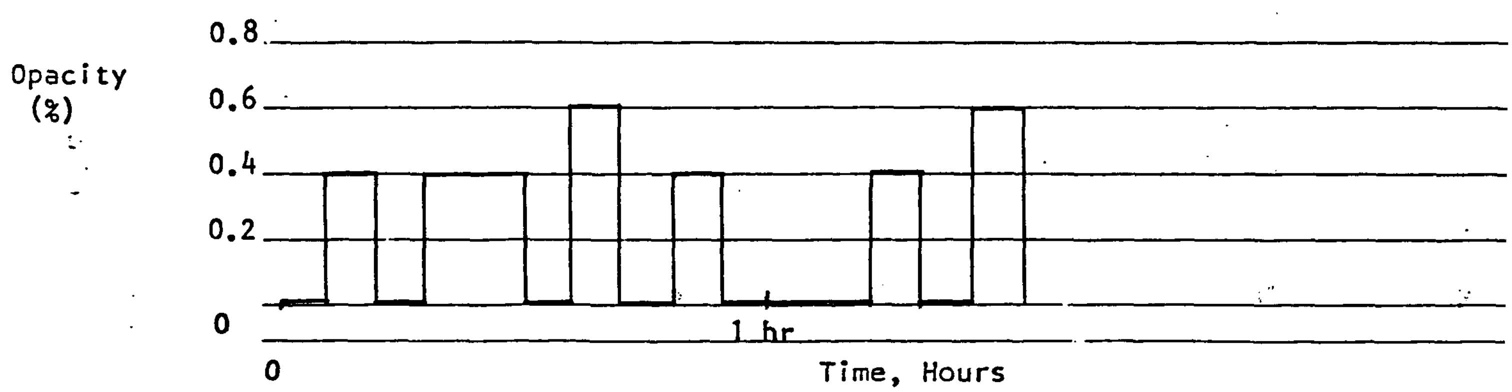
SUMMARY OF VISIBLE EMISSIONS
Table 30

Date: October 25, 1979
Type of Plant: Copper mine
Type of Discharge: Stack
Location of Discharge: No. 1-2 baghouse outlet
Height of Point of Discharge: 15' above roof
Description of Sky: N/A
Wind Direction: S.E.
Wind Velocity: 10-30
Color of Plume: Gray
Detached Plume: N/A
Observer No.: N/A
Duration of Observation: 1-1/2 hours
Distance from Observer to Discharge Point: 50'
Direction of Observer from Discharge Point: South-west of stack
Height of Observation Point: Level with lip of stack
Description of Background: Multicolored mine wall

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1630	1636	0	0	21				
2	1636	1642	10	0.4	22				
3	1642	1648	0	0	23				
4	1648	1654	10	0.4	24				
5	1654	1700	10	0.4	25				
6	1700	1706	0	0	26				
7	1706	1712	15	0.6	27				
8	1712	1718	0	0	28				
9	1718	1724	10	0.4	29				
10	1724	1730	0	0	30				
11	1730	1736	0	0	31				
12	1736	1742	0	0	32				
13	1742	1748	10	0.4	33				
14	1748	1754	0	0	34				
15	1754	1800	15	0.6	35				
16					36				
17					37				
18					38				
19					39				
20					40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

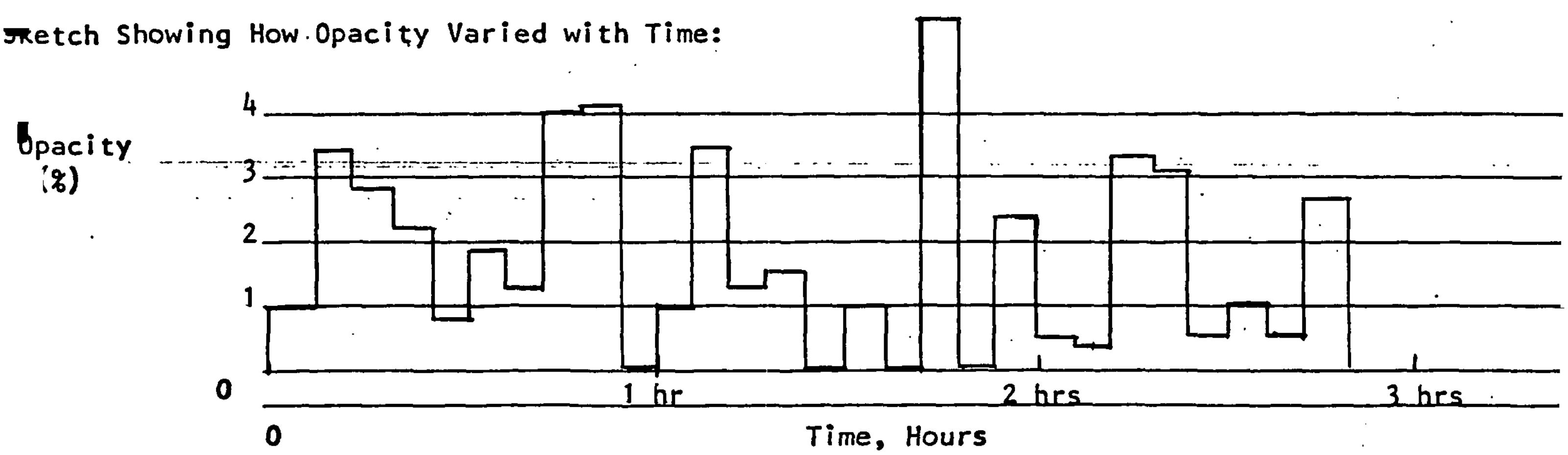
Table 31

Date: October 26, 1979
Type of Plant: Copper mine
Type of Discharge: Open dump pits
Location of Discharge: Truck dump area
Height of Point of Discharge: N/A
Description of Sky: Partly cloudy
Wind Direction: N.W.
Wind Velocity: 15-30 mph
Color of Plume: White
Detached Plume: No
Observer No.: N/A
Duration of Observation: Approximately 3 hours
Distance from Observer to Discharge Point: 20'
Direction of Observer from Discharge Point: North-east
Height of Observation Point: 10' above pits
Description of Background: Ground

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1450	1456	25	1.0	21	1721	1727	15	0.6
2	1456	1502	80	3.3	22	1727	1733	30	1.3
3	1502	1508	70	2.9	23	1733	1739	10	0.4
4	1508	1514	55	2.3	24	1739	1745	80	3.3
5	1514	1520	20	0.8	25	1745	1751	75	3.1
6	1520	1526	45	1.9	26	1751	1757	15	0.6
7	1526	1532	30	1.3	27	1757	1803	25	1.0
8	1532	1538	95	4.0	28	1803	1809	15	0.6
9	1538	1544	100	4.2	29	1809	1815	65	2.7
10	1615	1621	0	0	30				
11	1621	1627	25	1.0	31				
12	1627	1633	80	3.3	32				
13	1633	1639	30	1.3	33				
14	1639	1645	35	1.5	34				
15	1645	1651	0	0	35				
16	1651	1657	25	1.0	36				
17	1657	1703	0	0	37				
18	1703	1709	155	6.5	38				
19	1709	1715	0	0	39				
20	1715	1721	55	2.3	40				

Sketch Showing How Opacity Varied with Time:



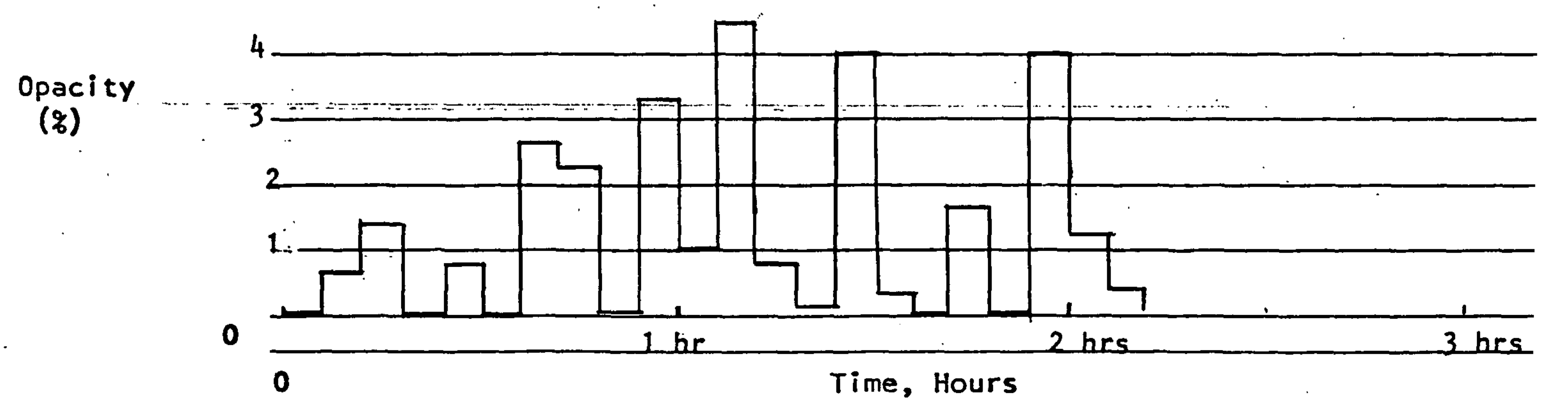
SUMMARY OF VISIBLE EMISSIONS

Table 32

Date: October 26, 1979
Type of Plant: Copper mine
Type of Discharge: Stack
Location of Discharge: 3,4 baghouse outlet
Height of Point of Discharge: 15' above roof
Description of Sky: Partly cloudy - cloudy
Wind Direction: South
Wind Velocity: 20-30 mph
Color of Plume: Gray
Detached Plume: No
Observer No.: N/A
Duration of Observation: Approximately 2-1/4 hours
Distance from Observer to Discharge Point: 100'-150'
Direction of Observer from Discharge Point: West of stack
Height of Observation Point: Level with lip of stack
Description of Background: Multicolored mine wall

SUMMARY OF AVERAGE OPACITY									
Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1445	1451	0	0	21	1826	1832	30	1.3
2	1451	1457	15	0.6	22	1832	1838	10	0.5
3	1457	1503	30	1.3	23				
4	1503	1509	0	0	24				
5	1509	1515	20	0.8	25				
6	1515	1521	0	0	26				
7	1521	1527	65	2.7	27				
8	1527	1533	55	2.3	28				
9	1533	1539	0	0	29				
10	1539	1545	80	3.3	30				
11	1619	1625	25	1.0	31				
12	1625	1631	110	4.6	32				
13	1726	1732	20	0.8	33				
14	1732	1738	5	0.2	34				
15	1738	1744	95	4.0	35				
16	1744	1750	10	0.4	36				
17	1802	1808	0	0	37				
18	1808	1814	40	1.7	38				
19	1814	1820	0	0	39				
20	1820	1826	95	4.0	40				

Sketch Showing How Opacity Varied with Time:

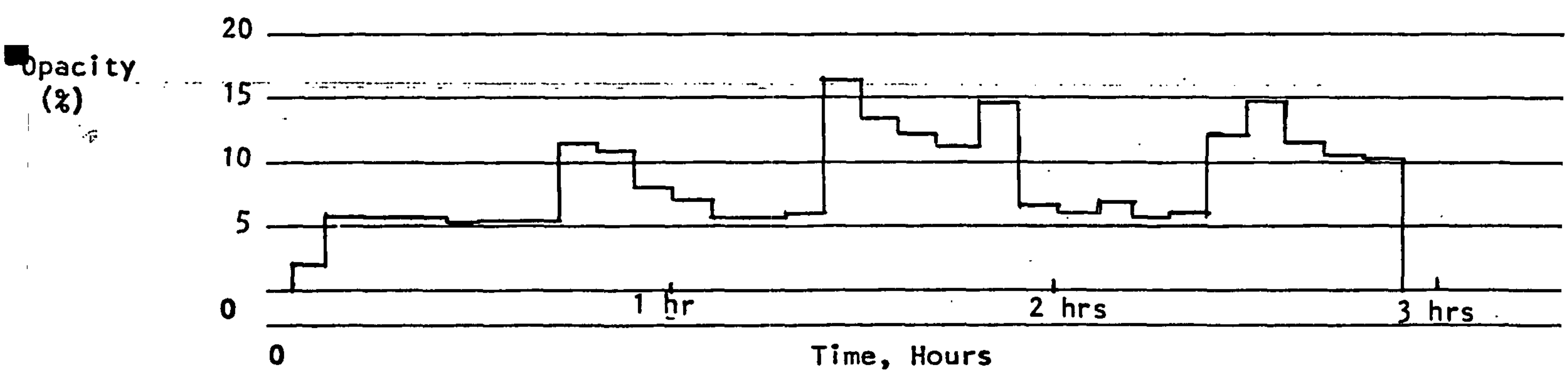


SUMMARY OF VISIBLE EMISSIONS
Table 33

Date: October 26, 1979
Type of Plant: Copper mine
Type of Discharge: Conveyor discharge to stockpile
Location of Discharge: Coarse ore stockpile
Height of Point of Discharge: 80'
Description of Sky: Overcast
Wind Direction: S.W.
Wind Velocity: 10-15
Color of Plume: White-Grey
Detached Plume: No
Observer No.: N/A
Duration of Observation: 3 hours
Distance from Observer to Discharge Point: 150'
Direction of Observer from Discharge Point: West
Height of Observation Point: 65'
Description of Background: Nearby mountain

SUMMARY OF AVERAGE OPACITY									
Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1400	1406	55	2.3	21	1636	1642	150	6.3
2	1406	1412	145	6.0	22	1642	1648	165	6.9
3	1412	1418	140	5.8	23	1648	1654	145	6.0
4	1426	1432	145	6.0	24	1654	1700	155	6.5
5	1432	1438	125	5.2	25	1700	1706	310	12.9
6	1438	1444	130	5.4	26	1706	1712	350	14.6
7	1450	1456	135	5.6	27	1712	1718	305	12.7
8	1456	1502	280	11.7	28	1718	1724	255	10.6
9	1502	1508	265	11.0	29	1724	1730	250	10.4
10	1515	1521	200	8.3	30				
11	1521	1527	165	6.9	31				
12	1527	1533	145	6.0	32				
13	1533	1539	140	5.8	33				
14	1539	1545	150	6.3	34				
15	1545	1551	400	16.7	35				
16	1551	1557	330	13.8	36				
17	1557	1603	305	12.7	37				
18	1603	1609	270	11.3	38				
19	1609	1615	355	14.8	39				
20	1630	1636	160	6.7	40				

Sketch Showing How Opacity Varied with Time:



SUMMARY OF VISIBLE EMISSIONS

Table 34

Date: October 26, 1979

Type of Plant: Copper mine

Type of Discharge: Conveyor belt discharge

Location of Discharge: Coarse ore transfer poin

Height of Point of Discharge: 85'

Description of Sky: N/A

Wind Direction: N/A

Wind Velocity: N/A

Color of Plume: N/A

Detached Plume: N/A

Observer No.: N/A

Duration of Observation: 3 hours

Distance from Observer to Discharge Point: 15'

Direction of Observer from Discharge Point:

Height of Observation Point: 85'

Description of Background: Indoors

SUMMARY OF AVERAGE OPACITY

Set Number	Time		Opacity		Set Number	Time		Opacity	
	Start	End	Sum	Average		Start	End	Sum	Average
1	1850	1856	0	0	21	2120	2126	0	0
2	1856	1902	0	0	22	2126	2132	0	0
3	1902	1908	0	0	23	2132	2138	0	0
4	1908	1914	0	0	24	2138	2144	0	0
5	1914	1920	0	0	25	2144	2150	0	0
6	1920	1926	0	0	26	2150	2156	0	0
7	1926	1932	0	0	27	2156	2202	0	0
8	1932	1938	0	0	28	2202	2208	0	0
9	1938	1944	0	0	29	2208	2214	0	0
10	1944	1950	0	0	30	2214	2220	0	0
11	2000	2006	0	0	31				
12	2006	2012	0	0	32				
13	2012	2018	0	0	33				
14	2018	2024	0	0	34				
15	2024	2030	0	0	35				
16	2030	2036	0	0	36				
17	2036	2042	0	0	37				
18	2042	2048	0	0	38				
19	2048	2054	0	0	39				
20	2054	2100	0	0	40				

Sketch Showing How Opacity Varied with Time:

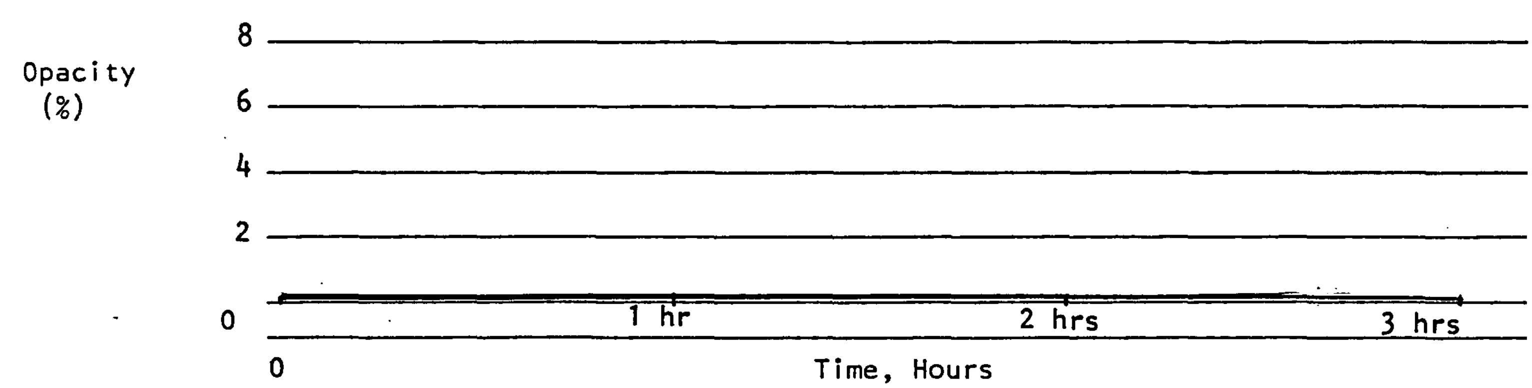


Table 35

Mean Fugitive Emission Values

Mean fugitive emission values (% frequency emission) for three tests at each location are presented. Values are given for each observer.

Crusher Grizzley East

	Observer 1	Test Mean
Test 1	0.0	0.0
Test 2	0.0	0.0
Test 3	0.29	0.29
Site Mean	0.09	0.09

Crusher Grizzley West

	Observer 1	Test Mean
Test 1	0.42	0.42
Test 2	0.0	0.0
Test 3	4.06	4.06
Site Mean	1.49	1.49

Crusher Hood Area

	Observer 1	Test Mean
Test 1	21.34	21.34
Test 2	31.73	31.73
Test 3	15.59	15.59
Site Mean	22.89	22.89

Fine Ore Feeder*

	Observer 1	Test Mean
Test 1	0.0	0.0
Test 2	0.0	0.0
Site Mean	0.0	0.0

*Illumination = 4 foot-candles. Ten foot-candles is the level considered necessary for proper application of the method.

Table 35
(continued)

Truck Dumping Area

	Observer 1	Test Mean
Test 1	15.44	15.44
Test 2	18.75	18.75
Test 3	15.42	15.42
Site Mean	16.54	16.54

Coarse Ore Stockpile

	Observer 1	Test Mean
Test 1	88.14	88.14
Test 2	100.00	100.00
Test 3	100.00	100.00
Site Mean	96.05	96.05

Coarse Ore Transfer Point

	Observer 1	Test Mean
Test 1	0.0	0.0
Test 2	0.0	0.0
Test 3	0.0	0.0
Site Mean	0.0	0.0

Appendix A

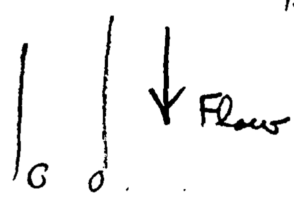
Raw Test Data

32'' = dia

A = πr²

R = D/2

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS



PLANT: ANACONDA COPPER
DATE: 10/24/79
SAMPLING LOCATION: GRIZZLY
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A): 35½''
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B): 3½''
STACK I.D., (DISTANCE A - DISTANCE B): 32''
NEAREST UPSTREAM DISTURBANCE: 10' = 120''
NEAREST DOWNSTREAM DISTURBANCE: 10' = 120''
CALCULATOR: BOB NEWTON

36 Traverse

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
1	.014	32''	.448	3½''	4''
2	.044		1.408	"	4 9/10''
3	.075		2.4	"	5 9/10''
4	.109		3.488	"	7''
5	.146		4.672	"	8 1/10''
6	.188		6.016	"	9 ½''
7	.236		7.552	"	11''
8	.296		9.472	"	13''
9	.382		12.224		15 [illegible]/10''
10	.618		19.776		23 ¼''
11	.704		22.528		26''
12	.764		24.448		28''
13	.812		25.984		29 ½''
14	.854		27.328		30 5/6''
15	.891		28.512		32''
16	.925		29.6		33 1/10''
17	.956		30.592		34''
18	.986		31.552		35''

PRELIMINARY VELOCITY TRAVERSE

PLANT ANACONDA COPPER
DATE 10/24/79
LOCATION GRIZZLY
STACK I.D. 32"
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O -1.6
OPERATORS BOB NEWTON, DAVE RALSTON

NUTECH
#5

SCHEMATIC OF TRAVERSE POINT LAYOUT

X

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	.86	78
2	.88	78
3	.90	78
4	.92	78
5	.94	80
6	.96	80
7	1.4	83
8	1.5	83
9	1.4	82
10	1.3	81
11	1.4	81
12	1.6	81
13	1.6	80
14	1.5	80
15	1.5	80
16	1.4	79
17	1.2	79
18	.97	79
AVERAGE	1.1236	77°

Y

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	.75	77°
2	.82	76°
3	.83	76
4	.98	76
5	.96	76
6	.98	75
7	.99	75
8	.96	75
9	1.1	75
10	1.2	75
11	1.25	75
12	1.2	75
13	1.2	75
14	1.3	75
15	1.3	74
16	1.3	75
17	1.3	75
18	1.1	75
AVERAGE	1.1236	77°

NOMOGRAPH DATA

PLANT ANACONDA COPPER

DATE 10/24/79

SAMPLING LOCATION GRIZZLY

CONTROL BOX NO. NUTECH #5

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.8499
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m\,avg.}$	100°
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	3%
BAROMETRIC PRESSURE AT METER, in Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	1.0
AVERAGE STACK TEMPERATURE, °F	$T_{s\,avg.}$	77°
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	1.1236
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	1.6
C FACTOR	1.12	
CALCULATED NOZZLE DIAMETER, in.	.188	
ACTUAL NOZZLE DIAMETER, in.	.188	
REFERENCE Δp, in. H_2O	1.37	

.846

FIELD DATA

PLANT ANACONDA COPPER
DATE 10/25/79
SAMPLING LOCATION GRIZZLY (CRUSHER)
SAMPLE TYPE PARTICULATE (EPA METHOD #5)
RUN NUMBER 1
OPERATOR BOB NEWTON / LEE ZINSER
AMBIENT TEMPERATURE 75°F
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -1.7
FILTER NUMBER (s) 25496

A = 5.585

PROBE LENGTH AND TYPE 4' BOROSILICATE
NOZZLE I.D. .188
ASSUMED MOISTURE, % 3%
SAMPLE BOX NUMBER 1
METER BOX NUMBER NUTECH #5
METER $\Delta H_@$ 1.8499
C FACTOR 1.12
PITOT TUBE FACTOR .848
REFERENCE Δp 1.37
NOTE

LC_I: .01
LC_F: .008

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 / 16:30	454.626								250±25	<70
1	2.5	457.1	1.1	1.55	1.55	74	96		7.0	250	
2	5	459.2	1.2	1.65	1.65	74	96		7.0	250	
3	7.5	461.3	1.3	1.8	1.8	75	97		7.0	250	
4	10	463.4	1.4	2.0	2.0	75	98		7.0	250	
5	12.5	465.6	1.3	1.8	1.8	75	98		7.0	250	
6	15	467.7	1.4	2.0	2.0	75	99		7.0	250	
7	17.5	469.8	1.2	1.65	1.65	75	100		7.0	250	
8	20	471.8	1.2	1.65	1.65	75	100		7.0	255	
9	22.5	* 473.9 / 474.5	1.1	1.55	1.55	75	100		7.0	255	
10	25	475 / 476.50	1.3	1.8	1.8	76	100		7.0	255	
11	27.5	478.6	1.1	1.55	1.55	76	98		7.0	255	
12	30	480.7	1.4	2.0	2.0	76	98		7.0	250	
13	32.5	482.7	1.4	2.0	2.0	76	98		7.5	250	
14	35	484.9	1.3	1.8	1.8	76	98		7.5	250	
15	37.5	487.0	1.3	1.8	1.8	77	98		7.5	250	
16	40	488.0	1.0	1.4	1.4	77	98		6.5	250	
17	42.5	491.1	.84	1.30	1.30	77	98		5.0	250	
18	45	492.998	.96	1.35	1.35	77	96		5.0	250	

* ST[redacted]PPE[redacted] BECAUSE [redacted] MA[redacted]METER [redacted] MALF[redacted] [redacted]

[redacted]N [redacted]1

Y

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0		492.998								250± 25	< 70
1	2.5		494.9	1.1	1.55	1.55	80	94		6.0		
2	5	17:30 STOP	496.9	1.2	1.65	1.65	78	95		6.0		
3	7.5	17:40 START	498.9	1.2	1.65	1.65	77	95		6.0		
4	10		500.9	1.3	1.8	1.8	76	92		6.5		
5	12.5		503.0	1.3	1.8	1.8	76	93		6.5		
6	15		505.0	1.2	1.65	1.65	76	94		6.0		
7	17.5		507.0	1.0	1.4	1.4	75	94		6.0		
8	20		508.9	1.0	1.4	1.4	75	95		6.0		
9	22.5		511.0	.95	1.32	1.32	75	95		6.0		
10	25		512.8	.86	1.2	1.2	75	94		6.0		
11	27.5		514.7	.86	1.2	1.2	75	84		6.0		
12	30		516.6	.90	1.28	1.26	75	94		5.0		
13	32.5		518.4	.90	1.28	1.28	74	94		5.0		
14	35		520.2	.88	1.25	1.25	74	94		5.0		
15	37.5		522.1	.98	1.38	1.38	75	94		5.0		
16	40	1'	523.9	.95	1.32	1.32	75	94		5.0		
17	42.5		525.8	.90	1.28	1.28	74	94		5.0		
18	45	18:20	527.502	.95	1.32	1.32	73	90		5.0		
			72.876			1.566		95.97				
			$(\sqrt{\Delta p})_{ave}$ =	1.0551			75.53					

1.0331	[illegible]
1.5661	ΔH
75.5	TS
95.97	TM
72.876	VMA
24.04	PBAR
16.6	VWC
16.6	WSG
28.97	MWD
5.585	AS
90.	TT
-1.7	STAT
0.188	DN
0.9975	Y
0.848	CP
33.2	TH2O
55.73484241	VMS
1.564052	VWS
2.72963731	%M
.9727036269	MD
28.67055879	MWS
23.915	PS
67.59759716	VACT
22651.95481	QACT
51.81954431	VSTD
17364.7293	QSTD
103.3221519	%I
0.4663	FHWT
0.	T WT
.1291102888	FHGR
19.21678064	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT ANACONDA COPPER
DATE 10/25/79
SAMPLING LOCATION GRIZZLY (CRUSHER)
SAMPLE TYPE PARTICULATE
RUN NUMBER 2
OPERATOR BOB NEWTON / LEE ZINSER
AMBIENT TEMPERATURE 78°C
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -1.25
FILTER NUMBER (s) 25493

PROBE LENGTH AND TYPE 8' BOROSILICATE
NOZZLE I.D. .188
ASSUMED MOISTURE, % 3%
SAMPLE BOX NUMBER
METER BOX NUMBER NUTECH #5
METER $\Delta H_@$ 1.8499
C FACTOR 1.12
PITOT TUBE FACTOR
REFERENCE Δp 1.37
NOTE

LC_I : .015
LC_F : .010

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

X

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 / 20:50	528.182								250±25	<70
1	2.5	529.8	1.3	1.8	1.8	76	90		5.0	250	
2	5	531.6	1.1	1.55	1.55	77	90		5.0	250	
3	7.5	533.9	1.4	2.0	2.0	78	91		4.5	250	
4	10	536.1	1.5	2.1	2.1	77	93		6.0	250	
5	12.5	538.3	1.4	2.0	2.0	79	94		6.0	250	
6	15	540.6	1.6	2.2	2.2	78	96		7.0	250	
7	17.5	543.0	1.5	2.1	2.1	79	97		7.0	250	
8	20	545.3	1.5	2.1	2.1	79	98		7.0	250	
9	22.5	547.7	1.5	2.1	2.1	79	98		7.0	245	
10	25	550.0	1.4	2.0	2.0	77	98		6.5	250	
11	27.5	552.4	1.4	2.0	2.0	77	99		6.5	250	
12	30	554.7	1.4	2.0	2.0	76	99		6.5	250	
13	32.5	557.1	1.5	2.1	2.1	78	99		6.5	250	
14	35	559.4	1.3	1.8	1.8	78	98		6.0	250	
15	37.5	561.7	1.4	2.0	2.0	77	98		6.5	250	
16	40	564.0	1.4	2.0	2.0	77	98		6.5	250	
17	42.5	566.2	1.3	1.8	1.8	75	98		6.5	250	
18	45	568.581	1.2	1.65	1.65	75	98		5.5	250	

RUN #2

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg
			568.581							
1	47.5		570.5	1.1	1.55	1.55	75	94		5.0
2	50		572.8	1.2	1.65	1.65	77	94		5.0
3	52.5		575.1	1.3	1.8	1.8	77	94		5.0
4	55		577.3	1.3	1.8	1.8	77	94		5.0
5	57.5		579.6	1.4	2.0	2.0	76	94		6.0
6	60		581.8	1.2	1.65	1.65	77	95		5.0
7	62.5		584.1	1.3	1.8	1.8	76	95		5.5
8	65		586.4	1.4	2.0	2.0	75	96		6.0
9	67.5		588.4	1.2	1.65	1.65	75	95		6.0
10	70		590.7	1.5	2.1	2.1	74	95		6.0
11	72.5		593.1	1.4	2.0	2.0	75	95		6.0
12	75		595.3	1.3	1.8	1.8	76	95		6.0
13	77.5		597.7	1.5	2.1	2.1	76	95		6.0
14	80		600.1	1.5	2.1	2.1	75	95		6.0
15	82.5		602.3	1.4	2.0	2.0	75	95		6.5
16	85		604.6	1.3	1.8	1.8	75	94		5.5
17	87.5		606.7	1.2	1.65	1.65	75	94		5.0
18	90	22:35	609.016	1.1	1.55	1.55	73	94		5.0
			80.834	1.1617	1.8972		76.417	95.36		

$= \sqrt{\Delta p}$ ave.

1.1617	√ΔP
1.8972	ΔH
76.42	TS
95.36	TM
80.834	VMA
24.04	PBAR
-3.	VWC
18.5	WSG
28.97	MWD
5.585	AS
90.	TT
-1.65	STAT
0.188	DN
0.9975	Y
0.848	CP
15.5	TH2O
61.95132219	VMS
0.731065	VWS
1.166300508	%M
.9883369949	MD
28.84205683	MWS
23.91867647	PS
74.2635923	VACT
24885.72978	QACT
57.75426663	VSTD
19353.45475	QSTD
103.0449614	%I
0.234	FHWT
0.	T WT
.0582891191	FHGR
9.669360593	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT ANACONDA COPPER
DATE ~~[illegible]~~ - 10/26/79
SAMPLING LOCATION GRIZZLY (CRUSHER)
SAMPLE TYPE PARTICULATE
RUN NUMBER 3
OPERATOR BOB NEWTON / LEE ZINSER
AMBIENT TEMPERATURE 72°F
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -1.7
FILTER NUMBER (s) 25499

PROBE LENGTH AND TYPE 2' BOROSILICATE
NOZZLE I.D. .188
ASSUMED MOISTURE, % 3%
SAMPLE BOX NUMBER 1
METER BOX NUMBER NUTECH #5
METER $\Delta H_@$ 1.8499
C FACTOR 1.12
PITOT TUBE FACTOR
REFERENCE Δp 1.37
NOTE

LC_I: .010
LC_F: .615

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET $(T_{m\,in})$, °F	OUTLET $(T_{m\,out})$, °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	00:40	609.525	-							250±25	<70
1	2.5		610.8	1.2	1.65	1.65	74	89		7.0	250	
2	5		612.9	1.3	1.8	1.8	74	89		7.0	250	
3	7.5		615.0	1.3	1.8	1.8	73	90		8.0	250	
4	10		617.3	1.5	2.1	2.1	73	90		8.0	250	
5	12.5		619.6	1.5	2.1	2.1	71	91		10.0	250	
6	15		622.1	1.6	2.2	2.2	71	92		10.0	250	
7	17.5		624.3	1.3	1.8	1.8	71	94		9.0	250	
8	20		626.6	1.4	2.0	2.0	70	94		9.0	250	
9	22.5		628.9	1.4	2.0	2.0	70	95		9.5	250	
10	25		631.1	1.3	1.8	1.8	70	96		9.0	250	
11	27.5		633.4	1.4	2.0	2.0	69	96		9.5	250	
12	30		635.7	1.5	2.1	2.1	69	96		10.0	250	
13	32.5	01:30 STOP	638.1	1.4	2.0	2.0	68	96		10.0	250	
14	35	01:35 START *	640.5	1.6	2.2	2.2	68	96		10.5	250	
15	37.5		643.0	1.5	2.1	2.1	68	96		5.0	250	
16	40		645.4	1.4	2.0	2.0	70	92		2.0	250	
17	42.5		648.1	1.4	2.0	2.0	70	92		2.0	250	
18	45		650.645	1.3	1.8	1.8	69	94		2.0	250	

* NOTE: SHUT DOWN BECAUSE OF MECHANICAL BREAKDOWN

[redacted]

Y

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	45		650.645									
1	47.5		653.1	1.4	2.0	2.0	69	94		2.0		
2	50		655.3	1.4	2.0	2.0	69	94		2.0		
3	52.5		657.7	1.5	2.1	2.1	69	94		2.0		
4	55		660.2	1.6	2.2	2.2	69	95		2.0		
5	57.5		662.6	1.6	2.2	2.2	69	96		2.0		
6	60		664.9	1.4	2.0	2.0	69	96		2.0		
7	62.5		667.3	1.5	2.1	2.1	68	96		2.0		
8	65		669.5	1.3	1.8	1.8	68	96		2.0		
9	67.5		672.0	1.5	2.1	2.1	68	96		2.0		
10	70		674.3	1.4	2.0	2.0	68	96		2.0		
11	72.5		675.6	1.3	1.8	1.8	68	96		2.0		
12	75		677.9	1.3	1.8	1.8	68	95		2.0		
13	77.5		680.0	1.2	1.65	1.65	69	95		2.0		
14	80		682.1	1.1	1.55	1.55	69	94		2.0		
15	82.5		684.1	.96	1.35	1.35	69	94		2.0		
16	85		686.0	1.1	1.55	1.55	69	94		2.0		
17	87.5		688.1	1.1	1.55	1.55	69	94		2.0		
18	90	02:35	690.151	1.1	1.55	1.55	69	94		2.0		
			80.626	1.1653 = $(\sqrt{\Delta p})_{ave}$		1.9097	69.555	94.08				

1.1653	√ΔP
1.9097	ΔH
69.55	TS
94.08	TM
80.626	VMA
24.04	PBAR
2.	VWC
10.	WSG
28.97	MWD
5.585	AS
90.	TT
-1.7	STAT
0.188	DN
0.9975	Y
0.848	CP
8.	TH2O
61.9370126	VMS
0.37736	VWS
.6055745798	%M
.9939442542	MD
28.90356847	MWS
23.915	PS
73.94204832	VACT
24777.98039	QACT
58.57169647	VSTD
19627.37549	QSTD
101.583391	%I
0.2734	FHWT
0.	T WT
.0681193461	FHGR
11.45999595	FHLB
0.	T GR
0.	T LB

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Anaconda Copper

DATE 10-24-79

SAMPLING LOCATION Crusher Hood

INSIDE OF FAR WALL TO OUTSIDE OF PORT. (DISTANCE A) 41½

INSIDE OF NEAR WALL TO OUTSIDE OF PORT. (DISTANCE B) 3½

STACK I.D.. (DISTANCE A - DISTANCE B) 38"

NEAREST UPSTREAM DISTURBANCE 4'

NEAREST DOWNSTREAM DISTURBANCE 4'

CALCULATOR Celiano

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
X,Y 1	.011	38"	½"	3½"	4
2	.032		1½"		5
3	.055		2 ⅛"		5⅝
4	.079		3		6½
5	.105		4		7½
6	.132		5		8½
7	.161		6⅛		9⅝
8	.194		7⅜		10⅞
9	.230		8¾		12¼
10	.272		10⅜		13⅞
11	.323		12¼		15¾
12	.398		15¼		18¾
13	.602		22⅞		27⅜
14	.677		25¾		29¼
15	.728		27⅝		31⅛
16	.770		29¼		32¾
17	.806		30⅝		34⅛
18	.839		31⅞		35⅜
19	.868		32⅞		36½
20	.895		34		37½
21	.921		35		38½
22	.945		36		39½
23	.968		36¾		40¼
24	.989		37½		41

PRELIMINARY VELOCITY TRAVERSE

PLANT Anaconda Copper
DATE 10-24-79
LOCATION Crusher Hood
STACK I.D. 38"
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O
OPERATORS Celiano - Zinzer

STATIC = - 1.15

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
X-1	.45	74
2	.56	74
3	.59	74
4	.64	
5	.66	73
6	.63	72
7	.63	
8	.64	
9	.64	73
10	.64	
11	.63	73
12	.40	
13	.44	71
14	.45	
15	.46	
16	.46	70
17	46	
18	.40	
19	.42	70
20	.44	
21	.46	69
22	.47	
23	.44	69
24	.46	
AVERAGE		

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
y-1	.45	70
2	.50	
3	.52	
4	.53	70
5	.54	
6	.49	
7	.50	70
8	.47	
9	.45	
10	.44	
11	.46	70
12	.48	
13	.48	71
14	.55	
15	.60	
16	.63	70
17	.69	
18	.70	
19	.67	70
20	.61	
21	.59	
22	.59	70
23	.60	
24	.54	
AVERAGE	.532	71

NOMOGRAPH DATA

PLANT Anaconda Copper

DATE 10-29-79

SAMPLING LOCATION Crusher Hood

CONTROL BOX NO. Nutech #1

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.91
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m\,avg.}$	95
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	3
BAROMETRIC PRESSURE AT METER, in Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s / P_m	1.0
AVERAGE STACK TEMPERATURE, °F	$T_{s\,avg.}$	71
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	.532
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	.70
C FACTOR		1.11
CALCULATED NOZZLE DIAMETER, in.		.250
ACTUAL NOZZLE DIAMETER, in.		.238
REFERENCE Δp, in. H_2O		.50

FIELD DATA

PLANT Anaconda Copper
DATE 10-25-79
SAMPLING LOCATION Crusher Head
SAMPLE TYPE Particulate
RUN NUMBER 1
OPERATOR Colizzo
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -1.70
FILTER NUMBER (s) 25491

A = 7.876

.9994

PROBE LENGTH AND TYPE 4' borosilicate
NOZZLE I.D. .238
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER
METER BOX NUMBER nutech
METER $\Delta H_@$ 1.91
C FACTOR 1.11
PITOT TUBE FACTOR 7A
REFERENCE Δp .50
NOTE

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg
	0	1638	236.506							
X 1	2		37.900	.31	1.15	1.15	72	91		7
2	4		39.100	.30	1.10	1.10	73	92		7
3	6		41.000	.70	2.60	2.60	73	92		14
4	8		42.800	.70	2.60	2.60	73	93		14
5	10		44.350	.70	2.60	2.60	75	94		14
6	12		46.900	.70	2.60	2.60	74	95		14
7	14		48.550	.70	2.60	2.60	74	96		14
8	16		50.600	.70	2.60	2.60	75	96		14
9	18		52.500	.70	2.60	2.60	74	96		14.5
10	20		54.100	.70	2.60	2.60	75	96		14.5
11	22		56.200	.70	2.60	2.60	74	96		14.5
12	24		58.500	.71	2.62	2.62	74	96		14.5
13	26		60.000	.65	2.40	2.40	74	96		14.5
14	28		62.000	.68	2.50	2.50	74	96		14.5
15	30	1711	63.500	.69	2.55	2.55	75	96		14.5
16	32		65.700	.70	2.60	2.60	75	97		14.5
17	34	stop 1716	67.680	.63	2.30	2.30	76	97		14.0
18	36	go 1720	69.500	.70	2.60	2.60	76	97		14.5
19	38		71.600	.60	2.22	2.22	77	95		13
20	40		73.300	.65	2.42	2.42	76	96		13.5
21	42		75.300	.65	2.42	2.42	78	96		13.5
22	44	stop 1730	77.200	.60	2.22	2.22	76	96		13.5
23	46	go 1741	79.000	.55	2.02	2.02	77	96		13
24	48		80.950	.60	2.22	2.22	78	93		13

end 1744

[illegible]	[illegible]
2.4265	ΔH
75.417	TS
95.23	TM
90.07	VMA
24.04	PBAR
-2.	VWC
18.	WSG
28.97	MWD
7.87579825	AS
96.	TT
-1.7	STAT
0.238	DN
0.9994	Y
0.846	CP
16.	TH2O
69.28883519	VMS
0.75456	VWS
1.077275021	%M
.9892272498	MD
28.85182293	MWS
23.915	PS
51.28491402	VACT
24234.57817	QACT
39.98847273	VSTD
18896.46861	QSTD
97.36923518	%I
6.9555	FHWT
0.	T WT
1.549128019	FHGR
250.9110121	FHLB
0.	T GR
0.	T LB

A-13

10-03-79

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1748										
1	2		82,400	.57	2.15	2.15	76	93		11	250	67
2	4		84.500	.53	1.98	1.98	78	94		11	248	66
3	6		86.300	.62	2.30	2.30	78	94		12.5	250	67
4	8		88.000	.62	2.30	2.30	78	94		13	246	67
5	10		90,100	.62	2.30	2.30	77	94		13.	240	67
6	12		91,700	.55	2.05	2.05	77	94		13	245	67
7	14		93.700	.62	2.30	2.30	77	95		13	245	68
8	16		95.300	.62	2.30	2.30	77	96		14	240	67
9	18		97.200	.67	2.55	2.55	76	96		14.5	240	68
10	20		99.200	.60	2.25	2.25	76	96		14	245	67
11	22		101,400	.67	2.55	2.55	77	96		14.5	245	68
12	24	STOP	103,200	.70	2.60	2.60	77	96		15	250	67
13	26	1815	105,100	.70	2.60	2.60	74	97		15	255	70
14	28		106,900	.76	2.90	2.90	74	97		16.5	260	71
15	30	go 1821	108.950	.76	2.90	2.90	74	94		16.5	260	70
16	32		111,000	.76	2.90	2.90	75	95		16.5	260	68
17	34		113.000	.70	2.60	2.60	75	95		16.0	240	67
18	36		115.000	.70	2.60	2.60	75	95		16.0	240	67
19	38		116.950	.70	2.60	2.60	76	96		16.0	245	68
20	40		118.950	.70	2.60	2.60	74	96		16.0	250	70
21	42		120,850	.70	2.60	2.60	74	96		16.0	246	70
22	44		122,890	.70	2.60	2.60	76	96		16.0	248	68
23	46		124,800	.70	2.60	2.60	75	96		16.0	250	68
24	48		126,576	.70	2.60	2.60	76	96		16.0	255	67
											260	63
	END 1843		90.07			2.4265	75.417	95.229				
			$(\sqrt{\Delta p})_{ave}$ = 0.80497									
				~~75306~~								

FIELD DATA

PLANT [illegible]
DATE 10-2?-79
SAMPLING LOCATION [illegible]
SAMPLE TYPE Particulate
RUN NUMBER 2
OPERATOR [illegible]
AMBIENT TEMPERATURE 74°
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -.660
FILTER NUMBER (s) 25494

A = 7.876

PROBE LENGTH AND TYPE 4' [illegible]
NOZZLE I.D. .228
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER
METER BOX NUMBER [illegible] #1
METER $\Delta H_@$ 1.91
C FACTOR 1.11
PITOT TUBE FACTOR 7A .846
REFERENCE Δp .50
NOTE

L.C.I = .012 cfm
L.C.F = .015 "

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	2047	327.189									
× 1	2		28.900	.53	2.00	2.00	73	90		8.0	245	67
2	4		30.700	.56	2.10	2.10	75	92		8.0	250	67
3	6		32.150	.47	1.78	1.78	76	93		7.0	250	68
4	8		34.100	.60	2.20	2.20	78	95		8.0	247	68
5	10		35.900	.56	2.10	2.10	77	96		8.0	250	68
6	12		37.500	.53	2.00	2.00	77	96		8.0	250	69
7	14		39.500	.67	2.50	2.50	76	97		10.0	246	66
8	16		41.300	.53	2.00	2.00	77	98		8.0	250	65
9	18		43.100	.60	2.20	2.20	76	98		8.5	255	65
10	20		44.900	.67	2.50	2.50	73	98		8.0	250	66
11	22		46.800	.67	2.50	2.50	72	99		8.0	245	63
12	24		49.100	.75	2.88	2.88	73	99		11.0	240	67
13	26		51.200	.75	2.88	2.88	75	99		11.0	245	68
14	28		53.100	.70	2.60	2.60	73	100		10.0	250	67
15	30		55.000	.80	2.99	2.99	70	100		11.5	240	67
16	32		57.350	.80	2.99	2.99	71	100		11.5	245	66
17	34		59.500	.80	2.99	2.99	70	100		11.5	250	67
18	36		61.500	.80	2.99	2.99	70	100		11.5	240	68
19	38		63.600	.800	2.99	2.99	70	100		11.5	245	70
20	40		65.600	.83	3.10	3.10	71	100		12.0	250	70
21	42		67.850	.85	3.20	3.20	71	100		12.5	260	71
22	44		70.000	.76	2.65	2.65	71	100		11.5	260	71
23	46		73.000	.83	3.10	3.10	70	100		12.0	240	70
24	48	2136	74.404	.83	3.10	3.10	70	100		12.0	245	67

10-25-79
Run #2

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE	IMPINGER TEMPERATURE
				DESIRED	ACTUAL		INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F			
	0 2138										
1	2	75.800	.40	1.46	1.46	70	95		6.5		
2	4	77.300	.45	1.62	1.62	70	96		7.0		
3	6	79.100	.53	1.90	1.90	70	96		8.0		
4	8	80.700	.53	1.90	1.90	70	96		8.0		
5	10	82.700	.75	2.75	2.75	71	96		10.5		
6	12	84.700	.75	2.75	2.75	71	96		10.5		
7	14	86.700	.62	2.22	2.22	71	97		10.0		
8	16	88.800	.80	2.90	2.90	71	97		11.5		
9	18	90.780	.80	2.90	2.90	71	97		11.5		
10	20	92.750	.85	3.10	3.10	72	97		12.0		
11	22	94.700	.75	2.75	2.75	71	97		10.5		
12	24	96.850	.75	2.75	2.75	71	97		10.5		
13	26	98.850	.70	2.60	2.60	71	97		10.0		
14	28	101.000	.65	2.30	2.30	71	96		10.0		
15	30	102.600	.60	2.15	2.15	72	96		9.0		
16	32	104.450	.70	2.60	2.60	71	96		10.0		
17	34	106.400	.72	2.70	2.70	73	96		11.0		
18	36	108.400	.72	2.70	2.70	72	96		11.0		
19	38	110.300	.62	2.22	2.22	71	95		9.5		
20	40	112.400	.75	2.75	2.75	70	95		10.9		
21	42	114.250	.67	2.50	2.50	70	95		10.0		
22	44	116.000	.55	2.00	2.00	71	95		8.5		
23	46	118.000	.62	2.22	2.22	70	95		9.0		
24	48	119.677	.60	2.15	2.15	70	95		9.0		
	END										
	26	92.488 ✓ $(\sqrt{\Delta p})_{avg}$ = .82056 ✓		2.5089 ✓		72.0 ✓	96.96 ✓				

0.82056	$\sqrt{\Delta P}$
2.5089	ΔH
72.	TS
96.96	TM
92.488	VMA
24.04	PBAR
10.	VWC
16.5	WSG
28.97	MWD
7.876	AS
96.	TT
-1.6	STAT
0.238	DN
0.9994	Y
0.846	CP
26.5	TH2O
70.94569368	VMS
1.248675	VWS
1.729601661	%M
.9827039834	MD
28.7802627	MWS
23.92235294	PS
52.16779915	VACT
24652.41517	QACT
40.68069637	VSTD
19224.06988	QSTD
98.00110591	%I
6.8063	FHWT
0.	T WT
1.480496083	FHGR
243.9519881	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT Anaconda Copper
DATE 10-25-79
SAMPLING LOCATION Crusher Hood
SAMPLE TYPE Particulate
RUN NUMBER 3
OPERATOR Celiano
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -1.60
FILTER NUMBER (s) 25498

PROBE LENGTH AND TYPE 4' borosilicate
NOZZLE I.D. .238
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER
METER BOX NUMBER [illegible]
METER $\Delta H_@$ 1.91
C FACTOR 1.11
PITOT TUBE FACTOR 7A
REFERENCE Δp .50
NOTE

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	~~0640~~	420.010									
1	2		21.700	.50	1.84	1.84	68	74		6.5	245	67
2	4		23.450	.55	2.00	2.00	68	74		6.5	247	68
3	6		25.400	.70	2.60	2.60	68	75		8.5	250	69
4	8		27.000	.68	2.50	2.50	68	76		8.5	250	70
5	10		29.100	.75	2.80	2.80	69	78		9.0	260	67
6	12		31.000	.75	2.80	2.80	69	79		9.0	240	66
7	14		32.950	.70	2.60	2.60	69	80		9.0	250	67
8	16		35.200	.80	2.99	2.99	67	80		10.0	245	67
9	18		37.200	.80	2.99	2.99	68	80		10.0	250	67
10	20		39.200	.80	2.99	2.99	69	81		10.0	250	68
11	22	Rain started	41.200	.70	2.60	2.60	69	82		9.0	240	67
12	24		43.250	.68	2.50	2.50	68	83		9.0	245	66
13	26		45.100	.70	2.60	2.60	67	83		9.5	245	67
14	28		46.900	.68	2.50	2.50	66	84		9.0	250	68
15	30		48.900	.66	2.40	2.40	66	84		8.5	250	67
16	32		50.850	.75	2.80	2.80	66	84		9.5	255	69
17	34		52.700	.70	2.60	2.60	66	84		9.0	260	63
18	36		54.700	.68	2.50	2.50	66	84		9.0	260	65
19	38	stop 0117	56.700	.75	2.80	2.80	66	85		9.5	240	67
20	40		58.700	.75	2.80	2.80	67	85		9.5	240	67
21	42	go 0136	60.650	.72	2.67	2.67	66	~~85~~ 78		9.5	250	68
22	44		62.700	.66	2.40	2.40	67	80		8.5	255	67
23	46		64.300	.62	2.25	2.25	66	81		8.0	245	67
24	48		66.122	.60	2.18	2.18	66	81		8.0	260	69

HOOD EXHAUST

Run #3
10-25-79

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE	IMPINGER TEMPERATURE
	0 / 0150										
1	2	67.850	.55	2.00	2.00	62	80		8.0		
	4	69.650	.60	2.20	2.20	62	82		8.0		
3	6	71.480	.60	2.20	2.20	63	83		8.0		
	8	73.200	.55	2.00	2.00	65	84		8.0		
	10	74.900	.55	2.00	2.00	64	84		8.0		
	12	76.700	.60	2.20	2.20	64	84		8.0		
	14	78.350	.55	2.00	2.00	65	85		8.0		
8	16	80.350	.67	2.40	2.40	63	86		9.0		
9	18	82.200	.67	2.40	2.40	62	86		9.0		
	20	83.900	.55	2.00	2.00	62	86		8.0		
	22	86.000	.67	2.40	2.40	61	86		8.0		
	24	87.600	.55	2.00	2.00	61	87		8.0		
	26	89.300	.55	2.00	2.00	63	87		8.0		
	28	90.850	.52	1.90	1.90	64	87		8.0		
	30	92.500	.60	2.20	2.20	66	87		8.0		
	32	94.600	.70	2.60	2.60	67	87		11.0		
	34	96.500	.65	2.35	2.35	63	88		10.5		
	36	98.300	.57	2.10	2.10	65	88		9.5		
	38	100.200	.65	2.35	2.35	66	88		11.0		
	40	102.300	.80	2.98	2.98	67	88		12.5		
	42	104.250	.75	2.75	2.75	66	89		10.5		
	44	106.200	.70	2.60	2.60	65	88		10.0		
	46	108.200	.70	2.60	2.60	63	88		10.0		
21	48	110.211	.72	2.65	2.65	62	88		10.0		
	END 0238	90.201		2.429		64.29	83.354167				

$(\sqrt{\Delta p})_{ave}$ = .81108

0.81108	ΓΔP
2.429	ΔH
64.29	TS
83.354	TM
90.201	VMA
24.04	PBAR
-4.	VWC
22.	WSG
28.97	MWD
7.876	AS
96.	TT
-1.6	STAT
0.238	DN
0.9994	Y
0.846	CP
18.	TH2O
70.90678619	VMS
0.84902	VWS
1.183207388	%M
.9881679261	MD
28.84020215	MWS
23.92235294	PS
51.13686068	VACT
24165.23488	QACT
40.68815725	VSTD
19227.59559	QSTD
97.92940054	%I
4.6136	FHWT
0.	T WT
[illegible].004093952	FHGR
[illegible]65.4821266	FHLB
0.	T GR
0.	T LB

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Anaconda Copper
DATE 10-24-79
SAMPLING LOCATION Crusher baghouse Inlet 1-2
INSIDE OF FAR WALL TO
OUTSIDE OF PORT. (DISTANCE A) 55 1/4" 55 1/4
INSIDE OF NEAR WALL TO
OUTSIDE OF PORT. (DISTANCE B) 3 1/4"
STACK I.D.. (DISTANCE A - DISTANCE B) 52" x 78" Box 1205 4 3/8
NEAREST UPSTREAM DISTURBANCE
NEAREST DOWNSTREAM DISTURBANCE A = 28.166
CALCULATOR

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
A-D 1	2 1/8	52"		3 2/8	5 3/8
2	6 2/8				9 4/8
3	10 7/8				14 1/8
4	15 3/8				18 4/8
5	19 5/8				22 7/8
6	24				27 2/8
7	28 3/8				31 5/8
8	32 4/8				36
9	37 1/8				40 3/8
10	41 4/8				44 6/8
11	45 7/8				49 1/8
12	50 2/8				53 4/8

PRELIMINARY VELOCITY TRAVERSE

PLANT Anaconda Copper
DATE 10-24-79
LOCATION Crusher baghouse Inlet 1-2.
STACK I.D.
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O
OPERATORS

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A 1	.45	54
2	.45	69
3	.52	74
4	.55	74
5	.57	74
6	.6	73
7	.62	73
8	.65	73
9	.7	73
10	.9	73
11	1.5	73
12	1.8	73
B 1	.3	65
2	.4	67
3	.55	70
4	.6	70
5	.75	72
6	.85	72
7	.9	72
8	.95	72
9	1.3	72
10	1.5	72
11	1.5	72
12	1.6	72
AVERAGE		

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
C 1	.35	69
2	.45	69
3	.45	69
4	.5	71
5	.6	72
6	.65	72
7	.7	72
8	.8	72
9	.85	73
10	.95	73
11	.98	73
12	1.2	73
D 1	.35	69
2	.35	70
3	.4	71
4	.4	72
5	.45	72
6	.5	73
7	.55	73
8	.6	73
9	.68	73
10	.62	73
11	.7	73
12	.75	73
AVERAGE	.61	73

NOMOGRAPH DATA

PLANT Anaconda

DATE 10-24-79

SAMPLING LOCATION Crusher baghouse Inlet #3+4

CONTROL BOX NO. 1205

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.9
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m\,avg.}$	75°
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	2%
BAROMETRIC PRESSURE AT METER, in Hg	P_m	/
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s / P_m	1
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	73°
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	.61
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	1.8
C FACTOR	1.12	
CALCULATED NOZZLE DIAMETER, in.	.179 (3/16)	
ACTUAL NOZZLE DIAMETER, in.	.179	
REFERENCE Δp, in. H_2O	1.5	

PLANT Anocanda Copper
DATE 10-25-79
SAMPLING LOCATION Crusher Baghouse Inlet #1+2
SAMPLE TYPE Part.
RUN NUMBER 1
OPERATOR Robertson McGlincy
AMBIENT TEMPERATURE 60
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -.25
FILTER NUMBER (s) 25492 (00005)

A = ~~1.4943~~ 28.166

PROBE LENGTH AND TYPE 7' glass
NOZZLE I.D. .179
ASSUMED MOISTURE, % 2%
SAMPLE BOX NUMBER
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.9
C FACTOR 1.12
PITOT TUBE FACTOR
REFERENCE Δp 1.5
NOTE
LC at 10" .014 I
LC at 10" .012 F

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
0	1638	595.610									<70
A 1		596.45	.35	.42		75	68	64	1	210	
2		597.220	.38	.44		73	70	66	1	210	
3		598.700	.45	.54		73	72	66	1	220	
4		598.960	.45	.54		73	72	66	2	220	
5		599.880	.50	.60		74	72	68	2	225	
6		600.825	.52	.62		75	72	68	2	230	
7		601.810	.55	.68		74	76	68	2	230	
8		602.900	.7	.84		73	78	68	3	230	
9		604.100	.70	.84		73	80	70	3	230	
10		604.900	.80	.98		72	80	70	3	235	
11		606.350	.75	.92		71	82	70	3	235	
12		607.570	1.0	1.2		72	84	70	3	235	
0		607.570									
1		608.400	.32	.38		72	78	70	1	230	
2		609.280	.50	.60		74	82	72	1	230	
3		610.230	.50	.60		75	82	72	1	230	
4		611.180	.50	.60		75	82	72	1	230	
5		612.200	.50	.6		75	82	72	1	240	
6		613.180	.63	.75		76	84	72	2	240	
7		614.240	.65	.78		75	84	74	2	240	
8		615.375	.70	.84		75	86	74	2	240	
9		616.480	.70	.84		75	86	74	2	240	
10		617.550	.80	.98		75	88	74	3	245	
11		618.900	.95	1.2		74	90	74	3	245	

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in Hg
12		620.235	1.1	1.35		73	90	76	3
C 0		620.235							
1		620.977	.30	.36		76	84	74	.5
2		621.790	.35	.42		76	86	76	.5
3		622.730	.40	.47		76	86	76	1
4		623.700	.5	.60		76	82	77	1
5		624.680	.55	.68		78	84	78	1
6		625.700	.60	.72		77	86	78	1
7		626.775	.60	.72		78	88	78	1
8		627.850	.65	.78		77	88	78	1
9		628.970	.70	.84		76	88	78	2
10		629.170	.80	.98		75	88	78	3
11		630.350	.75	.92		75	88	78	2
12		631.550	.80	.96		75	90	78	2.5
D 0		631.550							
1		632.340	.32	.38		76	84	76	.5
2		633.170	.38	.45		77	85	77	1
3		634.200	.50	.60		77	86	78	1
4		635.050	.50	.60		77	86	78	1
5		636.175	.55	.68		77	86	78	2
6		637.100	.60	.72		78	88	78	2
7		638.200	.65	.78		77	88	78	2.5
8		639.300	.68	.82		76	88	78	2.5
9		640.565	.65	.78		76	82	76	2
10		641.820	.75	.92		76	84	76	2
11		643.050	.75	.92		76	88	78	3
12		644.20	.75	.92		75	88	78	3
	183.5	48.590	~~.7318~~	.7329		~~75.1~~ 75.10	78.51		
		$(\sqrt{\Delta p})_{ave}$ = .76987							

0.76987	$\Gamma\Delta P$
0.7329	ΔH
75.1	TS
78.5	TM
48.59	VMA
24.04	PBAR
4.	VWC
10.7	WSG
28.97	MWD
28.166	AS
96.	TT
-2.5	STAT
0.179	DN
1.0317	Y
0.848	CP
14.7	TH2O
39.58151615	VMS
0.692785	VWS
1.720166409	%M
.9827983359	MD
28.78129774	MWS
23.85617647	PS
49.27089325	VACT
83265.83876	QACT
38.09707402	VSTD
64382.53121	QSTD
103.2147991	%I
7.1942	FHWT
0.	T WT
2.80486715	FHGR
1547.861528	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT Anaconda Copper
DATE 10-25-79
SAMPLING LOCATION Crusher Baghouse Inlet #1+2
SAMPLE TYPE Part
RUN NUMBER 2
OPERATOR Robertson McGlincy
AMBIENT TEMPERATURE 50
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -2.7
FILTER NUMBER (s) 25497 (0049)

PROBE LENGTH AND TYPE 7' glass
NOZZLE I.D. .179
ASSUMED MOISTURE, % 2%
SAMPLE BOX NUMBER
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.9
C FACTOR 1.12
PITOT TUBE FACTOR
REFERENCE Δp 1.5
NOTE
LC at 10" .01 I
LC at 10" .013 F

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
0	2045	644.342									<70
A 1		645.350	.47	.56		74	58	54	1	150	
2		646.275	.47	.56		74	58	54	1	160	
3		647.130	.60	.72		75	60	58	2.5	170	
4		648.120	.60	.72		75	62	58	2.5	180	
5		649.195	.65	.78		77	64	58	2.5	195	
6		650.270	.65	.78		78	64	58	2.5	200	
7		651.285	.60	.72		75	67	59	2		
8		652.372	[illegible]	.84		74	68	58	3		
9		653.520	.75	.91		75	70	58	3		
10		654.780	.9	1.1		73	73	60	3.5		
11		655.225	1.5	1.8		73	79	60	6		
12		657.780	1.5	1.8		71	76	60	6		
0		657.780									
B 1		658.675	.4	.45		72	69	60	1	200	
2		659.650	.45	.54		72	72	62	2	200	
3		660.625	.55	.66		72	74	62	2.5	220	
4		661.590	.60	.72		71	76	64	2.5		
5		662.570	.55	.66		71	76	64	2		
6		663.625	.65	.78		71	78	66	2.5		
7		664.770	.70	.84		71	79	66	3		
8		665.815	.75	.91		71	80	66	3	230	
9		667.090	.77	.94		73	80	66	3	230	
10		668.342	1.00	1.2		72	82	66	4	225	
11		669.710	1.2	1.5		72	82	66	4.5	225	

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
12		671.265	1.6	2.0		71	84	66	6		
0		671.265									
C 1		672.175	.40	.45		71	74	66	1		
2		673.025	.42	.50		72	78	67	1		
3		673.920	.50	.60		73	80	68	2.5		
4		674.9[illegible]	.58	.68		73	80	68	2.5		
5		676.100	[illegible]	.78		72	80	70	3		
6		677.110	.68	.82		72	80	70	3		
7		678.245	.70	.84		71	80	70	3		
8		679.395	.77	.93		71	82	70	3		
9		680.685	.87	1.05		71	84	72	4		
10		681.965	.87	1.05		71	84	72	4		
11		683.200	.90	1.10		69	86	72	4		
12		684.443	.90	1.10		69	87	73	4		
0		684.443									
1		685.170	.30	.35		70	78	70	.5		
D 2		685.950	.35	.41		72	80	70	1		
3		686.800	.40	.45		72	80	70	1		
4		687.720	.50	.60		71	80	71	2		
5		688.672	.50	.60		70	81	71	2		
6		689.701	.60	.72		70	81	71	3		
7		690.[illegible]0	.60	.72		71	82	72	3		
8		691.875	.70	.84		71	82	70	3		
9		693.030	.74	.89		72	84	72	3		
10		694.200	.78	.93		72	84	72	3.5		
11		695.320	.70	.84		72	84	72	3		
12		696.465	.75	.91		72	84	72	3		
						72.146	71.25				
	2230	52.123	$\sqrt{}$ .8248	.8469							

0.8248	√ΔP
0.8469	ΔH
72.146	TS
71.25	TM
52.123	VMA
24.04	PBAR
4.	VWC
10.1	WSG
28.97	MWD
28.166	AS
96.	TT
-2.7	STAT
0.179	DN
1.0317	Y
0.848	CP
14.1	TH2O
43.05392615	VMS
0.664495	VWS
1.519942812	%M
.9848005719	MD
28.80326227	MWS
23.84147059	PS
52.63660416	VACT
88953.75557	QACT
40.98352212	VSTD
69260.51305	QSTD
104.3625424	%I
7.3215	FHWT
0.	T WT
2.624276067	FHGR
1557.926579	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT Anaconda Copper
DATE 10-25-79
SAMPLING LOCATION Crusher Baghouse Inlet #1+2
SAMPLE TYPE [illegible]
RUN NUMBER
OPERATOR [illegible]
AMBIENT TEMPERATURE 40
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -2.4
FILTER NUMBER (s) 25500

PROBE LENGTH AND TYPE [illegible]
NOZZLE I.D. .179
ASSUMED MOISTURE, % 2.0
SAMPLE BOX NUMBER
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.9
C FACTOR 1.12
PITOT TUBE FACTOR
REFERENCE Δp 1.5
NOTE
LC at 6'' .011 I
LC at 6'' .01 F

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
0	1245	696.910									
1		697.855	.50	.6		79	65	60	2	250	
2		698.895	.49	.57		77	66	62	2		
3		699.720	.55	.66		77	70	64	2.5		
4		700.700	.60	.70		76	70	65	3		
5		701.720	.6	.7		75	70	65	3		
6		702.735	.7	.84		77	70	65	3		
7		703.890	.73	.88		75	70	65	3		
8		704.930	.75	.91		74	70	65	3		
9		706.090	.75	[illegible]		73	70	65	3		
10		707.230	.93	1.15		72	70	65	4		
11		708.435	1.0	1.2		72	70	65	4		
12		709.550	1.2	1.5		72	72	65	4		
0		709.71[illegible]									
1		710.550	.4	.46		69	62	60	1	250	
2		711.440	.45	.52		71	64		1		
3		712.410	.52	.62		71	66		2.5		
4		713.400	.6	.7		69	66		3		
5		714.430	.67	.8		74	68		3	255	
6		715.585	.7	.84		73	68		3.5		
7		716.745	.75	.9		73	68		3.5		
8		717.970	.82	1.0		73	68		4		
9		719.20	.9	1.1		73	67		4		
10		720.450	1.0	1.2		72	70		4		
11		721.765	1.0	1.2		71	70		4		

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
12		722.13[illegible]	[illegible]	[illegible]		70	70	59	5		
0		723.155	.6	.7					[illegible]		
1		724.[illegible]	[illegible]	[illegible]		71	70		1.5		
2		725.[illegible]00	[illegible]	[illegible]		72	72		[illegible]		
[illegible]		726.[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		3		
[illegible]		727.010	[illegible]	.7		[illegible]	[illegible]		[illegible]		
[illegible]		72[illegible].050	[illegible]	.74		72	73		3		
[illegible]		72[illegible].100	.65	.78		71	76		3		
[illegible]		730.[illegible]	.80	[illegible]		[illegible]	76		4		
9		731.500	.85	1.0		70	76		4		
[illegible]		732.650	.83	.95		69	76		4		
[illegible]		733.810	.80	.93		68	76		4		
[illegible]		734.[illegible]	.95	1.15		68	76		4		
12		736.215	.95	1.15		69	76		4		
0		7[illegible].275									
1		737.[illegible]	.4	.46		68	70		1		
1 2		738.000	.48	.58		68	72		2		
[illegible]		7[illegible].750	.45	.53		70	72		2		
[illegible]		739.850	.50	.6		69	74		3		
[illegible]		740.[illegible]	.5	.64		69	74		3		
[illegible]		741.[illegible]	[illegible]	.7		69	74		3		
[illegible]		742.[illegible]	[illegible]	.7		69	76		3		
[illegible]		743.9[illegible]	[illegible]	.78		69	[illegible]		3		
[illegible]		744.9[illegible]	.70	.84		67	77		3.5		
[illegible]		746.1[illegible]	.75	.9		66	78		4		
[illegible]		747.240	.75	.9		67	78		4		
[illegible]		748.[illegible]	[illegible]	.95		65	78		4		
	0250	51.462									
				.8306		71.204	69.63				
			.8275								

0.8275	ΓΔP
0.8306	ΔH
71.204	TS
69.63	TM
51.462	VMA
24.04	PBAR
3.	VWC
10.4	WSG
28.97	MWD
28.166	AS
96.	TT
-2.9	STAT
0.179	DN
1.0317	Y
0.848	CP
13.4	TH2O
42.63583643	VMS
0.63157	VWS
1.459689989	%M
.9854031001	MD
28.80987201	MWS
23.82676471	PS
52.77237473	VACT
89183.20239	QACT
41.16187856	VSTD
69561.92829	QSTD
102.9012779	%I
4.68	FHWT
0.	T WT
1.6939215	FHGR
1009.989027	FHLB
0.	T GR
0.	T LB

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Anaconda Cu - EPA
DATE 12-24-79
SAMPLING LOCATION ~~[illegible]~~ outlet 1,2 Baghouse
INSIDE OF FAR WALL TO
OUTSIDE OF PORT, (DISTANCE A) 77½" (77½)
INSIDE OF NEAR WALL TO
OUTSIDE OF PORT, (DISTANCE B) 3½" (3½)
STACK I.D., (DISTANCE A - DISTANCE B) 74" (74)
NEAREST UPSTREAM DISTURBANCE 33' (29'4")
NEAREST DOWNSTREAM DISTURBANCE 13' (13')
CALCULATOR

12
5
60
56
48

1/8 = .125
2/8 = .25
3/8 = .375
4/8 = .5
5/8 = .625
6/8 = .75
7/8 = .875

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
1	.016	74"	1¼	3½"	4¾
2	.049		3⅝		7⅛
3	.085		6¼		9¾
4	.125		9¼		12¾
5	.169		12½		16
6	.220		16¼		19¾
7	.283		21		24½
8	.375		27¾		31¼
9	.625		46¼		49¾
10	.717		53		56½
11	.780		57¾		61¼
12	.831		61½		65
13	.875		64¾		68¼
14	.915		67¾		71¼
15	.951		70⅜		73⅞
16	.984		72¾		76½

PRELIMINARY VELOCITY TRAVERSE

PLANT Anaconda Cu - EPA
DATE 10-24-79
LOCATION ~~Crusher~~ Outlet 1,2 Baghouse
STACK I.D. 74"
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O - .55
OPERATORS

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A- 1	.50	69
2	.55	72
3	.66	74
4	.71	74
5	.70	74
6	.71	74
7	.70	74
8	.67	74
9	.70	74
10	.74	74
11	.88	74
12	.85	74
13	.81	74
14	.79	74
15	.75	74
16	.71	74
	11.43	
AVERAGE	.71	74

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
B- 1	.60	72
2	.69	75
3	.69	74
4	.72	74
5	.72	74
6	.71	74
7	.69	74
8	.69	74
9	.69	74
10	.69	74
11	.86	74
12	.91	74
13	.96	74
14	.98	74
15	.97	74
16	.93	74
	12.5	
AVERAGE	.78	74

74

.75

Adapter ✓
teflon tape ✓
Grad. cylinder ✓
filter ✓
Grease ✓
water ✓
silica gell ✓
nozzle
probe
wrench

NOMOGRAPH DATA

PLANT Anaconda Cu - EPA

DATE 10-24-79

SAMPLING LOCATION 1,2 Baghouse ~~Chamber~~ outlet

CONTROL BOX NO. 1227

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.89
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m\,avg.}$	70
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	3
BAROMETRIC PRESSURE AT METER, in Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg → -.55 ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	1
AVERAGE STACK TEMPERATURE, °F	$T_{s\,avg.}$	74
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	.75
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	.98
C FACTOR	1.09	
CALCULATED NOZZLE DIAMETER, in.	3/16	
ACTUAL NOZZLE DIAMETER, in.	.187	
REFERENCE Δp, in. H_2O	1.1	

[redacted]

Impingers + Silica gel
meter box
nozzle + probe
rubber tubing
data sheet + clip board

FIELD DATA

PLANT Anaconda Cu - EPA
DATE 10-25-79
SAMPLING LOCATION 1,2 Baghouse outlet
SAMPLE TYPE part.
RUN NUMBER 1
OPERATOR NG
AMBIENT TEMPERATURE 65°
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) ~~-~~ .49
FILTER NUMBER (s) 25490

PROBE LENGTH AND TYPE 7' borosilicate
NOZZLE I.D. .197
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER RAC
METER BOX NUMBER 1227
METER $\Delta H_@$ 1.89
C FACTOR 1.09
PITOT TUBE FACTOR 1 ?
REFERENCE Δp 1.1
NOTE LCI = .015
LCF = .010

A = 29.880

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 / 1630	273.606									
A-1	3	275.5	.55	.97		80	64	64	–	235	50
2	6	277.5	.58	1.05		81	65	65	–	235	50
3	9	279.3	.62	1.1		81	68	66	–	235	50
4	12	281.0	.65	1.15		82	68	66	–	235	51
5	15	282.9	.71	1.25		79	72	66	–	250	51
6	18	284.8	.71	1.25		81	73	66	–	235	52
7	21	286.7	.68	1.15		80	76	68	–	255	52
8	24	289.0	.71	1.25		79	77	68	–	250	52
9	27	290.5	.76	1.4		79	79	70	1	260	52
10	30	292.5	.73	1.3		79	80	70	1	265	52
11	33	294.8	.84	1.5		80	81	70	1.5	265	54
12	36	297.0	.89	1.5		76	83	71	1.5	280	54
13	39	298.9	.91	1.55		79	84	71	1.5	270	54
14	42	301.7	.95	1.6		80	84	72	1.5	270	54
15	45	303.5	.92	1.6		80	86	74	2	270	54
16	48	305.769	.92	1.6		77	86	74	2	270	54
B-1	3	308.0	.62	1.1		80	80	76	1	275	52
2	6	309.9	.64	1.1		76	86	77	1	275	52
3	9	311.1	.70	1.2		76	87	78	1	275	52
4	12 shut down due to boulder in crusher	313.9	.75	1.3		76	90	78	1	275	52
5	15	315.617	.78	1.35		76	91	79	1	275	52
6	18 1740	317.5	.73	1.3		76	82	78	1	265	52
7	21 1744 started again	319.06	.72	1.3		80	84	78	1	255	53

-B7 SP

Run 1
1,2 Baghouse outlet
10-25-79

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O: DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O: ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE: INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE: OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
B-8	24	321.6	.7	1.2	1.2	79	88	80	1	260	53
9	27	323.6	.75	1.3	1.3	79	88	80	1	260	53
10	30	325.7	.77	1.3	1.3	76	88	80	1	255	57
11	33	327.6	.70	1.2	1.2	77	89	80	1	255	54
12	36	329.9	.84	1.5	1.5	77	89	79	1	255	53
13	39	332.0	.84	1.5	1.5	77	89	79	1	255	53
14	42	334.1	.77	1.3	1.3	75	90	79	1	255	53
15	45	336.2	.84	1.5	1.5	77	90	79	1	260	53
16	48	338.454	.80	1.4	1.4	77	90	79	1	260	53
	1805										
							77.921				
				1.3147		78.344					
		64.848	0.8655								

0.8655	[illegible]
1.3147	ΔH
78.34	TS
77.9	TM
64.848	VMA
24.04	PBAR
2.	VWC
14.5	WSG
28.97	MWD
29.87	AS
96.	TT
-0.49	STAT
0.197	DN
1.0362	Y
0.848	CP
16.5	TH2O
53.2092151	VMS
0.777815	VWS
1.440744191	[illegible]
.9855925581	MD
28.81195036	MWS
24.00397059	PS
55.35778374	VACT
99212.22001	QACT
42.93123992	VSTD
76941.36819	QSTD
101.6548721	%I
0.0187	FHWT
0.	T WT
.0054234666	FHGR
3.576750414	FHLB
0.	T GR
[illegible]	T LB

FIELD DATA

PLANT Anaconda Cu - EPA
DATE 10-25-79
SAMPLING LOCATION 1,2 Baghouse outlet
SAMPLE TYPE port 0
RUN NUMBER 2
OPERATOR NG
AMBIENT TEMPERATURE 58
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -.26
FILTER NUMBER (s) 25495

PROBE LENGTH AND TYPE borosilicate
NOZZLE I.D. .197
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER RAC
METER BOX NUMBER 1227
METER $\Delta H_@$ 1.89
C FACTOR 1.09
PITOT TUBE FACTOR [illegible]
REFERENCE Δp 1.1
NOTE LCI = .014
LCF = .010

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 / 2049	338.670									
A-1	3	339.8	.53	1.0		78	57	57	1	230	50
2	6	341.1	.65	1.14		79	59	58	1	240	51
3	9	343.0	.66	1.2		80	62	58	1	240	51
4	12	345.1	.62	1.1		80	67	58	1	250	51
5	15	347.9	.62	1.1		80	67	58	1	250	51
6	18	350.2	.71	1.2		77	68	58	1	245	52
7	21	352.3	.6	1.1		76	68	60	1	245	52
8	24	354.0	.71	1.2		77	70	62	1	255	52
9	27	355.5	.69	1.2		76	70	62	1	255	52
10	30	358.0	.78	1.35		75	70	62	1	250	52
11	33	360.1	.81	1.4		76	72	62	1	245	52
12	36	362.0	.84	1.45		77	72	62	1	245	52
13	39	364.4	.89	1.5		76	72	62	1	245	53
14	42	366.8	.89	1.5		75	72	62	1	250	53
15	45	368.5	.74	1.25		75	74	64	1	250	54
16	48	370.236	.81	1.4		75	74	64	1	255	54
B-1	3	372.4	.65	1.15		75	68	62	1	235	53
2	6	373.8	.68	1.15		74	70	64	1	240	53
3	9	376.5	.72	1.25		75	74	64	1	250	53
4	12	377.8	.66	1.15		74	74	64	1	250	53
5	15	379.8	.76	1.3		75	78	66	1	250	53
6	18	382.4	.76	1.3		72	79	66	1	255	53
7	21	383.7	.65	1.15		75	80	66	1	255	53

Run 2
1,2 Baghouse Outlet
10-25-79

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
B-8	24	386.0	.72	1.29		~~25~~ 75	80	68	1	255	53
9	27	387.8	.72	1.29		75	80	68	1	255	53
10	30	390.2	.83	1.4		75	80	68	1	255	55
11	33	392.2	.83	1.4		75	80	68	1	255	55
12	36	394.3	.84	1.45		75	80	68	1	260	55
13	39	397.0	.87	1.5		75	80	68	1	260	55
14	42	398.8	.81	1.4		74	80	68	1	255	55
15	45	401.0	.89	1.5		74	82	68	1	260	55
16	48	403.070	.91	1.6		74	82	68	2	255	55
	~~2237~~							68.344			
				1.2928		75.75					
		64.400									
		$(\sqrt{\Delta p})_{ave}$ =	0.86184								

0.86184	$\sqrt{\Delta P}$
1.2928	ΔH
75.75	TS
68.344	TM
64.4	VMA
24.04	PBAR
3.	VWC
23.7	WSG
28.97	MWD
29.87	AS
96.	TT
-0.26	STAT
0.197	DN
1.0362	Y
0.848	CP
26.7	TH2O
53.7937627	VMS
1.258665	VWS
2.286302444	%M
.9771369756	MD
28.71919262	MWS
24.02088235	PS
55.06026721	VACT
98679.01089	QACT
42.56880164	VSTD
76291.8063	QSTD
103.6466515	%I
0.0156	FHWT
0.	T WT
.0044752252	FHGR
2.926473194	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT Anaconda Cu - EPA
DATE 10-25-79
SAMPLING LOCATION 1,2 Baghouse outlet
SAMPLE TYPE part
RUN NUMBER 3
OPERATOR NG, TF
AMBIENT TEMPERATURE 47
BAROMETRIC PRESSURE [illegible]
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 25524

24.04 @ 11:10 PM.

PROBE LENGTH AND TYPE Borosilicate
NOZZLE I.D. .197
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER RAC
METER BOX NUMBER 1227
METER $\Delta H_@$ 1.89
C FACTOR 1.09
PITOT TUBE FACTOR [illegible]
REFERENCE Δp 1.1
NOTE LCI = .017

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET $(T_{m\,in})$, °F	OUTLET $(T_{m\,out})$, °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	2345	403.324									
A-1	3		405.3	.60	1.0		76	50	50	1	275	50
2	6		407.2	.73	1.3		77	51	51	1	275	50
3	9		409.0	.79	1.4		75	52	51	1	255	50
4	12		411.0	.77	1.3		76	52	50	1	240	50
5	15		413.5	.82	1.5		75	54	50	2	235	50
6	18		415.8	.80	1.4		73	54	50	2	235	50
7	21		417.9	.76	1.4		74	[illegible]	50	2	235	50
8	24		420.0	.81	1.45		74	50	50	2	235	50
9	27		421.0	[illegible]	1.5		74	50	50	[illegible]	235	50
10	30		423.9	1.0	1.5		[illegible]	50	49	3	235	50
11	33		427.7	1.0	1.8		72	50	49	3	235	50
12	36		430.7	1.0	1.8		72	50	49	3	235	50
13	39		433.0	1.0	1.8		72	50	47	3	235	50
14	42		434.6	1.0	1.8		72	50	46	3	235	50
15	45		436.2	1.0	1.8		72	50	44	3	235	50
16	48		438.791	1.0	1.8		72	50	44	3	235	50
B-1	3		441.0	.67	1.15		74	46	44	2	250	50
2	6		443.1	.77	1.35		74			2	250	50
3	9		444.9	.79	1.4		73	52	44	2	[illegible]	50
4	12		447.0	.81	1.45		72			2	250	51
5	15		448.9	.91	1.45		72	56	46	2	[illegible]	51
6	18		450.9	.76	1.4		72			2	255	51
7	21		452.0	.81	1.45		72	60	48	2	250	51

Run 3
1,2 Baghouse Outlet
10-25-79

CCF = 1010

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
8	24	455.5	.75	1.3		73	64	48	3	250	[illegible]
9	27	456.9	.81	1.[illegible]		72			2	260	52
10	30	459.4	.77	1.[illegible]		72	66	50	2	255	[illegible]
11	33	460.[illegible]	.91	1.6		71			2.5	260	51
12	36	463.3	[illegible]	[illegible]		71	67	52	2.[illegible]	[illegible]	[illegible]
13	39	465.4	.95	1.7		71			3	260	[illegible]
14	42	467.6	.95	1.7		71	69	52	3	260	52
15	45	470.1	.96	1.7		72			3	255	52
16	48	472.452	.96	1.7		72	70	54	3	260	5[illegible]
	0240										
				1.5156		72.91	51.64				
		69.108									
		$(\sqrt{\Delta p})_{ave}$	0.92336								

$\sqrt{\Delta P}$	0.92336
ΔH	1.5156
TS	72.9
TM	51.64
VMA	69.108
PBAR	24.04
VWC	13.
WSG	13.
MWD	28.97
AS	29.87
TT	96.
STAT	-0.38
DN	0.197
Y	1.0362
CP	0.848
TH2O	26.
VMS	59.65149867
VWS	1.22486
%M	2.01204542
MD	.9798795456
MWS	28.74927861
PS	24.01205882
VACT	58.81348458
QACT	105405.5271
VSTD	45.82517872
QSTD	82127.88531
I%	106.7657535
FHWT	0.0275
T WT	0.
FHGR	.0071143225
FHLB	5.00813436
T GR	0.
T LB	0.

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Anaconda Copper
DATE 12-2-79
SAMPLING LOCATION Truck Dump Baghouse Inlet 3-4
INSIDE OF FAR WALL TO OUTSIDE OF PORT, (DISTANCE A) 75 1/2"
INSIDE OF NEAR WALL TO OUTSIDE OF PORT, (DISTANCE B) 3 1/2"
STACK I.D., (DISTANCE A - DISTANCE B) 72"
NEAREST UPSTREAM DISTURBANCE 5'
NEAREST DOWNSTREAM DISTURBANCE 12'
CALCULATOR

1/8 .125
1/4 .250
3/8 .375
1/2 .5
5/8 .625
3/4 .750
7/8 .875
1.0

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 4 & 5)
A-B 1	.044 4.4%	x 72"	3 1/8	3 1/2"	6 5/8
2	.145 14.5	"	10 1/2	"	14
3	.296 29.6	"	21 1/4	"	24 3/4
4	.704 70.4	"	50 3/4	"	54 1/4
5	.854 85.4	"	61 1/2	"	65
6	.956 95.6	"	68 7/8	"	72 3/8

PRELIMINARY VELOCITY TRAVERSE

PLANT Anaconda Copper

DATE 12-15-77

LOCATION Truck Dump Baghouse Inlet

STACK I.D. 72"

BAROMETRIC PRESSURE, in. Hg

STACK GAUGE PRESSURE, in. H_2O [illegible]

OPERATORS [illegible]

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
1	.25	45
2	.35	[illegible]
3	.37	[illegible]
4	.44	[illegible]
5	[illegible]	[illegible]
6	[illegible]	[illegible]
1	.43	45
2	.75	[illegible]
3	.73	[illegible]
4	.55	[illegible]
5	.46	[illegible]
6	.51	[illegible]
AVERAGE	.4917 ✓✓	44.08 ✓✓

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
AVERAGE		

TJF

NOMOGRAPH DATA

PLANT Anaconda Copper

DATE 10-26-79

SAMPLING LOCATION Truck Dump Baghouse Inlet

CONTROL BOX NO. 1205

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.9
AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F	$T_{m\,avg.}$	[illegible]
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	2%
BAROMETRIC PRESSURE AT METER, in Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	-1.2
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	1.0
AVERAGE STACK TEMPERATURE, °F	$T_{s\,avg.}$	45
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	.52
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	.75
C FACTOR	1.1	
CALCULATED NOZZLE DIAMETER, in.	.227	
ACTUAL NOZZLE DIAMETER, in.	.227	
REFERENCE Δp, in. H_2O	.60	

FIELD DATA

PLANT Anaconda Copper
DATE 10-26-77
SAMPLING LOCATION Truck Dump Baghouse Inlet - 34
SAMPLE TYPE [illegible]
RUN NUMBER 1
OPERATOR [illegible]
AMBIENT TEMPERATURE 39
BAROMETRIC PRESSURE 24.44 28.274
STATIC PRESSURE, (P_s) -.53
FILTER NUMBER (s) 35523

PROBE LENGTH AND TYPE 2' glass
NOZZLE I.D. .227
ASSUMED MOISTURE, % 2
SAMPLE BOX NUMBER
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.9
C FACTOR 1.1
PITOT TUBE FACTOR
REFERENCE Δp .50
NOTE LC at 15" .004
LC at 15" .01

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SA TE
0		1445	[illegible]								
A 1			751.[illegible]	.55	1.10		42	54	50	3.5	
2			757.910	[illegible]	1.4		43	[illegible]	[illegible]	4	
3			753.[illegible]	[illegible]	1.9		43	74	56	5.5	
4			763.475	.62	1.9		44	[illegible]	58	5	
5			766.5[illegible]	.55	1.7		45	73	53	4.5	
6			770.975	.68	2.1		43	78	60	5	
0			[illegible]								
B 1			772.650	.25	.75		43	[illegible]	56	2	
2			775.[illegible]	.6	1.85		43	[illegible]	[illegible]	5	
3			780.[illegible]	.72	2.3		44	79	60	6	
4			783.[illegible]	.55	1.7		42	[illegible]	[illegible]	5	
5			786.9[illegible]	.6	1.85		42	79	64	5	
6			[illegible].455	.6	1.85		42	[illegible]	64	5	
			41.911	.732632	1.691667		43.1667	65.33		4.675	

0.732632	ΓΔP
1.69166	ΔH
43.17	TS
65.3	TM
41.911	VMA
24.44	PBAR
4.	VWC
9.1	WSG
28.97	MWD
28.27	AS
60.	TT
-0.53	STAT
0.227	DN
1.0317	Y
0.848	CP
13.1	TH2O
35.68213774	VMS
0.617345	VWS
1.700699165	%M
.9829930083	MD
28.7834333	MWS
24.40102941	PS
44.9551086	VACT
76252.8552	QACT
37.81758349	VSTD
64146.18512	QSTD
93.25509934	%I
0.3873	FHWT
0.	T WT
.1675015562	FHGR
92.09614299	FHLB
0.	T GR
0.	T LB

A-40

FIELD DATA

PLANT ... Copper
DATE 10-26-79
SAMPLING LOCATION Truck Dump Baghouse Inlet
SAMPLE TYPE Part
RUN NUMBER 3
OPERATOR Robertson McGliney
AMBIENT TEMPERATURE 40°
BAROMETRIC PRESSURE 24.44
STATIC PRESSURE, (P_s) -.65
FILTER NUMBER (s) 75577

PROBE LENGTH AND TYPE 7' glass
NOZZLE I.D. .227
ASSUMED MOISTURE, % 2
SAMPLE BOX NUMBER
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.9
C FACTOR 1.1
PITOT TUBE FACTOR
REFERENCE Δp .60
NOTE

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg
0	1730	790,763							
B 1		794,290	.50	1.5		45	64	62	4.5
2		798,245	.70	2.2		46	74	66	5.2
3		802,370	.65	2.0		46	82	66	5
4		805,325	.55	1.7		46	87	66	5
5		809,020	.55	1.7		44	88	68	5
6		812,320	.55	1.7		43	87	67	5
0		812,820							
A 1		816,000	.38	1.18		41	72	65	3
2		820,050	.48	1.5		43	77	65	4
3		823,875	.52	1.6		43	80	66	4
4		827,980	.50	1.5		43	80	66	4
5		832,010	.53	1.8		41	81	66	5
6		836,035	.60	1.9		40	81	66	5.5
	1845	45,272	.737375	1.69		43.4167	72.5833		4.6

0.73737	$\sqrt{\Delta P}$
1.69	ΔH
43.42	TS
72.58	TM
45.272	VMA
24.44	PBAR
2.	VWC
8.4	WSG
28.97	MWD
28.27	AS
60.	TT
-0.65	STAT
0.227	DN
1.0317	Y
0.848	CP
10.4	TH2O
38.01656842	VMS
0.4902	VWS
1.273022952	%M
.9872697705	MD
28.83034938	MWS
24.39220588	PS
45.22841569	VACT
76716.43869	QACT
38.18024509	VSTD
64761.33172	QSTD
98.4123718	%I
0.3349	FHWT
0.	T WT
.1359453789	FHGR
75.46263801	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT Anaconda Copper
DATE 10-26-79
SAMPLING LOCATION Truck Dump Baghouse Inlet
SAMPLE TYPE Part
RUN NUMBER 3
OPERATOR Roberson McGlenn
AMBIENT TEMPERATURE 37
BAROMETRIC PRESSURE 24.44
STATIC PRESSURE, (P_s) -.45
FILTER NUMBER (s) 25519

PROBE LENGTH AND TYPE 7' glass
NOZZLE I.D. .227
ASSUMED MOISTURE, % 2
SAMPLE BOX NUMBER
METER BOX NUMBER 1205
METER $\Delta H_@$ 1.9
C FACTOR 1.1
PITOT TUBE FACTOR
REFERENCE Δp .60
NOTE
LC at 10" .015
LC at 10" .015

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg
0	2037	837.250							
A 1		840.765	.45	1.4		38	66	57	4.5
2		844.370	.50	1.5		36	76	64	5
3		847.885	.5	1.5		37	80	64	5
4		851.615	.65	2.0		36	82	64	5.5
5		855.690	.63	2.1		35	84	64	6.5
6		859.840	.65	2.0		37	86	65	6
8		859.840							
1		863.510	.45	1.4		37	76	60	5
2		867.230	.55	1.7		40	80	62	5
3		870.972	.55	1.7		41	81	64	5.2
4		874.910	.65	2.0		40	82	64	6
5		878.874	.60	1.85		40	82	64	6
6		882.812	.60	1.85		38	84	65	6
	2145	45.462	.752632	1.75		37.9167	71.5417		5.475
		TJF							

0.7326	CAF
1.75	ΔH
37.92	TS
71.54	TM
45.462	VMA
24.44	PBAR
2.	VWC
9.4	WSG
28.97	MWD
28.27	AS
60.	TT
-0.45	STAT
0.227	DN
1.0317	Y
0.848	CP
11.4	TH2O
38.2576829	VMS
0.53735	VWS
1.385099998	%M
0.986149	MD
28.81805453	MWS
24.40691176	PS
45.90567988	VACT
77865.21422	QACT
39.15913666	VSTD
66421.7276	QSTD
96.56084396	%I
0.2413	FHWT
0.	T WT
.0973331712	FHGR
55.41442144	FHLB
0.	T GR
0.	T LB

PRELIMINARY VELOCITY TRAVERSE

PLANT Anaconda Cu - EPA
DATE 10-25-79
LOCATION ~~truck dump outlet~~ 2.9
STACK I.D. #3,4 baghouse outlet
BAROMETRIC PRESSURE, in. Hg
STACK GAUGE PRESSURE, in. H_2O -.36
OPERATORS Goldberg / Jackson

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
A-1	.80	78
2	.81	
3	.87	
4	.89	
5	.89	
6	.89	
7	.87	
8	.84	
9	.83	
10	.83	
11	.96	
12	1.0	
13	1.05	
14	1.1	
15	1.1	
16	1.0	
AVERAGE	0.95818 ✓	

TRAVERSE POINT NUMBER	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMPERATURE (T_s), °F
B-1	.88	
2	.90	
3	.96	
4	.95	
5	.94	
6	.94	
7	.89	
8	.90	
9	.89	
10	.84	
11	.86	
12	.90	
13	.97	
14	.98	
15	1.1	
16	1.1	
AVERAGE	0.96755 ✓	

FIELD DATA

PLANT Anaconda Cu - EPA
DATE 10-26-79
SAMPLING LOCATION 34 Baghouse outlet
SAMPLE TYPE part
RUN NUMBER 1
OPERATOR NG, TF
AMBIENT TEMPERATURE 47
BAROMETRIC PRESSURE 24.44
STATIC PRESSURE, (P_s) -.34
FILTER NUMBER (s) 25522

A = 29.87

PROBE LENGTH AND TYPE Borosilicate
NOZZLE I.D. .197
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER
METER BOX NUMBER 1227
METER $\Delta H_@$ 1.89
C FACTOR 1.09
PITOT TUBE FACTOR Y
REFERENCE Δp 1.05
NOTE LCI = .014
LCF = .010

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0 / 1445	472.882									
A-1	2	473.9	.53	.93		54	47	48	1	235	50
2	4	475.3	.53	.93		56	48	48	1	235	50
3	6	476.1	.56	.99		54	50	48	1	235	50
4	8	477.8	.59	1.05		54	52	48	1	235	50
5	10	478.7	.35	.64		55	53	48	1	235	50
6	12	479.5	.60	1.05		55	54	49	1	235	50
7	14	480.6	.56	.99		54	54	48	1	235	50
8	16	481.4	.51	.91		56	55	49	1	235	50
9	18	483.4	.58	1.0		55	57	49	1	235	50
10	20	484.4	.60	1.15		53	58	50	1	235	50
11	22	485.4	.67	1.2		55	59	50	1	235	50
12	24	486.8	.56	1.05		55	59	50	1	235	50
13	26	488.0	.68	1.25		55	60	50	1	235	50
14	28	489.3	.79	1.49		54	60	50	2	235	50
15	30	491.0	.74	1.35		54	62	51	1	235	50
16	32	492.194	.74	1.35		54	63	51	1	235	50
B-1	2	493.3	.54	.99		54	58	57	1	235	50
2	4	494.4	.45	.82		54	60	51	1	235	50
3	6	495.5	.48	.87		55	60	51	1	235	50
4	8	496.7	.64	1.1		54	61	52	1	235	50
5	10	497.9	.61	1.0		56	62	52	1	245	50
6	12	499.0	.57	1.[illegible]		56	64	53	1	260	50
7	14	500.4	.59	1.05		54	65	53	1	260	50

[redacted]
Run 1
3,4 Baghouse outlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)		GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
B-8	16		501.5	.59	1.05	1.05	54	66	54	1	265	50
9	18		502.9	.56	.99		55	66	54	1	265	50
10	20		503.8	.45	.80		55	67	54	1	260	50
11	22	shift change	505.228	.63	1.0		55	66	55	1	270	50
12	24	505.228 stop at 1547	506.1	.64	1.10		54	48	48	1	275	50
13	26		507.6	.64	1.10		55	48	48	1	275	50
14	28		508.6	.67	1.2		55	52	48	1	275	50
15	30		509.5	.39	.73		55	53	49	1	275	50
16	32		510.604	.39	.73		57	54	49	1	275	50
		1630						53.84				
					1.03		54.72					
			37.722	.75591								

0.75591	√ΔP
1.03	ΔH
54.72	TS
53.8	TM
37.722	VMA
24.44	PBAR
0.	VWC
8.	WSG
28.97	MWD
29.87	AS
64.	TT
-0.34	STAT
0.197	DN
1.0362	Y
0.844	CP
8.	TH2O
32.91243451	VMS
0.3772	VWS
1.133085435	%M
.9886691456	MD
28.84570053	MWS
24.415	PS
46.62775079	VACT
83566.25497	QACT
38.58797765	VSTD
69157.37355	QSTD
104.9334679	%I
0.0431	FHWT
0.	T WT
.0202087512	FHGR
11.97925283	FHLB
0.	T GR
0.	T LB

510.604
472.882
37.722

FIELD DATA

PLANT Anaconda Cu-EPA
DATE 10-26-79
SAMPLING LOCATION 3,4 Baghouse outlet
SAMPLE TYPE part.
RUN NUMBER 2
OPERATOR NG, TF
AMBIENT TEMPERATURE 45
BAROMETRIC PRESSURE 24.44
STATIC PRESSURE, (P_s) -.35
FILTER NUMBER (s)

PROBE LENGTH AND TYPE 8' Borosilicate
NOZZLE I.D. .197
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER RAC
METER BOX NUMBER 1227
METER $\Delta H_@$ 1.89
C FACTOR 1.09
PITOT TUBE FACTOR Y
REFERENCE Δp 1.05
NOTE LCI = .017

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 1730	510.867									
A-1	2	511.6	.30	.54		57	44	44	1	235	50
2	4	512.7	.49	.90		56	46	46	1	235	50
3	6	513.8	.55	1.02		55	48	46	1	235	50
4	8	515.4	.57	1.05		55	50	46	1	235	50
5	10	516.1	.57	1.05		55	52	46	1	235	50
6	12	517.4	.55	1.02		55	53	47	1	245	50
7	14	518.5	.52	.95		55	54	47	1	255	50
8	16	519.6	.41	.75		55	55	47	1	260	50
9	18	520.8	.61	1.15		54	57	48	1	265	50
10	20	522.1	.65	1.2		54	58	48	1	270	50
11	22	523.5	.67	1.25		55	57	49	1	270	50
12	24 stopped 1756	524.8	.69	1.29		54	60	49	1	265	50
13	26	526.665 526.0	.71	1.3		54	61	50	2	275	50
14	28	527.2	.71	1.3		54	56	50	2	275	50
15	30	528.5	.68	1.25		53	52	50	1	275	50
16	32	529.976	.65	1.2		53	55	50	1	275	50
B-1	2	530.9	.46	.86		54	54	50	1	275	50
2	4	532.0	.34	.65		55	60	51	1	275	50
3	6	533.2	.59	1.05		54	58	50	1	250	50
4	8	534.3	.59	1.05		53	58	50	1	260	50
5	10	535.6	.57	1.03		55	59	51	1	270	50
6	12	536.7	.54	1.02		55	60	50	1	270	50
7	14	537.9	.54	1.02		54	61	51	1	275	50

[redacted] Run [redacted]
10-26-79
3,4 Baghouse outlet

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
B-8	16	539.1	.51	.44		54	62	51	1	270	50
9	18	540.1	.35	.65		54	62	52	1	265	50
10	20	541.3	.57	1.05		54	62	52	1	265	50
11	22	542.4	.57	1.05		54	63	52	1	270	50
12	24	543.7	.62	1.15		54	62	52	1	265	50
13	26	544.9	.64	1.17		53	64	52	1	265	50
14	28	546.3	.64	1.17		53	64	52	1	265	50
15	30	548.0	.65	1.2		53	64	52	1	265	50
16	32	548.857	.45	.81		54	65	52	1	265	50
	1845										
		37.990	.7453	1.034		54.28	53.44				

0.7453	∆P
1.034	∆H
54.28	TS
53.44	TM
37.99	VMA
24.44	PBAR
-6.	VWC
9.2	WSG
28.97	MWD
29.87	AS
64.	TT
-0.35	STAT
0.197	DN
1.0362	Y
0.844	CP
3.2	TH2O
33.17248731	VMS
0.15136	VWS
.4542092593	%M
.9954579074	MD
28.92017324	MWS
24.41426471	PS
45.89511188	VACT
82.25321952	QACT
38.27403354	VSTD
68.59472292	QSTD
106.6301058	%I
0.	FHWT
0.	T WT
0.	FHGR
0.	FHLB
0.	T GR
0.	T LB

.0187
10.99

FIELD DATA

PLANT Anaconda Cu EPA
DATE 10-26-79
SAMPLING LOCATION 3,4 Baghouse outlet
SAMPLE TYPE part. U
RUN NUMBER 3
OPERATOR NB, TF
AMBIENT TEMPERATURE 42°
BAROMETRIC PRESSURE 24.44
STATIC PRESSURE, (P_s) -.27
FILTER NUMBER (s) 25518

PROBE LENGTH AND TYPE 8' Borosilicate
NOZZLE I.D. .197
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER RAC
METER BOX NUMBER 1227
METER $\Delta H_@$ 1.89
C FACTOR 1.09
PITOT TUBE FACTOR Y
REFERENCE Δp 1.05
NOTE LCI = .018
LCF = .015

READ AND RECORD ALL DATA EVERY 2 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 / 2037	549.103									
A-1	2	550.4	.43	.80		52	42	40	1	235	50
2	4	551.1	.50	.92		52	44	40	1	235	50
3	6	552.2	.50	.92		52	46	42	1	235	50
4	8	553.8	.44	.82		52	50	42	1	235	50
5	10	554.6	.59	1.1		52	52	42	2	250 ~~235~~	50
6	12	556.2	.56	1.05		57	56	44	2	260	50
7	14	557.8	.54	1.0		51	58	44	2	265	50
8	16	558.2	.53	1.0		51	60	46	2	270	50
9	18	559.6	.56	1.07		51	62	46	2.5	275	50
10	20	560.5	.60	1.1		51	62	46	2.5	275	50
11	22	561.9	.49	.91		52	62	48	1	275	50
12	24	562.8	.70	1.3		51	64	48	3	275	50
13	26	564.1	.76	1.4		50	66	50	3	275	50
14	28	565.5	.76	1.4		51	68	50	3	275	50
15	30	567.1	.67	1.25		51	69	50	3	275	50
16	32	568.219	.67	1.25		51	72	52	3	275	50
B-1	2	569.5	.47	.88		51	68	52	2	275	50
2	4	570.6	.36	.66		51	68	52	1	275	50
3	6	571.5	.61	1.15		50	68	52	2.5	270	50
4	8	572.6	.67	1.2		51	70	52	3	270	50
5	10	573.9	.64	1.18		50	70	54	3	270	50
6	12	575.2	.60	1.1		51	72	56	2	270	50
7	14	576.4	.58	1.1		50	72	56	2.5	270	50

Run 3 [redacted] [redacted]
3,4 Baghouse ~~outlet~~ [redacted]
10-26-79

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE °F
B-8	16	577.6	.57	1.1		50	68	56	2.5	270	50
9	18	578.6	.38	.72		52	66	56	1	270	50
10	20	579.8	.55	1.05		51	64	54	2	265	50
11	22	581.0	.69	1.25		50	64	56	3	265	50
12	24	582.3	.74	1.35		50	66	54	3	265	50
13	26	583.8	.72	1.3		50	66	52	3	270	50
14	28	585.4	.74	1.35		50	68	54	3	270	50
15	30	586.3	.72	1.3		50	70	56	3	270	50
16	32	587.848	.72	1.3		51	70	56	3	270	50
	2145										
				1.103		50.91	56.58				
		38.745	0.7682 = $(\sqrt{\Delta p})_{ave}$								

0.7682	ΔP
1.103	ΔH
50.91	TS
56.6	TM
38.745	VMA
24.44	PBAR
-4.	VWC
9.	WSG
28.97	MWD
29.89	AS
64.	TT
-0.27	STAT
0.197	DN
1.0362	Y
0.844	CP
5.	TH2O
33.62913817	VMS
0.23607	VWS
.6970871073	%M
.9930291289	MD
28.89352954	MWS
24.42014706	PS
47.1660853	VACT
84587.65737	QACT
39.50632003	VSTD
70850.63435	QSTD
104.7261641	%I
0.0307	FHWT
0.	T WT
.0140878543	FHGR
8.555400765	FHLB
0.	T GR
0.	T LB

FIELD DATA

PLANT Anaconda Co.
DATE 10-25-79
SAMPLING LOCATION Grizzly East
SAMPLE TYPE P-S.
RUN NUMBER One
OPERATOR O'Neill
AMBIENT TEMPERATURE 70°
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 1 Set 21B
2 Set 22B
3 Set 23B

PROBE LENGTH AND TYPE —
NOZZLE I.D. .179
ASSUMED MOISTURE, % —
SAMPLE BOX NUMBER —
METER BOX NUMBER 2253
METER $\Delta H_@$ —
C FACTOR —
PITOT TUBE FACTOR —
REFERENCE Δp —
NOTE LC = OK

READ AND RECORD ALL DATA EVERY 2.0 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	2025	95,878									
#1	2½			1.1	1.55	1.55	—	95	100	1	—	—
	5	2030	99,668	1.1	1.55	1.55	—	95	110	1	—	—
									100 ✓			
			3.79 ✓					~~95~~	~~80~~			
#2	0	2305	99.949	1.1	1.55	1.55	-	~~95~~	~~90~~			
	2½			"	"	"	—	95	90	1	—	—
	5	2310	3,692				-	90	105	1	—	—
			3.743 ✓				—	90	110			
										96.67 ✓		
#3	0	2315	3.727	1.1	1.55	1.53	—	90	97	1	—	—
	2½			"	"	"	—	92	110	1	—	—
	5	2320	7.624	"	"	"						
								97.25 ✓				
			3.897 ✓									

① $\frac{17.71\,(3.79)\,(.9954)\,\left(24.04 + \frac{1.55}{13.6}\right)}{(.990)\,(560)} = \cancel{2.883}\ 2.911 \div 5 = 0.\cancel{576}\ .582$

② $\frac{17.71\,(3.743)\,(.9954)\,\left(24.04 + \frac{1.55}{13.6}\right)}{(.990)\,(557.25)} = \cancel{2.883}\ 2.89 \div 5 = 0.578$

③ $\frac{17.71\,(3.897)\,(.9954)\,\left(24.04 + \frac{1.55}{13.6}\right)}{(.990)\,(557.25)} = \cancel{2.978}\ 3.009 \div 5 = 0.\cancel{596}\ 602$

FIELD DATA

PLANT Anaconda Copper
DATE 10-25-79
SAMPLING LOCATION Crusher Load
SAMPLE TYPE P.S.
RUN NUMBER 1, 2, 3
OPERATOR O'Neill
AMBIENT TEMPERATURE 70°
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) —
FILTER NUMBER (s) 1 Set 14 B
2 set 13 B
3 Set 2 B

PROBE LENGTH AND TYPE —
NOZZLE I.D. 0.242
ASSUMED MOISTURE, % —
SAMPLE BOX NUMBER —
METER BOX NUMBER 2253
METER $\Delta H_@$ —
C FACTOR —
PITOT TUBE FACTOR —
REFERENCE Δp —
NOTE LC = Ok

TS = 70
MD = .987

READ AND RECORD ALL DATA EVERY 5. MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1913	81.770	0.7								
#1	5	1918		~~0.8~~	2.65	—	—	96	115	3	—	—
			86.663	0.7	2.65	—	—	96	120	3	—	
			4.893 ✓									
								106.75 ✓				
#2	0	1922	86.825									
	2½			0.7	2.65	-	-	96	107	3	-	-
	5	1927	91.714	↓	↓			97	121			
			4.889 ✓					105.25 ✓ 460				
#3	0	1955	91.843	.7	2.65	-	=	96	104	3	=	=
	2					—	—	98	112	3	—	—
	4	1959	95.828									
								102.5 ✓				
	4 min		3.985 ✓	Ave = 2.65								

(1) $\dfrac{17.71\,(4.893)(.9954)\left(24.04+\dfrac{2.65}{13.6}\right)}{(.987)\ 566.75} = \cancel{3.7??}\ 3.735 \div 5 = 0.\cancel{7??}\ 747$

(2) $\dfrac{17.71\,(4.889)(.9954)\left(24.04+\dfrac{2.65}{13.6}\right)}{(.987)\ 565.25} = \cancel{3.7??}\ 3.744 \div 5 = 0.\cancel{7??}\ 749$

(3) $\dfrac{17.71\,(3.985)(.9954)\left(24.04+\dfrac{2.65}{13.6}\right)}{(.987)\ 562.5} = \cancel{3.0??}\ 3.065 \div 5 = \cancel{0.605}\ \cancel{0.613}\ .766$

FIELD DATA

PLANT Anaconda
DATE 10-26-79
SAMPLING LOCATION #1,2 Baghouse Inlet
SAMPLE TYPE Part. Size
RUN NUMBER 1
OPERATOR
AMBIENT TEMPERATURE 52°F
BAROMETRIC PRESSURE 24.44
STATIC PRESSURE, (P_s)
FILTER NUMBER (s) 1. Set 15B
2. 18D
3. 16B

PROBE LENGTH AND TYPE 7' ss
NOZZLE I.D. .179
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER
METER BOX NUMBER 2253
METER $\Delta H_@$
C FACTOR
PITOT TUBE FACTOR
REFERENCE Δp
NOTE LC_{d15} =

READ AND RECORD ALL DATA EVERY ~~3~~ 4 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	0105	7.678									
C-7	4	0109	9.935	.70	.84	.84	—	55	55	1	—	—
	4 min		2.257	.70	.84			55				
Run 2	0	255	10.100									
	3	258	11.768	.70	.84	.84	—	50	50	1	—	—
								48	50			
	3 min		1.668					49.5				
Run 3	0	304	11.840	.70	.84	.84	—	47	50			
	3	307	13.447									
								48.5				
	3 min		1.607									

1. $\frac{17.71(2.257)(.9954)\left(24.44+\frac{.84}{13.6}\right)}{(.984)(460+55)}$ 506.7 = 1.924 1.893 ÷ 4 = 0.481

2. $\frac{17.71(1.668)(.9954)\left(24.44+\frac{.84}{13.6}\right)}{(.984)(509.5)}$ 501.4 = 1.414 ÷ 3 = 0.47

3. $\frac{17.71(1.607)(.9954)\left(24.44+\frac{.84}{13.6}\right)}{(.984)(508.5)}$ = 1.365 ÷ 3 = ~~0.455~~ 0.462

FIELD DATA

PLANT EPA - Anaconda
DATE 10-25-79
SAMPLING LOCATION #1,2 Baghouse outlet
SAMPLE TYPE Part. Size
RUN NUMBER 1
OPERATOR Jackson
AMBIENT TEMPERATURE 70°F
BAROMETRIC PRESSURE 24.04
STATIC PRESSURE, (P_s) -.55
FILTER NUMBER (s) Set 9B9

PROBE LENGTH AND TYPE 7' ss
NOZZLE I.D. .232
ASSUMED MOISTURE, % 3
SAMPLE BOX NUMBER —
METER BOX NUMBER Nutech 2
METER $\Delta H_@$ 1.9
C FACTOR 1.09
PITOT TUBE FACTOR —
REFERENCE Δp .57
NOTE $L_{e_{15}}$ = .002 cfm

READ AND RECORD ALL DATA EVERY 5 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 1630	572.955								N/A	60±10
B-6	5		.71	2.1	2.1		71		12.5		
	10						72		12.5		
	15						74		12.5		
	20						76		12.5		
	25						79		12.5		
	30						82		12.5		
	35						84		12.5		
	40						86		12.5		
	45 Stop @ 47 min	(613.3)					88		12.5		
A-6	50 (1717)						90		12.5		
	55						92		12.5		
	60 End Test @ 1736						94		12.5		
		624.900									
	TT = 60 min.		.71		2.1		82.33				
		51.945									

Restart @ 1723

A-53

$$1.0204 \quad \frac{17.71\,(51.945)\left(24.04+\frac{0.71}{13.6}\right)}{.981\,(460+82.33)} = 41.645 \div 60 = 0.694$$

FIELD DATA

PLANT Anaconda Cu
DATE 10-26-79
SAMPLING LOCATION Truck Dump Inlet
SAMPLE TYPE P.S.
RUN NUMBER 1
OPERATOR O'Neill
AMBIENT TEMPERATURE 39°
BAROMETRIC PRESSURE 24.47
STATIC PRESSURE, (P_s) —
FILTER NUMBER (s) 1 Set = 4
2 " 3
3 17

PROBE LENGTH AND TYPE —
NOZZLE I.D. .227
ASSUMED MOISTURE, % —
SAMPLE BOX NUMBER —
METER BOX NUMBER 2253
METER $\Delta H_@$ —
C FACTOR —
PITOT TUBE FACTOR —
REFERENCE Δp —
NOTE —

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F	OUTLET ($T_{m\ out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	
	0	1630	17.750										
#1	3		20.300	0.6	1.9	1.9	—	62	60	1	—	—	LCF: OK
	6		22.400	0.6	1.9	1.9	—	79	63	1	—	—	.009 CFM
	9		25.300	0.6	1.9	1.9	—	83	64	1	—	—	
	12		27.3	0.6	1.9	1.9	—	87	64	1	—	—	
	15	1650	29.808	0.6	1.9	1.9	—	82	64	1	—	—	LCF = .011 CFM
					1.9								
			12.058					73.8					
				Vmstd =	9.933								
#2	0	1710	29.848	0.6	1.9	1.9	—	65	72	1	—	—	LCF: OK
	3		32.4				—	66	85	1	—	—	
	6		35.6				—	66	80	1	—	—	
	9		37.6				—	67	88	1	—	—	
	12		39.7				—	67	89	1	—	—	
	15	1734	42.100										LCF: OK
								74.					
			12.252		1.9								
				Vm =	10.093								
#3	0	1740	42.138										
	3		45.6	0.6	1.9	1.9	—	66	75	1	—	—	LCF = OK
	6		47.8					67	84		—	—	
	9		49.1					68	89		—		
	12		52.9					68	89		—	—	
	15	1800	54.372					68	90		—		LCF: OK
			12.234		1.9			76.4					

Vmstd [redacted] = [redacted] 10.078

A-54

0.1

FIELD DATA

PLANT: EPA - Anaconda
DATE: 10-25-79
SAMPLING LOCATION: #3, 4 baghouse outlet
SAMPLE TYPE:
RUN NUMBER:
OPERATOR:
AMBIENT TEMPERATURE:
BAROMETRIC PRESSURE: 24.04
STATIC PRESSURE, (P_s): -.36
FILTER NUMBER (s): 3 & 1B

PROBE LENGTH AND TYPE:
NOZZLE I.D.:
ASSUMED MOISTURE, %:
SAMPLE BOX NUMBER:
METER BOX NUMBER: Nutech 2
METER $\Delta H_@$:
C FACTOR:
PITOT TUBE FACTOR:
REFERENCE Δp:
NOTE:

READ AND RECORD ALL DATA EVERY ______ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0 / 2110	625.103									
A-6	5		.89	2.2	2.2		69		[illegible]		
	10						72		13[illegible]		
	15						74		13.5		
	20						76		13.5		
	25						78		13.5		
	30						79		13.5		
	35						80		13.5		
	40						82		13.5		
	45						83		13.5		
	50						84		13.5		
	55						85		13.5		
	60						86		13.5		
	65						88		13.5		
	70						88		13.5		
	75						88		13.5		
	80						89		13.5		
	85						89		13.5		
	90	707.823					90		13.5		
									-		
		82.720	.89	2.2			82.22				

$$.0334 \cdot 17.71 \frac{(82.720)\left(24.04+\frac{2.2}{13.6}\right)}{(460+82.22)} = 67.26 \ \cancel{66.727} \div 90\,\text{min} = .747 \ \cancel{.746}$$

542.22

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Ore Processing Date 10-25-79

Company Name Anaconda, Copper Hours of Observation ______

Plant Address Butte, Montana Observer Chuck Dobroski

Type of Discharge STACK OTHER ~~[illegible]~~ Grizzly Chute

Discharge Location East Grizzly

Height of Point of Discharge ~~≈~~ 10-20' above floor

Observer's Location:

Distance to Discharge Point 10'

Height of Observation Point (Observer is about 10' above discharge location

Direction from Discharge Point East

Background Description Grey metal walls

Weather: Clear Overcast Partly Cloudy Other ______ Sky Color ______

Wind Direction ______ Wind Velocity ______ mi/hr

Plume Description:

Detached: Yes No

Color: Black White Other ______

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other ______

Estimated Distance Plume Visible ______

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Montana Observer C. Dobroski

Stack Location East Grizzly Observer's Location 10' East & 5' above

Weather Conditions

	HR	MIN	00	15	30	45	COMMENTS
1630-1636	16	30	0	0	0	0	start Test #1
$\frac{0}{24}=0$		31	0	0	0	0	
		32	0	0	0	0	
		33	0	0	0	0	
		34	0	0	0	0	
		35	0	0	0	0	
		36	0	0	0	0	
		37	0	0	0	0	
		38	0	0	0	0	
1636-1642		39	0	0	0	0	
		40	0	0	0	0	
$\frac{0}{24}=0$		41	0	0	0	0	
		42	0	0			line down
		43					
1642-1648		44	10	0	0	0	line up
$\frac{30}{12}=6.67$		45	0	0	0	0	
		46	0				line down
		47	70				- release of rock down chute
		48	0	0	0	0	line up
1648-1654		49	0	0	0		line down
$\frac{0}{15}=0$		50					
		51	0	0	0	0	line up
		52	0	0	0	0	
		53					line down
1654-1700		54	0	0	0	0	
$\frac{0}{15}=0$		55	0	0	0	0	
		56					
		57					
		58		0	0	0	
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name *Anaconda Copper* Date *10-25-79*

Plant Address *Butte, Montana* Observer *C. Dobroski*

Stack Location *East Grizzly* Observer's Location *same*

Weather Conditions ______

HR	MIN	00	15	30	45	COMMENTS
1700-1706/1700	00	0	0			line down 1714
$\frac{0}{11} = 0$	01			0	0	
	02	0	0	0		down
	03					
	04					
	05	0	0	0	0	up
1706-1712	06	0	0	0	0	
$\frac{0}{19} = 0$	07	0	0			down
	08		0	0	0	up
	09	0	0	0	0	
	10	0			0	down/up
	11	0	0	0	0	
1712-1718	12	0	0	0	0	
	13	0	0	0	0	
$\frac{0}{8} = 0$	14					line down
	15					
	16					
1718-1724	17					
$\frac{0}{13} = 0$	18					
	19					
	20				0	up
	21	0	0	0	0	
	22	0	0	0	0	
1724-1730	23	0	0	0	0	
$\frac{0}{20} = 0$	24	0	0	0	0	
	25	0	0	0	0	down
	26				0	up
	27	0	0	0	0	
	28	0		0	0	down/up
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Copper
Date: 10-25-79
Plant Address: Butte, Montana
Observer: C. Dobrowski
Stack Location: East Grizzly
Observer's Location: same
Weather Conditions:

HR	MIN	00	15	30	45	COMMENTS
17	30					down
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43		0	0	0	up
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0		down
	48				0	up
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0		down
	57			0	0	up
	58	0	0	0	0	
	59	0	0	0	0	

1742-1748
$\frac{0}{18} = 0$

1748-1754
$\frac{0}{21} = 0$

54-1800
$\frac{0}{11} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Montana Observer C. Dobrowski

Stack Location East Grizzly Observer's Location Same

Weather Conditions

	HR	MIN	00	15	30	45	COMMENTS
1800-1806	18	00	0	0	0	0	
$\frac{0}{24} = 0$		01	0	0	0	0	~~down~~
		02	0	0	0	0	
		03	0	0	0	0	
		04	0	0	0	0	
1806-1812		05	0	0	0	0	
$\frac{0}{19} = 0$		06	0				down
		07			0	0	up
		08	0	0	0	0	
		09	0	0	0	0	
		10	0	0	0	0	
		11	0	0	0	0	
1812-1818		12	0	0	0	0	
$\frac{0}{11} = 0$		13	0	0	0	0	
		14	0	0	0		down
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22			0	0	
1824-1830		23	0	0	0	0	
$\frac{0}{17} = 0$		24	0	0	0	0	
		25	0	0	0	0	
		26			0	0	down/up
		27				0	down
		28			0	0	up
		29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-74

Plant Address Butte, Montana Observer C. Dobroski

Stack Location Grizzly East Observer's Location Same

Weather Conditions

HR	MIN	00	15	30	45	COMMENTS
1830-1836/1830	30	0	0	0	0	
$\frac{0}{22} = 0$	31	0	0			Down
	32	0	0	0	0	Up
	33	0	0	0	0	
	34	0	0	0	0	
1836-1842	35	0	0	0	0	
$\frac{0}{9} = 0$	36	0	0	0	0	
	37	0	0	0	0	
	38	0				End Test #1
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer C. Dobroski

Stack Location East Grizzly Observer's Location 10' East & 5' above

Weather Conditions ______

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50	0	0	0	0	Start Test #2
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

2050-2056

$\frac{0}{24} = 0$

2056-2102

$\frac{0}{18} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer O. Dobroski

Stack Location East Grizzly Observer's Location same

Weather Conditions

	HR	MIN	00	15	30	45	COMMENTS
	21	00	0	0			Down
		01					
2102- 2108		02	0	0	0	0	Up
[redacted]/3 = 0		03	0	0	0	0	
		04	0	0	0	0	
		05	0		0	0	Down/Up
		06	0	0	0	0	
2108-2114		07	0	0	0	0	
[redacted]/24 = 0		08	0	0	0	0	
		09	0	0	0	0	
		10	0	0	0	0	
		11	0	0	0	0	
		12	0	0	0	0	
[redacted]2114-2120		13	0	0	0	0	
0/[redacted]23 = 0		14	0	0	0	0	
		15	0	0	0	0	
		16	0	0	0	0	
		17	0	0	0	0	
		18	0	0	0	0	
[redacted]20-2126		19	0	0	0		Down
0/[redacted] = 0		20			0	0	Up
		21	0	0	0	0	
		22	0	0	0		Down
		23	0	0	0	0	Up
		24	0	0			Down
126-2132		25			0	0	Up
		26	0	0	0	0	
0/[redacted]24 = 0		27	0	0	0	0	
		28	0	0	0	0	
		29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Montana Observer O. Dobrosky

Stack Location East Grizzly Observer's Location same

Weather Conditions

	HR	MIN	00	15	30	45	COMMENTS
	21	30	0	0	0	0	
2132-2138		31	0	0	0	0	
		32	0	0	0	0	
$\frac{0}{21} = 0$		33	0	0	0	0	
		34	0				Down
		35	0	0	0	0	Up
		36	0	0	0	0	
2138-2144		37	0	0	0	0	
$\frac{0}{24} = 0$		38	0	0	0	0	
		39	0	0	0	0	
		40	0	0	0	0	
		41	0	0	0	0	
		42	0	0	0	0	
2144-2150		43	0	0	0	0	
$\frac{0}{24} = 0$		44	0	0	0	0	
		45	0	0	0	0	
		46	0	0	0	0	
		47	0	0	0	0	
		48	0	0	0	0	
2150-2156		49	0	0	0	0	
$\frac{0}{22} = 0$		50	0	0	0	0	
		51	0	0	0	0	
		52	0	0	0	0	
		53	0	0	0	0	
		54	0			0	Down / Up
2156-2202		55	0	0	0	0	
		56	0	0	0	0	
$\frac{0}{23} = 0$		57	0	0	0	0	
		58	0	0	0	0	
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Copper   Date: 10-25-79

Plant Address: Butte, Montana   Observer: O.D

Stack Location: East Grizzly   Observer's Location: Same

Weather Conditions:

HR	MIN	00	15	30	45	COMMENTS
22	00	0	0	0	0	
	01	0	0	0		Down
	02			0	0	Up
	03	0	0	0	0	
	04	0				Down
	05					
	06		0	0	0	Up
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0				End Test #2
	25					
	26					
	27					
	28					
	29					

2202-2208
2/4 = 0

208-2214
[redacted] 0/4 = 0

2214-2220
[redacted] 2/4 = 0

[redacted] 20-2226
[redacted] 0/7 = 0

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25/26-79

Plant Address Butte, Montana Observer C. Dobrowski

Stack Location East Grizzly Observer's Location 10' East & 5' above

Weather Conditions

	TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
		30					
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
0040-0046 $\frac{0}{24}=0$	00	40	0	0	0	0	Start Test #3
		41	0	0	0	0	
		42	0	0	0	0	
		43	0	0	0	0	
		44	0	0	0	0	
		45	0	0	0	0	
0046-0052 $\frac{0}{21}=0$		46	0	0	0		Down
		47			0	0	Up
		48	0	0	0	0	
		49	0	0	0	0	
0052-0058 $\frac{0}{16}=0$		50	0	0	0	0	
		51	0	0	0	0	
		52	0	0	0	0	
		53	0	0	0	0	
		54	0	0	0	0	
		55	0	0	0	0	Down
		56					
0058-0104 $\frac{0}{22}=0$		57					
		58			0	0	Up
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer C. Doborski

Stack Location East Grizzly Observer's Location same

Weather Conditions

	HR	MIN	00	15	30	45	COMMENTS
	01	00	0	0	0	0	
		01	0	0	0	0	
		02	0	0	0	0	
		03	0	0	0	0	
[redacted]104-0110		04	0	0	0	0	
$\frac{0}{24} = 0$		05	0	0	0	0	
		06	0	0	0	0	
		07	0	0	0	0	
		08	0	0	0	0	
		09	0	0	0	0	Down
[redacted]10 - 0116		10	~~0~~	~~0~~	0	0	Up
[redacted] $\frac{0}{22} = 0$		11	0	0	0	0	
		12	0	0	0	0	
		13	0	0	0	0	
		14	0	0	0	0	
[redacted]116-0122		15	0	0	0	0	
$\frac{0}{24} = 0$		16	0	0	0	0	
		17	0	0	0	0	
		18	0	0	0	0	
		19	0	0	0	0	
		20	0	0	0	0	
		21	0	0	0	0	
[redacted]122-0128		22	0	0	0	0	
$\frac{30}{20} = 1.5$		23	0	0	0	0	
		24	0	0	0	0	
		25	0	0	0	0	Down
		26	~~20~~	~~10~~			
		27	20	10	0	0	Up
		28	0	0	0	0	
		29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name *Anaconda Copper* Date *10-25-79*

Plant Address *Butte Montana* Observer *C. Dobroslie*

Stack Location *East Grizzly* Observer's Location *Same*

Weather Conditions

0128-0134
$\frac{0}{24} = 0$

0134-0140
$\frac{0}{24} = 0$

0140-0146
$\frac{0}{23} = 0$

0146-0152
$\frac{0}{24} = 0$

0152-0158
$\frac{0}{24} = 0$

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
01	30	0	0	0	0	
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	0	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	
	42	0		0	0	Down/Up
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	01
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25/26/79

Plant Address Butte, Montana Observer C. Dobonski

Stack Location Grizzly East Observer's Location Same

Weather Conditions

HR	MIN	SECONDS 00	15	30	45	COMMENTS
0158-0204	00	0	0	0	0	
0/[redacted]4 = 0	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
[redacted]204-0210	04	0	0	0	0	
0/4 = 0	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
[redacted]10-0216	10	0	0	0	0	
0/24 = 0	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
0216-0222	16	0	0	0	0	
[redacted]0/24 = 0	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
[redacted]0222-0228	22	0	0	0	0	
0/[redacted]1 = 0	23	0	0	0	0	
	24	0	0	0	0	End Test
	25	0	0	0	0	~~[illegible]~~
	26	0	0	0	0	
	27	0				Line Down
	28	0	0	0	[illegible]	" Up/Down
	29					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper

Date 10-25/26-79

Plant Address Butte Montana

Observer C. Dobroski

Stack Location Grizzly East

Observer's Location Same

Weather Conditions

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
02	30					line down
	31					
	32					
	33					
	34					
02	35					End Test #3
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

SUMMARY

RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Ore Processing   Date 10-25-79

Company Name Anaconda Copper   Hours of Observation ________

Plant Address Butte, Montana   Observer ____________

Type of Discharge STACK   OTHER Grizzly Chute

Discharge Location West Grizzly

Height of Point of Discharge 10-20' above floor

Observer's Location:

Distance to Discharge Point 30'

Height of Observation Point (~ 5' above discharge location)

Direction from Discharge Point East

Background Description Grey metal walls

Weather: Clear   Overcast   Partly Cloudy   Other ____ Sky Color ________

Wind Direction ____________   Wind Velocity ________ mi/hr

Plume Description:

Detached: Yes   No

Color: Black   White   Other ________

Plume Dispersion Behavior: Looping   Coning   Fanning

Lofting   Fumigating   Other ____________

Estimated Distance Plume Visible ____________

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer C. Dobroski

Stack Location West Grizzly Observer's Location 30' East & 5' above

Weather Conditions

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
16	30	0	0	0	0	Start Test #1
	31	0	0	0	0	line stopped
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
1656-1702	55					
$\frac{0}{20} = 0$	56	0	0	0	0	line up
	57	0	0	0	0	
	58	0				down
	59		0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Copper   Date: 10-25-79
Plant Address: Butte Montana   Observer: C. Debrooke
Stack Location: West Grizzly   Observer's Location: same
Weather Conditions: ______

HR	MIN	00	15	30	45	COMMENTS
17	00	0	0	0	0	
	01	0	0	0	0	
1702-1708	02	0	0	0	0	
[redacted] 0/20 = 0	03	0	0	0	0	
	04					down
	05	0	0	0	0	up
	06	0	0	0	0	
	07	0	0	0	0	
1708-1714	08	0	0	0	0	
[redacted] 0/24 = 0	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0				down
	16					
	17					
	18					
	19					
1721-1727	20				0	up
[redacted] 0/24 = 0	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27					down
	28	0	0	0	0	up
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer A. Dobroski

Stack Location West Grizzly Observer's Location Same

Weather Conditions

	HR	MIN	00	15	30	45	COMMENTS
	17	30					down
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40					
1741-1747		41	0	0	0	0	~~St~~ up
$\frac{0}{24} = 0$		42	0	0	0	0	
		43	0	0	0	0	
		44	0	0	0	0	
		45	0	0	0	0	
		46	0	0	0	0	
1747-1753		47	0	0	0		down
$\frac{0}{20} = 0$		48				0	up
		49	0	0	0	0	
		50	0	0	0	0	
		51	0	0	0	0	
1753-1759		52	0	0	0	0	
$\frac{0}{21} = 0$		53	0	0	0	0	
		54	0	0	0	0	
		55	0	0	0	0	
		56	0	0	0		down
		57			0	0	up
		58	0	0	0	0	
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Copper — Date: 10-25-79

Plant Address: Butte, Montana — Observer: C. Dobroski

Stack Location: West Grizzly — Observer's Location: Same

Weather Conditions: ____________

1759-1805 $\frac{0}{24} = 0$

1805-1811 $\frac{0}{19} = 0$

1811-1817 $\frac{0}{5} = 0$

1822-1828 $\frac{0}{17} = 0$

HR	MIN	00	15	30	45	COMMENTS
18	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0				down
	07			0	0	up
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0		down
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22			0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	
	26			0	0	down/up
	27				0	down
	28					up
	29					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer C. Dobrozki

Stack Location Grizzly West Observer's Location Same

Weather Conditions

1830-1836

$\frac{0}{22} = 0$

TIME		SECONDS				COMMENTS
HR	MIN	00	15	30	45	
18	30	0	0	0	0	
	31	0	0			Down
	32	0	0	0	0	Up
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0				End Test #1
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper   Date 10-25-75

Plant Address Butte, Montana   Observer A. Dobroski

Stack Location West Grizzly   Observer's Location 30' East & 10' above

Weather Conditions

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
20	50	0	0	0	0	Start Test #2
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0		Down
	54					
	55					
	56					
	57					
	58					
	59		0	0	0	Up

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper | Date 10-25-79

Plant Address Butte Montana | Observer C. Dobkoski

Stack Location West Grizzly | Observer's Location Same

Weather Conditions

	TIME						COMMENTS
	HR	MIN	SECONDS 00	15	30	45	
~~2100-2106~~	21	00	0	0	0	0	
~~$\frac{0}{16}=0$~~		01	0				Down
		02					
		03	0	0	0	0	Up
		04	0	0	0	0	
		05	0		0	0	Down/Up
2106-2112		06	0	0	0	0	
$\frac{0}{24}=0$		07	0	0	0	0	
		08	0	0	0	0	
		09	0	0	0	0	
		10	0	0	0	0	
		11	0	0	0	0	
2112-2118		12	0	0	0		Down
$\frac{0}{19}=0$		13					
		14	0	0	0	0	Up
		15	0	0	0	0	
		16	0	0	0	0	
2118-2124		17	0	0	0	0	
$\frac{0}{23}=0$		18	0	0	0	0	
		19	0	0	0	0	
		20	0	0	0	0	21
		21	0	0	0	0	
		22	0	0	0		Down
2124-2130		23	0	0	0	0	Up
$\frac{0}{24}=0$		24	0	0	0	0	
		25	0	0	0	0	
		26	0	0	0	0	
		27	0	0	0	0	
		28	0	0	0	0	
		29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper
Date 10-25-79
Plant Address Butte Montana
Observer C. Dobrosli
Stack Location West Grizzly
Observer's Location same
Weather Conditions

2130-2136
4=0

[redacted]136-2142
$\frac{0}{[redacted]4}=0$

2142-2148
$\frac{[redacted]}{24}=0$

[redacted]148-2154
$\frac{0}{24}=0$

2154-2200
$\frac{0}{24}=0$

HR	MIN	00	15	30	45	COMMENTS
21	30	0	0	0	0	
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	0	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper
Date 10-25-79
Plant Address Butte, Montana
Observer C. Dobroski
Stack Location West Grizzly
Observer's Location Same
Weather Conditions

2200-2206
$\frac{0}{17} = 0$

2206-2212
$\frac{0}{22} = 0$

2212-2218
$\frac{0}{24} = 0$

2218-2224
$\frac{0}{24} = 0$

HR	MIN	00	15	30	45	COMMENTS
22	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0				Down
	05					
	06		0	0	0	Up
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0		
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0				End Test #2
	25					
	26					
	27					
	28					
	29					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte, Montana Observer C. Dobrowski

Stack Location West Grizzly Observer's Location 30' East & 5' above

Weather Conditions

[redacted]040-0046
[redacted]/24 = 0

0046-0052
0/24 = 0

0052-0058
[redacted]/24 = 0

HR	MIN	00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
00	40	0	0	0	0	Start Test #3
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Copper Date: 10-25-79

Plant Address: Butte, Montana Observer: C. Dobrowski

Stack Location: West Grizzly Observer's Location: Same

Weather Conditions:

	TIME						COMMENTS
	HR	MIN	SECONDS 00	15	30	45	
0058-0104	01	00	0	0	0	0	
$\frac{0}{24}=0$		01	0	0	0	0	
		02	0	0	0	0	
		03	0	0	0	0	
0104-0110		04	0			0	Down/Up
$\frac{0}{17}=0$		05	0	0	0	0	
		06	0	0	0	0	
		07	0	0	0	0	
		08	0	0	0		Down
		09					
		10					
		11					
		12					
		13					
		14					
0115-0121		15	0	0	0	0	Up
$\frac{105}{24}=4,4$		16	0	0	0	0	
		17	0	0	0	0	
		18	0	0	0	0	
		19	15	15	15	15	
		20	10	15	10	10	
0121-0127		21	10	10	5	5	
$\frac{95}{21}=4,5$		22	5	5	5		Down
		23			0	5	Up
		24	10	10	10	5	
		25	5	0	0	0	
		26	0	5	0	0	
0127-0133		27	0	0	0	0	
$\frac{45}{24}=1,9$		28	0	0	0	0	
		29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper　　Date 10-25-79

Plant Address Butte, Montana　　Observer C. Dobroski

Stack Location West Grizzly　　Observer's Location Same

Weather Conditions ______

[redacted] 0139-0145
$\frac{0}{24}=0$

[redacted] 0153-0159
$\frac{0}{24}=0$

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
01	30	5	5	5	5	
	31	5	5	5	5	
	32	5	0	0	0	
	33	0	5	5	0	
	34					Line Down
	35					
	36					
	37					
	38		0	0	0	Line Up
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0				Line Down
	48					
	49					
	50					
	51					
	52					
	53	0	0	0	0	Up
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Copper

Date: 10-25 to 26-79

Plant Address: Butte, Montana

Observer: C. Dobosh

Stack Location: Grizzly West

Observer's Location: Same

Weather Conditions:

0159-0205 $\frac{0}{24}=0$

0205-0211 $\frac{0}{16}=0$

0211-0217 $\frac{0}{22}=0$

0217-0223 $\frac{0}{24}=0$

0223-0229 $\frac{0}{24}=0$

HR	MIN	00	15	30	45	COMMENTS
02	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	Down
	09					
	10					
	11			0	0	up
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper
Date 10-25/26-79
Plant Address Butte, Montana
Observer C. Dobrosky
Stack Location Grizzly West
Observer's Location Same
Weather Conditions

0229-0235

$\frac{0}{24} = 0$

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
02	30	0	0	0	0	
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0				End Test #3
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Mine Date 10-25-79

Company Name Anaconda Copper Hours of Observation ~~8~~ see below

Plant Address Butte Montana Observer J. D. O'Neill

Type of Discharge STACK OTHER hood area

Discharge Location crusher hood

Height of Point of Discharge ground level

Observer's Location:

Distance to Discharge Point ____________

Height of Observation Point ground level

Direction from Discharge Point __________

Background Description indoors

Weather: Clear Overcast Partly Cloudy Other N/A Sky Color ________

Wind Direction N/A Wind Velocity N/A mi/hr

Plume Description:

Detached: Yes No N/A

Color: Black White Other Brown

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other ____________

Estimated Distance Plume Visible ~10-15'

1. 1645 - 1840
2. 2050 - 2223
3. 0036 - 0237

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25

Plant Address Butte Montana Observer J.D. O'Neill

Stack Location Crusher hood Observer's Location Above discharge

Weather Conditions [illegible]

HR	MIN	00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
16	45	0	0	0	0	Start 1645
	46	0	0	0	0	
	47	0	5	10	35	
	48	20	0	0	0	
	49	0	0	0	30	
	50	15	10	5	5	
	51	0	0	0	0	
	52	0	0	0	0	
	53	5	5	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	5	5	10	
	59	0	0	0	0	

[redacted]645-1651

$\frac{135}{24} = 5.6$ [redacted]

1651-1657

[redacted] $\frac{0}{24} = 0.4$

657-1703

$\frac{110}{24} = 4.6$ [redacted]

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Mon. Observer J.D. O'Neill

Stack Location Crusher hood Observer's Location Crusher hood

Weather Conditions N/A

Test #1

	HR	MIN	00	15	30	45	COMMENTS
	17	00	15	20	15	15	
		01	0	5	10	10	
		02	0	0	0	0	
1703-1709		03	0	0	0	0	
$\frac{30}{24} = 1.3$		04	0	0	5	10	
		05	0	0	0	0	
		06	5	5	0	0	
		07	0	0	0	0	
		08	0	0	5	0	
1709-1715		09	0	0	5	5	
$\frac{55}{24} = 2.3$		10	5	10	10	5	
		11	10	5	0	0	
		12	0	0	0	0	
		13	0	0	0	0	
		14	0	0	0	0	
		15	0	0	0	0	Stopped 1716 Crusher down
		16					
		17					
1720-1726		18					
$\frac{25}{24} = 1.0$		19					
	17	20	0	10	5	0	Restart 1720
		21	0	0	0	5	
		22	0	0	0	0	
		23	0	0	0	0	
		24	0	0	0	0	
1726-1732		25	0	0	5	0	
$\frac{30}{16} = 1.9$		26	0	10	0	5	
		27	5	0	10	0	
		28	0	0	0	0	
		29	0	0	0	0	Stopped 1729

RECORD OF VISIBLE EMISSIONS

Company Name Anacond
Date 10-25-79
Plant Address Butte Montana
Observer J.D. O'Neill
Stack Location Crusher hood
Observer's Location Next to hood
Weather Conditions N/A

HR	MIN	00	15	30	45	COMMENTS
17	30					Test Run 1
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
17	45	0	0	0	0	Restart 1745
	46	0	0	5	5	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	5	
	50	10	10	0	5	
	51	5	0	5	5	
	52	5	5	0	5	
	53	5	0	0	0	
	54	5	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

[redacted]45-1751
40/[redacted]4 = 1.7

[redacted]1751-1757
40/24 = 1.7

[redacted]1757-1803
5/24 =-0.2

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper
Date 10-25-79
Plant Address Butte Mon.
Observer J.D. O'Neill
Stack Location Crusher hood
Observer's Location ~15' away from hood
Weather Conditions N/A

	TIME						COMMENTS
	HR	MIN	SECONDS 00	15	30	45	
	18	00	0	0	0	0	Test # 1
		01	0	0	0	5	
		02	0	0	0	0	
1803-1809 $\frac{0}{24} = 0$		03	0	0	0	0	
		04	0	0	0	0	
		05	0	0	0	0	
		06	0	0	0	0	
		07	0	0	0	0	
		08	0	0	0	0	
1809-1815 $\frac{15}{24} = 0.6$		09	0	0	0	0	
		10	0	5	0	0	
		11	0	0	0	0	
		12	5	0	0	0	
		13	0	5	0	0	
		14	0	0	0	0	
		15	0	0	0	0	
		16	0	0	0	0	Stopped 1816
		17					
		18					
		19					
		20					
1821-1827 $\frac{65}{24} = 2.7$	18	21	5	5	0	0	Restart
		22	0	5	10	10	
		23	0	5	10	5	
		24	0	0	0	0	
1827-1833 $\frac{40}{24} = 1.7$		25	0	5	0	0	
		26	0	0	0	5	
		27	0	5	0	5	
		28	0	0	0	0	
	18	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Mt. Observer J D O'Neill

Stack Location Crusher hood Observer's Location ~15' away

Weather Conditions N/A

[redacted]833-1839

[redacted]0 / 24 = 2.5 [redacted]

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
18	30	0	0	5	0	Test # 1
	31	0	0	0	5	
	32	5	10	5	0	
	33	0	0	0	0	
	34	0	0	0	5	
	35	5	5	5	10	
	36	5	5	5	5	
	37	5	5	0	0	
	38	0	0	0	0	
	39	0	0	5	5	
	40	0	0	0	0	End Run 1840
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu

Date 10-25-79

Plant Address Butte Mt.

Observer J. D. O'Neill

Stack Location Crusher hood

Observer's Location ~15' away from hood

Weather Conditions N/A

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
20	50	0	0	0	0	Test NO. 2
	51	0	0	0	0	
	52	5	0	0	0	
	53	0	0	5	5	
	54	0	0	0	0	
	55	0	0	0	0	
	56	5	0	0	0	
	57	0	5	0	10	
	58	0	0	0	0	
	59	0	0	0	0	

2050-2056

$\frac{15}{24} = 0.6$

2056-2102

$\frac{20}{24} = 0.8$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Mt. Observer J D O'Neill

Stack Location Crusher hood Observer's Location 15' away from hood

Weather Conditions N/A

HR	MIN	00	15	30	45	COMMENTS
21	00	0	0	0	0	Test #2
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	5	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	5	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	5	0	5	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	5	5	0	0	
	16	15	15	10	0	
	17	5	5	5	5	
	18	0	0	0	0	
	19	0	5	0	5	
	20	5	0	0	5	
	21	10	5	5	5	
	22	0	0	5	0	
	23	0	0	0	0	
	24	5	0	0	0	
	25	0	0	0	0	
	26	0	0	0	5	
	27	0	0	0	0	
	28	0	0	0	0	
	29	0	0	0	0	

[redacted]02-2108
10/[redacted] = 0.4

2108-2114
[redacted] 10/24 = 0.4

[redacted]
2114-2120
[redacted]80/24 = 3.3

2[redacted]20-2126
45/24 = 1.9
[redacted]

[redacted]26-2132
15/24 = 0.6

RECORD OF VISIBLE EMISSIONS

Company Name Anoconda Cu Date 10-25-79
Plant Address Butte Mt. Observer S D O'Neill
Stack Location Crusher hood Observer's Location 15' away from hood
Weather Conditions N/A

	TIME		SECONDS				COMMENTS
	HR	MIN	00	15	30	45	
	21	30	0	0	0	0	Test 2
2132-2138 $\frac{5}{24} = 0.2$		31	5	5	0	0	
		32	0	0	0	0	
		33	0	0	0	0	
		34	0	0	0	0	
		35	5	0	0	0	
		36	0	0	0	0	
2138-2144 $\frac{20}{24} = 0.8$		37	0	0	0	0	
		38	0	0	0	0	
		39	0	0	0	0	
		40	0	0	0	0	
		41	0	5	0	10	
		42	0	0	0	0	
2144-2150 $\frac{40}{24} = 1.7$		43	0	0	0	5	
		44	10	5	5	0	
		45	5	5	0	0	
		46	5	5	0	0	
		47	0	0	0	0	
		48	0	0	0	0	
2150-2156 $\frac{80}{24} = 3.3$		49	0	0	0	0	
		50	5	0	0	5	
		51	0	0	5	5	
		52	5	5	0	0	
		53	5	0	5	5	
		54	5	5	5	5	
2156-2202 $\frac{25}{24} = 1.0$		55	5	5	5	0	
		56	0	5	0	5	
		57	0	0	0	0	
		58	0	5	0	5	
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Co Date 10-25-79
Plant Address Butte Mt. Observer J D O'Neill
Stack Location Crusher hood Observer's Location crusher hood
Weather Conditions N/A

HR	MIN	SECONDS 00	15	30	45	COMMENTS
22	00	0	0	0	0	Test Run 2
	01	0	0	5	0	
	02	10	10	20	10	
	03	15	15	15	10	
	04	15	15	10	15	
	05	15	20	15	10	
	06	15	15	5	5	
	07	10	10	10	10	
	08	10	10	10	10	
	09	10	5	10	10	
	10	5	5	0	0	
	11	5	0	0	5	
	12	5	0	5	5	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	5	5	5	
	16	0	0	0	0	
	17	5	5	5	5	
	18	5	5	5	5	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
22	23	0	0	0	0	Stopped test #2 1023
	24					
	25					
	26					
	27					
	28					
	29					

2202-2208
$\frac{300}{24} = 12.5$

2208-2214
$\frac{110}{24} = 4.6$

2214-2220
$\frac{55}{24} = 2.3$

2220-2226
$\frac{0}{24} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-25-79

Plant Address Butte Mtc Observer JD O'Neill

Stack Location Crusher hood Observer's Location hood area

Weather Conditions N/A

0036-0042 $\frac{5}{24} = 0.2$

0042-0048 $\frac{45}{24} = 1.9$

0048-0054 $\frac{30}{24} = 1.3$

0054-0100 $\frac{0}{24} = 0$

HR	MIN	00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
00	36	0	0	0	0	Start Run 3
	37	0	0	0	0	
	38	0	0	0	0	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	5	0	
	42	10	5	0	5	
	43	5	0	0	0	
	44	0	0	0	0	
00	45	0	0	0	0	
	46	0	5	0	5	
	47	0	5	5	0	
	48	0	0	0	0	
	49	0	5	0	5	
	50	5	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	5	0	10	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper

Date 10-25-79

Plant Address Butte Mt.

Observer JD O'Neill

Stack Location Crusher hood

Observer's Location hood area

Weather Conditions N/A

[redacted]111-0117

$\frac{195}{[redacted]4} = 8.1$

HR	MIN	00	15	30	45	COMMENTS
01	00	0	0	0	0	
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11	0	0	0	0	
	12	0	5	5	10	
	13	10	25	20	30	
	14	20	20	10	5	
00	15	0	10	0	5	~~Start test #3~~
	16	0	20	0	0	Stopped 0116 hood down
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu — Date 10-26-79

Plant Address Butte Mt. — Observer J.D. O'Neill

Stack Location Crusher hood — Observer's Location hood area

Weather Conditions N/A

HR	MIN	00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
~~01~~	~~41~~	~~0~~	~~0~~	~~0~~	~~0~~	Restart 0147
	42					
	43					
	44					
	45					
	46					
01	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	5	5	5	
	51	0	0	0	0	
	52	0	5	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	5	0	
	59	5	5	0	0	

0147-0153
$\frac{20}{24} = 0.8$

0153-0159
$\frac{5}{24} = 0.2$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper | Date 10-26-79

Plant Address Butte Mont. | Observer JD O'Neill

Stack Location Crusher hood | Observer's Location hood area

Weather Conditions N/A

0159-0205
[redacted] 40/24 = 1.7

0205-0211
[redacted] 5/24 = 0.6

[redacted]211-0217
0/[redacted]4 = 0

[redacted]217-0223
0/[redacted]4 = 0

0223-0229
[redacted]/24 = 0.2

HR	MIN	00	15	30	45	COMMENTS
02	00	0	0	0	5	Test #3
	01	5	5	0	0	
	02	0	0	0	0	
	03	0	5	0	0	
	04	0	5	5	0	
	05	0	0	5	5	
	06	0	0	5	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	5	
	29	5	5	10	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper | Date 10-26-79

Plant Address Butte Mt | Observer JD O'Neill

Stack Location crusher hood | Observer's Location hood area

Weather Conditions N/A

0229-0235

$\frac{45}{24} = 2.3$

HR	MIN	00	15	30	45	COMMENTS
02	30	5	5	5	5	
	31	5	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
02	37	0	0	0	0	Stoppe 0237 Run 3
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Mine — Date 10-25-79

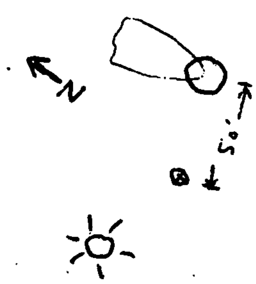
Company Name Anaconda — Hours of Observation 1630-

Plant Address Butte, Mont. — Observer B. L. Jackson

Type of Discharge STACK OTHER ______

Discharge Location #1, 2 Baghouse Outlet

Height of Point of Discharge 15' above roof



Observer's Location:

Distance to Discharge Point 50'

Height of Observation Point level w/ lip of stack

Direction from Discharge Point SW of stack

Background Description multi-colored mine wall area

Weather: Clear Overcast Partly Cloudy Other ______ Sky Color N/A

Wind Direction from SE Wind Velocity 10-30 mi/hr

Plume Description:

Detached: Yes No

Color: Black White Other [redacted] Gray when visible

Plume Dispersion Behavior: Looping Coning Fanning when visible

Lofting Fumigating Other [redacted]

Estimated Distance Plume Visible 0' to 100'

Comment(s): 1. 20-25 sec emission when bags shaken for cleaning.

2. Test 1 Summary:

Opacity	# of Readings
0	446
5	12
10	2
≥ 15	0
	360 Total

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Date 10-25-79

Plant Address Butte, Montana Observer B. L. Jackson

Stack Location #1,2 baghouse outlet Observer's Location See Summary Record

Weather Conditions See Summary Record

	TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
1630-1636	16	30	0	0	0	0	Start Run 1
$\frac{0}{24} = 0$		31	0	0	0	0	Baghouse appears to be well maintained
		32	0	0	0	0	
		33	0	0	0	0	
		34	0	0	0	0	
1636-1642		35	0	0	0	0	
$\frac{10}{24} = 0.4$		36	0	0	0	0	
		37	0	0	0	0	
		38	0	0	0	0	
		39	0	0	0	0	
		40	0	0	0	0	
1642-1648		41	0	0	5	5	
		42	0	0	0	0	
$\frac{0}{24} = 0$		43	0	0	0	0	
		44	0	0	0	0	
		45	0	0	0	0	
		46	0	0	0	0	
1648-1654		47	0	0	0	0	
$\frac{10}{24} = 0.4$		48	0	0	0	0	
		49	0	0	0	0	
→		50	5	5	0	0	
		51	0	0	0	0	
		52	0	0	0	0	
1654-1700		53	0	0	0	0	
$\frac{10}{24} = 0.4$		54	0	0	0	0	
		55	0	0	0	0	
		56	0	0	0	0	
		57	0	0	0	0	
→		58	0	0	5	5	
		59	0	0	0	0	

Σ: Opacity 0 / 5 / 210   # Readings 114 / 6 / 0   120 Total

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda — Date: 10-25-79

Plant Address: Butte, Montana — Observer: B.L. Jackson

Stack Location: #1,2 Baghouse Outlet — Observer's Location: See Summary Record

Weather Conditions: See Summary Record

HR	MIN	00	15	30	45	COMMENTS
1700-1706	00	0	0	0	0	Run 1 cont.
[redacted]/24 = 0	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
[redacted]1706-1712	06	0	10	5	0	
[redacted] = 0.6	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
[redacted]12-1718	12	0	0	0	0	
[redacted] 0/24 = 0	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
[redacted]18-1724	17	0	0	0	0	
[redacted] = 0.4	18	0	0	0	0	
	19	0	0	0	0	
	20	5	5	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
[redacted]24-1730	23	0	0	0	0	
0/24 = 0	24	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
[redacted]city	28	0	0	0	0	
	29	0	0	0	0	

[redacted]city	# Rdgs
0	116
5	3
[redacted]	1
	0
	120 total

RECORD OF VISIBLE EMISSIONS

Company Name Anasonda Date 10-25-79

Plant Address Butte, Montana Observer B. L. Jackson

Stack Location #1,2 Baghouse Outlet Observer's Location See Summary Record

Weather Conditions See Summary Record

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
17	30	0	0	0	0	Run 1 (cont.)
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	Crusher down - boulder jam
	38	0	0	0	0	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
	44	5	5	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	0	0	0	
	57	0	0	0	10	
	58	5	0	0	0	
	59	0	0	0	0	End observation period due to darkness.

1730-1736
$\frac{0}{24} = 0$

1736-1742
$\frac{0}{24} = 0$

1742-1748
$\frac{10}{24} = 0.4$

1748-1754
$\frac{0}{24} = 0$

1754-1800
$\frac{15}{24} = 0.6$

Σ:

Opacity	# Rdgs.
0	116
5	3
10	1
≥15	0
	120 Total

0	346
5	12
10	2
15	0

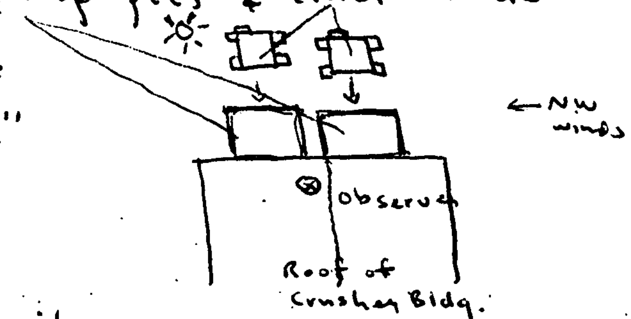
SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Mining (Crushing) Date 10-26-79

Company Name Anaconda Copper Co. Hours of Observation 1450- 1815

Plant Address Butte, Montana Observer B. L. Jackson

Type of Discharge STACK OTHER open dump pits & truck beds



Discharge Location Truck Dump Area

Height of Point of Discharge "ground level"

Observer's Location:

Distance to Discharge Point 20'

Height of Observation Point 10' above pits

Direction from Discharge Point NE

Background Description ground

Weather: Clear Overcast Partly Cloudy Other ____ Sky Color blue/gray

Wind Direction from NW Wind Velocity 15-30 mi/hr

Plume Description:

Detached: Yes No N.A.

Color: Black White Other ____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other ____

Estimated Distance Plume Visible up to 100 M

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date

Plant Address Butte, Montana Observer

~~Stack~~ Source Location Truck Dump Area Observer's Location

Weather Conditions 15-30 mph winds See Sum

TIME						COMMENTS
HR	MIN	SECONDS				
		00	15	30	45	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	49					
14	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	5	15	5	0	1 Truck
	56	0	0	0	0	
	57	0	0	0	0	
	58	5	5	0	0	1 Truck
	59	0	0	0	0	

1450-1456
$\frac{25}{24} = 1.0$

1456-1502
$\frac{80}{24} = 3.3$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu. Co. Date 10-26-79

Plant Address Butte, Montana Observer B.L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

HR	MIN	00	15	30	45	COMMENTS
15	00	5	10	15	15	2 trucks
	01	10	10	5	0	50% maximum
	02	0	0	0	0	
	03	0	5	30	0	1 Truck
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	5	1 Truck + 1 Truck
	07	5	5	10	10	1 "
	08	0	10	5	10	1 " 1 "
	09	5	0	0	0	
	10	0	0	0	5	1-170s ~~[illegible]~~
	11	5	10	5	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	5	5	2 Trucks (100's)
	18	10	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	10	0	1-100
	22	0	0	10	5	2-"
	23	5	0	0	0	
	24	0	0	0	0	
	25	0	10	5	0	1-170 + 1-100
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
	29	5	15	0	0	1-100

[redacted]02-1508
70/[redacted]24 = 2.9

[redacted]8-1514
[redacted]/24 = 2.3

1[redacted]4-1520
20/[redacted]4 = 0.8

1[redacted]20-1526
45/[redacted]4 = 1.9

[redacted]526-1532
30/[redacted]24 = 1.3

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date 10-26-79

Plant Address Butte, Montana Observer B. L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

HR	MIN	00	15	30	45	COMMENTS
15	30	0	0	0	0	1-100
	31	5	5	0	0	
	32	40	5	0	0	1-170
	33	0	0	0	0	
	34	0	0	0	5	1-100
	35	5	0	0	0	
	36	0	0	0	0	
	37	0	0	30	10	1-100
	38	5	5	0	0	
	39	0	5	0	0	1-100
	40	0	0	0	0	
	41	0	0	0	0	
	42	5	15	0	15	1-100 1-170
	43	15	15	5	15	1-100
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	End Observation Set 1
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

1532-1538
$\frac{95}{24} = 4.0$

1538-1544
$\frac{100}{24} = 4.2$

Shift Change

Summary:

Opacity	# of Rdgs.
0	
5	31
10	13
15	9
20	0
25	0
30	2
35	0
40	1
≥45	0

RECORD OF VISIBLE EMISSIONS

Company Name: Anaconda Cu Co. Date: 10-26-79

Plant Address: Butte, Montana Observer: B.L. Jackson

~~Stack~~ Location: Truck Dump Area Observer's Location: See Summary Record

Weather Conditions: See Summary Record

	HR	MIN	00	15	30	45	COMMENTS
		00					
		01					
		02					
		03					
		04					
		05					
		06					
		07					
		08					
		09					
		10					
		11					
		12					
		13					
		14					
[redacted]615-1621	16	15	0	0	0	0	Run 2
$\frac{0}{24}=0$ [redacted]		16	0	0	0	0	
		17	0	0	0	0	
		18	0	0	0	0	
		19	0	0	0	0	
1621-1627		20	0	0	0	0	
[redacted] $\frac{25}{24}=1.0$		21	0	0	0	0	
		22	0	0	0	0	
		23	0	0	0	0	
		24	0	0	0	0	
		25	0	0	25	0	1-170
[redacted]627-1633		26	0	0	0	0	
$\frac{80}{24}=3.3$ [redacted]		27	0	0	0	0	
		28	0	0	0	0	
		29	10	5	0	5	2-100

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date 10-26-79

Plant Address Butte, Montana Observer B. L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

HR	MIN	00	15	30	45	COMMENTS
16	30	10	0	0	0	Set 2
	31	5	10	0	0	2-100's
	32	0	0	10	25	1-100 1-170
	33	0	0	0	0	
	34	0	20	10	0	2-170's
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	0	
	39	5	10	0	0	1-100 + 1-170
	40	0	0	0	0	
	41	5	5	0	5	1-100
	42	5	0	0	0	
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	5	5	1-100
	56	0	0	10	5	1-100
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

1633-1639 $\frac{30}{24} = 1.3$

1639-1645 $\frac{35}{24} = 1.5$

1645-1651 $\frac{0}{24} = 0$

1651-1657 $\frac{25}{24} = 1.0$

1657-1703 $\frac{0}{24} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date 10-26-79

Plant Address Butte, Montana Observer B.L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

HR	MIN	00	15	30	45	COMMENTS
17	00	0	0	0	0	Set 2 Cont.
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	5	30	5	1-100
	04	5	0	0	45	1-100
	05	5	5	5	0	1-100
	06	0	5	15	5	1-170
	07	0	0	0	0	
	08	0	0	10	15	1-170
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	End Run 2
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

1703-1709
[redacted]5 / [redacted]4 = 6.5

[redacted]09-1715
0 / [redacted]4 = 0

Summary:

Opacity	# of Rdgs
0	206
5	19
10	8
15	2
20	1
25	2
30	1
35	0
40	0
45	1
[redacted]50	0
	240

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date 10-26-79

Plant Address Butte, Montana Observer B.L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

HR	MIN	00	15	30	45	COMMENTS
	00					
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
1715-1721 17	15	0	0	0	0	
55/24 = 2.3	16	0	10	15	0	2-100's Run 3
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
1721-1727	20	0	0	25	5	1-100 + 1-170
15/24 = 0.6	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
1727-1733	25	0	0	0	0	
	26	0	0	5	10	1-100
30/24 = 1.3	27	10	0	0	0	1-100
	28	0	0	0	0	
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date 10-26-79

Plant Address Butte, Montana Observer B. L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

	HR	MIN	00	15	30	45	COMMENTS
	17	30	0	0	0	0	Run 3
		31	0	1.0	5	0	1-100
		32	0	0	5	0	1-100
[redacted]33-1739		33	0	0	0	0	
[redacted]/24 = 0.4		34	0	5	5	0	
		35	0	0	0	0	
		36	0	0	0	0	
		37	0	0	0	0	
[redacted]39-1745		38	0	0	0	0	
80/[redacted]4 = 3.3		39	0	0	0	0	
		40	0	0	0	0	
		41	10	30	0	0	max. 60 1-170
		42	0	0	5	5	1-100
		43	0	0	5	5	Dozer in pit
[redacted]45-1751		44	5	5	5	5	" " "
75/24 = 3.1		45	5	40	10	5	1-170 + dozer
		46	0	0	0	10	1-100
		47	5	0	0	0	
		48	0	0	0	0	
		49	0	0	0	0	
		50	0	0	0	0	
1251-1757		51	10	5	0	0	1-100 25 max.
[redacted]5/24 = 0.6		52	0	0	0	0	
		53	0	0	0	0	
		54	0	0	0	0	
		55	0	0	0	0	
[redacted]57=1803		56	0	0	0	0	
25/[redacted]4 = 0		57	0	0	0	5	1-100
		58	10	0	0	0	
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Cu Co. Date 10-26-79

Plant Address Butte, Montana Observer B. L. Jackson

~~Stack~~ Location Truck Dump Area Observer's Location See Summary Record

Weather Conditions See Summary Record

HR	MIN	SECONDS 00	15	30	45	COMMENTS
18	00	0	0	0	0	Set 3
	01	0	0	0	0	
	02	0	5	5	0	due to strong wind
	03	0	5	5	0	1-100
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	5	1-100
	09	10	5	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	5	1-100
	13	25	0	0	0	
	14	20	0	0	0	1-100
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

1803-1809
$\frac{15}{24} = 0.6$

1809-1815
$\frac{65}{24} = 2.7$

Summary:

opacity	# of Rdgs.
0	198
5	26
10	10
15	1
20	1
25	2
30	0
35	1
40	1
≥45	0

240 total Rdgs.

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-26-79

Plant Address Butte Montana Observer C. Dobroski

Stack Location 3 4 Baghouse Out Observer's Location 100 - 150' West of stack

Weather Conditions Partly Cloudy, Windy

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
14	45	0	0	0	0	Start Test #1
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	
	55	0	0	0	0	
	56	0	5	5	5	
	57	5	5	5	5	
	58	5	5	0	0	
	59	0	0	0	0	

[redacted]45-1451
0/24 = 0

1451 - 1457
[redacted]5/[redacted]4 = 0.6

1457-1503
30/24 = 1.3

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-26-79

Plant Address Butte, Montana Observer C. Dobroski

Stack Location 3,4 Baghouse Out. Observer's Location Same

Weather Conditions Same

1503-1509
$\frac{0}{24} = 0$

1509-1515
$\frac{20}{24} = 0.8$

1515-1521
$\frac{0}{24} = 0$

1521-1527
$\frac{65}{24} = 2.7$

1527-1533
$\frac{55}{24} = 2.3$

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
15	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	5	- 46
	12	5	5	5	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	5	5	5	
	25	10	15	10	10	
	26	0	0	0	5	
	27	5	5	5	5	
	28	5	5	5	5	
	29	5	5	5	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-21-79

Plant Address Butte, Montana Observer C. Dibroski

Stack Location 3, 4 Baghouse Outlet Observer's Location Same

Weather Conditions Cloudy, 20-30 mph winds

1533-1539

[redacted]0 / [redacted]4 = 0

[redacted]539-1545

80 / [redacted]24 = 3.3

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
15	30	0	0	0	0	
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	0	
	39	5	0	0	0	
	40	0	0	0	0	
	41	0	5	10	10	
	42	5	5	5	5	
	43	5	5	5	5	
	44	5	5	0	0	
	45	0				→ stop test
	46					
	47					
	48					
	49					
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-26-79
Plant Address Butte, Montana Observer C. Dobrowski
Stack Location 3, 4 Baghouse Out. Observer's Location Same
Weather Conditions Partly Cloudy, Windy

HR	MIN	00	15	30	45	COMMENTS
16	00					0 = 219 10 = 7
	01					5 = 49 15 = 3
	02					280 total obs. 20 = 2
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
16	19	0	0	0	0	Restart
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	10	15	
	25	20	20	15	5	
	26	5	5	5	0	
	27	10	5	5	5	
	28	0	5	5	0	
	29	~~0~~	0	0	0	End Test 4

1619-1625
$\frac{25}{24} = 1.0$

1625-1631
$\frac{110}{24} = 4.6$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper   Date 10-26-79

Plant Address Butte, Montana   Observer C. Dobroski

Stack Location 3,4 Baghouse Outlet   Observer's Location 100'-150' west of stack

Weather Conditions Partly Cloudy/Windy

HR	MIN	00	15	30	45	COMMENTS
	00	0	0	0	0	
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
17	26	0	0	0	0	Start Test #2
	27	0	0	0	0	
	28	5	5	5	0	
	29	5	0	0	0	

[redacted]726-1732

$\frac{20}{24} = 0.8$

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-26-79

Plant Address Butte, Montana Observer C. Dobroski

Stack Location 3,4 Baghouse Outlet Observer's Location Same

Weather Conditions Same

	TIME					COMMENTS
HR	MIN	SECONDS 00	15	30	45	
17	30	0	0	0	0	
1732-1738	31	0	0	0	0	
$\frac{5}{24} = 0.2$	32	5	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
1738-1744	37	0	0	0	0	
$\frac{95}{24} = 4.0$	38	0	0	0	0	
	39	0	5	5	0	
	40	0	0	0	0	
	41	0	10	15	10	
	42	10	10	5	5	
1744-1750	43	5	5	5	5	
$\frac{10}{24} = 0.4$	44	5	0	0	0	
	45	0	0	0	5	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	5	5	5	
	52	0	0	0	0	
	53	~~0~~	0			Stop Test
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper — Date 10-26-79

Plant Address Butte, Montana — Observer C. Dehuski

Stack Location 3, 4 Bighouse Outlet — Observer's Location Same

Weather Conditions Same

	HR	MIN	00	15	30	45	COMMENTS
	18	00					
		01					
[redacted]802-1808		02	0	0	0	0	Restart Test
0/[redacted]4 = 0		03	0	0	0	0	
		04	0	0	0	0	
		05	0	0	0	0	
		06	0	0	0	0	
1808-1814		07	0	0	0	0	
[redacted]0/24 = 1.7		08	0	0	0	0	
		09	0	0	0	0	
		10	0	0	0	0	
		11	0	0	0	5	
		12	10	10	5	5	
[redacted]814-1820		13	5	0	0	0	
0/[redacted]4 = 0		14	0	0	0	0	
		15	0	0	0	0	
		16	0	0	0	0	
		17	0	0	0	0	
		18	0	0	0	0	
[redacted]820-1826		19	0	0	0	0	
95/24 = 4.0		20	0	0	0	0	
		21	0	0	0	0	
		22	0	0	0	0	
		23	0	0	0	0	
		24	0	5	10	15	
1826-1832		25	10	20	15	20	
[redacted]30/24 = 1.3		26	15	10	5	0	
		27	0	0	0	0	
		28	0	0	0	0	
		29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name Anaconda Copper Date 10-26-79

Plant Address Butte, Montana Observer C. Dobroski

Stack Location 3, 4 Baghouse Outlet Observer's Location same

Weather Conditions Ptly Cldy/Windy

1832-1838

$\frac{10}{20} = 0.5$

HR	MIN	SECONDS 00	15	30	45	COMMENTS
18	30	0	0	0	0	
	31	0	0	0	0	
	32	0	5	0	0	
	33	0	0	0	0	
	34	0	0	0	5	
	35	0	0	0	0	
	36	0	0	0	0	End Test #3
	07					
	08					
	09					Total = 248
	10					
	11					0 = 208
	12					5 = 26
	13					10 = 9
	14					15 = 3
	15					20 = 2
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Mine

Date 10/26/79

Company Name Anaconda Copper

Hours of Observation 1400-1500

Plant Address Butte, Montana

Observer Theodore B. Moxon

Type of Discharge STACK OTHER conveyor discharge to stockpile

Discharge Location Coarse ore stockpile

Height of Point of Discharge 80'

Observer's Location:

Distance to Discharge Point 150'

Height of Observation Point 65'

Direction from Discharge Point ~~Sout~~ West

Background Description Nearby Mountain

Weather: Clear Overcast Partly Cloudy Other ______ Sky Color ______

Wind Direction south westerly Wind Velocity 10-15 mi/hr

Plume Description:

Detached: Yes No

Color: Black White Other ______

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other ______

Estimated Distance Plume Visible 50'

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Mine

Date 10/26 Run 2

Company Name EPA Anaconda Copper

Hours of Observation 1515 - 1645

Plant Address Butte Montana

Observer Theodore Moxon

Type of Discharge STACK OTHER discharge to stockpile from conveyor

Discharge Location Coarse Ore Stockpile

Height of Point of Discharge 80'

Observer's Location:

Distance to Discharge Point 150'

Height of Observation Point 65'

Direction from Discharge Point west

Background Description nearby Mountain

Weather: Clear Overcast Partly Cloudy Other ______ Sky Color ______

Wind Direction south westerly Wind Velocity 10-15 mi/hr

Plume Description:

Detached: Yes No

Color: Black ~~White~~ Other gray

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other ______

Estimated Distance Plume Visible 50'

RECORD OF VISIBLE EMISSIONS

Company Name EPA - Anaconda Copper Date 10/26/79

Plant Address Anaconda Copper, Butte Montana Observer Theodore B. Moxon

Stack Location Coarse ore stockpile Observer's Location

Weather Conditions overcast

Run 1

Notes	HR	MIN	00	15	30	45	COMMENTS
1400-1406	14	00	5	5	5	0	
55/[redacted] = 2.3		01	0	0	5	5	
		02	0	5	0	0	
		03	0	0	0	0	
		04	0	5	0	5	
[redacted]06-1412		05	5	0	5	5	
		06	5	5	5	5	
[redacted]45/24 = 6.0		07	5	10	5	10	
		08	5	5	5	5	
		09	5	5	10	15	
		10	5	5	5	0	
		11	15	5	5	0	
1412-1418		12	5	5	0	5	
[redacted]40/24 = 5.8		13	5	5	0	5	
		14	5	0	0	5	
		15	10	10	15	10	
		16	5	5	20	10	
		17	5	5	0	5	
		18	0	5	5	5	
		19	0	5	5	5	
		20	5				
		21					
		22					
		23					
		24					
		25					
[redacted]26-1432	14	26	0	10	5	5	
145/[redacted]4 = 6.0		27	5	10	5	10	
		28	10	10	10	10	
		29	10	5	5	0	

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda — Date 10/26/79

Plant Address Butte Montana — Observer Theodore Moxon

Stack Location Coarse Ore Stockpile — Observer's Location see summary

Weather Conditions overcast — Run 2

HR	MIN	00	15	30	45	COMMENTS
14	30	5	5	0	5	
	31	5	5	5	5	
	32	0	5	0	5	
	33	5	5	5	5	
	34	10	5	5	0	
	35	5	5	5	5	
	36	5	5	5	10	
	37	20	5	5	0	
	38	5	5	5	5	
	39	5	5	5	10	
	40	5	5	5	5	
	41	5	5	10	5	
	42	5	5	5	5	
	43	5	5	10	0	
	44	5	5	5	5	
	45	5	5	5	0	
	46	5	5			
	47					
	48					
	49					
	50	5	5	10	5	
	51	5	5	5	5	
	52	5	5	5	10	
	53	5	5	0	5	
	54	5	5	10	10	
	55	5	5	5	5	
	56	15	20	20	20	
	57	20	10	5	5	
	58	5	10	15	20	
	59	15	15	15	15	

1432-1438 $\frac{125}{24} = 5.2$

1438-1444 $\frac{130}{24} = 5.4$

1450-1456 $\frac{135}{24} = 5.6$

1456-1502 $\frac{280}{24} = 11.7$

RECORD OF VISIBLE EMISSIONS

Company Name ____________________ Date ____________________

Plant Address ____________________ Observer ____________________

Stack Location ____________________ Observer's Location ____________________

Weather Conditions ____________________

Run 1

[redacted]502-1508

$\frac{\text{[redacted]}65}{\text{[redacted]}4} = 11.0$

TIME						COMMENTS
HR	MIN	SECONDS 00	15	30	45	
15	00	5	5	5	10	
	01	5	5	10	10	
	02	5	5	10	5	
	03	5	10	10	10	
	04	20	25	25	20	
	05	15	20	10	15	
	06	5	10	5	10	
	07	5	5	10	5	
	08	10	15	10	5	
	09	5	5	20	20	
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

RECORD OF VISIBLE EMISSIONS

Company Name EPA- Anaconda Copper | Date 10/26/79

Plant Address Butte, Montana | Observer Theodore Moxan

~~Stack~~ Location Coarse Ore Stockpile | Observer's Location see summary

Weather Conditions Overcast

Run 2

HR	MIN	00	15	30	45	COMMENTS
	00	~~5~~	~~5~~	~~5~~	~~5~~	
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
	13					
	14					
15	15	5	5	5	5	
	16	15	15	10	10	
	17	10	5	5	15	
	18	10	5	5	5	
	19	10	5	5	10	
	20	15	10	10	5	
	21	5	5	5	5	
	22	10	5	10	10	
	23	10	10	5	10	
	24	5	10	5	5	
	25	10	5	5	5	
	26	5	5	10	5	
	27	5	5	5	5	
	28	5	5	5	10	
	29	5	10	10	5	

1515-1521
$\frac{200}{24} = 8.3$

1521-1527
$\frac{165}{24} = 6.9$

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda

Date 10/25/79

Plant Address Butte Montana

Observer Theodore Moxos

Stack Location Coarse ore Stockpile

Observer's Location see summary Run2

Weather Conditions overcast

1527-1533 $\frac{145}{24} = 6.0$

1533-1539 $\frac{140}{24} = 5.8$

·39-1545 $\frac{150}{24} = 6.3$

545-1551 30 $\frac{400}{24} = 16.7$

551-1557 $\frac{330}{24} = 13.8$

45

TIME HR	MIN	SECONDS 00	15	30	45	COMMENTS
15	30	5	5	5	5	
	31	5	10	5	10	
	32	5	5	10	0	
	33	0	5	0	10	
	34	15	5	10	5	
	35	5	5	5	5	
	36	5	10	5	5	
	37	10	5	0	5	
	38	5	5	10	5	
	39	5	10	10	5	
	40	0	5	5	5	
	41	5	0	5	10	
	42	5	10	10	5	
	43	5	5	5	10	
	44	5	5	10	10	
	45	5	5	10	5	
	46	20	20	25	25	15' drop outside bldg
	47	20	25	15	20	
	48	15	20	20	25	
	49	15	20	25	15	
	50	15	10	10	15	
	51	10	15	5	10	
	52	10	5	10	5	
	53	15	20	10	15	
	54	10	15	20	20	
	55	25	15	25	20	
	56	15	10	10	15	
	57	15	20	20	15	
	58	15	20	15	10	
	59	15	10	10	10	

RECORD OF VISIBLE EMISSIONS

Company Name EPA, Anaconda Copper

Plant Address Butte Montana

Stack Location Coarse Ore Bin

Weather Conditions Overcast

Date 10/26/79

Observer Theodore Moxon

Observer's Location see summary

Run 2

1557-1603 $\frac{305}{24}=12.7$

1603-1609 $\frac{270}{24}=11.3$

1609-1615 $\frac{355}{24}=14.8$

60

HR	MIN	00	15	30	45	COMMENTS
	00	5	10	5	5	
	01	10	15	20	15	
	02	10	5	15	15	
	03	20	10	15	10	
	04	10	5	15	10	
	05	5	5	10	15	
	06	15	10	10	10	
	07	5	15	5	10	
	08	15	15	15	15	
	09	10	5	15	10	
	10	10	5	5	10	
	11	15	15	15	15	
	12	20	25	20	15	
	13	20	15	20	15	
	14	20	15	20	20	
	15					
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda
Plant Address Butte Montana
Stack Location Coarse ore stockpile
Weather Conditions Overcast

Date 10/26/79
Observer Theodore Moxon
Observer's Location See Summary Run 3

[redacted]630-1636 [redacted]160/24 = 6.7

[redacted]636-1642 [redacted]150/24 = 6.3

1642-1648 165/24 = 6.9

1648-1654 145/24 = 6.0

[redacted]654-1700 [redacted]55/24 = 6.5

HR	MIN	00	15	30	45	COMMENTS
	30	5	5	10	5	moist ore
	31	5	10	5	10	
	32	10	5	10	5	
	33	0	5	5	5	
	34	10	5	5	5	
	35	10	5	10	10	
	36	10	5	10	5	
	37	10	5	5	5	
	38	5	5	5	5	
	39	10	5	10	10	
	40	5	5	5	5	
	41	5	5	5	5	
	42	10	5	5	10	
	43	5	10	5	5	
	44	10	10	5	10	
	45	5	10	5	10	
	46	10	5	5	5	
	47	5	5	5	5	
	48	5	5	5	5	
	49	5	5	5	5	
	50	5	5	5	10	
	51	5	5	5	5	
	52	10	5	10	5	
	53	10	10	5	5	
	54	10	5	5	5	
	55	10	10	5	10	
	56	5	5	10	5	
	57	10	5	5	5	
	58	5	5	5	5	
	59	5	5	10	5	

RECORD OF VISIBLE EMISSIONS

Company Name: EPA Anaconda | Date: 10/26/79

Plant Address: Butte, Montana | Observer: Theodore Maxon

Stack Location: Coarse ~~ore~~ Ore stockpile | Observer's Location: see summary

Weather Conditions: overcast | Run 3

	HR	MIN	00	15	30	45	COMMENTS
1700-1706	17	00	10	10	15	15	
$\frac{310}{24} = 12.9$		01	10	15	15	20	
		02	15	20	15	15	
		03	5	5	10	10	
		04	10	10	15	10	
		05	20	15	15	10	
1706-1712		06	5	15	15	15	
$\frac{350}{24} = 14.6$		07	10	15	15	25	
		08	20	15	20	20	
		09	20	15	10	15	
		10	15	10	10	20	
		11	5	10	15	15	
1712-1718		12	20	10	10	15	
$\frac{305}{24} = 12.7$		13	15	15	10	10	
		14	5	5	10	15	
		15	10	15	20	20	
		16	15	20	10	10	
		17	15	15	5	10	
1718-1724		18	5	5	20	10	
$\frac{255}{24} = 10.6$		19	15	10	15	15	
		20	5	10	10	5	
		21	15	10	10	15	
		22	5	10	10	15	
		23	10	5	10	15	
1724-1730		24	20	15	10	15	
$\frac{250}{24} = 10.4$		25	20	10	5	10	
		26	5	5	10	5	
		27	10	5	5	10	
		28	10	5	10	15	
		29	15	10	10	15	

SUMMARY
RECORD OF VISIBLE EMISSIONS

Type of Plant Copper Mine — Date 10/26/79

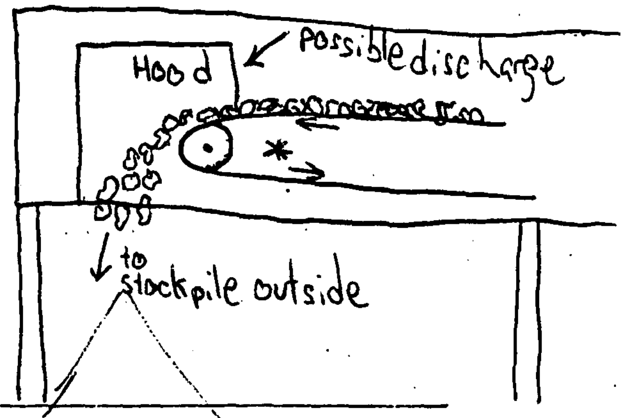
Company Name ~~A~~EPA, Anaconda Copper — Hours of Observation ____

Plant Address Butte, Montana — Observer Theodore Moxon

Type of Discharge STACK OTHER conveyer belt discharge *observation point beside belt

Discharge Location coarse ore transfer point

Height of Point of Discharge 85'



Observer's Location:

Distance to Discharge Point 15'

Height of Observation Point 85'

Direction from Discharge Point ____

Background Description Indoors

Weather: Clear Overcast Partly Cloudy Other ____ Sky Color ____

Wind Direction — Wind Velocity — mi/hr

Plume Description:

Detached: Yes No

Color: Black White Other ____

Plume Dispersion Behavior: Looping Coning Fanning

Lofting Fumigating Other ____

Estimated Distance Plume Visible ____

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda Copper Date 10/26/79

Plant Address Butte Montana Observer Theodore Moxon

Stack Location coarse ore transfer Observer's Location see summary sheet

Weather Conditions Indoors Run 1

	TIME						COMMENTS
	HR	MIN	SECONDS				
			00	15	30	45	
		30					
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40					
		41					
		42					
		43					
		44					
		45					
		46					
		47					
		48					
		49					
1850-1856	18	50	0	0	0	0	
$\frac{0}{24}=0$		51	0	0	0	0	
		52	0	0	0	0	
		53	0	0	0	0	
		54	0	0	0	0	
1856-1902		55	0	0	0	0	
$\frac{0}{24}=0$		56	0	0	0	0	
		57	0	0	0	0	
		58	0	0	0	0	
		59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda

Date 10/26/79

Plant Address Butte Montana

Observer Theodore Moxon

Stack Location coarse ore transfer

Observer's Location see summary

Weather Conditions Indoors

Run 1

HR	MIN	00	15	30	45	COMMENTS
19	00	0	0	0	0	
	01	0	0	0	0	
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20	0	0	0	0	
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
	29	0	0	0	0	

[redacted]2-1908 $\frac{0}{[redacted]} = 0$

[redacted]908-1914 $\frac{0}{24} = 0$ [redacted]

1[redacted]4-1920 [redacted] $\frac{0}{24} = 0$

[redacted]920-1926 [redacted] $4 = 0$

1926-1932 $\frac{0}{24} = 0$

RECORD OF VISIBLE EMISSIONS

Company Name EPA ~~[illegible]~~ Anaconda Date 10/26/79

Plant Address Butte, Montana Observer Theodore Mexon

Stack Location coarse ore transfer Observer's Location see summary

Weather Conditions indoors

Run 1

1932-1938 $\frac{0}{24}=0$

1938-1944 $\frac{0}{24}=0$

1944-1950 $\frac{0}{24}=0$

HR	MIN	00	15	30	45	COMMENTS
19	30	0	0	0	0	
	31	0	0	0	0	
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	
	36	0	0	0	0	
	37	0	0	0	0	
	38	0	0	0	0	
19	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	
	42	0	0	0	0	
	43	0	0	0	0	
19	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	
	48	0	0	0	0	
19	49	0	0	0	0	
	50					
	51					
	52					
	53					
	54					
	55					
	56					
	57					
	58					
	59					

RECORD OF VISIBLE EMISSIONS

Company Name: EPA Anaconda
Date: 10/26/79
Plant Address: Butte, Montana
Observer: Theodore Moxon
Stack Location: coarse ore transfer
Observer's Location: see summary
Weather Conditions: indoors

Run 2

HR	MIN	00	15	30	45	COMMENTS
20	00	0	0	0	0	2000 - 2006
	01	0	0	0	0	$\frac{0}{24} = 0$
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	2006 - 2012
	07	0	0	0	0	$\frac{0}{24} = 0$
	08	0	0	0	0	
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	2012 - 2018
	13	0	0	0	0	$\frac{0}{24} = 0$
	14	0	0	0	0	
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	2018 - 2024
	20	0	0	0	0	$\frac{0}{24} = 0$
	21	0	0	0	0	
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	2024 - 2030
	25	0	0	0	0	$\frac{0}{24} = 0$
	26	0	0	0	0	
	27	0	0	0	0	
	28	0	0	0	0	
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda

Date 10/26/79

Plant Address Butte Montana

Observer Theodore Moxon

Stack Location coarse ore discharge

Observer's Location see summary Run 2

Weather Conditions indoors

HR	MIN	00	15	30	45	COMMENTS
	30	0	0	0	0	2030 - 2036
	31	0	0	0	0	0/24 = 0
	32	0	0	0	0	
	33	0	0	0	0	
	34	0	0	0	0	
	35	0	0	0	0	2036 - 2042
	36	0	0	0	0	0/24 = 0
	37	0	0	0	0	
	38	0	0	0	0	
	39	0	0	0	0	
	40	0	0	0	0	
	41	0	0	0	0	2042 - 2048
	42	0	0	0	0	0/24 = 0
	43	0	0	0	0	
	44	0	0	0	0	
	45	0	0	0	0	
	46	0	0	0	0	
	47	0	0	0	0	2048 - 2054
	48	0	0	0	0	0/24 = 0
	49	0	0	0	0	
	50	0	0	0	0	
	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	54	0	0	0	0	2054 - 2100
	55	0	0	0	0	0/24 = 0
	56	0	0	0	0	
	57	0	0	0	0	
	58	0	0	0	0	
	59	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda

Date 10/26/79

Plant Address Butte, Montana

Observer Theodore Moxon

Stack Location Coarse ore transfer

Observer's Location see summary

Weather Conditions indoors

Run 3

HR	MIN	00	15	30	45	COMMENTS
	00	0				
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
21	10	0				
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
start → 21 Run 3	20	0	0	0	0	2120 - 2126
	21	0	0	0	0	$\frac{0}{24} = 0$
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	2126 - 2132
	26	0	0	0	0	$\frac{0}{24} = 0$
	27	0	0	0	0	
	28	0	0	0	0	
	29	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name EPA Anaconda

Date 10/26/79

Plant Address Butte, Montana

Observer Theodore Moxon

Stack Location coarse ore transfer

Observer's Location see summary

Weather Conditions indoors

Run 3

HR	MIN	00	15	30	45	COMMENTS
21	30 (~~00~~)	0	0	0	0	2132-2138
	01	0	0	0	0	0 = 0
	02	0	0	0	0	24
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	2138-2144
	08	0	0	0	0	0 = 0
	09	0	0	0	0	24
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	2144-2150
	14	0	0	0	0	0 = 0
	15	0	0	0	0	24
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	2150-2156
	20	0	0	0	0	0 = 0
	21	0	0	0	0	24
	22	0	0	0	0	
	23	0	0	0	0	
	24	0	0	0	0	
	25	0	0	0	0	2156-2202
	26	0	0	0	0	0 = 0
	27	0	0	0	0	24
	28	0	0	0	0	
21	59 (~~29~~)	0	0	0	0	

RECORD OF VISIBLE EMISSIONS

Company Name EPA- Anaconda

Date 10/26/79

Plant Address Butte, Montana

Observer Theodore Moxon

Stack Location coarse ore transfer

Observer's Location see summary Run 3

Weather Conditions indoors

HR	MIN	00	15	30	45	COMMENTS
22	00	0	0	0	0	2202-2208
	01	0	0	0	0	0/24 = 0
	02	0	0	0	0	
	03	0	0	0	0	
	04	0	0	0	0	
	05	0	0	0	0	
	06	0	0	0	0	
	07	0	0	0	0	2208 - 2214
	08	0	0	0	0	0/24 = 0
	09	0	0	0	0	
	10	0	0	0	0	
	11	0	0	0	0	
	12	0	0	0	0	
	13	0	0	0	0	2214 - 2220
	14	0	0	0	0	0/24 = 0
	15	0	0	0	0	
	16	0	0	0	0	
	17	0	0	0	0	
	18	0	0	0	0	
	19	0	0	0	0	
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					

FUGITIVE EMISSION INSPECTION

Company Anaconda Copper, Butte, Montana	Inspector Theodore B. Mexen
Location Grizzly Hood East	Affilitation Roy F. Weston Inc
Company Rep.	Date 10/25/79
Sky Conditions Inside	Wind Direction — Run 1
Precipitation —	Wind Speed —
Facility Type Copper ore concentrator	Emission Source Grizzly Hood East

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	*1630-1650	20	not running
	*1655-1715	20	0
	*1720-1730	~~20~~ 10	0
	*1745-1805	20	0
	*1810-1830	20	0
End Observation			

*several stop+start sequences during run

FUGITIVE EMISSION INSPECTION

Company EPA-Anaconda Copper
Location Butte Montana
Company Rep.

Inspector Theodore Loxas
Affilitation Roy F. Weston Inc
Date 10/25/79

Sky Conditions Indoors
Precipitation —

Wind Direction — Run 2
Wind Speed —

Facility Type Copper Ore Concentrator

Emission Source Grizzly Hood East

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	2050-2110	20'00"	0
	2115-2135	40	0
	2140-2200	60	0
	2205-2224	79	0
End Observation			

FUGITIVE EMISSION INSPECTION

Company EPA - Anaconda Copper
Location Anaconda Copper Co, Butte, Montana
Company Rep.

Inspector Theodore Moxon
Affilitation Roy F. Weston Inc
Date 10/25/79

Sky Conditions Indoors
Precipitation —

Wind Direction — Run 3
Wind Speed —

Facility Type Copper Ore Concentrator

Emission Source Grizzly Hood East

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	0045-0105	20 min	0" —
	0110-0130	40 min	16"
	0135-0155	60 min	0 (16")
	0200-0220	80 min	0 (16")
	0225-0235	90 min	0 (16")
End Observation			

FUGITIVE EMISSION
INSPECTION

Company: Anaconda Copper, Butte Montana
Location: Grizzly Hood West
Company Rep.:

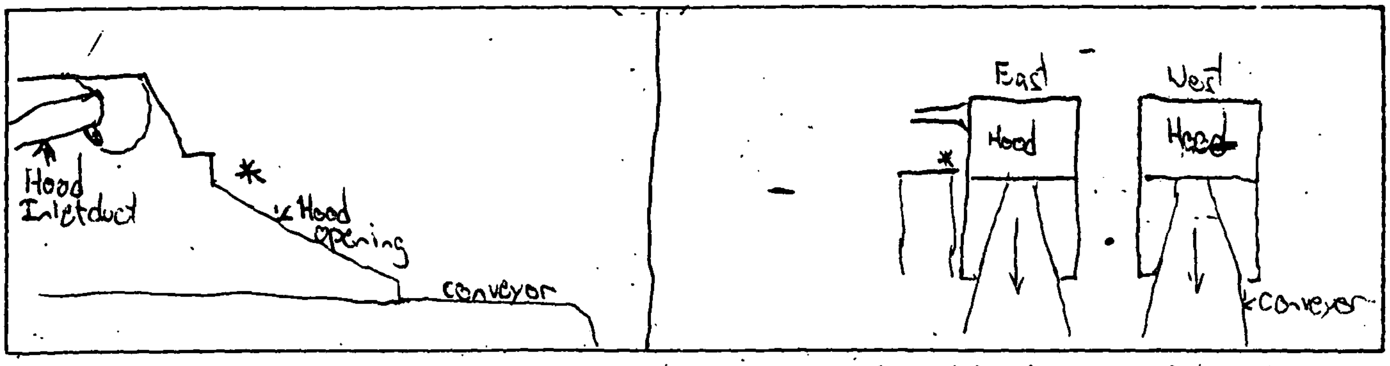
Inspector: Theodore R. Moxon
Affilitation: Roy F. Weston Inc
Date: 10/25/79

Sky Conditions: Indoors
Precipitation:

Wind Direction: — Run 1
Wind Speed: —

Facility Type: Copper Ore Concentrator
Emission Source: Grizzly Hood West

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

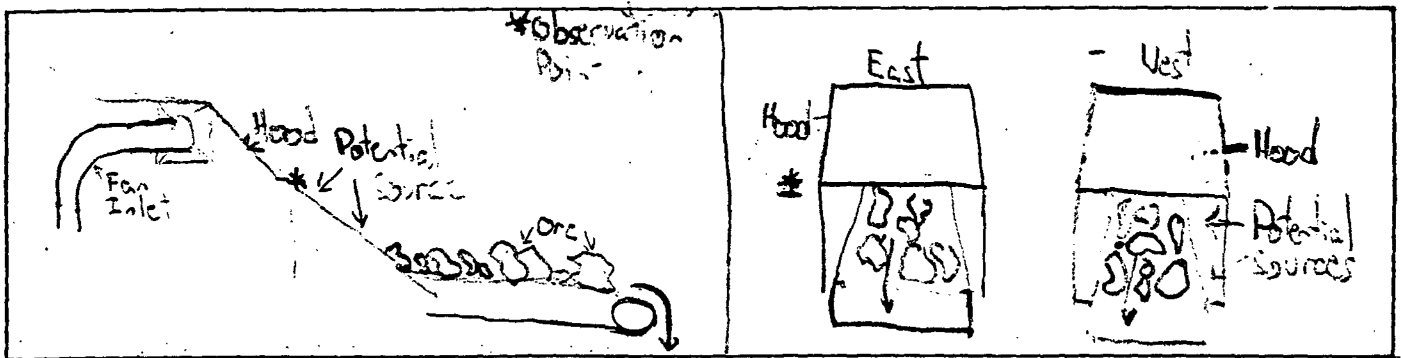
	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	*1630-1650	20 min	25" During two stop/start sequences in middle of test
	*1655-1715	20' (40)	0' (25")
	*1720-1730	~~20~~ 10' (50)	0" (25")
	*1745-1805	20' (70)	0' (25")
	*1810-1830	20' (90)	0" (25')
	1835-1838	3' (93')	0" (25")
		93' 343 5923	150
End Observation			

*several start + stop sequences during run

FUGITIVE EMISSION INSPECTION

Company EPA- Anaconda Copper	Inspector Theodore Maxon
Location Butte Montana	Affiliation Roy F Weston Inc
Company Rep.	Date 10/25/79
Sky Conditions Indoors	Wind Direction — Run 2
Precipitation —	Wind Speed —
Facility Type Copper Ore: Concentrator	Emission Source Grizzly Hood West

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	2050-2110	20'20"	0
	2115-2135	40'	0
	2140-2200	60'	0
	2205-2224	79'	0
End Observation			

FUGITIVE EMISSION
INSPECTION

Company EPA- Anaconda Copper	Inspector Theodore Maxon
Location Anaconda Copper Co Butte Montana	Affilitation Roy F. Weston Inc
Company Rep.	Date 10/25/79
Sky Conditions Indoors	Wind Direction — Run 3
Precipitation —	Wind Speed —
Facility Type Copper Ore Concentrator	Emission Source Grizzly Hood West

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

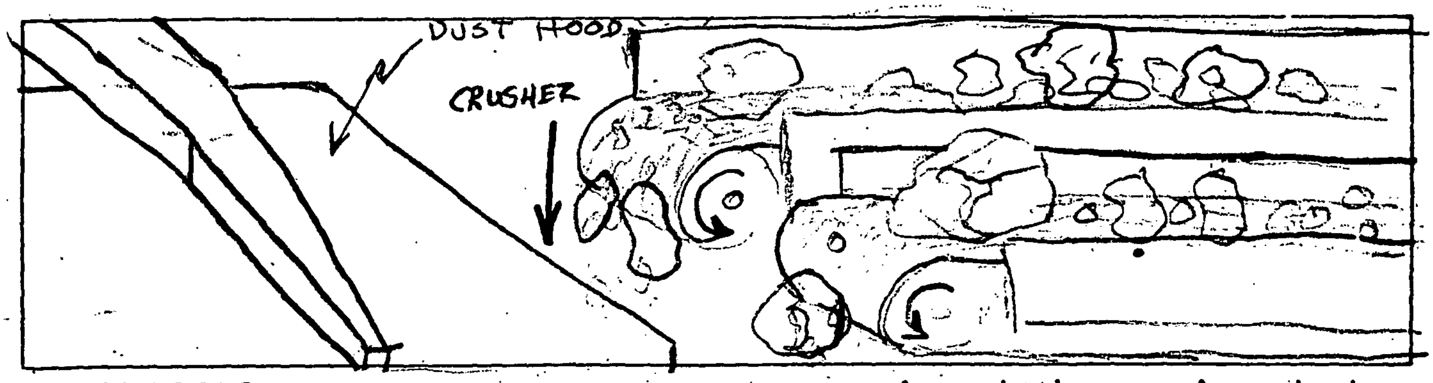
OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	0045 - 0105	20'	0 —
	~~001~~ 0110 - 0130	40'	3' 29"
	0135 - 0155	60'	0 (3'29")
	0200 - 0220	80'	0 (3'39")
	0225 - 0235	90'	0 (3'39)
		5400	
End Observation			

FUGITIVE EMISSION
INSPECTION TEST 1; RUN 1

Company ANBACONDA COPPER Co	Inspector ANDREW T. WATKIN
Location PRIMARY CRUSHER HOOD	Affilitation ROY F. WESTON, INC
Company Rep.	Date 10/25/79
Sky Conditions INDOORS - WELL LIT	Wind Direction N.A (INDOORS)
Precipitation INDOORS	Wind Speed N.A (INDOORS)
Facility Type COPPER ORE CONCENTRATOR	Emission Source PRIMARY CRUSHER

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	16:40 - 1700	20:00	05:53
	17:05 - 17:15	10:00	02:08
CRUSHER DOWN →	17:15	1719	~~1:36~~
CRUSHER DOWN →	17:19 - 17:29	10:00	01:36
	17:45 - 18:05	20:00	03:27
CRUSHER DOWN	18:10 - 18:15	5:00	00:02
	18:20 - 18:41	21:00	05:55
		5160	17.81 1101 sec
			21.34%
End Observation			

FUGITIVE EMISSION
INSPECTION

TEST 1; RUN 2

Company ADACONDA COPPER CO.
Location CONCENTRATOR
Company Rep.

Inspector ANDREW WATKIN
Affilitation ROY F. WESTON
Date 10/25/79

Sky Conditions INDOORS
Precipitation "

Wind Direction INDOORS
Wind Speed "

Facility Type COPPER ORE CONCENTRATOR

Emission Source PRIMARY CRUSHER

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

SEE RUN 1; TEST 1

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	2045-2105	20:00	01:59
	2110-2130	20:00	06:13
	2140-2200	20:00	08:08
	2205-2225	20:00	09:03
		80×60 = 4800	83
End Observation			

FUGITIVE EMISSION INSPECTION   TEST 1 ; RUN 3

Company ADACONDA COPPER CO.	Inspector ANDREW WATKIN
Location PRIMARY CRUSHERS	Affilitation ROY F. WESTON
Company Rep.	Date 10/26/79

Sky Conditions INDOORS (WET LIT)	Wind Direction INDOORS
Precipitation "	Wind Speed "

Facility Type COPPER ORE CONSENTRATOR	Emission Source PRIMARY CRUSHER

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

SEE TEST 1 ; RUN 1

OBSERVATIONS

STOPED HOOD DOWN @ 0116

HOOD UP

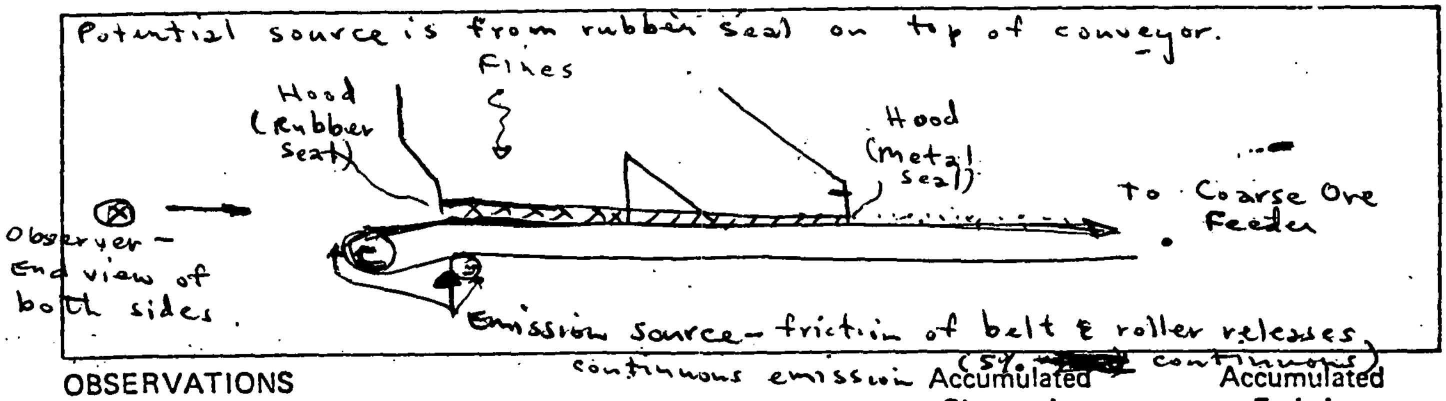
	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	0040-0100	20:00	02:59
	0105-0116	11:00	03:03
	0137-0157	20:00	03:11
	0200-0220	20:00	02.52
	0230-0238	08:00	00:14 STOP
		4740	139
End Observation			

Most of the emmission seem to be comming from the right-hand conveyor (from the inside facing out)

FUGITIVE EMISSION INSPECTION

Company: Anaconda Copper Co.	Inspector: B. L. Jackson
Location: Butte, Montana	Affilitation: Roy F. Weston, Inc.
Company Rep.: Ray Bailey	Date: 10-25-79
Sky Conditions: N.A. (Indoor Location)	Wind Direction: N/A
Precipitation: "	Wind Speed: "
Facility Type: Copper Mining Opr.	Emission Source: Fine Ore Feeder (T.P. #8) Bottom level of primary crusher building

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

w/ Test Run 2

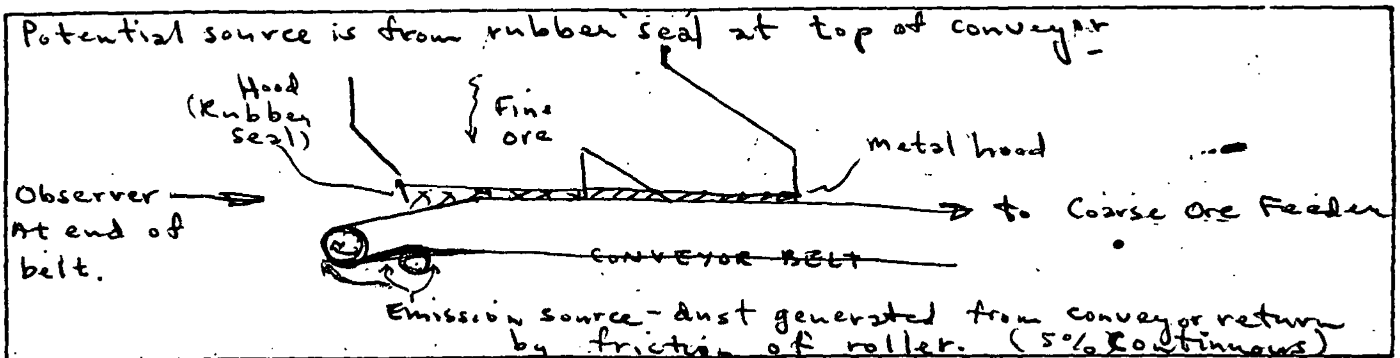
	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation 2115	2115-2125	10:00	0:00
	2125-2135	10:00	0:00
	2135-2145	10:00	0:00
0 opacity	2145-2155	10:00	0:00
	2155-2205	10:00	0:00
	2205-2215	10:00	0:00
	2215-2225	10:00	0:00
	2225-2230	5:00	0:00
	Σ:	75:00	0:00
End Observation 2230			

Note: Dusty room from: 1. belt/roller releases 2. coarse ore feeder exit releases.

FUGITIVE EMISSION INSPECTION

Company: Anaconda Copper Co.	Inspector: B. L. Jackson
Location: Butte, Montana	Affilitation: Roy F. Weston, Inc.
Company Rep.: Ray Bailey	Date: 10-26-79
Sky Conditions: N/A (Indoor Location)	Wind Direction: N.A.
Precipitation: "	Wind Speed: "
Facility Type: Copper Mining Opr.	Emission Source: Fine Ore Feeder (t.p. #8) Bottom level of primary crusher build

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS

w/ Test Run 3

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation 1245	0045 - 0055	10:00	0:00
	0055 - 0105	10:00	0:00
	0105 - 0115	10:00	0:00
0 Opacity	0115 - 0125	10:00	0:00
	0125 - 0135	10:00	0:00
	0135 - 0145	10:00	0:00
	0145 - 0155	10:00	0:00
Break -	0220 - 0230	10:00	0:00
	0230 - 0240	10:00	0:00
End Observation	0240 - 0250	10:00	0:00
	Summary:	100:00	0:00

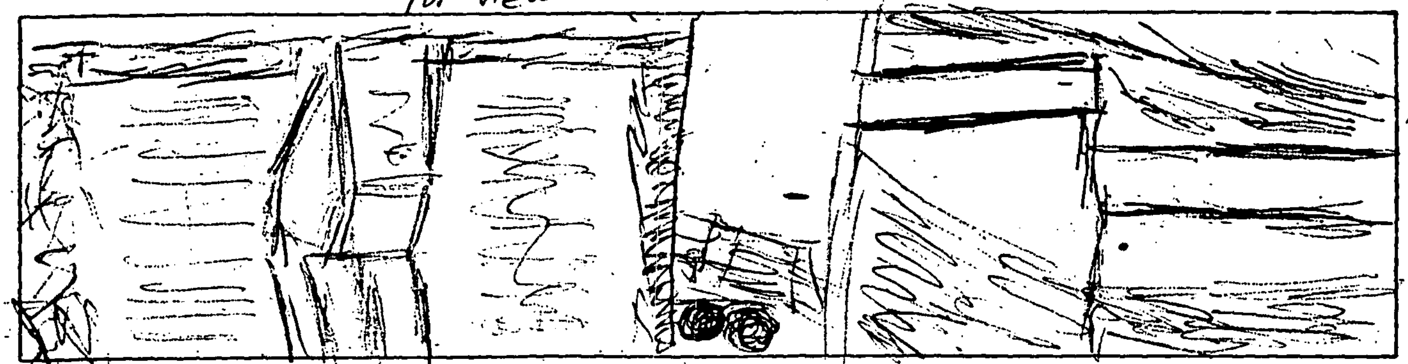
Run 1

FUGITIVE EMISSION INSPECTION

Company: ANACONDA COPPER	Inspector: BOB NEWTON
Location: TRUCK DUMP	Affilitation: ROY F. Weston INC
Company Rep.: Ray Bailey	Date: 10/26/79
Sky Conditions: Overcast	Wind Direction: N-NW
Precipitation: 0	Wind Speed: 15-30 mph
Facility Type: Copper Crushing	Emission Source: Pit and/or Truck bed

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

TOP VIEW SIDE VIEW



*

OBSERVATIONS

	* # of Trucks	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation 14:56	2	14:50 - 15:00	10	~~E~~ 44 sec
	8	15:00 - 15:10	10	(2:04) 2 Min 45 sec
	5	15:10 - 15:20	10	(48 sec) 3 Min 33 sec
	5	15:20 - 15:30	10	(1 min 10 sec) 4 Min 43 sec
	6	15:30 - 15:40	10	(2 min 17 sec) 7 min
	4	15:40 - 15:50	10	(2 min 16 sec) 9 min 16 sec
			60 x 60 = 3600	
End Observation 15:50	Summary: 30		60 min	9 min 16 sec

Run 2

FUGITIVE EMISSION INSPECTION

Company: Anaconda Copper
Location: Truck Dump
Company Rep.: Ray Bailey

Inspector: BOB NEWTON
Affiliation: Roy F. Weston Inc
Date: 10/26/79

Sky Conditions: Overcast
Precipitation: 0

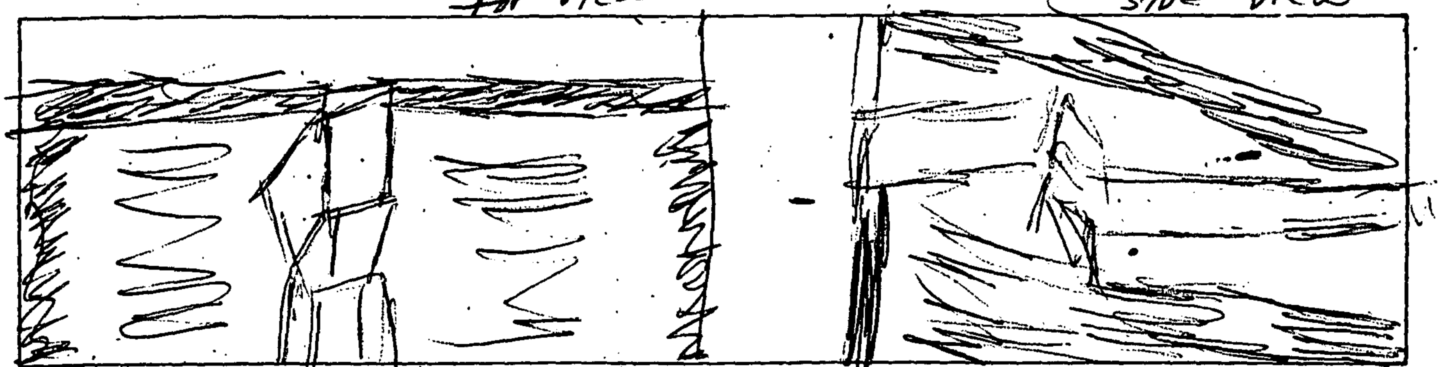
Wind Direction: N-NW
Wind Speed: 15-30 mph

Facility Type: Copper Crushing

Emission Source: Pit and truck bed

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

top view — side view



OBSERVATIONS

Begin Observation 16:15

# of Trucks	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
0	16:15 - 16:25	10	0
8	16:25 - 16:35	10	2min 38 sec
4	16:35 - 16:45	10	(1 min 28 sec) 4 min 6 sec
1	16:45 - 16:55	10	(48 sec) 4 min 54 sec
4	16:55 - 17:05	10	(3 min 1 sec) 7 min 55 sec
5	17:05 - 17:15	10	(3 min 20 sec) 11 min 15 sec
		3600 =	
		60	11 min 15 sec

End Observation 17:15 Summary: 22

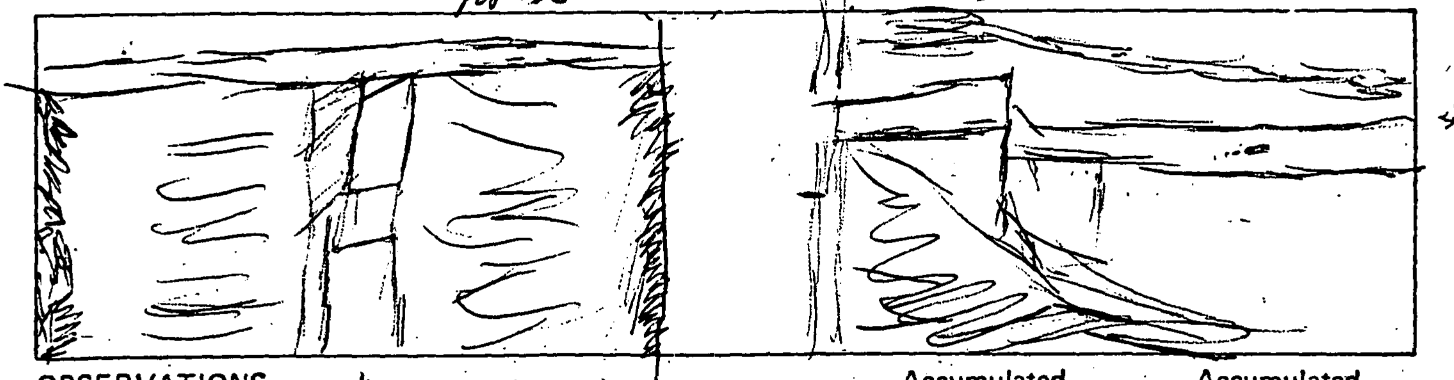
Run 3

FUGITIVE EMISSION INSPECTION

Company: Anaconda Copper	Inspector: BOB NEWTON
Location: Truck Dump	Affilitation: Roy F. Weston Inc.
Company Rep.: Ray Bailey	Date: 10/26/79
Sky Conditions: Overcast	Wind Direction: N-NW
Precipitation: 0	Wind Speed: 15-30 mph
Facility Type: Copper Crushing	Emission Source: Pit and truck bed

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

TOP VIEW SIDE VIEW



OBSERVATIONS

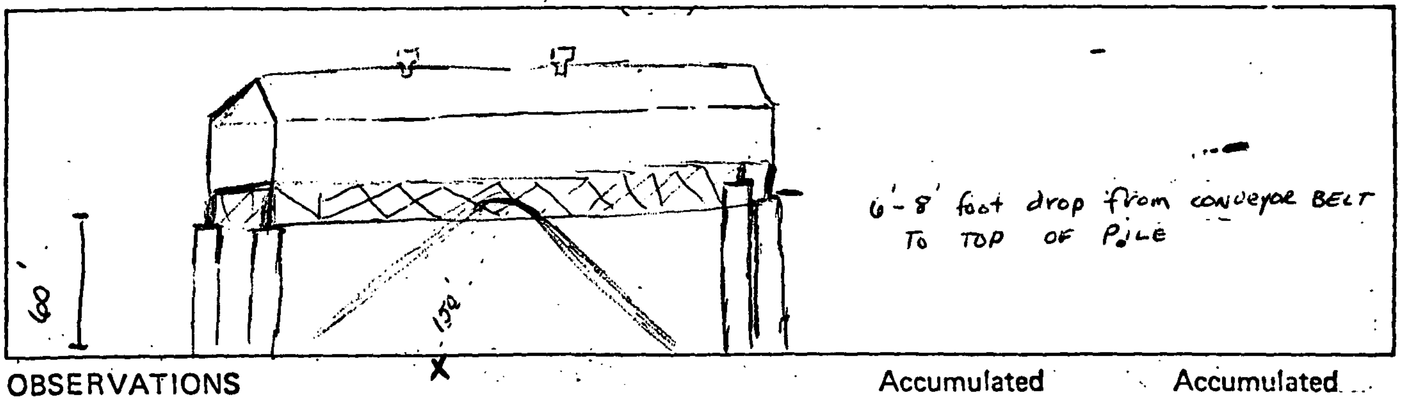
	# TRUCKS	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation 17:15	4	~~17:15~~ 17:15-17:25	10	~~1 MIN~~ 45 SEC
	3	17:25-17:35	10	(1 min 15) 3 MIN
	4	17:35-17:45	10	(1 min 40) 4 MIN 40 SEC
	2	17:45-17:55	10	(1 min 45 sec) 6 MIN 20 SEC
	2	17:55-18:05	10	(1 min 15 sec) 7 MIN 35 SEC
	3	18:05-18:15	10	(1 min 40 sec) 9 min 15 sec
End Observation 18:15	Summary: 18		60	9 min 15 sec

TEST 1

FUGITIVE EMISSION INSPECTION

Company EPA ANACONDA	Inspector DAVID RALSTON
Location ANACONDA COPPER; Butte, Mt	Affilitation R. F. WESTON
Company Rep.	Date 10/26/79
Sky Conditions OVER CAST	Wind Direction SOUTH WESTERLY
Precipitation	Wind Speed 10 - 15 MPH
Facility Type COPPER ORE: Concentrator ~~STOCKPILE~~	Emission Source COURSE ORE. STOCKPILE

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	1400 - 1420	20.00	(14.49) 14.49
	1426 - 1446	40.00	(18.04) 32.53
	14.50 - 15.10	60.00	(20.00) 52.53
			5173
End Observation			

FUGITIVE EMISSION INSPECTION

TEST 2

Company EPA Anaconda

Location Anaconda Copper; Butte Mt.

Company Rep.

Inspector David Ralston

Affilitation R.F. Weston

Date 10/26/79

Sky Conditions Overcast

Precipitation

Wind Direction South Westerly

Wind Speed 10-20 mpH

Facility Type Copper Ore Concentrator ~~Course Ore Stockpile~~

Emission Source Course Ore Stockpile

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	15.15 - 15.35	20.00	(20.00) — 20.00
	15.40 - 16.00	40.00	(20.00) - 40.00
	16.05 - 16:25	60.00	(20.00) - 60.00
End Observation			

FUGITIVE EMISSION INSPECTION

TEST 3

Company EPA ANACONDA
Location ANANACONDA COPPER; BUTTE, MT.
Company Rep.

Inspector DAVID RALSTON
Affilitation R.F. WESTON
Date 10/26/79

Sky Conditions OVERCAST
Precipitation

Wind Direction South WESTERLY
Wind Speed 10 - 20 MPH

Facility Type COPPER ORE CONCENTRATOR

Emission Source COURSE ORE STOCKPILE

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

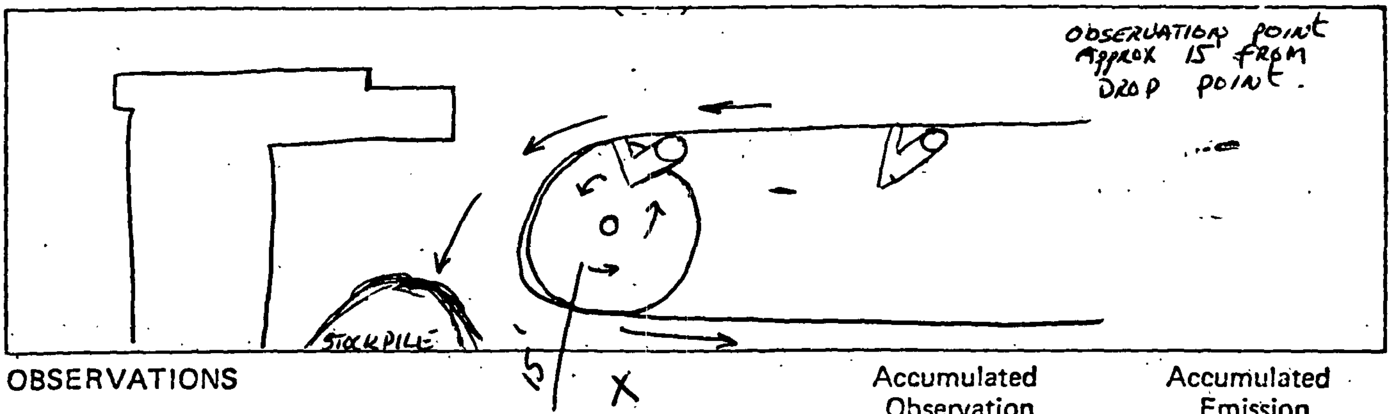
	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission – Time (Min: Sec)
Begin Observation	17.00 - 17.20	20.00	(20.00) – 20.00
	17.25 - 17.45	40.00	(20.00) – 40.00
	17.50 18.10	60.00	(20.00) – 60.00
End Observation			

FUGITIVE EMISSION INSPECTION

TEST 1

Company EPA ANACONDA	Inspector DAVID RALSTON
Location ANACONDA COPPER: Butte, MT.	Affiliation R. F. WESTON
Company Rep.	Date 10/26/79
Sky Conditions INDOORS	Wind Direction INDOORS
Precipitation	Wind Speed
Facility Type COURSE ORE : TRANSFER Point	Emission Source COURSE ORE. STOCKPILE

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	18.50 - 19.10	20.00	0.00
	19.15 - 19:35	40.00	0.00
	19.40 20.00	60.00	0.00
End Observation			

FUGITIVE EMISSION INSPECTION

TEST 2

Company EPA ANACONDA	Inspector DAVID RALSTON
Location ANACONDA COPPER: BUTTE, MT.	Affiliation R. F. WESTON
Company Rep.	Date 10/26/79
Sky Conditions INDOORS	Wind Direction INDOORS
Precipitation "	Wind Speed "
Facility Type COURSE ORE TRANSFER POINT	Emission Source COURSE ORE STOCKPILE

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	20.05 - 20.25	20.00	0.00
	20:30 - 20.50	40.00	0:00
	20:55 21:15	60.00	0.00
End Observation			

FUGITIVE EMISSION INSPECTION

TEST 3

Company EPA ANACONDA

Location ~~ANACONDA~~ COPPER; BUTTE, MT.

Company Rep.

Inspector David Ralston

Affilitation R.F. WESTON

Date 10/26/79

Sky Conditions INDOORS

Precipitation "

Wind Direction INDOORS

Wind Speed "

Facility Type COURSE ORE: TRANSFER Point

Emission Source COURSE ORE STOCKPILE

Sketch emission source, indicate observer position relative to source; indicate potential emission points and/or actual emission points.

OBSERVATIONS

	Time	Accumulated Observation Period (Min: Sec)	Accumulated Emission Time (Min: Sec)
Begin Observation	21.20 - 21.40	20	0.00
	21.45 - 22.05	40	0.00
	22.10 - 22.30	60	0.00
End Observation			

Appendix B

Laboratory Reports

EPA

PARTICULATE SAMPLE ANALYSES

Plant Anaconda Copper   Sampling Location Grizzly East   Analyst AER   Date 11-2-79

Test Date 10-25-79   Test Period 10-25 to 10-27-79   Run # 1   1   Stack #   Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-11	260	102.9835	102.9840		103.1448	103.1445	0.1608	0.001248	0.1595
FILTER$_1$ #	25496		.4593	.4593		.7665	.7660	.3067	—	.3067
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.4663
Comments										

EPA

Plant Anaconda Copper   Sampling Location Grizzly East   Run # 2

Test Date 10-25-79   Test Period 10-25 to 10-27-79   Stack #   Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-12	400	104.3585	104.3585		104.4746	104.4748	0.1161	.0019	.1142
FILTER$_1$ #	25493		.4587	.4587		.5785	.5790	.1198	—	.1198
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.2340
Comments										

EPA

Plant Anaconda Copper   Sampling Location Grizzly East   Run # 3

Test Date 10-26-79   Test Period 10-25 to 10-27-79   Stack #   Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-13	300	104.4289	104.4259		104.6786	[illegible]	.2497	.0014	.2483
FILTER$_1$ #	25499		.4572	.4572		.4826	.4823	.0251	—	.0251
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.2734
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water (impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

ROY F. WESTON

B-2

ROY F. WESTON

PARTICULATE SAMPLE ANALYSES

Plant EPA Anaconda Copper   Sampling Location Primary Crusher Hood   Analyst NER   Date 11-2-79
Test Date 10-25-79   Test Period 10-25 to 10-27-79   Run # 1   Stack # ____   Process# ____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-8	210	109.3971	109.3973		109.7725	109.7728	.3752	.0012	.3740
FILTER$_1$ #	25491		.4606	.4606		7.0421	7.0425	6.5815		6.5815
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										6.9555
Comments										

Plant EPA Anaconda Copper   Sampling Location Primary Crusher Hood   Run # 2
Test Date 10-25-79   Test Period 10-25 to 10-27-79   Stack # ____   Process# ____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-9	410	104.2879	104.2879		104.5007	104.5008	0.2128	.0020	.2108
FILTER$_1$ #	25494		.4600	.4600		7.0555	7.0555	6.5955	–	6.5955
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										6.8063
Comments										

Plant EPA Anaconda Copper   Sampling Location Primary Crusher Hood   Run # 3
Test Date 10-25-79   Test Period 10-25 to 10-27-79   Stack # ____   Process# ____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-10	250	104.4951	104.4951		104.7617	104.7621	0.2666	.0012	.2654
FILTER$_1$ #	25498		.4592	.4592		4.8074	4.8076	4.3482		4.3482
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										4.6136
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half ac[redacted]e w[redacted]FH [redacted]L=F[redacted] ha[redacted]atch [redacted]ght [redacted]TOTA[redacted]otal [redacted]in catch we[redacted]

B-3

ROY F. WESTON

PARTICULATE SAMPLE ANALYSES

Analyst N.L. Date 11-2-79

Plant EPA Anaconda Copper Sampling Location #1,#2 Baghouse Inlet Run # 1
Test Date 10-25-79 Test Period 10-25 to 10-27-79 Stack # Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-1	210	110.5619	110.5621		115.4466	115.4466	4.8847	.0010	4.8837
FILTER₁ #	25492		.4604	.4604		2.7714	2.7709		—	2.3105
FILTER₂ #										
FH TOTAL										
BHW										
BHA										
TOTAL										7.1942
Comments										

Plant EPA Anaconda Copper Sampling Location #1,#2 Baghouse Inlet Run # 2
Test Date 10-25-79 Test Period 10-25 to 10-27-79 Stack # Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-2	220	107.8478	107.8479		110.9005	110.9010	3.0527	.0013	3.0514
FILTER₁ #	25497		.4580	.4580		4.7281	4.7285	4.2701	-	4.2701
FILTER₂ #										
FH TOTAL										
BHW										
BHA										
TOTAL										
Comments										7.3215

Plant EPA Anaconda Copper Sampling Location #1,#2 Baghouse Inlet Run # 3
Test Date 10-25-79 Test Period 10-25 to 10-27-79 Stack # Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-3	240	107.8530	107.8535		110.4524	110.4827	2.6294	.0012	2.6282
FILTER₁ #	25500		.4584	.4584		2.5102	2.5107	2.0518	-	2.0518
FILTER₂ #										
FH TOTAL										
BHW										
BHA										4.6800
TOTAL										
Comments										
ACETONE BLK	An-4	210	105.2389	105.2388		105.2401	105.2398	0.0010	0.0000048 g/ml	
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water (impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

B-4

ROY F. WESTON

PARTICULATE SAMPLE ANALYSES

Plant EPA Anaconda Copper
Test Date 10-25-79
Sampling Location #1, #2 Baghouse Outlet
Test Period 10-25 to 10-27-79
Analyst [illegible]
Run # 1
Stack #
Date 11-2-79
Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-5	190	103.7895	103.7895		103.8061	103.8061	0.5670	.0009	.0166
FILTER$_1$ #	25490		.4622	.4622		.4643	.4646	.0021		.0021
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.0187
Comments										

Plant EPA Anaconda Copper
Test Date 10-25-79
Sampling Location #1 #2 Baghouse Outlet
Test Period 10-25 to 10-27-79
Run # 2
Stack #
Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-6	150	104.9701	104.9701		104.9835	104.9835	.0134	.0007	.0127
FILTER$_1$ #	25495		.4600	.4600		.4634	.4629	.0029	—	.0029
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.0156
Comments										

Plant EPA Anaconda Copper
Test Date 10-25-79
Sampling Location #1 #2 Baghouse Outlet
Test Period 10-25 to 10-27-79
Run # 3
Stack #
Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	An-7	280	104.8103	104.8105		104.8364	104.8366	.0261	.0013	.0248
FILTER$_1$ #	25524		.4552	.4552		.4580	.4579	.0027	–	.0027
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.0275
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half [redacted]one [redacted] F[redacted]TAL[redacted]t [redacted] catch weight[redacted] TOT[redacted]otal[redacted]ain[redacted]atch weight

PARTICULATE SAMPLE ANALYSES

Plant EPA Anaconda Copper Sampling Location #3,4 Baghouse Inlet Analyst [illegible] Date 11-2-79
Test Date 10-26-79 Test Period 10-25 to 10-27-79 Run # 1 Stack # Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	Ap-14	290	108.8287	108.8287		108.9114	108.9110	.0823	.0014	.0809
FILTER$_1$ #	25523		.4538	.4538		.7606	.7602	.3064	—	.3064
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.3873
Comments										

Plant EPA Anaconda Copper Sampling Location #3,4 Baghouse Inlet Run # 2
Test Date 10-26-79 Test Period 10-25 to 10-27-79 Stack # Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	Ap-15	280	104.3335	104.3338		104.4497	104.4492	.1157	.0013	.1144
FILTER$_1$ #	25525		.4547	.4547		.6752	.6753	.2205	–	.2205
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.3349
Comments										

Plant EPA Anaconda Copper Sampling Location #3,4 Baghouse Inlet Run # 3
Test Date 10-26-79 Test Period 10-25 to 10-27-79 Stack # Process#

	Beaker #	Volume ml	Tare (1) grams	Tare (2) grams		Final (1) grams	Final (2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	Ap-16	160	105.4089	105.4089		105.4788	105.4786	.0697	.0008	.0689
FILTER$_1$ #	25519		.4564	.4564		.6290	.6288	.1724		.1724
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.2413
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half acetone wash FH TOTAL=Front half catch weight TOTAL=Total train catch weight

PARTICULATE SAMPLE ANALYSES

Plant EPA Anaconda Copper — Analyst DER — Date 11-2-79
Sampling Location #3,4 Baghouse Outlet — Run # 1
Test Date 10-26-79 — Test Period 10-25 to 10-27-79 — Stack # ____ — Process# ____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	Ap-17	250	102.7277	102.7277		102.7662	102.7663	.0385	.0012	.0373
FILTER$_1$ #	25522		.4531	.4531		.4594	.4589	.0058	—	.0058
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.0431
Comments										

Plant EPA Anaconda Copper — Sampling Location #3,4 Baghouse Outlet — Run # 2
Test Date 10-26-79 — Test Period 10-25 to 10-27-79 — Stack # ____ — Process# ____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	Ap-18	350	105.2647	105.2650		105.2964	105.2962	.0315	.0017	.0298
FILTER$_1$ #	25521		.4549	.4549		.4658	.4653	.0104	—	.0104
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.0402
Comments										

Plant EPA Anaconda Copper — Sampling Location #3,4 Baghouse Outlet — Run # 3
Test Date 10-26-79 — Test Period 10-25 to 10-27-79 — Stack # ____ — Process# ____

	Beaker #	Volume ml	Tare(1) grams	Tare(2) grams		Final(1) grams	Final(2) grams	Δ wt. grams	Blk. Cor. grams	Net wt. grams
FHA	Ap-19	190	103.8049	103.8049		103.8330	103.8330	.0281	.0009	.0272
FILTER$_1$ #	25518		.4527	.4527		.4567	.4562	.0035	—	.0035
FILTER$_2$ #										
FH TOTAL										
BHW										
BHA										
TOTAL										.0307
Comments										
ACETONE BLK										
WATER BLK										

CODE: FHA=Front half acetone wash BHW=Back half water(impinger contents + water wash) BHA=Back half ac[redacted] wa[redacted] FH [redacted]L=F[redacted] ha[redacted]atch[redacted]ght [redacted]TOTAL[redacted]al [redacted] c[redacted] wei[redacted]

ROY F. WESTON

ANALYTICAL DATA

PLANT ANACONDA COPPER

DATE 10/25/79

SAMPLING LOCATION GRIZZLY (CRUSHER)

SAMPLE TYPE PARTICULATE

RUN NUMBER 1

SAMPLE BOX NUMBER 1

CLEAN UP MAN NEWTON / RALSTON

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00002	159.6 mg
FILTER NUMBER 25496	CONTAINER 00001	306.7 mg

FRONT HALF SUBTOTAL 466.3 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg

BACK HALF SUBTOTAL mg

TOTAL WEIGHT 466.3 mg

MOISTURE

IMPINGERS

FINAL VOLUME 198 ml
INITIAL VOLUME 200 ml
NET VOLUME -2 ml

SILICA GEL

FINAL WEIGHT 216.6 g ____ g
INITIAL WEIGHT 200 g ____ g
NET WEIGHT 16.6 g ____ g

SUBTOTAL 14.6 g

TOTAL MOISTURE 14.6 g

ANALYTICAL DATA

PLANT ANNACONDA (EPA)

DATE 10/25/79

SAMPLING LOCATION GRIZZLY

SAMPLE TYPE PARTICULATE

RUN NUMBER 2

SAMPLE BOX NUMBER 1

CLEAN UP MAN BOB NEWTON / LEE ZINSER

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00011	114.2 mg
FILTER NUMBER 25493	CONTAINER 0-0010	119.8 mg
	FRONT HALF SUBTOTAL	234.0 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	234.0 mg

MOISTURE

IMPINGERS

FINAL VOLUME	197	ml
INITIAL VOLUME	200	ml
NET VOLUME	-3	ml

SILICA GEL

FINAL WEIGHT	218.5 g	g
INITIAL WEIGHT	200 g	g
NET WEIGHT	18.5 g	g

SUBTOTAL 15.5 g

TOTAL MOISTURE 15.5

ANALYTICAL DATA

PLANT ANACONDA (EPA)
DATE 10/26/79
SAMPLING LOCATION GRIZZLY
SAMPLE TYPE PARTICULATE
RUN NUMBER 3
SAMPLE BOX NUMBER 1
CLEAN UP MAN BOB NEWTON/LEE ZINSER

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00017	248.3 mg
FILTER NUMBER 25499	CONTAINER 00016	25.1 mg
	FRONT HALF SUBTOTAL	273.4 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	273.4 mg

MOISTURE

IMPINGERS
FINAL VOLUME 198 ml
INITIAL VOLUME 100 ml
NET VOLUME -2 ml

SILICA GEL
FINAL WEIGHT 210 g ____ g
INITIAL WEIGHT 200 g ____ g
NET WEIGHT 10 g ____ g

SUBTOTAL 8 g

TOTAL MOISTURE 8 g

ANALYTICAL DATA

PLANT: Anaconda Copper

DATE: 10-25-79

SAMPLING LOCATION: Crusher Primary Hood

SAMPLE TYPE: Part

RUN NUMBER: 1

SAMPLE BOX NUMBER: 1

CLEAN UP MAN: Celiano

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00008	374.0 mg
FILTER NUMBER 25491 [redacted]	CONTAINER 00007	6,581.5 mg
	FRONT HALF SUBTOTAL	6,955.5 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER ____	____ mg
	ETHER-CHLOROFORM EXTRACTION	____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER ____	____ mg
	BACK HALF SUBTOTAL	____ mg
	TOTAL WEIGHT	6,955.5 mg

MOISTURE

IMPINGERS

FINAL VOLUME	198	ml
INITIAL VOLUME	200	ml
NET VOLUME	-2	ml

SILICA GEL

FINAL WEIGHT	218	g	____	g
INITIAL WEIGHT	200	g	____	g
NET WEIGHT	18	g	____	g

SUBTOTAL ____ g

18
-2
16

TOTAL MOISTURE 16

ANALYTICAL DATA

PLANT Anaconda Copper

DATE 10-25-79

SAMPLING LOCATION Crusher Hood

SAMPLE TYPE Part

RUN NUMBER 2

SAMPLE BOX NUMBER 1

CLEAN UP MAN Jones

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 00009 — 210.8 mg

FILTER NUMBER 25494 — CONTAINER 00012 — 6,595.5 mg

FRONT HALF SUBTOTAL 6,806.3 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ______ ______ mg

ETHER-CHLOROFORM EXTRACTION ______ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ______ ______ mg

BACK HALF SUBTOTAL ______ mg

TOTAL WEIGHT 6,806.3 mg

MOISTURE

IMPINGERS

FINAL VOLUME 210 ml

INITIAL VOLUME 200 ml

NET VOLUME 10 ml

SILICA GEL

FINAL WEIGHT 216.5 g ______ g

INITIAL WEIGHT 200 g ______ g

NET WEIGHT 16.5 g ______ g

SUBTOTAL ______ g

10.0
16.5

TOTAL MOISTURE 26.5 g

ANALYTICAL DATA

PLANT Anaconda Copper

DATE 10-25-79

SAMPLING LOCATION Crusher Hood

SAMPLE TYPE Part

RUN NUMBER 3

SAMPLE BOX NUMBER 1

CLEAN UP MAN Oleann

COMMENTS:

FRONT HALF — LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER		CONTAINER 00015	265.4 mg
FILTER NUMBER	25498	CONTAINER 00019	4,348.2 mg
		FRONT HALF SUBTOTAL	4,6136.0 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER ____	____ mg
	ETHER-CHLOROFORM EXTRACTION	____ mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER ____	____ mg
	BACK HALF SUBTOTAL	____ mg
	TOTAL WEIGHT	4,6136.0 mg

MOISTURE

IMPINGERS

FINAL VOLUME	196	ml
INITIAL VOLUME	200	ml
NET VOLUME	-4	ml

SILICA GEL

FINAL WEIGHT	222	g	____	g
INITIAL WEIGHT	200	g	____	g
NET WEIGHT	22	g	____	g

SUBTOTAL ____ g

22
-4
+18

TOTAL MOISTURE 18

ANALYTICAL DATA

PLANT Anaconda Copper

COMMENTS:

DATE 10-25-79

SAMPLING LOCATION Crusher Baghouse Inlet #1&2

SAMPLE TYPE Part

RUN NUMBER 1

SAMPLE BOX NUMBER 1205

CLEAN UP MAN Robert Tom McHaling

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER		CONTAINER 00005	4,883.7 mg
FILTER NUMBER	25492 (00005)	CONTAINER	2,310.5 mg
		FRONT HALF SUBTOTAL	7,194.2 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	7,194.2 mg

MOISTURE

IMPINGERS

FINAL VOLUME	204	ml
INITIAL VOLUME	200	ml
NET VOLUME	4	ml

SILICA GEL

FINAL WEIGHT	210.7 g		g
INITIAL WEIGHT	200 g		g
NET WEIGHT	10.7 g		g

SUBTOTAL ______ g

TOTAL MOISTURE 4 g

ANALYTICAL DATA

PLANT Anaconda Copper

DATE 10-25-79

SAMPLING LOCATION Crusher Baghouse Inlet #1+2

SAMPLE TYPE Part

RUN NUMBER 2

SAMPLE BOX NUMBER 1205

CLEAN UP MAN Rianton / McGlinny

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00048	3,051.4 mg
FILTER NUMBER 25497 (00049)	CONTAINER	4,270.1 mg
	FRONT HALF SUBTOTAL	7,321.5 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	7,321.5 mg

MOISTURE

IMPINGERS
- FINAL VOLUME 204 ml
- INITIAL VOLUME 200 ml
- NET VOLUME 4 ml

SILICA GEL
- FINAL WEIGHT 210.1 g ____ g
- INITIAL WEIGHT 200 g ____ g
- NET WEIGHT 10.1 g ____ g

SUBTOTAL ____ g

TOTAL MOISTURE 14.1

ANALYTICAL DATA

PLANT [illegible]

DATE [illegible]

SAMPLING LOCATION [illegible]

SAMPLE TYPE [illegible]

RUN NUMBER 3

SAMPLE BOX NUMBER [illegible]

CLEAN UP MAN [illegible]

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER ______ 2,628.2 mg

FILTER NUMBER 25500 — CONTAINER ______ 2,051.8 mg

FRONT HALF SUBTOTAL 4,680.0 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ______ ______ mg

ETHER-CHLOROFORM EXTRACTION ______ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ______ ______ mg

BACK HALF SUBTOTAL ______ mg

TOTAL WEIGHT 4,680.0 mg

MOISTURE

IMPINGERS

FINAL VOLUME [illegible] ml

INITIAL VOLUME ______ ml

NET VOLUME ______ ml

SILICA GEL

FINAL WEIGHT [illegible] g ______ g

INITIAL WEIGHT ______ g ______ g

NET WEIGHT ______ g ______ g

SUBTOTAL ______ g

TOTAL MOISTURE 13.4 g

ANALYTICAL DATA

PLANT Anaconda Cu - EPA

DATE 10-25-79

SAMPLING LOCATION L2 Baghouse outlet

SAMPLE TYPE part.

RUN NUMBER 1

SAMPLE BOX NUMBER RAC

CLEAN UP MAN TE, NG

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER ______ 16.6 mg

FILTER NUMBER 25490 — CONTAINER ______ 2.1 mg

FRONT HALF SUBTOTAL 18.7 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER 00003 ______ mg

ETHER-CHLOROFORM EXTRACTION ______ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ______ ______ mg

BACK HALF SUBTOTAL ______ mg

TOTAL WEIGHT 18.7 mg

MOISTURE

IMPINGERS

FINAL VOLUME 202 ml

INITIAL VOLUME 200 ml

NET VOLUME 2 ml

SILICA GEL

FINAL WEIGHT 214.5 g ______ g

INITIAL WEIGHT 200 g ______ g

NET WEIGHT 14.5 g ______ g

SUBTOTAL ______ g

TOTAL MOISTURE 16.5 g

ANALYTICAL DATA

PLANT Anaconda Cu - EPA

DATE 10-25-79

SAMPLING LOCATION 1,2 Baghouse outlet

SAMPLE TYPE part.

RUN NUMBER 2

SAMPLE BOX NUMBER ____

CLEAN UP MAN TF, NG

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER ____ — 12.7 mg

FILTER NUMBER 25495 — CONTAINER ____ — 2.9 mg

FRONT HALF SUBTOTAL 15.6 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER 00013 — ____ mg

ETHER-CHLOROFORM EXTRACTION ____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ____ — ____ mg

BACK HALF SUBTOTAL ____ mg

TOTAL WEIGHT 15.6 mg

MOISTURE

IMPINGERS

FINAL VOLUME 203 ml

INITIAL VOLUME 200 ml

NET VOLUME 3 ml

SILICA GEL

FINAL WEIGHT 223.7 g ____ g

INITIAL WEIGHT 200 g ____ g

NET WEIGHT 23.7 g ____ g

SUBTOTAL ____ g

TOTAL MOISTURE 26.7 g

ANALYTICAL DATA

PLANT Anaconda Cu - EPA

DATE 10-25-79

SAMPLING LOCATION 1,2 Baghouse outlet

SAMPLE TYPE part

RUN NUMBER 3

SAMPLE BOX NUMBER ______

CLEAN UP MAN NG, TF

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER ______ 24.8 mg

FILTER NUMBER 25524 — CONTAINER ______ 2.7 mg

FRONT HALF SUBTOTAL 27.5 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER 00018 ______ mg

ETHER-CHLOROFORM EXTRACTION ______ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ______ ______ mg

BACK HALF SUBTOTAL ______ mg

TOTAL WEIGHT 27.5 mg

MOISTURE

IMPINGERS

FINAL VOLUME 213 ml

INITIAL VOLUME 200 ml

NET VOLUME 13 ml

SILICA GEL

FINAL WEIGHT 213. g ______ g

INITIAL WEIGHT 200 g ______ g

NET WEIGHT 13 g ______ g

SUBTOTAL ______ g

TOTAL MOISTURE 26 g

ANALYTICAL DATA

PLANT Anaconda

DATE 10-25-79

SAMPLING LOCATION Truck Dump Baghouse Inlet

SAMPLE TYPE Part

RUN NUMBER 1

SAMPLE BOX NUMBER 1205

CLEAN UP MAN Robertson McGilvry

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00026	80.9 mg
FILTER NUMBER 25523 (00025)	CONTAINER	306.4 mg

FRONT HALF SUBTOTAL 387.3 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg

BACK HALF SUBTOTAL mg

TOTAL WEIGHT 387.3 mg

MOISTURE

IMPINGERS

FINAL VOLUME	204	ml
INITIAL VOLUME	200	ml
NET VOLUME	4	ml

SILICA GEL

FINAL WEIGHT	209.1 g	g
INITIAL WEIGHT	200 g	g
NET WEIGHT	9.1 g	g

SUBTOTAL g

9.1
4
13.1

TOTAL MOISTURE 13.1 g

ANALYTICAL DATA

PLANT Anaconda Copper

COMMENTS:

DATE 10-26-79

SAMPLING LOCATION Truck Dump Baghouse Inlet

SAMPLE TYPE Part

RUN NUMBER 2

SAMPLE BOX NUMBER 1205

CLEAN UP MAN Roberts McElhiney

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00032	114.4 mg
FILTER NUMBER 25525 (00031)	CONTAINER	220.5 mg
	FRONT HALF SUBTOTAL	334.9 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	334.9 mg

MOISTURE

IMPINGERS

FINAL VOLUME 202 ml

INITIAL VOLUME 200 ml

NET VOLUME 2 ml

SILICA GEL

FINAL WEIGHT	208.4 g	g
INITIAL WEIGHT	200 g	g
NET WEIGHT	8.4 g	g

SUBTOTAL ______ g

TOTAL MOISTURE 10.4 g

ANALYTICAL DATA

PLANT Anaconda Copper

DATE 10-26-79

SAMPLING LOCATION Truck Dump Baghouse Inlet

SAMPLE TYPE Part

RUN NUMBER 3

SAMPLE BOX NUMBER 1205

CLEAN UP MAN Robertson McGinty

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00033	68.9 mg
FILTER NUMBER 25519 (00034)	CONTAINER	172.4 mg
	FRONT HALF SUBTOTAL	241.3 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	241.3 mg

MOISTURE

IMPINGERS

FINAL VOLUME 202 ml

INITIAL VOLUME 200 ml

NET VOLUME 2 ml

SILICA GEL

FINAL WEIGHT 209.4 g ____ g

INITIAL WEIGHT 200 g ____ g

NET WEIGHT 9.4 g ____ g

SUBTOTAL ____ g

TOTAL MOISTURE 11.4 g

ANALYTICAL DATA

PLANT Anaconda Cu-EPA

DATE 10-26-79

SAMPLING LOCATION 3,4 Baghouse outlet

SAMPLE TYPE part

RUN NUMBER 1

SAMPLE BOX NUMBER

CLEAN UP MAN NG, TF, C.D.

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER 00027 — 37.3 mg

FILTER NUMBER 25522 — CONTAINER 00024 — 5.8 mg

FRONT HALF SUBTOTAL 43.1 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ~~00027~~ ____ mg

ETHER-CHLOROFORM EXTRACTION ____ mg

ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER — CONTAINER ____ mg

BACK HALF SUBTOTAL ____ mg

TOTAL WEIGHT 43.1 mg

MOISTURE

IMPINGERS

FINAL VOLUME 200 ml

INITIAL VOLUME 200 ml

NET VOLUME 0 ml

SILICA GEL

FINAL WEIGHT 208 g ____ g

INITIAL WEIGHT 200 g ____ g

NET WEIGHT 8 g ____ g

SUBTOTAL ____ g

TOTAL MOISTURE 8 g

ANALYTICAL DATA

PLANT Anaconda Cu-EPA

DATE 10-26-79

SAMPLING LOCATION 3,4 Baghouse outlet

SAMPLE TYPE part

RUN NUMBER 2

SAMPLE BOX NUMBER RAe

CLEAN UP MAN NG, TF

COMMENTS:

FRONT HALF

		LABORATORY RESULTS
ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00029	29.8 mg
FILTER NUMBER 25521	CONTAINER 00028	10.4 mg
	FRONT HALF SUBTOTAL	40.2 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	40.2 mg

MOISTURE

IMPINGERS

FINAL VOLUME 194 ml

INITIAL VOLUME 200 ml

NET VOLUME −6 ml

SILICA GEL

FINAL WEIGHT 209.2 g ______ g

INITIAL WEIGHT 200 g ______ g

NET WEIGHT 9.2 g ______ g

SUBTOTAL ______ g

TOTAL MOISTURE 3.2 g

ANALYTICAL DATA

PLANT Anaconda Cu - EPA

DATE 10-26-79

SAMPLING LOCATION 3,4 Baghouse outlet

SAMPLE TYPE part.

RUN NUMBER 3

SAMPLE BOX NUMBER RAC

CLEAN UP MAN NG, TE, CD

COMMENTS:

FRONT HALF

LABORATORY RESULTS

ACETONE WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER	CONTAINER 00035	27.2 mg
FILTER NUMBER 25518	CONTAINER 00036	3.5 mg
	FRONT HALF SUBTOTAL	30.7 mg

BACK HALF

IMPINGER CONTENTS AND WATER WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER ~~00031~~	mg
	ETHER-CHLOROFORM EXTRACTION	mg
ACETONE WASH OF IMPINGERS, CONNECTORS, AND BACK HALF OF FILTER HOLDER	CONTAINER	mg
	BACK HALF SUBTOTAL	mg
	TOTAL WEIGHT	30.7 mg

MOISTURE

IMPINGERS
- FINAL VOLUME 196 ml
- INITIAL VOLUME 200 ml
- NET VOLUME -4 ml

SILICA GEL
- FINAL WEIGHT 209 g ____ g
- INITIAL WEIGHT 200 g ____ g
- NET WEIGHT 9 g ____ g

SUBTOTAL ____ g

TOTAL MOISTURE 5

TITLE Anderson Particle Size

Fr[redacted] Page No. ___

Client	filter #	final (1)	final (2)	Tare (1)	Tare (2)			Δ wt. grams
[redacted] Baghouse	1B-1	.1823	.1822	.1709	.1709			.0113
	2	.1669	.1667	.1560	.1560			.0107
O[redacted]let	3	.1705	.1705	.1650	.1652			.0055
Run 1	4	.1590	.1591	.1572	.1572			.0018
	5	.1678	.1679	.1668	.1668			.0010
	6	.1552	.1551	.1546	.1547			.0005
	7	.1726	.1727	.1722	.1722			.0004
	8	.1549	.1549	.1546	.1548			.0003
	9 Bu	.2514	.2513	.2505	.2507			.0008
	2B-1	.2011	.2013	.1673	.1673			.0338
	2	.1797	.1797	.1527	.1527			.0270
[redacted]usher	3	.1777	.1779	.1728	.1728			.0049
Hood	4	.1536	.1536	.1518	.1520			.0018
#3	5	.1718	.1720	.1711	.1711			.0007
	6	.1555	.1555	.1552	.1553			.0003
	7	.1671	.1672	.1666	.1666			.0005
	8	.1583	.1584	.1577	.1577			.0006
	9 Bu	.2575	.2576	.2559	.2561			.0016
	3B-1	.1706	.1706	.1684	.1684			.0022
	2	.1567	.1567	.1523	.1523			.0044
[redacted]	3	.1693	.1695	.1625	.1626			.0068
Dump Inlet	4	.1607	.1608	.1570	.1570			.0037
#2	5	.1693	.1693	.1684	.1686			.0009
	6	.1553	.1553	.1547	.1547			.0006
	7	.1689	.1689	.1682	.1684			.0007
	8	.1557	.1557	.1553	.1553			.0004
	9 Bu	.2526	.2527	.2514	.2514			.0012
	4B-1	.1735	.1735	.1702	.1702			.0033
	2	.1605	.1605	.1541	.1541			.0064
	3	.1765	.1765	.1684	.1686			.0081
	4	.1600	.1600	.1554	.1554			.0046
	5	.1666	.1668	.1644	.1646			.0022
	6	.1575	.1575	.1568	.1568			.0007
	7	.1700	.1700	.1693	.1696			.0007
	8	.1535	.1537	.1528	.1527			.0008
	9 B.U	.2505	.2506	.2494	.2494			.0011

To Page No. ___

[redacted]

Witnessed & Understood by me. | Date | Invented by | Date

Recorded by

LE andersons

Project No. ______ Book No. ______ COPY 3

From Page No. / Client	filter #	final (1)	final (2)	Tare (1)	Tare (2)		Δ wt gms
Grinder Hood #2	13 B-1	.2331	.2331	.1922	.1924		.0409
	2	.1976	.1976	.1800	.1800		.0176
	3	.2015	.2016	.1931	.1931		.0084
	4	.1833	.1837	.1820	.1820		.0013
	5	.1736	.1736	.1722	.1724		.0014
	6	.1536	.1538	.1532	.1530		.0006
	7	.1685	.1687	.1679	.1679		.0006
	8	.1580	.1580	.1577	.1576		.0004
	9B.U.	.2555	.2555	.2538	.2538		.0017
Grinder Hood #1	14 B-1	.2124	.2124	.1665	.1665		.0459
	2	.1841	.1841	.1528	.1528		.0313
	3	.1770	.1770	.1700	.1700		.0070
	4	.1554	.1554	.1527	.1527		.0027
	5	.1746	.1746	.1732	.1732		.0014
	6	.1552	.1553	.1540	.1540		.0012
	7	.1722	.1725	.1716	.1716		.0006
	8	.1542	.1543	.1533	.1533		.0008
	9B.U.	.2532	.2533	.2516	.2516		.0016
Crusher Baghouse Inlet Run 1	15 B-1	.3325	.3324	.1682	.1682		.2142
	2	.2416	.2416	.1548	.1545		.0032
	3	.1812	.1813	.1725	.1725		.0087
	4	.1585	.1584	.1570	.1570		.0014
	5	.1725	.1725	.1720	.1720		.0005
	6	.1519	.1518	.1513	.1513		.0005
	7	.1703	.1701	.1703	.1703		.0002
	8	.1557	.1555	.1555	.1555		.0000
	9B.U.	.2485	.2484	.2489	.2492		.0005
Crusher Baghouse Inlet Run 3	16 B-1	.3646	.3647	.1686	.1687		.1959
	2	.1649	.1647	.1602	.1602		.0045
	3	.1721	.1720	.1706	.1706		.0014
	4	.1580	.1580	.1578	.1575		.0002
	5	.1748	.1749	.1748	.1748		.0000
	6	.1523	.1522	.1521	.1521		.0001
	7	.1710	.1711	.1707	.1709		.0001
	8	.1552	.1553	.1548	.1545		.0004
	9B.U.	.2516	.2517	.2515	[illegible]		.0001

To Page No.

Witnessed & Understood by me.	Date	Invented by	Date
		Recorded by	

Project No. ______

ITLE Andersons ______ Book No. ______

Fr[redacted] Page No. ______

Client

[redacted] Baghouse outlet Run 1

filter #	final (1)	final (2)	Tare (1)	Tare (2)	Δ wt gram
9B-1	.1737	.1736	.1725	.1723	.0013
-2	.1571	.1571	.1563	.1563	.0008
3	.1680	.1682	.1683	.1683	.0003
4	.1522	.1520	.1515	.1515	.0005
5	.1705	.1705	.1702	.1702	.0003
6	.1508	.1505	.1502	.1502	.0003
7	.1702	.1702	.1708	.1708	.0006
8	.1505	.1503	.1508	.1508	.0005
9Bu	.2507	.2507	.2502	.2502	.0005
10B-1			.1750	.1749	
2			.1546	.1546	
3			.1682	.1682	
4			.1553	.1553	
5			.1660	.1660	
6			.1546	.1546	
7			.1666	.1666	
8			.1528	.1528	
9Bu.			.2535	.2535	
11B-1			.1702	.1702	
2			.1515	.1515	
3			.1657	.1657	
4			.1522	.1522	
5			.1752	.1752	
6			.1575	.1575	
7			.1652	.1652	
8			.1583	.1583	
9Bu.			.2489	.2489	
12B-1			.1701	.1702	
2			.1494	.1494	
3			.1721	.1723	
4			.1543	.1543	
5			.1673	.1676	
6			.1540	.1540	
7			.1933	.1933	
8			.1526	.1526	
9Bu			.2526	.2528	

To Page No. ______

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	

Project No. ______
TITLE Andersons Book No. ______

From Page No. Client	filter #	final (1)	final (2)	Tare (1)	Tare (2)	Front Half Acetone	Δ wt grams
Truck Dump Inlet Run 3	17B-1	.1718	.1718	.1682	.1682		.0036
	2	.1607	.1607	.1557	.1555		.0052
	3	.1806	.1807	.1730	.1730		.0076
	4	.1565	.1566	.1544	.1544		.0021
	5	.1705	.1707	.1688	.1689		.0017
	6	.1576	.1576	.1571	.1571		.0005
	7	.1692	.1692	.1687	.1689		.0005
	8	.1542	.1542	.1535	.1534		.0008
	9Bu.	.2520	.2520	.2508	.2508		.0012
Crusher Baghouse inlet Run 2	18B-1	.3055	.3054	.1714	.1714		.1340
	2	.1657	.1656	.1535	.1534		.0122
	3	.1745	.1744	.1722	.1722		.0022
	4	.1549	.1548	.1539	.1539		.0009
	5	.1692	.1689	.1685	.1685		.0004
	6	.1573	.1574	.1572	.1572		.0002
	7	.1666	.1666	.1663	.1663		.0003
	8	.1540	.1541	.1538	.1538		.0002
	9Bu.	.2517	.2518	.2513	.2513		.0004
A Inlet Run 2 PPxL MC	19B-1	.1777	.1776	.1700	.1700	.1209	.1285
	2	.1675	.1675	.1584	.1584		.0091
	3	.1734	.1735	.1653	.1653		.0081
	4	.1649	.1649	.1600	.1600		.0049
	5	.1717	.1716	.1672	.1674		.0044
	6	.1582	.1584	.1559	.1559		.0023
	7	.1700	.1700	.1691	.1691		.0009
	8	.1628	.1628	.1618	.1618		.001
	9Bu.	.2548	.2548	.2522	.2522		.0026
A outlet Run 2 PPxL MC	20B-1	.1723	.1720	.1703	.1703	.0013	.003
	2	.1554	.1554	.1537	.1536		.0018
	3	.1705	.1705	.1703	.1703		.0002
	4	.1592	.1594	.1577	.1577		.0015
	5	.1700	.1700	.1679	.1679		.0021
	6	.1563	.1562	.1548	.1546		.0016
	7	.1761	.1761	.1743	.1743		.0018
	8	.1568	.1568	.1555	.1554		.0014
	9Bu.	.2519	.2519	.2500	.2500		.0019

To Page No.

Witnessed & Understood by me, | Date | Invented by | Date
Recorded by

Project No. ______ Book No. ______ COPY 4

TITLE Anderson

Fr[redacted] Page No. ___

Client	Filter #	Final (1)	Final (2)	Tare (1)	Tare (2)		Δ wt gain
	21B-1	.1770	.1767	.1713	.1713	.0054	
	2	.1644	.1642	.1613	.1610	.0032	
[redacted] GRIZZLY	3	.1716	.1715	.1704	.1704	.0011	
	4	.1539	.1540	.1538	.1538	.0001	
[redacted] EAST	5	.1670	.1670	.1667	.1667	.0003	
	6	.1542	.1543	.1540	.1540	.0002	
	7	.1705	.1706	.1700	.1702	.0005	
[redacted] Run 1	8	.1585	.1584	.1580	.1580	.0004	
	9B.U.	.2570	.2571	.2570	.2570	.0000	
	22B-1	.1707	.1705	.1689	.1691	.0016	
	2	.1620	.1618	.1600	.1602	.0018	
	3	.1706	.1706	.1700	.1700	.0006	
[redacted] GRIZZLY	4	.1569	.1571	.1568	.1568	.0001	
EAST	5	.1593	.1594	.1693	.1693	.0000	
	6	.1563	.1562	.1561	.1561	.0002	
Run 2	7	.1754	.1755	.1751	.1751	.0003	
	8	.1621	.1622	.1620	.1620	.0001	
	9B.U.	.2548	.2549	.2546	.2546	.0002	
	23B-1	.1757	.1754	.1728	.1728	.0026	
GRIZZLY	2	.1588	.1587	.1581	.1581	.0006	
[redacted] EAST	3	.1702	.1703	.1700	.1700	.0002	
	4	.1561	.1560	.1559	.1559	.0061	
	5	.1709	.1707	.1707	.1707	.0000	
[redacted] Run 3	6	.1499	.1498	.1495	.1495	.0003	
	7	.1436	.1735	.1731	.1731	.0004	
	8	.1560	.1559	.1557	.1557	.0002	
	9B.U.	.2560	.2560	.2556	.2558	.0004	
	24B-1			.1690	.1690		
	2			.1545	.1545		
	3			.1687	.1687		
	4			.1584	.1584		
	5			.1679	.1679		
	6			.1538	.1538		
	7			.1700	.1700		
	8			.1560	.1560		
	9B.U.			.2519	[illegible]		

To Page No. ___

Witnessed & Understood by me. | Date | Invented by | Date

Recorded by

B-29

York Services Corporation
- Energy and Environmental Systems Engineering
- Atmospheric Sciences Services
- Emission Measurement Services

One Research Drive
Stamford, Connecticut 06906
Telephone: (203) 325-1371
TWX: 710-474-3947

December 9, 1980

Mr. David Ralston
Roy F. Weston, Inc.
Weston Way
West Chester, PA 19380

Reference: TRACE ELEMENT ANALYSIS OF PARTICULATE SAMPLES

Dear Mr. Ralston:

The results of the trace element analyses of your particulate samples are enclosed. The samples are identified with the numbers listed below and correspond to your sample descriptions as follows:

#37695 - Anaconda - #1 & #2 - Crusher Baghouse Inlet, Run 1, 10/25/79 WESTON #00006

#37696 - Anaconda - Primary Crusher Hoop, Run 1, 10/25/79 WESTON #00008

#37701 - Anaconda - Front Half Acetone Grizzly Crusher, Run 1, 10/25/79

#37703 - Anaconda - Front Half Aceton #3 & #4 Baghouse Inlet, Run 1, 10/26/79

Please contact Mr. Robert Bradley, if you have any questions.

Sincerely,

Maria Denaro

Maria Denaro
Project Scientist

MD/mdf
cc: Dennis Holzschuh
Roger Kniskern
Robert Bradley

Ledoux & Company
EST. 1850

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INDEPENDENT CONTROL, AND RESEARCH CHEMISTRY, INSTRUMENTAL AND CHEMICAL ANALYSIS • SAMPLING, WEIGHING, SHIPPERS' REPRESENTATION, BENEFICIATION, AND STORAGE OF ORES AND METALS

REPORT OF ANALYSIS

No. 1014215

~~October 31, 1980~~

Our analysis of the sample of DUST SAMPLES

From York Research Corporation

Marked: 15 Samples as below P.O. #3-5830

and submitted to us, shows:

PARTS PER MILLION

	37695	37696
URANIUM	<1.	<1.
THORIUM	<1	<1.
BISMUTH	5.	10.
LEAD	50.	200.
THALLIUM	<1.	<1.
MERCURY	<2.	<2.
GOLD	<1.	<1.
PLATINUM	<2.	<2.
IRIDIUM	<1.	<1.
OSMIUM	<2.	<2.
RHENIUM	<2.	<2.
TUNGSTEN	<2.	500.
TANTALUM	<1.	<1.
HAFNIUM	<2.	<2.
LUTETIUM	<0.2	<0.2
YTTERBIUM	<1.	<1.
THULIUM	<0.2	<0.2
ERBIUM	<1.	<1.
HOLMIUM	<0.2	<0.2
DYSPROSIUM	<1.	<1.
TERBIUM	2.	<0.2
GADOLINIUM	<1.	2.
EUROPIUM	<1.	<1.
SAMARIUM	<1.	2.
NEODYMIUM	20.	5.
PRASEODYMIUM	5.	5.

* *

To York Research Corporation

PAGE 4 of 12 PAGES

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REPORT OF ANALYSIS

No. 1014215 October 31, 1980

Our analysis of the sample of DUST SAMPLES

From York Research Corporation

Marked: 15 Samples as below P.O.#3-5830

and submitted to us, shows:

PARTS PER MILLION

	37695	37696
CERIUM	10.	20.
LANTHANUM	10.	20.
BARIUM	500.	200.
CESIUM	2.	2.
IODINE	1.	1.
TELLURIUM	<1.	<1.
ANTIMONY	20.	50.
TIN	<1.	<1.
INDIUM	<2.	<2.
CADMIUM	<2.	<2.
SILVER	5.	10.
PALLADIUM	<2.	<2.
RHODIUM	<1.	<1.
RUTHENIUM	<2.	<2.
MOLYBDENUM	<2.	<2.
NIOBIUM	10.	5.
ZIRCONIUM	2.	200.
YTTRIUM	10.	5.
STRONTIUM	100.	50.
RUBIDIUM	10.	20.
BROMINE	10.	<0.5
SELENIUM	<0.5	<0.5
ARSENIC	500.	500.
GERMANIUM	<2.	<2.
GALLIUM	5.	5.
ZINC	200.	1000.

* *

To York Research Corporation

LEDOUX & COMPANY

B-32

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TELEX 134340

BS

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212 947 0953

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REPORT OF ANALYSIS

No. 1014215

October 31, 1980

Our analysis of the sample of DUST SAMPLES

From York Research Corporation

Marked: 15 Samples as below P.O.# 3-5830

and submitted to us, shows:

PARTS PER MILLION

	37695	37696
COPPER	M	M
NICKEL	50.	50.
COBALT	5.	2.
IRON	M	M
MANGANESE	M	200.
CHROMIUM	50.	10.
VANADIUM	100.	100.
TITANIUM	M	M
SCANDIUM	10.	5.
CALCIUM	500.	1000.
POTASSIUM	M	M
CHLORINE	2.	2.
SULFUR	M	M
PHOSPHORUS	500.	200.
SILICON	M	M
ALUMINUM	M	M
MAGNESIUM	A	A
SODIUM	M	1.
FLUORINE	10.	5.
CARBON	--	--
BORON	100.	50.
BERYLLIUM	A	A
LITHIUM	# 10. #	5.

A. Matrix Interference

M. Signifies Major Constituent of Sample

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REPORT OF ANALYSIS

No. 1014215

October 31, 1980

Our analysis of the sample of Dust Samples

From York Research Corporation

Marked: 15 Lots as Below P.O.#3-5830

and submitted to us, shows:

PARTS PER MILLION

	#37703
URANIUM	1000.
THORIUM	<1.
BISMUTH	<1.
LEAD	100.
THALLIUM	<1.
MERCURY	<2.
GOLD	<1.
PLATINUM	<2.
IRIDIUM	<1.
OSMIUM	<2.
RHENIUM	<2.
TUNGSTEN	<2.
TANTALUM	<1.
HAFNIUM	<2.
LUTETIUM	<0.2
YTTERBIUM	<1.
THULIUM	<0.2
ERBIUM	<1.
HOLMIUM	<0.2
DYSPROSIUM	<1.
TERBIUM	<0.2
GADOLINIUM	<1.
EUROPIUM	<1.
SAMARIUM	<1.
NEODYMIUM	20.
PRASEODYMIUM	5.

*

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REPORT OF ANALYSIS

No. 1014215

October 31, 1980

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From York Research Corporation

Marked: 15 Lots As Below P.O.# 3-5830

and submitted to us, shows:

	PARTS PER MILLION #37703
CERIUM	20.
LANTHANUM	20.
BARIUM	1000.
CESIUM	<1.
IODINE	<1.
TELLURIUM	<1.
ANTIMONY	20.
TIN	<1.
INDIUM	<2.
CADMIUM	<2.
SILVER	5.
PALLADIUM	<2.
RHODIUM	<1.
RUTHENIUM	<2.
MOLYBDENUM	<2.
NIOBIUM	20.
ZIRCONIUM	50.
YTTRIUM	10.
STRONTIUM	200.
RUBIDIUM	100.
BROMINE	<0.5
SELENIUM	<0.5
ARSENIC	100.
GERMANIUM	<2.
GALLIUM	<1.
ZINC	100.

* * *

To York Research Corporation

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LM EST. 1900

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REPORT OF ANALYSIS

No. 1014215

October 31, 1980

Our analysis of the sample of Dust Samples

From York Research Corporation

Marked: 15 Lots As Below P.O.#3-5830

and submitted to us, shows:

PARTS PER MILLION

	#37703
COPPER	M
NICKEL	20.
COBALT	20.
IRON	M
MANGANESE	500.
CHROMIUM	200.
VANADIUM	100.
TITANIUM	M
SCANDIUM	5.
CALCIUM	M
POTASSIUM	M
CHLORINE	20.
SULFUR	1000.
PHOSPHORUS	200.
SILICON	M
ALUMINUM	M
MAGNESIUM	A
SODIUM	1000.
FLUORINE	10.
CARBON	-----
BORON	200.
BERYLLIUM	A
LITHIUM	50.

* * *

A = Matrix Interference

M Signifies Major Constituent of Sample

Page 9 of 12 Pages

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REPORT OF ANALYSIS

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October 31, 1980

Our analysis of the sample of DUST SAMPLES

From York Research Corporation

Marked: 15 Samples as below P.O. #3-5830

and submitted to us, shows:

PARTS PER MILLION

	37701
URANIUM	1000
THORIUM	5.
BISMUTH	2.
LEAD	100.
THALLIUM	<1.
MERCURY	<2.
GOLD	<1.
PLATINUM	<2.
IRIDIUM	<1.
OSMIUM	<2.
RHENIUM	<2.
TUNGSTEN	50.
TANTALUM	<1.
HAFNIUM	<2.
LUTETIUM	<0.2
YTTERBIUM	<1.
THULIUM	<0.2
ERBIUM	<1.
HOLMIUM	<0.2
DYSPROSIUM	<1.
TERBIUM	<0.2
GADOLINIUM	<1.
EUROPIUM	<1.
SAMARIUM	5.
NEODYMIUM	20.
PRASEODYMIUM	10.

*

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PARTS PER MILLION

	37701
CERIUM	50.
LANTHANUM	20.
BARIUM	1000.
CESIUM	2.
IODINE	<1.
TELLURIUM	<1.
ANTIMONY	10.
TIN	<1.
INDIUM	2.
CADMIUM	<2.
SILVER	20.
PALLADIUM	<2.
RHODIUM	<1.
RUTHENIUM	<2.
MOLYBDENUM	10.
NIOBIUM	5.
ZIRCONIUM	20.
YTTRIUM	20.
STRONTIUM	200.
RUBIDIUM	<0.5
BROMINE	10.
SELENIUM	<0.5
ARSENIC	500.
GERMANIUM	<2.
GALLIUM	5.
ZINC	20.

*

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REPORT OF ANALYSIS

No. 1014215 October 31, 1980

Our analysis of the sample of DUST SAMPLES

From York Research Corporation

Marked: 15 Samples as below P.O. #3-5830

and submitted to us, shows:

PARTS PER MILLION

	37701
COPPER	M
NICKEL	50.
COBALT	2.
IRON	M
MANGANESE	500.
CHROMIUM	50.
VANADIUM	100.
TITANIUM	M
SCANDIUM	10.
CALCIUM	1000.
POTASSIUM	M
CHLORINE	10.
SULFUR	M
PHOSPHORUS	500.
SILICON	M
ALUMINUM	M
MAGNESIUM	A
SODIUM	M
FLUORINE	10.
CARBON	--
BORON	200.
BERYLLIUM	A
LITHIUM	10.

A. Matrix Interference
M. Signifies Major Constituent of Sample

To York Research Corporation

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Appendix C

Sample Calculations

SAMPLE CALCULATIONS

Test Run 3 Crusher Baghouse No. 1-2 Outlet Stack

1. Volume of dry gas sampled at standard conditions ($68^{o}F$, 29.92 in. Hg), dscf.

$$V_{m(std)} = \frac{17.647 \times Y \times V_m \times \left(P_b + \frac{\Delta H}{13.6}\right)}{(T_m + 460)}$$

$$V_{m(std)} = \frac{17.647 \times 1.0362 \times 69.108 \times \left(24.04 + \frac{1.516}{13.6}\right)}{(52 + 460)} = 59.65$$

Where:

$V_{m(std)}$	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
V_m	=	Volume of gas sample measured by the dry gas meter at meter conditions, dcf.
P_b	=	Barometric pressure, in. Hg.
ΔH	=	Average pressure drop across the orifice meter, in. H_2O.
T_m	=	Average dry gas meter temperature, ^{o}F.
17.647	=	Factor that includes ratio of standard temperature ($528^{o}R$) to standard pressure (29.92 in. Hg), ^{o}R/in. Hg.
Y	=	Dry gas meter calibration factor.

2. Volume of water vapor in the gas sample corrected to standard conditions, scf.

$$V_{w(std)} = (0.04707 \times V_{wc}) + 0.04715 \times W_{wsg}$$

$$V_{w(std)} = (0.04707 \times 13.0) + (0.04715 \times 13.0) = 1.22$$

Where:

$V_{w(std)}$	=	Volume of water vapor in the gas sample corrected to standard conditions, scf.
V_{wc}	=	Volume of liquid condensed in impingers, ml.

W_{wsg} = Weight of water vapor collected in silica gel, g.

0.04707 = Factor which includes the density of water (0.002201 lb/ml), the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant [21.85 (in. Hg) (ft^3)/(lb-mole)(^oR)] ; absolute temperature at standard conditions (528^oR), absolute pressure at standard conditions (29.92 in. Hg), ft^3/ml.

0.04715 = Factor which includes the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant [21.85 (in. Hg)(ft^3)/(lb-mole)(^oR)]. absolute temperature at standard conditions (528^oR), absolute pressure at standard conditions (29.92 in. Hg), and 453.6 g/lb, ft^3/g.

3. Moisture content.

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

$$B_{ws} = \frac{1.22}{1.22 + 59.65} = .020$$

Where:

B_{ws} = Proportion of water vapor, by volume, in the gas stream, dimensionless.

4. Mole fraction of dry gas.

$$M_d = 1 - B_{ws}$$

$$M_d = 1 - .020 = 0.980$$

Where:

M_d = Mole fraction of dry gas, dimensionless

5. Dry molecular weight of gas stream, lb/lb-mole.

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

MW_d = $(0.440 \times 0.0) + (0.320 \times 20.9) + [0.280\ (0.0 + 79.1)]$

= 28.97

Where:

MW_d = Dry molecular weight, lb/lb-mole.

$\%CO_2$ = Percent carbon dixoide by volume, dry basis.

$\%O_2$ = Percent oxygen by volume, dry basis.

$\%N_2$ = Percent nitrogen by volume, dry basis.

%CO = Percent carbon monoxide by volume, dry basis.

0.440 = Molecular weight of carbon dioxide, divided by 100.

0.320 = Molecular weight of oxygen, divided by 100.

0.280 = Molecular weight of nitrogen or carbon monoxide, divided by 100.

6. Actual molecular weight of gas stream (wet basis), lb/lb-mole.

MW_s = $(MW_d \times M_d) + [18\ (1 - M_d)]$

MW_s = $(28.97 \times .980) + [18\ (1 - .980)]$

= 28.75

Where:

MW_s = Molecular weight of wet gas, lb/lb-mole.

18 = Molecular weight of water, lb/lb-mole.

7. Average velocity of gas stream at actual conditions, ft/sec.

$$v_s = 85.49 \times C_p \times (\sqrt{\Delta p})_{avg.} \times \left[\frac{T_s\ (avg)}{P_s \times MW_s}\right]^{\frac{1}{2}}$$

$$v_s = 85.49 \times .848 \times .923 \times \left[\frac{72.9}{24.01 \times 28.749}\right]^{\frac{1}{2}}$$

$$= 58.8$$

Where:

v_s = Average gas stream velocity, ft/sec.

85.49 = Pitot tube constant, ft/sec $\times \left[\frac{(lb/lb\text{-}mole)(in.Hg)}{(^{o}R)\ (in.\ H_2O)}\right]^{\frac{1}{2}}$.

C_p = Pitot tube coefficient, dimensionless.

Δp = Velocity head of stack gas, in H_2O.

T_s = Absolute gas stream temperature, ^{o}R.

P_s = Absolute gas stack pressure, in. Hg.

8. Average gas stream dry volumetric flow rates, dscf/min.

$$Q_{s(std)} = \frac{1058.8 \times v_s \times A_s \times M_d \times P_s}{T_s}$$

$$Q_{s(std)} = \frac{1058.8 \times 58.8 \times 29.87 \times .980 \times 24.01}{(73. + 460)}$$

$$= 82{,}128$$

Where:

$Q_{s(std)}$ = Volumetric flow rate of dry stack gas, corrected to standard conditions, dscf/min.

A_s = Cross-sectional area of stack, ft^2.

1058.8 = Factor which includes standard temperature ($528^{o}R$), standard pressure (29.92 in. Hg), and 60 sec/min, $\frac{(^{o}R)\ (sec)}{(in.\ Hg)(min)}$.

9. Isokinetic variation calculated from intermediate values, percent.

$$I = \frac{17.316 \times T_s \times V_{m(std)}}{V_s \times \theta \times P_s \times M_d \times (D_n)^2}$$

$$I = \frac{17.316 \times 72.9 \times 59.65}{58.8 \times 96 \times 24.01 \times .980 \times (.197)^2}$$

$$= 106.8$$

Where:

I	=	Percent of isokinetic sampling.
θ	=	Total sampling time, minutes.
D_n	=	Diameter of nozzle, inches.
17.316	=	Factor which includes standard temperature (528^oR), standard pressure (29.92 in. Hg), the formula for calculating area of circle $\frac{\pi D^2}{4}$, conversion of square feet to square inches (144), conversion of seconds to minutes (60), and conversion to percent (100), $\frac{(in.\ Hg)\ (in^2)\ (min)}{(^oR)\ (ft^2)\ (sec)}$.

10. Particulate concentration, gr/dscf.

$$C_1 = 0.015432 \times \frac{M_t}{V_{m(std)}}$$

$$C_1 = 0.015432 \times \frac{27.5}{59.65} = .007$$

Where:

C_1	=	Particulate concentration, gr/dscf.
M_t	=	Total weight of particulate caught by train, mg.
0.015432	=	Conversion factor of gr/mg.

11. Particulate mass emission rate, lb/hr.

$$PMR_t = 0.0085714 \times C_1 \times Q_{s(std)}$$

$$= 0.0085714 \times .007 \times 82{,}128 = 5.01$$

Where:

PMR_t	=	Particulate mass emission rate, lb/hr.
0.0085714	=	Conversion factor relating minutes to hours (60), and grains to pounds (7,000), (lb) (min)/(gr) (hr).

Appendix D

Equipment Calibration Records

Date *Oct. 19th 1977* Box No. *Nutech 2*

Barometric pressure, P_b = *30.30* in. Hg Dry gas meter No. ______

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test: Meter t_w, °F	Temperature: Dry gas meter: Inlet t_{di}, °F	Temperature: Dry gas meter: Outlet t_{do}, °F	Temperature: Dry gas meter: Average t_d, °F	Time θ, min	γ	$\Delta H_@$
0.5	5	*535.623* *540.519*	*60°*			*61° 65° 70°*	*12.43*	*1.0273*	*1.6651*
1.0	5	*540.519* *545.503*	*62°*			*70° 72° 75°*	*9.32*	*1.0199*	*1.8618*
1.5	~~10~~ *5*	*545.503* *550.549*	*62°*			*75° 80° 80°*	*7.95*	*1.0177*	*2.0093*
2.0	10	*550.548* *560.752*	*62°*			*80° 84° 85°*	*13.90*	*1.0145*	*2.0286*
6.0	10								
8.0	10								
							Average	*1.0204*	*1.8911*

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date Oct. 19th 1979 Box No. 2253

Barometric pressure, P_b = 30.30 in. Hg Dry gas meter No. ______

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test: Meter t_w, °F	Temperature: Dry gas meter: Inlet t_{di}, °F	Temperature: Dry gas meter: Outlet t_{do}, °F	Temperature: Dry gas meter: Average t_d, °F	Time θ, min	γ	$\Delta H_@$
0.5	5	833.170 838.232	64°	60 75 83	60 62 66	68°	12.67	.9940	1.7467
1.0	5	838.232 843.373	64°	76 93 97	[illegible] 70 72	79°	9.25	.9979	1.8240
1.5	5	843.373 848.627	64°	82 104 108	78 90 82	89°	7.68	.9954	1.8517
2.0	10	848.627 859.262	64°	97 115 116	82 87 90	98°	13.43	.9964	1.8570
6.0	10								
8.0	10								
						Average		.9954	1.8198

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date Oct. 19th 1979 Box No. 1205

Barometric pressure, P_b = 30.30 in. Hg Dry gas meter No. ______

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test: Meter t_w, °F	Temperature: Dry gas meter: Inlet t_{di}, °F	Temperature: Dry gas meter: Outlet t_{do}, °F	Temperature: Dry gas meter: Average t_d, °F	Time θ, min	γ	$\Delta H_@$
0.5	5	567.112 571.954	64°	64 76 70	61 67 64	67°	12.99	1.0372	1.8085
1.0	5	571.954 576.901	64°	74 89 84	68 75 72	77°	9.28	1.0332	1.8427
~~2.0~~ 1.5	~~10~~ 5	576.901 581.244	64°	84 9? 95	75 8? 78	85°	7.85	1.0276	1.9488
~~4.0~~ 2.0	10	581.944 592.166	64°	98 106 106	81 87 86	94°	13.73	1.0292	1.9549
6.0	10								
8.0	10								
						Average		1.0317	1.8887

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date *Oct. 19th 1979* Box No. *Nutech #1*

Barometric pressure, P_b = *30.30* in. Hg Dry gas meter No. ______

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test — Meter t_w, °F	Temperature: Dry gas meter — Inlet t_{di}, °F	Temperature: Dry gas meter — Outlet t_{do}, °F	Temperature: Dry gas meter — Average t_d, °F	Time θ, min	γ	ΔH@
0.5	5	207.434 212.452	62°			62° 68° 73°	13.20	1.0047	1.8850
1.0	5	212.452 217.522	62°			72° 74° 76°	9.47	1.0004	1.9114
~~2.0~~ 1.5	~~10~~ 5	217.522 222.724	62°			78° 80° 82°	7.80	.9933	1.9271
~~4.0~~ 2.0	10	222.724 233.173	62°			82° 85° 87°	13.58	.9945	1.929
6.0	10								
8.0	10								
							Average	.9994	1.9131

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	ΔH@: $\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

ΔH@ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date *Oct. 19th 1979* Box No. *Nutch 5*

Barometric pressure, P_b = *30.30* in. Hg Dry gas meter No. ______

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test: Meter t_w, °F	Temperature: Dry gas meter: Inlet t_{di}, °F	Temperature: Dry gas meter: Outlet t_{do}, °F	Temperature: Dry gas meter: Average t_d, °F	Time θ, min	γ	$\Delta H_@$
0.5	5	421.924 426.878	63°			58° 60° 62°	12.60	1.0022	1.7473
1.0	5	426.878 431.901	62°			63° 65° 67°	9.18	.9987	1.8303
1.5	7.5	431.901 436.972	62°			68° 70° 72°	7.69	.9974	1.9035
2.0	10	436.972 447.272	62°			71° 76° 80°	13.43	.9920	1.9185
6.0	10								
8.0	10								
						Average		.9975	1.8499

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

Date Oct. 19th 1979 Box No. 1227

Barometric pressure, P_b = 30.30 in. Hg Dry gas meter No. ______

Orifice manometer setting, ΔH, in. H_2O	Gas volume wet test meter V_w, ft^3	Gas volume dry gas meter V_d, ft^3	Temperature: Wet test: Meter t_w, °F	Temperature: Dry gas meter: Inlet t_{di}, °F	Temperature: Dry gas meter: Outlet t_{do}, °F	Temperature: Dry gas meter: Average t_d, °F	Time θ, min	γ	$\Delta H_@$
0.5	5	245.156 249.963	63°	64 72 80	64 66 69	69°	12.75	1.0503	1.7587
1.0	5	249.963 254.884	63°	76 87 92	75 72 76	79°	9.42	1.0446	1.8844
1.5	5	254.884 259.928	63°	86 98 10[illegible]	76 79 80	86.5	7.87	1.0320	1.9459
2.0	10	259.928 270.248	63°	91 105 106	81 83 87	92	13.8	1.0177	1.9745
6.0	10								
8.0	10								
						Average		1.0362	1.8908

Calculations

ΔH	$\frac{\Delta H}{13.6}$	γ: $\frac{V_w P_b (t_d + 460)}{V_d\left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$	$\Delta H_@$: $\frac{0.0317\ \Delta H}{P_b\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.147		
4.0	0.294		
6.0	0.431		
8.0	0.588		

γ = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

$\Delta H_@$ = Orifice pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in. H_2O. Tolerance - ± 0.15

BY J. D. O. DATE 8-2-79 WESTON SHEET ____ OF ____
CHKD BY ____ DATE ____ W.O. NO. ____
PROJECT ____
SUBJECT Nozzles

Nominal 1/8"

L = 0.118

B = 0.120

Nominal 3/8"

II = 0.375 III = 0.37

IV = 0.356 VI = 0.3

V = 0.367

A = 0.375

Nominal 3/16"

III = 0.186

M = 0.179 ✓

C = 0.175

D = 0.188 ✓

Q = 0.197 ✓

Nominal 7/16"

E = 0.400

Nominal 1/2"

IX = 0.495

F = 0.490

G = 0.500

Nominal 1/4"

I = 0.250

N = 0.250

O = 0.238

R = 0.227

Nominal 9/16"

H = 0.559

I = 0.560

Nominal 5/16"

D = 0.306

E = 0.303

F = 0.313

Nominal 5/8"

J = 0.620 K = 0.620

PITOT TUBE IDENTIFICATION NUMBER: 4 DATE: 12/25/78

CALIBRATED BY: Buse / Ru

	"A" SIDE CALIBRATION			
RUN NO.	Δ p_{std} cm H_2O (in. H_2O)	Δ $p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.23	1.75	.838	
2	0.65	0.90	.850	
3	0.32	0.44	.853	
		AVERAGE		
4	.016	.022	.853	

AVG. .848

	"B" SIDE CALIBRATION"			
RUN NO.	Δ p_{std} cm H_2O (in. H_2O)	Δ $p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.23	1.76	.836	
2	0.65	0.91	.845	
3	0.32	0.44	.853	
		AVERAGE		
4	.016	.021	.873	

AVG. .852

DEV. = $C_{p(S)} - C_{p(S)(avg.)}$ (MUST BE ≤ 0.01)

C_p DIFFERENCE: $A_{avg} - B_{avg}$ = ______ (MUST BE ≤ 0.01)

Pitot tube calibration data.

PITOT TUBE IDENTIFICATION NUMBER: 6 DATE: 12/25/78

CALIBRATED BY: Bwe / Kw

	"A" SIDE CALIBRATION			
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.30	1.79	.852	
2	0.65	.89	.855	
3	0.32	0.44	.853	
		AVERAGE		
4	.016	.023	.834	

AVG. .848

	"B" SIDE CALIBRATION"			
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.30	1.80	.850	
2	0.65	.89	.855	
3	0.32	0.44	.853	
		AVERAGE		
4	.016	.024	.816	

.844

DEV. = $\underline{C_{p(S)} - C_{p(S)(avg.)}}$ (MUST BE $\leq$ 0.01)

C_p DIFFERENCE: $A_{avg} - B_{avg}$ = ________ (MUST BE $\leq$ 0.01)

Pitot tube calibration data.

PITOT TUBE IDENTIFICATION NUMBER: 1 DATE: 12/28/78

CALIBRATED BY: Burr / Lee

	"A" SIDE CALIBRATION			
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.23	1.74	0.832	
2	0.65	.88	.859	
3	0.32	.43	.863	
		AVERAGE		
4	.016	.022	.853	

.852 avg

	"B" SIDE CALIBRATION"			
RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.23	1.78	.831	
2	0.65	.89	.855	
3	0.32	.44	.853	
		AVERAGE		
4	.016	.022	.853	

.848 avg.

DEV. = $C_p(S) - C_p(S)(avg.)$ (MUST BE $\leq$ 0.01)

C_p DIFFERENCE: $A_{avg} - B_{avg}$ = ______ (MUST BE $\leq$ 0.01)

Pitot tube calibration data.

PITOT TUBE IDENTIFICATION NUMBER: 7 DATE: 12/28/78

CALIBRATED BY: BWC / KW

"A" SIDE CALIBRATION

RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.30	1.88	.832	
2	0.65	.91	.845	
3	0.32	0.44	.853	
		AVERAGE		
4	.016	.022	.853	

AVG. .846

"B" SIDE CALIBRATION"

RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(S)}$	DEV.
1	1.30	1.86	.836	
2	0.65	.89	.855	
3	0.32	.43	.863	
		AVERAGE		
4	.016	.025	~~0.80~~	

AVG. .851

DEV. = $C_p(S) - C_p(S)(avg.)$ (MUST BE $\leq$ 0.01)

C_p DIFFERENCE: $A_{avg} - B_{avg}$ = ______ (MUST BE $\leq$ 0.01)

Pitot tube calibration data.

Probe	Temp °F 100	150	200	250
1-3'	15	30	4[illegible]	50
2-3'	14	29	38	[illegible]
1-6'	22	38	52	60
2-6'	20	37	50	60
1-7'	36	50	72	77

Sample case thermometers:
① Adj. filt. chamber thermometers to boiling pt. (212°F), OK
② Adj. control box & exit imp. thermometers to ice pt. (32°F). OK
③ Check pyrometers & thermocouples @ B.P. & ice pts. OK ±2°F.

Calibration Check: Nomographs

Laboratory Weston by BLJ

Date 3-18-79

(1) C Factor Adjustment

Probe 1	Probe 2	Probe 3
$C_p =$ ______	$C_p =$ ______	$C_p =$ ______

If $C_p > 0.87$ or $C_p < 0.83$

$C_{adj} = C \dfrac{C_p^2}{(0.85)^2}$	$C_{adj} = C \dfrac{C_p^2}{(0.85)^2}$	$C_{adj} = C \dfrac{C_p^2}{(0.85)^2}$
$= C \dfrac{(\quad)^2}{(0.85)^2}$	$= C \dfrac{(\quad)^2}{(0.85)^2}$	$= C \dfrac{(\quad)^2}{(0.85)^2}$
$= C(\quad).$	$= C(\quad).$	$= C(\quad).$

(2) Accuracy (±10% Deviation acceptable)

(a) K-factor line, ΔH and Δp scales

Aline	Set	1	ΔH Reading Nomograph 2	3	Nomograph 4	5
$\Delta p = 0.001$; $\Delta H = 0.1$	$\Delta p = 0.01$	1.02	0.97	0.93	1.00	0.9
	$\Delta p = 0.1$	10.0	9.4	8.7	9.8	8.6
$\Delta p = 10.0$: $\Delta H = 10.0$	$\Delta p = 1.0$	1.02	1.02	1.06	0.99	1.0[redacted]
	$\Delta p = 0.1$	0.103	0.108	0.108	0.100	0.1[redacted]2
$\Delta p = 0.1$: $\Delta H = 1.0$	$\Delta p = 1.0$	9.9	9.4	9.5	9.9	9.[redacted]
	$\Delta p = 0.01$	0.101	0.104	0.106	0.102	0.106

(b) C, t_s and D_n scales

ΔH, calc.	C	D_n	t_s (°F)	Δp	1	ΔH Readings Nomograph 2	3	Nomograph 4	[redacted]
0.47	2.0	0.5	2500	0.02	0.47	0.49	0.51	0.48	0.49
8.6	1.5	0.4	1500	0.8	8.7	8.6	8.6	9.0	8.[redacted]
0.31	1.0	0.3	1000	0.1	0.32	0.32	0.33	0.31	0.[redacted]3
4.7	0.7	0.25	500	3.0	4.8	4.7	4.8	4.8	4.7
0.60	0.5	0.2	200	0.9	0.64	0.65	0.66	0.62	0[redacted]6

$$\Delta H_{calc} = K_@ \, C \, \frac{D_n^4}{T_s} \, \Delta p$$

$K_@ = 5.507 \times 10^5$

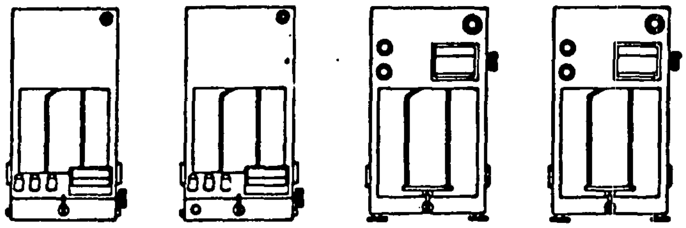
$\boxed{1, 2, 4 \text{ OK}}$

3, 5 Unacceptable

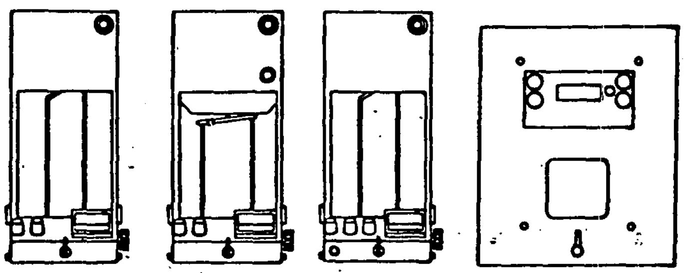
Serviced by
Mettler
INSTRUMENT CORPORATION
609-448-3000

DATE SERVICED	SERIAL NO.
7-9-79	388106
TECHNICIAN	
Joe Rogowicz	

Mettler Analytical Balances Performance Data, Contd.



H51AR H54AR H72 H78AR



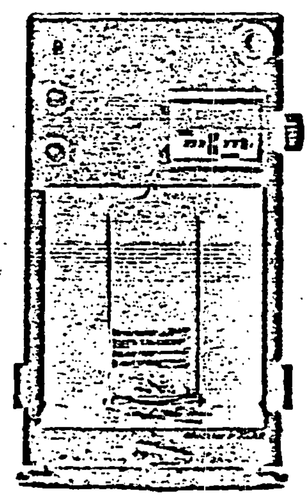
H311 H315 H542 M5

Specially designed, low-cost Student Models H72 and H78AR now available

Two economical balances with digital readout and weight knobs at eye level above weighing compartment. Big readout numerals and clearly labeled controls make it easy for the novice. Weight knob direction arrows and rapid filling guide keep students on target and shorten weighing time significantly. Designed to hold their own through the academic storm: a weight knob interlock avoids abrupt weight application. Slip clutches prevent forcing of weight knobs. And, in the H78AR, an air release system safeguards knife edges.

Model H78AR buyers receive a condensed instruction label that can be attached to balance. Pads of weighing instructions and overhead transparencies on operating procedures are included in packing carton.

See specifications in table.



1-909-78AR

H78AR

Economical student model. Same as H72 except with air release system. Protective features enable 2-year warranty even in school lab use.

Special Features	H78AR
Air Release System	
Automatic Preweighing	
Optical Range Taring	
Full Range Taring	
Capacity Weighing Range (g) Taring in Optical Range (g) Additional Tare Weight (g) Total (g)	 0-160 — — 160
Precision Standard Deviation (mg)	 ±0.05
Readability Analog Scale-Est. (mg) Digital Reading Device-Direct (mg)	 — 0.1
Optical Scale Range (mg) 1 Scale Div (mg) 1 Digital Step (mg)	 0-1000 10 0.1
Filling Guide 1 Scale Div (mg)	 100
Built-in Weights Set of Wts (g) Additional Tare Wt (g) Accuracy Ea Wt Comb (mg) 1 Digital Step (g)	 159 — ±0.25 1
Taring System Max Tare (g) By Setting Optical Scale to Zero (g) By Use of Built-in Wts (g)	 159 — 159
Pan Dia x Bow H (cm)	8.9x18
Housing LxW (cm) H (cm)	 46x24 41
Chamber LxW (cm) H (cm)	 17x20 20
Shp Wt (kg/lb)	18/40
Net Wt (kg)	11
Cat. No.	1-909-78AR
Ea	1195.00

THE PENNSYLVANIA STATE UNIVERSITY
226 FENSKE LABORATORY
UNIVERSITY PARK, PENNSYLVANIA 16802

Center for Air Environment Studies

Area Code 814
865-1415

June 15, 1979

Mr. James W. Davison
Air Sampling Supervisor
Roy F. Weston, Incorporated
Weston Way
West Chester, Pennsylvania 19380

Dear Mr. Davison:

Five persons from your corporation attended the Visible Emissions Evaluation Seminar at The Pennsylvania State University on May 22-23, 1979. Following is a list of the attendees and their performance:

Name	Certified
C. Dobroski	Yes
B. Jackson	Yes
N. Kaufman	No
T. Moxon	Yes
J. O'Neill	Yes

Certificates and letters will be mailed to each participant.

Sincerely,

Robert Jennings Heinsohn

Robert Jennings Heinsohn
Professor, Mechanical Engineering
and Project Director

RJH/mg

cc: Vern Irwin

Appendix E

Project Participants

APPENDIX E

PROJECT PARTICIPANTS

The following Weston employees participated in this project:

Peter J. Marks Vice President, Laboratory Services	econENVIRONomics Division
Barry L. Jackson Supervisor, Air Testing	econENVIRONomics Division
Jeffery D. O'Neill Project Scientist	econENVIRONomics Division
Gregory A. Celiano Assistant Project Scientist	econENVIRONomics Division
Charles Dobroski Assistant Project Scientist	econENVIRONomics Division
Theodore Moxon Senior Laboratory Technician	econENVIRONomics Division
Andrew Watkins Assistant Project Scientist	econENVIRONomics Division
Nancy Goldberg Chemist	econENVIRONomics Division
Nancy Robertson Laboratory Technician	econENVIRONomics Division
David Ralston Laboratory Technician	econENVIRONomics Division
Robert Newton Laboratory Technician	econENVIRONomics Division
Virginia McGlincy Laboratory Technician	econENVIRONomics Division

Scott Stanley Laboratory Technician	econENVIRONomics Division
Thomas Feeley Laboratory Technician	econENVIRONomics Division
Emily Zinser Laboratory Technician	econENVIRONomics Division