Commonwealth of Pennsylvania
Environmental Resources
August 22, 1988

Subject: Source Test Review

To: Data File
Faylor-Middlecreek, Inc.
Winfield, Union County

From: John S. Pitulski
Air Quality Program Specialist
Division of Technical Services and Monitoring
Bureau of Air Quality Control

Through: Chief, Source Testing and Monitoring Section

The batch-mix asphalt production plant operated by Faylor-Middlecreek, Inc. in Union Township uses reclaimed/reprocessed fuel oil as its primary firing fuel. Maximum production capacity of the unit is 300 tons per hour. Emissions from the plant are controlled by a knock-out chamber and baghouse collector manufactured by McCarter Corporation.

NSPS particulate compliance testing was conducted by Mease Engineering Associates at the exhaust stack servicing the facility. The three tests were conducted in accordance with the applicable test methods and the results appear to be valid. The tests are acceptable to the Department.

The following information was extracted from the test report:

Test Date	6/27/88	6/27/88	6/28/88
Test Run Number	1	2	3
Production Rate During Test (tons/hr)	226	228	224
Volumetric Flowrate (dscfm)	31300	33100	31300
Mass Emission Rate (lb/hr)	2.87	2.02	1.81
Emission Concentration (gr/dscf)	0.011	0.007	0.007
Allowable Emission Concentration (gr/dscf)	0.04	0.04	0.04

COMMONWEALTH OF PENNSYLVANIA

August 9, 1988

SUBJECT: Test Report Review
Faylor-Middlecreek, Inc.
Union Township, Union County
60-303-001A

TO: L. Blaine DeHaven
Chief, Source Testing & Monitoring Section

FROM: Richard L. Maxwell, Jr.
Chief, Engineering Services
Bureau of Air Quality Control
Williamsport Regional Office

Enclosed is a copy of a test report submitted for particulate source testing performed on 6/27 and 28, 1988 on a batch asphalt plant by Mease Engineering Associates. The respective plant is subject to NSPS Subpart I. Would you please have someone on your staff review this report for Chapter 139 conformance, etc.

A copy of Jim Orr's test observation memo is also enclosed. As far as we are concerned, Mr. Orr's opacity observations satisfy the NSPS visible emission observation requirement.

RLM/skb

Enclosures

cc: File

JC
8/26/88

COMMONWEALTH OF PENNSYLVANIA

July 14, 1988

SUBJECT: Faylor-Middlecreek - Asphalt Plant
Winfield, Union County
File No. 60-303-001A
AP File # 60-001

TO: File

THROUGH: John E. Arthaudault
Williamsport District Supervisor

Richard L. Maxwell, Jr.
Chief, Engineering Services

FROM: James R. Orr JRO
Air Quality Specialist
Williamsport District Office

On June 27, 1988 I observed the second particulate compliance test conducted by Mease Engineering Associates. Mike Mease was in charge of the test crew. Al Mabus of Faylor was also on-site during all three tests.

When I first arrived on-site, the first particulate test had already been completed. Mike said that the first test started at 6:15 a.m. and ended at 8:18 a.m. Mike also said that they pulled 53 cubic feet of air during the first test. Al said that the plant was producing base and top asphalt at 200 to 210 tons/hour.

The second test started at 8:47 a.m. I first checked the reverse pulse header pressure at the manifold on top of the fabric collector. The pressure was 80 psi. The collector was pulsing approximately every 15 seconds when the pulse cycle was turned on. Al said that they had decided to try this method to keep a good cake buildup on the bags. He said that the asphalt plant operator would watch the collector pressure drop and when the pressure drop would reach approximately 7 inches, he would turn the cleaning pulse on. The collector would then pulse every 15 seconds until the collector pressure drop was approximately 3 inches. The plant operator would then turn the pulse cycle off. This procedure will be followed in the future.

At 9:05 a.m. I noted the following plant operating conditions:

Collector stack temperature - 260°F
Collector pressure drop - 5.8 inches
Stone temperature - 340°F
Collector draft - (-).44 inches
Product being produced - base asphalt

After observing these operating conditions, I conducted visible emission observations of the collector exhaust. I conducted my official observation from 9:20 a.m. to 9:50 a.m. (see attached visible emission observation record sheet). During my official observation period and subsequent observations, I could not detect even one visible puff from the collector exhaust.

Al told me that he had been in the collector on Saturday, June 25, caulking and sealing the bags.

At 10:36 a.m. I again noted the following plant operating conditions:

Collector stack temperature - 220°F
Collector pressure drop - 3.4 inches
Stone temperature - 358°F
Collector draft - (-).38 inches
Product being produced - top asphalt

After checking the operating data, Neal Klinger, plant supervisor, and I took a sample of the RC-100 oil from the storage tank. Prior to taking the sample, Neal looked up the last delivery slip from Baumgardner Oil. The oil was delivered on June 23, 1988. The ticket number was 2015 and 6,203 gallons were delivered. The oil sample was taken using the company's thief sampler. A large enough sample was taken to split between the company and myself. The oil sample taken would be representative of what was being burned in the dryer burner.

The second compliance test ended at 11:10 a.m. I did not observe the leak check after the end of this test. Mike Mease did assure me that the leak test was okay.

During my time at the plant I noted dust coming from the collector dust loadout area. When I had a chance I would go over to the loadout area and observe the operation. The dust from the collector hopper is transferred to a holding bin on top of a truck loadout area. The dust from the holding bin is transferred to a large dump truck via a screw conveyor with a manually operated water spray. I asked the loadout operator why he was not using the water in the screw conveyor all the time. He said that he puts a dry layer of dust in the bed of truck first, and then turns on the water in the screw conveyor to load the rest of the truck. I asked why he had to put this dry layer of dust in first. He said that if he did not, the watered down dust would be harder to unload.

I did eventually point the dust problem out to Al Mabus. I stated that I observed enough dust from this operation crossing the company's property that some kind of corrective action would have to be done. Al said that he would look into it.

After much discussion and checking orders, it was decided that a third compliance test would be put off until the next morning.

I again returned to the plant on the morning of June 28, 1988 for the third compliance test. The third test started at 6:32 a.m.

I first checked the reverse pulse header pressure at the manifold on the top of the fabric collector. The pressure was still 80 psi.

At 6:57 a.m. I noted the following plant operating conditions:

Collector stack temperature - 260°F
Collector pressure drop - 6 inches
Stone temperature - 327°F
Collector draft - (-).37 inches
Product being produced - top asphalt

During the course of this third test, I made frequent observations of the collector exhaust. As like the observations made the previous day, not one puff from the exhaust was noted.

I checked the plant's operating condition three more times during this test. The following are the times and observation conditions:

7:37 a.m.

Collector stack temperature - 250°F
Collector pressure drop - 7 inches
Stone temperature - 321°F
Collector draft - (-).4 inches
Product being produced - top asphalt

8:09 a.m.

Collector stack temperature - 290°F
Collector pressure drop - 5.8 inches
Stone temperature - 324°F
Collector draft - (-).36 inches
Product being produced - base asphalt

8:32 a.m.

Collector stack temperature - 250°F
Collector pressure drop - 4.8 inches
Stone temperature - 325°F
Collector draft - (-).44 inches
Product being produced - top asphalt

The third test ended at 8:34 a.m. I did observe the leak check at the end of the test. The leak test was conducted for approximately one minute and all looked to be in order.

Al then checked the asphalt batch slips for the test period. He said that they produced approximately 460 tons of asphalt or an hourly average of 230 tons.

Al said that he would call Rich Maxwell with the result of the three tests when he hears from Mike Mease. He also said that he would work on the dusting problem from the dust loadout operation.

JRO/bls

Note: This report will also serve as the facility compliance inspection.

E-38 REV. 8/78

Commonwealth of Pennsylvania
Department of Environmental Resources
Bureau of Air Quality Control

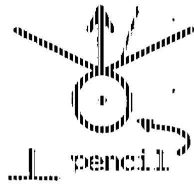
File No. 60-303-001A

VISIBLE EMISSIONS OBSERVATION RECORD

Description of Source: Asphalt Plant

Owner of Source: Faylor-Middlecreek

Location of Source: Winfield, Union Co.



Observers Name: James Orr

Title: A.Q.S.

Date: 6/27/88

Time interval: from 9:20A to 9:50A

PART OF MINUTES

MINUTES

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

Other Comments:

Distance to source: Appx 100 ft

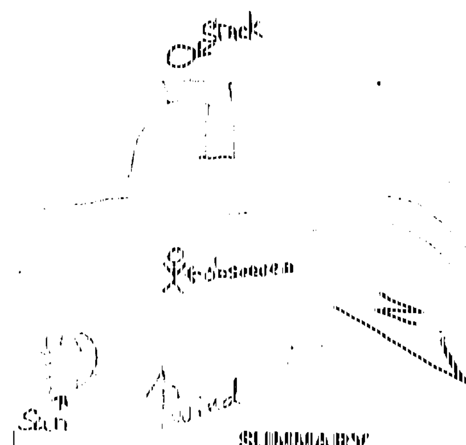
Wind speed and direction: 5-10 mph

Sky conditions: Clear

Plume color:

Plume background: Sky

Sketch with source, observer, and north indicated:



SUMMARY

Opacity	No. of Readings	Total Time Minutes
< 20%		30
≥ 20%		
≥ 60%		

SOURCE TEST REPORT

Particulate Emissions

Faylor Middlecreek
Winfield, Pennsylvania
June, 1988

RECEIVED
AUG 03 1988
DER-AIR QUALITY CONTROL
WILLIAMSPORT REGION

Client: Faylor Middlecreek
P.O. Box 177
Winfield, Pennsylvania

Testing Firm: Mease Engineering Associates
P.O. Box 721
State College, Pennsylvania

CONTENTS

SECTION 1.0

Summary of Results

CLIENT:	Faylor Middlecreek, Inc. P.O. Box 177 Winfield, Pennsylvania
TEST LOCATION:	Faylor Middlecreek, Inc. P.O. Box 177 Winfield, Pennsylvania
UNIT TESTED:	Asphalt Dryer/Baghouse
TEST PURPOSE:	Determine the particulate emission rate as required by the Pennsylvania Department of Environmental Resources to determine compliance with applicable air pollution emission regulations.
TEST EQUIPMENT:	Research Appliance Company "STAKSAMPLR" Portable Gas Sampler, Model #2343.
TEST METHODS:	Environmental Protection Agency Method 5 and as modified by the Pennsylvania Dept. Environmental Resources 'Source Testing Manual"
TEST OBSERVER:	Mr. Jim Orr Pennsylvania Department of Environmental Resources
TEST PERSONNEL:	Michael J. Mease Miles W. Carpenter
TESTING FIRM:	Mease Engineering Associates P.O. Box 721 State College, PA 16804
TEST ENGINEER:	

Michael J. Mease

Michael J. Mease
Pennsylvania Professional Engineer No. 26809-E

TEST DATA SUMMARY

Process: Asphalt Dryer/Baghouse

	Run #1	Run #2	Run #3
Test Date and Times	06-27-88 6:14- 8:18 am	06-27-88 8:47am- 11:07 am	06-28-88 6:32 - 8:34 am
Stack Diameter, Inches	51.125	51.125	51.125
Sampling Nozzle Diameter, Inches	0.189	0.189	0.189
Testing Time, Minutes	120	120	120
Stack Gas Volume Sampled, ACF	53.075	54.119	53.479
Stack Gas Volume Sampled, SCF @ 70 deg. F., 29.92 in.Hg.,dry	52.0	54.1	51.3
Stack Gas Temperature, deg. F.	227	217	228
Stack Gas Moisture Content, %	15.4	15.1	15.0
Stack Gas Composition,			
%CO2	4.27	3.70	3.87
%O2	16.8	16.8	16.2
Stack Gas Molecular Weight	27.6	27.6	27.6
Stack Gas Velocity, Ft./Sec.	55.6	57.8	55.5
Stack Gas Flowrate, ACFM	47,600	49,500	47,400
Stack Gas Flowrate, SCFM @ 70 deg. F., 29.92 in.Hg.,dry	31,300	33,100	31,300
Particulate Captured, Grams (Front Half & Back Insoluble)	0.0361	0.0250	0.0224
Particulate Concentration,			
Grains/SCF	0.011	0.007	0.007
Grains/ACF	0.007	0.005	0.004
Particulate Mass Rate, Lb./Hr.	2.87	2.02	1.81
Percent Isokinetic of Test	101	99.7	99.9

TEST PROCEDURE SUMMARY

The sampling ports on the 51.125 inch diameter stack were located approximately 160 inches downstream (3.13 diameters) from a flow disturbance and approximately 46 inches (0.90 diameters) from an upstream flow disturbance. Two separate traverses of twelve points each were sampled for a total of twenty-four sampling points. The sampling points were located at the following distances, in inches, from the inside stack walls: 1.07, 3.43, 6.03, 9.05, 12.78, 18.20, 32.92, 38.34, 42.08, 45.09, 47.70, and 50.05.

Each point was sampled for a period of five minutes each for a total test time of one hundred twenty minutes.

The tests followed the EPA Method 5 procedures and those procedures as required by the Pennsylvania Department of Environmental Resources. These included washing the probe with both acetone and distilled water and the analysis of impinger solutions as outlined in Section 3.0 of this report.

Test No. 1:

The test began at 6:14 am and concluded at 8:18 am without interruption.

TEST PROCEDURE SUMMARY

Test No. 2:

Test No. 2 began at 8:47 am and was interrupted at 10:05 am when the process shut down. The process resumed and the test re-started at 10:22 and continued until completion at 11:07 am.

Test No. 3:

The asphalt plant operators were unsure of the amount of product that they could produce during the mid and late afternoon hours on the 27th and therefore decided to perform the third test on the following day, June 28th.

The test began at 6:32 am on June 28th and continued without interruption until 8:34 am.

SAMPLE RESULTS SUMMARY

Process emissions were calculated by using the front half of the sampling train and the insoluble portion of the rear half of the sampling train. The captured particulate was a light brown color, barely visible on the white fiberglass filters.

The average particulate concentration was determined to be 0.008 grains per standard cubic foot. The average particulate emission rate was determined to be 2.23 pounds per hour.

faylor
middlecreek
inc

July 26, 1988

SUBJECT: WINFIELD BLACKTOP PLANT PROCESS DESCRIPTION
COMPLIANCE TEST #3

Mr. Michael J. Mease, President
Mease Engineering Associates
PO Box 721
State College, PA 16804

Dear Mr. Mease:

So that you may complete your stack test report, I am enclosing the following information:

1) Winfield plant process description
2) McCarter baghouse brochure
3) B.H.A. technical bulletin: scrimless bags
4) D.E.R. letter, October 21, 1987
5) E.C.C. report
6) May 26, 1988 unofficial stack test report
7) F.M.I. letter to D.E.R. - puffing, October 26, 1980

Should you have any questions concerning this information, please contact Albert Mabus at our Winfield office, (717)524-2251.

Sincerely,

M. Lee Eberhart

M. LEE EBERHART, JR.
President

AM/cfb

Enclosure

p.o. box 177 winfield, pennsylvania 17889 phone (717) 524-2251
fax no. (717) 524-7995

I PROCESS DESCRIPTION

The asphalt plant operated by Faylor-Middlecreek, Inc. in Winfield, Pennsylvania was designed by The McCarter Corporation, Norristown, Pennsylvania. The batch asphalt plant is a new model M-300-18. The primary collector is a new McCarter McC 10'x 10' knockout box. The plant was installed and put on line in the Spring of 1987. The knockout box is followed by a McCarter MCC-648-S baghouse. This baghouse was first installed at Winfield in the Spring of 1979. Because of the larger plant, air flows were expected increase. To maintain the air to cloth ration the baghouse was retrofitted with new bags and cages; half of which were 9' and the other half being 10'. Previously all bags and cages were 9' long. After a series of problems and test failures which will be discussed later, a complete new set of 648 14 ounce Nomex bags with Teflon impregnation were installed in the baghouse. The "NX 66" bags were purchased from B.H.A. Group, Inc., Kansas City, Missouri. They were installed from April 14-16, 1988.

The process begins with the sized aggregate being loaded into one of the seven cold feed aggregate bins located at the plant(See Figure #1). The aggregate is removed, in the desired proportions, from the storage bins by calibrated belt feeders. The stone is loaded from the belt feeders onto a gathering conveyor located underneath the storage bins and feeders. An approximate ration for ID-2 wearing(top) would be 55%-60% PA #1 aggregate(Screenings) and 40%-45% #1B aggregate. An approximate ratio for base material(B.C.B.C. or ID-2 binder) would be 30%-35% PA #1 aggregate and 65%-70% 2B aggregate.

From the gathering conveyor the aggregate discharges to another conveyor which in turn empties onto a 300" x 10' slinger conveyor. This slinger conveyor provides a uniform feed to the aggregate dryer. Once in the rotary dryer the stone is heated from 250° to 350° F. The temperature of the raw material is taken continuously from a point located at the bottom of the hot elevator. The average temperature of the material leaving the dryer during the three compliance tests was 331° F. This temperature was slightly higher than normal because of cold conditions and a longer than usual haul to the jobsite.

The dryer is 108" diameter x 34' long. It has 18 flights and is driven by two(2) 75 horsepower motors. The dryer rotates about 8½ times per minute. The dryer is fired by a Hauck 111.5 million BTU Starjet oil burner. The model number is SJ-580. At rated capacity the burner will fire at 81 million BTU or 73% capacity. The burner is driven by a 75 horsepower turbo blower.

The heated aggregate is discharged from the rotary dryer into the vertical hot elevator. The elevator is enclosed by 28" x 64" metal casing. The buckets, which are located in every second link, are 18" x 10" x 10½" in size. The elevator is driven by a 30 horsepower motor. The elevator is rated at 350 tons per hour with 3/4 full buckets.

The aggregate discharges from the hot elevator onto a 6' x 16', 4½ deck inclined Deister screen. The screen is powered by a 30 horsepower motor.

Once sized the aggregate falls into one of four hot bins. The hot bins have combined a capacity of 130 tons. Each bin is equipped with a high and low bin indicator. The gates to the hot bins are opened and closed by air cylinders.

The aggregate drops from the hot bins into the 180 Cu. ft. weigh hopper. At the same time, the asphalt which is heated to 300° F., is being loaded into a separate asphalt weigh bucket. Once the desired weights are reached the aggregate will discharge, first, into the 12,000 Lb. mixer. (CIMA rated live zone = 180 Cu. Ft.: 67% of live zone = 12,000 Lb. batch) The aggregate is mixed dry for 10 seconds. After dry mixing, the asphalt is injected into the mixer and the asphalt and aggregate are mixed together for an additional 30 seconds. Roughly 6.5% asphalt is added to ID-2 wearing(top) mixed and 3.5% - 4% asphalt is added to base mixes. The mixer is driven by a 200 horsepower motor.

Once mixed the blacktop can be dumped directly from the mixers 35" x 38" gate to the waiting truck or it can be transferred from the mixer to a 75 horsepower drag conveyor and then to one of two 168 ton storage silos. From the silos the blacktop can be dumped into the waiting truck. Acceptable temperature for finished blacktop range from 290° F. to 325° F.

Emissions are captured at various points on the plant and are routed by low pressure, low resistance duct work to the McC 10' x 10' knockout box where the larger particles settle out and are reintroduced into the hot elevator. The finer particles are drawn with the exhaust gas into the MCC-648-S baghouse.(See Supplement #1). Air is pulled through the plant by a 150 horsepower # 49 exhaust fan. During this test the average stack gas flow rate was 481,66 ACFM.

The clean and dirty side of the baghouse are separated by an air plenum. There are 12 compartments of bags with six on each side of the baghouse. Each compartment has nine rows of bags with six bags in each row or 54 bags in each compartment. One row of bags in each compartment was pulsed on "cleaned" every 15 seconds. The cleaning interval can be adjusted based upon what the static pressure readings are for the baghouse. A static pressure of 4-6 is preferable.

During the cleaning cycle the dust is knocked from the outside of the bags and falls to the bottom of the baghouse. The dust is removed from the baghouse by a screw conveyor. The "dust" or baghouse fines are removed by a 14" rotary air lock valve. From the rotary valve the fines are moved through 5" lines by a 40 horsepower continuous pneumatic blower. The dust is blown into a 100 ton storage silo. The dust is removed from the dust silo by a paddle auger. Water is introduced before the dust leaves the auger. The baghouse fines are loaded onto haul trucks for transport and stockpiling. Six and seven loads of dust were removed, respectively, from the silo on Monday, June 27 and Tuesday, June 28, 1988. A load of dust weighs 12-15 tons. Roughly 1,250 tons of blacktop were produced on each of those two days.

A 75 horsepower Sullair air compressor is used to operate the plant. Average plant production for the three tests was 226.0 tons per hour. ID-2 wearing(top) material accounted for 79.1% of the total plant production. Average fuel consumption during the three tests was 360 gallons per hour. The average fuel firing rate was 1.59 gallons per ton. The burner is fired with reprocessed, R-100, oil which is purchased from The Baumgardner Company, Fayetteville, PA. A sample of this oil was taken during the testing by D.E.R. Air Quality Inspector Jim Orr.

Process information taken by Albert Mabus a Faylor-Middlecreek, Inc. employee, has been summarized in Table 1. Plant production was determined by use of printed tickets. Fuel usage was determined by taking readings from a meter located before The Hauck burner. Static pressure and temperature readings were taken from gauges located in the control booth. These readings can be located in Section III(A-C). Extract on work sheets with stock gradations are also included with the readings.

Neil Klinger was the plant foreman. William Davis was the plant operator and Dayton Walls, Jr. was the blacktop technician during these tests.

II TEST HISTORY

As mentioned in Section I, the present baghouse was installed new at Winfield in 1979. The baghouse replaced a wet scrubber system. The baghouse was fitted with 648 9' bags and cages. Bags were replaced at least one time from 1979 to 1987. A stack test for SO_2 emissions was performed at the plant in September 1980.

In 1987 the Winfield plant was upgraded to a larger McCarter McC-300-18 model. Air flows were expected in increase and one-half of the 9' bags and cages were replaced by 10' gas and cages in order to maintain the 6.0 to 1 air to cloth ratio. All of the bags and cages were replaced with new cages and bags prior to initial start up in May of 1987. Upon inspection, it was observed that "puffing" was occurring after each cleaning cycle. Steps were taken to solve the problem. An air regulator was installed on the baghouse to reduce the pressure from 120 p.s.i.g. to 85 - 90 p.s.i.g. The cleaning sequence was changed so that the row of bags being cleaned was not immediately adjacent to the row which had been cleaned on the previous pulsing sequence. Covers were removed from the baghouse and numerous cages were found to be loose. These cages were tightened and a black light test was run on the baghouse. Two faulty solenoids were replaced and closer attention was paid to baghouse static pressure. The plant appeared to be in proper working order although puffing still existed. On August 31, 1987 a stack test, consisting of three particulate emissions tests were conducted at the plant. All three tests failed and the average grain loading was determined to be 0.099 Gr./SCF.

After the test, further investigation showed the bags which were installed in the Spring had "stretched" and were made with scrimless fabric. The bag manufacturer, Albarrie, had apparently used the wrong material when manufacturing the bags.(See Supplement #2). The bags were also found to have been subject to 100% bleed through. At this point the McCarter Corp. took an active role and immediately ordered a complete new set of 14 ounce Nomex bags with scrim from B.H.A. These bags were installed October 2-4, 1988 by Faylor-Middlecreek, Inc. and McCarter personnel. Rebagging appeared to have improved the problem, although there were still visible emissions. This view was shared by D.E.R. personnel and it was strongly suggested that retesting should be completed before the end of the 1987 season(Supplement #3).

The plant was retested on November 16-17, 1988. Again the three compliance tests failed. The average grain loading was 0.084 Gr./SCF. This was the last week in which the plant was operated in 1987. The new bags from B.H.A. had processed 25,000 tons of blacktop. Permission to start up in 1988 would be denied unless "convincing evidence" was presented to show that the problem could be solved.

The bags were once again checked for proper construction and bleed through. The B.H.A. bags were made of the proper material, however, they too had shown 100% bleed through. At this time a sample of dust was taken from the top of the baghouse's tube sheet. McCarter and B.H.A. had a bag and the dust tested by Environmental Consultant Company, Phoenix, Arizona. The most important finding of this study was that 50% of the particles were smaller than 1.5 microns; a size which is very difficult to capture with normal fabric. It was recommended that a change be made to B.H.A.'s "Nx 66" material which is 14 ounce Nomex fabric with Teflon impregnation(See Supplement #4).

These new bags were ordered from B.H.A. on February 29, 1988. The new bags were manufactured and shipped to Faylor-Middlecreek, Inc. in April 1988. The bags were installed by Faylor-Middlecreek, Inc. personnel on April 14-16, 1988. A McCarter Corp. employee supervised the final installation of the bags.

Upon start up a much cleaner stack was observed. Occasionally, random puffing was still apparent. A stack test was delayed until such time as the plant had sufficient material to conduct the tests. A private, one-hour, particulate test was conducted at the plant on May 26, 1988(See Supplement #5). The results of this test were shared immediately with the D.E.R. Several bags were known to be leaking. The grain loading, even with the leaking bags, was 0.025 Gr./SCF.

Prior to the official stack test on June 27-28, 1988, four bags were found to have holes around the collars which in turn had produced considerable leakage. These four bags were replaced and 30-40 other bags were checked for proper seals. Upon completion, no visible emissions were apparent from the stack at any time. The average particulate concentration during the official stack test was 0.008 Gr./SCF. At the time of testing the new "NX 66" bags had processed, roughly 46,000 tons of blacktop.

This successful test was the result of a concerted effort by Faylor-Middlecreek, Inc., McCarter, B.H.A., Mease Engineering and D.E.R. personnel. With the cost of the new bags, the rebagging effort, transportation, stack tests and various other time and materials, total investment in solving this problem could easily reach $ 60,000 - $ 70,000.

Process and "particulate" emission information, for each of the above mentioned tests, has been summarized in Table 1. The installation of the "NX 66" bags has resulted in a decrease of better than twelve times the emissions experienced during the initial test. This information should prove to be most valuable to anyone involved with this type of problem in the future.

Finally although there is no proof, it would seem that "puffing" has long been a problem at the Winfield plant. In a November 26, 1980 letter from S. Wayne Simmons to John P. Eagan, the problem of pulsing dust is addressed. There could be many reasons for this pulsing, but the problem sounds strikingly familiar to that which has only recently been corrected(See Supplement #6).

TABLE 1

SUMMARY OF PLANT OPERATING PARAMETER(8/31/87 - 6/28/88)

	DER Compliance Test #1			DER Compliance Test #2			FMI Private	DER Compliance Test #3		
Test Date	8/31/87	8/31/87	8/31/87	11/16/87	11/16/87	11/17/87	5/26/87	6/27/88	6/27/88	6/28/88
Test Number	1	2	3	1	2	3	1	1	2	3
Production Rate (Tons/Hour)	240	252	249	213	188	192	209	226	228	224
Fuel Firing Rate(Gals./Hour)	402	414	414	372	360	367	366	378	336	366
Fuel Usage(Gals./Ton)	1.68	1.64	1.66	1.75	1.91	1.91	1.75	1.67	1.47	1.63
Baghouse Static Pressure(Inches)	5.2	5.1	5.5	5.1	5.0	5.2	5.6	5.8	5.4	5.7
Stack Gas Flow Rate(ACFM)	54,500	52,600	51,000	53,400	52,600	53,700	47,200	47,600	49,500	47,400
Particulate Mass Rate(Lbs./Hour)	25.4	28.9	28.5	21.5	29.7	21.6	6.29	2.87	2.02	1.81
Particulate Concentration(Gr./SCF)	0.087	0.104	0.105	0.079	0.99	0.76	0.025	0.011	0.007	0.007
Mix Type: Percentage										
ID-2 Wearing(Top)	95.6%	62.6%	87.5%	26.4%	28.9%	3.8%	79.0%	87.6%	71.6%	78.3%
BCBC/ID-2 Binder(Base)	4.4%	37.4%	12.5%	73.6%	71.1%	96.2%	21.0%	12.4%	28.4%	21.7%
Bag Type/Manufacturer	(Albarrie 14% Nomex Scrimless Bags)			(B.H.A 14 Ounce Nomex Bags With Scrim)			(B.H.A. "NX 66" 4 Bags With Holes)	(B.H.A. "NX 66" 14 Ounce Teflon Coated Bags-No Leakage)		

III INDIVIDUAL TEST RESULTS

A) Test #1
Location: Winfield Blacktop Plant
Date: June 27, 1988
Time: 6:14 - 8:18 AM

Baghouse Static Pressure

Time	Pressure
6:27	6.0
6:52	6.0
7:13	6.0
7:31	5.8
7:50	6.0
8:10	5.8
8:21	5.0

$\bar{x} = 5.8$

Fuel Usage

Time	G.P.M.
6:30	6.5
6:50	6.0
7:11	6.0
7:33	6.0
7:54	6.0
8:12	7.0

$\bar{x} = 6.3$

Stack Temperature

Time	° F.
7:30	260
7:45	260
8:00	250
8:10	320
8:22	260

$\bar{x} = 270$

Elevator(Material) Temperature

Time	° F.
7:31	331

Elevator(Material) Temperature(Con't)

Time	° F.
7:45	329
8:00	344
8:10	321
8:22	340

$\bar{x}$ = 333

Pulsing: 15 Second Intervals
90 P.S.I.G.

Plant Production

Test #1:

Time	Job/Customer	Material	Tonnage
6:13		Plant Drainage	3.06
6:19	R8806	ID-2 Wearing "E"	22.10
6:25	R8806	ID-2 Wearing "E"	22.00
6:30	R8806	ID-2 Wearing "E"	17.00
6:34	R8806	ID-2 Wearing "E"	17.91
6:41	R8806	ID-2 Wearing "E"	22.55
6:47	R8806	ID-2 Wearing "E"	22.08
6:52	R8806	ID-2 Wearing "E"	21.07
6:59	R8806	ID-2 Wearing "E"	22.15
7:05	R8806	ID-2 Wearing "E"	22.16
7:10	R8806	ID-2 Wearing "E"	22.00
7:16	R8806	ID-2 Wearing "E"	22.03
7:20	R8806	ID-2 Wearing "E"	17.92
7:24	BR8054	ID-2 Wearing	10.17
7:27	BR8054	ID-2 Wearing	14.16
7:30	BR8054	ID-2 Wearing	11.13
7:35	R8806	ID-2 Wearing "E"	21.92
7:37	Silo-A	ID-2 Wearing "E"	4.02
7:52	Silo-A	ID-2 Wearing "E"	59.82
8:02	Silo-A	ID-2 Wearing "E"	36.15
8:08	BH8247	ID-2 Binder	18.08
8:12	BH8247	ID-2 Binder	17.69
8:17	Center State	BCBC 3.5	22.10

Totals:

ID-2 Wearing "E"	372.88
ID-2A Wearing	35.46
ID-2A Binder	35.71
BCBC 3.5%	22.10
	466.15 Tons

Testing Time: 124 Minutes
466.15 Tons
225.5 Tons Per Hour

IMMEREX EXTRACTION

Sp. Gr. of Bit. @ 77° F. Sp. Gr. of Agg. @ 77° F. Sp. Gr. of Solv. @ 77° F. Vol. of Bit'meter @ 77° F.		= 1.03 = 2.67 = 1.319 752.3
Wt. of orig. sample Wt. of extr. sample	—	784.7 720.0
Wt. of Extr. loss		64.7
Wt. of Bit'mr & extr. liq. Wt. of Bit'mr	—	1984 2147
Wt. of extr. liq.		983.7
Wt. of extr. liq. Wt. of extr. loss	—	983.7 64.7
Wt. of solvent		919.0
Wt. of solvent: (919.0)	÷	Vol. of solvent
Sp. Gr. of solvent (1.319)		696.7
Vol. of Bit'meter Vol. of solvent	—	752.3 696.7
Vol. of extr. loss		55.6
Vol. of extr. loss Sp. Gr. of Aggr	×	55.6 2.67
Alg. wt. of extr. loss		148.5
Alg. wt. of extr. loss Wt. of extr. loss	—	148.5 64.7
Alg. wt. of bit.		83.8
Sp. Gr. of Aggr. Sp. Gr. of bit.	—	2.67 1.03
Alg. Sp. Gr. of bit.		1.64
Alg. wt. of bit. (83.8)	÷	Vol. of bit.
Alg. Sp. Gr. of bit. (1.64)		51.1
Vol. of bit. Sp. Gr. of bit.	×	51.1 1.03
Wt. of bit.		52.6
Wt. of bit. (52.6)	÷	% of bit.
Wt. of orig. sample (784.7)		6.7 %
Wt. of orig. sample Wt. of bit.	—	784.7 52.6
Wt. of total aggr.		732.1
Wt. of extr. Wt. of bit.	—	64.7 52.6
Wt. of fines in sample		12.1

FAYLOR - MIDDLECREEK, INC.

Winfield, Pa. 17889

MIX: [illegible] "F" DATE: 6-22-83

COUNTY: [illegible] RTE: [illegible]

PLANT: [illegible]

TESTED BY: [illegible]

REMARKS: [illegible]

ROTAREX EXTRACTION

Wt. of sample & pan Wt. of pan	—	
Wt. of sample		
Wt. of aggr. & pan Wt. of pan	—	
Wt. of aggr.		
Extracted liq. Portion of liq.	÷	
Total extracted liq.		
Wt. of dish & ash Wt. of dish	—	
Wt. of ash		
Total of extracted liq. Wt. of ash (portion)	×	
Wt. of total ash		
Wt. of aggr. Wt. of total ash	+	
Wt. of total aggr.		
Wt. of sample Wt. of total aggr.	—	
Wt. of bit. in sample		
Wt. of bit. ( )	÷	% of bit.
Wt. of sample ( )		

SIEVE ANALYSIS

Sieve Sizes	Agg. Less ASH Grams	ASH Grams	Agg. Plus ASH Grams	% Passing	Uniformity Band	Hot Bin Grad.	Cold Bin Grad.	Spec.
200	22.9	14.3	37.2	5.0	2-8			
100	41.6		55.9	7.6	4-14			
50	73.2		87.5	12.0	5-17			
30	122.3		136.6	19	12-24			
16	186.5		200.8	27	22-34			
8	305.7		320.0	44	39-51			
4	492.7		507.0	69	58-75			
3/8	702.2		716.5	98	94-100			
1/2	717.8	14.3	732.1	100	100			
3/4								
1								
1 1/4								
1 1/2								
2								
2 1/2								

FAYLOR - MIDDLECREEK, INC.

Winfield, Pa. 17889

Contractor S.M.I. Mix ID-2W(E) Date 6-27-88

STOCK GRADATIONS

Sieve Sizes	S/S Stock	S/S Spec.	#10 L/S Stock	#10 L/S Spec.	#8 Sville Stock	#8 Sville Spec.	Cold Blend 29 %	Cold Blend 28 %	Cold Blend 43 %	Combined Gradings
200	48.6	2	75.1	9			.5	2.5		3
100	140.0	6	111.6	14			1.7	3.9		5.6
50	130.9	15	171.8	22			4.3	6.1		10.4
30	220.7	33	265.4	35			9.6	9.8		19.4
15	354.2	52	385.7	50 1	.3	2	15.0	14.0	.8	29.8
8	503.5	76	571.0	75 3	.5	3	22.0	21.0	1.2	44.2
4	651.3	97	762.2	99	3.6	25	28.0	24.7	10.7	66.4
3/8	665.2	100	766.1	100	12.9	90	29	25	38.7	95.7
1/2					14.3	100	29	28	43	100
3/4										
1		26-3	X = 45-3							
1 1/4		73	X = 42							
1 1/2			X=57							
2		100-57	= 43							
2 1/2										

HOT BIN GRADATIONS

Sieve Sizes	Gradations Bin 1	Gradations Bin 2	Gradations Bin 3	Gradations Bin 4	% Combination Bin 1 47 %	% Combination Bin 2 28 %	% Combination Bin 3 25 %	% Combination Bin 4 %	Comb. Grad.	Spec. Limits
200	2.2				1.0				1.0	
100	2.1				3.3				3.3	
50	19				8.9				8.9	
30	40.4				19.0				19.0	
16	63.3				29.7				29.7	
8	91.7	4.2	.7		43.0	1.1	.2		44.3	45
4	99.0	46.0	2.8		46.5	12.9	.7		65.1	
3/8	100	100	76.7		47	28	19.1		94.1	
1/2			100		47	28	25		100	
3/4										
1										
1 1/4										
1 1/2										
2										
2 1/2										

Combine Bins & 3&2 and 1

(A-B) X = C-B

64.0 - 3X = 35 - 3

61X = 32

X = 52 2 bin

100 - 52 = 48 3 bin

Combine Bins & 2&3 and 1

(A-B) X = C-B

92 - 3X = 45 - 3

89X = 42

X = 47 #1 bin

100 - 47 = 53

Combine Bins &

(A-B) X = C-B

Formula	%	Lbs.
Asphalt	6.6	
Bin #1	43.8	
Bin #2	26.2	
Bin #3	23.4	
Bin #4		
Total	100	

B) Test #2
Location: Winfield Blacktop Plant
Date: June 27, 1988
Time: 8:47 - 11:07 AM

Baghouse Static Pressure

Time	Pressure
8:53	5.6
9:12	6.0
9:30	4.6
9:31	6.0
9:50	4.6
10:27	4.0
10:51	6.0
11:04	6.2

$\bar{x}$ = 5.4

Fuel Usage

Time	G.P.M.
9:10	5.0
9:29	6.0
9:50	4.5
10:30	6.0
10:50	6.0
11:03	6.0

$\bar{x}$ = 5.6

Stack Temperature

Time	°F.
8:52	280
9:12	285
9:30	260
9:52	240
10:28	270
10:51	250
11:04	250

$\bar{x}$ = 262

Elevator(Material) Temperature

Time	°F.
8:52	344

Taylor Middlecreek Inc

Elevator(Material) Temperature

Time	°F.
9:12	318
9:30	323
9:52	317
10:28	365
10:51	336
11:04	330

$\bar{x} = 333$

Pulsing: 15 Second Intervals
90 P.S.I.G.

Plant Production

Test #2

Time	Job/Customer	Material	Tonnage
8:52	Center State	BCBC 3.5	16.10
8:57	BR8054	ID-2 Wearing	10.12
9:13	Silo-B	ID-2 Binder	60.03
9:21	Silo-B	ID-2 Binder	36.02
9:27	BR8054	ID-2 Wearing	14.09
9:30	BR8054	ID-2 Wearing	11.09
9:45	Silo-A	ID-2 Wearing "E"	60.01
10:00	Silo-A	ID-2 Wearing "E"	59.97
10:05 - 10:22	Plant Breakdown		
10:35	Silo-A	ID-2 Wearing "E"	60.00
10:40	Silo-A	ID-2 Wearing	12.00
10:53	Silo-A	ID-2 Wearing "E"	59.91
11:06	Silo-A	ID-2 Wearing "E"	50.54
11:13	Center State	BCBC 3.5	22.10

Totals:

ID-2 Wearing "E"	290.43
ID-2 Wearing	47.30
ID-2 Binder	96.05
BCBC 3.5	38.20
	471.98 Tons

Testing Time: 124 Minutes
471.98 Tons
228.4 Tons Per Hour

IMMEREX EXTRACTION

Sp. Gr. of Bit. @ 77° F. Sp. Gr. of Agg. @ 77° F. Sp. Gr. of Solv. @ 77° F. Vol. of Bit'meter @ 77° F.		= 1.03 = 2.67 = 1.319 752.3
Wt. of orig. sample Wt. of extr. sample	−	838.8 778.5
Wt. of Extr. loss		60.3
Wt. of Bit'mr & extr. liq. Wt. of Bit'mr	−	1196.7 214.7
Wt. of extr. liq.		982.0
Wt. of extr. liq. Wt. of extr. loss	−	982.0 60.3
Wt. of solvent		921.7
Wt. of solvent (921.7)	÷	Vol. of solvent
Sp. Gr. of solvent (1.319)		698.8
Vol. of Bit'meter Vol. of solvent	−	752.3 698.8
Vol. of extr. loss		53.5
Vol. of extr. loss Sp. Gr. of Aggr.	×	53.5 2.67
Alg. wt. of extr. loss		142.9
Alg. wt. of extr. loss Wt. of extr. loss	−	142.9 60.3
Alg. wt. of bit		82.6
Sp. Gr. of Aggr. Sp. Gr. of bit.	−	2.67 1.03
Alg. Sp. Gr. of bit.		1.64
Alg. wt. of bit. (82.6)	÷	Vol of bit.
Alg. Sp. Gr. of bit. (1.64)		50.3
Vol of bit. Sp. Gr. of bit.	×	50.3 1.03
Wt. of bit.		51.9
Wt. of bit. (51.9)	÷	% of bit.
Wt. of orig. sample (838.8)		6.2
Wt. of orig. sample Wt. of bit.	−	838.9 51.9
Wt. of total aggr.		787.0
Wt. of extr. Wt. of bit.	−	60.3 51.9
Wt. of fines in sample		8.4

FAYLOR - MIDDLECREEK, INC.

Winfield, Pa. 17889

MIX: [illegible] DATE: [illegible]

COUNTY: [illegible] RTE: [illegible]

PLANT: [illegible]

TESTED BY: [illegible]

REMARKS: [illegible]

ROTAREX EXTRACTION

Wt. of sample & pan Wt. of pan	−	
Wt. of sample		
Wt. of aggr. & pan Wt. of pan	−	
Wt. of aggr.		
Extracted liq. Portion of liq.	−	
Total extracted liq.		
Wt. of dish & ash Wt. of dish	−	
Wt. of ash		
Total of extracted liq. Wt. of ash (portion)	×	
Wt. of total ash		
Wt. of aggr. Wt. of total ash	+	
Wt. of total aggr.		
Wt. of sample Wt. of total aggr.	−	
Wt. of bit. in sample		
Wt. of bit. ( )	÷	% of bit.
Wt. of sample ( )		

SIEVE ANALYSIS

Sieve Sizes	Agg. Less ASH Grams	ASH Grams	Agg. Plus ASH Grams	% Passing	Uniformity Band	Hot Bin Grad.	Cold Bin Grad.	Spec.
200	29.5	12.6	42.1	5.3	2-8			
100	52.1	↑	64.7	8.2	4-14			
50	86.4		99.0	13	5-17			
30	140.0		152.6	19	12-24			
16	212.1		224.7	29	22-34			
8	335.3		347.9	45	39-51			
4	549.0		561.6	71	59-75			
3/8	756.8	↓	769.4	98	84-100			
1/2	774.4	12.6	787.0	100	100			
3/4								
1								
1 1/4								
1 1/2								
2								
2 1/2								

C) Test #3
Location: Winfield Blacktop Plant
Date: June 28, 1988
Time: 6:32 - 8:34 AM

Baghouse Sattic Pressure

Time	Pressure
6:38	6.0
6:52	6.0
7:12	5.8
7:31	5.8
7:51	5.8
8:11	4.8
8:33	5.8

$\bar{x}$ = 5.7

Fuel Usage

Time	G.P.M.
6:35	6.5
6:50	6.0
7:10	5.5
7:30	6.0
7:50	6.0
8:10	6.5
8:32	6.5

$\bar{x}$ = 6.1

Stack Temperature

Time	°F.
6:38	260
6:52	260
7:12	260
7:31	260
7:51	250
8:11	290
8:33	270

$\bar{x}$ = 264

Elevator(Material) Temperature

Time	°F.
6:38	338

Elevator (Material) Temperature (Con;t)

Time	° F.
6:52	322
7:12	324
7:31	328
7:51	328
8:11	327
8:33	325

$\bar{x} = 327$

Pulsing: 15 Second Intervals
90 P.S.I.G.

Plant Production

Test #3

Time	Job Customer	Material	Tonnage
6:33	R8806	ID-2 Wearing "E"	22.12
6:36	R8806	ID-2 Wearing "E"	17.91
6:42	R8806	ID-2 Wearing "E"	22.03
6:47	R8806	ID-2 Wearing "E"	17.29
6:51	R8806	Id-2 Wearing "E"	17.87
6:57	R8806	ID-2 Wearing "E"	21.99
6:59	AR8034	ID-2 Wearing	10.03
7:05	R8806	ID-2 Wearing "E"	22.41
7:11	R8806	ID-2 Wearing "E"	22.30
7:16	R8806	ID-2 Wearing "E"	22.23
7:22	BH8247	ID-2 Binder	18.12
7:26	AR8034	ID-2 Wearing	12.06
7:30	R8806	ID-2 Wearing "E"	21.11
7:36	R8806	ID-2 Wearing "E"	22.16
7:42	R8806	DI-2 Wearing "E"	22.04
7:45	BH8247	ID-2 Wearing	11.09
7:49	BH8247	ID-2 Wearing	17.68
7:54	Fairchild Bros.	ID-2 Wearing	17.95
7:56	Fairchild Bros.	ID-2 Wearing	9.06
8:01	Hackenberg Paving	ID-2 Wearing	11.93
8:02	PDT Union County	ID-2 Wearing	5.96
8:04	City of Sunbury	ID-2 Wearing	5.06
8:07	East Buffalo Twp.	I-2 Wearing	7.17
8:12	Center State	BCBC 3.5	17.06
8:16	Center State	BCBC 3.5	16.11
8:18	PDT Union County	BCBC 3.5	8.11
8:22	Center State	BCBC 3.5	16.09
8:26	Center State	BCBC 3.5	16.09
8:28	PDT Snyder County	BCBC 3.5	8.20
8:36	R8806	ID-2 Wearing "E"	22.51

Totals:

ID-2 Wearing "E"	251.85
ID-2 Wearing	107.99
ID-2 Binder	18.12
BCBC 3.5	81.66
	459.62

Testing Time: 123 Minutes
459.62 Tons
224.2 Tons Per Hour

FAYLOR - MIDDLECREEK, INC.

Winfield, Pa. 17889

MIX: [illegible] (E) DATE: 6-28-98

COUNTY: [illegible] RTE: [illegible]

PLANT: [illegible]

TESTED BY: [illegible]

REMARKS: 6.5% AS.

IMMEREX EXTRACTION

Sp. Gr. of Bit. @ 77° F.		= 1.03
Sp. Gr. of Agg. @ 77° F.		= 2.69
Sp. Gr. of Solv. @ 77° F.		= 1.319
Vol. of Bit'meter @ 77° F.		752.3
Wt. of orig. sample Wt. of extr. sample	−	755.7 697.5
Wt. of Extr. loss		58.2
Wt. of Bit'mr & extr. liq. Wt. of Bit'mr	−	1198.3 214.7
Wt. of extr. liq.		983.6
Wt. of extr. liq. Wt. of extr. loss	−	983.6 58.2
Wt. of solvent		925.4
Wt. of solvent (925.4)	÷	Vol. of solvent
Sp. Gr. of solvent (1.319)		701.5
Vol. of Bit'meter Vol. of solvent	−	752.3 701.5
Vol. of extr. loss		50.8
Vol. of extr. loss Sp. Gr. of Aggr.	×	50.8 2.69
Alg. wt. of extr. loss		136.6
Alg. wt. of extr. loss Wt. of extr. loss	−	136.6 58.2
Alg. wt. of bit.		78.5
Sp. Gr. of Aggr. Sp. Gr. of bit.	−	2.69 1.03
Alg. Sp. Gr. of bit.		1.66
Alg. wt. of bit. (78.5)	÷	Vol. of bit.
Alg. Sp. Gr. of bit. (1.66)		47.2
Vol. of bit. Sp. Gr. of bit.	×	47.2 1.03
Wt. of bit.		48.7
Wt. of bit. (48.7)	÷	% of bit.
Wt. of orig. sample (755.7)		6.5%
Wt. of orig. sample Wt. of bit.	−	755.7 48.7
Wt. of total aggr.		707.0
Wt. of extr. Wt. of bit.	−	58.2 48.7
Wt. of fines in sample		9.5

ROTAREX EXTRACTION

Wt. of sample & pan Wt. of pan	−	
Wt. of sample		
Wt. of aggr. & pan Wt. of pan	−	
Wt. of aggr.		
Extracted liq. Portion of liq.	÷	
Total extracted liq.		
Wt. of dish & ash Wt. of dish	−	
Wt. of ash		
Total of extracted liq. Wt. of ash (portion)	×	
Wt. of total ash		
Wt. of aggr. Wt. of total ash	−	
Wt. of total aggr.		
Wt. of sample Wt. of total aggr.	−	
Wt. of bit. in sample		
Wt. of bit. ( )	÷	% of bit.
Wt. of sample ( )		

SIEVE ANALYSIS

Sieve Sizes	Agg. Less ASH Grams	ASH Grams	Agg. Plus ASH Grams	% Passing	Uniformity Band	Hot Bin Grad.	Cold Bin Grad.	Spec.
200	23.1	12.1	35.2	5.0	2-8			
100	42.3		54.4	7.7	4-14			
50	74.0		86.1	12	5-17			
30	123.1		135.2	19	12-24			
16	187.7		199.8	28	22-34			
8 st.	292.0		304.1	44	37-51			
4	471.3		483.4	68	57-75			
3/8	664.0		676.1	96	94-100			
1/2	694.9	12.1	707.0	100	100			
3/4								
1								
1 1/4								
1 1/2								
2								
2 1/2								

FAYLOR - MIDDLECREEK, INC.

Winfield, Pa. 17889

Contractor [illegible] Mix [illegible] (E) Date 6-28-98

STOCK GRADATIONS

Sieve Sizes	[illegible] Stock	Spec.	[illegible] Stock	Spec.	[illegible] Stock	Spec.	Cold Blend 30 %	25 %	45 %	Combined Gradings
200	7.0	16.0	1.3	1.8			2	.5		2.5
100	10.5	14.8	32.5	1.6			4	1.3		5.3
50	14.3	8.1	8.0	11.4			4	3.4		8.4
30	21.7	20.7	14.9	29.0			9	5.4		15.4
16	37.0	44.0	34.0	47.6	.5	2.5	1.3	11.5	.1	25.9
8	44.4	68.0	42.5	54.8	.6	3.6	20	2.4	1.4	35.5
4	67.0	95.0	68.0	84.4	3.3	15.6	[illegible]	22.3	7.8	65.8
3/8	97.6	100	97.7	100	44.8	58.0	30	30	35.2	95.2
1/2					16.8	100	30	30	45	100.0
3/4										
1		72 — 46	44 — 4							
1¼		63 — 35	44							
1½			X .60							
2		40 — 60	40							
2½										

HOT BIN GRADATIONS

Sieve Sizes	Gradations Bin 1	Bin 2	Bin 3	Bin 4	% Combination Bin 1 48 %	Bin 2 26 %	Bin 3 26 %	Bin 4 %	Comb. Grad.	Spec. Limits
200	3.9				1.9				1.9	
100	7.3				3.5				3.5	
50	13.2				6.3				6.3	
30	34.2				16.4				16.4	
16	61.2				29.4				29.4	
8	90.5	2.3	.6		43.4	.6	.2		44.2	
4	100.0	66.2	2.7		48	17.2	.7		65.9	
3/8		100.0	82.4		48	26	21.4		95.4	
1/2			100.0		48	26	26		100.0	
3/4										
1										
1¼										
1½										
2										
2½										

Combine Bins & (A-B) X = C-B [illegible]

[illegible]

Combine Bins & (A-B) X = C-B [illegible]

[illegible]

Combine Bins & (A-B) X = C-B

Formula	%	Lbs.
Asphalt	6.6	
Bin #1	44.8	
Bin #2	24.3	
Bin #3	24.3	
Bin #4		
Total	100	

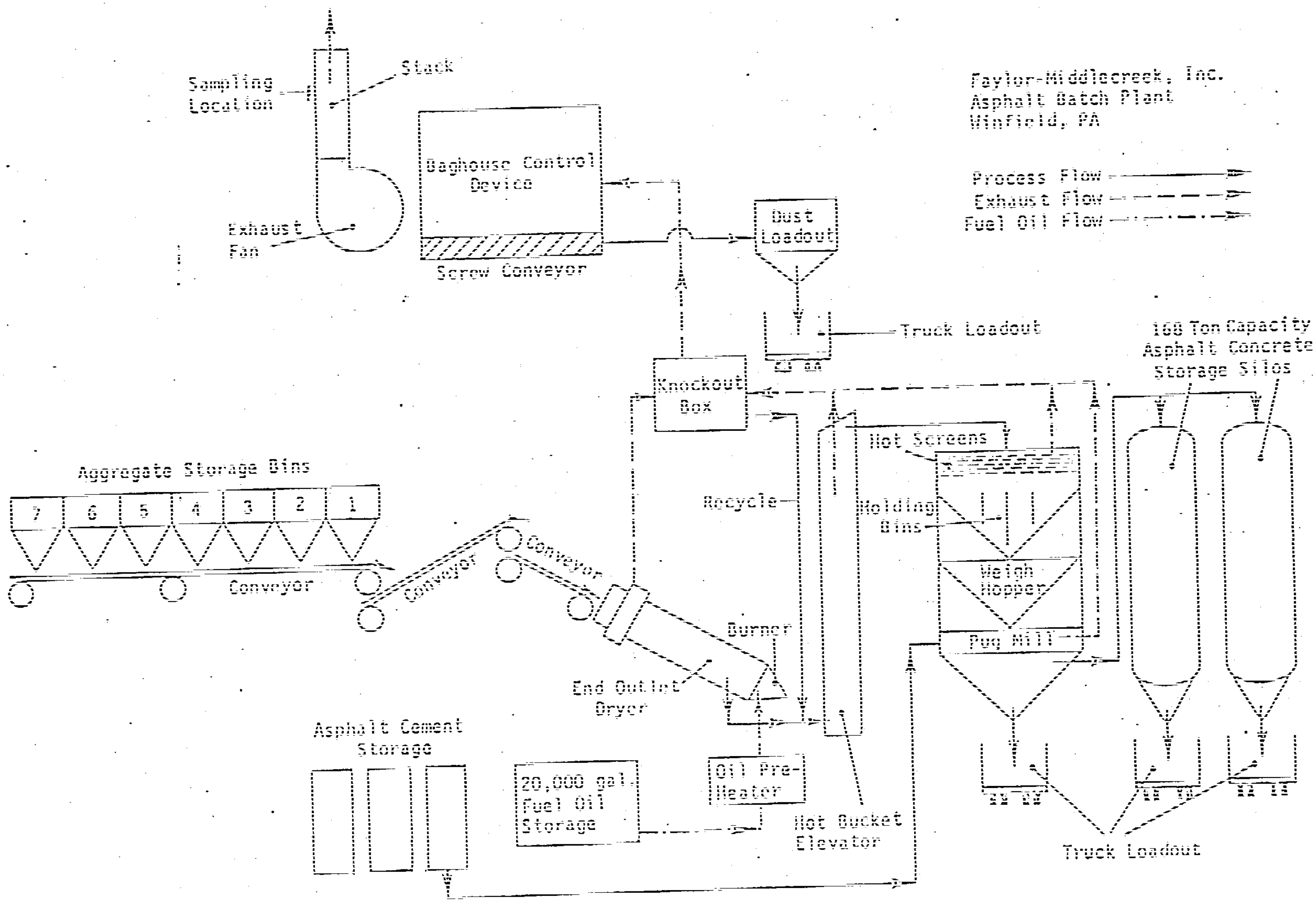
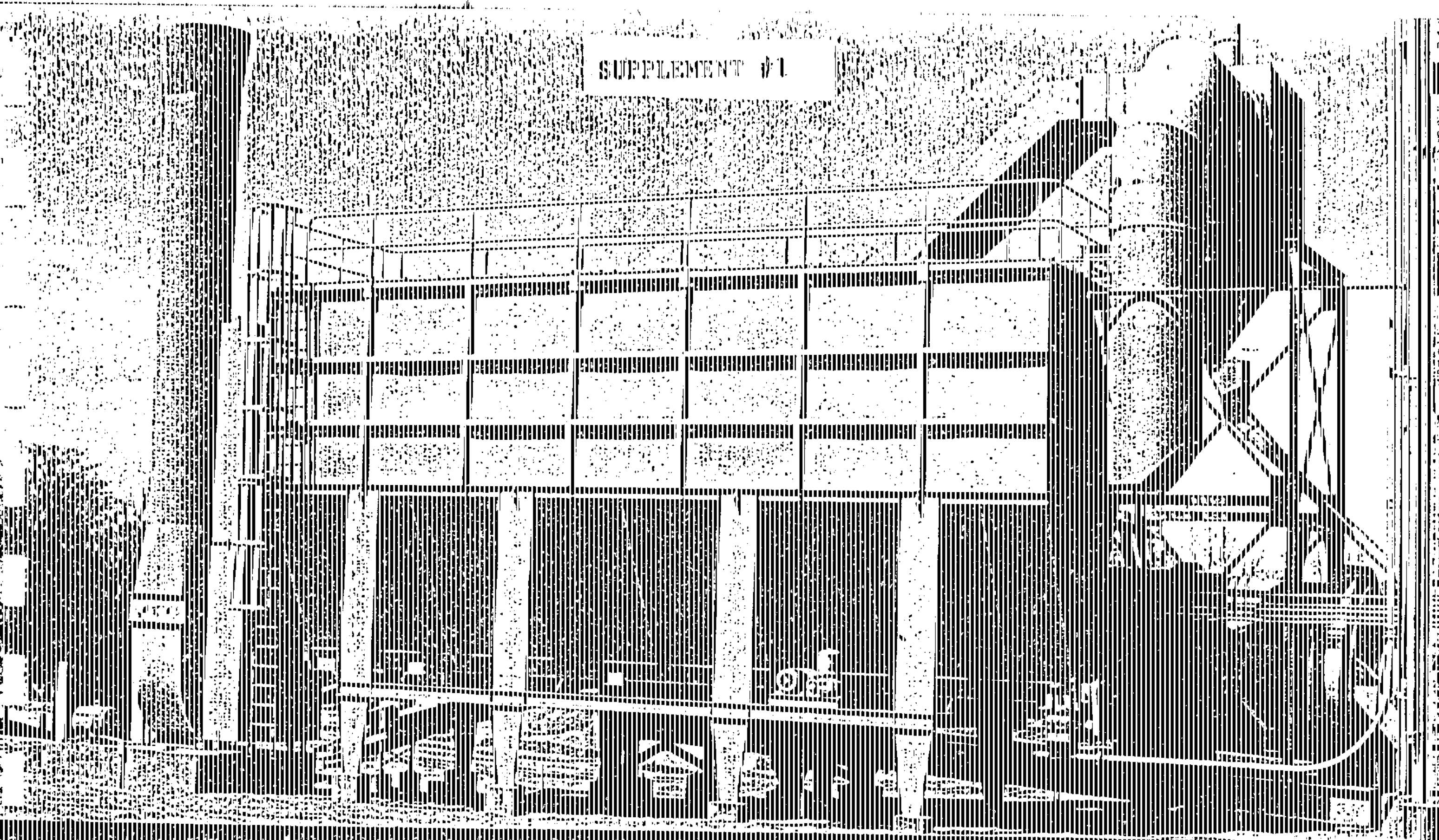


Figure 1. Process Flow Diagram

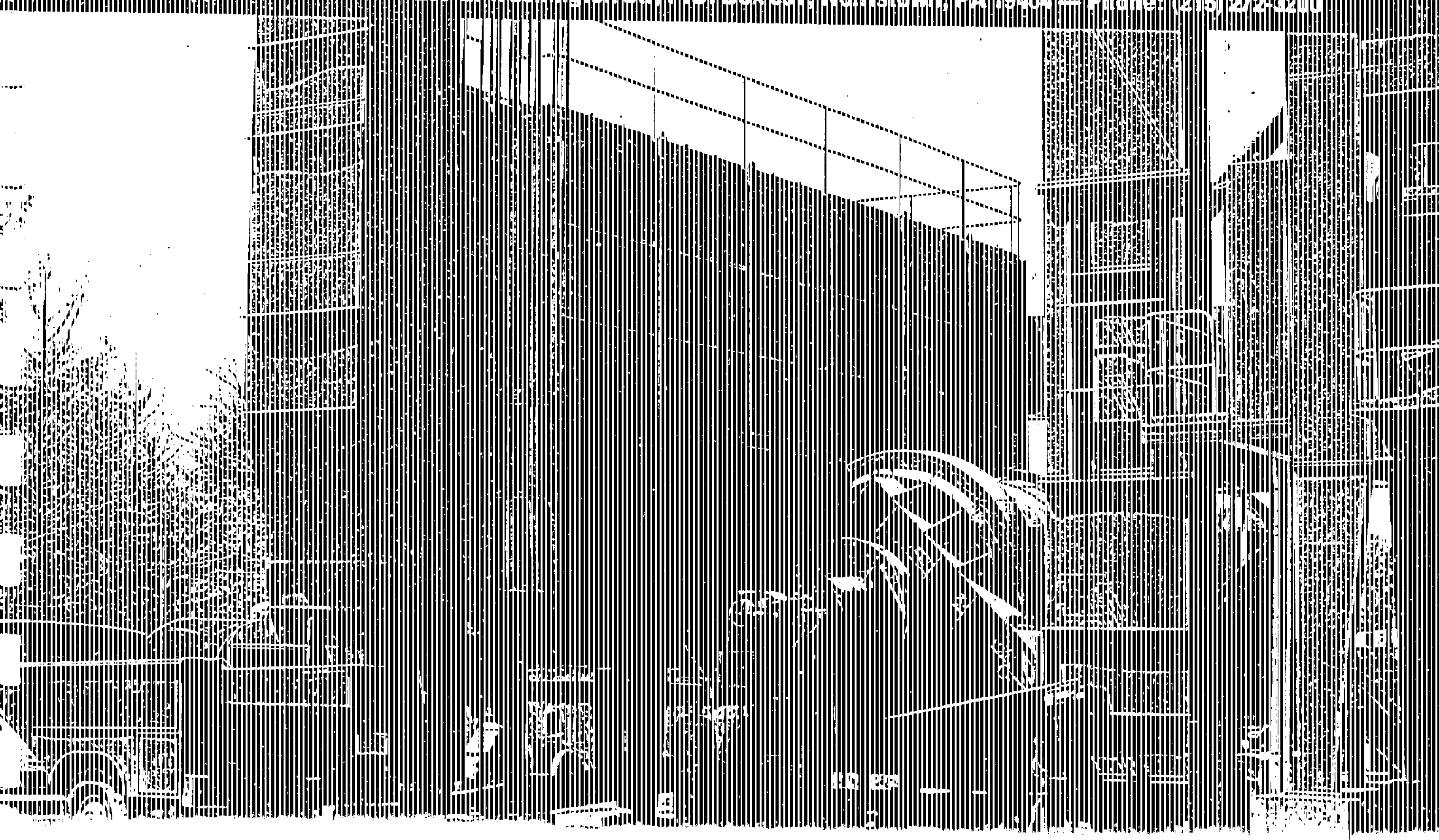
SUPPLEMENT #1



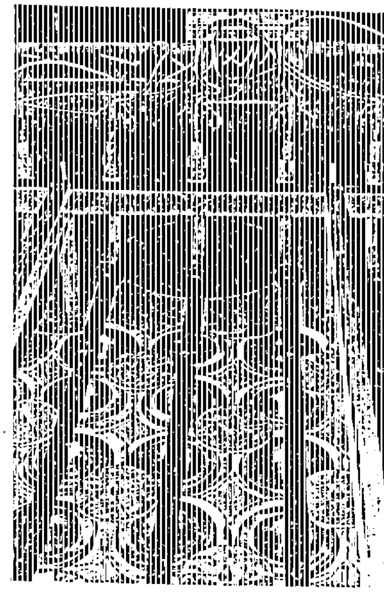
BAGHOUSE DUST COLLECTORS

The McCARTER CORPORATION

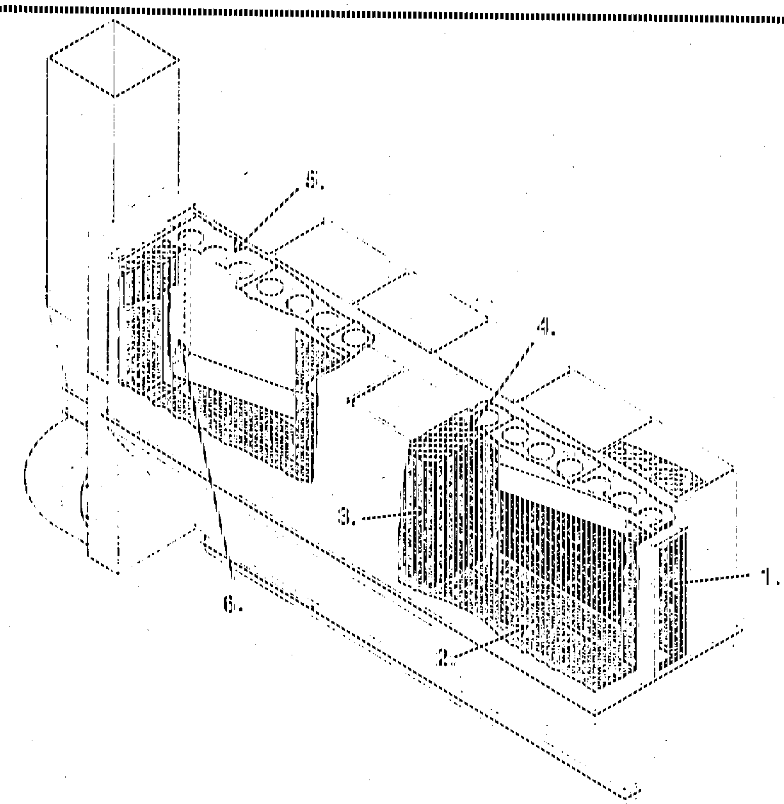
200 E. Washington St., P.O. Box 351, Norristown, PA 19404 — Phone: (215) 272-3200



Only McCarter Offers ALL These Features



- Tube sheets are fabricated from ¼" plate; screw conveyor flights are 3/16".
- Access to the tube sheet for changing bags is facilitated by large, easily removed covers.
- Heat resistant paint is applied to the interior of the baghouse covers and the top of the tube sheet to help prevent corrosion.
- Grease fittings are located externally for easy lubrication of screw conveyor fittings.
- Clean-out doors are located under the hanger bearings, allowing the bearing to be changed from outside the baghouse.
- McCarter baghouses are built for asphalt plant use by a manufacturer of asphalt plants.
- The baghouse may be used with or without a primary dust collector; the center plenum acts as a giant knock-out box for coarse particles.
- Low air velocities and low static pressure are due to the center plenum design that uniformly distributes the air flow over all the bags.
- Field erection costs are reduced with the modular shop-wired, fully assembled two piece design.



Air Flow

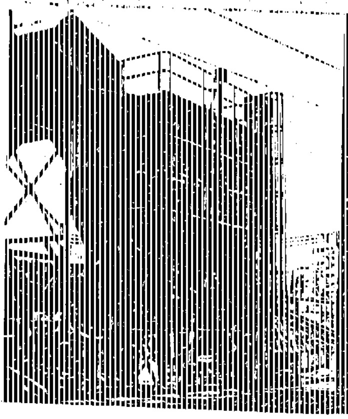
1. Dirty, dust-laden air from dryer exhaust enters the intake plenum
2. Reduction of exhaust velocity in the hopper section causes larger particles to drop from suspension
3. Air passes into and through filter bags, leaving particulate matter on the outside of the bags
4. Cleaned air exits from inside the bags into the upper chamber
5. Clean air is then drawn into the clean air exhaust plenum
6. From the exhaust plenum, the clean air exits from the baghouse and is drawn into the exhaust stack

Jet-Pulse Instantaneous Cleaning Action

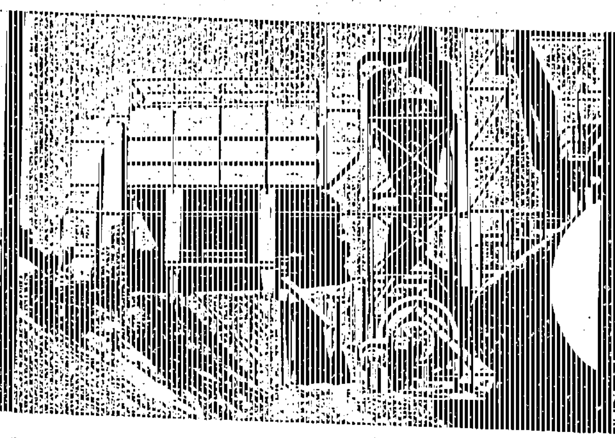
- Air is distributed evenly to every bag to insure extended life.
- Only the highest quality Nomex bags are used, sewn by nationally known manufacturers.
- Collector always remains operational —— even during the cleaning cycle.
- Fully adjustable solid state pulse frequency and duration control meets all requirements.
- Power savings provided by low back-pressure design.
- Meets ALL air pollution codes -- PERIOD!

Cover Photographs: Top McC-756 Bottom McC-648

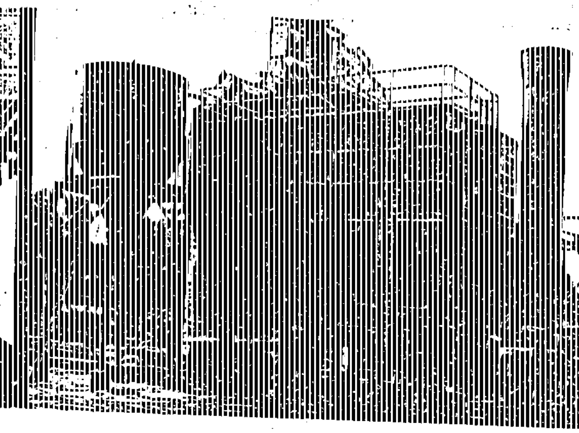
Some of the More than 100 Baghouses McCarter Has Built



McC-324-S



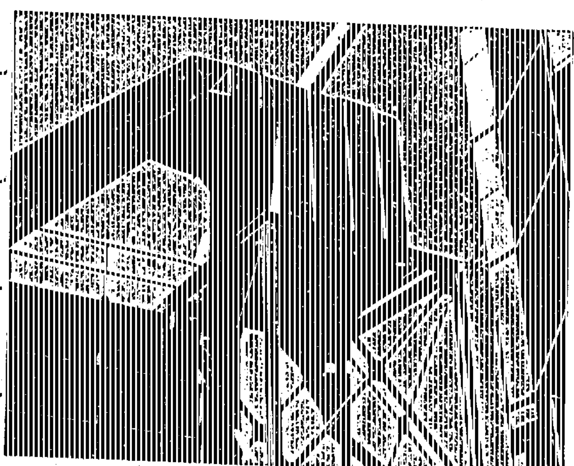
McC432-S



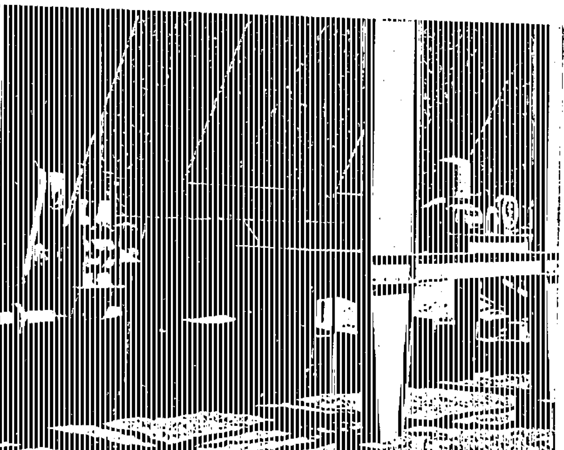
McC540-S

Other McCarter Dust Handling Equipment

In addition to the full range of baghouse sizes, McCarter offers a complete line of dust handling equipment. Our engineering department can analyze your particular situation and recommend the proper combination of components to meet your specific needs.



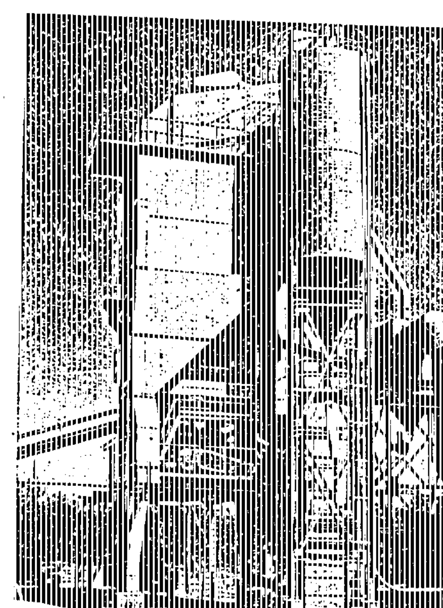
Knock-out Box



Rotary Airlock with Constant Speed Blower

Which better satisfies your needs for a primary dust collector; a knock-out box or cyclone? Both types of collectors are manufactured by McCarter so that you have a choice, depending on the gradation split you desire. The collectors are heavy construction and are provided with a one-piece welded frame for easy installation. We can also provide low velocity connecting ductwork.

McCarter also provides options for dust transfer systems in conjunction with the dust handling equipment. Depending on the particular circumstances, our engineering staff will determine whether a dust transfer pod or a continuous constant speed blower is the best choice, taking into consideration all the other equipment in the system as well as the customer's needs.

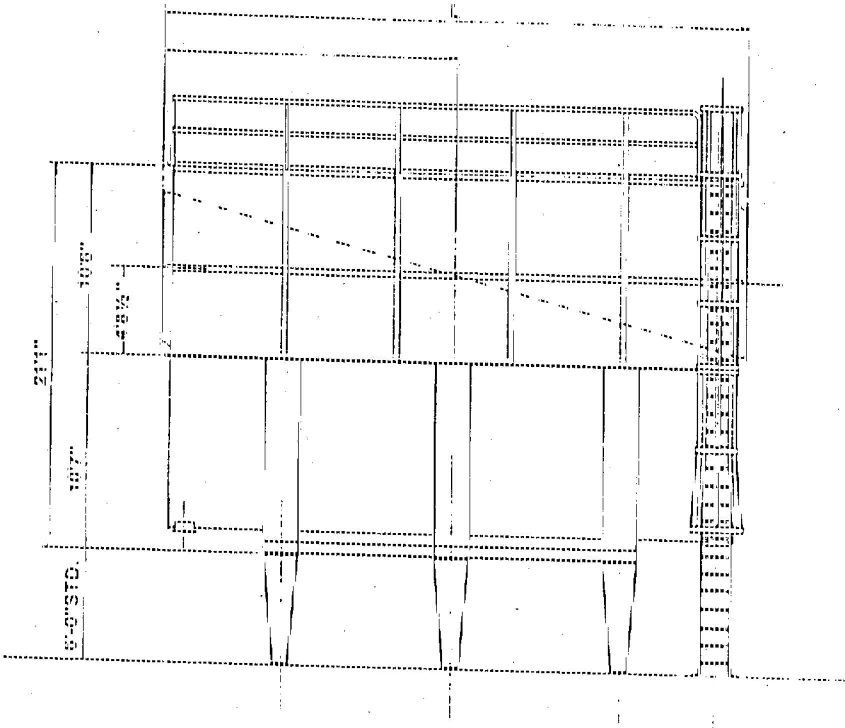


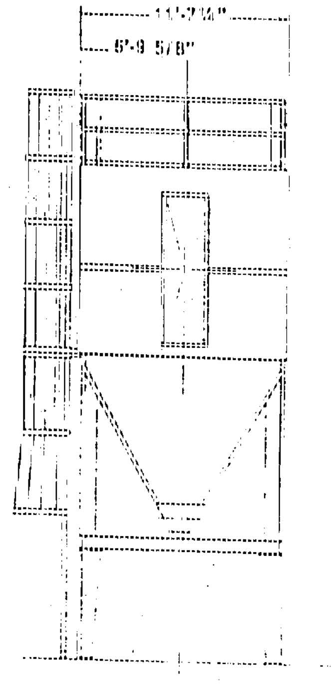
300 Ton Dust Silo

If you need a dust or mineral filler silo, McCarter is also able to supply that. Whether your requirements are large or small, McCarter has a silo size to fi your needs. All McCarter silos feature internal fill lines, steep sloping necks. "fluffers" on the cone section PLUS the capability of selecting either a pneumatic transfer system or screw conveyor to transfer material from the silo to the weigh hopper.

McCARTER EQUIPMENT ——— designed with integrity, built with care, so you can BUY WITH CONFIDENCE!

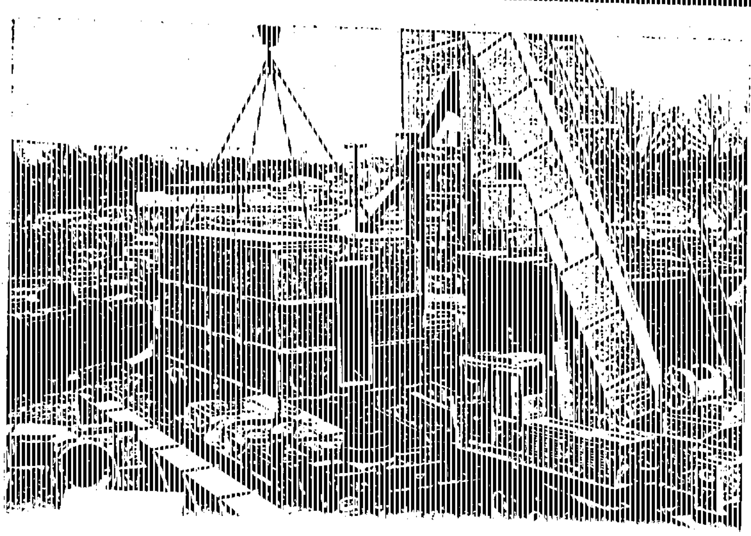
SPECIFICATIONS FOR McCARTER
ENTER-PLENUM BAGHOUSES





McCarter Model Number	Design CFM Capacity At 250°F*	Cloth Area Sq. Ft.	No of Bags	Length	CFM of 120 psi Cleaning Air Reqd	Approx. Shipping Weight (lbs.)
SINGLE BAG DESIGN (Based on 6.0 : 1 air to cloth ratio)*						
McC-324-S	27,500	4,580	324	19'-9"		
McC-432-S	36,650	6,110	432	26'-0"	65	18,000
McC-540-S	45,800	7,640	540	32'-3"	85	23,000
McC-648-S	55,000	9,160	648	38'-6"	105	29,000
McC-756-S	64,150	10,690	756	44'-9"	130	36,000
					150	46,000
DOUBLE BAG DESIGN (Based on 5.5 : 1 air to cloth ratio)*						
McC-324-D	39,600	7,200	324	19'-9"		
McC-432-D	52,800	9,600	432	26'-0"	65	18,000
McC-540-D	66,000	12,000	540	32'-3"	85	23,000
McC-648-D	79,200	14,400	648	38'-6"	105	29,000
McC-756-D	92,400	16,800	756	44'-9"	130	36,000
					150	46,000

*slightly higher or lower ratios can be applied.



McCARTER CORPORATION

200 East Washington St. P.O. Box 351
Norristown, Pennsylvania 19404
Phone: (215) 272-3200

ADDITIONAL PRODUCTS:

Complete Asphalt Batch Plants
Bucket Elevators
Rotary Airlocks
Duct Work
Automatic Dampers

BHA
Group, Inc.
8800 East 63rd Street
Kansas City, MO 64133
Phone 816-356-8400
Toll Free 800-821-2222
Telex 989091
• Baghouse Accessories
• BEMCO
• Filtra Gmbh
• PrecipTech

TECHNICAL BULLETIN

SUBJECT "Scrimless" Felted Filtration Media DATE 10/1/86

In an on-going effort to reduce the cost of air pollution control filtration media, there has been a recent move in the industry to supply felted bags manufactured from "scrimless" felt. This decision was supported by initial test results showing no discernible difference in strength or stability between unused traditional felted fabrics and the new scrimless construction.

BHA Group takes the challenge of reducing costs very seriously and, therefore, we have researched this trend carefully. Below are BHA's conclusions on what has been proposed as a viable alternative in felted fabrics.

The scrim of a felted fabric is a light weight, open weave cloth with the function of providing support to the carded fibers of the batt/web. Felt is constructed through the interlocking of batt and scrim using a needling process.

BHA's research to-date has shown that after filter bags have been placed in service and have been subjected to particulate weight and cleaning forces, scrim supported fabric maintains higher airflow capacity, better protection against particulate penetration, and higher ratings on flex endurance. The scrim, acting as a base, increases strength levels and controls shrinkage and elongation.

Scrimless fabrics have a greater batt fiber density, which contributes to lower airflow acceptance. The scrimless felts are also more susceptible to fine particulate penetration, and losses in original flex endurance.

Scrimless felts are still unproven in actual use. As more data is available, it will be necessary to continue a thorough evaluation. However, based on the data available to-date, the small reduction in cost does not justify the change. Given the possible ramifications to our customers' equipment performance and plant productivity, BHA does not feel scrimless felt is cost effective at this time.

SS:17/S4094/BHA

SUPPLEMENT #3

PENNSYLVANIA DER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Air Quality Control
200 Pine Street
Williamsport, Pennsylvania 17701-6510

October 21, 1987

OCT 22 1987

Mr. Albert Mabus
Faylor-Middlecreek, Inc.
P.O. Box 177
Winfield, PA 17889

RE: Winfield Batch Asphalt Plant
Plan Approval No. 60-303-001A

Dear Mr. Mabus:

As we discussed on October 15, 1987, collector rebagging appears to have resulted in a significant reduction in the level of visible air contaminants emitted. You are reminded, however, that this plant must be retested in order to demonstrate compliance with the particulate matter emission limitation specified in Subpart I of the Federal Standards of Performance for New Stationary Sources. As the 180 day period mandated by the Standards of Performance for the performance of the testing have now lapsed, said testing should be scheduled as soon as possible (and definitely prior to seasonal plant shutdown).

Should you have any questions concerning this matter, please feel free to contact me at (717) 327-3637.

Sincerely,

Richard L. Maxwell, Jr.

Richard L. Maxwell, Jr.
Chief, Engineering Services
Bureau of Air Quality Control
Williamsport Regional Office

RLM/bls

cc: File

Environmental Consultant Company

PREPARED FOR:

BAGHOUSE ACCESSORIES COMPANY

KANSAS CITY, MISSOURI

FEBRUARY 10, 1988

TLN 6049

Environmental Consultant Company
dedicated to filtration science...

P.O. Box 9936 • Phoenix, AZ 85068 • 602-582-5156
Laboratory: 2401 W. Behrend Dr., Suite 1 • Phoenix, AZ 85027

R E P O R T

BAGHOUSE ACCESSORIES COMPANY

REFERENCE: Control Number 2889

PURPOSE OF TEST:

Identify the source of high dust emissions.

CONDITIONS & HISTORY:

This bag was installed for 1 month in a Mc Carter pulse cleaning baghouse that collects particulate emissions off an asphalt batch plant. The average inlet gas stream temperature is 260° F. The maximum differential pressure is 5" W. G.

TEST RESULTS:

Full dust bleed through is the source of excessive emissions.

Cross sectional examination of the filter media reveals that fine particulate has penetrated through to the clean air surface (Photo's A, B).

Further examination of the collection surface of the bag finds that there is essentially no cake retention (Photo C). The surface cake becomes an integral part of the media and in fact performs the primary filtration function. The lack of an adequate cake formation is therefore a critical factor and without it there is no effective barrier to accelerated dust penetration.

The formation and retention of a good, porous collection side cake is essential to preventing bleed through.

There is no evidence of any of the defects in fabric structure, such as areas of light weight or low density, that may allow for accelerated dust bleed through.

There is also no indication that current pulsing procedures are responsible for limiting the cake development. A pulse pressure of 80 P.S.I. is not excessive and should not result in over-cleaning.

The results of additional particle analysis suggests that a change in the filter media design may be required to improve collection efficiency. The dust is classified as being of a very small micron size. This particulate will penetrate rapidly into the felt depth thereby inhibiting cake development. The lower the cake retention the more severe the rate of migration.

No standard (plain finish) Nomex felt product will provide acceptable long term surface filtration. A Nomex media which has a Teflon coating has in effect been provided with a permanent, artificial cake. This type of fabric design has been proven to enhance surface collection and arrest dust penetration when fine particulate is involved.

The details of the particle analysis are provided below.

A sample count of eight million particles was conducted. During sample preparation particles below .5 micron and above 10.0 micron were eliminated from analysis. These micron sizes were present in either very small quantities or were too large to pose any severe bleed through problem.

The particles were tested in three different modes, volume, area and population. The numerical and graphic results of these tests are enclosed.

It is important to note that when measured by area and volume the median particle size is 3.28 and 4.61 microns respectively.

However when measured by population it was found that the media particle size is 1.514 micron. This of course indicates that of all the particles subjected to analysis 50% are smaller than 1.5 micron. This is an important finding and clearly indicates that, with emissions consisting of such fine dust size, conversion to an alternative filter media design is the most viable method of minimizing bleed through.

ENVIRONMENTAL CONSULTANT COMPANY

Date: 05 Feb 88 Oper ID: WB Sample Nr: 02

Current	Gain	Calib. -(um)	Orfice	Flow Pr.	Volume	Timer	Peak	Total
5.5	4.5	0.5842/ 1.002645	48.932 um	160.0 mm	100.0 ul	32.0 secs	3200	800000

geometric mean size = 1.620 arithmetic mean size = 1.894
standard deviation = 1.254 coeff. of variation = 77.44 skewness = 2.549e-01
median size = 1.516 mode size = 1.300

Total = 4.974750000e+05

Chnl	Size	Counts	% >	Chnl	Size	Counts	% >	Chnl	Size	Counts	% >	Chnl	Size	Counts	% >
2	0.603	0	100.0	34	1.186	8052	69.11	66	2.332	4722	23.28	98	4.585	1543	4.535
3	0.616	8169	99.18	35	1.211	8070	67.49	67	2.381	4656	22.34	99	4.683	1392	4.240
4	0.629	1500	98.21	36	1.237	8252	65.86	68	2.432	4570	21.41	100	4.783	1366	3.960
5	0.642	1233	97.93	37	1.263	8163	64.19	69	2.484	4388	20.51	101	4.885	1299	3.691
6	0.656	1362	97.67	38	1.290	8412	62.53	70	2.537	4248	19.64	102	4.989	1299	3.429
7	0.670	1530	97.38	39	1.318	8343	60.84	71	2.591	4093	18.80	103	5.096	1191	3.179
8	0.684	1929	97.03	40	1.346	8259	59.18	72	2.647	3971	17.99	104	5.204	1382	2.951
9	0.699	2058	96.63	41	1.375	8299	57.51	73	2.703	3777	17.21	105	5.316	1093	2.732
10	0.714	2474	96.18	42	1.404	8069	55.87	74	2.761	3654	16.47	106	5.429	1035	2.518
11	0.729	2540	95.66	43	1.434	8153	54.24	75	2.820	3661	15.73	107	5.545	1000	2.314
12	0.745	3110	95.09	44	1.465	8050	52.61	76	2.880	3430	15.02	108	5.663	910	2.122
13	0.761	3280	94.44	45	1.496	7966	51.00	77	2.942	3419	14.33	109	5.784	867	1.943
14	0.777	3672	93.74	46	1.528	7889	49.40	78	3.004	3154	13.67	110	5.908	797	1.775
15	0.794	3870	92.99	47	1.561	7887	47.82	79	3.069	3111	13.03	111	6.034	696	1.625
16	0.811	4119	92.18	48	1.594	7586	46.25	80	3.134	2931	12.43	112	6.163	724	1.483
17	0.828	4478	91.32	49	1.628	7713	44.73	81	3.201	2956	11.84	113	6.295	732	1.337
18	0.846	4609	90.41	50	1.663	7622	43.21	82	3.269	2807	11.26	114	6.429	637	1.199
19	0.864	4925	89.45	51	1.698	7363	41.72	83	3.339	2707	10.71	115	6.566	588	1.075
20	0.882	5321	88.42	52	1.734	7278	40.25	84	3.411	2538	10.18	116	6.707	500	0.967
21	0.901	5546	87.33	53	1.771	7179	38.79	85	3.483	2570	9.668	117	6.850	527	0.863
22	0.920	5683	86.20	54	1.809	6819	37.39	86	3.558	2333	9.175	118	6.996	449	0.765
23	0.940	5969	85.03	55	1.848	6638	36.04	87	3.634	2302	8.709	119	7.145	400	0.683
24	0.960	6347	83.79	56	1.887	6504	34.71	88	3.711	2284	8.268	120	7.298	431	0.597
25	0.980	6553	82.49	57	1.928	6488	33.41	89	3.791	2165	7.801	121	7.454	361	0.517
26	1.001	6722	81.16	58	1.969	6152	32.14	90	3.872	2013	7.381	122	7.613	312	0.449
27	1.023	6972	79.78	59	2.011	6060	30.91	91	3.954	2027	6.975	123	7.776	300	0.388
28	1.044	7084	78.37	60	2.054	5854	29.71	92	4.039	1811	6.589	124	7.942	270	0.330
29	1.067	7283	76.92	61	2.098	5685	28.55	93	4.125	1798	6.227	125	8.111	245	0.279
30	1.090	7585	75.43	62	2.143	5575	27.42	94	4.213	1840	5.861	126	8.285	207	0.233
31	1.113	7715	73.89	63	2.188	5272	26.33	95	4.303	1719	5.503	127	8.462	153	0.194
32	1.137	7783	72.33	64	2.235	5116	25.29	96	4.395	1598	5.170	128	8.642	574	0.088
33	1.161	8147	70.73	65	2.283	5058	24.26	97	4.489	1590	4.849				

ENVIRONMENTAL CONSULTANT COMPANY

Date: 05 Feb 88   Oper ID: W8   Sample Nr: 02

Low at   2 0.603   0 High at 128 8.642   874   Top of scale is   12800

Graph of Diam Size vs. Differential Counts From channel   2 to 128 skip: 2

% >	Size
100.0	0.603
97.93	0.642
97.03	0.684
95.65	0.729
93.74	0.777
91.32	0.828
88.42	0.882
85.03	0.940
81.16	1.001
76.92	1.067
72.33	1.137
67.49	1.211
62.53	1.290
57.51	1.375
52.61	1.465
47.82	1.561
43.21	1.653
38.79	1.771
34.71	1.887
30.91	2.011
27.42	2.143
24.26	2.283
21.41	2.432
18.80	2.591
16.47	2.761
14.33	2.942
12.43	3.134
10.71	3.339
9.175	3.558
7.801	3.791
6.589	4.039
5.503	4.303
4.535	4.585
3.691	4.885
2.951	5.204
2.314	5.545
1.776	5.908
1.337	6.295
0.967	6.707
0.680	7.145
0.449	7.613
0.279	8.111
0.088	8.642

Prepared for: BAGHOUSE ACCESSORIES COMPANY
:
: Ref: Control No. 2889

Date: 2-10-88
TLN : 6049
Page: 3

Identification: ----
Fiber Content: Nomex/Glass

Fabric Construction: Needled
Weave: Scrim-PW
Count: N/A

Yarn System- Warp/Length: Spun
Filling/Width: Spun

Avg. Weight [oz/sq yd]: 13.73
Thickness [inches]: .062
Density Factor: .171

Treatment- Physical Type: None
Chemical Type: None

% Ignition Loss [LOI] - 500°F/1 Hr: N/A 1150°F/1 Hr: N/A

% Extractable Matter: Sulphates
Acid/Alkaline [PH]: 8.32

Fabrication
Seaming: Chain
Cuffing: Lock
Ring Cover: None
Hardware:
Sewing Thread: Nomex
Fabrication Rating: Good

PROFILE DATA			TOP	CENTER	BOTTOM
Weight [oz/sq yd]	As Received		20.09	20.87	19.62
	Cleaned (Vacuum)				
	Cleaned (Washed)		14.05	13.66	13.38
Permeability CFM/sq ft @ .5" H2O	As received		7.60	5.60	7.25
	Cleaned (Vacuum)				
	Cleaned (Washed)		40.0	43.5	41.5
Breaking Strength lbs/inch	Warp/Length		113.7	120.8	128.0
	Filling/Width		153.7	164.4	159.0
Breaking Strength % Loss	Warp/Length	@ 150	24.2%	19.4%	14.6%
	Filling/Width	@ 200	23.1%	17.8%	20.5%
Mullen Burst (lbs/sq inch)			380.0	405.0	420.0
Mullen Burst % Loss		@ 450	15.5%	10.0%	6.5%
Flex Cycles [MIT Method]	Warp		2000	2000	2000
	Fill		2000	2000	2000
Flex Cycles % Loss	Warp	Rated	35%	25%	25%
	Fill	Rated	35%	25%	25%
Other Testing					

BHA Group, Inc.
8800 East 63rd Street
Kansas City, MO 64133
Phone 816-356-8400
Toll Free 800 821-2222
Telex 986098
• Baghouse Accessories
• BEMCO
• Filtra Systems
• Precipitech

February 24, 1988

McCarter
200 East Washington
P. O. Box 351
Norristown, Pennsylvania 19401

ATTN: Mr. Lowell Adams

Dear Lowell:

Enclosed are the results from the recent independent laboratory testing we had performed for you on the filter bag out of your customer's collector.

The purpose of the analysis was to help determine the cause of the reported emissions that your customer had recently been experiencing and, based upon the results, to offer the appropriate measures to help alleviate this problem.

To summarize the findings, examination of the filter media reveals complete bleed-through to the clean air side. Cake retention on the collection side is nonexistent, which is a critical factor in preventing bleed-through. The dust cake plays an important part in the actual filtration, and without it, no effective barrier is established, thus allowing for dust penetration to occur.

No evidence of any defects in fabric structure, weight, or density was found that would have allowed for the accelerated dust penetration through the fabric to occur.

Through further testing of particle size and distribution, it was found that 50%+ of the particulate by count is 1.496 micron or smaller. It is recommended that a change in Nomex filter media be made to provide better long-term surface filtration.

We concur with the analysis that suggests the use of our NX66 with Teflon treatment to enhance collection efficiency. Due to the quantity of particulate below 1.5 micron (51%), the NX66 material will provide the best overall collection efficiencies. An increase in delta P should be expected due to the addition of the fluorocarbon material on the dust collection surface. This fabric has proven to be very successful in fine particulate applications similar to this one.

After you have had an opportunity to read the report, we would like to review its contents with you. In the meantime, if you should have any questions, please call us at our Toll Free number 800-821-2222.

Sincerely,

BHA GROUP, INC.

Mary Kay Hancock

Mary Kay Hancock
Sales Representative

Mike Weiland

Mike Weiland
Product Manager

MH:MC/N10

Enclosure

SOURCE TEST REPORT

Particulate Emissions

Faylor Middlecreek
Winfield, Pennsylvania
May, 1988

Client: Faylor Middlecreek
P.O. Box 177
Winfield, Pennsylvania

Testing Firm: Mease Engineering Associates
P.O. Box 721
State College, Pennsylvania

CLIENT:	Faylor Middlecreek, Inc. P.O. Box 177 Winfield, Pennsylvania
TEST LOCATION:	Faylor Middlecreek, Inc. P.O. Box 177 Winfield, Pennsylvania
UNIT TESTED:	Asphalt Dryer/Baghouse
TEST PURPOSE:	Determine the particulate emission rate as requested by Faylor Middlecreek for engineering evaluations.
TEST EQUIPMENT:	Research Appliance Company "STAKSAMPLR" Portable Gas Sampler, Model #2343.
TEST METHODS:	Environmental Protection Agency Method 5
TEST PERSONNEL:	Michael J. Mease Timothy J. Lockard
TESTING FIRM:	Mease Engineering Associates P.O. Box 721 State College, PA 16804
TEST ENGINEER:	Michael J. Mease

Michael J. Mease
Pennsylvania Professional Engineer No. 26809-E

Mease Engineering Associates

Environmental Consultants

LABORATORY WORKSHEET

Client: FAYLOR MIDDLECREEK Run No. & Date: 1 5-26-88

Process: ASPHALT DRYER Sample Box No.: 1

Filter Analysis:

Filter Wt., grams	0.6678
Filter Tare, gms	0.6453
Part. Increase, gm.	0.0225

Impinger Water Increase:

Silica Gel Impinger (#4):

Final Wt., gms	830.0
Tare Wt., gms	820.8
H_2O Increase	9.2

Total Water Volume Increase:

Impinger #1	84	ml
Impinger #2	24	ml
Impinger #3	1	ml
Impinger #4	9.2	ml
TOTAL INCREASE	118.2	ml

Impinger Analysis:

Wash Bottle No.	
Filter Wt., gms	
Filter Tare, gms	
Total Insoluble	
Final Beaker Wt.	
Tare Wt. (No. ___)	
Total Soluble	

Particulate Weight Summary:

Filter	0.0225	
Probe Wash	0.0192	
Impingers (Sol.)		
Impingers (Insol.)		
Total (w/imp.)		grams
Total (w/o imp.)	0.0417	grams

Signature: Michael J. Mease

Date: 5-28-88

Probe Wash Analysis:

Wash Volume, ml.	
Acetone Density, mg/ml	
Blank Volume, ml	
Blank Residue	
Final Wt.	
Tare Wt.	
Part. Wt.	

Wash Analysis, Bottle No. 31

Beaker Wt., gms	155.7278
Tare Wt. (No. ___)	155.7086
Part. Wt., gms	0.0192

MEASE ENGINEERING ASSOCIATES

FIELD DATA

Run no. 1
Location FAYLOE MIDDLECREEK
Date 5-26-88
Operator MEASE / LOCKARD
Sample box no. 1

K Factor 1.03
C_P 0.84
C_M
Stack dimen.
Stack press., in. H_2O
Gas composition, % O_2 13.0 ~~17.8~~ 15.6
% CO_2 7.0 6.6 5.4
% N_2
Time, start 7:13 AM
Time, finish 8:18

Ambient Temp., °F 50
Bar. press., in. hg. 30.01
Assumed moisture, %
Probe tip diameter, in. 3/16
Probe length 6' GLASS
Probe heater setting 55
Box heater setting 225
Leak checks, pre: 0.006 cfm @ 15" Hg
post:
Wash bottle no.

Initial dry gas meter reading 624.737

Notes:

Point	Clock time	Dry gas meter	Pitot in. H_2O ΔP	Orifice in. H_2O ΔH	Dry gas temp. °F Inlet	Dry gas temp. °F Outlet	Stack temp. °F	Pump vacuum in. Hg	Impinger temp. °F	Box temp. °F	
1	2.5	625.896	0.92	0.68	68	66	196	6.0	<50	200	
2	2.5	626.994	0.82	0.64	71	68	238	5.5	<50	210	
3	2.5	627.926	0.88	0.62	73	69	262	6.0	<50	216	
4	2.5	629.234	0.80	0.60	75	69	276	5.5	<50	220	
5	2.5		0.76	0.56	75	69	288	5.5	<50	225	
6	2.5	631.436	0.77	0.64	75	69	286	5.5	<50	220	
7	2.5	632.378	0.68	0.51	75	68	275	5.5	<50	220	
8	2.5	633.530	0.75	0.56	76	68	267	5.5	<50	220	
9	2.5	634.606	0.79	0.60	76	69	261	5.5	<50	221	
10	2.5	635.746	0.87	0.67	78	68	256	5.5	<50	234	
11	2.5	636.876	0.73	0.57	78	68	243	5.5	<50	235	
12	2.5	637.847	0.63	0.53	80	69	199	5.5	<50	240	
13	2.5	638.831	0.52	0.41	78	70	240	5.0	<50	220	
14	2.5	639.818	0.61	0.48	80	73	244	5.5	<50	225	
15	2.5	640.811	0.61	0.48	81	73	246	5.5	<50	230	
16	2.5	641.800	0.63	0.49	81	74	246	5.5	<50	235	
17	2.5	642.844	0.62	0.49	83	74	248	5.5	<50	240	
18	2.5	643.861	0.71	0.56	84	74	247	6.0	<50	230	
19	2.5	644.989	0.82	0.65	85	75	243	6.0	<50	235	
20	2.5	646.174	0.98	0.81	87	77	240	6.0	<50	230	
21	2.5	647.4	0.97	0.77	87	77	240	6.0	<50	235	
22	2.5	648.388	0.40	0.32	89	79	236	5.0	<50	230	
23	2.5	649.037	0.30	0.25	89	80	213				
24	2.5	~~649.~~	0.53	0.49	87	79	147				
		650.076									

Re: One Hour, Private Stack Test
Location: Winfield Blacktop Plant
Date: May 26, 1988
Stack Tester: Mease Engineering Assoc.; State College, Pa.
P.O. # 04-000657
Tonnage:

Time	Truck No.	Driver	Material	Tons
7:13	80	Dye	ID2AB	10:12
7:16	436	Whitmoyer	ID2AB	11.13
7:20	Self	Persing Cont.	ID2AB	17.92
7:26	370	Snook	ID2AB	22.96
7:33	Self	Nedig Cont.	ID2AW	22.04
7:35	SiloA	---	ID2A	4.0
7:50	SiloA		ID2A	59.93
8:05	SiloA		ID2A	59.83
8:24	SiloA		ID2A	49.79
				247.76

Static Pressure: (28 Sec.Between Pulses)

Time	Pressure	Pulsing
7:20	6.0	On
7:33	5.4	On
7:41	6.0	On
7:47	6.0	On
7:57	6.2	On
8:05	6.2	On
8:10	6.2	On
8:22	3.2	On (Out of Screenings)
8:31	5.0	On

Fuel Useage:

time	useage
8:00	6.2 pm
8:30	6.0 pm

Temperature:

Time	Stack Temp.	Elevator temp.
7.25	355	348
7:33	290	342
7:48	270	341
7:47	270	341
7:55	270	332
8:10	270	336
8:20	210	375
8:33	270	340

taylor middlecreek inc

Calculations;

Tons/Hour: 247.76 Ton/ 1.18Hr. = 209.23 T.P.H.
Fuel Useage: (A) Gallons/Hour: 6.1 GPM x 60 = 366 GPH
(B) Gallons/Ton: 366 Gal/ 209.23 Tons = 1.75 GPH
Cost: 1.75 GPT x $0.50 / Gallon =0.875/Ton

Notes;

The stack did "puff" at times. However, puffing was not observed after each cleaning sequence. Several bags on the North side of the baghouse are not properly sealed and are most likely, the reason for the irregular puffs of dust. The improperly seated bags should be removed and reseated before the official stack test.

SUPPLEMENT #6

FAYLOR-MIDDLECREEK, INC.

WINFIELD, PA. 17889

Plant Location	Telephone No.	Plant Location	Telephone No.
Winfield, Pa.	(Lewisburg) 717-524-2231	Shamokin, Pa.	717-644-0601
Elizabethville, Pa.	717-362-8595	Loganton, Pa.	717-725-3454
McVeytown, Pa.	717-899-6395	Lewisburg, Pa.	717-524-9959
Lewistown, Pa.	717-248-9677	Naginey (Milroy) Pa.	717-667-2315

November 26, 1980

Mr. John P. Eagan
Commonwealth of Pennsylvania
Department of Environmental Resources
Bureau of Air Quality Control
736 West Fourth Street
Williamsport, Penna. 17701

Dear Mr. Eagan,

When I recently talked to you on the telephone, concerning our Winfield Blacktop Plant; I had forgotten we had received a letter from McCarter. It summarized their findings on their visit to determine if they could pinpoint the reason for the pulsing of dust in our stack.

I am enclosing a copy of McCarters letter for your information and file.

As I suggested to you in our conversation, perhaps you could run on opacity test on our stack in the Spring, during production as the Environmental Protection Agency did to determine if we are in compliance.

Sincerely yours,

FAYLOR-MIDDLECREEK, INC.

S. WAYNE SIMMONS
General Superintendent of Administration

SWS/lar

Enclosure - a/s

RECEIVED OCT 27 1980

The McCARTER *Corporation*

200 E. WASHINGTON ST., P. O. BOX 351, NORRISTOWN, PA. 19404 • (215) 272-3200

October 23, 1980

Mr. Jess Hackenberg
Faylor Middlecreek
Winfield, PA 17889

Dear Jess:

Lowell Adams reported to me that you had some concern about a trail of dust that appears from the baghouse stack after every pulse at your Winfield plant. Jack Deering, our serviceman, visited your plant recently and could not find anything out of the ordinary as far as the equipment is concerned. He stated that everything seemed to him to be operating normally. He also felt there was not an excessive amount of dust being emitted from the stack, and that it would pass a stack test and would be within the allowable limits of the EPA (.04 Gr./SCFM). This was our original guarantee when the unit was sold to you in the fall of 1978 and became operational in the spring of 1979.

In an effort to determine if there is any bag deterioration, we would like to have one of the bags from the baghouse returned to us for testing. Perhaps we can then make a determination as to whether or not there really is a problem.

We will send you a new bag right away so you can replace the bag you remove to send us.

Very truly yours,

Robert G. Meeker

Robert G. Meeker
V.P. of Marketing

SECTION 2.0

Lab & Field Data

Mease Engineering Associates

Environmental Consultants

LABORATORY WORKSHEET

Client: Taylor Middlesex (Wharf Ed)   Run No. & Date: 1 6-27-88

Process: Asphalt Dryer   Sample Box No.: 1/4

Filter Analysis:

Filter Wt., grams 0.6538

Filter Tare, gms 0.6436

Part. Increase, gm. 0.0102

Impinger Water Increase:

Silica Gel Impinger (#4):

Final Wt., gms 853.5

Tare Wt., gms 841.5

H_2O Increase 12.0

Total Water Volume Increase:

Impinger #1 163 ml 40

Impinger #2 24 ml

Impinger #3 2 ml

Impinger #4 12.0 ml

TOTAL INCREASE 201.0 ml

Impinger Analysis:

Wash Bottle No. 1

Filter Wt., gms 0.0175

Filter Tare, gms 0.0160

Total Insoluble 0.0015

Final Beaker Wt. 156.9208

Tare Wt. (No.____) 156.9137

Total Soluble 0.0071

Particulate Weight Summary:

Filter 0.0102

Probe Wash 0.0244

Impingers (Sol.) 0.0071

Impingers (Insol.) 0.0015

Total (w/imp.) 0.0361 grams

Total (w/o imp.) ____ grams

Signature: Michael J. Mease

Date: 7-4-88

Probe Wash Analysis:

Wash Volume, ml.

Acetone Density, mg/ml

Blank Volume, ml

Insoluble Residue-Water Rinse

Final Wt. 0.0250

Filter Tare Wt. 0.0162

Insol. Part. Wt. 0.0088

Water Wash Analysis, Bottle No. PDF1

Beaker Wt., gms 152.0721

Tare Wt. (No. 32) 152.0647

Soluble Part. Wt., gms 0.0074

Acetone/Front Half/Soluble

Wash Bottle No. 6

#35 Beaker Wt., Gms. 152.1843

Tare Wt., Gms. 152.1761

Soluble Wt. Gms. 0.0082

Acetone/Back Half/Soluble

Wash Bottle No. 1-ACE

Beaker Wt., Gms. 152.0393

Tare Wt., Gms. 152.0379

Soluble Wt, Gms. 0.0014

Mease Engineering Associates

Environmental Consultants

LABORATORY WORKSHEET

Client: BAYLOR MIDDLECREEK WINFIELD   Run No. & Date: 2 6-27-88

Process: ASPHALT DRYER   Sample Box No.: 2

Filter Analysis:
Filter Wt., grams 0.6531
Filter Tare, gms 0.6454
Part. Increase, gm. 0.0077

Impinger Water Increase:
Silica Gel Impinger (#4):
Final Wt., gms 768.0
Tare Wt., gms 753.0
H_2O Increase 15.0

Total Water Volume Increase:
Impinger #1 271 ml
Impinger #2 16 ml
Impinger #3 2 ml
Impinger #4 15.0 ml
TOTAL INCREASE 304.0 ml

Impinger Analysis:
Wash Bottle No. 2
Filter Wt., gms 0.0180
Filter Tare, gms 0.0163
Total Insoluble 0.0017
Final Beaker Wt. 156.2282
Tare Wt. (No. ____) 156.2235
Total Soluble 0.0047

Particulate Weight Summary:
Filter 0.0077
Probe Wash 0.0156
Impingers (Sol.) 0.0047
Impingers (Insol.) 0.0017
Total (w/imp.) 0.0290 grams
Total (w/o imp.) ____ grams

Signature: Michael J. Mease

Date: 7-4-88

Probe Wash Analysis:
Wash Volume, ml. ____
Acetone Density, mg/ml ____
Blank Volume, ml ____
Insoluble Residue-Water Rinse
Final Wt. 0.0222
Filter Tare Wt. 0.0158
Insol. Part. Wt. 0.0064
Water Wash Analysis, Bottle No. 20
Beaker Wt., gms 157.5420
Tare Wt. (No. 37) 157.5353
Soluble Part. Wt., gms 0.0067

Acetone/Front Half/Soluble
Wash Bottle No. 2
Beaker Wt., Gms. 152.0647
Tare Wt., Gms. 152.0622
Soluble Wt., Gms. 0.0025

Acetone/Back Half/Soluble
Wash Bottle No. ____
Beaker Wt., Gms. 154.2380
Tare Wt., Gms. 154.2371
Soluble Wt., Gms. 0.0009

Mease Engineering Associates

Environmental Consultants

LABORATORY WORKSHEET

Client: FAWOE MIDWEST WINFIELD Run No. & Date: 3 6-28-88

Process: ASPHALT DRYER Sample Box No.: 3

Filter Analysis:
- Filter Wt., grams 2.6626
- Filter Tare, gms 2.6533
- Part. Increase, gm. 0.0093

Impinger Water Increase:
Silica Gel Impinger (#4):
- Final Wt., gms 790.5
- Tare Wt., gms 772.1
- H_2O Increase 18.4

Total Water Volume Increase:

Impinger #1	161	ml
Impinger #2	16	ml
Impinger #3	2	ml
Impinger #4	18.4	ml
TOTAL INCREASE	197.4	ml

Impinger Analysis:
- Wash Bottle No. 3
- Filter Wt., gms 0.0179
- Filter Tare, gms 0.0157
- Total Insoluble 0.0022
- Final Beaker Wt. 152.0439
- Tare Wt. (No. ____) 152.0371
- Total Soluble 0.0068

Particulate Weight Summary:
- Filter 0.0093
- Probe Wash 0.0109
- Impingers (Sol.) 0.0068
- Impingers (Insol.) 0.0022
- Total (w/imp.) 0.0224 grams
- Total (w/o imp.) ____ grams

Probe Wash Analysis:
- Wash Volume, ml. ____
- Acetone Density, mg/ml ____
- Blank Volume, ml ____

Insoluble Residue-Water Rinse
- Final Wt. 0.0231
- Filter Tare Wt. 0.0161
- Insol. Part. Wt. 0.0070

Water Wash Analysis, Bottle No. 1
- Beaker Wt., gms 158.1862
- Tare Wt. (No. 33) 158.1843
- Soluble Part. Wt., gms 0.0019

Acetone/Front Half/Soluble
- Wash Bottle No. 2-A
- Beaker Wt., Gms. 157.5353
- Tare Wt., Gms. 157.5333
- Soluble Wt. Gms. 0.0020

Acetone/Back Half/Soluble
- Wash Bottle No. 4-ACE
- Beaker Wt., Gms. 157.7190
- Tare Wt., Gms. 157.7177
- Soluble Wt, Gms. 0.0013

Signature: Michael J. Mease

Date: 7-4-88

MEASE ENGINEERING ASSOCIATES

FIELD DATA

Run no. 1
Location FAYLOE MIDDLECREEK - WINFIELD
Date 6-27-88
Operator MEASE/CARPENTER
Sample box no. 1

K Factor 1.03
C_p 0.84
C_M 1.01
Stack dimen. 51 1/8" ⌀
Stack press., in. H_2O -0.62
Gas composition, % O_2 15.6 17.0 17.8
% CO_2 4.4 4.4 4.0
% N_2
Time, start 6:14 AM
Time, finish 8:48 AM

Ambient Temp., °F 52
Bar. press., in. hg. 30.16
Assumed moisture, % 15-17
Probe tip diameter, in. 3/16
Probe length 6' 5"
Probe heater setting 60
Box heater setting 240
Leak checks, pre: 0.012 CFM @ 15"Hg
post: 0.002 CFM @ 8"Hg
Wash bottle no. H_2O: FOP: ACE: 2

Initial dry gas meter reading 824.713

Notes:

Point	Clock time	Dry gas meter	Pitot in. H_2O ΔP	Orifice in. H_2O ΔH	Dry gas temp. °F Inlet	Dry gas temp. °F Outlet	Stack temp. °F	Pump vacuum in. Hg.	Impinger temp. °F	Box temp. °F
1	5	824.171	0.91	0.77	70	68	186	6.0	<50	220
2	5	826.630	0.94	0.77	78	71	210	6.0	<50	230
3	5	829.101	0.95	0.77	84	74	223	6.0	<50	235
4	5	831.512	0.92	0.75	88	77	229	6.0	<50	235
5	5	833.916	0.88	0.71	90	79	233	6.0	<50	240
6	5	836.342	0.91	0.74	91	81	228	6.0	<50	230
7	5	838.453	0.66	0.54	91	84	228	5.5	<50	225
8	5	840.587	0.67	0.55	91	84	231	5.5	<50	220
9	5	842.735	0.68	0.56	91	85	229	5.5	<50	225
10	5	845.044	0.80	0.66	88	86	225	6.0	52	215
11	5	847.214	0.69	0.57	90	86	219	5.5	53	220
12	5	849.128	0.51	0.43	92	87	211	5.0	54	220
13	5	851.242	0.62	0.51	91	88	227	5.5	<50	220
14	5	853.274	0.61	0.50	91	90	235	5.5	52	210
15	5	855.364	0.64	0.52	91	96	235	5.5	54	210
16	5	857.418	0.63	0.51	90	89	234	5.5	53	220
17	5	859.550	0.67	0.55	90	89	233	5.5	54	225
18	5	861.682	0.68	0.55	89	88	234	5.5	54	220
19	5	863.964	0.79	0.64	89	88	236	5.5	58	225
20	5	866.202	0.74	0.61	93	89	230	6.6	60	220
21	5	868.746	0.97	0.80	94	90	228	6.0	60	225
22	5	870.806	0.58	0.49	93	90	219	6.0	61	230
23	5	872.823	0.60	0.49	92	89	238	6.0	60	220
24	5	874.738	0.55	0.46	92	90	237	5.0	60	215
			.852549	.66177	546.440	81.396	686.958	-36.958		

MEASE ENGINEERING ASSOCIATES

FIELD DATA

Run no. 2
Location FAYLOR MIDDLECREEK WINFIELD
Date 6-27-88
Operator MEASE / CARPENTER
Sample box no. 2

Initial dry gas meter reading 874.937

K Factor 1.03
C_P 0.84
C_M 1.002
Stack dimen. 51 1/8" ⌀
Stack press., in. H_2O
Gas composition, % O_2 15.6 17.1 17.6
% CO_2 4.6 4.0 2.5
% N_2
Time, start 8:47 AM
Time, finish 11:07 AM

Ambient Temp., °F 55
Bar. press., in. hg. 30.16
Assumed moisture, % 15-17
Probe tip diameter, in. 3/16
Probe length 6'55
Probe heater setting 60
Box heater setting 225
Leak checks, pre: 0.011 CFM @ 15" Hg
post: 0.003 CFM @ 8" Hg
Wash bottle no. H_2O - 26 ACE: 2
Notes: # PROCESS DOWN - 10:05 AM
RESUMED 10:32

Point	Clock time	Dry gas meter	Pitot in. H_2O ΔP	Orifice in. H_2O ΔH	Dry gas temp. °F Inlet	Dry gas temp. °F Outlet	Stack temp. °F	Pump vacuum in. Hg.	Impinger temp. °F	Box temp. °F	
1	5	877.122	0.67	0.57	76	77	184	6.0	<50	200	
2	5	879.171	0.64	0.53	76	74	206	6.0	<50	210	
3	5	881.606	0.96	0.77	77	75	224	6.5	52	220	
4	5	883.794	0.75	0.64	77	75	223	6.0	53	220	
5	5	885.836	0.65	0.53	77	75	220	5.5	54	215	
6	5	888.000	0.74	0.59	77	75	234	6.0	53	220	
7	5	890.176	0.77	0.60	76	75	243	6.0	54	230	
8	5	892.430	0.83	0.65	75	74	238	6.0	53	235	
9	5	894.858	0.97	0.77	74	73	234	6.5	54	235	
10	5	897.117	0.61	0.65	75	73	229	6.0	56	240	
11	5	899.131	0.63	0.51	75	73	218	5.5	52	220	
12	5	900.701	0.47	0.39	74	73	200	5.0	51	225	
13	5	903.424	1.07	0.87	73	73	215	6.5	52	220	
14	5	905.984	1.05	0.84	75	73	220	6.5	53	215	#
15	5	908.457	0.97	0.80	78	75	214	6.0	52	220	
16	5	910.928	1.02	0.80	73	73	175	6.0	<50	215	
17	5	913.517	1.03	0.87	78	76	196	6.5	<50	220	
18	5	916.098	1.05	0.87	80	77	210	6.5	52	215	
19	5	918.338	0.77	0.63	80	78	221	6.0	54	220	
20	5	920.266	0.62	0.51	79	78	219	6.0	56	220	
21	5	922.106	0.74	0.60	82	78	223	6.0	54	235	
22	5	924.596	0.82	0.67	81	78	223	5.5	56	230	
23	5	927.084	0.78	0.64	80	78	217	5.5	57	220	
24	5	929.056	0.59	0.44	81	79	209				
			.9960	0.662	626.083	76.083	176.708	210.708			

MEASE ENGINEERING ASSOCIATES

FIELD DATA

Run no. 3
Location TAYLOR MIDDLECREEK WINFIELD
Date 6-29-88
Operator MEASE/CARPENTER
Sample box no. 3

K Factor 1.03
C_p 0.84
C_M
Stack dimen. 51 1/8" ⌀
Stack press., in. H_2O − 0.64
Gas composition, % O_2 16.9 15.6 16.2
% CO_2 3.1 4.5 4.0
% N_2
Time, start 6:32 AM
Time, finish 8:34 AM

Ambient Temp., °F 50
Bar. press., in. hg. 30.21
Assumed moisture, % 15-17
Probe tip diameter, in. 3/16
Probe length 6' SS
Probe heater setting 60
Box heater setting 230
Leak checks, pre: 0.011 CFM @ 16" Hg
post: 0.001 CFM @ 6" Hg
Wash bottle no. H_2O: 1 Ace: 2-A

Initial dry gas meter reading 930.191

Notes:

Point	Clock time	Dry gas meter	Pitot in. H_2O ΔP	Orifice in. H_2O ΔH	Dry gas temp. °F Inlet	Dry gas temp. °F Outlet	Stack temp. °F	Pump vacuum in. Hg.	Impinger temp. °F	Box temp. °F
1	5	932.324	.66	0.54	73	73	216	5.0	<50	250
2	5	934.396	.67	0.54	79	74	225	5.5	<50	240
3	5	936.588	.70	0.57	83	78	222	5.5	<50	240
4	5	938.627	.66	0.54	86	80	226	5.5	52	235
5	5	940.784	.70	0.57	89	82	230	5.5	54	240
6	5	943.009	.74	0.60	93	84	234	6.0	55	235
7	5	945.436	.90	0.74	104	90	235	6.0	56	240
8	5	947.803	.82	0.68	103	93	233	6.0	58	235
9	5	950.313	.96	0.80	106	95	233	6.0	57	240
10	5	952.548	.68	0.58	108	98	222	5.5	59	240
11	5	954.581	.57	0.49	102	99	215	5.5	60	235
12	5	956.835	.70	0.61	100	98	203	5.5	60	230
13	5	959.206	.85	0.71	100	98	235	6.0	60	220
14	5	961.881	.05	0.89	104	100	224	6.5	61	225
15	5	964.374	.93	0.78	107	101	230	6.0	60	225
16	5	966.816	.75	0.72	109	102	231	6.0	60	220
17	5	969.218	.83	0.70	111	104	232	6.0	57	225
18	5	971.534	.75	0.64	112	105	233	5.5	60	230
19	5	973.736	.70	0.60	113	106	237	5.5	60	230
20	5	975.793	.56	0.47	116	108	241	5.5	60	230
21	5	977.876	.60	0.50	116	109	246	5.5	61	225
22	5	979.738	.53	0.44	117	110	248	5.0	60	230
23	5	981.811	.60	0.50	118	112	252	5.0	58	235
24	5	983.670	.46	0.41	120	114	210	5.0	56	240

SECTION 3.0

Test Procedures

Mease Engineering Associates

Engineers & Surveyors

June 3, 1988

Mr. Richard Maxwell
Bureau of Air Quality Control
Pennsylvania Department of Environmental Resources
200 Pine Street
Williamsport, PA 17701

Re: Source Test Protocol
Faylor Middlecreek
Winfield, PA

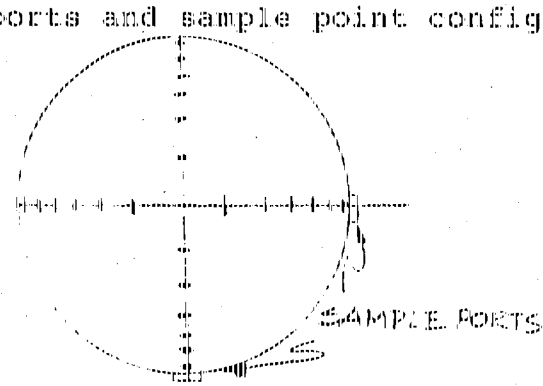
Dear Mr. Maxwell:

We hereby propose to perform a series of particulate source emission tests at the subject facility with the following test procedures:

Three particulate tests of approximately two hours each will be conducted using the DER procedures (back half analysis of test train included) on an asphalt dryer/baghouse process.

The vertical stack is 51.125 inches in diameter and approximately forty feet high. The two sampling ports will be located approximately 80% of the distance between the fan inlet to the stack feet and the top of the stack (estimate of 4 diameters downstream and 1 diameter upstream from flow disturbances). We anticipate sampling twenty four sampling points (twelve per traverse) at five minutes each for a total test time of one hundred twenty minutes. We propose to perform three tests, with a minimum sample volume of 50 DSCF per emission test.

The sampling ports and sample point configurations are:



P.O. BOX 721 • STATE COLLEGE, PENNSYLVANIA 16804 • PHONE 814-692-4225

ATTACHMENT NO. 2
DER ANALYTICAL PROCEDURES

DETERMINATION OF PARTICULATE EMISSIONS FROM SOURCE TESTS

I. Introduction

This procedure determines gravimetrically the particulate captured on collection surfaces and in solutions during source testing. The sampling train should be analyzed within a maximum of 48 hours after collection.

II. Pretest Preparation

A. Field Materials

1. Glass fiber filters, Gelman type A, or equal.

2. Alundum thimbles, Norton grades AL788, AL899, AL485, or equal.

3. Triple distilled and deionized water.

4. Acetone, reagent grade.

5. Silica gel, indicating type, 6-16 mesh.

B. Glass Fiber Filters

1. Heat the filter to 900°F for one hour then desiccate for 24 hours.

2. Identify all filters sequentially using a five-digit number. The first digit equals the diameter of the filter; e.g., "30079" signifies the 79th 3" filter weighed.

3. Weigh the filter to the nearest 0.1 mg. Record the weight, the identification number and the date.

4. Place the filter in a clean, dry container (petri dish) which is identified with the number of the enclosed filter and seal the container. DO NOT FOLD FILTERS.

C. Alundum Filters

1. Sand the lip and outside of the filter (thimble) to remove loose particles. Check the thimble to assure a proper seal in the filter holder.

2. Wash the thimble a minimum of four times in clean distilled water using an ultrasonic cleaner. Use clean water each time.

3. Air dry the thimble.

4. Identify the thimbles sequentially using Coors ceramic ink. Use an alpha numeric system of five characters. The first is the letter A; e.g., "A0079" signifies the 79th alundum filter weighed.

5. Place the thimble in a cold muffle furnace and heat to 600°F at a rate not to exceed 200°F per hour. Increase the temperature to 1200°F and hold for four hours minimum.

6. Cool in a desiccator for 24 hours and weigh to the nearest 0.1 mg. Record the weight, identification number and date.

7. Place the thimble in a clean, dry container which is identified with the number of the enclosed thimble and seal the container.

D. Distilled Water, Acetone, and Silica Gel

1. Provide triple distilled, deionized water for the collection train and cleanup procedures and acetone for cleanup.

2. Store each in a sealable, clean container.

3. Retain a sample of each for a blank determination.

4. Dry approximately 300gm of silica gel at a temperature of 105°C for approximately 12 hours. Desiccate until cool and place in an air-tight container.

III. Particulate Analysis

A. Procedure:

1. Remove the used glass fiber or alundum filters carefully to prevent loss of collected particulate or filter material and store in their original, relabeled, clean containers (separate petri dishes).

2. Measure to the nearest ml the volume of liquid in each impinger and record.

3. Place the impinger solutions in a labeled container and wash any residue in the impingers into the container using distilled water.

4. Add the washings from the back-half of the filter holder and interconnecting glassware to step 3.

5. Wash the nozzle, probe, front-half of the filter holder, and the cyclone or cyclone bypass into a labeled container using distilled water. NOTE: any dry material in the cyclone is brushed onto the glass fiber filter.

6. Wash with acetone the impingers and the components in step 4 into a labeled container.

7. Wash with acetone the components in step 5 into a labeled container.

NOTE:

Steps III.A.1 through 7 are the responsibility of the source test team leader. When multiple tests are conducted and it is necessary to clean the sampling train in the field, proceed in accordance with these steps. Store the samples in an airtight, cool or refrigerated condition.

8. Identify and desiccate for 24 hours, a sufficient number of 0.22 μ membrane filters to filter all liquid collections and washings.

9. Weigh and record the weights of the membrane filters.

10. Filter the solutions from (step 4) and (step 5) separately using preweighed and identified membrane filter(s). It may be necessary to start with an 0.8 μ filter then finally the 0.22 μ filter.

11. Measure the two filtrates from step 10 to the nearest ml and record the volumes.

12. Air dry, then desiccate for 24 hours, all membrane filters used in the above steps. Weigh to the nearest 0.1 mg and record the weights.

13. Identify and dry for two hours at $105^{\circ} \pm 5^{\circ}C$ sufficient evaporating dishes to evaporate the filtrates. Desiccate until cool and weigh to the nearest 0.1 mg. Record the weights with their identification numbers.

14. Using the evaporating dishes, evaporate 300 ml of the filtrates from step 11 and 300 ml of the distilled water (blank) at a constant temperature of $105^{\circ} \pm 5^{\circ}C$. Desiccate the residue until cool, weigh until constant weights are achieved to the nearest 0.1 mg and record the final weight. THE WASHINGS FROM EACH INDIVIDUAL COLLECTION TRAIN HALF ARE TO BE KEPT SEPARATE.

15. Quantitatively transfer an equal volume of acetone washing (from steps 6 and 7) into separate preweighed evaporating dishes after measuring and recording each volume of acetone. AS ABOVE, KEEP EACH COLLECTION TRAIN HALF SEPARATE.

16. Place a measured quantity of unused acetone, equal to the transferred volume of acetone washing, into a preweighed evaporating dish for use as a blank.

17. Evaporate both the blank and the washings from steps 15 and 16 in a vacuum at $60^{\circ}C$.

18. Desiccate to constant weight, reweigh and record.

19. Handle the used glass fiber or alundum filters carefully to prevent loss of material.

20. Air dry the used alundum and glass fiber filters if necessary, desiccate 24 hours and weigh. Record the weights and the identification numbers.

21. Weigh and record the spent silica gel to the nearest 0.5gm.

22. Dry the spent silica gel at a temperature of $105^{\circ}C$ for 12 hours.

23. Desiccate until cool then reweigh to the nearest 0.5gm and record.

B. Calculations

1. Front or Back-Half Water Wash

   For each:

   a. Insoluble Particulate

      membrane filter weight - membrane filter tare weight

   b. Soluble Particulate

      $$(\text{filtrate dish wt.--tare wt.}) - (\text{water blank wt.--tare wt.}) \times \frac{\text{final wash vol.}}{\text{aliquot}}$$

2. Front- or Back-Half Acetone Wash

   For each:

   a. Soluble Particulate

      $$(\text{washings dish wt.--tare wt.}) - (\text{acetone blank wt.--tare wt.}) \times \frac{\text{final acetone}}{\text{aliquot}}$$

3. Glass Fiber Filter or Alundum Filter

   a. Insoluble Particulate

      used filter weight - filter tare weight

4. Water Vapor

   a. Silica gel

      weight of spent silica gel - weight of dried silica gel

   b. Impinger solution

      final impinger volumes - initial impinger volumes

B. General Sampling Procedure

1. Starting with clean equipment, a leak check is performed by drawing a vacuum of 15 inches on system as indicated on the vacuum gage. Leak checks are also performed post-test and corrections may be necessary to account for increases in the leakage rate.

2. The sample is collected at isokinetic rates based upon a velocity profile determined with the use of an "S" type pitot tube.

3. Samples are taken at multiple points across the gas stream representing equal areas of cross-sectional flow, and each point is sampled for as long a time as is feasible.

4. Moisture content of the gas stream is determined by the condensation method, using a series of cooled impingers described above (A-5).

5. The duration of the test depends on the number of sample points and the time required to equally sample each point. In no case will the sample time be less than that required to collect a sufficient sample for complete analysis.

C. Analytical Techniques

1. Before use, the filter is desiccated for a period of 24 hours and weighed to the nearest 0.1 mg.

2. When processing the sample, any material deposited inside the sample probe, glass cyclone (or cyclone eliminator) and the front half of the filter holder is washed into a container using acetone, or other suitable solvent, evaporated to dryness at either ambient conditions or below the boiling point of acetone (55°C), desiccated for a period of 25 hours, and weighed to the nearest 0.1 mg.

3. After sampling, the in-line glass fiber filter is desiccated for a period of 24 hours and weighedto the nearest 0.1 mg.

4. The moisture content is determined by collecting the liquid in the impingers described above and measuring. The difference between 200 ml. and the measurement is recorded as increase in water. The spent silica gel is weighed to the nearest 0.1 gram and the increase is included in the moisture content determination.

5. The liquid in the impingers may be analyzed for particulate matter and the weights may be included in the particulate catch.

SAMPLING TRAIN COMPONENTS, METHOD OF USE, AND ANALYTICAL TECHNIQUES

A. Components

1. Stainless steel or glass probe with minimum 3/16 inch diameter opening, heated above the dew point of the gas stream to be sampled.

2. Glass cyclone efficient for removal of particles of 5 microns or greater, and cyclone collection flask. In cases of low particulate loadings, a glass cyclone eliminator may be substituted.

3. In-line filter of 0.3 micron porosity.

4. Heated chamber for maintaining glass fiber filter and cyclone above the dew point of the gas stream to be sampled.

5. Impingers placed in the following order:

   a. A 500 ml. modified Greenburg-Smith impinger filled with 100 mls. of distilled deionized water.

   b. A 500 ml. Greenburg-Smith impinger filled with 100 mls. of distilled deionized water.

   c. A 500 ml. modified Greenburg-Smith impinger left dry to act as a water trap to remove entrained water.

   d. A 500 ml. modified Greenburg-Smith impinger containing approximately 200 grams of precisely weighed silica gel.

6. An ice bath in which the impingers are partially submerged to maintain exit temperature well below the dew point of the gas to be sampled.

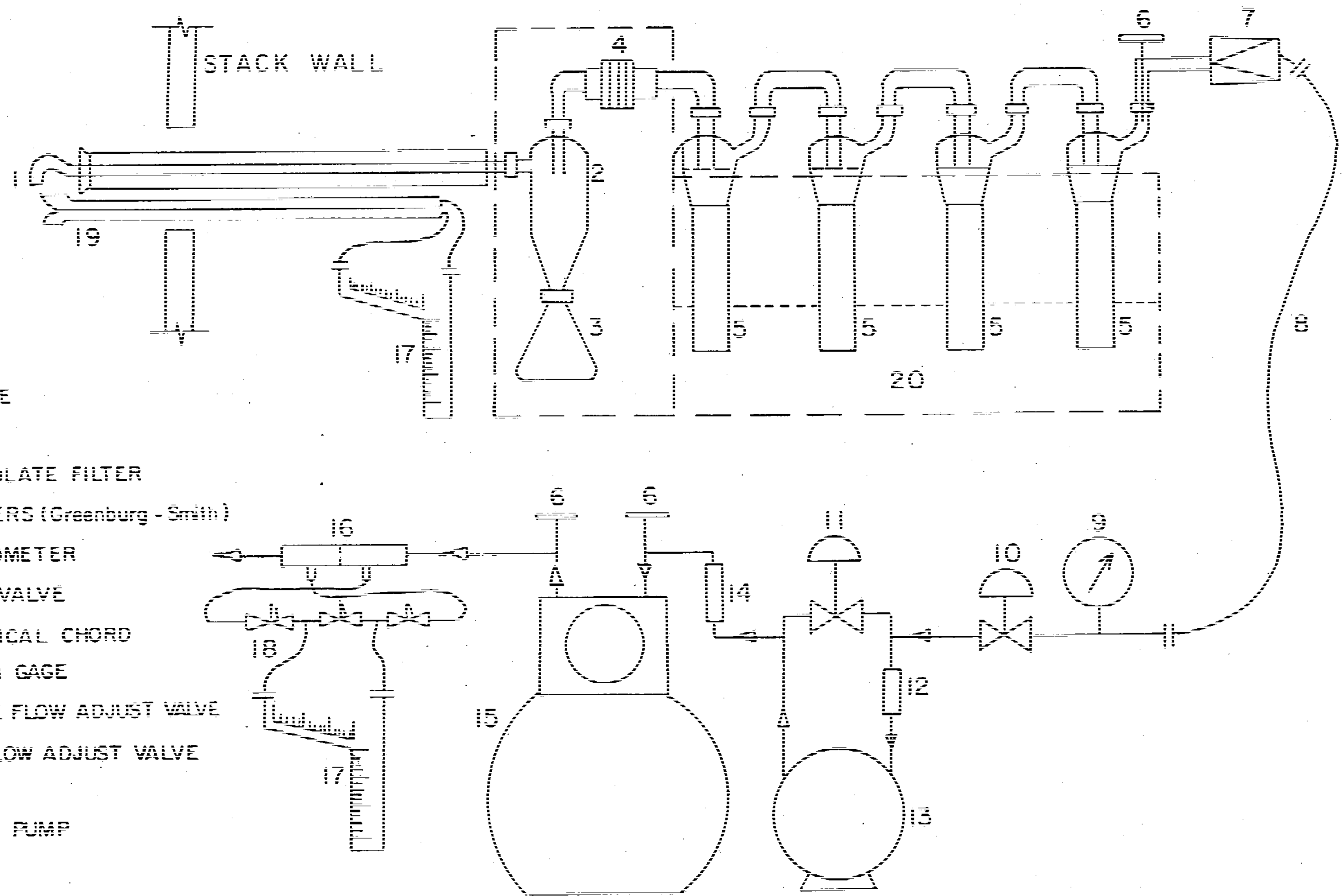
7. Dry gas meter equipped with a vacuum gage registering up to 30 inches of mercury, and a calibrated orifice.

6. The total particulate in the system is the sum of that collected in Nos. 2,3 and possibly 5. The contribution of each portion shall be individually identified. The inclusion of the impinger particulate catch is to be considered on an individual basis.

7. The emission rate and calculations are made from suitable measurements of gas temperature, moisture content, velocities and materials collected. In order for a test to be considered valid, isokinetic sampling rates shall be between 90% and 110%.

8. All equipment, including orifice meter, probe tip nozzles, dry gas meter, and temperature measuring devices is calibrated on a regular basis, dependent on the frequency of equipment use.

9. The stack gas content is determined by collecting a sample of stack gas and analyzing the contents with an Orsat analyzer or Fyrite analyzer.



LEGEND:

1. PROBE
2. CYCLONE
3. FLASK
4. PARTICULATE FILTER
5. IMPINGERS (Greenburg - Smith)
6. THERMOMETER
7. CHECK VALVE
8. UMBRILICAL CHORD
9. VACUUM GAGE
10. COURSE FLOW ADJUST VALVE
11. FINE FLOW ADJUST VALVE
12. OILER
13. VACUUM PUMP
14. FILTER
15. DRY GAS METER
16. ORFICE TUBE
17. INCLINE MANOMETER
18. SOLENOID VALVES
19. PITOT
20. ICE BATH

MEASE ENGINEERING ASSOC.
GENERAL ARRANGEMENT
SOURCE SAMPLING TRAIN

SECTION 4.0

Calibrations

Certificate
OF TRACEABILITY

This is to certify that the undersigned checked for Mease Engineering

Ainsworth, Model TC Balance Number 18185 on December 15, 1986

The following readings were obtained:

Sensitivity reciprocal unloaded	.8 Mg.			Readability	.1 Mg.		
Sensitivity reciprocal at 100 Gm.	.73 Mg.			Optical scale	NA Gm.	NA Mg.	
Arm length error	4 PPM			Reading at half scale	NA	NA Mg.	
Chain weight	NA Mg.	NA Mg.		Taring device error	NA Mg.		
Rider	10 Mg.	±0 Mg.					

Traceability is through National Bureau of Standards Test No. 732/221797 and/or New Jersey Test No. NJ 82419

Dated: December 30, 1986
MATAWAN, NEW JERSEY

J. Kory
OMEGA BALANCE SERVICE, INC.

Mease Engineering Associates

Environmental Consultants

DRY GAS METER AND ORIFICE METER CALIBRATION

Model Number 2343

Serial Number

Meter Box No. "D"

Wet Test Meter No. AL-20 14524

Calibration Date 4-26-88

Signature Michael J. Mease

Barometric Pressure, Pb 30.17

Orifice Manometer ΔH in. H_2O	Gas Volume Wet V_w ft^3	Gas Volume Dry V_d ft^3	Temperature Wet t_w °F	Temperature Dry In t_{di} °F	Temperature Dry Out t_{do} °F	Time θ Min.	Υ	$\Delta H_@$
0.5	5.000	5.017	73	83	75	12.79	1.007	1.81
1.0	5.000	5.113	73	93	82	9.27	1.002	1.87
2.0	10.000	10.399	73	105	90	13.347	1.001	1.91
3.0	10.000	10.523	73	111	96	11.142	0.997	1.97
						AVERAGE	1.002	1.89

$$\Upsilon = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)\left(t_w + 460\right)} \qquad \Delta H_@ = \frac{0.0317\ H}{P_b\ (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$$

Mease Engineering Associates

Environmental Consultants

DRY GAS METER AND ORIFICE METER CALIBRATION

Model Number 2343

Serial Number

Meter Box No. "C"

Wet Test Meter No. AL-20 14524

Calibration Date 9-26-88

Signature [signature]

Barometric Pressure, Pb 30.17

02	03	04	05	06	07	08	09	10
Orifice Manometer ΔH in. H_2O	Gas Volume		Temperature			Time θ Min.	γ	$\Delta H_@$
	Wet V_w ft^3	Dry V_d ft^3	Wet t_w °F	Dry In t_{di} °F	Dry Out t_{do} °F			
0.5	5.000	5.034	73	82	72	12.997	0.999	1.86
1.0	5.000	5.142	73	93	79	9.300	0.994	1.89
2.0	10.000	10.496	73	106	90	13.37	0.993	2.09
3.0	10.000	10.587	73	119	99	10.68	1.001	1.96
						AVERAGE	0.997	1.95

$$\gamma = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)\left(t_w + 460\right)} \qquad \Delta H_@ = \frac{0.0317 \; H}{P_b \; (t_d + 460)} \left[\frac{(t_w + 460)\;\theta}{V_w}\right]^2$$

PITOT TUBE CALIBRATION

All pitot tubes are geometrically aligned and within the limits as prescribed in the Federal Register. Therefore, they are assigned a value of 0.84.
In the event that a pitot tube tip is altered during transport, and the geometric qualifications cannot be met, the pitot tube is calibrated according to the Federal Register. In this case, the new calibration factor is listed in the report and used in the calculations.

TEMPERATURE SENSING DEVICE CALIBRATIONS

All temperature sensing devices used during a test series, including thermocouples and thermometers are calibrated after each test series, as specified in the Federal Register. In the event that these calibration factors fall within the limits as specied, no corrections are necessary. In the evnt that a device is outside the limits, as specified, the correction factor is listed and used in the calculations.

SAMPLING NOZZLE CALIBRATION

The sampling nozzle used during the test series is determined after each test series using a micrometer on several diameters as specified in the Federal Register.

CARL POE CO., INC. 99 REINERMAN ST. • HOUSTON, TEXAS 77007 • 713-861-3816

December 9, 1986

Princeton Testing Lab
P.O. Box 3108
Princeton, NJ 08543
Attn: Glenn

Dear Sir/Madam:

This is to certify that your Model AL-20 American Wet Test Meter, Serial No. 14524, has been calibrated with an American 5 Ft. Bell Prover, Serial No. 1045. It is traceable to the Bureau of Standards.

Reference No. 26727, PI-TAPE.

Sincerely,

CARL POE CO., INC.

Carl W. Poe

Carl W. Poe

CWP:mv

SECTION 5.0

Calculations

SOURCE SAMPLING CALCULATIONS: NOMENCLATURE

An = Nozzle Area, $ft.^2$

As = Stack Area, $ft.^2$

Bwo = Water Vapor Proportion, by volume, dimensionless

Cm = Meter Correction Factor, dimensionless

Cp = Pitot Coefficient, dimensionless

Cs = Particulate Concentration, units specified

$\Delta H_{avg.}$ = Average Pressure Drop Across Orifice, in.H_2O

$\%H_2O$ = Water Vapor Content, dimensionless

Is = Percent Isokinetic of Test, dimensionless

Kp = 85.48, unit correction

Md = Molecular Weight of Dry Gas

Mn = Total Particulate Catch, grams

Ms = Molecular Weight of Stack Gas

$(\sqrt{\Delta P})_{avg}$ = Average of the Square Roots of the Velocity Head

Pbar = Barometric Pressure, in. Hg.

pmr = Pollutant Mass Rate, lb./hr.

θ = Time, minutes

Pstd = 29.92 in. Hg.

Qs = Stack Gas Flowrate, actual cubic feet per minute

(Qs)std = Stack Gas Flowrate, standard cubic feet per minute

Ts = Stack Gas Temperature, ^oR

Tstd = 530^oR

Vfc = Increase in Liquid Volume in Impingers, ml.

Vm = Volume Sampled at Meter Conditions, $ft.^3$

Vmstd = Volume of Air Metered at Standard Conditions

Vs = Stack Gas Velocity, ft./sec.

Vsstd = Stack Gas Velocity, standard conditions, ft./min.

Vwc = Volume of Liquid Collected, cubic feet

SAMPLE CALCULATIONS: Run #1

1. Volume of Water Collected

$$Vwc = (0.04707)(Vfc)$$
$$= (0.04707)(201.0)$$
$$= 9.461$$

2. Volume of Air Metered

$$Vmstd = \frac{(Vm)(Tstd)(Pbar + \frac{\Delta H}{13.6})(Cm)}{(Tm)\quad(Pstd)}$$
$$= \frac{(53.075)(530)(30.10 + \frac{0.6027}{13.6})(1.002)}{(546.896)(29.92)}$$
$$= 52.028$$

3. Moisture Content

$$Bwo = \frac{Vwc}{(Vwc + Vmstd)}$$
$$= \frac{9.461}{9.461 + 52.028}$$
$$= 0.15387$$

4. Molecular Weights

$$Md = (\%CO_2 \times 0.44) + (\%O_2 \times 0.32) + ((\%N_2 + \%CO) \times 0.28)$$
$$= (4.27 \times 0.44) + (16.8 \times 0.32) + (78.93 \times 0.28)$$
$$= 29.35$$

$$Ms = Md(1 - Bwo) + 18(Bwo)$$
$$= (29.35)(1 - 0.15387) + 18(0.15387)$$
$$= 27.608$$

5. Velocity of Exit Gases

$$Vs = (Kp)(Cp)\sqrt{\frac{Ts}{(Ps)(Ms)}} \quad \sqrt{(\Delta P)}\ avg.$$
$$= (85.48)(0.84)\sqrt{\frac{686.958}{(30.11)(27.608)}} \quad (0.8525)$$
$$= 55.645 \text{ FT/SEC.}$$

SAMPLE CALCULATIONS: Run #1, Continued

6. Flowrates

$$Qs = (Vs)(As)(60)$$
$$= (55.645)(14.2559)(60)$$
$$= 47{,}596 \text{ ACFM}$$

$$Qs_{std} = \frac{(Qs)(Ps)(Tstd)(1-Bwo)}{(Pstd)(Ts)}$$
$$= \frac{(47{,}596)(30.11)(530)(1-0.15887)}{(29.92)(686.958)}$$
$$= 31{,}273 \text{ SCFM}$$

7. Particulate Concentration

$$Cs = \frac{(Mn)(15.43)}{Vmstd}$$
$$= \frac{(0.0361)(15.43)}{52.028}$$
$$= 0.0107 \text{ GRAINS/SCF}$$

8. Particulate Emission Rate

$$pmr = \frac{(Mn)(Qs_{std})(60)}{(Vmstd)(454)}$$
$$= \frac{(0.0361)(31{,}273)(60)}{(52.028)(454)}$$
$$= 2.87 \text{ LB/HR.}$$

9. Isokinetics

$$Is = \frac{Vmstd}{(An)(\theta)(Vs_{std})} \quad \text{where } Vs_{std} = \frac{Qs_{std}}{As} = \frac{31{,}273}{14.2259} = 2193.7$$
$$= \frac{52.028}{(0.000195)(120)(2193.7)}$$
$$= 1.0144$$