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

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

Commonwealth of Pennsylvania
Environmental Resources
August 27, 1992

Subject: Stack Test Review

To: Data File
James Julian, Inc.
Perry Township, Snyder County

From: Jaydeb Pal
Air Pollution Control Engineer
Division of Technical Services
and Monitoring
Bureau of Air Quality Control

Through: Chief, Source Testing and Monitoring Section

James Julian, Inc. operates a Boeing MS600 drum mix asphalt plant with a rated production capacity of 600 tons per hour at the aforementioned location. The exhaust gas from the dryer is ducted to an Aeropulse Model 1134-108P baghouse before being discharged to the atmosphere through a 60 inches by 40.5 inches stack having an exit point 30 feet above grade.

Three particulate and three EPA Method 25A VOC tests were performed in the exhaust stack by the personnel of Ramcon Environmental Corporation to demonstrate compliance with the conditions of Plan Approval No. 55-303-002A. All tests were conducted in accordance with a preapproved test protocol and are acceptable to the Department.

The following data was extracted from the test reports:

Test run no.	1	2	3
Test date	6/25/92	6/25/92	6/25/92
Process rated production capacity (ton/hr.)	600	600	600
Process normal production rate (ton/hr.)	400	400	400
Production rate during test (ton/hr.)	424	423	421
Material produced during test	heavy duty BCBC	heavy duty BCBC	heavy duty BCBC
Percent passing through 200 mesh	4.5	4.5	4.5
Volumetric flow rate (dscfm)	35,279	34,792	33,575
Particulate emission concentration (gr./dscf)	0.0041	0.0033	0.0042

Allowable particulate emission concentration (gr./dscf) (per BAT) (per NSPS)	0.02 0.04	0.02 0.04	0.02 0.04
Particulate emission rate (lb./hr.)	1.24	0.95	1.21
VOC emission concentration, as methane (ppm)	137	165	184
VOC emission rate, as methane (lb./hr.)	12	14.3	15.4
VOC emission rate, as methane (lb./ton of production)	0.028	0.034	0.036
Allowable VOC emission rate (lb./ton of production) (per BAT)	0.07	0.07	0.07

cc: Richard L. Maxwell, Jr., Northcentral Regional Office
File No. 55-303-002A
EPA/RSL
Reading File - Source Testing
Krishnan Ramamurthy, Central Office

JPepke

COMMONWEALTH OF PENNSYLVANIA

August 10, 1992

SUBJECT: Stack Test Review
James Julian, Inc.
Perry Township, Snyder County
Plan Approval 55-303-002A

TO: Rick St. Louis
Division of Source Testing & Monitoring

FROM: Richard L. Maxwell, Jr.
Chief, Engineering Services
Air Quality Control
Northcentral Region

Attached is a test report for particulate and Method 25A testing performed on a drum mix asphalt concrete plant on 6/25/92 by Ramcon. Would you please have someone on your staff review this protocol for Chapter 139 conformance, etc.

Also attached is a copy of my test observation memo.

The plant is subject to NSPS Subpart I (.04 grains of particulate matter per dry standard cubic foot) as well as to a particulate matter standard of .02 grains per dry cubic foot and a VOC standard of .07 pounds of VOC per ton of asphalt concrete produced, both of which were established pursuant to the best available technology provisions of Chapter 127.

RLM/sks

cc: File

8/28

RECEIVED
AUG 11 1992
DIV AIR QUALITY CONTROL
DIV OF TECH SERVICES

COMMONWEALTH OF PENNSYLVANIA

July 7, 1992

SUBJECT: Stack Test Observation
James Julian, Inc.
Perry Township, Snyder County
Plan Approval 55-303-002A

TO: Files

FROM: Richard L. Maxwell, Jr.
Chief, Engineering Services
Air Quality Control
Northcentral Region

On June 25, 1992, I observed the performance of particulate and Method 25A VOC stack testing being performed by Ramcon personnel on James Julian's drum mix asphalt plant and associated fabric collector. Sam Powers and Ron McGuirk of James Julian were present.

The plant was producing heavy duty BCBC at a rate of approximately 425 TPH using AC20 asphalt from Sun Oil at an addition rate of 3.8%. The AC20 temperature was 313-322°F and the mix temperature was assumed to be 300°F. (The respective thermocouple was reading 320-325°F but was believed to be inaccurate).

The first particulate test began at approximately 9:06 a.m. and ended at 10:14 a.m., approximately ten minutes after I arrived on site. The second particulate test began at approximately 11:24 and ended at 12:29. The third particulate test began at approximately 1:35 and ended at 2:47. In addition to the first 50 minutes of test 1, I missed the first five minutes of test 3 as I was off-site having lunch. The start and stop times of the VOC runs did not generally match those of the particulate runs. (The #1 VOC run started ten minutes after the #1 particulate run, etc.).

The particulate test port locations were as depicted in the test protocol. Sampling occurred at six points in each of the five ports, two minutes per point. The VOC port was located approximately seven feet upstream of the particulate ports. VOC sampling occurred at a single point.

A J.U.M. model VE-7 total hydrocarbon analyzer was used for the VOC testing. Zero gas and 31.0 and 85.6 ppm propane were used for calibration. The initial pre-test calibration was supposedly done with all three gases but the between run calibrations were done with 0 gas and 31.0 ppm propane only.

The first test had to be stopped prematurely due to a need to cease plant production (the product silo was full and no trucks were available). As there were only 50 seconds of sampling remaining for the last particulate sampling point and as waiting until the plant started up again to perform this 50 seconds of sampling would cause an overall delay of approximately one hour in the day's sampling schedule, possibly endangering the likelihood of completing a third test run, I okayed the deletion of the 50 seconds of sampling (the first VOC run was about nine minutes short, a deficiency which I also okayed).

I observed the final leak checks on all three particulate runs. In all cases, the leak rate was below .02 cfm at a vacuum equivalent to or higher than the highest vacuum pulled during the corresponding test run.

At no time during the day did I observe any visible emissions from the collector stack. This was true from a number of different vantage points on the plant site itself, using the sky as a background, as well as from a distance, using a hillside as a background.

Other items of interest were:

- Despite a collector bag cleaning pulse frequency of 30 seconds and several months of operation, the collector pressure drop is still less than one inch. When I questioned Sam Powers about this, he claimed Aeropulse told him it may take a whole season to get the pressure drop where it should be. He also claimed that the magnehelic guage needle drops to 0 when the plant is down and the collector fan is off (indicating that the needle isn't stuck on .6 inches).

- An AC20 delivery ticket in the control room indicated that the flash point of the AC20 was in excess at 199°F.

- The plant appears to incorporate two asphalt injector pipes (which enter the drum opposite the burner end). It was noted that the upper (and smaller diameter) of the two was in use during this testing and was positioned all the way in (presumably as close to the burner as it can get).

- I examined the filters from the first two particulate runs. In both cases, they appear to have some light "splotchy" staining rather than a uniform layer of dust. The filter for the second run also had a number of loose particles associated with it whereas I did not notice that the filter for the first run had any.

- I observed the dust silo while dust was being conveyed to it and did not see any fugitive emissions from the silo top or from the dust transfer and silo vent lines.

- The plant was firing #2 oil.

RLM/bls

JAMES JULIAN, INC.

6/25/92

TIME	PRODUCTION RATE #	AC-20 USAGE RATE	BURNER SETTING	COLLECTOR INLET TEMP.	COLLECTOR OUTLET TEMP.	COLLECTOR ΔP	HC ppm CONC.						
10:03	427 T/H	16.4 T/H	56%	329°F	311°F		43.6 ppm						
10:09													
10:14	1ST	TEST	OVER (PARTICULATE)										
10:10						.6"							
11:24	2ND	TEST	START (PARTICULATE)					OUTLET TEMP LOW AS PLANT HAD BEEN DOWN					
11:25	377	14.4	56	338	275		38.7						
11:28							45.6						
11:34													
11:37	413	15.6	52.5	333	315								
11:52	425	16.1	58	334	317		43.2						
11:53													
12:01	427	16.3	57.5	337	318								
12:10	423	16.3	58	335	318		51.3						
12:12						.6							
12:15							49.5						
12:21													
12:22	426	16.3	58	333	316		40.5						
12:26													
12:29	2ND	TEST	OVER (PARTICULATE)										
1:35	3RD	TEST	START (PARTICULATE)				35.2						
1:43								OUTLET TEMP LOW - PLANT WAS DOWN					
1:44	404	15.1	52.5	319	296								
1:48						.6	39.1						
1:50													
1:54	424	16.1	62	334	312		45.5						
2:01							47.8						
2:10													
2:11	427	16.2	58	336	319		55.9						
2:19													
2:23	428	16.1	58	337	319								
2:28						.7							
2:30							52.0						

MIX, NOT AGGREGATE

ϕ GAS PROPANE

JAMES JULIAN, INC

6/25/92

TIME	PRODUCTION RATE	AC-20 USAGE RATE	BURNER SETTING	COLLECTOR INLET TEMP.	COLLECTOR OUTLET TEMP.	COLLECTOR ΔP	HC CONC
2:35	420	16.2	56	336	317		
2:45	421	16.0	56	334	317		
2:47	TEST 3 OVER (PARTICULATE)						

RAMCON
ENVIRONMENTAL CORPORATION

RECEIVED
AUG 6 1992
DER-AIR QUALITY CONTROL
WILLIAMSPORT REGION

AIR EMISSIONS TESTING
for
PARTICULATE MATTER AND THC
at
JAMES JULIAN, INC.
A.K.A. NORTH EAST HOT MIX COMPANY
MT. PLEASANT, PENNSYLVANIA
JUNE 25, 1992

Ron McGuirk
James Julian, Inc.

Wm. Joseph Sewell, II
Vice-President

RECEIVED
AUG 11 1992
DER AIR QUALITY CONTROL
DIV. OF TECH. SERVICES

Allen Turner
Team Leader

RAMCON BUILDING, 223 SCOTT STREET, MEMPHIS, TENNESSEE 38112
TELEPHONE 800/458-4567 IN TENNESSEE 901/458-7000 FAX 901-458-3868

RAMCON

ENVIRONMENTAL CORPORATION

July 20, 1992

Mr. Ron McGuirk
James Julian, Inc.
P. O. Box 647
North East, MD 21901

Re: Air Emissions Testing: June 25, 1992

Dear Mr. McGuirk:

Enclosed you will find four copies of our report on the Air Emissions Testing we conducted on North East Hot Mix Company's exhaust stack for particulate matter and total hydrocarbons (THC). Based on our test results, we found this facility to be operating in compliance with EPA and the State of Pennsylvania.

You will want to sign the report covers and send two copies to:

Mr. Richard Maxwell
EPA Pennsylvania
200 Pine Street
Williamsport, PA 17701-6501

You will need to keep one copy of the report at the plant. We certainly have enjoyed working with you. Please let us know if we can be of further assistance.

Respectfully,

William Joseph Sewell, II
Vice President

WJS/kns/b

Enclosures

RAMCON BUILDING, 223 SCOTT STREET, MEMPHIS, TENNESSEE 38112
TELEPHONE 800/458-4567 IN TENNESSEE 901/458-7000 FAX 901-458-3868

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I. INTRODUCTION

On June 25, 1992, personnel from RAMCON Environmental Corporation conducted source air emissions testing at James Julian, Inc. (North East Hot Mix Co.) located in Perry Township in Snyder County, Pennsylvania. The testing was conducted on the exhaust stack positioned on a Boeing drum mix asphalt plant. The testing was performed on the outlet stack for particulate matter and total hydrocarbons (THC).

The measurement of the total hydrocarbon concentration within the various sources was conducted utilizing "real-time" continuous emission monitoring instrumentation via EPA Reference Method 25A. This technique provides the total gaseous organic concentrations of the source within seconds of extracting the sample from the source. The total hydrocarbon content of the stack is provided on an as-methane basis.

The particulate testing was conducted using US EPA Reference Method 5. This testing procedure was performed isokinetically extracting the sample from the source at a rate which simulates the stack gas velocity being emitted from the source. A minimum of 50 standard cubic feet of stack gas was collected and analyzed for the applicable source.

II. TEST RESULTS

Table I summarizes the test results for the sampling conducted during this project. This summary includes the total hydrocarbon and particulate test results in terms of concentration and emission values for each test run. The concentration of THC is listed in terms of parts per million (ppm) and the particulate matter as grains per dry standard cubic foot (gr/dscf). The emission value for each pollutant is tabulated in terms of pounds per hour (lb/hr).

The allowable emission for this source is set forth by the State of Pennsylvania Department of Environmental Resources for particulate matter. This allowable emission has been established at 0.02 gr/dscf.

Therefore, on the basis of these test results, the facility is operating in compliance with EPA and the State of Pennsylvania. Mr. Richard Maxwell represented the State of Pennsylvania Department of Environmental Resources during the testing conducted by RAMCON Environmental Corporation.

JAMES JULIAN, INC.
NORTH EAST HOT MIX COMPANY

TABLE I

RUN	PARTICULATE MATTER		TOTAL HYDROCARBONS		
	GR/DSCF	LB/HR	PPMw	PPMd	LB/HR
1	0.0041	1.24	103.8	136.7	12.02
2	0.0032	0.95	126.6	165.2	14.33
3	0.0042	1.21	138.6	183.7	15.37
AVG	0.0038	1.13	123.0	161.9	13.91

III. TEST PROCEDURES

Each testing procedure employed in the test project is discussed below. This will provide information as to the manner in which the test results were obtained.

1. Determination of Total Gaseous Organic Emissions From Stationary Sources (Instrumental Analyzer Procedure) - US EPA Method 25A:

This procedure utilizes a continuous emissions monitor to provide the data results from the source on a "real-time" or instantaneous basis.

The instrument utilized a flame ionization detector. The minimum detection limit of the analyzer is 0.1 ppm. Fullscale ranges are available in 100 ppm, 1000 ppm, and 10,000 ppm settings according to the expected concentrations in the flue gas stream. The gas concentrations encountered in this testing project required that the 0 - 100 ppm scale be utilized. The calibration standards employed for this scale were within the appropriate percentages of fullscale according to Method 25A.

When the THC analyzer was calibrated using propane as the standard, the data output (as propane) must be corrected to an as-methane basis for reporting. This is accomplished by scaling the output of the analyzer upward by a factor of three (3). This factor represents the number of carbon atoms present in a propane molecule versus the number present in methane. Calibration with propane accurately establishes the output signal of the instrument to produce values which are one-third the actual values. This correction procedure is set forth in Method 25A.

A. Calibration - Calibration of the instruments was performed using certified gas standards composed of a known concentration of propane or methane in zero grade nitrogen. These gas standards were prepared using partial pressure/volumetric and gravimetric methods.

The prepared gas mixture was analyzed and the certification tolerance was not greater than 2% of the pollutant component. A copy of the analysis certificate for each of the certified gas mixtures used during the testing is included in the test report.

Immediately prior to each compliance test series, a complete calibration of the instrument was performed. This calibration differs from that of Method 3A in that a mid- and low-range calibration standard is used to establish the linearity of the instrument.

Then a high range pollutant gas mixture, prepared in the specified range percentage of the span or fullscale, was injected. After the system stabilized, the span or fullscale potentiometer was adjusted until the voltage output from the analyzer corresponded to the certification of analysis for the respective calibration gas.

When this procedure was complete and the system had responded properly to a zero and fullscale reading, a mid- and/or low-range certified calibration gas was injected into the system. No adjustments were made to the system except to achieve proper flow rate through the analyzer. The analyzer, after reaching a stable value, corresponded to the certified value of the calibration gas within a specified percentage of the fullscale.

This mid-range calibration gas served two purposes of quality control and quality assurance. The first was to show the instrument analyzef and output data on a linear scale. The second purpose was to validate the zero and fullscale values of the instrument were properly set.

Prior to sampling, a single calibration gas was injected into the probe inlet. This calibration gas was a mixture of oxygen and carbon dioxide in a balance of zero nitrogen. The system was not adjusted except to achieve proper flow through the analyzers. This system bias check served to demonstrate the sample train was leak free and caused no interference to the integrity of the sample.

B. Sampling - After calibration, the system was purged with zero grade nitrogen to remove any pollutants injected as calibration gas. Once the system indicated the pollutant gases had been removed, the calibration valve assembly was positioned to allow stack gas to flow through the instrument.

The THC instrument analyzed the gas stream on a wet basis, prior to moisture removal, to prevent hydrocarbon sample loss upon condensation. This was accompanied by correcting the data output in ppm to a dry basis using the moisture content determined at the time of sampling. These calculations are provided in a later section.

All samples injected into the instruments were removed from the stack and delivered to the instruments via a heated probe and sample line. This prevented any condensation of water vapor and/or pollutant in the gas stream. Once the sample gas exited the sample line, the stream was separated in a sample gas manifold. The split stream enabled analysis of the CEM instrumentation on both wet and dry basis, as necessary.

As previously mentioned, a single test run was conducted to determine the concentration values of THC for each source. Each test run was conducted over a period of 1 hour.

To demonstrate the instrument did not exhibit any deviation from the calibrated values set at the beginning of a test period, a sample of certified calibration gas was injected into the sampling system at the conclusion of each test run. The sample system responded within specified tolerance limits according to the initial system bias check.

This post-test calibration served two purposes: (1) it demonstrated excessive calibration drift of the instrument(s) did not occur during the test period and, (2) the system was not contaminated with any foreign material from the source to alter any results during the test period.

2. Determination of Particulate Matter from Stationary Sources - U.S. EPA Reference Method 5:

The testing procedure for conducting the particulate determinations followed the guidelines set forth in Method 5. The analysis of the collected samples was performed according to the procedures set forth by the Pennsylvania Department of Environmental Resources.

A. Preparation - All glassware utilized in each sampling train was thoroughly cleaned and dried prior to each test series. A glass fiber filter was used which had been labeled and desiccated for a minimum of 24 hours and pre-weighed.

The impinger system configuration was assembled using the outlined procedure in Method 5. One hundred ml of deionized water was placed in the first two impingers. The third impinger was initially empty and the fourth impinger contained a pre-weighed amount of silica gel for complete moisture removal. In assembling the sample train, a small amount of silicon grease was placed on the ball joints to ensure adequate sealing.

A stainless steel probe liner and nozzle system was utilized for the total particulate determinations. The probe housed a set of calibrated S-type pitot tubes and a calibrated thermocouple for monitoring stack temperature. These calibrations are included in another section in this report.

B. Sampling - The probe and sample box were heated to an approximate temperature of 250° F. These temperatures were monitored throughout the testing. An ice bath was prepared in which to submerse the impinger system. The temperature of the last impinger was monitored throughout the testing to ensure adequate condensation of the water vapor in the flue gases.

A leak check was performed prior to each test run. The entire sample train system was subjected to a vacuum which did not exceed 0.02 cfm leakage rate. The vacuum established during the pre-test leak check was not exceeded during the test period.

A single run was conducted at each sampling location for the test. The sampling time was a minimum of 1 hour and at least 50 scf of stack gas was extracted via the sampling system.

When a test run had been completed, a post-test leak check was conducted prior to any dismantling of the sampling train. Once this had been successfully achieved, the sample train was dismantled for sample recovery.

The probe and connecting glassware were washed with acetone. The contents of the impingers were also volumetrically measured for moisture gain. The glass fiber filter was carefully transferred to its sample container.

C. Analysis - The first portion of the particulate matter was determined by analyzing the filter catch and front half probe wash. The glass fiber filter was desiccated for 24 hours prior to any weighing. The acetone probe wash was transferred to a tared beaker and evaporated to dryness. The resultant residue was also desiccated prior to gravimetric analysis.

The first weighing was performed after this initial period of drying. The weights were recorded to 0.0001 g. After a minimum of 6 additional hours of desiccating, a second weighing was conducted. The weights must agree within 0.0005 g or further desiccation must be conducted until the weights stabilize.

All analysis data was recorded and is provided in this document.

The back half impinger catch was filtered through a series of filters reducing to a 0.22 micron filter mesh. The gravimetric analysis of these filters follows the analysis described for the front half samples. The weight of insoluble material collected by these filters were included in the weight of total particulate matter as reported.

The filtrate material, that which passes through the 0.22 micron filters, was placed into a tared beaker and allowed to evaporate to dryness. Gravimetric analysis was also performed on these samples. The weight of soluble material determined was not included in the total particulate catch amount.

Sample field blanks of acetone and water were collected, contained, labeled and analyzed in conjunction with the samples. The blank weight was deducted from the acetone probe wash residue weight determinations.

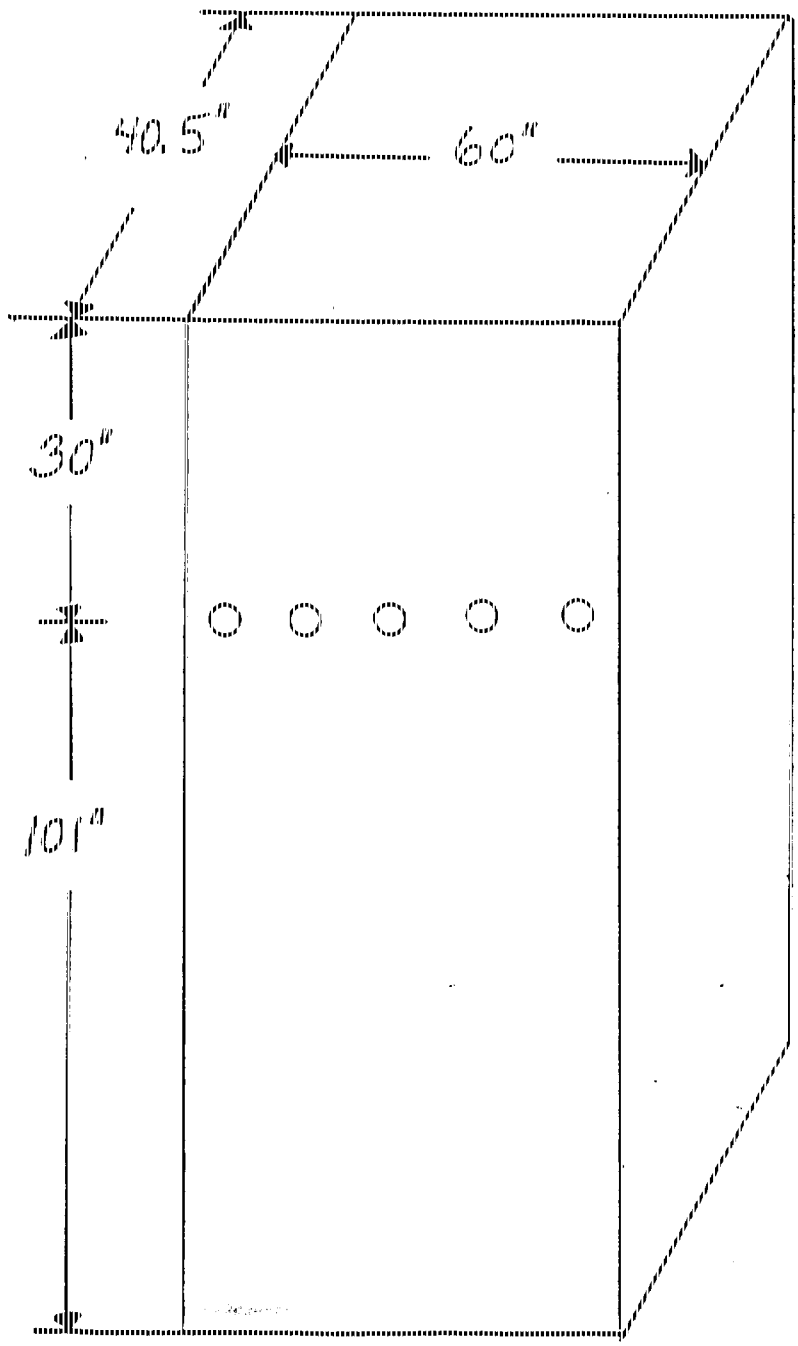
Sample field blanks of acetone were collected, contained, labeled and analyzed in conjunction with the samples.

IV. SOURCE INFORMATION

SOURCE INFORMATION

The emissions test was conducted after a baghouse on a rectangular stack with an equivalent diameter of 48.4". Five sampling ports were placed 30" down (0.62 diameters upstream) from the top of the stack and 101" up (2.1 diameters downstream) from the last flow disturbance. The ports were evenly spaced on 12" centers. The two outside ports were 6" from the side walls of the stack. Thirty points were sampled, six through each port for two minutes each for a total testing time of 60 minutes. All requirements of US EPA Method Five were met for this stack test.

Points on a Diameter	Probe Mark
1	3.4"
2	10.1"
3	16.9"
4	23.6"
5	30.4"
6	37.1"



V. EQUIPMENT USED

V. EQUIPMENT USED

Equipment used on conducting the particulate emissions test was:

A. The Lear Siegler PM-100 stack sampler with appropriate auxiliary equipment and glassware. The train was set up according to the schematic on the nex page.

B. An Airguide Instruments Model 211-B (uncorrected) aneroid barometer was used to check the barometric pressure.

C. Weston dial thermometers are used to check meter temperatures. An Analogic Model 2572 Digital Thermocouple is used for stack temperatures.

D. A Hays 621 Analyzer was used to measure the oxygen, carbon dioxide and carbon monoxide content of the stack gases. For non-combustion sources, A Bacharach Instrument Company Fyrite is used for the gas analysis.

E. Filters are mady by Schleicher and Schuell and are type 1-HV with a porosity of .03 microns.

F. The acetone is reagent grade or ACS grade with a residue of ≤ .001.

J.U.M.
ENGINEERING

HEATED TOTAL HYDROCARBON ANALYZER
MODEL VE7

The J.U.M. Engineering Model VE7 is a high accuracy Total Hydrocarbon Analyzer for the measurement and analysis of organic vapors.

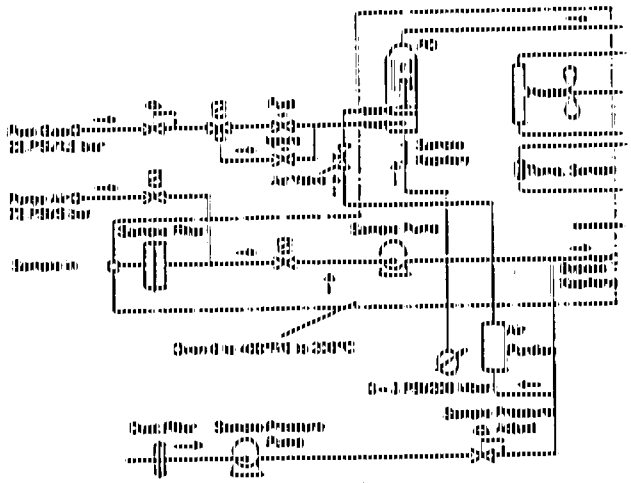
The VE7 utilizes a Hydrogen Flame Ionization Detector (FID) in a thermostatically controlled oven to prevent the loss of high molecular weight hydrocarbons.

Options
Digital display with BCD output/without BCD output Remote range control and range I.D. Recorder output of oven temperature

- All heated components
- Integrated heated sample pump
- Permanent heated stainless steel 2 micron sample filter
- Built in burner air supply - no extra bottles needed
- Automatic fuel enrichment for ignition
- 19 inch relay rack mount
- 1% precision full scale
- Response time - 90% full scale within 1 second

STANDARD SPECIFICATIONS:

Analysis Method:	Flame Ionization Detector (FID)
Sensitivity:	Min. 1 ppm CH
Response Time:	90% of full scale in less than one second
Zero Drift:	1% of full scale per 24 hours
Span Drift:	1% of full scale per 24 hours
Linearity:	Within 1%
Oxygen Synergism:	Less than 1% of selected range
Ranges:	Any three of the following: 0 - 10, 100, 1000, 10,000, 100,000 ppm
Outputs:	0 - 10 Volts D.C.
Display:	Analog Meter in ppm Hydrocarbon or in % LEL
Zero/Span Adjust:	Mounted on front panel
Fuel Consumption:	Hydrogen 20 cc/min at 22 psig (1.5 Bar) Hydrogen/Helium 40/60 min. 80 cc/min.
Air Consumption:	None Integral Air generator
Zero & Span Gas:	3 psig (200 m Bar)
Sample Pump:	All Stainless Steel, heated, 3 liters per minute at operating temperature
Sample Pressure:	By Integral Pump 3 psig (200 m Bar)
Sample Filter:	Permanent all stainless steel 2 micron back-purged for cleaning
Analysis Temperature:	Adjustable 300 to 400°F (90 to 200°C)
Power Requirements:	110 Volts, 60 Hertz AC 800 Watts (others on request)
Ambient Temperature:	32°F to 110°F (0 to 43°C)
Dimensions:	Width 483 mm (19 inches), Depth 480 mm (19-1/8 inches), Height 227 mm (8-3/4 inches)
Weight:	39.0 lbs (17.8 kg)
Shipping Weight:	53 lbs (24 kg)



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VI. LABORATORY PROCEDURES AND RESULTS

LABORATORY PROCEDURES FOR PARTICULATE SAMPLING

I. Field Preparation

A. FILTERS: Fiberglass 4" sampling filters are prepared as follows:

Filters are removed from their box and numbered on the back side with a felt pen. The numbering system is continuous from job to job. The filters are placed in a desiccator to dry for at least 24 hours. Clean plastic petri dishes, also numbered, top and bottom, are placed in the desiccator with the filters. After desiccation, the filters are removed, one at a time, and weighed on the Sartorius analytical balance then placed in the correspondingly numbered petri dish. Weights are then recorded in the lab record books. Three filters are used for each complete particulate source emissions test and there should be several extra filters included as spares.

B. SILICA GEL: Silica Gel used for the test is prepared as follows:

Approximately 200 g of silica gel is placed in a wide mouth "Mason" type jar and dried in an oven at 175°C for two hours. The open jars are removed and placed in a desiccator until cool for two hours and then tightly sealed. The jars are then numbered and weighed on the triple beam balance to the closest tenth of a gram. This weight is recorded for each sealed jar. The number of silica gel jars used is the same as the number of filters. Silica gel should be indicating type, 6-16 mesh.

II. Post - Testing Lab Analysis

A. FILTERS: The filters are returned to the lab in their sealed petri dishes. In the lab, the dishes are opened and placed into a desiccator for at least 24 hours. Then the filters are weighed continuously every six hours until a constant weight is achieved. All data is recorded on the laboratory forms that will be bound in the test report.

B. SILICA GEL: The silica gel used in the stack test is returned to the appropriate mason jar and sealed for transport to the laboratory where it is reweighed to a constant weight on a triple beam balance to the nearest tenth of a gram.

C. PROBE RINSINGS: In all tests where a probe washout analysis is necessary, this is accomplished in accordance with procedures specified in "EPA Reference Method 5". These samples are returned to the lab in sealed mason jars for analysis. The front half of the filter holder is washed in accordance with the same procedures and included with the probe wash. Reagent or ACS grade acetone is used as the solvent. The backhalf of the filter holder is washed with deionized water into the impinger catch for appropriate analysis.

D. IMPINGER CATCH: In some testing cases, the liquid collected in the impingers must be analyzed for solid content. This involves a similar procedure to the probe wash solids determination, except that the liquid is deionized water.

E. ACETONE: A blank analysis of acetone is conducted from the one gallon glass container used in the field preparation. This acetone was used in the field for rinsing the probe, nozzle, and top half of the filter holder. A blank analysis is performed prior to testing on all new containers of acetone received from the manufacturer to insure that the quality of the acetone used will be exceed the .001% residual purity standard.

SPECIAL NOTE

When sampling sources high in moisture content, (such as asphalt plants) the filter paper sometimes sticks to the filter holder. When removing the filter, it may tear. In order to maintain control of any small pieces of filter paper which may be easily lost, they are washed with acetone into the probe washing. This makes the filter weight light (sometimes negative) and the probe wash correspondingly heavier. this laboratory procedure is taught by EPA in the "Quality Assurance for Source Emissions Workshop" at Research Triangle Park and is approved by EPA.

WEIGHING PROCEDURE - SARTORIUS ANALYTICAL BALANCE

The Sartorius balance is accurate to 0.1 mg and has a maximum capacity of 200 grams. The balance precision (standard deviation) is 0.05 mg. Before weighing an item, the balance should first be zeroed. This step should be taken before every series of weighings. To do this, the balance should have all weight adjustments at the "zero" position. The beam arrest lever (on the lower left hand side toward the rear of the balance) is then slowly pressed downward to the full release position. The lighted vernier scale on the front of the cabinet should align with the "zero" with the mark on the cabinet. If it is not so aligned, the adjustment knob on the right hand side (near the rear of the cabinet) should be turned carefully until the marks align. Now return the beam arrest to the horizontal arrest position. The balance is now "zeroed".

To weigh an item, it is first placed on the pan. And the sliding doors are closed to avoid air current disturbance. The weight adjustment knob on the right hand side must be at "zero". The beam arrest is then slowly turned upward. The lighted scale at the front of the cabinet will now indicate the weight of the item in grams. If the scale goes past the divided area, the item then exceeds 100 g weight (about 3 1/2 ounces) and it is necessary to arrest the balance (beam arrest lever) and move the lever for 100 g weight away from you. It is located on the left hand side of the cabinet near the front, and is the knob closest to the side of the cabinet. The balance will not weigh items greater than 200 grams in mass, and trying to do this might harm the balance. Remember, this is a delicate precision instrument.

After the beam is arrested in either weight range, the procedure is the same. When the weight of the item in grams is found, "dial in" that amount with the two knobs on the left hand side (near the 100 g lever) color coded yellow and green. As you dial the weight, the digits will appear on the front of the cabinet. When the proper amount is dialed, carefully move the arrest lever down with a slow, steady turn of the wrist. The lighted dial will appear, and the right hand side knob (front of cabinet) is turned to align the mark with the lower of the two lighted scale divisions which the mark appears between. when these marks are aligned, the two lighted digits along with the two indicated on the right hand window on the cabinet front are fractional weight in grams (the decimal would appear before the lighted digits) and the whole number of grams weight is the amount "dialed in" on the left.

In general, be sure that the beam is in "arrest" position before placing weight on or taking weight off of the pan. Don't "dial in" weight unless the beam is arrested. The balance is sensitive to even a hand on the table near the balance, so be careful and painstaking in every movement while weighing.

Form REC#8

(14)

SAMPLE ANALYTICAL DATA FORM

Company Name James Julian

Sample Location

Blank Volume (V_a) 100 ml

Date/Time wt. blank 6/29 8:31 am

Date/Time wt. blank 6/29 4:00pm

Relative Humidity in Lab 49 %

Density of Acetone (ρ_a) .7857 mg/ml

Gross wt. 175.2107 g

Gross wt. 175.2105 g

Ave. Gross wt. 175.2106 g

Tare wt. 175.2104 g

Weight of blank (m_{ab}) 0.0002 g

Acetone blank residue concentration (C_a) : (C_a) = (m_{ab}) / (V_a) (ρ_a) = (.000003 mg/g)

Acetone Blank Wt. : $W_a = C_a V_{aw} \rho_a$ = (.000003) (200) (.7857) = (.0005 g)

		Run # 1	Run # 2	Run # 3
Acetone rinse volume (V_{aw})	ml	200	200	200
Date/Time of wt. 6/29 8:30 am Gross wt.	g	138.5280	170.1675	135.0348
Date/Time of wt. 6/29 4:00pm Gross wt.	g	138.5275	170.1674	135.0345
Average Gross wt.	g	138.5278	170.1675	135.0347
Tare wt.	g	138.5242	170.1664	135.0328
Less Acetone blank wt. (W_a)	g	.0005	.0005	.0005
Weight of particulate in acetone rinse (m_a)	g	.0031	.0006	.0014

Filter Numbers	#	TS 6018	TS 6017	TS 6014
Date/Time of wt. 6/29 8:00 am Gross wt.	g	.5844	.5860	.5856
Date/Time of wt. 6/29 4:00pm Gross wt.	g	.5845	.5856	.5852
Average Gross wt.	g	.5845	.5858	.5854
Tare wt.	g	.5784	.5786	.5801

Weight of particulate on filter (m_f)	g	.0061	.0072	.0053
Weight of particulate in acetone rinse (m_a)	g	.0031	.0006	.0014
Total weight of particulate (m_n)	g	.0092	.0078	.0067

NOTE: In no case should a blank residue greater than 0.01 mg/g (or 0.001% of the blank weight) be subtracted from the sample weight.

Remarks:

Signature of Analyst Thomas Smith Signature of Reviewer [signature]

D:\DONNA\FORMS\LAB\SAMPLE.TBL

(15)

PENNSYLVANIA BACK-HALF (METHOD 5)

FILTERATION ANALYSIS

Company Name: James J. Lian	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30Am Gross wt.	.0718	.0775	
Date/Time of wt. 7/1 4:30pm Gross wt.	.0717	.0775	
Filter Ave. Gross wt.	.0718	.0775	
Filter Tare wt.	.0715	.0773	
Net	.0003	.0002	
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30Am Gross wt.	.0798	.0781	
Date/Time of wt. 7/1 4:30pm Gross wt.	.0797	.0780	
Filter Ave. Gross wt.	.0798	.0781	
Filter Tare wt.	.0794	.0780	
Net	.0004	.0001	
Filter Size: (µm): 0.8			
Date/Time of wt. 7/1 9:30Am Gross wt.	.0736	.0790	
Date/Time of wt. 7/1 4:30pm Gross wt.	.0736	.0790	
Filter Ave. Gross wt.	.0736	.0790	
Filter Tare wt.	.0732	.0788	
Net	.0004	.0002	
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30Am Gross wt.	.0781	.0799	
Date/Time of wt. 7/1 4:30pm Gross wt.	.0780	.0798	
Filter Ave. Gross wt.	.0781	.0799	
Filter Tare wt.	.0778	.0797	
Net	.0004	.0002	
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30Am Gross wt.	.0723	.0797	
Date/Time of wt. 7/1 4:30pm Gross wt.	.0773	.0798	
Filter Ave. Gross wt.	.0773	.0798	
Filter Tare wt.	.0765	.0795	
Net	.0008	.0003	
NET TOTAL:			

Signature of Analyst: [signature] Date: 7/2/92

Signature of Reviewer: [signature] Date:

PENNSYLVANIA BACK-HALF (METHOD 5)
(10)

FILTERATION ANALYSIS

Company Name: James Julian	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.45			
Date/Time of wt. 7/1 9:30Am Gross wt.	.08 07		
Date/Time of wt. 7/1 4:30pm Gross wt.	.08 07		
Filter Ave. Gross wt.	.08 07		
Filter Tare wt.	.08 04		
Net	.00 03		
Filter Size (µm): 0.45			
Date/Time of wt. 7/1 9:30Am Gross wt.	.08 20		
Date/Time of wt. 7/1 4:30pm Gross wt.	.08 19		
Filter Ave. Gross wt.	.08 20		
Filter Tare wt.	.08 12		
Net	.00 08		
Filter Size: (µm): 0.22			
Date/Time of wt. 7/1 9:30Am Gross wt.	.08 77		
Date/Time of wt. 7/1 4:30pm Gross wt.	.08 77		
Filter Ave. Gross wt.	.08 77		
Filter Tare wt.	.08 74		
Net	.00 03		
Filter Size (µm): 0.22			
Date/Time of wt. 7/1 9:30Am Gross wt.	.08 75		
Date/Time of wt. 7/1 4:30pm Gross wt.	.08 75		
Filter Ave. Gross wt.	.08 75		
Filter Tare wt.	.08 72		
Net	.00 03		
Filter Size (µm): 0.22			
Date/Time of wt. 7/1 9:30Am Gross wt.	.08 81		
Date/Time of wt. 7/1 4:30pm Gross wt.	.08 81		
Filter Ave. Gross wt.	.08 81		
Filter Tare wt.	.08 75		
Net	.00 06		
NET TOTAL:	0.0046		

Signature of Analyst: [signature] Date: 7/2/92

Signature of Reviewer: [signature] Date:

PENNSYLVANIA BACK-HALF (METHOD 5)

FILTERATION ANALYSIS

Company Name: James Julian	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30AM Gross wt.		.0777	
Date/Time of wt. 7/1 4:30PM Gross wt.		.0777	
Filter Ave. Gross wt.		.0777	
Filter Tare wt.		.0774	
Net		.0003	
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30AM Gross wt.		.0754	
Date/Time of wt. 7/1 4:30PM Gross wt.		.0755	
Filter Ave. Gross wt.		.0755	
Filter Tare wt.		.0750	
Net		.0005	
Filter Size: (µm): 0.8			
Date/Time of wt. 7/1 9:30AM Gross wt.		.0734	
Date/Time of wt. 7/1 4:30PM Gross wt.		.0734	
Filter Ave. Gross wt.		.0734	
Filter Tare wt.		.0732	
Net		.0002	
Filter Size (µm): 0.45			
Date/Time of wt. 7/1 9:30AM Gross wt.		.0824	
Date/Time of wt. 7/1 4:30PM Gross wt.		.0804	
Filter Ave. Gross wt.		.0804	
Filter Tare wt.		.0801	
Net		.0003	
Filter Size (µm): 0.45			
Date/Time of wt. 7/1 9:30AM Gross wt.		.0813	
Date/Time of wt. 7/1 4:30PM Gross wt.		.0813	
Filter Ave. Gross wt.		.0813	
Filter Tare wt.		.0812	
Net		.0001	
NET TOTAL:			

Signature of Analyst: [signature] Date: 7/2/92

Signature of Reviewer: [signature] Date:

PENNSYLVANIA BACKHAUL (METHOD 5)

FILTRATION ANALYSIS

Company Name: James Smith	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.22			
Date/Time of wt. 2/ 9:30AM Gross wt.		.0866	
Date/Time of wt. 2/ 4:30pm Gross wt.		.0866	
Filter Ave. Gross wt.		.0866	
Filter Tare wt.		.0864	
Net		.0002	
Filter Size (µm): 0.22			
Date/Time of wt. 2/ 9:30AM Gross wt.		.0866	
Date/Time of wt. 2/ 4:30pm Gross wt.		.0865	
Filter Ave. Gross wt.		.0866	
Filter Tare wt.		.0865	
Net		.0001	
Filter Size: (µm): 0.22			
Date/Time of wt. 2/ 9:30AM Gross wt.		.0865	
Date/Time of wt. 2/ 4:30pm Gross wt.		.0866	
Filter Ave. Gross wt.		.0866	
Filter Tare wt.		.0863	
Net		.0003	
Filter Size (µm):			
Date/Time of wt. Gross wt.			
Date/Time of wt. Gross wt.			
Filter Ave. Gross wt.			
Filter Tare wt.			
Net			
Filter Size (µm):			
Date/Time of wt. Gross wt.			
Date/Time of wt. Gross wt.			
Filter Ave. Gross wt.			
Filter Tare wt.			
Net			
NET TOTAL:		0.0030	

Signature of Analyst: [illegible] Date: 2/2/92

Signature of Reviewer: [illegible] Date:

PENNSYLVANIA BACK-HALF (METHOD 5)

FILTERATION ANALYSIS

Company Name: JAMES JULIAN	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 9:30AM Gross wt.			.0745
Date/Time of wt. 7/1 4:30PM Gross wt.			.0745
Filter Ave. Gross wt.			.0745
Filter Tare wt.			.0740
Net			.0005
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0765
Date/Time of wt. 7/1 4:30PM Gross wt.			.0765
Filter Ave. Gross wt.			.0765
Filter Tare wt.			.0756
Net			.0009
Filter Size: (µm): 0.8			
Date/Time of wt. 7/1 9:30AM Gross wt.			.0790
Date/Time of wt. 7/1 4:30PM Gross wt.			.0791
Filter Ave. Gross wt.			.0791
Filter Tare wt.			.0789
Net			.0002
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0816
Date/Time of wt. 7/1 4:30PM Gross wt.			.0817
Filter Ave. Gross wt.			.0817
Filter Tare wt.			.0808
Net			.0009
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0770
Date/Time of wt. 7/1 4:30PM Gross wt.			.0770
Filter Ave. Gross wt.			.0770
Filter Tare wt.			.0762
Net			.0008
NET TOTAL:			

Signature of Analyst: [signature] Date: 7/2/92

Signature of Reviewer: [signature] Date:

PENNSYLVANIA BACK-HALF (METHOD 5)

FILTERATION ANALYSIS

Company Name: James Julian	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0784
Date/Time of wt. 7/1 4:30pm Gross wt.			.0783
Filter Ave. Gross wt.			.0784
Filter Tare wt.			.0778
Net			.0006
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0819
Date/Time of wt. 7/1 4:30pm Gross wt.			.0819
Filter Ave. Gross wt.			.0819
Filter Tare wt.			.0817
Net			.0002
Filter Size: (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0847
Date/Time of wt. 7/1 4:30pm Gross wt.			.0847
Filter Ave. Gross wt.			.0847
Filter Tare wt.			.0845
Net			.0002
Filter Size (µm): 0.8			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0846
Date/Time of wt. 7/1 4:30pm Gross wt.			.0846
Filter Ave. Gross wt.			.0846
Filter Tare wt.			.0836
Net			.0010
Filter Size (µm): 0.45			
Date/Time of wt. 7/1 10:00AM Gross wt.			.0844
Date/Time of wt. 7/1 4:30pm Gross wt.			.0844
Filter Ave. Gross wt.			.0844
Filter Tare wt.			.0839
Net			.0005
NET TOTAL:			

Signature of Analyst: [signature] Date: 7/2/92

Signature of Reviewer: [signature] Date:

PENNSYLVANIA BACK-HALF (METHOD 5)

FILTERATION ANALYSIS

Company Name: James Julian	RUN #1	RUN #2	RUN #3
Filter Size (µm): 0.45			
Date/Time of wt. 7/1 9:30am Gross wt.			.0856
Date/Time of wt. 7/1 9:30am Gross wt.			.0855
Filter Ave. Gross wt.			.0856
Filter Tare wt.			.0850
Net			.0006
Filter Size (µm): 0.22			
Date/Time of wt. 7/1 9:30am Gross wt.			.0875
Date/Time of wt. 7/1 9:30am Gross wt.			.0876
Filter Ave. Gross wt.			.0876
Filter Tare wt.			.0874
Net			.0002
Filter Size: (µm): 0.22			
Date/Time of wt. 7/1 9:30am Gross wt.			.0886
Date/Time of wt. 7/1 9:30am Gross wt.			.0886
Filter Ave. Gross wt.			.0886
Filter Tare wt.			.0883
Net			.0003
Filter Size (µm): 0.22			
Date/Time of wt. 7/1 9:30am Gross wt.			.0875
Date/Time of wt. 7/1 9:30am Gross wt.			.0874
Filter Ave. Gross wt.			.0875
Filter Tare wt.			.0873
Net			.0002
Filter Size (µm):			
Date/Time of wt. Gross wt.			
Date/Time of wt. Gross wt.			
Filter Ave. Gross wt.			
Filter Tare wt.			
Net			
NET TOTAL:			0.0071

Signature of Analyst: [signature] Date: 7/2/92

Signature of Reviewer: [signature] Date:

PENNSYLVANIA BACK HALF ANALYSIS:
Filtration & Evaporation

COMPANY NAME: JAMES JULIAN NORTH EAST HOT MIX - SNYDER CO. DATE: 6/29/92

Relative humidity in lab 45 %

Blank volume of Water (Va) 200 mℓ

Date/Time wt. blank 7/1 4:30pm Gross wt. 101.1255 g

Date/Time wt. blank 7/2 8:00am Gross wt. 101.1255 g

Ave. Gross wt. 101.1255 g

Tare wt. 101.1253 g

Weight of blank (M_{ab}) .0002 g

H_2O Blank Residue Concentration (C_a) : $C_a = M_{ab}/V_a$ = .000001 mg/g

Blank Weight: $W_a = C_a V_{aw}$

		RUN 1	RUN 2	RUN 3
Impinger rinse volume (V_{aw})	mℓ	300	300	300
Date/Time of wt. 7/1 9:30am Gross wt.	g	164.4490	126.1448	172.2325
Date/Time of wt. 7/1 4:30pm Gross wt.	g	164.4486	126.1445	172.2320
Avg. Gross wt.	g	164.4488	126.1447	172.2323
Tare wt.	g	164.4414	126.1410	172.2307
Weight of soluble particulate from water	g	0.0074	0.0037	0.0016
*Total Weight of Insoluble particulate on Filters	g	0.0046	0.0030	0.0071
Less Blank wt (W_a)	g	.0003	.0003	.0003
Total weight of particulate (m_a)	g	0.0117	0.0064	0.0084

Remarks:

*SEE FILTRATION ANALYSIS

Signature of Analyst: [signature]

Signature of Reviewer: [signature]

D:\DONNA\FORMS\LAB\5.TBL

VII. INSTRUMENT CALIBRATION CERTIFICATES

AIR PRODUCTS AND CHEMICALS, INC.
4822 Industry Lane
UDI Business Park
Research Triangle Park, NC 27709
TELEPHONE (919) 361-2077
FAX (919) 361-2074

(23)

DATE: 08/10/90
TIME: 14:59
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2544 HARBOR AVENUE
MEMPHIS TN 38112

CUSTOMER ACCOUNT : 7[illegible]
CUSTOMER ORDER NO : 3687
ORDER NO : 3[illegible]-0[illegible]
ORDER DETAIL SEQ : 6

REMARKS : GAS MIXTURE(S) LISTED BELOW ARE TRACEABLE TO NIST CLASS S WEIGHTS AND/OR NIST GAS MIXTURE STANDARD REFERENCE MATERIALS (SRM's) - REFERENCE APCI SOP FIELD DIRECTIVE BOOK I PART A-3.

** ANALYSIS **

CERTIFIED GAS MIXTURE: PROPANE IN NITROGEN

	CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 0068C ANAL DATE: 08/10/90	SG2290[illegible]	PROPANE	30	31	MOLAR PPM
		NITROGEN		BALANCE	

Rancon

CERTIFICATION

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED ANALYTICAL METHOD(S) AND IS CORRECT TO WITHIN THE ANALYTICAL ACCURACIES OF THIS (THESE) METHOD(S).

AUTHORIZED SIGNATURE

AIR PRODUCTS AND CHEMICALS, INC.
4822 Industry Lane
UDI Business Park
Research Triangle Park, NC 27713
TELEPHONE (919) 361-2077
FAX (919) 361-2074

(24)

DATE: 08/10/90
TIME: 14:56
PAGE: 1

* CERTIFICATE OF ANALYSIS *

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38117

CUSTOMER ACCOUNT : 331
CUSTOMER ORDER NO : GARY
ORDER NO : 351-042708
ORDER DETAIL SEQ : 7

REMARKS : GAS MIXTURE(S) LISTED BELOW ARE TRACEABLE TO NIST CLASS S WEIGHTS AND/OR NIST GAS MIXTURE STANDARD REFERENCE MATERIALS (SRM's) - REFERENCE APCI SOD FIELD DIRECTIVE BOOK I PART A-3.

** ANALYSIS **

CERTIFIED GAS MIXTURE: PROPANE IN NITROGEN

	CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 00692 ANAL DATE: 08/10/90	S635342	PROPANE NITROGEN	85	85.5 BALANCE	MOLAR PPM

RAMCON

CERTIFICATION

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED ANALYTICAL METHOD(S) AND IS CORRECT TO WITHIN THE ANALYTICAL ACCURACIES OF THIS (THESE) METHOD(S).

AUTHORIZED SIGNATURE

VIII. CALCULATIONS

JAMES JULIANI
MT PLEASANT, PA

SUMMARY OF TEST DATA

		6-25-92 RUN #1	6-25-92 RUN #2	6-25-92 RUN #3
SAMPLING TRAIN DATA				
	start	09:02	11:21	13:35
	finish	10:13	12:26	14:44
1. Sampling time, minutes	Θ	60.0	60.0	60.0
2. Sampling nozzle diameter, in.	D_n	.2750	.2750	.2750
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000412	.000412	.000412
4. Isokinetic variation	I	99.8	102.5	103.2
5. Sample gas volume - meter cond., cf.	V_m	53.382	54.872	53.412
6. Average meter temperature, ^oR	T_m	548	556	557
7. Avg. oriface pressure drop, in. H_2O	dH	2.61	2.47	2.36
8. Total particulate collected, mg.	M_n	13.80	10.80	13.80
VELOCITY TRAVERSE DATA				
9. Stack area, ft^2	A	16.88	16.88	16.88
10. Absolute stack gas pressure, in. Hg.	P_s	30.00	30.00	30.00
11. Barometric pressure, in. Hg.	P_{bar}	30.00	30.00	30.00
12. Avg. absolute stack temperature, R^o	T_s	778	778	779
13. Average $-\sqrt{\text{vel. head}}$, (C_p= .84)	$-\sqrt{dP}$	0.95	0.93	0.91
14. Average stack gas velocity, ft./sec.	V_s	67.39	65.87	64.66
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{lc}	346.50	338.00	351.50
16. Moisture in stack gas, %	B_{ws}	24.04	23.36	24.56
EMISSIONS DATA				
17. Stack gas flow rate, dscf/hr.(000's)	Q_{sd}	2116	2087	2014
18. Stack gas flow rate, cfm	acfm	68253	66713	65488
19. Particulate concentration, gr/dscf	C_s	0.0041	0.0032	0.0042
20. Particulate concentration, lb/hr	E	1.24	0.95	1.21
21. Particulate concentration, lb/mBtu	E'	0.00000	0.00000	0.00000
ORSAT DATA				
22. Percent CO_2 by volume	CO_2	5.00	5.00	5.00
23. Percent O_2 by volume	O_2	12.50	12.50	12.50
24. Percent CO by volume	CO	.00	.00	.00
25. Percent N_2 by volume	N_2	82.50	82.50	82.50

Format: summyR3

Dry Gas Volume

$$V_{m(std)} = V_m \left[\frac{T_{(std)}}{T_m} \right] \left[\frac{P_{bar} + \frac{dH}{13.6}}{P_{(std)}} \right] = 17.64 \frac{^oR}{in.Hg} \; Y \; V_m \left[\frac{P_{bar} + \frac{dH}{13.6}}{T_m} \right]$$

Where:

$V_{m(std)}$ = Dry Gas Volume through meter at standard conditions, cu. ft.

V_m = Dry Gas Volume measured by meter, cu. ft.

P_{bar} = Barometric pressure at oriface meter, in. Hg.

P_{std} = Standard absolute pressure, (29.92 in. Hg.).

T_m = Absolute temperature at meter ^oR.

T_{std} = Standard absolute temperature (528^oR).

dH = Average pressure drop across oriface meter, in. H_2O.

Y = Dry gas meter calibration factor.

13.6 = Inches water per inches Hg.

RUN 1:

$$V_{m(std)} = (17.64)(.993)(53.382) \left[\frac{(30.00) + \frac{2.61}{13.6}}{548} \right] = 51.517 \text{ dscf}$$

RUN 2:

$$V_{m(std)} = (17.64)(.993)(54.872) \left[\frac{(30.00) + \frac{2.47}{13.6}}{556} \right] = 52.175 \text{ dscf}$$

RUN 3:

$$V_{m(std)} = (17.64)(.993)(53.412) \left[\frac{(30.00) + \frac{2.36}{13.6}}{557} \right] = 50.682 \text{ dscf}$$

Total Contaminants by Weight: GRAIN LOADING

Particulate concentration C_s' gr./dscf.

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{M_n}{V_{m(std)}}\right]$$

Where:

C_s' = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, gr./dscf.

M_n = Total amount of particulate matter collected, mg.

$V_{m(std)}$ = Dry gas volume through meter at standard conditions, cu. ft.

Run 1:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{13.80}{51.517}\right] = 0.0041 \text{ gr./dscf.}$$

Run 2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{10.80}{52.175}\right] = 0.0032 \text{ gr./dscf.}$$

Run 3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{13.80}{50.682}\right] = 0.0042 \text{ gr./dscf.}$$

Dry Molecular Weight

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

Where:

M_d = Dry molecular weight, lb./lb.-mole.

$\%CO_2$ = Percent carbon dioxide by volume (dry basis).

$\%O_2$ = Percent oxygen by volume (dry basis).

$\%N_2$ = Percent nitrogen by volume (dry basis).

$\%CO$ = Percent carbon monoxide by volume (dry basis).

0.264 = Ratio of O_2 to N_2 in air, v/v.

0.28 = Molecular weight of N_2 or CO, divided by 100.

0.32 = Molecular weight of O_2 divided by 100.

0.44 = Molecular weight of CO_2 divided by 100.

Run 1:

$$M_d = 0.44(5.00\%) + 0.32(12.50\%) + 0.28(.00\% + 82.50\%) = 29.30 \frac{lb}{lb\text{-}mole}$$

Run 2:

$$M_d = 0.44(5.00\%) + 0.32(12.50\%) + 0.28(.00\% + 82.50\%) = 29.30 \frac{lb}{lb\text{-}mole}$$

Run 3:

$$M_d = 0.44(5.00\%) + 0.32(12.50\%) + 0.28(.00\% + 82.50\%) = 29.30 \frac{lb}{lb\text{-}mole}$$

Water Vapor Condensed

$$V_{wc_{std}} = \left[V_f - V_i \right] \left[\frac{\rho_w \; R \; T_{(std)}}{M_w \; P_{(std)}} \right] = 0.04707 \left[V_f - V_i \right]$$

$$V_{wsg_{std}} = \left[W_f - W_i \right] \left[\frac{R \; T_{(std)}}{M_w \; P_{(std)}} \right] = 0.04715 \left[W_f - W_i \right]$$

Where:

0.04707 = Conversion factor, $ft.^3/ml.$

0.04715 = Conversion factor, $ft.^3/g.$

$V_{wc_{std}}$ = Volume of water vapor condensed (standard conditions), scf.

$V_{wsg_{std}}$ = Volume of water vapor collected in silica gel (standard conditions), ml.

$V_f - V_i$ = Final volume of impinger contents less initial volume, ml.

$W_f - W_i$ = Final weight of silica gel less initial weight, g.

ρ_w = Density of water, 0.002201 lb/ml.

R = Ideal gas constant, 21.85 in.Hg. (cu.ft./lb.-mole)(^oR).

M_w = Molecular weight of water vapor, 18.0 lb/lb-mole.

T_{std} = Absolute temperature at standard conditions, 528^oR.

P_{std} = Absolute pressure at standard conditions, 29.92 inches Hg.

Run 1:

$V_{wc(std)}$ = (0.04707) (336.0) = 15.8 cu.ft
$V_{wsg(std)}$ = (0.04715) (10.5) = 0.5 cu.ft

Run 2:

$V_{wc(std)}$ = (0.04707) (330.0) = 15.5 cu.ft
$V_{wsg(std)}$ = (0.04715) (8.0) = 0.4 cu.ft

Run 3:

$V_{wc(std)}$ = (0.04707) (338.0) = 15.9 cu.ft
$V_{wsg(std)}$ = (0.04715) (13.5) = 0.6 cu.ft

Moisture Content of Stack Gases

$$B_{ws} = \frac{V_{wc_{std}} + V_{wsg_{std}}}{V_{wc_{std}} + V_{wsg_{std}} + V_{m_{std}}} \times 100$$

Where:

B_{ws} = Proportion of water vapor, by volume, in the gas stream.

V_m = Dry gas volume measured by dry gas meter,(dcf).

$V_{wc_{std}}$ = Volume of water vapor condensed corrected to standard conditions (scf).

$V_{wsg_{std}}$ = Volume of water vapor collected in silica gel corrected to standard conditions (scf).

Run 1:

$$B_{ws} = \frac{15.8 + 0.5}{15.8 + 0.5 + 51.517} \times 100 = 24.04\ \%$$

Run 2:

$$B_{ws} = \frac{15.5 + 0.4}{15.5 + 0.4 + 52.175} \times 100 = 23.36\ \%$$

Run 3:

$$B_{ws} = \frac{15.9 + 0.6}{15.9 + 0.6 + 50.682} \times 100 = 24.56\ \%$$

Molecular Weight of Stack Gases

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

Where:

M_s = Molecular weight of stack gas, wet basis, (lb./lb.-mole).

M_d = Molecular weight of stack gas, dry basis, (lb./lb.-mole).

Run 1:

$$M_s = 29.30 (1 - 24.04) + 18 (24.04) = 26.58 \text{ (lb./lb.-mole)}$$

Run 2:

$$M_s = 29.30 (1 - 23.36) + 18 (23.36) = 26.66 \text{ (lb./lb.-mole)}$$

Run 3:

$$M_s = 29.30 (1 - 24.56) + 18 (24.56) = 26.52 \text{ (lb./lb.-mole)}$$

Stack Gas Velocity

$$V_s = K_p \, C_p \left[\sqrt{dP} \right]_{avg.} \sqrt{\frac{T_{s(avg.)}}{P_s \; M_s}}$$

Where:

V_s = Average velocity of gas stream in stack, ft./sec.

K_p = 85.49 ft/sec $\left[(g/g\text{-mole})\text{-}(mm\ Hg) \ / \ (^{o}K)(\ mm\ H_2O \right]^{1/2}$

C_p = Pitot tube coefficient, (dimensionless).

dP = Velocity head of stack gas, in. H_2O.

P_{bar} = Barometric pressure at measurement site, (in. Hg).

P_g = Stack static pressure, (in. Hg).

P_s = Absolute stack gas pressure, (in. Hg) = $P_{bar} + P_g$

P_{std} = Standard absolute pressure, (29.92 in. Hg).

t_s = Stack temperature, (^{o}F).

T_s = Absolute stack temperature, (^{o}R). = 460 + t_s.

M_s = Molecular weight of stack gas, wet basis, (lb/lb-mole).

Run 1:

$$V = (85.49)\ (\ .84)\ (\ 0.95) \sqrt{\frac{778}{(30.00)(26.58)}} = 67.39 \text{ ft/sec.}$$

Run 2:

$$V = (85.49)\ (\ .84)\ (\ 0.93) \sqrt{\frac{778}{(30.00)(26.66)}} = 65.87 \text{ ft/sec.}$$

Run 3:

$$V = (85.49)\ (\ .84)\ (\ 0.91) \sqrt{\frac{779}{(30.00)(26.52)}} = 64.66 \text{ ft/sec.}$$

Stack Gas Flow Rate

$$Q_{sd} = 3600 \left[1 - B_{wc} \right] V_s \; A \left[\frac{T_{std}}{T_{stk}} \right] \left[\frac{P_s}{P_{std}} \right]$$

Where:

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions, (dscf/hr).

A = Cross sectional area of stack, ($ft.^2$).

3600 = Conversion factor, (sec./hr.).

t_s = Stack temperature, (^oF).

T_s = Absolute stack temperature, (^oR).

T_{std} = Standard absolute temperature, (528^oR).

P_{bar} = Barometric pressure at measurement site, (in.Hg.).

P_g = Stack static pressure, (in.Hg.).

P_s = Absolute stack gas pressure, (in.Hg.); = $P_{bar} + P_g$

P_{std} = Standard absolute pressure, (29.92 in.Hg.).

Run 1:

$$Q_{sd} = 3600(1 - .2404)(67.39)(16.88)\left[\frac{528}{778}\right]\left[\frac{30.00}{29.92}\right] = 2116748.9 \; \frac{dscf}{hr}$$

Run 2:

$$Q_{sd} = 3600(1 - .2336)(65.87)(16.88)\left[\frac{528}{778}\right]\left[\frac{30.00}{29.92}\right] = 2087527.0 \; \frac{dscf}{hr}$$

Run 3:

$$Q_{sd} = 3600(1 - .2456)(64.66)(16.88)\left[\frac{528}{779}\right]\left[\frac{30.00}{29.92}\right] = 2014505.5 \; \frac{dscf}{hr}$$

Emissions Rate from Stack

$$E = \frac{(C_s)(Q_{sd})}{7000 \text{ gr./lb.}} = \text{lb. / hr.}$$

Where:

E = Emissions rate, lb/hr.

C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, gr/dscf.

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr.

Run 1:

$$E = \frac{(0.0041)(2116748.9)}{7000} = 1.24 \text{ lb. / hr.}$$

Run 2:

$$E = \frac{(0.0032)(2087527.0)}{7000} = 0.95 \text{ lb. / hr.}$$

Run 3:

$$E = \frac{(0.0042)(2014505.5)}{7000} = 1.21 \text{ lb. / hr.}$$

Isokinetic Variation

$$I = 100\ T_s \left[\frac{0.002669\ \frac{V_{lc}}{60} + \frac{(V_m / T_m)}{\theta}\ \frac{(P_{bar} + dH / 13.6)}{V_s\ P_s\ A_n}}{} \right]$$

Where:

I	=	Percent isokinetic sampling.
100	=	Conversion to percent.
T_s	=	Absolute average stack gas temperature, ^oR.
0.002669	=	Conversion factor, Hg - ft^3/ml - ^oR.
V_{lc}	=	Ttl vol of liquid collected in impingers and silica gel, ml.
T_m	=	Absolute average dry gas meter temperature, ^oR.
P_{bar}	=	Barometric pressure at sampling site, (in. Hg).
dH	=	Av pressure differential across the oriface meter, (in.H_2O).
13.6	=	Specific gravity of mercury.
60	=	Conversion seconds to minutes.
θ	=	Total sampling time, minutes.
V_s	=	Stack gas velocity, ft./sec.
P_s	=	Absolute stack gas pressure, in. Hg.
A_n	=	Cross sectional area of nozzle, ft^2.

Run 1:

$$I = (100)(\ 778\ ) \left[\frac{(0.002669)(346.50) + \frac{53.382}{548} \left[30.00 + \frac{2.61}{13.6} \right]}{60\ (\ 60.0\ )\ (\ 67.39\ )\ (\ 30.00\ )\ (\ .000412\ )} \right] = 99.8\%$$

Run 2:

$$I = (100)(\ 778\ ) \left[\frac{(0.002669)(338.00) + \frac{54.872}{556} \left[30.00 + \frac{2.47}{13.6} \right]}{60\ (\ 60.0\ )\ (\ 65.87\ )\ (\ 30.00\ )\ (\ .000412\ )} \right] = 102.5\%$$

Run 3:

$$I = (100)(\ 779\ ) \left[\frac{(0.002669)(351.50) + \frac{53.412}{557} \left[30.00 + \frac{2.36}{13.6} \right]}{60\ (\ 60.0\ )\ (\ 64.66\ )\ (\ 30.00\ )\ (\ .000412\ )} \right] = 103.2\%$$

JAMES JULIAN
MT PLEASANT, PA

TEST DATE: 6-25-92
SOURCE: NORTH EAST HOT MIX CO.

TOTAL HYDROCARBON EMISSIONS - Convert ppm (wet) to ppm (dry)

$$ppm_d = ppm_w \left(\frac{100}{100 - B_{ws}}\right)$$

Where: ppm_d = Parts per million, dry basis.

ppm_w = Parts per million, wet basis (as measured by the instrument).

B_{ws} = Proportion of water vapor, by volume, in the gas stream.

Run #1 = $(103.8)\left(\frac{100}{100 - 24.04}\right)$ = 136.7 ppm_d

Run #2 = $(126.6)\left(\frac{100}{100 - 23.36}\right)$ = 165.2 ppm_d

Run #3 = $(138.6)\left(\frac{100}{100 - 24.56}\right)$ = 183.7 ppm_d

JAMES JULIAN
MT PLEASANT, PA

TEST DATE: 6-25-92
SOURCE: NORTH EAST HOT MIX CO.

TOTAL CARBON MONOXIDE EMISSIONS: POUNDS PER HOUR

$$E = (2.59 \times 10^{-9})(M_d)(ppm_d)(Q_{sd})(K)$$

Where:

E = Total Carbon Monoxide emissions rate, lbs/hr.

2.59×10^{-9} = Conversion factor, lbs/dscf.

M_d = Dry molecular weight. (CO = 28.01)

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr.

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #1: $E = (2.59 \times 10^{-9})(16.04)(136.7)(2,116,748.9) = 12.02$ lbs/hr

Run #2: $E = (2.59 \times 10^{-9})(16.04)(165.2)(2,087,527.0) = 14.33$ lbs/hr

Run #3: $E = (2.59 \times 10^{-9})(16.04)(183.7)(2,014,505.5) = 15.37$ lbs/hr

IX. FIELD DATA

A. INSTRUMENT CALIBRATION FIELD DATA

INSTRUMENTAL ANALYSIS CALIBRATION DATA

TOTAL HYDROCARBONS

PLANT James Julian LOCATION Mt. Pleasant Mills, PA

DATE 6-25-92 OPERATOR Tim Huey

H C RANGE 0-100 RESPONSE TIME

12.5 O_2
5 CO_2

INITIAL CALIBRATION: (Accuracy ±5% of calibration gas value)

Gas Type	Actual Concentration	Analyzer	Gas Type	Actual Concentration	Analyzer
HC - Zero	0	0.0	HC - Mid		
HC - High	85.6	86.0	HC - Low	31.0	31.1

ZERO & SPAN DRIFT: (Accuracy ±3% of span)

Run # 1	Time: 9:23 - 10:[illegible] 57 minutes	
Gas Type	Initial Response	Final Response
HC - Zero	0.0	0.1
HC - Low	31.1	31.3

AVG. 39.6

Approved by State [illegible] 2[illegible]

Run #	Time:	
Gas Type	Initial Response	Final Response
HC- Zero		
HC -		

Run # 2	Time: 11:20 - 11:35 / 11:53 - 12:[illegible]	
Gas Type	Initial Response	Final Response
HC - Zero	0.1	0.1
HC - Low	31.3	30.7

AVG. 42.9

Run #	Time:	
Gas Type	Initial Response	Final Response
HC- Zero		
HC -		

Run # 3	Time: 13:37 - 14:36	
Gas Type	Initial Response	Final Response
HC - Zero	0.1	
HC - Low	30.7	

AVG. 46.2

Run #	Time:	
Gas Type	Initial Response	Final Response
HC- Zero		
HC -		

B. PARTICULATE FIELD DATA

RAMCON ENVIRONMENTAL CORPORATION

Plant [illegible]

Location [illegible] Pa.

Operator [illegible]

Date 6-25-92

Run No. 1

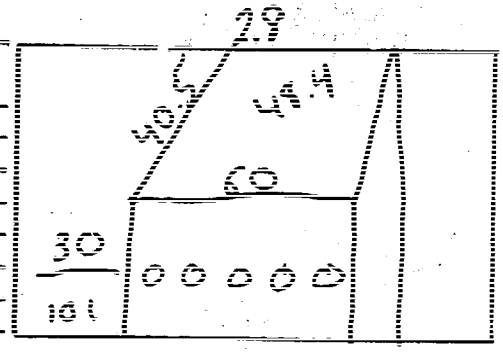
Sample Box No. 1

Meter Box No. C-292

Meter H @ 1.51

C Factor .993

Pitot Tube Coefficient Cp .84



Schematic of Stack Cross Section

Ambient Temperature	70	
Barometric Pressure	30.0 mm	534	270
Assumed Moisture, %	18 mm	200	266.5
Probe Length, m(ft)	5(16) mm	336	10.5
Nozzle Identification No.	.0004(0.5)		
Avg. Calibrated Nozzle Dia.	(in.)		
Probe Heater Setting	4		
Leak Rate, m³/min. (cfm)	.015		
Probe Liner Material	[illegible]		
Static Pressure, mm Hg(in.Hg)	+.03		
Filter No.	TS-6018		

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H20	PRESSURE DIFF. ORF. MUR in H20	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
1	9:04	3	315	.70	2.0	342.9	.90	.62	230	60
2	9:06	3	315	.70	2.0	347.9	.97	.62	261	60
3	9:08	3	315	.72	2.2	350.5	.90	.64	261	60
4	9:10	3	315	.85	2.4	352.3	.94	.64	261	60
5	9:12	3	315	.95	2.7	354.1	.96	.64	265	60
6	9:14	3	320	.85	2.4	355.9	.98	.64	265	61
1	9:16	3	320	.60	1.7	357.3	.94	.64	265	60
2	9:20	3	320	.60	1.7	358.9	.94	.64	265	60
3	9:22	3	320	.55	1.5	360.6	104	70	265	60
4	9:24	3	320	.60	1.7	361.7	104	70	265	60
5	9:26	3	320	.60	1.7	363.3	106	72	260	60
6	9:29	3	320	.60	1.7	364.9	106	72	260	60
1	9:34	3	320	.90	2.5	366.6	102	72	260	60

Form #RRC-05

Tulin

RAMCON emissions test log sheet, cont. DATE 6-25-92 LOCATION [illegible] TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME Vm (ft.^{3})	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	9:36:30	4	315	.70	20	368.3	108	74	253	65
3	9:38:30	4	315	.70	20	369.9	108	74	253	65
4	9:40:30	4	315	1.0	2.8	371.7	110	76	253	65
5	9:42:30	4	315	1.0	2.8	373.2	110	76	253	63
6	9:44:30	4	315	1.0	2.8	375.4	112	76	260	60
1	9:47 9:49	4	315	1.0	2.8	377.8	108	76	260	60
2	9:51	4	315	1.5	4.2	379.7	160	76	260	60
3	9:53	4	318	1.5	4.2	381.9	110	76	260	60
4	9:55	4	318	1.5	4.2	383.9	110	76	260	60
5	9:57	4	320	1.1	3.1	386.4	112	78	260	60
6	9:59	4	320	1.1	3.1	387.9	112	78	260	60
1	10:04	4	320	1.5	4.2	390.4	162	78	255	60
2	10:06	5	320	1.0	2.8	392.4	112	78	255	60
3	10:08	5	320	1.0	2.8	394.5	112	78	255	60
4	10:10	5	318	1.0	2.8	392.3	112	78	255	60
5	10:12	5	318	1.0	2.8	398.0	112	78	245	60
6	10:18	5	318	1.0	2.8	398.992	112	78	245	60
			318	.95	2.6	53.38	89		258	61

RAMCON ENVIRONMENTAL CORPORATION

Plant James Julian

Location Mt Pleasant PA.

Operator Allen Jones

Date 6-25-92

Run No. 2

Sample Box No. 1

Meter Box No. C-282

Meter H @ 1.51

C Factor .993

Pitot Tube Coefficient Cp .84

2.8

Ambient Temperature 70

Barometric Pressure 30.0

Assumed Moisture, % 15

Probe Length, m(ft) 5

Nozzle Identification No. 000 4125

Avg. Calibrated Nozzle Dia., (in.) .275/.275/.275

Probe Heater Setting 4

Leak Rate, m^3/min. (cfm) .013 @ 10 inches

Probe Liner Material [illegible]

Static Pressure, mm Hg (in. Hg) +.03

Filter No. TS-6017

	Impinger Volume, ml	Silica Gel Weight, g
Final	530	230.0
Initial	200	222.0
Difference	330	9.0

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
1	11:21 / 11:23	5	315	1.5	4.2	399.6 / 401.2	102	88	262	60
2	11:25	5	315	1.0	2.8	404.3	102	80	260	56
3	11:27	5	315	1.0	2.8	405.8	110	80	260	56
4	11:29	5	320	1.0	2.8	407.3	110	80	260	56
5	11:31	5	320	1.1	3.1	409.9	110	80	255	56
6	11:33	5	320	.98	2.7	411.8	112	80	250	56
1	11:34 / 11:36	5	320	.90	2.5	414.4	112	80	250	56
2	11:38	5	316	.90	2.5	416.0	112	80	250	60
3	11:40	5	315	.90	2.5	417.8	112	80	250	60
4	11:42	5	315	.90	2.5	419.3	114	80	250	60
5	11:44	5	317	.95	2.7	421.0	114	80	260	63
6	11:46	5	317	.95	2.7	423.2	114	80	261	63
1	11:47 / 11:49	5	318	.87	2.4	424.9	112	80	261	63

(41)

RAMCON emissions test log sheet, cont. DATE 6-25-92 LOCATION [illegible] TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORIFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME Vm (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	11:51	5	319	.85	.24	426.5	112	80	260	60
3	11:53	5	318	.50	1.4	428.0	114	80	260	60
4	11:55	5	319	.50	1.4	429.4	114	80	260	60
5	11:57	5	319	.70	2.0	431.1	114	80	247	63
6	11:59	5	319	.70	2.0	433.0	114	80	260	60
1	12:02	5	319	.25	.21	435.1	114	80	260	60
2	12:04	5	319	.65	1.8	436.4	114	80	251	61
3	12:06	5	319	.73	2.6	437.5	114	80	251	60
4	12:08	5	320	.73	2.0	440.0	114	80	251	63
5	12:10	5	320	.70	2.0	441.2	114	80	251	63
6	12:12	5	319	.70	2.0	442.8	114	80	250	64
1	12:14	5	320	1.0	2.8	444.3	110	80	240	64
2	12:18	5	320	1.0	2.8	446.4	110	80	240	63
3	12:20	5	320	1.0	2.8	448.4	110	80	240	60
4	12:22	5	320	1.0	2.8	450.1	110	80	240	60
5	12:24	5	320	1.0	2.8	452.0	110	80	240	60
6	12:26	5	320	1.0	2.8	454.422	110	80	240	60

RAMCON ENVIRONMENTAL CORPORATION

Plant: James Julian

Location: Mt Pleasant Pa.

Operator: [illegible]

Date: 6-26-92

Run No.: 3

Sample Box No.: 1

Meter Box No.: C-282

Meter H @: 1.51

C Factor: .993

Pitot Tube Coefficient Cp: .84

2.8

Ambient Temperature: 70

Barometric Pressure: 30.0

Assumed Moisture, %: 15

Probe Length, m(ft): 5

Nozzle Identification No.: 0004125

Avg. Calibrated Nozzle Dia., (in.): .275/.275/.275

Probe Heater Setting: 4

Leak Rate, m^3/min. (cfm): .018 at 5 [illegible]

Probe Liner Material: [illegible]

Static Pressure, mm Hg (in. Hg): +.03

Filter No.: TS-6014

Final	588	254.5
Initial	200	241.0
Difference	338	13.5

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
1	~~1:37~~ 1:37	3	318	1.5	4.2	~~458.9~~ 457.3	100	80	250	60
2	1:39	3	320	1.5	4.2	459.3	100	80	250	60
3	1:41	3	320	.80	2.2	461.1	110	80	265	60
4	1:43	3	320	1.0	2.8	462.7	110	80	265	60
5	1:45	3	320	1.0	2.8	464.5	110	80	265	60
6	1:47	3	320	1.0	2.8	467.0	110	80	265	60
1	~~1:49~~ 1:51	3	320	1.0	2.8	468.8	110	80	260	60
2	1:53	3	319	1.0	2.8	470.5	110	80	250	61
3	1:55	3	319	1.0	2.8	473.5	110	80	250	61
4	1:57	3	319	1.0	2.8	475.1	112	80	250	61
5	1:59	3	318	.45	1.3	476.5	116	80	263	62
6	2:01	3	317	.70	2.0	478.1	118	80	262	62
1	~~2:03~~ 2:05	3	316	1.0	2.8	479.6	118	80	262	60

Form #REC-05

RAMCON emissions test log sheet, cont. DATE 6-25-92 LOCATION [illegible] TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORIFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	2:07	3	320	.90	2.5	481.5	118	80	260	60
3	2:09	3	320	.90	2.5	483.3	119	90	254	60
4	2:11	3	320	.80	2.2	485.1	118	80	259	60
5	2:13	3	320	.60	1.9	486.5	119	80	232	59
6	2:15	2	320	.32	.90	488.9	116	80	232	59
1	2:18	2	320	.70	2.0	489.1	116	80	232	59
2	2:22	2	319	.70	2.0	491.3	116	80	240	60
3	2:24	2	320	.70	2.0	492.6	116	80	262	60
4	2:26	2	320	.70	2.0	494.3	116	80	260	63
5	2:28	3	320	.65	1.8	496.3	116	80	260	60
6	2:30	3	315	.40	1.1	497.5	116	80	257	65
1	2:34	3	320	.70	2.0	499.2	116	80	254	65
2	2:36	3	320	.85	2.4	500.9	118	80	265	54
3	2:38	3	320	.75	2.1	502.5	118	80	259	54
4	2:40	3	320	.90	2.5	504.3	119	90	259	54
5	2:42	3	320	.90	2.5	505.6	119	90	259	54
6	2:44	3	320	.90	2.5	508.312	118	90	259	54

C. O_2 AND CO_2 FIELD DATA

Company Name: [illegible]

Date: 6-25-97

REFERENCE METHOD 3: GAS ANALYSIS BY FYRITE

FUEL	F_o FACTORS
WOOD	1.0540
BARK	1.0830
ANTHRACITE	1.0699
BITUMINOUS	1.1398
LIGNITE	1.0761
OIL	1.3465
GAS	1.7489
PROPANE	1.5095
BUTANE	1.4791

$O_2\% = 20.9 - [F_o \times CO_2\%]$

RUN #1: ____ = 20.9 - [____ x ____]

RUN #2: ____ = 20.9 - [____ x ____]

RUN #3 ____ = 20.9 - [____ x ____]

RUN 1:	CO_2	5.0	CO_2	5.0	CO_2	5.0	AVG. ____
	O_2	12.5	O_2	12.5	O_2	12.5	AVG. ____
	N_2	____	N_2	____	N_2	____	AVG. ____
RUN 2:	CO_2	5.0	CO_2	5.0	CO_2	5.0	AVG. ____
	O_2	12.5	O_2	12.5	O_2	12.5	AVG. ____
	N_2	____	N_2	____	N_2	____	AVG. ____
RUN 3:	CO_2	5.0	CO_2	5.0	CO_2	5.0	AVG. ____
	O_2	12.5	O_2	12.5	O_2	12.5	AVG. ____
	N_2	____	N_2	____	N_2	____	AVG. ____

X. PLANT OPERATING DATA

DATA ON FACILITY BEING STACK TESTED

COMPANY NAME James Julian, Inc. COMPANY REP. Bob McGuire PHONE (412) 281-5555

LOCATION OF FACILITY Mt. Pleasant Mills, Pa. ORIGINAL START-UP DATE _____ DESIGNED CAPACITY 600 T.P.H.

OEM Pioneer MODEL NO. 600 TYPE Pioneer Drum Mix AC TYPE AC 20

1 Time (24 Hr) NOTE: check small box in column when moisture sample is taken	2 Fuel Use ✓ Fuel Oil 2 Nat. Gas Propane Coal other	3 Burner Setting	4 Blower Pressure	5 Production Rate ✓ Mix Aggregate TPH	RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 Venturi Scrubber ✓ Baghouse Pressure Drop in w.g.	Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
9:15	✓ #2	40%	.15	410		3.8	290°	306	.9				
9:30	"	50%	.15	420		"	290°	307	.6				
9:45	"	50%	.15	430		"	300°	312	.7				
10:00	"	50%	.15	430		" ✓	295°	311	.7				
10:15	"	50%	.15	430		"	295°	311	.7				
* 11:30	✓ "	50%	.15	490		"	300	298	.6				
11:45	"	50%	.15	495		"	295°	315	.7				
12:00	"	50%	.15	430		"	300°	317	.7				
12:15	✓ "	50%	.15	430		"	295°	316	.7				
12:30	"	50%	.15	430		"	300°	317	.7				
* 1:45	✓ "	60%	.15	495		"	305°	295	.6				
2:00	"	60%	.15	495		"	300°	312	.7				
2:15	"	60%	.15	495		"	300°	318	.7				
2:30	"	60%	.15	495		"	300°	320°	.6				
2:45	"	60	.15	495		"	300°	317	.6				

DATA SUMMARY ON STACK BEING TESTED

AGGREGATE

1. Name/type of mix HDBCBC
2. Name/type of 2nd mix (if used) _____
3. Type/temperature of Liquid Asphalt AC 20 / 300 °F
4. Sieve/Screening analysis: _____ % Passing;

	1st mix / 2nd mix		1st mix / 2nd mix		1st mix / 2nd mix
1"	92 /	3/8"	— /	#	/
3/4"	— /	#200	4.5 /	#	/
1/2"	56 /	# 8	29 /	#	/

CONTROL SYSTEM

Manufacturer Boeing Plant w/ Atropulse Baghouse
SP-1134-10-14

A. **Baghouse:**

1. Type of bags Nomex # of bags 1134 Sq. ft. of bags 4.5"x10'=
2. Air to cloth ratio 5.5-1 Designed ACFM 82000
3. Type of cleaning - pulse jet ✓ reverse air _____ plenum pulse _____ other _____
4. Cleaning cycle time 0.14 Interval between cleaning cycle 15 Sec.
5. Pulse pressure on cleaning cycle 120 psi

B. **Scrubber:**

1. Type - Venturi _____ Wet Washer _____
   Spray Booth _____ Other _____
2. Gallons per minute through system _____
3. Water source _____ (i.e., pond, lagoon, etc.)
4. Number of spray nozzles _____

Company Name James Julian Inc. Date 6/25/92

Company Representative Ron McGuirk

XI. RAMCON PERSONNEL

Name: Mr. Joe Sewell
Title: Vice President

Qualifications:

Mr. Sewell is currently serving as the Vice President of RAMCON Environmental Corporation. Mr. Sewell is a graduate of Christian Brothers University in Memphis, Tennessee where he obtained a Bachelor of Science degree in Chemical Engineering. He has conducted and supervised air emissions testing projects ranging a broad spectrum of facility process categories. His accomplishments include the development of the instrumental branch of emissions testing utilizing continuous emission monitors and gas chromatography. Mr. Sewell performs a major role in the upgrading of testing capabilities and professional quality that RAMCON Environmental Corporation offers.

Project Duties:

Mr. Sewell provides staff engineering and project administration to ensure the integrity of the requested services. He serves as the primary contact person for RAMCON Environmental Corporation handling all correspondence between the facility personnel involved in the project and respective state agency representative(s). He provides project leadership to RAMCON Environmental Corporation field supervisors and managers involved in the test project.

Name: Allen Turner
Title: Team Leader

Qualifications:

Mr. Turner has been employed with RAMCON Environmental Corporation for five years. Altogether, he has sampled approximately 300 stacks of all types. Mr. Turner became qualified for a Team Leader in 1988 and has served as such since that time. He is a current V.E. reader and continues his studies at State Technical Institute in Memphis, Tennessee. Mr. Turner has extensive experience in EPA Methods 1-9.

Project Duties:

Mr. Turner is responsible for isokinetic sampling procedures, including but not limited to, Method 5 for particulate, multi-metals, PAH, calibration and cleaning of necessary equipment for his testing. His duties on-site include assembling the sample train, leak checking the system, operation of the train and recording the test data on the field data forms.