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.

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State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
Bureau of Technical Services
CN 411
Trenton, N.J. 08625-0411
(609) 530-4041

March 18, 1992

MEMORANDUM

TO: Michael Papp, Regional Enforcement Officer
Northern Regional Enforcement Office

FROM: Edward Choromanski, Chief
Bureau of Technical Services

SUBJECT: Tri-County Asphalt Corporation - Rockaway, New Jersey
Stack Emission Test Program
APC Plant ID No. 25009
NJ Stack No. 002
P/CT No. 05641 (Log No. 90-3156)

Stack emission tests were conducted at the above referenced facility on December 12, 1991. The purpose of these tests was to quantify the emissions of carbon monoxide (CO) and total hydrocarbons (THC, as equivalent methane), being emitted to the atmosphere from the batch mix plant. The test results are then compared to the allowable emission limits for CO and THC listed on the air permit. In addition, emission tests for nitrogen oxides (NO_x) were also conducted. These tests were for informational purposes only.

Len Sobolewski reviewed the submitted stack emission test report. His review indicates that the CO and THC emission were within the allowable permit limits, during each test run.

Based on the average NO_x concentration (30 ppmvd) determined during the test program, the volumetric flow rate (40,000 ACFM) listed in the permit, a stack temperature averaging 330°F and an average moisture value of 16.6 percent the NO_x emission rate for this source is calculated to be 4.8 lbs/hr. Based on 2,000 operating hours per year, the NO_x annual emission rate would be 4.8 tons/year.

The CO and THC test results should be accepted for determining compliance with the permit conditions. The NO_x emissions data is for informational purposes only and should not be used for enforcement purposes. NO_x emission limits are currently under development with the New Jersey Asphalt Paving Association (NJAPA).

c: Milton Polakovic
Louis Mikolajczyk
Len Sobolewski

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Bureau of Technical Services
CN 411
Trenton, N.J. 08625-0411
(609) 530-4041

March 12, 1992

MEMORANDUM

TO: Ed Choromanski

FROM: Len Sobolewski

SUBJECT: Tri-County Asphalt Corporation
311 West Main Street
Rockaway, New Jersey
APC ID No. 25009
NJ Stack No. 002
P/CT No. 005641
Log No. 01-90-3156

Emission stack tests were conducted on The Hot Mix Plant #4 (NJ Stack No. 002) at the above subject facility on December 12, 1991. The purpose of the testing project was to demonstrate compliance / non-compliance with the Nitrogen Oxides, Total Hydrocarbon and the Carbon Monoxide parts per million (ppm) corrected to 7% oxygen as required by the Permit/Certificate.

The results of the aforementioned stack emission testing project utilizing the raw field data and the laboratory analysis submitted to the Bureau of Technical Services for review and evaluation is as follows:

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THE HOT MIX PLANT #4
TEST RESULTS

Contaminant	Run No.1	Run No.2	Run No.3	Allowable
Nitrogen Oxides (as NO_2)				
(ppm wet)	24	26	24	-----
(ppm dry)	29	32	28	-----
(ppm @ 7% O_2)	73	72	79	-----
Total Hydrocarbons (as propane)				
(ppm wet)	11	12	8	-----
(ppm dry)	13	14	10	-----
(ppm @ 7% O_2)	34	32	27	-----
Total Hydrocarbons (as methane)				
(ppm wet)	4.0	4.37	2.91	-----
(ppm dry)	4.73	5.09	3.64	-----
(ppm @ 7% O_2)	12.37	11.64	9.82	250
Carbon Monoxide				
(ppm wet)	51	26	14	-----
(ppm dry)	60	32	17	-----
(ppm @ 7% O_2)	153	73	46	500

THE HOT MIX PLANT #4
PRODUCTION RATES

Run	Time	Mix Type	Tons/Hr
1	0845 - 0945	BASE	136
2	1015 - 1115	TOP	136
3	1140 - 1240	TOP	122

The Permit/Certificate lists a maximum asphalt production rate at 5,000 lb/batch 1/60 hr/batch.

The Technical Services calculations of the raw field data and reported results of the laboratory analysis submitted indicated substantially the same results as reported by Air Recon, Division of Recon Systems Inc.

The test results indicated that the Total Hydrocarbons (as propane) and the Carbon Monoxide emission rates from The Hot Mix Plant #4 were within the ppm allowable emission standards stated on the Permit/Certificate during all test runs.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
Bureau of Technical Services
CN 411
Trenton, N.J. 08625-0411
(609) 530-4041

March 20, 1992

MEMORANDUM

TO: Michael Papp, Regional Enforcement Officer
Northern Regional Enforcement Office

FROM: Edward Choromanski, Chief
Bureau of Technical Services

SUBJECT: Tri-County Asphalt Corporation - Rockaway, New Jersey
Stack Emission Test Program
APC Plant ID No. 25009
NJ Stack No. 002
P/CT No. 05641 (Log No. 90-3156)

AMENDED REPORT

Stack emission tests were conducted at the above referenced facility on December 12, 1991. The purpose of these tests was to quantify the emissions of carbon monoxide (CO) and total hydrocarbons (THC, as equivalent methane), being emitted to the atmosphere from the batch mix plant. The test results are then compared to the allowable emission limits for CO and THC listed on the air permit. In addition, emission tests for nitrogen oxides (NO_x) were also conducted. These tests were for informational purposes only.

Len Sobolewski reviewed the submitted stack emission test report. His review indicates that the CO and THC emission were within the allowable permit limits, during each test run.

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The CO and THC test results should be accepted for determining compliance with the permit conditions. The NO_x emissions data is for informational purposes only and should not be used for enforcement purposes. NO_x emission limits are currently under development with the New Jersey Asphalt Paving Association (NJAPA).

c Milton Polakovic
Louis Mikolajczyk
Len Sobolewski

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Trenton, N.J. 08625-0411
(609) 530-4041

March 20, 1992

MEMORANDUM

TO: Ed Choromanski

FROM: Len Sobolewski

SUBJECT: Tri-County Asphalt Corporation
311 West Main Street
Rockaway, New Jersey
APC ID No. 25009
NJ Stack No. 002
P/CT No. 005641
Log No. 01-90-3156

AMENDED REPORT

Emission stack tests were conducted on The Hot Mix Plant #4 (NJ Stack No. 002) at the above subject facility on December 12, 1991. The purpose of the testing project was to demonstrate compliance / non-compliance with the Nitrogen Oxides, Total Hydrocarbon and the Carbon Monoxide parts per million (ppm) corrected to 7% oxygen as required by the Permit/Certificate.

The results of the aforementioned stack emission testing project utilizing the raw field data and the laboratory analysis submitted to the Bureau of Technical Services for review and evaluation is as follows:

THE HOT MIX PLANT #4
TEST RESULTS

Contaminant	Run No.1	Run No.2	Run No.3	Allowable
Nitrogen Oxides (as NO_2)				
(ppm wet)	24	26	24	-----
(ppm dry)	29	32	28	-----
(ppm @ 7% O_2)	73	72	79	-----
Total Hydrocarbons (as propane)				
(ppm wet)	11	12	8	-----
(ppm dry)	13	14	10	-----
(ppm @ 7% O_2)	34	32	27	-----
Total Hydrocarbons (as methane)				
(ppm wet)	12.00	13.11	8.73	-----
(ppm dry)	14.19	15.27	10.92	-----
(ppm @ 7% O_2)	37.11	34.92	29.46	250
Carbon Monoxide				
(ppm wet)	51	26	14	-----
(ppm dry)	60	32	17	-----
(ppm @ 7% O_2)	153	73	46	500

THE HOT MIX PLANT #4
PRODUCTION RATES

Run	Time	Mix Type	Tons/Hr
1	0845 - 0945	BASE	136
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The Technical Services calculations of the raw field data and reported results of the laboratory analysis submitted indicated substantially the same results as reported by Air Recon, Division of Recon Systems Inc.

The test results indicated that the Total Hydrocarbons (as methane) and the Carbon Monoxide emission rates from The Hot Mix Plant #4 were within the ppm allowable emission standards stated on the Permit/Certificate during all test runs.

Recon
Division of
RECON SYSTEMS, Inc.

5 Johnson Drive, P.O. Box 130
Raritan, NJ 08869-0130
(908) 526-1000
FAX (908) 526-7887

Connecticut (203) 293-1212
Massachusetts (508) 752-4217
New Hampshire (603) 431-7500
Pennsylvania (215) 433-5511

COMPLIANCE
STACK SAMPLING REPORT

For

TRI-COUNTY ASPHALT CORPORATION
RD 3, Box 561
Lake Hopatcong, NJ 07849

Attn: Edwin M. Gately

Source Tested:

Scrubber Outlet Stack (plant #4)
Rockaway Asphalt facility
311 West Main Street
Rockaway, New Jersey 07866

Prepared by

Thomas J. Weber, VEC
Chemical Engineer

In Fulfillment of Purchase Order No. A-05043

RECON Project No. 6088B

Test Date: December 12, 1991

Report Date: January 24, 1992

Recon
Division of
RECON SYSTEMS, Inc.
Raritan, NJ 08869-0130

COMPLIANCE
STACK SAMPLING REPORT FOR

TRI-COUNTY ASPHALT CORPORATION

on

Scrubber Outlet Stack (plant #4)
Rockaway Asphalt facility
311 West Main Street
Rockaway, New Jersey 07866

INTRODUCTION

The above-referenced source was sampled for nitrogen oxide (as NO_2), total hydrocarbon (as propane), carbon monoxide, carbon dioxide, and oxygen emissions on December 12, 1991. This report contains the following information.

	PAGE
SUMMARY	2
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APPENDICES

I - NJDEPE APPROVED PROTOCOL & AIR PERMIT
II - ORIGINAL DATA AND CALCULATION SHEETS
III - CEM STRIP CHART RECORDINGS
IV - REAL TIME DATA SHEETS
V - EMISSIONS CALCULATION TABLE

SUMMARY

The following results were obtained:

Run	1	2	3
Date	12/12/91	----------	
Time	0845-0945	1015-1115	1140-1240
Emissions Data			
Nitrogen Oxides (as NO_2			
ppmv (wet)	24	26	24
ppmv (dry)	29	32	28
ppmv @ 7% O_2 (dry)	73	72	79
Total Hydrocarbons (as Propane)			
ppmv (wet)	11	11	8
ppmv (dry)	13	14	10
ppmv @ 7% O_2 (dry)	34	32	27
Carbon Monoxide			
ppmv (wet)	51	26	14
ppmv (dry)	60	32	17
ppmv @ 7% O_2 (dry)	153	73	46

PERSONNEL AND CERTIFICATIONS

FIELD SAMPLING ON THIS PROJECT WAS PERFORMED BY:

Thomas F. Mattei Thomas J. Weber George H. Wagner II

CALCULATIONS AND REPORT PREPARATION WERE PERFORMED BY:

Thomas J. Weber

THE TESTING WAS OBSERVED BY:

Richelle Burkeen, NJDEPE

Jeff Meyer, NJDEPE

Edwin M. Gately, TRI-COUNTY ASPHALT CORPORATION

THIS REPORT IS SUBMITTED BY:

Thomas J. Weber

Thomas J. Weber, VEC
Chemical Engineer

APPROVED BY:

George H. Wagner II
Manager
Real Time Stack/Air Testing

RECON PERSONNEL CERTIFICATION

I CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND ABILITY, THE WORK ON THIS PROJECT WAS REPORTED TRULY, ACCURATELY AND COMPLETELY.

FIELD SUPERVISOR: Thomas J. Weber

PROJECT MANAGER: Thomas J. Weber

AirRECON VICE PRESIDENT: Frank Spitale

PROFESSIONAL ENGINEER OR CERTIFIED INDUSTRIAL HYGIENIST CERTIFICATION

I CERTIFY THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION DEVELOPED OR ACQUIRED BY RECON PERSONNEL IN THIS REPORT AND, TO THE BEST OF MY KNOWLEDGE, THIS INFORMATION IS TRUE, ACCURATE AND COMPLETE.

Richard F. Toro
RICHARD F. TORO, CIH
CIH #4340

TJW/ldb (ST-2/6088B)

FACILITY-OWNER CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT THE INFORMATION PROVIDED IN THIS DOCUMENT IS TRUE, ACCURATE, AND COMPLETE.

I AM AWARE THAT THERE ARE SIGNIFICANT CIVIL AND CRIMINAL PENALTIES, INCLUDING FINES OR IMPRISONMENT OR BOTH FOR SUBMITTING FALSE, INACCURATE OR INCOMPLETE INFORMATION.

I AM THE HIGHEST RANKING INDIVIDUAL WITH DIRECT KNOWLEDGE AND OVERALL RESPONSIBILITY FOR THE INFORMATION CONTAINED IN THIS REPORT.

EDWIN M GATELY
NAME

1-31-92
DATE

ENVIRON/SAFETY COMPL. SUPVR
TITLE

Ed. M Gately
SIGNATURE

SHOULD THIS REPORT INDICATE A VIOLATION HAS OR MAY HAVE OCCURRED OF ANY PROVISION OR CONDITION OF A PERMIT OR CERTIFICATE OR ANY APPLICABLE LAW, REGULATION, OR RULE:

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED IN THIS APPLICATION AND ALL ATTACHED DOCUMENTS AND; BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THAT THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT CIVIL AND CRIMINAL PENALTIES, INCLUDING THE POSSIBILITY OF FINES OR IMPRISONMENT OR BOTH, FOR SUBMITTING FALSE, INACCURATE OR INCOMPLETE INFORMATION.

I AM A PRINCIPAL EXECUTIVE OFFICER OF AT LEAST THE LEVEL OF VICE PRESIDENT OF THIS CORPORATION.

JACK SHOFF
NAME

1/31/92
DATE

CHIEF OPERATING OFFICER
TITLE

Jack Shoff
SIGNATURE

VELOCITY AND FLOW RATE DATA

Run No.	1	2	3
Date	12/12/91		
Time	0845-0945	1015-1115	1140-1240
Stack Diameter (in)	48		
Stack Cross Section (sq ft)	12.56		
Barometric Pressure ("Hg)	30.09	30.08	30.06
Moisture (% vol)	15.5	18.6	15.6

Standard Conditions are 70°F, 29.92 "Hg

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STACK GAS COMPOSITION

Run No.	1	2	3
Date	12/12/91 ----------		
Time	0845-0945	1015-1115	1140-1240
	% By Volume (Dry Basis)		

REAL TIME ANALYZER

CO_2	2.7	3.4	3.1
O_2	15.4	14.8	15.9
N_2 (By Difference)	81.9	81.8	81.0

NITROGEN OXIDE EMISSIONS

Run No.	1	2	3
Date	12/12/91 ----------		
Time	0845-0945	1015-1115	1140-1240
Sampling Data			
No. of Sampling Points	1	1	1
Sampling Time (min)	60	60	60
Emissions Data			
Nitrogen Oxides (as NO_2			
ppmv (wet)	24	26	24
ppmv (dry)	29	32	28
ppmv @ 7%O_2 (dry)	73	72	79

HYDROCARBON EMISSIONS

Run No.	1	2	3
Date	12/12/91 ----------		
Time	0845-0945	1015-1115	1140-1240

Sampling Data

No. of Sampling Points	1	1	1
Sampling Time (min)	60	60	60

Emissions Data

Total Hydrocarbons (as Propane)			
ppmv (wet)	11	12	8
ppmv (dry)	13	14	10
ppmv @ 7% O_2 (dry)	34	32	27

CARBON MONOXIDE EMISSIONS

Run No.	1	2	3
Date	12/12/91 ----------		
Time	0845-0945	1015-1115	1140-1240

Sampling Data

No. of Sampling Points	1	1	1
Sampling Time (min)	60	60	60

Emissions Data

Carbon Monoxide

ppmv (wet)	51	26	14
ppmv (dry)	60	32	17
ppmv @ 7% O_2 (dry)	153	73	46

PROCESS INFORMATION

The following process information was supplied to AirRECON personnel by Edwin M. Gately.

DATA ON FACILITY BEING STACK TESTED

COMPANY NAME Tri County COMPANY REP. ED GATLey PHONE (24) 663-1500
LOCATION OF FACILITY Rochway ORIGINAL START-UP DATE _____ DESIGNED CAPACITY _____
OEM _____ MODEL NO. _____ TYPE _____ AC TYPE _____

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use #Fuel Oil / Nat. Gas X / Propane / Coal / other	3 Burner Setting	4 Blower Pressure	5 Production Rate Mix Aggregate TPH	5 Production Rate RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 X Venturi Scrubber / Baghouse Pressure Drop inches	9 Water Pressure psi	Ac 20		
0850	1898.7 1506.5	355		136	N/A	4.4	315°	320	42	N/A	BASE		
0914	1898.7 1506.9	358		136		4.4	320°	340	42		BASE		
0925	1898.7 1508.1	405		136		4.4	320	340	42		BASE		
1015	1899.7 1508.0	352		136		5.5		330	42		TOP		
1025	1899.7 1508.1	355		136		5.5	325	340	42		TOP		
1011	1900.6 1508.5	368		131		5.5	325	300	42		TOP		
1115	1900 1508.9	340		136		5.5		390	42		TOP		
1140	1901.1 1509.4	344		122		5.5		340	42		TOP		
1155	1901.4 1509.6	343		122		5.5	320	330	42		TOP		
1210	1901.6 1509.7	337		122		5.5	316	280	42		TOP		
1240	1902.1 1510.3	340		122		5.5	310	320	42		TOP		

ALLOWABLE EMISSIONS

The following allowable emissions are based on our understanding of the applicable regulatory rules and regulations. Since we are not always privy to the situation, these should not be accepted without confirmation from relevant sources.

Particulate	Reference	Allowable
Federal Regulations		
State Regulations		
State Permit		
Sulfur Dioxide		
Federal Regulations		
State Regulations		
State Permit		
Sulfur Trioxide and Sulfuric Acid		
Federal Regulations		
State Regulations		
State Permit		
Nitrogen Oxides		
Federal Regulations		
State Regulations		
State Permit		
Hydrocarbon (VOS, VOC)		
Federal Regulations		
State Regulations		
State Permit		
Other: _____		
Federal Regulations		
State Regulations		
State Permit		

X We do not have sufficient information to determine allowable emissions.

SELECTED NOMENCLATURE

Time	= military time
min	= minutes
°F	= degrees Fahrenheit
°C	= degrees Centigrade
"H_2O	= inches water (pressure or vacuum)
"Hg	= inches mercury (pressure or vacuum)
mm Hg	= millimeters of mercury (pressure or vacuum)
psig	= pounds of pressure per square inch-gage
sq ft	= square feet
in	= inches
micron	= 10^{-6} meters
ft/sec	= feet per second
ft/min	= feet per minute
acfm	= cubic feet per minute of total gas flow at flowing conditions
scfm	= cubic feet per minute of total gas flow at 70°F, 29,92"Hg
lb/hr	= pounds per hour
BTU/hr	= British thermal units per hour
%	= volume per cent when referred to gases and water vapor
%	= weight percent for solids, liquids
% vol	= volume per cent
% wgt	= weight percent
ppmv	= volumes of gaseous contaminants per million volumes of total gas
grains	= grams x 15.4
ug	= micrograms = 10^{-6} grams
mg	= milligrams = 10^{-3} grams
grains/dscf	= grains of pollutants per cubic foot of dry stack gas at 70°F, 29.92 "hg
gr/dscf	= grains/dscf
ug/m^3	= micrograms of pollutants per cubic meter of total stack gas at 25°C, 760 mm Hg
mg/l	= milligrams/liter of liquid = ppm by weight if specific gravity of liquid = 1.0
C	= elemental carbon
CO_2	= carbon dioxide
cfu/m^3	= colony forming units per cubic meter of air
f/mm^2	= density of fibers per square millimeter on an air filter
f/cc	= concentration of fibers per cubic centimeter in air
H	= elemental hydrogen
H_2	= molecular hydrogen
H_2O	= water
N	= elemental nitrogen
N_2	= molecular nitrogen
NO_x	= NO + NO_2 = nitric oxide plus nitrogen dioxide reported as equivalent nitrogen dioxide
S	= elemental sulfur
SO_2	= sulfur dioxide
SO_3	= sulfur trioxide
SO_4	= sulfate
H_2SO_4	= sulfuric acid
H_2S	= hydrogen sulfide
Cl	= elemental chlorine or chloride
HCl	= hydrogen chloride
F	= elemental fluorine or fluoride
CH_4	= methane
O	= elemental oxygen
O_2	= molecular oxygen
A	= argon
<	= less than; represents the minimum detectability limits
≤	= equal to or less than
ND	= none detected

Front half (dry catch particulate) = particulate matter collected in/on nozzle, probe, cyclone, flask heated hose, and filter of EPA sampling train

Back Half (wet catch particulate) = material collected in impingers after filter of EPA sampling train

Organic wet catch = residue after low temperature (70°F) evaporation of ether/chloroform used to extract soluble materials from the wet catch

Aqueous wet catch = residue after high temperature (220°F) evaporation of water left after ether/chloroform extraction

Combustibles = volatiles = loss on heating @ 550°C after drying @ 100°C

Ash = residue after heating @550°C

Recon Systems Inc.
Raritan, NJ 08869-0130

LABORATORY INFORMATION SHEET

METHODOLOGY

Method No.	=	EPA Methods unless otherwise noted
EPA	=	United States Environmental Protection Agency SW-846 3rd Edition; or EPA 600/4-79-020 Methods for Chemical Analysis of Water and Wastes; or 40 CFR, most recent edition; or Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water
SM	=	Standard Methods for the Examination of Water and Wastewater 16th Edition
ASTM	=	American Society for Testing Materials
RECON	=	RECON SYSTEMS, Inc. in-house method
NIOSH	=	National Institute for Occupational Safety and Health
NJDEP	=	New Jersey Department of Environmental Protection
Mod	=	Modified; e.g. 8015Mod indicates that the 8015 method has been modified by the lab

COMMON NOMENCLATURE

ND	=	none detected
ND<	=	none detected, less than value shown
	=	less than value shown
	=	less than or equal to value shown
>	=	greater than value shown
≥	=	greater than or equal to value shown
MPN	=	most probable number
I	=	not ignitable solid
NA	=	not applicable
NR	=	not requested
NL	=	no limits set
MDL	=	minimum detection limit
B	=	compound was found in laboratory blank
J	=	compound was detected but below the MDL
	=	compound was probable background due to solvent or CO_2
MGD	=	million gallons per day
GPD	=	gallons per day
TCLP	=	Toxicity Characteristic Leaching Procedure
ZHE	=	Zero Headspace Extraction
MBAS	=	Methylene Blue Active Substances
USEPA	=	United States Environmental Protection Agency
NJDEP	=	New Jersey Department of Environmental Protection
RCRA	=	Resource Conservation and Recovery Act
CERCLA	=	Environmental Cleanup Responsibility Act

UNITS

ug/l	=	micrograms per liter
mg/l	=	milligrams per liter
ml/l	=	milliliters per liter
ug/kg	=	micrograms per kilogram, dry weight basis (unless otherwise noted)
mg/kg	=	milligrams per kilogram, dry weight basis (unless otherwise noted)
m^3	=	cubic meter
in/yr	=	inches per year
lbs/yd^3	=	pounds per cubic yard
pCi/l	=	picocuries per liter
ppmv	=	parts per million by volume, dry basis (unless otherwise noted)
ppbv	=	parts per billion by volume, dry basis (unless otherwise noted)
°F	=	degrees Fahrenheit
°C	=	degrees Celsius
vol %	=	percent by volume
wt %	=	percent by weight
cc	=	cubic centimeter
ug	=	microgram
mg	=	milligram
g	=	gram
kg	=	kilogram
ul	=	microliter
ml	=	milliliter
	=	liter
su	=	standard units
cu	=	color units
NTU	=	nephelometric turbidity units

Systems Inc.
Raritan, NJ 08869-0130

LABORATORY INFORMATION SHEET

ANALYTICAL REMARKS

a	=	possibly significant, unidentified peaks observed during normal run time
b	=	possibly significant, unidentified peaks observed subsequent to normal run time
dx	=	minimum detection limits are x times those listed; e.g. d10 indicates that the minimum detection limits are 10 times those listed

INSTRUMENT ABBREVIATIONS

FID	=	Flame Ionization Detector
TCD	=	Thermal Conductivity Detector
ECD	=	Electron Capture Detector
PID	=	Photoionization Detector
HECD	=	Hall Electrolytic Conductivity Detector
MS	=	Mass Spectrometer Detector
IR	=	Infrared Spectrometer
GC	=	Gas Chromatograph

Samples for this project will be retained for sixty (60) days from the date of this report unless otherwise noted.

New Jersey State Certified Water Laboratory Certification No. 10196

SAMPLE CALCULATIONS

RECON SYSTEMS, INC.
5 Johnson Drive P.O. Box 130
RARITAN, NEW JERSEY 08869-0130
(908) 526-1000 FAX (908) 526-7886

JOB 6088A, B
SHEET NO 1 OF 1
CALCULATED BY TJ Weber DATE 1/14/92
CHECKED BY DATE
SCALE

SAMPLE CALCULATIONS:

ppmv, dry ≡ Parts per million by volume, dry: (for NO_x, CO, THC)

$$ppmv, dry = \frac{ppmv, wet}{\left(\frac{100 - \%\ Moisture, (Bws)}{100}\right)}$$

e.g. ppmv, wet NO_x = 29.1 ; % Moisture = 18.8

$$ppmv, dry = \frac{29.1}{\left(\frac{100 - 18.8}{100}\right)}$$

$$ppmv, dry = 29.1 / .812$$

$$ppmv, dry = 35.8$$

1:). Corrected ppmv, dry to Seven percent oxygen, dry: (7% O_2)

$$C_{adj} = C_{meas} \times \frac{(13.9)}{(20.9 - \%\ O_2)}$$

where;

C_{adj} = Pollutant concentration corrected to 7% O_2, dry.
C_{meas} = Pollutant " measured, ppmv, dry.
13.9 = 20.9 − 7.0 % O_2, the defined O_2 correction value, %.
% O_2 = measured O_2 concentration, dry basis, %.

e.g.

ppmv, dry (CO) = 199.3 ; % O_2 = 14.6 %

$$C_{adj} = 199.3 \times \frac{13.9}{(20.9 - 14.6)}$$

$$C_{adj} = 199.3 \times 2.206$$

$$C_{adj} = 439.7 \text{ ppmv, dry CO @ 7\% } O_2$$

Recon
Division of
RECON SYSTEMS, Inc.
Raritan, NJ 08869-0130

CALIBRATION DATA

AirRecon
Division of
RECON SYSTEMS, Inc.

5 Johnson Drive, P.O. Box 130
Raritan, NJ 08869-0130
(908) 526-1000
FAX (908) 526-7887

METERING SYSTEM CALIBRATION DATA SHEET
FOR CALIBRTION AFTER USE

SYSTEM ID NO: 1 DATE: 12/9/91 BY MU

FIELD METER S/N: 592191 STD. MTR. S/N: 716691

INTERMEDIATE DELTA H 0.2 INCHES H_2O, MAX. VACUUM 2 INCHES Hg

BAROMETRIC PRESSURE 29.87 INCHES Hg = Pb

LEAK CHECK 0.001 CFM @ 26 INCHES Hg and PRESSURE CHECK ok

RUN NO.		STD DRY GAS METER V_s ft³	FIELD DRY GAS METER V_f ft³	STD METER t_s °F	FIELD METER IN t_i °F	FIELD METER OUT t_o °F	FIELD METER AVG t_f °F	TIME θ MIN	DGM CALIB FACTOR Y NO UNITS
	F	973.576	962.882						
	I	968.005	952.025	64	76	69	72.5	21	0.97
1	D	5.571	5.857						
	F	979.129	968.774						
	I	973.576	962.882	65	85	78	81.5	21	0.97
2	D	5.553	5.892						
	F	984.703	974.737						
	I	979.129	968.774	66	90	83	86.5	21	0.97
3	D	5.574	5.963						

* FINAL, INITIAL & DIFFERENCE VOLUMES

AVG. 0.97 **

**IF THE VALUE HAS CHANGED MORE THAN FIVE PERCENT FROM PREVIOUS VALUES REFER TO U.S. EPA METHOD 5, PARAGRAPH 5.3.2.

ok

$$Y = \frac{V_s P_b (t_f + 460)}{V_f \left(P_b + \frac{\text{DELTA H}}{13.6}\right)(t_s + 460)}$$

29.88

(SEE US EPA METHOD 5, PARAGRAPH 5.3 & 7.1)

L-32 AFTER (2.2.90) (AND ADD TO M-137)

Scott Specialty Gases, Inc.

20

2330 HAMILTON BOULEVARD, SOUTH PLAINFIELD, NJ 07080-010/10/90
PHONE: 201-754-7700 FAX:201-754-7303

RECON
ROUTE 202

PROJECT #: 07-07813
PO #: 6761

THREE BRIDGES NJ 08887-0000
ATT:RECEIVING DEPT

CYLINDER #: ALM009729

ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
OXYGEN	6.0	PCT	6.00	PCT
N TROGEN	BALANCE	GAS		N/A

DATE OF ANALYSIS:10/08/90

ANALYST: Addison Williams
ADDISON WILLIAMS

APPROVED BY: _____
ADELA SY

21

MG Industries
®Gas Products

1399 NEW FORD MILL RD.
MORRISVILLE, PA 19067
(800)638-6360

ANALYTICAL REPORT – PRODUCT CERTIFICATION

TO:

MG Industries - Linden
Intra-Company Transfer
901 W Edgar Road
Linden , NJ 07036

DATE: 07/29/91

P.O. NO.

ORDER NO. 700147-002

REF. # CSM-073

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
	CERTIFIED MIXTURE		
CC-104054	Oxygen	15.0 %	15.5 %
	Nitrogen	Balance	Balance

Carlos Serrano Marquez ANALYST

MG Industries
®Gas Products

1399 NEW FORD MILL RD.
MORRISVILLE, PA 19067
(800)638-6360

22

ANALYTICAL REPORT – PRODUCT CERTIFICATION

TO:

MG Industries - Linden
Intra-Company Transfer
901 W. Edgar Road
Linden NJ 07036

DATE: 05/08/91

P.O. NO.

ORDER NO. 616998-003

REF. # WCP-190

CYLINDER NO.	CONSTITUENTS CONCENTRATION:	NOMINAL	ACTUAL
	CERTIFIED MIXTURE		
CC-[illegible]3331	Oxygen	20.9 %	20.8 %
	Nitrogen	Balance	Balance

ANALYST

Walter C. Freller

G 3301/A 3/89

Scott Specialty Gases, Inc.

Shipped From: 2330 HAMILTON BOULEVARD SOUTH PLAINFIELD NJ 07080-0000
Phone: 908-754-7700 Fax: 908-754-7303

CERTIFICATE OF ANALYSIS

RECON SYSTEMS
TOM WEBER OR TOM MATTE
P O BOX 317
5 JOHNSON DRIVE
RARITAN NJ 08869-0317

PROJECT #: 07-12980
PO#: 8919
ITEM #: 07023411 4AL
DATE: 11/19/91

CYLINDER #: ALM019039 ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
PROPANE	25.	PPM	25.9	PPM
AIR		BAL		BAL

AIR/HC FREE

ANALYST: ADELA SY

APPROVED BY: JOHN O'SHEA

Scott Specialty Gases, Inc.

Shipped From: 2330 HAMILTON BOULEVARD SOUTH PLAINFIELD NJ 07080-0000
Phone: 908-754-7700 Fax: 908-754-7303

CERTIFICATE OF ANALYSIS

RECON SYSTEMS
TOM WEBER OR TOM MATTE
P O BOX 317
5 JOHNSON DRIVE
RARITAN NJ 08869-0317

PROJECT #: 07-12980
PO#: 8919
ITEM #: 07023411 4AL
DATE: 11/19/91

CYLINDER #: ALM026334 ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
PROPANE	50.	PPM	52.0	PPM
AIR		BAL		BAL

AIR/HC FREE

ANALYST: ADELA SY

APPROVED BY: JOHN O'SHEA

Scott Specialty Gases, Inc.

Shipper: 2330 HAMILTON BOULEVARD SOUTH PLAINFIELD NJ 07080-0000
From: Phone: 908-754-7700 Fax: 908-754-3000

CERTIFICATE OF ANALYSIS

RECON SYSTEMS
TOM WEBER OR TOM MATTI
P O BOX 317
5 JOHNSON DRIVE
RARITAN NJ 08869-0317

PROJECT #: 07-12980
PO#: 8919
ITEM #: 07023411 4AL
DATE: 11/19/91

CYLINDER #: AL002620 ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED GAS CONC	MOLES	ANALYSIS (MOLES)	
PROPANE	80.	PPM	82.1	PPM
AIR		BAL		BAL

AIR/HC FREE

ANALYZED BY: _____ APPROVED BY: _____
ANDY B. JOHN O'SHEA

Scott Specialty Gases, Inc.

2030 HAMILTON BOULEVARD, SOUTH PLAINFIELD, NJ 07080-0 3/01/91
PHONE: 201-754-7700 FAX:201-75--7200

RECON SYSTEME
P O BOX 317
5 JOHNSON DRIVE
RARITAN NJ 08869-0000
PICK UP 24 EMPTIES

PROJECT #: 07-09461
PO #: 7391

CYLINDER #: AAL1927B

ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
CARBON MONOXIDE	180.0	PPM	180.	PPM
NITROGEN	BALANCE			N/A

DATE OF ANALYSIS: 2/26/91

ANALYST: D. Dudics
DONALD DUDICS

APPROVED BY: Adela Sy
ADELA SY

Scott Specialty Gases, Inc.

2330 HAMILTON BOULEVARD, SOUTH PLAINFIELD, NJ 07080-010/10/90
PHONE: 201-754-7700 FAX:201-754-7303

ECON
..OUTE 202

HREE BRIDGES NJ 08887-0000
TT:RECEIVING DEPT

PROJECT #: 07-07813
PO #: 6761

CYLINDER #: ALM008131 ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
3C : DIOXIDE	11.0	PCT	11.0	PCT
ROGEN	BALANCE	GAS		N/A

DATE OF ANALYSIS:10/08/90

ANALYST: Addison Williams ADDISON WILLIAMS APPROVED BY: ADELA SY

RECEIVED

Scott Specialty Gases, Inc.

RECEIVED
1 1991

2330 HAMILTON BOULEVARD, SOUTH PLAINFIELD, NJ 07080-0 ~~7/25/91~~
PHONE: 201-754-7700 FAX:201-754-7303

RECON SYSTEMS
P O BOX 317
5 JOHNSON DRIVE
RARITAN NJ 08869-0000
Attn: Tom Weber

PROJECT #: 07-11252
PO #: 8169

CYLINDER #: 1L1462

ANALYTICAL ACCURACY: +/- 1%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
CARBON DIOXIDE	18.0	PCT	17.8	PCT
NITROGEN	BALANCE			N/A

DATE OF ANALYSIS: 7/16/91

ANALYST: ADELA SY

APPROVED BY: DONALD DUDICS

Scott Specialty Gases, Inc.

29 - W

PHONE: [illegible]
FAX: [illegible]
[illegible] BLVD. SOUTH PLAINFIELD NJ 07080 [illegible]

RECON SYSTEMS INC.
PO BOX 460
ROUTE 202 NORTH
THREE BRIDGES NJ 08887-0000
ATT:RECEIVING DEPT

PROJECT #: 07-[illegible]
PO #: 5485

CYLINDER #: AL00[illegible]

ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS % (MOLES)	U/M
NITRIC OXIDE	20.0	PPM	19.1	PPM
NITROGEN - OXYGEN FREE	BALANCE GAS			N/A

NOTES: NO = 19.1 PPM

DATE OF ANALYSIS: 8/15/90

ANALYST: DONALD DUDICS

APPROVED BY: ADDISON WILLIAMS

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SEP - 6 [illegible]

Scott Specialty Gases, Inc.

2330 HAMILTON BOULEVARD, SOUTH PLAINFIELD, NJ 07080-0 5/24/91
PHONE: 201-754-7700 FAX:201-754-7303

RECON SYSTEMS
P O BOX 317
5 JOHNSON DRIVE
RARITAN NJ 08869-0000

PROJECT #: 07-10582
PO #: 7848

CYLINDER #: ALM015705 ANALYTICAL ACCURACY: +/- 2%

COMPONENT	REQUESTED CONCENTRATION		ANALYSIS 1 (MOLES)	U/M
T IC OXIDE	95.0	PPM	96.2	PPM
T OGEN - OXYGEN FREE	BALANCE			N/A

DATE OF ANALYSIS: 5/14/91

ANALYST: JOHN O'SHEA

APPROVED BY: ADELA SY

- A copy of an originally approved test protocol
- Manufacturer's calibration gas certificates
- Copies of the real-time strip-chart recordings.

A completed copy of the proposed compliance test production data form (as shown in Appendix II) will also be included with the final report. The report will be issued in triplicate.

Submitted by:

Thomas P. Brown, REM
Chemical Engineer

Approved by:

George H. Wagner II
Manager
Real-Time Stack/Testing

TPB/prh
(PRT#18/NAPA)

Light emission results when electronically excited NO_2 molecules revert to their ground state.

To measure NO concentrations, the gas sample to be analyzed is blended with O_3 in a reaction chamber. The resulting chemiluminescence is monitored through an optical filter by a highly sensitive photomultiplier tube, which is positioned at one end of the chamber. The filter/photomultiplier combination responds to light in a narrow-wavelength band unique to the above reaction. Thus, there is no interference. The output from the photomultiplier tube is linearly proportional to the NO concentration.

To measure NO_x concentrations, (i.e., NO plus NO_2), the sample gas flow is diverted through an NO_2-to-NO thermal converter. The chemiluminescent response in the reaction chamber to the convertor effluent is linearly proportional to the NO_x concentration entering the converter.

NO_2-to-NO Converter: To measure NO_x, as was stated, the NO_2 is first converted to NO. This conversion is accomplished by passing the sample gas through a thermally insulated, resistance-heated, stainless steel coil.

With the application of heat, NO_2 molecules from the sample are reduced to NO molecules. A 650 C environment is recommended for the conversion.

The TECO NO_x analyzer range will be set at 1.5 to 2.5 times the emission limitation.

4.5 CARBON MONOXIDE MEASURING EQUIPMENT

Carbon monoxide concentrations will be determined by infrared (IR) spectroscopy employing US EPA Reference Method 10. A representative sample of stack gas is directed to the CO analyzer via the sample transport system described previously. The sample enters the analyzer and is passed through a measurement cell.

While the sample is in the cell, an IR source located at the focal point of a concave mirror shines a beam through the measurement cell and through a parallel reference cell. A chopper disc rotates to send the IR beams alternately through the sample and reference measurement cells.

The radiant beams, after passing through the two cells, are reflected by a second mirror onto two photo detectors with spectral filters. The detectors convert optical energy from the radiant beams into electrical signals. The signals from the reference cell are compared to signals from the sample cell.

Any absorption of the IR beam in the sample cell by CO in the sample causes a proportional difference in the signals from the sample and reference cell beams. This difference is converted electronically into an output signal that is linearly proportional to the concentration of CO in the sample.

The CO analyzer will conform to performance specifications listed in Section 4.7, which meets 40 CFR 60, Appendix A criteria. The range of the CO analyzer will be zero to one thousand parts per million by volume.

4.6 OXYGEN MEASURING EQUIPMENT

Real-time analysis for oxygen will be performed on a Infrared Industries model 2200 electrochemical O_2 analyzer. Values will be displayed in volume percent.

The sensor contains an anode, electrolyte, and an air cathode, to which the diffusion of oxygen is severely restricted by a barrier. At the air cathode, oxygen is reduced to hydroxyl ions, while an oxidation reaction occurs at the metal anode. Current is proportional to the rate of consumption of oxygen. The range of operation for this analyzer is zero to twenty-five percent by volume.

4.7 PERFORMANCE STANDARDS FOR CONTINUOUS EMISSION MONITORS (REAL-TIME ANALYZERS)

The specific instrument type and model number were identified in Section 4.1 and shall conform to the following criteria outlined in 40 CFR 60, Appendix A, US EPA RM 6C:

- Analyzer calibration error: ± 2% of the span for zero, low-range, mid-range, and high-range calibration gases.
- Zero drift: ± 3% of the span over the period of each run.
- Calibration drift: ± 3% of the span over the period of each run.
- Sampling system bias: ± 5% of the span for the zero, low-range, mid-range and high-range calibration gases.

Prior to the start of testing, these four aforementioned performance tests will be conducted. A synopsis of each is described below.

The analyzer calibration error test consists of introducing zero gas (less than 0.25 percent of the span), mid-range calibration gas (between 50 and 60 percent of the span) and high-range calibration gas (between 80 and 90 percent of the span) to the measuring system and recording the analyzers' response. All calibration gases utilized during the CEMS conformance tests will be certified master standards.

The error check will be considered invalid if the gas concentration displayed by the analyzers exceeds ± two percent of the span for any calibration gases.

The sampling system bias check is performed by introducing a zero and either a mid-level or high-level calibration gas to the CEMS (at the calibration valve located at the sample probe outlet) and recording the analyzers' response. The gases are introduced until a stable response is achieved then, the other gas is introduced.

The measuring system response time will be determined by observing the times required to achieve stable response for both the zero and higher-level gases. The sampling system bias check will be considered invalid if the difference between the gas concentrations displayed by the measurement system for the analyzer calibration error check exceeds five percent. It will also be considered invalid if the sampling system bias check exceeds five percent of the span for either the zero or higher-level calibration gases.

After the system performance tests are completed, the testing will begin. Immediately preceding and following each test run, a zero and calibration drift test will be performed in the exact manner as the sampling system bias check was performed (see above).

5.0 QUALITY ASSURANCE PROCEDURES

This section describes quality assurance procedures used to ensure the accuracy and quality of the data acquired. Calibration will be performed as per 40 CFR 60, Appendix A, Reference Methods 1-6C.

5.1 CALIBRATION DATA

All pretest calibration data for sampling and analytical equipment will be made available onsite at the time of the first test to any NJDEP representatives. Copies of all pre-test and post-test calibration data will be included in the final report.

5.2 CALIBRATION PROCEDURES FOR INSTRUMENT ANALYZERS

Quality assurance for the Continuous Emission Monitors requires that prior to measurement of concentrations and once for each test run, that the sampling and analyzer system be calibrated at four points. All calibrations are performed by introducing calibration gas into the sampling system near the sampling probe and comparing the measurement system response of the gas to the actual value of the calibration gases. All gases will be certified master calibration gases traceable to NBS reference materials. The calibration procedure is described below.

After achieving proper operating condition, a zero gas (nitrogen or hydrocarbon-free air) is passed through the system and into the instrument, and it is adjusted into agreement with the zero gas. A low level span gas is then introduced into the instrument, and if necessary, an adjustment is made to equal the span gas concentration.

At this point, the high level and middle level span gases are then passed through the instrument to check linearity. Without adjustment between spans, values displayed by the instrument must agree within 5% of full scale with all span gases before analysis may begin. Furthermore, a system response time test will be conducted to determine the time required for the system to have a 95% response to a sample of known value.

6.0 FINAL REPORT

6.1 REPORTING OF RESULTS

The test report will be certified by a New Jersey licensed professional engineer or a certified industrial hygienist. It will be submitted, by the plant, to the Bureau of Technical Services within thirty days after completion of the testing. All test results will be reported in a manner consistent with the requirements of NJDEP and the US EPA.

Pollutant concentrations for THC, NO_x, (if applicable) and CO will be reported in parts per million by volume on a wet basis (ppmvw), parts per million by volume on a dry basis (ppmvd), and ppmvd corrected to seven percent oxygen. Oxygen will be reported in terms of volume percent.

6.2 INFORMATION INCLUDED IN THE FINAL TEST REPORT

AirRECON's final test report for this project will include the following:

- Original field data sheets
- Observations and notes
- A summary
- An emissions section for each parameter
- A personnel and certifications summary
- Calibration data for all sampling equipment used
- Sampling location diagrams
- Gas composition data
- Process information

APPENDIX I

PERMIT INFORMATION

August 14, 1991

AUG 20 1991

To: Emission Testing Consultants

Regarding: Generic Testing Protocol for Hot Mix Asphalt Plant Compliance Testing

From: Generic Protocol Task Group
The New Jersey Asphalt Pavement Association

The New Jersey Department of Environmental Protection, Division of Environmental Quality has defined new gaseous emission limits for Asphalt Plants. Each plant in New Jersey must be tested by June 1, 1991 to confirm compliance with those limits. The New Jersey Asphalt Pavement Association has met with Mr. Ed Choromanski, Chief Bureau of Technical Services, to streamline protocol requirements for that testing. We write to you on behalf of the Association Members to define the testing requirements and to ask for your quotation.

Emission Testing Consultants will be able to develop and submit to The Supervisor/Technical Review, Bureau of Technical Services a generic protocol for the compliance testing of any asphalt plant. Plant owners will then be able to inform Technical Services in writing that their plant will be tested by a Consultant whose pre-approved protocol is on file. The generic protocol eliminates the need to have protocols submitted and approved for each plant tested. Time is of the essence since all plants must sign on to a generic protocol or have their own protocol approved by October 15, 1991. An additional benefit to the generic testing program is advanced scheduling with Technical Services will not be required. Consultants must give only seven days notice of which plant they will test next.

NJAPA's goal is to reduce the testing cost for our members. We expect that the generic protocol defined here and the single sampling port at ground level will translate into lower costs. There are also the economies of scale, NJAPA represents over 60 asphalt plants of the 94 plants in New Jersey. Most plants remain to be tested. We would like your quotation to test our member's plants. Your quotation should be broken down into two components: (1) Lump Sum to mobilize and report results, (2) Per day cost to perform the compliance testing. Please give with your quotation the minimum number of plants required to obtain the quoted testing rate. Your quotation will be made available to our members, they would contract with you individually.

RECEIVED
AUG 20 1991

We invite you to submit a protocol to Mr. Choromanski's attention as soon as possible. Our members must chose consultants from those with approved protocol's. If you have testing protocols already approved in New Jersey it should be a simple matter for you to modify them as described here. Please keep Cliff Heath informed as to your progress. Cliff is President of our Association and can be reached at (609) 655-2030.

We look forward to hearing from you. Feel free to call me at (609) 641-2781 with any questions or problems.

Respectfully,

Robert E. Frank

Robert E. Frank
Chairman, Generic Protocol Task Group
New Jersey Asphalt Pavement Association

REF/h

cc: Mr. Ed Choromanski

Generic Protocol Requirements

A. Compounds To Be Tested For

1. Oxygen, USEPA method 3A

2. Carbon Monoxide, by USEPA method 10, calibration range 0-1,000 ppm

3. Total Hydrocarbons (Expressed as Methane) by New Jersey Method 3 (Modified EPA method 25A), calibration range 0-500 ppm.

   a. Moisture determination can be done by EPA method 4. A single sample drawn over one hour and the results used for the 3 hours of compliance testing.

4. Nitrogen Oxides (optional but recommended) USEPA method 7E

B. Sampling

1. Emission limits are in units of concentration (Parts per Million) therefore volumentric determination is not required. Sampling can be done from a single point preferably where pressure is positive. Sampling location must be approved by letter for each plant testing.

2. Three one hour sampling runs are required. Calibration must be checked between each hour of data in accordance with EPA test methods. Master Gases are acceptable for calibration.

3. Protocol must include all six items from Technical Service Sampling Methods (see attached)

C. Reporting

1. A Standard report form with results added at test site will be acceptable. Results require Professional Engineer or Certified Industrial Hygienist Certification.

2. CO and THC (as Methane) results are to be reported in units of parts per million dry volume, and parts per million dry volume corrected to seven percent oxygen.

3. Oxygen concentration must be reported in unit of percent.

4. Sampling methods to be utilized as part of the testing program.

   a. Summary of each method to be utilized including any deviations from the reference methods. Simply listing the methods is not acceptable.

   b. Description and/or labeled diagram of each sampling train.

   c. Description of each train's operation and parameters to be recorded and monitored during the test run.

   d. Description of the leak check procedures for each train, including continuous monitors.

   e. Description of sample volumes and detection limits where applicable. Include justifications.

   f. Calibration procedures for all pertinent sampling equipment, including but not limited to:

      Dry Gas Meter
      Office Meter
      S-Type Pitot Tubes
      Temperature Sensors
      Nozzles
      Rotameters
      Continuous Monitors
      Span Gas Certifications

''EM-045
/88

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PERMIT PROGRAM
BUREAU OF NEW SOURCE REVIEW
CN 027
TRENTON, NEW JERSEY 08625

Date: 8/24/90

TRI COUNTY ASPHALT CORPORATION
EDWIN M. GATLY
RD 3 BOX 561
LAKE HOPATCONG , NJ, 07849-0000

Plant Location: BYRAM TWP.
County: SUSSEX
Applicant's Designation of Stack:004
Application Log #: 01903158
Approval Date: 8/21/90
Permit/Certificate #: 093317

This letter is to advise you that an alteration to a Permit to Construct, Install, or Alter Control Apparatus or Equipment and Certificate to Operate Control Apparatus or Equipment has been approved under the authority of chapter 106, P.L. 1967 (N.J.S.A. 26:2C-9.2) by the Bureau of New Source Review as referenced above.

The correspondence that you sent will be added to the appropriate stack file. The information is incorporated into the application and constitutes an ENFORCEABLE PERMIT CONDITION. Unless revised herein, all previous conditions of approval continue to apply.

If you have any questions regarding this document, please write to the Bureau of New Source Review at the above address. Questions regarding Certificates to Operate should be directed to the Regional Office.

Approved by: Louis Mikolajczyk
Chief

C: File
Regional Office

83

REGIONAL OFFICES

METROPOLITAN REGIONAL ENFORCEMENT

N.J. Department of Environmental Protection
Division of Environmental Quality
Bureau of Enforcement Operations
2 Babcock Place
West Orange, New Jersey 07052
(201) 669-3935

Covers Counties of: **Bergen, Essex, Hudson & Union**

CENTRAL REGIONAL ENFORCEMENT

N.J. Department of Environmental Protection
Division of Environmental Quality
Bureau of Enforcement Operations
Twin Rivers Professional Bldg.
East Windsor, New Jersey 08520
(609) 426-0796

Covers Counties of: **Burlington, Mercer, Middlesex, Monmouth & Ocean**

NORTHERN REGIONAL ENFORCEMENT

N.J. Department of Environmental Protection
Division of Environmental Quality
Bureau of Enforcement Operations
1259 Route 46
Parsippany-Troy Hills, N.J. 07054
(201) 299-7700

Covers Counties of: **Hunterdon, Morris, Somerset, Sussex, Passaic & Warren**

SOUTHERN REGIONAL ENFORCEMENT

N.J. Department of Environmental Protection
Division of Environmental Quality
Bureau of Enforcement Operations
The Paint Works Corporate Center
20 East Clementon Road/3rd Floor
Gibbsboro, N.J. 08026
(609) 346-8071

Covers Counties of: **Atlantic, Camden, Cape May, Cumberland, Salem & Gloucester**

CERTIFICATE STATUS CODES:

- 01 - Temporary Operating Certificate
- 05 - Five Year Operating Certificate
- 51 - Conditional — Temporary (See Condition Checked)
- 52 - Stack Test Required
- 55 - Five Year Conditional (See Condition Checked)

CONDITIONS THAT WILL APPLY:

_____ The owner/operator shall not construct, install, use or cause to be used this equipment in a manner which will result in odors being detectable by sense of smell in any area, except for those areas over which the owner or operator has exclusive use or occupancy.

_____ No visible emissions, exclusive of condensed water vapor

_____ No person shall cause, suffer, allow or permit particles to be emitted from this stack or chimney into the outdoor air, the shade or appearance of which is greater than 10% opacity, exclusive of visible condensed water vapor.

X Special conditions (see attached)

NOTE:

_____ **If this item is checked this Operating Certificate is not approved for start up.**

Supplemental Conditions for CO and THC
Attachment to Certificate Number 093317
Log Number 1-90-3158
Approval Date 8/21/90

The following conditions replace any previous emission limits on conditions concerning carbon monoxide (CO) and total hydrocarbon (THC) emissions for the asphalt mix dryer stack operating certificate referenced above.

1. **EMISSION LIMITS, ASPHALT MIX DRYER STACK**

Emissions from the stack, averaged over any 60 minute period , shall not exceed any of the concentration limits in Table 1, measured in parts per million by volume, dry basis, corrected to 7 percent oxygen (ppmvd at 7% O_2). Compliance shall be determined by the use of New Jersey Air Test Method 3 for THC (N.J.A.C. 7:27B) and USEPA Reference Method 10 (40 CFR Part 60, Appendix A), for CO or by Continuous Emission Monitors and Recorders (CEM & R's) approved by the Department.

TABLE 1

	EMISSION LIMITS WITH CONTROL	
POLLUTANT	**6/15/90 TO 6/15/91**	**AFTER 6/15/91**
Carbon Monoxide (CO) PPMVD AT 7% O_2	1000	500
Total Hydrocarbon (THC) PPMVD AT 7% O_2	250	250

2. **TESTING REQUIREMENTS**

a. If this approval includes authorisation to use Reclaimed Asphalt Pavement (RAP), conduct stack tests prior to October 31, 1990, unless extended in writing by chief, Bureau of Technical Service.

b. If RAP is not used, conduct stack tests by October 31, 1991.

c. Test for carbon monoxide, oxygen, and total hydrocarbons.

d. Sixty days prior to the conduct of the required tests, the Company shall submit for approval a detailed description of the sampling port locations, sampling equipment, sampling and analytical procedures and operating conditions for such tests to:

Chief
Bureau of Technical Services
NJDEP
CN 411
Trenton, New Jersey 08625

e. Company shall contact the Bureau of Technical Services at (609)530-4041 to schedule a mutually acceptable test date.

f. Company shall submit two copies of the test results to the Chief, Bureau of Technical Services, within 30 days of the completion of testing. The test results must be certified by a New Jersey licensed professional engineer.

g. The Department may accept other recent test (after June 1, 1988) results as fulfilling these testing requirements if approved by the Chief Bureau of Technical Services.

h. The Department may require additional testing for carbon monoxide, total hydrocarbons, and other pollutants as a condition of renewal of the 5 year operating certificate. If there has been recent testing (within 30 months) of the renewal date, the Chief, Bureau of Technical Services may approve those tests to satisfy all, or part of, the 5 year renewal test requirement.

3. <u>Conditions for use of Reclaimed Asphalt Pavements (RAP)</u>
(if applicable)

a. The Company must conduct stack tests prior to October 31, 1990, unless extended by the Chief, Bureau of Technical Services, with and without RAP, in accordance with Condition Number 2.

b. The maximum THC concentration with RAP shall not exceed 250 ppmvd at 7% O_2 for any 60 minute period.

c. A maximum of 25 ppmvd at 7% O_2 THC increase is allowed between the average of 3 one hour tests without RAP and the average of 3 one hour tests with RAP, unless each one hour test with RAP is less than 125 ppmvd at 7% O_2.

d. The company may test at various RAP percentages in the feed material as defined in the operating conditions in an approval test protocol (see Condition 2d). The maximum amount of RAP processed during the complying stack tests shall set the maximum RAP charging rate for the facility.

e. Based on the results of testing RAP in drum mix plants, the Department may prohibit or otherwise limit the charging of RAP to the drum if it is shown that the exposure of the RAP to the flame or high temperatures generally causes THC emissions which exceed the above limits.

4. <u>Continuous Emission Monitors and Recorders (CEM & R's)</u>

a. Continuous emission monitors for oxygen and carbon monoxide shall be installed by June 15, 1993. These monitors must meet the minimum performance specifications outlined in 40 CFR Part 60 Appendix B and any other performance requirement specified by the Department.

b. Details on the continuous monitor, recording devices, calibration, monitoring and operating procedures, and monitor performance specifications tests shall be submitted by 6/15/92 to the Chief, Bureau of Technical Services for review and approval.

c. The Department may require installation and operation of a continuous emission monitor for total hydrocarbons (THC) if testing indicates control of carbon monoxide within the required limit does not result in control of THC within the required limit.

d. As an alternative to the stack testing requirement in Condition Number 2 for units which do not use RAP, the company may install Continuous Emission Monitors & Recorders (CEM & R's) for carbon monoxide and oxygen prior to October 31, 1991 provided a CEM & R equipment protocol is approved by 6/15/90.

e. Quarterly excess emission reports on the CEMS data must be submitted in the attached form to the Regional Enforcement Office after June 15, 1993, or October 31, 1991 if condition 4(d) is applicable.

5. **Pollution Prevention By Use Of Good Operating Practices for Air Pollution Control** (GOPAPC)

a. Adjust burner systems at least annually to insure optimum fuel atomization and fuel/air mixing. The fuel system should have a maximum fuel rate setting and restriction to prevent fuel rate in excess of that required for the maximum air flow rate for the dryer. Combustion air, including atomizing, primary and secondary air should be adjusted to provide proper fuel atomization and good mixing for maximum combustion efficiency over the operating range of the fuel firing rate.

b. Examine the flights in the dryer at least annually to determine whether flame quenching by the aggregate is occurring. If so, replace or modify with appropriate flights for the combustion zone.

c. Review the existing procedure of loading the dryer from the aggregate and sand piles:

(1) Provide cover to prevent high water content due to rain: or

(2) Remove sand and aggregate from piles at a sufficient height above the base to avoid charging wet mix to the dryer.

d. For drum mix asphalt plants:

(1) Adjust the location of the asphalt injection to ensure that the asphalt is not being injected near the flame zone or otherwise subjected to high temperatures. High temperatures, in this regard, can be defined as greater than the minimum flash point of the asphalt, which is 450°F for Grade-AC-20.

(2) Adjust the flight design and arrangement for the purpose of providing a full aggregate curtain in the dryer, after the combustion zone but prior to the asphalt injection point. This will serve to increase the heat exchange from the hot gases to the aggregate and thus reduce the temperature of the gases around the area of the asphalt injection.

e. If necessary to meet the emission limits in the above condition, by June 15, 1991, replace the burner system to provide:

(1) Better atomization of the fuel over the entire fuel firing rate range;

(2) Better mixing of air and fuel for improved combustion efficiency;

(3) Automatic combustion air control based on the fuel firing rate; and

(4) Reduction of excess air to the optimum level to minimize emissions.

f. Consider further alterations of the flight arrangement to reduce the dryer exit temperature by increasing heat transfer to the aggregate.

g. Consider recirculation of exit dryer gases and energy recovery to preheat the combustion air and aggregate prior to the dryer feed.

h. Continue to evaluate and implement reasonable good operating practices to minimize CO and THC emissions, with a goal of 250 ppmvd and 125 ppmvd, respectively, at 7% O_2.

6. Reporting

a. To evaluate the progress made by each asphalt plant in implementing the above listed measures and any other measures taken to achieve the emission limits, the company must submit a quarterly report to the Chief Engineer, Air Quality Engineering, and the Regional Enforcement Officer. The report should include the following:

(1) Summary of THC and CO emission levels being achieved by the plant.

(2) Company progress in implementing Good Operating Practices over last quarter.

(3) Company plans to implement Good Operating Practices over the next quarter.

(4) Company progress toward meeting emission limits and other requirements of these operating conditions.

Each report shall be submitted within 30 days of the end of each quarter. The first quarter of each year begins January 1 of that year. The first report is due by January 31, 1991.

b. After July 1, 1994, the company may request that the Regional Enforcement Officer decrease the frequency of reporting, based upon the emission levels achieved and the operating history of the plant.

The Chief Engineer
Air Quality Engineering
CN 027
Trenton, New Jersey 08625

The Regional Enforcement Officer
1259 Route 46
Parsippany-Troy Hill, N.J. 07054

APPENDIX II

ORIGINAL DATA AND CALCULATION SHEETS

Tri County Plant 4

HYDROCARBON SAMPLING DATA

SAMPLE LOCATION Scrubber RUN NO. 1 DATE 12/12/91

TIME	ROTOMETER SETTING	GAS METER TEMPERATURE	VACCUM "HG	SAMPLE RATE L/M

PRE-LEAK CHECK _____ POST-LEAK CHECK _____

MOISTURE SAMPLING DATA

TIME	METER READING	INLET METER TEMPERATURE	OUTLET METER TEMPERATURE	SAMPLE RATE L/M	ΔH	VAC
0845	37.335	46	46	1.0		4.5
0850		60	50			
0855		68	52			
0900		74	52			
0905		76	56			
0910		79	60			
0915		80	61			
0920		81	63			
0925		82	65			
0930		83	67			
0935		84	68			
0940		85	68			
0945	121.166					

PRE-LEAK CHECK 0.005 @ 7" POST-LEAK CHECK 0.005 @ 5"

RAC BOX NO 1 DELTA H @ 1.74 DELTA H SETTING 1.0

PUMP CALIBRATION FLOW RATE	CALIBRATION INSTRUMENT	FYRITE
FLOW RATE LITERS/MIN ROTAMETER SETTING	____ SOAP FILM BURET ____ DRY GAS METER ____ OTHER _____	% OXYGEN % CARBON DIOXIDE

Tri County Plant 4

MOISTURE DETERMINATION

SAMPLE LOCATION Scrubber RUN NO. 1 DATE 12/12/91

		GRAMS		GRAMS
IMPINGER 1	FINAL WEIGHT	639.7	IMPINGER 1	119.5
	INITIAL WEIGHT	520.2		
	INCREASE			
IMPINGER 2	FINAL WEIGHT	644.2	IMPINGER 2	0.2
	INITIAL WEIGHT	644.0		
	INCREASE			
IMPINGER 3	FINAL WEIGHT	493.3	IMPINGER 3	0.0
	INITIAL WEIGHT	493.3		
	INCREASE			
SILICA GEL	FINAL WEIGHT	647.2	SILICA GEL	9.3
	INITIAL WEIGHT	637.9		
	INCREASE			

TOTAL MASS OF WATER CAUGHT 129.0 GRAMS

CALCULATIONS

VELOCITY (ACTUAL) IN STACK $= 85.48\ (C_p) \sqrt{\frac{T_s + 460}{P_s\ (MW)}} \sqrt{\text{DELTA P}} = 85.48\ (\quad)\ \sqrt{\frac{(\quad)}{(\quad)(\quad)}}\ \sqrt{\text{DELTA P}}$

$V_s = (\quad)\ \sqrt{\quad}\ \sqrt{\text{DELTA P}} = (\quad)(\quad)\ \sqrt{\text{DELTA P}}$

$V_s = (\quad)\ \sqrt{\text{DELTA P}} = (\quad)(\quad) =$ _____ FT/SEC

ACFM = (V_s) (60)(CSA) = ( ) (60) ( ) = _____

VELOCITY @ Stp V_s - std = $V_s\ (17.65) \left(\frac{P_s}{T_s + 460}\right) = \frac{(\quad)(17.65)(\quad)}{(\quad)} =$ _____ FT/SEC

SCFM = (V_s - std) (CSA) (60) = ( ) ( ) (60) = _____

DSCFM $= \left(\frac{100 - \%H_2O}{100}\right)$ (SCFM) = ( ) ( ) = _____

CORRECTING ROTOMETERE VOLUME TO DRY STANDARD CONDITIONS

EQUATION: $V_{STD} = V_m \times \frac{P_m}{T_m} \times \frac{T_{STD}}{P_{STD}}$

WHERE:

V_M = SAMPLE RATE OF ROTOMETER

T_{STD} = 70°F = 460°F = 530°F

P_{STD} = 29.92"HG

P_M = BAROMETRIC PRESSURE DURING SAMPLING ("HG)

Tm = TEMPERATURE OF GAS STREAM (+460°F)

V_{STD} = $\times \frac{(\quad)}{(\quad)} \times \frac{(530)}{(29.92)} =$ _____

CF = V_{STD} L/MIN) (3.53 X 10^{-2} CF/L) (60 MIN/1 HR) = ( ) (3.53 X 10^{-2}) (60)

= CFM

HC.91

AirRECON
RARITAN, NJ

==== Stack Flowrate Calculator === AirRECON, Raritan, NJ. ====

"TOMFLOW3"

COMPANY NAME: TRI-COUNTY ASPHALT CO. RUN No: 1
SAMPLE LOCATION: ROCKAWAY, NJ DATE: DEC. 12, 1991
UNIT: SCRUBBER OUTLET; PLANT 4 TIME: 08:45-09:45

FIELD DATA SHEET

POINT	PRE-TEST TRAVERSE STATIC "H2O ==> 0.0 DELTA P	TEMP	SQRT(P)	METER TEMPS IN	OUT	POST-TEST TRAVERSE STATIC "H2O ==> 0.0 DELTA P	TEMP	SQRT(P)
1	0.0		0.00	46	46	0.0		0.00
2			0.00	60	50			0.00
3			0.00	68	52			0.00
4			0.00	74	52			0.00
5			0.00	76	56			0.00
6			0.00	79	60			0.00
7			0.00	80	61			0.00
8			0.00	81	63			0.00
9			0.00	82	65			0.00
10			0.00	83	67			0.00
11			0.00	84	68			0.00
12			0.00	85	68			0.00
13			0.00					0.00
14			0.00					0.00
15			0.00					0.00
16			0.00					0.00
17			0.00					0.00
18			0.00					0.00
19			0.00					0.00
20			0.00					0.00
21			0.00					0.00
22			0.00					0.00
23			0.00					0.00
24			0.00					0.00
25			0.00					0.00
AVG.	0.0	ERR	0.00		67	0.000	ERR	0.00

INPUT DATA		OUTPUT DATA	
BARO.PRES.("HG)	30.09	METER VOL.(STD-FT3)	33.27
METER VOL.(FT3)	33.831	WATER VAPOR (FT3)	6.085
IMP.CATCH (GRAMS)	129.0	PERCENT MOISTURE	15.46
METER CORRECTION F	0.97	MOL.WT (DRY-#/#MOLE)	29.05
DELTA H ("H2O)	1.00	MOL.WT(WET #/#MOLE)	27.35
PITOT TUBE F		AVG. STACK PRES("HG)	30.09
STACK AREA(FT2)		STACK VELOCITIES:	
PERCENT OXYGEN	15.44	PRE-TEST (FT/SEC)	
PERCENT CO2	2.73	POST-TEST (FT/SEC)	
PERCENT CO	0.00	AVERAGE (FT/SEC)	
PERCENT NITROGEN	81.83	AVG. STD.(FT/SEC)	
		STACK FLOWRATE:	
		AVG. ACTUAL (ACFM)	
		STD. AVERAGE (SCFM)	
		DRY STD. AVG. (DSCFM)	

Tri County Plant 4

HYDROCARBON SAMPLING DATA

SAMPLE LOCATION Scrubber RUN NO. 2 DATE 12/12/91

TIME	ROTOMETER SETTING	GAS METER TEMPERATURE	VACCUM "HG	SAMPLE RATE L/M
1015	60		1	≈ 1.0
1020				
1025				
1030				
1035				
1040				
1045				
1050				
1055				
1100				
1105				
1110				
1115				

PRE-LEAK CHECK OK POST-LEAK CHECK

MOISTURE SAMPLING DATA

TIME	METER READING	INLET METER TEMPERATURE	OUTLET METER TEMPERATURE	SAMPLE RATE L/M	ΔH
1015	125.024	69	67	1.0	VAC 4.5
1020		79	71		
1025		84	73		
1030		86	72		
1035		87	73		
1040		87	73		
1045		87	73		
1050		86	74		
1055		85	74		
1100		83	73		
1105		80	71		
1110		77	70		
1115	163.000				

PRE-LEAK CHECK 0.000 @ 7" POST-LEAK CHECK 0.000 @ 6"

RAC BOX NO 1 DELTA H @ .74 DELTA H SETTING 1.0

PUMP CALIBRATION FLOW RATE	CALIBRATION INSTRUMENT	FYRITE
FLOW RATE LITERS/MIN ROTAMETER SETTING	____ SOAP FILM BURET ____ DRY GAS METER ____ OTHER ____	% OXYGEN % CARBON DIOXIDE

Tri County Plant 4

MOISTURE DETERMINATION

SAMPLE LOCATION Scrubber RUN NO. 2 DATE 12/12/91

		GRAMS		GRAMS
IMPINGER 1	FINAL WEIGHT	636.7	IMPINGER 1	139.8
	INITIAL WEIGHT	496.9		
	INCREASE			
IMPINGER 2	FINAL WEIGHT	601.9	IMPINGER 2	31.0
	INITIAL WEIGHT	570.9		
	INCREASE			
IMPINGER 3	FINAL WEIGHT	457.3	IMPINGER 3	0.7
	INITIAL WEIGHT	456.6		
	INCREASE			
SILICA GEL	FINAL WEIGHT	773.3	SILICA GEL	5.2
	INITIAL WEIGHT	768.1		
	INCREASE			

TOTAL MASS OF WATER CAUGHT 176.7 GRAMS

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CALCULATIONS

VELOCITY (ACTUAL) IN STACK $= 85.48\ (C_p) \sqrt{\frac{T_s + 460}{P_s\ (MW)}} \sqrt{\text{DELTA P}} = 85.48\ (\quad)\ \sqrt{\frac{(\quad)}{(\quad)(\quad)}}\ \sqrt{\text{DELTA P}}$

$V_s = (\quad) \sqrt{\quad}\ \sqrt{\text{DELTA P}} = (\quad)(\quad)\ \sqrt{\text{DELTA P}}$

$V_s = (\quad)\ \sqrt{\text{DELTA P}} = (\quad)(\quad) =$ _____ FT/SEC

ACFM = (V_s) (60)(CSA) = ( ) (60) ( ) = _____

VELOCITY @ Stp V_s - std = $V_s\ (17.65) \left(\frac{P_s}{T_s + 460}\right) = \frac{(\quad)(17.65)(\quad)}{(\quad)(\quad)} =$ _____ FT/SEC

SCFM = (V_s - std) (CSA) (60) = ( ) ( ) (60) = _____

DSCFM $= \left(\frac{100 - \%H_2O}{100}\right)$ (SCFM) = ( ) ( ) = _____

CORRECTING ROTOMETERE VOLUME TO DRY STANDARD CONDITIONS

EQUATION: $V_{STD} = V_m \times \frac{P_m}{T_m} \times \frac{T_{STD}}{P_{STD}}$

WHERE:

V_M	=	SAMPLE RATE OF ROTOMETER
T_{STD}	=	70°F = 460°F = 530°F
P_{STD}	=	29.92"HG
P_M	=	BAROMETRIC PRESSURE DURING SAMPLING ("HG)
Tm	=	TEMPERATURE OF GAS STREAM (+460°F)
V_{STD}	=	$\times \frac{(\quad)}{(\quad)} \times \frac{(530)}{(29.92)} =$ _____
CF	=	V_{STD} L/MIN) (3.53 X 10^{-2} CF/L) (60 MIN/1 HR) = ( ) (3.53 X 10^{-2}) (60)
	=	CFH

==== Stack Flowrate Calculator === AirRECON, Raritan, NJ. ====

"TOMFLOW3"

COMPANY NAME: TRI-COUNTY ASPHALT CO. RUN No: 2

SAMPLE LOCATION: ROCKAWAY, NJ DATE: DEC. 12, 1991

UNIT: SCRUBBER OUTLET; PLANT 4 TIME: 10:15-11:15

FIELD DATA SHEET

POINT	PRE-TEST TRAVERSE STATIC "H2O ==> 0.0 DELTA P	TEMP	SQRT(P)	METER TEMPS IN	OUT	POST-TEST TRAVERSE STATIC "H2O ==> 0.0 DELTA P	TEMP	SQRT(P)
1	0.0		0.00	69	67	0.0		0.00
2			0.00	79	71			0.00
3			0.00	89	72			0.00
4			0.00	88	72			0.00
5			0.00	87	73			0.00
6			0.00	87	73			0.00
7			0.00	87	73			0.00
8			0.00	86	74			0.00
9			0.00	85	74			0.00
10			0.00	83	73			0.00
11			0.00	80	71			0.00
12			0.00	77	70			0.00
13			0.00					0.00
14			0.00					0.00
15			0.00					0.00
16			0.00					0.00
17			0.00					0.00
18			0.00					0.00
19			0.00					0.00
20			0.00					0.00
21			0.00					0.00
22			0.00					0.00
23			0.00					0.00
24			0.00					0.00
25			0.00					0.00
AVG.	0.0	ERR	0.00		78	0.000	ERR	0.00

INPUT DATA

BARO.PRES.("HG)	30.08
METER VOL.(FT3)	37.976
IMP.CATCH (GRAMS)	176.7
METER CORRECTION F	0.97
DELTA H ("H2O)	1.00
PITOT TUBE F	
STACK AREA(FT2)	
PERCENT OXYGEN	14.77
PERCENT CO2	3.40
PERCENT CO	0.00
PERCENT NITROGEN	81.83

OUTPUT DATA

METER VOL.(STD-FT3)	36.60
WATER VAPOR (FT3)	8.335
PERCENT MOISTURE	18.55
MOL.WT (DRY-#/#MOLE)	29.13
MOL.WT(WET #/#MOLE)	27.07
AVG. STACK PRES("HG)	30.08
STACK VELOCITIES:	
PRE-TEST (FT/SEC)	
POST-TEST (FT/SEC)	
AVERAGE (FT/SEC)	
AVG. STD.(FT/SEC)	
STACK FLOWRATE:	
AVG. ACTUAL (ACFM)	
STD. AVERAGE (SCFM)	
DRY STD. AVG. (DSCFM)	

Tri County Plant 4

HYDROCARBON SAMPLING DATA

SAMPLE LOCATION Scrubber RUN NO. 3 DATE 12/12/91

TIME	ROTOMETER SETTING	GAS METER TEMPERATURE	VACCUM "HG	SAMPLE RATE L/M
1140	60		1	≅ 1.0
1145				
1150				
1155				
1200				
1205				
1210				
1215				
1220				
1225				
1230				
1235				
1240				

PRE-LEAK CHECK _____ POST-LEAK CHECK _____

MOISTURE SAMPLING DATA

ΔH

UAC/S

TIME	METER READING	INLET METER TEMPERATURE	OUTLET METER TEMPERATURE	SAMPLE RATE L/M
1140	163.680	68	68	1.0
1145		73	68	
1150		75	68	
1155		77	68	
1200		79	68	
1205		79	68	
1210		80	68	
1215		80	67	
1220		81	67	
1225		81	68	
1230		80	68	
1235		80	70	
1240	200.240			

PRE-LEAK CHECK 0.000 @ 6" POST-LEAK CHECK _____

RAC BOX NO 1 DELTA H @ 1.7Y DELTA H SETTING _____

PUMP CALIBRATION FLOW RATE	CALIBRATION INSTRUMENT	FYRITE
FLOW RATE LITERS/MIN ROTAMETER SETTING	____ SOAP FILM BURET ____ DRY GAS METER ____ OTHER _____	% OXYGEN % CARBON DIOXIDE

Tri County Plant 4

MOISTURE DETERMINATION

SAMPLE LOCATION Scrubber RUN NO. 3 DATE 12/12/91

		GRAMS		GRAMS
IMPINGER 1	FINAL WEIGHT	607.2	IMPINGER 1	128.0
	INITIAL WEIGHT	479.2		
	INCREASE			
IMPINGER 2	FINAL WEIGHT	646.0	IMPINGER 2	1.8
	INITIAL WEIGHT	644.2		
	INCREASE			
IMPINGER 3	FINAL WEIGHT	494.4	IMPINGER 3	1.1
	INITIAL WEIGHT	493.3		
	INCREASE			
SILICA GEL	FINAL WEIGHT	655.2	SILICA GEL	8.0
	INITIAL WEIGHT	647.2		
	INCREASE			

TOTAL MASS OF WATER CAUGHT 138.9 GRAMS

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CALCULATIONS

VELOCITY (ACTUAL) IN STACK $= 85.48\ (C_p) \sqrt{\frac{T_s + 460}{P_s\ (MW)}} \sqrt{\text{DELTA P}} = 85.48\ (\quad)\ \sqrt{\frac{(\quad)}{(\quad)(\quad)}}\ \sqrt{\text{DELTA P}}$

$V_s = (\quad)\ \sqrt{\quad}\ \sqrt{\text{DELTA P}} = (\quad)(\quad)\ \sqrt{\text{DELTA P}}$

$V_s = (\quad)\ \sqrt{\text{DELTA P}} = (\quad)(\quad) =$ _____ FT/SEC

$ACFM = (V_s)\ (60)(CSA) = (\quad)\ (60)\ (\quad) =$ _____

VELOCITY @ Stp $V_s - std = V_s\ (17.65)\left(\frac{P_s}{T_s + 460}\right) = \frac{(\quad)\ (17.65)\ (\quad)}{(\quad)} =$ _____ FT/SEC

$SCFM = (V_s - std)\ (CSA)\ (60) = (\quad)\ (\quad)\ (60) =$ _____

$DSCFM = \left(\frac{100 - \%H_2O}{100}\right)(SCFM) = (\quad)\ (\quad) =$ _____

CORRECTING ROTOMETERE VOLUME TO DRY STANDARD CONDITIONS

EQUATION: $V_{STD} = V_m \times \frac{P_m}{T_m} \times \frac{T_{STD}}{P_{STD}}$

WHERE:

V_M = SAMPLE RATE OF ROTOMETER

T_{STD} = $70^oF = 460^oF = 530^oF$

P_{STD} = 29.92"HG

P_M = BAROMETRIC PRESSURE DURING SAMPLING ("HG)

T_M = TEMPERATURE OF GAS STREAM ($+460^oF$)

V_{STD} = $\times \frac{(\quad)}{(\quad)} \times \frac{(530)}{(29.92)} =$ _____

CF = V_{STD} L/MIN) $(3.53 \times 10^{-2}$ CF/L) (60 MIN/1 HR) = ( ) (3.53×10^{-2}) (60)

= CFH

==== Stack Flowrate Calculator === AirRECON, Raritan, NJ. ====

"TOMFLOW3"

COMPANY NAME: TRI-COUNTY ASPHALT CO. RUN No: 3
SAMPLE LOCATION: ROCKAWAY, NJ DATE: DEC. 12, 1991
UNIT: SCRUBBER OUTLET; PLANT 4 TIME: 11:40-12:40

FIELD DATA SHEET

POINT	PRE-TEST TRAVERSE STATIC "H2O ==> 0.0 DELTA P	TEMP	SQRT(P)	METER TEMPS IN	OUT	POST-TEST TRAVERSE STATIC "H2O ==> 0.0 DELTA P	TEMP	SQRT(P)
1	0.0		0.00	68	68	0.0		0.00
2			0.00	73	68			0.00
3			0.00	75	68			0.00
4			0.00	77	68			0.00
5			0.00	79	68			0.00
6			0.00	79	68			0.00
7			0.00	80	68			0.00
8			0.00	80	67			0.00
9			0.00	81	67			0.00
10			0.00	81	68			0.00
11			0.00	80	68			0.00
12			0.00	81	70			0.00
13			0.00					0.00
14			0.00					0.00
15			0.00					0.00
16			0.00					0.00
17			0.00					0.00
18			0.00					0.00
19			0.00					0.00
20			0.00					0.00
21			0.00					0.00
22			0.00					0.00
23			0.00					0.00
24			0.00					0.00
25			0.00					0.00
AVG.	0.0	ERR	0.00		73	0.000	ERR	0.00

INPUT DATA		OUTPUT DATA	
BARO.PRES.("HG)	30.06	METER VOL.(STD-FT3)	35.51
METER VOL.(FT3)	36.560	WATER VAPOR (FT3)	6.552
IMP.CATCH (GRAMS)	138.9	PERCENT MOISTURE	15.58
METER CORRECTION F	0.97	MOL.WT (DRY-#/#MOLE)	29.13
DELTA H ("H2O)	1.00	MOL.WT(WET #/#MOLE)	27.39
PITOT TUBE F		AVG. STACK PRES("HG)	30.06
STACK AREA(FT2)		STACK VELOCITIES:	
PERCENT OXYGEN	15.88	PRE-TEST (FT/SEC)	
PERCENT CO2	3.07	POST-TEST (FT/SEC)	
PERCENT CO	0.00	AVERAGE (FT/SEC)	
PERCENT NITROGEN	81.05	AVG. STD.(FT/SEC)	
		STACK FLOWRATE:	
		AVG. ACTUAL (ACFM)	
		STD. AVERAGE (SCFM)	
		DRY STD. AVG. (DSCFM)	

APPENDIX IV

REAL TIME DATA SHEETS

TRI-COUNTY ASPHALT, INC.
ROCKAWAY, NJ PLANT COMPLIANCE TESTS
SCRUBBER OUTLET STACK; PLANT NO. 4
DECEMBER 12, 1991
08:45-09:45
RUN # 1

NOx PPMV,DRY	O2 VOL %,DRY	THC AS C3H8 PPMV,WET	CO PPMV,DRY	CO2 VOL %,DRY
27.0	15.9	7.0	11.4	2.5
27.0	15.9	6.0	9.8	2.5
26.2	15.9	11.7	13.0	2.5
26.3	15.9	11.4	11.8	2.5
26.4	15.9	14.3	13.0	2.5
26.8	15.8	10.9	18.7	2.7
30.6	14.9	16.3	21.9	2.3
28.6	15.6	12.4	23.2	2.6
25.9	15.8	15.3	19.8	2.7
32.2	15.6	10.0	25.5	3.0
29.1	16.0	7.7	21.0	2.5
27.9	14.7	5.5	21.9	2.8
33.0	15.5	5.6	20.1	2.9
28.8	16.4	17.9	21.1	2.4
25.1	15.3	12.4	26.4	2.5
29.1	15.6	7.3	35.8	2.8
27.2	16.4	18.0	22.1	2.3
27.2	15.0	11.6	28.7	2.7
33.0	15.3	14.8	32.9	2.6
31.0	16.3	14.4	231.5	2.4
26.8	15.5	11.6	21.9	2.8
31.2	15.5	13.8	80.0	2.4
28.9	16.0	7.4	17.1	2.4
27.9	16.0	16.7	821.5	2.5
27.4	15.9	8.0	231.6	2.5
27.9	15.9	16.0	13.9	2.5
27.7	15.9	8.9	11.0	2.5
27.0	15.9	13.7	627.9	2.5
27.1	15.9	10.4	11.6	2.5
27.3	19.5	7.2	10.9	2.5
27.0	15.9	7.6	11.8	2.5
26.6	16.0	16.1	81.3	2.5
27.1	15.8	8.5	42.8	2.5
26.8	15.5	16.1	15.0	2.5
27.3	15.4	7.0	15.0	2.6
28.2	15.5	14.2	21.9	2.7
29.0	15.5	7.8	70.6	2.7
28.9	15.3	14.3	21.9	2.7
28.8	15.2	8.5	18.1	2.7
29.3	15.3	13.2	231.6	2.8
29.7	15.4	9.8	21.1	2.8
30.0	15.2	14.0	19.9	2.8
29.8	15.2	12.4	730.3	2.8
29.7	15.3	11.9	546.9	2.8

30.1	15.3	11.4	55.9	2.7
30.3	15.2	12.8	19.8	2.8
30.2	15.2	9.6	19.8	2.8
30.0	15.3	13.8	144.9	2.8
30.0	15.2	8.2	21.8	2.8
30.3	15.2	15.0	20.9	2.8
29.9	15.3	8.9	19.8	2.8
29.5	15.3	16.3	20.9	2.8
29.5	15.3	9.5	21.1	2.8
29.2	15.3	15.2	17.7	2.8
29.1	15.2	7.3	23.0	2.8
29.1	15.2	15.9	23.9	2.8
28.9	15.2	7.3	24.9	2.8
28.8	15.2	15.8	24.9	2.8
29.0	15.2	7.5	23.0	2.8
29.1	15.0	14.4	22.8	2.8
29.6	14.9	6.6	26.8	2.8
30.5	15.0	16.3	25.8	2.9
30.0	15.0	6.9	223.2	3.0
30.0	14.8	14.9	5.5	2.9
31.1	15.1	9.1	0.1	2.9
29.6	14.9	16.4	0.1	3.0
31.2	14.8	7.6	0.1	2.9
30.6	15.1	17.3	0.1	2.9
30.0	15.0	6.7	0.1	3.0
31.0	15.0	14.7	0.4	2.9
29.6	15.3	6.4	0.1	2.9
29.9	15.1	13.4	0.1	2.9
30.9	15.1	11.3	33.4	2.8
29.9	15.4	13.9	0.1	2.8
29.6	15.4	8.6	0.2	2.8
29.2	16.0	13.5	0.1	2.8
28.8	15.0	9.2	11.8	2.6
30.2	15.0	9.6	166.3	2.8
30.4	14.9	9.9	61.7	2.9
30.6	14.9	4.8	423.9	2.9
30.3	15.4	17.4	13.3	3.0
28.4	15.5	6.3	13.0	3.0
27.3	15.6	18.9	13.0	2.6
27.4	15.1	6.6	13.4	2.7
29.3	14.4	14.0	17.3	2.7
32.1	14.1	5.7	152.4	2.9
33.6	14.5	14.4	83.3	3.1
32.5	14.6	8.1	265.7	3.3
30.8	15.8	13.8	13.0	3.2
26.5	16.0	7.5	13.0	3.1
25.4	16.1	8.7	13.2	2.7
25.3	15.9	12.1	12.9	2.5
25.7	16.0	9.8	12.9	2.4
25.0	16.1	13.0	12.9	2.5
24.8	16.1	8.1	12.9	2.5
24.6	16.1	13.1	12.9	2.4
24.8	15.7	8.2	12.9	2.4
26.9	15.6	14.9	12.9	2.4
27.4	15.6	8.1	20.2	2.6
27.5	15.6	16.4	13.0	2.6

27.0	15.8	7.7	18.0	2.7
26.6	15.8	16.0	0.5	2.7
26.3	15.8	7.4	136.1	2.6
26.1	15.8	16.3	0.1	2.6
26.0	15.7	8.7	4.2	2.6
26.0	15.7	16.8	0.1	2.6
25.8	15.8	8.0	0.0	2.6
26.0	15.7	17.2	0.0	2.6
25.9	15.4	7.2	55.2	2.6
30.9	14.5	15.6	231.5	2.6
29.8	15.2	6.6	19.8	3.1
31.4	14.3	14.2	19.7	2.9
31.3	15.0	9.7	20.1	3.0
29.5	14.9	15.3	18.2	3.0
31.7	15.0	7.3	19.8	2.9
29.9	15.2	4.5	19.7	3.0
29.8	15.0	8.0	19.8	2.9
30.5	15.0	9.5	19.7	2.9
20.6	14.9	11.2	19.8	2.9

AVG. =	28.64 PPMV,DRY	15.44 VOL% DRY	11.29 PPMV,WET	60.23 PPMV,DRY	2.73 VOL% DRY
	NOx	O2	THC	CO	CO2

TRI-COUNTY ASPHALT, INC.
ROCKAWAY, NJ PLANT COMPLIANCE TESTS
SCRUBBER OUTLET STACK; PLANT NO. 4
DECEMBER 12, 1991
RUN # 2

DATE / TIME	NOx PPMV,DRY	O2 VOL %,DRY	THC AS C3H8 PPMV,WET	CO PPMV,DRY	CO2 VOL %,DRY
12/Dec/91 10:16: 6	26.6	15.4	6.7	15.9	3.1
12/Dec/91 10:17: 6	29.6	15.2	5.9	16.9	3.1
12/Dec/91 10:18: 6	31.8	14.5	9.2	22.9	3.3
12/Dec/91 10:19: 5	26.3	15.9	8.9	20.9	2.3
12/Dec/91 10:20: 6	27.1	15.6	5.6	24.8	3.0
12/Dec/91 10:21: 6	26.3	15.8	4.4	16.9	2.9
12/Dec/91 10:22: 5	27.5	15.7	5.6	18.8	3.1
12/Dec/91 10:23: 5	29.4	15.1	6.9	21.8	3.2
12/Dec/91 10:24: 6	29.3	15.1	8.5	22.9	3.2
12/Dec/91 10:25: 4	29.8	15.1	9.2	21.8	3.2
12/Dec/91 10:26: 5	30.2	15.1	13.0	19.7	3.2
12/Dec/91 10:27: 5	30.7	15.0	16.4	22.9	3.4
12/Dec/91 10:28: 5	30.8	14.8	16.0	21.8	3.3
12/Dec/91 10:29: 5	30.0	14.9	16.5	32.8	3.3
12/Dec/91 10:30: 5	31.8	14.9	15.2	32.8	3.4
12/Dec/91 10:31: 5	31.7	14.7	17.0	27.7	3.4
12/Dec/91 10:32: 5	32.5	15.0	15.8	30.9	3.5
12/Dec/91 10:33: 5	32.9	14.2	15.2	33.7	3.5
12/Dec/91 10:34: 4	32.3	14.7	17.2	31.7	3.5
12/Dec/91 10:35: 5	33.3	14.4	15.6	33.7	3.6
12/Dec/91 10:36: 5	33.5	14.6	14.4	38.5	3.6
12/Dec/91 10:37: 5	31.9	14.4	16.1	33.7	3.4
12/Dec/91 10:38: 5	32.3	14.5	15.8	32.8	3.4
12/Dec/91 10:39: 5	31.3	14.6	17.0	31.7	3.3
12/Dec/91 10:40: 5	31.7	14.9	17.6	28.9	3.4
12/Dec/91 10:41: 5	32.0	14.8	16.5	34.8	3.5
12/Dec/91 10:42: 5	31.8	14.8	15.7	32.8	3.4
12/Dec/91 10:43: 5	33.1	14.7	10.8	27.7	3.5
12/Dec/91 10:44: 5	33.9	14.6	6.1	37.8	3.5
12/Dec/91 10:45: 5	32.1	14.7	5.3	34.8	3.4
12/Dec/91 10:46: 4	33.4	14.4	6.3	36.9	3.5
12/Dec/91 10:47: 5	33.4	14.5	6.9	36.9	3.5
12/Dec/91 10:48: 5	32.6	14.6	8.5	36.9	3.5
12/Dec/91 10:49: 5	32.7	14.7	9.3	28.9	3.5
12/Dec/91 10:50: 5	33.6	14.7	9.5	41.8	3.6
12/Dec/91 10:51: 5	32.6	14.4	16.1	35.7	3.5
12/Dec/91 10:52: 5	33.7	14.6	14.8	32.8	3.6
12/Dec/91 10:53: 5	33.2	14.4	17.1	45.8	3.7
12/Dec/91 10:54: 5	33.7	14.2	18.2	26.8	3.6
12/Dec/91 10:55: 5	35.5	14.4	13.9	41.8	3.5
12/Dec/91 10:56: 4	34.2	13.9	8.2	36.9	3.6
12/Dec/91 10:57: 5	33.8	14.4	4.1	34.8	3.6
12/Dec/91 10:58: 5	33.7	14.4	4.5	37.8	3.6
12/Dec/91 10:59: 5	33.7	14.5	6.5	23.8	3.5

APPENDIX V

EMISSIONS CALCULATION TABLE

Company: TRI-COUNTY ASPHALT COMPANY
Unit: SCRUBBER OUTLET STACK; PLANT 4
Site: ROCKAWAY, NJ
Date: DECEMBER 12, 1991

	General Parameters			Nitrogen Oxides as (NO2) MW= 46.01 LB/LB-MOLE			Total Hydrocarbons (THC) As Propane (C3H8); MW = 44.09		
RUN No.	Bws (%) (B)	Oxygen (%,Dry) (D)	CO2 (%, Dry)	PPMV (Wet) (E)	PPMV (Dry) (F)	PPMV@ 7 % O2 (Dry) (G)	PPMV (Wet) (E)	PPMV (Dry) (F)	PPMV@ 7 % O2 (Dry) (G)
1	15.46	15.44	2.73	24.21	28.64	72.9	11.29	13.35	34.0
2	18.55	14.77	3.40	25.85	31.74	72.0	11.45	14.06	31.9
3	15.56	15.88	3.07	23.98	28.40	76.6	8.26	9.78	27.1
Avg =	16.53	15.36	3.07	24.68	29.59	74.5	10.33	12.40	31.0

	Carbon Monoxide (CO) MW = 28.01 LB/LB-MOLE		
RUN No.	PPMV (Wet) (E)	PPMV (Dry) (F)	PPMV@ 7 % O2 (Dry) (G)
1	50.92	60.23	153.3
2	26.15	32.14	72.9
3	14.16	15.77	46.4
Avg =	30.42	36.38	90.9

Equations:
(E)=(F)(100-(B)/100) OR (F)=(E)(100/(100-(B))
(G)=(F)(13.9/(20.9-(D))