

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.



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: Joseph DePierro, Regional Enforcement Officer
Central Regional Enforcement Office

FROM: Edward Choromanski, Chief 
Bureau of Technical Services

SUBJECT: Trap Rock Industries - Hopewell Township, New Jersey
Stack Emissions Test Program
APC Plant ID No. 60031
NJ Stack No. 006
P/CT No. 78727 (Log No. 90-3339)

Stack emission tests were conducted at the above referenced facility on December 18, 1991. The purpose of these tests was to quantify the emissions of carbon monoxide and total hydrocarbons (expressed as equivalent methane) being emitted to the atmosphere from the Batch Mix Asphalt Plant at this location. The test results are then compared to the allowable emission limits specified in the permit.

Richelle Burkeen reviewed the submitted stack emissions test report. Her review indicates that the carbon monoxide (CO) and total hydrocarbons (THC) emissions from the Batch Mix Asphalt Plant are within the limits specified in the permit, during all test runs.

In addition to the CO and THC tests, an emission test for nitrogen oxides (NO_x) was conducted. Using the average NO_x concentration data, (119 ppm_{dv}) and the volumetric flow rate specified in the permit (55,000 ACFM corrected to dry standard conditions) the NO_x emission rate would be approximately 33.2 lbs/hr. If you multiply this figure by 2,000 hours per year of plant operations, a total of 33.2 tons per year of NO_x would be emitted.

Based on the reported stack test results, the source complies with the allowable limits specified on the permit. No enforcement action should be made based on the NO_x emissions. NO_x emission limits is currently a topic of negotiation with the New Jersey Asphalt Plant Association (NJAPA).

c Milton Polakovic
Louis Mikolajczyk
Richelle Burkeen

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

March 6, 1992

MEMORANDUM

TO: Edward Choromanski

FROM: Richelle Burkeen *RSP*

SUBJECT: Trap Rock Industries
 Pennington, New Jersey
 APC Plant ID No. 60031
 NJ Stack No. 006
 P/CT No. 78727 (Log No. 01-90-3339)

On December 18, 1991, stack emission tests were conducted at the above referenced facility. The tests were conducted in accordance with an agreement the New Jersey Department of Environmental Protection and Energy (NJDEPE) has with the New Jersey Asphalt Pavement Association (NJAPA) to determine compliance with applicable permits.

The purpose of these tests was to determine total hydrocarbon, carbon monoxide, and nitrogen oxide emissions. The results of the tests are as follows.

EMISSIONS

| | Run 1 | Run 2 | Run 3 | Allowable |
|---|-------|-------|-------|-----------|
| Oxygen | | | | |
| % | 12.60 | 12.00 | 12.05 | |
| Total Hydrocarbons (as CH ₄) | | | | |
| ppmvd ⁴ | 39.4 | 33.5 | 33.7 | |
| ppmvd @ 7% O ₂ | 65.8 | 52.3 | 52.9 | 250 |
| Carbon Monoxide | | | | |
| ppmvd | 149 | 119 | 127 | |
| ppmvd @ 7% O ₂ | 249 | 186 | 199 | 500 |
| *Nitrogen Oxides | | | | |
| ppmvd | 119 | | | |
| ppmvd @ 7% O ₂ | 199 | | | |

* Emissions measured for run one only.



PRODUCTION DATA

| | Run 1 | Run 2 | Run 3 |
|--|-------|-------|-------|
| Production Rate (tph) | 281 | 267 | 275 |
| No. 2 Fuel Oil Use (gpm) | 7 | 7 | 7 |
| Blower Pressure (sq. in) | 26 | 25.6 | 25.6 |
| Asphalt Cement (%) | 5.6 | 5.6 | 5.6 |
| Mix Temperature (°F) | 326 | 323 | 322 |
| Exhaust Gas Temp. (°F) | 217 | 212 | 209 |
| Pressure Drop (in. of H₂O) | 2.4 | 2.0 | 2.0 |
| % MOISTURE | | | |
| Sand | 4.5 | 4.6 | 4.5 |
| Screenings | 2.8 | 2.8 | 2.7 |
| 3/8 inch | 4.8 | 4.7 | 4.9 |

The design capacity of the facility is 300 tph. Therefore, at the above production rates, the facility was operating at 89% -93% of maximum capacity.

Technical Services review of the raw data supplied indicates substantially the same results. The results indicate that carbon monoxide and total hydrocarbon emissions adhere to the NJDEPE standard allowable emissions limits for all runs.

RECEIVED
JAN 28 1992
N.J. DEP. - 100

Project No. 1496

Trap Rock Industries, Inc.
Emission Compliance Test Program
Pennington Facility

APC ID No. 60031
N.J. Stack No. 001

M. W. W. W. W.
Prepared By

Certified By:
Robert H. Cutler 1/16/92

Prepared for:

Mr. Gil Gerard
Trap Rock Industries, Inc.
P.O. Box 419
Kingston, New Jersey 08524

January 1992

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1.0 INTRODUCTION

The New Jersey Asphalt Pavement Association (NJAPA) has reached an agreement with the New Jersey Department of Environmental Protection and Energy (NJDEPE) Bureau of Technical Services (BTS) regarding the performance of emission compliance demonstrations at member facilities. It is required that the affected facilities conduct emission sampling in determination of total hydrocarbons (THC) carbon monoxide (CO) and nitrogen oxides (NOx) in demonstration of permit limitations for these parameters.

AirNova, Inc. conducted such an emission compliance program at the Trap Rock Industries, Inc. facility located in Pennington, New Jersey on December 18, 1991.

This report contains the complete results of the program.

2.0 FACILITY DESCRIPTION

The facility under evaluation produces asphaltic hot mix utilizing a batch process. The hot mix is a paving material consisting of a combination of graded aggregate that is dried, heated and evenly coated with hot asphalt cement. The aggregate is dried and heated in a rotary dryer which is fired by No. 2 fuel oil. After further classification, the aggregate is mixed with asphalt pumped from heated storage tanks prior to truck loading the final product. Particulate emissions from the dryer are controlled by a fabric filter baghouse operated at approximately 2.0 in WG pressure drop.

All emission determinations were conducted at the baghouse exhaust. Sampling was conducted in a vertical section of exhaust duct 36-inches in diameter. Two test ports located 1.6 duct diameters downstream and 1.7 duct diameters upstream from the nearest flow disturbance were utilized for all sampling.

3.0 TEST RESULTS

The results of the test program are presented on the following page in Table 3-1. The results indicate that the source has met the emission limitations specified by NJDEPE for all parameters. The average emission values as determined are as follows:

| <u>Parameter</u> | <u>Average Test Value</u> | <u>NJDEPE Emission Limit</u> |
|---|---------------------------|------------------------------|
| Total Hydrocarbons (ppmV @ 7% O ₂) | 57.0 | 250 |
| Carbon Monoxide (ppmV @ 7% O ₂) | 211 | 500 |
| Nitrogen Oxides (ppmV @ 7% O ₂) | 199* | 500 |

* Only one test run was conducted for nitrogen oxides

**Table 3-1
Test Results Summary**

**Trap Rock Industries
Pennington, New Jersey**

| Run No. | 1 | 2 | 3 |
|----------------------------------|-----------|-----------|-----------|
| Test Date | 12/18/91 | 12/18/91 | 12/18/91 |
| Test Period | 0910-1010 | 1030-1130 | 1145-1245 |
| Moisture Content (%) | 14.5 | ---- | ---- |
| Oxygen (%-Dry) | 12.60 | 12.00 | 12.05 |
| Total Hydrocarbons (ppmV-dry) | 39.4 | 33.5 | 33.7 |
| (ppmV-dry @ 7% O ₂) | 65.8 | 52.3 | 52.9 |
| Carbon Monoxide (ppmV-dry) | 149 | 119 | 127 |
| (ppmV-dry @ 7% O ₂) | 249 | 186 | 199 |
| Nitrogen Oxides (ppmV-dry) | 119 | ---- | ---- |
| (ppmV-dry @ 7% O ₂) | 199 | ---- | ---- |

Standard Conditions: 70°F, 29.92 in Hg.

4.0 SAMPLING AND ANALYTICAL METHODOLOGIES

The emission test program was conducted utilizing the methodologies specified below:

EPA Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

EPA Method 4 - Determination of Moisture Content in Stack Gases

NJ Air Test
Method 3.7 - Procedures for the Direct Measurement of Volatile Organics Substances Using a Flame Ionization Detector (FID), a Photoionization Detector (PID), or a Non-Dispersive Infrared Analyzer (NDIR)

EPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources

EPA Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources

Triplicate test runs were conducted in determination of total hydrocarbons and carbon monoxide concentrations with each being a minimum of 1 hour in duration. EPA Methods 4 and 7E were conducted during one (1) test run only for the purpose of determining the stack gas moisture content and nitrogen oxides concentration.

A complete description of each test methodology is presented below.

4.1 Carbon Dioxide and Oxygen

Carbon dioxide (CO₂) and oxygen (O₂) content were determined by EPA Method 3. The sampling train consisted of a stainless steel probe packed with a plug of glass wool for particulate filtration. The sampling probe was attached to an ice-cooled condenser used to remove excess moisture from the sample stream. The condenser was attached to a leak-free diaphragm pump with an in-line needle valve to adjust the sample flow rate. The sample stream was drawn

through a rotameter to measure the sampling flow rate within ±5 percent of the selected flow rate for the test. The sample stream passed through the rotameter into a leak-free Tedlar bag. Analysis was conducted in accordance with EPA Method 3 (ORSAT analysis).

4.2 Moisture Content

Moisture content was determined in accordance with EPA Reference Method 4. Sampling was conducted utilizing large capacity impingers while collecting a minimum sample volume of 30 DSCF. One (1) test run for moisture content was conducted concurrent with the emission determinations during test run No. 1.

4.3 Total Hydrocarbons

Total hydrocarbons were measured continuously using a heated total hydrocarbon analyzer. Sample gas was transported from the test location through a heated glass fiber filter and heated Teflon sample line and directed to the instrument. This instrument uses a Flame Ionization Detector (FID) and a heated sample oven maintained at 320°F to prevent the condensation of high molecular weight hydrocarbons. The detector is fueled with a hydrogen/helium mixture and uses blended air as the oxidant. The instrument was calibrated with NBS traceable mixtures of methane in air of approximately 25%, 50% and 90% of instrument span and zeroed with hydrocarbon free air (<0.1 ppm C) both before and after each test run. System bias checks were conducted before and after each test run utilizing the midpoint calibration standard.

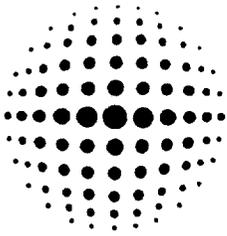
4.4 Carbon Monoxide

Exhaust gas concentrations of carbon monoxide were determined by utilizing EPA Reference Method 10. This method allowed for the continuous instrumental analysis of source gas concentrations by employing a gas filter

correlation analyzer. Exhaust gas sample was extracted from the emission source through a heated (320°F) Teflon sample line and filter and passed through a chilled condenser for moisture removal prior to being introduced to the instrument for immediate analysis. Instrument calibrations occurred by introducing zero and NBS traceable upscale span gases of approximately 25%, 50% and 90% to the instrument span both before and after each sample period. System bias checks were conducted before and after each test run utilizing the midpoint calibration standard. The instrument was operated in the 0-1000 ppmV range. Source concentrations were permanently recorded by a strip chart recorder. A leak check was performed from the sample probe prior to the start of testing to ensure the integrity of all system components. (See Figure 3-1).

4.5 Oxides of Nitrogen

A chemiluminescence analyzer with a thermal converter was employed for the analysis of nitric oxide (NO) and total oxides of nitrogen (NOx) in accordance with of EPA Reference Method 7E. Exhaust samples were transported to the analyzer through a heated filter and heated (320°F) Teflon sample line. A thermal converter is used to convert nitrogen dioxide (NO₂) to nitric oxide (NO) so that total oxides of nitrogen (NOx) could be measured. The converter can be switched in and out of the system using solenoid valves permitting selective operation in the NO or NOx mode. The instrument was calibrated using three NBS traceable NO in nitrogen standards of approximately 25%, 50% and 90% of instrument span and zeroed with zero grade nitrogen. Source concentrations were permanently recorded by a strip chart recorder. One 1-hour test run was performed in determination of outlet concentrations of nitrogen oxides. (See Figure 3-1).



AirNova, Inc.

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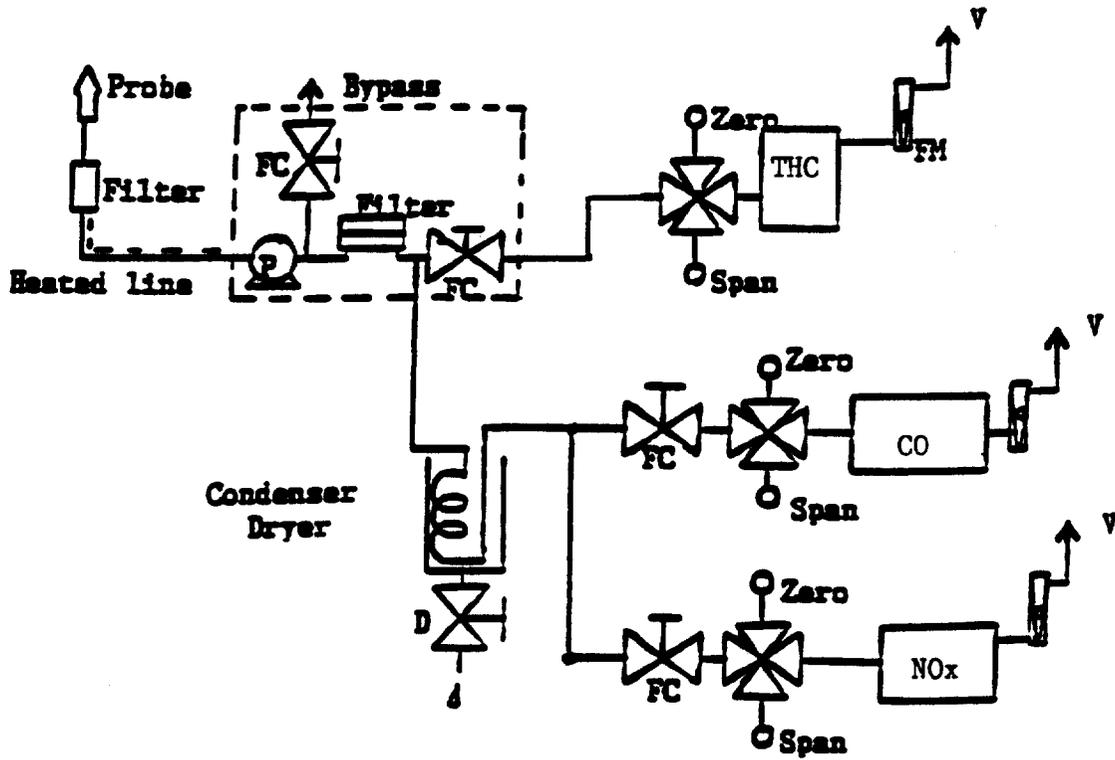
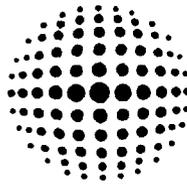


Figure 3-1 Instrumental Analysis System

Appendix A

Field Data and Calculations



AirNova, Inc.
AIR QUALITY SAMPLING AND ANALYSIS

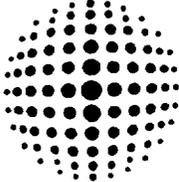
GAS ANALYSIS DATA FORM

PLANT TRAP ROCK - PENNINGTON
 DATE 12/18/91 TEST NO 1
 SAMPLING TIME (24-hr CLOCK) _____
 SAMPLING LOCATION PAGHOUSE OUTLET
 SAMPLE TYPE (MAG. INTEGRATED, CONTINUOUS) _____
 ANALYTICAL METHOD DRIFT
 AMBIENT TEMPERATURE 32°F
 OPERATOR MC/SC

COMMENTS:

| RUN GAS | 1 | | 2 | | 3 | | AVERAGE NET VOLUME | MULTIPLIER | MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d |
|--|-------------------|-------|-------------------|-------|-------------------|-------|--------------------------|------------|--|
| | ACTUAL READING | NET | ACTUAL READING | NET | ACTUAL READING | NET | | | |
| CO ₂ | 7.90 | 7.90 | 7.90 | 7.90 | 7.90 | 7.90 | 7.90 | 44.100 | |
| O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING) | 20.50 | 12.60 | 20.50 | 12.60 | 20.50 | 12.60 | 12.60 | 32.100 | |
| CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING) | 20.50 | 0.00 | ————— | | | | 0.00 | 28.100 | |
| N ₂ (NET IS 100 MINUS ACTUAL CO READING) | ————— | | | | | | 79.50 | 28.100 | |
| TOTAL | | | | | | | | | |

AG



AirNova, Inc.

AIR QUALITY SAMPLING AND ANALYSIS

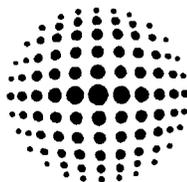
GAS ANALYSIS DATA FORM

PLANT TRAP RIVER
 DATE 12/18/91 TEST NO 2
 SAMPLING TIME (24-hr CLOCK)
 SAMPLING LOCATION SAGHAWSE OULES
 SAMPLE TYPE (MAG. INTEGRATED, CONTINUOUS)
 ANALYTICAL METHOD DRM
 AMBIENT TEMPERATURE 30 °F
 OPERATOR MC/SC

COMMENTS:

| RUN GAS | 1 | | 2 | | 3 | | AVERAGE NET VOLUME | MULTIPLIER | MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _g | |
|--|-------------------|-------|-------------------|-------|-------------------|-------|--------------------------|------------|--|--|
| | ACTUAL READING | NET | ACTUAL READING | NET | ACTUAL READING | NET | | | | |
| CO ₂ | 7.95 | 2.55 | 2.95 | 2.95 | 2.95 | 2.95 | 7.95 | 44.100 | | |
| O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING) | 19.00 | 11.05 | 19.90 | 11.55 | 19.95 | 12.00 | 12.00 | 32.100 | | |
| CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING) | 19.55 | 0.00 | | | | | 0.00 | 28.100 | | |
| N ₂ (NET IS 100 MINUS ACTUAL CO READING) | | | | | | | 80.05 | 28.100 | | |
| TOTAL | | | | | | | | | | |

AB



AirNova, Inc.

AIR QUALITY SAMPLING AND ANALYSIS

GAS ANALYSIS DATA FORM

PLANT TRAP ROCK - PENNINGTON
 DATE 12/18/91 TEST NO 3
 SAMPLING TIME (24-hr CLOCK) _____
 SAMPLING LOCATION LEAKHOUSE OUTLET
 SAMPLE TYPE (NAG, INTEGRATED, CONTINUOUS) _____
 ANALYTICAL METHOD DR8A7
 AMBIENT TEMPERATURE 30 °F
 OPERATOR MC/TC

COMMENTS:

| RUN GAS | 1 | | 2 | | 3 | | AVERAGE NET VOLUME | MULTIPLIER | MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d |
|--|-------------------|-------|-------------------|-------|-------------------|-------|--------------------------|--------------|--|
| | ACTUAL READING | NET | ACTUAL READING | NET | ACTUAL READING | NET | | | |
| CO ₂ | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 8.05 | 44/100 | |
| O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING) | 19.90 | 11.85 | 20.00 | 11.95 | 20.10 | 12.05 | 12.05 | 32/100 | |
| CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING) | 20.10 | 0.05 | | | | | 0.00 | 28/100 | |
| N ₂ (NET IS 100 MINUS ACTUAL CO READING) | | | | | | | 79.90 | 28/100 | |
| | | | | | | | | TOTAL | |

27

1496-01

METHOD 4- Moisture Determination

Proj. No. 1496
Test Date 12/18/91

| Run No. | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------|--------|--------|--------|--------|--------|--------|
| Meter Vol. (DCF) | 48.810 | | | | | |
| Moisture Gain (g) | 181.5 | | | | | |
| Avg Meter Temp (F) | 45.2 | | | | | |
| Std. Temp. (F) | 70 | | | | | |
| Meter Coeff. (Y) | 0.99 | | | | | |
| Baro. Press. (in. Hg) | 30.00 | | | | | |
| Meter Vol. (DSCF) | 50.830 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Water Vapor (SCF) | 8.5900 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Stack Moisture (%) | 14.5 | ERR | ERR | ERR | ERR | ERR |

AS

Appendix B
Calibration Data

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
GAS METER SHOP

PROOF TEST RECORD

METER SIZE: CL175

DATE RECEIVED: 10/04/89

INSPECTOR: C. RIZZA

DATE TESTED: 10/05/89

MANUFACTURER: ROCKWELL

PROVER NO. 1264

TEMPERATURE:

OIL : 73° F.

METER NUMBER: 6837018

PROVER AIR: 73° F.

175 C.F.H.

| TEST # | CU. FT. | PERCENT PROOF | |
|----------|-------------|---------------|--|
| TEST # 1 | 2.0 CU. FT. | 100.0 | |
| TEST # 2 | 2.0 CU. FT. | 100.0 | |
| TEST # 3 | 2.0 CU. FT. | 100.0 | |

35 C.F.H.

| TEST # | CU. FT. | PERCENT PROOF | |
|----------|-------------|---------------|--|
| TEST # 1 | 2.0 CU. FT. | 100.1 | |
| TEST # 2 | 2.0 CU. FT. | 100.0 | |
| TEST # 3 | 2.0 CU. FT. | 100.0 | |

A calibration and accuracy test was performed on test meter number 6837018 for:

AirNova Inc
931 Haddon Avenue
Collingswood, N.J.
08108

METER REPAIR SUPERVISOR

CARMEN RIZZA

Carmen Rizza

Bl

STACK SAMPLER CALIBRATION SHEET

Calibrated by JAY

Date 10-22-91 Box No. 4

Pump Pump Oil

Clean Quick Connects Valves

Manometers Dry Test Meter

Thermometers

Lights _____ Buzzer _____

Electrical Check - Amphenol _____

Baric _____ Vacuum Gauge _____

Stack Check at 27" Hg. - Leakage _____ CFM _____

Remarks _____

CALIBRATION - ORIFICE AND METER

| Man Orifice | CF _v | CF _d | I _w | IT _d | OT _d | T _d AVG. | Pb | Time _c |
|-------------|-----------------|-----------------|----------------|-----------------|-----------------|---------------------|-------|-------------------|
| 0.5 | 6.770 | 6.916 | 525 | — | — | 532 | 30.40 | 15 |
| 1.0 | 5.424 | 5.452 | 525 | — | — | 533 | 30.40 | 10 |
| 2.0 | 7.666 | 7.676 | 526 | — | — | 533 | 30.40 | 10 |
| 3.0 | 9.482 | 9.469 | 525 | — | — | 534 | 30.40 | 10 |
| 4.0 | 10.915 | 10.910 | 526 | — | — | 536 | 30.40 | 10 |
| 5.0 | 12.120 | 12.075 | 527 | — | — | 536 | 30.40 | 10 |

B2

Tolerances

Y = 0.99 - 1.00 - 1.01
 ΔH = 1.6 - 1.84 - 2.1

| P_b (Man. orifice) $(T_w + 460)t^2$ | P_b (T_d avg. + 460) | CF_w | ΔH_e | Man. | $CF_v P_b$ (T_d avg. + 460) | Man. | Y |
|---------------------------------------|---------------------------|--------|--------------|------|----------------------------------|------|-------|
| 0.01585 | $(65 + 460) 15^2$ | 5.770 | 1.83 | .5 | $5.770 \times 30420 (72 + 460)$ | .5 | 1.004 |
| 0.0317 | $(65 + 460) 10^2$ | 5.424 | 1.83 | 1.0 | $5.424 \times 30420 (73 + 460)$ | 1.0 | 1.007 |
| 0.0634 | $(66 + 460) 10^2$ | 2.666 | 1.84 | 2.0 | $2.666 \times 30420 (73 + 460)$ | 2.0 | 1.007 |
| 0.0951 | $(65 + 460) 10^2$ | 9.482 | 1.80 | 3.0 | $9.482 \times 30420 (74 + 460)$ | 3.0 | 1.01 |
| 0.1268 | $(66 + 460) 10^2$ | 10.915 | 1.84 | 4.0 | $10.915 \times 30420 (76 + 460)$ | 4.0 | 1.01 |
| 0.1585 | $(67 + 460) 10^2$ | 12.120 | 1.84 | 5.0 | $12.120 \times 30420 (76 + 460)$ | 5.0 | 1.009 |

(Handwritten mark)

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 6-7-91 Thermocouple number Box #4 INLET OF UNIT

Ambient temperature 70° °C Barometric pressure 30.29 in. Hg

Calibrator J. MAY Reference: mercury-in-glass ASTM-2F

other _____

| Reference point number ^a | Source ^b (specify) | Reference thermometer temperature, °C | Thermocouple potentiometer temperature, °C | Temperature difference, % ^c |
|-------------------------------------|-------------------------------|---------------------------------------|--|--|
| 1 | Ambient | 70° F | 70° F | 0.0% |
| 2 | boiling oil | 420° F | 417° F | .7% |
| 3 | ice/water | 35° F | 34.5° F | 1.6% |

^aEvery 30°C (50°F) for each reference point.

^bType of calibration system used.

^c
$$\left[\frac{(\text{ref temp, } ^\circ\text{C} + 273) - (\text{test thermom temp, } ^\circ\text{C} + 273)}{\text{ref temp, } ^\circ\text{C} + 273} \right] 100 \leq 1.5\%.$$

BB

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 6-7-91 Thermocouple number Box #4 OUTLET of motor

Ambient temperature 70° °C Barometric pressure 30.29 in. Hg

Calibrator Jimay Reference: mercury-in-glass ASTM-2F

other _____

| Reference point number ^a | Source ^b (specify) | Reference thermometer temperature, °C | Thermocouple potentiometer temperature, °C | Temperature difference, % ^c |
|-------------------------------------|-------------------------------|---------------------------------------|--|--|
| 1 | Ambient | 70°F | 69°F | 1% |
| 2 | boiling oil | 420°F | 419°F | .8% |
| 3 | ice/water | 35° | 35° | 0% |

^aEvery 30°C (50°F) for each reference point.

^bType of calibration system used.

^c
$$\left[\frac{(\text{ref temp, } ^\circ\text{C} + 273) - (\text{test thermom temp, } ^\circ\text{C} + 273)}{\text{ref temp, } ^\circ\text{C} + 273} \right] 100 < 1.5\%.$$

BA

1

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 6-8-91 Thermocouple number Sample box #2 17F

Ambient temperature 71 °C Barometric pressure _____ in. Hg

Calibrator JM Reference: mercury-in-glass ASTM-2F
other _____

| Reference point number ^a | Source ^b (specify) | Reference thermometer temperature, °C | Thermocouple potentiometer temperature, °C | Temperature difference, % ^c |
|-------------------------------------|-------------------------------|---------------------------------------|--|--|
| 1 | Ambient | 72° | 71.5° | .69% |
| 2 | Boiling oil | 421°F | 420°F | .2% |
| 3 | Ice/water | 35°F | 34.5°F | 1.4% |

^a Every 30°C (50°F) for each reference point.

^b Type of calibration system used.

^c
$$\left[\frac{(\text{ref temp, } ^\circ\text{C} + 273) - (\text{test thermom temp, } ^\circ\text{C} + 273)}{\text{ref temp, } ^\circ\text{C} + 273} \right] 100 < 1.5\%$$

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 6-8-91 Thermocouple number Sample Box #2 FLI

Ambient temperature 71 °C Barometric pressure 30.3 in. Hg

Calibrator JM Reference: mercury-in-glass ASTM-2F
 other _____

| Reference point number ^a | Source ^b (specify) | Reference thermometer temperature, °C | Thermocouple potentiometer temperature, °C | Temperature difference, % ^c |
|-------------------------------------|-------------------------------|---------------------------------------|--|--|
| 1 | Ambient | 71°F | 71°F | 0.0% |
| 2 | boiling oil | 422°F | 419°F | .7% |
| 3 | ice/water | 34°F | 34°F | 0.0% |

^a Every 30°C (50°F) for each reference point.

^b Type of calibration system used.

^c
$$\left[\frac{(\text{ref temp, } ^\circ\text{C} + 273) - (\text{test thermom temp, } ^\circ\text{C} + 273)}{\text{ref temp, } ^\circ\text{C} + 273} \right] 100 \leq 1.5\%.$$

B7

01

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Air Nova
5845A Clayton Avenue
Pennsauken, New Jersey 08109

Date September 14, 1990

Our Invoice # _____

Your P.O. # AN635

Ref. No. _____

Gentlemen:

Below are the results you requested as reported by our laboratory. Results are in molecular percent, unless otherwise indicated.

LABORATORY REPORT ON GAS CERTIFICATION

Cyl. # SX20103
Mixture Req 270PPM Meth/A1 Certification

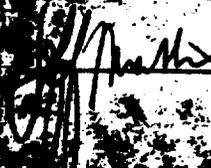
288 PPM Methane

Balance Air Zero

Cyl. # SX21127
Mixture Req 55PPM Meth/A1 Certification

58 PPM Methane

Balance Air Zero

Analyst 

B8



World Leader in Specialty Gases & Equipment

POST OFFICE BOX 85
EAST RUTHERFORD, NEW JERSEY 07073
TELEPHONE: (201) 933-2400

Air Nova
5845A Clayton Avenue
Pennsauken, NJ 08109

Date March 1, 1991

Our Invoice # _____

Your P.O. # AN691

Ref. No. _____

Gentlemen:

Below are the results you requested as reported by our laboratory. Results are in molecular percent, unless otherwise indicated.

LABORATORY REPORT ON GAS CERTIFICATION

Cyl. # SX21267
Mixture Req. 1800 PPM Methane *C/Air* Certification

1688 PPM Methane

Balance Air Zero

Cyl. # SX 21189
Mixture Req. 180 PPM Methane *C/Air* Certification

173 PPM Methane

Balance Air Zero

Analysed

Mordelt

RECEIVED

MGI Industries

Gas Products

1399 NEW FORD MILL RD.
MORRISVILLE, PA 17067
(800)638-6360

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO:

M.G. Industries
Intracompany Transfer Account
2300 E Church St.
Philadelphia, PA 19124

DATE:

10/31/91

P.O. NO.

ORDER NO.

780055-001

REF. #

AD-133

CYLINDER NO. CONSTITUENTS CONCENTRATION NOMINAL ACTUAL

CERTIFIED MIXTURE

LL-29537

Methane

450 ppm

445.7 ppm

Air

Balance

Balance





Scott Specialty Gases, Inc.

PLUMSTEADVILLE, PA 18949

PHONE: 215-766-8861

FAX: 215-766-0320

Date Shipped 11-14-90

Our Project No: 23894

Your P.O. No: 637

Page 5 of 7

AIRNOVA
5845 A CLAYTON AVENUE
PENNSAUKEN NJ 08109

ATTN: JOHN DEEMER

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES*

(Concentrations are in mole % or ppm)

Cylinder Number ALM 011271 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 9-6-90 Last 11-8-90
CP = 1750 psig

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|-----------------|----------------|-----------------|----------------------|----------------------------|--------------------------|-----------|
| | | | | | FIRST | SECOND |
| CARBON MONOXIDE | 848 ppm | 5-8-92 | NDIR | 2636 | 847.1 ppm | 849.2 ppm |
| | | | | | 847.1 ppm | 849.2 ppm |
| | | | | | 847.1 ppm | 849.2 ppm |
| NITROGEN | BALANCE | | | | | |

Cylinder Number _____ Certified Accuracy _____ % NBS Traceable Analysis Dates: First _____ Last _____

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|------------|----------------|-----------------|----------------------|----------------------------|--------------------------|--------|
| | | | | | FIRST | SECOND |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*We hereby certify the cylinder gas has been analyzed according to EPA Protocol No: 1 Procedure G1

Analyst [Signature]

Approved By [Signature]
MARK S. SIRINIDES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

CERTIFIED REFERENCE MATERIALS ■ EPA PROTOCOL GASES ■ ACUBLEND® ■ CALIBRATION & SPECIALTY GAS MIXTURES
PURE GASES ■ ACCESSORY PRODUCTS ■ CUSTOM ANALYTICAL SERVICES

TROY, MICHIGAN / SAN BERNARDINO, CALIFORNIA / HOUSTON, TEXAS
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO

811

CYLINDER NUMBER ALM 011271

PROJECT NO. 23894

STANDARD

ANALYZER

TYPE (SEM, CRM, GMIS) GMIS

MAKE HORIBA

CYLINDER NUMBER AAL 17448

MODEL CFA 310A

CONCENTRATION 994.2 ppm CARBON MONOXIDE/NITROGEN

SERIAL NO. 474091

2nd

GMIS

DATE OF

AAL 18874

CALIBRATION

1002 ppm CARBON MONOXIDE/NITROGEN

9-4-90

RAW DATA (FOR CONCENTRATION LISTED UNDER "REPLICATE ANALYSIS" ON THE OTHER SIDE)

Z-ZERO GAS

COMPONENT CARBON MONOXIDE

FIRST ANALYSIS 9-6-90 UNITS mV

Z 0 R 944 T 808

R 945 Z 0 T 808

Z 0 T 808 R 946

SECOND ANALYSIS 11-8-90 UNITS mV

Z 0 R 948 T 810

R 949 Z 0 T 810

Z 0 T 810 R 949

THIS CYLINDER WAS BLENDED, ANALYZED AND SHIPPED FROM SCOTT SPECIALTY GASES
ROUTE 611
PLUMSTEADVILLE PA 18949

B12



Scott Specialty Gases, Inc.

PLUMSTEADVILLE, PA 18949

PHONE: 215-766-8861

FAX: 215-766-0320

Date Shipped 11-14-90

Our Project No: 23894

Your P.O. No: 637

Page 2 of 7

AIRNOVA
5845 A CLAYTON AVENUE
PENNSAUKEN NJ 08109

ATTN: JOHN DEEMER

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES*

(Concentrations are in mole % or ppm)

Cylinder Number AAL 1704 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 9-7-90 Last 11-7-90
CP = 1800 psig

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|-----------------|----------------|-----------------|----------------------|----------------------------|--------------------------|-----------|
| | | | | | FIRST | SECOND |
| CARBON MONOXIDE | 150.9 ppm | 5-7-92 | NDIR | 2636 | 151.1 ppm | 150.7 ppm |
| | | | | | 151.1 ppm | 150.7 ppm |
| | | | | | 151.1 ppm | 150.7 ppm |
| NITROGEN | BALANCE | | | | | |

Cylinder Number _____ Certified Accuracy _____ % NBS Traceable Analysis Dates: First _____ Last _____

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|------------|----------------|-----------------|----------------------|----------------------------|--------------------------|--------|
| | | | | | FIRST | SECOND |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*We hereby certify the cylinder gas has been analyzed according to EPA Protocol No:

Procedure G1

Analyst [Signature]

Approved By [Signature]

MARK S. SIRINIDES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

CERTIFIED REFERENCE MATERIALS ■ EPA PROTOCOL GASES ■ ACUBLEND® ■ CALIBRATION & SPECIALTY GAS MIXTURES
PURE GASES ■ ACCESSORY PRODUCTS ■ CUSTOM ANALYTICAL SERVICES

TROY, MICHIGAN / SAN BERNARDINO, CALIFORNIA / HOUSTON, TEXAS
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO

11/18

CYLINDER NUMBER AAL 1704

PROJECT NO. 23894

STANDARD

TYPE (SEM, CRM, GMIS) CRM 2636

CYLINDER NUMBER AAL 3094

CONCENTRATION 244 ppm CARBON MONOXIDE/NITROGEN

2nd

GMIS

AAL 16569

304 ppm CARBON MONOXIDE/NITROGEN

ANALYZER

MAKE HORIBA

MODEL CFA 310A

SERIAL NO. 474091

DATE OF CALIBRATION 9-6-90

RAW DATA (FOR CONCENTRATION LISTED UNDER "REPLICATE ANALYSIS" ON THE OTHER SIDE)

Z-ZERO GAS

COMPONENT CARBON MONOXIDE

FIRST ANALYSIS 9-7-90 UNITS mV

Z 0 R 722 T 447

R 722 Z 0 T 447

Z 0 T 447 R 722

SECOND ANALYSIS 11-7-90 UNITS mV

Z 0 R 903 T 448

R 904 Z 0 T 448

Z 0 T 448 R 903

THIS CYLINDER WAS BLENDED, ANALYZED AND SHIPPED FROM SCOTT SPECIALTY GASES
ROUTE 611
PLUMSTEADVILLE PA 18949

B14



Scott Specialty Gases, Inc.

PLUMSTEADVILLE, PA 18949

PHONE: 215-766-8861

FAX: 215-766-0320

AIRNOVA
5845 A CLAYTON AVENUE
PENNSAUKEN NJ 08109

Date Shipped 11-14-90

Our Project No: 23894

Your P.O. No: 637

Page 7 of 7

ATTN: JOHN DEEMER

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES*

(Concentrations are in mole % or ppm)

Cylinder Number ALM 007004 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 9-7-90 Last 11-12-90
CO = 2000 psig

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|--------------|----------------|-----------------|----------------------|----------------------------|--------------------------|-----------|
| | | | | | FIRST | SECOND |
| NITRIC OXIDE | 851 ppm | 5-12-91 | CHEMILUMINESCENCE | 1687 | 843.8 ppm | 857.1 ppm |
| NOX | 854 ppm | | | | 848.6 ppm | 852.9 ppm |
| | | | | | 852.6 ppm | 851.0 ppm |
| NITROGEN | BALANCE | | | | | |

Cylinder Number ALM 007004 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 9-7-90 Last 11-9-90

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|----------------|----------------|-----------------|----------------------|----------------------------|--------------------------|-----------|
| | | | | | FIRST | SECOND |
| SULFUR DIOXIDE | 416 ppm | 5-9-91 | NDIR | 1662 | 417.5 ppm | 413.0 ppm |
| | | | | | 415.7 ppm | 415.4 ppm |
| | | | | | 417.5 ppm | 416.0 ppm |
| NITROGEN | BALANCE | | | | | |

*We hereby certify the cylinder gas has been analyzed according to EPA Protocol No:

Analyst *Mark S. Sirinides*

Approved By *Mark S. Sirinides*

Procedure G1

MARK S. SIRINIDES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

CERTIFIED REFERENCE MATERIALS ■ EPA PROTOCOL GASES ■ ACUBLEND® ■ CALIBRATION & SPECIALTY GAS MIXTURES
PURE GASES ■ ACCESSORY PRODUCTS ■ CUSTOM ANALYTICAL SERVICES

TROY, MICHIGAN / SAN BERNARDINO, CALIFORNIA / HOUSTON, TEXAS
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO

8/5



Scott Specialty Gases, Inc.

PLUMSTEADVILLE, PA 18949

PHONE: 215-766-8861

FAX: 215-766-0320

AIRNOVA
5845 A CLAYTON AVENUE
PENNSAUKEN NJ 08109

Date Shipped 11-14-90

Our Project No: 23894

Your P.O. No: 637

Page 6 of 7

ATTN: JOHN DEEMER

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES*

(Concentrations are in mole % or ppm)

Cylinder Number ALM 009377 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 9-7-90 Last 11-8-90
CP = 2000 psig

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|--------------|----------------|-----------------|----------------------|----------------------------|--------------------------|-----------|
| | | | | | FIRST | SECOND |
| NITRIC OXIDE | 510 ppm | 5-8-91 | CHEMILUMINESCENCE | 1687 | 512.6 ppm | 515.9 ppm |
| NOX | 514 ppm | | | | 507.0 ppm | 513.6 ppm |
| | | | | | 504.9 ppm | 507.4 ppm |

Cylinder Number ALM 009377 Certified Accuracy ±1 % NBS Traceable Analysis Dates: First 9-10-90 Last 11-5-90

| COMPONENTS | CERTIFIED CONC | EXPIRATION DATE | ANALYTICAL PRINCIPLE | PRIMARY STANDARD NBS/SRM's | REPLICATE CONCENTRATIONS | |
|----------------|----------------|-----------------|----------------------|----------------------------|--------------------------|-----------|
| | | | | | FIRST | SECOND |
| SULFUR DIOXIDE | 247 ppm | 5-5-91 | NDIR | 1694 | 246.6 ppm | 247.4 ppm |
| | | | | | 246.8 ppm | 247.1 ppm |
| | | | | | 246.8 ppm | 247.2 ppm |
| NITROGEN | BALANCE | | | | | |

*We hereby certify the cylinder gas has been analyzed according to EPA Protocol No:

1 Procedure G1

Analyst *Pat Spink*

Approved By *Mark S. Sirinides*

MARK S. SIRINIDES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

CERTIFIED REFERENCE MATERIALS ■ EPA PROTOCOL GASES ■ ACUBLEND® ■ CALIBRATION & SPECIALTY GAS MIXTURES
PURE GASES ■ ACCESSORY PRODUCTS ■ CUSTOM ANALYTICAL SERVICES

TROY, MICHIGAN / SAN BERNARDINO, CALIFORNIA / HOUSTON, TEXAS
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO

h/cj

MGI Industries
Gas Products

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

ANALYTICAL REPORT - PRODUCT CERTIFICATION

TO:
M.G. Industries
Intracompany Transfer Account
2300 E Church St.
Philadelphia PA 19124

DATE: 10/18/91
P.O. NO.
ORDER NO. 780065-001
REF. # EM-1174-2

CYLINDER NO. CONSTITUENTS CONCENTRATION: NOMINAL ACTUAL

CERTIFIED MIXTURE

150-684

12% Dioxide
Balance

100 ppm
Balance

ppm

[Handwritten Signature]

ben

Appendix C
NJDEPE Process Log

Dec 23, 91 11:35 No. 002 P. 03

DATA ON FACILITY BEING STACK TESTED

COMPANY NAME Trap Rock Ind Inc COMPANY REP. G. Girard PHONE () 609 924 0300
 LOCATION OF FACILITY Pennington ORIGINAL START-UP DATE 5/86 DESIGNED CAPACITY 300 TPH
 OEM Madson-McCaster MODEL NO. 481 TYPE Batch AC TYPE AC 80

| 1 Time (24 HR) | 2 Fuel Use # Fuel Oil ✓ Nat. Gas _____ Propane _____ Coal _____ Other _____ GPM | 3 Barter Setting % 099 | 4 Blower Pressure oz/ sq. in. | 5 Production Rate | | 6 Asphalt Cement % | 7 Mix Temp. °F | 8 Exhaust Gas Temp. °F | 9 Venturi Scrubber ✓ Baghouse | | Moistures % | Sand | Screenings |
|----------------------|--|---------------------------------|--|-----------------------------|--|-----------------------------|-------------------------|------------------------------------|-------------------------------------|---------------------------------------|----------------|------|------------|
| | | | | 15 Min. Aggregate TPH | 15 Min. Aggregate TPH | | | | Pressure Drop in w.g. | Water Pressure psi | | | |
| 910 | 7 | 75 | 25 | | | 5.6 | 325 | 220 | 2 | | | | |
| 925 ✓ | 7 | 69 | 25 | | | | 325 | 230 | 3 | | 4.8 | 4.5 | 2.8 |
| 940 | 6.5 | 58 | 25 | | | | 325 | 210 | 2.8 | | | | |
| 955 | 6.5 | 57 | 25 | | | | 325 | 210 | 2 | | | | |
| 1010 | 8 | 75 | 30 | (281) | | | 330 (326) | 215 (217) | 2 (2.4) | | | | |
| 1025 | 6.5 | 57 | 25 | | | 5.6 | 325 | 210 | 2 | | | | |
| 1040 ✓ | 6.5 | 61 | 28 | | | | 326 | 210 | 2 | | 4.7 | 4.6 | 2.8 |
| 1055 | 7 | 67 | 25 | | | | 325 | 210 | 2 | | | | |
| 1110 | 6.5 | 62 | 25 | | | | 325 | 210 | 2 | | | | |
| 1125 | 7 | 71 | 25 | (267) | | | 320 (323) | 220 (212) | 2 (2) | | | | |
| 1145 | 7 | 71 | 25 | | | 5.6 | 320 | 210 | 2 | | | | |
| 1200 ✓ | 6.5 | 64 | 25 | | | | 325 | 210 | 2 | | 4.9 | 4.5 | 2.7 |
| 1215 | 7 | 67 | 25 | | | | 320 | 210 | 2 | | | | |
| 1230 | 6.5 | 60 | 28 | | | | 320 | 205 | 2 | | | | |
| 1245 | 7 | 67 | 25 | (275) | | | 325 | 210 | 2 | | | | |
| 1250 | | | | | | | (320) | 209 | (2) | | | | |

TEL No. 1-609-497-1422

TRAP*ROCK*IND.*PURCH.