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.

# CO/THC COMPLIANCE STACK EMISSION TEST RESULTS

BRUNSWICK HOT MIX CORPORATION
SOUTH BRUNSWICK, NEW JERSEY

APC ID NO. 15654
NJ STACK NO. 006

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ENERGY
AIR QUALITY REGULATIONS PROGRAM
BUREAU OF TECHNICAL SERVICES
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BUREAU CHIEF

REPORT DATE: JUNE 8, 1992

CO/THC STACK EMISSION REPORT
BURLINGTON ASPHALT CORPORATION
BATCH MIX ASPHALT PLANT

TABLE OF CONTENTS


| SECTION | SUBJECT |
|---|---|
| I | Project Background |
| II | Project Personnel |
| III | Summary of Results |
| IV | Source Description |
| V | Sampling Procedures |
| Appendix A | Source Operating Parameters |
| Appendix B | Test Data Corrected For Calibration Drift and Moisture |
| Appendix C | Test Data - Uncorrected<br>. Graphical Presentation<br>. Raw Data |
| Appendix D | Monitor Calibration Data<br>. Summary Reports<br>. Raw Data Summary Forms |
| Appendix E | Moisture Data and Calculations<br>. Summary Report<br>. Field Data and Calculations |
| Appendix F | Equipment Calibration and Quality Assurance<br>. Calibration Gas Certificates of Analysis<br>. Meter Calibration<br>. Orifice Calibration |
| Appendix G | Reference Methods |

# SECTION I

# PROJECT BACKGROUND

## PROJECT BACKGROUND

The Department of Environmental Protection and Energy (DEPE) in conjunction with the New Jersey Asphalt Pavement Association (NJAPA) developed emission standards for carbon monoxide (CO) and total hydrocarbons (THC) expressed as equivalent methane. These emission standards are 250 ppmvd corrected to seven percent oxygen for THC and 500 ppmvd corrected to seven percent oxygen for CO.

The emission limits were developed subsequent to testing conducted by the DEPE in 1986 which showed wide variability in both CO and THC emissions. The variability of emissions from both drum and batch mix asphalt plants was confirmed during further stack emission studies conducted by the NJAPA in 1987 and 1988. The objective of the 1987 and 1988 emission studies was to attempt to identify the causes of the variable CO/THC emissions. The resulting data was then utilized to establish Best Management Practices (BMP) which were to be incorporated into the operating procedures of each asphalt plant. Such BMP included but were not limited to modification of flight designs in the rotary drum to prevent flame quenching, "tuning" of burner to increase combustion efficiency and pulling top, dry material from storage piles rather then bottom wet material.

A date to determine compliance with the asphalt plant emission standards for CO and THC was established as June 15, 1991 which was later extended to June 1, 1992.

# SECTION II

# PROJECT PERSONNEL

## PROJECT PARTICIPANTS

The CO/THC stack emission tests were conducted on May 27 and 28, 1992. These stack emission tests were conducted on the Batch Mix Asphalt Plant Stack (NJ Stack No. 006). This source is covered by Certificate Number 42380 (Log No. 90-2848). These tests were conducted by DEPE, Bureau of Technical Services personnel. Those participating were as follows.

Frederick Ballay - Principal Environmental Specialist
Frank Papp - Environmental Compliance Investigator 1
Robert Kettig - Environmental Specialist Trainee

Test Run Numbers 1, 2 and 3, were conducted while producing asphalt pavement from virgin material. This batch mix asphalt plant does not use RAP as part of the materials processed. Source operating parameters were monitored and recorded by:

Joseph Waldron - Brunswick Hot Mix Corporation

This Bureau would like to acknowledge the assistance of Mr. Joseph Waldron, Plant Operator and the staff of Brunswick Hot Mix Corporation for their participation and cooperation in the stack test program.

# SECTION III

# SUMMARY OF RESULTS

STACK EMISSION TEST RESULTS

I - VIRGIN MATERIAL
MAY 27 and 28, 1992

| | RUN 1 | RUN 2 | RUN 3 |
|---|---|---|---|
| Stack Gas Moisture (%) | 16.4 | 17.2 | 16.6 |
| Stack Gas Temperature ( F) | 206 | 207 | 193 |
| Carbon Monoxide (ppmvd) | 110.9 | 104.0 | 103.6 |
| Carbon Monoxide (ppmvd @ 7% O2) | 236.8 | 226.6 | 244.5 |
| Allowable CO Limit ** | 500 | 500 | 500 |
| Total Hydrocarbons * (ppmvd) | 81.8 | 86.1 | 60.2 |
| Total Hydrocarbons * (ppmvd @ 7% O2) | 174.7 | 187.7 | 142.2 |
| Allowable THC Limit ** | 250 | 250 | 250 |
| Oxygen (%) | 14.4 | 14.5 | 15.0 |

* Expressed as equivalent methane
** ppmvd at seven percent oxygen

II - NITROGEN OXIDES
(NOx EMISSIONS)

| | RUN 1 | RUN 2 | RUN 3 |
|---|---|---|---|
| Stack Gas Moisture (%) | 16.4 | 17.2 | 16.6 |
| Stack Gas Temperature ( F) | 206 | 207 | 193 |
| NOx Emissions (ppmvd) | 75.0 | 72.0 | 54.9 |
| NOx Emissions (ppmvd @ 7% O2) | 160.2 | 156.9 | 129.6 |
| Stack Gas Flow Rate (ACFM) * | 50,000 | 50,000 | 50,000 |
| Stack Gas Flow Rate (DSCFM) | 33,264 | 32,897 | 33,845 |
| Calculated NOx Emission (lbs/hr) | 17.8 | 16.9 | 13.3 |
| Calculated NOx Emission (tons/yr) ** | 17.8 | 16.9 | 13.3 |

* From permit application
** Based on source opering hours (2,000 hrs/year)

# SECTION IV

# SOURCE DESCRIPTION

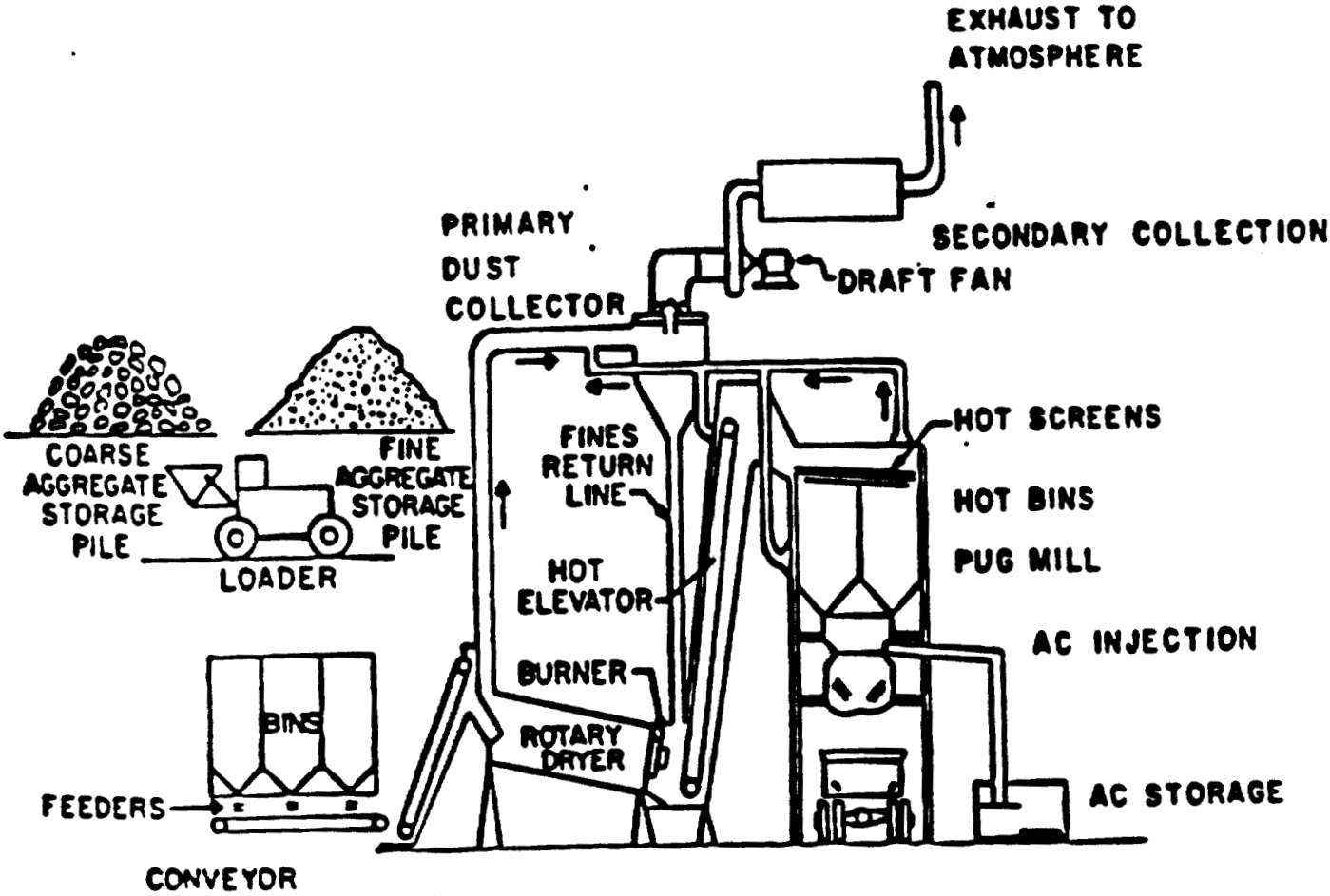
## SOURCE DESCRIPTION

Brunswick Hot Mix Corporation operates a H&B batch mix asphalt plant with a nominal rating of 180 tons per hour (TPH). The plant is equipped with an Dustex Jet Pulse baghouse for particulate control.

The plant fires No. 2 fuel oil as its primary fuel to the rotary dryer. A Hauck Burner (Model SJ-520E) and burner blower are installed on the rotary dryer..

The following is a general schematic of a batch mix asphalt plant.

TYPICAL BATCH MIX ASPHALT CONCRETE PLANT



# SECTION V

# SAMPLING PROCEDURES

## SAMPLING PROCEDURES

All samples were extracted from the centroid of the exhaust duct exiting the baghouse at a point 2.7 diameters downstream from the nearest disturbance and 2.3 diameters upstream from the exit stack I.D. fan.

The sampling and analytical procedures utilized in this stack test program were as follows.

Total hydrocarbon (THC) emissions, as equivalent methane, were determined using the sampling and analytical procedures outlined in NJAC 7:27B Air Test Method Three (ATM3), "Sampling and Analytical Procedures for the Determination of Volatile Organic Substances from Source Operations".

Carbon monoxide (CO) emissions were determined using the sampling and analytical procedures outlined in 40 CFR - Part 60 - Appendix A - Referenced Method Ten - "Determination of Carbon Monoxide Emissions from Stationary Sources".

Nitrogen oxide ($NO_x$) emissions were determined using the sampling and analytical procedures outlined in 40 CFR - Part 60 - Appendix A - Reference Method 7E - "Determination of Nitrogen Oxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)".

Fixed gases, oxygen ($O_2$) and carbon dioxide ($CO_2$), were determined using the procedures outlined in 40 CFR - Part 60 - Appendix A - Referenced Method 3A - "Determination of Oxygen and Carbon Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)".

Stack gas moisture was determined using the sampling and analytical procedures outlined in 40 CFR - Part 60 - Appendix A - Reference Method Four - "Determination of Stack Gas Moisture Content in Stack Gases".

The referenced sampling and analytical procedures may be found in Appendix G.

# APPENDIX A

## SOURCE OPERATING PARAMETERS

## SOURCE OPERATING PARAMETER

The batch mix asphalt plant was operating within the following parameters during the emission test program.

VIRGIN MATERIAL
MAY 27 and 28, 1992

| | RUN 1 | RUN 2 | RUN 3 |
|---|---|---|---|
| Avg. Material Processed (TPH) | 165-175 | 165-175 | 165-175 |
| Avg. Mix Temp. ( F) | 330.1 | 334.4 | 337.9 |
| Avg. Baghouse Pressure Drop (in H2O) | 1.6 | 1.6 | 1.2 |
| Avg. Burner Setting (%) | 34.4 | 32.7 | 26.4 |
| Avg. E.P.S. Damper Setting | -1 | -1 | -1 |

NOTES:

A) No. 2 fuel oil is the primary fuel fired by the batch mix plant dryer.

B) RAP is not utilized in producing asphalt pavement at this plant.

C) Material processed is 20 tons per batch. Each batch is produced every 7 to 8 minutes. Each batch also includes 200 pounds of lime.

# APPENDIX B

## TEST DATA CORRECTED FOR CALIBRATION DRIFT AND MOISTURE

New Jersey Department of Environmental Protection & Energy
Bureau of Technical Services
Data Correction Summary

RAW DATA CORRECTED FOR DRIFT AND MOISTURE

DATE THIS RUN WAS CONDUCTED : 05-27-1992

FACILITY : Brunswick Hot Mix Corp. APC ID # : 15654 NJ STACK : 006

PROCESS : Batch Plant P&CT # : 042380 LOG # : 90-2848

Run Number : 1

Percent Moisture for this Run = 16.39%

| | | O2 Pct | CO2 Pct | THC-OUT PPMV | CO PPMV | NOX PPMV | THC-IN PPMV |
|---|---|---|---|---|---|---|---|
| CALIBRATION GASES | ZERO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | LOW | N/A | N/A | 27.50 | 91.30 | N/A | |
| | MID | 10.10 | 5.10 | 48.40 | 178.00 | 123.00 | |
| | HIGH | 17.10 | 9.35 | 88.90 | 376.00 | 217.00 | |
| CALIBRATION ERROR RESPONSE | ZERO | 0.00 | 0.00 | 0.30 | 0.40 | 0.00 | 0.00 |
| | LOW | N/A | N/A | 26.30 | 87.60 | N/A | 0.00 |
| | MID | 10.20 | 5.00 | 48.60 | 174.00 | 120.40 | 0.00 |
| | HIGH | 17.10 | 9.40 | 90.80 | 380.60 | 216.10 | 0.00 |
| INITIAL CALIBRATION BIAS | ZERO | 0.10 | 0.10 | 0.40 | 0.40 | 0.00 | 0.00 |
| | UPSCALE | 17.00 | 5.00 | 90.60 | 380.00 | 119.20 | 0.00 |
| FINAL CALIBRATION BIAS | ZERO | 0.10 | 0.10 | 0.20 | 0.40 | 0.00 | 0.00 |
| | UPSCALE | 17.00 | 5.00 | 91.00 | 379.70 | 119.40 | 0.00 |
| AVERAGE CONCENTRATIONS UNCORRECTED FOR DRIFT | | Dry 14.32 | Dry 4.88 | Wet(C3H8) 23.52 | Dry 112.34 | Dry 72.77 | Wet 0.00 |
| DRIFT CORRECTED AVERAGE CONCENTRATIONS | | Dry 14.39 | Dry 4.98 | Wet(CH4) 68.43 | Dry 110.92 | Dry 75.03 | Wet ???????? |
| Final DRY CONCENTRATIONS | | 14.39 | 4.98 | AS CH4 81.84 | 110.92 | 75.03 | ???????? |

| Oxygen Corrections | TOTAL HYDRCARBONS | CARBON MONOXIDE | NITROGEN OXIDES |
|---|---|---|---|
| PPMVD @ 7% O2 | 174.70 AS CH4 | 236.78 | 160.15 |

New Jersey Department of Environmental Protection & Energy
Bureau of Technical Services
Data Correction Summary

RAW DATA CORRECTED FOR DRIFT AND MOISTURE

DATE THIS RUN WAS CONDUCTED : 05-27-1992

FACILITY : Brunswick Hot Mix Corp. APC ID # : 15654 NJ STACK : 006

PROCESS : Batch Plant P&CT # : 042380 LOG # : 90-2848

Run Number : 2

Percent Moisture for this Run = 17.21%

| | | O2 Pct | CO2 Pct | THC-OUT PPMV | CO PPMV | NOX PPMV | THC-IN PPMV |
|---|---|---|---|---|---|---|---|
| CALIBRATION GASES | ZERO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | LOW | N/A | N/A | 27.50 | 91.30 | N/A | |
| | MID | 10.10 | 5.10 | 48.40 | 178.00 | 123.00 | |
| | HIGH | 17.10 | 9.35 | 88.90 | 376.00 | 217.00 | |
| CALIBRATION ERROR RESPONSE | ZERO | 0.00 | 0.00 | 0.30 | 0.40 | 0.00 | 0.00 |
| | LOW | N/A | N/A | 26.30 | 87.60 | N/A | 0.00 |
| | MID | 10.20 | 5.00 | 48.60 | 174.00 | 120.40 | 0.00 |
| | HIGH | 17.10 | 9.40 | 90.80 | 380.60 | 216.10 | 0.00 |
| INITIAL CALIBRATION BIAS | ZERO | 0.10 | 0.10 | 0.20 | 0.40 | 0.00 | 0.00 |
| | UPSCALE | 17.00 | 5.00 | 91.00 | 379.70 | 119.40 | 0.00 |
| FINAL CALIBRATION BIAS | ZERO | 0.00 | 0.10 | 0.00 | 0.40 | 0.00 | 0.00 |
| | UPSCALE | 16.90 | 5.00 | 90.50 | 380.80 | 119.70 | 0.00 |
| AVERAGE CONCENTRATIONS UNCORRECTED FOR DRIFT | | Dry 14.40 | Dry 4.85 | Wet(C3H8) 24.34 | Dry 105.48 | Dry 70.02 | Wet 0.00 |
| DRIFT CORRECTED AVERAGE CONCENTRATIONS | | Dry 14.52 | Dry 4.94 | Wet(CH4) 71.32 | Dry 104.01 | Dry 72.04 | Wet ???????? |
| Final DRY CONCENTRATIONS | | 14.52 | 4.94 | AS CH4 86.14 | 104.01 | 72.04 | ???????? |

| Oxygen Corrections | TOTAL HYDRCARBONS | CARBON MONOXIDE | NITROGEN OXIDES |
|---|---|---|---|
| PPMVD @ 7% O2 | 187.67 AS CH4 | 226.61 | 156.95 |

New Jersey Department of Environmental Protection & Energy
Bureau of Technical Services
Data Correction Summary

RAW DATA CORRECTED FOR DRIFT AND MOISTURE

DATE THIS RUN WAS CONDUCTED : 05-28-1992

FACILITY : Brunswick Hot Mix Corp. APC ID # : 15654 NJ STACK : 006

PROCESS : Batch Plant P&CT # : 042380 LOG # : 90-2848

Run Number : 3

Percent Moisture for this Run = 16.59%

| | | O2 Pct | CO2 Pct | THC-OUT PPMV | CO PPMV | NOX PPMV | THC-IN PPMV |
|---|---|---|---|---|---|---|---|
| CALIBRATION GASES | ZERO | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | LOW | N/A | N/A | 27.50 | 91.30 | N/A | |
| | MID | 10.10 | 5.10 | 48.40 | 178.00 | 123.00 | |
| | HIGH | 17.10 | 9.35 | 88.90 | 376.00 | 217.00 | |
| CALIBRATION ERROR RESPONSE | ZERO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | LOW | N/A | N/A | 25.50 | 87.20 | N/A | 0.00 |
| | MID | 10.20 | 5.00 | 48.60 | 174.20 | 120.90 | 0.00 |
| | HIGH | 17.10 | 9.30 | 90.10 | 380.00 | 216.10 | 0.00 |
| INITIAL CALIBRATION BIAS | ZERO | 0.10 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 |
| | UPSCALE | 17.00 | 5.00 | 49.20 | 86.60 | 120.70 | 0.00 |
| FINAL CALIBRATION BIAS | ZERO | 0.10 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 |
| | UPSCALE | 17.10 | 5.00 | 48.80 | 87.20 | 119.60 | 0.00 |
| AVERAGE CONCENTRATIONS UNCORRECTED FOR DRIFT | | Dry 14.98 | Dry 4.47 | Wet(C3H8) 16.95 | Dry 98.52 | Dry 53.64 | Wet |
| DRIFT CORRECTED AVERAGE CONCENTRATIONS | | Dry 15.01 | Dry 4.56 | Wet(CH4) 50.23 | Dry 103.56 | Dry 54.91 | Wet ???????? |
| Final DRY CONCENTRATIONS | | 15.01 | 4.56 | AS CH4 60.22 | 103.56 | 54.91 | ???????? |

| Oxygen Corrections | TOTAL HYDRCARBONS | CARBON MONOXIDE | NITROGEN OXIDES |
|---|---|---|---|
| PPMVD @ 7% O2 | 142.15 AS CH4 | 244.48 | 129.63 |

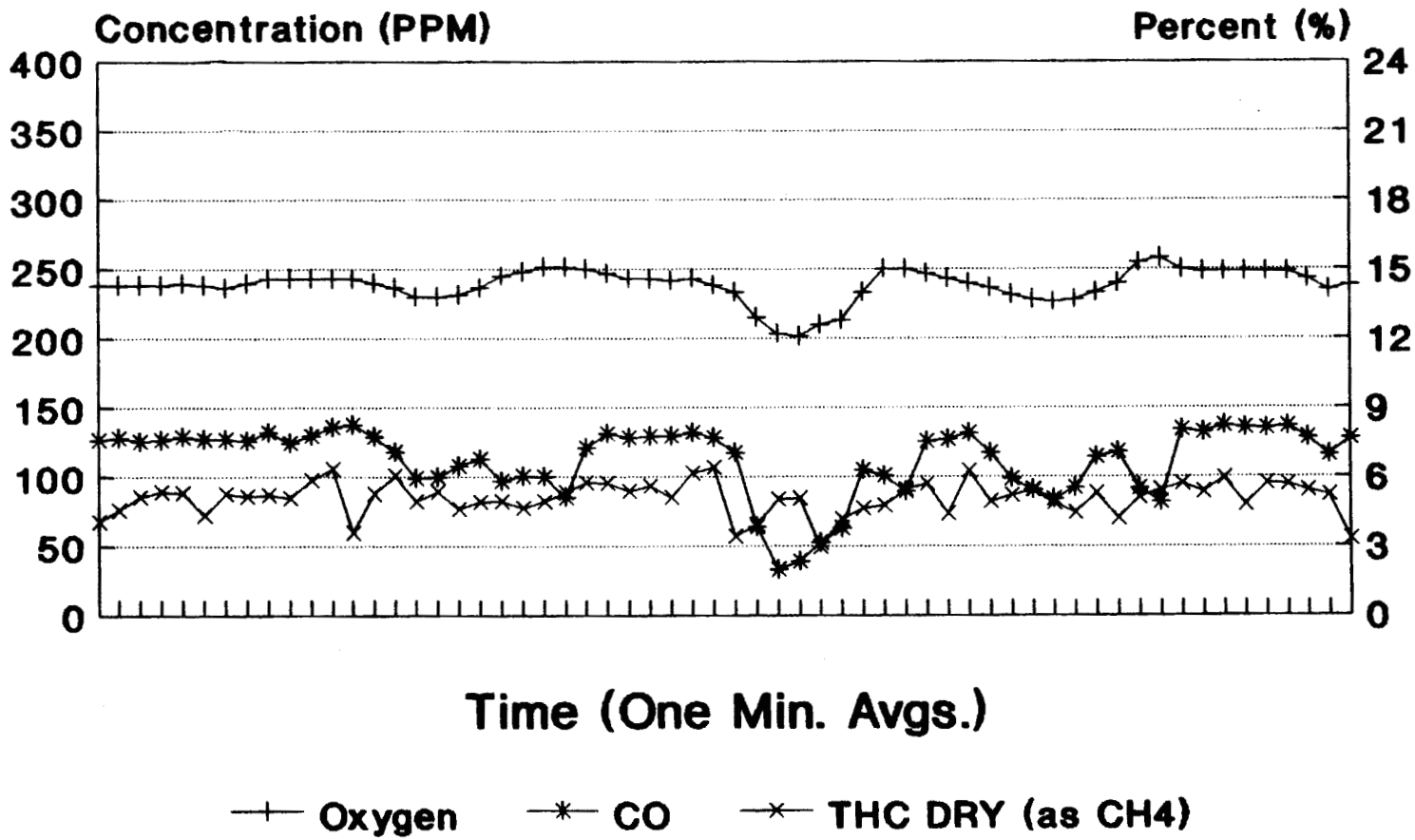
# APPENDIX C

## TEST DATA - UNCORRECTED

- GRAPHICAL PRESENTATION
- RAW DATA

# Brunswick Hot Mix Corporation

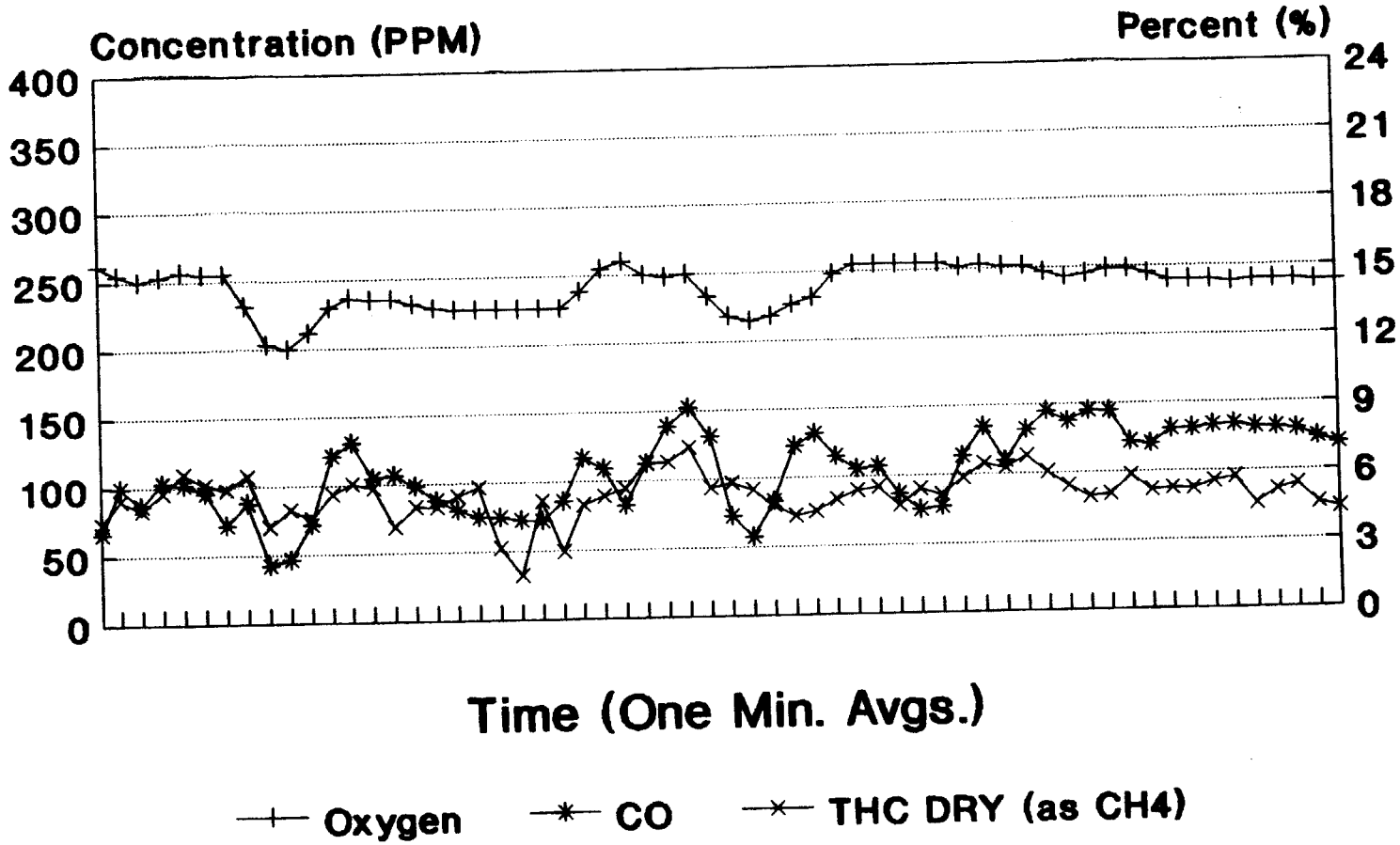
## Compliance Stack Test - Run No. 1




Virgin Material (12:40am to 13:40am)

# Brunswick Hot Mix Corporation

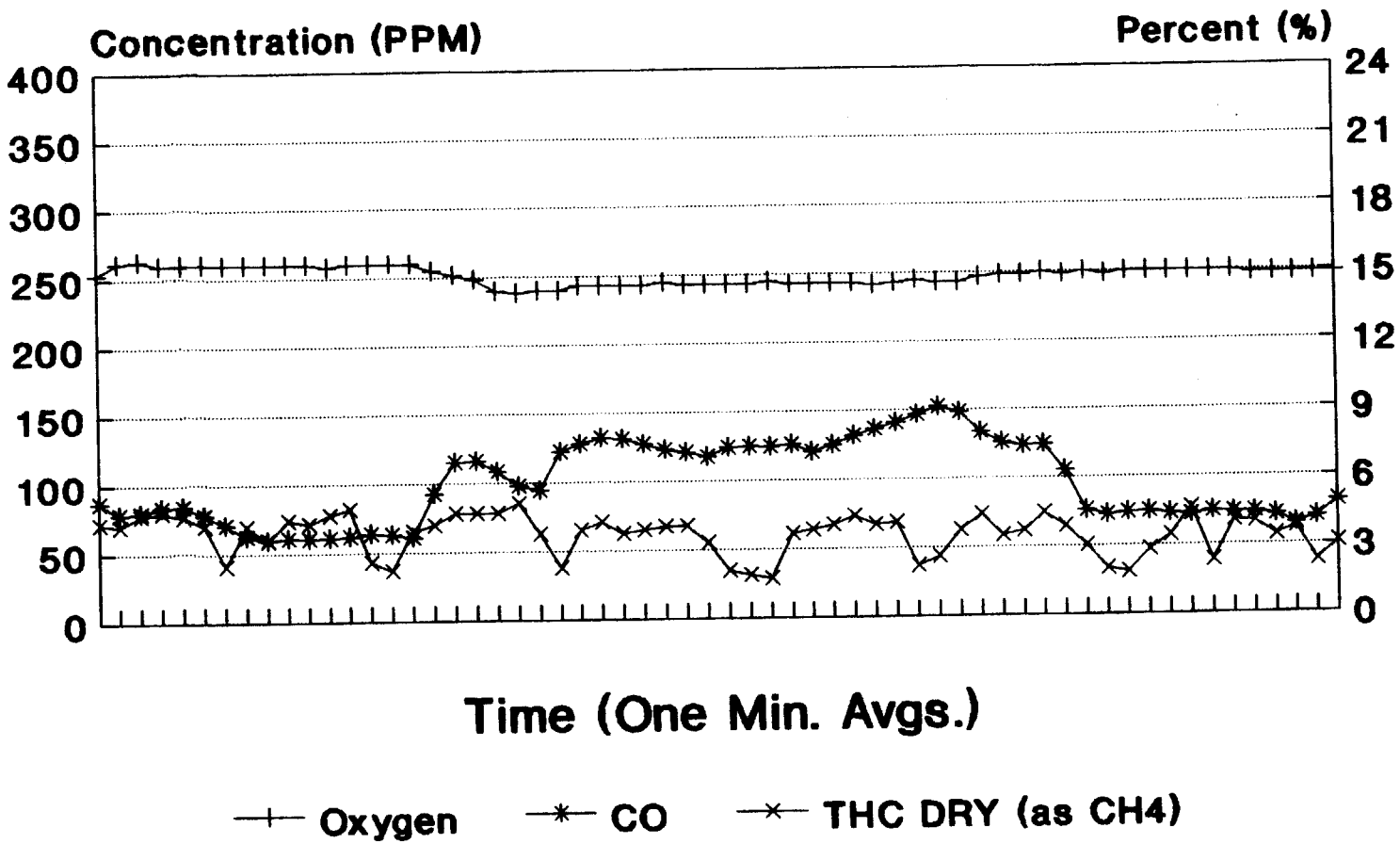
## Compliance Stack Test - Run No. 2




Virgin Material (13:56am to 14:56am)

# Brunswick Hot Mix Corporation

## Compliance Stack Test - Run No. 3




Virgin Material (6:10am to 7:10am)

# Instumental Method Raw Data Summary

Facility: Brunswick Hot Mix Corp. APC ID. #: 15654 NJ Stack #: 006

Run Number: 1 Date: 05/27/92

| Reading Number | Time | O2 Pct | CO2 Pct | THC-OUT PPMVW | CO PPMVD | NOx PPMVD | THC-IN PPMVW |
|---|---|---|---|---|---|---|---|
| 1 | 12:41:12 | 14.30 | 4.90 | 18.80 | 126.60 | 74.00 | 0.00 |
| 2 | 12:42:12 | 14.30 | 4.90 | 21.20 | 128.30 | 74.80 | 0.00 |
| 3 | 12:43:11 | 14.30 | 4.90 | 23.80 | 125.50 | 74.60 | 0.00 |
| 4 | 12:44:11 | 14.30 | 4.90 | 24.80 | 126.50 | 73.90 | 0.00 |
| 5 | 12:45:10 | 14.40 | 4.90 | 24.60 | 128.80 | 74.00 | 0.00 |
| 6 | 12:46:10 | 14.30 | 4.90 | 20.10 | 127.20 | 75.20 | 0.00 |
| 7 | 12:47:09 | 14.20 | 4.90 | 24.40 | 126.90 | 75.30 | 0.00 |
| 8 | 12:48:08 | 14.40 | 4.80 | 23.90 | 125.90 | 64.20 | 0.00 |
| 9 | 12:49:08 | 14.60 | 4.60 | 24.20 | 132.10 | 58.20 | 0.00 |
| 10 | 12:50:07 | 14.60 | 4.60 | 23.60 | 124.50 | 73.20 | 0.00 |
| 11 | 12:51:07 | 14.60 | 4.70 | 27.20 | 129.60 | 73.20 | 0.00 |
| 12 | 12:52:06 | 14.60 | 4.60 | 29.40 | 136.00 | 72.40 | 0.00 |
| 13 | 12:53:06 | 14.60 | 4.70 | 16.60 | 137.80 | 73.00 | 0.00 |
| 14 | 12:54:05 | 14.40 | 4.80 | 24.40 | 128.90 | 76.30 | 0.00 |
| 15 | 12:55:05 | 14.20 | 5.00 | 28.10 | 117.80 | 79.50 | 0.00 |
| 16 | 12:56:04 | 13.80 | 5.30 | 22.90 | 99.00 | 83.70 | 0.00 |
| 17 | 12:57:03 | 13.80 | 5.30 | 24.80 | 99.50 | 82.60 | 0.00 |
| 18 | 12:58:03 | 13.90 | 5.20 | 21.40 | 107.80 | 78.70 | 0.00 |
| 19 | 12:59:02 | 14.20 | 4.90 | 22.80 | 112.70 | 64.90 | 0.00 |
| 20 | 13:00:02 | 14.70 | 4.60 | 22.90 | 96.90 | 52.00 | 0.00 |
| 21 | 13:01:01 | 14.90 | 4.40 | 21.60 | 100.40 | 48.20 | 0.00 |
| 22 | 13:02:01 | 15.10 | 4.30 | 22.90 | 100.20 | 48.00 | 0.00 |
| 23 | 13:03:00 | 15.10 | 4.30 | 24.70 | 85.00 | 60.20 | 0.00 |
| 24 | 13:04:00 | 15.00 | 4.40 | 26.70 | 120.90 | 69.20 | 0.00 |
| 25 | 13:04:59 | 14.80 | 4.50 | 26.60 | 131.10 | 72.10 | 0.00 |
| 26 | 13:05:58 | 14.60 | 4.70 | 24.90 | 128.00 | 72.60 | 0.00 |
| 27 | 13:06:58 | 14.60 | 4.70 | 25.90 | 129.40 | 72.60 | 0.00 |
| 28 | 13:07:57 | 14.50 | 4.70 | 23.70 | 129.10 | 72.40 | 0.00 |
| 29 | 13:08:58 | 14.60 | 4.70 | 28.60 | 131.70 | 72.50 | 0.00 |
| 30 | 13:09:57 | 14.30 | 5.00 | 29.70 | 128.00 | 78.40 | 0.00 |
| 31 | 13:10:57 | 14.00 | 5.20 | 15.90 | 117.20 | 82.00 | 0.00 |
| 32 | 13:11:57 | 12.90 | 6.00 | 18.20 | 63.90 | 95.10 | 0.00 |
| 33 | 13:12:57 | 12.20 | 6.50 | 23.30 | 33.30 | 96.90 | 0.00 |
| 34 | 13:13:56 | 12.10 | 6.50 | 23.50 | 39.10 | 97.20 | 0.00 |
| 35 | 13:14:56 | 12.60 | 6.20 | 13.70 | 52.70 | 93.40 | 0.00 |
| 36 | 13:15:56 | 12.80 | 6.00 | 19.30 | 62.90 | 89.60 | 0.00 |
| 37 | 13:16:55 | 14.00 | 5.00 | 21.50 | 104.90 | 65.40 | 0.00 |
| 38 | 13:17:55 | 15.00 | 4.30 | 22.10 | 100.90 | 47.70 | 0.00 |
| 39 | 13:18:55 | 15.00 | 4.30 | 25.30 | 89.60 | 61.50 | 0.00 |
| 40 | 13:19:54 | 14.80 | 4.60 | 26.50 | 125.70 | 72.90 | 0.00 |
| 41 | 13:20:54 | 14.60 | 4.60 | 20.40 | 126.90 | 73.40 | 0.00 |
| 42 | 13:21:54 | 14.40 | 4.80 | 29.00 | 131.60 | 76.20 | 0.00 |
| 43 | 13:22:53 | 14.20 | 5.00 | 22.90 | 117.30 | 80.00 | 0.00 |
| 44 | 13:23:53 | 13.90 | 5.20 | 24.10 | 98.70 | 82.70 | 0.00 |
| 45 | 13:24:53 | 13.70 | 5.40 | 25.10 | 90.40 | 86.00 | 0.00 |
| 46 | 13:25:52 | 13.60 | 5.40 | 22.60 | 83.80 | 85.00 | 0.00 |
| 47 | 13:26:52 | 13.70 | 5.40 | 20.70 | 91.90 | 81.80 | 0.00 |
| 48 | 13:27:52 | 14.00 | 5.10 | 24.50 | 114.30 | 77.70 | 0.00 |

# Instumental Method Raw Data Summary

Facility: Brunswick Hot Mix Corp. APC ID. #: 15654 NJ Stack #: 006

Run Number: 1 Date: 05/27/92

| Reading Number | Time | O2 Pct | CO2 Pct | THC-OUT PPMVW | CO PPMVD | NOx PPMVD | THC-IN PPMVW |
|---|---|---|---|---|---|---|---|
| 49 | 13:28:51 | 14.40 | 4.80 | 19.50 | 118.00 | 58.90 | 0.00 |
| 50 | 13:29:51 | 15.30 | 4.10 | 23.70 | 91.50 | 44.30 | 0.00 |
| 51 | 13:30:50 | 15.50 | 4.10 | 25.20 | 81.90 | 60.00 | 0.00 |
| 52 | 13:31:50 | 15.00 | 4.40 | 26.50 | 133.90 | 70.70 | 0.00 |
| 53 | 13:32:50 | 14.90 | 4.40 | 24.80 | 132.20 | 71.10 | 0.00 |
| 54 | 13:33:50 | 14.90 | 4.40 | 27.60 | 136.90 | 70.30 | 0.00 |
| 55 | 13:34:49 | 14.90 | 4.40 | 22.30 | 135.50 | 69.90 | 0.00 |
| 56 | 13:35:49 | 14.90 | 4.40 | 26.60 | 135.20 | 69.80 | 0.00 |
| 57 | 13:36:49 | 14.90 | 4.40 | 26.30 | 136.70 | 70.50 | 0.00 |
| 58 | 13:37:48 | 14.60 | 4.70 | 25.10 | 128.20 | 76.40 | 0.00 |
| 59 | 13:38:48 | 14.10 | 5.00 | 24.20 | 115.60 | 77.70 | 0.00 |
| 60 | 13:39:49 | 14.30 | 4.90 | 15.40 | 127.70 | 62.40 | 0.00 |
| Run Average | | 14.32 | 4.88 | 23.52 | 112.34 | 72.77 | 0.00 |

# Instumental Method Raw Data Summary

Facility: Brunswick Hot Mix Corp. APC ID. #: 15654 NJ Stack #: 006

Run Number: 2 Date: 05/27/92

| Reading Number | Time | O2 Pct | CO2 Pct | THC-OUT PPMVW | CO PPMVD | NOx PPMVD | THC-IN PPMVW |
|---|---|---|---|---|---|---|---|
| 1 | 13:56:01 | 15.70 | 4.00 | 20.20 | 66.50 | 51.80 | 0.00 |
| 2 | 13:57:01 | 15.30 | 4.30 | 25.00 | 99.60 | 63.50 | 0.00 |
| 3 | 13:58:00 | 15.00 | 4.40 | 23.00 | 86.80 | 51.90 | 0.00 |
| 4 | 13:59:00 | 15.20 | 4.20 | 26.40 | 103.10 | 45.40 | 0.00 |
| 5 | 13:59:59 | 15.40 | 4.20 | 30.10 | 101.50 | 44.50 | 0.00 |
| 6 | 14:00:59 | 15.30 | 4.20 | 28.00 | 95.40 | 48.70 | 0.00 |
| 7 | 14:01:58 | 15.30 | 4.20 | 26.80 | 72.00 | 54.80 | 0.00 |
| 8 | 14:02:57 | 13.90 | 5.40 | 29.40 | 87.40 | 91.60 | 0.00 |
| 9 | 14:03:57 | 12.20 | 6.50 | 19.30 | 42.20 | 100.50 | 0.00 |
| 10 | 14:04:56 | 12.00 | 6.60 | 22.80 | 46.30 | 99.40 | 0.00 |
| 11 | 14:05:56 | 12.70 | 6.10 | 20.90 | 72.00 | 89.30 | 0.00 |
| 12 | 14:06:55 | 13.80 | 5.20 | 25.80 | 121.40 | 63.70 | 0.00 |
| 13 | 14:07:55 | 14.20 | 5.00 | 27.80 | 130.70 | 79.60 | 0.00 |
| 14 | 14:08:54 | 14.10 | 5.10 | 26.90 | 104.70 | 82.70 | 0.00 |
| 15 | 14:09:53 | 14.10 | 5.10 | 19.00 | 106.70 | 81.80 | 0.00 |
| 16 | 14:10:53 | 13.90 | 5.20 | 23.00 | 98.40 | 83.20 | 0.00 |
| 17 | 14:11:52 | 13.70 | 5.40 | 22.90 | 87.90 | 85.70 | 0.00 |
| 18 | 14:12:52 | 13.60 | 5.50 | 25.00 | 80.40 | 87.20 | 0.00 |
| 19 | 14:13:51 | 13.60 | 5.50 | 26.70 | 75.20 | 87.00 | 0.00 |
| 20 | 14:14:51 | 13.60 | 5.40 | 14.50 | 74.70 | 87.40 | 0.00 |
| 21 | 14:15:50 | 13.60 | 5.50 | 9.00 | 72.50 | 88.30 | 0.00 |
| 22 | 14:16:49 | 13.60 | 5.50 | 23.80 | 72.00 | 88.20 | 0.00 |
| 23 | 14:17:49 | 13.60 | 5.40 | 13.60 | 85.60 | 79.60 | 0.00 |
| 24 | 14:18:48 | 14.30 | 4.80 | 22.90 | 116.90 | 53.50 | 0.00 |
| 25 | 14:19:48 | 15.30 | 4.10 | 24.60 | 109.20 | 42.80 | 0.00 |
| 26 | 14:20:47 | 15.60 | 4.10 | 26.00 | 82.10 | 54.20 | 0.00 |
| 27 | 14:21:47 | 15.00 | 4.40 | 31.10 | 112.10 | 69.90 | 0.00 |
| 28 | 14:22:46 | 14.90 | 4.40 | 31.10 | 138.80 | 68.90 | 0.00 |
| 29 | 14:23:46 | 15.00 | 4.40 | 34.10 | 152.10 | 70.00 | 0.00 |
| 30 | 14:24:46 | 14.00 | 5.30 | 25.80 | 131.00 | 85.70 | 0.00 |
| 31 | 14:25:46 | 13.10 | 5.90 | 26.70 | 72.70 | 93.30 | 0.00 |
| 32 | 14:26:45 | 12.90 | 5.90 | 25.30 | 57.20 | 91.70 | 0.00 |
| 33 | 14:27:45 | 13.10 | 5.80 | 22.10 | 83.30 | 84.20 | 0.00 |
| 34 | 14:28:45 | 13.60 | 5.50 | 19.90 | 123.00 | 80.70 | 0.00 |
| 35 | 14:29:44 | 13.90 | 5.10 | 20.80 | 132.00 | 65.30 | 0.00 |
| 36 | 14:30:44 | 14.90 | 4.40 | 23.10 | 115.00 | 48.70 | 0.00 |
| 37 | 14:31:44 | 15.30 | 4.20 | 24.80 | 105.50 | 45.00 | 0.00 |
| 38 | 14:32:43 | 15.30 | 4.20 | 25.40 | 107.20 | 45.30 | 0.00 |
| 39 | 14:33:43 | 15.30 | 4.20 | 21.70 | 86.80 | 52.70 | 0.00 |
| 40 | 14:34:43 | 15.30 | 4.20 | 24.90 | 75.30 | 54.70 | 0.00 |
| 41 | 14:35:43 | 15.30 | 4.20 | 23.70 | 76.90 | 55.20 | 0.00 |
| 42 | 14:36:42 | 15.10 | 4.30 | 26.90 | 113.60 | 67.40 | 0.00 |
| 43 | 14:37:42 | 15.20 | 4.30 | 29.70 | 134.20 | 66.40 | 0.00 |
| 44 | 14:38:42 | 15.10 | 4.30 | 28.80 | 109.40 | 63.00 | 0.00 |
| 45 | 14:39:41 | 15.10 | 4.30 | 31.10 | 131.90 | 67.30 | 0.00 |
| 46 | 14:40:41 | 14.80 | 4.50 | 27.80 | 145.00 | 72.20 | 0.00 |
| 47 | 14:41:41 | 14.60 | 4.60 | 25.00 | 137.50 | 56.10 | 0.00 |
| 48 | 14:42:40 | 14.70 | 4.60 | 22.80 | 145.10 | 51.50 | 0.00 |

# Instumental Method Raw Data Summary

Facility: Brunswick Hot Mix Corp. APC ID. #: 15654 NJ Stack #: 006

Run Number: 2 Date: 05/27/92

| Reading Number | Time | O2 Pct | CO2 Pct | THC-OUT PPMVW | CO PPMVD | NOx PPMVD | THC-IN PPMVW |
|---|---|---|---|---|---|---|---|
| 49 | 14:43:40 | 14.90 | 4.40 | 23.20 | 144.60 | 48.30 | 0.00 |
| 50 | 14:44:40 | 14.90 | 4.40 | 26.90 | 121.90 | 58.10 | 0.00 |
| 51 | 14:45:40 | 14.70 | 4.60 | 23.90 | 120.10 | 74.50 | 0.00 |
| 52 | 14:46:39 | 14.40 | 4.80 | 24.20 | 130.60 | 75.50 | 0.00 |
| 53 | 14:47:39 | 14.40 | 4.80 | 24.10 | 130.90 | 75.60 | 0.00 |
| 54 | 14:48:39 | 14.40 | 4.80 | 25.50 | 133.20 | 75.20 | 0.00 |
| 55 | 14:49:38 | 14.30 | 4.80 | 26.30 | 133.90 | 75.10 | 0.00 |
| 56 | 14:50:38 | 14.40 | 4.80 | 20.90 | 131.70 | 75.00 | 0.00 |
| 57 | 14:51:38 | 14.40 | 4.80 | 23.70 | 131.50 | 74.60 | 0.00 |
| 58 | 14:52:37 | 14.40 | 4.90 | 24.80 | 130.00 | 75.30 | 0.00 |
| 59 | 14:53:37 | 14.30 | 4.90 | 20.90 | 123.80 | 76.40 | 0.00 |
| 60 | 14:54:38 | 14.30 | 4.90 | 19.90 | 119.50 | 76.20 | 0.00 |
| Run Average | | 14.40 | 4.85 | 24.34 | 105.48 | 70.02 | 0.00 |

# Instumental Method Raw Data Summary

Facility: Brunswick Hot Mix Corp. APC ID. #: 15654 NJ Stack #: 006

Run Number: 3 Date: 05/28/92

| Reading Number | Time | O2 Pct | CO2 Pct | THC-OUT PPMVW | CO PPMVD | NOx PPMVD | THC-IN PPMVW |
|---|---|---|---|---|---|---|---|
| 1 | 06:11:01 | 15.20 | 4.20 | 20.00 | 87.30 | 46.50 | 0.00 |
| 2 | 06:12:01 | 15.70 | 4.00 | 19.50 | 78.80 | 44.50 | 0.00 |
| 3 | 06:13:00 | 15.80 | 3.90 | 21.60 | 80.00 | 42.50 | 0.00 |
| 4 | 06:14:00 | 15.60 | 4.00 | 22.20 | 83.70 | 44.50 | 0.00 |
| 5 | 06:14:59 | 15.60 | 4.10 | 21.30 | 84.50 | 44.80 | 0.00 |
| 6 | 06:15:58 | 15.60 | 4.10 | 19.50 | 78.20 | 47.00 | 0.00 |
| 7 | 06:16:58 | 15.60 | 4.10 | 11.40 | 70.90 | 48.60 | 0.00 |
| 8 | 06:17:57 | 15.60 | 4.10 | 19.30 | 62.40 | 52.10 | 0.00 |
| 9 | 06:18:57 | 15.60 | 4.10 | 16.40 | 59.40 | 52.00 | 0.00 |
| 10 | 06:19:56 | 15.60 | 4.10 | 20.50 | 61.00 | 51.60 | 0.00 |
| 11 | 06:20:56 | 15.60 | 4.10 | 19.80 | 60.60 | 51.40 | 0.00 |
| 12 | 06:21:55 | 15.50 | 4.10 | 21.50 | 60.90 | 51.20 | 0.00 |
| 13 | 06:22:55 | 15.60 | 4.10 | 22.70 | 61.90 | 51.70 | 0.00 |
| 14 | 06:23:54 | 15.60 | 4.00 | 12.00 | 64.00 | 51.30 | 0.00 |
| 15 | 06:24:53 | 15.60 | 4.00 | 10.20 | 63.20 | 51.50 | 0.00 |
| 16 | 06:25:53 | 15.60 | 4.10 | 18.20 | 61.00 | 53.60 | 0.00 |
| 17 | 06:26:52 | 15.30 | 4.30 | 19.40 | 92.30 | 66.50 | 0.00 |
| 18 | 06:27:52 | 15.10 | 4.40 | 21.70 | 115.50 | 66.10 | 0.00 |
| 19 | 06:28:51 | 14.90 | 4.50 | 21.70 | 116.00 | 69.40 | 0.00 |
| 20 | 06:29:51 | 14.40 | 4.90 | 21.70 | 108.30 | 75.40 | 0.00 |
| 21 | 06:30:50 | 14.30 | 4.90 | 23.60 | 98.00 | 77.30 | 0.00 |
| 22 | 06:31:50 | 14.40 | 4.90 | 17.50 | 94.60 | 71.40 | 0.00 |
| 23 | 06:32:49 | 14.40 | 4.90 | 10.50 | 122.30 | 54.30 | 0.00 |
| 24 | 06:33:48 | 14.60 | 4.70 | 18.10 | 127.80 | 51.00 | 0.00 |
| 25 | 06:34:48 | 14.60 | 4.70 | 19.70 | 132.10 | 50.80 | 0.00 |
| 26 | 06:35:47 | 14.60 | 4.70 | 17.30 | 131.00 | 51.50 | 0.00 |
| 27 | 06:36:47 | 14.60 | 4.70 | 18.10 | 127.40 | 51.40 | 0.00 |
| 28 | 06:37:46 | 14.70 | 4.70 | 18.70 | 123.10 | 52.70 | 0.00 |
| 29 | 06:38:46 | 14.60 | 4.70 | 18.80 | 120.80 | 52.00 | 0.00 |
| 30 | 06:39:46 | 14.60 | 4.70 | 15.30 | 117.50 | 52.10 | 0.00 |
| 31 | 06:40:46 | 14.60 | 4.70 | 9.60 | 124.10 | 51.40 | 0.00 |
| 32 | 06:41:45 | 14.60 | 4.70 | 8.70 | 124.80 | 51.70 | 0.00 |
| 33 | 06:42:45 | 14.70 | 4.70 | 8.00 | 124.50 | 51.80 | 0.00 |
| 34 | 06:43:44 | 14.60 | 4.70 | 17.00 | 125.90 | 52.20 | 0.00 |
| 35 | 06:44:44 | 14.60 | 4.70 | 17.80 | 120.30 | 52.20 | 0.00 |
| 36 | 06:45:44 | 14.60 | 4.70 | 18.70 | 125.20 | 52.00 | 0.00 |
| 37 | 06:46:44 | 14.60 | 4.70 | 20.40 | 131.70 | 50.80 | 0.00 |
| 38 | 06:47:43 | 14.50 | 4.70 | 18.70 | 136.70 | 50.60 | 0.00 |
| 39 | 06:48:43 | 14.60 | 4.70 | 19.10 | 140.90 | 51.20 | 0.00 |
| 40 | 06:49:42 | 14.70 | 4.70 | 10.20 | 146.90 | 50.80 | 0.00 |
| 41 | 06:50:42 | 14.60 | 4.70 | 12.10 | 152.40 | 50.50 | 0.00 |
| 42 | 06:51:42 | 14.60 | 4.70 | 17.40 | 148.10 | 50.40 | 0.00 |
| 43 | 06:52:41 | 14.80 | 4.60 | 20.50 | 133.80 | 48.30 | 0.00 |
| 44 | 06:53:41 | 14.90 | 4.50 | 16.20 | 126.10 | 47.40 | 0.00 |
| 45 | 06:54:41 | 14.90 | 4.50 | 17.20 | 123.60 | 47.90 | 0.00 |
| 46 | 06:55:40 | 15.00 | 4.50 | 20.70 | 124.20 | 48.30 | 0.00 |
| 47 | 06:56:40 | 14.90 | 4.50 | 18.00 | 105.20 | 52.70 | 0.00 |
| 48 | 06:57:40 | 15.00 | 4.50 | 14.00 | 76.10 | 54.50 | 0.00 |

# Instumental Method Raw Data Summary

Facility: Brunswick Hot Mix Corp. APC ID. #: 15654 NJ Stack #: 006

Run Number: 3 Date: 05/28/92

| Reading Number | Time | O2 Pct | CO2 Pct | THC-OUT PPMVW | CO PPMVD | NOx PPMVD | THC-IN PPMVW |
|---|---|---|---|---|---|---|---|
| 49 | 06:58:39 | 14.90 | 4.50 | 9.30 | 72.60 | 53.90 | 0.00 |
| 50 | 06:59:39 | 15.00 | 4.50 | 8.60 | 74.20 | 54.00 | 0.00 |
| 51 | 07:00:39 | 15.00 | 4.50 | 13.10 | 74.90 | 54.20 | 0.00 |
| 52 | 07:01:38 | 15.00 | 4.50 | 15.90 | 73.30 | 54.00 | 0.00 |
| 53 | 07:02:38 | 15.00 | 4.50 | 21.40 | 72.30 | 54.00 | 0.00 |
| 54 | 07:03:38 | 15.00 | 4.50 | 10.80 | 74.30 | 54.00 | 0.00 |
| 55 | 07:04:37 | 15.00 | 4.50 | 18.80 | 73.80 | 54.40 | 0.00 |
| 56 | 07:05:37 | 14.90 | 4.50 | 18.60 | 73.90 | 53.80 | 0.00 |
| 57 | 07:06:37 | 14.90 | 4.50 | 15.80 | 71.40 | 56.10 | 0.00 |
| 58 | 07:07:36 | 14.90 | 4.50 | 17.40 | 64.80 | 60.70 | 0.00 |
| 59 | 07:08:36 | 14.90 | 4.50 | 10.60 | 69.60 | 66.00 | 0.00 |
| 60 | 07:09:36 | 14.90 | 4.50 | 14.30 | 81.30 | 61.80 | 0.00 |
| Run Average | | 14.98 | 4.47 | 16.95 | 98.52 | 53.64 | 0.00 |

# APPENDIX D

## MONITOR CALIBRATION DATA

- SUMMARY REPORTS
- RAW DATA SUMMARY FORMS

New Jersey Department of Environmental Protection & Energy
Bureau of Technical Services
Instrumental Method Calibration Summary Report

Facility : Brunswick Hot Mix Corp. APC ID # : 15654 NJ Stack # : 006

Process : Batch Plant P&CT # : 042380 Log # : 90-2848

| Run Number : 1<br>Date : 05-27-1992 | | O2<br>Pct | CO2<br>Pct | THC-OUT<br>PPMV | CO<br>PPMV | NOx<br>PPMV | THC-IN<br>PPMV |
|---|---|---|---|---|---|---|---|
| Analyzer Span | | 25 | 10 | 100 | 500 | 250 | |
| Upscale Bias Gas | | 17.10 | 5.10 | 88.90 | 376.00 | 123.00 | 0.00 |
| Calibration Gases | Low | N/A | N/A | 27.50 | 91.30 | N/A | |
| | Mid | 10.10 | 5.10 | 48.40 | 178.00 | 123.00 | |
| | High | 17.10 | 9.35 | 88.90 | 376.00 | 217.00 | |
| Calibration Error Response | Zero | 0.00 | 0.00 | 0.30 | 0.40 | 0.00 | 0.00 |
| | Low | N/A | N/A | 26.30 | 87.60 | N/A | 0.00 |
| | Mid | 10.20 | 5.00 | 48.60 | 174.00 | 120.40 | 0.00 |
| | High | 17.10 | 9.40 | 90.80 | 380.60 | 216.10 | 0.00 |
| Initial Bias Response | Zero | 0.10 | 0.10 | 0.40 | 0.40 | 0.00 | 0.00 |
| | Upscale | 17.00 | 5.00 | 90.60 | 380.00 | 119.20 | 0.00 |
| Final Bias Response | Zero | 0.10 | 0.10 | 0.20 | 0.40 | 0.00 | 0.00 |
| | Upscale | 17.00 | 5.00 | 91.00 | 379.70 | 119.40 | 0.00 |
| RESULTS | | | | | | | |
| Calibration Error Results (% of Span) | Zero | 0.00 | 0.00 | 0.30 | 0.08 | 0.00 | ??????? |
| | Low | N/A | N/A | -1.20 | -0.74 | N/A | ??????? |
| | Mid | 0.40 | -1.00 | 0.20 | -0.80 | -1.04 | ??????? |
| | High | 0.00 | 0.50 | 1.90 | 0.92 | -0.36 | ??????? |
| Initial Bias Results (% of Span) | Zero | 0.40 | 1.00 | 0.10 | 0.00 | 0.00 | ??????? |
| | Upscale | -0.40 | 0.00 | -0.20 | -0.12 | -0.48 | ??????? |
| Final Bias Results (% of Span) | Zero | 0.40 | 1.00 | -0.10 | 0.00 | 0.00 | ??????? |
| | Upscale | -0.40 | 0.00 | 0.20 | -0.18 | -0.40 | ??????? |
| Analyzer Drift (% of Span) | Zero | 0.00 | 0.00 | -0.20 | 0.00 | 0.00 | ??????? |
| | Upscale | 0.00 | 0.00 | 0.40 | -0.06 | 0.08 | ??????? |

**Calibration Error MUST be less than or equal to 2 percent of Span.**

Calibration Bias MUST be less than or equal to 5 percent of Span.

Calibration Drift Must be less than or equal to 3 percent of Span.

New Jersey Department of Environmental Protection & Energy
Bureau of Technical Services
Instrumental Method Calibration Summary Report

Facility : Brunswick Hot Mix Corp. APC ID # : 15654 NJ Stack # : 006

Process : Batch Plant P&CT # : 042380 Log # : 90-2848

| Run Number : 2<br>Date : 05-27-1992 | | O2<br>Pct | CO2<br>Pct | THC-OUT<br>PPMV | CO<br>PPMV | NOx<br>PPMV | THC-IN<br>PPMV |
|---|---|---|---|---|---|---|---|
| Analyzer Span | | 25 | 10 | 100 | 500 | 250 | |
| Upscale Bias Gas | | 17.10 | 5.10 | 88.90 | 376.00 | 123.00 | 0.00 |
| Calibration Gases | Low | N/A | N/A | 27.50 | 91.30 | N/A | |
| | Mid | 10.10 | 5.10 | 48.40 | 178.00 | 123.00 | |
| | High | 17.10 | 9.35 | 88.90 | 376.00 | 217.00 | |
| Calibration Error Response | Zero | 0.00 | 0.00 | 0.30 | 0.40 | 0.00 | 0.00 |
| | Low | N/A | N/A | 26.30 | 87.60 | N/A | 0.00 |
| | Mid | 10.20 | 5.00 | 48.60 | 174.00 | 120.40 | 0.00 |
| | High | 17.10 | 9.40 | 90.80 | 380.60 | 216.10 | 0.00 |
| Initial Bias Response | Zero | 0.10 | 0.10 | 0.20 | 0.40 | 0.00 | 0.00 |
| | Upscale | 17.00 | 5.00 | 91.00 | 379.70 | 119.40 | 0.00 |
| Final Bias Response | Zero | 0.00 | 0.10 | 0.00 | 0.40 | 0.00 | 0.00 |
| | Upscale | 16.90 | 5.00 | 90.50 | 380.80 | 119.70 | 0.00 |
| RESULTS | | | | | | | |
| Calibration Error Results (% of Span) | Zero | 0.00 | 0.00 | 0.30 | 0.08 | 0.00 | ??????? |
| | Low | N/A | N/A | -1.20 | -0.74 | N/A | ??????? |
| | Mid | 0.40 | -1.00 | 0.20 | -0.80 | -1.04 | ??????? |
| | High | 0.00 | 0.50 | 1.90 | 0.92 | -0.36 | ??????? |
| Initial Bias Results (% of Span) | Zero | 0.40 | 1.00 | -0.10 | 0.00 | 0.00 | ??????? |
| | Upscale | -0.40 | 0.00 | 0.20 | -0.18 | -0.40 | ??????? |
| Final Bias Results (% of Span) | Zero | 0.00 | 1.00 | -0.30 | 0.00 | 0.00 | ??????? |
| | Upscale | -0.80 | 0.00 | -0.30 | 0.04 | -0.28 | ??????? |
| Analyzer Drift (% of Span) | Zero | -0.40 | 0.00 | -0.20 | 0.00 | 0.00 | ??????? |
| | Upscale | -0.40 | 0.00 | -0.50 | 0.22 | 0.12 | ??????? |

Calibration Error MUST be less than or equal to 2 percent of Span.

Calibration Bias MUST be less than or equal to 5 percent of Span.

Calibration Drift Must be less than or equal to 3 percent of Span.

New Jersey Department of Environmental Protection & Energy
Bureau of Technical Services
Instrumental Method Calibration Summary Report

Facility : Brunswick Hot Mix Corp. APC ID # : 15654 NJ Stack # : 006

Process : Batch Plant P&CT # : 042380 Log # : 90-2848

| Run Number : 3<br>Date : 05-28-1992 | | O2<br>Pct | CO2<br>Pct | THC-OUT<br>PPMV | CO<br>PPMV | NOx<br>PPMV | THC-IN<br>PPMV |
|---|---|---|---|---|---|---|---|
| Analyzer Span | | 25 | 10 | 100 | 500 | 250 | |
| Upscale Bias Gas | | 17.10 | 5.10 | 48.40 | 91.30 | 123.00 | 0.00 |
| Calibration Gases | Low | N/A | N/A | 27.50 | 91.30 | N/A | |
| | Mid | 10.10 | 5.10 | 48.40 | 178.00 | 123.00 | |
| | High | 17.10 | 9.35 | 88.90 | 376.00 | 217.00 | |
| Calibration Error Response | Zero | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Low | N/A | N/A | 25.50 | 87.20 | N/A | 0.00 |
| | Mid | 10.20 | 5.00 | 48.60 | 174.20 | 120.90 | 0.00 |
| | High | 17.10 | 9.30 | 90.10 | 380.00 | 216.10 | 0.00 |
| Initial Bias Response | Zero | 0.10 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 |
| | Upscale | 17.00 | 5.00 | 49.20 | 86.60 | 120.70 | 0.00 |
| Final Bias Response | Zero | 0.10 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 |
| | Upscale | 17.10 | 5.00 | 48.80 | 87.20 | 119.60 | 0.00 |
| RESULTS | | | | | | | |
| Calibration Error Results (% of Span) | Zero | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ??????? |
| | Low | N/A | N/A | -2.00 | -0.82 | N/A | ??????? |
| | Mid | 0.40 | -1.00 | 0.20 | -0.76 | -0.84 | ??????? |
| | High | 0.00 | -0.50 | 1.20 | 0.80 | -0.36 | ??????? |
| Initial Bias Results (% of Span) | Zero | 0.40 | 0.00 | 0.00 | 0.08 | 0.00 | ??????? |
| | Upscale | -0.40 | 0.00 | 0.60 | -0.12 | -0.08 | ??????? |
| Final Bias Results (% of Span) | Zero | 0.40 | 0.00 | 0.00 | 0.08 | 0.00 | ??????? |
| | Upscale | 0.00 | 0.00 | 0.20 | 0.00 | -0.52 | ??????? |
| Analyzer Drift (% of Span) | Zero | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | ??????? |
| | Upscale | 0.40 | 0.00 | -0.40 | 0.12 | -0.44 | ??????? |

Calibration Error MUST be less than or equal to 2 percent of Span.

Calibration Bias MUST be less than or equal to 5 percent of Span.

Calibration Drift Must be less than or equal to 3 percent of Span.

# Instrumental Method Data Summary Form

Facility: Brunswick Hot Mix Corp.
Purpose : COMPLIANCE

APC ID NO. : 15654
NJ Stack NO.: 006
P&Ct/Log NO.: 042380
90-2848

Run Number: 1 Date: 5/27/92

| Monitor | Cal Gases | Error <2% | I Bias <5% | F Bias <5% | Drift <3% | Run Average |
|---|---|---|---|---|---|---|
| Oxygen Span = 25 (%) | 0 | 0.0 | 0.1 | 0.1 | | |
| | | | | | | |
| | 10.1 | 10.2 | | | | |
| | 17.1 • | 17.1 | 17.0 | 17.0 | | |
| Tolerance (%) | | .5 | 1.25 | 1.25 | .75 | |
| Carbon Dioxide Span = 10 (%) | 0 | 0.0 | 0.1 | 0.1 | | |
| | | | | | | |
| | 5.1 • | 5.0 | 5.0 | 5.0 | | |
| | 9.35 | 9.4 | | | | |
| Tolerance (%) | | .2 | .5 | .5 | .3 | |
| Nitrogen Oxides Span = 250 (ppm) | 0 | 0.0 | 0.0 | 0.0 | | |
| | | | | | | |
| | 123 • | 120.4 | 119.2 | 119.4 | | |
| | 217 | 216.1 | | | | |
| Tolerance (ppm) | | 5 | 12.5 | 12.5 | 7.5 | |
| Carbon Monoxide Span = 500 (ppm) | 0 | 0.4 | 0.4 | 0.4 | | |
| | 91.3 • | 87.6 | | | | |
| | 178 | 174.0 | | | | |
| | 376 • | 380.6 | 380.0 | 379.7 | | |
| Tolerance (ppm) | | 10 | 25 | 25 | 15 | |
| Outlet Total Hydrocarbons Span = 100 (ppm) "Propane" | 0 | 0.3 | 0.4 | 0.2 | | |
| | 27.5 | 26.3 | | | | |
| | 48.4 • | 48.6 | | | | |
| | 88.9 • | 90.8 | 90.6 | 91.0 | | |
| Tolerance (ppm) | | 2 | 5 | 5 | 3 | |
| Inlet Total Hydrocarbons Span = 1000 (ppm) "Propane" | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Tolerance (ppm) | | 20 | 50 | 50 | 30 | |

# Instrumental Method Data Summary Form

Facility: Brunswick Hot Mix Corp.
Purpose : compliance

APC ID NO. : 15654
NJ Stack NO.: 006
P&Ct/Log NO.: 042380
90-2848

Run Number: 2 Date: 5/27/92

| Monitor | Cal Gases | Error <2% | I Bias <5% | F Bias <5% | Drift <3% | Run Average |
|---|---|---|---|---|---|---|
| Oxygen Span = 25 (%) | 0 | | 0.1 | 0.0 | | |
| | | | | | | |
| | 10.1 | | | | | |
| | 17.1 | | 17.0 | 16.9 | | |
| Tolerance (%) | | .5 | 1.25 | 1.25 | .75 | |
| Carbon Dioxide Span = 10 (%) | 0 | | 0.1 | 0.1 | | |
| | | | | | | |
| | 5.1 | | 5.0 | 5.0 | | |
| | 9.35 | | | | | |
| Tolerance (%) | | .2 | .5 | .5 | .3 | |
| Nitrogen Oxides Span = 250 (ppm) | 0 | | 0.0 | 0.0 | | |
| | | | | | | |
| | 123 | | 119.4 | 119.7 | | |
| | 217 | | | | | |
| Tolerance (ppm) | | 5 | 12.5 | 12.5 | 7.5 | |
| Carbon Monoxide Span = 500 (ppm) | 0 | | 0.4 | 0.4 | | |
| | 91.3 | | | | | |
| | 178 | | | | | |
| | 376 | | 377.7 | 380.8 | | |
| Tolerance (ppm) | | 10 | 25 | 25 | 15 | |
| Outlet Total Hydrocarbons Span = 100 (ppm) "Propane" | 0 | | 0.2 | 0.0 | | |
| | 27.5 | | | | | |
| | 48.4 | | | | | |
| | 88.9 | | 91.0 | 90.5 | | |
| Tolerance (ppm) | | 2 | 5 | 5 | 3 | |
| Inlet Total Hydrocarbons Span = 1000 (ppm) "Propane" | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Tolerance (ppm) | | 20 | 50 | 50 | 30 | |

# Instrumental Method Data Summary Form

Facility: Brunswick Hot Mix Corp.
Purpose : Compliance

APC ID NO. : 15654
NJ Stack NO.: 006
P&Ct/Log NO.: 042380
90-2848

Run Number: 3 Date: 5/28/92

| Monitor | Cal Gases | Error <2% | I Bias <5% | F Bias <5% | Drift <3% | Run Average |
|---|---|---|---|---|---|---|
| Oxygen Span = 25 (%) | 0 | 0.0 | 0.1 | 0.1 | | |
| | | | | | | |
| | 10.1 | 10.2 | | | | |
| | 17.1 • | 17.1 | 17.0 | 17.1 | | |
| Tolerance (%) | | .5 | 1.25 | 1.25 | .75 | |
| Carbon Dioxide Span = 10 (%) | 0 | 0.0 | 0.0 | 0.0 | | |
| | | | | | | |
| | 5.1 • | 5.0 | 5.0 | 5.0 | | |
| | 9.35 | 9.3 | | | | |
| Tolerance (%) | | .2 | .5 | .5 | .3 | |
| Nitrogen Oxides Span = 250 (ppm) | 0 | 0.0 | 0.0 | 0.0 | | |
| | | | | | | |
| | 123 • | 120.9 | 120.7 | 119.6 | | |
| | 217 | 216.1 | | | | |
| Tolerance (ppm) | | 5 | 12.5 | 12.5 | 7.5 | |
| Carbon Monoxide Span = 500 (ppm) | 0 | 0.0 | 0.4 | 0.4 | | |
| | 91.3 • | 87.2 | 86.6 | 87.2 | | |
| | 178 | 174.2 | | | | |
| | 376 | 380.0 | | | | |
| Tolerance (ppm) | | 10 | 25 | 25 | 15 | |
| Outlet Total Hydrocarbons Span = 100 (ppm) "Propane" | 0 | 0.0 | 0.0 | 0.0 | | |
| | 27.5 | 25.5 | | | | |
| | 48.4 • | 48.6 | 49.2 | 48.8 | | |
| | 88.9 | 90.1 | | | | |
| Tolerance (ppm) | | 2 | 5 | 5 | 3 | |
| Inlet Total Hydrocarbons Span = 1000 (ppm) "Propane" | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Tolerance (ppm) | | 20 | 50 | 50 | 30 | |

6.38

# APPENDIX E

## MOISTURE DATA AND CALCULATIONS

- SUMMARY REPORT
- FIELD DATA AND CALCULATIONS

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ENERGY
BUREAU OF TECHNICAL SERVICES
COMPLIANCE TEST MOISTURE DETERMINATION

FACILITY: BRUNSWICK HOT MIX CORP.
APC ID NO: 15654
NJ STACK NO: 006

| DATE | RUN | MATERIAL TYPE | BAROMETRIC PRESSURE | STANDARD METER VOL. | IMPINGER COLLECT | SILICA COLLECT | PERCENT MOISTURE |
|---|---|---|---|---|---|---|---|
| 05-27-92 | 1 | VIRGIN | 29.95 | 41.993 | 159.0 | 15.1 | 16.39 % |
| 05-27-92 | 2 | VIRGIN | 29.95 | 41.311 | 162.0 | 19.6 | 17.21 % |
| 05-28-92 | 3 | VIRGIN | 30.05 | 42.513 | 170.0 | 8.8 | 16.59 % |

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF TECHNICAL SERVICES
TRAVERSE-CONDENSATE SHEET

| | | | |
|---|---|---|---|
| COMPANY: BRUNSWICK HOT MIX CORP. | | | ID #: 15654 |
| STACK: HOT MIX | | INLET or OUTLET | N.J. #: 006 |
| ADDITIONAL TEST: THC, CO | | RUN #: 2 | DATE: 5/27/92 |
| DESICCANT #: 7 | WET GAIN: 19.6 gms | Pst (H2O): -4.8 | Pb (Hg): 29.95 |

**IMPINGERS**
1 100 ml H2O
2 EMPTY
3 SILICA GEL
4 ____

H2O COLLECTED: 162 mls

**TEST TIMES**
START: 1:55 AM PM
STOP: 2:55 AM PM
SAMPLING TIME (MIN): 60

**FYRITE**
% CO2 ____
% O2 ____
Cp: ____ ID # ____

| TRAVERSES | | | | | | Pt | CONDENSATE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PORT | POINT | ΔP1 Stack | Ts1 | ΔP2 | Ts2 | | TMIN | TMOUT | TMAVG | ΔH | Hg | REMARKS |
| | | 1.5 | | | 196 | 1 | 80 | 72 | 76 | 1.5 | 6" | 0 |
| | | 1.6 | | | 198 | 2 | 80 | 74 | 77 | 1.5 | 7" | 300 |
| | | 1.6 | | | 203 | 3 | 82 | 74 | 78 | 1.5 | 7" | 600 |
| | | 1.6 | | | 212 | 4 | 84 | 76 | 80 | 1.5 | 7" | 900 |
| | | 1.6 | | | 217 | 5 | 84 | 76 | 80 | 1.5 | 8" | 1200 |
| | | 1.6 | | | 219 | 6 | 84 | 76 | 80 | 1.5 | 8" | 1500 |
| | | 1.6 | | | 211 | 7 | 84 | 76 | 80 | 1.5 | 8" | 1800 |
| | | 1.5 | | | 216 | 8 | 84 | 76 | 80 | 1.5 | 8" | 2100 |
| | | 1.6 | | | 209 | 9 | 84 | 76 | 80 | 1.5 | 8" | 2400 |
| | | 1.6 | | | 202 | 10 | 84 | 76 | 80 | 1.5 | 8" | 2700 |
| | | 1.6 | | | 201 | 11 | 84 | 76 | 80 | 1.5 | 8" | 3000 |
| | | 1.6 | | | 201 | 12 | 84 | 76 | 80 | 1.5 | 8" | 3300-3600 |
| | | | | TS AVG | 207 | | AVG. | | 79 | 1.5 | | |
| AVG. | | | | | | | | | | | | |

AVG. Ts = ____
AVG √ΔP = ____

Tm = 539 PM = 30.06

**METER DATA**
ID#: 11 Y = 1.000
ORIFICE ID#: 0-9 ΔH@ = 1.70
FINAL VOL.: 462.616
INIT. VOL.: 420.800
Vm : 41.816 * Y = 41.816

**LEAK RATE**
PRE.: .001 @ 15" CFM @ "Hg
POST: .001 @ 10" CFM @ "Hg

TESTED BY: BOB KERTING, FRANK PAPP
FRED BALLAY

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF TECHNICAL SERVICES
TRAVERSE-CONDENSATE SHEET

| | | | |
|---|---|---|---|
| COMPANY: BRUNSWICK HOT MIX CORP. | | | ID #: 15654 |
| STACK: HOT MIX | | ~~INLET~~ or OUTLET | N.J. #: 006 |
| ADDITIONAL TEST: THC, CO | | RUN #: 1 | DATE: 5/27/92 |
| DESICCANT #: 3 | WET GAIN: 15.1 gm. | Pst (H2O): -48 | Pb (Hg): 29.95 |

**IMPINGERS**
1 100 mls $H_2O$
2 EMPTY
3 SILICA GEL
4 —

H2O COLLECTED: 159 mls

**TEST TIMES**
START: 12:40 AM (PM)
STOP: 1:40 AM (PM)
SAMPLING TIME (MIN): 60

**FYRITE**

| | | | | |
|---|---|---|---|---|
| % CO2 | — | | | |
| % O2 | — | | | |

Cp: — ID # —

| ~~TRAVERSES~~ | | | | | | Pt | CONDENSATE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PORT | POINT | ΔP1 | Ts1 | ΔP2 | Ts2 | | TMIN | TMOUT | TMAVG | ΔH | Hg | REMARKS |
| | | 1.5" | | | 206 | 1 | 62 | 60 | 61 | 1.5 | 6" | 0 |
| | | 1.6" | | | 205 | 2 | 62 | 60 | 61 | 1.5 | 6" | 300 |
| | | 1.6" | | | 202 | 3 | 64 | 60 | 62 | 1.5 | 6" | 600 |
| | | 1.6" | | | 203 | 4 | 66 | 60 | 63 | 1.5 | 6" | 900 |
| | | 1.6" | | | 205 | 5 | 68 | 60 | 64 | 1.5 | 6" | 1200 |
| | | 1.6" | | | 200 | 6 | 72 | 60 | 66 | 1.5 | 6" | 1500 |
| | | 1.6" | | | 202 | 7 | 74 | 62 | 68 | 1.5 | 6" | 1800 |
| | | 1.6" | | | 214 | 8 | 76 | 64 | 70 | 1.5 | 6" | 2100 |
| | | 1.6 | | | 209 | 9 | 80 | 66 | 73 | 1.5 | 6" | 2400 |
| | | 1.7 | | | 210 | 10 | 82 | 68 | 75 | 1.5 | 6" | 2700 |
| | | 1.6 | | | 208 | 11 | 86 | 70 | 78 | 1.5 | 6" | 3000 |
| | | 1.6 | | | 205 | 12 | 86 | 72 | 79 | 1.5 | 6" | 3300 3600 |
| | | | | | 206 | | AVG. | | 68 | 1.5 | | |
| AVG. | | | | | | | | | | | | |

TM = 528 °R = 30.06

AVG. Ts = _____

AVG √ΔP = _____

**METER DATA**
ID#: 11 Y = 1.000
ORIFICE ID#: 0-9 ΔH@ = 1.70
FINAL VOL.: 419.549
INIT. VOL.: 377.910
Vm : ~~[illegible]~~ * Y = 41.639

**LEAK RATE**
PRE.: 0.0 @ 16 CFM @ "Hg
POST: 0.0 @ 7" CFM @ "Hg

TESTED BY: Bob Kelly, FRANK PAPP
FRED BALLAY

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF TECHNICAL SERVICES
TRAVERSE-CONDENSATE SHEET

| | | | |
|---|---|---|---|
| COMPANY: BRUNSWICK HOT MIX CORP. | | | ID #: 15654 |
| STACK: HOT MIX | | INLET or OUTLET | N.J. #: 006 |
| ADDITIONAL TEST: THC, CO | | RUN #: 3 | DATE: 5/28/92 |
| DESICCANT #: 9 | NET GAIN: 8.8 gms | Pst (H2O): -4.8 | Pb (Hg): 30.05 |

**IMPINGERS**
1 Empty
2 H2O
3 empty
4 SILICA GEL

H2O COLLECTED: 170 mls

**TEST TIMES**
START: 6:10 AM PM
STOP: 7:10 AM PM
SAMPLING TIME (MIN): 60

**FYRITE**
% CO2
% O2
Cp: ~~ID #~~

| TRAVERSES | | | | | | Pt | CONDENSATE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PORT | POINT | ΔP1 | ~~Ts1~~ Bag | ΔP2 | Ts2 | | TMIN | TMOUT | TMAVG | ΔH | Hg | REMARKS |
| | | | 13 | | 189 | 1 | 52 | 44 | 48 | 15 | 8" | 0 |
| | | | 12 | | 187 | 2 | 58 | 44 | 51 | 1.5 | 8" | 300 |
| | | | 12 | | 187 | 3 | 62 | 46 | 54 | 15 | 8" | 600 |
| | | | 1.2 | | 186 | 4 | 64 | 46 | 55 | 15 | 8" | 900 |
| | | | 12 | | 191 | 5 | 64 | 46 | 55 | 15 | 8" | 1200 |
| | | | 1.2 | | 194 | 6 | 66 | 48 | 57 | 15 | 8" | 1500 |
| | | | 11 | | 195 | 7 | 66 | 50 | 58 | 15 | 8" | 1800 |
| | | | 1.1 | | 195 | 8 | 66 | 50 | 58 | 1.5 | 8" | 2100 |
| | | | 1.1 | | 196 | 9 | 66 | 50 | 58 | 1.5 | 8" | 2400 |
| | | | 1.1 | | 194 | 10 | 68 | 52 | 60 | 15 | 8" | 2700 |
| | | | 1.1 | | 194 | 11 | 70 | 54 | 62 | 1.5 | 8" | 3000 |
| | | | 1.1 | | 193 | 12 | 72 | 56 | 64 | 1.5 | 8" | 3300 3600 |
| | | | | | | | AVG. | | 57 | 1.5 | | |
| AVG. | | | | | | | | | | | | |

TM = 517 PM = 30.16

AVG. Ts = _____

AVG √ΔP = _____

**METER DATA**
ID#: 11 Y = 1.000
ORIFICE ID#: 0-9 ΔH@ = 1.70
FINAL VOL.: 535.050
INIT. VOL.: 493.910
Vm : 41.140 * Y = 41.140

**LEAK RATE**
PRE.: 0.0 @ 16 CFM @ "Hg
POST: 0.00309" CFM @ "Hg

TESTED BY: KETTIG, PAPP

# APPENDIX F

## EQUIPMENT CALIBRATION AND QUALITY ASSURANCE

- CALIBRATION GAS CERTIFICATES OF ANALYSIS
- METER CALIBRATION
- ORIFICE CALIBRATION

**MG 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: 05/08/91

P.O. NO.

ORDER NO. 816079-002

REF. # WCP-182

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| 3X-2132 | Carbon Dioxide | 5 % | 5.10 % |
| | Oxygen | 17 % | 17.1 % |
| | Nitrogen | Balance | Balance |

Recd 5/21/91

ANALYST

Walter C. Preller

MG 23301/A 3/89

**MG 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 18124

DATE: 05/08/91
P.O. NO.
ORDER NO. 816079-003
REF. # WCP-183

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| 250-023696 | Carbon Dioxide | 9 % | 9.35 % |
| | Oxygen | 10 % | 10.1 % |
| | Nitrogen | Balance | Balance |

Rec'd 5/21/91

ANALYST

Walter C. Preller

MG 23301/A 3/89

**MG 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: 07/10/91

P.O. NO.

ORDER NO. 880101-001

REF. # PMF-035

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| CC55186 | CARBON MONOXIDE | 90 ppm | 91.3 ppm |
| | Nitrogen | Balance | Balance |

Peter Michael Fazio

ANALYST

MG 23301/A 3/89

**MG 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 Chufch St.
Philadelphia , PA 19124

DATE: 05/07/91

P.O. NO.

ORDER NO. 816113-001

REF. # EM-890-4

| CYLINDER NO. | CONSTITUENTS | CONCENTRATION: NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| CC99736 | Carbon Monoxide | 180 ppm | 178 ppm |
| | Nitrogen | Balance | Balance |

Rec'd 5/21/91

E Maxwell

Eben Maxwell ANALYST

MG 23301/A 3/89

**MG 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: 05/07/91
P.O. NO.
ORDER NO. 616113-001
REF. # EM-890-5

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| CC99920 | Carbon Monoxide | 400 ppm | 376 ppm |
| | Nitrogen | Balance | Balance |

Recd 5/21/91

E. Maxwell

Eben Maxwell ANALYST

MG 23301/A 3/89

**MG 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: 05/13/91

P.O. NO.

ORDER NO. 623998-001

REF. # WCP-221

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| 44-3986 | Hydrogen | 40 % | 39.6 % |
| | Total Hydrocarbons | <0.5 ppm | <0.5 ppm |
| | Helium | Balance | Balance |

ANALYST

Walter C. Preller

MG 23301/A 3/89

**MG 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: 05/07/91

P.O. NO. -

ORDER NO. 616134-001

REF. # WCP-175

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| 35523 | Propane | 25 ppm | 27.5 ppm |
| | Nitrogen | Balance | Balance |

Rec'd 5/21/91

ANALYST

Walter C. Preller

MG 23301/A 3/89

**MG 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: 05/03/91

P.O. NO.

ORDER NO. 616134-002

REF. # WCP-176

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| 250-042432 | Propane | 50 ppm | 48.4 ppm |
| | Nitrogen | Balance | Balance |

Recd 5/21/91

Walter C. Preller
ANALYST

Walter C. Preller

MG 23301/A 3/89

**MG 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: 05/07/91

P.O. NO.

ORDER NO. 616134-003

REF. # WCP-177

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| 2A-0645 | Propane | 90 ppm | 88.9 ppm |
| | Nitrogen | Balance | Balance |

ANALYST

Walter C. Preller

MG 23301/A 3/89

**MG 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: 05/10/91
P.O. NO.
ORDER NO. 618079-001
REF. # EM-900-5

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| CC38748 | Nitric Oxide | 125 ppm | 123 ppm |
| | Nitrogen | Balance | Balance |

Rec'd 5/21/91

Eb Maxwell
ANALYST
Eben Maxwell

MG 23301/A 3/89

**MG 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: 05/13/91

P.O. NO.

ORDER NO. 616079-001

REF. # EM-900-6

| CYLINDER NO. | CONSTITUENTS CONCENTRATION: | NOMINAL | ACTUAL |
|---|---|---|---|
| | CERTIFIED MIXTURE | | |
| CC88255 | Nitric Oxide | 220 ppm | 217 ppm |
| | Nitrogen | Balance | Balance |

Rec'd 5/21/91

Eben Maxwell

Eben Maxwell ANALYST

MG 23301/A 3/89