

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.

Background Report Reference

AP-42 Section Number: 10.6.1

Background Report Section: 4

Reference Number: 92

**Title: Air Emissions Diagnostic Test
Report for Louisiana Pacific
Corporation, Dungannon, VA,
July 27-28, 1995**

ETS, Inc.

August 1995

RECEIVED
SEP 28 1995
LOUISIANA PACIFIC CORP.
HAYWARD, WISCONSIN

4-92

AIR EMISSIONS DIAGNOSTIC TEST REPORT

FOR

LOUISIANA PACIFIC
DUNGANNON, VIRGINIA

TEST DATES: JULY 27 - 28, 1995
REPORT DATE: AUGUST 29, 1995



ETS, INC.

A subsidiary of ETS International, Inc.

*ETS, Inc.
1401 Municipal Road, N.W.
Roanoke, VA 24012
540-265-0004
540-265-0131 fax*

*Air Compliance Division
1635-A Bustleton Pike
Feasterville, PA 19053
215-364-8940
215-364-4596 fax*

*Pollution Control Consultants
Specializing In
Toxic Emission Measurement and Control*

ETS 553

ETS CONTRACT NO. 95-553-T

TABLE OF CONTENTS

| | <u>PAGE</u> |
|---|-------------|
| 1.0 INTRODUCTION | 1 |
| 1.1 BACKGROUND | 1 |
| 1.2 OBJECTIVE | 1 |
| 1.3 TEST PROGRAM | 1 |
| 2.0 SUMMARY OF RESULTS | 2 |
| 3.0 SOURCE DESCRIPTION | 2 |
| 4.0 SAMPLING AND ANALYTICAL PROCEDURES | 2 |
| 4.1 SAMPLING PROCEDURES | 8 |
| 4.1.1 SAMPLING POINT DETERMINATION | |
| EPA METHOD 1 | 8 |
| 4.1.2 VOLUMETRIC MEASUREMENTS - EPA METHOD 2 | 10 |
| 4.1.3 MOLECULAR WEIGHT DETERMINATION | |
| EPA METHOD 3 AND 3A | 10 |
| 4.1.3.1 MOLECULAR WEIGHT DETERMINATION - | |
| EPA METHOD 3 | 10 |
| 4.1.3.2 MOLECULAR WEIGHT DETERMINATION - | |
| EPA METHOD 3A | 11 |
| 4.1.4 FLUE GAS MOISTURE CONTENT - EPA METHOD 4 | 11 |
| 4.1.5 PARTICULATE SAMPLING | 13 |
| 4.1.5.1 SAMPLING TRAIN DESCRIPTION | 13 |
| 4.1.5.2 SAMPLING TRAIN OPERATION | 15 |
| 4.1.5.3 SAMPLE RECOVERY AND CLEAN-UP | 15 |
| 4.1.5.4 BLANKS | 16 |
| 4.1.6 FORMALDEHYDE DETERMINATION - BIF | |
| METHOD 0011 | 16 |
| 4.1.6.1 SAMPLING TRAIN DESCRIPTION | 16 |
| 4.1.6.2 SAMPLING TRAIN OPERATION | 18 |
| 4.1.6.3 SAMPLE RECOVERY AND CLEAN-UP | 18 |
| 4.1.6.4 SAMPLE STORAGE AND TRANSPORT | 19 |
| 4.1.6.5 BLANKS | 19 |
| 4.1.7 METHYLENE BISPHENYL ISOCYANATE (MDI) | |
| SAMPLING - DRAFT EPA MACT METHOD | 20 |
| 4.1.7.1 SAMPLING TRAIN DESCRIPTION | 20 |
| 4.1.7.2 SAMPLING TRAIN OPERATION | 22 |
| 4.1.7.3 SAMPLE RECOVERY AND CLEAN-UP | 22 |
| 4.1.7.4 SAMPLE STORAGE AND TRANSPORT | 24 |
| 4.1.7.5 FIELD BLANKS | 24 |
| 4.1.8 CONTINUOUS MONITORING FOR SO ₂ , NO _x , CO, | |
| THC, O ₂ , AND CO ₂ - INSTRUMENTAL METHODS | 24 |
| 4.1.8.1 SAMPLING SYSTEM DESCRIPTION | 25 |
| 4.1.8.2 DATA ACQUISITION SYSTEM | 27 |
| 4.1.8.3 DRY SYSTEM CALIBRATION | 27 |
| 4.1.8.4 WET SYSTEM CALIBRATION | 28 |

TABLE OF CONTENTS (CONTINUED)

| | <u>PAGE</u> |
|--|-------------|
| 4.2 ANALYTICAL PROCEDURES | 29 |
| 4.2.1 MOLECULAR WEIGHT DETERMINATION - EPA METHODS 3A | 29 |
| 4.2.2 MOISTURE CONTENT - EPA METHOD 4 | 29 |
| 4.2.3 PARTICULATE ANALYSES - EPA METHOD 5 AND 202 | 30 |
| 4.2.4 FORMALDEHYDE ANALYSES | 31 |
| 4.2.5 METHYLENE BISPHENYL ISOCYANATE (MDI) ANALYSES | 31 |
| 5.0 DATA ANALYSIS | 32 |
| 6.0 EQUIPMENT CALIBRATION | 32 |

LIST OF TABLES

| | |
|--|---|
| TABLE 1 - SUMMARY OF AVERAGE EMISSIONS | 3 |
| TABLE 2 - SUMMARY OF PARTICULATE EMISSIONS | 4 |
| TABLE 3 - SUMMARY OF FORMALDEHYDE EMISSIONS | 5 |
| TABLE 4 - SUMMARY OF MDI EMISSIONS | 6 |
| TABLE 5 - SUMMARY OF SO ₂ , NO _x , CO, AND VOC EMISSIONS | 7 |

LIST OF FIGURES

| | |
|--|----|
| FIGURE 1 - SAMPLING AND TRAVERSE POINTS FOR RTO STACK | 9 |
| FIGURE 2 - EPA METHOD 3 SAMPLING TRAIN | 12 |
| FIGURE 3 - EPA METHOD 5/202 SAMPLING TRAIN | 14 |
| FIGURE 4 - BIF METHOD 0011 SAMPLING TRAIN | 17 |
| FIGURE 5 - SAMPLING TRAIN FOR MDI | 21 |
| FIGURE 6 - CONTINUOUS MONITORING SYSTEM FOR EPA METHODS 3A, 6C, 7E, 10, AND 25A | 26 |

LIST OF APPENDICES

- APPENDIX A - TEST LOG
- APPENDIX B - DATA AND RESULTS FOR EPA METHOD 5/202 TESTING
RTO STACK
- APPENDIX C - DATA AND RESULTS FOR BIF METHOD 0011 TESTING
RTO STACK
- APPENDIX D - DATA AND RESULTS FOR MDI TESTING
RTO STACK
- APPENDIX E - DATA AND RESULTS FOR EPA METHODS 3A, 6C, 7E, 10, AND
25A TESTING - RTO STACK
- APPENDIX F - CALCULATIONS
- APPENDIX G - RAW FIELD DATA FOR EPA METHOD 5/202 TESTING
RTO STACK
- APPENDIX H - RAW FIELD DATA BIF METHOD 0011 TESTING
RTO STACK
- APPENDIX I - RAW FIELD DATA FOR MDI TESTING
RTO STACK
- APPENDIX J - CEMS ANALYZER CALIBRATION DATA AND SAMPLING SYSTEM
CALIBRATION DRIFT DATA AND RESULTS
- APPENDIX K - GRAVIMETRICS LABORATORY DATA
- APPENDIX L - FORMALDEHYDE LABORATORY DATA
- APPENDIX M - MDI LABORATORY DATA
- APPENDIX N - FACILITY OPERATING DATA
- APPENDIX O - FIELD EQUIPMENT CALIBRATIONS

1.0 INTRODUCTION

1.1 Background: An air emissions testing program was conducted at Louisiana Pacific located in Dungannon, Virginia. The test program was conducted on July 27 - 28, 1995 by ETS, Incorporated (ETS) of Roanoke, Virginia. ETS personnel participating in the test program were Andy Hetz, Jeff Smith, Ross Roberson, and Troy Pryor. Project coordination was provided by Mickey Mullins and Scott Ziesenis of Louisiana Pacific.

1.2 Objective: The purpose of the test program was to evaluate the performance of the Regenerative Thermal Oxidizer (RTO) with respect to emissions limits contained in a VDEQ permit.

1.3 Test Program: The test program consisted of performing three valid measurements for total suspended and condensable particulate, formaldehyde, methylene bisphenyl isocyanate (MDI), oxygen (O₂), carbon dioxide (CO₂), sulfur dioxide (SO₂), oxides of nitrogen (NO_x), and volatile organic compounds (VOCs) at the RTO stack. A fourth run was conducted for carbon monoxide (CO) at Louisiana Pacific's request. Gas temperature, moisture content, molecular weight, gas velocity, and volumetric flow rate were measured concurrently with each test. The testing was conducted in accordance with the procedures of Appendix A of the Code of Federal Regulations, Title 40, Part 60, (40 CFR 60). Appendix A contains a test log which provides the exact dates and times for each of the tests.

2.0 SUMMARY OF RESULTS

Table 1 presents a summary of the average emissions. Tables 2, 3, and 4 summarize the results of the total particulate, formaldehyde, and MDI testing conducted on the RTO stack, respectively. Table 5 provides the results of the O₂, CO₂, SO₂, NO_x, CO, and VOC testing. Appendices B through E provide more detailed data and results for the analyses.

3.0 DISCUSSION OF RESULTS

Three valid test runs were completed for the formaldehyde testing on the RTO stack. Only the results of the third test run are presented because the samples from the first two test runs were accidentally destroyed by the laboratory. However, the results from the third test run indicate that formaldehyde emissions are significantly below the permitted limit.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

All sampling and analytical procedures followed those recommended by the U.S. Environmental Protection Agency (EPA), Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60), or other methods generally accepted by the EPA and the VDEQ. The following specific methods were used:

- EPA Method 1 for determination of sampling and traverse points;
- EPA Method 2 for determination of flue gas velocity and volumetric flow rate;

TABLE 1
 SUMMARY OF AVERAGE EMISSIONS
 LOUISIANA PACIFIC
 JULY 1995 DIAGNOSTIC TEST PROGRAM
 RTO STACK

| TEST PARAMETER | REPORTING UNITS | AVERAGE EMISSIONS | EMISSIONS LIMITATION |
|--------------------------------|--------------------|----------------------|-------------------------|
| Total Particulate | gr/dscf lb/hr | 0.005 3.91 | 16.5 |
| Formaldehyde* | lb/hr | 0.29 | 1.26 |
| Methylene Bisphenyl Isocyanate | lb/hr | 4.75E-06 | 0.10 |
| NOx | lb/hr | 10.90 | 24.3 |
| SO2 | lb/hr | 1.05 | 21.4 |
| CO | lb/hr | 20.32 | 31.9 |
| VOC | lb/hr | 2.07 | 9.4 |

*Only test run three was analyzed due to a laboratory error.

TABLE 2

SUMMARY OF PARTICULATE EMISSIONS
LOUISIANA PACIFIC

RTO STACK

| RUN I.D. | RTO-M5/202-R1 | RTO-M5/202-R2 | RTO-M5/202-R3 | AVERAGE |
|--|---------------|---------------|---------------|---------|
| DATE | 07/27/95 | 07/27/95 | 07/27/95 | |
| TIME STARTED | 09:15 | 12:15 | 14:30 | |
| TIME ENDED | 10:56 | 13:35 | 15:49 | |
| <u>SAMPLING PARAMETERS</u> | | | | |
| Metered Volume - dcf | 53.455 | 53.751 | 52.702 | 53.303 |
| Corrected Volume - dscf | 48.350 | 47.974 | 46.492 | 47.605 |
| Total Test Time - min | 72 | 72 | 72 | 72 |
| % Isokinetics | 100.3 | 100.7 | 99.6 | 100.2 |
| <u>GAS PARAMETERS</u> | | | | |
| Gas Temperature - ° F | 177 | 181 | 184 | 181 |
| Oxygen - % | 19.5 | 19.1 | 19.0 | 19.2 |
| Carbon Dioxide - % | 1.1 | 1.2 | 1.1 | 1.1 |
| Moisture - % | 9.5 | 10.2 | 12.5 | 10.7 |
| <u>GAS FLOWRATE</u> | | | | |
| Velocity - ft/sec | 47.73 | 47.83 | 48.19 | 47.92 |
| Actual Volume - acfm | 143964 | 144256 | 145352 | 144524 |
| Standard Volume - dscfm | 98803 | 97616 | 95607 | 97342 |
| <u>SUSPENDED PARTICULATE EMISSIONS</u> | | | | |
| Conc. - gr/dscf | 0.002 | 0.002 | 0.003 | 0.003 |
| Mass Rate - lb/hr | 2.03 | 1.91 | 2.34 | 2.09 |
| <u>CONDENSIBLE PARTICULATE EMISSIONS</u> | | | | |
| Conc. - gr/dscf | 0.003 | 0.002 | 0.002 | 0.002 |
| Mass Rate - lb/hr | 2.28 | 1.85 | 1.33 | 1.82 |
| <u>TOTAL PARTICULATE EMISSIONS</u> | | | | |
| Conc. - gr/dscf | 0.005 | 0.004 | 0.004 | 0.005 |
| Mass Rate - lb/hr | 4.31 | 3.76 | 3.67 | 3.91 |

TABLE 3

SUMMARY OF FORMALDEHYDE EMISSIONS
LOUISIANA PACIFIC

RTO STACK

| | |
|--------------|-------------|
| RUN I.D. | RTO-0011-R3 |
| DATE | 07/27/95 |
| TIME STARTED | 14:30 |
| TIME ENDED | 15:49 |

SAMPLING PARAMETERS

| | |
|-------------------------|--------|
| Metered Volume - dcf | 60.360 |
| Corrected Volume - dscf | 52.117 |
| Total Test Time - min | 72 |
| % Isokinetics | 102.8 |

GAS PARAMETERS

| | |
|-----------------------|------|
| Gas Temperature - ° F | 183 |
| Oxygen - % | 19.0 |
| Carbon Dioxide - % | 1.1 |
| Moisture - % | 10.7 |

GAS FLOWRATE

| | |
|-------------------------|--------|
| Velocity - ft/sec | 51.27 |
| Actual Volume - acfm | 154623 |
| Standard Volume - dscfm | 103849 |

FORMALDEHYDE EMISSIONS

| | |
|---------------------------|--------|
| Sample - mg | 1.1 |
| Blank - mg | < 0.01 |
| Corrected Sample - mg | 1.1 |
| Conc. - ppm _{dv} | 0.60 |
| Mass Rate - lb/hr | 0.29 |

TABLE 4
SUMMARY OF MDI EMISSIONS
LOUISIANA PACIFIC

RTO STACK

| RUN I.D. | RTO-MDI-R1 | RTO-MDI-R2 | RTO-MDI-R3 | AVERAGE |
|--------------|------------|------------|------------|---------|
| DATE | 07/27/95 | 7/28/95 | 7/28/95 | |
| TIME STARTED | 16:50 | 11:45 | 12:30 | |
| TIME ENDED | 18:07 | 13:05 | 13:33 | |

SAMPLING PARAMETERS

| | | | | |
|-------------------------|--------|--------|--------|--------|
| Metered Volume - dcf | 46.142 | 48.913 | 48.532 | 47.862 |
| Corrected Volume - dscf | 39.389 | 43.043 | 42.761 | 41.731 |
| Total Test Time - min | 60 | 60 | 60 | 60 |
| % Isokinetics | 99.1 | 103.6 | 103.6 | 102.1 |

GAS PARAMETERS

| | | | | |
|-----------------------|------|------|------|------|
| Gas Temperature - ° F | 185 | 181 | 181 | 182 |
| Oxygen - % | 18.4 | 20.1 | 19.9 | 19.5 |
| Carbon Dioxide - % | 1.1 | 1.0 | 1.1 | 1.1 |
| Moisture - % | 9.5 | 8.6 | 9.3 | 9.1 |

GAS FLOWRATE

| | | | | |
|-------------------------|--------|--------|--------|--------|
| Velocity - ft/sec | 47.76 | 49.07 | 49.14 | 48.65 |
| Actual Volume - acfm | 144045 | 147978 | 148190 | 146738 |
| Standard Volume - dscfm | 97743 | 102154 | 101509 | 100469 |

MDI EMISSIONS

| | | | | |
|--------------------------|------------|------------|----------|------------|
| Sample - µg | < 0.01 | < 0.01 | 0.04 | < 0.02 |
| Blank - µg | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Corrected Sample - µg | < 0.01 | < 0.01 | 0.04 | < 0.02 |
| Conc. - ppm _v | < 8.62E-07 | < 7.89E-07 | 3.18E-06 | < 1.21E-06 |
| Mass Rate - lb/hr | < 3.28E-06 | < 3.14E-06 | 1.26E-05 | < 4.75E-06 |

NOTE:

< = not detected in one or more laboratory samples

TABLE 5
SUMMARY OF SO₂, NO_x, CO, AND VOC EMISSIONS
LOUISIANA PACIFIC
RTO STACK

DUNGANNON, VA
 JULY 1995

| RUN I.D. | RUN 1* | RUN 2* | RUN 3* | RUN 4** | AVERAGE |
|--------------|----------|----------|----------|----------|---------|
| DATE | 07/27/95 | 07/27/95 | 07/27/95 | 07/27/95 | |
| TIME STARTED | 09:15 | 12:15 | 14:30 | 16:50 | |
| TIME ENDED | 10:15 | 13:15 | 15:30 | 17:45 | |

SAMPLING PARAMETERS

| | | | | | |
|-----------------------|----|----|----|----|----|
| Total Test Time - min | 60 | 60 | 60 | 55 | 59 |
|-----------------------|----|----|----|----|----|

GAS PARAMETERS

| | | | | | |
|-----------------------|------|------|------|------|------|
| Gas Temperature - ° F | 177 | 182 | 183 | 185 | 182 |
| Oxygen - % | 19.5 | 19.1 | 19.0 | 18.4 | 19.0 |
| Carbon Dioxide - % | 1.1 | 1.2 | 1.1 | 1.1 | 1.1 |
| Moisture - % | 9.4 | 10.0 | 11.6 | 9.5 | 10.1 |

GAS FLOWRATE

| | | | | | |
|-------------------------|--------|--------|--------|--------|--------|
| Velocity - ft/sec | 49.47 | 49.35 | 49.73 | 48.75 | 49.32 |
| Actual Volume - acfm | 149199 | 148822 | 149988 | 147018 | 148756 |
| Standard Volume - dscfm | 102571 | 100837 | 99728 | 99760 | 100724 |

NO_x EMISSIONS (as NO₂)

| | | | | | |
|-----------------------------------|-------|-------|-------|----|-------|
| Concentration - ppm _{dv} | 13.65 | 16.21 | 15.34 | NA | 15.07 |
| Mass Rate - lb/hr | 10.03 | 11.71 | 10.96 | NA | 10.90 |

SO₂ EMISSIONS

| | | | | | |
|-----------------------------------|------|------|------|----|------|
| Concentration - ppm _{dv} | 1.74 | 1.26 | 0.10 | NA | 1.03 |
| Mass Rate - lb/hr | 1.78 | 1.27 | 0.10 | NA | 1.05 |

CO EMISSIONS

| | | | | | |
|-----------------------------------|-------|-------|-------|-------|-------|
| Concentration - ppm _{dv} | 28.19 | 46.40 | 75.02 | 35.94 | 46.39 |
| Mass Rate - lb/hr | 12.61 | 20.41 | 32.63 | 15.64 | 20.32 |

VOC EMISSIONS (as Propane)

| | | | | | |
|-----------------------------------|------|------|------|----|------|
| Concentration - ppm _{wv} | 3.45 | 1.87 | 2.68 | NA | 2.67 |
| Concentration - ppm _{dv} | 3.81 | 2.08 | 3.03 | NA | 2.97 |
| Mass Rate - lb/hr | 2.68 | 1.44 | 2.08 | NA | 2.07 |

*Flow data represents an average of the data from the Method 5/202 and BIF Method 0011 testing.

**Flow data taken from the first test run of the MDI testing.

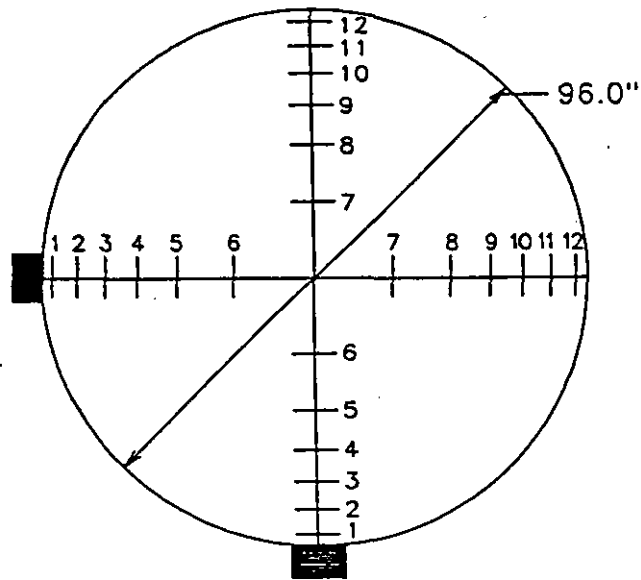
- EPA Methods 3 for determination of flue gas composition and molecular weight (sampling procedure);
- EPA Methods 3A for determination of flue gas composition and molecular weight (analytical procedure);
- EPA Method 4 for determination of flue gas moisture content;
- EPA Method 5/202 for determination of total suspended and condensable particulate emissions;
- EPA Method 6C for determination of sulfur dioxide emissions;
- EPA Method 7E for determination of NO_x emissions;
- EPA Method 10 for determination of CO emissions;
- BIF Method 0011 for determination of formaldehyde emissions;
- EPA Method 25A for determination of volatile organic compounds (VOCs);
- Draft EPA MACT Method for determination of methyl bisphenyl isocyanate (MDI) emissions.

Appendices G through I contain the raw field data for the testing. Appendices K through M contain the laboratory data for the testing.

4.1 Sampling Procedures

4.1.1 Sampling Point Determination - EPA Method 1: EPA

Reference Method 1 was used to determine the number and location of the sampling and traverse points at the test location. Figure 1 shows the location of the sampling and traverse points for the RTO stack. A total of 24 sampling and traverse points (12 for



| POINT | % ID | DISTANCE FROM INSIDE OF PORT (inches) |
|-------|------|---------------------------------------|
| 1 | 2.1 | 2.04 |
| 2 | 6.7 | 6.43 |
| 3 | 11.8 | 11.34 |
| 4 | 17.7 | 17.02 |
| 5 | 25.0 | 24.00 |
| 6 | 35.6 | 34.14 |
| 7 | 64.4 | 61.86 |
| 8 | 75.0 | 72.00 |
| 9 | 82.3 | 78.98 |
| 10 | 88.2 | 84.66 |
| 11 | 93.3 | 89.57 |
| 12 | 97.9 | 93.96 |

| | | |
|-----------------------|---------|--------|
| INSIDE STACK DIAMETER | 96.0 in | 8.0 ft |
|-----------------------|---------|--------|

Figure 1 - Sampling and Traverse Points for RTO Stack

each of two ports) were utilized for all pollutant sampling and gas flow rate measurements conducted at the RTO stack.

4.1.2 Volumetric Measurements - EPA Method 2: EPA Reference Method 2 was used to determine the velocity and volumetric flow rates of the stack gases. Stainless steel Type-S pitot tubes were used to measure the gas velocity heads. The pitot tubes were calibrated against a NIST traceable pitot tube in accordance with Method 2. Calibrated Type-K thermocouples were used to determine gas temperatures.

Velocity and temperature measurements were made at each of the points traversing the stack as shown in Figure 1. These measurements were performed in conjunction with the pollutant sampling described below.

4.1.3 Molecular Weight Determination - EPA Method 3 and 3A: Gas compositional measurements (O_2 and CO_2) were performed in accordance with EPA Methods 3 and 3A of 40 CFR 60.

4.1.3.1 Molecular Weight Determination - EPA Method 3: For test runs two and three of the MDI sampling, gas compositional measurements (O_2 and CO_2) for determining the average molecular weight of the stack gases were done in accordance with EPA Reference Method 3. Multi-point, integrated sampling was used to obtain a constant rate sample of flue gas concurrent with the

pollutant testing. Sampling was of the same duration (except purges following port changes) as the pollutant runs.

A stainless steel probe was affixed to the pollutant sampling probe for this purpose. A peristaltic pump, delivering 500 to 750 mL/min of flue gas, was used to fill a Tedlar bag. Moisture was removed from the sample gas by means of an air-cooled condenser located prior to the pump. Figure 2 shows a schematic of the Method 3 sampling train.

4.1.3.2 Molecular Weight Determination - EPA Method 3A: For the remainder of the test program, gas compositional measurements (O_2 and CO_2) for determining the average molecular weight of the stack gases were done instrumentally in accordance with EPA Reference Method 3A. Sampling was done by obtaining integrated gas samples as part of the continuous emissions monitoring discussed in section 3.1.8.

4.1.4 Flue Gas Moisture Content - EPA Method 4: Flue gas moisture was measured in conjunction with each of the pollutant tests according to the sampling and analytical procedures outlined in EPA Method 4. The flue gas moisture for each test was determined by gravimetric analyses of the water collected in the impinger condensers of the pollutant sampling train. All impingers were contained in an ice bath throughout the testing in order to assure complete condensation of the moisture in the flue

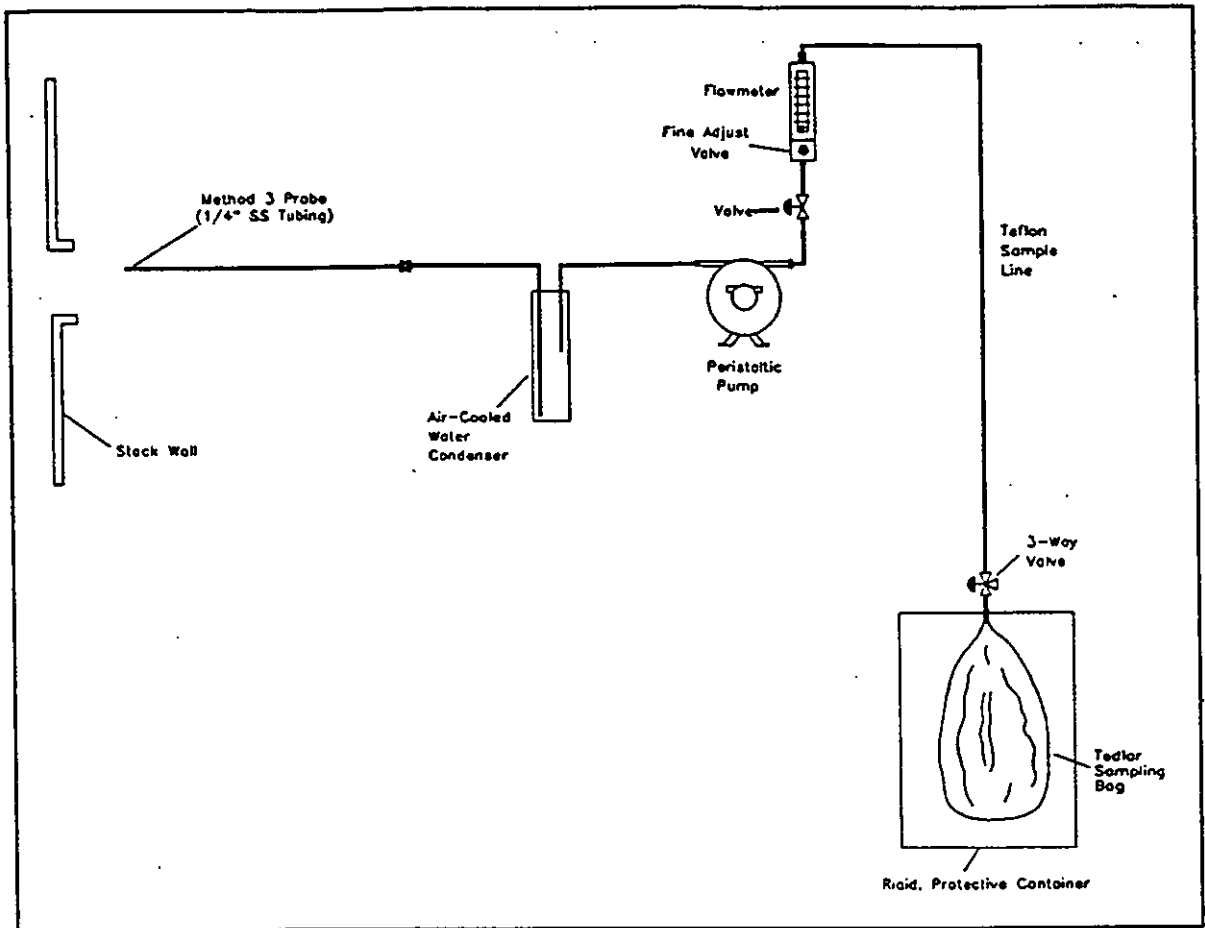


Figure 2 - EPA Method 3 Sampling Train

gas stream. Any moisture which was not condensed in the impingers was captured in the silica gel contained in the final impinger.

4.1.5 Particulate Sampling: Sampling for total particulate was performed in accordance with EPA Method 5 of 40 CFR 60 in conjunction with EPA Method 202 of 40 CFR 51.

4.1.5.1 Sampling Train Description: Figure 3 shows the major components of the Method 5 sampling train. A heated stainless steel probe with a quartz liner was used to withdraw the gas sample. The probe was equipped with an appropriately sized integrated quartz nozzle fused directly to the liner for isokinetic gas withdrawal.

From the nozzle and probe, sample gas was pulled through a heated glass fiber filter which is maintained at $248^{\circ}\text{F} \pm 25^{\circ}\text{F}$ to prevent water condensation. Sample gas was subsequently passed through an impinger train consisting of five glass impingers immersed in an ice bath. The first, second, and third impingers each contained 100 milliliters of deionized distilled water. The fourth impinger was initially empty, and the fifth initially contained approximately 200 grams of silica gel.

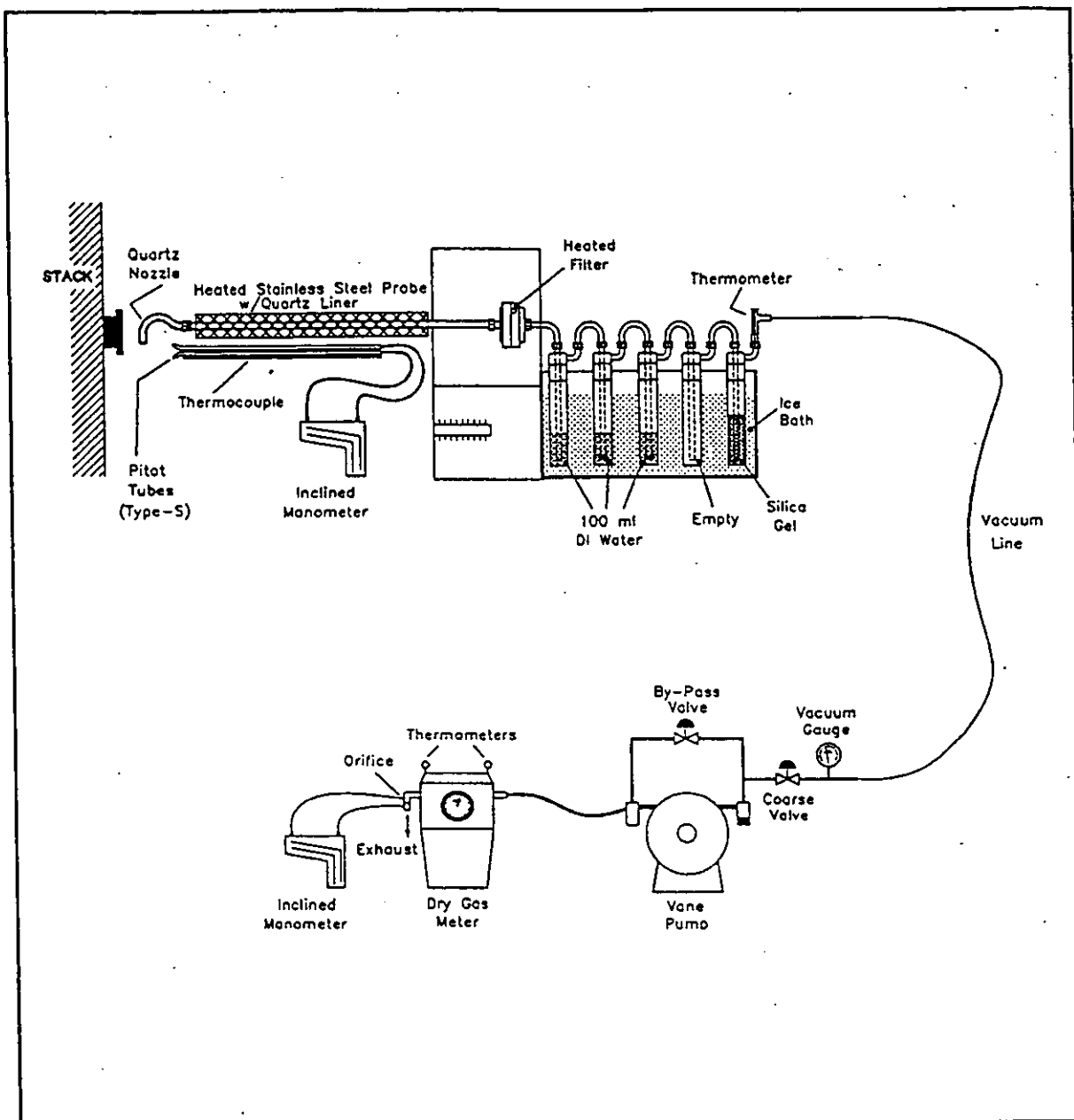


Figure 3 - EPA Methods 5/202 Sampling Train

4.1.5.2 Sampling Train Operation: Sampling was done in accordance with EPA Method 5 procedures and specifications, including leak checking, isokinetic sampling rate and stack traversing. Sampling was conducted for three minutes at each of the 24 traverse points, resulting in a 72-minute test per run, excluding the time required to change ports.

4.1.5.3 Sample Recovery and Clean-Up: Recovery of the front-half of the sampling train (probe plus filter and associated glassware) was performed in accordance with EPA Method 5 procedures. The probe and front-half glassware were rinsed with acetone three times each and brushed between rinses with a Teflon fiber brush. Exposed filters were placed back into their original tared containers.

The back-half of the sampling train (impingers plus connecting glassware) were recovered in accordance with EPA Method 202 procedures. The pH of the first impinger was measured immediately after the test. If the pH was less than 4.5, then the entire impinger train was purged for one hour using purified air in accordance with Method 202 procedures. If the pH of the first impinger exceeded 4.5, then the purge was omitted.

After purging (if applicable), the contents of the first four impingers were measured and transferred to glass jars. The first four impingers and all back-half glassware were rinsed

twice with water. All water rinses were collected with the impinger contents. The back-half glassware was then rinsed twice with methylene chloride. These rinses were collected into a separate glass jar.

The silica gel from the fifth impinger was transferred back to its original Nalgene container. The amount of moisture collected in the sampling train was quantified in order to determine the stack gas moisture content in accordance with EPA Method 4.

4.1.5.4 Field Blanks: Acetone, water, and methylene chloride field blanks were collected during the test program. Each blank was taken from the same reagent stock used for testing.

4.1.6 Formaldehyde Determination - BIF Method 0011:

Formaldehyde sampling was performed in accordance with the procedures described in 40 CFR 266, Appendix IX, Section 3.5. Appendices C and H contain all sampling data and results for the BIF Method 0011 test program.

4.1.6.1 Sampling Train Description: A diagram of the BIF Method 0011 sampling train is provided in Figure 4. A heated stainless steel probe with a quartz liner was used to withdraw the gas sample. The probe was equipped with an appropriately sized integrated quartz nozzle fused directly to the liner for

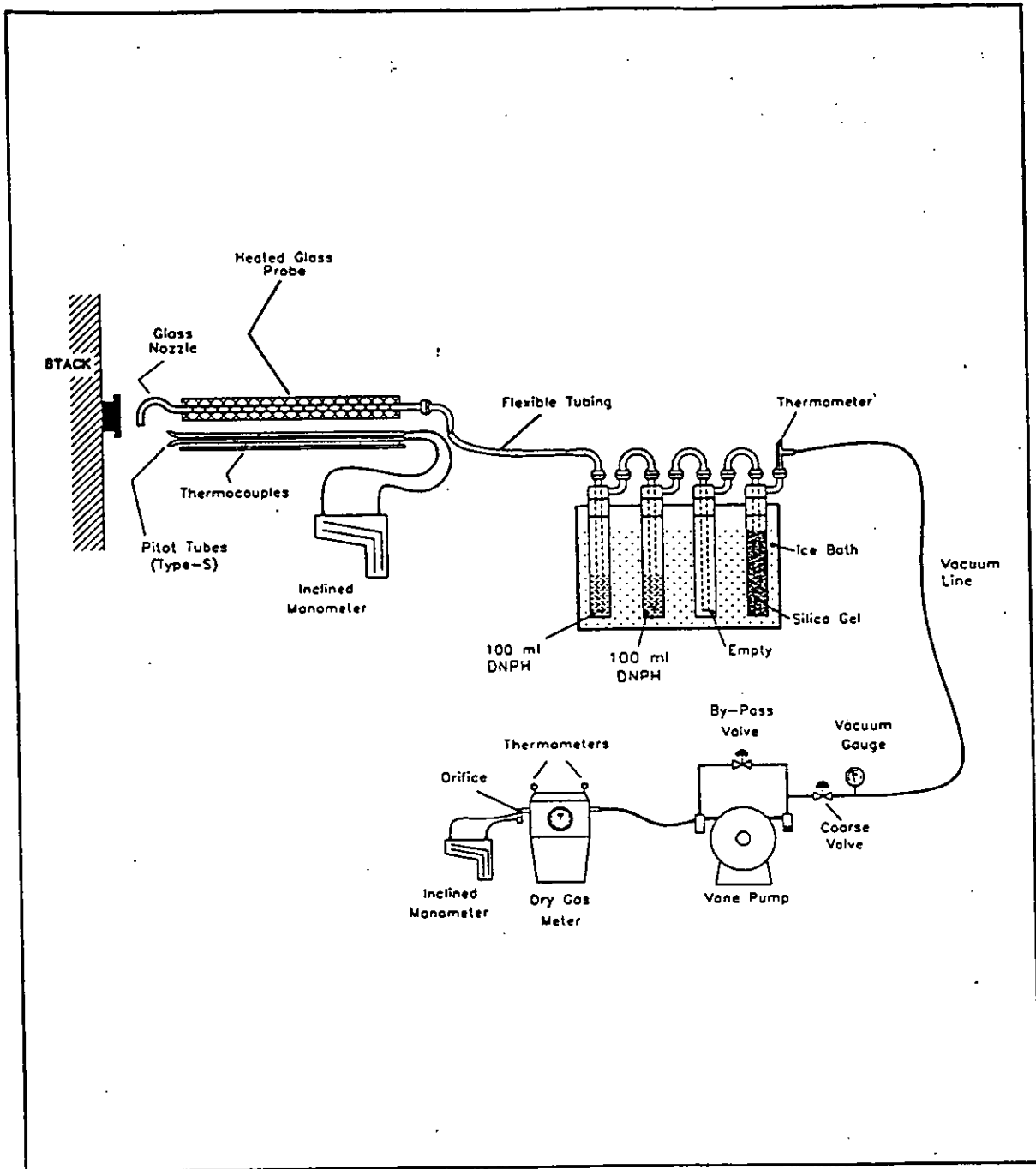


Figure 4 - Sampling Train for BIF Method 0011

isokinetic gas withdrawal. After the probe, effluent gas was drawn into a train of four impingers immersed in an ice bath. The first two impingers initially contained 100 mL of DNPH. The third impinger was left empty and the fourth initially contained approximately 200 grams of silica gel.

4.1.6.2 Sampling Train Operation: Sampling was done in accordance with EPA Method 5 procedures and specifications, including leak checking, isokinetic sampling rate and stack traversing. Sampling was conducted for three minutes at each of the 24 traverse points, resulting in a 72-minute test per run, excluding the time required to change ports.

4.1.6.3 Sample Recovery and Clean-up: Recovery of the front-half of the sampling train (probe and associated glassware) was performed as follows. The probe and front-half glassware were rinsed with methylene chloride three times each and brushed between rinses with a Teflon fiber brush.

The back-half of the sampling train (impingers plus connecting glassware) were recovered in accordance with BIF Method 0011 procedures. The contents of the first three impingers were measured and transferred to an amber flint glass jar. The first three impingers and all back-half glassware were rinsed three times with methylene chloride. All rinses were collected with the impinger contents. The back-half glassware

was then rinsed with distilled water. The water rinse was collected into the same amber glass jar.

The silica gel from the fourth impinger was transferred back to its original Nalgene container. The amount of moisture collected in the sampling train was quantified in order to determine the stack gas moisture content in accordance with EPA Method 4.

4.1.6.4 Sample Storage and Transport: Immediately upon recovery, all samples were placed into insulated coolers packed with ice, thus protecting the samples from light and heat.

The samples remained inside the coolers during transport to the analytical laboratory. While in the custody of ETS, the temperatures inside the coolers were periodically measured to insure that the samples did not exceed 32°F. All samples were express mailed directly to the analytical lab for analysis. While at the lab, the samples were kept in a refrigerated compartment until analyzed.

4.1.6.5 Blanks: One field blank was collected during the BIF Method 0011 testing. The field blank consisted of a reagent blank from the batch of DNPH reagent and a methylene chloride reagent blank.

4.1.7 Methylene Bisphenyl Isocyanate (MDI) Sampling - Draft EPA MACT Method: Sampling for MDI was conducted in accordance with Draft EPA MACT Method.

4.1.7.1 Sampling Train Description: Figure 5 illustrates the sampling train for measuring MDI. A heated stainless steel probe with a quartz liner was used to withdraw the gas sample. The probe was equipped with an appropriately sized integrated quartz nozzle fused directly to the liner for isokinetic gas withdrawal.

After the probe, the gases passed into a impinger train consisting of six impingers packed in ice water with a water-cooled glass condenser placed between the first and second impingers. The first impinger contained 300 milliliters of absorbing solution (1-(2-pyridyl) piperazine in toluene). Coolant water maintained at wet-ice temperature was continuously recirculated into the condenser using a submersible water pump. The condenser minimized the evaporation of toluene from the first impinger. The second and third impingers each contained 200 milliliters of absorbing solution. The fourth impinger was initially left empty. The fifth and sixth impinger contained approximately 200 grams of activated charcoal and 200 grams of silica gel, respectively.

All components from the nozzle to the sixth impinger were made of glass. All connections from the probe to the exit stem

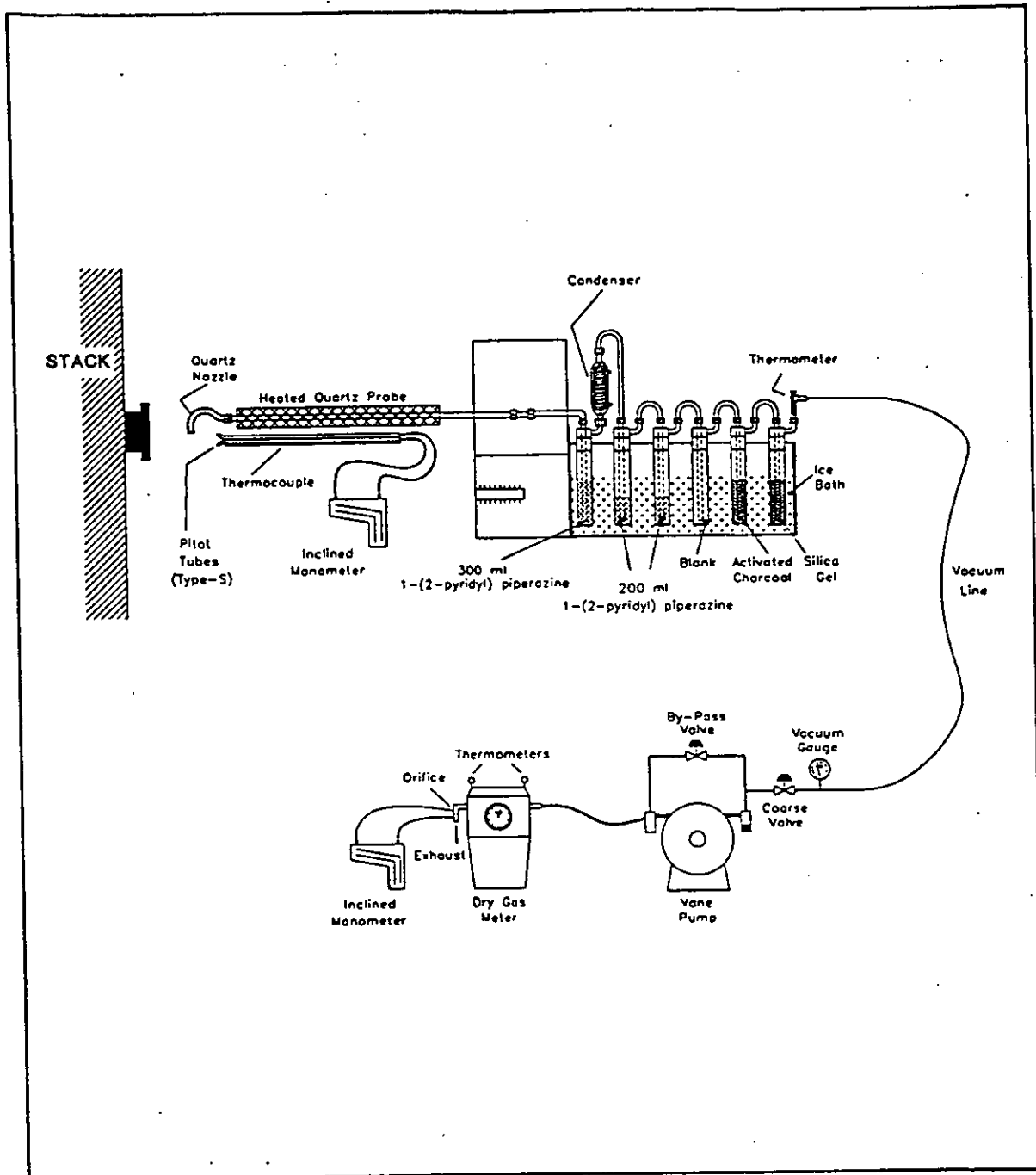


Figure 5 - Sampling Train for MDI

of the sixth impinger were sealed with Teflon O-rings. Sealing grease was not used on any connections before the sixth impinger.

4.1.7.2 Sample Train Operation: Sampling was performed in general accordance with EPA Method 5 procedures and specifications, including leak checking, isokinetic sampling rate, and stack traversing.

Sampling was performed for 2.5 minutes at each of the 24 traverse points, yielding a 60-minute test per run. A minimum sample volume of 35.31 dry standard cubic feet was obtained for each test run.

4.1.7.3 Sample Recovery and Clean-up: At the completion of each test, the probe was removed from the train and the ends of the sampling train capped with Teflon tape. The probe was recovered immediately on the sampling platform, while the remainder of the sampling train was transported to a clean-up site for recovery. Sample recovery proceeded as follows:

- 1) Front-half Rinse: The probe and all connecting lines between the probe and first impinger were rinsed three times with toluene. A Teflon-fiber probe brush was used to brush the probe between rinses. Following the toluene rinse, the probe and all connecting lines between the probe and first impinger were rinsed with acetonitrile. All rinses were

collected into a pre-cleaned amber glass bottle fitted with a Teflon-lined screw cap.

- 2) Impinger 1 Recovery: The condensate collected in the first impinger was transferred to a graduated cylinder and the volume recorded. The liquid was then transferred into the amber glass bottle containing the probe rinses. The impinger was rinsed with toluene and then acetonitrile. The rinses were collected into the same bottle.

- 3) Impingers 2-4 Recovery: The liquid volumes in impingers two through four were recorded for the Method 4 moisture determination. The liquids were then transferred in a pre-cleaned amber glass bottle fitted with a Teflon-lined screw cap. A toluene rinse followed by an acetonitrile rinse was performed on impingers two through four along with the condenser and any connecting glassware. These rinses were collected in the same amber bottle.

- 4) Activated Charcoal: The activated charcoal in the fifth impinger was transferred into its original plastic container and sealed.

- 5) Silica Gel: The silica gel in the sixth impinger was transferred into its original plastic container and sealed.

4.1.7.4 Sample Storage and Transport: Immediately upon recovery, all samples including liquid rinses were placed into insulated coolers packed with ice, thus protecting the samples from light and heat.

The samples remained inside the coolers during transport to the analytical laboratory. While in the custody of ETS, the temperatures inside the coolers were periodically measured to insure that the samples did not exceed 32°F. All samples were express mailed directly to the analytical lab for analysis. While at the lab, the samples were kept in a refrigerated compartment until analyzed.

4.1.7.5 Field Blanks: One field blank was collected during the test program for MDI. The field blank consisted of a reagent blank from the batch of absorbing solution, a toluene reagent blank, and an acetonitrile reagent blank.

4.1.8 Continuous Monitoring for SO₂, NO_x, CO, THC, O₂ and CO₂ --
Instrumental Methods: Instrumental monitoring of the stack gases was performed in accordance with the following procedures:

| <u>GAS</u> | <u>REFERENCE METHOD</u> | <u>INSTRUMENT TYPE</u> |
|-----------------|-------------------------|--|
| SO ₂ | Method 6C | Western Research 721M SO ₂ Analyzer |
| NO _x | Method 7E | TECO Model 10AR Chemiluminescence NO _x Analyzer |
| CO | Method 10 | TECO Model 48 NDIR CO Analyzer |
| THC | Method 25A | J.U.M. Engineering Model VE7 FID Total Hydrocarbon Analyzer |
| O ₂ | Method 3A | Teledyne Model 320A Chemical Cell Portable O ₂ Analyzer |
| CO ₂ | Method 3A | FUJI Model 3300 A NDIR CO ₂ Analyzer |

All of the analyzers except the hydrocarbon analyzer measured gas concentrations on a dry volume basis. The hydrocarbon analyzer measured the concentrations on a wet volume basis as propane.

4.1.8.1 Sampling System Description: An integrated, remote instrumental system housing the pollutant gas analyzers as well as the diluent gas (O₂ and CO₂) monitors was used. Figure 6 outlines the general schematic of the system. The design incorporated two extractive systems - one for the dry analyzers and one for the wet hydrocarbon analyzer. All of the instruments were housed in a trailer located at ground level.

The dry sampling system consisted of a heated stainless steel probe located at the stack port location. A heated glass fiber filter was attached to the probe for rough particulate removal. A short section of heated Teflon sample line was used

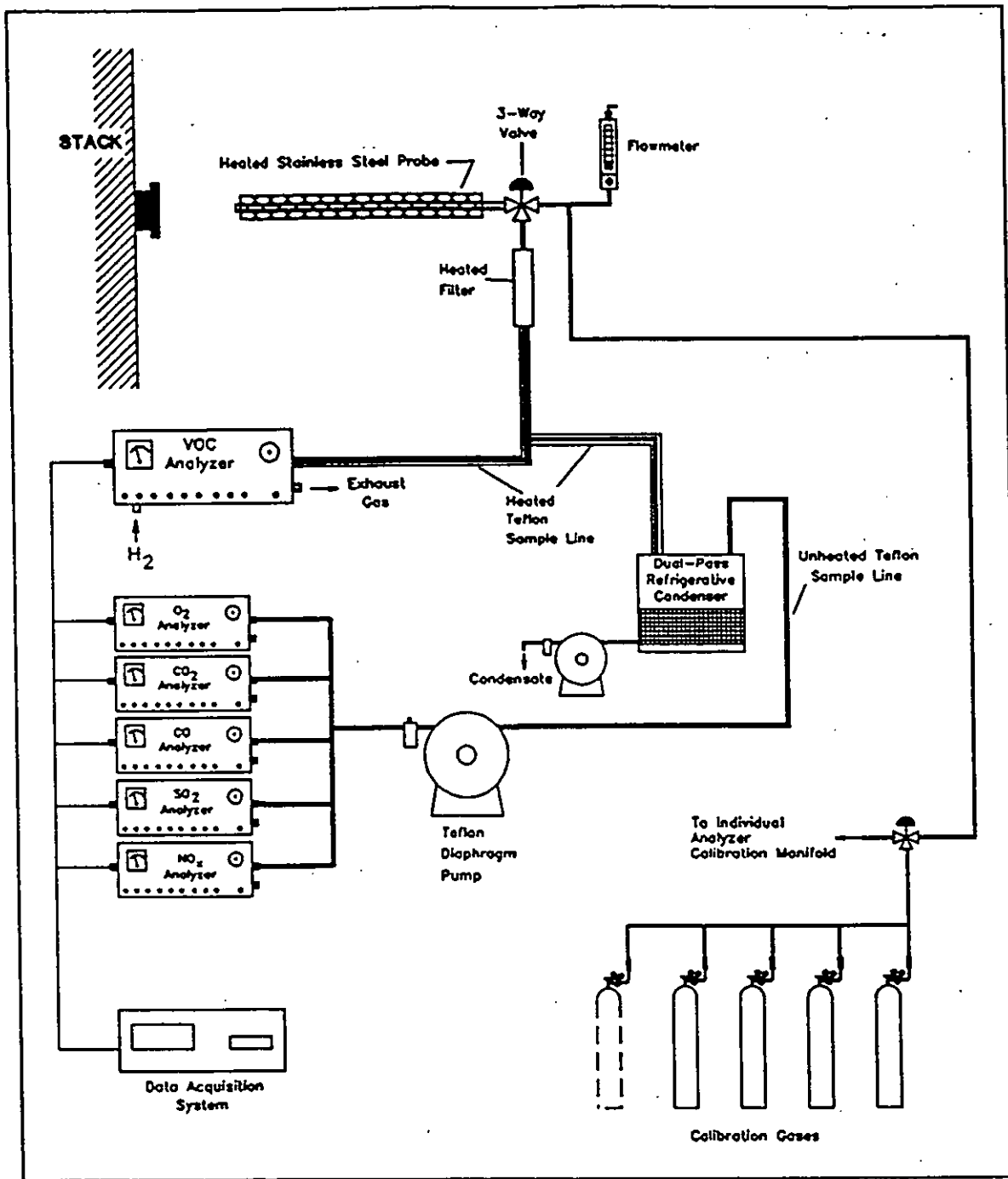


Figure 6 - Continuous Emissions Monitoring System for EPA Methods 3A, 6C, 7E, 10 and 25A

to deliver the sample to an ice-cooled condenser designed to remove the flue gas moisture. An unheated Teflon sample line was used to transport the dry gas sample from the stack port location down to the instrumental system. The sample gas exiting the Teflon sample line was pumped to the SO₂, NO_x, CO, CO₂, and O₂ monitors.

The sampling system for the hydrocarbon analyzer incorporated a heated stainless steel probe, a heated glass fiber filter, and a heated Teflon sample line. The sample line was heated along its entire length from the stack sampling location to the analyzer.

4.1.8.2 Data Acquisition System: The response outputs of the monitors were recorded digitally by a Campbell Scientific Model CR10WP multi-channel data acquisition system. The system sampled at a rate of 60 Hz and stored one-minute average values.

4.1.8.3 Dry System Calibration: At the beginning of each test run, the O₂, CO₂, SO₂, and NO_x monitors on the dry sampling system were zeroed, using Zero Nitrogen and spanned using a certified calibration gas with a concentration of 80 to 100 percent of the instrument span. Following calibration a mid range gas, 40 to 60 percent of the instrument span, was introduced to each monitor. The mid range response error never exceeded two percent of the instrument span as required by EPA Reference Method 6C.

The CO monitor was zeroed using Zero Nitrogen and spanned using a known concentration of CO in nitrogen. Following calibration, the CO monitor was challenged with two additional gas concentrations corresponding to approximately 60 percent and 30 percent of instrument span. All calibration gases were EPA Protocol 1 certified to be within ± 2 percent of stated concentration.

After calibrating the O_2 , CO_2 , SO_2 , and NO_x monitors, calibration gas was introduced remotely through the probe in order to verify the absence of sampling system bias. The bias error never exceeded five percent of the instrument span as required by EPA Reference Method 6C.

After each test run, Zero Nitrogen and either a mid or high range calibration gas were introduced remotely through the sampling system to each monitor to check for calibration drift error. In accordance with Method 6C, the calibration drift did not exceed three percent of the instrument span for all valid test runs.

4.1.8.4 Wet System Calibration: All calibration gas standards used were EPA Protocol 1 certified. At the beginning of each test period, the VOC measurement system was zeroed, using Zero Nitrogen, and spanned, using a calibration gas with a concentration of 80 to 90 percent of the instrument span.

Following calibration a mid range gas (45 to 55 percent of the instrument span) and then a low range calibration gas (25 to 35 percent of the instrument span) were introduced to the measurement system to check response linearity. The mid and low range response error did not exceed five percent of the calibration gas value as required by EPA Reference Method 25A.

After each test run, calibration gas was introduced to the VOC measurement system in order to indicate the zero and calibration drift. EPA Method 25A requires that the zero and calibration drift errors not exceed three percent of the instrument span.

4.2 Analytical Procedures

4.2.1 Molecular Weight Determination - EPA Method 3A: Flue gas compositional analysis for molecular weight determination was conducted using instrumental analyzers operated in general accordance with EPA Method 3A. The instruments were calibrated before each analysis with EPA Protocol 1 calibration gas standards. Each bag was analyzed in triplicate and the average flue gas composition used for calculation of gas volumetric flow rate.

4.2.2 Moisture Content - EPA Method 4: Moisture contents were determined gravimetrically in accordance with Method 4 by

measuring the volume or mass gains of each impinger in the pollutant sampling trains.

4.2.3 Particulate Analyses - EPA Method 5 and 202: Particulate matter was determined in accordance with EPA Method 5 and 202 procedures. Appendix K contains the laboratory data for the analysis.

The filter was desiccated and analyzed gravimetrically to a constant weight. The front-half acetone rinse was evaporated and analyzed gravimetrically to a constant weight. The front-half particulate catch equals the sum of the front half acetone rinse and the filter, in accordance with Method 5.

The determination of the total condensible particulate matter in the back-half of the sampling train was determined in accordance with Method 202 procedures. The total sulfate concentration of the impinger contents and aqueous rinses was determined by analyzing an aliquot of the impinger water and rinses sample using ion chromatography. The impinger contents and aqueous rinses were then combined with the methylene chloride rinses and extracted twice with methylene chloride using a separatory funnel. The sample was divided into organic (methylene chloride) and inorganic (aqueous) fractions. The organic fraction was evaporated at room temperature and pressure,

and the resulting residue gravimetrically analyzed to a constant weight.

The inorganic fraction was evaporated to dryness at 105°C. If the pH of the original impinger solutions was less than 4.5, then the resulting residue was redissolved in 100 milliliters of distilled water, and made basic using concentrated ammonium hydroxide. The resulting solution was evaporated to dryness at 105°C once more, and the residue determined gravimetrically. If the pH of the original solution was greater than 4.5, then the ammonia addition step was omitted.

The back-half condensible particulate catch equals the organic residue plus the inorganic residue plus the combined water removed by the acid-base reaction based on the impinger analysis for sulfate. The total particulate catch equals the front-half probe rinse and filter plus the back-half condensibles.

4.2.4 Formaldehyde Analyses: The impinger solutions and train rinses from the BIF Method 0011 sampling train were analyzed for formaldehyde using high performance liquid chromatography (HPLC) in accordance with BIF Method 0011A.

4.2.5 Methylene Bisphenyl Isocyanate (MDI) Analyses: The impinger solutions and train rinses from the MDI sampling train

were analyzed for MDI using high performance liquid chromatography (HPLC) in accordance with draft EPA MACT Method.

5.0 Data Analysis

Sample calculations related to the pollutant sampling, including gas flow rates, temperatures, percent isokinetics, and moisture content, are shown in Appendix F.

6.0 Equipment Calibration

Field equipment was calibrated in accordance with the requirements of the applicable EPA Methods and those recommended within the "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III" (EPA-600/4-77-027b, August, 1977). Field equipment calibrations are contained in Appendix O.

APPENDIX A

TEST LOG

TEST LOG
LOUISIANA PACIFIC - DUNGANNON, VIRGINIA

| <u>UNIT</u> | <u>LOCATION</u> | <u>TEST</u> <u>PARAMETER</u> | <u>TEST</u> <u>METHOD</u> | <u>RUN I.D.</u> | <u>DATE</u> | <u>START</u> <u>TIME</u> | <u>END</u> <u>TIME</u> |
|-------------|-----------------|---------------------------------|------------------------------|-------------------------|-------------|-----------------------------|---------------------------|
| RTO | OUTLET | PARTICULATE | METHOD 5/202 | RTO-M5/202-R1 | 07/27/95 | 09:15 | 10:56 |
| | OUTLET | PARTICULATE | METHOD 5/202 | RTO-M5/202-R2 | 07/27/95 | 12:15 | 13:35 |
| | OUTLET | PARTICULATE | METHOD 5/202 | RTO-M5/202-R3 | 07/27/95 | 14:30 | 15:49 |
| RTO | OUTLET | FORMALDEHYDE | BIF METHOD 0011 | RTO-M0011-R1 | 07/27/95 | 09:15 | 10:56 |
| | OUTLET | FORMALDEHYDE | BIF METHOD 0011 | RTO-M0011-R2 | 07/27/95 | 12:15 | 13:35 |
| | OUTLET | FORMALDEHYDE | BIF METHOD 0011 | RTO-M0011-R3 | 07/27/95 | 14:30 | 15:49 |
| RTO | OUTLET | MDI | METHOD MDI | RTO-MDI-R1 | 07/27/95 | 16:50 | 18:07 |
| | OUTLET | MDI | METHOD MDI | RTO-MDI-R2 | 07/28/95 | 11:45 | 13:05 |
| | OUTLET | MDI | METHOD MDI | RTO-MDI-R3 | 07/28/95 | 12:30 | 13:33 |
| RTO | OUTLET | O2,CO2,SO2,NOx,CO,VOC | METHOD 3A,6C,7E,10,25A | RTO-M3A,6C,7E,10,25A-R1 | 07/27/95 | 09:15 | 10:15 |
| | OUTLET | O2,CO2,SO2,NOx,CO,VOC | METHOD 3A,6C,7E,10,25A | RTO-M3A,6C,7E,10,25A-R2 | 07/27/95 | 12:15 | 13:15 |
| | OUTLET | O2,CO2,SO2,NOx,CO,VOC | METHOD 3A,6C,7E,10,25A | RTO-M3A,6C,7E,10,25A-R3 | 07/27/95 | 14:30 | 15:30 |
| | OUTLET | O2,CO2,SO2,NOx,CO,VOC | METHOD 3A,6C,7E,10,25A | RTO-M3A,6C,7E,10,25A-R4 | 07/27/95 | 16:50 | 17:45 |

APPENDIX B
DATA AND RESULTS FOR EPA METHOD 5/202
RTO STACK

RUN NUMBER

RTO-M5/202-R1

Date 07/27/95
 Start Time 09:15
 End Time 10:56
 Stack Diam. 96 inches
 Nozzle I.D. 0.250 inches
 Meter Box Gamma 1.0166
 Meter Box dH@ 1.7393
 Barometric 27.43 in.Hg
 Cp 0.84
 Test Duration 72 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 100.0 | 165.0 | 65.0 |
| IMP.2 | 100.0 | 129.0 | 29.0 |
| IMP.3 | 100.0 | 102.0 | 2.0 |
| IMP.4 | 0.0 | 0.5 | 0.5 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 300.0 | 396.5 | 96.5 |
| S.G. | 200.0 | 211.7 | 11.7 |

METHOD 1-4 RESULTS

Metered Volume 53.455 dcf
 Volume @ Std.Cond. 48.350 dscf
 % Water 9.53 %
 % Isokinetics 100.3 %
 Velocity 47.73 ft/sec
 Actual Flow 143964 acfm
 Std. Flow 109213 scfm
 Dry Std. Flow 98803 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 19.5 | Md | 28.96 |
| %CO2 | 1.11 | Ms | 27.91 |
| %CO | 0.0 | Ps | 27.40 |
| %N2 | 79.4 | Fo | 1.231 |
| O2+CO2 | 20.6 | %EA | 1375 |

| POINT | STACK | STATIC | DP | DH | METER | METER TEMPERATURE | |
|-------|--------|---------|---------|---------|---------|-------------------|--------|
| | TEMP | | | | VOLUME | INLET | OUTLET |
| | (DegF) | (in.WC) | (in.WC) | (in.WC) | (dcf) | (DegF) | (DegF) |
| 1 | 175 | -0.47 | 0.55 | 1.67 | 327.658 | 82 | 82 |
| 2 | 177 | -0.46 | 0.59 | 1.79 | 381.113 | 83 | 80 |
| 3 | 179 | | 0.57 | 1.72 | | 85 | 81 |
| 4 | 174 | | 0.60 | 1.82 | | 85 | 81 |
| 5 | 173 | | 0.57 | 1.74 | | 86 | 81 |
| 6 | 174 | | 0.57 | 1.73 | | 86 | 82 |
| 7 | 176 | | 0.57 | 1.73 | | 87 | 82 |
| 8 | 174 | | 0.58 | 1.76 | | 87 | 83 |
| 9 | 172 | | 0.54 | 1.65 | | 88 | 83 |
| 10 | 172 | | 0.50 | 1.53 | | 89 | 84 |
| 11 | 171 | | 0.44 | 1.34 | | 89 | 85 |
| 12 | 169 | | 0.35 | 1.07 | | 90 | 86 |
| 13 | 179 | | 0.59 | 1.78 | | 86 | 85 |
| 14 | 180 | | 0.58 | 1.75 | | 86 | 86 |
| 15 | 182 | | 0.58 | 1.74 | | 87 | 86 |
| 16 | 183 | | 0.56 | 1.68 | | 87 | 86 |
| 17 | 182 | | 0.56 | 1.68 | | 88 | 86 |
| 18 | 181 | | 0.57 | 1.71 | | 89 | 86 |
| 19 | 183 | | 0.57 | 1.71 | | 90 | 87 |
| 20 | 185 | | 0.55 | 1.64 | | 91 | 87 |
| 21 | 182 | | 0.54 | 1.62 | | 91 | 88 |
| 22 | 180 | | 0.49 | 1.48 | | 91 | 88 |
| 23 | 177 | | 0.43 | 1.30 | | 92 | 88 |
| 24 | 175 | | 0.34 | 1.03 | | 91 | 88 |
| | | | | | 381.113 | | |
| AVG. | 177 | -0.47 | 0.53 | 1.61 | 53.455 | 86 | |

LOUISIANA PACIFIC
RTO STACK
EPA METHOD 5/202 ANALYTICAL DATA AND RESULTS

SAMPLING DATA:

Run Number: RTO-M5/202-R1
Corr. Sample Volume: 48.350 dscf
Corr. Flowrate 98803 dscfm
O2 Content: 19.5 %
CO2 Content: 1.1 %

SUMMARY:

| COMPONENT | NET (grams) | CORRECTED FOR BLANK (grams) |
|-----------------------|----------------|-----------------------------------|
| <i>SUSPENDED PM</i> | | |
| Probe Wash | 0.00430 | 0.00430 |
| Filter | 0.00320 | 0.00320 |
| <i>CONDENSIBLE PM</i> | | |
| Organic CPM | 0.00730 | 0.00730 |
| Inorganic CPM | 0.00390 | 0.00114 |
| TOTAL CPM | 0.01120 | 0.00844 |
| TOTAL PM | 0.01870 | 0.01594 |

ANALYTICAL DATA:

| METHOD 5 COMPONENTS | TARE (grams) | FINAL (grams) | NET (grams) | VOLUME (ml) |
|--------------------------|-----------------|------------------|----------------|----------------|
| Acetone Probe Wash | 67.46020 | 67.46450 | 0.00430 | 110.0 |
| Acetone Blank Residue | 64.29320 | 64.29320 | 0.00000 | 120.0 |
| Applicable Acetone Blank | | | 0.00000 | |
| Max. Allowable Blank | | | 0.00086 | |
| Filter | 0.41790 | 0.42110 | 0.00320 | |

| METHOD 202 COMPONENTS | TARE (grams) | FINAL (grams) | NET (grams) | REAGENT VOLUME (ml) | CONC. (mg/l) |
|-------------------------|-----------------|------------------|----------------|---------------------------|-----------------|
| Volume of Cont.#4 | | | | 400.0 | |
| Organic CPM (Uncorr.) | 66.83550 | 66.84280 | 0.00730 | 270.0 | |
| MeCl2 Blank | 67.33300 | 67.33260 | 0.00000 | 275.0 | |
| Inorganic CPM (Uncorr.) | 67.26250 | 67.26640 | 0.00390 | 400.0 | |
| H2O Blank | 70.94820 | 70.95130 | 0.00310 | 450.0 | |
| Inorganic CPM (Corr.) | | | 0.00390 | | |

PARTICULATE EMISSIONS:

| | FILTERABLE | CPM | TOTAL |
|--------------------------------|-------------|-------------|-------------|
| Actual Grain Loading (gr/dscf) | 0.0024 | 0.0027 | 0.0051 |
| Corrected to 7% O2 (gr/dscf) | 0.0243 | 0.0273 | 0.0516 |
| Corrected to 12% CO2 (gr/dscf) | 0.0258 | 0.0291 | 0.0549 |
| Mass Rate (lb/hr) | 2.03 | 2.28 | 4.31 |

RUN NUMBER

RTO-M5/202-R2

Date 07/27/95
 Start Time 12:15
 End Time 13:35
 Stack Diam. 96 inches
 Nozzle I.D. 0.250 inches
 Meter Box Gamma 1.0166
 Meter Box dH@ 1.7393
 Barometric 27.43 in.Hg
 Cp 0.84
 Test Duration 72 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 100.0 | 155.0 | 55.0 |
| IMP.2 | 100.0 | 138.0 | 38.0 |
| IMP.3 | 100.0 | 109.0 | 9.0 |
| IMP.4 | 0.0 | 2.0 | 2.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 300.0 | 404.0 | 104.0 |
| S.G. | 200.0 | 212.0 | 12.0 |

METHOD 1-4 RESULTS

Metered Volume 53.751 dcf
 Volume @ Std.Cond. 47.974 dscf
 % Water 10.22 %
 % Isokinetics 100.7 %
 Velocity 47.83 ft/sec
 Actual Flow 144256 acfm
 Std. Flow 108728 scfm
 Dry Std. Flow 97616 dscfm

METHOD 3 DATA

| %O2 | 19.1 | Md | 28.95 |
|--------|------|-----|-------|
| %CO2 | 1.17 | Ms | 27.83 |
| %CO | 0.0 | Ps | 27.40 |
| %N2 | 79.7 | Fo | 1.524 |
| O2+CO2 | 20.3 | %EA | 994 |

| POINT | STACK | STATIC | DP | DH | METER VOLUME | METER TEMPERATURE | |
|-------|--------|---------|---------|---------|-------------------|-------------------|--------|
| | TEMP | | | | | INLET | OUTLET |
| | (DegF) | (in.WC) | (in.WC) | (in.WC) | (dcf) | (DegF) | (DegF) |
| 1 | 182 | -0.48 | 0.51 | 1.53 | 381.837 | 89 | 89 |
| 2 | 181 | -0.46 | 0.53 | 1.59 | 435.588 | 90 | 89 |
| 3 | 182 | | 0.52 | 1.56 | | 90 | 90 |
| 4 | 181 | | 0.58 | 1.74 | | 91 | 90 |
| 5 | 182 | | 0.54 | 1.62 | | 92 | 90 |
| 6 | 184 | | 0.57 | 1.71 | | 93 | 91 |
| 7 | 186 | | 0.55 | 1.64 | | 94 | 91 |
| 8 | 187 | | 0.56 | 1.67 | | 94 | 92 |
| 9 | 183 | | 0.52 | 1.56 | | 94 | 92 |
| 10 | 180 | | 0.51 | 1.54 | | 95 | 92 |
| 11 | 179 | | 0.45 | 1.36 | | 96 | 92 |
| 12 | 177 | | 0.42 | 1.27 | | 96 | 93 |
| 13 | 180 | | 0.54 | 1.63 | | 92 | 92 |
| 14 | 182 | | 0.57 | 1.71 | | 94 | 92 |
| 15 | 183 | | 0.53 | 1.59 | | 95 | 93 |
| 16 | 183 | | 0.55 | 1.65 | | 96 | 93 |
| 17 | 182 | | 0.57 | 1.71 | | 96 | 93 |
| 18 | 184 | | 0.56 | 1.68 | | 97 | 93 |
| 19 | 181 | | 0.53 | 1.59 | | 97 | 94 |
| 20 | 180 | | 0.54 | 1.63 | | 98 | 94 |
| 21 | 181 | | 0.56 | 1.68 | | 98 | 94 |
| 22 | 180 | | 0.54 | 1.63 | | 98 | 95 |
| 23 | 178 | | 0.52 | 1.57 | | 99 | 95 |
| 24 | 176 | | 0.41 | 1.24 | | 99 | 95 |
| AVG. | 181 | -0.47 | 0.53 | 1.59 | 435.588 53.751 | 93 | |

LOUISIANA PACIFIC
RTO STACK
EPA METHOD 5/202 ANALYTICAL DATA AND RESULTS

SAMPLING DATA:

Run Number: RTO-M5/202-R2
Corr. Sample Volume: 47.974 dscf
Corr. Flowrate: 97616 dscfm
O2 Content: 19.1 %
CO2 Content: 1.2 %

SUMMARY:

| COMPONENT | NET (grams) | CORRECTED FOR BLANK (grams) |
|-----------------------|----------------|-----------------------------------|
| <i>SUSPENDED PM</i> | | |
| Probe Wash | 0.00280 | 0.00280 |
| Filter | 0.00430 | 0.00430 |
| <i>CONDENSIBLE PM</i> | | |
| Organic CPM | 0.00350 | 0.00350 |
| Inorganic CPM | 0.00620 | 0.00338 |
| TOTAL CPM | 0.00970 | 0.00688 |
| TOTAL PM | 0.01680 | 0.01398 |

ANALYTICAL DATA:

| METHOD 5 COMPONENTS | TARE (grams) | FINAL (grams) | NET (grams) | VOLUME (ml) |
|--------------------------|-----------------|------------------|----------------|----------------|
| Acetone Probe Wash | 67.18480 | 67.18760 | 0.00280 | 100.0 |
| Acetone Blank Residue | 64.29320 | 64.29320 | 0.00000 | 120.0 |
| Applicable Acetone Blank | | | 0.00000 | |
| Max. Allowable Blank | | | 0.00078 | |
| Filter | 0.41780 | 0.42210 | 0.00430 | |

| METHOD 202 COMPONENTS | TARE (grams) | FINAL (grams) | NET (grams) | REAGENT VOLUME (ml) | CONC. (mg/l) |
|-------------------------|-----------------|------------------|----------------|---------------------------|-----------------|
| Volume of Cont.#4 | | | | 410.0 | |
| Organic CPM (Uncorr.) | 64.88330 | 64.88680 | 0.00350 | 255.0 | |
| MeCl2 Blank | 67.33300 | 67.33260 | 0.00000 | 275.0 | |
| Inorganic CPM (Uncorr.) | 67.37660 | 67.38280 | 0.00620 | 410.0 | |
| H2O Blank | 70.94820 | 70.95130 | 0.00310 | 450.0 | |
| Inorganic CPM (Corr.) | | | 0.00620 | | |

PARTICULATE EMISSIONS:

| | FILTERABLE | CPM | TOTAL |
|--------------------------------|-------------|-------------|-------------|
| Actual Grain Loading (gr/dscf) | 0.0023 | 0.0022 | 0.0045 |
| Corrected to 7% O2 (gr/dscf) | 0.0178 | 0.0173 | 0.0351 |
| Corrected to 12% CO2 (gr/dscf) | 0.0235 | 0.0227 | 0.0462 |
| Mass Rate (lb/hr) | 1.91 | 1.85 | 3.76 |

RUN NUMBER

RTO-M5/202-R3

Date 07/27/95
 Start Time 14:30
 End Time 15:49
 Stack Diam. 96 inches
 Nozzle I.D. 0.250 inches
 Meter Box Gamma 1.0166
 Meter Box dH@ 1.7393
 Barometric 27.43 in.Hg
 Cp 0.84
 Test Duration 72 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 100.0 | 188.0 | 88.0 |
| IMP.2 | 100.0 | 138.0 | 38.0 |
| IMP.3 | 100.0 | 102.0 | 2.0 |
| IMP.4 | 0.0 | 1.0 | 1.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 300.0 | 429.0 | 129.0 |
| S.G. | 200.0 | 211.5 | 11.5 |

METHOD 1-4 RESULTS

Metered Volume 52.702 dcf
 Volume @ Std.Cond. 46.492 dscf
 % Water 12.45 %
 % Isokinetics 99.6 %
 Velocity 48.19 ft/sec
 Actual Flow 145352 acfm
 Std. Flow 109209 scfm
 Dry Std. Flow 95607 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 19.0 | Md | 28.94 |
| %CO2 | 1.12 | Ms | 27.58 |
| %CO | 0.0 | Ps | 27.40 |
| %N2 | 79.9 | Fo | 1.705 |
| O2+CO2 | 20.1 | %EA | 904 |

| POINT | STACK | STATIC (in.WC) | DP (in.WC) | DH (in.WC) | METER VOLUME (dcf) | METER TEMPERATURE | |
|-------|----------------|-------------------|---------------|---------------|--------------------------|-------------------|------------------|
| | TEMP (DegF) | | | | | INLET (DegF) | OUTLET (DegF) |
| 1 | 184 | -0.45 | 0.39 | 0.95 | 435.881 | 99 | 98 |
| 2 | 185 | -0.43 | 0.52 | 1.60 | 488.583 | 99 | 98 |
| 3 | 185 | | 0.55 | 1.69 | | 100 | 98 |
| 4 | 184 | | 0.53 | 1.63 | | 101 | 98 |
| 5 | 184 | | 0.54 | 1.60 | | 101 | 98 |
| 6 | 183 | | 0.54 | 1.66 | | 101 | 98 |
| 7 | 183 | | 0.54 | 1.66 | | 101 | 99 |
| 8 | 182 | | 0.55 | 1.70 | | 102 | 99 |
| 9 | 180 | | 0.58 | 1.64 | | 102 | 99 |
| 10 | 179 | | 0.56 | 1.55 | | 102 | 100 |
| 11 | 177 | | 0.47 | 1.46 | | 102 | 100 |
| 12 | 175 | | 0.41 | 1.28 | | 103 | 100 |
| 13 | 187 | | 0.50 | 1.53 | | 98 | 98 |
| 14 | 189 | | 0.56 | 1.71 | | 99 | 98 |
| 15 | 189 | | 0.57 | 1.74 | | 100 | 99 |
| 16 | 188 | | 0.56 | 1.71 | | 100 | 99 |
| 17 | 188 | | 0.59 | 1.74 | | 101 | 99 |
| 18 | 187 | | 0.56 | 1.71 | | 101 | 99 |
| 19 | 184 | | 0.56 | 1.72 | | 101 | 99 |
| 20 | 182 | | 0.54 | 1.67 | | 101 | 100 |
| 21 | 184 | | 0.55 | 1.69 | | 102 | 100 |
| 22 | 184 | | 0.54 | 1.66 | | 102 | 100 |
| 23 | 182 | | 0.53 | 1.64 | | 103 | 100 |
| 24 | 179 | | 0.48 | 1.49 | | 103 | 100 |
| | | | | | 488.583 | | |
| AVG. | 184 | -0.44 | 0.53 | 1.60 | 52.702 | 100 | |

LOUISIANA PACIFIC
RTO STACK
EPA METHOD 5/202 ANALYTICAL DATA AND RESULTS

SAMPLING DATA:

Run Number: RTO-M5/202-R3
Corr. Sample Volume: 46.492 dscf
Corr. Flowrate: 95607 dscfm
O2 Content: 19.0 %
CO2 Content: 1.1 %

SUMMARY:

| COMPONENT | NET (grams) | CORRECTED FOR BLANK (grams) |
|-----------------------|----------------|-----------------------------------|
| <i>SUSPENDED PM</i> | | |
| Probe Wash | 0.00340 | 0.00340 |
| Filter | 0.00520 | 0.00520 |
| <i>CONDENSIBLE PM</i> | | |
| Organic CPM | 0.00500 | 0.00500 |
| Inorganic CPM | 0.00280 | -0.00009 |
| TOTAL CPM | 0.00780 | 0.00491 |
| TOTAL PM | 0.01640 | 0.01351 |

ANALYTICAL DATA:

| METHOD 5 COMPONENTS | TARE (grams) | FINAL (grams) | NET (grams) | VOLUME (ml) |
|--------------------------|-----------------|------------------|----------------|----------------|
| Acetone Probe Wash | 70.12320 | 70.12660 | 0.00340 | 100.0 |
| Acetone Blank Residue | 64.29320 | 64.29320 | 0.00000 | 120.0 |
| Applicable Acetone Blank | | | 0.00000 | |
| Max. Allowable Blank | | | 0.00078 | |
| Filter | 0.41680 | 0.42200 | 0.00520 | |

| METHOD 202 COMPONENTS | TARE (grams) | FINAL (grams) | NET (grams) | REAGENT VOLUME (ml) | CONC. (mg/l) |
|-------------------------|-----------------|------------------|----------------|---------------------------|-----------------|
| Volume of Cont.#4 | | | | 420.0 | |
| Organic CPM (Uncorr.) | 67.02160 | 67.02660 | 0.00500 | 290.0 | |
| MeCl2 Blank | 67.33300 | 67.33260 | 0.00000 | 275.0 | |
| Inorganic CPM (Uncorr.) | 64.14680 | 64.14960 | 0.00280 | 420.0 | |
| H2O Blank | 70.94820 | 70.95130 | 0.00310 | 450.0 | |
| Inorganic CPM (Corr.) | | | 0.00280 | | |

PARTICULATE EMISSIONS:

| | FILTERABLE | CPM | TOTAL |
|--------------------------------|-------------|-------------|-------------|
| Actual Grain Loading (gr/dscf) | 0.0029 | 0.0016 | 0.0045 |
| Corrected to 7% O2 (gr/dscf) | 0.0208 | 0.0119 | 0.0326 |
| Corrected to 12% CO2 (gr/dscf) | 0.0306 | 0.0174 | 0.0480 |
| Mass Rate (lb/hr) | 2.34 | 1.33 | 3.67 |

APPENDIX C
DATA AND RESULTS FOR BIF METHOD 0011
RTO STACK

RUN NUMBER

RTO-0011-R1

Date 07/27/95
 Start Time 09:15
 End Time 10:56
 Stack Diam. 96 inches
 Nozzle I.D. 0.250 inches
 Meter Box Gamma 0.9928
 Meter Box dH@ 1.8475
 Barometric 27.43 in.Hg
 Cp 0.823
 Test Duration 72 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 100.0 | 175.0 | 75.0 |
| IMP.2 | 100.0 | 122.0 | 22.0 |
| IMP.3 | 0.0 | 3.0 | 3.0 |
| IMP.4 | | | 0.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 200.0 | 300.0 | 100.0 |
| S.G. | 200.0 | 219.5 | 19.5 |

METHOD 1-4 RESULTS

Metered Volume 62.154 dcf
 Volume @ Std.Cond. 55.063 dscf
 % Water 9.27 %
 % Isokinetics 106.1 %
 Velocity 51.21 ft/sec
 Actual Flow 154433 acfm
 Std. Flow 117205 scfm
 Dry Std. Flow 106339 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 19.5 | Md | 28.96 |
| %CO2 | 1.1 | Ms | 27.94 |
| %CO | 0.0 | Ps | 27.40 |
| %N2 | 79.4 | Fo | 1.231 |
| O2+CO2 | 20.6 | %EA | 1375 |

| POINT | STACK | STATIC | DP | DH | METER | METER TEMPERATURE | |
|-------|--------|---------|---------|---------|---------|-------------------|--------|
| | TEMP | | | | VOLUME | INLET | OUTLET |
| | (DegF) | (in.WC) | (in.WC) | (in.WC) | (dcf) | (DegF) | (DegF) |
| 1 | 171 | -0.48 | 0.70 | 2.31 | 706.726 | 78 | 76 |
| 2 | 175 | -0.47 | 0.70 | 2.51 | 768.880 | 83 | 80 |
| 3 | 177 | | 0.75 | 2.48 | | 84 | 81 |
| 4 | 174 | | 0.71 | 2.34 | | 85 | 81 |
| 5 | 173 | | 0.73 | 2.41 | | 86 | 81 |
| 6 | 175 | | 0.69 | 2.28 | | 87 | 82 |
| 7 | 172 | | 0.70 | 2.34 | | 89 | 83 |
| 8 | 176 | | 0.70 | 2.34 | | 89 | 83 |
| 9 | 172 | | 0.65 | 2.15 | | 89 | 83 |
| 10 | 173 | | 0.65 | 2.15 | | 89 | 83 |
| 11 | 171 | | 0.50 | 1.65 | | 90 | 83 |
| 12 | 170 | | 0.45 | 1.49 | | 90 | 84 |
| 13 | 180 | | 0.75 | 2.48 | | 86 | 85 |
| 14 | 183 | | 0.75 | 2.48 | | 86 | 84 |
| 15 | 180 | | 0.68 | 2.24 | | 87 | 84 |
| 16 | 185 | | 0.65 | 2.15 | | 88 | 84 |
| 17 | 181 | | 0.62 | 2.05 | | 89 | 84 |
| 18 | 184 | | 0.60 | 2.05 | | 89 | 84 |
| 19 | 186 | | 0.59 | 1.95 | | 90 | 84 |
| 20 | 179 | | 0.61 | 2.01 | | 90 | 85 |
| 21 | 181 | | 0.63 | 2.08 | | 90 | 84 |
| 22 | 177 | | 0.52 | 1.72 | | 90 | 84 |
| 23 | 177 | | 0.52 | 1.72 | | 90 | 85 |
| 24 | 176 | | 0.50 | 1.65 | | 90 | 85 |
| | | | | | 768.880 | | |
| AVG. | 177 | -0.48 | 0.64 | 2.13 | 62.154 | | 85 |

RUN NUMBER

RTO-0011-R2

Date 07/27/95
 Start Time 12:15
 End Time 13:35
 Stack Diam. 96 inches
 Nozzle I.D. 0.250 inches
 Meter Box Gamma 0.9928
 Meter Box dH@ 1.8475
 Barometric 27.43 in.Hg
 Cp 0.823
 Test Duration 72 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 100.0 | 187.0 | 87.0 |
| IMP.2 | 100.0 | 119.0 | 19.0 |
| IMP.3 | 0.0 | 2.0 | 2.0 |
| IMP.4 | | | 0.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 200.0 | 308.0 | 108.0 |
| S.G. | 200.0 | 212.0 | 12.0 |

METHOD 1-4 RESULTS

Metered Volume 59.370 dcf
 Volume @ Std.Cond. 51.650 dscf
 % Water 9.86 %
 % Isokinetics 101.7 %
 Velocity 50.86 ft/sec
 Actual Flow 153388 acfm
 Std. Flow 115439 scfm
 Dry Std. Flow 104057 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 19.1 | Md | 28.95 |
| %CO2 | 1.2 | Ms | 27.87 |
| %CO | 0.0 | Ps | 27.40 |
| %N2 | 79.7 | Fo | 1.524 |
| O2+CO2 | 20.3 | %EA | 994 |

| POINT | STACK | STATIC (in.WC) | DP (in.WC) | DH (in.WC) | METER | METER TEMPERATURE | |
|-------|----------------|-------------------|---------------|---------------|-------------------|-------------------|------------------|
| | TEMP (DegF) | | | | VOLUME (dcf) | INLET (DegF) | OUTLET (DegF) |
| 1 | 183 | -0.49 | 0.61 | 1.89 | 769.064 | 89 | 89 |
| 2 | 180 | -0.45 | 0.68 | 2.11 | 828.434 | 93 | 91 |
| 3 | 183 | | 0.66 | 2.05 | | 93 | 92 |
| 4 | 180 | | 0.66 | 2.05 | | 94 | 92 |
| 5 | 183 | | 0.64 | 1.98 | | 95 | 92 |
| 6 | 183 | | 0.67 | 2.08 | | 95 | 92 |
| 7 | 184 | | 0.65 | 2.02 | | 95 | 92 |
| 8 | 182 | | 0.62 | 1.92 | | 95 | 92 |
| 9 | 181 | | 0.62 | 1.92 | | 95 | 93 |
| 10 | 180 | | 0.60 | 1.86 | | 95 | 93 |
| 11 | 179 | | 0.50 | 1.55 | | 94 | 92 |
| 12 | 180 | | 0.51 | 1.58 | | 94 | 92 |
| 13 | 183 | | 0.69 | 2.14 | | 95 | 92 |
| 14 | 184 | | 0.68 | 2.11 | | 96 | 92 |
| 15 | 186 | | 0.66 | 2.05 | | 98 | 92 |
| 16 | 184 | | 0.70 | 2.17 | | 99 | 93 |
| 17 | 186 | | 0.70 | 2.17 | | 100 | 93 |
| 18 | 183 | | 0.62 | 1.92 | | 101 | 94 |
| 19 | 184 | | 0.63 | 1.95 | | 101 | 95 |
| 20 | 182 | | 0.59 | 1.83 | | 101 | 95 |
| 21 | 184 | | 0.60 | 1.86 | | 102 | 96 |
| 22 | 182 | | 0.60 | 1.86 | | 102 | 96 |
| 23 | 181 | | 0.52 | 1.61 | | 103 | 96 |
| 24 | 180 | | 0.53 | 1.64 | | 104 | 97 |
| AVG. | 182 | -0.47 | 0.62 | 1.93 | 828.434 59.370 | 95 | |

APPENDIX D
DATA AND RESULTS FOR MDI TESTING
RTO STACK

RUN NUMBER

RTO-MDI-R1

Date 07/27/95
 Start Time 16:50
 End Time 18:07
 Stack Diam. 96 inches
 Nozzle I.D. 0.250 inches
 Meter Box Gamma 0.9928
 Meter Box dH@ 1.8475
 Barometric 27.43 in.Hg
 Cp 0.823
 Test Duration 60 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 300.0 | 260.0 | -40.0 |
| IMP.2 | 200.0 | 256.0 | 56.0 |
| IMP.3 | 200.0 | 201.0 | 1.0 |
| IMP.4 | 0.0 | 4.0 | 4.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 700.0 | 721.0 | 21.0 |
| S.G. | 400.0 | 467.0 | 67.0 |

METHOD 1-4 RESULTS

Metered Volume 46.142 dcf
 Volume @ Std.Cond. 39.389 dscf
 % Water 9.53 %
 % Isokinetics 99.1 %
 Velocity 47.76 ft/sec
 Actual Flow 144045 acfm
 Std. Flow 108035 scfm
 Dry Std. Flow 97743 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 18.4 | Md | 28.91 |
| %CO2 | 1.1 | Ms | 27.87 |
| %CO | 0.0 | Ps | 27.40 |
| %N2 | 80.5 | Fo | 2.287 |
| O2+CO2 | 19.5 | %EA | 648 |

| POINT | STACK | STATIC (in.WC) | DP (in.WC) | DH (in.WC) | METER | METER | TEMPERATURE |
|-------|----------------|-------------------|---------------|---------------|-----------------|-----------------|------------------|
| | TEMP (DegF) | | | | VOLUME (dcf) | INLET (DegF) | OUTLET (DegF) |
| 1 | 185 | -0.48 | 0.55 | 1.79 | 889.360 | 100 | 100 |
| 2 | 185 | -0.47 | 0.50 | 1.63 | 935.502 | 101 | 100 |
| 3 | 187 | | 0.60 | 1.95 | | 102 | 101 |
| 4 | 186 | | 0.61 | 1.99 | | 103 | 101 |
| 5 | 187 | | 0.58 | 1.89 | | 104 | 102 |
| 6 | 187 | | 0.59 | 1.92 | | 105 | 103 |
| 7 | 185 | | 0.58 | 1.89 | | 106 | 103 |
| 8 | 186 | | 0.58 | 1.89 | | 107 | 104 |
| 9 | 184 | | 0.56 | 1.83 | | 107 | 105 |
| 10 | 184 | | 0.54 | 1.76 | | 107 | 105 |
| 11 | 181 | | 0.47 | 1.54 | | 107 | 105 |
| 12 | 179 | | 0.45 | 1.49 | | 107 | 106 |
| 13 | 184 | | 0.58 | 1.90 | | 108 | 106 |
| 14 | 186 | | 0.51 | 1.66 | | 108 | 106 |
| 15 | 186 | | 0.60 | 1.95 | | 108 | 107 |
| 16 | 188 | | 0.60 | 1.95 | | 108 | 107 |
| 17 | 187 | | 0.57 | 1.85 | | 108 | 107 |
| 18 | 187 | | 0.56 | 1.82 | | 108 | 107 |
| 19 | 184 | | 0.57 | 1.86 | | 109 | 107 |
| 20 | 185 | | 0.57 | 1.86 | | 107 | 106 |
| 21 | 184 | | 0.55 | 1.80 | | 107 | 106 |
| 22 | 181 | | 0.51 | 1.67 | | 107 | 106 |
| 23 | 183 | | 0.48 | 1.57 | | 107 | 106 |
| 24 | 179 | | 0.42 | 1.38 | | 108 | 106 |
| | | | | | 935.502 | | |
| AVG. | 185 | -0.48 | 0.55 | 1.79 | 46.142 | | 105 |

RUN NUMBER

RTO-MDI-R2

Date 7/28/95
 Start Time 11:45
 End Time 13:05
 Stack Diam. 96 inches
 Nozzle I.D. 0.25 inches
 Meter Box Gamma 0.9928
 Meter Box dH@ 1.8475
 Barometric 27.47 in.Hg
 Cp 0.823
 Test Duration 60 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 300.0 | 222.0 | -78.0 |
| IMP.2 | 200.0 | 276.0 | 76.0 |
| IMP.3 | 200.0 | 211.0 | 11.0 |
| IMP.4 | 0.0 | 1.0 | 1.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 700.0 | 710.0 | 10.0 |
| S.G. | 400.0 | 476.0 | 76.0 |

METHOD 1-4 RESULTS

Metered Volume 48.913 dcf
 Volume @ Std.Cond. 43.043 dscf
 % Water 8.61 %
 % Isokinetics 103.6 %
 Velocity 49.07 ft/sec
 Actual Flow 147978 acfm
 Std. Flow 111776 scfm
 Dry Std. Flow 102154 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 20.1 | Md | 28.96 |
| %CO2 | 1.0 | Ms | 28.02 |
| %CO | 0.0 | Ps | 27.44 |
| %N2 | 78.9 | Fo | 0.800 |
| O2+CO2 | 21.1 | %EA | 2755 |

| POINT | STACK | STATIC (in.WC) | DP (in.WC) | DH (in.WC) | METER | METER | TEMPERATURE |
|-------|----------------|-------------------|---------------|---------------|-------------------|-----------------|------------------|
| | TEMP (DegF) | | | | VOLUME (dcf) | INLET (DegF) | OUTLET (DegF) |
| 1 | 177 | -0.40 | 0.62 | 1.96 | 937.007 | 91 | 87 |
| 2 | 180 | -0.40 | 0.63 | 1.99 | 985.920 | 92 | 91 |
| 3 | 176 | | 0.65 | 2.05 | | 91 | 87 |
| 4 | 178 | | 0.62 | 1.96 | | 90 | 87 |
| 5 | 177 | | 0.66 | 2.09 | | 91 | 87 |
| 6 | 179 | | 0.62 | 1.96 | | 90 | 87 |
| 7 | 178 | | 0.62 | 1.96 | | 90 | 86 |
| 8 | 180 | | 0.63 | 1.99 | | 90 | 86 |
| 9 | 177 | | 0.58 | 1.83 | | 91 | 87 |
| 10 | 181 | | 0.58 | 1.83 | | 92 | 87 |
| 11 | 179 | | 0.49 | 1.55 | | 92 | 87 |
| 12 | 177 | | 0.49 | 1.55 | | 93 | 87 |
| 13 | 186 | | 0.63 | 1.99 | | 92 | 87 |
| 14 | 185 | | 0.63 | 1.99 | | 93 | 87 |
| 15 | 190 | | 0.61 | 1.93 | | 92 | 87 |
| 16 | 188 | | 0.65 | 2.05 | | 92 | 88 |
| 17 | 189 | | 0.61 | 1.93 | | 93 | 87 |
| 18 | 185 | | 0.58 | 1.83 | | 93 | 87 |
| 19 | 181 | | 0.55 | 1.74 | | 93 | 87 |
| 20 | 180 | | 0.60 | 1.98 | | 92 | 87 |
| 21 | 183 | | 0.57 | 1.88 | | 92 | 87 |
| 22 | 180 | | 0.52 | 1.72 | | 92 | 87 |
| 23 | 180 | | 0.48 | 1.58 | | 92 | 87 |
| 24 | 180 | | 0.42 | 1.39 | | 92 | 87 |
| AVG. | 181 | -0.40 | 0.59 | 1.86 | 985.920 48.913 | 89 | |

RUN NUMBER

RTO-MDI-R3

Date 7/28/95
 Start Time 12:30
 End Time 13:33
 Stack Diam. 96 inches
 Nozzle I.D. 0.25 inches
 Meter Box Gamma 0.9928
 Meter Box dH@ 1.8475
 Barometric 27.47 in.Hg
 Cp 0.823
 Test Duration 60 minutes

METHOD 4 DATA

| | INIT. (ml) | FINAL (ml) | NET (ml) |
|-------|---------------|---------------|-------------|
| IMP.1 | 300.0 | 229.0 | -71.0 |
| IMP.2 | 200.0 | 305.0 | 105.0 |
| IMP.3 | 200.0 | 187.0 | -13.0 |
| IMP.4 | 0.0 | 1.0 | 1.0 |
| IMP.5 | | | 0.0 |
| IMP.6 | | | 0.0 |
| IMP.7 | | | 0.0 |
| TOTAL | 700.0 | 722.0 | 22.0 |
| S.G. | 400.0 | 471.0 | 71.0 |

METHOD 1-4 RESULTS

Metered Volume 48.532 dcf
 Volume @ Std.Cond. 42.761 dscf
 % Water 9.30 %
 % Isokinetics 103.6 %
 Velocity 49.14 ft/sec
 Actual Flow 148190 acfm
 Std. Flow 111914 scfm
 Dry Std. Flow 101509 dscfm

METHOD 3 DATA

| | | | |
|--------|------|-----|-------|
| %O2 | 19.9 | Md | 28.97 |
| %CO2 | 1.1 | Ms | 27.95 |
| %CO | 0.0 | Ps | 27.44 |
| %N2 | 79.0 | Fo | 0.909 |
| O2+CO2 | 21.0 | %EA | 2082 |

| POINT | STACK | STATIC (in.WC) | DP (in.WC) | DH (in.WC) | METER | METER | TEMPERATURE |
|-------|----------------|-------------------|---------------|---------------|--------------------|-----------------|------------------|
| | TEMP (DegF) | | | | VOLUME (dcf) | INLET (DegF) | OUTLET (DegF) |
| 1 | 180 | -0.40 | 0.66 | 2.11 | 988.476 | 89 | 87 |
| 2 | 181 | -0.40 | 0.63 | 2.02 | 1037.008 | 89 | 87 |
| 3 | 181 | | 0.64 | 2.05 | | 89 | 87 |
| 4 | 183 | | 0.61 | 1.95 | | 89 | 87 |
| 5 | 183 | | 0.61 | 1.95 | | 90 | 87 |
| 6 | 184 | | 0.62 | 1.98 | | 91 | 87 |
| 7 | 181 | | 0.62 | 1.98 | | 91 | 88 |
| 8 | 181 | | 0.59 | 1.89 | | 91 | 87 |
| 9 | 180 | | 0.60 | 1.92 | | 91 | 87 |
| 10 | 181 | | 0.55 | 1.76 | | 91 | 87 |
| 11 | 180 | | 0.47 | 1.50 | | 90 | 87 |
| 12 | 181 | | 0.46 | 1.47 | | 90 | 87 |
| 13 | 180 | | 0.62 | 1.98 | | 90 | 87 |
| 14 | 180 | | 0.65 | 2.08 | | 90 | 87 |
| 15 | 180 | | 0.63 | 2.02 | | 90 | 87 |
| 16 | 182 | | 0.61 | 1.95 | | 90 | 87 |
| 17 | 181 | | 0.61 | 1.95 | | 90 | 87 |
| 18 | 184 | | 0.59 | 1.89 | | 90 | 87 |
| 19 | 180 | | 0.60 | 1.92 | | 90 | 87 |
| 20 | 182 | | 0.60 | 1.92 | | 91 | 87 |
| 21 | 180 | | 0.57 | 1.82 | | 91 | 87 |
| 22 | 183 | | 0.57 | 1.82 | | 92 | 87 |
| 23 | 180 | | 0.48 | 1.54 | | 93 | 87 |
| 24 | 181 | | 0.45 | 1.44 | | 93 | 87 |
| AVG. | 181 | -0.40 | 0.59 | 1.87 | 1037.008 48.532 | 89 | |

APPENDIX E

DATA AND RESULTS FOR EPA METHODS 3A, 6C, 7E, 10, AND 25A TESTING

RTO STACK

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R1

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv | VOC ppmwv |
|-------|------------|-------------|-------------|--------------|--------------|--------------|
| 09:16 | 19.45 | 1.218 | 31.29 | 2.02 | 13.230 | 4.90 |
| 09:17 | 19.39 | 1.271 | 26.74 | 1.93 | 14.200 | 4.48 |
| 09:18 | 19.32 | 1.282 | 35.54 | 1.85 | 12.660 | 4.27 |
| 09:19 | 19.43 | 1.090 | 36.40 | 2.21 | 9.690 | 4.29 |
| 09:20 | 19.64 | 1.173 | 30.00 | 2.07 | 13.350 | 4.30 |
| 09:21 | 19.48 | 1.187 | 26.51 | 1.29 | 13.810 | 4.07 |
| 09:22 | 19.46 | 1.268 | 31.45 | 1.79 | 13.720 | 3.87 |
| 09:23 | 19.32 | 1.224 | 30.14 | 1.96 | 12.810 | 3.85 |
| 09:24 | 19.49 | 1.100 | 29.22 | 1.85 | 9.750 | 3.69 |
| 09:25 | 19.57 | 1.219 | 37.28 | 1.71 | 13.210 | 3.54 |
| 09:26 | 19.41 | 1.205 | 33.66 | 2.10 | 13.510 | 3.62 |
| 09:27 | 19.40 | 1.230 | 25.31 | 2.21 | 14.750 | 3.52 |
| 09:28 | 19.36 | 1.197 | 24.80 | 2.02 | 13.180 | 3.45 |
| 09:29 | 19.49 | 1.051 | 33.71 | 1.79 | 9.730 | 3.23 |
| 09:30 | 19.58 | 1.191 | 35.89 | 1.74 | 12.840 | 3.55 |
| 09:31 | 19.42 | 1.168 | 25.46 | 1.79 | 14.140 | 3.50 |
| 09:32 | 19.40 | 1.279 | 28.13 | 1.85 | 13.920 | 3.26 |
| 09:33 | 19.30 | 1.233 | 37.33 | 1.79 | 12.570 | 3.25 |
| 09:34 | 19.50 | 1.032 | 32.47 | 1.93 | 10.250 | 3.47 |
| 09:35 | 19.67 | 1.153 | 27.65 | 2.35 | 13.540 | 5.27 |
| 09:36 | 19.48 | 1.184 | 32.49 | 1.48 | 13.320 | 4.62 |
| 09:37 | 19.44 | 1.239 | 34.69 | 1.74 | 13.970 | 3.99 |
| 09:38 | 19.35 | 1.161 | 27.80 | 1.09 | 13.760 | 4.04 |
| 09:39 | 19.55 | 0.997 | 27.93 | 1.32 | 10.950 | 3.83 |
| 09:40 | 19.67 | 1.141 | 35.16 | 1.60 | 13.710 | 3.82 |
| 09:41 | 19.43 | 1.166 | 32.67 | 1.01 | 13.620 | 3.88 |
| 09:42 | 19.42 | 1.220 | 25.88 | 1.54 | 14.700 | 3.80 |
| 09:43 | 19.35 | 1.189 | 29.16 | 1.71 | 13.550 | 3.72 |
| 09:44 | 19.47 | 0.990 | 33.52 | 1.65 | 10.900 | 3.57 |
| 09:45 | 19.69 | 1.088 | 27.69 | 1.15 | 14.620 | 3.71 |
| 09:46 | 19.56 | 1.100 | 22.15 | 1.51 | 15.020 | 3.55 |
| 09:47 | 19.51 | 1.165 | 27.68 | 1.43 | 15.220 | 3.28 |
| 09:48 | 19.34 | 1.145 | 29.94 | 1.57 | 13.780 | 3.48 |
| 09:49 | 19.50 | 1.021 | 25.13 | 1.37 | 10.880 | 3.46 |
| 09:50 | 19.70 | 1.107 | 25.47 | 1.90 | 14.160 | 3.21 |
| 09:51 | 19.44 | 1.151 | 28.46 | 1.71 | 13.830 | 3.11 |
| 09:52 | 19.42 | 1.182 | 25.25 | 1.15 | 14.720 | 3.17 |
| 09:53 | 19.40 | 1.124 | 18.61 | 1.51 | 14.430 | 3.19 |
| 09:54 | 19.56 | 0.989 | 25.35 | 2.05 | 11.560 | 2.85 |
| 09:55 | 19.69 | 1.104 | 27.19 | 1.54 | 14.880 | 2.83 |
| 09:56 | 19.52 | 1.139 | 19.49 | 1.76 | 15.740 | 2.89 |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R1

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv | VOC ppmwv |
|---------------------------------|------------|-------------|-------------|--------------|--------------|--------------|
| 09:57 | 19.45 | 1.221 | 17.77 | 2.10 | 16.160 | 2.76 |
| 09:58 | 19.39 | 1.154 | 24.24 | 2.49 | 14.850 | 2.73 |
| 09:59 | 19.54 | 1.018 | 26.28 | 2.41 | 11.330 | 2.82 |
| 10:00 | 19.65 | 1.134 | 19.02 | 2.07 | 15.420 | 3.05 |
| 10:01 | 19.50 | 1.152 | 18.75 | 1.31 | 15.610 | 2.83 |
| 10:02 | 19.41 | 1.265 | 25.73 | 1.43 | 15.360 | 2.76 |
| 10:03 | 19.32 | 1.214 | 25.00 | 1.34 | 14.700 | 3.04 |
| 10:04 | 19.48 | 1.060 | 19.88 | 1.62 | 12.280 | 3.03 |
| 10:05 | 19.55 | 1.210 | 25.71 | 1.34 | 15.110 | 2.81 |
| 10:06 | 19.42 | 1.248 | 29.07 | 1.51 | 14.510 | 2.84 |
| 10:07 | 19.33 | 1.375 | 24.74 | 1.34 | 15.310 | 3.04 |
| 10:08 | 19.26 | 1.282 | 24.37 | 1.82 | 14.340 | 3.03 |
| 10:09 | 19.42 | 1.107 | 34.94 | 1.68 | 10.690 | 2.85 |
| 10:10 | 19.61 | 1.198 | 32.41 | 2.18 | 14.410 | 3.10 |
| 10:11 | 19.41 | 1.204 | 20.06 | 1.62 | 15.110 | 3.21 |
| 10:12 | 19.41 | 1.273 | 23.30 | 1.65 | 15.710 | 2.80 |
| 10:13 | 19.33 | 1.194 | 28.72 | 1.57 | 14.200 | 2.84 |
| 10:14 | 19.51 | 1.052 | 24.56 | 2.27 | 11.980 | 3.02 |
| 10:15 | 19.59 | 1.210 | 20.14 | 1.74 | 15.160 | 2.94 |
| 60 MinAvg | 19.47 | 1.166 | 27.76 | 1.73 | 13.574 | 3.45 |
| Data Corrected for Calibrations | | | | | | |
| 60 MinAvg | 19.53 | 1.113 | 28.19 | 1.74 | 13.648 | 3.41 |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R2

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv | VOC ppmwv |
|-------|------------|-------------|-------------|--------------|--------------|--------------|
| 12:16 | 19.02 | 1.380 | 42.16 | 1.15 | 16.400 | 1.07 |
| 12:17 | 18.90 | 1.299 | 50.35 | 1.17 | 14.390 | 1.42 |
| 12:18 | 19.13 | 1.091 | 43.00 | 1.09 | 12.060 | 1.57 |
| 12:19 | 19.23 | 1.211 | 43.71 | 1.20 | 16.000 | 1.92 |
| 12:20 | 19.08 | 1.202 | 39.26 | 1.25 | 15.760 | 1.41 |
| 12:21 | 19.05 | 1.245 | 35.24 | 1.29 | 16.910 | 1.37 |
| 12:22 | 19.08 | 1.128 | 30.12 | 1.28 | 16.270 | 1.46 |
| 12:23 | 19.25 | 1.002 | 35.71 | 1.13 | 13.230 | 1.22 |
| 12:24 | 19.33 | 1.137 | 36.57 | 1.22 | 16.610 | 1.34 |
| 12:25 | 19.17 | 1.178 | 33.33 | 1.21 | 15.790 | 1.47 |
| 12:26 | 19.05 | 1.289 | 40.44 | 0.97 | 16.340 | 1.48 |
| 12:27 | 18.99 | 1.241 | 50.92 | 0.89 | 14.840 | 1.64 |
| 12:28 | 19.15 | 1.097 | 54.55 | 1.24 | 11.870 | 1.91 |
| 12:29 | 19.21 | 1.217 | 49.13 | 1.17 | 15.740 | 2.09 |
| 12:30 | 19.04 | 1.209 | 48.00 | 1.28 | 15.510 | 1.86 |
| 12:31 | 19.08 | 1.268 | 48.60 | 1.40 | 16.020 | 1.92 |
| 12:32 | 19.01 | 1.182 | 46.26 | 1.20 | 15.540 | 2.11 |
| 12:33 | 19.18 | 1.046 | 41.46 | 1.06 | 13.400 | 2.09 |
| 12:34 | 19.22 | 1.188 | 45.34 | 1.24 | 16.480 | 1.87 |
| 12:35 | 19.10 | 1.176 | 48.51 | 1.46 | 15.930 | 1.95 |
| 12:36 | 19.05 | 1.247 | 41.25 | 1.38 | 17.430 | 2.15 |
| 12:37 | 19.04 | 1.167 | 45.74 | 1.42 | 15.330 | 2.20 |
| 12:38 | 19.21 | 1.080 | 55.81 | 1.26 | 13.240 | 2.03 |
| 12:39 | 19.20 | 1.206 | 50.67 | 1.58 | 16.410 | 2.33 |
| 12:40 | 19.06 | 1.224 | 48.01 | 1.67 | 16.300 | 2.35 |
| 12:41 | 18.99 | 1.285 | 48.90 | 1.43 | 16.350 | 2.25 |
| 12:42 | 18.99 | 1.231 | 58.56 | 1.38 | 15.200 | 2.29 |
| 12:43 | 19.16 | 1.112 | 56.98 | 1.61 | 13.410 | 2.62 |
| 12:44 | 19.14 | 1.197 | 49.16 | 1.51 | 16.750 | 2.53 |
| 12:45 | 19.03 | 1.196 | 43.61 | 1.11 | 16.020 | 2.22 |
| 12:46 | 19.02 | 1.239 | 41.97 | 1.15 | 17.290 | 2.16 |
| 12:47 | 19.00 | 1.172 | 41.60 | 1.24 | 16.220 | 2.18 |
| 12:48 | 19.19 | 1.042 | 43.45 | 1.82 | 14.550 | 2.09 |
| 12:49 | 19.20 | 1.149 | 38.03 | 1.44 | 17.630 | 2.20 |
| 12:50 | 19.08 | 1.202 | 38.74 | 1.18 | 16.280 | 1.99 |
| 12:51 | 18.97 | 1.256 | 38.86 | 1.21 | 17.630 | 1.99 |
| 12:52 | 19.00 | 1.149 | 38.48 | 1.25 | 15.510 | 2.11 |
| 12:53 | 19.20 | 1.125 | 41.90 | 1.38 | 14.930 | 1.97 |
| 12:54 | 19.07 | 1.248 | 39.67 | 1.18 | 17.340 | 1.95 |
| 12:55 | 18.99 | 1.290 | 44.99 | 1.35 | 16.210 | 1.73 |
| 12:56 | 18.88 | 1.360 | 45.77 | 0.80 | 16.830 | 1.80 |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R2

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv | VOC ppmwv |
|---------------------------------|------------|-------------|-------------|--------------|--------------|--------------|
| 12:57 | 18.93 | 1.210 | 48.53 | 1.35 | 15.250 | 1.79 |
| 12:58 | 19.24 | 1.140 | 47.68 | 1.09 | 14.840 | 1.93 |
| 12:59 | 19.08 | 1.206 | 40.89 | 1.54 | 17.910 | 1.87 |
| 13:00 | 19.02 | 1.157 | 33.06 | 1.22 | 17.770 | 1.73 |
| 13:01 | 19.05 | 1.184 | 28.24 | 1.06 | 18.310 | 1.60 |
| 13:02 | 19.03 | 1.107 | 29.34 | 1.15 | 17.280 | 1.38 |
| 13:03 | 19.24 | 1.079 | 27.40 | 1.15 | 17.090 | 1.47 |
| 13:04 | 19.13 | 1.179 | 29.12 | 1.21 | 18.600 | 1.25 |
| 13:05 | 19.07 | 1.221 | 30.63 | 1.42 | 18.490 | 1.19 |
| 13:06 | 18.91 | 1.265 | 35.90 | 1.60 | 17.680 | 1.39 |
| 13:07 | 18.96 | 1.178 | 46.75 | 1.09 | 14.940 | 1.48 |
| 13:08 | 19.17 | 1.250 | 61.08 | 1.42 | 15.250 | 1.73 |
| 13:09 | 18.93 | 1.348 | 59.07 | 1.22 | 17.100 | 2.03 |
| 13:10 | 18.86 | 1.427 | 61.74 | 0.97 | 16.890 | 2.02 |
| 13:11 | 18.74 | 1.433 | 62.67 | 1.02 | 16.510 | 2.03 |
| 13:12 | 18.86 | 1.210 | 69.09 | 1.06 | 12.960 | 1.99 |
| 13:13 | 19.10 | 1.326 | 75.20 | 0.92 | 16.190 | 2.25 |
| 13:14 | 18.87 | 1.360 | 74.40 | 0.77 | 16.440 | 2.25 |
| 13:15 | 18.86 | 1.343 | 62.51 | 1.10 | 17.620 | 2.33 |
| 60 MinAvg | 19.06 | 1.210 | 45.64 | 1.24 | 15.985 | 1.87 |
| Data Corrected for Calibrations | | | | | | |
| 60 MinAvg | 19.12 | 1.168 | 46.40 | 1.26 | 16.213 | 1.93 |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R3

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv | VOC ppmwv |
|-------|------------|-------------|-------------|--------------|--------------|--------------|
| 14:31 | 18.84 | 1.041 | 98.40 | 0.59 | 12.020 | 3.13 |
| 14:32 | 19.13 | 1.103 | 100.40 | 0.67 | 13.680 | 3.59 |
| 14:33 | 18.91 | 1.144 | 89.20 | 0.68 | 14.770 | 3.46 |
| 14:34 | 18.88 | 1.150 | 90.00 | 0.59 | 14.490 | 3.33 |
| 14:35 | 18.82 | 1.160 | 93.80 | 0.64 | 14.190 | 3.33 |
| 14:36 | 18.86 | 1.022 | 82.40 | 0.66 | 12.220 | 3.29 |
| 14:37 | 19.12 | 1.106 | 85.20 | 0.53 | 14.360 | 3.28 |
| 14:38 | 18.90 | 1.142 | 83.70 | 0.77 | 14.800 | 2.96 |
| 14:39 | 18.91 | 1.106 | 76.90 | 0.21 | 14.330 | 3.00 |
| 14:40 | 18.90 | 1.105 | 63.67 | 0.30 | 14.880 | 3.12 |
| 14:41 | 18.91 | 1.013 | 67.93 | -0.08 | 13.320 | 2.60 |
| 14:42 | 19.10 | 1.058 | 76.30 | 0.25 | 14.760 | 2.64 |
| 14:43 | 18.94 | 1.082 | 58.96 | 0.17 | 15.250 | 2.72 |
| 14:44 | 18.94 | 1.165 | 54.40 | -0.04 | 15.770 | 2.53 |
| 14:45 | 18.69 | 1.281 | 67.20 | -0.12 | 17.470 | 2.32 |
| 14:46 | 18.71 | 1.094 | 68.04 | -0.48 | 14.310 | 2.33 |
| 14:47 | 18.96 | 1.068 | 56.59 | -0.05 | 15.450 | 2.55 |
| 14:48 | 19.00 | 1.055 | 55.41 | -0.31 | 14.760 | 2.30 |
| 14:49 | 19.01 | 1.117 | 68.42 | 0.08 | 15.260 | 2.14 |
| 14:50 | 18.81 | 1.206 | 66.81 | 0.06 | 16.220 | 2.43 |
| 14:51 | 18.80 | 1.039 | 58.28 | 0.53 | 13.370 | 2.45 |
| 14:52 | 19.09 | 1.027 | 58.66 | 0.50 | 14.080 | 2.32 |
| 14:53 | 19.04 | 1.046 | 70.20 | 0.34 | 14.590 | 2.14 |
| 14:54 | 18.93 | 1.195 | 68.12 | -0.31 | 16.820 | 2.43 |
| 14:55 | 18.69 | 1.218 | 62.08 | -0.06 | 16.160 | 2.61 |
| 14:56 | 18.82 | 1.041 | 75.60 | -0.20 | 13.190 | 2.37 |
| 14:57 | 19.00 | 1.053 | 75.70 | -0.34 | 14.270 | 2.48 |
| 14:58 | 18.97 | 1.096 | 71.30 | 0.20 | 14.010 | 2.63 |
| 14:59 | 18.89 | 1.293 | 70.70 | 0.64 | 16.490 | 2.75 |
| 15:00 | 18.57 | 1.304 | 90.70 | 0.64 | 16.190 | 2.68 |
| 15:01 | 18.75 | 1.122 | 97.50 | 0.63 | 12.910 | 2.76 |
| 15:02 | 18.88 | 1.135 | 90.80 | 0.57 | 14.140 | 3.01 |
| 15:03 | 18.89 | 1.121 | 89.20 | 0.48 | 14.320 | 2.83 |
| 15:04 | 18.83 | 1.297 | 91.30 | 0.45 | 16.580 | 2.82 |
| 15:05 | 18.59 | 1.230 | 86.10 | 0.32 | 15.300 | 3.08 |
| 15:06 | 18.85 | 1.068 | 78.60 | 0.31 | 13.600 | 2.95 |
| 15:07 | 18.94 | 1.093 | 84.00 | 0.05 | 15.150 | 2.78 |
| 15:08 | 18.92 | 1.120 | 85.40 | 0.14 | 14.520 | 2.66 |
| 15:09 | 18.78 | 1.333 | 79.90 | 0.46 | 16.900 | 3.08 |
| 15:10 | 18.59 | 1.205 | 82.50 | 0.42 | 15.480 | 3.02 |
| 15:11 | 18.89 | 1.081 | 100.40 | -0.17 | 12.940 | 2.89 |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R3

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv | VOC ppmwv |
|---------------------------------|------------|-------------|-------------|--------------|--------------|--------------|
| 15:12 | 18.91 | 1.114 | 99.20 | -0.37 | 13.900 | 3.04 |
| 15:13 | 18.81 | 1.128 | 94.30 | -0.34 | 13.630 | 2.98 |
| 15:14 | 18.78 | 1.333 | 98.40 | -0.13 | 16.690 | 3.06 |
| 15:15 | 18.55 | 1.241 | 99.40 | -0.12 | 16.460 | 3.02 |
| 15:16 | 18.73 | 1.128 | 78.80 | -0.24 | 15.210 | 3.35 |
| 15:17 | 18.78 | 1.116 | 59.25 | -0.49 | 17.220 | 3.82 |
| 15:18 | 18.78 | 1.220 | 56.11 | -0.19 | 18.700 | 2.39 |
| 15:19 | 18.58 | 1.289 | 56.44 | -0.20 | 18.460 | 2.35 |
| 15:20 | 18.63 | 1.099 | 53.05 | -0.26 | 14.570 | 2.50 |
| 15:21 | 18.96 | 1.048 | 62.08 | -0.44 | 12.930 | 2.30 |
| 15:22 | 18.94 | 1.094 | 75.00 | -0.09 | 14.260 | 2.14 |
| 15:23 | 18.87 | 1.155 | 78.90 | -0.26 | 14.930 | 2.25 |
| 15:24 | 18.66 | 1.285 | 57.61 | -0.59 | 17.710 | 2.51 |
| 15:25 | 18.62 | 1.180 | 56.43 | -0.20 | 17.690 | 2.18 |
| 15:26 | 18.85 | 1.021 | 57.10 | -0.32 | 15.500 | 2.01 |
| 15:27 | 18.98 | 1.009 | 41.12 | -0.34 | 16.800 | 2.14 |
| 15:28 | 19.00 | 1.102 | 36.04 | -0.13 | 16.540 | 1.78 |
| 15:29 | 18.74 | 1.245 | 50.30 | -0.32 | 18.480 | 1.59 |
| 15:30 | 18.73 | 1.064 | 49.82 | -0.19 | 14.860 | 1.71 |
| 60 MinAvg | 18.85 | 1.137 | 73.84 | 0.09 | 15.131 | 2.68 |
| Data Corrected for Calibrations | | | | | | |
| 60 MinAvg | 18.99 | 1.120 | 75.02 | 0.10 | 15.336 | 2.81 |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10-R4

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv |
|-------|------------|-------------|-------------|--------------|--------------|
| 16:51 | 18.64 | 1.010 | 32.17 | -0.21 | 18.170 |
| 16:52 | 18.46 | 1.194 | 36.59 | -0.23 | 19.740 |
| 16:53 | 18.24 | 1.122 | 48.62 | -0.08 | 16.330 |
| 16:54 | 18.48 | 1.013 | 48.18 | -0.02 | 14.600 |
| 16:55 | 18.57 | 1.004 | 35.97 | -0.34 | 16.920 |
| 16:56 | 18.57 | 1.041 | 39.10 | -0.21 | 17.390 |
| 16:57 | 18.43 | 1.184 | 43.19 | -0.09 | 19.140 |
| 16:58 | 18.26 | 1.109 | 35.17 | -0.24 | 17.800 |
| 16:59 | 18.47 | 0.973 | 36.77 | -0.14 | 15.000 |
| 17:00 | 18.59 | 0.986 | 42.00 | -0.20 | 16.630 |
| 17:01 | 18.54 | 1.043 | 42.24 | -0.28 | 16.220 |
| 17:02 | 18.37 | 1.219 | 35.77 | -0.16 | 18.690 |
| 17:03 | 18.18 | 1.154 | 40.41 | -0.28 | 16.620 |
| 17:04 | 18.40 | 1.046 | 48.60 | -0.20 | 14.800 |
| 17:05 | 18.45 | 1.045 | 37.37 | -0.08 | 16.780 |
| 17:06 | 18.42 | 1.096 | 31.03 | -0.08 | 16.810 |
| 17:07 | 18.23 | 1.235 | 37.14 | -0.01 | 18.920 |
| 17:08 | 18.13 | 1.073 | 37.44 | -0.12 | 16.060 |
| 17:09 | 18.44 | 0.989 | 30.68 | -0.14 | 16.450 |
| 17:10 | 18.42 | 1.037 | 28.93 | -0.17 | 17.360 |
| 17:11 | 18.34 | 1.123 | 37.26 | -0.20 | 17.090 |
| 17:12 | 18.12 | 1.223 | 33.12 | -0.04 | 18.950 |
| 17:13 | 18.07 | 1.121 | 29.15 | -0.30 | 15.830 |
| 17:14 | 18.30 | 1.087 | 40.19 | -0.12 | 15.160 |
| 17:15 | 18.29 | 1.100 | 41.18 | -0.20 | 15.110 |
| 17:16 | 18.24 | 1.150 | 38.08 | -0.24 | 15.990 |
| 17:17 | 18.06 | 1.269 | 31.58 | -0.31 | 18.380 |
| 17:18 | 18.02 | 1.073 | 39.37 | 0.10 | 14.900 |
| 17:19 | 18.31 | 1.026 | 36.32 | -0.20 | 16.150 |
| 17:20 | 18.30 | 0.994 | 24.42 | -0.14 | 17.780 |
| 17:21 | 18.35 | 1.024 | 23.38 | -0.01 | 19.510 |
| 17:22 | 18.14 | 1.103 | 27.84 | -0.16 | 19.720 |
| 17:23 | 18.14 | 0.968 | 25.29 | -0.04 | 15.060 |
| 17:24 | 18.34 | 1.011 | 24.40 | 0.10 | 16.200 |
| 17:25 | 18.27 | 1.084 | 33.78 | -0.10 | 15.790 |
| 17:26 | 18.15 | 1.272 | 40.57 | -0.32 | 16.250 |
| 17:27 | 17.80 | 1.358 | 41.93 | -0.20 | 17.320 |
| 17:28 | 17.85 | 1.152 | 44.67 | -0.23 | 14.320 |
| 17:29 | 18.08 | 1.114 | 50.12 | -0.09 | 15.160 |
| 17:30 | 18.08 | 1.079 | 38.98 | -0.32 | 15.390 |
| 17:31 | 18.09 | 1.155 | 27.41 | -0.26 | 18.270 |

Wheelabrator/LP/Dungannon
 Reference Method Data
 RTO Stack Outlet
 RTOSO-M3A, 6C, 7E, 10-R4

Starting
 07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv |
|---------------------------------|------------|-------------|-------------|--------------|--------------|
| 17:32 | 17.86 | 1.157 | 24.57 | -0.27 | 18.750 |
| 17:33 | 18.01 | 0.958 | 22.55 | 0.08 | 15.520 |
| 17:34 | 18.20 | 0.977 | 21.18 | -0.20 | 17.070 |
| 17:35 | 18.15 | 1.007 | 21.65 | -0.30 | 16.710 |
| 17:36 | 18.04 | 1.213 | 24.09 | -0.27 | 18.390 |
| 17:37 | 17.75 | 1.210 | 32.67 | -0.20 | 16.110 |
| 17:38 | 17.91 | 1.108 | 41.36 | -0.19 | 13.140 |
| 17:39 | 17.93 | 1.190 | 48.66 | -0.32 | 14.170 |
| 17:40 | 17.84 | 1.217 | 51.35 | -0.16 | 13.880 |
| 17:41 | 17.72 | 1.409 | 49.36 | -0.16 | 16.550 |
| 17:42 | 17.57 | 1.202 | 41.54 | 0.01 | 15.590 |
| 17:43 | 17.90 | 0.990 | 29.89 | -0.27 | 13.770 |
| 17:44 | 18.04 | 0.965 | 23.18 | 0.06 | 16.140 |
| 17:45 | 18.07 | 0.960 | 20.57 | -0.21 | 17.150 |
| 55 MinAvg | 18.19 | 1.102 | 35.44 | -0.16 | 16.576 |
| Data Corrected for Calibrations | | | | | |
| 55 MinAvg | 18.41 | 1.089 | 35.94 | -0.31 | 33.218 |

APPENDIX F
EQUATIONS AND CALCULATIONS

EPA METHODS 2-4 CALCULATIONS

1. Metered Gas Sample Volume at Standard Conditions

$$V_{m(std)} = V_m \times \gamma \times \frac{528}{29.92} \times \left[\frac{P_B + \frac{\Delta H}{13.6}}{T_m + 460} \right]$$

2. Gas Volume of Water Vapor Collected in Impinger Liquid

$$V_{wc(std)} = (V_f - V_i) \times 0.04707$$

3. Gas Volume of Water Vapor Collected in Silica Gel

$$V_{wsg(std)} = (W_f - W_i) \times 0.04715$$

4. Moisture Volume Fraction in Flue Gas

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

5. Moisture Volume Percentage in Flue Gas

$$\%H_2O = B_{ws} \times 100$$

6. Absolute Pressure of Flue Gas

$$P_s = P_B + \frac{P_{static}}{13.6}$$

7. Nitrogen Content of Flue Gas

$$\%N_2 = 100 - (\%CO_2 + \%O_2 + \%CO)$$

8. Dry Molecular Weight of Flue Gas

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

9. Wet Molecular Weight of Flue Gas

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

10. Fuel Factor Based on Flue Gas Composition

$$F_o = \frac{20.9 - \%O_2}{\%CO_2}$$

EPA METHODS 2-4 CALCULATIONS - continued

11. Excess Air of Flue Gas

$$\%EA = \frac{\%O_2 - 0.5\%CO}{0.264\%N_2 - (\%O_2 - 0.5\%CO)} \times 100$$

12. Average Gas Velocity, ft/sec

$$v_s = 85.49 \times C_p \times (\Delta P^{1/2})_{avg} \times \frac{(T_s + 460)^{1/2}}{(P_s \times M_s)^{1/2}}$$

13. Area of Round Duct or Stack

$$A_s = \frac{\pi \times D^2}{4 \times 144} \quad (\text{round ducts})$$

14. Area of Rectangular Duct

$$A_s = \frac{L \times W}{144} \quad (\text{rectangular ducts})$$

15. Actual Volumetric Flow Rate of Flue Gas

$$Q_a = v_s \times A_s \times 60$$

16. Flow Rate of Flue Gas at Standard Temperature and Pressure

$$Q_s = Q_a \times \left[\frac{P_s \times 528}{(T_s + 460) \times 29.92} \right]$$

17. Dry Flow Rate of Flue Gas at Std. Temperature and Pressure

$$Q_{sd} = Q_s \times (1 - B_{ws})$$

NOMENCLATURE FOR EPA METHODS 2-4

| | | |
|----------------|---|---|
| A_s | = | Stack area, ft ² |
| B_{ws} | = | Moisture volume fraction |
| C_p | = | Pitot tube coefficient (≈ 0.84) |
| D_s | = | Stack diameter, inches |
| ΔH | = | Average meter orifice pressure, in.W.C. |
| ΔP | = | Pitot tube differential pressure, in.W.C. |
| F_o | = | Combustion factor |
| γ | = | Meter calibration factor, gamma |
| L | = | Length of rectangular stack or duct, inches |
| M_D | = | Dry molecular weight, lb/lb-mole |
| M_s | = | Wet molecular weight, lb/lb-mole |
| P_B | = | Barometric pressure, in.Hg |
| P_s | = | Absolute stack pressure, in.Hg |
| P_{static} | = | Average static pressure, in.W.C. |
| Q_a | = | Actual gas flow rate, acfm |
| Q_s | = | Standard gas flow rate, scfm |
| Q_{sd} | = | Dry standard gas flow rate, dscfm |
| T_m | = | Average meter temperature, °F |
| T_s | = | Average stack temperature, °F |
| V_f | = | Final impinger volume, ml |
| V_i | = | Initial impinger volume, ml |
| V_m | = | Uncorrected metered gas volume, dcf |
| $V_{m(std)}$ | = | Corrected gas volume, dscf |
| V_s | = | Average gas velocity, ft/sec |
| $V_{wc(std)}$ | = | Gas volume of water caught in impingers, scf |
| $V_{wsg(std)}$ | = | Gas volume of water caught in silica gel, scf |
| W | = | Width of rectangular stack or duct, inches |
| W_f | = | Final silica gel mass, grams |
| W_i | = | Initial silica gel mass, grams |
| $\%O_2$ | = | Dry volumetric concentration of O ₂ , %dv |
| $\%CO_2$ | = | Dry volumetric concentration of CO ₂ , %dv |
| $\%CO$ | = | Dry volumetric concentration of CO, %dv |
| $\%N_2$ | = | Dry volumetric concentration of N ₂ , %dv |
| $\%EA$ | = | Percent excess air |

EPA METHOD 5 GRAVIMETRIC CALCULATIONS

1. PM Collected in Probe Wash - M_{pw}

$$M_{pw} = (W_{pw})_{final} - (W_{pw})_{tare}$$

2. Applicable Acetone Blank Correction - B_{apw}

$$B_{apw} = [(W_{ab})_{final} - (W_{ab})_{tare}] \times \frac{V_{pw}}{V_{ab}}$$

3. Maximum Allowable Acetone Blank - B_{amax}

$$B_{amax} = 0.7845 \times 0.00001 \times V_{pw}$$

4. Actual Probe Wash Blank Correction - B_{pw}

$$B_{pw} = \text{MINIMUM} [B_{apw}, B_{amax}]$$

5. PM Collected on Filter - M_f

$$M_f = (W_f)_{final} - (W_f)_{tare}$$

6. Total PM Collected for Method 5 Calculations - M_5

$$M_5 = M_{pw} + M_f - B_{pw}$$

NOMENCLATURE

| | | |
|--------------------|---|---|
| B_{amax} | = | Maximum allowable acetone blank correction, based on weight of acetone in probe wash, grams |
| B_{apw} | = | Acetone blank correction based on residue of blank, grams |
| B_{pw} | = | Acetone blank correction actually used, grams |
| M_5 | = | Total mass of particulate in train corrected for acetone blank, grams |
| M_f | = | Mass gain of filter, grams |
| M_{pw} | = | Probe wash residue, grams |
| V_{ab} | = | Liquid volume of acetone blank, ml |
| V_{pw} | = | Liquid volume of probe wash, ml |
| $(W_{ab})_{final}$ | = | Final weight of beaker containing acetone blank residue, grams |
| $(W_{ab})_{tare}$ | = | Tare weight of beaker containing acetone blank residue, grams |
| $(W_f)_{final}$ | = | Final weight of filter, grams |
| $(W_f)_{tare}$ | = | Tare weight of filter, grams |
| $(W_{pw})_{final}$ | = | Final weight of beaker containing probe wash residue, grams |
| $(W_{pw})_{tare}$ | = | Tare weight of beaker containing probe wash residue, grams |

METHOD 202 GRAVIMETRIC CALCULATIONS

1. Organic CPM - M_o

$$M_o = (W_o)_{final} - (W_o)_{tare}$$

2. Organic Blank Correction - B_o

$$B_o = [(W_{ob})_{final} - (W_{ob})_{tare}] \times \frac{V_o}{V_{ob}}$$

3. Inorganic CPM (Uncorrected for NH₄ and Cl ions) - M_{iu}

$$M_{iu} = [(W_i)_{final} - (W_i)_{tare}] \times \frac{V_4}{V_4 - V_a}$$

4. Inorganic Blank Correction - B_i

$$B_i = [(W_{ib})_{final} - (W_{ib})_{tare}] \times \frac{V_i}{V_{ib}}$$

5. Inorganic Correction for Ammonia addition - m_a

$$m_a = \frac{0.020502 \times C_{SO_4} \times V_4}{10^6}$$

6. Inorganic Correction for NH₄Cl in Sample - m_{cl}

$$m_{cl} = \frac{1.509 \times C_{Cl} \times 100}{10^6}$$

7. Inorganic CPM (Corrected for NH₄ and Cl ions) - M_{ic}

$$M_{ic} = M_{iu} - m_a - m_{cl}$$

8. Total CPM - M_{CPM}

$$M_{CPM} = M_o + M_{ic} - B_o - B_i$$

METHOD 202 GRAVIMETRIC NOMENCLATURE

| | | |
|--------------------|---|---|
| B_i | = | Inorganic blank correction, grams |
| B_o | = | Organic blank correction, grams |
| C_{Cl} | = | Concentration of chloride in reconstituted inorganic fraction, mg/liter |
| C_{SO_4} | = | Concentration of sulfate in inorganic fraction, mg/liter |
| m_a | = | Inorganic correction for ammonia addition step, grams |
| m_{Cl} | = | Inorganic correction for ammonium chloride in reconstituted sample, grams |
| M_{CPM} | = | Total Mass of CPM in sample, grams |
| M_{ic} | = | Inorganic CPM corrected for NH_4 and Cl ions, grams |
| M_{iu} | = | Inorganic CPM uncorrected for NH_4 and Cl ions, grams |
| M_o | = | Mass of organic CPM in sample, grams |
| V_4 | = | Liquid volume of container 4 (Impingers + water rinses), ml |
| V_a | = | Volume of aliquot used for IC analysis of sulfates, ml |
| V_i | = | Liquid volume of water used in sample collection and rinses, ml |
| V_{ib} | = | Liquid volume of water used in blank, ml |
| V_o | = | Liquid volume of Methylene Chloride used in sample recovery and extractions, ml |
| V_{ob} | = | Liquid volume of Methylene Chloride used in blank, ml |
| $(W_{ib})_{final}$ | = | Final weight of beaker containing H_2O blank residue, grams |
| $(W_{ib})_{tare}$ | = | Tare weight of beaker containing H_2O blank residue, grams |
| $(W_i)_{final}$ | = | Final weight of beaker containing inorganic sample residue, grams |
| $(W_i)_{tare}$ | = | Tare weight of beaker containing inorganic sample residue, grams |
| $(W_{ob})_{final}$ | = | Final weight of beaker containing $MeCl_2$ blank residue, grams |
| $(W_{ob})_{tare}$ | = | Tare weight of beaker containing $MeCl_2$ blank residue, grams |
| $(W_o)_{final}$ | = | Final weight of beaker containing organic sample residue, grams |
| $(W_o)_{tare}$ | = | Tare weight of beaker containing organic sample residue, grams |

PARTICULATE EMISSIONS CALCULATIONS

1. Particulate Concentration - C_{sd}

$$C_{sd} = \frac{\Sigma(M_i)}{V_{m(std)}} \times \frac{7000}{453.593}$$

2. Particulate Concentration Corrected to 7% O₂ - $C_{sd@7\%O_2}$

$$C_{sd@7\%} = C_{sd} \times \frac{20.9 - 7.0}{20.9 - \%O_2}$$

3. Particulate Concentration Corrected to 12% CO₂ - $C_{sd@12\%CO_2}$

$$C_{sd@12\%} = C_{sd} \times \frac{12}{\%CO_2}$$

4. Particulate Concentration Corrected to 50% Excess Air - $C_{sd@50\%EA}$

$$C_{sd@50\%EA} = C_{sd} \times \frac{100 + \%EA}{150}$$

5. Particulate Mass Rate - M_p

$$M_p = \frac{\Sigma(M_i)}{V_{m(std)}} \times Q_{sd} \times \frac{60}{453.593}$$

6. Isokinetic Variation - %ISO

$$\%ISO = \frac{0.09450 \times (T_s + 460) \times V_{m(std)}}{P_s \times V_s \times A_n \times time \times (1 - B_{ws})}$$

NOMENCLATURE

| | | |
|--------------|---|---|
| A_n | = | Nozzle area, ft ² |
| C_{sd} | = | Particulate concentration, grains/dscf |
| D_n | = | Nozzle diameter, inches |
| ΣM_i | = | Summation of PM collected in sample train, grams |
| M_p | = | Mass rate of particulate emissions, lb/hr |
| P_s | = | Absolute stack pressure, in.Hg |
| Q_{sd} | = | Dry standard gas flow rate, dscfm |
| time | = | Net sampling time, minutes |
| T_s | = | Average stack temperature, °F |
| $V_{m(std)}$ | = | Corrected gas volume, dscf |
| V_s | = | Average gas velocity, ft/sec |
| $\%O_2$ | = | Dry volumetric concentration of O ₂ , %dv |
| $\%CO_2$ | = | Dry volumetric concentration of CO ₂ , %dv |
| $\%EA$ | = | Percent excess air |
| $\%Iso$ | = | Percent isokinetics |

ORGANIC POLLUTANT EMISSIONS CALCULATIONS

1. Concentration

$$C_i = \frac{m_i}{V_{m_{std}}} \times \frac{0.84948}{MW_i}$$

2. Mass Emissions Rate

$$M_i = \frac{m_i}{V_{m(std)}} \times \frac{Q_{sd} \times 60}{10^6 \times 453.593}$$

NOMENCLATURE

| | | |
|--------------|---|---|
| C_i | = | concentration of analyte i, ppm _{dv} |
| m_i | = | mass of analyte i collected, μ g |
| M_i | = | mass emissions rate of analyte i, lb/hr |
| MW_i | = | molecular weight of analyte i, g/g-mole |
| Q_{sd} | = | dry standard gas flow rate, dscfm |
| $V_{m(std)}$ | = | corrected gas volume, dscf |
| 453.593 | = | grams per pound |
| 0.84948 | = | std. cubic feet per gram mole of ideal gas |
| 10^6 | = | micrograms per gram |
| 60 | = | minutes per hour |

GASEOUS EMISSIONS MONITORING CALCULATIONS

1. HOURLY EMISSIONS RATE - M_i

$$M_i = \frac{C_i \times Q_{sd} \times 60 \times MW_i}{10^6 \times 0.84948 \times 453.593}$$

NOMENCLATURE

| | |
|----------|--|
| i | = NO_x , SO_2 , CO , or total hydrocarbons (as propane) |
| M_i | = Mass emissions rate of i , lb/hr |
| C_i | = Concentration of i in stack gas, ppmvd |
| MW_i | = Molecular weight of i |
| | = 46.01 for NO_2 |
| | = 28.01 for CO |
| | = 64.06 for SO_2 |
| | = 44.10 for propane |
| Q_{sd} | = Average flue gas flow rate, dscfm |
| 0.84948 | = Molar volume of ideal gas, ft^3/mole |
| 453.593 | = grams per pound |
| 10^6 | = parts per million |
| 60 | = minutes per hour |

INSTRUMENT ANALYZER CALCULATIONS

1. Analyzer Calibration Error is determined by:

$$E_c = \frac{A_c - C_g}{V_s} \times 100$$

2. System Bias is determined by:

$$B_s = \frac{C_s - A_c}{V_s} \times 100$$

3. Calibration Drift is determined by:

$$D_c = \frac{F_c - I_c}{V_s} \times 100$$

4. The Adjusted Data Value is determined by:

$$C_{gas} = (\bar{C} - C_0) \times \frac{C_{na}}{C_m - C_0}$$

Nomenclature:

- A_c = the analyzer response for calibration gas standard
- B_s = Sampling system bias, % analyzer span
- \bar{C} = the average gas concentration of the analyte indicated by the gas analyzer
- C_g = the actual gas cylinder concentration value
- C_{gas} = the adjusted gas concentration of the analyte
- C_m = the average of initial and final system calibration responses for the upscale calibration gas
- C_{ma} = the actual concentration of the upscale calibration gas used for system calibration
- C_o = the average of initial and final system calibration responses for the zero gas
- C_s = the system response for calibration gas introduced remotely at the sample probe (zero or upscale)
- D_c = Calibration drift, % analyzer span
- E_c = Analyzer calibration error, % analyzer span
- F_c = Final system calibration response value
- I_c = Initial system calibration response value
- V_s = Span value of analyzer

METHOD 25A EMISSIONS CALCULATIONS

1. Dry VOC Concentration

$$C_c = \frac{C_w}{(1 - B_{ws})}$$

2. Hourly emissions rate

$$M = \frac{C_c \times Q_{sd} \times 60 \times MW_i}{10^6 \times 0.84948 \times 453.593}$$

EPA METHOD 25A EMISSIONS NOMENCLATURE

| | | |
|-----------------|---|--|
| C_w | = | Wet concentration of total gaseous VOC's in stack gas, ppmwv |
| B_{ws} | = | stack gas moisture fraction |
| M | = | Emissions rate of VOC's, lb/hr |
| C_c | = | Dry concentration of total gaseous VOC's in stack gas, ppmv |
| Q_{sd} | = | Total gas flow rate, dscfm |
| MW_i | = | Molecular weight of reporting standard for VOC's, grams/mole |
| | = | 44.097 for propane |
| | = | 12.011 for carbon |
| 60 | = | Minutes per hour |
| 0.84948 | = | Molar volume of ideal gas, ft ³ /mole |
| 453.593 | = | grams per pound |
| 10 ⁶ | = | parts per million |

APPENDIX G

RAW FIELD DATA FOR EPA METHOD 5/202

RTO STACK

ISOKINETIC SAMPLING DATA SHEET

FACILITY: LOUISIANA PACIFIC TEST LOCATION: PTO OUTLET DATE: 7/27/95
 S TIME: 0915 END TIME: 1056 POLLUTANT: TSP/20C RUN I.D.: PTO-M5-R1

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| B 1 | 0 | 0915 | | 175 | .55 | 1.67 | 327.658 | 82 | 82 | 69 | 250 | 5 |
| B 2 | 3 | | | 177 | .59 | 1.79 | 329.9 | 83 | 80 | 64 | 247 | 5 |
| 3 | 6 | | | 179 | .57 | 1.72 | 332.3 | 85 | 81 | 63 | 248 | 5 |
| 4 | 9 | | | 174 | .60 | 1.82 | 334.6 | 85 | 81 | 63 | 247 | 5 |
| 5 | 12 | | | 173 | .57 | 1.74 | 337.0 | 86 | 81 | 62 | 249 | 5 |
| 6 | 15 | | | 174 | .57 | 1.73 | 339.3 | 86 | 82 | 62 | 249 | 5 |
| 7 | 18 | | 0.47 | 176 | .57 | 1.73 | 341.6 | 87 | 82 | 62 | 251 | 5 |
| 8 | 21 | | | 174 | .58 | 1.76 | 343.9 | 87 | 83 | 63 | 250 | 5 |
| 9 | 24 | | | 172 | .54 | 1.65 | 346.3 | 88 | 83 | 63 | 252 | 5 |
| 10 | 27 | | | 172 | .50 | 1.53 | 348.6 | 89 | 84 | 64 | 252 | 5 |
| 11 | 30 | | | 171 | .44 | 1.34 | 350.8 | 89 | 85 | 64 | 251 | 4 |
| 12 | 33 | | | 169 | .35 | 1.07 | 352.9 | 90 | 86 | 64 | 250 | 4 |
| A 1 | 36 | 0951 | | 179 | .59 | 1.78 | 354.72 | 86 | 85 | 64 | 252 | 5 |
| 2 | 39 | 1020 | | 180 | .58 | 1.75 | 357.0 | 86 | 86 | 63 | 251 | 5 |
| 3 | 42 | | | 182 | .58 | 1.74 | 359.2 | 87 | 86 | 63 | 251 | 5 |
| 4 | 45 | | | 183 | .56 | 1.68 | 361.5 | 87 | 86 | 63 | 252 | 5 |
| 5 | 48 | | | 182 | .56 | 1.68 | 363.8 | 88 | 86 | 64 | 253 | 5 |
| 6 | 51 | | | 181 | .57 | 1.71 | 366.1 | 89 | 86 | 65 | 251 | 5 |
| 7 | 54 | | 0.46 | 183 | .57 | 1.71 | 368.4 | 90 | 87 | 65 | 250 | 5 |
| 8 | 57 | | | 185 | .55 | 1.64 | 370.7 | 91 | 87 | 65 | 248 | 5 |
| 9 | 60 | | | 182 | .54 | 1.62 | 372.9 | 91 | 88 | 65 | 250 | 5 |
| 10 | 63 | | | 180 | .49 | 1.48 | 375.2 | 91 | 88 | 65 | 252 | 5 |
| 11 | 66 | | | 177 | .43 | 1.30 | 377.3 | 92 | 88 | 66 | 250 | 4 |
| 12 | 69 | | | 175 | .37 | 1.03 | 379.3 | 91 | 88 | 66 | 251 | 4 |
| | 72 | 1056 | | | 0.34 | | 381.113 | | | | | |

CHAIN OF CUSTODY:

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

LEAK CHECK: PRC

| VACUUM | 15 | 12 | | | |
|--------|-------|-------|--|--|--|
| RATE | 0.005 | 0.003 | | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| | | |
| #1 | 100 | 165 |
| #2 | 100 | 129 |
| #3 | 100 | 102 |
| #4 | 0 | 0.5 |
| #5 | 200 | 217 |
| #6 | | |

| | |
|------------------|--------|
| NOZZLE # | .250 |
| PITOT # | |
| BOX I.D. | 8 |
| GAMMA Y | 1.0166 |
| ΔH ₂ | 1.7393 |
| P _{BAR} | 27.43 |
| FILTER | |
| TECH. | SH174 |

ISOKINETIC SAMPLING DATA SHEET

FACILITY: LA Pacific

TEST LOCATION: BTO OUTLET

DATE: 7/27/95

START TIME: 1215

END TIME: 1335

POLLUTANT: TSP/202

RUN I.D.: BTO - M5 - R2

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| A1 | 0 | 1215 | | 182 | .51 | 1.53 | 381.837 | 89 | 89 | 69 | 258 | 3 |
| 2 | 3 | | | 181 | .53 | 1.59 | 384.0 | 90 | 89 | 64 | 253 | 3 |
| 3 | 6 | | | 182 | .52 | 1.56 | 386.2 | 90 | 90 | 62 | 254 | 3 |
| 4 | 9 | | | 181 | .58 | 1.74 | 388.5 | 91 | 90 | 62 | 254 | 4 |
| 5 | 12 | | | 182 | .54 | 1.62 | 390.8 | 92 | 90 | 61 | 251 | 4 |
| 6 | 15 | | -48 | 184 | .52 | 1.71 | 393.1 | 93 | 91 | 61 | 249 | 4 |
| 7 | 18 | | | 186 | .55 | 1.64 | 395.4 | 94 | 91 | 62 | 247 | 4 |
| 8 | 21 | | | 187 | .56 | 1.67 | 392.7 | 94 | 92 | 62 | 249 | 4 |
| 9 | 24 | | | 183 | .52 | 1.56 | 399.9 | 94 | 92 | 63 | 250 | 3 |
| 10 | 27 | | | 180 | .51 | 1.54 | 402.2 | 95 | 92 | 63 | 253 | 3 |
| 11 | 30 | | | 179 | .45 | 1.36 | 404.4 | 96 | 92 | 63 | 251 | 3 |
| 12 | 33 | | | 177 | .42 | 1.27 | 406.6 | 96 | 93 | 64 | 249 | 3 |
| B1 | 36 | 1251 | | 180 | .54 | 1.63 | 408.63 | 92 | 92 | 67 | 250 | 4 |
| 2 | 39 | 1259 | | 182 | .57 | 1.71 | 410.8 | 94 | 92 | 65 | 253 | 4 |
| 3 | 42 | | | 183 | .53 | 1.59 | 413.1 | 95 | 93 | 64 | 255 | 4 |
| 4 | 45 | | | 183 | .55 | 1.65 | 415.4 | 96 | 93 | 64 | 251 | 4 |
| 5 | 48 | | | 182 | .57 | 1.71 | 417.7 | 96 | 93 | 64 | 250 | 4 |
| 6 | 51 | | -46 | 184 | .56 | 1.68 | 420.0 | 97 | 93 | 65 | 249 | 4 |
| 7 | 54 | | | 181 | .53 | 1.59 | 422.3 | 97 | 94 | 65 | 250 | 4 |
| 8 | 57 | | | 180 | .54 | 1.63 | 424.6 | 98 | 94 | 65 | 250 | 4 |
| 9 | 60 | | | 181 | .56 | 1.68 | 426.8 | 98 | 94 | 65 | 250 | 4 |
| 10 | 63 | | | 180 | .54 | 1.63 | 429.1 | 98 | 95 | 65 | 252 | 4 |
| 11 | 66 | | | 178 | .52 | 1.57 | 431.4 | 99 | 95 | 66 | 251 | 4 |
| 12 | 69 | | | 176 | .41 | 1.24 | 433.6 | 99 | 95 | 66 | 247 | 43 |
| | 72 | 1335 | | | | | 435.588 | | | | | |

CHAIN OF CUSTODY:

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

LEAK CHECK: Dir Pst

| VACUUM | 15 | 10 | | | |
|--------|------|------|--|--|--|
| RATE | .008 | .005 | | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|----------|
| #1 | 100 | 152.7 ml |
| #2 | 100 | 139.4 ml |
| #3 | 100 | 101.1 ml |
| #4 | 0 | 2 |
| #5 | 200 | 212 |
| #6 | | |

| | |
|----------|--------|
| NOZZLE # | 25 |
| PITOT # | |
| BOX I.D. | 90-8 |
| GAMMA T | 1.0166 |
| ΔH | 1.7393 |
| PBAR | 27.43 |
| FILTER | |
| TECH. | Smith |

ISO-KINETIC SAMPLING DATA SHEET

ACILITY: LA PACIFIC TEST LOCATION: BTO OUTLET DATE: _____
 STA. TIME: 1430 END TIME: 1549 POLLUTANT: TSP 202 RUN I.D.: BTO - M5 - R3

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| B1 | 0 | 1430 | | 184 | .39 | 0.95 | 435.881 | 99 | 98 | 66 | 239 | 3 |
| 2 | 3 | | | 185 | .52 | 1.60 | 437.7 | 99 | 98 | 63 | 242 | 5 |
| 3 | 6 | | | 185 | .55 | 1.69 | 439.9 | 100 | 98 | 62 | 247 | 5 |
| 4 | 9 | | | 184 | .53 | 1.63 | 442.1 | 101 | 98 | 62 | 250 | 5 |
| 5 | 12 | | | 184 | .54 | 1.60 | 444.4 | 101 | 98 | 62 | 253 | 5 |
| 6 | 15 | | .45 | 183 | .54 | 1.66 | 446.7 | 101 | 98 | 63 | 251 | 5 |
| 7 | 18 | | | 183 | .54 | 1.66 | 448.9 | 101 | 99 | 63 | 251 | 5 |
| 8 | 21 | | | 182 | .55 | 1.70 | 451.1 | 102 | 99 | 63 | 250 | 5 |
| 9 | 24 | | | 180 | .58 | 1.64 | 453.4 | 102 | 99 | 64 | 249 | 5 |
| 10 | 27 | | | 179 | .56 | 1.55 | 455.6 | 102 | 100 | 64 | 250 | 5 |
| 11 | 30 | | | 177 | .47 | 1.46 | 457.7 | 102 | 100 | 64 | 250 | 5 |
| 12 | 33 | | | 175 | .41 | 1.28 | 459.8 | 103 | 100 | 64 | 251 | 4 |
| A1 | 36 | 1505 | | 187 | .50 | 1.53 | 461.7 | 98 | 98 | 67 | 250 | 5 |
| 2 | 39 | 1513 | | 189 | .56 | 1.71 | 463.8 | 99 | 98 | 65 | 247 | 5 |
| 3 | 42 | | | 189 | .57 | 1.74 | 466.0 | 100 | 99 | 64 | 244 | 5 |
| 4 | 45 | | | 188 | .56 | 1.71 | 468.3 | 100 | 99 | 64 | 248 | 5 |
| 5 | 48 | | | 188 | .59 | 1.74 | 470.6 | 101 | 99 | 64 | 245 | 5 |
| 6 | 51 | | .43 | 187 | .56 | 1.71 | 472.9 | 107 | 99 | 64 | 250 | 5 |
| 7 | 54 | | | 184 | .56 | 1.72 | 475.2 | 101 | 99 | 65 | 251 | 5 |
| 8 | 57 | | | 182 | .54 | 1.67 | 477.5 | 101 | 100 | 65 | 250 | 5 |
| 9 | 60 | | | 184 | .55 | 1.69 | 479.7 | 102 | 100 | 65 | 250 | 5 |
| 10 | 63 | | | 184 | .54 | 1.66 | 482.0 | 102 | 100 | 65 | 249 | 5 |
| 11 | 66 | | | 182 | .53 | 1.64 | 484.2 | 103 | 100 | 65 | 249 | 5 |
| 12 | 69 | | | 179 | .48 | 1.49 | 486.4 | 103 | 100 | 65 | 247 | 5 |
| | 72 | 1549 | | | | | 488.583 | | | | | |

CHAIN OF CUSTODY:

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

LEAK CHECK: PRE POST

| VACUUM | 15 | 10 | | | |
|--------|-------|------|--|--|--|
| RATE | 0.005 | .003 | | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| | | |
| #1 | 100 | 188 |
| #2 | 100 | 188 |
| #3 | 100 | 102 |
| #4 | 0 | 1 |
| #5 | 200 | 211.5 |
| #6 | | |

| | |
|----------|--------|
| NOZZLE # | .25 |
| PITOT # | |
| BOX I.D. | 80-8 |
| GAMMA Y | 1.0166 |
| ΔHG | 1.7393 |
| P BAR | 27.43 |
| FILTER | |
| TECH. | SMITH |

APPENDIX H
RAW FIELD DATA FOR BIF METHOD 0011
RTO STACK

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Louisiana-Pacific TEST LOCATION: RTO Stack DATE: 7/27/95
 START TIME: 09:15 END TIME: 10:56 POLLUTANT: HCOH RUN I.D.: RTO-NOOH-21

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|-------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| A12 | 0 | 09:15 | | 171 | 0.70 | 2.31 | 706.726 | 78 | 76 | 72 | 246 | 5 |
| 11 | 3 | | | 175 | 0.70 | 2.51 | 710.0 | 83 | 80 | 59 | 254 | 5.5 |
| 10 | 6 | | | 177 | 0.75 | 2.48 | 712.8 | 84 | 81 | 62 | 258 | 5.5 |
| 9 | 9 | | | 174 | 0.71 | 2.34 | 715.6 | 85 | 81 | 63 | 258 | 5 |
| 8 | 12 | | | 173 | 0.73 | 2.41 | 718.2 | 86 | 81 | 63 | 255 | 5.5 |
| 7 | 15 | | | 175 | 0.69 | 2.28 | 720.9 | 87 | 82 | 61 | 255 | 5 |
| 6 | 18 | | -0.48 | 172 | 0.70 | 2.34 | 723.6 | 89 | 83 | 61 | 255 | 5.5 |
| 5 | 21 | | | 176 | 0.70 | 2.34 | 726.3 | 89 | 83 | 62 | 255 | 5.5 |
| 4 | 24 | | | 172 | 0.65 | 2.15 | 728.9 | 89 | 83 | 65 | 255 | 5.0 |
| 3 | 27 | | | 173 | 0.65 | 2.15 | 731.6 | 89 | 83 | 66 | 255 | 5.0 |
| 2 | 30 | | | 171 | 0.50 | 1.65 | 734.2 | 90 | 83 | 66 | 256 | 4.8 |
| 1 | 33 | | | 170 | 0.45 | 1.49 | 736.5 | 90 | 84 | 67 | 256 | 4.7 |
| | 36 | 09:51 | | | | | 738.673 | | | | | |
| B12 | 36 | 10:20 | | 180 | 0.75 | 2.48 | 738.673 | 86 | 85 | 72 | 264 | 6.5 |
| 11 | 39 | | | 183 | 0.75 | 2.48 | 741.7 | 86 | 84 | 68 | 255 | 7 |
| 10 | 42 | | | 180 | 0.68 | 2.24 | 744.2 | 87 | 84 | 67 | 255 | 6 |
| 9 | 45 | | | 185 | 0.65 | 2.15 | 746.9 | 88 | 84 | 66 | 255 | 6 |
| 8 | 48 | | | 181 | 0.62 | 2.05 | 749.4 | 89 | 84 | 65 | 257 | 5.5 |
| 7 | 51 | | | 184 | 0.60 | 2.05 | 751.9 | 89 | 84 | 66 | 256 | 5.5 |
| 6 | 54 | | -0.47 | 186 | 0.59 | 1.95 | 754.5 | 90 | 84 | 65 | 257 | 5.5 |
| 5 | 57 | | | 179 | 0.61 | 2.01 | 756.9 | 90 | 85 | 66 | 256 | 5.5 |
| 4 | 60 | | | 181 | 0.63 | 2.08 | 759.3 | 90 | 84 | 62 | 255 | 5.5 |
| 3 | 63 | | | 177 | 0.52 | 1.72 | 761.9 | 90 | 84 | 61 | 255 | 5 |
| 2 | 66 | | | 177 | 0.52 | 1.72 | 764.2 | 90 | 85 | 65 | 254 | 5 |
| 1 | 69 | | | 176 | 0.50 | 1.65 | 766.5 | 90 | 85 | 67 | 254 | 5 |

CHAIN OF CUSTODY: 12 10:56

LEAK CHECK: 766.880

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| VACUUM | 15 | 10 | | |
|--------|-------|-------|--|--|
| RATE | 0.007 | 0.004 | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| #1 | 100 | 175 |
| #2 | 100 | 122 |
| #3 | 0 | 3 |
| #4 | 100 | 219.5 |

| | |
|----------|--------|
| NOZZLE # | 0.25 |
| PITOT # | 129 |
| SCX I.D. | 11 |
| GAMMA Y | 0.9928 |
| ΔH | 1.8475 |
| PBAR | 29.43 |

ISOKINETIC SAMPLING DATA SHEET

FACILITY: Louisiana Pacific TEST LOCATION: RTO Stack DATE: 7/27/95
 START TIME: 12:15 END TIME: 13:35 POLLUTANT: HCl RUN I.D.: RTO - NOC-1 R2

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|-------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| B12 | 0 | 12:15 | | 183 | 0.61 | 1.89 | 769.064 | 89 | 89 | 72 | 230 | 5.5 |
| 11 | 3 | | | 180 | 0.68 | 2.11 | 771.5 | 93 | 91 | 67 | 258 | 6 |
| 10 | 6 | | | 183 | 0.66 | 2.05 | 773.9 | 93 | 92 | 64 | 258 | 6 |
| 9 | 9 | | | 180 | 0.66 | 2.05 | 776.6 | 94 | 92 | 66 | 257 | 6 |
| 8 | 12 | | | 183 | 0.64 | 1.98 | 779.2 | 95 | 92 | 64 | 256 | 6 |
| 7 | 15 | | | 183 | 0.67 | 2.08 | 781.6 | 95 | 92 | 66 | 257 | 6 |
| 6 | 18 | | | 184 | 0.65 | 2.02 | 784.1 | 95 | 92 | 63 | 254 | 6 |
| 5 | 21 | | -0.49 | 182 | 0.62 | 1.92 | 786.7 | 95 | 92 | 60 | 257 | 6 |
| 4 | 24 | | | 181 | 0.62 | 1.92 | 789.1 | 95 | 93 | 61 | 258 | 6 |
| 3 | 27 | | | 180 | 0.60 | 1.86 | 791.5 | 95 | 93 | 62 | 257 | 6 |
| 2 | 30 | | | 179 | 0.50 | 1.55 | 793.9 | 94 | 92 | 64 | 258 | 5 |
| 1 | 33 | | | 180 | 0.51 | 1.58 | 796.2 | 94 | 92 | 64 | 257 | 5 |
| | 36 | 12:51 | | | | | 796.436 | | | | | |
| A12 | 36 | 12:59 | | 183 | 0.69 | 2.14 | 798.432 | 95 | 92 | 70 | 261 | 6 |
| 11 | 39 | | | 184 | 0.68 | 2.11 | 801.1 | 96 | 92 | 68 | 260 | 6.5 |
| 10 | 42 | | | 186 | 0.66 | 2.05 | 803.8 | 98 | 92 | 65 | 257 | 6 |
| 9 | 45 | | | 184 | 0.70 | 2.17 | 806.1 | 99 | 93 | 64 | 258 | 7 |
| 8 | 48 | | | 186 | 0.70 | 2.17 | 808.8 | 100 | 93 | 64 | 256 | 7 |
| 7 | 51 | | -0.45 | 183 | 0.62 | 1.92 | 811.4 | 101 | 94 | 64 | 259 | 6 |
| 6 | 54 | | | 184 | 0.63 | 1.95 | 813.8 | 101 | 95 | 63 | 256 | 6 |
| 5 | 57 | | | 182 | 0.59 | 1.83 | 816.4 | 101 | 95 | 65 | 257 | 6 |
| 4 | 60 | | | 184 | 0.60 | 1.86 | 818.8 | 102 | 96 | 65 | 258 | 6 |
| 3 | 63 | | | 182 | 0.60 | 1.86 | 821.3 | 102 | 96 | 66 | 258 | 6 |
| 2 | 66 | | | 181 | 0.52 | 1.61 | 823.8 | 103 | 96 | 67 | 256 | 5.5 |
| 1 | 69 | | | 180 | 0.53 | 1.64 | 826.1 | 104 | 97 | 67 | 255 | 5.5 |

CHAIN OF CUSTODY: ⁷² 13-35

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

LEAK CHECK: 828.434

| VACUUM | 15 | 8 | | |
|--------|-------|-------|--|--|
| RATE | 0.007 | 0.005 | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|---------|
| | | |
| #1 | 100 | 187 |
| #2 | 100 | 1190.02 |
| #3 | 0 | 2 |
| #4 | 200g | 212 |
| #5 | | |
| #6 | | |

| | |
|------------------|--------|
| NOZZLE # | 0.25 |
| PITOT # | 129 |
| BOX I.D. | 11 |
| GAMMA T | 0.9928 |
| ΔH ₀ | 1.8175 |
| P _{BAR} | 27.43 |
| FILTER | None |
| TECH. | Troy |

ISOKINETIC SAMPLING DATA SHEET

ACTIVITY: Louisiana-Pacific TEST LOCATION: RTO Stack DATE: 7/27/95
 START TIME: 14:30 END TIME: 15:49 POLLUTANT: HCOH RUN I.D.: RTO-M001-R3

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|-------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| A12 | 0 | 14:30 | | 184 | 0.67 | 2.08 | 828.748 | 99 | 99 | 74 | 260 | 4 |
| 10 | 3 | | | 183 | 0.69 | 2.14 | 831.4 | 99 | 99 | 68 | 257 | 4 |
| 10 | 6 | | | 181 | 0.65 | 2.02 | 834.0 | 99 | 98 | 65 | 257 | 4 |
| 98 | 9 | | | 184 | 0.70 | 2.17 | 836.5 | 99 | 98 | 65 | 257 | 4 |
| 80 | 12 | | | 181 | 0.68 | 2.14 | 839.2 | 99 | 98 | 64 | 255 | 4 |
| 70 | 15 | | | 183 | 0.68 | 2.14 | 841.8 | 100 | 98 | 63 | 255 | 4 |
| 63 | 18 | | | 181 | 0.64 | 1.98 | 844.4 | 99 | 98 | 64 | 257 | 4 |
| 54 | 21 | | -0.46 | 183 | 0.65 | 2.02 | 846.9 | 99 | 98 | 62 | 256 | 4 |
| 43 | 24 | | | 184 | 0.61 | 1.89 | 849.5 | 100 | 99 | 61 | 256 | 3.5 |
| 32 | 27 | | | 182 | 0.60 | 1.86 | 851.9 | 99 | 97 | 63 | 256 | 3.5 |
| 21 | 30 | | | 183 | 0.50 | 1.58 | 854.4 | 99 | 96 | 65 | 258 | 3 |
| 11 | 33 | | | 181 | 0.49 | 1.52 | 856.7 | 98 | 96 | 65 | 259 | 3 |
| 8 | 36 | 15:06 | | | | | 858.923 | | | | | |
| B12 | 36 | 15:13 | | 181 | 0.65 | 2.02 | 858.923 | 97 | 96 | 72 | 257 | 4 |
| 1 | 39 | | | 184 | 0.69 | 2.14 | 861.4 | 99 | 96 | 68 | 259 | 4 |
| 10 | 42 | | | 184 | 0.57 | 2.08 | 864.0 | 100 | 96 | 68 | 258 | 4 |
| 9 | 45 | | | 186 | 0.65 | 2.02 | 866.6 | 101 | 96 | 67 | 255 | 4 |
| 8 | 48 | | | 188 | 0.60 | 2.05 | 869.2 | 104 | 97 | 66 | 254 | 4 |
| 7 | 51 | | -0.44 | 184 | 0.66 | 2.05 | 871.6 | 105 | 98 | 65 | 257 | 4 |
| 6 | 54 | | | 183 | 0.64 | 1.98 | 874.2 | 106 | 99 | 65 | 255 | 4 |
| 5 | 57 | | | 185 | 0.63 | 1.95 | 876.7 | 105 | 100 | 65 | 258 | 3.5 |
| 4 | 60 | | | 182 | 0.62 | 1.92 | 879.4 | 104 | 99 | 66 | 257 | 4.0 |
| 3 | 63 | | | 182 | 0.61 | 1.89 | 881.8 | 103 | 100 | 67 | 257 | 4.0 |
| 2 | 66 | | | 181 | 0.58 | 1.80 | 884.3 | 102 | 100 | 68 | 255 | 3.5 |
| 1 | 69 | | | 180 | 0.55 | 1.71 | 886.7 | 102 | 99 | 68 | 258 | 3.5 |

CHAIN OF CUSTODY: 72 15:49

LEAK CHECK: 889.108

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| VACUUM | 1.5 | 10 | | |
|--------|-------|-------|--|--|
| RATE | 0.006 | 0.008 | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| | | |
| #1 | 100 | 200 |
| #2 | 100 | 110 |
| #3 | 0 | 2 |
| #4 | 200g | 212.5 |
| #5 | | |
| #6 | | |

| | |
|----------|--------|
| NOZZLE # | 0.25 |
| PITOT # | 129 |
| BOX I.D. | 11 |
| GAMMA Y | 0.9928 |
| ΔH | 1.8475 |
| P BAR | 27.43 |
| FILTER | None |
| TECH. | Troy |

APPENDIX I
RAW FIELD DATA FOR MDI TESTING
RTO STACK

ISOKINETIC SAMPLING DATA SHEET

FACILITY: LA. PACIFIC

TEST LOCATION: ATO OUTLET

DATE: 7/27/95

START TIME: 16:50

END TIME: 17:53 18:07

POLLUTANT: MDI

RUN I.D.: MSP - MHPF R1

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK AP | METER AH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|------------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| A1 | D | 1650 | | 185 | 0.55 | 179 | 889.360 | 100 | 100 | 66 | 250 | 6 |
| 2 | | | | 185 | 0.50 | 163 | 891.3 | 101 | 100 | 63 | 247 | 6 |
| 3 | 5 | | | 187 | 0.60 | 195 | 893.2 | 102 | 101 | 63 | 249 | 6 |
| 4 | | | | 186 | 0.61 | 199 | 895.4 | 103 | 101 | 62 | 250 | 6 |
| 5 | 10 | | | 187 | 0.58 | 189 | 897.5 | 104 | 102 | 62 | 250 | 6 |
| 6 | | | .48 | 187 | 0.59 | 192 | 899.5 | 105 | 103 | 62 | 252 | 6 |
| 7 | 15 | | | 185 | 0.58 | 189 | 890.5 | 106 | 103 | 62 | 251 | 6 |
| 8 | | | | 186 | 0.58 | 189 | 903.5 | 107 | 104 | 63 | 249 | 6 |
| 9 | 20 | | | 184 | 0.56 | 183 | 905.4 | 107 | 105 | 63 | 248 | 6 |
| 10 | | | | 184 | 0.54 | 176 | 907.3 | 107 | 105 | 63 | 249 | 6 |
| 11 | 25 | | | 181 | 0.47 | 154 | 909.2 | 107 | 105 | 64 | 249 | 6 |
| 12 | | | | 177 | 0.45 | 149 | 911.0 | 107 | 106 | 64 | 249 | 6 |
| B1 | 30 | 1727, 1723 | | 184 | 0.58 | 19 | 912.81 | 108 | 106 | 67 | 247 | 6 |
| 2 | | | | 186 | 0.51 | 166 | 914.8 | 104 | 106 | 66 | 247 | 6 |
| 3 | 35 | | | 186 | 0.60 | 195 | 916.6 | 108 | 107 | 64 | 249 | 6 |
| 4 | | | | 188 | 0.60 | 195 | 918.6 | 108 | 107 | 63 | 251 | 6 |
| 5 | 40 | | | 187 | .51 | 185 | 920.6 | 108 | 107 | 63 | 252 | 6 |
| 6 | | | .47 | 187 | .54 | 182 | 922.5 | 108 | 107 | 63 | 254 | 6 |
| 7 | 45 | | | 184 | .57 | 186 | 924.4 | 109 | 107 | 64 | 251 | 6 |
| 8 | | | | 185 | .57 | 186 | 926.3 | 107 | 106 | 64 | 250 | 6 |
| 9 | 50 | | | 184 | .55 | 180 | 928.2 | 107 | 106 | 65 | 252 | 6 |
| 10 | | | | 181 | .51 | 167 | 930.1 | 107 | 106 | 66 | 251 | 6 |
| 11 | 55 | | | 183 | .48 | 157 | 932.0 | 107 | 106 | 66 | 252 | 5 |
| 12 | | | | 179 | .42 | 138 | 933.8 | 108 | 106 | 66 | 249 | 5 |
| 66 | 1807 | | | | | | 935.504 | | | | | |

CHAIN OF CUSTODY: PLANT DOWN FOR 13 MINUTES - RESTART @ 1753

LEAK CHECK: Pass

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | | |
|--------|-------|-------|--|--|
| VACUUM | 15 | 10 | | |
| RATE | 0.004 | 0.004 | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| #1 | 300ml | 260ml |
| #2 | 200ml | 256ml |
| #3 | 200ml | 201ml |
| #4 | 0ml | 4ml |
| #5 | 200ml | 249ml |
| #6 | 200ml | 218ml |

| | |
|----------|-----------------------|
| NOZZLE # | .25 |
| PITOT # | 129 |
| BOX I.D. | 94-11 |
| GAMMA T | 1.8 0.9928 |
| AHQ | 1.8475 |
| PBAR | 27.43 |
| FILTER | |
| TECH. | SMITH/PAYO |

ISOKINETIC SAMPLING DATA SHEET

JIC

PAGE 1 OF 1

FACILITY: Louisiana Pacific

TEST LOCATION: RTO Stack

DATE: 7/28/95

START TIME: 10:45

END TIME:

POLLUTANT: mbi

RUN I.D.: RTO - NUMBER 2

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|-------|--------|-------------|----------|----------|-------------------------------|-----------------|------------------|----------------|--------------|------------|
| A12 | 0 | 10:45 | | 177 | 0.62 | 1.96 | 937.007 | 91 | 87 | 72 | | 8 |
| 11 | 2.5 | | | 180 | 0.62 | 1.99 | 939.1 | 92 | 91 | 68 | | 8 |
| 10 | 5 | | | 178 | 0.65 | 2.05 | 941.2 | 91 | 87 | 67 | | 8.5 |
| 9 | 7.5 | | | 178 | 0.62 | 1.96 | 943.3 | 90 | 87 | 68 | | 8 |
| 8 | 10 | | | 177 | 0.66 | 2.09 | 945.5 | 91 | 87 | 67 | | 9 |
| 7 | 12.5 | | | 179 | 0.62 | 1.96 | 947.6 | 90 | 87 | 67 | | 9 |
| 6 | 15 | | | 178 | 0.62 | 1.96 | 949.7 | 90 | 86 | 66 | | 9 |
| 5 | 17.5 | | -0.40 | 180 | 0.63 | 1.99 | 951.8 | 90 | 86 | 66 | | 9 |
| 4 | 20 | | | 177 | 0.58 | 1.83 | 953.8 | 91 | 87 | 65 | | 9 |
| 3 | 22.5 | | | 181 | 0.58 | 1.83 | 955.9 | 92 | 87 | 65 | | 9 |
| 2 | 25 | | | 179 | 0.49 | 1.55 | 957.9 | 92 | 87 | 64 | | 8.5 |
| 1 | 27.5 | | | 177 | 0.49 | 1.55 | 959.8 | 93 | 87 | 65 | | 8.5 |
| | 30 | 11:15 | | | | | 961.712 | | | | | |
| B12 | 30 | 11:18 | | 186 | 0.63 | 1.99 | 961.712 | 92 | 87 | 68 | | 10 |
| 11 | 32.5 | | | 185 | 0.63 | 1.99 | 963.7 | 93 | 87 | 66 | | 10 |
| 10 | 35 | | | 190 | 0.61 | 1.93 | 965.8 | 92 | 87 | 67 | | 10 |
| 9 | 37.5 | | | 188 | 0.65 | 2.05 | 968.0 | 92 | 88 | 65 | | 10 |
| 8 | 40 | | | 189 | 0.61 | 1.93 | 970.0 | 93 | 87 | 63 | | 10 |
| 7 | 42.5 | | -0.40 | 185 | 0.58 | 1.93 | 972.0 | 93 | 87 | 61 | | 10 |
| 6 | 45 | | | 181 | 0.55 | 1.74 | 974.3 | 93 | 87 | 60 | | 9.5 |
| 5 | 47.5 | | | 180 | 0.60 | 1.98 | 976.1 | 92 | 87 | 61 | | 9.5 |
| 4 | 50 | | | 183 | 0.57 | 1.88 | 978.1 | 92 | 87 | 62 | | 10 |
| 3 | 52.5 | | | 180 | 0.52 | 1.72 | 980.2 | 92 | 87 | 63 | | 9 |
| 2 | 55 | | | 180 | 0.48 | 1.58 | 982.2 | 92 | 87 | 66 | | 9 |
| 1 | 57.5 | | | 180 | 0.42 | 1.39 | 984.1 | 92 | 87 | 66 | | 8.5 |

CHAIN OF CUSTODY: 11:48

LEAK CHECK: 985.920

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| VACUUM | 15 | 12 | | |
|--------|-------|-------|--|--|
| RATE | 0.005 | 0.003 | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| | | |
| | | |
| #1 | 200 | 276 |
| #2 | 200 | 276 |
| #3 | 200 | 211 |
| #4 | 0 | 1 |
| #5 | 200g | 254 |
| #6 | 200g | 222 |

| | |
|----------|-----------|
| NOZZLE # | 0.25 |
| PITOT # | 129 |
| BOX I.D. | 18 |
| GAMMA Y | 0.9928 |
| ΔH | 1.8475 |
| PBAR | 27.47 |
| FILTER | None |
| TECH. | Tony/Andy |

ISOKINETIC SAMPLING DATA SHEET

ACTIVITY: Louisiana Pacific TEST LOCATION: RTO Stack DATE: 7/28/95
 STA TIME: 12:30 END TIME: 13:33 POLLUTANT: Mbl RUN I.D.: RTO-MMOER 3

| POINT | SAMPLE TIME | TIME | STATIC | STACK TEMP. | STACK ΔP | METER ΔH | DGM VOLUME ft ³ | DGM TEMP. INLET | DGM TEMP. OUTLET | IMPINGER TEMP. | FILTER TEMP. | METER VAC. |
|-------|-------------|-------|--------|-------------|----------|----------|----------------------------|-----------------|------------------|----------------|--------------|------------|
| B12 | 0 | 12:30 | | 180 | 0.66 | 2.11 | 988.476 | 89 | 87 | 72 | | 9 |
| 11 | 2.5 | | | 181 | 0.63 | 2.02 | 990.5 | 89 | 87 | 63 | | 9 |
| 10 | 5 | | | 181 | 0.64 | 2.05 | 992.7 | 89 | 87 | 62 | | 9 |
| 9 | 7.5 | | | 183 | 0.61 | 1.95 | 994.8 | 89 | 87 | 63 | | 9 |
| 8 | 10 | | | 183 | 0.61 | 1.95 | 996.8 | 90 | 87 | 62 | | 9 |
| 7 | 12.5 | | | 184 | 0.62 | 1.98 | 998.9 | 91 | 87 | 61 | | 9 |
| 6 | 15 | | | 181 | 0.62 | 1.98 | 1001.0 | 91 | 87 | 60 | | 9 |
| 5 | 17.5 | | -0.42 | 181 | 0.59 | 1.89 | 1003.1 | 91 | 88 | 61 | | 8.5 |
| 4 | 20 | | | 180 | 0.60 | 1.92 | 1005.1 | 91 | 87 | 63 | | 8.5 |
| 3 | 22.5 | | | 181 | 0.55 | 1.76 | 1007.2 | 91 | 87 | 63 | | 8.5 |
| 2 | 25 | | | 180 | 0.47 | 1.50 | 1009.2 | 90 | 87 | 64 | | 7.5 |
| 1 | 27.5 | | | 181 | 0.46 | 1.47 | 1011.0 | 90 | 87 | 65 | | 7.5 |
| | 30 | 13:00 | | | | | 1012.853 | | | | | |
| A12 | 30 | 13:03 | | 180 | 0.62 | 1.98 | 1012.853 | 90 | 87 | 69 | | 9 |
| 11 | 32.5 | | | 180 | 0.65 | 2.08 | 1014.9 | 90 | 87 | 68 | | 9.5 |
| 10 | 35 | | | 190 | 0.63 | 2.02 | 1017.0 | 90 | 87 | 66 | | 9.5 |
| 9 | 37.5 | | | 182 | 0.61 | 1.95 | 1019.1 | 90 | 87 | 64 | | 9.5 |
| 8 | 40 | | | 181 | 0.61 | 1.95 | 1021.1 | 90 | 87 | 61 | | 9.5 |
| 7 | 42.5 | | | 184 | 0.59 | 1.89 | 1023.2 | 90 | 87 | 61 | | 9 |
| 6 | 45 | | -0.40 | 180 | 0.60 | 1.92 | 1025.2 | 90 | 87 | 60 | | 9 |
| 5 | 47.5 | | | 182 | 0.60 | 1.92 | 1027.3 | 91 | 87 | 62 | | 9 |
| 4 | 50 | | | 180 | 0.57 | 1.82 | 1029.4 | 91 | 87 | 63 | | 9 |
| 3 | 52.5 | | | 183 | 0.57 | 1.92 | 1031.3 | 92 | 87 | 63 | | 9 |
| 2 | 55 | | | 180 | 0.48 | 1.54 | 1033.4 | 93 | 87 | 64 | | 8 |
| 1 | 57.5 | | | 181 | 0.45 | 1.44 | 1035.3 | 93 | 87 | 67 | | 7.5 |

CHAIN OF CUSTODY: 60 13:33

LEAK CHECK: 1037.008

| CONTAINER | SAMPLE I.D. | DESCRIPTION |
|-----------|-------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| VACUUM | 15 | 12 | | |
|--------|-------|-------|--|--|
| RATE | 0.010 | 0.008 | | |

IMPINGER CONTENTS:

| IMPINGER | INITIAL | FINAL |
|----------|---------|-------|
| #1 | 300 | 729 |
| #2 | 200 | 305 |
| #3 | 200 | 187 |
| #4 | 0 | 1 |
| #5 | 200g | 250 |
| #6 | 200g | 221 |

| | |
|----------|-----------|
| NOZZLE # | 0.25 |
| PITOT # | 129 |
| BOX I.D. | 11 |
| GAMMA γ | 0.9929 |
| ΔH | 1.8475 |
| PBAR | 27.47 |
| FILTER | None |
| TECH. | Troy/Andy |

INTEGRATED BAG ANALYSIS FOR %O2 AND %CO2
INSTRUMENT ANALYZER METHOD

| | |
|------------------------------|----------------------------|
| O2/CO2 CALIBRATION | DATE: 7/29/95 |
| O2 SPAN = 25% CO2 SPAN = 20% | TIME: 14:50 |
| O2 MONITOR ID: 4 | CO2 MONITOR ID: 1 |
| CALIBRATION GAS VALUES | CALIBRATION GAS ID |
| ZERO | |
| MID = 9.86 | 10.09 |
| HIGH = 22.1 | 17.25 |
| ANALYZER RESPONSE | ANALYZER CALIBRATION ERROR |
| ZERO 0 | 0 |
| MID = 10.0 | 10.04 |
| HIGH = 22.1 | 17.25 |

LA PACIFIC

| | |
|------------------------------|-----------------------|
| SOURCE: RTO STACK | DATE OF TEST: 7/29/95 |
| LOCATION: RTO STACK | RUN ID: RTO-M3/3A-R2 |
| %O2 20.1 | %CO2 1.0 |
| %O2 20.0 | %CO2 1.0 |
| %O2 20.1 | %CO2 1.0 |
| AVERAGE 20.07 | AVERAGE 1.0 |
| Fo FACTOR: | |

| | |
|---------------------|----------------------|
| LOCATION: RTO STACK | RUN ID: RTO-M3/3A-R3 |
| %O2 19.9 | %CO2 1.1 |
| %O2 19.9 | %CO2 1.2 |
| %O2 19.9 | %CO2 1.1 |
| AVERAGE 19.9 | AVERAGE 1.1 |
| Fo FACTOR: | |

| | |
|------------|---------|
| LOCATION: | RUN ID: |
| %O2 | %CO2 |
| %O2 | %CO2 |
| %O2 | %CO2 |
| AVERAGE | AVERAGE |
| Fo FACTOR: | |

$$Fo = (20.9 - \%O2) / \%CO2$$

COMMON Fo FACTORS:

Gas, Natural (1.600-1.836)
Gas, Propane (1.434-1.586)
Wood (1.000-1.120)

Coal, Bituminous (1.083-1.230)
Coal, Anthracite (1.016-1.130)
Oil, Distillate (1.260-1.413)
Oil, Residual (1.210-1.370)

APPENDIX J

CEMS ANALYZER CALIBRATION DATA AND SAMPLING SYSTEM CALIBRATION
DRIFT DATA AND RESULTS

RTO STACK

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
Local Calibration

Starting
07-27-95

| Time | O2 % dv | CO2 % dv | CO ppmdv | SO2 ppmdv | NOx ppmdv |
|-------|------------|-------------|-------------|--------------|--------------|
| 07:10 | 0.02C | 0.033C | -0.01C | 1.20C | -0.115C |
| 07:11 | 0.05 | 2.116 | 0.02 | 2.21 | -0.054 |
| 07:12 | 15.88 | 17.510 | -0.04 | 0.98 | -0.146 |
| 07:13 | 22.08 | 17.290 | 0.03 | 1.57 | -0.160 |
| 07:14 | 22.09C | 17.270C | 0.03 | 1.57 | -0.180 |
| 07:15 | 22.00 | 14.250 | 0.01 | 1.40 | -0.208 |
| 07:16 | 12.70 | 10.040 | -0.14 | 1.57 | -0.242 |
| 07:17 | 10.02C | 10.030C | -0.01 | 1.17 | -0.273 |
| 07:18 | 8.81 | 1.553 | 223.30 | 1.20 | -0.289 |
| 07:19 | 0.72 | 0.074 | 882.00 | 1.54 | -0.321 |
| 07:20 | 0.07 | 0.063 | 887.00 | 1.62 | -0.339 |
| 07:21 | 0.04 | 0.061 | 898.00 | 1.79 | -0.351 |
| 07:22 | 0.03 | 0.053 | 895.00C | 1.51 | -0.386 |
| 07:23 | 0.16 | 0.065 | 789.00 | 2.02 | -0.386 |
| 07:24 | 0.07 | 0.060 | 578.20 | 1.03 | -0.417 |
| 07:25 | 0.03 | 0.065 | 577.10 | 2.05 | -0.429 |
| 07:26 | 0.03 | 0.063 | 584.50C | 1.65 | -0.445 |
| 07:27 | 0.11 | 0.069 | 491.80 | 1.71 | -0.414 |
| 07:28 | 0.05 | 0.064 | 294.80 | 2.07 | -0.425 |
| 07:29 | 0.07 | 0.060 | 292.30C | 1.37 | -0.457 |
| 07:30 | 0.01 | 0.051 | 292.10 | 2.13 | -0.456 |
| 07:31 | 0.04 | 0.042 | 152.00 | 206.20 | -0.481 |
| 07:32 | 0.01 | 0.033 | 0.64 | 224.00C | -0.497 |
| 07:33 | 0.04 | 0.034 | 0.03 | 148.50 | -0.247 |
| 07:34 | 0.09 | 0.035 | 0.04 | 91.00 | -0.383 |
| 07:35 | 0.00 | 0.036 | 0.05 | 92.90C | -0.419 |
| 07:36 | 0.01 | 0.044 | 0.64 | 52.12 | 45.920 |
| 07:37 | 0.07 | 0.035 | 0.97 | 3.98 | 173.600 |
| 07:38 | 0.01 | 0.035 | 0.03 | 2.78 | 227.700C |
| 07:39 | 0.01 | 0.032 | 0.08 | 1.40 | 142.500 |
| 07:40 | -0.06 | 0.036 | 0.38 | 1.60 | 141.100 |
| 07:41 | -0.03 | 0.035 | -0.03 | 1.03 | 149.600C |

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
Local Calibration (VOC)

Starting
07-27-95

| Time | VOC ppmdv |
|-------|--------------|
| 08:52 | 0.04C |
| 08:53 | 0.21 |
| 08:54 | 57.40 |
| 08:55 | 67.01 |
| 08:56 | 83.70C |
| 08:57 | 84.20 |
| 08:58 | 84.50 |
| 08:59 | 70.20 |
| 09:00 | 44.89 |
| 09:01 | 44.65C |
| 09:02 | 53.89 |
| 09:03 | 48.46 |
| 09:04 | 33.13 |
| 09:05 | 25.72 |
| 09:06 | 25.32 |
| 09:07 | 25.31C |

Marker Description

Display Average

- A Data was Absent from original raw data file.
- C Local Calibration
- Data was not used in calculated parameter averages.

√
√

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R1

Calibrations:

[SO2] Span Value = 225
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 94.60
INITIAL CALIBRATION TIME --> 821
LOW Cal. Response = -0.00 HIGH Cal. Response = 94.32
FINAL CALIBRATION TIME ----> 1041
LOW Cal. Response = -0.01 HIGH Cal. Response = 94.12

LOW System Drift = -0.00 % HIGH System Drift = -0.09 %

[CO2] Span Value = 20
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 10.09
INITIAL CALIBRATION TIME --> 821
LOW Cal. Response = 0.06 HIGH Cal. Response = 9.89
FINAL CALIBRATION TIME ----> 1041
LOW Cal. Response = 0.11 HIGH Cal. Response = 9.86

LOW System Drift = 0.22 % HIGH System Drift = -0.13 %

[NOx] Span Value = 250
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 150.00
INITIAL CALIBRATION TIME --> 821
LOW Cal. Response = 0.19 HIGH Cal. Response = 150.00
FINAL CALIBRATION TIME ----> 1041
LOW Cal. Response = -0.31 HIGH Cal. Response = 149.65

LOW System Drift = -0.20 % HIGH System Drift = -0.14 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R1

Calibrations:

[O2] Span Value = 25
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 9.86
INITIAL CALIBRATION TIME --> 821
LOW Cal. Response = 0.04 HIGH Cal. Response = 9.82
FINAL CALIBRATION TIME ----> 1041
LOW Cal. Response = 0.03 HIGH Cal. Response = 9.87

LOW System Drift = -0.02 % HIGH System Drift = 0.18 %

[CO] Span Value = 1000
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 594.00
INITIAL CALIBRATION TIME --> 821
LOW Cal. Response = 0.04 HIGH Cal. Response = 585.01
FINAL CALIBRATION TIME ----> 1041
LOW Cal. Response = -0.01 HIGH Cal. Response = 584.19

LOW System Drift = -0.00 % HIGH System Drift = -0.08 %

[THC] Span Value = 100
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 44.80
INITIAL CALIBRATION TIME --> 900
LOW Cal. Response = -0.00 HIGH Cal. Response = 45.76
FINAL CALIBRATION TIME ----> 1052
LOW Cal. Response = -0.00 HIGH Cal. Response = 44.81

LOW System Drift = 0.00 % HIGH System Drift = -0.95 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A,6C,7E,10,25A-R2

Calibrations:

[SO2] Span Value = 225
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 94.60
INITIAL CALIBRATION TIME --> 1041
LOW Cal. Response = -0.01 HIGH Cal. Response = 94.12
FINAL CALIBRATION TIME ----> 1334
LOW Cal. Response = -0.01 HIGH Cal. Response = 94.02

LOW System Drift = -0.00 % HIGH System Drift = -0.04 %

[CO2] Span Value = 20
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 10.09
INITIAL CALIBRATION TIME --> 1041
LOW Cal. Response = 0.11 HIGH Cal. Response = 9.86
FINAL CALIBRATION TIME ----> 1334
LOW Cal. Response = 0.06 HIGH Cal. Response = 9.78

LOW System Drift = -0.26 % HIGH System Drift = -0.41 %

[NOx] Span Value = 250
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 150.00
INITIAL CALIBRATION TIME --> 1041
LOW Cal. Response = -0.31 HIGH Cal. Response = 149.65
FINAL CALIBRATION TIME ----> 1334
LOW Cal. Response = 0.00 HIGH Cal. Response = 148.70

LOW System Drift = 0.13 % HIGH System Drift = -0.38 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A,6C,7E,10,25A-R2

Calibrations:

[O2] Span Value = 25
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 9.86
INITIAL CALIBRATION TIME --> 1041
LOW Cal. Response = 0.03 HIGH Cal. Response = 9.87
FINAL CALIBRATION TIME ----> 1334
LOW Cal. Response = 0.01 HIGH Cal. Response = 9.81

LOW System Drift = -0.11 % HIGH System Drift = -0.24 %

[CO] Span Value = 1000
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 594.00
INITIAL CALIBRATION TIME --> 1041
LOW Cal. Response = -0.01 HIGH Cal. Response = 584.19
FINAL CALIBRATION TIME ----> 1334
LOW Cal. Response = 0.00 HIGH Cal. Response = 584.34

LOW System Drift = 0.00 % HIGH System Drift = 0.02 %

[THC] Span Value = 100
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 44.80
INITIAL CALIBRATION TIME --> 1052
LOW Cal. Response = -0.00 HIGH Cal. Response = 44.81
FINAL CALIBRATION TIME ----> 1359
LOW Cal. Response = -0.12 HIGH Cal. Response = 44.60

LOW System Drift = -0.12 % HIGH System Drift = -0.22 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10, 25A-R3

Calibrations:

[SO2] Span Value = 225
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 94.60
INITIAL CALIBRATION TIME --> 1334
LOW Cal. Response = -0.01 HIGH Cal. Response = 94.02
FINAL CALIBRATION TIME ----> 1547
LOW Cal. Response = -0.01 HIGH Cal. Response = 93.89

LOW System Drift = -0.00 % HIGH System Drift = -0.06 %

[CO2] Span Value = 20
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 10.09
INITIAL CALIBRATION TIME --> 1334
LOW Cal. Response = 0.06 HIGH Cal. Response = 9.78
FINAL CALIBRATION TIME ----> 1547
LOW Cal. Response = 0.07 HIGH Cal. Response = 9.66

LOW System Drift = 0.09 % HIGH System Drift = -0.61 %

[NOx] Span Value = 250
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 150.00
INITIAL CALIBRATION TIME --> 1334
LOW Cal. Response = 0.00 HIGH Cal. Response = 148.70
FINAL CALIBRATION TIME ----> 1547
LOW Cal. Response = -0.06 HIGH Cal. Response = 147.80

LOW System Drift = -0.02 % HIGH System Drift = -0.36 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A,6C,7E,10,25A-R3

Calibrations:

[O2] Span Value = 25
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 9.86
INITIAL CALIBRATION TIME --> 1334
LOW Cal. Response = 0.01 HIGH Cal. Response = 9.81
FINAL CALIBRATION TIME ----> 1547
LOW Cal. Response = 0.03 HIGH Cal. Response = 9.78

LOW System Drift = 0.08 % HIGH System Drift = -0.12 %

[CO] Span Value = 1000
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 594.00
INITIAL CALIBRATION TIME --> 1334
LOW Cal. Response = 0.00 HIGH Cal. Response = 584.34
FINAL CALIBRATION TIME ----> 1547
LOW Cal. Response = 0.00 HIGH Cal. Response = 584.88

LOW System Drift = 0.00 % HIGH System Drift = 0.05 %

[THC] Span Value = 100
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 44.80
INITIAL CALIBRATION TIME --> 1359
LOW Cal. Response = -0.12 HIGH Cal. Response = 44.60
FINAL CALIBRATION TIME ----> 1603
LOW Cal. Response = -0.00 HIGH Cal. Response = 42.55

LOW System Drift = 0.12 % HIGH System Drift = -2.05 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A, 6C, 7E, 10-R4

Calibrations:

[SO₂] Span Value = 225
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 94.60
INITIAL CALIBRATION TIME --> 1547
LOW Cal. Response = -0.01 HIGH Cal. Response = 93.89
FINAL CALIBRATION TIME ----> 1804
LOW Cal. Response = -0.01 HIGH Cal. Response = 0.00

LOW System Drift = 0.00 % HIGH System Drift = -41.73 %

[CO₂] Span Value = 20
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 10.09
INITIAL CALIBRATION TIME --> 1547
LOW Cal. Response = 0.07 HIGH Cal. Response = 9.66
FINAL CALIBRATION TIME ----> 1804
LOW Cal. Response = 0.02 HIGH Cal. Response = 10.02

LOW System Drift = -0.28 % HIGH System Drift = 1.81 %

[NO_x] Span Value = 250
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 150.00
INITIAL CALIBRATION TIME --> 1547
LOW Cal. Response = -0.06 HIGH Cal. Response = 147.80
FINAL CALIBRATION TIME ----> 1804
LOW Cal. Response = 0.60 HIGH Cal. Response = 0.00

LOW System Drift = 0.26 % HIGH System Drift = -59.12 %

Wheelabrator/LP/Dungannon
Reference Method Data
RTO Stack Outlet
RTOSO-M3A,6C,7E,10-R4

Calibrations:

[O2] Span Value = 25
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 9.86
INITIAL CALIBRATION TIME --> 1547
LOW Cal. Response = 0.03 HIGH Cal. Response = 9.78
FINAL CALIBRATION TIME ----> 1804
LOW Cal. Response = 0.13 HIGH Cal. Response = 9.78

LOW System Drift = 0.41 % HIGH System Drift = -0.00 %

[CO] Span Value = 1000
LOW Calibration Gas = 0.00 HIGH Calibration Gas = 594.00
INITIAL CALIBRATION TIME --> 1547
LOW Cal. Response = 0.00 HIGH Cal. Response = 584.88
FINAL CALIBRATION TIME ----> 1804
LOW Cal. Response = -0.13 HIGH Cal. Response = 588.36

LOW System Drift = -0.01 % HIGH System Drift = 0.35 %

APPENDIX K
GRAVIMETRIC LABORATORY DATA

ETS, INC.

FIELD SAMPLE LOG

Print Date 08/01/95 Time 15:20:47

Page 1

Contract No. 95-553

Job I.D.

Test Method 5/202

| Sample No. | Container No. | Other I.D. | Run I.D. | Sample Type | Volume, ml no Rinses | Volume, ml w/ Rinses | Analyst | Date | Comments |
|------------|---------------|------------|-------------|----------------------|----------------------|----------------------|---------|----------|----------|
| 00100 | F1 | 95-0045 | RTO -202-R1 | Filter | | | TGW | 08/01/95 | |
| 00101 | F2 | | RTO -202-R1 | FH Acetone Rinse | | | TGW | 08/01/95 | |
| 00102 | F3 | | RTO -202-R1 | Impinger contents | | | TGW | 08/01/95 | |
| 00103 | F4 | | RTO -202-R1 | Imp. Contents extra | | | TGW | 08/01/95 | |
| 00104 | F5 | | RTO -202-R1 | H2O Impinger Rinse | | | TGW | 08/01/95 | |
| 00105 | F6 | | RTO -202-R1 | MECL2 Impinger Rinse | | | TGW | 08/01/95 | |
| 00106 | F7 | | RTO -202-R1 | Silica Gel | | | TGW | 08/01/95 | |
| 00107 | F8 | | RTO -202-R1 | TEDLAR BAG | | | TGW | 08/01/95 | |
| 00108 | F1 | 95-0046 | RTO -202-R2 | Filter | | | TGW | 08/01/95 | |
| 00109 | F2 | | RTO -202-R2 | FH Acetone Rinse | | | TGW | 08/01/95 | |
| 00110 | F3 | | RTO -202-R2 | Impinger contents | | | TGW | 08/01/95 | |
| 00111 | F4 | | RTO -202-R2 | Imp. Contents extra | | | TGW | 08/01/95 | |
| 00112 | F5 | | RTO -202-R2 | H2O Impinger Rinse | | | TGW | 08/01/95 | |
| 00113 | F6 | | RTO -202-R2 | MECL2 Impinger Rinse | | | TGW | 08/01/95 | |
| 00114 | F7 | | RTO -202-R2 | Silica Gel | | | TGW | 08/01/95 | |
| 00115 | F8 | | RTO -202-R2 | TEDLAR BAG | | | TGW | 08/01/95 | |
| 00116 | F1 | 95-0047 | RTO -202-R3 | Filter | | | TGW | 08/01/95 | |
| 00117 | F2 | | RTO -202-R3 | FH Acetone Rinse | | | TGW | 08/01/95 | |
| 00118 | F3 | | RTO -202-R3 | Impinger contents | | | TGW | 08/01/95 | |
| 00119 | F4 | | RTO -202-R3 | Imp. Contents extra | | | TGW | 08/01/95 | |
| 00120 | F5 | | RTO -202-R3 | H2O Impinger Rinse | | | TGW | 08/01/95 | |
| 00121 | F6 | | RTO -202-R3 | MECL2 Impinger Rinse | | | TGW | 08/01/95 | |
| 00122 | F7 | | RTO -202-R3 | Silica Gel | | | TGW | 08/01/95 | |
| 00123 | F8 | | RTO -202-R3 | TEDLAR BAG | | | TGW | 08/01/95 | |
| 00124 | F1 | 95-0048 | BLK -202-R0 | Filter | | | TGW | 08/01/95 | |
| 00125 | F2 | | BLK -202-R0 | FH Acetone Rinse | | | TGW | 08/01/95 | |
| 00126 | F3 | | BLK -202-R0 | Impinger contents | | | TGW | 08/01/95 | |

ETS, INC.

FIELD SAMPLE LOG

Contract No. 95-553

Job I.D.

Test Method 5/202

Print Date 08/01/95

Page 2

| Sample No. | Container No. | Other I.D. | Run I.D. | Sample Type | Volume, ml no Rinses | Volume, ml w/ Rinses | Analyst | Date | Comments |
|------------|---------------|------------|-------------|----------------------|----------------------|----------------------|---------|----------|----------|
| 00127 | F4 | | BLK -202-R0 | Imp. Contents extra | | | TGW | 08/01/95 | |
| 00128 | F5 | | BLK -202-R0 | H2O Impinger Rinse | | | TGW | 08/01/95 | |
| 00129 | F6 | | BLK -202-R0 | MECL2 Impinger Rinse | | | TGW | 08/01/95 | |
| 00130 | F7 | | BLK -202-R0 | Silica Gel | | | TGW | 08/01/95 | |
| 00131 | F8 | | BLK -202-R0 | TEDLAR BAG | | | TGW | 08/01/95 | |

ETS, Inc.
GRAVIMETRIC LABORATORY DATA
Final Beaker Weights

Job Number: 95-553

Report Prepared on: 08/03/95

Page

1

| Beaker # Filter # Sample # Run I.D. Total Vol., ml Aliquot Vol. | Constant Tare Weight (g) Beaker Filter | Final Weight Data | | | | Constant Final Weight (g) |
|--|--|----------------------|----------------|----------------------|------------|---------------------------------|
| | | Date | Time | Weight (g) | Analyst | |
| 06/20/95-031 95-0045 95-553-00100 RTO -202-R1 | 67.54400 0.41790 | 08/02/95 08/03/95 | 10:58 09:53 | 67.96520 67.96510 | TGW TGW | 67.96510 |
| 06/20/95-032 95-553-00101 RTO -202-R1 110.00000 110.00000 | 67.46020 0.00000 | 08/02/95 08/03/95 | 10:58 09:54 | 67.46450 67.46450 | TGW TGW | 67.46450 |
| 06/20/95-040 95-553-00102 RTO -202-R1 400.00000 400.00000 | 67.26250 0.00000 | 08/03/95 08/03/95 | 09:56 16:02 | 67.26600 67.26640 | TGW TGW | 67.26640 |
| 06/20/95-039 95-553-00105 RTO -202-R1 270.00000 270.00000 | 66.83550 0.00000 | 08/02/95 08/03/95 | 11:00 09:56 | 66.84280 66.84280 | TGW TGW | 66.84280 |
| 06/20/95-033 95-0046 95-553-00108 RTO -202-R2 | 67.22850 0.41780 | 08/02/95 08/03/95 | 10:59 09:54 | 67.65050 67.65060 | TGW TGW | 67.65060 |

ETS, Inc.
GRAVIMETRIC LABORATORY DATA
Final Beaker Weights

Job Number: 95-553

Report Prepared on: 08/03/95

Page 2

| Beaker # Filter # Sample # Run I.D. Total Vol., ml Aliquot Vol. | Constant Tare Weight (g) Beaker Filter | Final Weight Data | | | | Constant Final Weight (g) |
|--|--|-------------------|-------|------------|---------|---------------------------------|
| | | Date | Time | Weight (g) | Analyst | |
| 06/20/95-034 95-553-00109 RTO -202-R2 100.00000 100.00000 | 67.18480 0.00000 | 08/02/95 | 10:59 | 67.18770 | TGW | 67.18760 |
| | | 08/03/95 | 09:54 | 67.18760 | TGW | |
| 06/20/95-042 95-553-00110 RTO -202-R2 410.00000 410.00000 | 67.37660 0.00000 | 08/03/95 | 09:56 | 67.38240 | TGW | 67.38280 |
| | | 08/03/95 | 16:02 | 67.38280 | TGW | |
| 06/20/95-041 95-553-00113 RTO -202-R2 255.00000 255.00000 | 64.88330 0.00000 | 08/02/95 | 11:00 | 64.88690 | TGW | 64.88680 |
| | | 08/03/95 | 09:56 | 64.88680 | TGW | |
| 06/20/95-035 95-0047 95-553-00116 RTO -202-R3 | 67.70930 0.41680 | 08/02/95 | 10:59 | 68.13140 | TGW | 68.13130 |
| | | 08/03/95 | 09:55 | 68.13130 | TGW | |
| 06/20/95-036 95-553-00117 RTO -202-R3 100.00000 100.00000 | 70.12320 0.00000 | 08/02/95 | 10:59 | 70.12670 | TGW | 70.12660 |
| | | 08/03/95 | 09:55 | 70.12660 | TGW | |

ETS, Inc.
GRAVIMETRIC LABORATORY DATA
Final Beaker Weights

Job Number: 95-553

Report Prepared on: 08/03/95

Page

3

| Beaker # Filter # Sample # Run I.D. Total Vol., ml Aliquot Vol. | Constant Tare Weight (g) Beaker Filter | Final Weight Data | | | | Constant Final Weight (g) |
|--|--|-------------------|-------|------------|---------|---------------------------------|
| | | Date | Time | Weight (g) | Analyst | |
| 06/20/95-044 95-553-00118 RTO -202-R3 420.00000 420.00000 | 64.14680 0.00000 | 08/03/95 | 09:57 | 64.14920 | TGW | 64.14960 |
| | | 08/03/95 | 16:03 | 64.14960 | TGW | |
| 06/20/95-043 95-553-00121 RTO -202-R3 290.00000 290.00000 | 67.02160 0.00000 | 08/02/95 | 11:00 | 67.02670 | TGW | 67.02660 |
| | | 08/03/95 | 09:57 | 67.02660 | TGW | |
| 06/20/95-037 95-0048 95-553-00124 BLK -202-R0 | 67.23540 0.41680 | 08/02/95 | 10:59 | 67.63890 | TGW | 67.63930 |
| | | 08/03/95 | 09:56 | 67.63930 | TGW | |
| 06/20/95-038 95-553-00125 BLK -202-R0 120.00000 120.00000 | 64.29320 0.00000 | 08/02/95 | 10:59 | 64.29350 | TGW | 64.29320 |
| | | 08/03/95 | 09:56 | 64.29320 | TGW | |
| 06/20/95-046 95-553-00126 BLK -202-R0 450.00000 450.00000 | 70.94820 0.00000 | 08/03/95 | 09:57 | 70.95080 | TGW | 70.95130 |
| | | 08/03/95 | 16:03 | 70.95130 | TGW | |

ETS, Inc.
 GRAVIMETRIC LABORATORY DATA
 Final Beaker Weights

Job Number: 95-553

Report Prepared on: 08/03/95

Page 4

| Beaker # Filter # Sample # Run I.D. Total Vol., ml Aliquot Vol. | Constant Tare Weight (g) Beaker Filter | Final Weight Data | | | Constant Final Weight (g) | |
|--|--|-------------------|-------|------------|---------------------------------|----------|
| | | Date | Time | Weight (g) | | Analyst |
| 06/20/95-045 | 67.33300 | 08/02/95 | 11:00 | 67.33210 | TGW | 67.33260 |
| | 0.00000 | 08/03/95 | 09:57 | 67.33260 | TGW | |
| 95-553-00129 BLK -202-R0 275.00000 275.00000 | | | | | | |

APPENDIX L
FORMALDEHYDE LABORATORY DATA

Table 1
Analytical Results
for

ETS, INC.

Clayton Project No. 29340.00

Client Reference#: 95-553

Sample Identification: RTO-0011-R3 (95-553-00204)
Lab Number: 003a
Sample Type: Impinger / Bubbler
Analyst: JW

Date Sampled: 07/29/95
Date Received: 08/01/95
Air Volume (L): --

| Analyte | Analytical Results | | | LOD (mg) | Method Reference | Date Analyzed |
|------------------|--------------------|---------|-------|-------------|---------------------|------------------|
| | (mg) | (mg/m3) | (ppm) | | | |
| Acetaldehyde | 0.31 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Acrolein | 0.03 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Benzaldehyde | 0.04 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Crotonaldehyde | 0.03 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Formaldehyde | 1.1 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Hexanal | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Isobutyraldehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Pentanal | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Propanal | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| m-Tolualdehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| o-Tolualdehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| p-Tolualdehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |

Table 1 (continued)

Analytical Results

for

ETS, INC.

Clayton Project No. 29340.00

Client Reference#: 95-553

Sample Identification: RTO-0011-BLANK (95-553-00206)
Lab Number: 004a
Sample Type: Impinger / Bubbler
Analyst: JW

Date Sampled: --
Date Received: 08/01/95
Air Volume (L): --

| Analyte | Analytical Results | | | LOD (mg) | Method Reference | Date Analyzed |
|------------------|--------------------|---------|-------|-------------|---------------------|------------------|
| | (mg) | (mg/m3) | (ppm) | | | |
| Acetaldehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Acrolein | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Benzaldehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Crotonaldehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Formaldehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Hexanal | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Isobutyraldehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Pentanal | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| Propanal | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| m-Tolualdehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| o-Tolualdehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |
| p-Tolualdehyde | <0.01 | -- | -- | 0.01 | EPA 0011 | 08/04/95 |

General Notes

<: Less than the indicated limit of detection (LOD)

--: Information not available or not applicable.

Samples RTO-0011-R1 (95-553-00200) and RTO-0011-R2 (95-553-00202) were not analyzed due to a laboratory error.

APPENDIX M
MDI LABORATORY DATA

ETS Analytical Services
Methylene bis(4,4'phenyl isocyanate) Analysis
Project #0895005
August 28, 1995

Summary and Interpretation Report
Prepared by:
Triangle Laboratories of Columbus

ETS Analytical Services
Methylene bis(4,4' phenyl isocyanate) analysis
Project #0895005

Narrative

Seven impinger samples were received on 2 August 1995 for methylene bis-(4,4'-phenyl isocyanate)[MDI] analyses. The samples were as follows:

| <u>Lab ID.:</u> | <u>Client ID.:</u> |
|-----------------|--------------------|
| 0895005-1 | 00300/RTO-MDI-R1 |
| 0895005-2 | 00301/RTO-MDI-R1 |
| 0895005-3 | 00307/RTO-MDI-R2 |
| 0895005-4 | 00308/RTO-MDI-R2 |
| 0895005-5 | 00314/RTO-MDI-R3 |
| 0895005-6 | 00315/RTO-MDI-R3 |
| 0895005-7 | 00319/BLANK |

Samples were pooled as follows: 00300 + 00301, 00307 + 00308, and 0314+00315. There were a total of four analyses.

Sample Results

There was no detectable MDI in samples R1, R2 and the BLANK. There appeared to be a very low level of MDI in sample R3. The residue in this sample was a total 0.04 μg . This was calculated from a concentration in the extract which was less than the lowest calibrator and is therefore an estimate.

Quality Control

The analyte calibration curve was linear with an r^2 value exceeding 0.99. The continuing calibration check deviated from the initial calibration by 9.2%. A Lab Spike (LS) and Lab Spike Duplicate (LSD) were performed with 10 μg spiked into 30 mL aliquots of the toluene impinger solution. The recoveries were 92.7% and 96.2% for the LS and LSD respectively.

There was no detectable MDI in the method blank. The reported value was the minimum detection limit.

The minimum detection limit was calculated as 5 times the baseline noise. The chromatogram for this analysis was the lowest calibrator (0.2 $\mu\text{g}/\text{mL}$). The calculated minimum detection limit was 0.01 total μg .

00000

Details of Method

The total volume of the toluene/piperazine impinger solution for each analysis was measured, then a 200-mL aliquot was removed and concentrated to 1.0 mL following a solvent exchange into acetonitrile. This 1.0-mL aliquot was transferred to an HPLC autosampler vial and capped for analysis.

The Method Blanks and Lab Spikes were prepared by with 30-mL of the toluene/piperazine solution which was exactly the same as that used for the impinger traps. The solutions were concentrated and solvent exchanged as were the samples. The calculations used for the recoveries etc. were done based on volumes similar to that of the samples for comparison.

The HPLC analysis was done by injection of 20 μ L of sample on a 4.6 mm x 25 cm Rainin ODS Widedpore column. The solvents for the HPLC elution were:

Solvent A: 30% acetonitrile in 0.1 M ammonium acetate at pH 5.0

Solvent B: acetonitrile

The HPLC program was as follows:

at time 0: 100% Solvent A

at time 20 minutes: 100% Solvent B

at time 22 minutes: 100% Solvent A, followed by a 4 minute equilibration time.

The piperazine derivative of MDI was detected by optical absorbance of a 248 nm incident beam, and all chromatographic data was acquired electronically by a local network of a personal computer configured with an HP 35900D A/D interface board and HP-G1250C ChemStation software.

Preparation of Piperazine-MDI Standard

A 223 mg aliquot of 1-(2-methoxyphenyl)-piperazine was dissolved in 225 mL of toluene and then 125.5 mg of 4,4'-methylene bis (phenyl isocyanate) was added to the solution. The reaction occurred quickly. A 50-mL aliquot of acetonitrile was added and the solution was heated until all precipitate was dissolved. The solution was placed in a refrigerator over night and the crystals separated from the solution by filtration through a Whatman #4 filter paper.

The filtrate was concentrated with heat to approximately 100 mL and then cooled over night again to optimize recovery of the derivative.

A 1.0 mg/mL solution in acetonitrile was made and mass corrected by 2.5365 (394.2 μ g/mL). The standard curve was prepared on a concentration from 0.2 to 50 μ g/mL based on the mass corrected concentrations.

000002

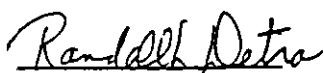
Data Analysis

The peak area data were computed into molar corrected concentrations of the analytes and reported as $\mu\text{g/mL}$ on the integration printout. This value is computed from a linear function of the initial calibration peak area and $\mu\text{g/mL}$ data. The sample data was entered into an Excel spreadsheet and mathematically converted to total μg as follows:

$$(A \times B) / C = \text{total } \mu\text{g}$$

Where: A = Reported $\mu\text{g/mL}$ of analyte
 B = Sample volume in mL
 C = Aliquot volume concentrated to 1 mL (200 mL)

Report prepared by:



Randall L. Detra, Ph. D.

Senior Chemist, Triangle Labs-Agrochemical Products Division

Data release by:



Ronald K. Mitchum, Ph. D.

President, Triangle Labs-Agrochemical Products Division

000003

DATA SUMMARY OF MDI ANALYSIS FROM IMPINGER CATCHES
Project #0895005.

| Lab ID | Client ID. | Total ug | Q |
|---------------|------------------------|-----------------|----------|
| 0895005-1+2 | 00300+00301/RTO-MDI-R1 | 0.01 | U |
| 0895005-3+4 | 00307+00308/RTOMDI-R2 | 0.01 | U |
| 0895005-5+6 | 00314+00315/RTO-MDI-R3 | 0.04 | J |
| 0895005-7 | 00319/BLANK | 0.01 | U |

U: Analyte was not detected, the calculated minimum detection limit is reported.

J: The detected analyte was present at a concentration less than the lowest calibrator.

DATA REDUCTION OF MDI ANALYSIS FROM IMPINGER CATCHES

Project #0895005.

| Lab ID | Client ID. | ug/mL | Concent. | Aliquot | Total | |
|-------------|------------------------|--------|----------|---------|-------|------------|
| | | | Vol. | Vol. | Vol. | Total ug Q |
| 0895005-1+2 | 00300+00301/RTO-MDI-R1 | 0.0018 | 1 | 200 | 1198 | 0.01 U |
| 0895005-3+4 | 00307+00308/RTO-MDI-R2 | 0.0018 | 1 | 200 | 1250 | 0.01 U |
| 0895005-5+6 | 00314+00315/RTO-MDI-R3 | 0.0069 | 1 | 200 | 1269 | 0.04 J |
| 0895005-7 | 00319/BLANK | 0.0018 | 1 | 200 | 949 | 0.01 U |

U: Analyte was not detected, the calculated minimum detection limit is reported.

J: The detected analyte was present at a concentration less than the lowest calibrator.

DATA REDUCTION OF MDI ANALYSIS QUALITY CHECKS

Project #0895005.

| Lab ID | Client ID. | Value | Q | Parameter |
|-------------|----------------------|-------|---|-----------|
| 0895005-MB | Method Blank | 0.01 | U | Total ug |
| 0895005-LS | Lab Spike | 92.7% | | Recovery |
| 0895005-LSD | Lab Spike Duplicate | 96.2% | | Recovery |
| CONCAL | Contin. Calib. Check | 9.2% | | Deviation |

U: Analyte was not detected, the calculated minimum detection limit is reported.

*Volume of lab method blank nominally set at 1200 mL for comparison.

000008

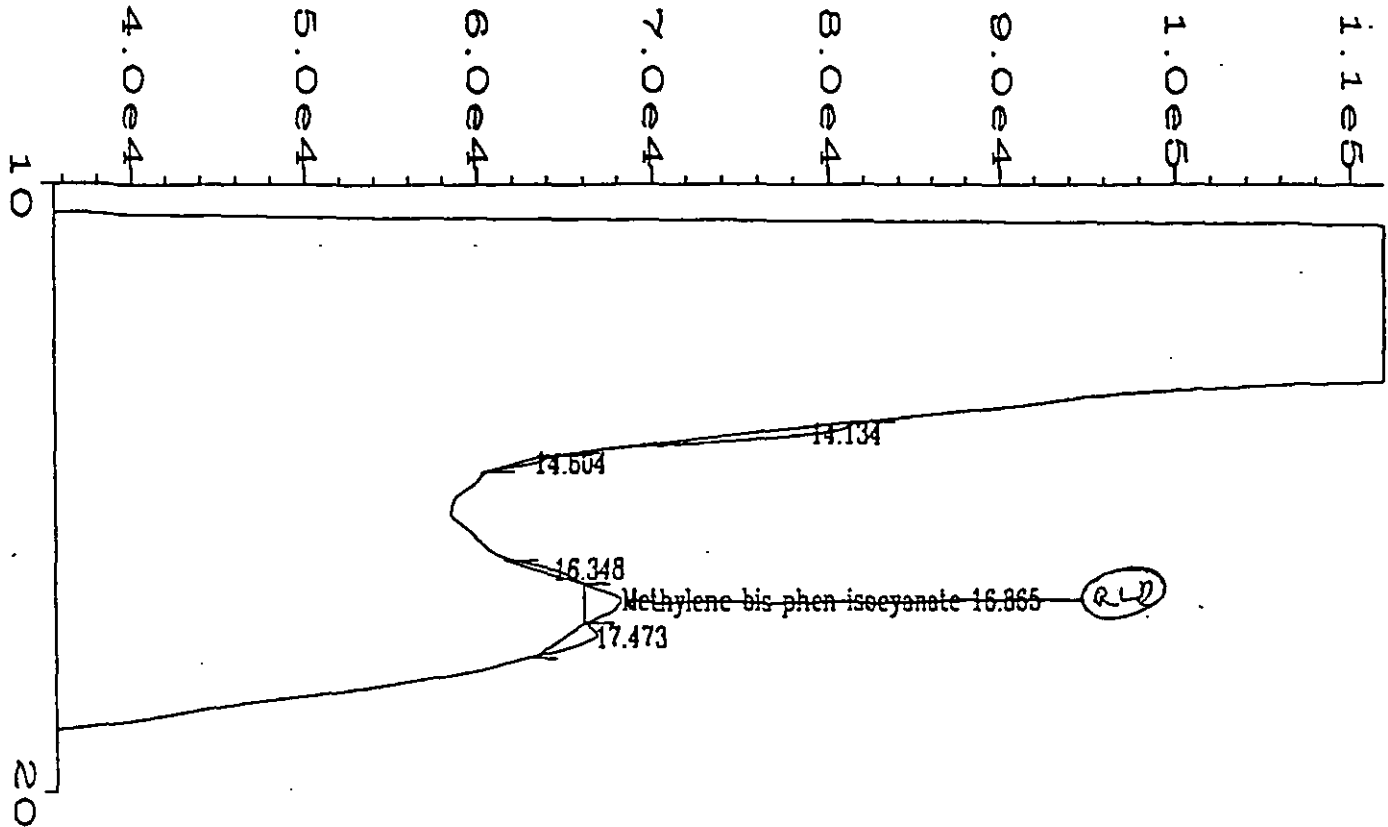
DATA REDUCTION OF MDI ANALYSIS QUALITY CHECKS

Project #0895005.

| Lab ID | Client ID. | Concent. ug/mL | Aliquot Vol. | Total Vol. | Total ug | Q | Value | Parameter |
|-------------|----------------------|-------------------|-----------------|---------------|----------|-------|-------|----------------|
| 0895005-MB | Method Blank* | 0.0018 | 1 | 200 | 1200 | 0.01 | U | 0.01 Total ug |
| 0895005-LS | Lab Spike | 9.2720 | 1 | 200 | 1200 | 55.63 | | 92.7% Recovery |
| 0895005-LSD | Lab Spike Duplicate | 9.6190 | 1 | 200 | 1200 | 57.71 | | 96.2% Recovery |
| CONCAL | Contin. Calib. Check | 10.9200 | 1 | 200 | 949 | 51.82 | | 9.2% Deviation |

U: Analyte was not detected, the calculated minimum detection limit is reported.

*Volume of lab method blank nominally set at 1200 mL fo comparison.



USER: J11001180

=====
 External Standard Report
 =====

Data File Name : C:\HPCHEM\2\DATA\15AU9507.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-1,2
 Time Bar Code:
 Acquired on : 15 Aug 95 12:55 PM
 Report Created on: 21 Aug 95 08:53 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

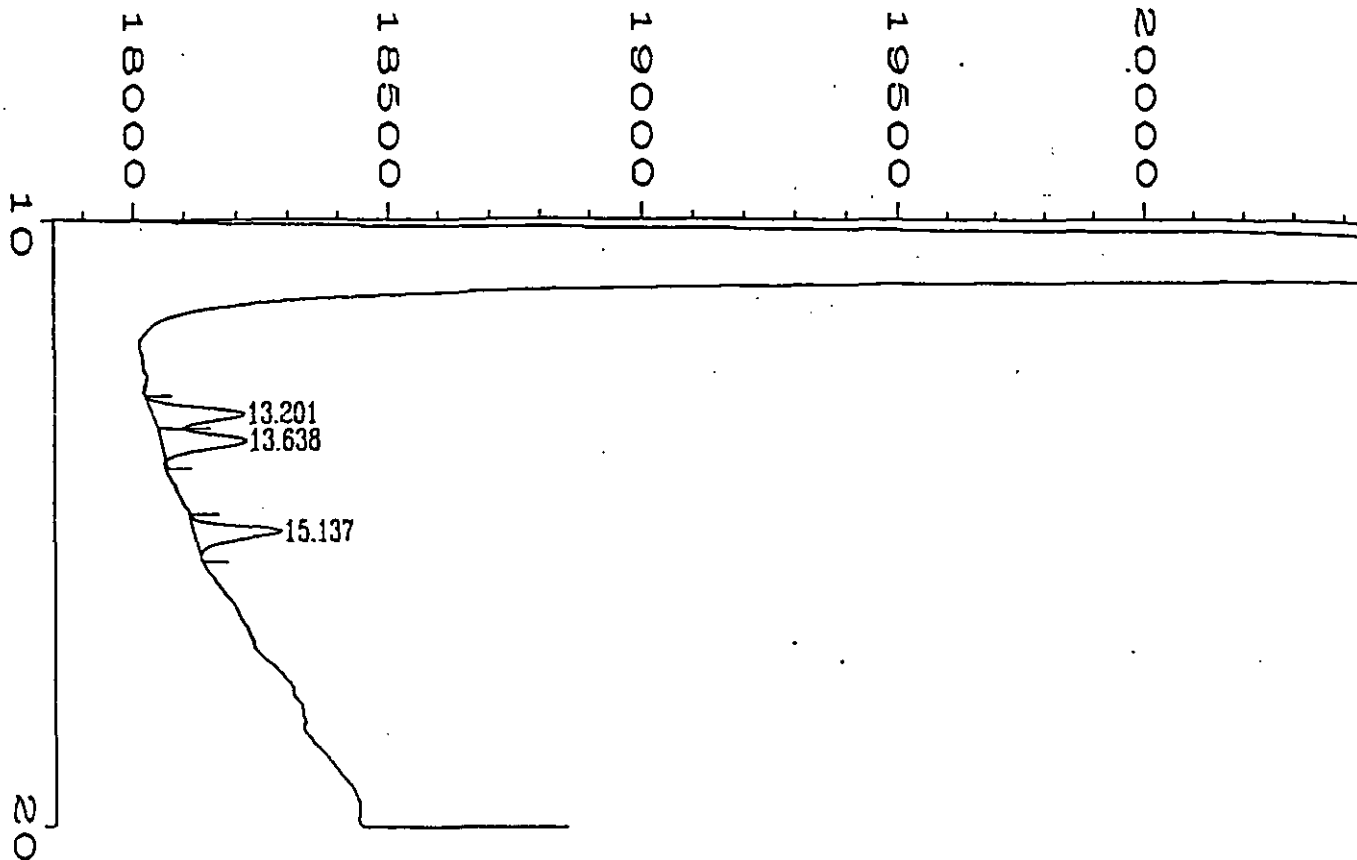
Page Number : 1
 Vial Number : 7
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Eq. 1 in C:\HPCHEM\2\DATA\15AU9507.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|--------|-------|------|-------|------|-------|-------------------------------|
| 16.865 | 50004 | MM | 0.389 | 1 | 1.626 | Methylene bis phen isocyanate |

Report Modified

(RLD)



External Standard Report

Data File Name : C:\HPCHEM\2\DATA\15AU9515.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-1&2 100x
 Run Time Bar Code:
 Acquired on : 15 Aug 95 04:44 PM
 Report Created on: 21 Aug 95 09:06 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

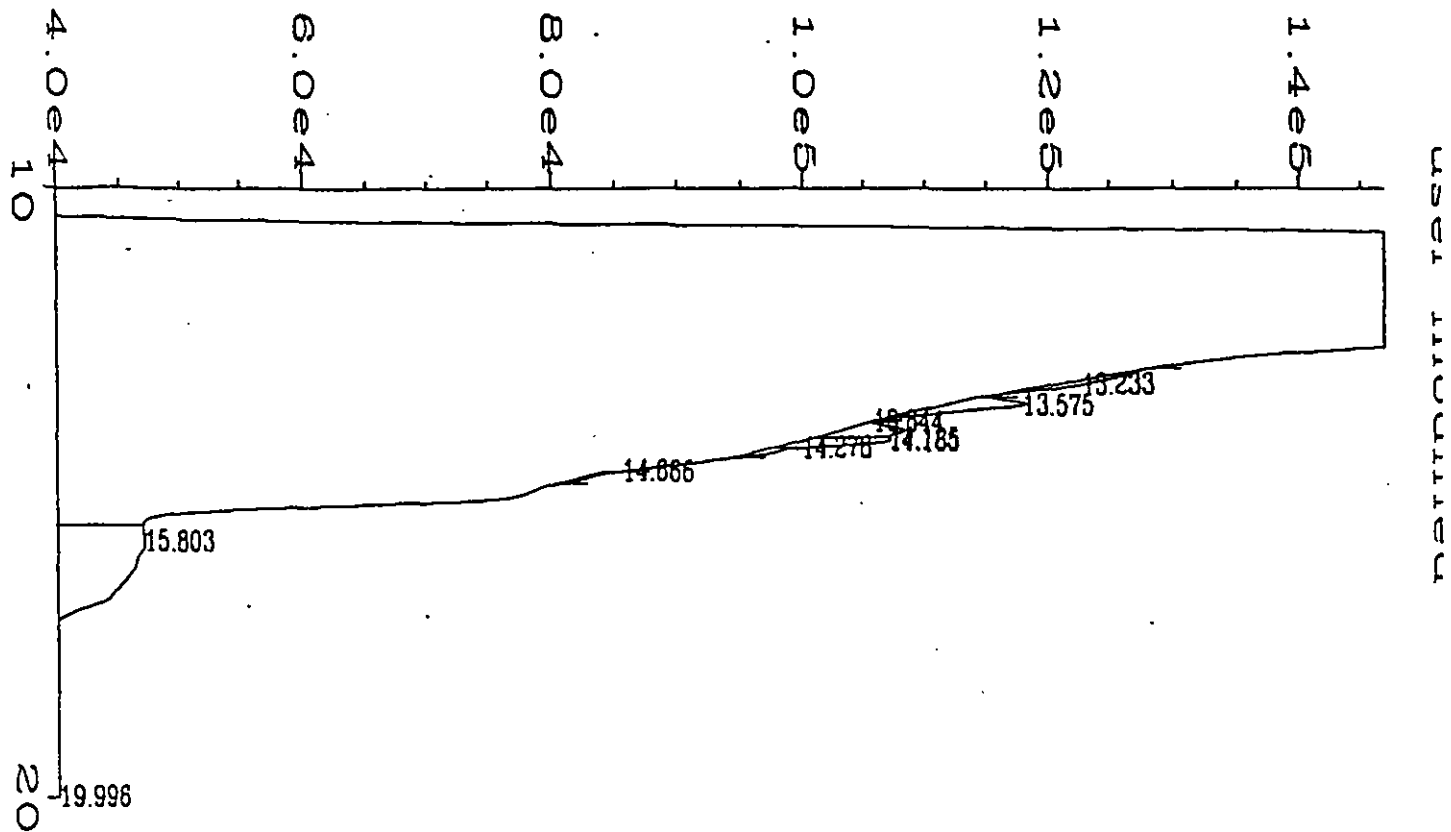
Page Number : 1
 Vial Number : 15
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Sig. 1 in C:\HPCHEM\2\DATA\15AU9515.D

| Ret Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------|---------------|------|-------|------|-------|-------------------------------|
| 16.762 | * not found * | | | 1 | | Methylene bis phen isocyanate |

Not all calibrated peaks were found

User Modified



External Standard Report

File Name : C:\HPCHEM\2\DATA\15AU9508.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-3,4
 Time Bar Code:
 Printed on : 15 Aug 95 01:24 PM
 Report Created on: 21 Aug 95 08:55 PM
 Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

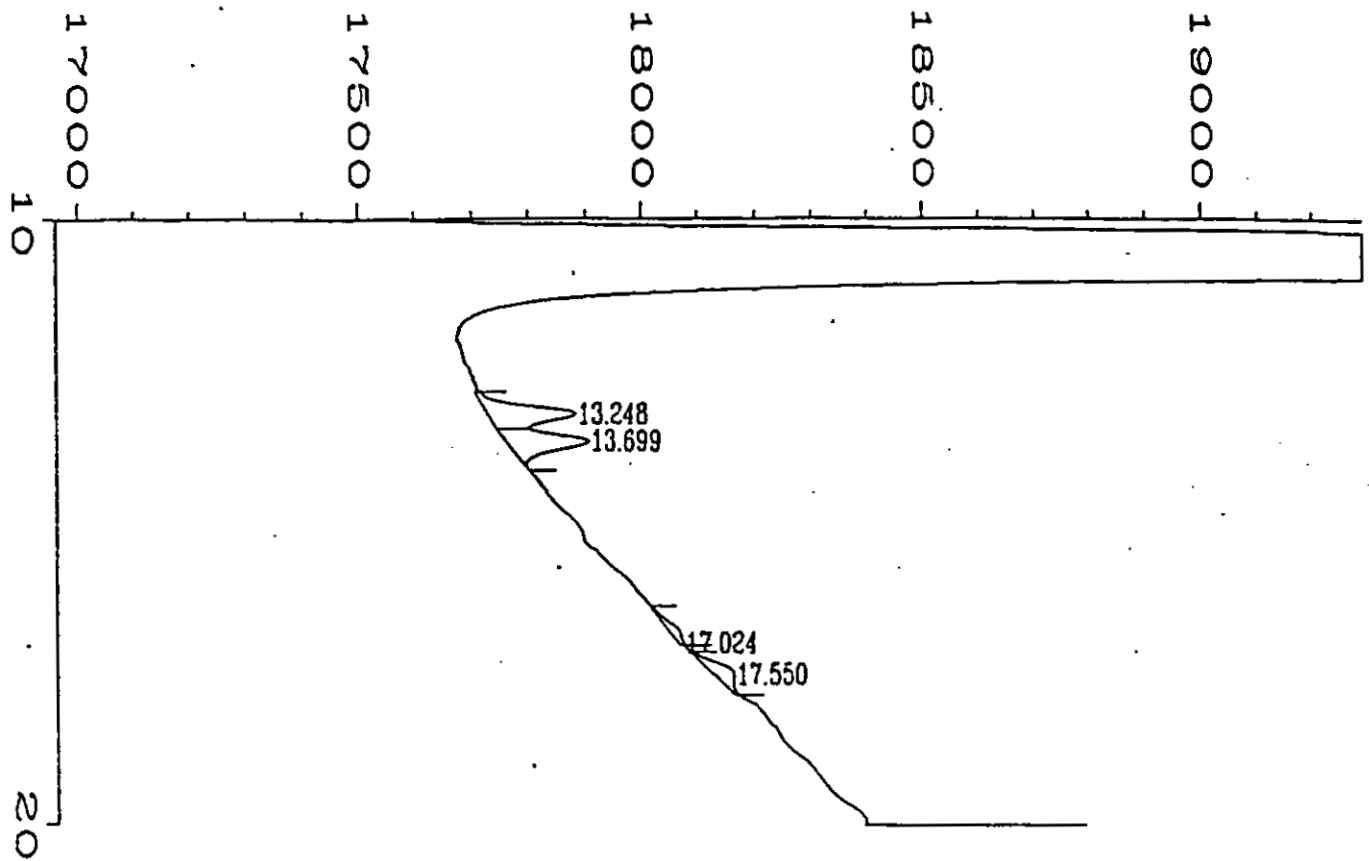
Page Number : 1
 Vial Number : 8
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

1 in C:\HPCHEM\2\DATA\15AU9508.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|-------|---------------|------|-------|------|-------|-------------------------------|
| 6.934 | * not found * | | | 1 | | Methylene bis phen isocyanate |

all calibrated peaks were found

Modified



USEL APPROVED

External Standard Report

Data File Name : C:\HPCHEM\2\DATA\15AU9516.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-3&4 100x
 Sample Time Bar Code:
 Sample Acquired on : 15 Aug 95 05:12 PM
 Report Created on: 21 Aug 95 09:07 PM
 Last Recalibration : 21 Aug 95 08:40 PM
 Multiplier : 1

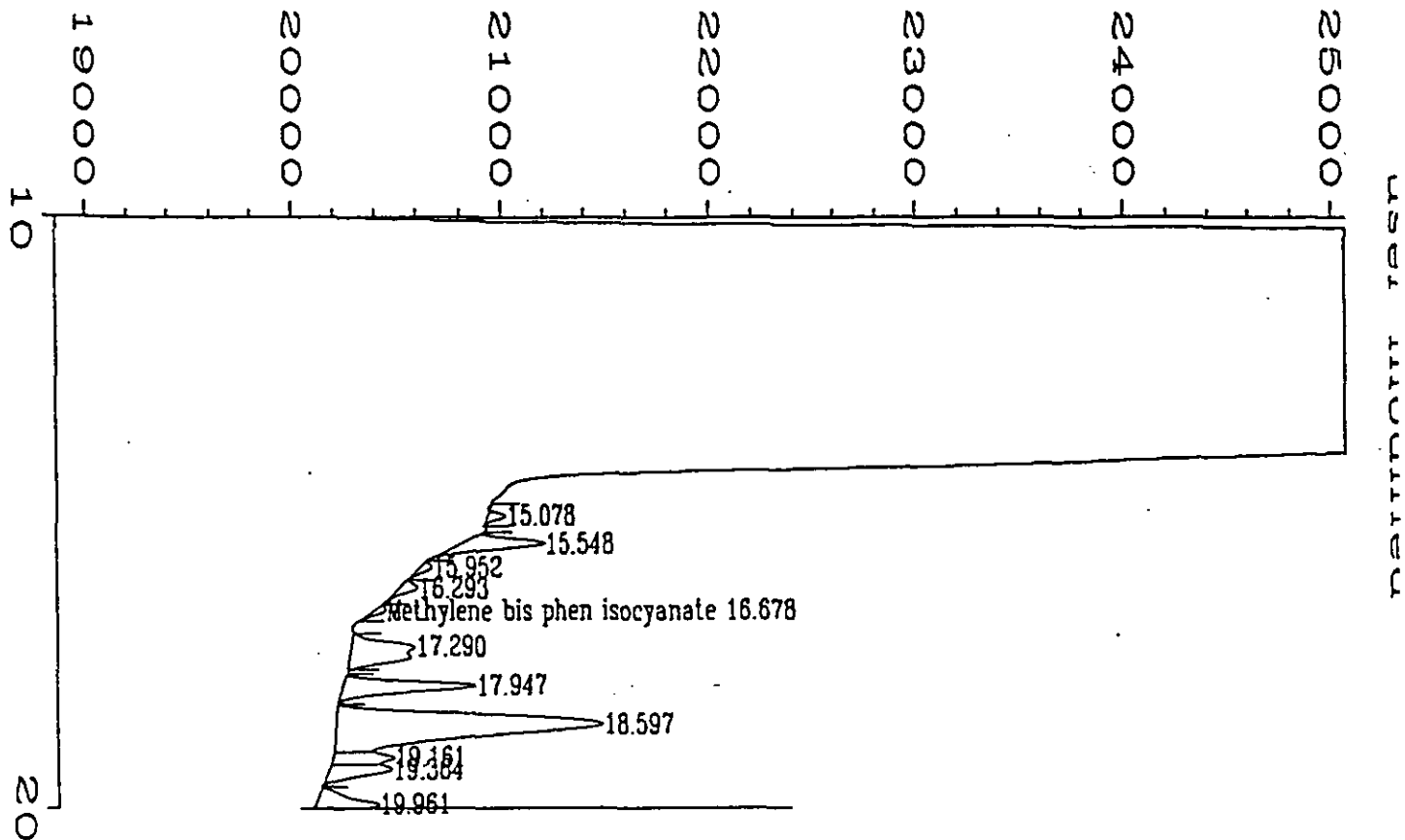
Page Number : 1
 Vial Number : 16
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

1 in C:\HPCHEM\2\DATA\15AU9516.D

| Retention Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------------|-----------|------|-------|------|-------|-------------------------------|
| 16.762 | not found | | | 1 | | Methylene bis phen isocyanate |

All calibrated peaks were found

Report Modified



External Standard Report

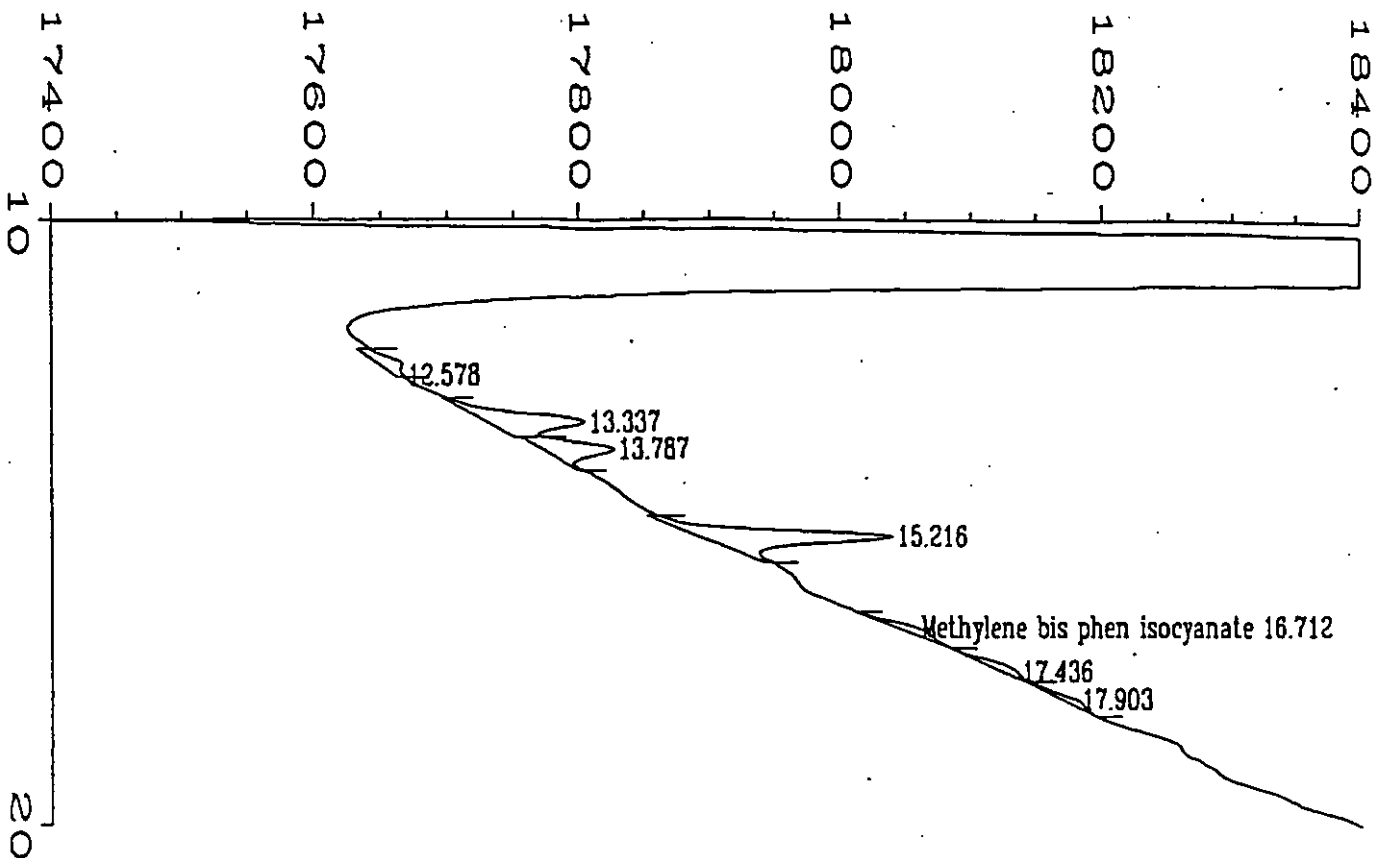
File Name : C:\HPCHEM\2\DATA\15AU9509.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-5,6
 Time Bar Code:
 Acquired on : 15 Aug 95 01:52 PM
 Report Created on: 21 Aug 95 09:14 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 9
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

1 in C:\HPCHEM\2\DATA\15AU9509.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|--------|------|------|-------|------|---------|-------------------------------|
| 16.678 | 588 | MM | 0.151 | 1 | 0.00691 | Methylene bis phen isocyanate |

Modified



External Standard Report

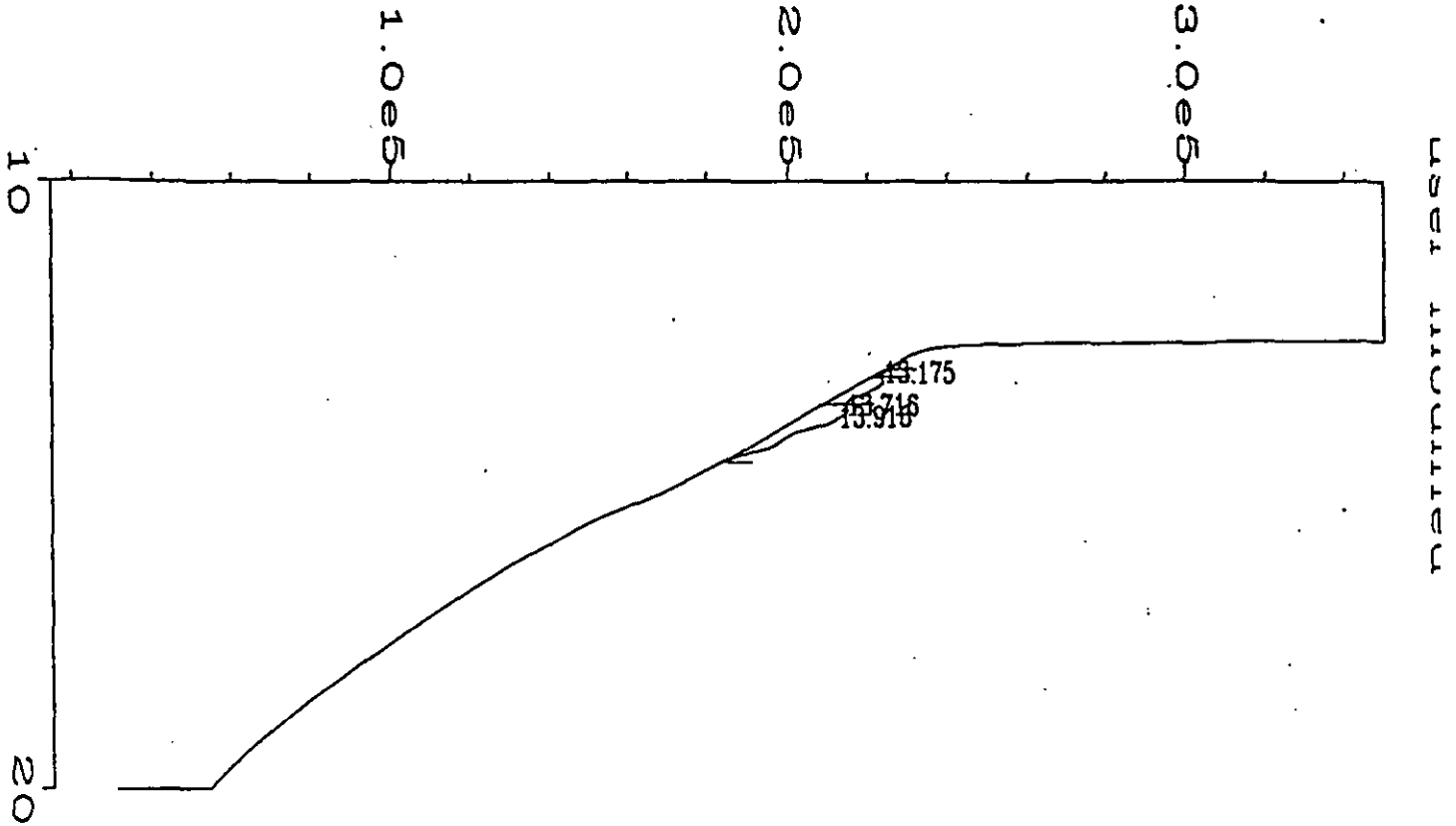
Data File Name : C:\HPCHEM\2\DATA\15AU9517.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-5&6 100x
 Run Time Bar Code:
 Acquired on : 15 Aug 95 05:41 PM
 Report Created on: 21 Aug 95 09:09 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 17
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Sig. 1 in C:\HPCHEM\2\DATA\15AU9517.D

| Ret Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------|------|------|-------|------|---------|-------------------------------|
| 16.712 | 240 | MM | 0.284 | 1 | 0.00282 | Methylene bis phen isocyanate |

User Modified



External Standard Report

File Name : C:\HPCHEM\2\DATA\15AU9510.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-7
 Time Bar Code:
 Acquired on : 15 Aug 95 02:21 PM
 Report Created on: 21 Aug 95 08:59 PM
 Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 10
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

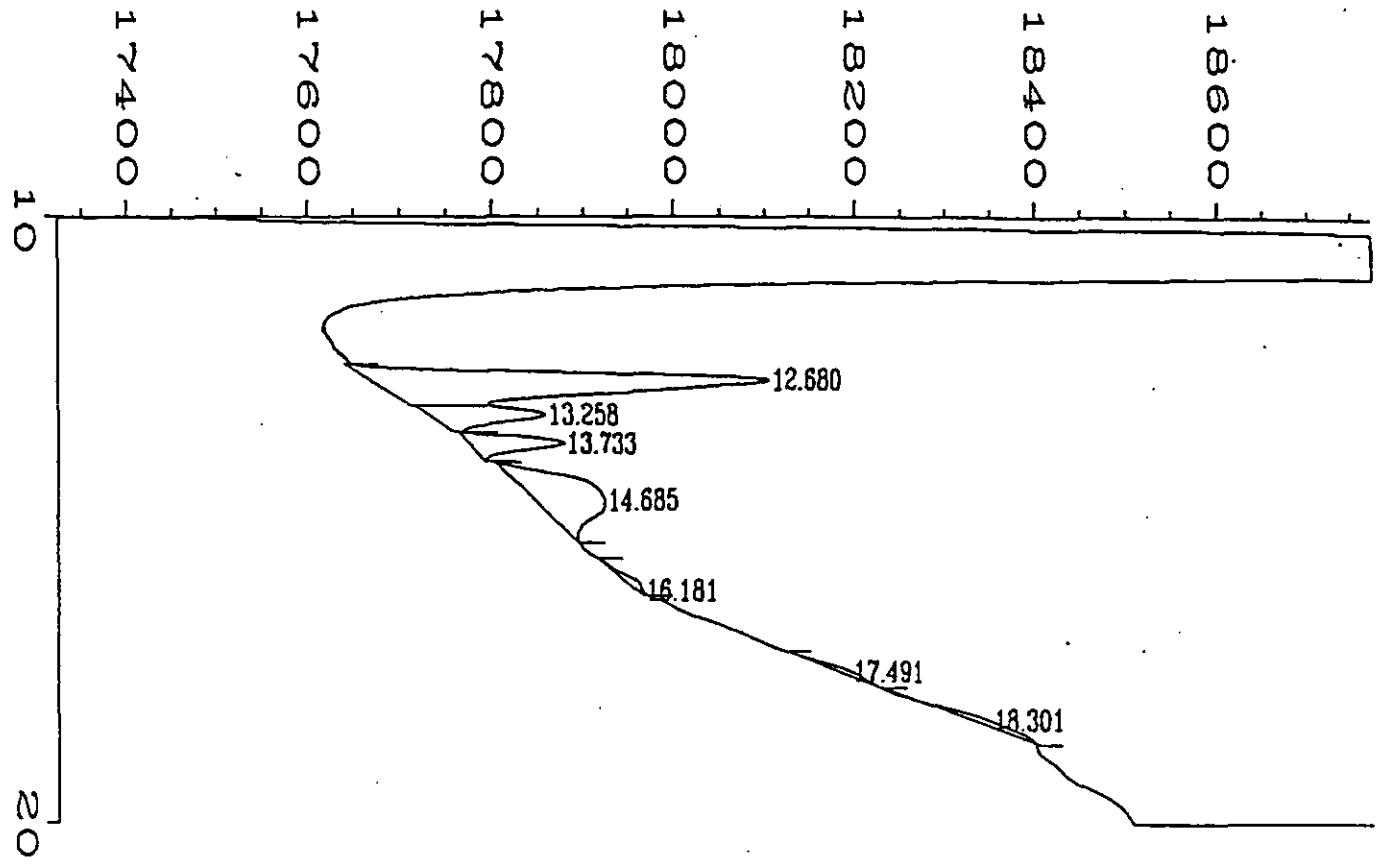
1 in C:\HPCHEM\2\DATA\15AU9510.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|--------|---------------|------|-------|------|-------|-------------------------------|
| 16.934 | * not found * | | | 1 | | Methylene bis phen isocyanate |

all calibrated peaks were found

er Modified

USER INQUIRED



=====
 External Standard Report
 =====

Data File Name : C:\HPCHEM\2\DATA\15AU9518.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-7 100x
 Run Time Bar Code:
 Acquired on : 15 Aug 95 06:09 PM
 Report Created on: 21 Aug 95 09:12 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 18
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Peak 1 in C:\HPCHEM\2\DATA\15AU9518.D

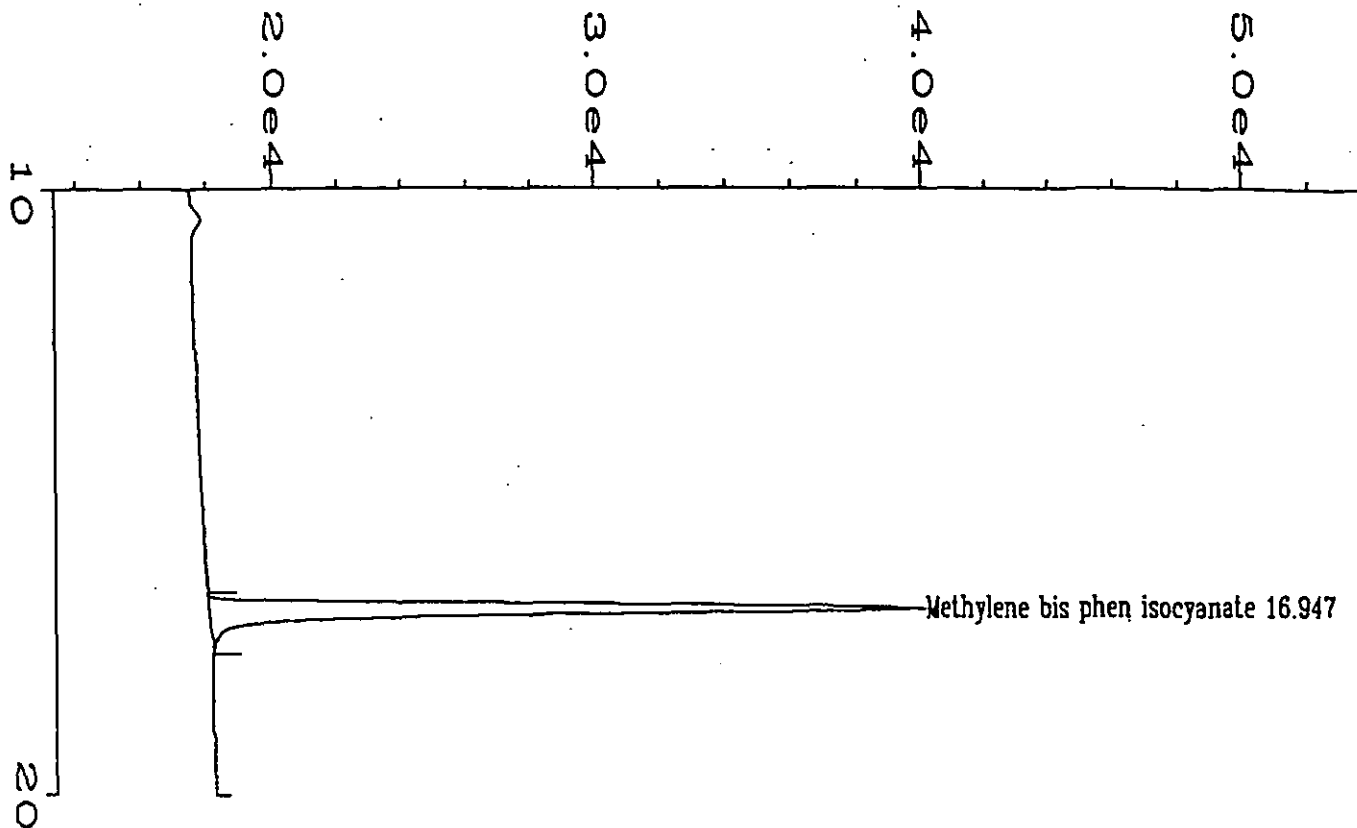
| Retention Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------------|---------------|------|-------|------|-------|-------------------------------|
| 16.762 | * not found * | | | 1 | | Methylene bis phen isocyanate |

Not all calibrated peaks were found

Report Modified

Calibration Table

| # | RT | Lvl | ng/ul | Amt/Hght | Ref Istd I# | Name |
|---|--------|-----|--------|-------------|-------------|-------------------------|
| 1 | 16.934 | 1 | 50.2 | 5.674e-004 | 1 | Methylene bis phen 1... |
| | | 2 | 20.08 | 5.439e-004 | | |
| | | 3 | 10.04 | 4.5537e-004 | | |
| | | 4 | 1.004 | 4.5368e-004 | | |
| | | 5 | 0.2008 | 3.892e-004 | | |



External Standard Report

Data File Name : C:\HPCHEM\2\DATA\15AU9504.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : CAL. 10.04 ug/mL
 Run Time Bar Code:
 Acquired on : 15 Aug 95 11:29 AM
 Report Created on: 21 Aug 95 08:50 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

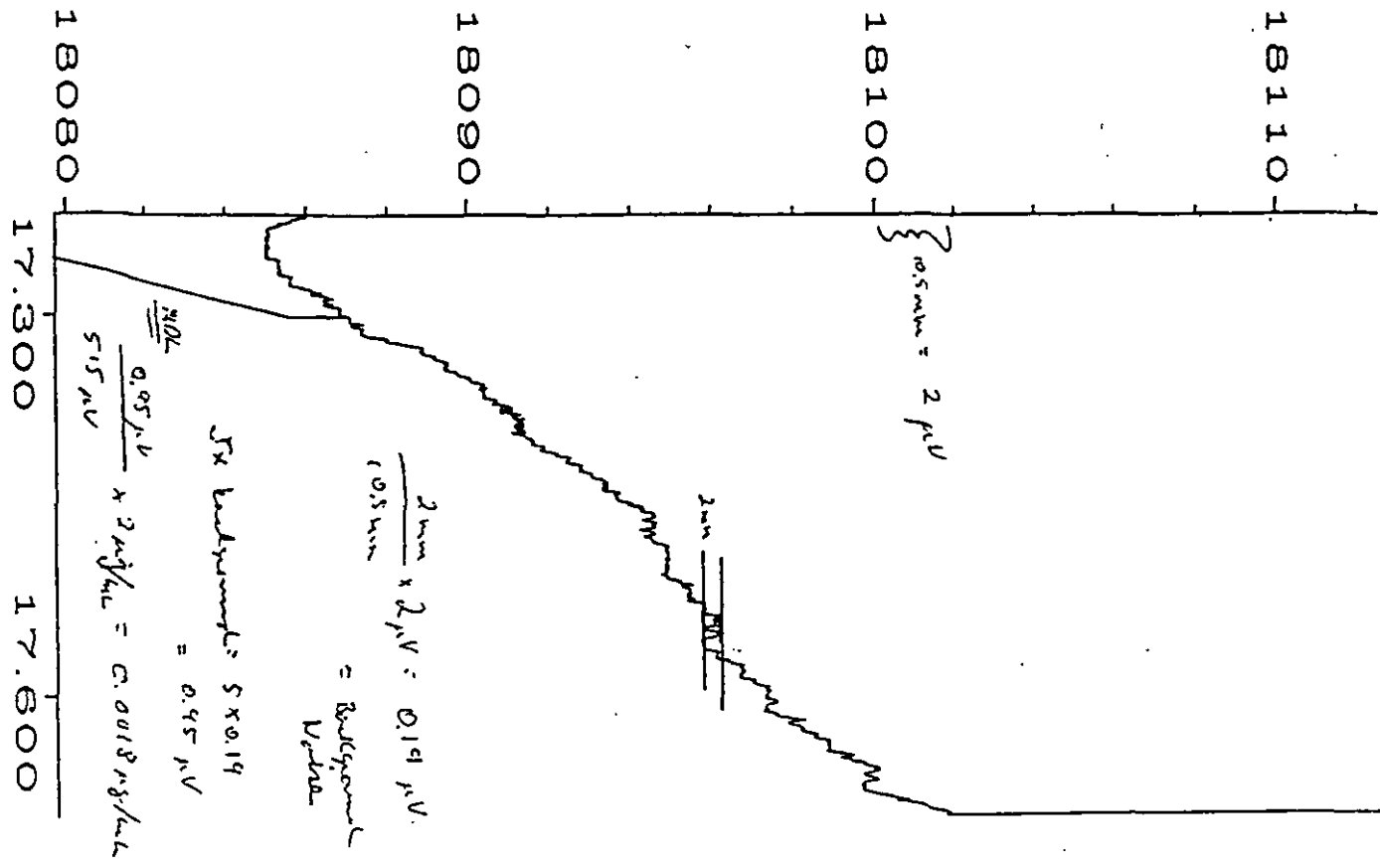
Page Number : 1
 Vial Number : 4
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Sig. 1 in C:\HPCHEM\2\DATA\15AU9504.D

| Ret Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------|--------|------|-------|------|--------|-------------------------------|
| 16.947 | 264531 | MM | 0.200 | 1 | 10.920 | Methylene bis phen isocyanate |

User Modified

USPT 11001111111111



External Standard Report

File Name : C:\HPCHEM\2\DATA\15AU9506.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : CAL. 0.2008ug/mL
 Time Bar Code:
 Acquired on : 15 Aug 95 12:26 PM
 Report Created on : 23 Aug 95 08:34 AM
 Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

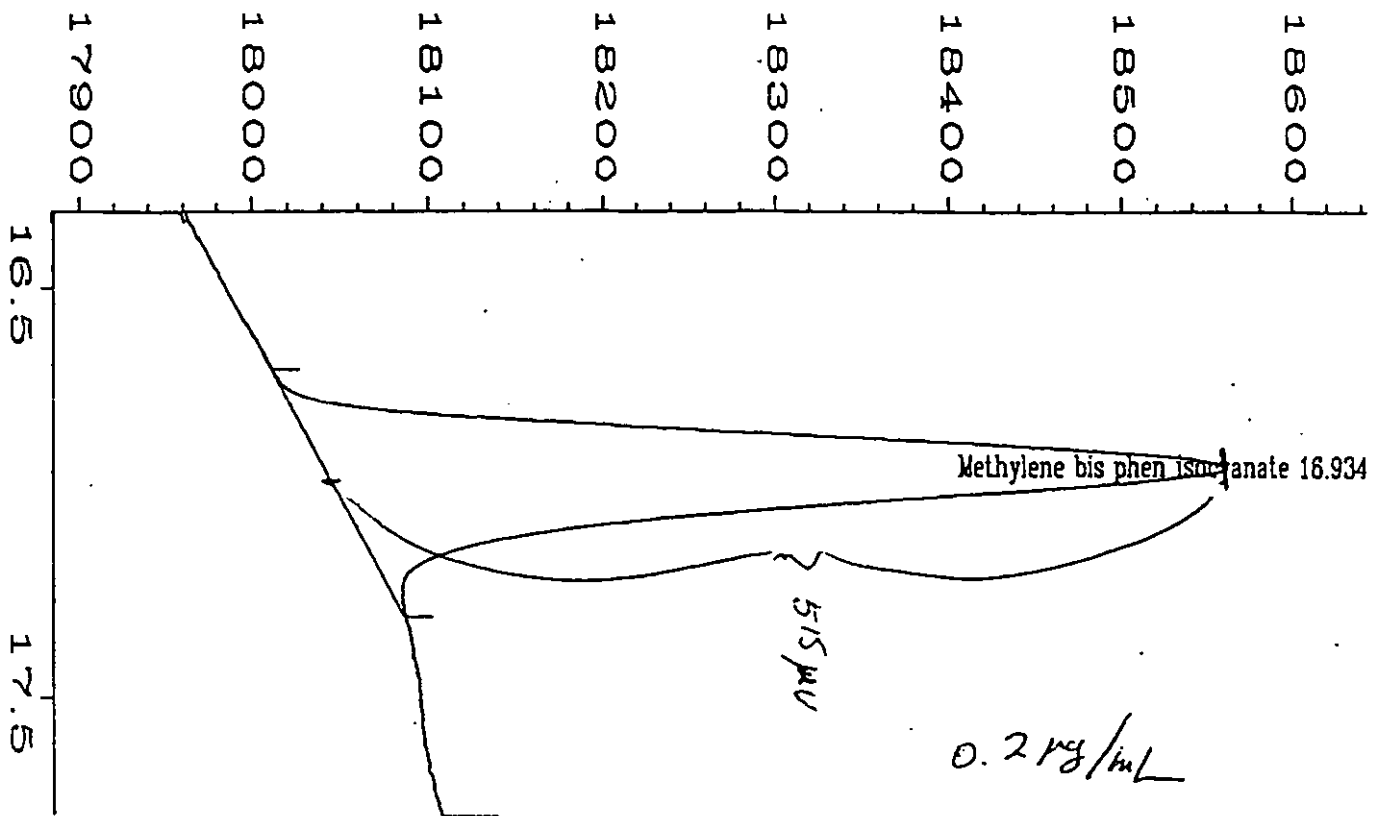
Page Number : 1
 Vial Number : 6
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

1 in C:\HPCHEM\2\DATA\15AU9506.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|-------|------|------|-------|------|--------|-------------------------------|
| 6.934 | 6105 | MM | 0.196 | 1 | 0.0717 | Methylene bis phen isocyanate |

Modified

Used for calculation of NIDL



External Standard Report

File Name : C:\HPCHEM\2\DATA\15AU9506.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : CAL. 0.2008ug/mL
 Sample Time Bar Code:
 Acquired on : 15 Aug 95 12:26 PM
 Report Created on: 22 Aug 95 08:48 AM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

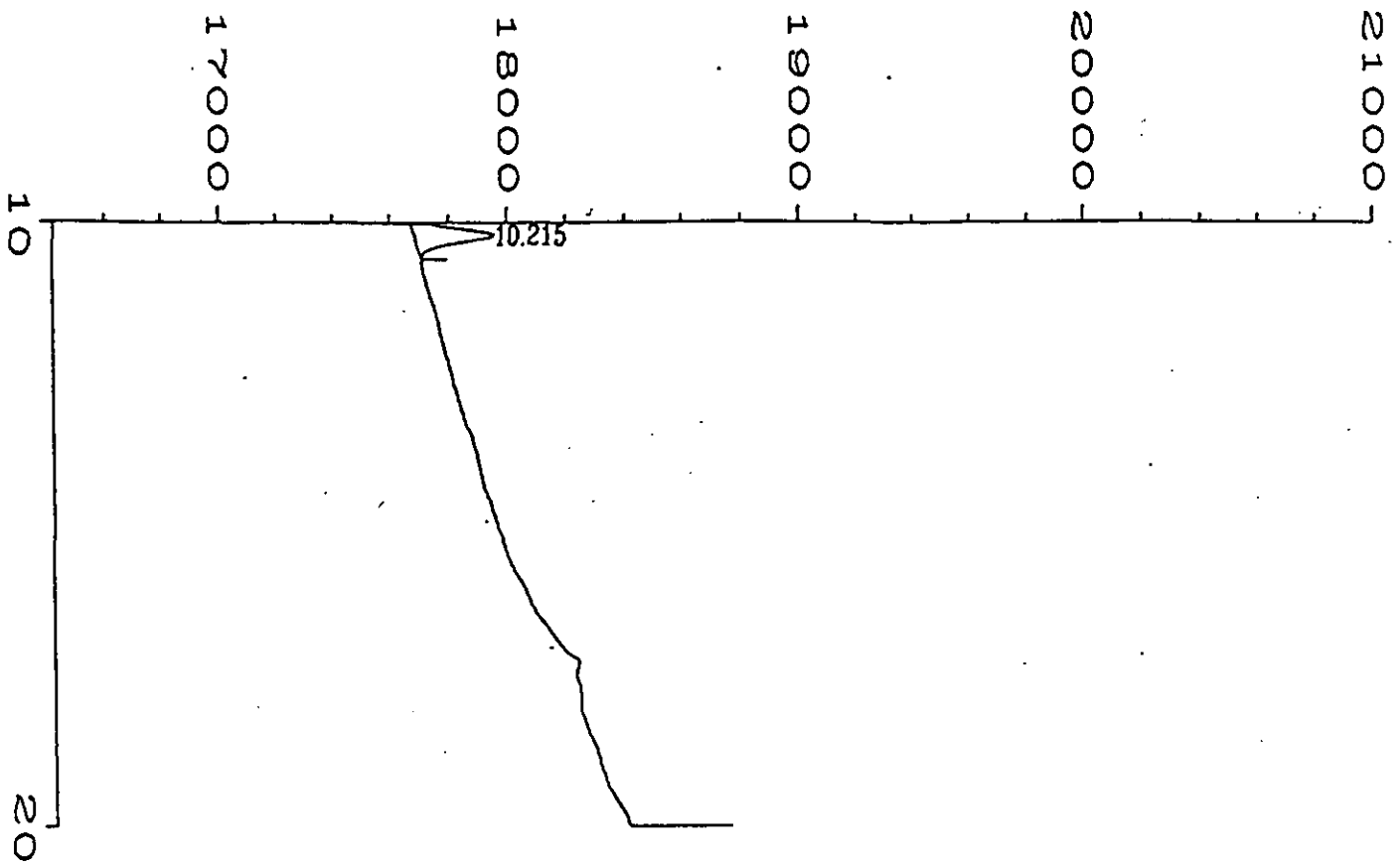
Page Number : 1
 Vial Number : 6
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

1 in C:\HPCHEM\2\DATA\15AU9506.D

| Retention Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------------|------|------|-------|------|--------|-------------------------------|
| 16.934 | 6105 | MM | 0.196 | 1 | 0.0717 | Methylene bis phen isocyanate |

Report Modified

*used for calculation of
 LOD.*



External Standard Report

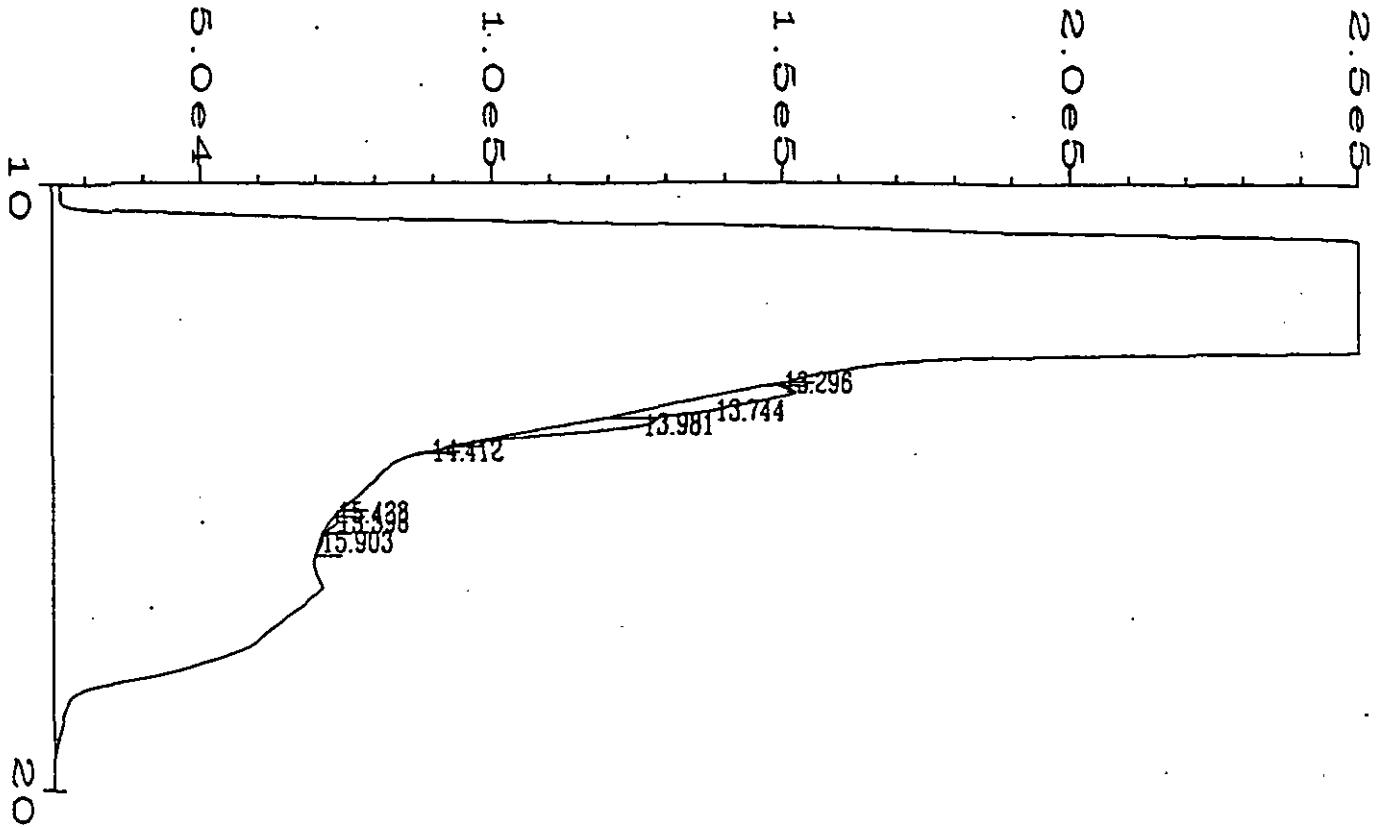
Data File Name : C:\HPCHEM\2\DATA\15AU9501.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : Ins. Blank
 Time Bar Code:
 Acquired on : 15 Aug 95 10:04 AM
 Report Created on: 21 Aug 95 08:51 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 1
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

g. 1 in C:\HPCHEM\2\DATA\15AU9501.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|--------|---------------|------|-------|------|-------|-------------------------------|
| 16.934 | • not found • | | | 1 | | Methylene bis phen isocyanate |

Not all calibrated peaks were found



External Standard Report

Data File Name : C:\HPCHEM\2\DATA\15AU9511.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-MB
 Run Time Bar Code:
 Acquired on : 15 Aug 95 02:49 PM
 Report Created on: 21 Aug 95 09:01 PM
 Last Recalib on : 21 Aug 95 08:40 PM
 Multiplier : 1

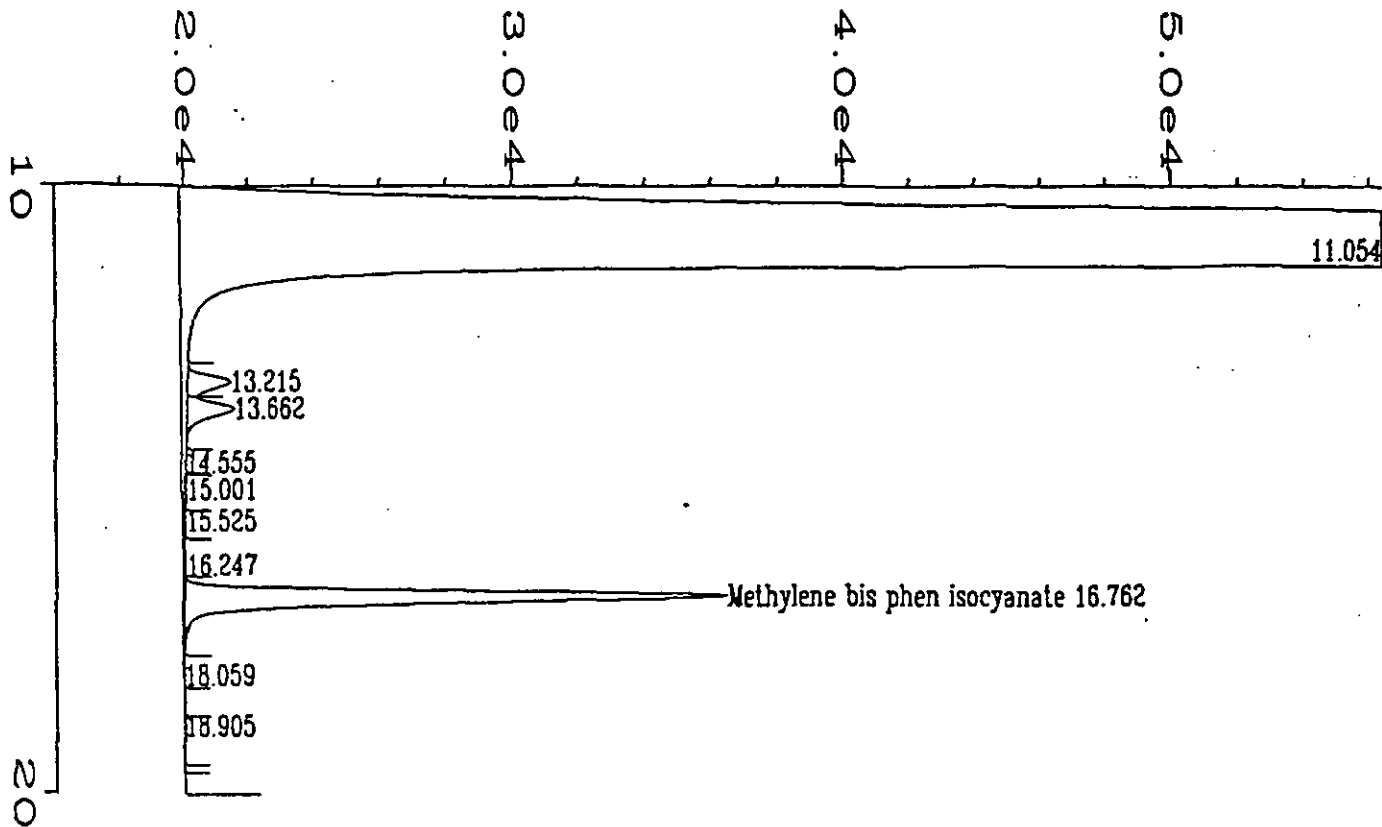
Page Number : 1
 Vial Number : 11
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Sig. 1 in C:\HPCHEM\2\DATA\15AU9511.D

| Ret Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------|---------------|------|-------|------|-------|-------------------------------|
| 16.934 | * not found * | | | 1 | | Methylene bis phen isocyanate |

Not all calibrated peaks were found

User Modified



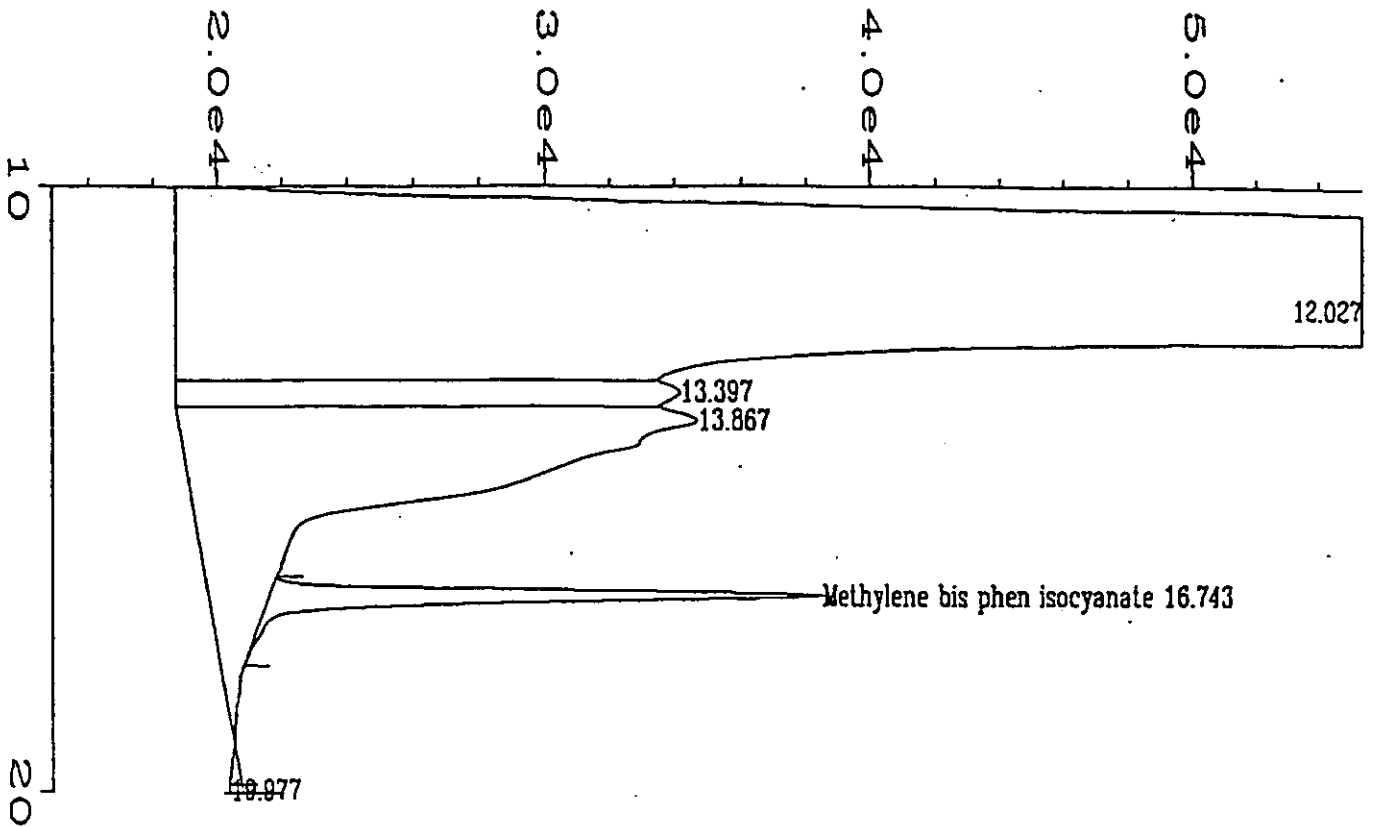
External Standard Report

File Name : C:\HPCHEM\2\DATA\15AU9512.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-LS
 Time Bar Code:
 Printed on : 15 Aug 95 03:18 PM
 Report Created on: 21 Aug 95 09:02 PM
 Recalibrated on : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 12
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

1 in C:\HPCHEM\2\DATA\15AU9512.D

| Time | Area | Type | Width | Ref# | ng/ul | Name |
|-------|--------|------|-------|------|-------|-------------------------------|
| 6.762 | 226511 | VV T | 0.212 | 1 | 9.272 | Methylene bis phen isocyanate |



External Standard Report

Data File Name : C:\HPCHEM\2\DATA\15AU9513.D
 Operator : RLD
 Instrument : LC 1 FLUO
 Sample Name : 0895005-LSD
 Run Time Bar Code:
 Acquired on : 15 Aug 95 03:46 PM
 Report Created on: 21 Aug 95 09:03 PM
 Last Recalibration : 21 Aug 95 08:40 PM
 Multiplier : 1

Page Number : 1
 Vial Number : 13
 Injection Number : 1
 Sequence Line : 1
 Instrument Method: MDI01.MTH
 Analysis Method : MDI01.MTH
 Sample Amount : 0
 ISTD Amount :

Sample 1 in C:\HPCHEM\2\DATA\15AU9513.D

| Retention Time | Area | Type | Width | Ref# | ng/ul | Name |
|----------------|--------|------|-------|------|-------|-------------------------------|
| 16.743 | 234503 | BB T | 0.211 | 1 | 9.619 | Methylene bis phen isocyanate |

Project #:

0895005

Client:

ETS, Inc. 1108

Date Rec'd:

8-2-95

Carrier:

Richman Exp

Tracking #:

7589361 861

Analysis:

MDI

Condition --

Type(s) of Matrix
Temperature
Type of Container
Custody seals?
Chain of Custody?

Ague's
cool
glass Other: good condition
NO
yes

| Client ID: | Lab ID: | Date Sampled | Matrix | Comment |
|------------|-------------|--------------|-------------|---------------|
| 00300 | 0895005 - 1 | 7/31 | Air/Aqueous | } combine 1+2 |
| 00301 | " - 2 | " | " | |
| 00307 | " - 3 | " | " | } combine 3+4 |
| 00308 | " - 4 | " | " | |
| 00314 | " - 5 | " | " | } combine 5+6 |
| 00315 | " - 6 | " | " | |
| 00319 | " - 7 | " | " | BLANK |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |



A subsidiary of ETS International, Inc.

July 31, 1995

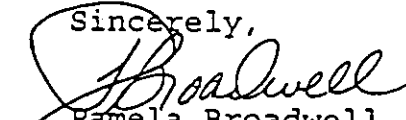
Sample Custody
Triangle Labs of RTP, Inc.
801 Capitola Drive
Durham, NC 22713
(919) 544-5491

RE: 4 runs - MDI Samples (front and back half)
ETS, Inc. Contract # 95-553 (La Pacific)
ETS, Inc. Purchase Order # 5637

Dear Sample Custody,

This letter accompanies four (4) MDI samples for analysis. Please note that runs 1,2 and 3 consist of a front and a back half - the blank is combined. Please refer to Purchase order # 5637 in all correspondence. A 21 calendar day turnaround is requested. Feel free to contact Sample Manager Terry Williamson, project manager Andy Hetz or myself if you have any questions.

Sincerely,


Pamela Broadwell
Sample Technician



APPENDIX N
FACILITY OPERATING DATA

RTO DATA SHEET

DATE: 7-27-95

UNIT: Dungannon

| | 8:00 | 9:00 | 10:00 | 11:00 | 12:00 | 1:00 | 2:00 | 3:00 | 4:00 |
|-------------------------------|------|------|-------|-------|-------|------|------|------|------|
| BTUE (On or Off) | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| Temp-Comb.Chamber | 1553 | 1548 | 1586 | 1580 | 1562 | 1589 | 1570 | 1530 | 1546 |
| Temp - Inlet | 113 | 115 | 114 | 116 | 119 | 120 | 120 | 123 | 123 |
| Temp - Exhaust | 218 | 225 | 224 | 227 | 222 | 230 | 230 | 232 | 235 |
| Temp - Cham. #1 lower bed | 316 | 319 | 320 | 318 | 316 | 323 | 317 | 322 | 322 |
| Temp - Cham. #2 lower bed | 291 | 288 | 285 | 286 | 292 | 288 | 293 | 292 | 294 |
| Temp - Cham #3 lower bed | 289 | 287 | 292 | 292 | 289 | 293 | 292 | 291 | 290 |
| Temp - Cham #4 lower bed | 317 | 324 | 313 | 313 | 327 | 319 | 320 | 325 | 322 |
| Temp - Cham #5 lower bed | 294 | 291 | 293 | 295 | 296 | 296 | 302 | 299 | 297 |
| Temp - Cham #6 lower bed | 305 | 311 | 315 | 313 | 315 | 320 | 312 | 321 | 298 |
| Temp - Cham #7 lower bed | 365 | 364 | 360 | 361 | 367 | 363 | 368 | 369 | 370 |
| Temp - Cham #8 lower bed | 355 | 350 | 355 | 357 | 351 | 356 | 356 | 354 | 359 |
| RTO Δ P | 17 | 16 | 15 | 16 | 16 | 15 | 15 | 17 | 17 |
| Pressure - Inlet Duct | 2.42 | 2.45 | 2.62 | 2.5 | 2.36 | 2.6 | 2.59 | 2.43 | 2.68 |
| Temp - Burner #1 | 1504 | 1499 | 1494 | 1502 | 1502 | 1493 | 1484 | 1480 | 1495 |
| Temp - Burner #2 | 1509 | 1531 | 1496 | 1511 | 1521 | 1505 | 1496 | 1490 | 1513 |
| Temp - Burner #3 | 1494 | 1524 | 1504 | 1481 | 1495 | 1517 | 1512 | 1493 | 1522 |
| Output - Burner #1 Cont. % | 40 | 47.2 | 45.8 | 41.2 | 42.3 | 46.2 | 44.6 | 42.4 | 45.8 |
| Output - Burner #2 Cont. % | 11 | 9.7 | 99.6 | 10.6 | 9.3 | 99.3 | 95.1 | 31.1 | 34.2 |
| Output - Burner #3 Cont. % | 53 | 10 | 25.9 | 52.3 | 54.3 | 10 | 10 | 20.6 | 10 |
| Setpoint - Burner #1 Cont. °F | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1480 | 1500 |
| Setpoint - Burner #2 Cont. °F | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1480 | 1500 |
| Setpoint - Burner #3 Cont. °F | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1480 | 1500 |
| Motor Amps - Fan #1 | 440 | 440 | 420 | 440 | 440 | 420 | 460 | 440 | 440 |
| Motor Amps - Fan #2 | 420 | 400 | 440 | 420 | 440 | 420 | 440 | 420 | 400 |
| motor Speed - Fan #1 | 84 | 84 | 85 | 86 | 86 | 84 | 84 | 85 | 84 |
| Motor Speed - Fan #2 | 81 | 80 | 82 | 83 | 82 | 80 | 81 | 81 | 82 |
| CO out from CEM | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Air flow from CEM | NA | NA | NA | NA | NA | NA | NA | NA | NA |

TEST
2
STARTED
9:15 am
STOP

TEST
2
STARTED
12:15 p.m.
STOP

TEST
3
STARTED
2:30 p.m.
3:49 p.m.

Randy
Dickenson

RTO DATA SHEET

DATE: 7-27-95

UNIT: Dungannon

| | Time | | | | | | | | |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--|--|--|
| | 5:00 | 5:15 | 5:30 | 5:45 | 6:00 | 6:15 | | | |
| BTUE (On or Off) | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | | | |
| Temp-Comb. Chamber | <u>1562</u> | <u>1545</u> | <u>1562</u> | <u>1568</u> | <u>1547</u> | <u>1541</u> | | | |
| Temp - Inlet | <u>123</u> | <u>124</u> | <u>123</u> | <u>125</u> | <u>123</u> | <u>123</u> | | | |
| Temp - Exhaust | <u>231</u> | <u>231</u> | <u>232</u> | <u>231</u> | <u>228</u> | <u>234</u> | | | |
| Temp - Cham. #1 lower bed | <u>322</u> | <u>317</u> | <u>321</u> | <u>318</u> | <u>317</u> | <u>318</u> | | | |
| Temp - Cham. #2 lower bed | <u>289</u> | <u>294</u> | <u>289</u> | <u>292</u> | <u>294</u> | <u>294</u> | | | |
| Temp - Cham #3 lower bed | <u>292</u> | <u>289</u> | <u>292</u> | <u>292</u> | <u>289</u> | <u>288</u> | | | |
| Temp - Cham #4 lower bed | <u>317</u> | <u>325</u> | <u>319</u> | <u>318</u> | <u>325</u> | <u>327</u> | | | |
| Temp - Cham #5 lower bed | <u>298</u> | <u>300</u> | <u>297</u> | <u>301</u> | <u>300</u> | <u>298</u> | | | |
| Temp - Cham #6 lower bed | <u>323</u> | <u>314</u> | <u>324</u> | <u>318</u> | <u>314</u> | <u>316</u> | | | |
| Temp - Cham #7 lower bed | <u>366</u> | <u>372</u> | <u>367</u> | <u>370</u> | <u>373</u> | <u>374</u> | | | |
| Temp - Cham #8 lower bed | <u>357</u> | <u>355</u> | <u>357</u> | <u>352</u> | <u>355</u> | <u>353</u> | | | |
| RTO Δ P | <u>16</u> | <u>16</u> | <u>17</u> | <u>16</u> | <u>17</u> | <u>17</u> | | | |
| Pressure - Inlet Duct | <u>2.65</u> | <u>2.44</u> | <u>2.66</u> | <u>2.56</u> | <u>2.49</u> | <u>2.43</u> | | | |
| Temp - Burner #1 | <u>1497</u> | <u>1504</u> | <u>1496</u> | <u>1503</u> | <u>1507</u> | <u>1502</u> | | | |
| Temp - Burner #2 | <u>1514</u> | <u>1481</u> | <u>1517</u> | <u>1491</u> | <u>1482</u> | <u>1491</u> | | | |
| Temp - Burner #3 | <u>1512</u> | <u>1474</u> | <u>1527</u> | <u>1496</u> | <u>1474</u> | <u>1480</u> | | | |
| Output - Burner #1 Cont. % | <u>47.2</u> | <u>43.5</u> | <u>46.7</u> | <u>43.5</u> | <u>40.7</u> | <u>43.5</u> | | | |
| Output - Burner #2 Cont. % | <u>34.2</u> | <u>50.6</u> | <u>29.1</u> | <u>41</u> | <u>51.2</u> | <u>41.2</u> | | | |
| Output - Burner #3 Cont. % | <u>10.6</u> | <u>66.4</u> | <u>10</u> | <u>26.3</u> | <u>65.5</u> | <u>53.0</u> | | | |
| Setpoint - Burner #1 Cont. °F | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | | | |
| Setpoint - Burner #2 Cont. °F | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | | | |
| Setpoint - Burner #3 Cont. °F | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | | | |
| Motor Amps - Fan #1 | <u>420</u> | <u>420</u> | <u>420</u> | <u>440</u> | <u>440</u> | <u>440</u> | | | |
| Motor Amps - Fan #2 | <u>400</u> | <u>420</u> | <u>440</u> | <u>420</u> | <u>400</u> | <u>420</u> | | | |
| motor Speed - Fan #1 | <u>85</u> | <u>86</u> | <u>84</u> | <u>85</u> | <u>87</u> | <u>86</u> | | | |
| Motor Speed - Fan #2 | <u>82</u> | <u>83</u> | <u>82</u> | <u>83</u> | <u>83</u> | <u>83</u> | | | |
| CO out from CEM | <u>NA</u> | <u>NA</u> | <u>NA</u> | <u>NA</u> | <u>NA</u> | <u>NA</u> | | | |
| Air flow from CEM | <u>NA</u> | <u>NA</u> | <u>NA</u> | <u>NA</u> | <u>NA</u> | <u>NA</u> | | | |

Randy Dickenson

DRYER DATA SHEETDATE 7-27-95BY Randall S. BeckPLANT: DUNGANWIN

REVOLUTIONS per MINUTE:

(NOTE ANY CHANGES IN SETPOINTS)

FUEL CALIBRATION: LOT 7# SM?

| TIME | OUTLET SET POINT | FEED RATE | DRYER INLET TEMP | DRYER OUTLET TEMP | FUEL COUNT | WET BIN LEVEL | DRY BIN LEVEL | | EVERY HOUR FLAKE MOISTURE | |
|-------|------------------|-----------|------------------|-------------------|------------|---------------|---------------|------|---------------------------|-----|
| | | | | | | | SUR. | CORE | IN | OUT |
| 8:30 | 196 | 85 | 1183 | 195 | 650 | 1/2 | 1/2 | 1/2 | | |
| 8:45 | 194 | 85 | 1184 | 193 | 792 | Full | 1/2 | 1/2 | | |
| 9:00 | 194 | 85 | 1181 | 193 | 903 | 3/4 | 1/2 | 1/2 | 33 | 6.0 |
| 9:15 | 193 | 85 | 1205 | 192 | 1039 | 1/2 | 1/2 | 1/2 | | |
| 9:30 | 194 | 85 | 1170 | 193 | 1154 | 1/4 | 1/2 | 1/2 | | |
| 9:45 | 193 | 85 | 1152 | 192 | 1275 | 1/4 | 1/2 | 1/2 | | |
| 10:00 | 193 | 85 | 1101 | 192 | 1379 | 1/4 | 1/2 | 1/2 | 28 | 6.0 |
| 10:15 | 193 | 85 | 1181 | 192 | 1490 | 1/2 | 1/2 | 1/2 | | |
| 10:30 | 193 | 85 | 1212 | 191 | 1616 | 1/2 | 1/2 | 1/2 | | |
| 10:45 | 193 | 85 | 1147 | 191 | 1728 | 3/4 | 1/2 | 1/4 | | |
| 11:00 | 193 | 85 | 1209 | 190 | 1855 | 3/4 | 1/4 | 1/4 | 33 | 7.0 |
| 11:15 | 193 | 85 | 1209 | 194 | 1970 | 3/4 | 1/2 | 1/4 | | |
| 11:30 | 193 | 85 | 1149 | 194 | 2066 | Full | 1/2 | 1/4 | | |
| 11:45 | 193 | 85 | 1181 | 192 | 2201 | Full | 1/2 | 1/4 | 0 | |
| 12:00 | 193 | 85 | 1182 | 192 | 2320 | 3/4 | 1/2 | 1/4 | 34 | 6.0 |
| 12:15 | 193 | 85 | 1151 | 190 | 2416 | 3/4 | 1/2 | 1/4 | | |
| 12:30 | 193 | 85 | 1244 | 190 | 2543 | 3/4 | 1/2 | 1/4 | | |
| 12:45 | 193 | 85 | 1247 | 192 | 2674 | Full | 1/2 | 1/4 | | |
| 1:00 | 193 | 85 | 1243 | 192 | 2738 | 3/4 | 1/2 | 1/2 | 32 | 8.0 |
| 1:15 | 883 | 85 | 1357 | 190 | 2910 | 3/4 | Full | Full | | |
| 1:30 | 193 | 85 | 1327 | 192 | 3021 | Full | Full | 1/2 | | |
| 1:45 | 193 | 85 | 1290 | 191 | 3177 | 3/4 | Full | Full | | |
| 2:00 | 193 | 85 | 1208 | 194 | 3253 | Full | 1/2 | Full | 30 | 6.0 |
| 2:15 | 193 | 85 | 1260 | 193 | 3397 | 3/4 | 1/2 | Full | | |
| 2:30 | 193 | 85 | 1255 | 192 | 3510 | 3/4 | Full | Full | | |
| 2:45 | 193 | 85 | 1202 | 193 | 3635 | 3/4 | Full | Full | | |
| 3:00 | 193 | 85 | 1278 | 192 | 3821 | 3/4 | Full | Full | 32 | 8.0 |
| 3:15 | 193 | 85 | 1259 | 193 | 3930 | 3/4 | Full | Full | | |
| 3:30 | 193 | 85 | 1212 | 193 | 4032 | 3/4 | Full | Full | | |
| 3:45 | 193 | 85 | 1264 | 190 | 4141 | 1/4 | Full | Full | | |

SCRUBBER DATA SHEET - B

DATE 7-27-95

| TIME | WATER LEVEL SIGHT GLASS | SCRUBBER " OF WATER | " OF WATER LOWER X CHEVRON | " OF WATER UPPER X CHEVRON | MAKE UP WATER X ADDED | INLET TEMP TO SCRUBBER |
|-------|-------------------------|---------------------|----------------------------|----------------------------|-----------------------|------------------------|
| 8:30 | full | 28 | | | | 174 |
| 9:30 | full | 28 | | | | 173 |
| 10:30 | full | 29 | | | | 173 |
| 11:30 | full | 29 | | | | 174 |
| 12:30 | full | 30 | | | | 172 |
| 1:30 | full | 30 | | | | 176 |
| 2:30 | full | 30 | | | | 174 |
| 3:30 | FULL | 30 | | | | 174 |
| 4:30 | FULL | 30 | | | | 174 |
| 5:30 | FULL | 30 | | | | 170 |
| 6:30 | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

SIGNATURE _____

10.68

12.43

LOUISIANA-PACIFIC CORPORATION
DUNGANNON, VIRGINIA

SHIFT OPERATING REPORT

SUPERVISOR JEFF MANN SHIFT 2AM 7AM CREW C DATE 7-22-95

PRESS OPERATION

| FROM | TO | LINE SPEED | THICKNESS | PRESS LOADS | 3/8" FOOTAGE | MINS. DOWNTIME | | |
|-------|-----|------------|-----------|-------------|--------------|----------------|----|---|
| | | | | | | M | E | O |
| 7AM | 7PM | 37.75 | 7/16 | 171 | 204,294 | | | |
| | | | | | | | | |
| | | | | | | | | |
| TOTAL | | | | 171 | 204,294 | 72 | 67 | — |

17,192 / hr

NONUS OPERATION

| | |
|------------|------------|
| HOURS FUEL | HOURS FUEL |
| USAGE WOOD | USAGE OIL |
| 12 | 0 |

| | |
|--------------------|----|
| NO. OF 'A' BUNDLES | 83 |
| NO. OF 'U' BUNDLES | 1 |
| NO. OF 'E' BUNDLES | |

~ 39# density

DRYER OPERATION

10.5 tpp/hr

| DRY FUEL IN COUNTS | OIL FUEL USAGE HRS | AVERAGE INLET | AVERAGE OUTLET | RUNNING TIME (MIN) | DOWNTIME (MINUTES) | AVG. WET MOISTURE | AVG. DRY MOISTURE |
|--------------------|--------------------|---------------|----------------|--------------------|--------------------|-------------------|-------------------|
| 5580 | 0 | 1207 | 192 | 713 | 7 | 31 | 6.3 |

BARK MOISTURE % (AVG.) 41

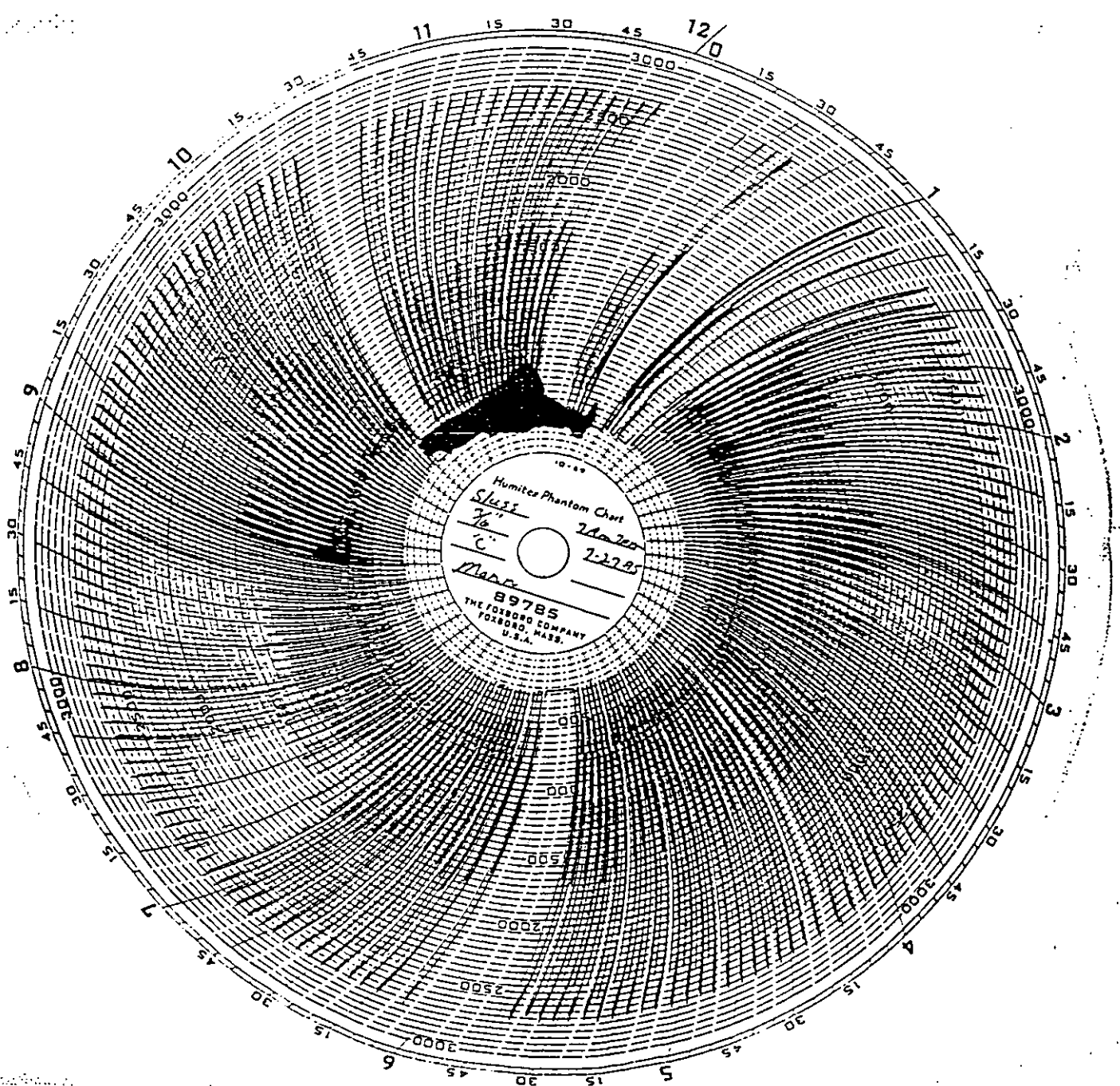
FUEL MOISTURE 3.0

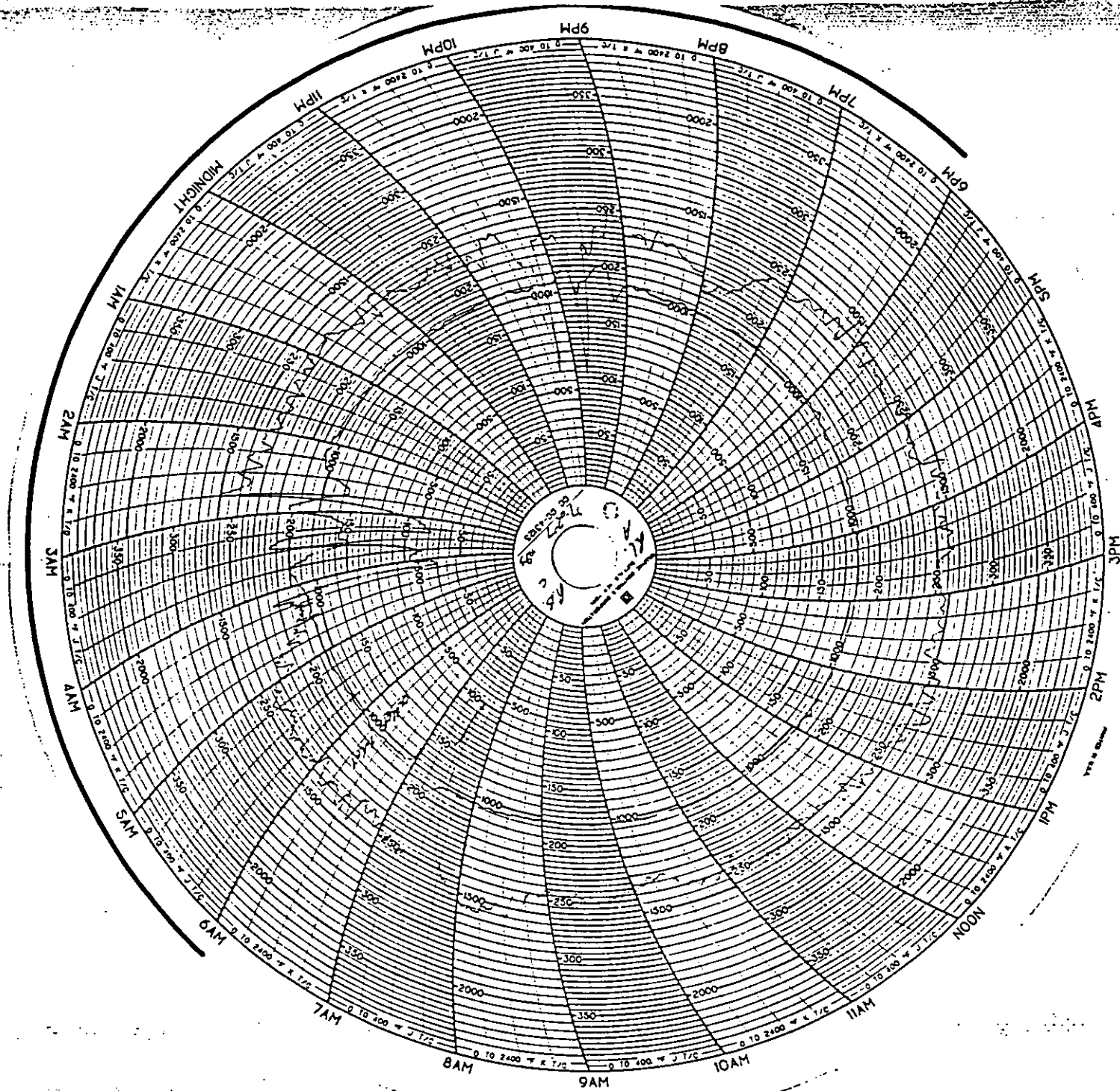
SCRUBBER WATER METER READING

BEGINNING OF SHIFT 428,000

END OF SHIFT 428,000

TOTAL GALLONS USED THIS SHIFT 0





RTO DATA SHEET

DATE: 07-27-95

UNIT: Dungannon

| | Time | | | | | | | | |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| | 1:00 | 1:15 | 1:30 | 1:45 | 2:00 | 2:15 | 2:30 | 2:45 | 3:00 |
| BTUE (On or Off) | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> | <u>OFF</u> |
| Temp - Comb. Chamber | <u>1584</u> | <u>1551</u> | <u>1592</u> | --- | --- | --- | --- | --- | --- |
| Temp - Inlet | <u>120</u> | <u>121</u> | <u>121</u> | --- | --- | --- | --- | --- | --- |
| Temp - Exhaust | <u>731</u> | <u>232</u> | <u>231</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham. #1 lower bed | <u>316</u> | <u>319</u> | <u>319</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham. #2 lower bed | <u>292</u> | <u>294</u> | <u>295</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham #3 lower bed | <u>299</u> | <u>296</u> | <u>295</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham #4 lower bed | <u>311</u> | <u>317</u> | <u>321</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham #5 lower bed | <u>291</u> | <u>290</u> | <u>291</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham #6 lower bed | <u>316</u> | <u>319</u> | <u>318</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham #7 lower bed | <u>360</u> | <u>364</u> | <u>368</u> | --- | --- | --- | --- | --- | --- |
| Temp - Cham #8 lower bed | <u>349</u> | <u>344</u> | <u>345</u> | --- | --- | --- | --- | --- | --- |
| RTO Δ P | <u>19</u> | <u>17</u> | <u>16</u> | --- | --- | --- | --- | --- | --- |
| Pressure - Inlet Duct | <u>2.41</u> | <u>2.43</u> | <u>2.40</u> | --- | --- | --- | --- | --- | --- |
| Temp - Burner #1 | <u>1496</u> | <u>1495</u> | <u>1498</u> | --- | --- | --- | --- | --- | --- |
| Temp - Burner #2 | <u>1505</u> | <u>1516</u> | <u>1518</u> | --- | --- | --- | --- | --- | --- |
| Temp - Burner #3 | <u>1520</u> | <u>1520</u> | <u>1512</u> | --- | --- | --- | --- | --- | --- |
| Output - Burner #1 Cont. % | <u>42.2</u> | <u>50.2</u> | <u>45.3</u> | --- | --- | --- | --- | --- | --- |
| Output - Burner #2 Cont. % | <u>32.9</u> | <u>37.7</u> | <u>21.3</u> | --- | --- | --- | --- | --- | --- |
| Output - Burner #3 Cont. % | <u>100</u> | <u>100</u> | <u>100</u> | --- | --- | --- | --- | --- | --- |
| Setpoint - Burner #1 Cont. °F | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | --- | --- | --- | --- |
| Setpoint - Burner #2 Cont. °F | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | --- | --- | --- |
| Setpoint - Burner #3 Cont. °F | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | <u>1500</u> | --- | --- | --- |
| Motor Amps - Fan #1 | <u>420</u> | <u>420</u> | <u>400</u> | --- | --- | --- | --- | --- | --- |
| Motor Amps - Fan #2 | <u>420</u> | <u>470</u> | <u>400</u> | --- | --- | --- | --- | --- | --- |
| motor Speed - Fan #1 | <u>87</u> | <u>95</u> | <u>95</u> | --- | --- | --- | --- | --- | --- |
| Motor Speed - Fan #2 | <u>91</u> | <u>91</u> | <u>91</u> | --- | --- | --- | --- | --- | --- |
| CO out from CEM | <u>N/A</u> | <u>N/A</u> | <u>N/A</u> | <u>N/A</u> | <u>N/A</u> | --- | --- | --- | --- |
| Air flow from CEM | <u>N/A</u> | <u>N/A</u> | <u>N/A</u> | <u>N/A</u> | <u>N/A</u> | --- | --- | --- | --- |

DRYER DATA SHEET

DATE: 7-27-95

SHIFT: 7am 7pm

CREW: e

NAME: RANDY BECK

OPACITY DRYER CHARTS: _____ CHECK AND INITIAL EVERY 30 MINUTES
 BURNER OUTLET SET POINT: _____ READING EVERY 30 MINUTES
 OUTLET TEMP SET POINT: _____ MOISTURE % EVERY HOUR
 REVOLUTIONS PER MINUTE: _____ BIN LEVEL EVERY HOUR
 FUEL CALABRATION: _____ NOTE ANY CHANGES IN SETPOINTS

| TIME | FEED | DRYER | DRYER OUT | FLAKE | MOUISTURE | DRY BIN | OPACITY | DRYER CHART |
|-------|------|------------|-----------|-------|-----------|-----------|----------|-------------|
| | RATE | DULET TEMP | LET TEMP | IN | OUT | LEVEL | MONITOR | CIRCULAR |
| 7:30 | 84 | 1308 | 198 | | 6.0 | 1/4 1/4 | R.B. O.K | O.K |
| 8:00 | 87 | 1311 | 196 | 32 | 7.0 | 1/4 1/2 | R.B. O.K | O.K |
| 8:30 | 85 | 1181 | 196 | | 6.0 | 1/2 1/2 | R.B. O.K | O.K |
| 9:00 | 85 | 1175 | 193 | 33 | 6.0 | 1/2 1/2 | R.B. O.K | O.K |
| 9:30 | 85 | 1169 | 193 | | 6.0 | 1/2 1/2 | R.B. O.K | O.K |
| 10:00 | 85 | 1101 | 192 | 28 | 6.0 | 1/2 1/2 | R.B. O.K | O.K |
| 10:30 | 85 | 1212 | 191 | | 7.0 | 1/2 1/2 | R.B. O.K | O.K |
| 11:00 | 85 | 1269 | 190 | 33 | 7.0 | 1/4 1/4 | R.B. O.K | O.K |
| 11:30 | 85 | 1149 | 194 | | 6.0 | 1/4 1/2 | R.B. O.K | O.K |
| 12:00 | 85 | 1182 | 192 | 34 | 8.0 | 1/4 1/2 | R.B. O.K | O.K |
| 12:30 | 85 | 1244 | 190 | | 6.0 | 1/4 1/2 | R.B. O.K | O.K |
| 1:00 | 85 | 1234 | 192 | 32 | 8.0 | 1/2 1/2 | R.B. O.K | O.K |
| 1:30 | 85 | 1327 | 192 | | 6.0 | Full 1/2 | R.B. O.K | O.K |
| 2:00 | 85 | 1208 | 194 | 30 | 6.0 | 1/2 Full | R.B. O.K | O.K |
| 2:30 | 85 | 1255 | 192 | | 8.0 | Full Full | R.B. O.K | O.K |
| 3:00 | 85 | 1218 | 192 | 32 | 8.0 | Full Full | R.B. O.K | O.K |
| 3:30 | 85 | 1212 | 193 | | 6.0 | Full Full | R.B. O.K | O.K |
| 4:00 | 85 | 1290 | 192 | 32 | 6.0 | Full Full | R.B. O.K | O.K |
| 4:30 | 85 | 1190 | 192 | | 6.0 | Full Full | R.B. O.K | O.K |
| 5:00 | 85 | 1157 | 192 | 30 | 6.0 | 1/2 1/2 | R.B. O.K | O.K |
| 5:30 | 85 | 1228 | 189 | | 6.0 | 1/2 1/2 | R.B. O.K | O.K |
| 6:00 | 80 | 1179 | 193 | 30 | 6.0 | Full Full | R.B. O.K | O.K |
| 6:30 | 82 | 1118 | 192 | | 6.0 | Full Full | R.B. O.K | O.K |
| 7:00 | 82 | 1131 | 192 | | | | | |

APPENDIX O
FIELD EQUIPMENT CALIBRATION DATA

METER CONSOLE CALIBRATION FORM

Print Date 05/23/95

Contract No. RECO
Job I.D.

Meter Box No.: B
Delta H: 1.7393
Gamma: 1.0166

QA/QC Check: *Sydney Section 5/25/95*
Previous Calibration Date: 12/29/94
Previous Gamma: 1.0054

Analyst: *[Signature]*
Calibration Date: 05/22/95
Test Meter No. 9548
Barometric Pressure 28.97

| Run | Orf Set | Initial Test | Final Test | Volume Test | Init Temp | Finl Temp | Test Temp | Initial Box | Final Box | Volume Box | I-I Temp | I-O Temp | F-I Temp | F-O Temp | Temp | Time | Delta H | Gamma |
|-----|---------|--------------|------------|-------------|-----------|-----------|-----------|-------------|-----------|------------|----------|----------|----------|----------|-------|------|---------|---------|
| 1 | 0.5 | 845.339 | 858.146 | 12.807 | 72.0 | 73.0 | 72.50 | 738.079 | 750.668 | 12.589 | 75.0 | 73.0 | 79.0 | 76.0 | 75.75 | 30.0 | 1.58893 | 1.02223 |
| 2 | 1.0 | 858.458 | 870.278 | 11.820 | 73.0 | 73.0 | 73.00 | 750.972 | 762.647 | 11.675 | 79.0 | 76.0 | 78.0 | 83.0 | 79.00 | 20.0 | 1.65121 | 1.02122 |
| 3 | 1.5 | 870.816 | 885.086 | 14.270 | 73.0 | 74.0 | 73.50 | 763.182 | 777.321 | 14.139 | 75.0 | 75.0 | 83.0 | 78.0 | 77.75 | 22.0 | 2.06485 | 1.01345 |
| 4 | 2.0 | 885.316 | 895.901 | 10.585 | 74.0 | 75.0 | 74.50 | 777.541 | 788.090 | 10.549 | 80.0 | 77.0 | 79.0 | 81.0 | 79.25 | 13.0 | 1.74884 | 1.00722 |
| 5 | 2.5 | 896.067 | 906.673 | 10.606 | 74.0 | 74.0 | 74.00 | 788.267 | 798.861 | 10.594 | 82.0 | 79.0 | 78.0 | 86.0 | 81.25 | 11.5 | 1.69445 | 1.00833 |
| 6 | 3.0 | 906.865 | 918.492 | 11.627 | 74.0 | 75.0 | 74.50 | 799.071 | 810.501 | 11.430 | 85.0 | 80.0 | 81.0 | 89.0 | 83.75 | 11.5 | 1.68729 | 1.02702 |

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 0 REFERENCE CALIBRATOR HM71 CAL-K
THERMOCOUPLE NUMBER 1 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 28 | 0.408 |
| 3 | 100 | 98 | 0.357 |
| 4 | 200 | 200 | 0.000 |
| 5 | 301 | 301 | 0.000 |
| 6 | 400 | 400 | 0.000 |
| 7 | 501 | 499 | 0.208 |
| 8 | 601 | 600 | 0.094 |
| 9 | 701 | 699 | 0.172 |
| 10 | 800 | 797 | 0.238 |
| 11 | 900 | 898 | 0.147 |

0.148 AVERAGE DIFF

Calibration Performed By R. Roberson

Post Test Calibration-Contract #- _____

Pre-Test Calibration-Contract #- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

meter Box No..... 8 REFERENCE CALIBRATOR MH71 CAL-K
THERMOCOUPLE NUMBER 2 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|---|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 28 | 0.400 |
| 3 | 101 | 98 | 0.535 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 399 | 0.116 |
| 7 | 500 | 500 | 0.000 |
| 8 | 600 | 597 | 0.283 |
| 9 | 700 | 699 | 0.286 |

| | | | |
|----|-----|-----|-------|
| 10 | 800 | 798 | 0.159 |
| 11 | 900 | 898 | 0.147 |

0.158 AVERAGE DIFF

Calibration Performed By R. Roberson

Post Test Calibration-Contract #1- _____

Pre-Test Calibration-Contract #2- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 8 REFERENCE CALIBRATOR H471 CAL-K
THERMOCOUPLE NUMBER 3 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|---|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 29 | 0.284 |
| 3 | 100 | 97 | 0.536 |
| 4 | 200 | 199 | 0.152 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 398 | 0.233 |
| 7 | 500 | 498 | 0.208 |
| 8 | 600 | 597 | 0.283 |
| 9 | 700 | 698 | 0.172 |

| | | | |
|----|-----|-----|-------|
| 10 | 800 | 798 | 0.159 |
| 11 | 901 | 899 | 0.147 |

0.190 AVERAGE DIFF

Calibration Performed By R. Roberson

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No. 8 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 4 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 29 | 0.204 |
| 3 | 100 | 97 | 0.536 |
| 4 | 200 | 199 | 0.152 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 398 | 0.233 |
| 7 | 500 | 498 | 0.208 |
| 8 | 600 | 599 | 0.094 |
| 9 | 701 | 700 | 0.086 |
| 10 | 800 | 799 | 0.079 |
| 11 | 900 | 898 | 0.147 |

0.158 AVERAGE DIFF

Calibration Performed By R. Roberson

Post Test Calibration-Contract #1- _____

Pre-Test Calibration-Contract #2- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No. 8 REFERENCE CALIBRATOR HH71 CAL-K
 THERMOCOUPLE NUMBER 5 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|---|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 29 | 0.204 |
| 3 | 100 | 98 | 0.357 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 398 | 0.233 |
| 7 | 500 | 498 | 0.208 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 698 | 0.172 |

| | | | |
|----|-----|-----|-------|
| 10 | 800 | 798 | 0.159 |
| 11 | 900 | 898 | 0.147 |

0.135 AVERAGE DIFF

Calibration Performed By R. Roberson

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 8 REFERENCE CALIBRATOR HM71 CAL-K
 THERMOCOUPLE NUMBER 6 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|---|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 28 | 0.408 |
| 3 | 100 | 98 | 0.357 |
| 4 | 199 | 198 | 0.152 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 399 | 0.116 |
| 7 | 500 | 497 | 0.313 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 699 | 0.086 |

| | | | |
|----|-----|-----|-------|
| 10 | 800 | 798 | 0.159 |
| 11 | 900 | 898 | 0.147 |

0.153 AVERAGE DIFF

Calibration Performed By R. Roberson

Past Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 8 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 7 Date 10-Nov-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|---|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 30 | 29 | 0.204 |
| 3 | 100 | 98 | 0.357 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 398 | 0.233 |
| 7 | 500 | 498 | 0.208 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 698 | 0.172 |

| | | | |
|----|-----|-----|-------|
| 10 | 800 | 798 | 0.159 |
| 11 | 900 | 898 | 0.147 |

0.135 AVERAGE DIFF

Calibration Performed By R. Roberson

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

E T S , I N C .

METER CONSOLE CALIBRATION FORM

Print Date 03/17/95

Contract No. 95-400
Job I.D.

Meter Box No.: 11
Delta H: 1.8475
Gamma: 0.9928

Analyst: *[Signature]*
Calibration Date: 03/17/95
Test Meter No. 9548
Barometric Pressure 28.83

QA/QC Check: *[Signature]* 3/22/95
Previous Calibration Date: 12/19/94
Previous Gamma: 0.9907

| Run | Orf Set | Initial Test | Final Test | Volume Test | Init Temp | Finl Temp | Test Temp | Initial Box | Final Box | Volume Box | I-I Temp | I-O Temp | F-I Temp | F-O Temp | Temp | Time | Delta H | Gamma |
|-----|---------|--------------|------------|-------------|-----------|-----------|-----------|-------------|-----------|------------|----------|----------|----------|----------|-------|------|---------|---------|
| 1 | 0.5 | 521.495 | 531.931 | 10.436 | 75.0 | 74.0 | 74.50 | 270.470 | 281.008 | 10.538 | 74.0 | 75.0 | 78.0 | 76.0 | 75.75 | 26.5 | 1.70131 | 0.99150 |
| 2 | 1.0 | 532.162 | 542.855 | 10.693 | 74.0 | 74.0 | 74.00 | 281.250 | 292.097 | 10.847 | 76.0 | 79.0 | 84.0 | 78.0 | 79.25 | 19.0 | 1.83576 | 0.99296 |
| 3 | 1.5 | 543.046 | 556.281 | 13.235 | 75.0 | 75.0 | 75.00 | 292.268 | 305.715 | 13.447 | 78.0 | 83.0 | 86.0 | 80.0 | 81.75 | 19.5 | 1.89163 | 0.99285 |
| 4 | 2.0 | 556.390 | 566.660 | 10.270 | 77.0 | 75.0 | 76.00 | 305.822 | 316.249 | 10.427 | 86.0 | 80.0 | 81.0 | 88.0 | 83.75 | 13.0 | 1.86175 | 0.99411 |
| 5 | 2.5 | 566.813 | 576.831 | 10.018 | 75.0 | 77.0 | 76.00 | 316.392 | 326.686 | 10.294 | 90.0 | 89.0 | 82.0 | 90.0 | 87.75 | 11.5 | 1.89992 | 0.98822 |
| 6 | 3.0 | 577.029 | 588.015 | 10.986 | 75.0 | 75.0 | 75.00 | 326.764 | 337.923 | 11.159 | 88.0 | 81.0 | 82.0 | 93.0 | 86.00 | 11.5 | 1.89462 | 0.99711 |

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 11 REFERENCE CALIBRATOR HM71 CAL-K
THERMOCOUPLE NUMBER 1 Date 17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 32 | 32 | 0.000 |
| 3 | 100 | 101 | -0.179 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 400 | 0.000 |
| 7 | 500 | 500 | 0.000 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 700 | 0.000 |
| 10 | 800 | 801 | -0.079 |
| 11 | 901 | 901 | 0.000 |

-0.023 AVERAGE DIFF

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

E. T. S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 11 REFERENCE CALIBRATOR HH71 CAL-K
 THERMOCOUPLE NUMBER 2 Date 17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 75 | 75 | 0.000 |
| 3 | 100 | 100 | 0.000 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 299 | 0.132 |
| 6 | 400 | 400 | 0.000 |
| 7 | 500 | 499 | 0.104 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 699 | 0.006 |
| 10 | 800 | 800 | 0.000 |
| 11 | 901 | 900 | 0.073 |

0.036 AVERAGE DIFF

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No.....
THERMOCOUPLE NUMBER

11 REFERENCE CALIBRATOR
3 Date

HH71 CAL-K
17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|-----------------------|--------------------------|--------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 75 | 75 | 0.000 |
| 3 | 100 | 100 | 0.000 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 400 | 0.000 |
| 7 | 500 | 499 | 0.104 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 699 | 0.086 |
| 10 | 800 | 800 | 0.000 |
| 11 | 901 | 900 | 0.073 |

0.024 AVERAGE DIFF

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

meter Box No..... 11 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 4 Date 17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % | |
|----|--------------------------|-----------------------------|-----------------|--------------|
| 1 | 0 | 0 | 0.000 | |
| 2 | 32 | 32 | 0.000 | |
| 3 | 100 | 100 | 0.000 | |
| 4 | 200 | 200 | 0.000 | |
| 5 | 300 | 300 | 0.000 | |
| 6 | 400 | 400 | 0.000 | |
| 7 | 500 | 500 | 0.000 | |
| 8 | 600 | 600 | 0.000 | |
| 9 | 700 | 700 | 0.000 | |
| 10 | 800 | 800 | 0.000 | |
| 11 | 901 | 901 | 0.000 | |
| | | | 0.000 | AVERAGE DIFF |

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 11 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 5 Date 17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 32 | 32 | 0.000 |
| 3 | 100 | 100 | 0.000 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 400 | 0.000 |
| 7 | 500 | 500 | 0.000 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 700 | 0.000 |
| 10 | 800 | 800 | 0.000 |
| 11 | 901 | 901 | 0.000 |

0.000 AVERAGE DIFF

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #\- _____

Pre-Test Calibration-Contract #- _____

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 11 REFERENCE CALIBRATOR H471 CAL-K
THERMOCOUPLE NUMBER 6 Date 17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % |
|----|--------------------------|-----------------------------|-----------------|
| 1 | 0 | 0 | 0.000 |
| 2 | 32 | 32 | 0.000 |
| 3 | 100 | 100 | 0.000 |
| 4 | 200 | 200 | 0.000 |
| 5 | 300 | 300 | 0.000 |
| 6 | 400 | 400 | 0.000 |
| 7 | 500 | 500 | 0.000 |
| 8 | 600 | 600 | 0.000 |
| 9 | 700 | 700 | 0.000 |
| 10 | 800 | 800 | 0.000 |
| 11 | 901 | 901 | 0.000 |

0.000 AVERAGE DIFF

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #- _____

Pre-Test Calibration-Contract #- _____

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No. 11 REFERENCE CALIBRATOR HH71 CAL-K
 THERMOCOUPLE NUMBER 7 Date 17-Sep-94

| | Reference Temperature | Thermocouple Temperature | Difference % | |
|----|--------------------------|-----------------------------|-----------------|--------------|
| 1 | 0 | 0 | 0.000 | |
| 2 | 32 | 32 | 0.000 | |
| 3 | 100 | 100 | 0.000 | |
| 4 | 200 | 200 | 0.000 | |
| 5 | 300 | 300 | 0.000 | |
| 6 | 400 | 400 | 0.000 | |
| 7 | 500 | 500 | 0.000 | |
| 8 | 600 | 600 | 0.000 | |
| 9 | 700 | 700 | 0.000 | |
| 10 | 800 | 800 | 0.000 | |
| 11 | 901 | 901 | 0.000 | |
| | | | 0.000 | AVERAGE DIFF |

Calibration Performed By Mick Berkhead

Post Test Calibration-Contract #- _____

Pre-Test Calibration-Contract #- _____

Comments:



PITOT TUBE CALIBRATION WORKSHEET

Pitot Tube I.D.: 129 Pitot Tube Type: S
 Standard Pitot I.D.: _____ $C_p(\text{std})$: .99
 Calibration Technician: Jeff Marden Date: 5/9/95

Side "A" Calibration

| $\frac{12}{1000}$ (in. W.C.) | $\frac{12}{1000}$ (in. W.C.) | $C_{p(A)}$ | Deviation |
|---------------------------------|---------------------------------|------------|-----------|
| .43 | .62 | .824 | .006 |
| .42 | .63 | .815 | .005 |
| .42 | .61 | .821 | .001 |
| | | | |
| | | | |
| Average | | .820 | |

Side "B" Calibration

| $\frac{12}{1000}$ (in. W.C.) | $\frac{12}{1000}$ (in. W.C.) | $C_{p(B)}$ | Deviation |
|---------------------------------|---------------------------------|------------|-----------|
| .43 | .62 | .824 | .001 |
| .44 | .63 | .827 | .002 |
| .43 | .62 | .824 | .001 |
| | | | |
| | | | |
| Average | | .825 | |

$$C_{p(A)} = C_{p(\text{std})} \times \sqrt{\frac{12}{1000}} \frac{1}{2}$$

$$\text{Deviation} = C_{p(A)} - \text{Average } C_{p(A)} \leq 0.01$$

$$\text{avg. } C_{p(A)} - \text{avg. } C_{p(B)} \leq 0.01$$

$$C_p = \boxed{.823}$$

EPA METHOD 20
INTERFERENCE RESPONSE TABLE

Date: 04/15/93
Analyzer Type: Oxygen
Serial Number: 111917
Span Value: 25 %

| Test Gas Type | Concentration (ppmdv) | Analyzer Output | % of Span |
|---------------|-----------------------|-----------------|-----------|
| CO | 488 | 0.009 | 0.0004 |
| CO2 | 9.98 | 0.015 | 0.0006 |
| SO2 | 231 | -0.022 | 0.0009 |
| NOx | 232 | -0.014 | 0.0006 |
| Total | | | 0.0024 |

% of Span = (Analyzer output response / Instrument span) x 100
The sum of the (% of Span) values should not exceed 2%.

METHOD 20
INTERFERENCE RESPONSE TABLE

DATE: 10/11/94

ANALYZER TYPE: CO₂ #1

SERIAL NUMBER: N3K43197

| TEST GAS TYPE | CONCENTRATION (ppmvd) | ANALYZER OUTPUT | % OF SPAN |
|-----------------|--------------------------|--------------------|-----------|
| SO ₂ | 250.4 | 0.00 | 0.00 |
| NO _x | 223 | 0.01 | 0.05 |
| CO | 594 | 0.00 | 0.00 |
| O ₂ | 22.0% | 0.03 | 0.15 |
| TOTAL | | | 0.20 |

----- % OF SPAN = (ANALYZER OUTPUT RESPONSE / INSTRUMENT SPAN) X 100 -----

The sum of the (% of Span) values should not exceed 2%.

METHOD 20
INTERFERENCE RESPONSE TABLE

DATE: 10/6/94

ANALYZER TYPE: CO #2

SERIAL NUMBER: 78-28883-233

| TEST GAS TYPE | CONCENTRATION (ppmvd) | ANALYZER OUTPUT | % OF SPAN |
|-----------------|--------------------------|--------------------|-----------|
| O ₂ | 21.7 | -0.6 | -0.067 |
| No _x | 223 | 0.0 | 0.000 |
| CO ₂ | 17.04 | 0.00 | 0.000 |
| SO ₂ | 224 | 0.0 | 0.000 |
| TOTAL | | -0.600 | -0.067 |

12:25

12:30

12:35

12:38

..... % OF SPAN = (ANALYZER OUTPUT RESPONSE / INSTRUMENT SPAN) X 100

The sum of the (% of Span) values should not exceed 2%.

ANALYZER ID: CO ^{serial to} 48 2883-233

UNITS: ppm SPAN: 900

SOURCE ID: Interference Check

LOCATION: ETS

TECHNICIAN: C.S.

DATE(S): 10 / 06 / 24

| ANALYZER CALIBRATION | | | | | |
|----------------------|-----------------|---------------------|-------------------|--------------|-------|
| RANGE | GAS CYLINDER ID | GAS VALUE | ANALYZER RESPONSE | ERROR & SPAN | TIME |
| ZERO | AV-24336 | 0 (N ₂) | 0.0 | 0 | 11:20 |
| LOW | ALM-10803 | 28F | 300 | 0.22 | 11:25 |
| HIGH | ALM-14221 | 304 | 507 | 0.33 | 11:28 |
| OTHER | SA 10123 | 897 | 900 | 0.33 | 11:23 |

| SYSTEM BIAS AND DRIFT | | | SYSTEM BIAS | | | SYSTEM DRIFT | | | |
|-----------------------|---------|-------------------|----------------|--------------|------|-----------------|----------------|--------------|------|
| RUN ID | RANGE | ANALYZER RESPONSE | ABSOLUTE ERROR | ERROR & SPAN | TIME | SYSTEM RESPONSE | ABSOLUTE ERROR | ERROR & SPAN | TIME |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |
| | ZERO | | | | | | | | |
| | UPSCALE | | | | | | | | |

METHOD 20
INTERFERENCE RESPONSE TABLE

DATE: 10/6/94

ANALYZER TYPE: NO_x #1

SERIAL NUMBER: 10 A/R 242-62-214

| TEST GAS TYPE | CONCENTRATION (ppmdv) | ANALYZER OUTPUT | % OF SPAN |
|-----------------|--------------------------|--------------------|-----------|
| O ₃ | 21.7 | 0.015 | 0.003 |
| CO | 442 504 | 0.02 | 0.004 |
| CO ₂ | 17.04 | 0.003 | 0.001 |
| SO ₂ | 224 | 0.017 | 0.002 |
| TOTAL | | 0.049 | 0.010 |

12:28
12:32
12:35
12:38

..... % OF SPAN = (ANALYZER OUTPUT RESPONSE/INSTRUMENT SPAN) X 100

The sum of the (% of Span) values should not exceed 2%.

ANALYZER ID: NOX 10 A/R 242-62-211
 UNITS: PPM SPAN: 500
 SOURCE ID: Indexence check
 LOCATION: ETS
 TECHNICIAN: CS.
 DATE(S): 10 / 6 / 94

ANALYZER CALIBRATION

| RANGE | GAS CYLINDER ID | GAS VALUE | ANALYZER RESPONSE | ERROR % SPAN | TIME |
|-------|----------------------------|----------------|-------------------|--------------|-------|
| ZERO | AX-24376 | N ₂ | 0 | 0 | 12:20 |
| LOW | 3203 ^{ALA} 009551 | 223 | 227 | 0 | 12:25 |
| HIGH | 3405 ALA-022136 | 451 | 451 | 0 | 12:27 |
| OTHER | | | | | |

| SYSTEM BIAS AND DRIFT | | | SYSTEM BIAS | | | SYSTEM DRIFT | | | | |
|-----------------------|---------|-------------------|-----------------|----------------|--------------|--------------|-----------------|----------------|--------------|------|
| RUN ID | RANGE | ANALYZER RESPONSE | SYSTEM RESPONSE | ABSOLUTE ERROR | ERROR % SPAN | TIME | SYSTEM RESPONSE | ABSOLUTE ERROR | ERROR % SPAN | TIME |
| | ZERO | 1 | | | | | | | | |
| | UPSCALE | | | | | | | | | |
| | ZERO | | | | | | | | | |
| | UPSCALE | | | | | | | | | |
| | ZERO | | | | | | | | | |
| | UPSCALE | | | | | | | | | |
| | ZERO | | | | | | | | | |
| | UPSCALE | | | | | | | | | |
| | ZERO | | | | | | | | | |
| | UPSCALE | | | | | | | | | |
| | ZERO | | | | | | | | | |
| | UPSCALE | | | | | | | | | |
| | ZERO | | | | | | | | | |
| | UPSCALE | | | | | | | | | |

ETS, Inc

NO_x ANALYZER CONVERTER CHECK

TEST INFORMATION

Analyzer Manufacturer:

Model No.:

Serial No:

Span Setting (ppm):

NO Gas Value:

NO₂ Gas Value:

Date:

Technician:

| |
|-----------------------------|
| Thermo Enviro Instr. |
| 10 AR |
| 246288 24267-214 |
| 250 |
| 288 |
| 288 |
| 5-3-95 |
| B. Hayes |

ANALYZER RESPONSE

Prepared Sample

| time (min) | response (ppm) | time (min) | response (ppm) |
|---------------|-------------------|---------------|-------------------|
| 1 | 288 | 16 | 286 |
| 2 | 288 | 17 | 287 |
| 3 | 288 | 18 | 286 |
| 4 | 288 | 19 | 285 |
| 5 | 287 | 20 | 285 |
| 6 | 287 | 21 | 284 |
| 7 | 288 | 22 | 286 |
| 8 | 287 | 23 | 285 |
| 9 | 287 | 24 | 284 |
| 10 | 287 | 25 | 284 |
| 11 | 286 | 26 | 284 |
| 12 | 287 | 27 | 284 |
| 13 | 286 | 28 | 284 |
| 14 | 286 | 29 | 284 |
| 15 | 286 | 30 | 284 |

| |
|------------------------------|
| Highest Response (ppm) |
| 288 |

| |
|----------------------------|
| Final Response (ppm) |
| 284 |

| |
|------------------|
| Reduction (%) |
| 99.3 |

NO₂ Gas

NO₂ Gas (ppm):

Stable Response (ppm):

Conversion Eff. (%):

| |
|------|
| 288 |
| 284 |
| 99.3 |

288

(6000)

CITARD INC. ZM1-01-12-15M

PAINTING

Nox Converter
10/12
34762-211
4006-314

CPUS with LO
SUPPRESSOR LO
CAL 127 @ -152
2220 @ -093
RT TEMP -65°C
RT VAC 29" Hg
Sample Flow
1.5 SCFH
Chart Speed
0.5 cm/min

START
288

EFFICIENCY
99.2
12.3

3/11/95
V.C. HARRIS

Nox

NO



Scott Specialty Gases

4026

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0803

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ETS, INC.
Attn: Bill Hayes
1401 Municipal Road NW
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5502
Scott Project # 12-11635

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

| | | | | | |
|-------------------|------------|------------------------|----------|-----------------|----------|
| Cylinder Number | ALM-004542 | Certification Date | 05-12-95 | Expiration Date | 05-12-98 |
| Cylinder Pressure | 2000 PSIG | Previous Certification | None | | |

ANALYZED CYLINDER

| Components | Certified Concentration | Analytical Uncertainty* |
|----------------|-------------------------|--------------------------------|
| Oxygen | 9.86 % | +/- 1% NIST Directly Traceable |
| Carbon Dioxide | 10.09% | +/- 1% NIST Directly Traceable |
| Nitrogen | | Balance |

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

| Type | Expiration Date | Cylinder Number | Concentration |
|-------------|-----------------|-----------------|--------------------------|
| NTRM # 2658 | 11-96 | ALM-031888 | 9.68 % O2 Balance in N2 |
| NTRM # 1675 | 09-95 | ALM-032766 | 14.01% CO2 Balance in N2 |

INSTRUMENTATION

| | | |
|---|----------------------------------|--|
| Instrument/Model/Serial # Varian /3400/16804 | Last Date Calibrated 04-19-95 | Analytical Principle Gas Chromatography |
|---|----------------------------------|--|

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|----------------|--|--|-------------------|
| Oxygen | Date: 05-12-95 Response Units: Area STD-255529 SPL-260232 SPL-260634 STD-255437 STD-255811 SPL-260168 | Date: Response Units: STD- SPL- SPL- STD- STD- SPL- | Date: 04-19-95 |
| Carbon Dioxide | Date: 05-12-95 Response Units: Area STD-263333 SPL-189632 SPL-189635 STD-262461 STD-263124 SPL-189630 | Date: Response Units: STD- SPL- SPL- STD- STD- SPL- | Date: 04-19-95 |
| | Date: Response Units: STD- SPL- SPL- STD- STD- SPL- | Date: Response Units: STD- SPL- SPL- STD- STD- SPL- | |

B. Becton
Analyst B. Becton



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ETS, INC.
Attn: Bill Hayes
1401 Municipal Road NW
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5129
Scott Project # 12-08743

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

| | | | | | |
|--------------------------|------------|-------------------------------|----------|------------------------|----------|
| Cylinder Number | ALM-045671 | Certification Date | 10-05-94 | Expiration Date | 10-05-97 |
| Cylinder Pressure | 1915 PSIG | Previous Certification | None | | |

ANALYZED CYLINDER

| <u>Components</u> | <u>Certified Concentration</u> | <u>Analytical Uncertainty*</u> |
|-------------------|--------------------------------|--------------------------------|
| Carbon Dioxide | 17.25 % | +/- 1% NIST Directly Traceable |
| Oxygen | 22.1 % | +/- 1% NIST Traceable |
| Nitrogen | | Balance |

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

| <u>Type</u> | <u>Expiration Date</u> | <u>Cylinder Number</u> | <u>Concentration</u> |
|-------------|------------------------|------------------------|-----------------------------|
| NTRM # 1675 | 09/95 | ALM-032766 | 14.01 % Balance in Nitrogen |
| GMIS | 12/95 | KLM-000274 | 20.98 % Balance in Nitrogen |

INSTRUMENTATION

| <u>Instrument/Model/Serial #</u> | <u>Last Date Calibrated</u> | <u>Analytical Principle</u> |
|----------------------------------|-----------------------------|-----------------------------|
| Varian /3400/0160 | 09-14-94 | Gas Chromatography |
| Varian /3400/16804 | 09-14-94 | Gas Chromatography |

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|----------------|--|--|-------------------|
| Carbon Dioxide | Date: 10-05-94 Response Units: Area STD-576600 SPL-711262 SPL-711331 SPL-709909 STD-577233 STD-577983 | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: 09-14-94 |
| Oxygen | Date: 10-05-94 Response Units: Area STD-777541 SPL-821266 SPL-820924 SPL-819633 STD-777929 STD-777332 | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: 09-14-94 |
| | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | |

A. Barber
Analyst: A. Barber



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

| | | |
|--|--|---|
| Customer ETS, Inc. Attn: Bill Hays 1401 Municipal Road NW Roanoke, VA 24012 | Assay Laboratory Scott Specialty Gases, Inc. 1750 East Club Boulevard Durham, NC 27704 | Purchase Order 5345 Scott Project # 12-10343 |
|--|--|---|

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

| | | |
|------------------------------------|------------------------------------|---------------------------------|
| Cylinder Number AAL-7446 | Certification Date 02-14-95 | Expiration Date 02-14-97 |
| Cylinder Pressure 1841 PSIG | Previous Certification None | |

ANALYZED CYLINDER

| | | |
|-------------------|--------------------------------|--------------------------------|
| Components | Certified Concentration | Analytical Uncertainty* |
| Nitric Oxide | 150.0 PPM | +/- 1% NIST Directly Traceable |
| NOX | 150.0 PPM | Reference Value Only |
| Nitrogen | | Balance |

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

| | | | |
|-------------|------------------------|------------------------|-------------------------------|
| Type | Expiration Date | Cylinder Number | Concentration |
| NTRM# 1695 | 08-96 | ALM-036429 | 245.3 PPM Balance in Nitrogen |
| NTRM# 1686 | 08-96 | ALM-025095 | 495 PPM Balance in Nitrogen |

INSTRUMENTATION

| | | |
|----------------------------------|-----------------------------|-----------------------------|
| Instrument/Model/Serial # | Last Date Calibrated | Analytical Principle |
| NICOLET / 8220 / AAB9400252 | 01-26-95 | FTIR |

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|--------------|---|---|-------------------|
| Nitric Oxide | Date: 02-07-95 Response Units: PPM Z1=-0.460 R2=246.8 Z3=-0.214 R1=245.3 Z2=-0.180 T3=149.5 T1=149.7 T2=149.6 R3=246.4 | Date: 02-14-95 Response Units: PPM Z1=-0.559 R2=495.4 Z3=-0.220 R1=495.0 Z2=0.072 T3=149.2 T1=149.7 T2=149.1 R3=495.6 | Date: 01-26-95 |
| | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: |
| | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: |


 Analyst M. Morris



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0803

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ETS, Inc.
Attn: Bill Hayes
1401 Municipal Road NW
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5129
Scott Project # 12-08743

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

| | | | | | |
|--------------------------|------------|-------------------------------|----------|------------------------|----------|
| Cylinder Number | ALM-045665 | Certification Date | 10-11-94 | Expiration Date | 10-11-96 |
| Cylinder Pressure | 1875 PSIG | Previous Certification | None | | |

ANALYZED CYLINDER

| <u>Components</u> | <u>Certified Concentration</u> | <u>Analytical Uncertainty*</u> |
|-------------------|--------------------------------|--------------------------------|
| Nitric Oxide | 225 PPM | +/- 1% NIST Directly Traceable |
| NOX | 227 PPM | Reference Value Only |
| Nitrogen | | Balance |

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

| Type | Expiration Date | Cylinder Number | Concentration |
|------------|-----------------|-----------------|-------------------------------|
| NTRM# 1685 | 08/96 | ALM-036516 | 245.4 PPM Balance in Nitrogen |
| NTRM# 1686 | 07/95 | ALM-022384 | 492 PPM Balance in Nitrogen |

INSTRUMENTATION

| Instrument/Model/Serial # | Last Date Calibrated | Analytical Principle |
|-----------------------------|----------------------|----------------------|
| NICOLET / 8220 / AAB9400252 | 09-24-94 | FTIR |
| NO: Horiba/CLA53A/850658093 | 10-10-94 | Chemiluminescent |

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|--------------|---|---|-------------------|
| Nitric Oxide | Date: 10-04-94 Response Units: PPM Z1=0.1 R2=245.8 Z3=0.5 R1=245.4 Z2=0.3 T3=224.1 T1=224.4 T2=224.8 R3=244.8 | Date: 10-11-94 Response Units: PPM Z1=0.6 R2=492.1 Z3=0.7 R1=491.4 Z2=0.8 T3=224.8 T1=224.5 T2=224.8 R3=491.4 | Date: 10-10-94 |
| | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: |
| | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: |

K. Cooke
Analyst K. Cooke

2005



LIQUID CARBONIC #7

CYLINDER GAS PRODUCTS

5700 SOUTH ALAMEDA STREET • LOS ANGELES, CA 90058

213-585-2154
FAX# 213-585-0582

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST.

P.O NUMBER 041994-1

REFERENCE STANDARD

| | | | |
|---------------------|--------------|--------------|---------------|
| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
| SULFUR DIOXIDE GMIS | 1694a | SA 6231 | 98.4 ppm |

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

| | | | | | | | |
|----------------------|----------------|-----------------|-------------------------|---------------------|------------|--------|----------------|
| COMPONENT | SULFUR DIOXIDE | GMIS | ANALYZER MAKE-MODEL-S/N | Siemens Ultramat 5E | S/N C1-009 | | |
| ANALYTICAL PRINCIPLE | NDIR | | LAST CALIBRATION DATE | 05/20/94 | | | |
| FIRST ANALYSIS DATE | 05/16/94 | | SECOND ANALYSIS DATE | 05/24/94 | | | |
| Z 0.0 | R 98.6 | C 94.9 | CONC. 94.7 ppm | Z 0.0 | R 96.1 | C 92.2 | CONC. 94.6 ppm |
| R 98.9 | Z 0.0 | C 95.4 | CONC. 94.9 ppm | R 96.2 | Z 0.0 | C 91.9 | CONC. 94.0 ppm |
| 0.0 | C 95.4 | R 98.9 | CONC. 94.9 ppm | Z 0.0 | C 92.4 | R 96.2 | CONC. 94.5 ppm |
| UM ppm | | MEAN TEST ASSAY | 94.8 ppm | UM ppm | | | |

Values not valid below 150 psig

| | | |
|---|-----------------|-------------------------|
| THIS CYLINDER NO. SA 4778 | EPA-600/R93/224 | CERTIFIED CONCENTRATION |
| HAS BEEN CERTIFIED ACCORDING TO SECTION | Rev. 9/93 | SULFUR DIOXIDE 94.6 ppm |
| OF TRACEABILITY PROTOCOL NO. | | NITROGEN BALANCE |
| PROCEDURE G1 | | |
| CERTIFIED ACCURACY ± 2 % NIST TRACEABLE | | |
| CYLINDER PRESSURE 2000 PSIG | | |
| CERTIFICATION DATE 05/24/94 | | |
| EXPIRATION DATE 05/24/96 TERM 24 MONTHS | | |

ANALYZED BY *Marie [Signature]*

CERTIFIED BY *[Signature]*
DOUG GRANT



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ETS, INC.
Attn: Bill Hayes
1401 Municipal Road NW
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5129
Scott Project # 12-08743

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

| | | | | | |
|-------------------|------------|------------------------|----------|-----------------|----------|
| Cylinder Number | ALM-045690 | Certification Date | 10-11-94 | Expiration Date | 10-11-96 |
| Cylinder Pressure | 1950 PSIG | Previous Certification | None | | |

ANALYZED CYLINDER

| | | |
|-------------------|--------------------------------|--|
| <u>Components</u> | <u>Certified Concentration</u> | <u>Analytical Uncertainty*</u> |
| Sulfur Dioxide | 224 PPM | +/- 1% NIST Directly Traceable Balance |
| Nitrogen | | |

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

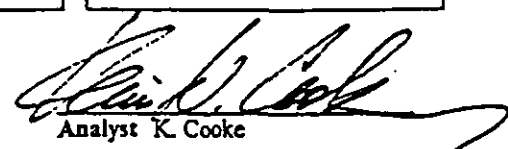
| | | | |
|-------------|------------------------|------------------------|-------------------------------|
| <u>Type</u> | <u>Expiration Date</u> | <u>Cylinder Number</u> | <u>Concentration</u> |
| GMIS | 05-96 | ALM-017302 | 498 PPM Balance in Nitrogen |
| NTRM# 0260 | 06-96 | AAL-14148 | 260.5 PPM Balance in Nitrogen |

INSTRUMENTATION

| | | |
|-----------------------------------|-----------------------------|-----------------------------|
| <u>Instrument/Model/Serial #</u> | <u>Last Date Calibrated</u> | <u>Analytical Principle</u> |
| LOW SO2: Horiba/AIA23AS/850658161 | 09-16-94 | NDIR |

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|----------------|---|---|-------------------|
| Sulfur Dioxide | Date: 10-04-94 Response Units: PPM Z1=0.0 R2=497.5 Z3=1.1 R1=498.3 Z2=1.1 T3=224.7 T1=224.5 T2=224.6 R3=498.3 | Date: 10-11-94 Response Units: PPM Z1=0.1 R2=261.1 Z3=0.1 R1=261.1 Z2=0.0 T3=223.9 T1=223.5 T2=223.6 R3=260.9 | Date: 09-16-94 |
| | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: |
| | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3= | Date: |


Analyst K. Cooke



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ETS, INC.
Attn: Bill Hayes
1401 Municipal Road NW
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4886
Scott Project # 12-07484

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

| | | | | | |
|--------------------------|-----------|-------------------------------|----------|------------------------|----------|
| Cylinder Number | AAL-21323 | Certification Date | 06-27-94 | Expiration Date | 06-27-97 |
| Cylinder Pressure | 1915 PSIG | Previous Certification | None | | |

ANALYZED CYLINDER

| | | |
|-------------------|--------------------------------|--|
| Components | Certified Concentration | Analytical Uncertainty* |
| Carbon Monoxide | 300 PPM | +/- 1% NIST Directly Traceable Balance |
| Nitrogen | | |

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

| | | | |
|-------------|------------------------|------------------------|-------------------------------|
| Type | Expiration Date | Cylinder Number | Concentration |
| NTRM # 2636 | 12/94 | ALM-024902 | 243.2 PPM Balance in Nitrogen |

INSTRUMENTATION

| | | |
|----------------------------------|-----------------------------|-----------------------------|
| Instrument/Model/Serial # | Last Date Calibrated | Analytical Principle |
| Varian /3400/16804 | 06-03-94 | Gas Chromatography |

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|-----------------|--|--|-------------------|
| Carbon Monoxide | Date: 06-17-94 Response Units: Area STD-11683 SPL-14543 SPL-14404 SPL-14502 STD-11585 STD-11791 | Date: 06-27-94 Response Units: Area STD-12132 SPL-14910 SPL-14831 SPL-14908 STD-11963 STD-12192 | Date: 06-03-94 |
| | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: |
| | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | |

[Handwritten Signature]
Analyst T. Richards



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
ETS, INC.
Attn: Bill Hayes
1401 Municipal Road NW
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4886
Scott Project # 12-07484

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-029325 Certification Date 06-27-94 Expiration Date 06-27-97
Cylinder Pressure 1915 PSIG Previous Certification None

ANALYZED CYLINDER

Components
Carbon Monoxide **Certified Concentration** 594 PPM **Analytical Uncertainty*** +/- 1% NIST Directly Traceable Balance
Nitrogen

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM # 1681 Expiration Date 07/94 Cylinder Number ALM-024751 Concentration 966.1 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial # Varian /3400/16804 Last Date Calibrated 06-03-94 Analytical Principle Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas C=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|-----------------|--|--|-------------------|
| Carbon Monoxide | Date: 06-20-94 Response Units: Area STD-49201 SPL-30211 SPL-30209 SPL-30308 STD-49239 STD-49150 | Date: 06-27-94 Response Units: Area STD-49644 SPL-30410 SPL-30258 SPL-30306 STD-49235 STD-49222 | Date: 06-03-94 |
| | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: |
| | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | Date: Response Units: STD- SPL- SPL- SPL- STD- STD- | |

T. Richards
Analyst T. Richards



213-585-2154
FAX# 213-585-0582

LIQUID CARBONIC

CYLINDER GAS PRODUCTS

5700 SOUTH ALAMEDA STREET • LOS ANGELES, CALIFORNIA 90058

44

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER ENV. & INDUST. DIST.

P.O NUMBER 011894-2

REFERENCE STANDARD

| | | | |
|---------------------|--------------|--------------|---------------|
| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
| CARBON MONOXIDE GMS | vs 1681b | CC 43665 | 950 ppm |

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

| | | | | | | | |
|----------------------|-----------------|-----------------|-------------------------|---------------------|-------------|-----------------|---------------|
| 1. COMPONENT | CARBON MONOXIDE | GMS | ANALYZER MAKE-MODEL-S/N | Siemens Ultramat 5E | S/N A12-729 | | |
| ANALYTICAL PRINCIPLE | NDIR | | LAST CALIBRATION DATE | 12/06/93 | | | |
| FIRST ANALYSIS DATE | 01/31/94 | | SECOND ANALYSIS DATE | 02/07/94 | | | |
| Z 0 | R 950 | C 897 | CONC. 897 ppm | Z 0 | R 950 | C 896 | CONC. 896 ppm |
| R 950 | Z 0 | C 897 | CONC. 897 ppm | R 950 | Z 0 | C 896 | CONC. 896 ppm |
| Z 0 | C 897 | R 950 | CONC. 897 ppm | Z 0 | C 896 | R 950 | CONC. 896 ppm |
| U/M ppm | | MEAN TEST ASSAY | 897 ppm | U/M ppm | | MEAN TEST ASSAY | 896 ppm |

THIS CYLINDER NO. SA 10333
 HAS BEEN CERTIFIED ACCORDING TO SECTION 10.4
 OF TRACEABILITY PROTOCOL NO. 1
 PROCEDURE G1

CERTIFIED CONCENTRATION

| | |
|-----------------|---------|
| CARBON MONOXIDE | 897 ppm |
| NITROGEN | BALANCE |

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
 CYLINDER PRESSURE 1650 PSIG
 CERTIFICATION DATE 02/07/94
 EXPIRATION DATE 02/07/97 TERM 36 MONTHS

ANALYZED BY

Wai E. P. [Signature]

CERTIFIED BY

[Signature]
KWAN T. YOUNG



Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083

(810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

| | | |
|---|--|--|
| Customer C A E INSTRUMENT RENTAL 246 WOODWORK LANE PALATINE, IL 60067 | Assay Laboratory Scott Specialty Gases, Inc 1290 Combermere Troy, MI 48083 | Purchase Order : 12908-85-7333 Scott Project # : 576595 |
|---|--|--|

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

| | | |
|--|---|----------------------------------|
| Cylinder Number : ALM005515 | Certificate Date : 1/31/95 | Expiration Date : 1/31/98 |
| Cylinder Pressure + : 1100 psig | Previous Certificate Date : 5-3-93 | |

ANALYZED CYLINDER

| | | |
|------------------------------|---|---|
| Components Propane | Certified Concentration 24.68 ppm | Analytical Uncertainty* ±1% NIST Directly Traceable |
|------------------------------|---|---|

Balance Gas: Nitrogen

+Do not use when cylinder pressure is below 150 psig.

*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

| | | | |
|-------------|------------------------|------------------------|-------------------------------|
| Type | Expiration Date | Cylinder Number | Concentration |
| SRM 2643A | 3/28/98 | SX-20290 | 99.12 ppm Propane in Nitrogen |

INSTRUMENTATION

| | | |
|---|--|--|
| Instrument/Model/Serial # Propane : Beckman/400/1002059 | Last Date Calibrated 1/16/95 | Analytical Principle Flame Ionization Detector |
|---|--|--|

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|------------|---|--|--|
| Propane | Date: 5/3/93 Response Units: mv Z1=0.00 R1=0.00 T1=0.00 R2=0.00 Z2=0.00 T2=0.00 Z3=0.00 T3=0.00 R3=0.00 Avg. Conc. of Cust. Cyl. 24.58 ppm | Date: 1/31/95 Response Units: mv Z1=0.00 R1=99.10 T1=24.80 R2=99.10 Z2=0.00 T2=24.80 Z3=0.00 T3=24.80 R3=99.10 Avg. Conc. of Cust. Cyl. 24.78 ppm | Concentration $A+Bx+Cx^2+Dx^3+Ex^4$ r=1.00000 SRM 2643A Constant: A=-0.034421000 B=1.000500000 C=0.000000000 D=0.000000000 E=0.000000000 |

Special Notes

Cylinder

Don E. Kelly Jr.

Analyst



Scott Specialty Gases, Inc.

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8861

FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Ets Inc
1401 Municipal Road Nw
Roanoke, VA 24012

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5000
Scott Project # 01-59436-005

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM019356 Certification Date 08-08-94 Expiration Date 08-08-97
Cylinder Pressure 2000 psig+ Previous Certification Dates None

ANALYZED CYLINDER

| Components | Certified Concentration | Analytical Uncertainty* |
|-----------------------|-------------------------|-------------------------|
| Propane | 44.8 ppm | ±1% NIST Traceable |
| Balance Gas: Nitrogen | | |

* Do not use when cylinder is less than 150 psig.

* Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

| Type | Expiration Date | Cylinder Number | Concentration |
|----------|-----------------|-----------------|--|
| NTRM1668 | 08-16-94 | ALM032011 | 95.5 ppm C ₃ H ₈ in N ₂ |

INSTRUMENTATION

| Instrument/Model/Serial # | Last Date Calibrated | Analytical Principle |
|---------------------------|----------------------|----------------------|
| C3H8: Varian/VA3300/7945 | 07-16-94 | FID |

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|------------|--|-----------------------|--|
| Propane | Date: 08-08-94 Response Units: Area Z1=000000 R1=108250 T1=050832 R2=108260 Z2=000000 T2=050890 Z3=000000 T3=050904 R3=108530 Avg. Conc. of Cust. Cyl. 44.8 ppm | | Concentration = A + Bx + Cx ² + Dx ³ + Ex ⁴ r=0.99998 NTRM1685 Constants: A=-7.0980E-01 B=3.3276E+01 C=0.0000E+00 D=0.0000E+00 E=0.0000E+00 |
| | | | |
| | | | |

Special Notes:

Check this box if certified concentration has been corrected for analytical interferences.

Walter Sabitus
Analyst Walter Sabitus



Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083

(810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : 1332-71500
Scott Project # : 578931

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM058692
Cylinder Pressure + : 1900 psig

Certificate Date : 3/29/95
Previous Certificate Date : None

Expiration Date : 3/29/98

ANALYZED CYLINDER

Components
Propane

Certified Concentration
83.74 ppm

Analytical Uncertainty*
±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder pressure is below 150 psig.

*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

| Type | Expiration Date | Cylinder Number | Concentration |
|-----------|-----------------|-----------------|-------------------------------|
| SRM 2643A | 3/28/98 | SX-20290 | 99.12 ppm Propane in Nitrogen |

INSTRUMENTATION

Instrument/Model/Serial #
Propane : Beckman/400/1002059

Last Date Calibrated
3/28/95

Analytical Principle
Flame Ionization Detector

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

| Components | First Triad Analysis | Second Triad Analysis | Calibration Curve |
|------------|---|-----------------------|---|
| Propane | Date: 3/29/95 Response Unit: mv Z1=0.00 R1=99.10 T1=83.70 R2=99.10 Z2=0.00 T2=83.80 Z3=0.00 T3=83.70 R3=99.10 Avg. Conc. of Cust. Cyl. 83.74 ppm | | $Concentration = A + Bx + Cx^2 + Dx^3 - Ex^4$ r=1.00000 SRM 2643A Constants: A=-0.034421000 B=1.000500000 C=0.000000000 D=0.000000000 E=0.000000000 |

Special Notes

Mail

Analyst