AP42 Section: 11.1

Reference Number: 47

Title: **Test Report For Air Pollution Source Testing At Fred Weber, Inc., Maryland Heights, Missouri,**

Ramcon Environmental Corporation, Memphis, TN,

September 1-4, 1994.

RAMCON

ENVIRONMENTAL CORPORATION

October 28, 1992

RECEIVED
11/26/93
T.E.3

Mr. David L. Poe
Fred Weber, Inc.
2320 Creve Coeur Mill Road
Maryland Heights, Missouri 63043-8501

RE: NAPA Air Test Project

Dear Mr. Poe:

Enclosed are two copies of the test report for the air emissions test project conducted at your facility in September of 1992. The test project was conducted according to the NAPA protocol for total particulate matter, condensible particulate matter, polynuclear aromatic hydrocarbons, formaldehyde, total hydrocarbons, sulfur dioxide, carbon monoxide, nitrogen oxides, methane, benzene, toluene, ethyl benzene, and xylene(s).

We certainly have enjoyed working with you on this project. If I may be of further assistance please do not hesitate to contact me. Thank you.

Respectfully,

William Joseph Sewell, II
Vice President

:wpc
Enclosures

RAMCON BUILDING, 6707 FLETCHER CREEK COVE, MEMPHIS, TENNESSEE 38134
TELEPHONE 800/458-4567 IN TENNESSEE 901/387-0500 FAX 901/367-0400

TABLE OF CONTENTS

I. INTRODUCTION

On September 1, 2, 3, and 4, 1992, personnel from RAMCON Environmental Corporation conducted source emissions determinations at Fred Weber, Inc. located in Maryland Heights, Missouri. The testing was conducted according to the National Asphalt Pavement Association (NAPA) guidelines entitled, "Protocol for Air Pollution Source Testing".

The scope of work involved testing this facility for filterable and condensible particulate matter, formaldehyde, and polynuclear aromatic hydrocarbons. These compounds were sampled according to specified isokinetic testing procedures. Reference Method 202 was employed for the particulate matter including condensibles. Method 0011/8315 issued in SW-846 was utilized for the formaldehyde extraction, collection, and analysis. The polynuclear aromatic hydrocarbons were sampled using Modified Method 5.

In addition, "real-time" continuous emission monitor (CEM) instrumentation was utilized to conduct on-site analysis for oxygen, carbon dioxide, total volatile organics, sulfur dioxide, carbon monoxide, and NOx. Reference Methods 3A, 6C, 7E, 10, and 25A were employed for the analysis of oxygen and carbon dioxide, sulfur dioxide, nitrogen oxides, carbon monoxide, and total hydrocarbons respectively. These testing procedures utilize a sampling system to continuously extract sample gas from the source. This sample stream is routed to individual CEM's for analysis of the various targeted pollutants and diluent gases. The test results are based on the average value of one minute averages generated by the CEM instrument data acquisition during the test periods.

Methane, benzene, toluene, ethyl benzene, and xylene compounds were analyzed on a semi-continuous basis by employing a gas chromatograph to the sampling location. Reference Method 18 was used for these determinations. The gas stream is continuously sampled during the testing period(s). Periodically, a sample of the extracted gas stream is injected into the gas chromatograph for analysis. The test results are based on the average value of the injections performed during each test period.

Additionally stack gas moisture, velocity, and volumetric flow rate were determined to provide data enabling conversion of flue gas concentrations to emission data. These determinations were conducted in conjunction with each of the isokinetic testing procedures.

Where possible, the testing was conducted simultaneously. This provides correlations of the various stack effluents relationships with one another. Three (3) test runs were conducted for each isokinetic testing procedure. Eleven test runs were conducted utilizing the CEM instrumental procedures for SO_2, CO, THC, NOx, CO_2, and O_2. Nine (9) test periods were conducted for the semi-continuous GC procedure.

The purpose of the testing project was to provide air emissions information for developing a database of information using various types of hot mix asphalt plants.

Mr. Thomas E. Brumagin representing the National Asphalt Pavement Association was present during the testing procedure(s) conducted by RAMCON Environmental Corporation.

II. TEST RESULTS

The test results are summarized in Tables I through VI. Each summary table represents the test results for each targeted pollutant. The concentration of the pollutant as well as the emission of the compound is provided.

Table I lists the test results for the CEM test procedures. Total hydrocarbons, sulfur dioxide, carbon monoxide, nitrogen oxides, oxygen and carbon dioxide concentrations are listed for each of the eleven test runs conducted. The pollutant concentrations are listed in terms of parts per million (ppm) and the diluent gases, oxygen and carbon dioxide are provided in percentage (%). Each concentration is listed on a dry basis.

Table II tabulates the CEM test compounds as an emission value. The concentrations listed in Table I were coupled with the volumetric flow rate of air being emitted from the source and are

shown in terms of pounds per hour (lb/hr). Additionally, the concentration of the pollutants are shown in terms of milligrams per cubic meter (mg/m^3).

Table III summarizes the formaldehyde test results. Three test runs were conducted and are listed in conjunction with the test averages. The pollutant concentration is provided in terms of ppm and mg/m^3. The emission value is provided in terms of lb/hr.

Table IV provides the particulate matter test results. Both the filterable and condensible particulate test results are listed. The filterable particulate matter is that which is collected in either the front half probe wash or retained on the glass fiber filter. The condensible particulate matter is that which is collected in the impinger system after passing through the particulate filter. The condensible particulate matter is subjected to extraction via methylene chloride to separate the organic and aqueous fractions of the sample. The test results are provided in terms of grains per dry standard cubic feet (gr/dscf) and lb/hr.

Table V lists the methane test results. This summary table provides the concentration and emission data for each of the nine (9) test runs. The concentration of methane is provided in terms of ppm and mg/m^3 and the emission is listed in lb/hr.

Table VI tabulates the PAH test results. Six positive identifications of PAH material were determined to exist in the exhaust stack. The test results for these six positive test resuits are provided in terms of mg/m^3 and lb/hr for each of the three test runs.

Table I
SO_2, NO_x, CO, THC Test Summary

Run	Date	Start Time	Stop Time	0_2, %	CO_2, %	SO_2, ppm	CO, ppm	NO_x, ppm	THC*, ppm
1	9-1	12:08	13:30	12.2	7.3	5.3	572.3	33.8	90.4
2	9-2	11:06	11:19	12.5	7.0	1.5	579.2	26.5	49.9
3	9-2	11:29	11:44	12.8	6.6	4.2	519.0	26.3	179.0
4	9-2	12:11	12:39	12.5	7.9	3.3	551.7	28.9	135.6
5	9-2	13:58	14:09	12.8	7.0	2.4	475.0	29.4	61.6
6	9-3	06:50	08:10	11.8	7.7	4.3	643.6	41.3	165.0
7	9-3	08:37	09:59	11.9	7.2	2.7	650.9	43.2	88.6
8	9-3	10:32	11:53	11.5	7.2	3.0	715.0	37.4	68.3
9	9-3	13:14	14:16	12.2	7.4	2.5	393.7	30.1	65.8
10	9-3	07:05	08:51	13.2	6.4	4.0	214.5	28.3	88.5
11	9-4	12:09	13:48	12.2	6.5	6.2	277.4	34.4	76.9

• All THC data on methane basis

Table II
SO_2, NO_x, CO, THC EmissionSummary

Run	SO_2, mg/m^3	SO_2, lb/hr	CO, mg/m^3	CO, lb/hr	NO_x, mg/m^3	NO_x, lb/hr	THC, mg/m^3	THC*, lb/hr
1	14.1	1.45	666.8	68.34	64.7	6.63	60.3	6.18
2	4.0	0.39	674.8	65.39	50.7	4.91	33.3	3.23
3	11.2	1.08	604.7	58.59	50.3	4.88	119.4	11.57
4	8.8	0.85	642.8	62.28	55.3	5.36	90.5	8.77
5	6.4	0.62	553.4	53.62	56.3	5.45	41.1	3.98
6	11.5	1.15	749.9	75.39	79.0	7.95	110.1	11.07
7	7.2	0.75	758.4	78.66	82.7	8.58	59.1	6.13
8	8.0	0.86	833.0	89.26	71.6	7.67	45.6	4.88
9	6.7	0.60	458.7	41.87	57.6	5.26	43.9	4.01
10	10.7	1.13	249.9	26.50	54.2	5.74	59.0	6.26
11	16.5	1.82	323.2	35.68	65.8	7.27	51.3	5.66

• All THC data on methane basis.

Table III

Formaldehyde Test Summary

Run	Date	Time	mg/m³	ppm	lb/hr
1	9-3	06:42 - 08:05	0.46	0.4	0.05
2	9-3	08:37 - 09:59	0.23	0.2	0.02
3	9-3	10:32 - 11:53	0.46	0.3	0.05
Avg.			0.4	0.3	0.04

Table IV

Particulate Test Summary

Run	Date	Time	Concentration, gr/dscf			Emission, lb/hr		
			Filterable	Condensible Organic	Condensible Inorganic	Filterable	Condensible Organic	Condensible Inorganic
1	9-1	12:10 - 13:17	0.0068	0.0119	0.0029	1.60	2.80	0.68
2	9-2	11:01 - 14:00	0.0029	0.0114	0.0040	0.64	2.53	0.89
3	9-2	15:16 - 15:26	0.0195	0.1340	0.0319	3.72	25.57	6.09
Avg.			0.0097	0.0524	0.0129	1.99	10.30	2.55

Table V

Methane Test Summary

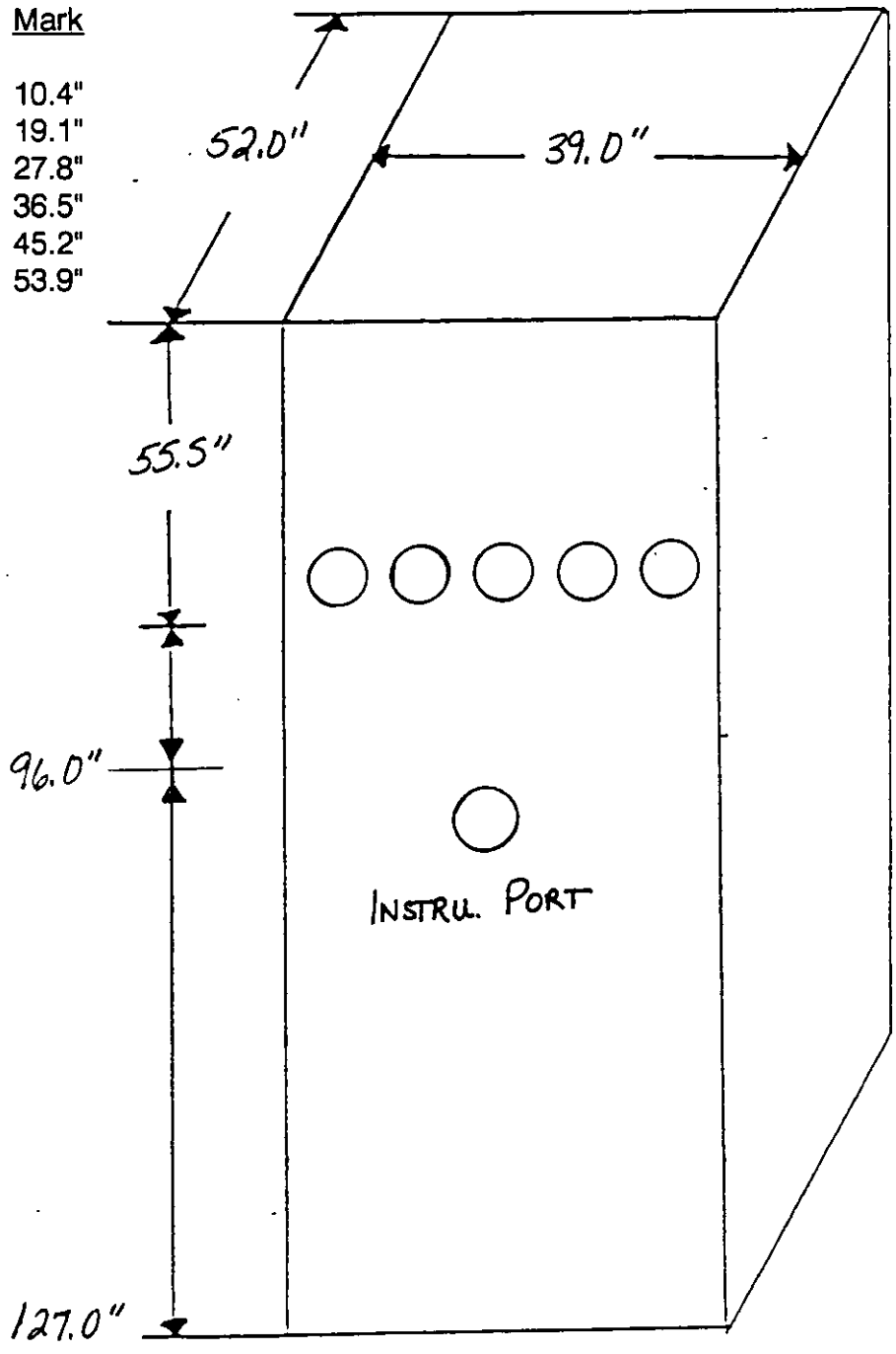
Run	Date	CH_4, ppm	CH_4, mg/m³	CH_4, lb/hr
1	9-1-92	50.8	33.9	3.47
2	9-2-92	118.7	79.2	7.67
3	9-2-92	140.3	93.6	9.07
4	9-3-92	157.2	104.9	10.55
5	9-3-92	53.3	35.6	3.69
6	9-3-92	77.9	52.0	5.57
7	9-3-92	48.8	32.6	2.97
8	9-4-92	84.2	56.2	5.96
9	9-4-92	123.4	82.3	9.09
Avg.		85.5	57.0	6.0

Table VI
PAH Test Summary

Compound	Concentration, mg/m³			Emission, lb/hr		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Naphthalene	0.092	0.068	0.080	0.0084	0.0072	0.0088
2-Methylnaphthalene	0.131	0.089	0.091	0.0120	0.0094	0.0101
Acenaphthene	ND	ND	0.006	ND	ND	0.0007
Fluorene	0.006	0.005	0.006	0.0005	0.0005	0.0007
Phenanthrene	0.007	0.007	0.007	0.0006	0.0007	0.0008
Fluoranthene	0.001	0.001	0.002	0.0001	0.0001	0.0002
TOTAL	0.236	0.168	0.191	0.0216	0.0179	0.0212

The emissions test was conducted on a rectangular stack measuring 39" x 52" with an equivalent diameter of 44.6". Five (5) sampling ports were placed 55.5" down from the top of the stack and 96.0" up from the last flow disturbance. Thirty (30) points were sampled, six (6) through each port for two minutes each.

Points on a Diameter	Probe Mark
1	10.4"
2	19.1"
3	27.8"
4	36.5"
5	45.2"
6	53.9"



III. SAMPLING AND ANALYTICAL PROCEDURES

The following is a description of each of the test methods that were conducted during the performance test(s). In this description, a discussion of the pertinent segments including preparation, sampling, and analysis is addressed. This section will provide information supporting the validity of the samples.

A. Determination of Carbon Dioxide and Oxygen Emissions From Stationary Sources (Instrumental Analyzer Procedure) - US EPA Method 3A:

The collection and analysis of carbon dioxide and oxygen content at the test location was performed by US EPA Reference Method 3A. This procedure utilizes continuous emissions monitors that provide the data results from the source on a "real-time" or instantaneous basis.

All of the CEM instrumental procedures that were conducted at the outlet testing location were extracted and analyzed with similar testing strategies. Because of this similarity, a detailed description of the calibration and operation procedures of the CEM procedures is provided in the discussion of Method 3A and is referred to in the other sections concerning the additional procedures.

1. Calibration.

The calibration of the instruments is performed using certified gas standards composed of a known concentration of carbon dioxide and oxygen in zero grade nitrogen. These gas standards are prepared using partial pressure/volumetric and gravimetric methods.

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

The oxygen instrument utilizes an paramagnetic detector and the carbon dioxide instrument utilizes a nondispersive infrared detector. The minimum detection limit for both gas analyzers is 0.1 %. The fullscale limitations of the oxygen and carbon dioxide analyzers is 25 and 20 % respectively.

Immediately prior to each compliance test series, a complete calibration of the instrument is performed. Each instrument has zero grade nitrogen injected into it and the zero potentiometer is adjusted, if necessary, until the proper voltage output from the analyzer is achieved.

Then a high range pollutant gas mixture, that has been prepared in the specified range percentage of the span or fullscale, is injected. After the system stabilizes, the span or fullscale potentiometer is adjusted until the voltage output from analyzer corresponds to the certification of analysis for the respective calibration gas.

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

This mid range calibration gas serves two purposes of quality control and quality assurance. The first is to show that the instrument analyzes and outputs data on a linear scale. The second purpose is to validate that the zero and fullscale values of the instrument are properly set.

Prior to sampling, a single calibration gas was injected into the probe inlet. This calibration gas is usually a mixture of oxygen and carbon dioxide in a balance of zero nitrogen. The system is not adjusted except to achieve proper flow through the analyzers. The calibration standard is allowed to traverse the sampling system. The response of the analyzer during this bias check must agree with the initial analyzer response of this standard within the specified tolerances set forth in the test method. This system bias check serves to demonstrate that the sample train is leak free and causes no interference to the integrity of the sample.

2. Sampling.

After calibration, the system is purged with zero grade nitrogen to remove any pollutants that were injected as calibration gas. Once the system indicates that the pollutant gases have been removed, the calibration valve assembly is positioned to allow stack gas to flow through the instrument.

The sample gas is filtered at the stack position to remove any particulate matter. This prevents instruments from being contaminated and ensures reliable data acquisition.

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

The portion of the sample gas dedicated to the dry basis analyzers is directed into a gas conditioning system where the moisture content of the stream is removed. The sample gas that exits the gas conditioning system is then routed to the instruments for analysis on a dry basis.

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

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

3. Data Acquisition.

The CEM monitors utilized in the testing project output a voltage signal corresponding to the pollutant concentration determined by the detector. This signal is relayed to a computerized datalogger system. This system retrieves the output signal from each monitor every 10 seconds. This data is then averaged on a per minute basis and stored on the hard drive of the computer. Additionally, a strip chart recorder is employed to record the data. This device records the instrument output on a one minute, instantaneous basis.

The data listing for all of the analyzers, for each testing period, is provided in another section. This listing provides the data results as recorded by the computerized datalogger system.

B. Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure) - US EPA Method 7E:

The calibration, sampling, and data acquisition procedures are similar to that of Method 3A. Listed below are any deviations or differences that were incurred specifically in this testing procedure.

The calibration of the instruments is performed using certified gas standards composed of a known concentration of nitrogen oxide in zero grade nitrogen. These gas standards are prepared using partial pressure/volumetric and gravimetric methods.

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

The instrument utilizes an chemiluminescent detector. The detection limitation of the analyzer is 0.1 ppm. Multiple fullscale ranges are available for operation. A 250, 1000, 2500, and 10,000 ppm fullscale may be selected according to the concentrations of NOx present in the gas steam.

The analyzers were calibrated using standards that were the appropriate percentage of fullscale according to Method 7E.

The pre-test calibration, system bias, and post-test calibration procedures are identical to those discussed in Reference Method 3A.

C. Determination of Carbon Monoxide Emissions From Stationary Sources (Instrumental Analyzer Procedure) - US EPA Method 10:

1. Calibration.

The calibration of the instruments is performed using certified gas standards composed of a known concentration of carbon monoxide in zero grade nitrogen. These gas standards are prepared using partial pressure/volumetric and gravimetric methods.

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

The instrument utilizes a Luft-type nondispersive infrared detector. Immediately prior to each compliance test series, a complete calibration of the instrument is performed. Each instrument has zero grade nitrogen injected into it and the zero potentiometer is adjusted, if necessary, until the proper voltage output from the analyzer is achieved.

Then a high range pollutant gas mixture, that has been prepared in the specified range percentage of the span or fullscale, is injected. After the system stabilizes, the span or fullscale potentiometer is adjusted until the voltage output from analyzer corresponds to the certification of analysis for the respective calibration gas.

When this procedure is complete and the system has responded properly to a zero and fullscale reading, a mid and low range certified calibration gas is injected into the system. No

adjustments are made to the system except to achieve proper flow rate through the analyzer. The analyzer, after reaching a stable value, must correspond to the certified value of the calibration gas within a specified percentage of the fullscale. This mid and low range calibration gas serves two purposes of quality control and quality assurance. The first is to show that the instrument analyzes and outputs data on a linear scale. The second purpose is to validate that the zero and fullscale values of the instrument are properly set.

2. Sampling.

After calibration of the instrument(s) has been completed, a sample bias check is performed. This involves injecting calibration gas into the sample probe inlet and allowing the calibration gas to traverse through the sample train to the analyzer(s) where it is analyzed. This analysis will correspond to the pre-test calibration analysis value of the standard within the tolerances set forth in the reference method.

Once the system indicates that the calibration gases have been removed, the calibration valve assembly is positioned to allow stack gas to flow through the instrument. The sample gas is filtered at the stack position to remove any particulate matter. This prevents instruments from being contaminated and ensures reliable data acquisition.

All samples injected to the instruments are removed from the stack and delivered to the instruments via a heated probe and sample line. This prevents any condensation of water vapor and/or pollutant in the gas stream.

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

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

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

1. Calibration.

The calibration of the instruments is performed using certified gas standards composed of a known concentration of methane in zero grade nitrogen. These gas standards are prepared using partial pressure/volumetric and gravimetric methods.
The prepared gas mixture is analyzed and the certification tolerance is not greater than 2% of the pollutant component. A copy of the analysis certificate for each of the certified gas mixtures used during the testing is included in the test report.

The instrument utilizes an flame ionization detector. Immediately prior to each compliance test series, a complete calibration of the instrument is performed. Each instrument has zero grade nitrogen injected into it and the zero potentiometer is adjusted, if necessary, until the proper voltage output from the analyzer is achieved.

Then a high range pollutant gas mixture, that has been prepared in the specified range percentage of the span or fullscale, is injected. After the system stabilizes, the span or fullscale potentiometer is adjusted until the voltage output from analyzer corresponds to the certification of analysis for the respective calibration gas.

When this procedure is complete and the system has responded properly to a zero and fullscale reading, a mid and low range certified calibration gas is injected into the system. No adjustments are made to the system except to achieve proper flow rate through the analyzer. The analyzer, after reaching a stable value, must correspond to the certified value of the calibration gas within a specified percentage of the fullscale. This mid and low range calibration

gas serves two purposes of quality control and quality assurance. The first is to show that the instrument analyzes and outputs data on a linear scale. The second purpose is to validate that the zero and fullscale values of the instrument are properly set.

2. Sampling.

After calibration, the system is purged with zero grade nitrogen to remove any pollutants that were injected as calibration gas. Once the system indicates that the pollutant gases have been removed, the calibration valve assembly is positioned to allow stack gas to flow through the instrument.

The sample gas is filtered at the stack position to remove any particulate matter. This prevents instruments from being contaminated and ensures reliable data acquisition. All samples injected to the instruments are removed from the stack and delivered to the instruments via a heated probe and sample line. This prevents any condensation of water vapor and/or pollutant in the gas stream.

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

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

E. Total Particulate - US EPA Reference Methods 5:

1. Preparation.

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

The impinger system configuration was assembled using the procedure outlined in Method 5. One hundred ml of deionized water was placed in the first two impingers. The third impinger was initially empty and the fourth impinger contained a pre-weighed amount of silica gel for complete moisture removal.

A stainless steel probe liner and nozzle system was utilized for the total particulate determinations. The probe housed a set of calibrated S-type pitot tubes and a calibrated thermocouple for monitoring stack temperature.

2. Sampling.

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

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

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

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

3. Analysis.

The glass fiber filter was desiccated for 24 hours prior to any weighing. The acetone probe wash was transferred to a tared beaker and evaporated to dryness. The resultant residue was also desiccated prior to gravimetric analysis.

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

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

F. EPA Draft Method 202, "Determination of Filterable and Condensible Particulate Matter"

The testing procedure was conducted according to Reference Method 5 for particulate matter determination. This testing procedure was covered in a previous section. The filterable portion of the particulate matter was determined via this procedure. The condensible fraction of the sample was determined by analyzing the back half impinger catch with a methylene chloride extraction.

This extraction procedure will yield fractions of inorganic and organic condensible matter. The concentrations and emission values of both filterable particulate and condensible particulate matter have been summarized in the test results section.

G. Polynuclear Aromatic Hydrocarbons - Method SW846 8270 "Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique

1. Preparation.

All glassware utilized in each sampling train was thoroughly cleaned with hot soapy water and dried prior to each test series. All residue silicon grease was removed from glassware upstream of the absorbent module. A glass fiber filter was used that has been properly labeled.

The absorbent traps was packed by the analytical laboratory that conducted the final analysis.

The impinger system was assembled using 100 ml of D.I. water in impingers 1 and 2. The third impinger was initially empty and the fourth impinger contained silica gel.

In assembling the sample train, teflon tape was placed on the ball joints to ensure adequate sealing upstream of the absorbent module. All connections downstream of the module were sealed with silicon grease.

A glass probe liner and nozzle system was utilized for the collection train. The probe housed a set of calibrated S-type pitot tubes and a calibrated thermocouple for monitoring stack temperature.

2. Sampling.

The probe and sample box was heated to an approximate temperature of 250 F. These temperatures were monitored throughout the testing.

The probe was connected to the heated filter system with connecting glassware. This filter system was connected to the condenser by a teflon line. The condenser and absorbent module are directly connected via ground glass ball and socket.

An ice bath was prepared to submerse the impinger system into. The temperature of the last impinger was monitored throughout the testing to ensure adequate condensation of the water vapor in the flue gases.

The condenser cooling fluid was recirculated through the system by a veristaltic pump. This pump is to be started prior to the start up of the sampling system to ensure that the temperature of the absorbent material in the module does not exceed its thermal decomposition temperature. The temperature of gas entering the module was monitored to ensure that the temperature did not exceed the recommended limitation for efficient capture.

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

Three sample runs were conducted to constitute a complete test. The sample time was be a minimum of one hour.

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

3. Sample Analysis.

Method 8270 is used to determine the concentration of semivolatile organic compounds in extracts prepared from all types of solid waste matrices. Each compound present in the sample is separated by gas chromatography and quantified by mass spectrometry.

The detection limitation of this type of sample has been determined to be 1.0 microgram. If the samples are separated for further analysis, the detection limit will be 2.0 micrograms.

H. EPA Draft Method 0011, "Determination of Formaldehyde"

This sampling procedure is similar to the operational procedures found in Reference Method 5. Described in this section are the differences set forth from Method 5 to ensure that the integrity of the formaldehyde sample is maintained.

Prior to any sampling, all glassware shall be rinsed with methylene chloride to remove any contamination that may be initially on the glassware such as stopcock grease. This includes the rinsing of the glass probe liner material required for the collection of the sample.

In collecting the sample, a minimum of 45 cubic feet must be pulled isokinetically such that the extracted sample is transferred through the DNPH absorption solution. All samples should be placed into glass amber sample containers to avoid the alteration of the sample by sunlight.

The analysis of the formaldehyde samples shall be conducted according to the procedures outlined in Method 8315. This analysis procedure provides guidance in the evaluation of formaldehyde samples by High Performance Liquid Chromatography (HPLC).

I. Determination of Gaseous Organic Emissions From Stationary Sources By Gas Chromatography - US EPA Method 18:

This procedure utilizes the technology of gas chromatography to separate, identify, and quantitate various volatile organic compounds that co-exist in a flue gas stream. In this testing project, methane and the BTEX compounds were targeted.

The gas chromatograph was first conditioned in the laboratory where ideal conditions exist for this initial calibration. This consists of conditioning the column, if necessary, and creating calibration curves based on actual data from the GC with known concentration standards. As required by EPA, three (3) standards of known concentration were used in creating the calibration curves. The concentrations of the standards bracketed the expected concentration of pollutant at the source level.

A field calibration check was performed prior to introducing any sample into the gas chromatograph. This is performed by injecting one of the known standards into the GC and comparing the result to the calibration curve. It must agree within 5 % of the previously determined response.

Analysis of the samples follow a successful field calibration. Collecting the sample consisted of extracting the sample from the stack via a heated sample line. The sample was introduced directly into the sample loop, where it was injected to the instrument for analysis.

EQUIPMENT USED

Equipment used to conduct the particulate emissions test was:

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

B. An Airguide Instruments Model 211-B (uncorrected) aneroid barometer for checking the barometric pressure.

C. Weston dial thermometers to check meter temperatures or an Analogic Model 2572 Digital Thermocouple to check stack temperatures.

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

E. Schleicher and Schuell Type 1-HV filters with a porosity of .03 microns.

F. Reagent- or ACS-grade acetone with a residue of ≤ .001.

J.U.M.® ENGINEERING

HEATED TOTAL HYDROCARBON ANALYZER MODEL VE7

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

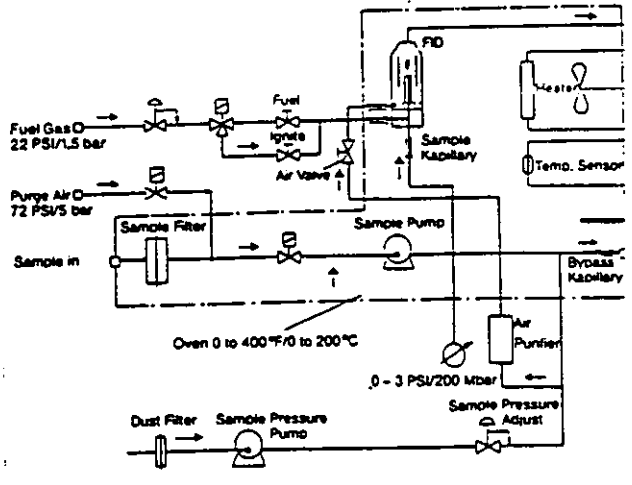
The VE7 utilizes a Hydrogen Flame Ionization Detector (FID) in a thermostatically controlled oven to prevent the loss of high molecular weight hydrocarbons.

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

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

STANDARD SPECIFICATIONS:

Analysis Method:	*Flame Ionization Detector (FID)*
Sensitivity:	*Max. 1 ppm CH*
Response Time:	*90% of full scale in less than one second*
Zero Drift:	*1% of full scale per 24 hours*
Span Drift:	*1% of full scale per 24 hours*
Linearity:	*Within 1%*
Oxygen Synergism:	*Less than 1% of selected range*
Ranges:	*Any three of the following:*
	0 - 10, 100, 1000, 10,000, 100,000 ppm
Outputs:	*0 - 10 Volts D.C.*
Display:	*Analog Meter in ppm Hydrocarbon or in % LEL*
Zero/Span Adjust:	*Manual on front panel*
Fuel Consumption:	*Hydrogen 20 cc/min at 22 psig (1.5 Bar)*
	Hydrogen/Helium 40/60 mix: 80 cc/min.
Air Consumption:	*None Integral Air generator*
Zero & Span Gas:	*3 psig (200 m Bar)*
Sample Pump:	*All Stainless Steel, heated, 3 liters per minute at operating temperature*
Sample Pressure:	*By Integral Pump 3 psig (200 m Bar)*
Sample Filter:	*Permanent all stainless steel 2 micron back-purged for cleaning*
Analysis Temperature:	*Adjustable 200 to 400°F (93 to 204°C)*
Power Requirements:	*110 Volts, 60 Hertz AC 800 Watts (others on request)*
Ambient Temperature:	*32°F to 110°F (0 to 43°C)*
Dimensions:	*Width 483 mm (19 inches), Depth 460 mm (18-1/8 inches), Height 221 mm (8-3/4 inches)*
Weight:	*38.6 lbs (17,5 kg)*
Shipping Weight:	*53 lbs (24 kg)*



D:\DONNA\JUM.DJB

FUJI 760
NDIR GAS ANALYZER

- *Unique Mass Flow Sensor System Eliminates Interference*
- *Wide Dynamic Range Permits Ultra-Sensitive and High Concentration Gas Analysis*
- *Designed for Continuous Operation and Low Maintenance*
- *Measures:*
  - → *Carbon Monoxide (CO)*
  - → *Carbon Dioxide (CO_2)*
  - → *Sulfur Dioxide (SO_2)*
  - → *Nitric Oxide (NO)*
  - → *Methane (CH_4)*
- *Insensitive to Vibration*

This instrument is designed for stack monitoring and process control applications. It's remarkable accuracy and fast response makes it an ideal instrument for CEMS, boiler control equipment, research labs and many other monitoring applications. For usage requiring ultra sensitive measurement, the Fuji 760 delivers superior performance. Using the Non-Dispersive Infrared (NDIR) Mass Flow Detector, low concentration measurements are accurate and reliable. The Fuji 760 incorporates an Interference Compensating Detector which minimizes the effects of other gases, particularly when operating in ranges of high sensitivity.

FEATURES OF THE FUJI-760

The Fuji 760 Analyzre uses infrared adsorption techniques to measure gas concentrations, however, many innovative patented features make this instrument far superior to conventional Non Dispersive Infrared Analyzers. Among its unique features are an optical chopper design which virtually eliminates the effects of vibration and resultant optical noise; a mass flow sensor system which reduces the effects of interfering gases to insignificant levels, thus permitting gas analysis at low concentration ranges; and a dual beam optical system derived from a single infrared source which enhances long term stability.

PRINCIPAL OF OPERATION

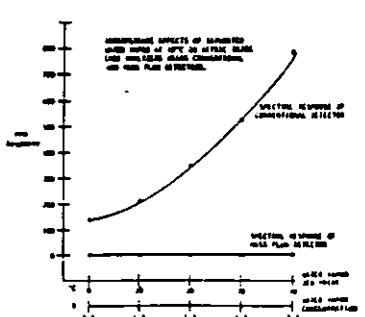
A single beam of infrared energy is modulated and split into two parallel beams by a distribution cell. One beam is passed through a reference cell containing a non-absorbing gas, and the other beam is passed through a cell containing the sample gas being measured. The beam passing through the sample cell is attenuated by the amount of gas concentration in the sample and compared against the unattenuated reference beam by the mass flow detector system. One set of detectors sense the amount of sample gas as compared against the reference, the second set of detectors measure and cancel interferents in the sample. The outputs of the detectors are electronically processed and conditioned into useable signals for indicators and other output devices.

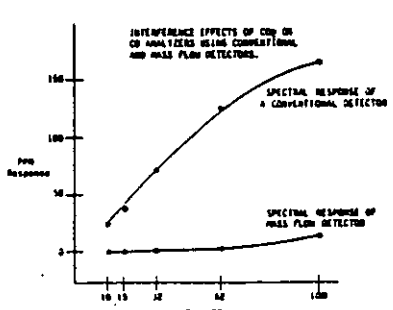
DETECTABLE GAS RANGES

Standard Configuration

Component	*Minimum Range*
Carbon Monoxide (CO)	*0 to 100 ppm*
Carbon Dioxide (CO_2)	*0 to 50 ppm*
Nitric Oxide (NO)	*0 to 100 ppm*
Sulfur Dioxide (SO_2)	*0 to 100 ppm*
Total Hydrocarbons	*0 to 500 ppm*

Other Gases can be measured.





Specifications
(Standard Configuration)

Repeatability: *±0.5% of full scale*
Zero Drift: *±2 % of full scale per week*
Span Drift: *±2% of full scale per week*
Linearity: *±2% of full scale*
Speed of Response: *90% indication within 5 seconds (Electronic Response)*
Range Selection: *Either of two ranges selected by front panel switch or external contact closure.*
Warm-Up: *Four hours minimum*
Outputs: *0 to 1V DC, linear and 4-20mA DC, linear*
Ambient Temperature Range: *23 to 113°F (-5 to 45°C)*
Ambient Humidity: *To 90% R.H. (non-condensing)*
Sample ***Gas*** *Temperature: 32 to 122° F (0 to 50°C)*
Sample Gas Flow Rate: *1.0 ±0.5 scfh (0.50±0.25 slpm) for standard configuration*
Materials in Contact with Sample: *304 Stainless steel, neoprene rubber, silicone rubber, CaF2/ sapphire, Teflon®*
Power Requirements: *115V AC ± 10%, 50/60 Hz (switch selectable)*
110 VA max. (200VA max with converter)
220V AC available
Gas Connections: *All ¼" compression-type tube fittings*
Size and Weight:
8.66 (H) x 17.44 (W) x 16.78 (D) inches (220 x 443 x 350 mm)
37.4 pounds (17 kg)

FUJI 730
NDIR SINGLE GAS ANALYZER

This unique Mass Flow Sensor used in the Fuji 730 Single Gas Analyzer provides significant advantages over other sensors used for this purpose. The design of the Mass Flow Detector minimizes the adverse effects of vibration which is often present in harsh environments. In addition the Mass Flow Sensor System virtually eliminates interference making the Fuji 730 a powerful analytical tool for monitoring burner and boiler efficiency heat treatment fermentation well logging and many other applications which require exceptional accuracy stability high sensitivity and reliabililty.

PRINCIPLE OF OPERATION

The Fuji 730 Series Analyzers use the infared adsorption characteristic of gases to measure the concentration of gas samples. An efficient single beam design which incorporates a unique mass flow sensor system insures accurate and interference free analysis for a wide variety of applications.

A single beam of infrared energy is chopped and passed through a sample cell containing the flowing as sample. Due to the adsorption characteristic, the amount of energy in the beam is reduced by the concentration of the measured gas in the sample. The attenuated infrared beam is passed serially through the twocavities of the mass flow sensor which contain a high concentration of the gas species the analyzer is intended to measure. The two cavity sensor performs two functions in the analyzing process, it first eliminates interference caused by other gases and water vapor by detecting and subtracting the interference component from the detector output, and secondly, produces an output signal which represents an accurate duplication of the relative infrared energy adsorption. This resultant signal is electronically processed and lineraized to provide an electrical signal which drives meters and other output devices.

STANDARD GASES:
Carbon Monoxide (CO)
Cardon Dioxide (CO_2)
Methane (CH_4)

STANDARD RANGES:
0-500/1000 ppm
0-1000/2000 ppm
0-2000/5000 ppm
0-2500/5000 ppm

0-0.5/1.0%
0-1/2%
0-2/5%
0-5/10%
1-10/20%

PURGE GAS FITTING
Standard Equipment

INTERNAL SPAN CHECK FEATURE
Calibration check without the use of span gases. Conserves gas and reduces operating costs.

SPECIFICATIONS

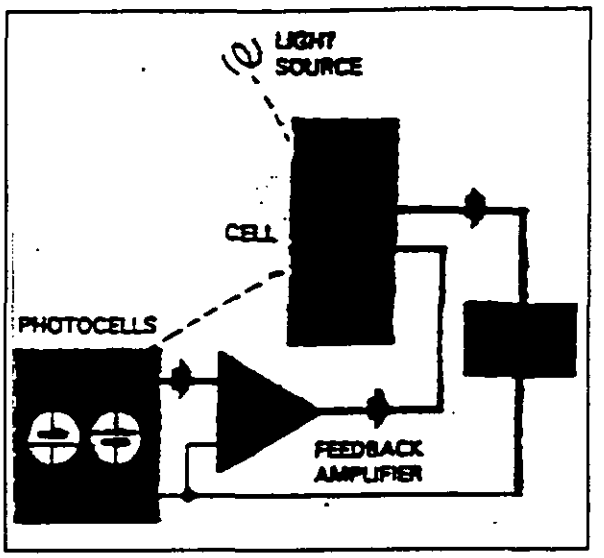
Repeatability:	±0.5% of full scale (low range) ±1.0% of full scale (high range)
Zero Drift*:	±1% of full scale per 24 hours
Span Drift*:	±1% of full scale per 24 hours
Linearity:	±2% of full scale (within linearizer)
Noise Level:	0.5% of full scale
Speed of Response:	90% indication
Electrical:	2, 3 or 5 seconds (field selectable)
Pneumatic:	Less than 15 seconds (depending on cell length)
Warm-Up:	Two hours (to ±2% full scale)
Internal Span Check:	Manually activated from front panel
Outputs:	0 to 1V DC, linear & 4-20mA DC, linear
Ambient Temperature Range:	23 to 113°F (-5 to 45°C)
Ambient Humidity:	To 90% R.H. (non-condensing)
Sample Gas Temperature:	32 to 122°F (0 to 50°C)
Sample Gas Flow Rate:	2 ± 1 scfh (1.0 ± .05 slpm)
Purge Gas Rate (where necessary):	2 scfh (1 slpm) when required
Power Requirements:	115V AC ± 10%, 60 Hz, 30VA
Gas Connections:	All ¼" compression-type tube fittings
Size and Weight:	7.9 (H) x 9.8 (W) x 21.3 (D) inches (200 x 250 x 541 mm) 24.2 pounds (11 kg)

***constant conditions**

PRINCIPLES OF OPERATION

SERVOMEX 1400 SERIES GAS ANALYZERS

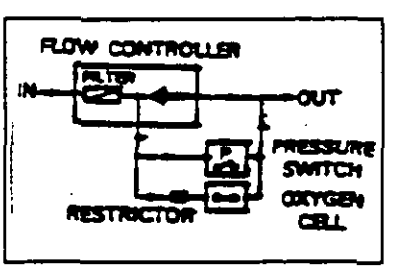
SPECIFICATION	OXYGEN
Principle	Magneto-dynamic
Linearity	±0.2% O_2
Repeatability	±0.2% $_2$
Zero Drift (Per Week)	<0.2% O_2
Signal Output	0-1V non-isolated for 0-100% O_2
Alarms	Flow alarm. 4 sets of changeover relay contacts rated at 3A/120V AC, 1A/240V AC or 1A/28V DC
Display	3½ digit LCD reading 0 to 100% O_2
Response Time	Less than 15 seconds to 90%
Operating Ambient Temperature	32 - 104°F (0-40°C)
Relative Humidity	0 - 85%, non-condensing
Sample Pressure	0.2 to 0.6 barg
Sample Contact Materials	Stainless steel, pyrex, glass, brass, platinum, epoxy resin, viton, polypropylene and glass fibre
AC Supply	110 to 120V AC, or 220 to 240V AC, ±10%, 48 to 62Hz, 15VA maximum
Dimensions	19" Rack - 4U case Bench top - 7.1" (180mm) hi gh, 10.1" (256mm) wide, 15.4" (390mm) deep
	22 lbs (10kg) approximately



PARAMAGNETIC OXYGEN

The oxygen analyzer measures the paramagnetic susceptibility of the sample gas by means of a magneto-dynamic type measuring cell.

Oxygen is virtually unique in being a paramagnetic gas, this means that it is attracted into a magnetic field. In the Servomex measuring cell, the oxygen concentration is detected by means of a dumb-bell mounted on a torque suspension in a strong, non-linear magnetic field. The higher the concentration of oxygen, the greater the dumb-bell is deflected from its rest position. this deflection is detected by an optical system and twin photocells connected to an amplifier. Around the dumb-bell is a coil of wire. A current is passed through this coil to return the dumb-bell to its original position. The current is measured and is proportional to the oxygen concentration.



Gas Flow Diagram

Advantages

- Not cross sensitive to most common gases
- Long lifetime
- Rugged Design
- No routine cell maintenance

8610 GAS CHROMATOGRAPH

Low Cost GC • Free Data System/Integrator

Field Portable • Built-In Purge and Trap

Temperature Programmable • Multiple Detectors

Miniature Lab GC

At a fraction of the cost, the SRI 8610 Gas Chromatograph provides the capabilities and sophistication of vastly larger and more expensive instruments in a small, lightweight and attractive package. More of a miniature laboratory GC than a true portable, the 8610 is the perfect size and weight for easy field use without sacrificing big GC features. In the lab or in the field, the 8610 Gas Chromatograph gives you up to five detectors plus a built-in purge and trap in a simple to operate, easy to trouble-shoot, and unbelievably low cost package. And, the Peaksimple Data System, provided free with every 8610 GC turns your IBM PC into a powerful chromatography integrator which also controls the 8610's temperature program and purge and trap.

Multi-Level Temperature Programming

Temperature programming is a standard feature on every 8610 GC. Up to 15 ramp/plateau segments permit maximum flexibility. Because the temperature program is controlled by the data system, an unlimited number of different temperature programs may be permanently stored on disk and activated with a few keystrokes. The 8610's temperature program can be controlled either by the Peaksimple Data System (included free with every GC) or by any other data system or integrator which has the ability to close relay contacts at specified times during the run.

Ultra Low Mass Column Oven

The SRI 8610's large easily accessible column oven is designed to fit all standard packed and capillary columns with diameters up to eight inches. The ultra-low mass design allows rapid heat-up and cool-down from ambient to 250 degrees centigrade. Interchangeable screw-in heater elements allow power consumption to be reduced for low temperature battery powered applications, or easy heater replacement in the event of a failure. Squirrel-cage type oven fan insures uniform heat distribution and stability to within .1 degree.

Digital Gas Flow Controllers

The carrier gas flow rate is regulated by a unique Digital Flow Controller. Precise and reproducible even at capillary flow rates below 1 cc/per minute, the carrier gas flow controller is standard equipment on every SRI 8610 GC (except low-cost student model). Digital dial allows flow rates to be adjusted without having to measure actual flows with a bubblemeter. A column head pressure gauge is provided to alert the operator to leaks or blockages in the column. The same flow controller is optionally available for hydrogen and air combustion gas flows (recommended for NPD operation). In addition, inlet pressure regulators are supplied for each gas to isolate the GC from fluctuations in gas supply pressure.

Direct Cool On Column Injection

The zero-dead volume on-column injector is designed for state of the art, cool on-column injections using both packed and wide-bore capillary (.53 mm). A special wide-bore adapter positions the .53 mm column so the syringe smoothly deposits the sample in the bore of the column itself. This provides a totally inert, metal and glass free sample path. Peaks are exceptionally sharp and well resolved.

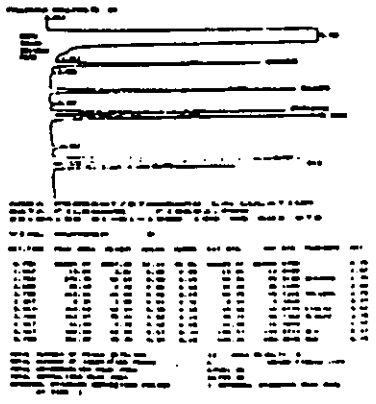
Detectors

Thermal Conductivity (TCD)	*Photo-Ionization (PID)*
Flame Ionization (FID)	*Electron Capture (ECD)*
Nitrogen-Phosphorus (NPD)	*Hall Detector (HALL or ELCD)*
Thermionic Ionization (TID)	*Flame Photometric (FPD)*

Up to 3 detectors may be mounted simultaneously and plumbed in series so that one injection passes through each detector and into the next. Common series configurations include:

(PID-FID), (TCD-FID), (PID-ECD), (PID-HALL) and (PID-ECD-FID).

D:\DONNA\8610GAS.DJB



100 NG. 602 STD. Data plotted using Peaksimple Data System.

MODEL 10
FOR CONTINUOUS SOURCE GAS MONITORING

CHEMILUMINESCENT NO/NO_x ANALYZER

Thermo Electron's Model 10 NO/NO_x Analyzer is based on the chemiluminescent reaction between nitric oxide (NO) and ozone (O_3) according to the reaction: $NO + O_3 \rightarrow NO_2 + O_2 + h\nu$

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

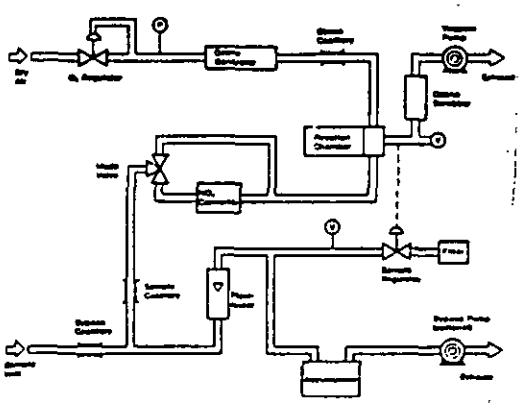
A front panel mode switch provides for either a direct readout of the NO concentration in the sample being analyzed ("NO" mode) or the total NO_x concentration ("NO_x" mode). When the Model 10 is placed in the "NO_x" mode, the sample stream passes through a NO_x-to-NO converter prior to entering the reaction chamber for subsequent analysis.

Key Features

- *Selective detection of NO or NO_x*
- *Eight ranges, from 2.5 to 10,000 ppm FS*
- *Continuous monitoring with rapid response*
- *Linear on all ranges*
- *Field proven reliability*
- *Insensitive to changes in sample flow*

As illustrated in the diagram, sample gas enters the Model 10, flows through the bypass capillary, and divides. Most of the sample flows through the flowmeter, accumulator, bypass pump, and exhausts. Only a small amount of sample flows through the sample capillary for analysis. The bypass pump in conjunction with the sample regulator maintain a constant pressure differential across the sample capillary, thus maintaining constant sample flow for analysis. This plumbing network makes the analyzer insensitive to pressure fluctuation in the sample inlet.

From the sample capillary, the sample to be analyzed is either directed through the NO_x to NO converter or around it, depending on the choice of the operator. In the reaction chamber the sample reacts with ozone to produce the light emission and is exhausted. The ozone is produced internally from dry air entering through the oxygen regulator and ozonator. The light emission is sensed by the photomultiplier tube and amplified.



Model 10 Specifications*

Ranges	*0-2.5*	*ppm*	*0-250*	*ppm*
	0-10	*ppm*	*0-1000*	*ppm*
	0-25	*ppm*	*0-2500*	*ppm*
	0-100	*ppm*	*0-10,000*	*ppm*
Minimum Detectable Concentration	*.05 ppm*			
Noise	*Less than 1% of FS*			
Reproducibility	*1% of FS*			
Operating Temperature Extremes	*0-40°C*			
Response Time (0-90%)	*~1.5 second NO mode* *~1.7 second NO_x mode*			
Zero Stability	*± 1 ppm in 24 hours*			
Span Stability	*± 1% in 24 hours*			
Linearity	*± 1% from 0.05 to 10,000 ppm***			
Power Requirements	*1000 watts, 115 ± 10 volts, 60 Hz standard.* *Also available in 115V 50 Hz, and 210 ± 15 volts, 50 Hz versions*			
Physical Dimensions	*19" wide x 17" high x 20" deep*			
Instrument Weight	*75 lbs. (including pump)*			
Outputs	*Two standard outputs supplied: 1) 0-10V;* *2) Field selectable from 0-10V, 5V, 1V, 100mV or 10mV.* *(ma options available.)*			

**Specifications are typical and subject to change without notice.*
***With O_2 Feed; With dry air, linearity to 2000 ppm.*

CALCULATIONS

A. SO_2, THC, CO, NO_X and CH_4

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

CO
GASEOUS CONCENTRATION CONVERSION TO mg/m³

Example Calculation

$$\text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{28.01\ \text{g}}{\text{mole}}\left|\frac{1{,}000\ \text{mg}}{\text{g}}\right| = \frac{\text{mg}}{\text{m}^3}$$

Where:

ppm	=	Parts per million, dry basis
1×10^{-6}	=	Conversion form parts per million
28.317	=	Conversion of liters to ft³
35,3145	=	Conversion of ft³ to m³
273/293°K	=	Temperature correction to standard conditions
22.4ℓ	=	Volumetric molar conversion @ 273°K
28.01 g/mole	=	Molecular weight of pollutant
1,000 mg/g	=	Conversion to milligrams

Run #1:

$$572.3\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{28.01\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 666.8\ \frac{\text{mg}}{\text{m}^3}$$

Run #2:

$$579.2\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{28.01\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 674.8\ \frac{\text{mg}}{\text{m}^3}$$

Run #3:

$$519.0\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{28.01\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 604.7\ \frac{\text{mg}}{\text{m}^3}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

THC
GASEOUS CONCENTRATION CONVERSION TO mg/m³

Example Calculation

$$\text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{16.04\ \text{g}}{\text{mole}}\left|\frac{1{,}000\ \text{mg}}{\text{g}}\right| = \frac{\text{mg}}{\text{m}^3}$$

Where:

ppm	=	Parts per million, dry basis
1×10^{-6}	=	Conversion form parts per million
28.317	=	Conversion of liters to ft³
35,3145	=	Conversion of ft³ to m³
273/293°K	=	Temperature correction to standard conditions
22.4ℓ	=	Volumetric molar conversion @ 273°K
16.04 g/mole	=	Molecular weight of pollutant (CH_4)
1,000 mg/g	=	Conversion to milligrams

Run #1:

$$90.4\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{16.04\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 60.3\ \frac{\text{mg}}{\text{m}^3}$$

Run #2:

$$49.9\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{16.04\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 33.3\ \frac{\text{mg}}{\text{m}^3}$$

Run #3:

$$179.0\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{16.04\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 119.4\ \frac{\text{mg}}{\text{m}^3}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

NO_x
GASEOUS CONCENTRATION CONVERSION TO mg/m³

Example Calculation

$$\text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{46.01\ \text{g}}{\text{mole}}\left|\frac{1{,}000\ \text{mg}}{\text{g}}\right| = \frac{\text{mg}}{\text{m}^3}$$

Where:

ppm	=	Parts per million, dry basis
1×10^{-6}	=	Conversion form parts per million
28.317	=	Conversion of liters to ft³
35,3145	=	Conversion of ft³ to m³
273/293°K	=	Temperature correction to standard conditions
22.4ℓ	=	Volumetric molar conversion @ 273°K
46.01 g/mole	=	Molecular weight of pollutant
1,000 mg/g	=	Conversion to milligrams

Run #1:

$$33.8\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{46.01\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 64.7\ \frac{\text{mg}}{\text{m}^3}$$

Run #2:

$$26.5\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{46.01\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 50.7\ \frac{\text{mg}}{\text{m}^3}$$

Run #3:

$$26.3\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{\text{ft}^3}\left|\frac{35.3145\ \text{ft}^3}{\text{m}^3}\right|\frac{273°\text{K}}{293°\text{K}}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{46.01\ \text{g}}{\text{mole}}\left|\frac{1000\ \text{mg}}{\text{g}}\right| = 50.3\ \frac{\text{mg}}{\text{m}^3}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992

SO_2
GASEOUS CONCENTRATION CONVERSION TO mg/m^3

Example Calculation

$$\text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{ft^3}\left|\frac{35.3145\ ft^3}{m^3}\right|\frac{273°K}{293°K}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{64.07\ g}{\text{mole}}\left|\frac{1{,}000\ mg}{g}\right| = \frac{mg}{m^3}$$

Where:

ppm	=	Parts per million, dry basis
1×10^{-6}	=	Conversion form parts per million
28.317	=	Conversion of liters to ft^3
35,3145	=	Conversion of ft^3 to m^3
273/293°K	=	Temperature correction to standard conditions
22.4ℓ	=	Volumetric molar conversion @ 273°K
64.07 g/mole	=	Molecular weight of pollutant
1,000 mg/g	=	Conversion to milligrams

Run #1:

$$5.3\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{ft^3}\left|\frac{35.3145\ ft^3}{m^3}\right|\frac{273°K}{293°K}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{64.07\ g}{\text{mole}}\left|\frac{1000\ mg}{g}\right| = 14.1\ \frac{mg}{m^3}$$

Run #2:

$$1.5\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{ft^3}\left|\frac{35.3145\ ft^3}{m^3}\right|\frac{273°K}{293°K}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{64.07\ g}{\text{mole}}\left|\frac{1000\ mg}{g}\right| = 4.0\ \frac{mg}{m^3}$$

Run #3:

$$4.2\ \text{ppm}\left|\frac{1}{1\times10^{-6}}\right|\frac{28.317\ \ell}{ft^3}\left|\frac{35.3145\ ft^3}{m^3}\right|\frac{273°K}{293°K}\left|\frac{\text{mole}}{22.4\ \ell}\right|\frac{64.07\ g}{\text{mole}}\left|\frac{1000\ mg}{g}\right| = 11.2\ \frac{mg}{m^3}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

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

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #1 = $(70.1) \left(\frac{100}{100 - 22.43} \right) = 90.4 \ ppm_d$

Run #2 = $(38.3) \left(\frac{100}{100 - 23.17} \right) = 49.9 \ ppm_d$

Run #3 = $(137.5) \left(\frac{100}{100 - 23.17} \right) = 179.0 \ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

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

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #4 = $(104.2) \left(\frac{100}{100 - 23.17} \right) = 135.6 \ ppm_d$

Run #5 = $(47.3.) \left(\frac{100}{100 - 23.17} \right) = 61.6 \ ppm_d$

Run #6 = $(125.2) \left(\frac{100}{100 - 24.10} \right) = 165.0 \ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

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

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #7 = $(66.1) \left(\frac{100}{100 - 25.39} \right) = 88.6 \ ppm_d$

Run #8 = $(51.6) \left(\frac{100}{100 - 24.50} \right) = 68.3 \ ppm_d$

Run #9 = $(51.1) \left(\frac{100}{100 - 22.32} \right) = 65.8 \ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

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

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #10 = $(67.5) \left(\frac{100}{100 - 23.72} \right) = 88.5 \ ppm_d$

Run #11 = $(58.3) \left(\frac{100}{100 - 24.20} \right) = 76.9 \ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL HYDROCARBON EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #1:

$E = (2.59 \times 10^{-9})\ (16.04)\ (\ 90.4)\ (1{,}645{,}934.7) = 6.18$ lbs/hr

Run #2:

$E = (2.59 \times 10^{-9})\ (16.04)\ (\ 49.9)\ (1{,}556{,}163.7) = 3.23$ lbs/hr

Run #3:

$E = (2.59 \times 10^{-9})\ (16.04)\ (179.0)\ (1{,}556{,}163.7) = 11.57$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL HYDROCARBON EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #4:

$E = (2.59 \times 10^{-9})\ (16.04)\ (135.6)\ (1{,}556{,}163.7) = 8.77$ lbs/hr

Run #5:

$E = (2.59 \times 10^{-9})\ (16.04)\ (61.6.)\ (1{,}556{,}163.7) = 3.98$ lbs/hr

Run #6:

$E = (2.59 \times 10^{-9})\ (16.04)\ (165.0)\ (1{,}614{,}735.9) = 11.07$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL HYDROCARBON EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #7:

$E = (2.59 \times 10^{-9})\ (16.04)\ (88.6.)\ (1,665,861.0) = 6.13$ lbs/hr

Run #8:

$E = (2.59 \times 10^{-9})\ (16.04)\ (68.3)\ (1,720,832.5) = 4.88$ lbs/hr

Run #9:

$E = (2.59 \times 10^{-9})\ (16.04)\ (65.8)\ (1,466,125.1) = 4.01$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL HYDROCARBON EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #10:

$E = (2.59 \times 10^{-9})\ (16.04)\ (88.5)\ (1{,}703{,}111.6) = 6.26$ lbs/hr

Run #11:

$E = (2.59 \times 10^{-9})\ (16.04)\ (76.9)\ (1{,}773{,}126.1) = 5.66$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: September 1-4, 1992

TOTAL CARBON MONOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CO = 28.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #1:

$E = (2.59 \times 10^{-9})\ (28.01)\ (572.3)\ (1{,}645{,}934.7) = 68.34$ lbs/hr

Run #2:

$E = (2.59 \times 10^{-9})\ (28.01)\ (569.2)\ (1{,}556{,}163.7) = 65.39$ lbs/hr

Run #3:

$E = (2.59 \times 10^{-9})\ (28.01)\ (519.0)\ (1{,}556{,}163.7) = 58.59$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL CARBON MONOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CO = 28.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #4:

$E = (2.59 \times 10^{-9})\ (28.01)\ (551.7)\ (1{,}556{,}163.7) = 62.28$ lbs/hr

Run #5:

$E = (2.59 \times 10^{-9})\ (28.01)\ (475.0)\ (1{,}556{,}163.7) = 53.62$ lbs/hr

Run #6:

$E = (2.59 \times 10^{-9})\ (28.01)\ (643.6)\ (1{,}614{,}735.9) = 75.39$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL CARBON MONOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CO = 28.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #7:

$E = (2.59 \times 10^{-9})\ (28.01)\ (650.9)\ (1{,}665{,}861.0) = 78.66$ lbs/hr

Run #8:

$E = (2.59 \times 10^{-9})\ (28.01)\ (715.0)\ (1{,}720{,}832.5) = 89.26$ lbs/hr

Run #9:

$E = (2.59 \times 10^{-9})\ (28.01)\ (393.7)\ (1{,}466{,}125.1) = 41.87$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL CARBON MONOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CO = 28.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #10:

$E = (2.59 \times 10^{-9})\ (28.01)\ (214.5)\ (1{,}703{,}111.6) = 26.50$ lbs/hr

Run #11:

$E = (2.59 \times 10^{-9})\ (28.01)\ (277.4)\ (1{,}773{,}126.1) = 35.68$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL NO_x EMISSIONS: POUNDS PER HOUR

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

Where:

E = NO_x as NO_2 emissions rate, lbs/hr.

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

M_d = Dry molecular weight (NO_2 = 46.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #1:

$E = (2.59 \times 10^{-9})\ (46.01)\ (33.8)\ (1{,}645{,}934.7) = 6.63$ lbs/hr

Run #2:

$E = (2.59 \times 10^{-9})\ (46.01)\ (26.5)\ (1{,}556{,}163.7) = 4.91$ lbs/hr

Run #3:

$E = (2.59 \times 10^{-9})\ (46.01)\ (26.3)\ (1{,}556{,}163.7) = 4.88$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL NO_x EMISSIONS: POUNDS PER HOUR

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

Where:

E = NO_x as NO_2 emissions rate, lbs/hr.

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

M_d = Dry molecular weight (NO_2 = 46.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #4:

$E = (2.59 \times 10^{-9})\ (46.01)\ (28.9)\ (1{,}556{,}163.7) = 5.36$ lbs/hr

Run #5:

$E = (2.59 \times 10^{-9})\ (46.01)\ (29.4)\ (1{,}556{,}163.7) = 5.45$ lbs/hr

Run #6:

$E = (2.59 \times 10^{-9})\ (46.01)\ (41.3)\ (1{,}614{,}735.9) = 7.95$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL NO_x EMISSIONS: POUNDS PER HOUR

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

Where:

E = NO_x as NO_2 emissions rate, lbs/hr.

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

M_d = Dry molecular weight (NO_2 = 46.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #7:

$E = (2.59 \times 10^{-9})\ (46.01)\ (43.2)\ (1{,}665{,}861.0) = 8.58$ lbs/hr

Run #8:

$E = (2.59 \times 10^{-9})\ (46.01)\ (37.4)\ (1{,}720.832.5) = 7.67$ lbs/hr

Run #9:

$E = (2.59 \times 10^{-9})\ (46.01)\ (30.1)\ (1{,}466{,}125.1) = 5.26$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL NO_x EMISSIONS: POUNDS PER HOUR

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

Where:

E = NO_x as NO_2 emissions rate, lbs/hr.

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

M_d = Dry molecular weight (NO_2 = 46.01).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #10:

$E = (2.59 \times 10^{-9})\ (46.01)\ (28.3)\ (1{,}703{,}111.6) = 5.74$ lbs/hr

Run #11:

$E = (2.59 \times 10^{-9})\ (46.01)\ (34.4)\ (1{,}773{,}126.1) = 7.27$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL SULFUR DIOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (SO_2 = 64.07).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #1:

$E = (2.59 \times 10^{-9})\ (64.07)\ (5.3)\ (1{,}645{,}934.7) = 1.45$ lbs/hr

Run #2:

$E = (2.59 \times 10^{-9})\ (64.07)\ (1.5)\ (1{,}556{,}163.7) = 0.39$ lbs/hr

Run #3:

$E = (2.59 \times 10^{-9})\ (64.07)\ (4.2)\ (1{,}556{,}163.7) = 1.08$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL SULFUR DIOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (SO_2 = 64.07).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #4:

$E = (2.59 \times 10^{-9})\ (64.07)\ (3.3)\ (1{,}556{,}163.7) = 0.85$ lbs/hr

Run #5:

$E = (2.59 \times 10^{-9})\ (64.07)\ (2.4)\ (1{,}556{,}163.7) = 0.62$ lbs/hr

Run #6:

$E = (2.59 \times 10^{-9})\ (64.07)\ (4.3)\ (1{,}614{,}735.9) = 1.15$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL SULFUR DIOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (SO_2 = 64.07).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #7:

$E = (2.59 \times 10^{-9})\ (64.07)\ (2.7)\ (1{,}665{,}861.0) = 0.75$ lbs/hr

Run #8:

$E = (2.59 \times 10^{-9})\ (64.07)\ (3.0)\ (1{,}720{,}832.5) = 0.86$ lbs/hr

Run #9:

$E = (2.59 \times 10^{-9})\ (64.07)\ (2.5)\ (1{,}446{,}125.1) = 0.60$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

TOTAL SULFUR DIOXIDE EMISSIONS: POUNDS PER HOUR

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

Where:

E = CO emissions rate, lbs/hr.

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

M_d = Dry molecular weight (SO_2 = 64.07).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #10:

$E = (2.59 \times 10^{-9})\ (64.07)\ (4.0)\ (1{,}703{,}111.6) = 1.13$ lbs/hr

Run #11:

$E = (2.59 \times 10^{-9})\ (64.07)\ (6.2)\ (1{,}773{,}126.1) = 1.82$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE EMISSIONS - Convert ppm (wet) to ppm (dry)

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #1 = $(39.4) \left(\frac{100}{100 - 22.43} \right) = 50.8\ ppm_d$

Run #2 = $(91.2) \left(\frac{100}{100 - 23.17} \right) = 118.7\ ppm_d$

Run #3 = $(107.8) \left(\frac{100}{100 - 23.17} \right) = 140.3\ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE EMISSIONS - Convert ppm (wet) to ppm (dry)

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #4 = $(119.3) \left(\frac{100}{100 - 24.10} \right) = 157.2 \ ppm_d$

Run #5 = $(39.8) \left(\frac{100}{100 - 25.39} \right) = 53.3 \ ppm_d$

Run #6 = $(58.8) \left(\frac{100}{100 - 24.50} \right) = 77.9 \ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE EMISSIONS - Convert ppm (wet) to ppm (dry)

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

Where:

ppm_d = Parts per million, dry basis, as carbon.

ppm_w = Parts per million, wet basis, as carbon.

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

Run #7 = $(37.9) \left(\frac{100}{100 - 22.32} \right) = 48.8\ ppm_d$

Run #8 = $(64.2) \left(\frac{100}{100 - 23.72} \right) = 84.2\ ppm_d$

Run #9 = $(93.5) \left(\frac{100}{100 - 24.20} \right) = 123.4\ ppm_d$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #1:

$E = (2.59 \times 10^{-9})\ (16.04)\ (\ 50.8)\ (1{,}645{,}934.7) = 3.47$ lbs/hr

Run #2:

$E = (2.59 \times 10^{-9})\ (16.04)\ (118.7)\ (1{,}556{,}163.7) = 7.67$ lbs/hr

Run #3:

$E = (2.59 \times 10^{-9})\ (16.04)\ (140.3)\ (1{,}556{,}163.7) = 9.07$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #4:

$E = (2.59 \times 10^{-9})\ (16.04)\ (157.2)\ (1{,}614{,}735.9) = 10.55$ lbs/hr

Run #5:

$E = (2.59 \times 10^{-9})\ (16.04)\ (53.3)\ (1{,}665{,}861.0) = 3.69$ lbs/hr

Run #6:

$E = (2.59 \times 10^{-9})\ (16.04)\ (77.9)\ (1{,}720{,}832.5) = 5.57$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE EMISSIONS: POUNDS PER HOUR

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

Where:

E = THC as methane emissions rate, lbs/hr.

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

M_d = Dry molecular weight (CH_4 = 16.04).

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

ppm_d = Parts per million, dry basis.

K = Constant (typically 1).

Run #7:

$E = (2.59 \times 10^{-9})\ (16.04)\ (48.8)\ (1,466,125.1) = 2.97$ lbs/hr

Run #8:

$E = (2.59 \times 10^{-9})\ (16.04)\ (84.2)\ (1,703,111.6) = 5.96$ lbs/hr

Run #9:

$E = (2.59 \times 10^{-9})\ (16.04)\ (123.4)\ (1,773,126.1) = 9.09$ lbs/hr

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE
GASEOUS CONCENTRATION CONVERSION TO mg/m³

$$\text{ppm}\left|\begin{array}{c|c|c|c|c|c|c} 1 & 28.317\ \ell & 35.3145\ \text{ft}^3 & 273°\text{K} & \text{mole} & 16.04\ \text{g} & 1{,}000\ \text{mg} \\ \hline 1\text{x}10^{-6} & \text{ft}^3 & \text{m}^3 & 293°\text{K} & 22.4\ \ell & \text{mole} & \text{g} \end{array}\right| = \frac{\text{mg}}{\text{m}^3}$$

Where:

ppm	=	Parts per million, dry basis
$1\text{x}10^{-6}$	=	Conversion form parts per million
28.317	=	Conversion of liters to ft³
35,3145	=	Conversion of ft³ to m³
273/293°K	=	Temperature correction to standard conditions
22.4ℓ	=	Volumetric molar conversion @ 273°K
16.04 g/mole	=	Molecular weight of pollutant (CH_4)
1,000 mg/g	=	Conversion to milligrams

Run #1:

$$50.8\ \text{ppm}\left|\begin{array}{c|c|c|c|c|c|c} 1 & 28.317\ \ell & 35.3145\ \text{ft}^3 & 273°\text{K} & \text{mole} & 16.04\ \text{g} & 1000\ \text{mg} \\ \hline 1\text{x}10^{-6} & \text{ft}^3 & \text{m}^3 & 293°\text{K} & 22.4\ \ell & \text{mole} & \text{g} \end{array}\right| = 33.9\ \frac{\text{mg}}{\text{m}^3}$$

Run #2:

$$118.7\ \text{ppm}\left|\begin{array}{c|c|c|c|c|c|c} 1 & 28.317\ \ell & 35.3145\ \text{ft}^3 & 273°\text{K} & \text{mole} & 16.04\ \text{g} & 1000\ \text{mg} \\ \hline 1\text{x}10^{-6} & \text{ft}^3 & \text{m}^3 & 293°\text{K} & 22.4\ \ell & \text{mole} & \text{g} \end{array}\right| = 79.2\ \frac{\text{mg}}{\text{m}^3}$$

Run #3:

$$140.3\ \text{ppm}\left|\begin{array}{c|c|c|c|c|c|c} 1 & 28.317\ \ell & 35.3145\ \text{ft}^3 & 273°\text{K} & \text{mole} & 16.04\ \text{g} & 1000\ \text{mg} \\ \hline 1\text{x}10^{-6} & \text{ft}^3 & \text{m}^3 & 293°\text{K} & 22.4\ \ell & \text{mole} & \text{g} \end{array}\right| = 93.6\ \frac{\text{mg}}{\text{m}^3}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE
GASEOUS CONCENTRATION CONVERSION TO mg/m³

$$\text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1{,}000\ \text{mg}}{\text{g}} \right| = \frac{\text{mg}}{\text{m}^3}$$

Where:

ppm	=	Parts per million, dry basis
1×10^{-6}	=	Conversion form parts per million
28.317	=	Conversion of liters to ft³
35,3145	=	Conversion of ft³ to m³
273/293°K	=	Temperature correction to standard conditions
22.4ℓ	=	Volumetric molar conversion @ 273°K
16.04 g/mole	=	Molecular weight of pollutant (CH_4)
1,000 mg/g	=	Conversion to milligrams

Run #4:

$$157.2\ \text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1000\ \text{mg}}{\text{g}} \right| = 104.9\ \frac{\text{mg}}{\text{m}^3}$$

Run #5:

$$53.5\ \text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1000\ \text{mg}}{\text{g}} \right| = 35.6\ \frac{\text{mg}}{\text{m}^3}$$

Run #6:

$$77.9\ \text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1000\ \text{mg}}{\text{g}} \right| = 52.0\ \frac{\text{mg}}{\text{m}^3}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI **DATE:** September 1-4, 1992

METHANE
GASEOUS CONCENTRATION CONVERSION TO mg/m³

$$\text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1{,}000\ \text{mg}}{\text{g}} \right| = \frac{\text{mg}}{\text{m}^3}$$

Where:

ppm	=	Parts per million, dry basis
1×10^{-6}	=	Conversion form parts per million
28.317	=	Conversion of liters to ft³
35,3145	=	Conversion of ft³ to m³
273/293°K	=	Temperature correction to standard conditions
22.4 ℓ	=	Volumetric molar conversion @ 273°K
16.04 g/mole	=	Molecular weight of pollutant (CH_4)
1,000 mg/g	=	Conversion to milligrams

Run #7:

$$48.8\ \text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1000\ \text{mg}}{\text{g}} \right| = 32.6\ \frac{\text{mg}}{\text{m}^3}$$

Run #8:

$$84.2\ \text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1000\ \text{mg}}{\text{g}} \right| = 56.2\ \frac{\text{mg}}{\text{m}^3}$$

Run #9:

$$123.4\ \text{ppm} \left| \frac{1}{1\times10^{-6}} \right| \frac{28.317\ \ell}{\text{ft}^3} \left| \frac{35.3145\ \text{ft}^3}{\text{m}^3} \right| \frac{273°\text{K}}{293°\text{K}} \left| \frac{\text{mole}}{22.4\ \ell} \right| \frac{16.04\ \text{g}}{\text{mole}} \left| \frac{1000\ \text{mg}}{\text{g}} \right| = 82.3\ \frac{\text{mg}}{\text{m}^3}$$

V. CALCULATIONS

B. Particulate — Condensibles

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

SUMMARY OF TEST DATA

		Run #1 09-01-92	Run #2 09-02-92	Run #3 09-02-92
SAMPLING TRAIN DATA	Start	12:10	11:01	15:16
	Finish	13:17	14:00	15:26
1. Sampling time, minutes	θ	60.0	60.0	10.0
2. Sampling nozzle diameter, in.	D_n	.2500	.2500	.2500
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000340	.000340	.000340
4. Isokinetic variation	I	97.5	98.8	81.4
5. Sample gas volume - meter cond., cf.	V_m	41.297	38.925	4.566
6. Average meter temperature, °R	T_m	564	553	554
7. Avg. orifice pressure drop, in. H_2O	ΔH	1.42	1.20	0.81
8. Total particulate collected, mg.	M_n	17.10	7.10	5.50
VELOCITY TRAVERSE DATA				
9. Stack area, $ft.^2$	A	14.08	14.08	14.08
10. Absolute stack gas pressure, in. Hg.	P_s	30.16	30.09	30.09
11. Barometric pressure, in. Hg.	P_{bar}	30.16	30.09	30.09
12. Avg. absolute stack temperature, R°	T_s	638	632	603
13. Average √vel. head, (C_p = .84)	√dp	0.79	0.75	0.60
14. Average stack gas velocity, ft./sec.	V_s	50.18	47.56	36.81
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{ic}	238.00	237.50	22.00
16. Moisture in stack gas, %	B_{ws}	22.43	23.17	18.71
EMISSION DATA				
17. Stack gas flow rate, dscf/hr. (000's)	Q_{sd}	1645	1556	1335
18. Stack gas flow rate, cfm	acfm	42392	40179	31097
19. Particulate concentration, gr/dscf	C_s	0.0068	0.0029	0.0195
20. Particulate concentration, lb/hr	E	1.60	0.64	3.72
21. Particulate concentration, lb/mBtu	E'	0.00000	0.00000	0.00000
ORSAT DATA				
22. Percent CO_2 by volume	CO_2	7.30	7.00	7.00
23. Percent O_2 by volume	O_2	12.20	12.70	12.70
24. Percent CO by volume	CO	.00	.00	.00
25. Percent N_2 by volume	N_2	80.50	80.30	80.30

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

DRY GAS VOLUME

$$V_{m(s\,d)} =$$

$$V_m \left[\frac{T_{(std)}}{T_m}\right] \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right] - 17.64 \frac{°R}{\epsilon.\ Hg}\ Y\ V_m \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

Where:

$V_{m(s\,d)}$ = Dry gas volume through meter at standard conditions, ft^3.
V_m = Dry gas volume measured by meter, ft^3.
P_{bar} = Barometric pressure at orifice meter, in. Hg.
$P_{s\,d}$ = Standard absolute pressure, (29.92 in. Hg.).
T_m = Absolute temperature at meter, °R.
$T_{s\,d}$ = Standard absolute temperature, (528°R).
ΔH = Avg. pressure drop across orifice meter, in. H_2O.
Y = Dry gas meter calibration factor.
13.6 = Inches of water per Hg.

Run #1:

$$V_{m(std)} - (17.64)(0.991)(41.297)\left[\frac{30.16. + \frac{1.42}{13.6}}{564}\right] - 38.739\ dscf$$

Run #2:

$$V_{m(std)} - (17.64)(0.991)(38.925)\left[\frac{30.09 + \frac{1.20}{13.6}}{553}\right] - 37.134\ dscf$$

Run #3:

$$V_{m(std)} - (17.64)(0.991)(4.566)\left[\frac{30.09 + \frac{0.81}{13.6}}{554}\right] - 4.344\ dscf$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

Particulate Concentration: C_S gr/dscf

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

Where:

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

M_n = Total amount of particulate matter collected, mg.

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

Run #1:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{17.10}{38.739}\right] = 0.0068 \text{ gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{7.10}{37.134}\right] = 0.0029 \text{ gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{5.50}{4.344}\right] = 0.0195 \text{ gr/dscf}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

Organic Condensible Particulate

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

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

Where:

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

M_n = Total amount of particulate matter collected, mg.

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

Run #1:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{29.90}{38.739}\right] = 0.0119 \text{ gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{27.50}{37.134}\right] = 0.0114 \text{ gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{37.80}{4.344}\right] = 0.1340 \text{ gr/dscf}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

Inorganic Condensible Particulate

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

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

Where:

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

M_n = Total amount of particulate matter collected, mg.

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

Run #1:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{7.3}{38.739}\right] = 0.0029 \text{ gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{9.6}{37.134}\right] = 0.0040 \text{ gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{9.0}{4.344}\right] = 0.0319 \text{ gr/dscf}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

DRY MOLECULAR WEIGHT

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

Where:

M_d = Dry molecular weight, lb/lb-mole.
$\%CO_2$ = Percent carbon dioxide by volume, dry basis.
$\%O_2$ = Percent oxygen by volume, dry basis.
$\%N_2$ = Percent nitrogen by volume, dry basis.
%CO = Percent carbon monoxide by volume, dry basis.
0.264 = Ratio of O_2 to N_2 in air, v/v.
0.28 = Molecular weight of N_2 or CO, divided by 100.
0.32 = Molecular weight of O_2 divided by 100.
0.44 = Molecular weight of CO_2 divided by 100.

Run #1:

$$M_d = 0.44\ (7.30\%) + 0.32\ (12.20\%) + 0.28\ (0.00\% + 80.50\%) = 29.66\ \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_d = 0.44\ (7.00\%) + 0.32\ (12.70\%) + 0.28\ (0.00\% + 80.30\%) = 29.63\ \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_d = 0.44\ (7.00\%) + 0.32\ (12.70\%) + 0.28\ (0.00\% + 80.30\%) = 29.63\ \frac{lb}{lb\text{-}mole}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

WATER VAPOR CONDENSED

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

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

Where:

0.04707	=	Conversion factor, ft^3/ml.
0.04715	=	Conversion factor, ft^3/g.
$Vwc_{s\,d}$	=	Volume of water vapor condensed (std. cond.), ml.
$Vwsg_{s\,d}$	=	Volume of water vapor collected in silica gel (standard conditions), ml.
$V_f - V_i$	=	Final volume of impinger contents less initial volume, ml.
$W_f - W_i$	=	Final weight of silica gel less initial weight, g.
P_w	=	Density of water, 0.002201 lb/ml.
R	=	Ideal gas constant, 21.85 in.Hg. (cu.ft./lb-mole)(°R).
M_w	=	Molecular weight of water vapor, 18.0 lb/lb-mole.
$T_{s\,d}$	=	Absolute temperature at standard conditions, 528°R.
$P_{s\,d}$	=	Absolute pressure at standard conditions, 29.92 inches Hg.

Run 1:

$$V_{wc_{std}} = (0.04707) \; (238.0) = 11.2 \text{ cu.ft}$$
$$V_{wsg_{std}} = (0.04715) \; (.0) = 0.0 \text{ cu.ft}$$

Run 2:

$$V_{wc_{std}} = (0.04707) \; (235.0) = 11.1 \text{ cu.ft}$$
$$V_{wsg_{std}} = (0.04715) \; (2.5) = 0.1 \text{ cu.ft}$$

Run 3:

$$V_{wc_{std}} = (0.04707) \; (22.0) = 1.0 \text{ cu.ft}$$
$$V_{wsg_{std}} = (0.04715) \; (.0) = 0.0 \text{ cu.ft}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

MOISTURE CONTENT OF STACK GASES

$$B_{ws} = \left[\frac{V_{wc_{std}} + V_{wsg_{std}}}{V_{wc_{std}} + V_{wsg_{std}} + V_{mstd}} \right] \times 100$$

Where:

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

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

Vwc_{std} = Volume of water vapor condensed, corrected to standard conditions, scf.

$Vwsg_{std}$ = Volume of water vapor collected in silica gel corrected to std. cond., scf.

Run 1:

$$B_{ws} = \left[\frac{11.2 + 0.0}{11.2 + 0.0 + 38.739} \right] \times 100 = 22.43\%$$

Run 2:

$$B_{ws} = \left[\frac{11.1 + 0.1}{11.1 + 0.1 + 37.134} \right] \times 100 = 23.17\%$$

Run 3:

$$B_{ws} = \left[\frac{1.0 + 0.0}{1.0 + 0.0 + 4.344} \right] \times 100 = 18.71\%$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

MOLECULAR WEIGHT OF STACK GASES

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

Where:

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

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

Run #1:

$$M_s = 29.66 (1 - 22.43) + 18 (22.43) = 27.04 \text{ (lb./lb.-mole)}$$

Run #2:

$$M_s = 29.63 (1 - 23.17) + 18 (23.17) = 26.94 \text{ (lb./lb.-mole)}$$

Run #1:

$$M_s = 29.63 (1 - 18.71) + 18 (18.71) = 27.45 \text{ (lb./lb.-mole)}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

STACK GAS VELOCITY

$$V_s = K_p \; C_p \; [\sqrt{\Delta P}]_{avg} \; \sqrt{\frac{T_s(avg)}{P_s \; M_s}}$$

Where:

V_s = Average velocity of gas stream in stack, ft/sec.
K_p = 85.49 ft/sec [(g/g-mole) - (mm Hg)/(°K)(mm H_2O)]$^{1/2}$
C_p = Pitot tube coefficient, dimensionless.
ΔP = Velocity head of stack gas, in. H_2O.
P_{bar} = Barometric pressure at measurement site, in. Hg.
P_g = Stack static pressure, in. Hg.
P_s = Absolute stack gas pressure, in. Hg. = $P_{bar} + P_g$
P_{sd} = Standard absolute pressure, 29.92 in. Hg.
t_s = Stack temperature, °F.
T_s = Absolute stack temperature, °R. = 460 + t_s.
M_s = Molecular weight of stack gas, wet basis, lb/lb-mole.

Run #1:

$$V = (85.49)\,(.84)\,(0.79)\sqrt{\frac{638}{(30.16)(27.04)}} = 50.18 \text{ ft/sec}$$

Run #2:

$$V = (85.49)\,(.84)\,(0.75)\sqrt{\frac{632}{(30.09)(26.94)}} = 47.56 \text{ ft/sec}$$

Run #3:

$$V = (85.49)\,(.84)\,(0.60)\sqrt{\frac{603}{(30.09)(27.45)}} = 36.81 \text{ ft/sec}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

STACK GAS FLOW RATE

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

Where:

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions (dscf/hr).
A = Cross sectional area of stack (ft^2).
3600 = Conversion factor (sec/hr).
T_{stk} = Absolute stack temperature (°R).
T_{std} = Standard absolute temperature (528°R).
P_{bar} = Barometric pressure at measurement site (in. Hg.).
P_g = Stack static pressure (in. Hg.).
P_s = Absolute stack gas pressure (in. Hg.) = $P_{bar} + P_g$
P_{std} = Standard absolute pressure (29.92 in. Hg.).

Run #1:

$$Q_{sd} = 3600\ (1-.2243)\ (50.18)\ (14.08) \left[\frac{528}{638} \right] \left[\frac{30.16}{29.92} \right] = 1{,}645{,}934.7 \frac{dscf}{hr}$$

Run #2:

$$Q_{sd} = 3600\ (1-.2317)\ (47.56)\ (14.08) \left[\frac{528}{632} \right] \left[\frac{30.09}{29.92} \right] = 1{,}556{,}163.7 \frac{dscf}{hr}$$

Run #3:

$$Q_{sd} = 3600\ (1-.1871)\ (36.81)\ (14.08) \left[\frac{528}{603} \right] \left[\frac{30.09}{29.92} \right] = 1{,}335{,}627.4 \frac{dscf}{hr}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

EMISSIONS RATE FROM STACK

$$E = \left[\frac{(C_s)\ (Q_{sd})}{7{,}000\ gr/lb}\right] = 0.0000\ lb/hr$$

Where:

E = Emissions rate, lbs/hr.

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

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

Run #1:

$$E = \left[\frac{(0.0068)\ (1{,}645{,}934.7)}{7{,}000}\right] = 1.60\ lbs/hr$$

Run #2:

$$E = \left[\frac{(0.0029)\ (1{,}556{,}163.7)}{7{,}000}\right] = 0.64\ lbs/hr$$

Run #3:

$$E = \left[\frac{(0.0195)\ (1{,}335{,}627.4)}{7{,}000}\right] = 3.72\ lbs/hr$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

Organic Condensible Particulate

EMISSIONS RATE FROM STACK

$$E = \left[\frac{(C_s)\ (Q_{sd})}{7{,}000\ gr/lb}\right] = 0.0000\ lb/hr$$

Where:

E = Emissions rate, lbs/hr.

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

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

Run #1:

$$E = \left[\frac{(0.0119)\ (1{,}645{,}934.7)}{7{,}000}\right] = 2.80\ lbs/hr$$

Run #2:

$$E = \left[\frac{(0.0114)\ (1{,}556{,}163.7)}{7{,}000}\right] = 2.53\ lbs/hr$$

Run #3:

$$E = \left[\frac{(0.1340)\ (1{,}335{,}627.4)}{7{,}000}\right] = 25.57\ lbs/hr$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

Inorganic Condensible Particulate

EMISSIONS RATE FROM STACK

$$E = \left[\frac{(C_s)\ (Q_{sd})}{7{,}000\ gr/lb}\right] = 0.0000\ lb/hr$$

Where:

E = Emissions rate, lbs/hr.

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

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

Run #1:

$$E = \left[\frac{(0.0029)\ (1{,}645{,}934.7)}{7{,}000}\right] = 0.68\ lbs/hr$$

Run #2:

$$E = \left[\frac{(0.0040)\ (1{,}556{,}163.7)}{7{,}000}\right] = 0.89\ lbs/hr$$

Run #3:

$$E = \left[\frac{(0.0319)\ (1{,}335{,}627.4)}{7{,}000}\right] = 6.09\ lbs/hr$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: RM 5/202

ISOKINETIC VARIATION

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

Where:

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

Run #1:

$$I = (100)\ (638) \left[\frac{(0.002669)\ (238.00) + \frac{41.297}{564} \left[30.16 + \frac{1.42}{13.6} \right]}{60\quad (60.0)\quad (50.18)\quad (30.16)\quad (.000340)} \right] = 97.5\%$$

Run #2:

$$I = (100)\ (632) \left[\frac{(0.002669)\ (237.50) + \frac{38.925}{553} \left[30.09 + \frac{1.20}{13.6} \right]}{60\quad (60.0)\quad (47.56)\quad (30.09)\quad (.000340)} \right] = 98.8\%$$

Run #3:

$$I = (100)\ (603) \left[\frac{(0.002669)\ (22.00) + \frac{4.566}{554} \left[30.09 + \frac{0.81}{13.6} \right]}{60\quad (10.0)\quad (36.81)\quad (30.09)\quad (.000340)} \right] = 81.4\%$$

V. CALCULATIONS

C. Formaldehyde

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

SUMMARY OF TEST DATA

		Run #1 09-03-92	Run #2 09-03-02	Run #3 09-03-92
SAMPLING TRAIN DATA	Start	06:42	08:37	10:32
	Finish	08:05	09:59	11:53
1. Sampling time, minutes	θ	75.0	75.0	75.0
2. Sampling nozzle diameter, in.	D_n	.2500	.2500	.2500
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000340	.000340	.000340
4. Isokinetic variation	I	100.9	105.9	100.8
5. Sample gas volume - meter cond., cf.	V_m	51.115	55.920	55.461
6. Average meter temperature, °R	T_m	549	555	559
7. Avg. orifice pressure drop, in. H_2O	ΔH	1.40	1.56	1.62
8. Total formaldehyde collected, mg.	M_n	.69	.46	.54
VELOCITY TRAVERSE DATA				
9. Stack area, $ft.^2$	A	14.08	14.08	14.08
10. Absolute stack gas pressure, in. Hg.	P_s	30.09	30.09	30.09
11. Barometric pressure, in. Hg.	P_{bar}	30.09	30.09	30.09
12. Avg. absolute stack temperature, R°	T_s	637	643	645
13. Average √vel. head, (C_p = .84)	√dp	0.79	0.83	0.85
14. Average stack gas velocity, ft./sec.	V_s	50.35	53.34	54.62
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{lc}	332.50	385.00	360.00
16. Moisture in stack gas, %	B_{ws}	24.10	25.30	24.50
EMISSION DATA				
17. Stack gas flow rate, dscf/hr. (000's)	Q_{sd}	1614	1665	1720
18. Stack gas flow rate, cfm	acfm	42536	45062	46143
19. Formaldehyde concentration, gr/dscf	C_s	0.0002	0.0001	0.0002
20. Formaldehyde concentration, lb/hr	E	0.05	0.02	0.05
ORSAT DATA				
21. Percent CO_2 by volume	CO_2	7.70	7.20	7.20
22. Percent O_2 by volume	O_2	11.80	11.90	11.50
23. Percent CO by volume	CO	.00	.00	.00
24. Percent N_2 by volume	N_2	80.50	80.90	81.30

Format: summryR3

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

DRY GAS VOLUME

$$V_{m(std)} = V_m \left[\frac{T_{(std)}}{T_m}\right] \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right] - 17.64 \frac{°R}{\epsilon. Hg} \; Y \; V_m \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

Where:

$V_{m(std)}$ = Dry gas volume through meter at standard conditions, ft^3.
V_m = Dry gas volume measured by meter, ft^3.
P_{bar} = Barometric pressure at orifice meter, in. Hg.
P_{std} = Standard absolute pressure, (29.92 in. Hg.).
T_m = Absolute temperature at meter, °R.
T_{std} = Standard absolute temperature, (528°R).
ΔH = Avg. pressure drop across orifice meter, in. H_2O.
Y = Dry gas meter calibration factor.
13.6 = Inches of water per Hg.

Run #1:

$$V_{m(std)} - (17.64)(0.991)(51.115)\left[\frac{30.09 + \frac{1.40}{13.6}}{549}\right] - 49.142 \text{ dscf}$$

Run #2:

$$V_{m(std)} - (17.64)(0.991)(55.920)\left[\frac{30.09 + \frac{1.56}{13.6}}{555}\right] - 53.201 \text{ dscf}$$

Run #3:

$$V_{m(std)} - (17.64)(0.991)(55.461)\left[\frac{30.09 + \frac{1.62}{13.6}}{559}\right] - 52.395 \text{ dscf}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

Emissions of Formaldehyde: PPM (PARTS PER MILLION)

$$E = \frac{C_S \times \frac{g}{1{,}000\ mg} \times \frac{MOL}{30.03g} \times \frac{22.4\ \ell}{MOL} \times \frac{293°K}{273°K} \times \frac{ft^3}{28.317}}{1{,}000{,}000}$$

Where:

C_S =	Concentration of formaldehyde in mg/dscf.
1000 mg/g =	Conversion to grams.
30.03 g/MOL =	Molar conversion for formaldehyde.
22.4 ℓ/MOL =	Volumetric molar conversion @ 273°K.
293°K/273°K =	Temperature correction to standard conditions.
28.317/ft³ =	Conversion to liters.
1,000,000 =	Conversion to parts per million.

Run #1:

$$\frac{0.69\ mg \times \frac{g}{49.142\ dscf} \times \frac{MOL}{1{,}000\ mg} \times \frac{22.4\ \ell}{30.03\ g} \times \frac{293°K}{MOL} \times \frac{ft^3}{273°K}}{28.317} \times 1{,}000{,}000 = 0.4\ ppm$$

Run #2:

$$\frac{0.46\ mg \times \frac{g}{53.201\ dscf} \times \frac{MOL}{1{,}000\ mg} \times \frac{22.4\ \ell}{30.03\ g} \times \frac{293°K}{MOL} \times \frac{ft^3}{273°K}}{28.317} \times 1{,}000{,}000 = 0.2\ ppm$$

Run #3:

$$\frac{0.54\ mg \times \frac{g}{52.395\ dscf} \times \frac{MOL}{1{,}000\ mg} \times \frac{22.4\ \ell}{30.03\ g} \times \frac{293°K}{MOL} \times \frac{ft^3}{273°K}}{28.317} \times 1{,}000{,}000 = 0.3\ ppm$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

Formaldehyde Concentration: C_s' gr/dscf

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

Where:

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

M_n = Total amount of formaldehyde collected, mg.

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

Run #1:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{.69}{49.142}\right] = 0.0002 \text{ gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{.46}{53.201}\right] = 0.0001 \text{ gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{.54}{52.395}\right] = 0.0002 \text{ gr/dscf}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

FORMALDEHYDE
CONVERSION TO mg/m³

$$C,mg/m^3 = (C,gr/dscf)\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right)$$

Where:

C,mg/m³	=	Concentration as milligrams per cubic meter
C,gr/dscf	=	Concentration as grains per cubic foot
35.31	=	*Conversion of ft³ to m³*
0.0154	=	Conversion from grains to milligrams

Run #1:

$$C,mg/m^3 = (0.0002)\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right) = 0.46$$

Run #2:

$$C,mg/m^3 = (0.0001)\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right) = 0.23$$

Run #3:

$$C,mg/m^3 = (0.0002)\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right) = 0.46$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

DRY MOLECULAR WEIGHT

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

Where:

M_d	=	Dry molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent carbon dioxide by volume, dry basis.
$\%O_2$	=	Percent oxygen by volume, dry basis.
$\%N_2$	=	Percent nitrogen by volume, dry basis.
%CO	=	Percent carbon monoxide by volume, dry basis.
0.264	=	Ratio of O_2 to N_2 in air, v/v.
0.28	=	Molecular weight of N_2 or CO, divided by 100.
0.32	=	Molecular weight of O_2 divided by 100.
0.44	=	Molecular weight of CO_2 divided by 100.

Run #1:

$$M_d = 0.44\ (7.70\%) + 0.32\ (11.80\%) + 0.28\ (0.00\% + 80.50\%) = 29.70\ \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_d = 0.44\ (7.20\%) + 0.32\ (11.90\%) + 0.28\ (0.00\% + 80.90\%) = 29.63\ \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_d = 0.44\ (7.20\%) + 0.32\ (11.50\%) + 0.28\ (0.00\% + 81.30\%) = 29.61\ \frac{lb}{lb\text{-}mole}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

WATER VAPOR CONDENSED

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

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

Where:

0.04707	=	Conversion factor, ft^3/ml.
0.04715	=	Conversion factor, ft^3/g.
Vwc_{std}	=	Volume of water vapor condensed (std. cond.), ml.
$Vwsg_{std}$	=	Volume of water vapor collected in silica gel (standard conditions), ml.
$V_f - V_i$	=	Final volume of impinger contents less initial volume, ml.
$W_f - W_i$	=	Final weight of silica gel less initial weight, g.
P_w	=	Density of water, 0.002201 lb/ml.
R	=	Ideal gas constant, 21.85 in.Hg. (cu.ft./lb-mole)(°R).
M_w	=	Molecular weight of water vapor, 18.0 lb/lb-mole.
T_{std}	=	Absolute temperature at standard conditions, 528°R.
P_{std}	=	Absolute pressure at standard conditions, 29.92 inches Hg.

Run 1:

$V_{wc_{std}}$ = (0.04707) (328.0) = 15.4 cu.ft
$V_{wsg_{std}}$ = (0.04715) (4.5) = 0.2 cu.ft

Run 2:

$V_{wc_{std}}$ = (0.04707) (385.0) = 18.1 cu.ft
$V_{wsg_{std}}$ = (0.04715) (.0) = 0.0 cu.ft

Run 3:

$V_{wc_{std}}$ = (0.04707) (358.0) = 16.9 cu.ft
$V_{wsg_{std}}$ = (0.04715) (2.0) = 0.1 cu.ft

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

MOISTURE CONTENT OF STACK GASES

$$B_{ws} = \left[\frac{V_{wc_{std}} + V_{wsg_{std}}}{V_{wc_{std}} + V_{wsg_{std}} + V_{mstd}} \right] \times 100$$

Where:

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

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

Vwc_{std} = Volume of water vapor condensed, corrected to standard conditions, scf.

$Vwsg_{std}$ = Volume of water vapor collected in silica gel corrected to std. cond., scf.

Run 1:

$$B_{ws} = \left[\frac{15.4 + 0.2}{15.4 + 0.2 + 49.142} \right] \times 100 = 24.10\%$$

Run 2:

$$B_{ws} = \left[\frac{18.1 + 0.0}{18.1 + 0.0 + 53.201} \right] \times 100 = 25.39\%$$

Run 3:

$$B_{ws} = \left[\frac{16.9 + 0.1}{16.9 + 0.1 + 52.395} \right] \times 100 = 24.50\%$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

MOLECULAR WEIGHT OF STACK GASES

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

Where:

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

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

Run #1:

$M_s = 29.70 (1 - 24.10) + 18 (24.10) = 26.88$ (lb./lb.-mole)

Run #2:

$M_s = 29.63 (1 - 25.39) + 18 (25.39) = 26.68$ (lb./lb.-mole)

Run #1:

$M_s = 29.61 (1 - 24.50) + 18 (24.50) = 26.77$ (lb./lb.-mole)

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

STACK GAS VELOCITY

$$V_s = K_p \; C_p \; [\sqrt{\Delta P}]\,avg \quad \sqrt{\frac{T_s(avg)}{P_s \; M_s}}$$

Where:

V_s = Average velocity of gas stream in stack, ft/sec.
K_p = 85.49 ft/sec [(g/g mole) - (mm Hg)/(°K)(mm H_2O]^{½}
C_p = Pitot tube coefficient, dimensionless.
ΔP = Velocity head of stack gas, in. H_2O.
P_{bar} = Barometric pressure at measurement site, in. Hg.
P_g = Stack static pressure, in. Hg.
P_s = Absolute stack gas pressure, in. Hg. = $P_{bar} + P_g$
P_{std} = Standard absolute pressure, 29.92 in. Hg.
t_s = Stack temperature, °F.
T_s = Absolute stack temperature, °R. = 460 + t_s.
M_s = Molecular weight of stack gas, wet basis, lb/lb mole.

Run #1:

$$V = (85.49)\;(.84)\;(0.79)\;\sqrt{\frac{637}{(30.09)(26.88)}} = 50.35 \text{ ft/sec}$$

Run #2:

$$V = (85.49)\;(.84)\;(0.83)\;\sqrt{\frac{643}{(30.09)(26.68)}} = 53.34 \text{ ft/sec}$$

Run #3:

$$V = (85.49)\;(.84)\;(0.85)\;\sqrt{\frac{645}{(30.09)(26.77)}} = 54.62 \text{ ft/sec}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

STACK GAS FLOW RATE

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

Where:

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions (dscf/hr).
A = Cross sectional area of stack (ft^2).
3600 = Conversion factor (sec/hr).
T_{stk} = Absolute stack temperature (°R).
T_{std} = Standard absolute temperature (528°R).
P_{bar} = Barometric pressure at measurement site (in. Hg.).
P_g = Stack static pressure (in. Hg.).
P_s = Absolute stack gas pressure (in. Hg.) = $P_{bar} + P_g$
P_{std} = Standard absolute pressure (29.92 in. Hg.).

Run #1:

$$Q_{sd} = 3600\ (1-.2410)\ (50.35)\ (14.08) \left[\frac{528}{637} \right] \left[\frac{30.09}{29.92} \right] = 1{,}614{,}735.9 \ \frac{dscf}{hr}$$

Run #2:

$$Q_{sd} = 3600\ (1-.2539)\ (53.34)\ (14.08) \left[\frac{528}{643} \right] \left[\frac{30.09}{29.92} \right] = 1{,}665{,}861.0 \ \frac{dscf}{hr}$$

Run #3:

$$Q_{sd} = 3600\ (1-.2450)\ (54.62)\ (14.08) \left[\frac{528}{645} \right] \left[\frac{30.09}{29.92} \right] = 1{,}720{,}832.5 \ \frac{dscf}{hr}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

EMISSIONS RATE FROM STACK

$$E = \left[\frac{(C_s)\ (Q_{sd})}{7{,}000\ gr/lb}\right] = 0.0000\ lb/hr$$

Where:

E = Emissions rate, lbs/hr.

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

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

Run #1:

$$E = \left[\frac{(0.0002)\ (1{,}614{,}735.9)}{7{,}000}\right] = 0.05\ lbs/hr$$

Run #2:

$$E = \left[\frac{(0.0001)\ (1{,}665{,}861.0)}{7{,}000}\right] = 0.02\ lbs/hr$$

Run #3:

$$E = \left[\frac{(0.0002)\ (1{,}720{,}832.5)}{7{,}000}\right] = 0.05\ lbs/hr$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: FORMALDEHYDE

ISOKINETIC VARIATION

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

Where:

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

Run #1:

$$I = (100)\ (637) \left[\frac{(0.002669)\ (332.50) + \frac{51.115}{549} \left[30.09 + \frac{1.40}{13.6} \right]}{60\quad (75.0)\quad (50.35)\quad (30.09)\quad (.000340)} \right] = 100.9\ \%$$

Run #2:

$$I = (100)\ (643) \left[\frac{(0.002669)\ (385.00) + \frac{55.920}{555} \left[30.09 + \frac{1.56}{13.6} \right]}{60\quad (75.0)\quad (53.34)\quad (30.09)\quad (.000340)} \right] = 105.9\%$$

Run #3:

$$I = (100)\ (645) \left[\frac{(0.002669)\ (360.00) + \frac{55.461}{559} \left[30.09 + \frac{1.62}{13.6} \right]}{60\quad (75.0)\quad (54.62)\quad (30.09)\quad (.000340)} \right] = 100.8\%$$

V. CALCULATIONS

D. PAH

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

SUMMARY OF TEST DATA

		Run #1 09-03-92	Run #2 09-04-92	Run #3 09-04-92
SAMPLING TRAIN DATA	Start	13:14	07:09	12:08
	Finish	14:13	08:50	13:48
1. Sampling time, minutes	θ	57.0	90.0	90.0
2. Sampling nozzle diameter, in.	D_n	.2500	.2500	.2500
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000340	.000340	.000340
4. Isokinetic variation	I	99.3	95.9	97.6
5. Sample gas volume - meter cond., cf.	V_m	35.659	60.861	67.008
6. Average meter temperature, °R	T_m	563	543	565
7. Avg. orifice pressure drop, in. H_2O	ΔH	1.08	1.50	1.67
8. Total PAH collected, mg.	M_n	.00	.00	.00
VELOCITY TRAVERSE DATA				
9. Stack area, $ft.^2$	A	14.08	14.08	14.08
10. Absolute stack gas pressure, in. Hg.	P_s	30.09	30.09	30.09
11. Barometric pressure, in. Hg.	P_{bar}	30.09	30.09	30.09
12. Avg. absolute stack temperature, R°	T_s	649	640	657
13. Average √vel. head, (C_p = .84)	√dp	0.71	0.83	0.88
14. Average stack gas velocity, ft./sec.	V_s	45.51	53.09	57.10
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{ic}	204.00	390.00	425.00
16. Moisture in stack gas, %	B_{ws}	22.32	23.72	24.20
EMISSION DATA				
17. Stack gas flow rate, dscf/hr. (000's)	Q_{sd}	1466	1703	1773
18. Stack gas flow rate, cfm	acfm	38447	44850	48238
19. PAH concentration, gr/dscf	C_s	1.03×10^{-4}	7.34×10^{-5}	8.35×10^{-5}
20. PAH concentration, lb/hr	E	0.0216	0.0179	0.0212
ORSAT DATA				
21. Percent CO_2 by volume	CO_2	7.40	6.40	6.50
22. Percent O_2 by volume	O_2	12.20	13.20	12.20
23. Percent CO by volume	CO	.00	.00	.00
24. Percent N_2 by volume	N_2	80.40	80.40	81.30

Format: summryR3

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

DRY GAS VOLUME

$$V_{m(std)} = V_m \left[\frac{T_{(std)}}{T_m}\right] \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right] - 17.64 \frac{°R}{\epsilon. Hg} Y V_m \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

Where:

$V_{m(std)}$ = Dry gas volume through meter at standard conditions, ft^3.
V_m = Dry gas volume measured by meter, ft^3.
P_{bar} = Barometric pressure at orifice meter, in. Hg.
P_{std} = Standard absolute pressure, (29.92 in. Hg.).
T_m = Absolute temperature at meter, °R.
T_{std} = Standard absolute temperature, (528°R).
ΔH = Avg. pressure drop across orifice meter, in. H_2O.
Y = Dry gas meter calibration factor.
13.6 = Inches of water per Hg.

Run #1:

$$V_{m(std)} = (17.64)(0.991)(35.659)\left[\frac{30.09 + \frac{1.08}{13.6}}{563}\right] = 33.404 \text{ dscf}$$

Run #2:

$$V_{m(std)} = (17.64)(0.991)(60.861)\left[\frac{30.09 + \frac{1.50}{13.6}}{543}\right] = 59.173 \text{ dscf}$$

Run #3:

$$V_{m(std)} = (17.64)(0.991)(67.008)\left[\frac{30.09 + \frac{1.67}{13.6}}{565}\right] = 62.638 \text{ dscf}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

PAH Concentration: C_S' gr/dscf

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

Where:

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

M_n = Total amount of PAH's collected, mg.

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

Run #1:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{0.22305}{33.404}\right] = 1.03 \times 10^{-4}$$

Run #2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{0.28187}{59.173}\right] = 7.34 \times 10^{-5}$$

Run #3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{0.33951}{62.638}\right] = 8.35 \times 10^{-5}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

PAH TEST
CONVERSION TO mg/m³

$$C,mg/m^3 = (C,gr/dscf)\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right)$$

Where:

C,mg/m³	=	Concentration as milligrams per cubic meter
C,gr/dscf	=	Concentration as grains per cubic foot
35.31	=	Conversion of ft³ to m³
0.0154	=	Conversion from grains to milligrams

Run #1:

$$C,mg/m^3 = (1.03\times10^{-4})\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right) = 0.236$$

Run #2:

$$C,mg/m^3 = (7.34\times10^{-5})\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right) = 0.168$$

Run #3:

$$C,mg/m^3 = (8.35\times10^{-5})\left(\frac{35.31\ ft^3}{m^3}\right)\left(\frac{mg}{0.0154\ gr}\right) = 0.191$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

DRY MOLECULAR WEIGHT

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

Where:

M_d	=	Dry molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent carbon dioxide by volume, dry basis.
$\%O_2$	=	Percent oxygen by volume, dry basis.
$\%N_2$	=	Percent nitrogen by volume, dry basis.
%CO	=	Percent carbon monoxide by volume, dry basis.
0.264	=	Ratio of O_2 to N_2 in air, v/v.
0.28	=	Molecular weight of N_2 or CO, divided by 100.
0.32	=	Molecular weight of O_2 divided by 100.
0.44	=	Molecular weight of CO_2 divided by 100.

Run #1:

$$M_d = 0.44\ (7.40\%) + 0.32\ (12.20\%) + 0.28\ (0.00\% + 80.40\%) = 29.67\ \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_d = 0.44\ (6.40\%) + 0.32\ (13.20\%) + 0.28\ (0.00\% + 80.40\%) = 29.55\ \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_d = 0.44\ (6.50\%) + 0.32\ (12.20\%) + 0.28\ (0.00\% + 81.30\%) = 29.53\ \frac{lb}{lb\text{-}mole}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

WATER VAPOR CONDENSED

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

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

Where:

0.04707	=	Conversion factor, ft^3/ml.
0.04715	=	Conversion factor, ft^3/g.
Vwc_{std}	=	Volume of water vapor condensed (std. cond.), ml.
$Vwsg_{std}$	=	Volume of water vapor collected in silica gel (standard conditions), ml.
$V_f - V_i$	=	Final volume of impinger contents less initial volume, ml.
$W_f - W_i$	=	Final weight of silica gel less initial weight, g.
P_w	=	Density of water, 0.002201 lb/ml.
R	=	Ideal gas constant, 21.85 in.Hg. (cu.ft./lb-mole)(°R).
M_w	=	Molecular weight of water vapor, 18.0 lb/lb-mole.
T_{std}	=	Absolute temperature at standard conditions, 528°R.
P_{std}	=	Absolute pressure at standard conditions, 29.92 inches Hg.

Run 1:

$$V_{wc_{std}} = (0.04707) \ (204.0) = 9.6 \text{ cu.ft}$$
$$V_{wsg_{std}} = (0.04715) \ (.0) = 0.0 \text{ cu.ft}$$

Run 2:

$$V_{wc_{std}} = (0.04707) \ (390.0) = 18.4 \text{ cu.ft}$$
$$V_{wsg_{std}} = (0.04715) \ (.0) = 0.0 \text{ cu.ft}$$

Run 3:

$$V_{wc_{std}} = (0.04707) \ (425.0) = 20.0 \text{ cu.ft}$$
$$V_{wsg_{std}} = (0.04715) \ (.0) = 0.0 \text{ cu.ft}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

MOISTURE CONTENT OF STACK GASES

$$B_{ws} = \left[\frac{V_{wc_{std}} + V_{wsg_{std}}}{V_{wc_{std}} + V_{wsg_{std}} + V_{mstd}} \right] \times 100$$

Where:

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

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

Vwc_{std} = Volume of water vapor condensed, corrected to standard conditions, scf.

$Vwsg_{std}$ = Volume of water vapor collected in silica gel corrected to std. cond., scf.

Run 1:

$$B_{ws} = \left[\frac{9.6 + 0.0}{9.6 + 0.0 + 33.404} \right] \times 100 = 22.32\%$$

Run 2:

$$B_{ws} = \left[\frac{18.4 + 0.0}{18.4 + 0.0 + 59.173} \right] \times 100 = 23.72\%$$

Run 3:

$$B_{ws} = \left[\frac{20.0 + 0.0}{20.0 + 0.0 + 62.638} \right] \times 100 = 24.20\%$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

MOLECULAR WEIGHT OF STACK GASES

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

Where:

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

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

Run #1:

$$M_s = 29.67 (1 - 22.32) + 18 (22.32) = 27.07 \text{ (lb./lb.-mole)}$$

Run #2:

$$M_s = 29.55 (1 - 23.72) + 18 (23.72) = 26.81 \text{ (lb./lb.-mole)}$$

Run #1:

$$M_s = 29.53 (1 - 24.20) + 18 (24.20) = 26.74 \text{ (lb./lb.-mole)}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

STACK GAS VELOCITY

$$V_s = K_p \; C_p \; [\sqrt{\Delta P}]\,avg \; \sqrt{\frac{T_s(avg)}{P_s \; M_s}}$$

Where:

V_s = Average velocity of gas stream in stack, ft/sec.
K_p = 85.49 ft/sec [(g/g-mole) - (mm Hg)/(°K)(mm H_2O]$^{1/2}$
C_p = Pitot tube coefficient, dimensionless.
ΔP = Velocity head of stack gas, in. H_2O.
P_{bar} = Barometric pressure at measurement site, in. Hg.
P_g = Stack static pressure, in. Hg.
P_s = Absolute stack gas pressure, in. Hg. = $P_{bar} + P_g$
P_{std} = Standard absolute pressure, 29.92 in. Hg.
t_s = Stack temperature, °F.
T_s = Absolute stack temperature, °R. = 460 + t_s.
M_s = Molecular weight of stack gas, wet basis, lb/lb-mole.

Run #1:

$$V = (85.49)\,(.84)\,(0.71)\,\sqrt{\frac{649}{(30.09)(27.07)}} = 45.51 \text{ ft/sec}$$

Run #2:

$$V = (85.49)\,(.84)\,(0.83)\,\sqrt{\frac{640}{(30.09)(26.81)}} = 53.09 \text{ ft/sec}$$

Run #3:

$$V = (85.49)\,(.84)\,(0.88)\,\sqrt{\frac{657}{(30.09)(26.74)}} = 57.10 \text{ ft/sec}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

STACK GAS FLOW RATE

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

Where:

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions (dscf/hr).
A = Cross sectional area of stack (ft^2).
3600 = Conversion factor (sec/hr).
T_{stk} = Absolute stack temperature (°R).
T_{std} = Standard absolute temperature (528°R).
P_{bar} = Barometric pressure at measurement site (in. Hg.).
P_g = Stack static pressure (in. Hg.).
P_s = Absolute stack gas pressure (in. Hg.) = $P_{bar} + P_g$
P_{std} = Standard absolute pressure (29.92 in. Hg.).

Run #1:

$$Q_{sd} = 3600\ (1 - .2232)\ (45.51)\ (14.08) \left[\frac{528}{649} \right] \left[\frac{30.09}{29.92} \right] = 1{,}466{,}125.1 \ \frac{dscf}{hr}$$

Run #2:

$$Q_{sd} = 3600\ (1 - .2372)\ (53.09)\ (14.08) \left[\frac{528}{640} \right] \left[\frac{30.09}{29.92} \right] = 1{,}703{,}111.6 \ \frac{dscf}{hr}$$

Run #3:

$$Q_{sd} = 3600\ (1 - .2420)\ (57.10)\ (14.08) \left[\frac{528}{657} \right] \left[\frac{30.09}{29.92} \right] = 1{,}773{,}126.1 \ \frac{dscf}{hr}$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

EMISSIONS RATE FROM STACK

$$E = \left[\frac{(C_s)\ (Q_{sd})}{7{,}000\ gr/lb}\right] = 0.0000\ lb/hr$$

Where:

E = Emissions rate, lbs/hr.

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

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

Run #1:

$$E = \left[\frac{(1.03\times10^{-4})\ (1{,}466{,}125.1)}{7{,}000}\right] = 0.0216\ lbs/hr$$

Run #2:

$$E = \left[\frac{(7.34\times10^{-5})\ (1{,}703{,}111.6)}{7{,}000}\right] = 0.0179\ lbs/hr$$

Run #3:

$$E = \left[\frac{(8.35\times10^{-5})\ (1{,}773{,}126.1)}{7{,}000}\right] = 0.0212\ lbs/hr$$

NAME: FRED WEBER
LOCATION: ST. LOUIS, MISSOURI

DATE: September 1-4, 1992
SOURCE: PAH TEST

ISOKINETIC VARIATION

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

Where:

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

Run #1:

$$I = (100)\ (649) \left[\frac{(0.002669)\ (204.00) + \frac{35.659}{563} \left[30.09 + \frac{1.08}{13.6} \right]}{60\ \ (57.0)\ \ (45.51)\ \ (30.09)\ \ (.000340)} \right] = 99.3\ \%$$

Run #2:

$$I = (100)\ (640) \left[\frac{(0.002669)\ (390.00) + \frac{60.861}{543} \left[30.09 + \frac{1.50}{13.6} \right]}{60\ \ (90.0)\ \ (53.09)\ \ (30.09)\ \ (.000340)} \right] = 95.9\%$$

Run #3:

$$I = (100)\ (657) \left[\frac{(0.002669)\ (425.00) + \frac{67.008}{565} \left[30.09 + \frac{1.67}{13.6} \right]}{60\ \ (90.0)\ \ (57.10)\ \ (30.09)\ \ (.000340)} \right] = 97.6\%$$

SAMPLE ANALYTICAL DATA FORM

Company Name FRED WEBER

Sample Location _____ Relative Humidity in Lab 56 %

Blank Volume (V_a) 100 ml Density of Acetone (ρ_a) .7857 mg/ml

Date/Time wt. blank 9/28 8:00A Gross wt. 98.0814 g

Date/Time wt. blank 9/29 8:00A Gross wt. 98.0814 g

Ave. Gross wt. 98.0814 g

Tare wt. 98.0812 g

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

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

Acetone Blank Wt.: $W_a = C_a V_{aw} \rho_a = (.000003)(250)(.7857) = (.0006$ g)

		Run # 1	Run # 2	Run # 3
Acetone rinse volume (V_{aw})	ml	250	250	250
Date/Time of wt. 9/28 8:00A Gross wt.	g	110.4128	103.3924	98.6946
Date/Time of wt. 9/29 8:00A Gross wt.	g	110.4128	103.3926	98.6943
Average Gross wt.	g	110.4128	103.3925	98.6945
Tare wt.	g	110.3972	103.3854	98.6894
Less Acetone blank wt. (W_a)	g	.0006	.0006	.0006
Weight of particulate in acetone rinse (m_a)	g	.0150	.0065	.0045

Filter Numbers	#	TS6495	TS6420	TS6497
Date/Time of wt. 9/28 8:00A Gross wt.	g	.5581	.7012	.5579
Date/Time of wt. 9/29 8:00A Gross wt.	g	.5581	.7012	.5579
Average Gross wt.	g	.5581	.7012	.5579
Tare wt.	g	.5560	.7006	.5569

Weight of particulate on filter (m_f)	g	.0021	.0006	.0010
Weight of particulate in acetone rinse (m_a)	g	.0150	.0065	.0045
Total weight of particulate (m_n)	g	.0171	.0071	.0055

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

Remarks: _____

Signature of Analyst Thomas South Signature of Reviewer WJS

METHOD 202

[redacted]

COMPANY NAME: FRED WEBER

Methylene Chloride Extraction for EPA Method 5 (back half) 10/5/92

Relative humidity in lab 50 %

Density of Methylene Chloride 1.3255 g/ml

ORGANIC

			RUN 1	RUN 2	RUN 3
Methylene Chloride rinse volume		ml	290	280	285
Volume of Solution			900	600	840
Date/time of wt 10/5 3:00P	Gross wt.	g	171.9600	165.1170	120.3198
Date/time of wt 10/6 8:00A	Gross wt.	g	171.9602	165.1174	120.3198
	Avg. Gross wt.	g	171.9601	165.1172	120.3198
	Tare wt.	g	171.9300	165.0895	120.2768
Less Methylene Chloride Blank			.0002	.0002	.0002
Wt./particulate: Methylene Chloride rinse		g	.0299	.0275	.0378
Water evaporation					
Date/time of wt. 10/5 3:00P	Gross wt.	g	133.6402	135.7227	125.6792
Date/time of wt. 10/6 8:00A	Gross wt.	g	133.6404	135.7227	125.6794
	Avg. Gross wt.	g	133.6403	135.7227	125.6793
	Tare wt.	g	133.6327	135.7128	125.6700
INORGANIC					
Less H_2O blank wt.		g	.0003	.0003	.0003
Weight of particulate from water (m_w)		g	.0073	.0096	.0090
Wt./particulate: Methylene Chloride rinse		g	.0299	.0275	.0378
Total weight of particulate (m_n)		g	.0372	.0371	.0468

NOTE: In no case should a blank residue 0.02 mg/g or 0.001% of the weight of Methylene Chloride used be subtracted from the sample weight.

Remarks:

Signature of Analyst: Thomas South

Signature of Reviewer: [illegible]

AMERICAN INTERPLEX
CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, Arkansas 72204-2322
(501) 224-5060

Ramcon Environmental Corporation (C-488)
6707 Fletcher Creek Cove
Memphis, TN 38134

October 2, 1992

ATTN: Mr. Joe Sewell

Control No. 10005

Sample Description: Four (4) impinger solutions received on 9/15/92
P.O. No. 080008; Re: Fred Weber

Results:

Sample Identification	Volume, ml	Formaldehyde, mg
Run 1, BH	763	0.69
Run 2, BH	865	0.46
Run 3, BH	737	0.54
Blank	137	0.029

Method: Graduated Cylinder, EPA 8315

AMERICAN INTERPLEX CORPORATION

By Steven Lovell
Steven Lovell
Technical Director

SL/td

CASE NARRATIVE
TRIANGLE LABORATORIES OF RTP, INC
801 Capitola Drive
Durham, NC 27713
Phone:(919) 544-5729
Fax: (919) 544-5491

DATE: October 13, 1992
CLIENT P.O. NO: 079600
TLI NO: 21899

OBJECTIVE: Analysis of four MM5 samples for semivolatile polyaromatic hydrocarbons (PAHs).

METHOD

The MM5 train extraction and analysis were based upon the guidelines of Method 8270. Prior to sampling, the XAD traps used were spiked with 100 ug of the surrogate standard terphenyl-d_{14}. Prior to extraction, the XAD portions of the samples were spiked with 100 ug of the surrogate standard pyrene-d_{10}. These portions of the MM5 trains were Soxhlet extracted with methylene chloride for 16 hours. The impinger rinses and condensate portions of the MM5 train were spiked with 100 ug of anthracene-d_{10} and extracted with methylene chloride using a separatory funnel. The semivolatile extracts were combined and concentrated to a final volume of 1.0 milliliter and relinquished for analysis by GC/MS.

The six internal standards, 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, perylene-d_{12} and chrysene-d_{12} were added such that the final concentration was 40 ug/milliliter immediately prior to analysis by GC/MS.

The GC/MS analysis conditions are listed below:

GC CONDITIONS:

Column:	J&W DB5-625, 30m x .32mm x 25u
Program:	40C hold 3 min, ramp at 8C/min to 230C , ramp at 3C/min to 250C, ramp at 20C/min to 310 C
Carrier Gas:	Helium

MS CONDITIONS:

Instrument:	VG TRIO-1, Lab Base data system
Scan:	35-510 amu at 1s/scan
Ion Source:	180C
Interface:	Capillary 275C

TRIANGLE LABORATORIES OF RTP, INC. **DATE: October 13, 1992**
CASE NARRATIVE **PROJECT NUMBER: 21899**

Enclosed with the case narrative are the client request for analysis sheet and chain of custody, TLI chain of custody sheets, wet laboratory extraction information sheets, analyst worksheets, run logs and tracking forms. All initial and continuing calibration data is located behind the samples in the back of the data package.

The data are reported as quantitation reports, chromatograms, interim reports, and spectra of detected compounds. The quantitation report header lists the sample and calibration file names. The client sample name, TLI identification number, dilution factor, TLI project number, date of report, and analysis date are also listed in the quantitation report header. The raw areas and scan numbers found on the quantitation report are from the interim report. The response factor (RF) is from the continuing calibration. The ISID is the internal standard identifier. Those compounds matched to naphthalene-d_8, for example, are flagged with ISID number 14. The amounts for the target compounds are reported in total micrograms (ug). The sample calculations are listed below in the Sample Calculations section of the narrative. If the target compound is detected, a code of 'D' is reported. If the target compound is detected but the amount is below the quantitation limit, a code of 'E' or estimated is reported. If the target compound is not detected, a code of 'ND' is reported. Amounts reported for target compounds that are not detected are calculated using an area of 20 counts. Compounds flagged with the code 'IS' are internal standards.

RESULTS

The laboratory blank SBLK 091892 was found to contain the compound naphthalene at a level below the quantitation limit. This analyte should not be considered native to the samples unless detected at levels over five times that found in the laboratory blank. Naphthalene was found at levels well over five times the blank in field samples RUN #1, RUN #2, and RUN #3.

The original analyses of the field samples were observed to have numerous problems with failed internal standard and surrogate standards and much non-target analyte interference was seen. The samples RUN #1, RUN #2, and RUN #3 were reanalyzed at fivefold dilutions to correct these problems. Only diluted results are reported for these three samples.

Surrogate standard recoveries ranged from 66.0 to 124.8 percent and are consistent between the samples and laboratory blank.

TRIANGLE LABORATORIES OF RTP, INC. **DATE: October 13, 1992**
CASE NARRATIVE **PROJECT NUMBER: 21899**

All internal standard areas meet quality control criteria, with the exception of perylene-d12, which is high in all four field samples. This does not greatly affect data quality as no compounds were detected which are quantitated against this internal standard.

SAMPLE CALCULATIONS

Response Factor, RF:

$$RF = \frac{(\text{Area X} * \text{Amount Int Std})}{(\text{Area Int Std} * \text{Amount X})}$$

$$\text{Amt of analyte (ug)} = \frac{(\text{area analyte in sample}) \times (\text{amount IS}) \times DF}{(\text{area IS in sample}) \times (RF)}$$

amount IS = 40 ug
amount analyte in the ccal = 50 ug
ccal = continuing calibration
IS = internal standard
DF = dilution factor

For Triangle Laboratories of RTP, Inc,

Report Preparation

Selena Armistead

Selena Armistead
Report Preparation Chemist

Quality Control

Eileen Winchester

Eileen Winchester
Report Preparation Chemist

TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

DATA FILE: GK255 SAMPLE ID: RUN #1
RF FILE: GK245 TLI ID: 59-154-1A-I
DATE: 10/13/92 DILN FACTOR: 5
TLI PROJ #: 21899 ANALYSIS DATE: 10/11/92

METHHOD 8270 QUANTITATION REPORT

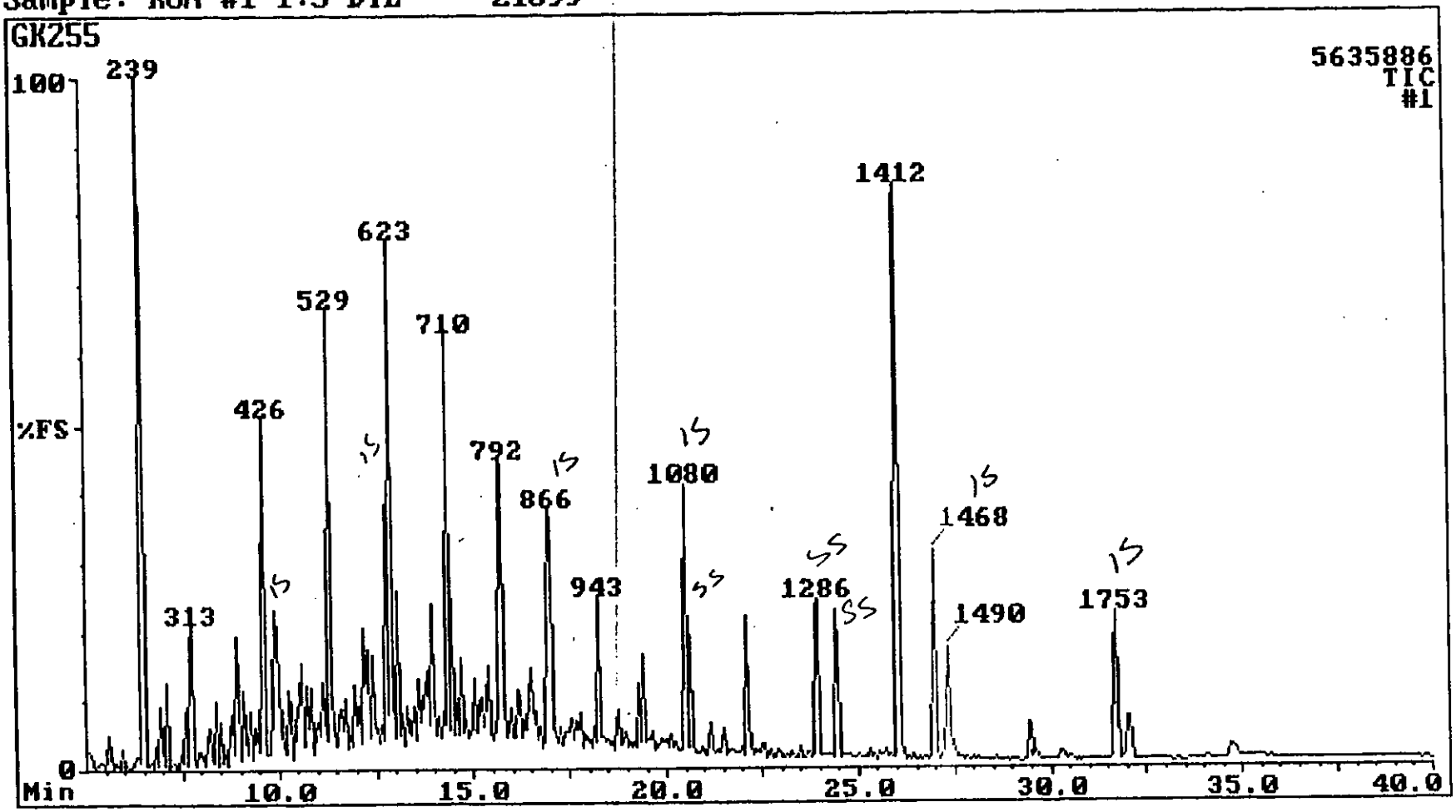
	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	4111		443	1		IS	
14	Naphthalene-d8	15144		615	14		IS	
23	Naphthalene	5732	.8722	618	14	86.80	D	50
27	2-Methylnaphthalene	5807	.6195	717	14	123.78	D	50
28	Acenaphthene-d10	9508		866	28		IS	
32	2-Chloronaphthalene	0	.8723	0	28	.48	ND	50
35	Acenaphthylene	197	1.4534	845	28	2.85	ND	50
37	Acenaphthene	0	.8396	0	28	.50	ND	50
45	Fluorene	280	1.0973	945	28	5.36	E	50
47	Phenanthrene-d10	21095		1080	47		IS	
52	Pentachlorophenol	0	.0898	0	47	2.11	ND	50
53	Phenanthrene	624	.9106	1084	47	6.50	E	50
54	Anthracene	0	.9499	0	47	.20	ND	50
56	Fluoranthene	79	1.2261	1256	47	.61	E	50
57	Chrysene-d12	15771		1468	57		IS	
58	Pyrene	0	1.6592	0	57	.15	ND	50
61	Benzo(a)anthracene	0	1.3636	0	57	.19	ND	50
62	Chrysene	0	1.3014	0	57	.19	ND	50
64	Perylene-d12	15950		1753	64		IS	
66	Benzo(b)fluoranthene	0	1.2066	0	64	.21	ND	50
67	Benzo(k)fluoranthene	0	1.3984	0	64	.18	ND	50
68	Benzo(a)pyrene	0	1.0676	0	64	.23	ND	50
87	Benzo(e)pyrene	0	1.1106	0	64	.23	ND	50
88	Perylene	0	.9602	0	64	.26	ND	50
69	Indeno(1,2,3-cd)pyrene	0	.6444	0	64	.39	ND	50
70	Dibenz(a,h)anthracene	0	.6837	0	64	.37	ND	50
71	Benzo(g,h,i)perylene	0	.7603	0	64	.33	ND	50

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
74	Terphenyl-d14	10083	1.0247	1317	57	124.79	D	124.8
83	Anthracene-d10	9001	.8455	1088	47	100.94	D	100.9
84	Pyrene-d10	11867	1.4043	1285	57	107.17	D	107.2

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard

SA
10-13-92

11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #1 1:5 DIL 21899 Instrument G



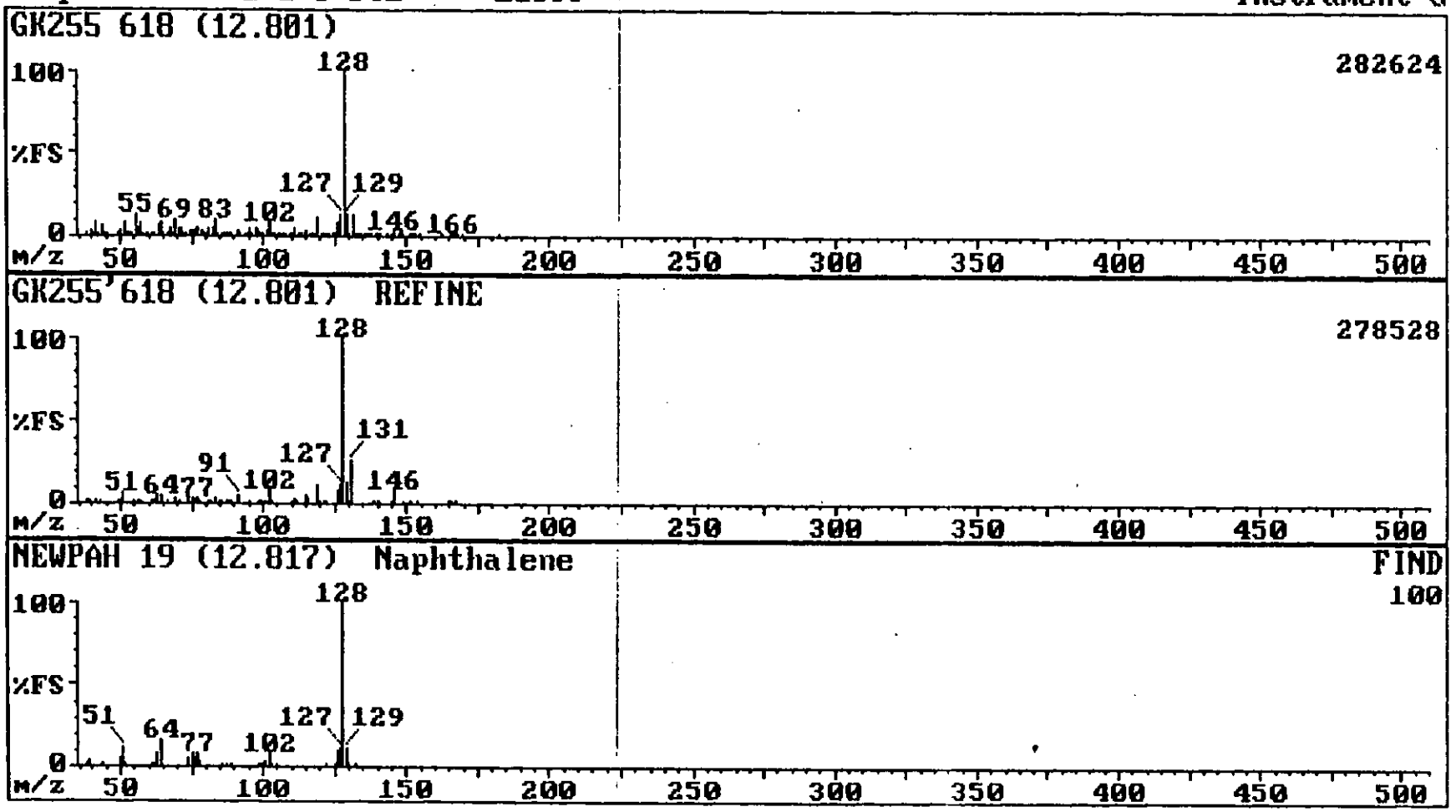
109

QUAN DB : GK255 LAB-BASE QUAN 11-Oct-92 12:05

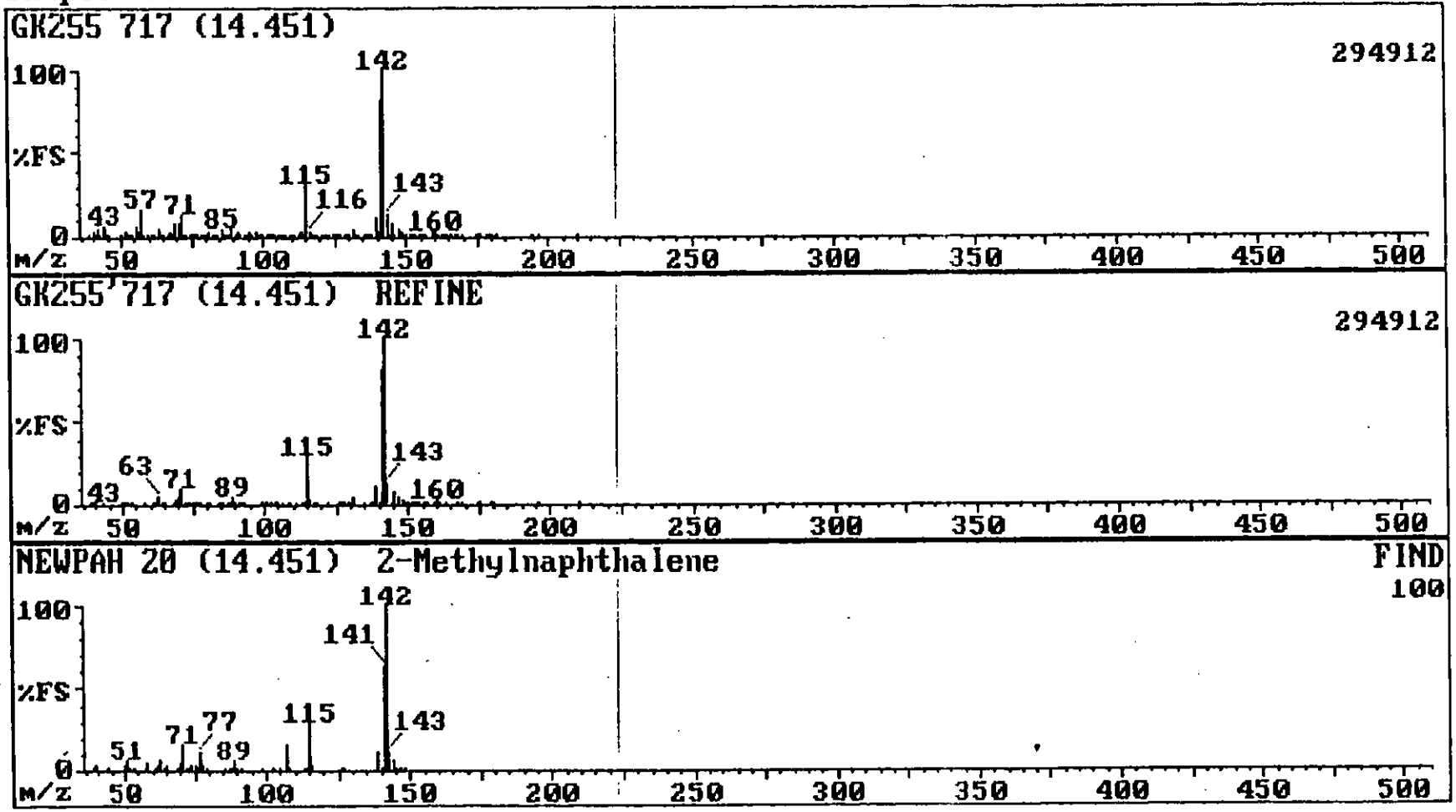
No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	78	96	0	411070	bb	443	152	1,4-Dichlorobenzene-d4
2	97	70	97	-1	1514400	bv	615	136	Naphthalene-d8
3	100	88	99	1	950780	bb	866	164	Acenaphthene-d10
4	100	84	99	-1	2109500	bv	1080	188	Phenanthrene-d10
5	100	88	98	0	1577100	bv	1468	240	Chrysene-d12
6	100	86	96	1	1595000	bv	1753	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	0	0	0	0	0		0	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	100	83	97	0	900140	vv	1088	188	Anthracene-d10
17	100	87	98	0	1186700	bb	1285	212	Pyrene-d10
18	100	82	99	0	1008300	bb	1317	244	Terphenyl-d14
19	96	55	98	0	573230	bv	618	128	Naphthalene
20	94	71	91	1	580690	bb	717	142	2-Methylnaphthalene
21	0	0	0	0	19663 ~~0~~		945 ~~0~~	162	2-Chloronaphthalene
22	0	0	0	0	~~0~~		~~0~~	152	Acenaphthylene
23	0	0	0	0	0		0	154	Acenaphthene
24	54	22	71	-1	27960	vv	945	166	Fluorene
25	0	0	0	0	0		0	266	Pentachlorophenol
26	65	28	84	1	62432	bv	1084	178	Phenanthrene
27	0	0	0	0	0		0	178	Anthracene
28	0	0	0	0	7904 ~~0~~ SH 10-13-92		1256 ~~0~~	202	Fluoranthene
29	0	0	0	0	0		0	202	Pyrene
30	0	0	0	0	0		0	228	Benzo(a)anthracene
31	0	0	0	0	0		0	228	Chrysene
32	0	0	0	0	0		0	252	Benzo(b)fluoranthene
33	0	0	0	0	0		0	252	Benzo(k)fluoranthene
34	0	0	0	0	0		0	252	Benzo(e)pyrene
35	0	0	0	0	0		0	252	Benzo(a)pyrene
36	0	0	0	0	0		0	252	Perylene
37	0	0	0	0	0		0	276	Indeno(1,2,3-cd)pyrene
38	0	0	0	0	0		0	278	Dibenz(a,h)anthracene
39	0	0	0	0	0		0	276	Benzo(g,h,i)perylene

11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #1 1:5 DIL 21899 Instrument G

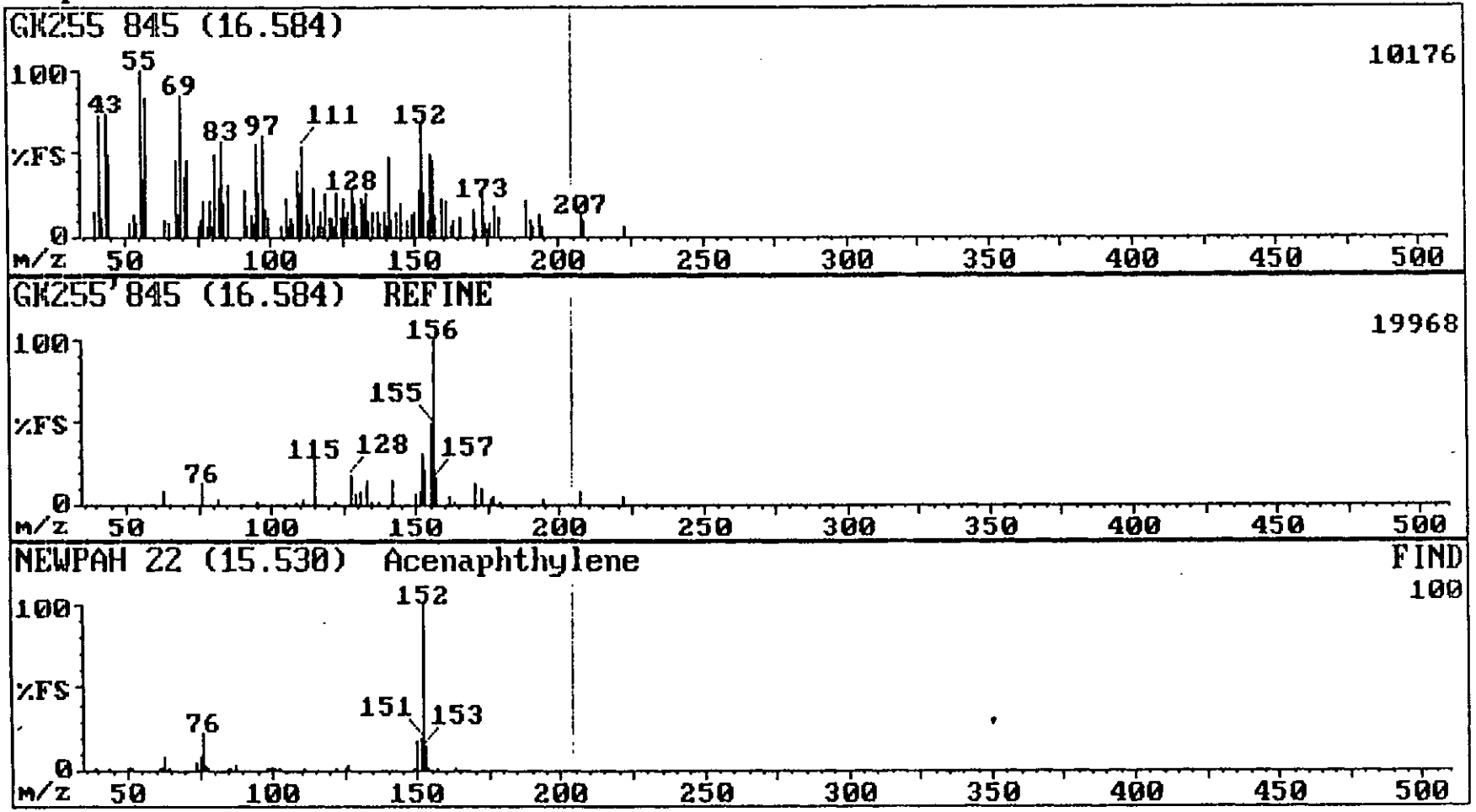


11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #1 1:5 DIL 21899 Instrument G



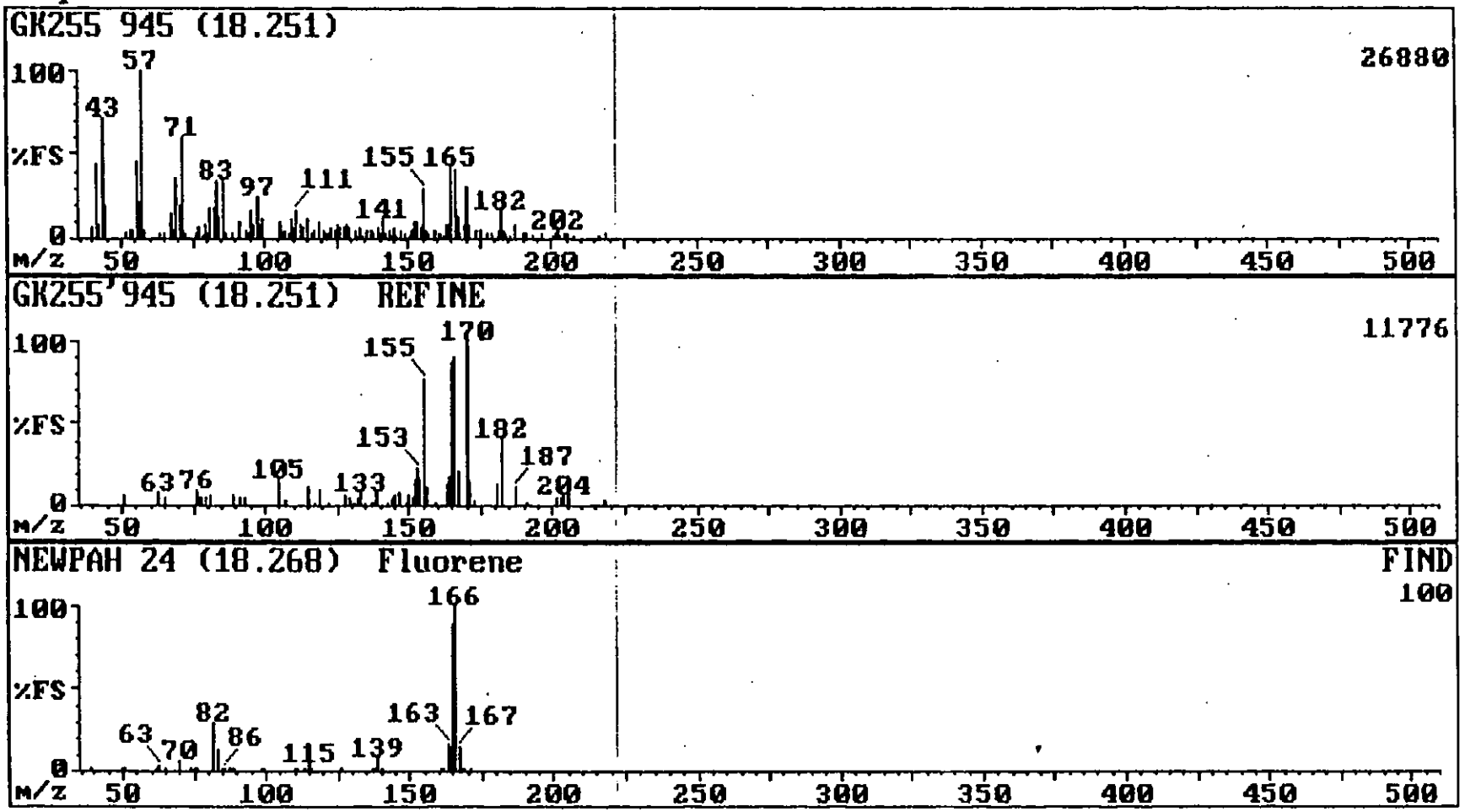
11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #1 1:5 DIL 21899 Instrument G

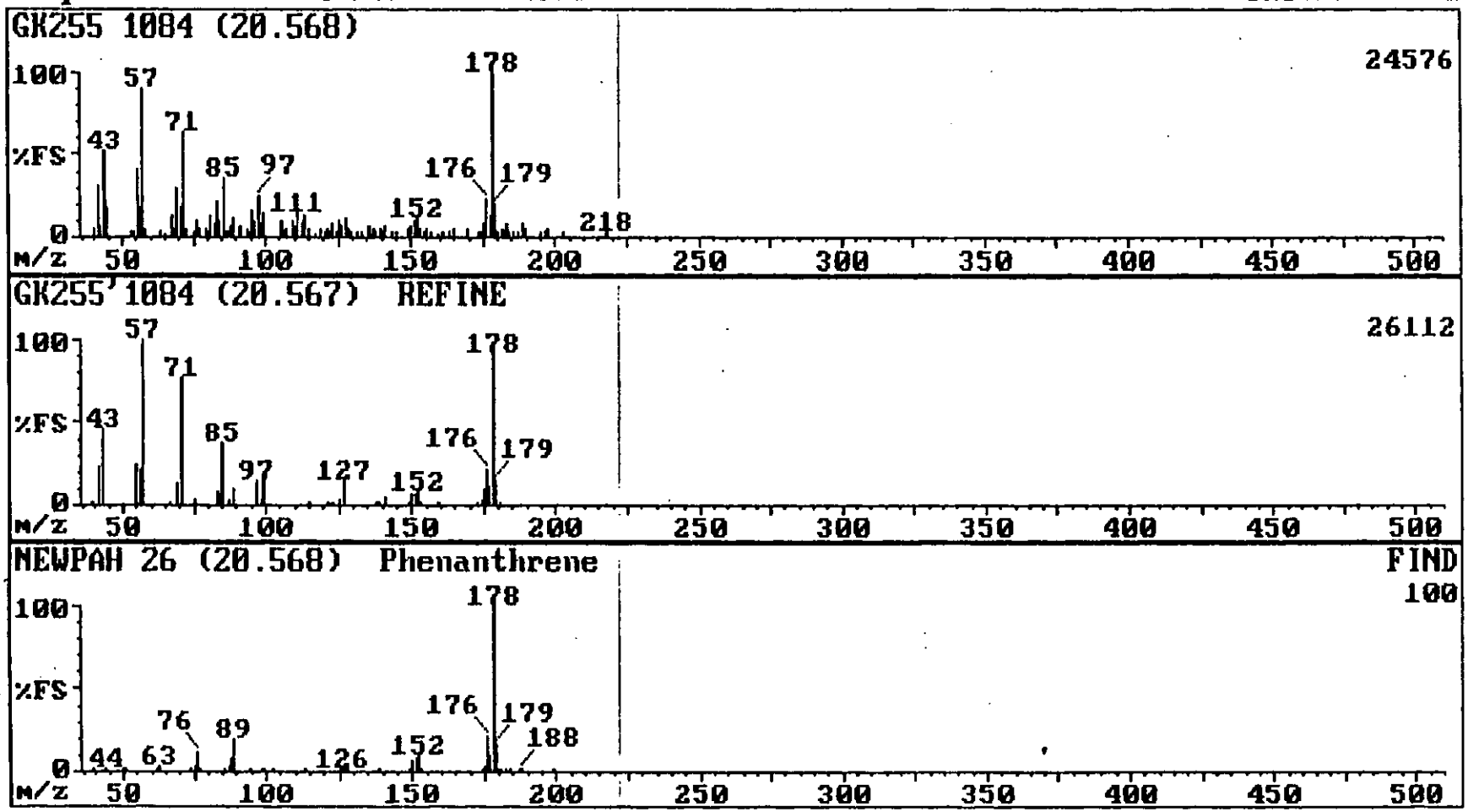


11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #1 1:5 DIL 21899 Instrument G

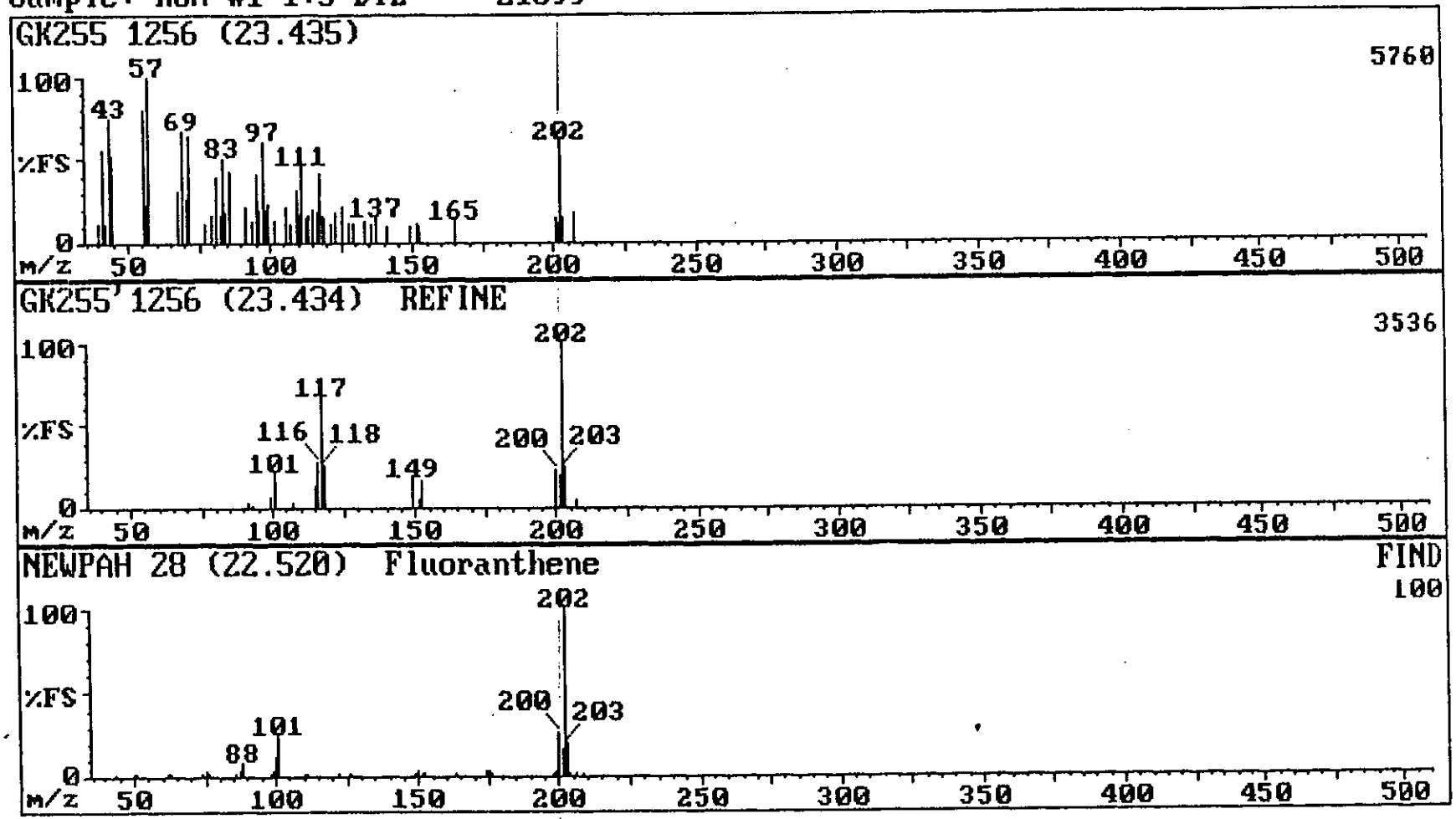


11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #1 1:5 DIL 21899 Instrument G



11-Oct-92 00:10 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #1 1:5 DIL 21899 Instrument G



TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

DATA FILE: GK256 SAMPLE ID: RUN #2
RF FILE: GK245 TLI ID: 59-154-2A-I
DATE: 10/13/92 DILN FACTOR: 5
TLI PROJ #: 21899 ANALYSIS DATE: 10/11/92

METHHOD 8270 QUANTITATION REPORT

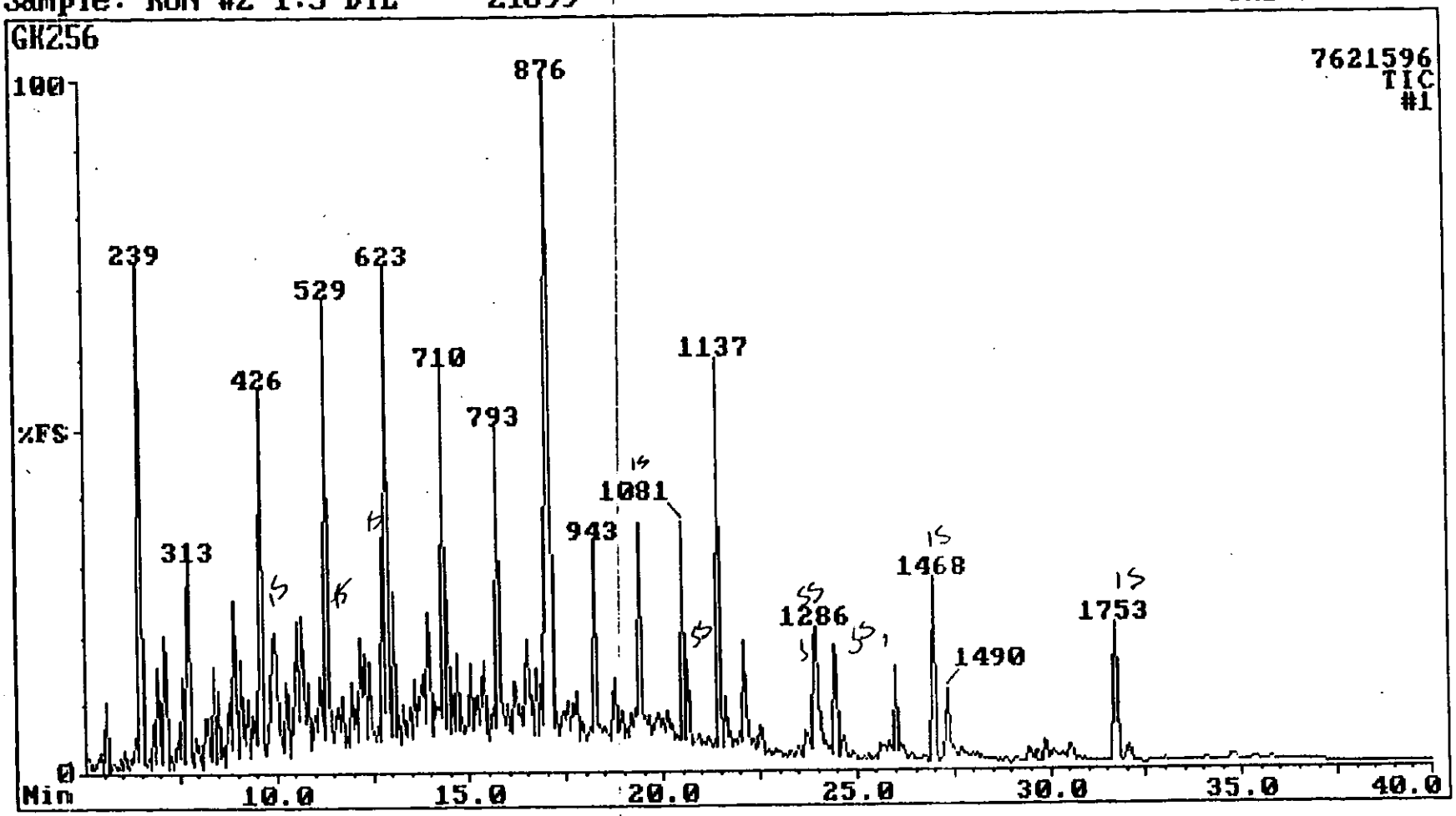
	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	4478		443	1		IS	
14	Naphthalene-d8	16552		615	14		IS	
23	Naphthalene	8197	.8722	618	14	113.55	D	50
27	2-Methylnaphthalene	7607	.6195	717	14	148.36	D	50
28	Acenaphthene-d10	10692		866	28		IS	
32	2-Chloronaphthalene	0	.8723	0	28	.43	ND	50
35	Acenaphthylene	411	1.4534	845	28	5.29	ND	50
37	Acenaphthene	0	.8396	0	28	.45	ND	50
45	Fluorene	476	1.0973	945	28	8.11	E	50
47	Phenanthrene-d10	22924		1080	47		IS	
52	Pentachlorophenol	0	.0898	0	47	1.94	ND	50
53	Phenanthrene	1145	.9106	1084	47	10.97	E	50
54	Anthracene	0	.9499	0	47	.18	ND	50
56	Fluoranthene	124	1.2261	1256	47	.88	E	50
57	Chrysene-d12	19330		1468	57		IS	
58	Pyrene	0	1.6592	0	57	.12	ND	50
61	Benzo(a)anthracene	0	1.3636	0	57	.15	ND	50
62	Chrysene	0	1.3014	0	57	.16	ND	50
64	Perylene-d12	19740		1753	64		IS	
66	Benzo(b)fluoranthene	0	1.2066	0	64	.17	ND	50
67	Benzo(k)fluoranthene	0	1.3984	0	64	.14	ND	50
68	Benzo(a)pyrene	0	1.0676	0	64	.19	ND	50
87	Benzo(e)pyrene	0	1.1108	0	64	.18	ND	50
88	Perylene	0	.9602	0	64	.21	ND	50
69	Indeno(1,2,3-cd)pyrene	0	.6444	0	64	.31	ND	50
70	Dibenz(a,h)anthracene	0	.6837	0	64	.30	ND	50
71	Benzo(g,h,i)perylene	0	.7603	0	64	.27	ND	50

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
74	Terphenyl-d14	10226	1.0247	1317	57	103.25	D	103.3
83	Anthracene-d10	9055	.8455	1088	47	93.44	D	93.4
84	Pyrene-d10	11950	1.4043	1285	57	88.05	D	88.0

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard

SA
10-13-92

11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #2 1:5 DIL 21899 Instrument G

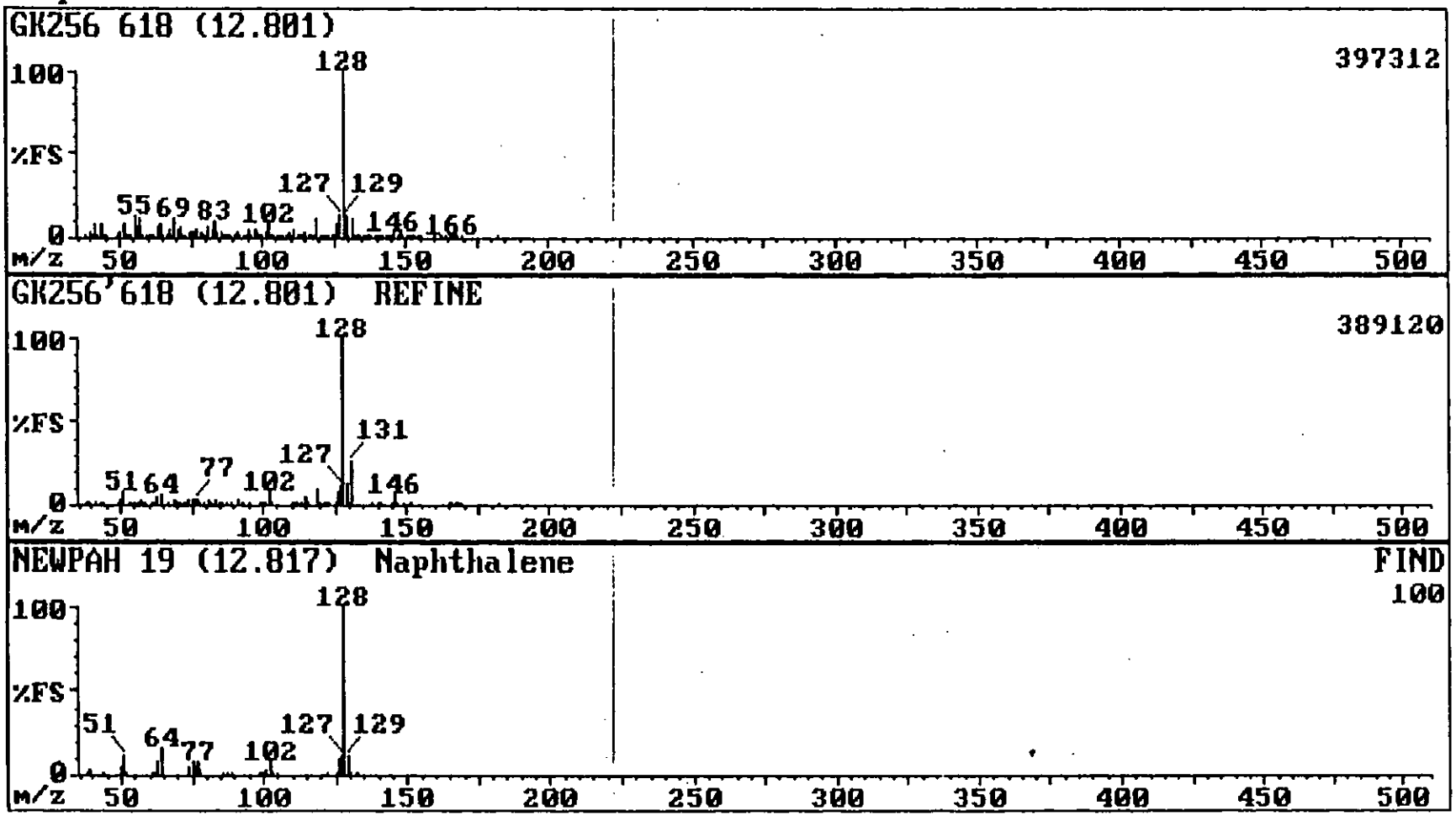


QUAN DB : GK256 LAB-BASE QUAN 11-Oct-92 12:08

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	72	96	0	447820	vv	443	152	1,4-Dichlorobenzene-d4
2	93	64	96	-1	1655200	vv	615	136	Naphthalene-d8
3	100	84	99	1	1069200	vv	866	164	Acenaphthene-d10
4	100	78	99	-1	2292400	bv	1080	188	Phenanthrene-d10
5	100	88	98	0	1933000	bv	1468	240	Chrysene-d12
6	100	86	96	1	1974000	bv	1753	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	0	0	0	0	0		0	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	100	72	97	0	905490	vv	1088	188	Anthracene-d10
17	100	79	98	0	1195000	bv	1285	212	Pyrene-d10
18	100	75	99	0	1022600	bb	1317	244	Terphenyl-d14
19	94	53	98	0	819660	vv	618	128	Naphthalene
20	92	67	91	1	760720	bb	717	142	2-Methylnaphthalene
21	0	0	0	0	0		0	162	2-Chloronaphthalene
22	0	0	0	0	41136 ~~0~~		845 ~~0~~	152	Acenaphthylene
23	0	0	0	0	0		0	154	Acenaphthene
24	62	23	76	-1	47579	vb	945	166	Fluorene
25	0	0	0	0	0		0	266	Pentachlorophenol
26	65	26	86	1	114480	bb	1084	178	Phenanthrene
27	0	0	0	0	0		0	178	Anthracene
28	0	0	0	0	12356 ~~0~~		1256 ~~0~~	202	Fluoranthene
29	0	0	0	0	0	SA 10-13-92	0	202	Pyrene
30	0	0	0	0	0		0	228	Benzo(a)anthracene
31	0	0	0	0	0		0	228	Chrysene
32	0	0	0	0	0		0	252	Benzo(b)fluoranthene
33	0	0	0	0	0		0	252	Benzo(k)fluoranthene
34	0	0	0	0	0		0	252	Benzo(e)pyrene
35	0	0	0	0	0		0	252	Benzo(a)pyrene
36	0	0	0	0	0		0	252	Perylene
37	0	0	0	0	0		0	276	Indeno(1,2,3-cd)pyrene
38	0	0	0	0	0		0	278	Dibenz(a,h)anthracene
39	0	0	0	0	0		0	276	Benzo(g,h,i)perylene

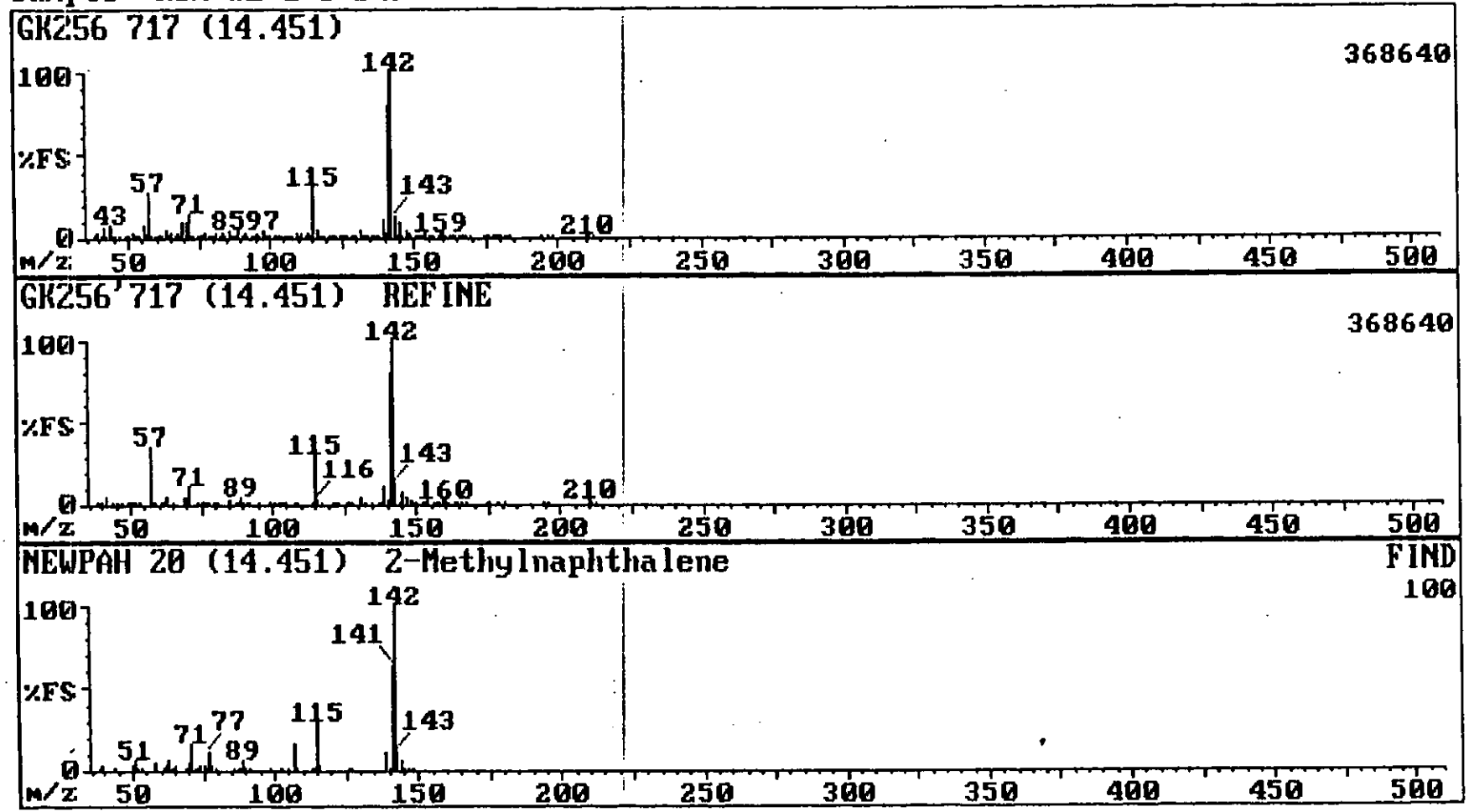
11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #2 1:5 DIL 21899 Instrument G

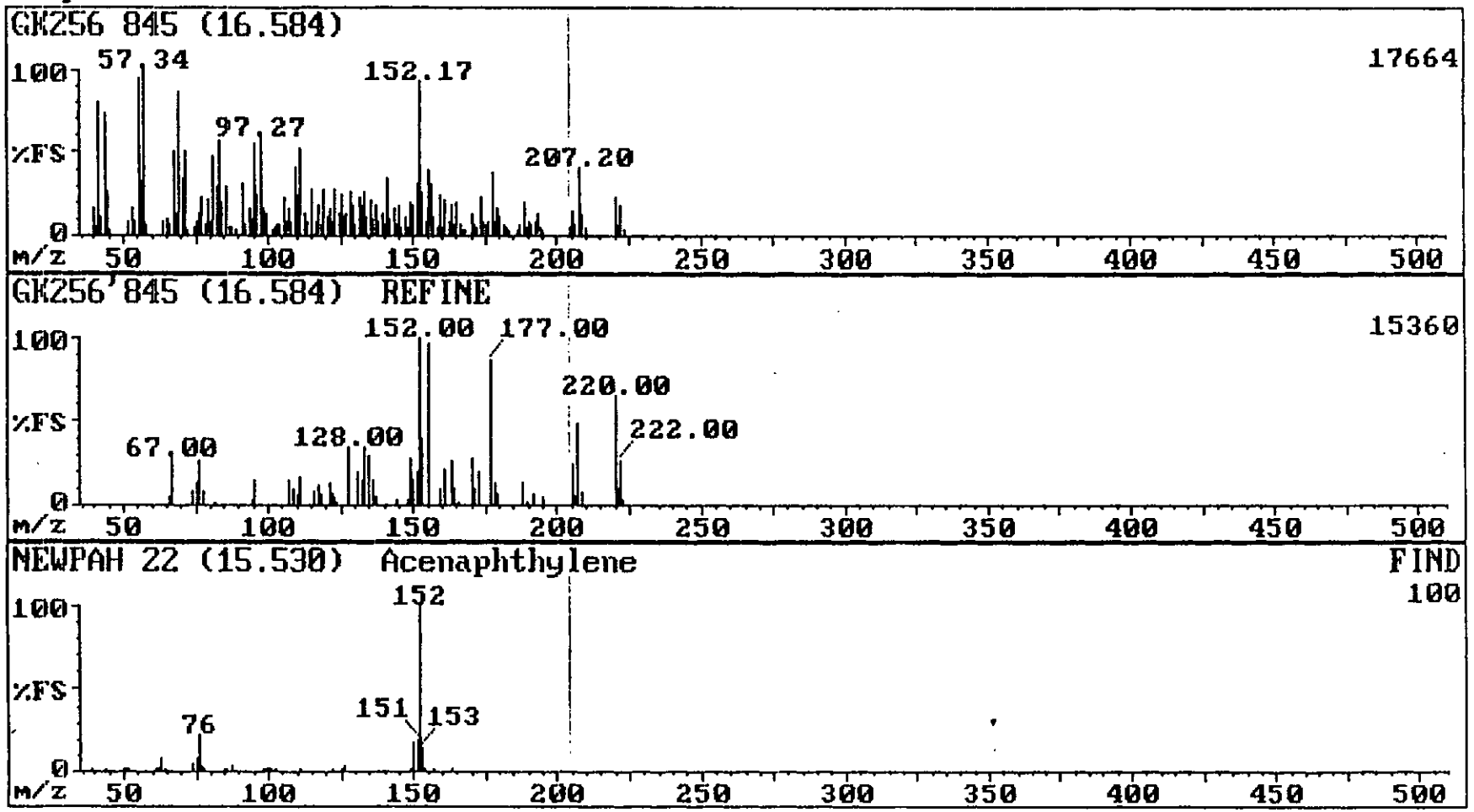


11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #2 1:5 DIL 21899 Instrument G

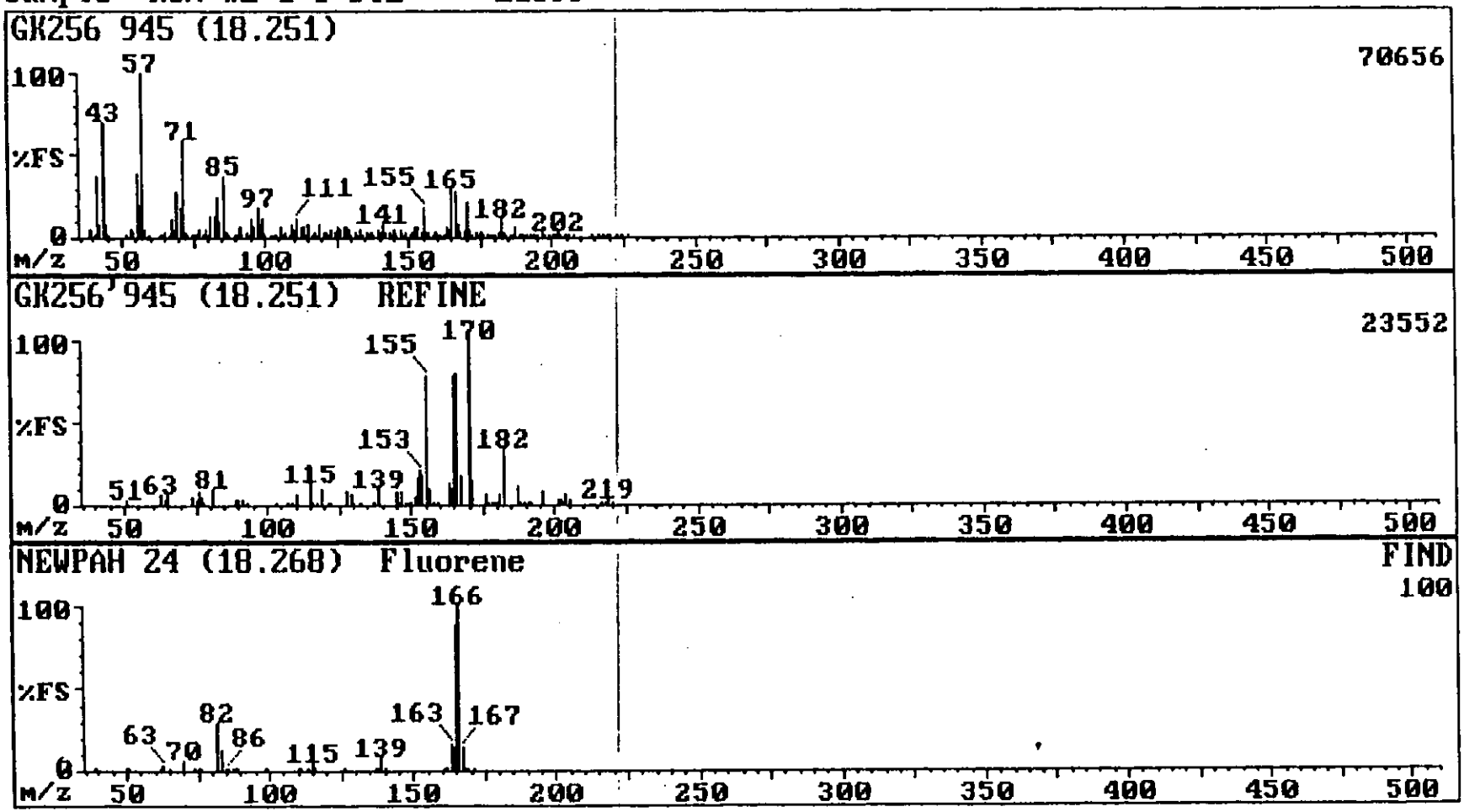


11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #2 1:5 DIL 21899 Instrument G



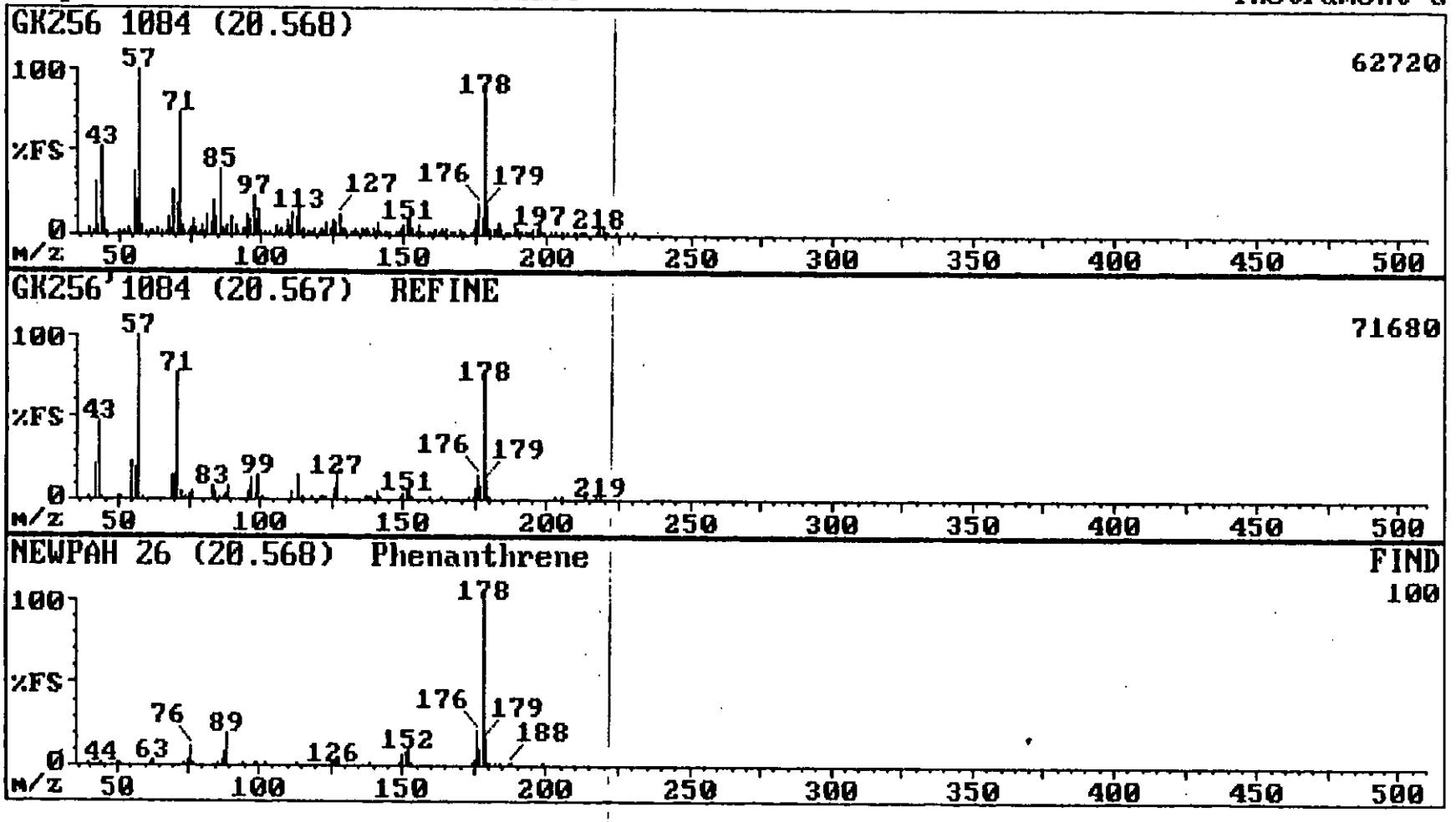
11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #2 1:5 DIL 21899 Instrument G

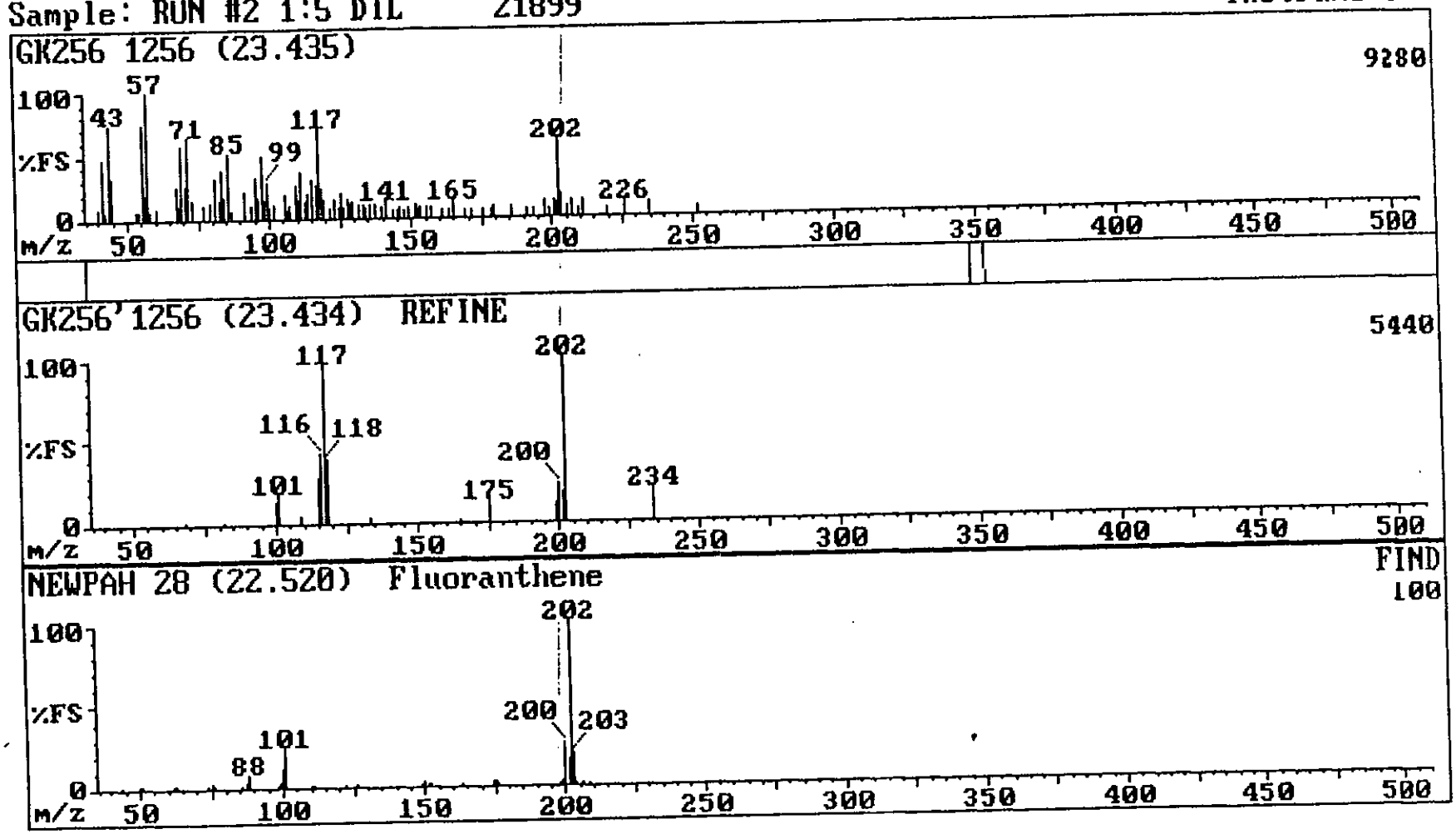


123

11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #2 1:5 DIL 21899 Instrument G



11-Oct-92 01:01 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #2 1:5 DIL 21899 Instrument G



TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

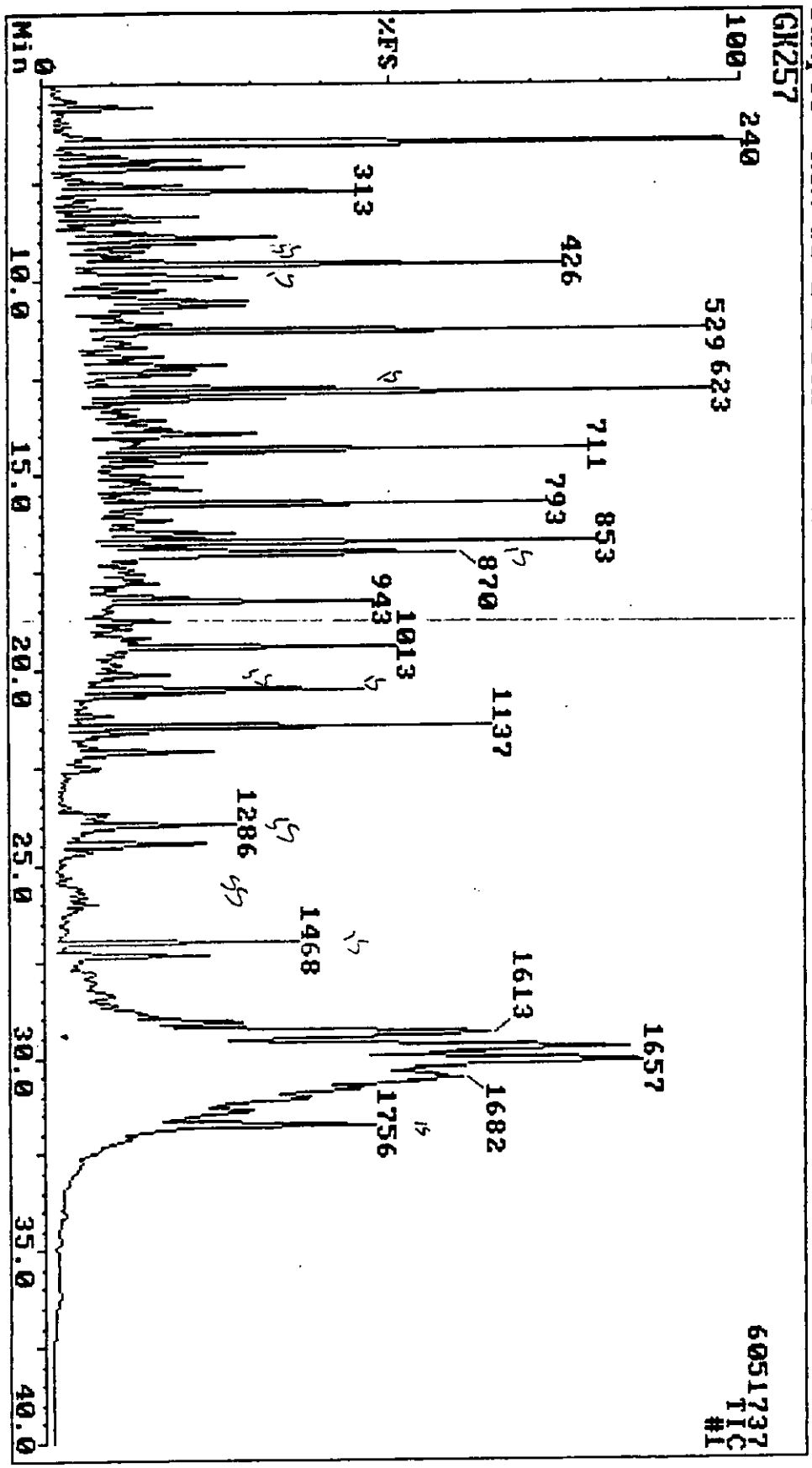
DATA FILE: GK257 SAMPLE ID: RUN #3
RF FILE: GK245 TLI ID: 59-154-3A-I
DATE: 10/13/92 DILN FACTOR: 5
TLI PROJ #: 21899 ANALYSIS DATE: 10/11/92

METHHOD 8270 QUANTITATION REPORT

	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	4275		443	1		IS	
14	Naphthalene-d8	16118		615	14		IS	
23	Naphthalene	9936	.8722	618	14	141.36	D	50
27	2-Methylnaphthalene	8089	.6195	717	14	162.01	D	50
28	Acenaphthene-d10	10600		866	28		IS	
32	2-Chloronaphthalene	0	.8723	0	28	.43	ND	50
35	Acenaphthylene	846	1.4534	845	28	10.98	E	50
37	Acenaphthene	0	.8396	0	28	.45	ND	50
45	Fluorene	568	1.0973	945	28	9.77	E	50
47	Phenanthrene-d10	22140		1081	47		IS	
52	Pentachlorophenol	0	.0898	0	47	2.01	ND	50
53	Phenanthrene	1190	.9106	1084	47	11.80	E	50
54	Anthracene	0	.9499	0	47	.19	ND	50
56	Fluoranthene	488	1.2261	1256	47	3.59	E	50
57	Chrysene-d12	20581		1468	57		IS	
58	Pyrene	0	1.6592	0	57	.12	ND	50
61	Benzo(a)anthracene	0	1.3636	0	57	.14	ND	50
62	Chrysene	0	1.3014	0	57	.15	ND	50
64	Perylene-d12	27884		1755	64		IS	
66	Benzo(b)fluoranthene	0	1.2066	0	64	.12	ND	50
67	Benzo(k)fluoranthene	0	1.3984	0	64	.10	ND	50
68	Benzo(a)pyrene	0	1.0676	0	64	.13	ND	50
87	Benzo(e)pyrene	0	1.1106	0	64	.13	ND	50
88	Perylene	0	.9602	0	64	.15	ND	50
69	Indeno(1,2,3-cd)pyrene	0	.6444	0	64	.22	ND	50
70	Dibenz(a,h)anthracene	0	.6837	0	64	.21	ND	50
71	Benzo(g,h,i)perylene	0	.7603	0	64	.19	ND	50

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
74	Terphenyl-d14	10472	1.0247	1317	57	99.31	D	99.3
83	Anthracene-d10	8200	.8455	1088	47	87.61	D	87.6
84	Pyrene-d10	12249	1.4043	1285	57	84.76	D	84.8

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard

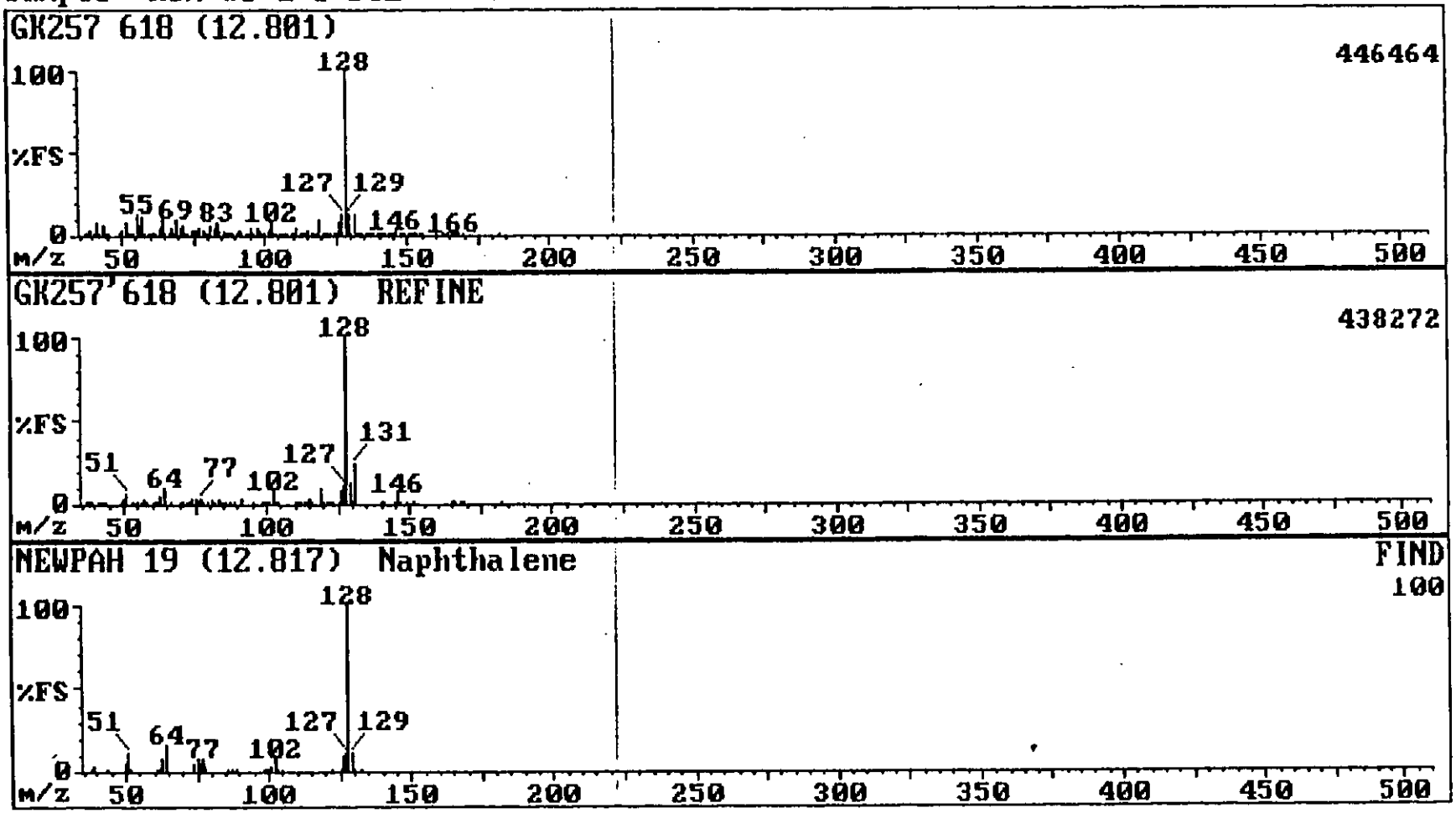

11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #3 1:5 DIL 21899 Instrument G
GR257
100-
%FS
0
Min
10.0
15.0
20.0
25.0
30.0
35.0
40.0
240
313
426
529
623
711
793
853
870
943
1013
1137
1286
1468
1613
1657
1682
1756
6051737
TIC
#1

QUAN DB : GK257 LAB-BASE QUAN 11-Oct-92 12:11

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	68	95	0	427530	vv	443	152	1,4-Dichlorobenzene-d4
2	100	64	96	-1	1611800	vv	615	136	Naphthalene-d8
3	100	81	99	1	1060000	bv	866	164	Acenaphthene-d10
4	100	78	99	0	2214000	bv	1081	188	Phenanthrene-d10
5	100	86	98	-1	2058100	bv	1468	240	Chrysene-d12
6	78	63	96	3	2788400	bv	1755	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	42	32	46	-3	28516	vv	395	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	97	70	97	-1	820000	vv	1088	188	Anthracene-d10
17	100	76	97	0	1224900	bv	1285	212	Pyrene-d10
18	100	75	99	0	1047200	bv	1317	244	Terphenyl-d14
19	95	54	98	0	993630	vv	618	128	Naphthalene
20	91	66	91	1	808910	bv	717	142	2-Methylnaphthalene
21	0	0	0	0	0		0	162	2-Chloronaphthalene
22	64	22	81	0	84576	bv	845	152	Acenaphthylene
23	0	0	0	0	0		0	154	Acenaphthene
24	63	24	76	-1	56810	vv	945	166	Fluorene
25	0	0	0	0	0		0	266	Pentachlorophenol
26	71	27	87	0	118970	vb	1084	178	Phenanthrene
27	0	0	0	0	0		0	178	Anthracene
28	67	30	85	-1	48752	bb	1256	202	Fluoranthene
29	0	0	0	0	0		0	202	Pyrene
30	0	0	0	0	0		0	228	Benzo(a)anthracene
31	0	0	0	0	0		0	228	Chrysene
32	0	0	0	0	0		0	252	Benzo(b)fluoranthene
33	0	0	0	0	0		0	252	Benzo(k)fluoranthene
34	0	0	0	0	0		0	252	Benzo(e)pyrene
35	0	0	0	0	0		0	252	Benzo(a)pyrene
36	0	0	0	0	0		0	252	Perylene
37	0	0	0	0	0		0	276	Indeno(1,2,3-cd)pyrene
38	0	0	0	0	0		0	278	Dibenz(a,h)anthracene
39	0	0	0	0	0		0	276	Benzo(g,h,i)perylene

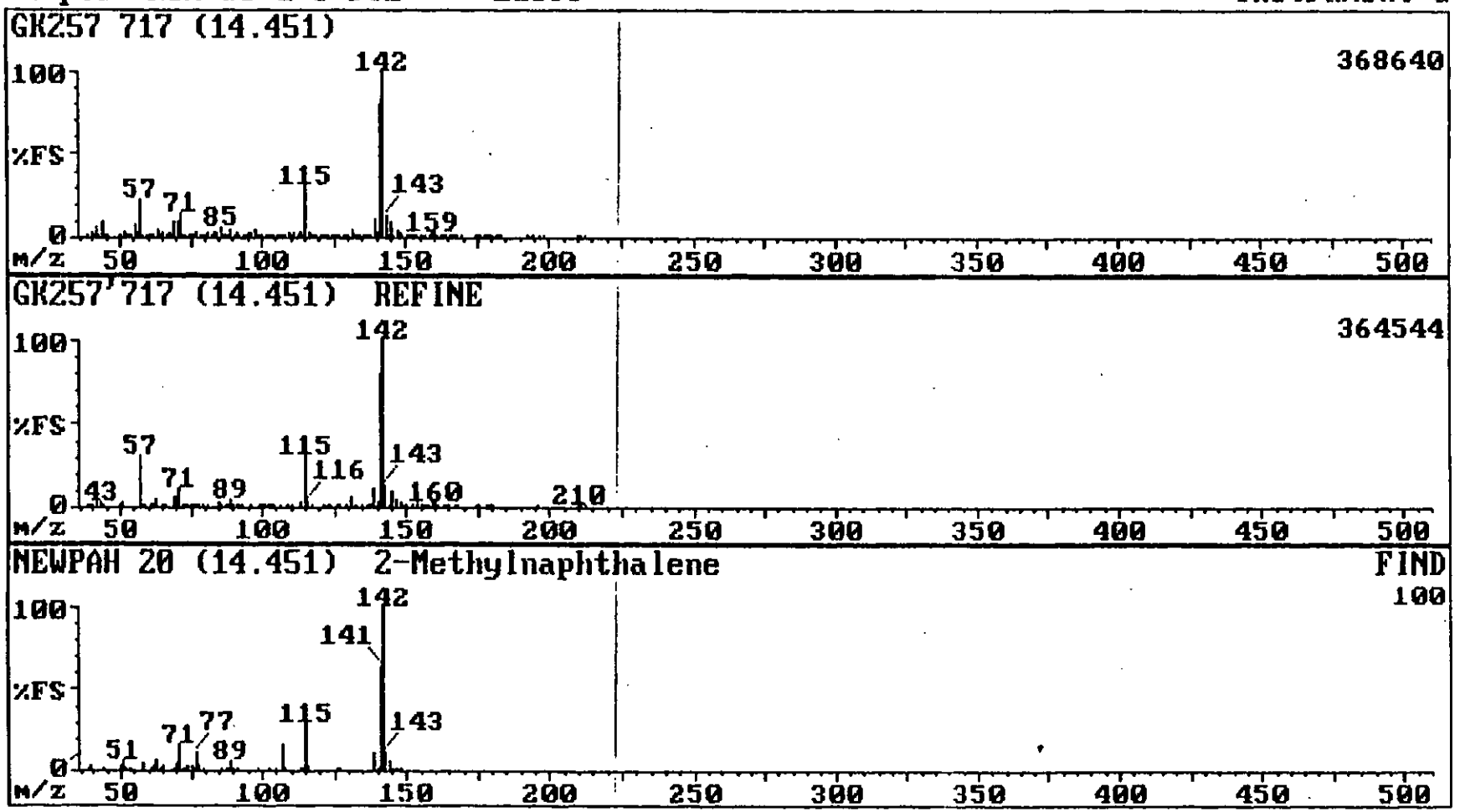
11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #3 1:5 DIL 21899 Instrument G



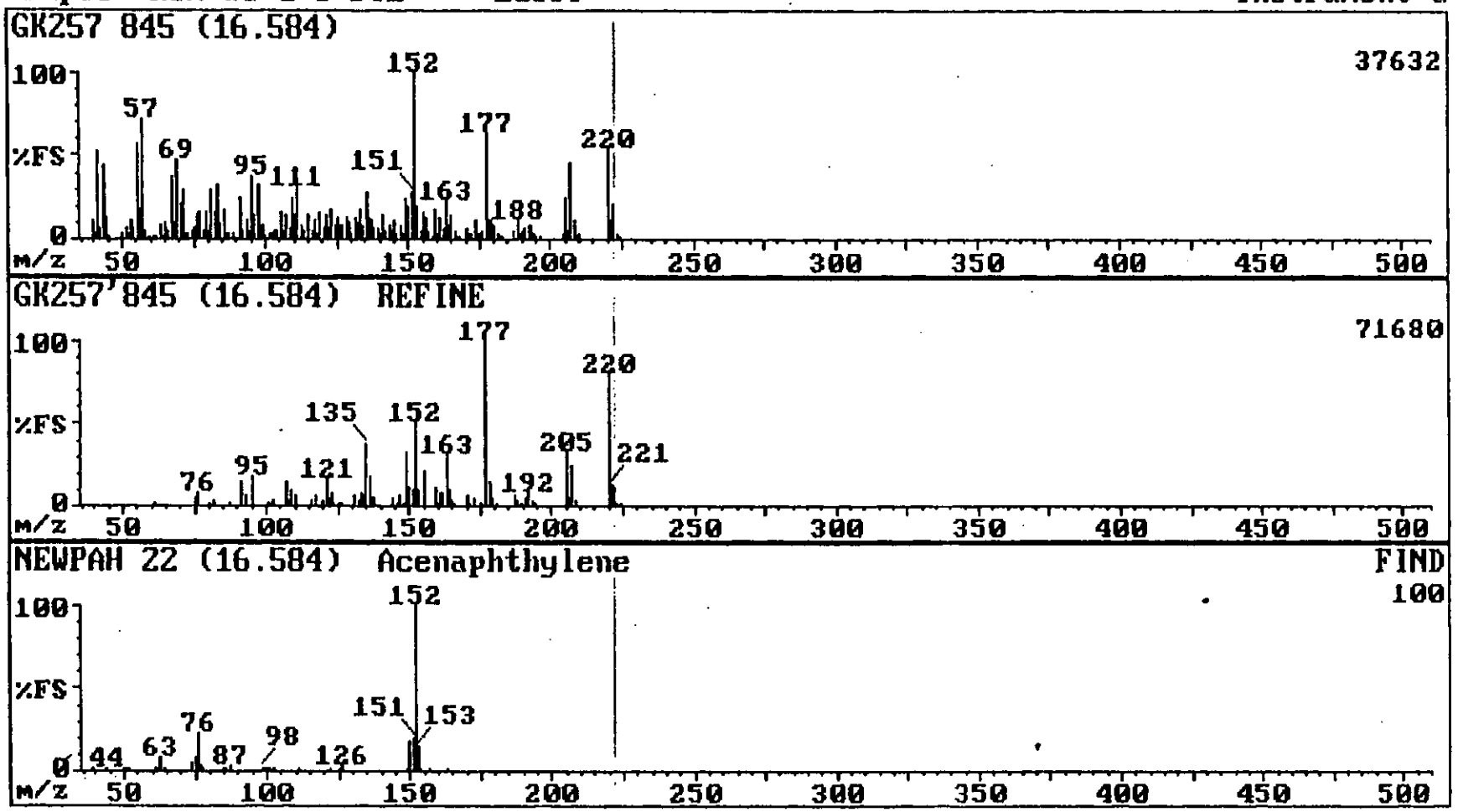
11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #3 1:5 DIL 21899 Instrument G



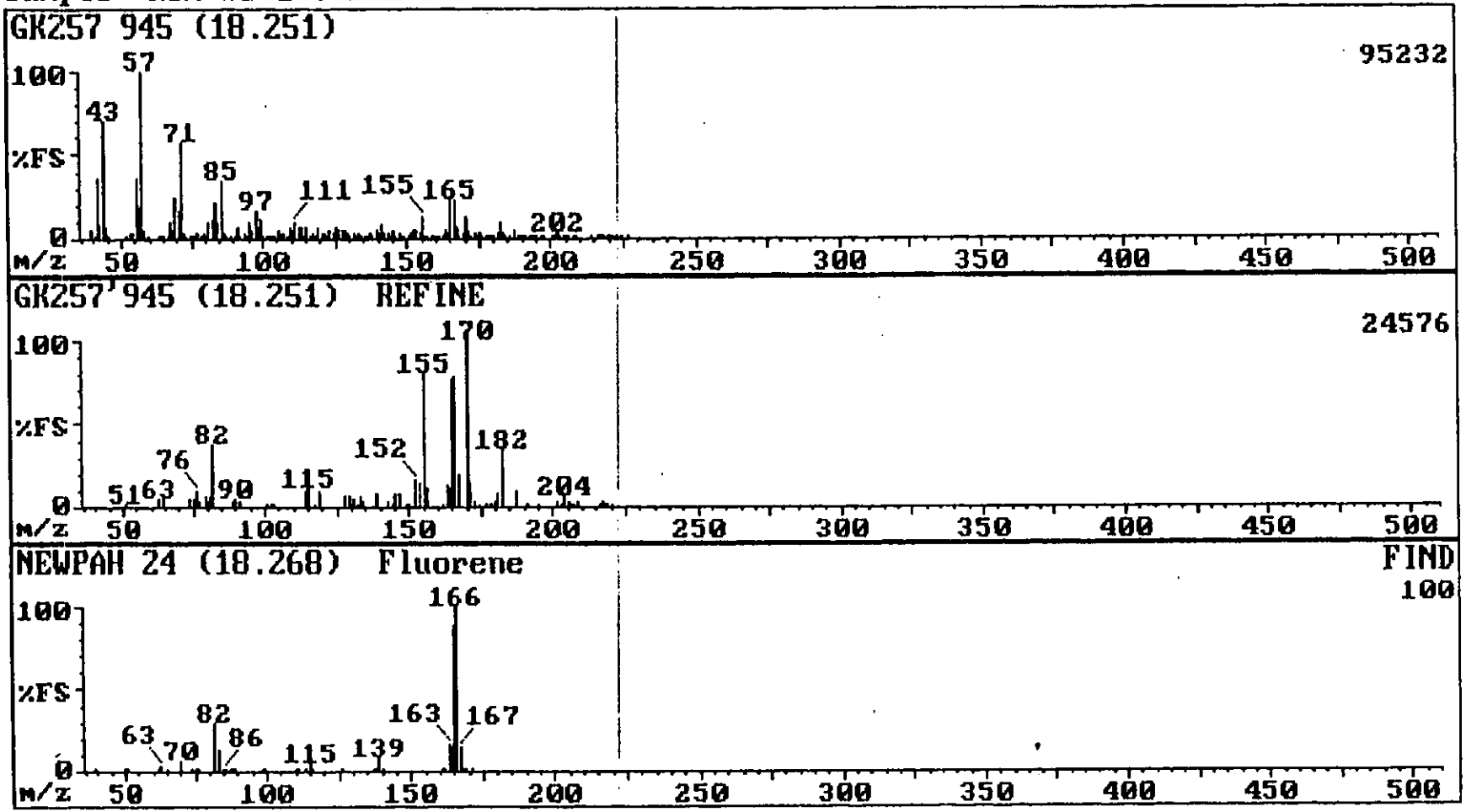
11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #3 1:5 DIL 21899 Instrument G



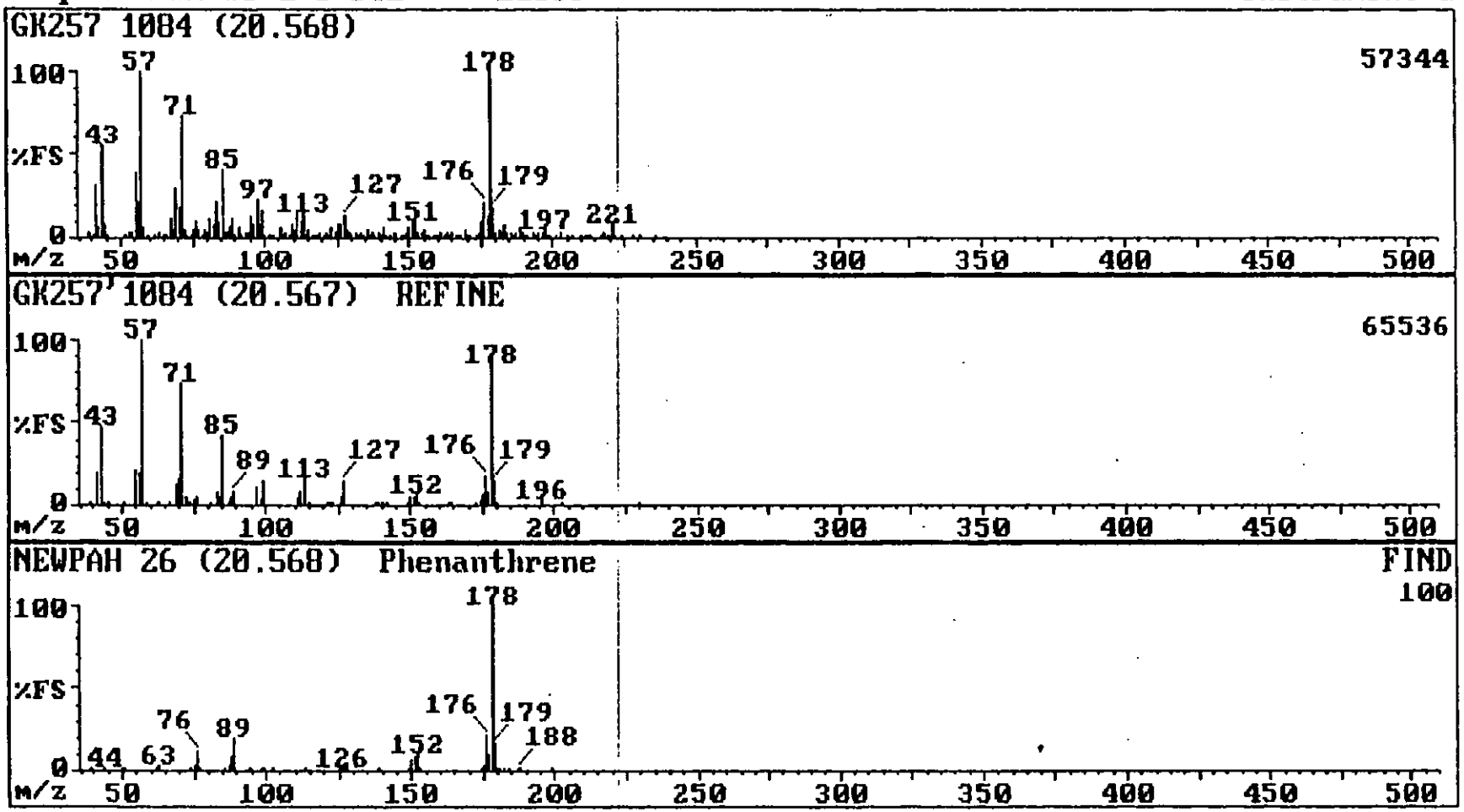
131

11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #3 1:5 DIL 21899 Instrument G

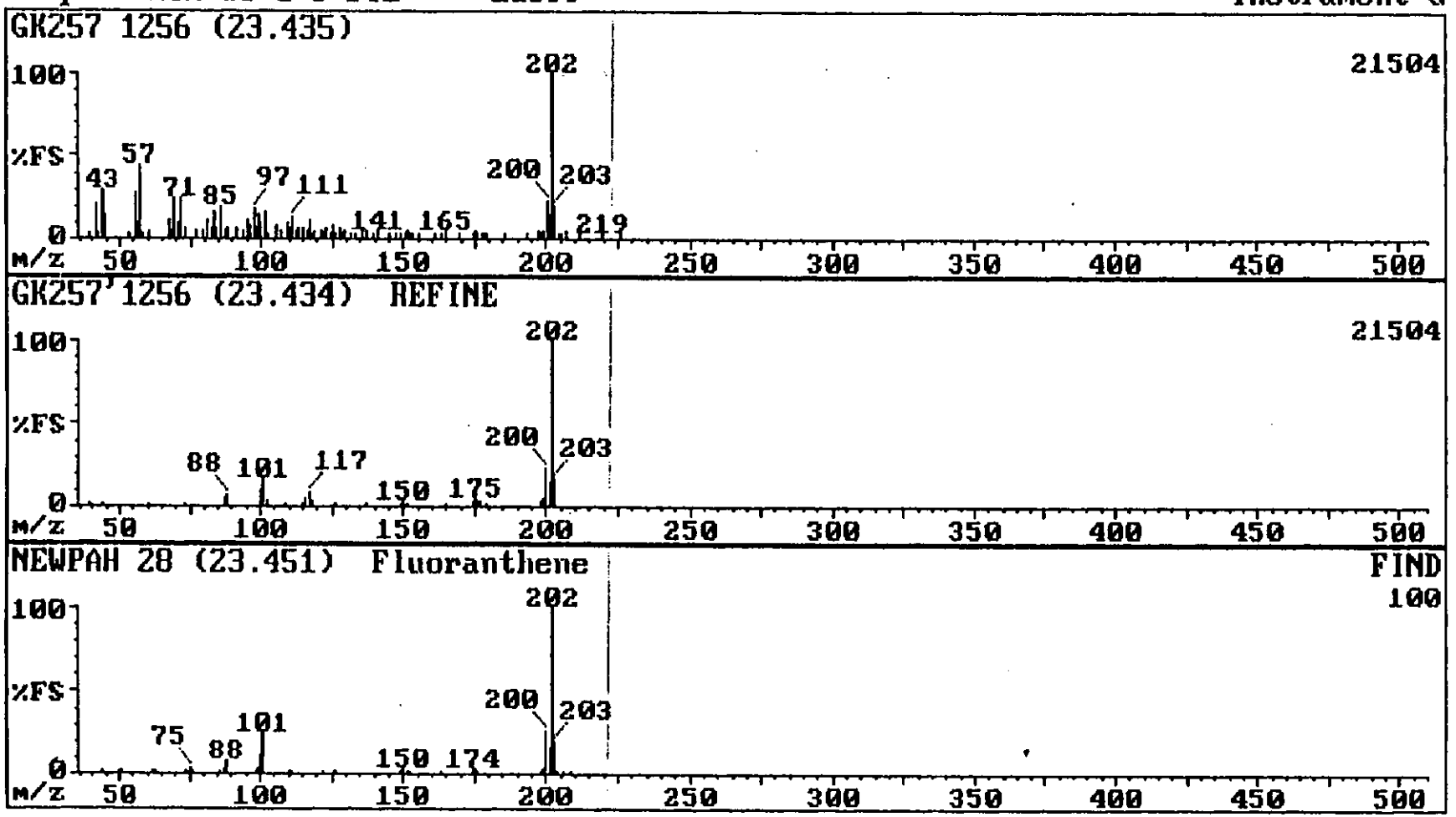


11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729

Sample: RUN #3 1:5 DIL 21899 Instrument G



11-Oct-92 01:52 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: RUN #3 1:5 DIL 21899 Instrument G



TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

DATA FILE: GK254
RF FILE: GK245
DATE: 10/13/92
TLI PROJ #: 21899

SAMPLE ID: BLANK
TLI ID: 59-154-4A-F
59-169-1-3
DILN FACTOR: 1
ANALYSIS DATE: 10/10/92

METHHOD 8270 QUANTITATION REPORT

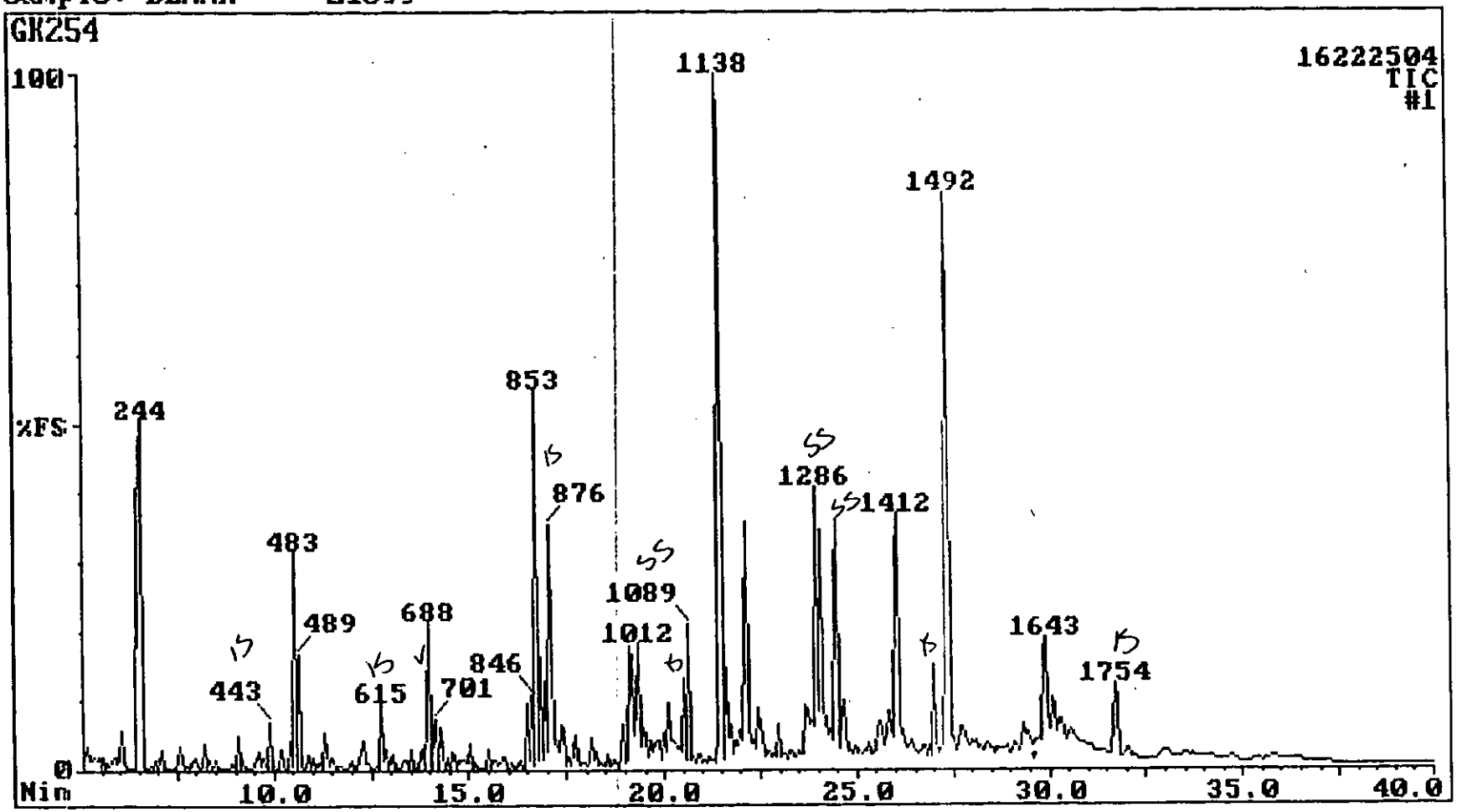
	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	3836		443	1		IS	
14	Naphthalene-d8	15028		615	14		IS	
23	Naphthalene	1522	.8722	618	14	4.65	E	10
27	2-Methylnaphthalene	387	.6195	717	14	1.66	E	10
28	Acenaphthene-d10	9681		866	28		IS	
32	2-Chloronaphthalene	0	.8723	0	28	.09	ND	10
35	Acenaphthylene	0	1.4534	0	28	.06	ND	10
37	Acenaphthene	0	.8396	0	28	.10	ND	10
45	Fluorene	0	1.0973	0	28	.08	ND	10
47	Phenanthrene-d10	19928		1080	47		IS	
52	Pentachlorophenol	0	.0898	0	47	.45	ND	10
53	Phenanthrene	343	.9106	1084	47	.76	E	10
54	Anthracene	0	.9499	0	47	.04	ND	10
56	Fluoranthene	138	1.2261	1256	47	.23	E	10
57	Chrysene-d12	20413		1468	57		IS	
58	Pyrene	0	1.6592	0	57	.02	ND	10
61	Benzo(a)anthracene	0	1.3636	0	57	.03	ND	10
62	Chrysene	0	1.3014	0	57	.03	ND	10
64	Perylene-d12	22768		1753	64		IS	
66	Benzo(b)fluoranthene	0	1.2066	0	64	.03	ND	10
67	Benzo(k)fluoranthene	0	1.3984	0	64	.03	ND	10
68	Benzo(a)pyrene	0	1.0676	0	64	.03	ND	10
87	Benzo(e)pyrene	0	1.1106	0	64	.03	ND	10
88	Perylene	0	.9602	0	64	.04	ND	10
69	Indeno(1,2,3-cd)pyrene	0	.6444	0	64	.05	ND	10
70	Dibenz(a,h)anthracene	0	.6837	0	64	.05	ND	10
71	Benzo(g,h,i)perylene	0	.7603	0	64	.05	ND	10

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
74	Terphenyl-d14	46173	1.0247	1318	57	88.30	D	88.3
83	Anthracene-d10	27790	.8455	1089	47	65.97	D	66.0
84	Pyrene-d10	51050	1.4043	1286	57	71.23	D	71.2

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard

SA
10-13-92

10-Oct-92 23:19 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: BLANK 21899 Instrument G



136

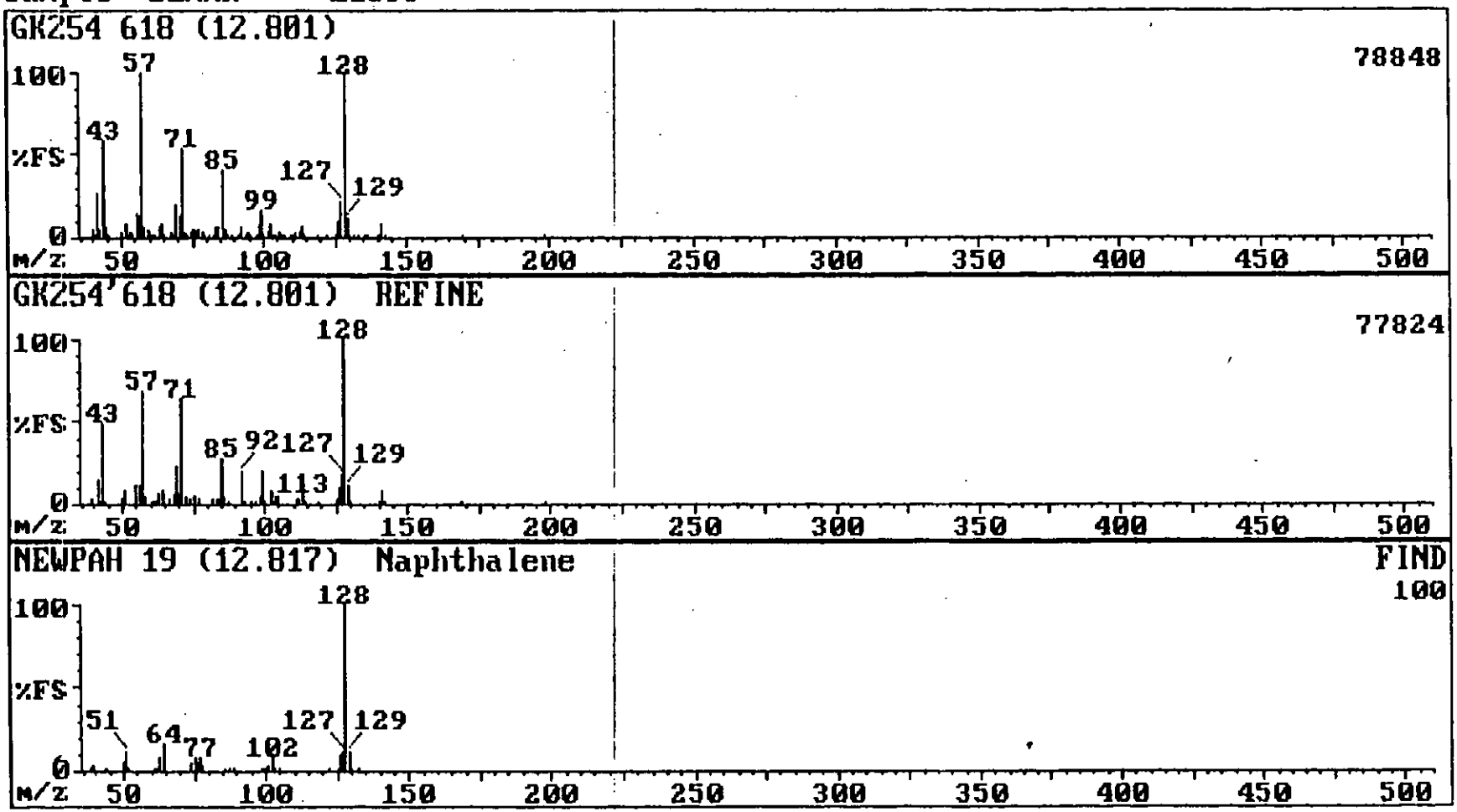
QUAN DB : GK254 LAB-BASE QUAN 11-Oct-92 12:02

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	83	97	0	383620	bb	443	152	1,4-Dichlorobenzene-d4
2	100	88	98	-1	1502800	bb	615	136	Naphthalene-d8
3	100	88	99	1	968120	bb	866	164	Acenaphthene-d10
4	100	81	99	-1	1992800	bv	1080	188	Phenanthrene-d10
5	100	79	98	0	2041300	bv	1468	240	Chrysene-d12
6	100	76	96	1	2276800	bv	1753	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	0	0	0	0	0		0	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	100	85	96	1	2779000	vv	1089	188	Anthracene-d10
17	100	83	98	1	5105000	vv	1286	212	Pyrene-d10
18	100	81	100	1	4617300	bv	1318	244	Terphenyl-d14
19	77	33	90	0	152230	bb	618	128	Naphthalene
20	56	31	66	1	38692	bb	717	142	2-Methylnaphthalene
21	0	0	0	0	0		0	162	2-Chloronaphthalene
22	0	0	0	0	0		0	152	Acenaphthylene
23	0	0	0	0	0		0	154	Acenaphthene
24	0	0	0	0	0		0	166	Fluorene
25	0	0	0	0	0		0	266	Pentachlorophenol
26	0	0	0	0	0		0	178	Phenanthrene
27	0	0	0	0	0		0	178	Anthracene
28	0	0	0	0	0		0	202	Fluoranthene
29	0	0	0	0	0		0	202	Pyrene
30	0	0	0	0	0		0	228	Benzo(a)anthracene
31	0	0	0	0	0		0	228	Chrysene
32	43	27	42	-1	7272	bv	1670	252	Benzo(b)fluoranthene
33	0	0	0	0	0		0	252	Benzo(k)fluoranthene
34	0	0	0	0	0		0	252	Benzo(e)pyrene
35	0	0	0	0	0		0	252	Benzo(a)pyrene
36	0	0	0	0	0		0	252	Perylene
37	0	0	0	0	0		0	276	Indeno(1,2,3-cd)pyrene
38	0	0	0	0	0		0	278	Dibenz(a,h)anthracene
39	0	0	0	0	0		0	276	Benzo(g,h,i)perylene

SA 10-8-92 3426 SA 10-13-92 1084
13808 SA 1256
SA 10-13-92

10-Oct-92 23:19 Triangle Laboratories of RTP, Inc. (919) 544-5729

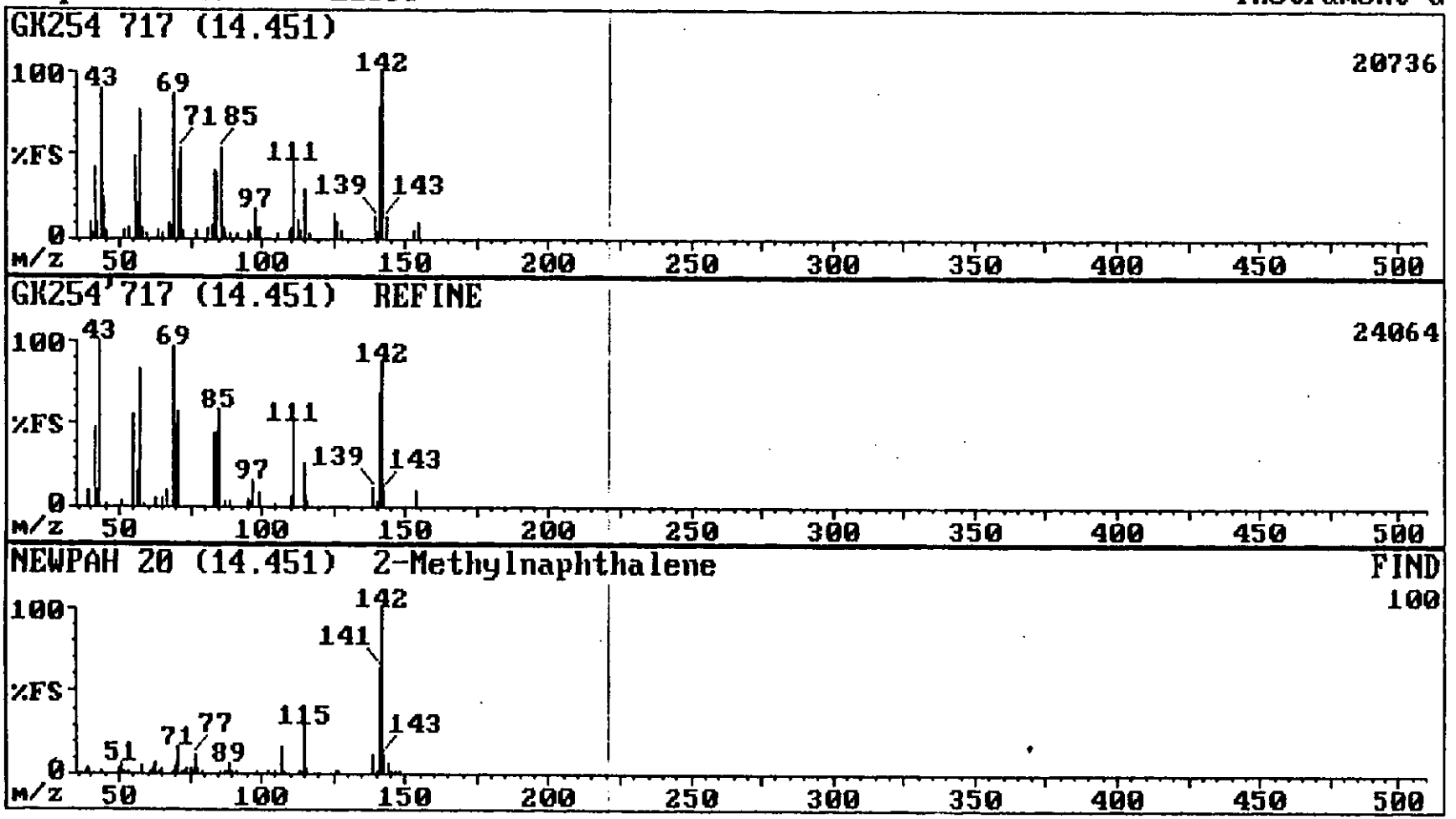
Sample: BLANK 21899 Instrument G



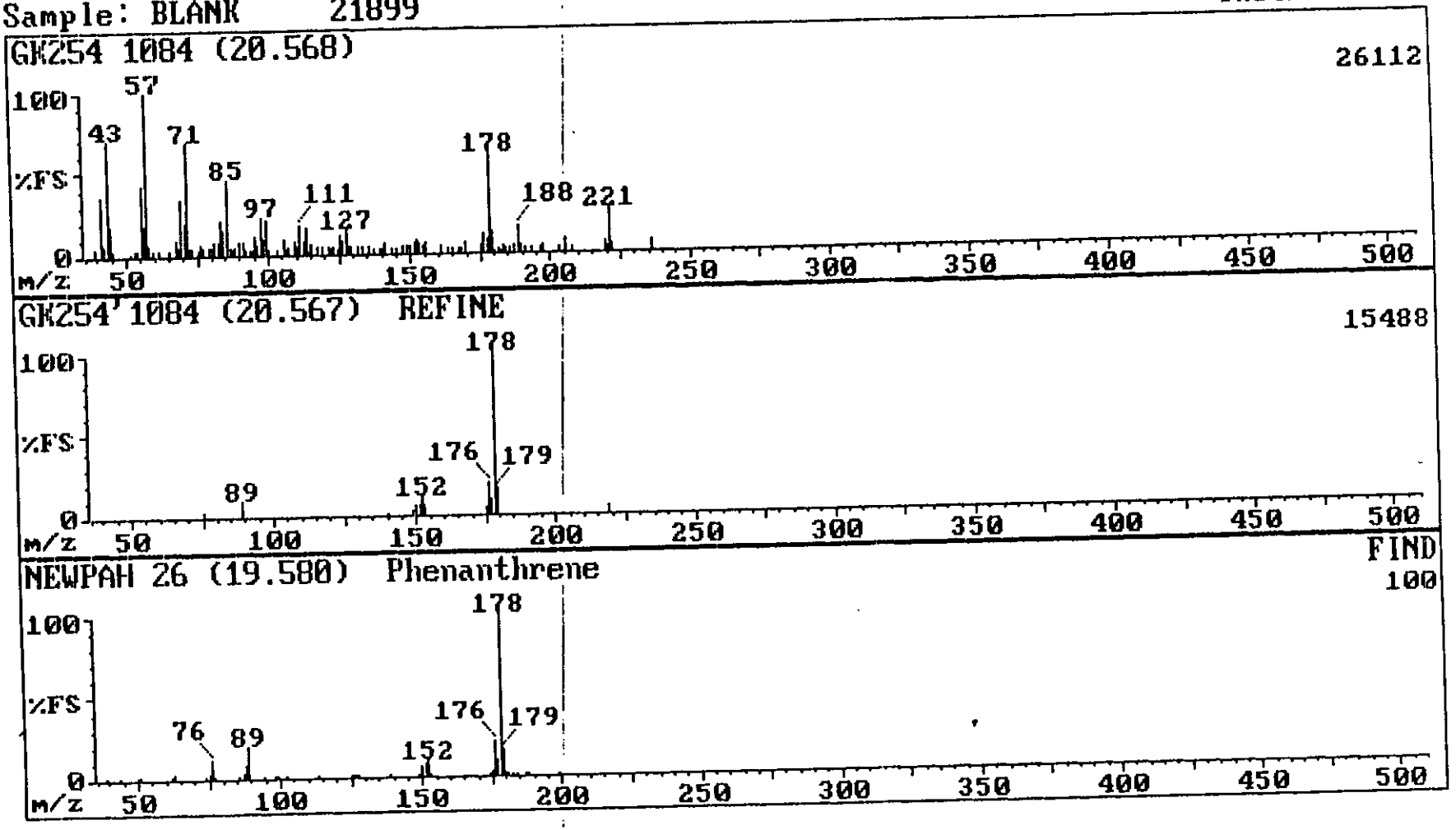
133

10-Oct-92 23:19 Triangle Laboratories of RTP, Inc. (919) 544-5729

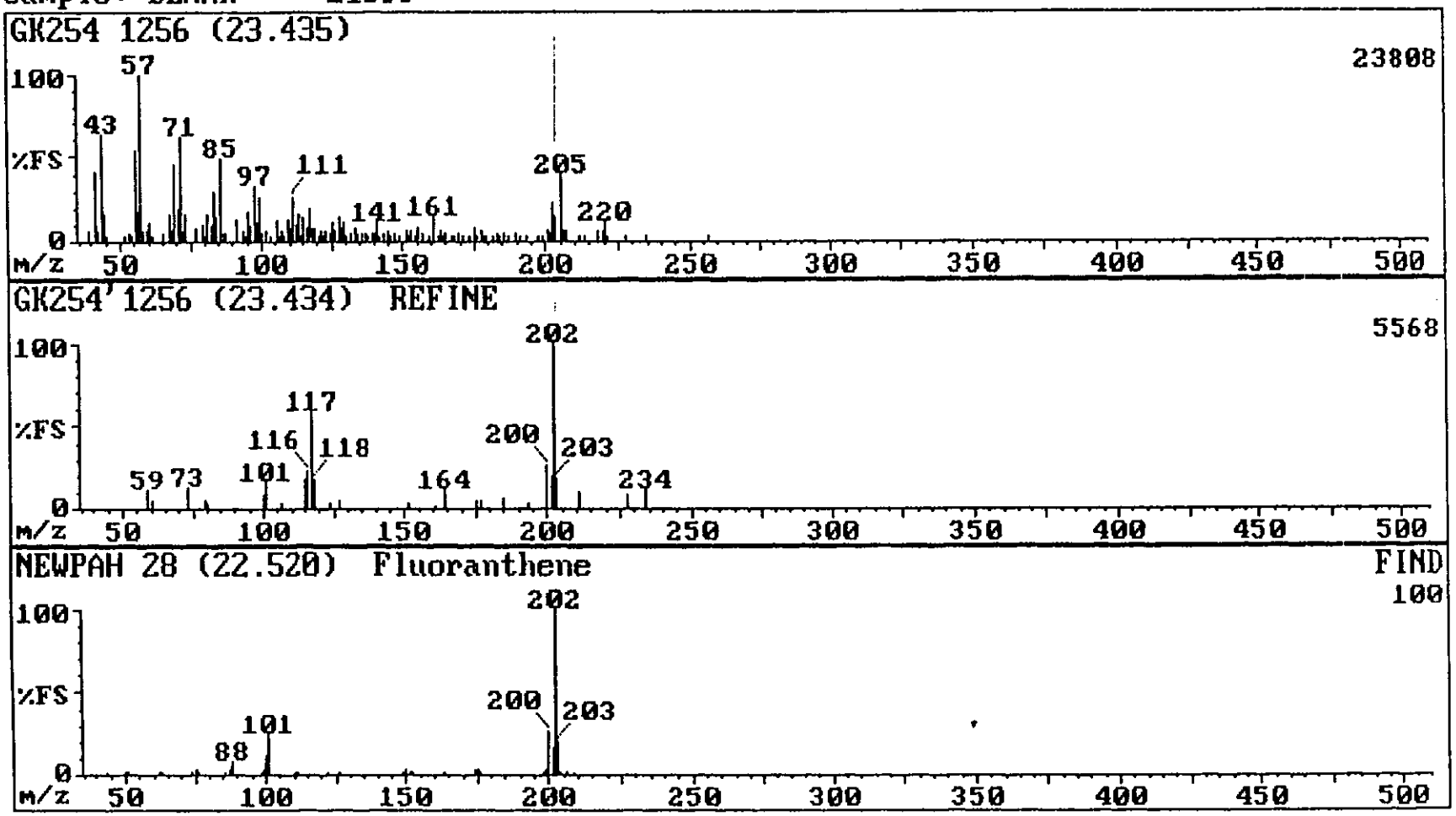
Sample: BLANK 21899 Instrument G



10-Oct-92 23:19 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: BLANK 21899 Instrument G



10-Oct-92 23:19 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: BLANK 21899 Instrument G



TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

DATA FILE: GK248 SAMPLE ID: SBLK 091892
RF FILE: GK245 TLI ID: N/A
DATE: 10/13/92 DILN FACTOR: 1
TLI PROJ #: 21899 ANALYSIS DATE: 10/10/92

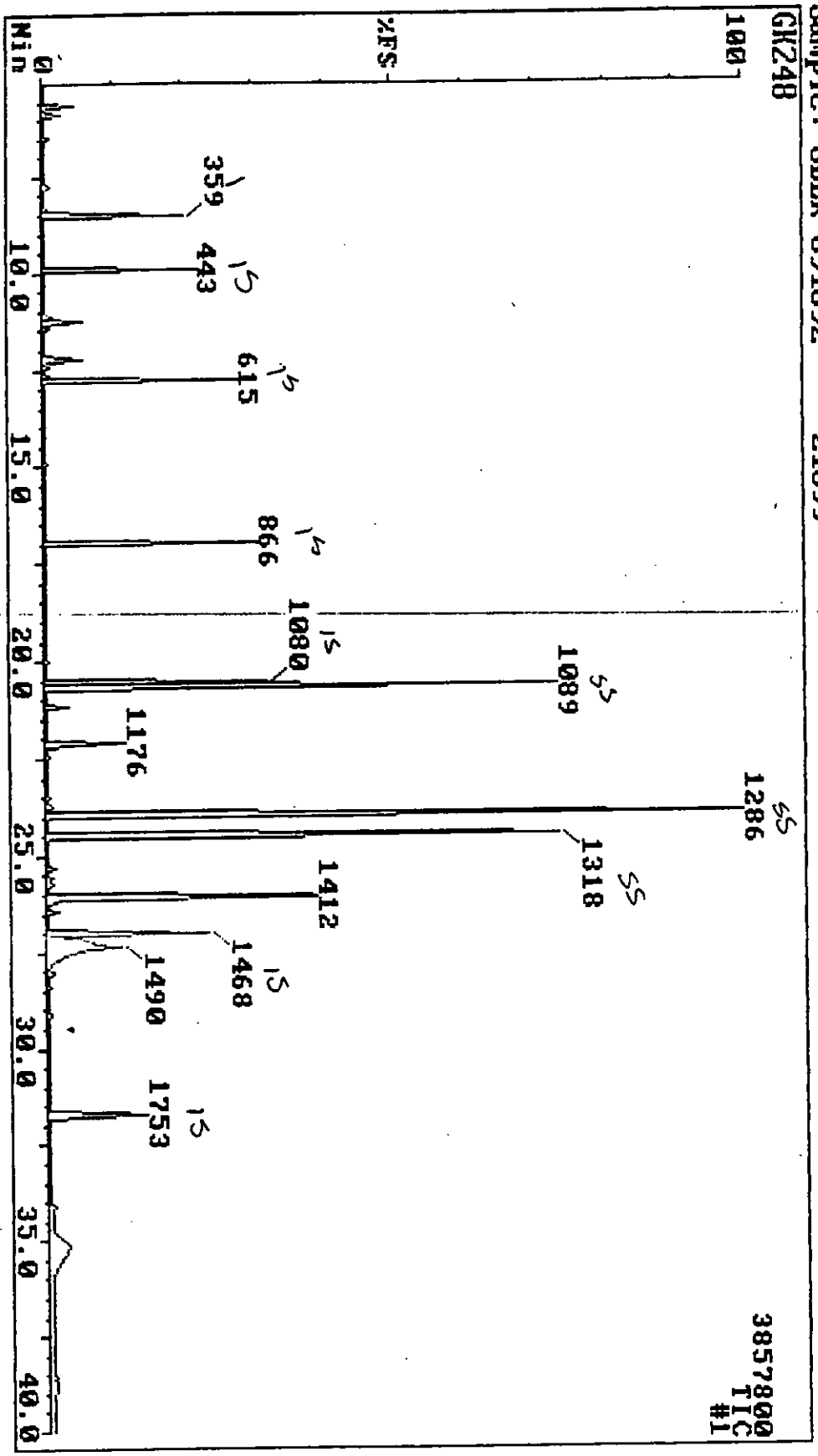
METHHOD 8270 QUANTITATION REPORT

	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	2884		443	1		IS	
14	Naphthalene-d8	10900		615	14		IS	
23	Naphthalene	259	.8722	618	14	1.09	E	10
27	2-Methylnaphthalene	0	.6195	0	14	.12	ND	10
28	Acenaphthene-d10	5901		866	28		IS	
32	2-Chloronaphthalene	0	.8723	0	28	.16	ND	10
35	Acenaphthylene	0	1.4534	0	28	.09	ND	10
37	Acenaphthene	0	.8396	0	28	.16	ND	10
45	Fluorene	0	1.0973	0	28	.12	ND	10
47	Phenanthrene-d10	12373		1080	47		IS	
52	Pentachlorophenol	0	.0898	0	47	.72	ND	10
53	Phenanthrene	0	.9106	0	47	.07	ND	10
54	Anthracene	0	.9499	0	47	.07	ND	10
56	Fluoranthene	0	1.2261	0	47	.05	ND	10
57	Chrysene-d12	7687		1468	57		IS	
58	Pyrene	0	1.6592	0	57	.06	ND	10
61	Benzo(a)anthracene	0	1.3636	0	57	.08	ND	10
62	Chrysene	0	1.3014	0	57	.08	ND	10
64	Perylene-d12	6015		1752	64		IS	
66	Benzo(b)fluoranthene	0	1.2066	0	64	.11	ND	10
67	Benzo(k)fluoranthene	0	1.3984	0	64	.10	ND	10
68	Benzo(a)pyrene	0	1.0676	0	64	.12	ND	10
87	Benzo(e)pyrene	0	1.1106	0	64	.12	ND	10
88	Perylene	0	.9602	0	64	.14	ND	10
69	Indeno(1,2,3-cd)pyrene	0	.6444	0	64	.21	ND	10
70	Dibenz(a,h)anthracene	0	.6837	0	64	.19	ND	10
71	Benzo(g,h,i)perylene	0	.7603	0	64	.17	ND	10

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
74	Terphenyl-d14	22009	1.0247	1318	57	111.77	D	111.8
83	Anthracene-d10	23437	.8455	1089	47	89.61	D	89.6
84	Pyrene-d10	29941	1.4043	1286	57	110.94	D	110.9

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard

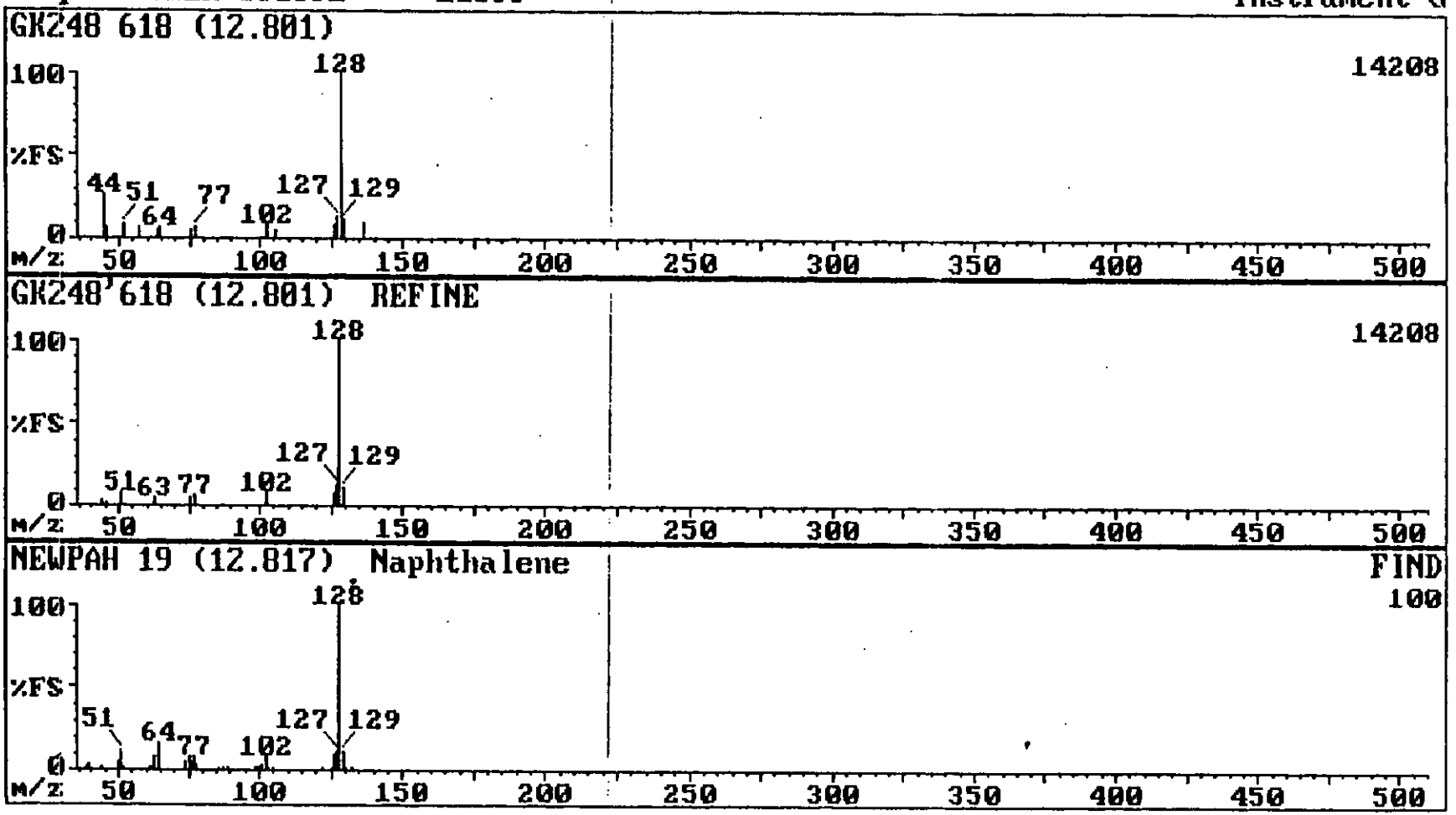
SA
10-13-92


10-Oct-92 18:16 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: SBLK 091892 21899 Instrument G
GK248
100
%FS
0
Min
10.0
15.0
20.0
25.0
30.0
35.0
40.0
3857800
TIC
#1
359
443
615
866
1080
1089
1176
1286
1318
1412
1468
1490
1753

QUAN DB : GK243 LAB-BASE QUAN 11-Oct-92 11:46

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	87	98	0	288420	bb	443	152	1,4-Dichlorobenzene-d4
2	100	93	96	-1	1090000	bb	615	136	Naphthalene-d8
3	100	97	99	1	590140	bb	866	164	Acenaphthene-d10
4	100	94	99	-1	1237300	bv*	1080	188	Phenanthrene-d10
5	100	91	99	0	768720	bb	1468	240	Chrysene-d12
6	100	90	97	0	601520	bb	1752	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	0	0	0	0	0		0	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	100	90	96	1	2343700	vb	1089	188	Anthracene-d10
17	100	92	99	1	2994100	bv	1286	212	Pyrene-d10
18	100	88	99	1	2200900	bb	1318	244	Terphenyl-d14
19	87	66	73	0	25912	bb	618	128	Naphthalene
20	0	0	0	0	0		0	142	2-Methylnaphthalene
21	0	0	0	0	0		0	162	2-Chloronaphthalene
22	0	0	0	0	0		0	152	Acenaphthylene
23	0	0	0	0	0		0	154	Acenaphthene
24	0	0	0	0	0		0	166	Fluorene
25	0	0	0	0	0		0	266	Pentachlorophenol
26	0	0	0	0	0		0	178	Phenanthrene
27	0	0	0	0	0		0	178	Anthracene
28	0	0	0	0	0		0	202	Fluoranthene
29	0	0	0	0	0		0	202	Pyrene
30	0	0	0	0	0		0	228	Benzo(a)anthracene
31	0	0	0	0	0		0	228	Chrysene
32	0	0	0	0	0		0	252	Benzo(b)fluoranthene
33	0	0	0	0	0		0	252	Benzo(k)fluoranthene
34	0	0	0	0	0		0	252	Benzo(e)pyrene
35	0	0	0	0	0		0	252	Benzo(a)pyrene
36	0	0	0	0	0		0	252	Perylene
37	0	0	0	0	0		0	276	Indeno(1,2,3-cd)pyrene
38	0	0	0	0	0		0	278	Dibenz(a,h)anthracene
39	0	0	0	0	0		0	276	Benzo(g,h,i)perylene

10-Oct-92 18:16 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: SBLK 091892 21899 Instrument G



TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

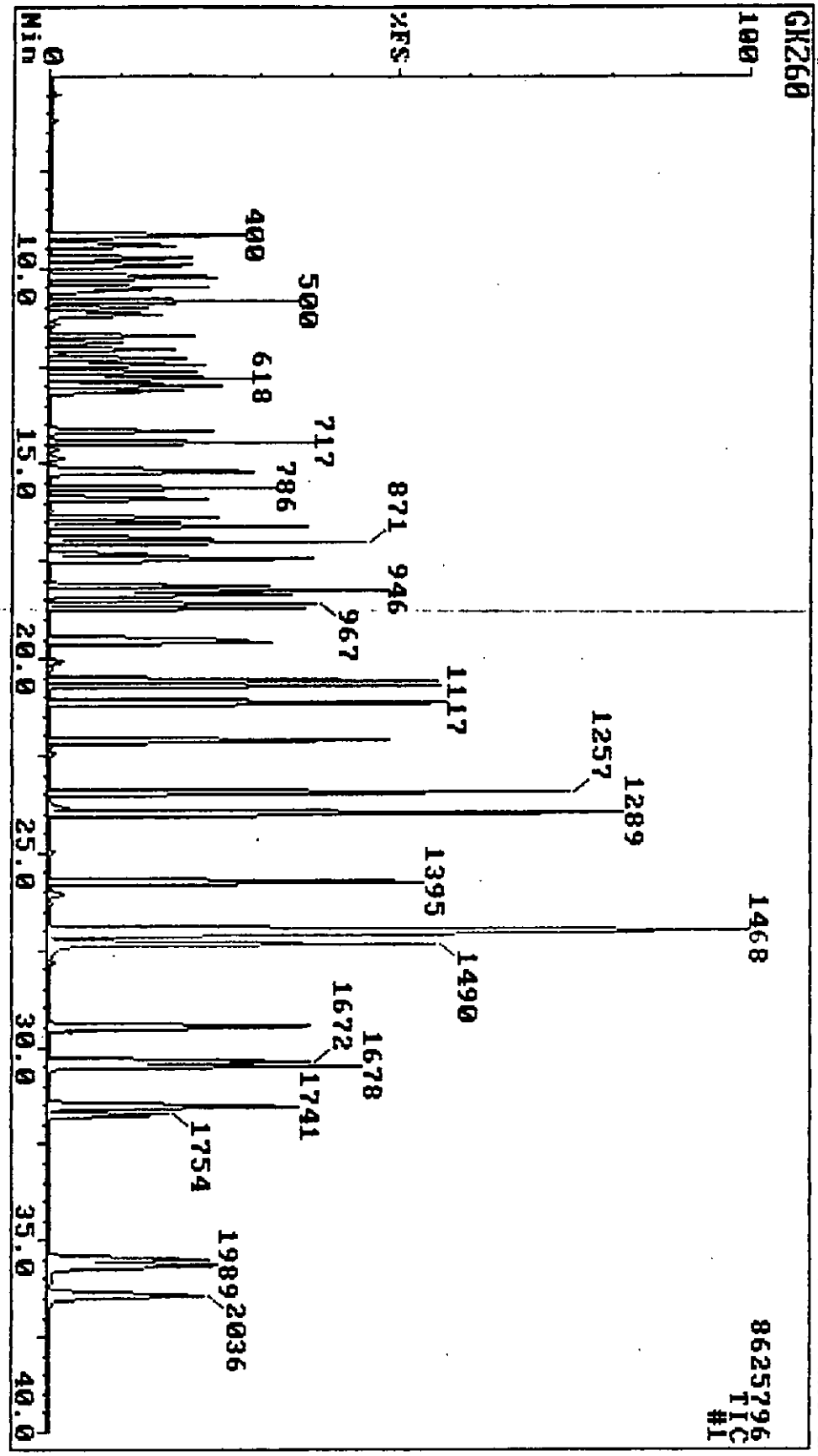
DATA FILE: GK260 SAMPLE ID: LCS
RF FILE: GK245 TLI ID: LCS
DATE: 10/13/92 DILN FACTOR: 1
TLI PROJ #: 21899 ANALYSIS DATE: 10/11/92

METHHOD 8270 QUANTITATION REPORT

	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	4339		443	1		IS	
14	Naphthalene-d8	15762		615	14		IS	
23	Naphthalene	28508	.8722	618	14	82.95	D	10
27	2-Methylnaphthalene	22274	.6195	717	14	91.24	D	10
28	Acenaphthene-d10	10210		866	28		IS	
32	2-Chloronaphthalene	21068	.8723	786	28	94.62	D	10
35	Acenaphthylene	33470	1.4534	845	28	90.22	D	10
37	Acenaphthene	20039	.8396	871	28	93.50	D	10
45	Fluorene	27387	1.0973	946	28	97.78	D	10
47	Phenanthrene-d10	23773		1081	47		IS	
52	Pentachlorophenol	598	.0898	1054	47	11.20	D	10
53	Phenanthrene	46690	.9106	1084	47	86.27	D	10
54	Anthracene	48447	.9499	1092	47	85.81	D	10
56	Fluoranthene	61712	1.2261	1257	47	84.69	D	10
57	Chrysene-d12	20691		1469	57		IS	
58	Pyrene	63063	1.6592	1289	57	73.48	D	10
61	Benzo(a)anthracene	65651	1.3636	1468	57	93.08	D	10
62	Chrysene	61900	1.3014	1474	57	91.95	D	10
64	Perylene-d12	18410		1753	64		IS	
66	Benzo(b)fluoranthene	54977	1.2066	1672	64	99.00	D	10
67	Benzo(k)fluoranthene	56432	1.3984	1678	64	87.68	D	10
68	Benzo(a)pyrene	49456	1.0676	1741	64	100.66	D	10
87	Benzo(e)pyrene	0	1.1106	0	64	.04	ND	10
88	Perylene	0	.9602	0	64	.05	ND	10
69	Indeno(1,2,3-cd)pyrene	35931	.6444	1980	64	121.15	D	10
70	Dibenz(a,h)anthracene	39086	.6837	1989	64	124.22	D	10
71	Benzo(g,h,i)perylene	38314	.7603	2036	64	109.49	D	10

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
84	Pyrene-d10	59576	1.4043	1286	57	82.01	D	82.0

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard


11-Oct-92 04:26
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Sample: LCS 21899
Instrument G
GK260
100
%FS
0
Min
10.0
15.0
20.0
25.0
30.0
35.0
40.0
400
500
618
717
786
871
946
967
1117
1257
1289
1395
1468
1490
1672
1678
1741
1754
1989
2036
8625796
TIC
#1

QUAN DB : GK260 LAB-BASE QUAN 11-Oct-92 12:19

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	85	96	0	433860	bb	443	152	1,4-Dichlorobenzene-d4
2	100	92	97	-1	1576200	bb	615	136	Naphthalene-d8
3	100	96	99	1	1021000	bb	866	164	Acenaphthene-d10
4	100	92	99	0	2377300	bv	1081	188	Phenanthrene-d10
5	85	48	98	0	2069100	bv	1469	240	Chrysene-d12
6	100	89	96	0	1841000	bv	1753	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	0	0	0	0	0		0	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	80	56	82	0	58104	vb	1089	188	Anthracene-d10
17	100	92	98	0	5957600	bv	1286	212	Pyrene-d10
18	0	0	0	0	0		0	244	Terphenyl-d14
19	100	94	96	0	2850800	bb	618	128	Naphthalene
20	100	88	90	1	2227400	vb	717	142	2-Methylnaphthalene
21	100	95	98	-1	2106800	bb	786	162	2-Chloronaphthalene
22	100	94	96	0	3347000	vb	845	152	Acenaphthylene
23	100	86	88	0	2003900	vb	871	154	Acenaphthene
24	100	93	96	0	2738700	bb	946	166	Fluorene
25	100	82	98	0	59800	bb	1054	266	Pentachlorophenol
26	100	93	98	0	4669000	bv*	1084	178	Phenanthrene
27	100	94	98	0	4844700	vv*	1092	178	Anthracene
28	100	94	99	0	6171200	bv	1257	202	Fluoranthene
29	100	93	99	0	6306300	vv	1289	202	Pyrene
30	100	80	99	0	6565100	bv	1468	228	Benzo(a)anthracene
31	100	93	99	1	6190000	vv	1474	228	Chrysene
32	81	67	72	1	5497700	bv	1672	252	Benzo(b)fluoranthene
33	100	91	97	1	5643200	vv	1678	252	Benzo(k)fluoranthene
34	0	0	0	0	0	✓SA	0	252	Benzo(e)pyrene
35	100	92	99	1	4945600	bv	1741	252	Benzo(a)pyrene
36	0	0	0	0	0	✓SA	0	252	Perylene
37	100	92	99	2	3593100	bv	1980	276	Indeno(1,2,3-cd)pyrene
38	100	89	99	2	3908600	bv	1989	278	Dibenz(a,h)anthracene
39	94	92	99	3	3831400	bv	2036	276	Benzo(g,h,i)perylene

TRIANGLE LABORATORIES OF RTP, INC.
801 Capitola Drive
Durham, NC 27713
Telephone: (919) 544-5729

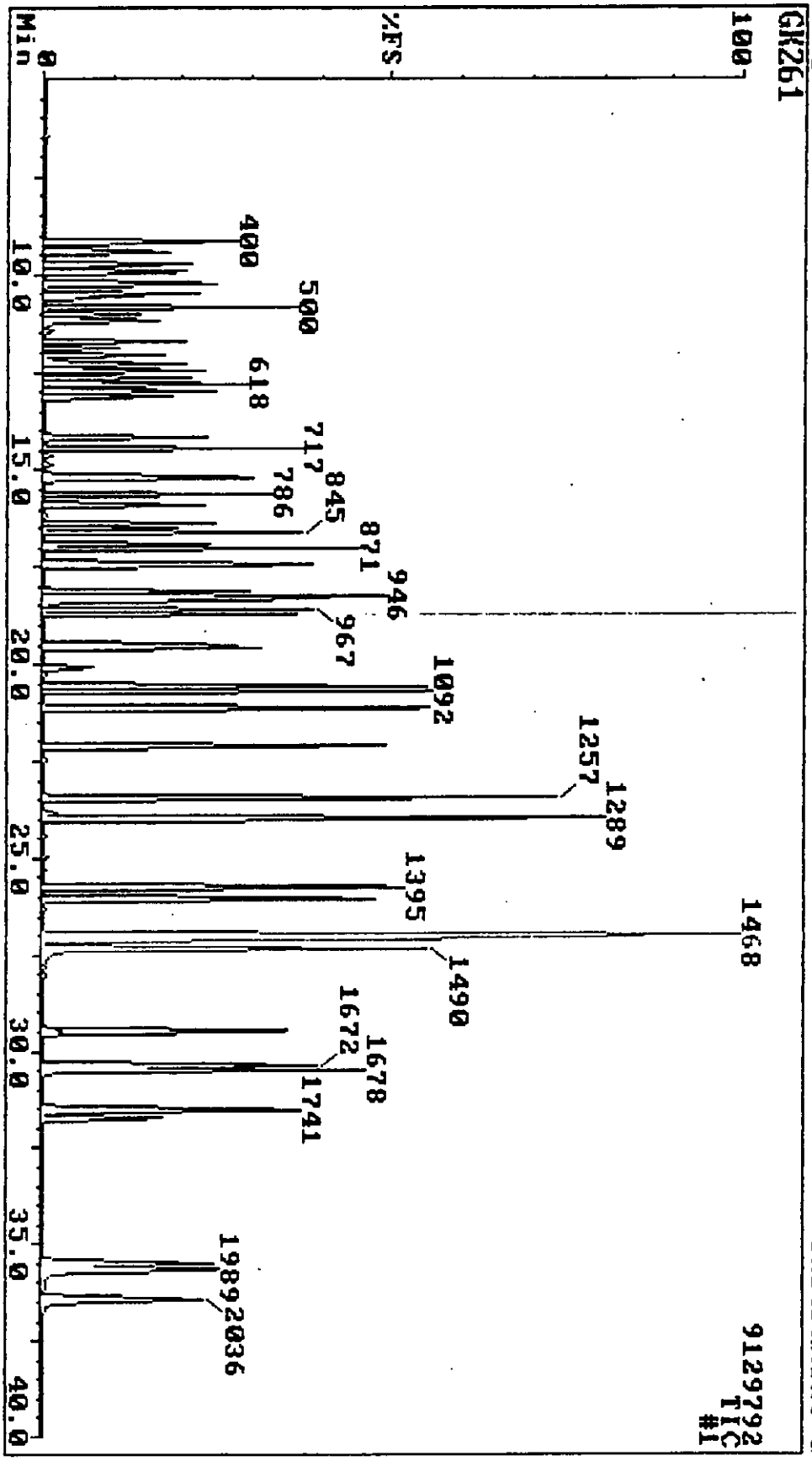
DATA FILE: GK261 SAMPLE ID: LCS DUP
RF FILE: GK245 TLI ID: LCS DUP
DATE: 10/13/92 DILN FACTOR: 1
TLI PROJ #: 21899 ANALYSIS DATE: 10/11/92

METHHOD 8270 QUANTITATION REPORT

	NAME	AREA	RF	SCAN	ISID	AMOUNT, ug	CODE	QUAN LIMIT
1	1,4-Dichlorobenzene-d4	4641		443	1		IS	
14	Naphthalene-d8	16995		615	14		IS	
23	Naphthalene	31252	.8722	618	14	84.34	D	10
27	2-Methylnaphthalene	23859	.6195	717	14	90.64	D	10
28	Acenaphthene-d10	10737		866	28		IS	
32	2-Chloronaphthalene	22677	.8723	786	28	96.84	D	10
35	Acenaphthylene	36342	1.4534	845	28	93.15	D	10
37	Acenaphthene	21672	.8396	871	28	96.16	D	10
45	Fluorene	28974	1.0973	946	28	98.37	D	10
47	Phenanthrene-d10	24769		1081	47		IS	
52	Pentachlorophenol	2006	.0898	1054	47	36.06	D	10
53	Phenanthrene	49045	.9106	1084	47	86.98	D	10
54	Anthracene	50752	.9499	1092	47	86.28	D	10
56	Fluoranthene	65178	1.2261	1257	47	85.85	D	10
57	Chrysene-d12	21238		1469	57		IS	
58	Pyrene	66540	1.6592	1289	57	75.53	D	10
61	Benzo(a)anthracene	68398	1.3636	1468	57	94.47	D	10
62	Chrysene	64284	1.3014	1474	57	93.03	D	10
64	Perylene-d12	20585		1753	64		IS	
66	Benzo(b)fluoranthene	61855	1.2066	1672	64	99.62	D	10
67	Benzo(k)fluoranthene	63368	1.3984	1678	64	88.06	D	10
68	Benzo(a)pyrene	55529	1.0676	1741	64	101.07	D	10
87	Benzo(e)pyrene	0	1.1106	0	64	.03	ND	10
88	Perylene	0	.9602	0	64	.04	ND	10
69	Indeno(1,2,3-cd)pyrene	40594	.6444	1980	64	122.41	D	10
70	Dibenz(a,h)anthracene	44366	.6837	1989	64	126.10	D	10
71	Benzo(g,h,i)perylene	43150	.7603	2036	64	110.28	D	10

SURROGATE SUMMARY		AREA	RF	SCAN	ISID	AMOUNT	CODE	% RECOVERY
84	Pyrene-d10	61974	1.4043	1286	57	83.12	D	83.1

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard


11-Oct-92 05:16
Sample: LCS DUP
GR261
21899
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Instrument G
%FS
100
Min
0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
400
500
618
717
786
845
871
946
967
1092
1257
1289
1395
1468
1490
1672
1678
1741
1989
2036
9129792
TIC
#1

QUAN DB : GK261 LAB-BASE QUAN 11-Oct-92 12:22

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	85	96	0	464080	bb	443	152	1,4-Dichlorobenzene-d4
2	100	93	97	-1	1699500	bb	615	136	Naphthalene-d8
3	100	96	99	1	1073700	bb	866	164	Acenaphthene-d10
4	100	92	99	0	2476900	bv	1081	188	Phenanthrene-d10
5	84	47	98	0	2123800	bv	1469	240	Chrysene-d12
6	100	89	96	0	2058500	bv	1753	264	Perylene-d12
7	0	0	0	0	0		0	112	2-Fluorophenol
8	0	0	0	0	0		0	132	2-Chlorophenol-d4
9	0	0	0	0	0		0	99	Phenol-d5
10	0	0	0	0	0		0	152	1,2-Dichlorobenzene-d4
11	0	0	0	0	0		0	82	Nitrobenzene-d5
12	0	0	0	0	0		0	185	1,3,5-Trichlorobenzene-d3
13	0	0	0	0	0		0	240	1,4-Dibromobenzene-d4
14	0	0	0	0	0		0	172	2-Fluorobiphenyl
15	0	0	0	0	0		0	330	2,4,6-Tribromophenol
16	78	51	84	0	49856	vb	1089	188	Anthracene-d10
17	100	92	98	0	6197400	bv	1286	212	Pyrene-d10
18	0	0	0	0	0		0	244	Terphenyl-d14
19	100	94	96	0	3125200	bb	618	128	Naphthalene
20	100	88	90	1	2385900	vb	717	142	2-Methylnaphthalene
21	100	95	98	-1	2267700	bb	786	162	2-Chloronaphthalene
22	100	94	96	0	3634200	vb	845	152	Acenaphthylene
23	100	86	87	0	2167200	vb	871	154	Acenaphthene
24	100	93	96	0	2897400	bb	946	166	Fluorene
25	100	85	99	0	200610	bv	1054	266	Pentachlorophenol
26	100	93	98	0	4904500	bv*	1084	178	Phenanthrene
27	100	94	98	0	5075200	vv*	1092	178	Anthracene
28	100	93	99	0	6517800	bv	1257	202	Fluoranthene
29	100	93	99	0	6654000	vv	1289	202	Pyrene
30	100	80	99	0	6839800	bv	1468	228	Benzo(a)anthracene
31	100	93	99	1	6428400	vv	1474	228	Chrysene
32	81	67	73	1	6185500	bv	1672	252	Benzo(b)fluoranthene
33	100	90	97	1	6336800	vv	1678	252	Benzo(k)fluoranthene
34	0	0	0	0	0		0	252	Benzo(e)pyrene
35	100	92	99	1	5552900	vv	1741	252	Benzo(a)pyrene
36	0	0	0	0	0		0	252	Perylene
37	100	91	99	2	4059400	bv	1980	276	Indeno(1,2,3-cd)pyrene
38	100	89	99	2	4436600	bv	1989	278	Dibenz(a,h)anthracene
39	94	92	99	3	4315000	bv	2036	276	Benzo(g,h,i)perylene

LCS AND LCS DUP RECOVERY REPORT

PROJECT #: 21899

NAME	LCS UG	%R	LCS DUP UG	%R	RPD
Naphthalene	82.95	83.0	84.34	84.3	3
2-Methylnaphthalene	91.24	91.2	90.64	90.6	1
2-Chloronaphthalene	94.62	94.6	96.84	96.8	5
Acenaphthylene	90.22	90.2	93.15	93.2	6
Acenaphthene	93.50	93.5	96.16	96.2	6
Fluorene	97.78	97.8	98.37	98.4	1
Phenanthrene	86.27	86.3	86.98	87.0	2
Anthracene	85.81	85.8	86.28	86.3	1
Fluoranthene	84.69	84.7	85.85	85.9	3
Pyrene	73.48	73.5	75.53	75.5	5
Benzo(a)anthracene	93.08	93.1	94.47	94.5	3
Chrysene	91.95	92.0	93.03	93.0	2
Benzo(b)fluoranthene	99.00	99.0	99.62	99.6	1
Benzo(k)fluoranthene	87.68	87.7	88.06	88.1	1
Benzo(a)pyrene	100.66	100.7	101.07	101.1	1
Indeno(1,2,3-cd)pyrene	121.15	121.1	122.41	122.4	2
Dibenz(a,h)anthracene	124.22	124.2	126.10	126.1	3
Benzo(g,h,i)perylene	109.49	109.5	110.28	110.3	1

CODES: ND = Not Detected; D = Detected; E = Estimated; IS = Internal Standard

DAILY CALIBRATION CHECK

DATE : 10-Oct-92

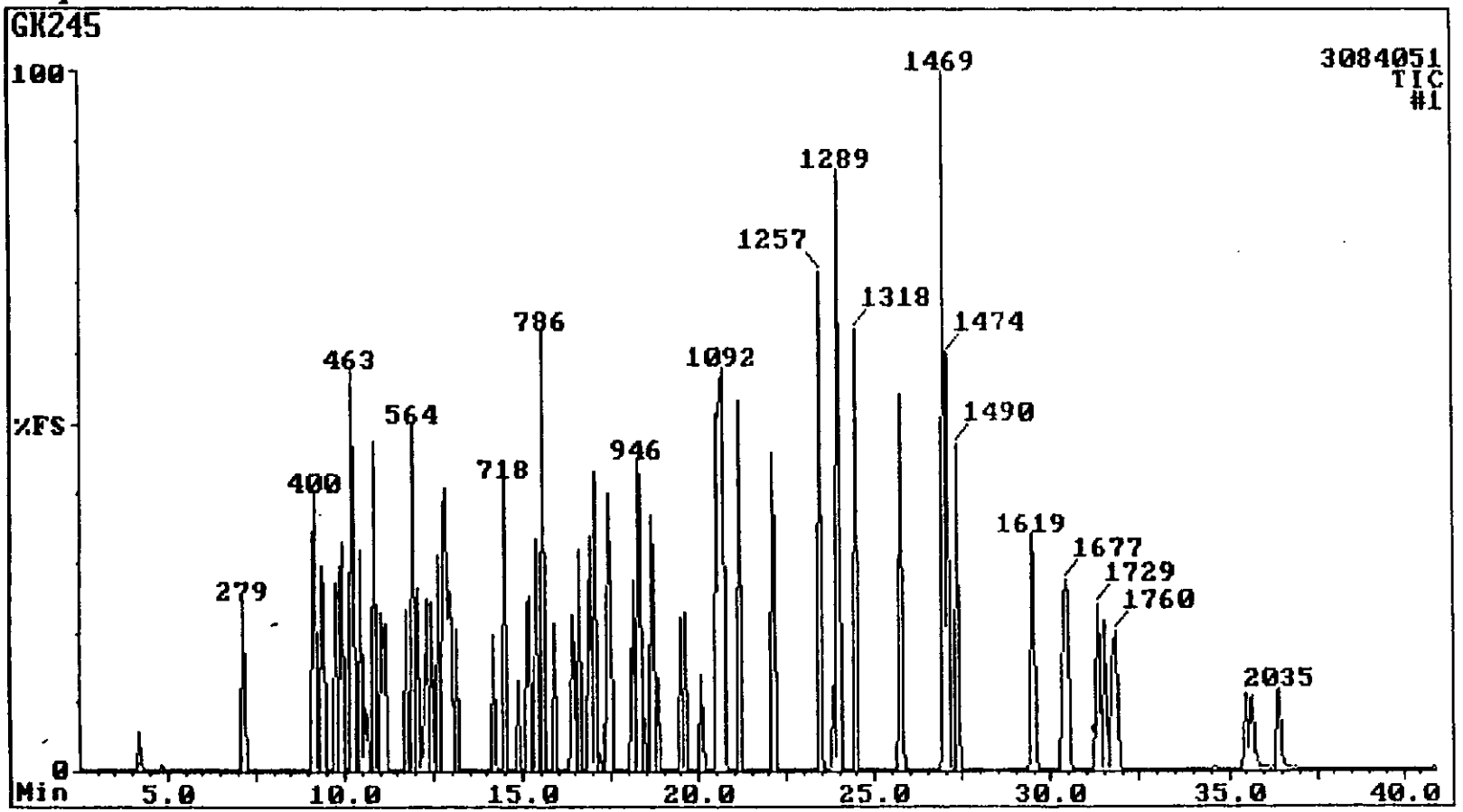
TIME : 16:25

LAB FILE ID: GK245

SA 10-13-92

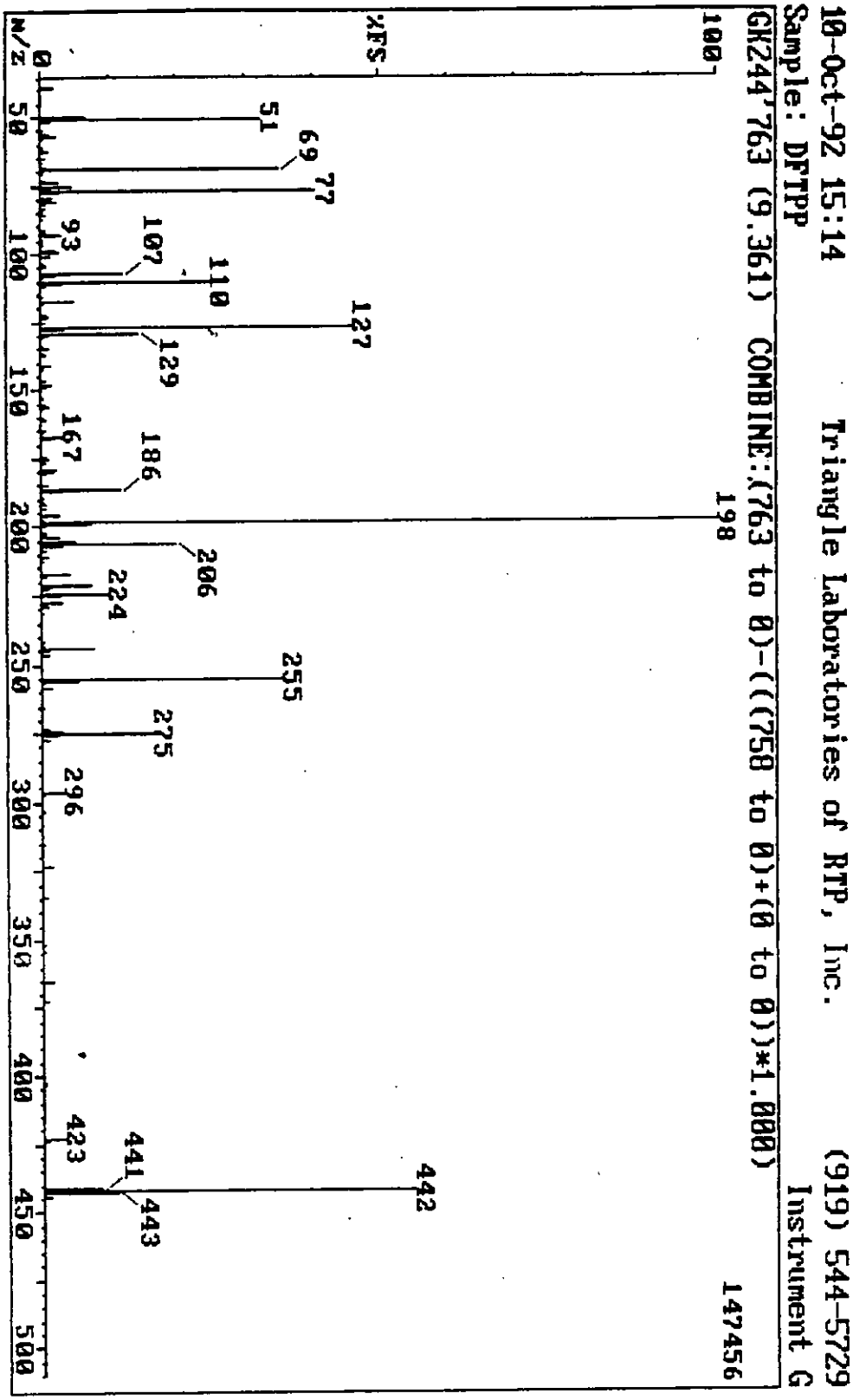
	COMPOUND	FLAG	RF MEAN	RF 50	%D
19	Naphthalene		0.989	0.872	11.8
20	2-Methylnaphthalene		0.640	0.620	3.1
21	2-Chloronaphthalene		0.922	0.872	5.4
22	Acenaphthylene		1.544	1.453	5.9
23	Acenaphthene	C	0.904	0.840	7.1
24	Fluorene		1.194	1.097	8.1
25	Pentachlorophenol	C	0.072	0.090	-24.2
26	Phenanthrene		0.952	0.911	4.3
27	Anthracene		0.999	0.950	4.9
28	Fluoranthene	C	1.197	1.226	-2.4
29	Pyrene		1.800	1.659	7.8
30	Benzo(a)anthracene		1.480	1.364	7.9
31	Chrysene		1.449	1.301	10.2
32	Benzo(b)fluoranthene		1.279	1.207	5.7
33	Benzo(k)fluoranthene		1.366	1.398	-2.3
34	Benzo(e)pyrene		1.200	1.111	7.5
35	Benzo(a)pyrene	C	1.199	1.068	10.9
36	Perylene		1.087	0.960	11.6
37	Indeno(1,2,3-cd)pyrene		0.809	0.644	20.3
38	Dibenz(a,h)anthracene		0.872	0.684	21.5
39	Benzo(g,h,i)perylene		0.953	0.760	20.2
7	2-Fluorophenol	S	1.897	1.340	29.4
8	2-Chlorophenol-d4	S	1.555	1.331	14.4
9	Phenol-d5	S	2.261	1.562	30.9
10	1,2-Dichlorobenzene-d4	S	0.891	0.880	1.3
11	Nitrobenzene-d5	S	0.365	0.290	20.3
12	1,3,5-Trichlorobenzene-d3	S	0.341	0.372	-9.0
13	1,4-Dibromobenzene-d4	S	0.651	0.682	-4.8
14	2-Fluorobiphenyl	S	1.130	1.143	-1.1
15	2,4,6-Tribromophenol	S	0.131	0.181	-38.8
16	Anthracene-d10	S	0.850	0.845	0.6
17	Pyrene-d10	S	1.523	1.404	7.8
18	Terphenyl-d14	S	1.005	1.025	-1.9

10-Oct-92 15:38 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: SSTD050 Instrument G



QUAN DB : GK245 LAB-BASE QUAN 10-Oct-92 16:26

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
	100	82	98	1	315390	bb	444	152	1,4-Dichlorobenzene-d4
	100	93	96	-1	1117300	bb	616	136	Naphthalene-d8
3	100	97	99	0	629500	bb	866	164	Acenaphthene-d10
4	100	94	99	0	1390100	bv*	1081	188	Phenanthrene-d10
5	94	63	98	0	1119900	bb	1469	240	Chrysene-d12
6	100	92	97	1	728220	bv	1754	264	Perylene-d12
7	100	95	96	-1	528130	bb	279	112	2-Fluorophenol
8	100	74	99	-1	524780	bb	413	132	2-Chlorophenol-d4
9	100	88	98	-1	615740	bv	398	99	Phenol-d5
10	87	65	85	-1	346750	bb	463	152	1,2-Dichlorobenzene-d4
11	100	89	100	0	405710	bb	517	82	Nitrobenzene-d5
12	100	67	97	0	519050	bb	564	185	1,3,5-Trichlorobenzene-d3
13	100	96	99	-1	268880	bb	623	240	1,4-Dibromobenzene-d4
14	100	93	98	0	899100	bb	772	172	2-Fluorobiphenyl
15	100	83	98	0	142520	bb	980	330	2,4,6-Tribromophenol
16	100	92	97	0	1469200	vb*	1089	188	Anthracene-d10
17	100	94	99	0	1965900	bb	1286	212	Pyrene-d10
18	100	89	99	0	1434500	bb	1318	244	Terphenyl-d14
19	100	96	97	0	1218200	bb	619	128	Naphthalene
20	100	87	89	1	865300	bb	718	142	2-Methylnaphthalene
21	100	75	98	0	686420	bb	787	162	2-Chloronaphthalene
22	100	95	96	0	1143700	vb	845	152	Acenaphthylene
23	100	84	85	0	660670	bb	871	154	Acenaphthene
24	100	94	96	0	863420	bb	946	166	Fluorene
25	100	90	99	0	156100	bv	1054	266	Pentachlorophenol
26	100	95	98	0	1582300	bv*	1084	178	Phenanthrene
27	100	95	99	0	1650600	vb*	1092	178	Anthracene
	100	94	98	0	2130500	bb	1257	202	Fluoranthene
	100	95	98	0	2322800	bb	1289	202	Pyrene
30	100	80	97	0	1908900	bv	1468	228	Benzo(a)anthracene
31	100	94	99	1	1821900	vv	1474	228	Chrysene
32	79	66	70	-1	1098300	bv	1671	252	Benzo(b)fluoranthene
33	100	92	97	-1	1272900	vv	1677	252	Benzo(k)fluoranthene
34	100	94	98	-1	1011000	bv	1729	252	Benzo(e)pyrene
35	100	93	98	0	971790	vv	1741	252	Benzo(a)pyrene
36	100	94	98	0	874050	vv	1760	252	Perylene
37	100	92	98	0	586590	bv	1979	276	Indeno(1,2,3-cd)pyrene
38	100	91	97	1	622350	vv	1989	278	Dibenz(a,h)anthracene
39	100	91	98	1	692110	bv	2035	276	Benzo(g,h,i)perylene


10-Oct-92 15:14
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Sample: DFTPP
Instrument G
GK244763 (9.361) COMBINE:(763 to 0)-(((758 to 0)+(0 to 0))*1.000)
147456
%FS
100
M/z
0
50
100
150
200
250
300
350
400
450
500
51
69
77
93
107
110
127
129
167
186
198
206
224
255
275
296
423
441
442
443

GK244'763 (9.361) COMBINE:(763 to 0)-(((758 to 0)+(0 to 0))*1.000) 147456

Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int
1	39	2848	1.93	32	87	720	0.49	63	131	624	0.42	94	189	852	0.58	125	244	11456	7.77
2	50	9472	6.42	33	91	1248	0.85	64	134	756	0.51	95	191	680	0.46	126	245	1744	1.18
3	51	47872	32.47	34	92	956	0.65	65	135	1984	1.35	96	192	1152	0.78	127	246	1808	1.23
4	52	2576	1.75	35	93	4416	2.99	66	136	832	0.56	97	193	1392	0.94	128	255	52480	35.59
5	55	272	0.18	36	94	656	0.44	67	137	1152	0.78	98	196	4224	2.86	129	256	7872	5.34
6	56	1472	1.00	37	95	344	0.23	68	141	2208	1.50	99	197	624	0.42	130	257	620	0.42
7	57	3504	2.38	38	96	848	0.58	69	142	848	0.58	100	198	147456	100.00	131	258	2512	1.70
8	58	576	0.39	39	97	208	0.14	70	143	848	0.58	101	199	10752	7.29	132	265	820	0.56
9	61	808	0.55	40	98	3216	2.18	71	147	1232	0.84	102	200	1104	0.75	133	273	1680	1.14
10	62	636	0.43	41	99	4000	2.71	72	148	2064	1.40	103	202	1344	0.91	134	274	4416	2.99
11	63	1952	1.32	42	101	2112	1.43	73	149	968	0.66	104	203	924	0.63	135	275	24320	16.49
12	65	1152	0.78	43	103	816	0.55	74	153	812	0.55	105	204	3760	2.55	136	276	3296	2.24
13	67	160	0.11	44	104	1424	0.97	75	155	1296	0.88	106	205	7296	4.95	137	277	1728	1.17
14	68	960	0.65	45	105	1360	0.92	76	156	1904	1.29	107	206	29440	19.97	138	296	4800	3.26
15	69	51712	35.07	46	107	17664	11.98	77	157	708	0.48	108	207	4480	3.04	139	297	696	0.47
16	70	400	0.27	47	108	3264	2.21	78	160	720	0.49	109	208	956	0.65	140	303	828	0.56
17	71	512	0.35	48	109	484	0.33	79	161	1184	0.80	110	211	1760	1.19	141	315	604	0.41
18	73	1024	0.69	49	110	36608	24.83	80	165	1004	0.68	111	212	680	0.46	142	323	2352	1.60
19	74	4160	2.82	50	111	4864	3.30	81	166	668	0.45	112	217	6528	4.43	143	334	1376	0.93
20	75	6848	4.64	51	112	940	0.64	82	167	4480	3.04	113	218	952	0.65	144	352	688	0.47
21	76	2432	1.65	52	116	836	0.57	83	168	2400	1.63	114	221	11136	7.55	145	354	808	0.55
22	77	59648	40.45	53	117	7296	4.95	84	174	968	0.66	115	222	2224	1.51	146	365	2064	1.40
23	78	4288	2.91	54	118	840	0.57	85	175	1984	1.35	116	223	1600	1.09	147	372	1312	0.89
24	79	2880	1.95	55	122	1040	0.71	86	176	688	0.47	117	224	14208	9.64	148	402	596	0.40
25	80	2384	1.62	56	123	1968	1.33	87	177	1136	0.77	118	225	3872	2.63	149	403	740	0.50
26	81	3568	2.42	57	124	968	0.66	88	179	3536	2.40	119	227	4672	3.17	150	423	4736	3.21
27	82	964	0.65	58	125	1024	0.69	89	180	2992	2.03	120	228	868	0.59	151	424	980	0.66
28	83	1168	0.79	59	127	67584	45.83	90	181	1344	0.91	121	229	1440	0.98	152	441	12416	8.42
29	84	608	0.41	60	128	5056	3.43	91	185	1776	1.20	122	231	720	0.49	153	442	80896	54.86
30	85	828	0.56	61	129	21248	14.41	92	186	17152	11.63	123	242	680	0.46	154	443	16128	10.94
31	86	904	0.61	62	130	1968	1.33	93	187	4672	3.17	124	243	792	0.54	155	444	1680	1.14

DFTPP TUNE CHECK REPORT

Raw Data File: GK244
Date: 10-Oct-92
Time: 15:14

M/E	ION ABUNDANCE CRITERIA	RELATIVE ABUNDANCE	TUNE
51	30.0 - 60.0% of mass 198	32.47	PASS
68	Less than 2.0% of mass 69	0.65(1.9)1	PASS
69	Mass 69 relative abundance	35.07	PASS
70	Less then 2.0% of mass 69	0.27(0.8)1	PASS
127	40.0 - 60.0% of mass 198	45.83	PASS
197	Less than 1% of mass 198	0.42	PASS
198	Base peak, 100% relative abundance	100.00	PASS
199	5 - 9% of mass 198	7.29	PASS
275	10 - 30% of mass 198	16.49	PASS
365	Greater than 1% of mass 198	1.40	PASS
441	Present, but less then mass 443	8.42	PASS
442	Greater than 40% of mass 198	54.86	PASS
443	17 - 23% of mass 442	10.94(19.9)2	PASS

INITIAL CALIBRATION CHECK

DATE : 09-Oct-92

TIME : 21:45

LAB FILE ID: RF20 =GK231 RF50 =GK230 RF80 =GK232
RF120=GK233 RF160=GK234

SC 10/12/92

	COMPOUND	FLAG	RF 20NG	RF 50NG	RF 80NG	RF 120NG	RF 160NG	RF MEAN	%RSD
19	Naphthalene		1.060	0.914	1.015	1.098	0.861	0.989	10.1
20	2-Methylnaphthalene		0.722	0.588	0.638	0.712	0.539	0.640	12.3
21	2-Chloronaphthalene		1.102	0.910	0.927	0.950	0.721	0.922	14.7
22	Acenaphthylene		1.731	1.463	1.574	1.678	1.275	1.544	11.8
23	Acenaphthene	C	1.011	0.840	0.927	0.979	0.763	0.904	11.3
24	Fluorene		1.279	1.105	1.235	1.319	1.033	1.194	10.1
25	Pentachlorophenol	C	0.054	0.067	0.076	0.090	0.074	0.072	18.4
26	Phenanthrene		1.099	0.912	0.942	0.987	0.820	0.952	10.8
27	Anthracene		1.166	0.963	0.996	1.028	0.841	0.999	11.7
28	Fluoranthene	C	1.335	1.233	1.241	1.213	0.965	1.198	11.5
29	Pyrene		2.152	1.670	1.760	1.821	1.599	1.800	11.9
30	Benzo(a)anthracene		1.697	1.419	1.441	1.552	1.292	1.480	10.3
31	Chrysene		1.553	1.400	1.465	1.522	1.304	1.449	6.9
32	Benzo(b)fluoranthene		1.356	1.258	1.379	1.337	1.066	1.279	10.0
33	Benzo(k)fluoranthene		1.428	1.273	1.433	1.557	1.143	1.366	11.8
34	Benzo(e)pyrene		1.264	1.140	1.224	1.317	1.055	1.200	8.7
35	Benzo(a)pyrene	C	1.217	1.117	1.221	1.350	1.089	1.199	8.6
	Perylene		1.157	0.988	1.085	1.211	0.991	1.087	9.1
	Indeno(1,2,3-cd)pyrene		0.734	0.701	0.758	0.935	0.916	0.809	13.4
38	Dibenz(a,h)anthracene		0.809	0.744	0.811	1.022	0.972	0.872	13.7
39	Benzo(g,h,i)perylene		0.900	0.811	0.871	1.118	1.066	0.953	13.8
7	2-Fluorophenol	S	1.748	1.595	2.161	2.187	1.792	1.897	13.9
8	2-Chlorophenol-d4	S	1.549	1.436	1.718	1.706	1.369	1.555	10.1
9	Phenol-d5	S	2.187	1.967	2.548	2.549	2.056	2.261	12.1
10	1,2-Dichlorobenzene-d4	S	0.895	0.865	0.975	0.955	0.767	0.891	9.3
11	Nitrobenzene-d5	S	0.311	0.280	0.423	0.434	0.374	0.365	18.6
12	1,3,5-Trichlorobenzene-d3	S	0.374	0.354	0.356	0.338	0.283	0.341	10.2
13	1,4-Dibromobenzene-d4	S	0.640	0.670	0.720	0.691	0.532	0.651	11.1
14	2-Fluorobiphenyl	S	1.264	1.171	1.205	1.118	0.891	1.130	12.7
15	2,4,6-Tribromophenol	S	0.103	0.125	0.152	0.145	0.127	0.131	14.9
16	Anthracene-d10	S	0.923	0.854	0.894	0.843	0.737	0.850	8.4
17	Pyrene-d10	S	1.633	1.412	1.578	1.554	1.438	1.523	6.2
18	Terphenyl-d14	S	1.086	0.976	1.055	1.003	0.907	1.005	7.0

DAILY CALIBRATION CHECK

DATE : 09-Oct-92

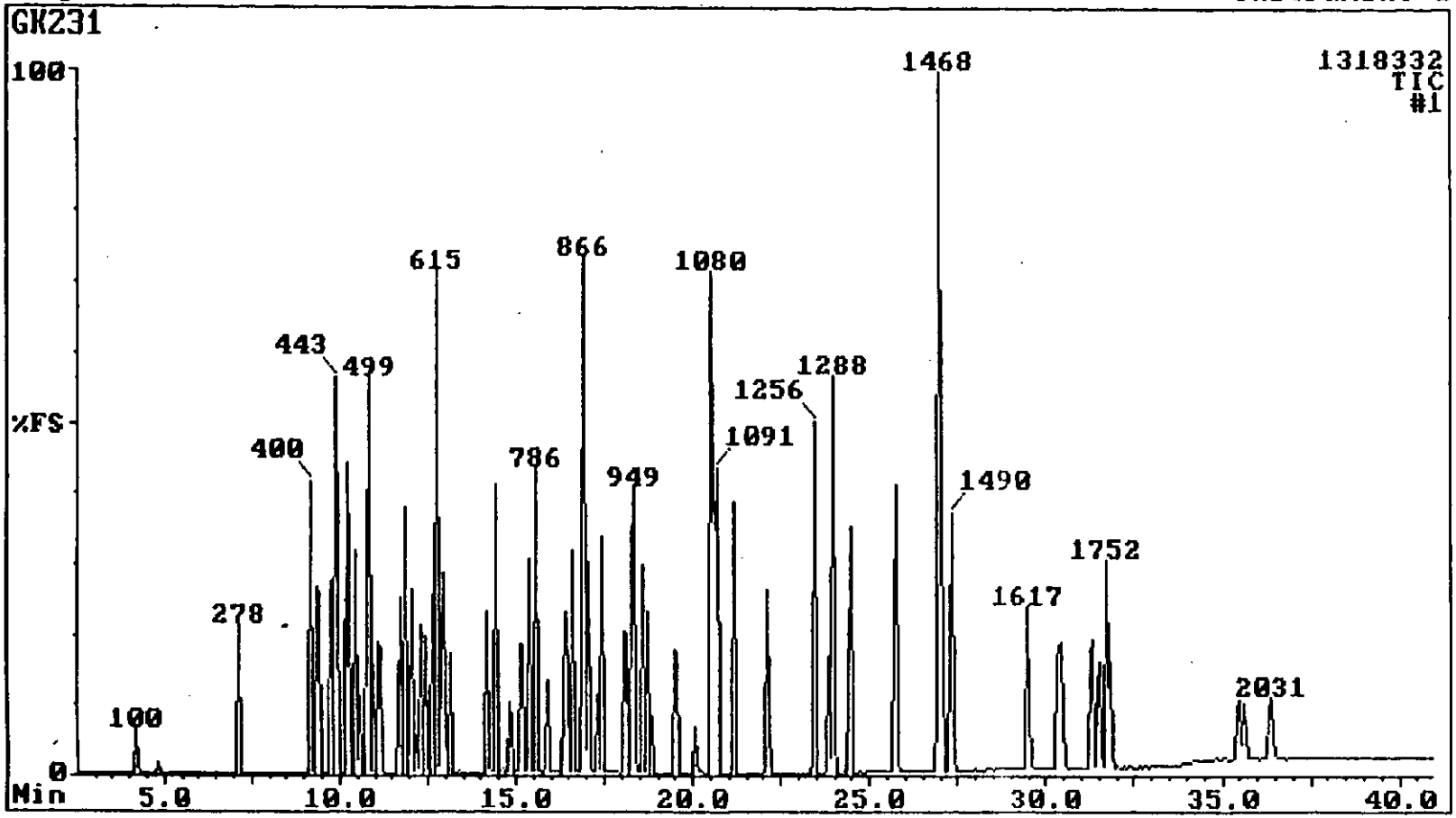
TIME : 21:47

LAB FILE ID: GK230

SC 10/12/92

	COMPOUND	FLAG	RF MEAN	RF 50	%D
19	Naphthalene		0.989	0.913	7.7
20	2-Methylnaphthalene		0.640	0.588	8.0
21	2-Chloronaphthalene		0.922	0.910	1.3
22	Acenaphthylene		1.544	1.463	5.2
23	Acenaphthene	C	0.904	0.840	7.1
24	Fluorene		1.194	1.105	7.5
25	Pentachlorophenol	C	0.072	0.067	7.1
26	Phenanthrene		0.952	0.912	4.2
27	Anthracene		0.999	0.963	3.6
28	Fluoranthene	C	1.197	1.233	-2.9
29	Pyrene		1.800	1.670	7.2
30	Benzo(a)anthracene		1.480	1.418	4.1
31	Chrysene		1.449	1.400	3.3
32	Benzo(b)fluoranthene		1.279	1.258	1.7
33	Benzo(k)fluoranthene		1.366	1.273	6.9
34	Benzo(e)pyrene		1.200	1.140	5.0
35	Benzo(a)pyrene	C	1.199	1.116	6.8
36	Perylene		1.087	0.988	9.0
37	Indeno(1,2,3-cd)pyrene		0.809	0.701	13.3
38	Dibenz(a,h)anthracene		0.872	0.744	14.7
39	Benzo(g,h,i)perylene		0.953	0.811	15.0
7	2-Fluorophenol	S	1.897	1.594	15.9
8	2-Chlorophenol-d4	S	1.555	1.436	7.7
9	Phenol-d5	S	2.261	1.967	13.0
10	1,2-Dichlorobenzene-d4	S	0.891	0.865	3.0
11	Nitrobenzene-d5	S	0.365	0.280	23.1
12	1,3,5-Trichlorobenzene-d3	S	0.341	0.354	-3.9
13	1,4-Dibromobenzene-d4	S	0.651	0.670	-3.0
14	2-Fluorobiphenyl	S	1.130	1.171	-3.6
15	2,4,6-Tribromophenol	S	0.131	0.125	4.3
16	Anthracene-d10	S	0.850	0.854	-0.5
17	Pyrene-d10	S	1.523	1.412	7.3
18	Terphenyl-d14	S	1.005	0.976	3.0

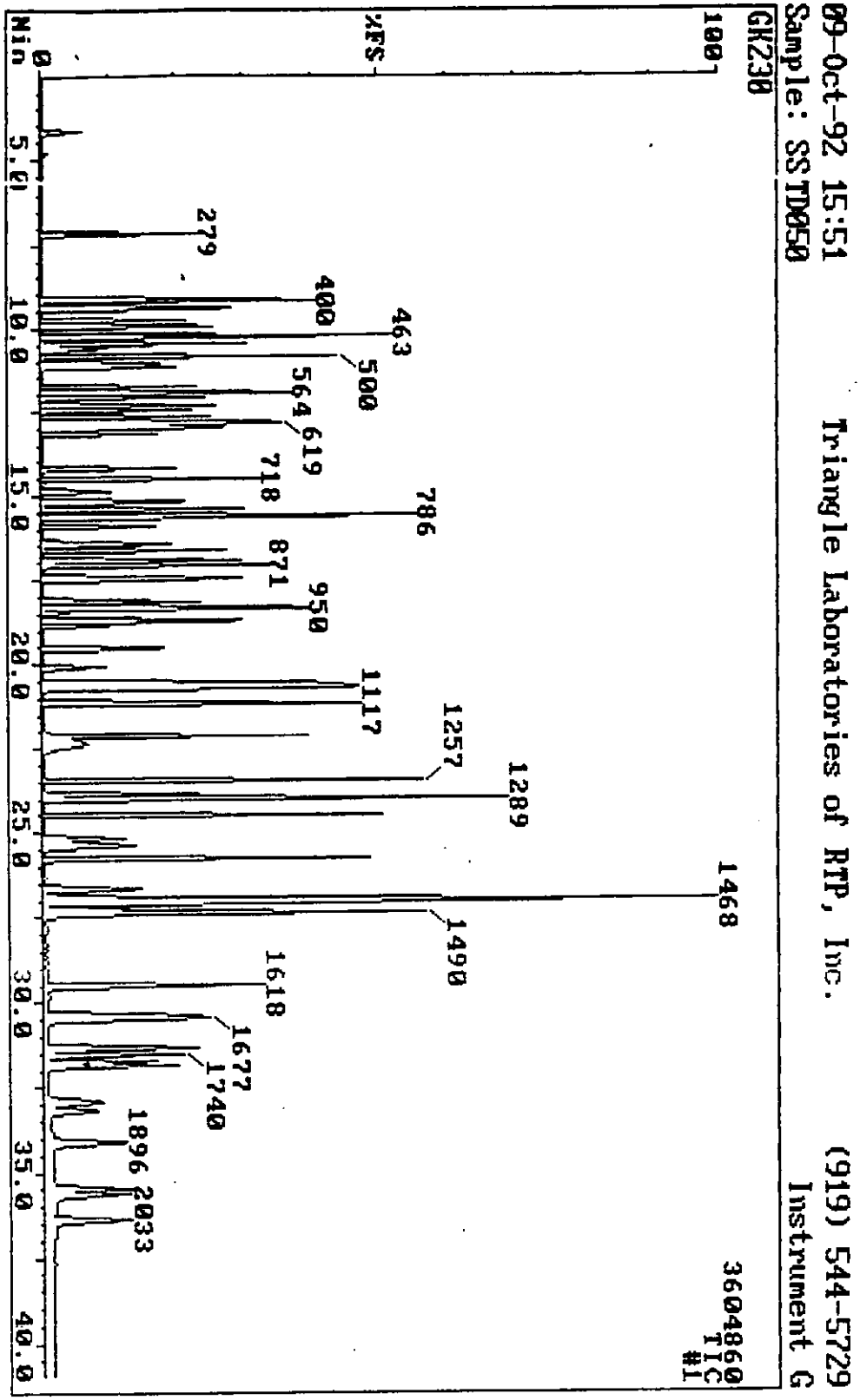
09-Oct-92 16:41 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: SSTD020 Instrument G



SST00220 SC 10/12/92

QUAN DB : GK231 LAB-BASE QUAN 09-Oct-92 21:52

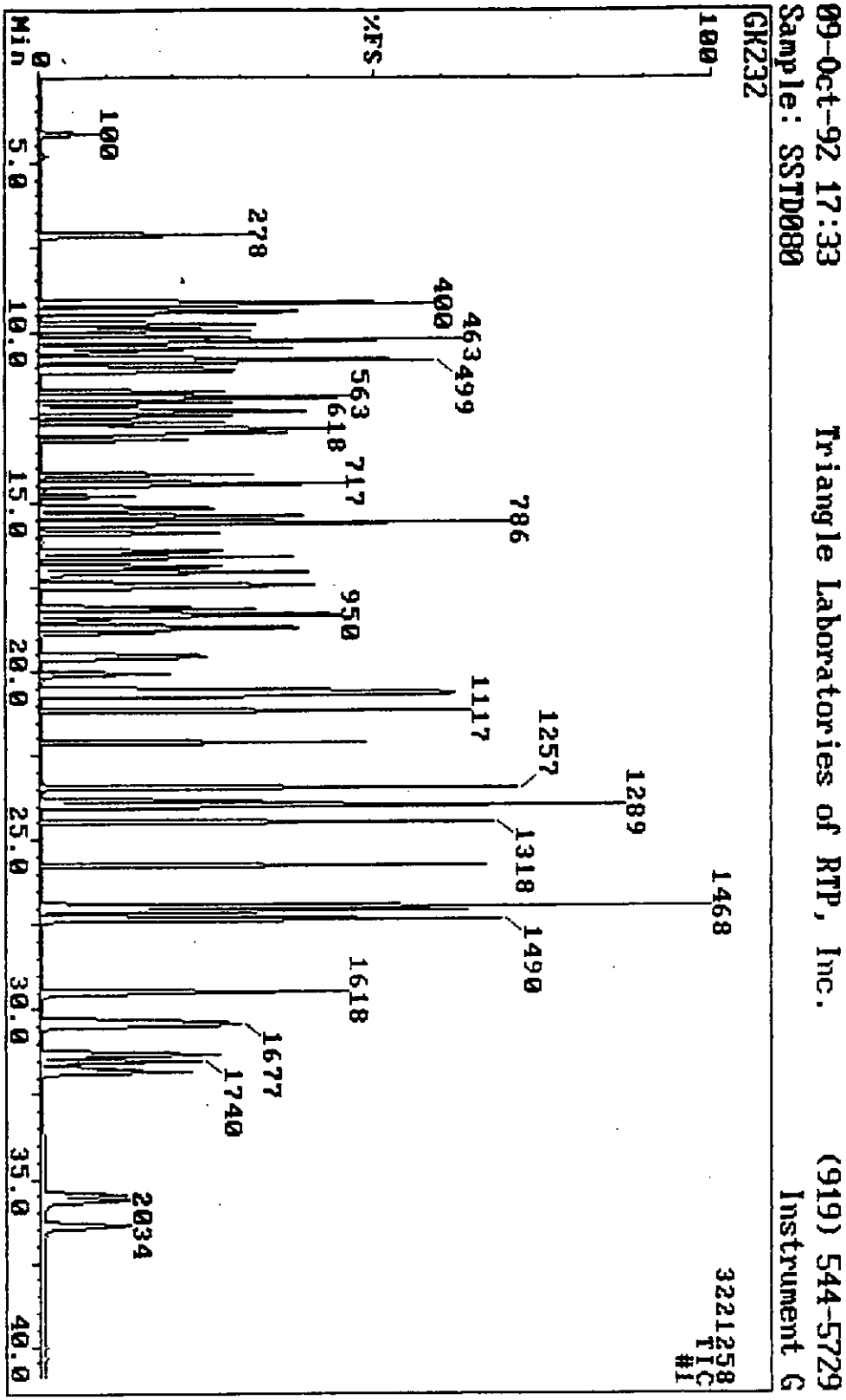
No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
	100	86	99	0	218350	bb	443	152	1,4-Dichlorobenzene-d4
	100	91	95	-1	849180	bb	615	136	Naphthalene-d8
3	100	95	98	1	426240	bb	866	164	Acenaphthene-d10
4	100	95	99	-1	850880	bv	1080	188	Phenanthrene-d10
5	96	56	98	0	571040	bb	1468	240	Chrysene-d12
6	100	90	97	0	445220	bb	1752	264	Perylene-d12
7	100	94	94	-1	190880	bb	278	112	2-Fluorophenol
8	100	76	99	0	169060	bb	413	132	2-Chlorophenol-d4
9	100	90	98	-1	238780	bb	397	99	Phenol-d5
10	88	60	80	-1	97728	bb	462	152	1,2-Dichlorobenzene-d4
11	100	84	99	1	132130	bb	517	82	Nitrobenzene-d5
12	100	69	97	0	158590	bb	563	185	1,3,5-Trichlorobenzene-d3
13	100	92	98	0	69888	bb	623	240	1,4-Dibromobenzene-d4
14	100	92	98	0	269420	bb	772	172	2-Fluorobiphenyl
15	100	77	95	0	21880	bb	980	330	2,4,6-Tribromophenol
16	100	93	98	0	392650	vb*	1088	188	Anthracene-d10
17	100	93	98	0	466140	bb	1285	212	Pyrene-d10
18	100	89	99	0	310140	bb	1317	244	Terphenyl-d14
19	100	96	97	0	449980	bb	618	128	Naphthalene
20	100	87	88	1	306580	bb	717	142	2-Methylnaphthalene
21	100	79	98	-1	234800	bb	786	162	2-Chloronaphthalene
22	100	96	97	0	368830	bb	845	152	Acenaphthylene
23	100	86	86	0	215460	bb	871	154	Acenaphthene
24	100	93	96	-1	272620	bb	945	166	Fluorene
25	100	90	92	1	22920	bb	1054	266	Pentachlorophenol
26	100	96	98	1	467420	bv*	1084	178	Phenanthrene
27	100	97	99	0	495940	vb	1091	178	Anthracene
	100	95	99	0	568060	bb	1256	202	Fluoranthene
	100	96	99	0	614290	bb	1288	202	Pyrene
30	100	74	91	0	484540	bv	1467	228	Benzo(a)anthracene
31	100	94	98	0	443260	vb	1472	228	Chrysene
32	80	62	66	0	301910	bv	1670	252	Benzo(b)fluoranthene
33	100	88	91	0	317810	vb	1676	252	Benzo(k)fluoranthene
34	100	91	93	0	281440	bv	1728	252	Benzo(e)pyrene
35	100	89	90	0	270800	vv	1739	252	Benzo(a)pyrene
36	100	91	92	0	257590	vv	1758	252	Perylene
37	99	75	84	0	163310	bv	1977	276	Indeno(1,2,3-cd)pyrene
38	99	76	83	0	180120	vv	1986	278	Dibenz(a,h)anthracene
39	95	78	85	-1	200360	bv	2031	276	Benzo(g,h,i)perylene


09-Oct-92 15:51
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Sample: SSTD050
Instrument G
GK230
%FS
100
Min
0
5.00
10.0
15.0
20.0
25.0
30.0
35.0
40.0
279
400
463
500
564
619
718
786
871
950
1117
1257
1289
1468
1490
1618
1677
1740
1896
2033
3604860
TIC
#1

5570050 GC 10/12-M2

QUAN DB : GK230 LAB-BASE QUAN 09-Oct-92 21:52

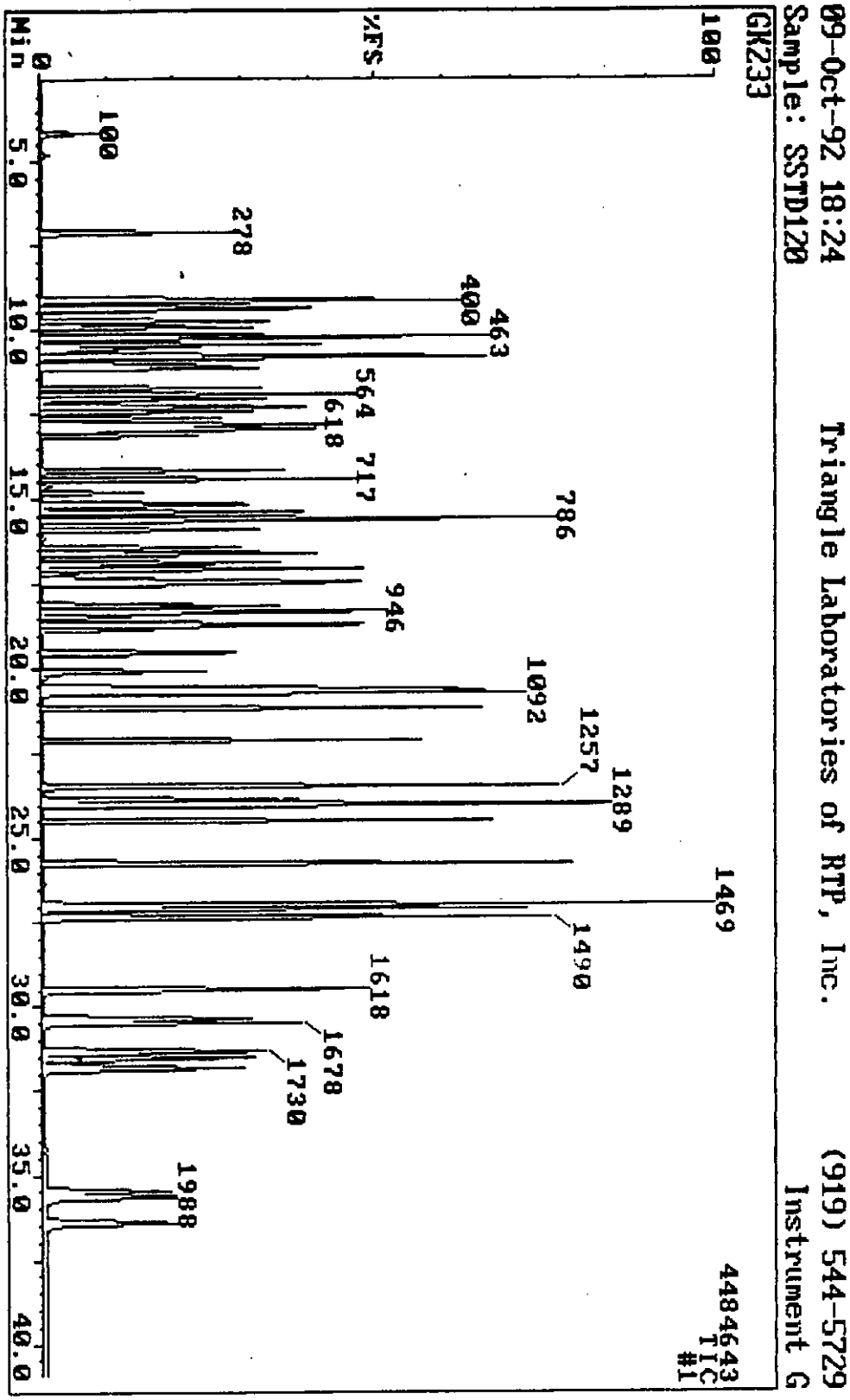
No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
	100	87	99	0	263920	bb	443	152	1,4-Dichlorobenzene-d4
	100	90	95	0	1019200	bb	616	136	Naphthalene-d8
3	100	95	99	0	525660	bb	866	164	Acenaphthene-d10
4	100	93	99	0	1206300	bv*	1081	188	Phenanthrene-d10
5	89	44	98	0	969410	bb	1469	240	Chrysene-d12
6	100	86	97	0	692730	bb	1753	264	Perylene-d12
7	100	95	96	0	526020	bb	279	112	2-Fluorophenol
8	93	75	99	-2	473710	bb	413	132	2-Chlorophenol-d4
9	100	84	98	-1	648800	bv	398	99	Phenol-d5
10	84	63	81	1	285250	bb	463	152	1,2-Dichlorobenzene-d4
11	66	85	99	-6	357000	bb	517	82	Nitrobenzene-d5
12	86	78	97	-2	451180	bb	564	185	1,3,5-Trichlorobenzene-d3
13	100	94	100	0	221070	bb	623	240	1,4-Dibromobenzene-d4
14	94	92	98	-3	769320	bb	772	172	2-Fluorobiphenyl
15	72	78	99	5	82112	bb	980	330	2,4,6-Tribromophenol
16	100	91	98	0	1288100	vb	1089	188	Anthracene-d10
17	100	92	99	0	1711400	bb	1286	212	Pyrene-d10
18	100	85	98	0	1182100	bb	1318	244	Terphenyl-d14
19	100	96	98	0	1163700	bb	619	128	Naphthalene
20	100	88	90	0	749490	bb	717	142	2-Methylnaphthalene
21	100	79	98	0	597900	bb	787	162	2-Chloronaphthalene
22	100	95	98	0	961260	vb	845	152	Acenaphthylene
23	100	87	88	0	551810	bb	871	154	Acenaphthene
24	100	93	96	0	726160	bb	946	166	Fluorene
25	100	88	99	0	101310	bb	1054	266	Pentachlorophenol
26	100	94	98	0	1374800	bv*	1084	178	Phenanthrene
27	100	95	99	0	1451600	vb*	1092	178	Anthracene
28	100	93	99	0	1858900	bb	1257	202	Fluoranthene
	100	94	98	0	2023500	bb	1289	202	Pyrene
30	100	78	99	0	1718800	bv	1468	228	Benzo(a)anthracene
31	100	92	99	0	1696800	vv	1473	228	Chrysene
32	87	67	72	0	1088900	bv	1671	252	Benzo(b)fluoranthene
33	100	89	95	0	1102100	vv	1677	252	Benzo(k)fluoranthene
34	100	90	96	0	987510	bv	1729	252	Benzo(e)pyrene
35	100	90	97	0	966750	vv	1740	252	Benzo(a)pyrene
36	100	90	97	0	855880	vv	1759	252	Perylene
37	100	85	94	0	607180	bv	1978	276	Indeno(1,2,3-cd)pyrene
38	100	83	93	0	643840	vv	1987	278	Dibenz(a,h)anthracene
39	100	84	94	0	701990	bv	2033	276	Benzo(g,h,i)perylene


09-Oct-92 17:33
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Sample: SSTD080
Instrument G
GK232
%FS
100
Min
0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
100
278
400
463
499
563
618
717
786
950
1117
1257
1289
1318
1468
1490
1618
1677
1740
2034
3221258
TIC
#1

SSTD08. 4C 10/12/92

QUAN DB : GK232 LAB-BASE QUAN 09-Oct-92 21:52

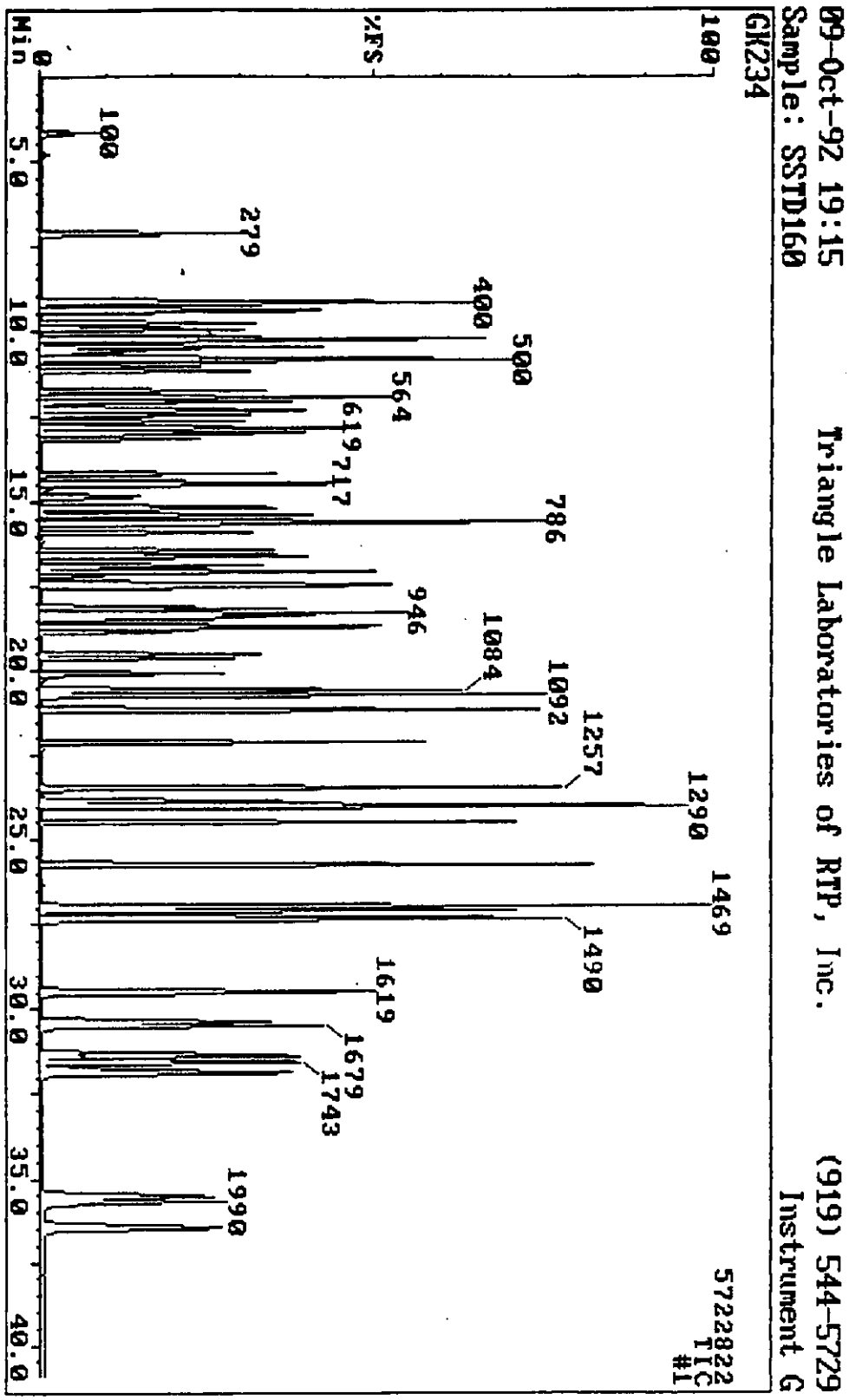
No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
	100	85	100	0	158210	bb	443	152	1,4-Dichlorobenzene-d4
	100	91	96	-1	641670	bb	615	136	Naphthalene-d8
3	100	95	98	1	332930	bb	866	164	Acenaphthene-d10
4	100	94	99	-1	798490	bv*	1080	188	Phenanthrene-d10
5	80	53	96	1	603510	bb	1469	240	Chrysene-d12
6	100	86	92	0	374070	bb	1753	264	Perylene-d12
7	100	95	96	-1	683850	bb	278	112	2-Fluorophenol
8	100	76	98	0	543470	bb	413	132	2-Chlorophenol-d4
9	100	81	99	0	806190	bv	398	99	Phenol-d5
10	87	65	84	0	308570	bb	463	152	1,2-Dichlorobenzene-d4
11	100	87	99	1	543410	bb	517	82	Nitrobenzene-d5
12	100	67	98	0	457280	bb	563	185	1,3,5-Trichlorobenzene-d3
13	100	93	98	0	227950	bb	623	240	1,4-Dibromobenzene-d4
14	100	90	98	0	802240	bb	772	172	2-Fluorobiphenyl
15	100	76	97	0	101480	bb	980	330	2,4,6-Tribromophenol
16	100	89	96	1	1427700	vb	1089	188	Anthracene-d10
17	100	87	94	0	1905200	bb	1286	212	Pyrene-d10
18	100	84	96	0	1272800	bb	1318	244	Terphenyl-d14
19	100	96	98	0	1302700	bb	618	128	Naphthalene
20	100	88	90	1	818160	bb	717	142	2-Methylnaphthalene
21	100	84	97	-1	617520	bb	786	162	2-Chloronaphthalene
22	100	95	97	0	1047800	vb	845	152	Acenaphthylene
23	100	86	87	0	617300	bb	871	154	Acenaphthene
24	100	92	95	0	822300	bb	946	166	Fluorene
25	100	84	97	1	121570	bv	1054	266	Pentachlorophenol
26	100	94	98	1	1504600	bv	1084	178	Phenanthrene
27	100	95	98	1	1591200	vb*	1092	178	Anthracene
	100	93	97	1	1981900	bb	1257	202	Fluoranthene
	100	93	97	0	2123800	bb	1289	202	Pyrene
30	100	80	98	0	1738700	bv	1468	228	Benzo(a)anthracene
31	100	92	97	0	1767800	vv	1473	228	Chrysene
32	82	63	68	0	1031900	bv	1671	252	Benzo(b)fluoranthene
33	100	87	94	0	1071700	vv	1677	252	Benzo(k)fluoranthene
34	100	90	94	0	915930	bv	1729	252	Benzo(e)pyrene
35	100	90	95	0	913410	vv	1740	252	Benzo(a)pyrene
36	100	92	95	0	811850	vv	1759	252	Perylene
37	100	92	95	0	566930	bv	1978	276	Indeno(1,2,3-cd)pyrene
38	100	87	94	0	606550	vv	1987	278	Dibenz(a,h)anthracene
39	100	91	94	0	651920	bv	2033	276	Benzo(g,h,i)perylene


09-Oct-92 18:24
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Sample: SSTD120
Instrument G
GK233
100
%FS
0
Min
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
100
278
400
463
564
618
717
786
946
1092
1257
1289
1469
1490
1618
1678
1730
1988
4484643
TIC
#1

SSTD120 GC 10/12/92

QUAN DB : GK233 LAB-BASE QUAN 09-Oct-92 21:52

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	84	100	0	140670	bb	443	152	1,4-Dichlorobenzene-d4
2	100	91	96	-1	577580	bb	615	136	Naphthalene-d8
3	100	94	98	1	332800	bb	866	164	Acenaphthene-d10
4	100	92	98	0	806400	bv*	1081	188	Phenanthrene-d10
5	76	35	95	1	563010	bb	1470	240	Chrysene-d12
6	100	88	96	0	415780	bb	1754	264	Perylene-d12
7	100	94	96	-1	922860	bv	278	112	2-Fluorophenol
8	100	74	99	0	719960	bb	413	132	2-Chlorophenol-d4
9	100	83	99	0	1075800	bv	398	99	Phenol-d5
10	87	65	84	0	402900	bb	463	152	1,2-Dichlorobenzene-d4
11	100	87	99	1	751680	bb	517	82	Nitrobenzene-d5
12	100	64	98	0	585090	bb	563	185	1,3,5-Trichlorobenzene-d3
13	100	92	98	0	291690	bb	623	240	1,4-Dibromobenzene-d4
14	100	90	98	0	1116200	bb	772	172	2-Fluorobiphenyl
15	100	76	98	0	145200	bb	980	330	2,4,6-Tribromophenol
16	100	89	97	0	2040200	vb	1089	188	Anthracene-d10
17	100	91	99	0	2623900	bb	1287	212	Pyrene-d10
18	100	83	96	-1	1694700	bb	1318	244	Terphenyl-d14
19	100	95	98	0	1903100	bb	618	128	Naphthalene
20	100	88	91	1	1232900	vb	717	142	2-Methylnaphthalene
21	100	82	97	-1	948340	bb	786	162	2-Chloronaphthalene
22	100	94	97	0	1675000	vb	845	152	Acenaphthylene
23	100	86	88	0	977570	bb	871	154	Acenaphthene
24	100	91	94	0	1316800	bb	946	166	Fluorene
25	100	83	97	0	218620	bv	1054	266	Pentachlorophenol
26	100	93	98	0	2387600	bv*	1084	178	Phenanthrene
27	100	94	99	0	2486800	vb	1092	178	Anthracene
28	100	92	97	0	2935400	bv	1257	202	Fluoranthene
29	100	92	97	-1	3075900	bb	1289	202	Pyrene
30	98	72	97	-1	2621100	bv	1468	228	Benzo(a)anthracene
31	100	90	96	0	2570900	vv	1474	228	Chrysene
32	81	62	68	0	1667800	bv	1672	252	Benzo(b)fluoranthene
33	100	86	93	0	1941900	vv	1678	252	Benzo(k)fluoranthene
34	100	87	93	0	1643000	bv	1730	252	Benzo(e)pyrene
35	100	89	95	0	1683700	vv	1741	252	Benzo(a)pyrene
36	100	90	94	0	1510500	vv	1760	252	Perylene
37	100	89	96	1	1166800	bv	1980	276	Indeno(1,2,3-cd)pyrene
38	100	86	95	0	1274800	vv	1988	278	Dibenz(a,h)anthracene
39	100	88	95	1	1394000	bv	2035	276	Benzo(g,h,i)perylene

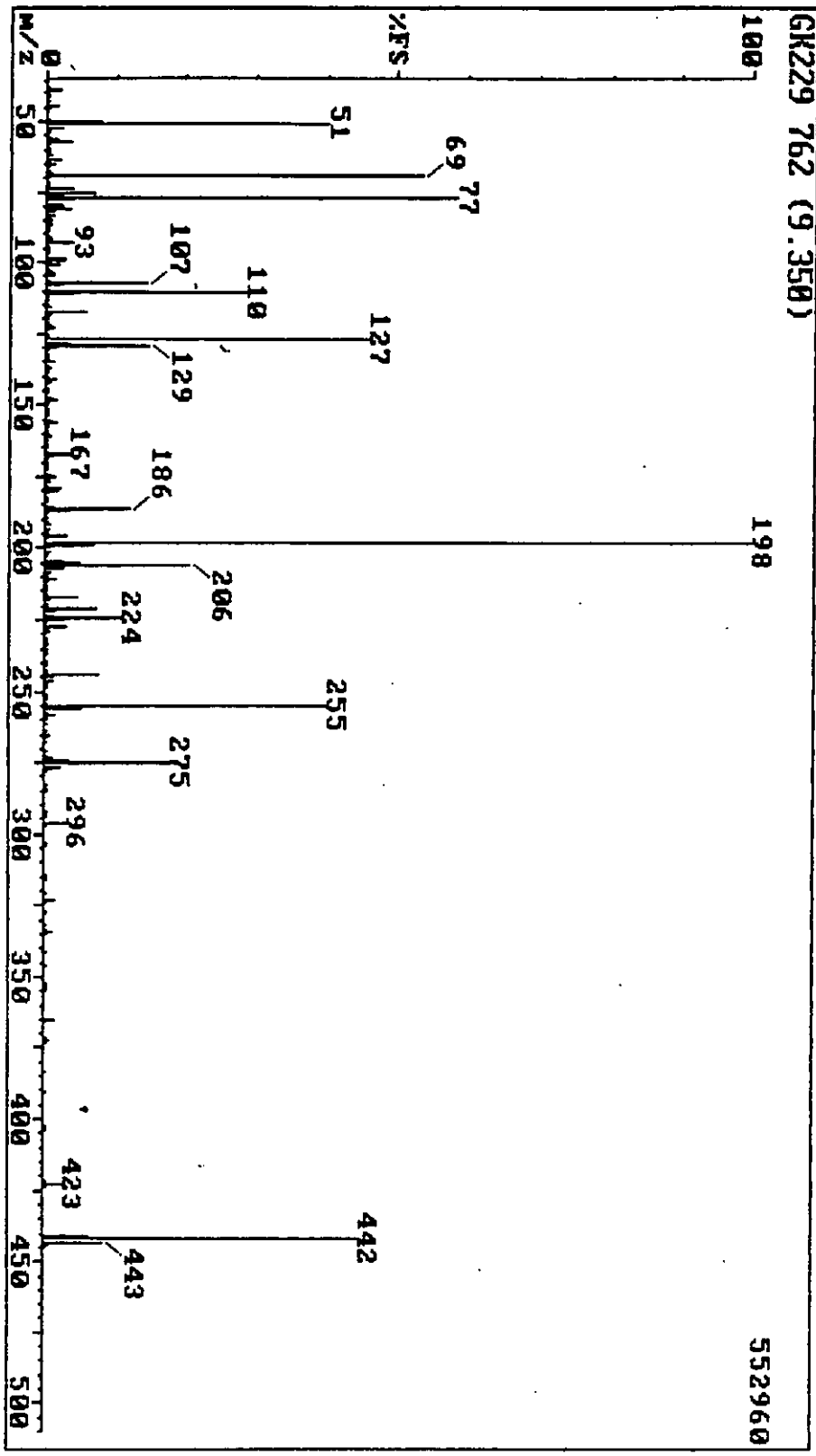

09-Oct-92 19:15
Sample: SSTD160
GK234
Triangle Laboratories of RTP, Inc.
(919) 544-5729
Instrument G
100
%FS
0
Min
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
100
279
400
500
564
619
717
786
946
1084
1092
1257
1290
1469
1490
1619
1679
1743
1990
5722822
TIC
#1

SSTD100 SC 10/12/92

QUAN DB : GK234 LAB-BASE QUAN 09-Oct-92 21:52

No.	MAT	FOR	REV	Delta	Area	P.Flags	Scan	QM	Name
1	100	85	99	0	175470	bb	443	152	1,4-Dichlorobenzene-d4
2	100	92	97	0	716690	bb	616	136	Naphthalene-d8
3	100	94	98	0	446330	bb	866	164	Acenaphthene-d10
4	100	92	98	0	1083200	bv*	1081	188	Phenanthrene-d10
5	71	29	94	1	674960	bb	1470	240	Chrysene-d12
6	100	88	96	0	629800	bb	1754	264	Perylene-d12
7	100	95	96	-1	1257700	bb	278	112	2-Fluorophenol
8	100	71	99	0	960580	bb	413	132	2-Chlorophenol-d4
9	100	86	99	0	1443300	bv	398	99	Phenol-d5
10	91	70	87	0	538150	bb	463	152	1,2-Dichlorobenzene-d4
11	100	85	99	1	1072400	bb	518	82	Nitrobenzene-d5
12	96	67	98	0	812370	bb	564	185	1,3,5-Trichlorobenzene-d3
13	100	93	99	0	373470	bb	623	240	1,4-Dibromobenzene-d4
14	100	90	98	0	1589900	bb	772	172	2-Fluorobiphenyl
15	100	77	98	0	226930	bb	980	330	2,4,6-Tribromophenol
16	100	90	97	0	3191600	vb	1089	188	Anthracene-d10
17	100	91	99	0	3882300	bv	1287	212	Pyrene-d10
18	100	83	97	-1	2447800	bb	1318	244	Terphenyl-d14
19	100	96	98	0	2466800	bb	619	128	Naphthalene
20	100	88	90	0	1545300	vb	717	142	2-Methylnaphthalene
21	100	79	97	0	1286500	bb	787	162	2-Chloronaphthalene
22	100	94	97	0	2275800	vb	845	152	Acenaphthylene
23	100	87	89	0	1361400	bb	871	154	Acenaphthene
24	100	91	95	0	1844700	bb	946	166	Fluorene
25	100	83	98	0	321540	bv	1054	266	Pentachlorophenol
26	100	94	98	0	3552300	bv*	1084	178	Phenanthrene
27	100	94	99	0	3645600	vv	1092	178	Anthracene
28	100	92	97	0	4181300	bb	1257	202	Fluoranthene
29	100	91	96	0	4316000	vv	1290	202	Pyrene
30	99	74	97	-1	3486700	bv	1468	228	Benzo(a)anthracene
31	100	90	97	0	3520500	vv	1474	228	Chrysene
32	81	62	68	0	2685800	bv	1672	252	Benzo(b)fluoranthene
33	100	87	94	1	2878200	vv	1679	252	Benzo(k)fluoranthene
34	100	87	94	1	2656800	bv	1731	252	Benzo(e)pyrene
35	100	89	96	1	2743300	vv	1742	252	Benzo(a)pyrene
36	100	89	95	1	2497200	vv	1761	252	Perylene
37	100	90	97	2	2307100	bv	1981	276	Indeno(1,2,3-cd)pyrene
38	97	85	96	2	2448900	bv	1990	278	Dibenz(a,h)anthracene
39	83	89	97	4	2686600	bv	2038	276	Benzo(g,h,i)perylene

09-Oct-92 15:01 Triangle Laboratories of RTP, Inc. (919) 544-5729
Sample: DFTPP Instrument G
GK229 762 (9.350)



GK229 762 (9.350) 552960

Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int
1	38	1344	0.24	55	96	2064	0.37	109	151	1968	0.36	163	207	15680	2.84	217	265	3760	0.68
2	39	9984	1.81	56	97	984	0.18	110	152	1680	0.30	164	208	4016	0.73	218	266	1568	0.28
3	40	960	0.17	57	98	14592	2.64	111	153	2544	0.46	165	209	1968	0.36	219	268	640	0.12
4	41	1424	0.26	58	99	14528	2.63	112	154	2128	0.38	166	210	1712	0.31	220	271	668	0.12
5	43	1152	0.21	59	100	1888	0.34	113	155	4928	0.89	167	211	7744	1.40	221	272	720	0.13
6	44	7616	1.38	60	101	10112	1.83	114	156	8192	1.48	168	212	1744	0.32	222	273	6848	1.24
7	45	832	0.15	61	102	1120	0.20	115	157	1952	0.35	169	213	684	0.12	223	274	18432	3.33
8	49	908	0.16	62	103	3488	0.63	116	158	1824	0.33	170	214	756	0.14	224	275	98304	17.78
9	50	44032	7.96	63	104	6400	1.16	117	159	1152	0.21	171	215	1296	0.23	225	276	13056	2.36
10	51	221184	40.00	64	105	5824	1.05	118	160	2576	0.47	172	216	2432	0.44	226	277	6912	1.25
11	52	12736	2.30	65	106	1984	0.36	119	161	4800	0.87	173	217	24832	4.49	227	278	1632	0.30
12	53	1232	0.22	66	107	78848	14.26	120	162	1312	0.24	174	218	4048	0.73	228	283	1232	0.22
13	54	756	0.14	67	108	12928	2.34	121	164	832	0.15	175	219	724	0.13	229	284	900	0.16
14	55	2400	0.43	68	109	2304	0.42	122	165	2912	0.53	176	220	732	0.13	230	285	1744	0.32
15	56	8256	1.49	69	110	156672	28.33	123	166	3136	0.57	177	221	41728	7.55	231	292	676	0.12
16	57	19456	3.52	70	111	21248	3.84	124	167	18432	3.33	178	222	7936	1.44	232	293	2176	0.39
17	58	1248	0.23	71	112	2976	0.54	125	168	7488	1.35	179	223	6720	1.22	233	294	656	0.12
18	59	704	0.13	72	113	1712	0.31	126	169	1872	0.34	180	224	60416	10.93	234	296	18176	3.29
19	60	672	0.12	73	115	732	0.13	127	170	920	0.17	181	225	14720	2.66	235	297	2768	0.50
20	61	3136	0.57	74	116	3568	0.65	128	171	992	0.18	182	226	2048	0.37	236	303	3072	0.56
21	62	3536	0.64	75	117	33280	6.02	129	172	1504	0.27	183	227	17408	3.15	237	304	956	0.17
22	63	10560	1.91	76	118	3568	0.65	130	173	2160	0.39	184	228	3008	0.54	238	314	1408	0.25
23	64	1808	0.33	77	119	900	0.16	131	174	3760	0.68	185	229	5248	0.95	239	315	2336	0.42
24	65	7360	1.33	78	120	1568	0.28	132	175	7936	1.44	186	230	1248	0.23	240	316	1776	0.32
25	66	944	0.17	79	121	620	0.11	133	176	2720	0.49	187	231	2656	0.48	241	321	904	0.16
26	67	952	0.17	80	122	3552	0.64	134	177	3568	0.65	188	232	1216	0.22	242	323	9408	1.70
27	68	3840	0.69	81	123	6016	1.09	135	178	1296	0.23	189	233	940	0.17	243	324	1824	0.33
28	69	294912	53.33	82	124	2736	0.49	136	179	12992	2.35	190	234	1584	0.29	244	327	1472	0.27
29	70	2496	0.45	83	125	2896	0.52	137	180	10816	1.96	191	235	2000	0.36	245	328	840	0.15
30	71	1408	0.25	84	126	868	0.16	138	181	5248	0.95	192	236	1552	0.28	246	332	740	0.13
31	72	844	0.15	85	127	253952	45.93	139	182	1088	0.20	193	237	2000	0.36	247	333	896	0.16
32	73	2128	0.38	86	128	19456	3.52	140	183	768	0.14	194	239	940	0.17	248	334	5440	0.98
33	74	21504	3.89	87	129	80896	14.63	141	184	1280	0.23	195	240	848	0.15	249	335	1488	0.27
34	75	39168	7.08	88	130	7680	1.39	142	185	6656	1.20	196	241	1216	0.22	250	341	992	0.18
35	76	13312	2.41	89	131	2256	0.41	143	186	66560	12.04	197	242	3200	0.58	251	346	1376	0.25
36	77	323584	58.52	90	132	1840	0.33	144	187	18688	3.38	198	243	3088	0.56	252	352	2704	0.49
37	78	22272	4.03	91	133	876	0.16	145	188	2128	0.38	199	244	43520	7.87	253	353	1936	0.35
38	79	13568	2.45	92	134	2544	0.46	146	189	2880	0.52	200	245	6144	1.11	254	354	2832	0.51
39	80	13056	2.36	93	135	6400	1.16	147	191	1568	0.28	201	246	6464	1.17	255	355	616	0.11
40	81	18688	3.38	94	136	2800	0.51	148	192	4800	0.87	202	247	1536	0.28	256	365	7808	1.41
41	82	5696	1.03	95	137	3472	0.63	149	193	5248	0.95	203	248	700	0.13	257	366	1360	0.25
42	83	6656	1.20	96	138	1024	0.19	150	194	1408	0.25	204	249	1680	0.30	258	371	680	0.12
43	84	1584	0.29	97	139	620	0.11	151	195	1016	0.18	205	251	600	0.11	259	372	4544	0.82
44	85	3552	0.64	98	140	1376	0.25	152	196	16384	2.96	206	252	692	0.13	260	373	1360	0.25
45	86	4224	0.76	99	141	8064	1.46	153	197	2720	0.49	207	253	932	0.17	261	383	1120	0.20
46	87	2880	0.52	100	142	3856	0.70	154	198	552960	100.00	208	254	1168	0.21	262	390	632	0.11
47	88	1392	0.25	101	143	2720	0.49	155	199	38656	6.99	209	255	222208	40.19	263	402	1712	0.31
48	89	980	0.18	102	144	780	0.14	156	200	4288	0.78	210	256	30720	5.56	264	403	2416	0.44
49	90	632	0.11	103	145	952	0.17	157	201	5376	0.97	211	257	3152	0.57	265	404	816	0.15
50	91	4608	0.83	104	146	1552	0.28	158	202	860	0.16	212	258	9216	1.67	266	421	2096	0.38
51	92	4864	0.88	105	147	4800	0.87	159	203	3072	0.56	213	259	2176	0.39	267	422	1792	0.32
52	93	22272	4.03	106	148	7552	1.37	160	204	15104	2.73	214	260	688	0.12	268	423	15488	2.80
53	94	2272	0.41	107	149	2000	0.36	161	205	27392	4.95	215	261	868	0.16	269	424	3008	0.54
54	95	1344	0.24	108	150	684	0.12	162	206	114688	20.74	216	264	1120	0.20	270	441	36864	6.67

GK229 762 (9.350) 552960

Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int	Pk#	Mass	Abs Int	Rel Int
	442	247808	44.81	272	443	47872	8.66	273	444	5120	0.93	274	445	896	0.16				

DFTPP TUNE CHECK REPORT

Raw Data File: GK229
Date: 09-Oct-92
Time: 15:01

M/E	ION ABUNDANCE CRITERIA	RELATIVE ABUNDANCE	TUNE
51	30.0 - 60.0% of mass 198	40.00	PASS
68	Less than 2.0% of mass 69	0.69(1.3)1	PASS
69	Mass 69 relative abundance	53.33	PASS
70	Less then 2.0% of mass 69	0.45(0.8)1	PASS
127	40.0 - 60.0% of mass 198	45.93	PASS
197	Less than 1% of mass 198	0.49	PASS
198	Base peak, 100% relative abundance	100.00	PASS
199	5 - 9% of mass 198	6.99	PASS
275	10 - 30% of mass 198	17.78	PASS
365	Greater than 1% of mass 198	1.41	PASS
441	Present, but less then mass 443	6.67	PASS
442	Greater than 40% of mass 198	44.81	PASS
443	17 - 23% of mass 442	8.66(19.3)2	PASS

INSTRUMENTAL ANALYSIS CALIBRATION DATA

DILUENT SO_2 MONITORS

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-1-92 Operator TM

Initial Calibration (Accuracy: ± 2% Span)

Gas Type	Actual Concentration	Analyzer Response
SO_2-Zero	0.0	0.1
SO_2-High	81.0	80.0
SO_2-Mid		

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(RM 202) Run # 1 Time: 12:08 - 13:30

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.1	3.3	
SO_2	80.0	81.9	

Run # 2 Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.1		
SO_2	81.1		

(RM 202) 9-2-92 Run # 2 Time: 11:01 - 14:01

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.8	1.2	
SO_2	82.1	84.1	

(RM 202) 9-2-92 Run # 3 Time: 15:16 - 15:26

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.8	0.2	
SO_2	84.1	81.0	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

TOTAL HYDROCARBONS

PLANT Fred Weber - NAPA LOCATION St. Louis, MO
DATE ~~8-31-92~~ (TM) 9-1-92 OPERATOR TM
H C RANGE 0-1000 (Methane) RESPONSE TIME

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

Gas Type	Actual Concentration	Analyzer	Gas Type	Actual Concentration	Analyzer
HC - Zero	0	0.1	HC - Mid	495	495
HC - High	764	762	HC - Low	303	300

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

(Rm 202)

Run # 1	Time: 12:08-13:30	
Gas Type	Initial Response	Final Response
HC - Zero	0.1	-1.8
HC - 303	300	318

(Rm 202) 9-2-92

Run # 3	Time: 15:16-15:26	
Gas Type	Initial Response	Final Response
HC- Zero	0.5	0.8
HC -	300	301.8

Run # 2	Time: 14:50-14:58	
Gas Type	Initial Response	Final Response
HC - Zero	0.4	
HC - 300	300	

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

(Rm 202)

9-2-92

Run # 2	Time: 14:01-14:01	
Gas Type	Initial Response	Final Response
HC - Zero	0.5	-0.6
HC - 303	300	300

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

INSTRUMENTAL ANALYSIS CALIBRATION DATA

DILUENT O_2 AND CO_2 MONITORS

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-1-92 Operator Tim

Initial Calibration (Accuracy: ± 2% Span)

O_2			CO_2		
Gas Type	Actual Concentration	Analyzer Response	Gas Type	Actual Concentration	Analyzer Response
O_2-Zero	0.0	0.1	CO_2-Zero	0.0	0.0
O_2-High	20.9	21.0	CO_2-High	16.1	16.5
O_2-Mid	10.0	9.9	CO_2-Mid	10.0	10.0

System Bias Reponse: Analyzer Response-Initial Bias ≤ ± 5% Span
Final Bias - Initial Bias ≤ ± 3% Span

(RM 202) Run # 1 Time: 12:08 - 13:30

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.0	0.1	0.5	-0.3	
CO_2/O_2	10.0	9.9	9.8	9.9	

9-2-92 Run # 2 Time:

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.0	0.0			
CO_2/O_2	10.0	10.1			

(RM 202) 9-2-92 Run # 2 Time: 11:01 - 14:01

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	-0.1	0.0	0.3	-0.2	
CO_2/O_2	10.1	10.1	9.8	10.2	

(RM 202) Run # 3 Time: 15:16 - 15:26

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.1	0.1	-0.3	0.3	
CO_2/O_2	10.1	10.1	9.6	9.8	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

CARBON MONOXIDE

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-1-92 Operator Tm

CO Range 0-1000

Initial Calibration: (Accuracy: ± 5% Span)

Gas Type	Actual Concentration	Anayzer Response
CO-Zero	0	0.3
CO-High	926	924
CO-Mid	614	604
CO-Low	400	412

Zero & Span Drift: (Accuracy ± 5% Span)

(RM 202) End Run # 1 Time: 12:08 - 13:30

Gas Type	Initial Response	Final Response	Drift
CO-Zero	0.3	0.2	
CO-	924	919	

End Run # 2 Time:

Gas Type	Initial Response	Final Response	Drift
CO-Zero	0.2		
CO-	919		

(RM 202)

9-2-92 End Run # 2 Time: 11:01-14:01

Gas Type	Initial Response	Final Response	Drift
CO-Zero	-0.1	0.4	
CO- 926	941	899	

(RM 202)

9-2-92 End Run # 3 Time: 15:16-15:26

Gas Type	Initial Response	Final Response	Drift
CO-Zero	0.4	0.3	
CO-	928	938	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

NO_x MONITOR

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-1-92 Operator Tm

Initial Calibration (Accuracy: ± 2% Span)

Gas Type	Actual Concentration	Analyzer Response
NO_x-Zero	0.0	0.4
NO_x-High	214	214.5
NO_x-Mid	138	139.5

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(RM 202) Run # 1 Time: 12:08 - 13:30

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.4	3.1	
NO_x	139.5	141.9	

Run # 2 Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.4		
NO_x	138.5		

(RM 202) 9-2-92 Run # 2 Time: 11:01 - 14:01

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.6	0.6	
NO_x	139.5	137.5	

RM 202) 9-2-92 Run # 3 Time: 15:16 - 15:26

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.6	0.5	
NO_x	137.5	139.4	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

DILUENT SO_2 MONITORS

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-3-92 Operator FM

Initial Calibration (Accuracy: ± 2% Span)

Gas Type	Actual Concentration	Analyzer Response
SO_2-Zero		
SO_2-High		
SO_2-Mid		

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(FORMALDEHYDE) Run # 1 Time: 6:42 - 8:10

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.0	0.6	
SO_2	80.9	81.1	

(FORM.) Run # 2 Time: 8:37 - 9:59

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.8	0.7	
SO_2	79.8	81.6	

(FORM.) Run # 3 Time: 10:32 - 11:53

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.7	-0.8	
SO_2	81.6	78.9	

(PAH) Run # 1 Time: 13:14 - 14:16

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.8	0.4	
SO_2	78.9	79.1	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

NO_x MONITOR

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-3-92 Operator FM

Initial Calibration (Accuracy: ± 2% Span)

Gas Type	Actual Concentration	Analyzer Response
NO_x-Zero		
NO_x-High		
NO_x-Mid		

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(FORMALDEHYDE) Run # 1 Time: 6:42-8:10

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.2	0.4	
NO_x	139	138	

(FORM.) Run # 2 Time: 8:37-9:59

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.4	0.6	
NO_x	138	141.8	

(FORM.) Run # 3 Time: 10:32-11:53

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.6	0.8	
NO_x	141.8	142.1	

(PAH) Run # 1 Time: 13:14-14:16

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.4	1.6	
NO_x	139.9	134.5	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

CARBON MONOXIDE

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-3-92 Operator TW

CO Range 0-1000

Initial Calibration: (Accuracy: ± 5% Span)

Gas Type	Actual Concentration	Anayzer Response
CO-Zero	0	
CO-High		
CO-Mid		
CO-Low		

Zero & Span Drift: (Accuracy ± 5% Span)

(FORM- End Run # 1 Time: 6:42 - 8:10
ALDEHYDE.)

Gas Type	Initial Response	Final Response	Drift
CO-Zero	1.0	1.3	
CO-	928	896	

FORM.) End Run # 2 Time: 8:37 - 9:59

Gas Type	Initial Response	Final Response	Drift
CO-Zero	1.3	0.9	
CO-	914	TW ~~894~~ 900	

FORM.) End Run # Time: 10:32 - 11:53

Gas Type	Initial Response	Final Response	Drift
CO-Zero	0.9	TW ~~0.8~~ 0.4	
CO-	930	910	

PAH) End Run # 1 Time: 13:14 - 14:16

Gas Type	Initial Response	Final Response	Drift
CO-Zero	0.4	-1.4	
CO-	930	954	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

DILUENT O_2 AND CO_2 MONITORS

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-3-92 Operator JM

Initial Calibration (Accuracy: ± 2% Span)

O_2			CO_2		
Gas Type	Actual Concentration	Analyzer Response	Gas Type	Actual Concentration	Analyzer Response
O_2-Zero			CO_2-Zero		
O_2-High			CO_2-High		
O_2-Mid			CO_2-Mid		

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(FORMALDEHYDE) Run # 1 Time: 6:42 - 8:10

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.0	0.0	0.3	0.1	
CO_2/O_2	10.0	10.0	9.6	10.0	

(FORM.) Run # 2 Time: 8:37 - 9:59

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.1	0.1	0.3	0.1	
CO_2/O_2	10.0	10.0	~~9.6 10.~~	10.0	

(FORM.) Run # 3 Time: 10:32 - 11:53

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.1	0.1	0.2	0.1	
CO_2/O_2	9.9	10.0	10.1	9.8	

(PAH) Run # 1 Time: 13:14 - 14:16

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.2	0.1	-0.1	-0.3	
CO_2/O_2	10.1	9.9	9.9	9.8	

INSTRUMENTAL ANALYSIS CALIBRATION DATA

TOTAL HYDROCARBONS

PLANT Fred Weber - NAPA LOCATION St. Louis, MO
DATE 9-3-92 OPERATOR Jm
H C RANGE 0-1000 (Methane) RESPONSE TIME

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

Gas Type	Actual Concentration	Analyzer	Gas Type	Actual Concentration	Analyzer
HC - Zero	0		HC - Mid		
HC - High			HC - Low		

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

Run # 1	Time: 6:42 - 8:10	
Gas Type	Initial Response	Final Response
HC - Zero	0.2	0.1
HC - 303	300	300

(PATH)

Run # 1	Time: 13:19-14:16	
Gas Type	Initial Response	Final Response
HC- Zero	0.7	0.8
HC - 303	302	300.1

Run # 2	Time: 8:37 - 9:59	
Gas Type	Initial Response	Final Response
HC - Zero	0.1	0.7
HC - 303	302	297.8

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

Run # 3	Time: 10:32 - 11:53	
Gas Type	Initial Response	Final Response
HC - Zero	0.7	1.1
HC - 303	301.1	297

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

INSTRUMENTAL ANALYSIS CALIBRATION DATA

TOTAL HYDROCARBONS

PLANT Fred Weber - NAPA LOCATION St. Louis, MO

DATE 9-4-92 OPERATOR TM

H C RANGE 0-1000 (Methane) RESPONSE TIME

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

Gas Type	Actual Concentration	Analyzer	Gas Type	Actual Concentration	Analyzer
HC - Zero	0		HC - Mid		
HC - High			HC - Low	303	

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

(PAH)

Run # 2	Time: 7:05 - 8:51	
Gas Type	Initial Response	Final Response
HC - Zero	- 0.1	- 3.9
HC -	301.1	300.0

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

(PAH)

Run # 3	Time: 12:08 - 13:48	
Gas Type	Initial Response	Final Response
HC - Zero	- 0.1	-2.6
HC -	301.4	296.4

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

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

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

INSTRUMENTAL ANALYSIS CALIBRATION DATA

NO_x MONITOR

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-4-92 Operator Tm

Initial Calibration (Accuracy: ± 2% Span)

Gas Type	Actual Concentration	Analyzer Response
NO_x-Zero	0.0	
NO_x-High		
NO_x-Mid	138	

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(PAH) Run # 2 Time: 7:05 - 8:51

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.4	1.8	
NO_x	138.9	138.7	

(PAH) Run # 3 Time: 12:08 - 13:48

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.7	3.5	
NO_x	138.6	138.7	

Run # Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero			
NO_x			

Run # Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero			
NO_x			

INSTRUMENTAL ANALYSIS CALIBRATION DATA

DILUENT SO_2 MONITORS

Plant Fred Weber-NAPA Location St. Louis, MO

Date 9-4-92 Operator JM

Initial Calibration (Accuracy: ± 2% Span)

Gas Type	Actual Concentration	Analyzer Response
SO_2-Zero	0.0	
SO_2-High		
SO_2-Mid	81.0	

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(PAH) Run # 2 Time: 7:05 - 8:51

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	0.4	1.0	
SO_2	81.4	80.0	

(PAH) Run # 3 Time: 12:08 - 13:48

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero	1.0	1.8	
SO_2	80.0		

Run # Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero			
SO_2			

Run # Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero			
SO_2			

INSTRUMENTAL ANALYSIS CALIBRATION DATA

DILUENT O_2 AND CO_2 MONITORS

Plant Fred Weber-NAPA Location St. Louis, MO

Date 9-4-92 Operator Tm

Initial Calibration (Accuracy: ± 2% Span)

O_2			CO_2		
Gas Type	Actual Concentration	Analyzer Response	Gas Type	Actual Concentration	Analyzer Response
O_2-Zero	0.0		CO_2-Zero	0.0	
O_2-High	20.9		CO_2-High		
O_2-Mid	10.0		CO_2-Mid	10.0	

System Bias Reponse: Analyzer Response-Initial Bias = ± 5% Span
Final Bias - Initial Bias = ± 3% Span

(PAH) Run # 2 Time: 7:05 - 8:51

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.1	0.1	0.3	0.0	
CO_2/O_2	10.1	9.9	9.8	9.8	

(PAH) Run # 3 Time: 12:08 - 13:48

Gas Type	Initial Bias Response		Final Bias Response		Drift
Zero	0.1	-0.1	0.3	-0.4	
CO_2/O_2	9.8	9.9			

Run # Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero			
CO_2/O_2			

Run # Time:

Gas Type	Initial Bias Response	Final Bias Response	Drift
Zero			
CO_2/O_2			

INSTRUMENTAL ANALYSIS CALIBRATION DATA

CARBON MONOXIDE

Plant Fred Weber - NAPA Location St. Louis, MO

Date 9-4-92 Operator TM

CO Range 0-1000

Initial Calibration: (Accuracy: ± 5% Span)

Gas Type	Actual Concentration	Anayzer Response
CO-Zero	0	
CO-High	926	
CO-Mid		
CO-Low		

Zero & Span Drift: (Accuracy ± 5% Span)

(PAH) End Run # 2 Time: 7:05 - 8:51

Gas Type	Initial Response	Final Response	Drift
CO-Zero	7.9	0.9	
CO- 926	928	894	

(PAH) End Run # 3 Time: ~~7:05~~ (TW) 12:08-13:48

Gas Type	Initial Response	Final Response	Drift
CO-Zero	0.9	-2.0	
CO-	930	(TW) ~~894~~ 897	

End Run # Time:

Gas Type	Initial Response	Final Response	Drift
CO-Zero			
CO-			

End Run # Time:

Gas Type	Initial Response	Final Response	Drift
CO-Zero			
CO-			

AIR PRODUCTS AND CHEMICALS, INC.
4822 INDUSTRY LANE
UDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC 27713
TELEPHONE (919) 361-4645

DATE: 06/04/92
TIME: 08:44
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-083839
ORDER DETAIL SEQ : 4

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

ANALYSIS

CERTIFIED GAS MIXTURE: NITRIC OXIDE IN NITROGEN

BATCH NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
21361	05/27/92	BNM284	SG9107880BAL	NITRIC OXIDE	137	138	MOLAR PPM
				NITROGEN		BALANCE	

CERTIFICATION

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

Patrick J. Kolchin

PRODUCTS AND CHEMICALS, INC.
INDUSTRY LANE
UDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC 27713
TELEPHONE (919) 361-4645

DATE: 06/05/92
TIME: 14:44
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-083839
ORDER DETAIL SEQ : 3

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

ANALYSIS

CERTIFIED GAS MIXTURE: NITRIC OXIDE IN NITROGEN

H NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
21362	05/27/92	BNM285	SG9107876BAL	NITRIC OXIDE	212	214	MOLAR PPM
				NITROGEN		BALANCE	

CERTIFICATION

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

Patrick J. Sullivan

AUTHORIZED SIGNATURE

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

004B

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO :
ORDER NO. : 351-019363
ORDER DETAIL SEQ : 3

ANALYSIS

CERTIFIED GAS MIXTURE: CARBON MONOXIDE IN NITROGEN

CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 02414C ANAL DATE: 10/04/89	58860757 CARBON MONOXIDE	600	613	MOLAR PPM

RAMCON

CERTIFICATION

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

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

DATE: 09/03/91
TIME: 15:45
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC,
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-068972
ORDER DETAIL SEQ : 1

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

ANALYSIS

CERTIFIED GAS MIXTURE: CARBON MONOXIDE IN NITROGEN

CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 04499 ANAL DATE: 09/03/91 SG671814	CARBON MONOXIDE NITROGEN	900	926 BALANCE	MOLAR PPM

CERTIFICATION

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED ANALYTICAL PROCEDURES OR THIS/THESE METHOD(S).

AUTHORIZED SIGNATURE

PRODUCTS AND CHEMICALS, INC.
[illegible] INQUIRY LANE
USA BUSINESS PARK
RESEARCH TRIANGLE PARK, NC [illegible]713
TELEPHONE (919) 361-4645

DATE: 05/06/92
TIME: 11:18
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-083655
ORDER DETAIL SEQ : 1

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

ANALYSIS

CERTIFIED GAS MIXTURE: CARBON MONOXIDE IN NITROGEN

B[illegible] NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
02015	05/06/92	BNF617	SB910748CBAL	CARBON MONOXIDE NITROGEN	400	400 BALANCE	MOLAR PPM
		BNF617	SB910748CBAL	CARBON MONOXIDE NITROGEN	400	400 BALANCE	MOLAR PPM

[illegible]

[illegible] ANALYSIS WAS PERFORMED UTILIZING APPROVED ANALYTICAL METHODS AND IS CORRECT TO THE BEST OF MY KNOWLEDGE. [illegible] THIS CERTIFICATE.

[illegible]
AUTHORIZED SIGNATURE

AIR PRODUCTS AND CHEMICALS, INC.
7522 INDUSTRY LANE
JDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC 27713
TELEPHONE (919) 361-4645

DATE: 07/21/92
TIME: 14:54
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-087849
ORDER DETAIL SEQ : 2

REMARKS : GAS MIXTURE(S) LISTED BELOW ARE TRACEABLE TO NIST CLASS S WEIGHTS AND/OR NIST GAS MIXTURE STANDARD REFERENCE MATERIALS (SRM's) - REFERENCE APDI 36D FIELD DIRECTIVE BOOK I PART A-3.

ANALYSIS

PRIMARY GAS MIXTURE : 2 COMPONENTS IN NITROGEN

BATCH NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
02786	07/21/92	ENES14	SB182404	OXYGEN	10	10.0	MOLAR %
				CARBON DIOXIDE	10	10.0	MOLAR %
				NITROGEN		BALANCE	

Rancon

CERTIFICATION

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

AUTHORIZED SIGNATURE

AIR PRODUCTS AND CHEMICALS, INC.
4822 INDUSTRY LANE
UDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC 27713
TELEPHONE (919) 361-4645

DATE: 12/18/91
TIME: 15:59
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-075499
ORDER DETAIL SEQ : 2

CUSTOMER SPEC NO : LIMX0010B

Ramcon Stock

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

ANALYSIS

CERTIFIED GAS MIXTURE: CARBON DIOXIDE IN NITROGEN

	CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 00699 ANAL DATE: 12/18/91	SS11979	CARBON DIOXIDE	17	16.1	MOLAR %
		NITROGEN		BALANCE	

Ramcon

CERTIFICATION

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

AUTHORIZED SIGNATURE

AIR PRODUCTS AND CHEMICALS, INC.
4825 Industry Lane
UDI Business Park
Research Triangle Park, NC 27713
TELEPHONE (919) 361-2077
FAX (919) 361-2074

DATE: 06/03/91
TIME: 10:49
PAGE: 1

****
* CERTIFICATE OF ANALYSIS *
****

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-063526
ORDER DETAIL SEQ : 3

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

** ANALYSIS **

CERTIFIED GAS MIXTURE: METHANE IN NITROGEN

	CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 03643	SG19818B	METHANE	850	765	MOLAR PPM
ANAL DATE: 06/03/91		NITROGEN		BALANCE	

RAMCON 6-20-91

CERTIFICATION

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED [illegible] METHODS AND IS CORRECT TO THE BEST OF MY KNOWLEDGE.

ANALYTICAL ACCURACIES OF THIS PARCEL METHOD IS +-.

AUTHORIZED SIGNATURE

PRODUCTS AND CHEMICALS, INC.
48[illegible] INDUSTRY LANE
UDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC 27713
TELEPHONE (919) 361-4645

DATE: 03/13/92
TIME: 16:25
PAGE: 1

****
* CERTIFICATE OF ANALYSIS *
****

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-080202
ORDER DETAIL SEQ : 1

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

** ANALYSIS **

CERTIFIED GAS MIXTURE: METHANE IN NITROGEN

BA. NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
01463	03/12/92	BQU414	SG51252	METHANE	300	303	MOLAR PPM
				NITROGEN		BALANCE	

Rancon.

CERTIFICATION

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

Patrick J. Ketchum
AUTHORIZED SIGNATURE

RODUCTS AND CHEMICALS, INC.
4[illegible] INDUSTRY LANE
UDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC [illegible]
TELEPHONE (919) 361-4645

DATE: 07/29/92
TIME: 15:21
PAGE: 1

CERTIFICATE OF ANALYSIS

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO :
ORDER NO : 351-088267
ORDER DETAIL SEQ : 1

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

ANALYSIS

CERTIFIED GAS MIXTURE: METHANE IN NITROGEN

LINE NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
02866	07/29/92	BN6862	S6581692	METHANE	500	495	MOLAR PPM
				NITROGEN		BALANCE	

P.D. Ramcon

CERTIFICATION

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED ANALYTICAL METHODS AND IS CORRECT TO WITHIN THE ANALYTICAL ACCURACIES OF THESE METHODS.

Patrick J. [illegible]
AUTHORIZED SIGNATURE

AIR PRODUCTS AND CHEMICALS, INC.
4822 INDUSTRY LANE
UDI BUSINESS PARK
RESEARCH TRIANGLE PARK, NC 27713
TELEPHONE (919) 361-4645

DATE: 11/20/91
TIME: 15:53
PAGE: 1

****
* CERTIFICATE OF ANALYSIS *
****

AIR PRODUCTS AND CHEMICALS, INC.
2541 HARBOR AVENUE
MEMPHIS TN 38113

CUSTOMER ACCOUNT : 351
CUSTOMER ORDER NO : GARY
ORDER NO : 351-072750
ORDER DETAIL SEQ : 1

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

** ANALYSIS **

CERTIFIED GAS MIXTURE: SULFUR DIOXIDE IN NITROGEN

	CYL NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
BATCH NO: 11969 ANAL DATE: 09/11/91	SB145DXE	SULFUR DIOXIDE NITROGEN	90	81 BALANCE	MOLAR PPM

Ramcon

CERTIFICATION

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

Patrick J. Kitchen
AUTHORIZED SIGNATURE

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) ✓ no

α_1 = 1.3 ° (<10°), α_2 = 0.8 ° (<10°), β_1 = 0.5 ° (<5°),
β_2 = 1.8 ° (<5°)

γ = 2.9 °, θ = 1.7 °, A = .97 cm (in.)

z = A sin γ = .05 cm (in.); <0.32 cm (<1/8 in.),
w = A sin θ = .03 cm (in.); <.08 cm (<1/32 in.)

P_A .48 cm (in.) P_b .49 cm (in.)

D_t = .38 cm (in.)

Comments: _____

_____

_____

Calibration required? _____ yes ✓ no

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) _____ no

α_1 = 2.3 ° (<10°), α_2 = .5 ° (<10°), β_1 = 1.8 ° (<5°),

β_2 = 1.8 ° (<5°)

γ = 3.2 °, θ = 1.0 °, A = .98 cm (in.)

z = A sin γ = .05 cm (in.); <0.32 cm (<1/8 in.),

w = A sin θ = .02 cm (in.); <.08 cm (<1/32 in.)

P_A .49 cm (in.) P_b .49 cm (in.)

D_t = .38 cm (in.)

Comments: _____

_____

_____

Calibration required? _____ yes ✓ no

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-5-89 Thermocouple number Hotbox

Ambient temperature 20 °C Barometric pressure 29.85 in. Hg

Calibrator S Turner Reference: mercury-in-glass ✓

other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °C F	Thermocouple potentiometer temperature, °C F	Temperature difference,[b] %
A	ice bath	32	32	0
B	oven	200	200	0
C	oven	350	350	0
D	ambient			

[a] Type of calibration system used.

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

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-5-89 Thermocouple number Inlet/Outlet

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator [illegible] Reference: mercury-in-glass —

other —

Reference point number	Source[a] (specify)	Reference thermometer temperature, °C °F	Thermocouple potentiometer temperature, °C °F	Temperature difference,[b] %
A	Ice Bath	32	32	0
B	oven	200	201	0
C	oven	350°F	350	0
D	Ambient			

[a] Type of calibration system used.

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

Lear Siegler Stack Sampler

Nozzle Diameter Calibration

Date _____ Signature _____

Nozzle No.	Average Diameter	Nozzle No.	Average Diameter
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

Pitot Tube Calibration (S Type)

Pitot Tube Identification No. 54 Date 6-9-91

Calibrated by: S Tuck

"A" SIDE CALIBRATION

Run No.	Δp std cm H_2O (in. H_2O)	Δp (s) cm H_2O (in. H_2O)	$C_p(s)$	DEVIATION $C_{p(s)}-\bar{C}_p(A)$
1	2.2	3.1	.842	.006
2	1.8	2.5	.848	.000
3	1.1	1.5	.856	.008
		$\bar{C}_p$ (SIDE A)	.848	

"B" SIDE CALIBRATION

Run No.	Δp std cm H_2O (in. H_2O)	Δp(s) cm H_2O in. H_2O)	$C_p(s)$	DEVIATION $C_{p(s)}-\bar{C}_p(B)$
1	2.2	3.1	.842	.006
2	1.8	2.5	.848	.000
3	1.1	1.5	.856	.008
		$\bar{C}_p$ (SIDE B)	.848	

$$\text{AVERAGE DEVIATION} = \sigma(\text{A OR B}) = \frac{\sum_1^3 |C_p(s)-\bar{C}_p(\text{A OR B})|}{3} \leftarrow \text{MUST BE} \leq 0.01$$

$$|\bar{C}_p(\text{SIDE A})-\bar{C}_p(\text{SIDE B})| \leftarrow \text{MUST BE} \leq 0.01$$

$$C_{p(s)} = C_{p(std)}\sqrt{\frac{\Delta p\ std}{\Delta p_s}}$$

RAMCON

Lear Siegler Stack Sampler

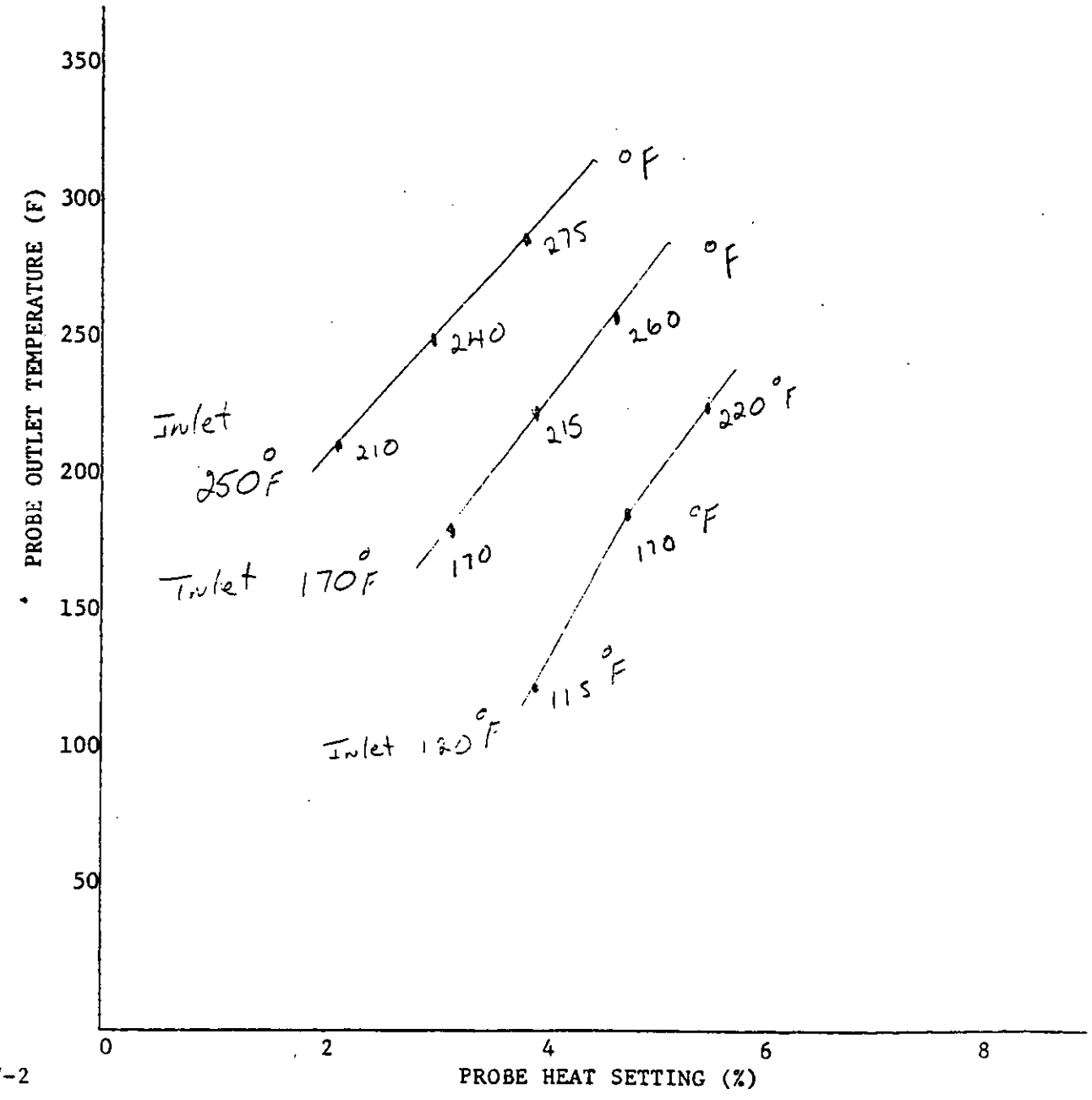
Heating Probe Calibration

Probe No. 54 Probe Length 5'

Date of Calibration 5-7-89 Signature Sam Turner

Name of Company to be tested _____

Note: 3 ft. probe - 5 min. warmup
6 ft. probe - 15 min. warmup
10 ft. probe - 30 min. warmup
Calibration flow rate = .75 CFM



Form No. EED-17-2

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-13-90 Thermocouple number 54

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator S Turner Reference: mercury-in-glass ✓

other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °C	Thermocouple potentiometer temperature, °C	Temperature difference,[b] %
A	ice water	32 °F	32 °F	0 %
B	Boiling	210 °F	210 °F	0 %
C	Boiling oil	391 °F	379 °F	.00?
D	Ambient			

[a] Type of calibration system used.

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

RAMCON Environmental Corporation

EPA QA MANUAL VOL. III, Section No. 3.4.2, Revision No. O, Date: January 15, 1980

Date: 8-2-91 Control Box Number: C-001

Ambient Temperature: 74°F °C Barometric Pressure 29.96 in. Hg

Calibrator: BS Reference: Mercury-in-glass X

Other: _____

Reference Point Number[a]	Source[b] (Specify)	Reference Thermometer Temperature °C	Thermocouple Potentiometer Temperature °C	Temperature Difference[c], %
Inlet Temperature				
1	Mercury In-Glass	212°F	212°F	0
2	Ice Water	32°F	32°F	0
3	Ambient			
Outlet Temperature				
1	Mercury In-Glass	212°F	212°F	0
2	Ice Water	32°F	32°F	0
3	Ambient			

[a] *Every 30°C (50°F) for each reference point.*

[b] *Type of calibration system used.*

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

Figure 2.5 stack temperature sensor calibration data form.

D:\DONNA\FORMS\STACKTEM.CAL

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 7-14-92 Meter box number CP-100

Barometric pressure, P_b = 30.21 in. Hg Calibrated by T. Casey

Orifice manometer setting (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Avg[a] (t_d), °F	Time (θ), min	Y_i	$\Delta H@_i$ in. H_2O
0.5	5	412.925 / 418.235	72	100 / 102	84 / 84	93.5	11.74	.979	1.484
1.0	5	451.634 / 456.404	72	104 / 105	84 / 85	94.5	8.28	.986	1.468
1.5	10	440.842 / 451.341	72	104 / 106	85 / 86	95.75	13.44	.989	1.452
2.0	10	430.154 / 440.661	72	106 / 110	84 / 86	97	11.7	.991	1.455
3.0	10	418.973 / 429.445	72	102 / 111	86 / 85	96	9.51	.990	1.449
4.0	10	402.604 / 412.486	72	108 / 114	86 / 87	99	8.24	.998	1.449
							Avg	.988	1.463

5.312 5.272 10.519 10.507 10.47 10.422

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t_w + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
1.5	0.110		
2.0	0.147		
3.0	0.221		
4.0	0.294		

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

Tommy

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number 1 Date 9-7-92 Meter box number C-100 Plant _____

Barometric pressure, P_b = 30.01 in. Hg Dry gas meter number _____ Pretest Y _____

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average[a] (t_d), °F	Time (θ), min	Vacuum setting, in. Hg	Y_i	$Y_i \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
5.219 .50	10 5	426.207 / 425.427	X	100 / 99	88 / 88	93.8	12.3	2	.985	1.670
10.402 1	10	426.05 / 425.450	X	90 / 100	87 / 87	92.5	17.1	3	.985	1.618
10.313 3	10	409.641 / 419.954	X	98 / 104	86 / 88	94.5	9.9	7	.992	1.623
									Y = .987	1.637

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d

where

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y ±0.05Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

Quality Assurance Handbook M4-2.4A

Form #REG-01

Tommy CRoots

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number _____ Date 8-23-96 Meter box number C-100 Plant _____

Barometric pressure, P_b = 29.95 in. Hg Dry gas meter number 670775 Pretest Y _____

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter Inlet (t_{d_i}), °F	Temperature: Dry gas meter Outlet (t_{d_o}), °F	Temperature: Dry gas meter Average[a] (t_d), °F	Time (θ), min	Vacuum setting, in. Hg	Y_i	$Y_i \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
5.196 .50	10 5	701.027 706.223	77	98 98	88 88	93	11.85	2	.985	1.550
10.392 1.0	10	706.524 716.516	77	94 100	88 88	92.5	16.55	3	.985	1.513
10.273 3.0	10	670.477 680.747	77	100 103	88 88	94.75	9.5	8	.998	1.485
									Y = .991	1.517

Y_i 551.5 553 554.75

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d

where

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y ±0.05Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

ANALYSIS OF METHOD 18 FIELD SAMPLES

Date: 9-1-92 Analyst: DS Plant: Fred Weber
Location: Sikeston Mo Sample Type: Gas
Type of Calibration Standard: Cylinder Target Compound: BTEX
Number of Standards: 2 Date Prepared: _____ Prepared By: _____

GC Used: SRI Column Used: _____
Carrier Gas Used: N_2 Carrier Gas Flow Rate: 30cc/min
Column Temperatures, Initial: 75 Program Rate: — Final: 75
Sample Loop Volume: 1cc Loop Temperature: 75 Inject. Port Temp.: _____
Detector Temp.: ___ Auxiliary Gases: _____

pre

Calibration Data Benzene	Standard 1	Standard 2	Standard 3
First analysis/second analysis			
Standard concentration (C_{act})	.989	9.78	
Flow rate through loop (ml/min)	500 /	500/	/
Liquid injection volume (tubes)	UA /	UA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	UA /	UA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	1.6 / 1.6	1.6 / 1.6	/
Peak retention time range (min)	1.6	1.6	
Peak area	6.11 / 6.12	363.01 / 363.02	/
Peak area x attenuation factor	/	/	/
Average peak area value (Y)	6.12	363.03	
Percent deviation from average	<5%	<5%	
Calculated concentration (C_{std})	.99	9.78	
% deviation from actual ($\%D_{act}$)			

Linear regression equation: slope (m): 40.60 y-intercept (b): -34.03

post

Sample Analysis Data	Sample 1	Sample 2	Sample 3
First analysis/second analysis			
Sample identification	.989	9.78	
Interface dilution factor			
Flow rate through loop (ml/min)	500 / 500	500 / 500	/
Liquid injection volume (tubes)	UA /	UA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	UA /	UA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	1.6 / 1.6	1.6 / 1.6	/
Peak retention time range (min)	1.6	1.6	
Peak area	7.03 / 6.97	364.27 / 363.04	/
Peak area x atten. factor (A_1/A_2)	/	/	/
Average peak area value (Y)	7.0	363.66	
% deviation from average ($\%D_{avg}$)	<5%	<5%	
Calculated concentration (C_s)	.989	9.8	

$$C_{std} \text{ or } C_s = \frac{(Y - b)}{m} \qquad \%D_{avg} = \left| \frac{A_1 - Y}{Y} \right| \times 100\% \qquad \%D_{act} = \frac{C_{std} - C_{act}}{Y} \times 100\%$$

ANALYSIS OF METHOD 18 FIELD SAMPLES

Date: _____ Analyst: _____ Plant: _____
Location: _____ Sample Type: _____
Type of Calibration Standard: _____ Target Compound: _____
Number of Standards: ___ Date Prepared: _____ Prepared By: _____

GC Used: _____ Column Used: _____
Carrier Gas Used: _____ Carrier Gas Flow Rate: _____
Column Temperatures, Initial: _____ Program Rate: _____ Final: _____
Sample Loop Volume: ___ Loop Temperature: ____ Inject. Port Temp.: _____
Detector Temp.: ___ Auxiliary Gases: _____

Calibration Data Toluene First analysis/second analysis	Standard 1	Standard 2	Standard 3
Standard concentration (C_{act})	1.10	9.78	
Flow rate through loop (ml/min)	500 / 500	500 / 500	/
Liquid injection volume (tubes)	NA /	NA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	NA /	NA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	3.1 /	3.1 /	/
Peak retention time range (min)	3.1		
Peak area	6.15 / 7.26	418.04 / 415.91	/
Peak area x attenuation factor	/	/	/
Average peak area value (Y)	6.71	416.98	
Percent deviation from average	< 5%	< 5%	
Calculated concentration (C_{std})	1.1	9.8	
% deviation from actual ($\%D_{act}$)			
Linear regression equation: slope (m): 47.27	y-intercept (b): -45.28		

Sample Analysis Data First analysis/second analysis	Sample 1	Sample 2	Sample 3
Sample identification	1.10	9.78	
Interface dilution factor	NA	NA	
Flow rate through loop (ml/min)	500 / 500	500 / 500	/
Liquid injection volume (tubes)	NA /	NA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	NA /	NA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	3.1 / 3.1	3.1 / 3.1	/
Peak retention time range (min)	3.1	3.1	
Peak area	7.52 / 7.81	426.19 / 419.36	/
Peak area x atten. factor (A_1/A_2)	/	/	/
Average peak area value (Y)	7.67	419.78	
% deviation from average ($\%D_{avg}$)	< 5%	< 5%	
Calculated concentration (C_s)			

$$C_{std} \text{ or } C_s = \frac{(Y - b)}{m} \qquad \%D_{avg} = \left| \frac{A_1 - Y}{Y} \right| \times 100\% \qquad \%D_{act} = \frac{C_{std} - C_{act}}{Y} \times 100\%$$

ANALYSIS OF METHOD 18 FIELD SAMPLES

Date: _____ Analyst: _____ Plant: _____
Location: _____ Sample Type: _____
Type of Calibration Standard: _____ Target Compound: _____
Number of Standards: ___ Date Prepared: _____ Prepared By: _____

GC Used: _____ Column Used: _____
Carrier Gas Used: _____ Carrier Gas Flow Rate: _____
Column Temperatures, Initial: _____ Program Rate: _____ Final: _____
Sample Loop Volume: ___ Loop Temperature: _____ Inject. Port Temp.: _____
Detector Temp.: ___ Auxiliary Gases: _____

Calibration Data Ethyl Benzene First analysis/second analysis	Standard 1	Standard 2	Standard 3
Standard concentration (C_{act})	.98	11.2	
Flow rate through loop (ml/min)	/	/	/
Liquid injection volume (tubes)	/	/	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	/	/	/
Detector attenuation	/	/	/
Peak retention time (min)	5.8 /	5.8 /	/
Peak retention time range (min)	5.5		
Peak area	9.53/9.91	579.76/562.37	/
Peak area x attenuation factor	/	/	/
Average peak area value (Y)	9.72	571.07	
Percent deviation from average	<5%	<5%	
Calculated concentration (C_{std})	9.7	571.0	
% deviation from actual ($\%D_{act}$)			
Linear regression equation: slope (m): 54.93		y-intercept (b): -44.11	

Sample Analysis Data First analysis/second analysis	Sample 1	Sample 2	Sample 3
Sample identification	.98	11.2	
Interface dilution factor			
Flow rate through loop (ml/min)	500 / 500	500 / 500	/
Liquid injection volume (tubes)	NA /	NA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	NA /	NA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	5.8 / 5.8	5.8 / 5.8	/
Peak retention time range (min)	5.8	5.8	
Peak area	10.55/ 10.23	579.94/562.66	/
Peak area x atten. factor (A_1/A_2)	/	/	/
Average peak area value (Y)	10.39	571.30	
% deviation from average ($\%D_{avg}$)	<5%	<5%	
Calculated concentration (C_s)			

$$C_{std} \text{ or } C_s = \frac{(Y - b)}{m} \qquad \%D_{avg} = \left| \frac{A_1 - Y}{Y} \right| \times 100\% \qquad \%D_{act} = \frac{C_{std} - C_{act}}{Y} \times 100\%$$

ANALYSIS OF METHOD 18 FIELD SAMPLES

Date: _____ Analyst: _____ Plant: _____
Location: _____ Sample Type: _____
Type of Calibration Standard: _____ Target Compound: _____
Number of Standards: ___ Date Prepared: _____ Prepared By: _____

GC Used: _____ Column Used: _____
Carrier Gas Used: _____ Carrier Gas Flow Rate: _____
Column Temperatures, Initial: _____ Program Rate: _____ Final: _____
Sample Loop Volume: ___ Loop Temperature: _____ Inject. Port Temp.: _____
Detector Temp.: ___ Auxiliary Gases: _____

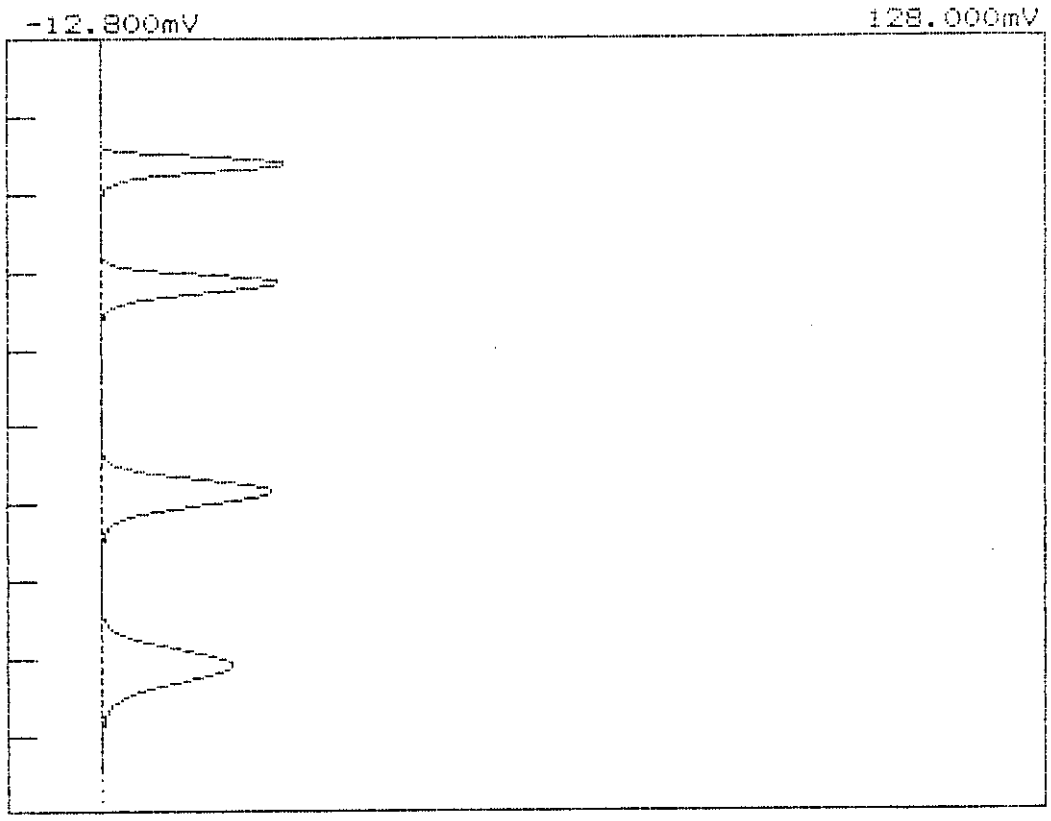
Calibration Data Xylene First analysis/second analysis	Standard 1	Standard 2	Standard 3
Standard concentration (C_{act})	1.01	10.9	
Flow rate through loop (ml/min)	500 / 500	500 / 500	/
Liquid injection volume (tubes)	NA /	NA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	NA /	NA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	8.3 / 8.3	8.3 / 8.3	/
Peak retention time range (min)	8.3	8.3	
Peak area	9.23 / 8.89	566.99 / 552.70	/
Peak area x attenuation factor	/	/	/
Average peak area value (Y)	9.06	559.83	
Percent deviation from average	<5%	<5%	
Calculated concentration (C_{std})			
% deviation from actual ($\%D_{act}$)			

Linear regression equation; slope (m): 55.69 y-intercept (b): -47.19

Sample Analysis Data First analysis/second analysis	Sample 1	Sample 2	Sample 3
Sample identification	1.01	10.9	
Interface dilution factor	NA	NA	
Flow rate through loop (ml/min)	500 / 500	500 / 500	/
Liquid injection volume (tubes)	NA /	NA /	/
Injection time (24-hr clock)	/	/	/
Chart speed (cm/min)	NA /	NA /	/
Detector attenuation	32 / 32	32 / 32	/
Peak retention time (min)	8.3 / 8.3	8.3 / 8.3	/
Peak retention time range (min)	8.3	8.3	
Peak area	9.74 / 9.29	566.93 / 556.14	/
Peak area x atten. factor (A_1/A_2)	/	/	/
Average peak area value (Y)	9.52	561.54	
% deviation from average ($\%D_{avg}$)	<5%	<5%	
Calculated concentration (C_s)			

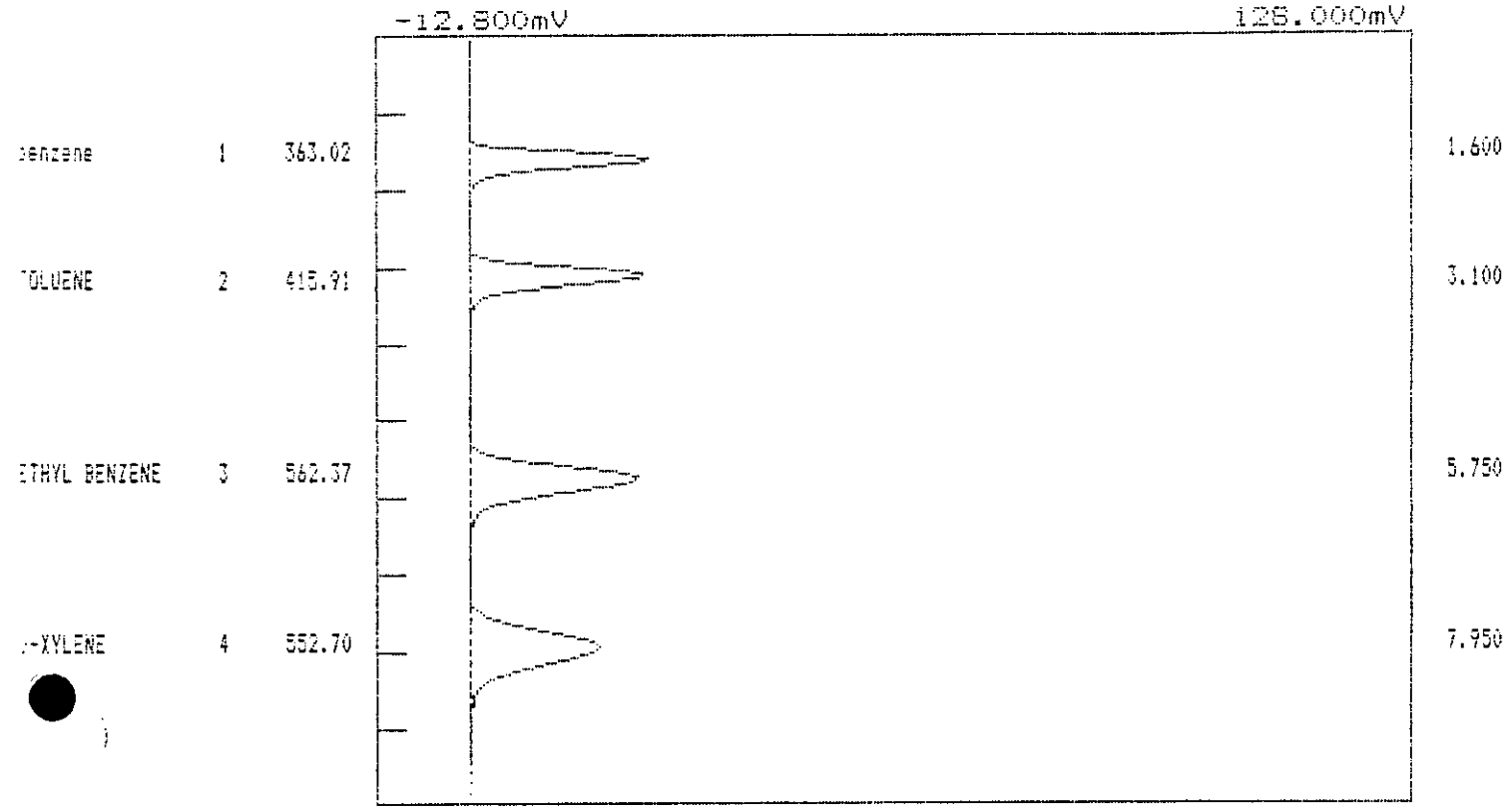
$$C_{std} \text{ or } C_s = \frac{(Y - b)}{m} \qquad \%D_{avg} = \left| \frac{A_1 - Y}{Y} \right| \times 100\% \qquad \%D_{act} = \frac{C_{std} - C_{act}}{Y} \times 100\%$$

Operator : DALE SAWYER
Instrument : Instrument 1
File : pcal8.CHR
emperature : NAPA.TEM
Components : NAPA.CPT



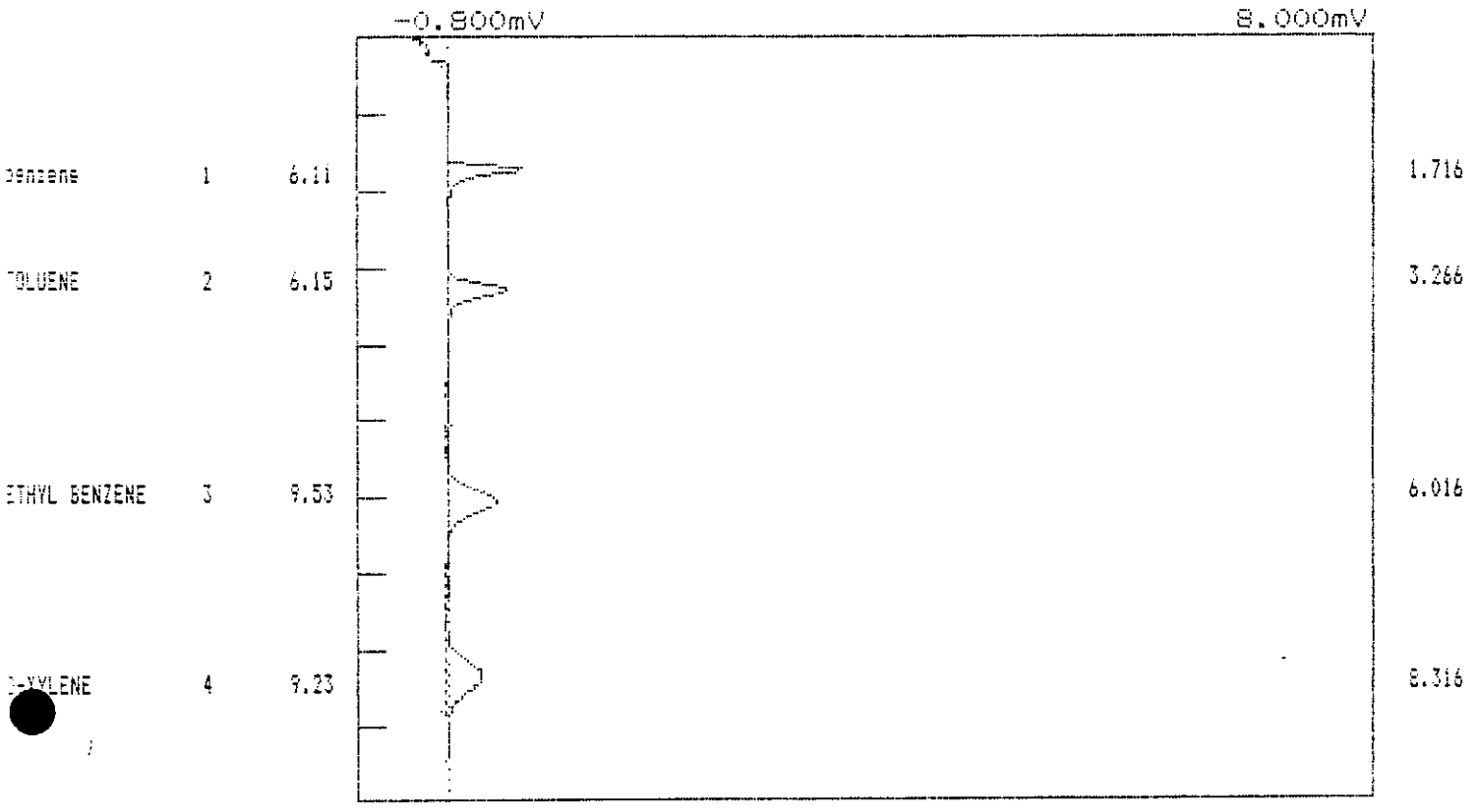
Component	Number	Retention	Height	Area	Area %	External	Units
enzene	1	1.616	25.072	363.04	18.83	N/A	
OLUENE	2	3.150	24.099	418.04	21.68	N/A	
THYL BENZENE	3	5.833	33.197	579.76	30.07	N/A	
-XYLENE	4	8.083	17.680	566.95	29.41	N/A	
4				1927.79	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca10.CHR
Temperature :
Components :



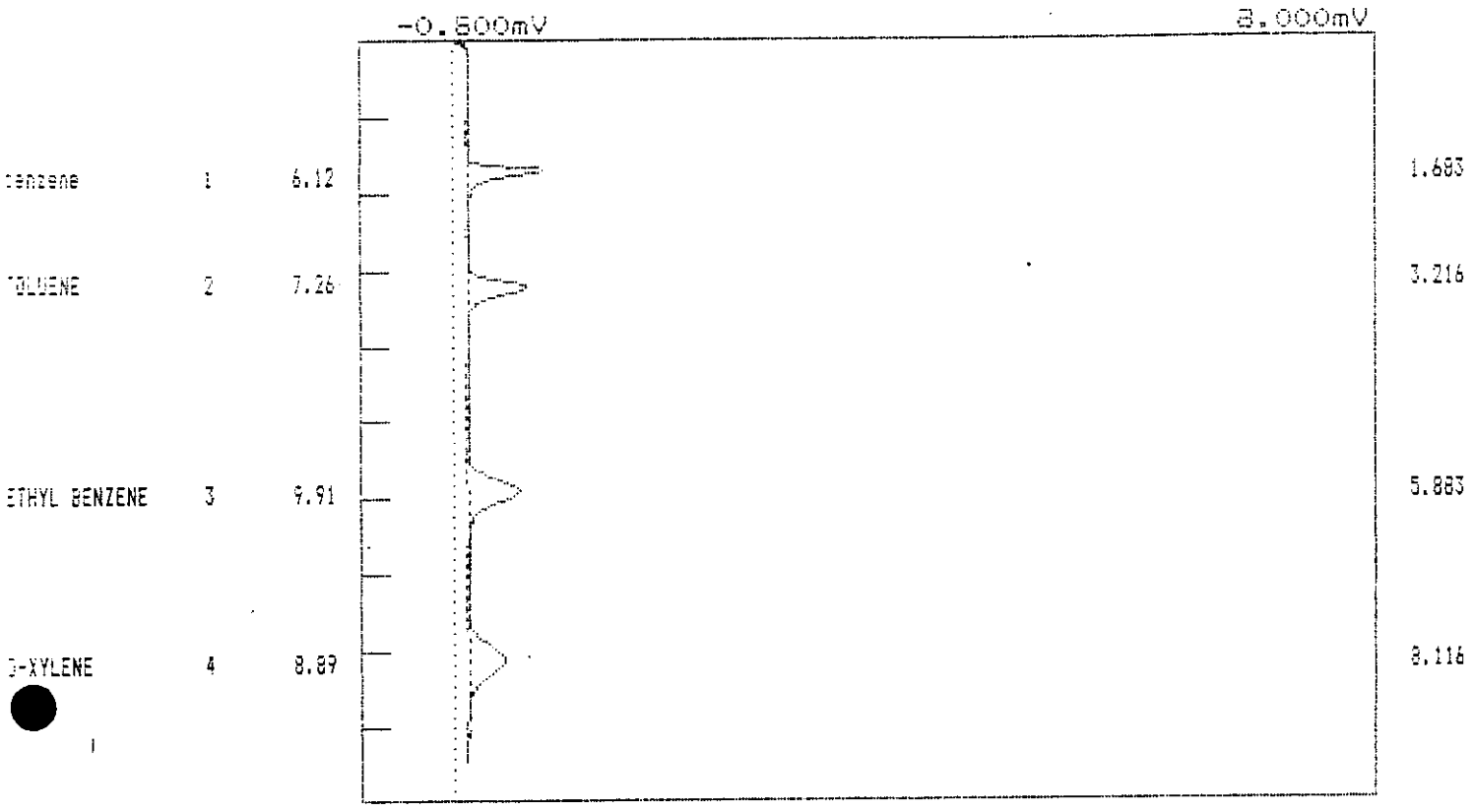
Component	Number	Retention	Height	Area	Area %	External	Units
benzene	1	1.600	24.512	363.02	19.17	N/A	
TOLUENE	2	3.100	23.801	415.91	21.96	N/A	
ETHYL BENZENE	3	5.750	32.972	562.37	29.69	N/A	
-XYLENE	4	7.950	17.564	552.70	29.18	N/A	
4				1893.99	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca18.CHR
Temperature :
Components :



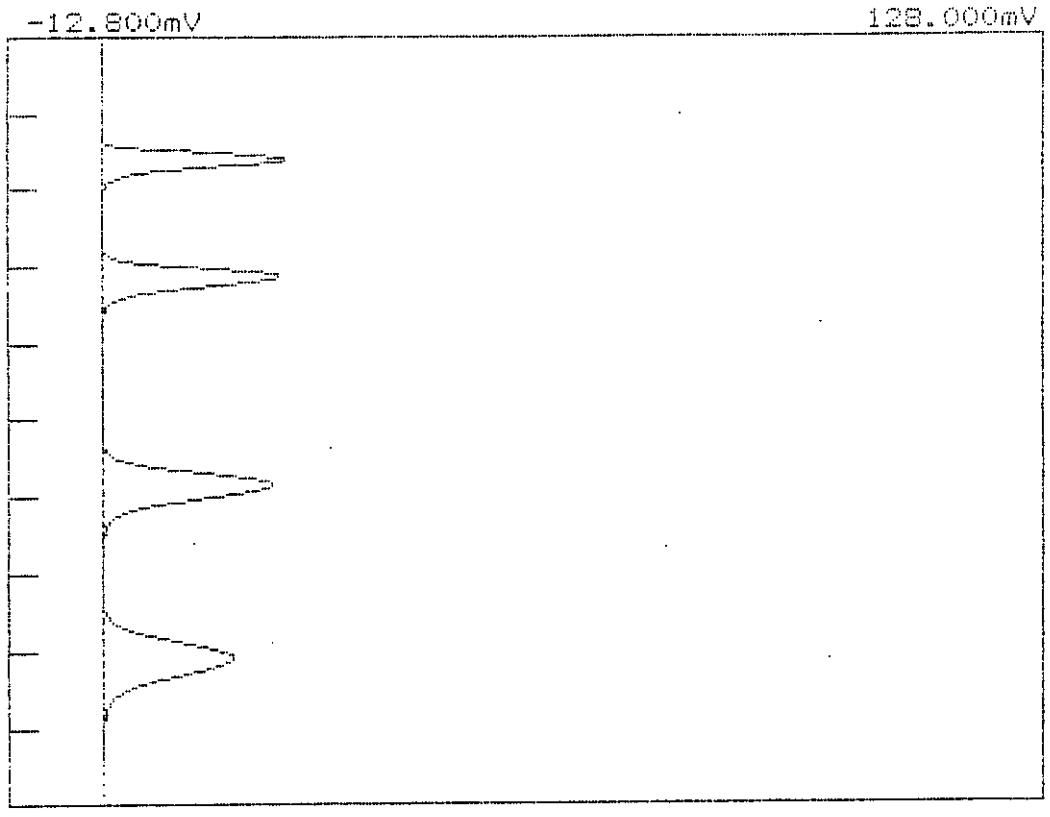
Component	Number	Retention	Height	Area	Area %	External	Units
benzene	1	1.716	0.650	6.11	19.70	N/A	
TOLUENE	2	3.266	0.487	6.15	19.83	N/A	
ETHYL BENZENE	3	6.016	0.416	9.53	30.71	N/A	
O-XYLENE	4	8.316	0.305	9.23	29.76	N/A	
4				31.02	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca22.CHR
emperature :
Components :



Component	Number	Retention	Height	Area	Area %	External	Units
enzene	1	1.683	0.653	6.12	19.02	N/A	
OLUENE	2	3.216	0.516	7.26	22.56	N/A	
THYL BENZENE	3	5.883	0.441	9.91	30.79	N/A	
-XYLENE	4	8.116	0.314	8.89	27.64	N/A	
4				32.19	100.00	N/A	

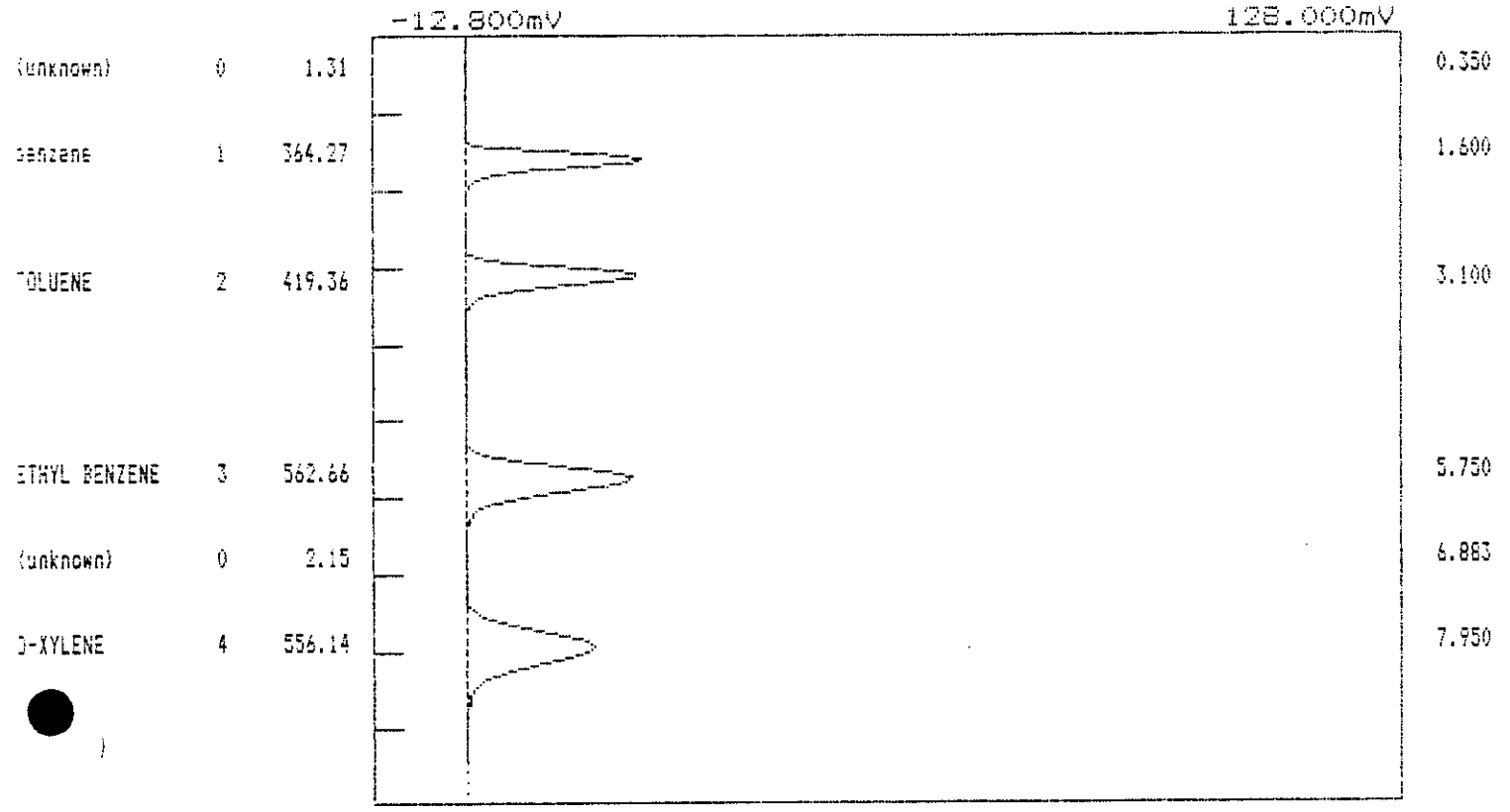
Operator : RAMCON
Instrument : Instrument 1
File : PREMCAL8.CHR
Temperature : NAPA.TEM
Components : NAPA.CPT



unknown) 0 3.27
benzene 1 363.04
unknown) 0 2.21
OLUENE 2 420.19
ETHYL BENZENE 3 579.94
unknown) 0 1.27
-XYLENE 4 566.93

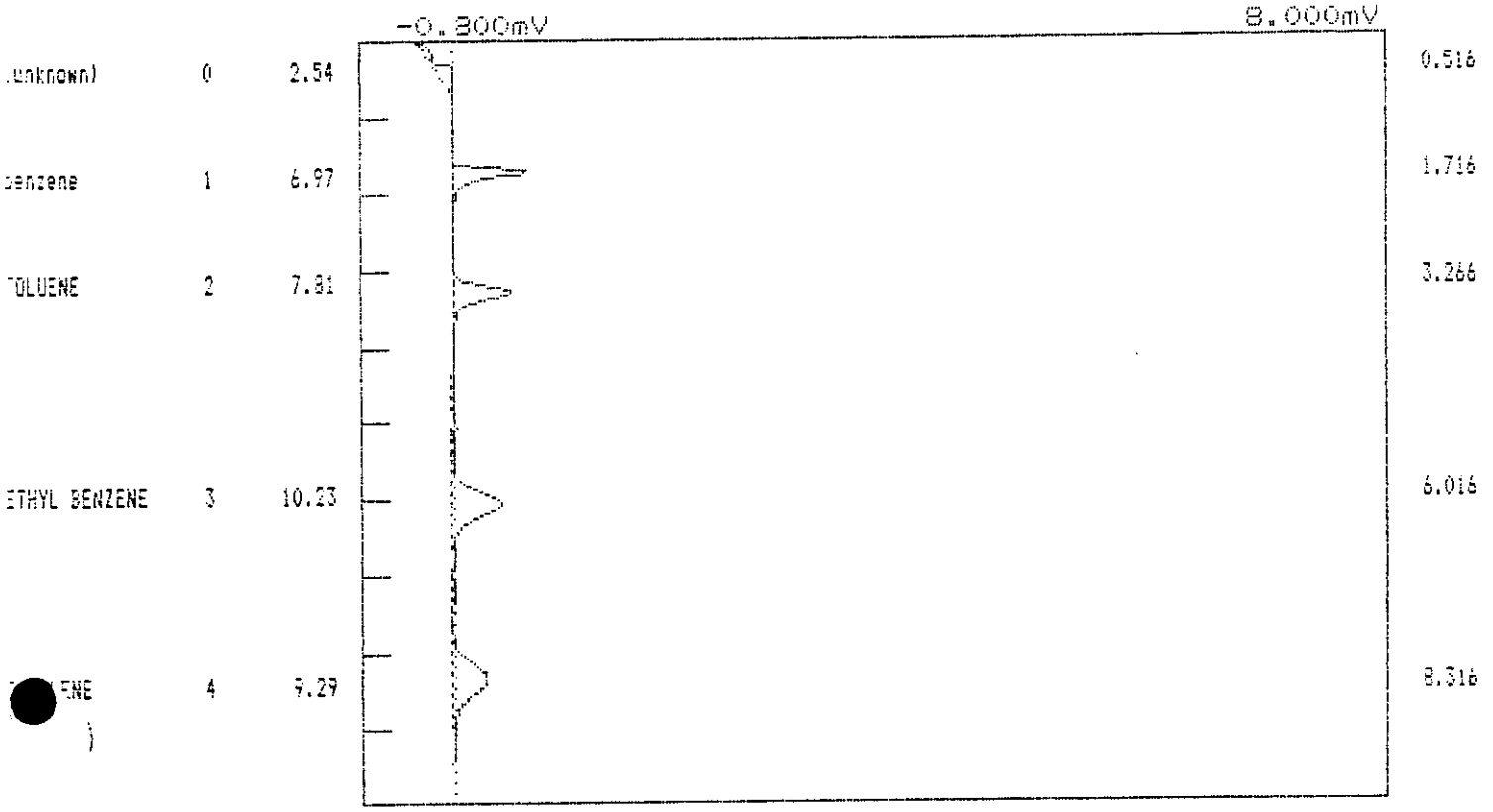
Component	Number	Retention	Height	Area	Area %	External	Units
benzene	1	1.616	25.072	363.04	18.74	N/A	
TOLUENE	2	3.150	24.114	420.19	21.67	N/A	
ETHYL BENZENE	3	5.833	23.198	579.94	29.94	N/A	
O-XYLENE	4	8.083	17.679	566.93	29.27	N/A	
4				1930.10	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA10.CHR
Temperature :
Components :



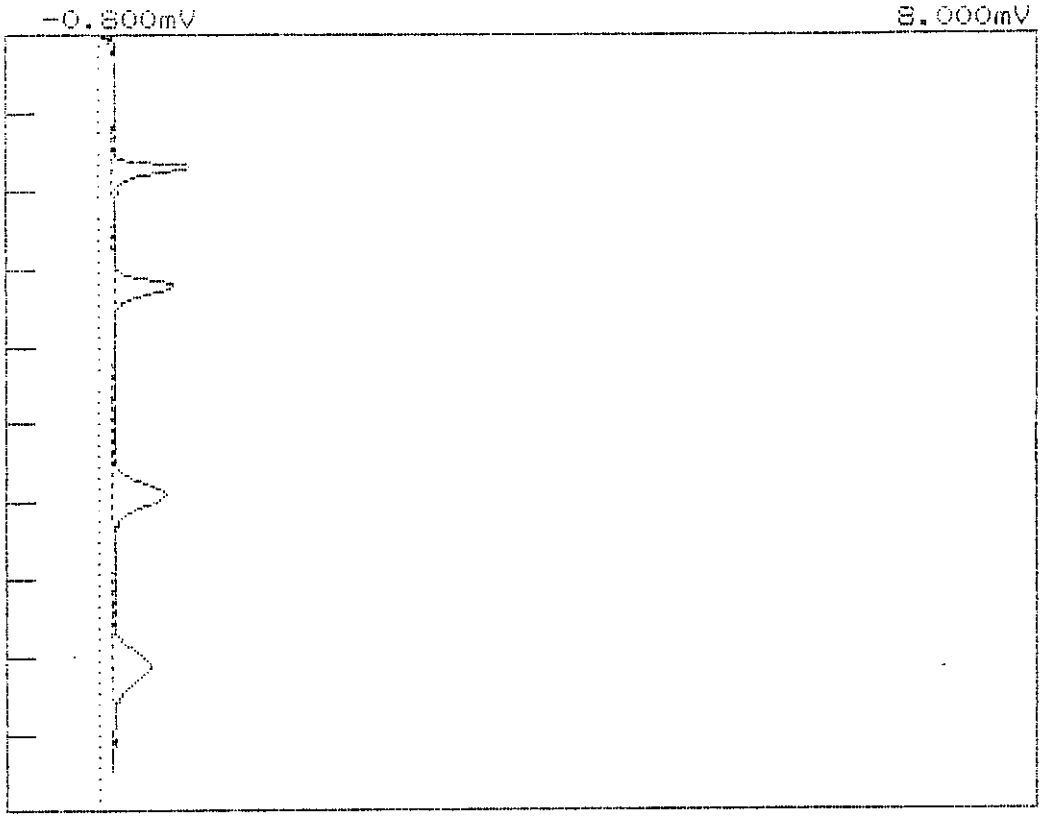
Component	Number	Retention	Height	Area	Area %	External	Units
benzene	1	1.600	24.525	364.27	19.11	N/A	
TOLUENE	2	3.100	23.826	419.36	22.00	N/A	
ETHYL BENZENE	3	5.750	22.974	562.66	29.52	N/A	
O-XYLENE	4	7.950	17.385	556.14	29.18	N/A	
4				1902.43	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA18.CHR
Temperature :
Components :



Component	Number	Retention	Height	Area	Area %	External	Units
benzene	1	1.716	0.660	6.97	18.91	N/A	
TOLUENE	2	3.266	0.510	7.81	21.19	N/A	
ETHYL BENZENE	3	6.016	0.425	10.23	27.77	N/A	
O-XYLENE	4	8.316	0.305	9.29	25.22	N/A	
4				34.31	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA22.CHR
Temperature :
Components :



Benzene	1	7.03	
TOLUENE	2	7.52	
ETHYL BENZENE	3	10.55	
P-XYLENE	4	9.74	

Component	Number	Retention	Height	Area	Area %	External	Units
Benzene	1	1.663	0.666	7.03	20.16	N/A	
TOLUENE	2	3.216	0.520	7.52	21.58	N/A	
ETHYL BENZENE	3	5.883	0.444	10.55	30.29	N/A	
P-XYLENE	4	8.116	0.326	9.74	27.97	N/A	
4				34.84	100.00	N/A	

ANALYSIS OF METHOD 18 FIELD SAMPLES

Date: 9-1-92 Analyst: DS Plant: Fred Weber
Location: St Louis, Missouri Sample Type: Gas
Type of Calibration Standard: cylinder Target Compound: Methane, BTEX
Number of Standards: 3 Date Prepared: _____ Prepared By: _____

GC Used: SRI Column Used: 5% SP-1200/1.75% Bentone 34 10/120 supelcoport
Carrier Gas Used: N_2 Carrier Gas Flow Rate: 30 ml/min
Column Temperatures, Initial: 75 Program Rate: _____ Final: 75
Sample Loop Volume: 1cc Loop Temperature: 75 Inject. Port Temp.: _____
Detector Temp.: ___ Auxiliary Gases: _____

9-1-92 Calibration Data (Gte) Methane First analysis/second analysis	Standard 1	Standard 2	Standard 3
Standard concentration (C_{act})	303	495	765
Flow rate through loop (ml/min)	500/500	500/500	500/500
Liquid injection volume (tubes)	NA/	NA/	NA/
Injection time (24-hr clock)	/_____	/_____	/_____
Chart speed (cm/min)	NA/	NA/	NA/
Detector attenuation	32/32	32/32	32/32
Peak retention time (min)	.46/.46	.46/.46	.46/.46
Peak retention time range (min)	.46	.46	.46
Peak area	326.94/338.85	553.46/538.95	891.9/879.10
Peak area x attenuation factor	/_____	/_____	/_____
Average peak area value (Y)	332.91	546.20	885.5
Percent deviation from average	<5%	<5%	<5%
Calculated concentration (C_{std})	308.3	485.9	768.79
% deviation from actual ($\%D_{act}$)	1.6	-1.6	.42
Linear regression equation: slope (m): 1.2	y-intercept (b): -37.01		

9-4-92 ~~Sample Analysis Data~~ Post calibrations Methane First analysis/second analysis	Sample 1	Sample 2	Sample 3
Sample identification	303	495	765
Interface dilution factor	_____	_____	_____
Flow rate through loop (ml/min)	500/500	500/500	500/500
Liquid injection volume (tubes)	NA/	NA/	NA/
Injection time (24-hr clock)	/_____	/_____	/_____
Chart speed (cm/min)	NA/	NA/	NA/
Detector attenuation	32/32	32/32	32/32
Peak retention time (min)	.46/.46	.46/.46	.46/.46
Peak retention time range (min)	.46	.46	.46
Peak area	327.69/339.40	553.9/540.47	893.2/880.53
Peak area x atten. factor (A_1/A_2)	/_____	/_____	/_____
Average peak area value (Y)	333.54	547.18	886.86
% deviation from average ($\%D_{avg}$)	<5%	<5%	<5%
Calculated concentration (C_s)	_____	_____	_____

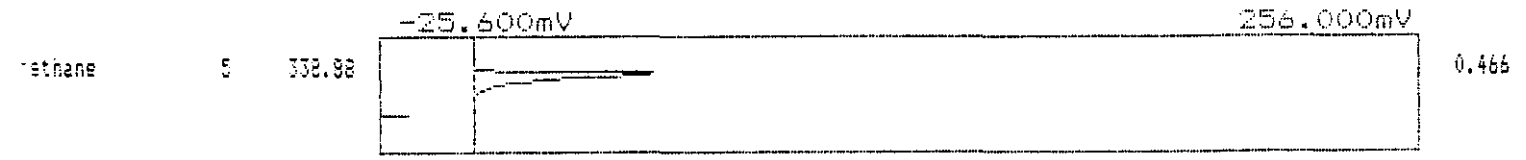
$$C_{std} \text{ or } C_s = \frac{(Y - b)}{m} \qquad \%D_{avg} = \left| \frac{A_1 - Y}{Y} \right| \times 100\% \qquad \%D_{act} = \frac{C_{std} - C_{act}}{Y} \times 100\%$$

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca53.CHR
Temperature :
Components :

ethane 5 326.94

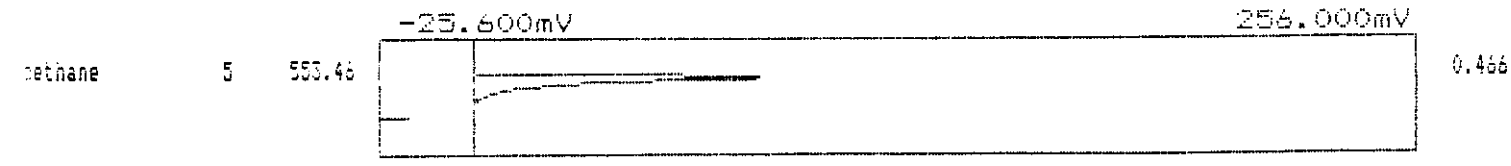
Component	Number	Retention	Height	Area	Area %	External	Units
ethane	5	0.466	50.424	325.94	100.00	N/A	
1				326.94	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca54.CHR
Temperature :
Components :



Component	Number	Retention	Height	Area	Area %	External	Units
ethane	5	0.466	50.266	338.88	100.00	N/A	
1				338.88	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca55.CHR
emperature :
Components :

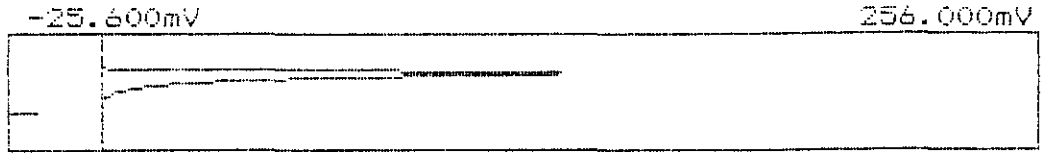


Component	Number	Retention	Height	Area	Area %	External	Units
ethane	5	0.466	81.441	553.46	100.00	N/A	
1				553.46	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca56.CHR
Temperature :
Components :

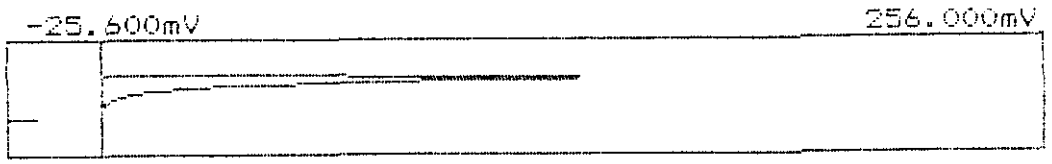
Component	Number	Retention	Height	Area	Area %	External	Units
methane	5	0.466	84.531	538.95	100.00	N/A	
1				538.95	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : pca57.CHR
Temperature :
Components :



Component	Number	Retention	Height	Area	Area %	External	Units
methane	5	0.466	130.883	891.90	100.00	N/A	
1				891.90	100.00	N/A	

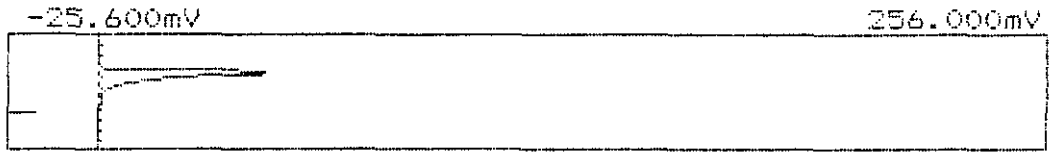
Operator : DALE SAWYER
Instrument : Instrument 1
File : pca58.CHR
Temperature :
Components :



ethane 5 879.10

Component	Number	Retention	Height	Area	Area %	External	Units
ethane	5	0.483	133.000	879.10	100.00	N/A	
1				879.10	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA53.CHR
Temperature :
Components :



Component	Number	Retention	Height	Area	Area %	External	Units
METHANE	5	0.466	50.428	327.69	100.00	N/A	
1				327.69	100.00	N/A	

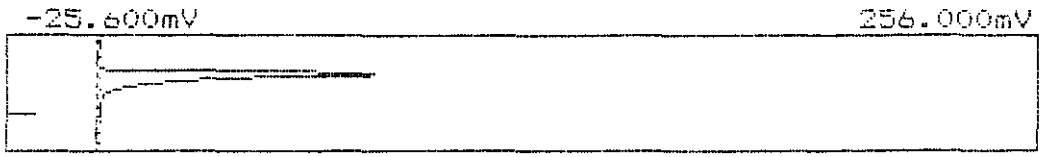
Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA54.CHR
Temperature :
Components :

Component	Number	Retention	Height	Area	Area %	External	Units
METHANE	5	0.466	50.273	339.40	100.00	N/A	
1				339.40	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA55.CHR
Temperature :
Component's :

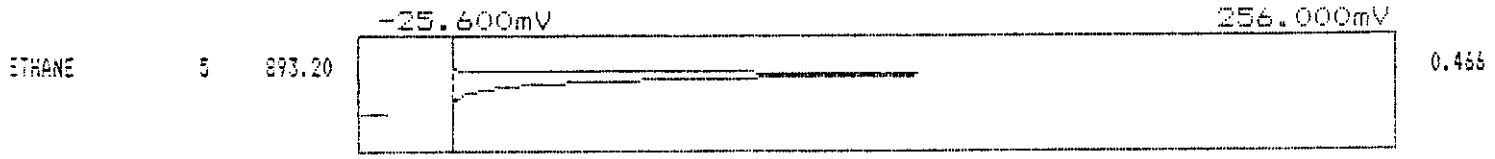
Component	Number	Retention	Height	Area	Area %	External	Units
METHANE	5	0.466	81.445	553.90	100.00	N/A	
1				553.90	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA56.CHR
Temperature :
Components :



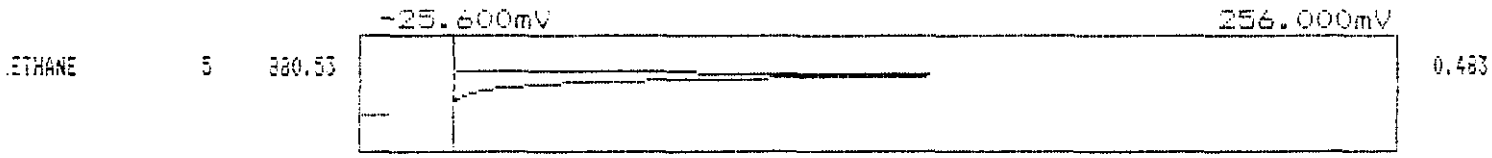
Component	Number	Retention	Height	Area	Area %	External	Units
METHANE	5	0.466	84.540	540.47	100.00	N/A	
1				540.47	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA57.CHR
Temperature :
Components :



Component	Number	Retention	Height	Area	Area %	External	Units
ETHANE	5	0.466	130.889	893.20	100.00	N/A	
1				893.20	100.00	N/A	

Operator : DALE SAWYER
Instrument : Instrument 1
File : PREMCA58.CHR
Temperature :
Components :



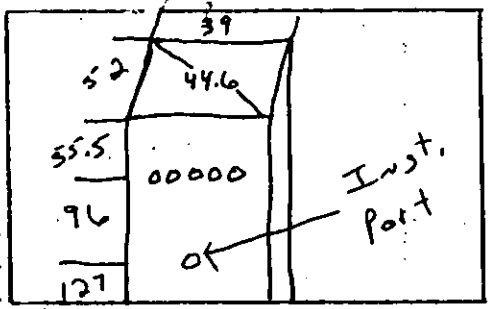
Component	Number	Retention	Height	Area	Area %	External	Units
METHANE	5	0.483	133.006	880.53	100.00	N/A	
1				880.53	100.00	N/A	

RAMCON ENVIRONMENTAL CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 9-1-92
Run No. 1
Sample Box No. 1
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

5/202



	Cont 84 90	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
Ambient Temperature			
Barometric Pressure	30.16 FINAL	538	215.5
Assumed Moisture, %	.22 INITIAL	300	215.5
Probe Length, m(ft)	5' DIFFERENCE	238	0.0

Nozzle Identification No. .0003408
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .016 @ 15"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in. Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	°F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	1210.30 / 1212.30	2	170	.26	.55	890.718 / 891.6	100	97	255	68
2	1214.30	2	180	.24	.5	892.4	101	97	262	67
3	1216.30	2	180	.22	.46	893.3	102	96	266	67
4	1218.30	2	179	.2	.42	894.0	103	96	270	66
5	1220.30	2	178	.3	.63	895.0	104	96	271	66
6	1222.30	2	178	.28	.59	895.9	105	96	263	65
B 1	1224 / 1226	4	179	.5	1.1	897.1	105	97	259	67
2	1228	3	181	.37	.78	898.2	107	97	257	68
3	1230	3	180	.37	.78	899.3	108	97	259	67
4	1232	3	179	.35	.74	900.3	108	97	264	67
5	1234	4	180	.44	.92	901.4	109	97	270	68
6	1236	4	180	.44	.92	902.6	109	98	272	67
C 1	1237.30 / 1239.30	4	177	.54	1.1	903.8	108	98	267	67

236

Form #REC-05

WEBER2

RAMCON emissions test log sheet, cont. DATE 9-1-92 LOCATION St. Louis TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [redacted]	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE [redacted]	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							[redacted]			
2	1241.30	5	179	.7	1.5	905.3	110	98	256	67
3	1243.30	5	179	.67	1.4	906.7	111	98	253	67
4	1245.30	5	178	.69	1.4	908.2	111	98	249	67
5	1247.30	5	178	.7	1.5	909.6	112	98	249	67
6	1249.30	5	177	.72	1.5	911.1	112	98	250	67
D 1	1251.30 / 1253.30	5	176	.68	1.4	912.6	109	99	244	68
2	1255.30	7	177	.9	1.9	914.2	112	99	248	67
3	1257.30	8	177	1.1	2.3	915.9	113	99	251	66
4	1259.30	10	176	1.3	2.7	917.9	113	99	255	66
5	1301.30	8	176	1.0	2.1	919.6	114	100	257	66
6	1303.30	7	176	.85	1.8	921.3	115	100	257	67
E 1	1305 / 1307	5	175	.53	1.1	922.7	111	101	261	66
2	1309	6	177	.82	1.7	924.2	113	101	267	67
3	1311	10	177	1.2	2.5	926.0	114	101	263	67
4	1313	12	177	1.5	3.2	928.0	115	101	254	66
5	1315	11	177	1.3	2.7	930.1	113	101	241	67
6	1317	10	176	1.1	2.3	932.009	114	101	233	67
				.7923						

RAMCON ENVIRONM[illegible]L CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 4-2-92
Run No. 2
Sample Box No. 1
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

5/202

		IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
Ambient Temperature	70		
Barometric Pressure	30.09 FINAL	535	1927
Assumed Moisture, %	.22 INITIAL	300	1902
Probe Length, m(ft)	5' DIFFERENCE	235	2.5
Nozzle Identification No.	.0003408		
Avg. Calibrated Nozzle Dia., (in.)	.250/.250/.250		
Probe Heater Setting	4		
Leak Rate, m^3/min. (cfm)	.013 @ 9"		
Probe Liner Material	Pyrex		
Static Pressure, mm Hg (in.Hg)	+.15		
Filter No.			

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	1101.30/1103.30	2	178	.33	.67	937.336/938.3	88	86	252	68
2	1105.30	2	179	.3	.61	939.3	90	86	260	64
3	1107.30	2	181	.25	.51	940.1	91	85	267	65
4	1109.30	2	181	.25	.51	941.0	92	85	270	65
5	1111.30	2	180	.24	.49	941.9	93	85	267	66
6	1113.30	2	180	.27	.56	943.0	94	85	254	67
B 1	1115/1117	4	179	.49	1.0	944.3	96	86	242	68
2	1119	3	180	.46	.95	945.3	97	86	244	66
Plant Down No Trucks 3	1128/1130	3	187	.4	.82	946.4	91	89	261	66
4	1132	2	169	.27	.56	947.3	95	88	257	67
5	1134	3	174	.33	.68	948.4	96	87	252	67
6	1136	2	176	.28	.58	949.4	97	87	246	66
C 1	1138/1140	5	176	.71	1.5	950.8	97	88	248	67

238

WBBER2

Form #REC-05

RAMCON emissions test log sheet, cont. DATE 9-2-92 LOCATION St. Louis TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s ($in.H_2O$)	ORFICE DIFF. PRESSURE ΔH ($in.H_2O$)	GAS VOLUME V_m ($ft.^3$)	GAS SAMPLE TEMP.(°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		
2	1142	5	171	.74	1.5	952.3	99	89	254	65
3	1144	4	179	.55	1.1	953.5	100	99	257	66
Plant Down No Trucks 4	1211 / 1213	5	167	.74	1.5	955.0	93	91	270	68
5	1215	4	169	.55	1.1	956.3	96	90	264	68
6	1217	4	169	.53	1.1	957.6	99	90	260	67
D 1	1219 / 1220	4	169	.68	1.4	958.9	98	90	254	67
2	1222	5	170	.79	1.6	960.4	100	90	254	68
3	1224	8	170	1.1	2.3	962.1	102	90	251	67
4	1226	8	172	.95	2.0	963.8	103	90	248	67
5	1228	7	176	.9	1.9	965.5	103	90	248	66
6	1230	6	176	.8	1.6	967.1	103	90	254	67
E 1	1231.30 / 1233	4	175	.55	1.1	968.4	101	91	251	67
2	1235.30	5	175	.75	1.5	969.8	102	91	248	67
3	1237.30	7	175	1.0	2.1	971.6	103	91	244	68
Plant Down No Trucks 4	1354.30 / 1356.30	5	135	.7	1.4	973.0	91	90	250	68
5	1358.30	8	145	.9	1.9	974.7	95	90	248	67
6	1400.30	7	146	.8	1.6	976.261	97	90	244	63

RAMCON ENVIRONMENTAL CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 9-2-92
Run No. 3
Sample Box No. 2
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

5/202

Ambient Temperature 80
Barometric Pressure 30.09
Assumed Moisture, % 12.3
Probe Length, m(ft) 5'
Nozzle Identification No. .0003408
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.256
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .013 @ 15"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in.Hg) +.15
Filter No.

	IMPING VOLUME ml	SILICA GEL WEIGHT g
FINAL	322	179.5
INITIAL	300	179.5
DIFFERENCE	22	0.0

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts)	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	1514/1518	4	138	.35	.74	976.959/978.0	92	91	255	68
2	1520	5	139	.74	1.6	979.8	98	91	255	67
3	1522/1524	4	148	.25	.5	980.6	97	91	251	67
4	1526	4	148	.2	.4	981.525	100	92	248	67
5										

242

WEBER2

Form #REC-05

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 9-2-92 LOCATION St Louis TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		

RAMCON ENVIRONMENTAL CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator Gilchrist
Date 9-3-92
Run No. 1
Sample Box No. 2
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

PAH

		IMPIN. VOLUME ml	SILICA GEL WEIGHT g
Ambient Temperature 85			
Barometric Pressure 30.09	FINAL	404	210.0
Assumed Moisture, % 23	INITIAL	200	210.0
Probe Length, m(ft) 5'	DIFFERENCE	204	0.0

Nozzle Identification No. .0003409
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .018 @ 15"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in. Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in. H2O	PRESSURE DIFF. ORF. MTR in. H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	1314.30/1317.30	7	179	.3	.63	146.139/147.6	99	97	259	68
2	1320.30	6	187	.28	.58	149.0	102	97	257	68
3	1323.30	6	189	.26	.54	150.3	104	97	254	68
4	1326.30	6	189	.26	.54	151.7	105	96	252	67
5	1329.30	7	189	.33	.69	153.2	106	96	255	67
6	1332.30	6	189	.29	.6	154.7	107	96	255	68
B 1	1334/1337	9	190	.45	.94	156.4	104	96	257	68
2	1340	9	191	.43	.9	158.2	107	96	256	67
3	1343	9	191	.43	.9	159.9	107	97	256	67
4	1346	9	190	.46	.96	161.8	108	97	256	67
5	1349	10	190	.5	1.0	163.6	109	97	254	68
6	1352	10	189	.51	1.0	165.5	109	97	251	68
C 1	1353.30/1356.39	11	190	.66	1.3	167.4	108	99	253	68

241

Form #REC-05

WEBER3

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 9-3-92 LOCATION St. Louis TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME Vm (ft^3)	GAS SAMPLE TEMP. (°F) In	GAS SAMPLE TEMP. (°F) Out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	1359.30	13	190	.75	1.5	169.9	110	99	251	68
3	1402.30	13	190	.75	1.5	172.2	111	99	251	67
4	1405.30	13	190	.8	1.6	174.4	111	100	251	67
5	1408.30	14	190	.85	1.7	176.8	111	100	250	68
6	1411.30	14	191	.86	1.8	179.2	112	100	249	67
D 1	1413/1416	14	190	.89	1.8	181.798	110	101	253	67
2										
3										
4										
5										
6										
E 1										
2										
3										
4										
5										
6										

Short Due to Plant shut-down

242

RAMCON ENVIRONMENTAL CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 9-4-92
Run No. 2
Sample Box No. 1
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

PAH

Ambient Temperature 70
Barometric Pressure 30.09
Assumed Moisture, % .23
Probe Length, m(ft) 5'

	IMPN. VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	590	196.5
INITIAL	200	196.5
DIFFERENCE	390	0.0

Nozzle Identification No. .0003408
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .023 @ 17"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in. Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	0709.30 / 0712.30	8	169	.66	1.3	182.325 / 184.3	72	71	252	68
2	0715.30	12	174	.99	2.0	186.8	77	71	250	60
3	0718.30	15	178	1.3	2.6	189.8	80	71	254	55
4	0721.30	16	179	1.5	3.0	192.7	81	71	260	56
5	0724.30	16	181	1.5	3.0	195.7	81	72	260	56
6	0727.30	16	182	1.5	3.0	198.6	82	72	263	58
B 1	0730.30 / 0733.30	9	180	.73	1.4	200.9	78	73	269	63
2	0736.30	12	184	1.1	2.2	203.5	85	73	266	62
3	0739.30	14	184	1.2	2.4	206.2	88	75	263	61
4	0742.30	15	185	1.4	2.8	209.2	89	76	259	61
5	0745.30	15	183	1.3	2.4	212.1	88	76	260	60
6	0748.30	14	181	1.3	2.6	214.9	89	76	259	59
C 1	0753 / 0756	9	174	.6	1.2	216.9	85	79	260	65

243

Form #REC-05

WEBER3

RAMCON emissions test log sheet, cont. DATE 9-4-92 LOCATION Stacks TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [redacted]	VELOCITY HEAD [redacted]	ORFICE DIFF. PRESSURE [redacted]	GAS VOLUME Vm (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							[redacted]			
2	0759	10	179	.7	1.4	219.1	89	79	266	61
3	0802	10	180	.69	1.4	221.2	90	78	267	61
4	0805	10	179	.66	1.3	223.3	91	78	261	62
5	0808	10	180	.6	1.2	225.5	92	78	257	61
6	0811	11	182	.85	1.7	227.7	93	79	254	61
D 1	0813 / 0816	8	179	.45	.89	229.4	89	80	251	65
2	0819	7	183	.4	.79	231.1	92	80	260	64
3	0822	7	183	.4	.79	232.8	92	80	264	63
4	0825	7	182	.39	.77	234.3	93	80	266	62
5	0828	7	182	.4	.79	235.9	93	80	267	63
6	0831	8	182	.44	.87	237.6	93	80	254	62
E 1	0832.30 / 0835.30	7	180	.3	.59	238.9	89	80	254	66
2	0838.30	7	180	.27	.53	240.1	92	81	251	65
3	0841.30	6	181	.25	.49	241.5	93	81	261	66
4	0844.30	6	181	.23	.46	242.8	93	82	268	67
5	0847.30	6	179	.24	.48	244.1	93	82	260	66
6	0850.30	6	178	.23	.46	245.256	94	83	252	66

RAMCON ENVIRONM[illegible]L CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 9-4-92
Run No. 3
Sample Box No. 3
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

PAH

			IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
Ambient Temperature	80			
Barometric Pressure	30.09	FINAL	625	2450
Assumed Moisture, %	1.23	INITIAL	200	2450
Probe Length, m(ft)	5'	DIFFERENCE	425	0.0

Nozzle Identification No. .00 03 40 8
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .016 @ 16"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in.Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) in. H2O	PRESSURE DIFF. ORF. MTR in. H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	1204.30 / 1211.30	6	219	.64	1.3	25[illegible] / 260.4	97	98	245	68
2	1215.30 / 1218.30	10	214	.95	1.9	262.8	100	98	267	68
3	1220.30	16	214	1.4	2.8	266.3	107	98	258	66
4	1224.30	16	214	1.8	3.7/3.1	269.8	108	98	241	65
5	1229.30	16	213	1.7	3.4/3.1	272.3	108	98	226	65
6	1230.20	16	210	1.8	3.7/3.1	275.4	107	98	231	64
B 1	1232 / 1235	9	202	.73	1.4	277.5	105	98	243	68
2	1238	12	201	1.1	2.2	280.2	109	98	254	67
3	1241	13	195	1.1	2.4	283.0	111	99	261	66
4	1244	16	193	1.7	3.4/3.0	286.1	112	99	252	64
5	1247	15	192	1.4	2.8	289.2	110	99	241	64
6	1250	16	190	1.5	3.0	292.4	110	99	238	65
C 1	1251 / 1254	9	190	.68	1.3	294.4	108	99	247	68

245

1 ICRCP 3

RAMCON emissions test log sheet, cont. DATE 9-4-92 LOCATION St. Louis TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP (°F)	VELOCITY HEAD ΔP_s (in H_2O)	ORFICE DIFF. PRESSURE ΔH (in H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		
2	1257	9	192	.74	1.5	296.6	112	100	253	68
3	1300	9	192	.76	1.5	298.9	113	100	253	67
4	1303	9	191	.77	1.5	301.1	113	100	255	68
5	1306	13	192	1.1	2.2	303.8	114	100	260	67
6	1309	12	193	1.0	2.0	306.5	114	100	262	66
D 1	1310.30 / 1313.30	7	192	.45	.89	308.2	109	100	261	68
2	1316.30	6	194	.35	.70	309.8	112	101	248	67
3	1319.30	8	196	.47	.93	311.5	112	101	248	68
4	1322.30	8	195	.5	.99	313.4	114	101	247	68
5	1325.30	9	195	.6	1.2	315.4	114	101	248	67
6	1328.30	9	194	.58	1.1	317.4	114	101	241	67
E 1	1330 / 1333	6	189	.27	.53	319.0	114	101	239	68
2	1336	7	192	.35	.69	320.4	114	101	246	68
3	1339	6	192	.25	.49	321.7	113	101	245	67
4	1342	6	191	.25	.49	322.9	112	101	254	67
5	1345	6	190	.25	.49	324.2	112	101	259	67
6	1348	6	190	.25	.49	325.427	112	101	262	68

RAMCON ENVIRONMENTAL CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 9-3-92
Run No. 1
Sample Box No. 1
Meter Box No. C-100
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

Formaldehyde

		IMPIN VOLUME ml	SILICA GEL WEIGHT g
Ambient Temperature 70			
Barometric Pressure 30.09	FINAL	528	220.5
Assumed Moisture, % .23	INITIAL	200	216.0
Probe Length, m(ft) 5'	DIFFERENCE	328	4.5

Nozzle Identification No. .000 3408
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .018 @ 11"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in. Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	0642.30 / 0645	5	150	.3	.63	981.912 / 983.1	77	76	257	68
2	0646.30 / 0649	6	172	.32	.67	984.4	82	77	236	68
3	0651.30	5	174	.25	.53	985.5	85	77	236	68
4	0654	4	175	.22	.46	986.5	87	77	256	68
5	0656.30	5	175	.27	.57	987.6	88	78	270	68
6	0659	8	176	.35	.74	989.0	90	79	262	68
B 1	0701 / 0703.30	9	178	.43	.9	990.3	88	80	245	68
2	0706	10	182	.45	.95	991.8	90	81	252	68
3	0708.30	9	184	.4	.84	993.2	91	80	247	67
4	0711	9	185	.42	.88	994.8	92	81	241	67
5	0713.30	3	187	.5	1.1	996.4	94	81	246	67
6	0716	3	188	.52	1.1	997.9	96	82	251	66
C 1	0717 / 0719.30	3	187	.63	1.3	999.7	95	83	240	67

247

Form #REC-05

WEBER1

RAMCON emissions test log sheet, cont. DATE 9-3-92 LOCATION St. Louis TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [illegible] (°F)	VELOCITY HEAD ΔPs (in H2O)	ORFICE DIFF. PRESSURE ΔH (in H2O)	GAS VOLUME Vm (ft.3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							[illegible]	out		
2	0722	3	189	.7	1.5	001.5	97	83	233	65
3	0724.30	3	188	.71	1.5	003.4	98	83	241	64
4	0727	2	186	.62	1.3	004.7	98	84	270	65
5	0729.30	2	186	.67	1.4	005.9	98	84	269	66
6	0732	3	186	.7	1.5	007.9	98	84	256	66
D 1	0733.30 / 0736	2	178	.35	.74	009.1	96	84	229	68
2	0738.30	4	178	.75	1.6	010.9	98	84	233	68
3	0741	4	175	.8	1.7	012.8	99	84	254	66
4	0743.30	4	174	.84	1.7	014.6	100	85	256	65
5	0746	4	172	.83	1.7	016.8	100	85	247	66
6	0748.30	4	170	.78	1.6	018.8	101	85	233	66
E 1	0750 / 0752.30	3	169	.6	1.3	020.6	97	85	245	68
2	0755	4	170	.73	1.5	022.4	100	85	252	66
3	0757.30	5	170	1.2	2.5	024.8	101	85	248	65
4	0800	6	170	1.3	2.7	027.5	102	85	238	65
5	0802.30	9	172	1.8	3.8	030.1	104	86	233	65
6	0805	9	175	1.5	3.2	033.027	103	86	235	66

RAMCON ENVIRONMF[illegible] CORPORATION

Plant Fred Weber, Inc.

Location St. Louis
Operator C. Hughes
Date 9-3-92
Run No. 2
Sample Box No. 2
Meter Box No. C-60
Meter H @ 1.517
C Factor .991
Pitot Tube Coefficient Cp .84

Formaldehyde

		IMPIN. VOLUME, ml	SILICA GEL WEIGHT, g
Ambient Temperature	70		
Barometric Pressure	30.09 FINAL	585	196.0
Assumed Moisture, %	.23 INITIAL	200	196.0
Probe Length, m(ft)	5' DIFFERENCE	385	0.0

Nozzle Identification No. .0003408
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .005 @ 8"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in. Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) in. H2O	PRESSURE DIFF. ORF. MTR ΔH in. H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	0837.30 / 0840	1	178	.25	.51	033.339 / 034.6	92	89	266	68
2	0842.30	1	188	.3	.63	035.8	95	89	260	68
3	0845	1	~~180~~ 186	.29	.6	036.9	97	87	260	68
4	0847.30	1	185	.25	.51	038.0	98	88	261	68
5	0850	2	184	.35	.74	039.3	98	88	267	68
6	085230	1	182	.3	.63	040.6	99	87	265	68
B 1	0854 / 0856.30	2	181	.5	1.1	042.2	97	87	256	68
2	0859	2	181	.45	.95	043.7	99	87	253	68
3	0901.30	2	181	.45	.95	045.2	100	87	254	68
4	0904	2	181	.42	.88	046.6	100	87	256	67
5	0906.30	2	181	.43	.9	048.1	101	87	257	68
6	0909	2	180	.47	.99	049.6	101	88	259	66
C 1	0910 / 0912.30	2	179	.68	1.4	051.6	100	88	260	67

249

Form #REC-05

WEBER1

Basin #REC-06

RAMCON emissions test log sheet, cont. DATE 9-3-92 LOCATION St. Louis TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [illegible] (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) [illegible]	GAS SAMPLE TEMP. (°F) [illegible]	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	0915	2	182	.72	1.5	053.3	102	88	262	66
3	0917.30	2	182	.65	1.4	055.1	103	88	263	66
4	0920	2	182	.72	1.5	056.9	103	89	262	67
5	092230	2	183	.66	1.4	058.8	103	89	262	66
6	0925	2	182	.68	1.4	060.8	104	89	263	66
D 1	0927 / 0929.30	3	182	.85	1.8	062.9	100	89	264	67
2	0932	4	184	1.1	2.3	065.1	104	89	266	66
3	0934.30	4	184	1.1	2.3	067.4	105	89	262	65
4	0937	5	185	1.6	3.4	070.1	107	89	256	66
5	0939.30	5	186	1.5	3.2	072.8	106	89	259	66
6	0942	4	183	.9	1.9	074.9	106	89	262	67
E 1	0944 / 0946.30	3	180	.6	1.3	076.8	100	90	262	67
2	0949	3	181	.81	1.7	079.7	103	90	253	68
3	0951.30	5	183	1.5	3.2	081.4	106	90	246	67
4	0954	5	183	1.4	2.9	084.0	106	90	246	68
5	095630	5	183	1.4	2.9	086.6	106	90	248	68
6	0959	4	180	.87	1.8	089.259	106	90	249	68

250

RAMCON ENVIRONMENTAL CORPORATION

Plant Fred Weber, Inc

Location St. Louis
Operator C. Hughes
Date 9-3-92
Run No. 3
Sample Box No. 1
Meter Box No. C-100
Meter H @ 1.517
C Factor .997
Pitot Tube Coefficient Cp .84

Formaldehyde

		IMPIN. VOLUME ml	SILICA GEL WEIGHT g
Barometric Pressure 30.09	FINAL	558	234.5
Assumed Moisture, % 23	INITIAL	200	232.5
Probe Length, m(ft) 5'	DIFFERENCE	358	2.0

Ambient Temperature 70
Nozzle Identification No. .0003408
Avg. Calibrated Nozzle Dia., (in.) .250/.250/.250
Probe Heater Setting 4
Leak Rate, m^3/min. (cfm) .004 @ 11"
Probe Liner Material Pyrex
Static Pressure, mm Hg (in. Hg) +.15
Filter No.

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (ΔPs) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	°F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	1032 / 1034.30	2	168	.27	.57	089.9 / 091.0	95	91	252	68
2	1037	2	177	.27	.57	092.1	98	91	235	65
3	1039.30	2	178	.22	.46	093.1	99	91	231	66
4	1042	2	178	.23	.48	094.1	100	91	256	68
5	1044.30	2	179	.25	.52	095.2	101	91	266	68
6	1047	2	180	.32	.67	096.5	102	91	271	68
B 1	1049.30 / 1052	2	180	.45	.94	098.0	99	91	230	68
2	1054.30	2	181	.4	.84	099.4	101	91	227	68
3	1057	2	181	.33	.69	100.6	102	91	238	68
4	1059.30	2	181	.33	.69	101.9	103	91	255	67
5	1102	2	182	.39	.81	103.4	103	91	270	67
6	1104.30	3	183	.62	1.3	105.0	104	91	262	68
C 1	1105.30 / 1108	3	184	.7	1.4	106.8	104	92	244	68

251

Form #REC-05

WEBER1

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 9-3-92 LOCATION St. Louis TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [redacted]	VELOCITY HEAD ΔPs (in. H2O)	ORFICE DIFF. PRESSURE [redacted]	GAS VOLUME Vm (ft.3)	GAS SAMPLE TEMP. (°F) [redacted]	[redacted]	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	1110.30	3	186	.7	1.4	108.6	105	92	226	68
3	1113	3	187	.63	1.3	110.4	107	92	230	65
4	1115.30	3	187	.65	1.3	112.2	107	92	244	66
5	1118	4	187	.74	1.5	114.0	107	93	250	67
6	1120.30	4	187	.68	1.4	115.9	108	93	240	68
D 1	1121.30 / 1124	4	188	.79	1.6	117.8	106	93	250	68
2	1126.30	5	190	1.1	2.3	120.0	108	94	257	68
3	1129	7	190	1.4	2.9	122.6	110	94	257	68
4	1131.30	8	190	1.5	3.1	125.3	109	94	257	67
5	1134	8	190	1.5	3.1	127.9	108	94	262	67
6	1136.30	7	190	1.4	2.9	130.6	107	94	264	68
E 1	1138 / 1140.30	3	189	.64	1.3	132.4	104	94	270	68
2	1143	5	191	1.1	2.3	134.7	108	94	264	67
3	1145.30	7	192	1.4	2.9	137.3	110	94	246	68
4	1148	9	192	1.7	3.5	140.0	110	95	248	68
5	1150.30	9	191	1.7	3.5	142.9	109	95	256	67
6	1153	6	188	1.2	2.5	145.452	109	95	256	67

Pages 253 through 262 Reserved

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/01/92	12:08	81.5	3.9	7.4	900.0	12.2	32.3
09/01/92	12:09	78.0	3.9	7.4	990.5	12.1	31.6
09/01/92	12:10	63.5	4.1	7.3	963.5	12.3	31.6
09/01/92	12:11	64.0	4.0	6.9	366.5	12.9	32.0
09/01/92	12:12	71.5	4.1	6.7	157.0	13.1	31.5
09/01/92	12:13	73.0	4.0	7.1	307.0	12.9	31.9
09/01/92	12:14	72.5	4.1	7.5	959.5	12.2	32.5
09/01/92	12:15	68.0	4.1	7.7	990.5	11.7	33.3
09/01/92	12:16	68.5	4.3	7.4	802.0	12.1	33.4
09/01/92	12:17	65.5	4.6	7.1	322.0	12.6	33.3
09/01/92	12:18	70.5	4.3	7.3	326.5	12.5	33.5
09/01/92	12:19	79.0	4.7	7.6	710.0	12.1	33.8
09/01/92	12:20	75.0	4.9	7.4	971.0	12.0	33.6
09/01/92	12:21	72.0	4.7	7.3	752.0	12.2	34.3
09/01/92	12:22	67.0	4.7	7.3	798.0	12.2	34.6
09/01/92	12:23	64.5	4.6	7.3	504.5	12.3	34.9
09/01/92	12:24	71.5	4.9	7.6	881.5	12.0	35.3
09/01/92	12:25	75.5	4.9	7.6	990.5	11.8	35.3
09/01/92	12:26	86.0	5.1	7.7	990.5	11.6	35.1
09/01/92	12:27	87.5	5.2	7.7	990.5	11.5	34.5
09/01/92	12:28	72.0	5.0	7.6	990.5	11.7	34.6
09/01/92	12:29	63.5	4.8	7.3	754.0	12.1	34.4
09/01/92	12:30	73.0	5.1	7.1	389.0	12.6	33.9
09/01/92	12:31	74.5	5.2	7.0	236.0	12.8	33.6
09/01/92	12:32	74.5	5.2	6.9	202.0	12.8	33.4
09/01/92	12:33	78.0	5.1	7.3	306.0	12.5	33.4
09/01/92	12:34	68.0	5.2	7.7	869.5	11.9	34.0
09/01/92	12:35	66.5	5.2	7.5	915.0	11.8	34.3
09/01/92	12:36	69.5	5.3	7.0	414.0	12.5	33.6
09/01/92	12:37	63.0	5.2	6.9	164.0	12.7	33.1
09/01/92	12:38	58.5	5.2	6.9	139.0	12.8	33.1
09/01/92	12:39	71.0	5.4	7.0	176.5	12.6	33.3
09/01/92	12:40	71.5	5.2	7.2	405.0	12.4	32.9
09/01/92	12:41	62.0	5.3	7.2	621.5	12.3	32.9
09/01/92	12:42	58.0	5.2	7.1	541.0	12.4	33.4
09/01/92	12:43	59.5	5.3	7.1	372.5	12.4	33.6
09/01/92	12:44	66.5	5.3	7.0	328.5	12.5	33.8
09/01/92	12:45	66.5	5.4	6.9	222.5	12.6	33.5
09/01/92	12:46	65.5	5.2	6.8	176.0	12.9	32.9
09/01/92	12:47	61.5	5.4	6.8	145.5	12.9	32.9
09/01/92	12:48	63.0	5.5	6.8	152.0	12.8	33.3

FRED WEBER, INC. - NAPA

DATA LISTING

AME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/01/92	12:49	67.5	5.4	6.9	154.0	12.8	33.5
09/01/92	12:50	73.0	5.7	7.0	187.5	12.7	33.6
09/01/92	12:51	72.0	5.5	7.1	220.5	12.5	33.9
09/01/92	12:52	72.0	5.6	7.1	233.0	12.5	34.0
09/01/92	12:53	69.5	5.2	7.1	253.5	12.5	34.0
09/01/92	12:54	69.5	5.4	7.2	285.5	12.4	34.1
09/01/92	12:55	76.0	5.5	7.4	433.5	12.2	34.4
09/01/92	12:56	73.0	5.6	7.4	587.5	12.0	34.0
09/01/92	12:57	75.0	5.6	7.5	928.0	11.9	33.5
09/01/92	12:58	77.5	5.5	7.4	990.5	11.8	33.5
09/01/92	12:59	79.5	5.7	7.5	990.5	11.8	33.4
09/01/92	13:00	69.5	5.7	7.5	990.5	11.8	33.6
09/01/92	13:01	72.0	5.7	7.3	885.0	12.1	33.9
09/01/92	13:02	75.5	5.4	7.4	669.5	12.1	34.3
09/01/92	13:03	73.0	5.5	7.6	642.0	11.9	34.9
09/01/92	13:04	67.5	5.5	7.5	652.5	11.8	35.1
09/01/92	13:05	64.5	5.6	7.6	694.0	11.8	34.6
09/01/92	13:06	66.5	5.8	7.6	805.0	11.7	34.9
09/01/92	13:07	73.0	5.6	7.6	744.0	11.6	35.0
09/01/92	13:08	70.5	5.5	7.6	665.0	11.8	34.9
09/01/92	13:09	70.0	5.5	7.6	603.0	11.7	35.1
09/01/92	13:10	67.0	5.7	7.7	653.5	11.7	35.0
09/01/92	13:11	67.5	5.7	7.6	646.5	11.7	35.0
09/01/92	13:12	67.5	5.6	7.7	679.5	11.6	34.6
09/01/92	13:13	68.0	5.7	7.7	743.5	11.6	34.6
09/01/92	13:14	77.5	5.8	7.7	902.5	11.6	34.3
09/01/92	13:15	80.0	6.0	7.7	955.5	11.5	34.5
09/01/92	13:16	80.5	5.9	7.8	990.5	11.5	34.4
09/01/92	13:17	73.5	5.9	7.6	911.5	11.6	34.6
09/01/92	13:18	69.5	5.8	7.4	791.0	11.7	34.6
09/01/92	13:19	79.0	6.0	7.4	690.0	12.1	34.6
09/01/92	13:20	72.5	5.9	7.6	990.0	11.6	35.1
09/01/92	13:21	69.5	5.8	7.4	760.5	11.8	35.4
09/01/92	13:22	67.0	6.0	7.4	471.0	11.9	35.4
09/01/92	13:23	62.0	5.9	7.3	368.0	12.1	35.5
09/01/92	13:24	57.0	5.9	7.3	301.5	12.2	35.3
09/01/92	13:25	69.5	6.0	7.2	289.0	12.2	35.1
09/01/92	13:26	63.0	6.1	6.6	218.5	12.5	33.5
09/01/92	13:27	69.5	5.9	6.0	78.0	13.5	30.4
09/01/92	13:28	67.0	5.9	5.9	52.5	14.1	28.9
09/01/92	13:29	65.0	6.0	6.3	83.0	13.7	30.6
09/01/92	13:30	62.0	5.9	6.5	136.5	13.3	31.8
Averages:		70.1	5.3	7.3	572.5	12.2	33.8

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/02/92	11:06	65.0	1.4	6.4	263.5	12.1	24.6
09/02/92	11:07	59.0	1.4	6.9	796.0	12.4	25.1
09/02/92	11:08	58.5	1.6	7.1	991.0	12.1	25.8
09/02/92	11:09	65.0	1.4	7.0	823.5	12.3	26.5
09/02/92	11:10	62.5	1.5	7.0	490.0	12.4	26.6
09/02/92	11:11	52.5	1.4	7.0	399.0	12.6	27.1
09/02/92	11:12	48.0	1.6	6.9	343.0	12.7	27.3
09/02/92	11:13	23.0	1.6	6.9	220.0	12.9	27.5
09/02/92	11:14	18.5	1.6	7.0	223.0	12.8	27.4
09/02/92	11:15	18.0	1.3	7.1	384.0	12.7	27.0
09/02/92	11:16	18.0	1.4	7.2	700.5	12.5	26.5
09/02/92	11:17	17.0	1.4	7.2	820.0	12.5	26.6
09/02/92	11:18	16.0	1.4	7.2	819.5	12.5	26.8
09/02/92	11:19	15.5	1.5	7.3	836.0	12.5	26.6
Averages:		38.3	1.5	7.0	579.2	12.5	26.5

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	06:50	77.5	2.5	8.1	991.5	11.5	36.1
09/03/92	06:51	76.0	2.4	8.1	991.5	11.5	36.6
09/03/92	06:52	68.5	2.4	8.1	991.5	11.5	37.0
09/03/92	06:53	67.0	2.5	8.2	991.5	11.5	37.0
09/03/92	06:54	65.0	2.5	8.2	991.0	11.6	37.3
09/03/92	06:55	66.5	2.5	8.2	991.5	11.6	37.5
09/03/92	06:56	67.0	2.4	8.2	991.0	11.5	37.5
09/03/92	06:57	63.0	2.4	8.3	991.5	11.5	36.8
09/03/92	06:58	79.5	2.7	8.3	991.5	11.3	37.0
09/03/92	06:59	90.0	2.9	8.3	991.0	11.3	39.0
09/03/92	07:00	89.0	2.8	8.4	991.5	11.2	40.5
09/03/92	07:01	176.0	4.5	8.3	991.0	11.0	41.3
09/03/92	07:02	307.0	6.8	8.2	991.0	10.8	43.6
09/03/92	07:03	373.5	8.7	8.1	147.0	10.6	45.5
09/03/92	07:04	416.0	10.0	8.0	471.5	10.6	47.5
09/03/92	07:05	504.5	12.2	8.1	704.5	10.3	49.6
09/03/92	07:06	350.0	10.0	8.2	918.0	10.3	50.6
09/03/92	07:07	372.0	9.3	8.1	992.4	10.4	52.4
09/03/92	07:08	449.5	10.8	8.1	643.0	10.3	53.4
09/03/92	07:09	416.5	11.0	8.1	841.0	10.2	54.8
09/03/92	07:10	357.0	9.4	8.2	580.0	10.3	55.4
09/03/92	07:11	325.5	8.9	8.2	324.5	10.3	55.0
09/03/92	07:12	263.0	7.6	8.2	992.4	10.4	55.0
09/03/92	07:13	188.5	5.7	8.3	990.0	10.5	54.6
09/03/92	07:14	171.0	5.5	8.2	991.5	10.6	53.6
09/03/92	07:15	125.5	4.0	8.2	991.5	10.8	53.8
09/03/92	07:16	150.0	4.3	8.4	991.5	10.8	55.1
09/03/92	07:17	119.5	4.6	8.4	992.4	10.8	53.5
09/03/92	07:18	136.1	4.8	8.3	991.8	10.8	53.2
09/03/92	07:19	139.0	4.2	8.4	991.0	10.7	53.4
09/03/92	07:20	139.5	4.3	8.3	991.0	10.8	53.1
09/03/92	07:21	140.5	4.6	8.3	991.0	10.8	53.3
09/03/92	07:22	99.0	4.1	8.2	991.0	10.9	53.3
09/03/92	07:23	68.0	3.0	8.2	991.5	11.2	53.1
09/03/92	07:24	51.5	2.8	8.0	991.5	11.6	52.1
09/03/92	07:25	59.0	2.8	8.0	825.5	11.9	51.4
09/03/92	07:26	70.0	2.9	8.3	882.0	11.6	51.0
09/03/92	07:27	64.0	3.2	8.3	991.5	11.3	51.5
09/03/92	07:28	59.5	2.8	8.4	991.5	11.3	52.4
09/03/92	07:29	65.5	2.9	8.4	991.5	11.3	53.8
09/03/92	07:30	82.5	3.1	8.2	991.5	11.3	54.4
09/03/92	07:31	150.5	4.7	8.2	991.5	11.2	53.1
09/03/92	07:32	92.0	3.9	8.1	991.0	11.0	50.3
09/03/92	07:33	48.0	2.8	7.2	828.5	12.2	42.3
09/03/92	07:34	49.5	2.7	6.2	130.0	14.0	31.1
09/03/92	07:35	54.5	2.9	6.1	65.0	14.8	28.3
09/03/92	07:36	56.0	2.8	6.7	68.5	14.4	31.6
09/03/92	07:37	67.0	3.0	7.4	237.0	13.1	35.6

09/03/92	07:39	55.5	2.8	7.6	702.0	12.3	35.4
09/03/92	07:40	47.0	2.8	7.0	305.5	12.9	34.1
09/03/92	07:41	46.5	2.7	6.7	79.0	13.6	32.5
09/03/92	07:42	53.0	2.8	6.6	53.5	13.9	31.8
09/03/92	07:43	57.5	3.0	6.8	67.5	13.7	32.6
09/03/92	07:44	60.0	2.9	7.3	191.5	13.1	34.0
09/03/92	07:45	42.0	2.7	7.4	362.0	12.8	34.3
09/03/92	07:46	48.5	2.8	7.0	269.0	13.2	33.3
09/03/92	07:47	52.0	3.0	6.8	185.5	13.3	33.1
09/03/92	07:48	54.0	3.0	6.8	138.0	13.4	33.0
09/03/92	07:49	41.0	2.8	6.8	146.0	13.3	32.8
09/03/92	07:50	45.5	2.9	6.8	133.5	13.4	32.5
09/03/92	07:51	51.0	3.0	6.8	151.5	13.3	32.6
09/03/92	07:52	52.5	2.9	6.9	154.0	13.3	32.6
09/03/92	07:53	47.0	2.7	6.8	154.5	13.3	32.4
09/03/92	07:54	38.5	2.8	6.9	191.5	13.1	32.1
09/03/92	07:55	45.0	2.9	7.1	275.5	12.9	32.5
09/03/92	07:56	48.5	2.9	7.0	287.0	12.8	32.8
09/03/92	07:57	47.5	3.0	6.8	213.5	13.0	32.5
09/03/92	07:58	36.0	2.9	6.6	88.0	13.3	31.8
09/03/92	07:59	18.0	2.7	6.5	55.0	13.7	30.9
09/03/92	08:00	35.0	2.9	6.5	53.0	13.6	31.0
09/03/92	08:01	52.0	3.0	6.5	50.5	13.6	31.0
09/03/92	08:02	242.5	5.1	7.4	502.5	12.6	32.9
09/03/92	08:03	384.0	10.0	7.6	520.5	10.6	34.0
09/03/92	08:04	311.5	9.5	7.7	432.0	10.5	34.0
09/03/92	08:05	174.0	6.3	7.8	482.5	10.7	34.5
09/03/92	08:06	80.0	4.5	7.8	991.0	10.9	35.0
09/03/92	08:07	75.0	3.8	7.8	991.5	11.0	35.0
09/03/92	08:08	51.0	3.4	7.9	991.0	11.2	35.4
09/03/92	08:09	67.0	3.4	7.9	991.5	11.2	35.3
09/03/92	08:10	57.0	3.3	7.9	991.5	11.3	35.5
Averages:		125.2	4.3	7.7	643.6	11.8	41.3

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/04/92	07:05	456.5	13.0	7.0	163.5	11.0	26.9
09/04/92	07:06	115.5	4.8	7.1	653.5	11.5	27.4
09/04/92	07:07	54.5	2.5	6.9	853.5	12.6	27.9
09/04/92	07:08	63.0	2.7	7.0	444.0	12.7	27.3
09/04/92	07:09	83.5	3.0	7.0	858.5	12.6	25.5
09/04/92	07:10	191.5	4.9	7.4	991.5	12.1	27.3
09/04/92	07:11	133.0	4.8	7.4	992.0	11.5	27.6
09/04/92	07:12	39.5	2.9	7.3	992.0	11.8	28.6
09/04/92	07:13	40.0	2.6	6.9	604.0	12.7	27.9
09/04/92	07:14	28.5	2.6	6.8	434.0	12.9	27.6
09/04/92	07:15	46.5	2.5	6.8	353.0	13.0	27.6
09/04/92	07:16	32.5	2.7	7.0	534.5	12.9	27.4
09/04/92	07:17	69.5	2.8	7.3	900.0	12.5	27.9
09/04/92	07:18	53.0	3.3	7.4	992.0	11.9	28.5
09/04/92	07:19	50.0	2.9	7.2	803.0	12.4	28.6
09/04/92	07:20	47.5	2.9	6.9	377.5	12.9	28.1
09/04/92	07:21	42.5	2.9	7.0	357.5	12.8	27.8
09/04/92	07:22	72.0	3.6	7.2	947.5	12.3	26.6
09/04/92	07:23	50.5	3.2	7.3	992.0	12.1	27.5
09/04/92	07:24	34.0	3.2	7.3	992.0	12.2	28.4
09/04/92	07:25	52.0	3.2	7.2	835.5	12.3	28.8
09/04/92	07:26	51.5	3.1	7.1	450.5	12.6	28.5
09/04/92	07:27	56.0	3.3	7.0	294.5	12.8	28.6
09/04/92	07:28	61.5	3.5	6.9	230.0	12.9	28.6
09/04/92	07:29	58.5	3.5	6.9	194.5	12.9	29.3
09/04/92	07:30	50.5	3.4	6.9	167.5	12.9	29.6
09/04/92	07:31	57.5	3.7	7.0	181.5	12.8	29.9
09/04/92	07:32	59.0	3.5	6.8	163.0	12.9	29.8
09/04/92	07:33	51.0	3.5	6.5	112.0	13.2	29.3
09/04/92	07:34	60.5	3.8	6.4	95.5	13.4	28.5
09/04/92	07:35	57.5	3.7	6.6	91.0	13.3	28.9
09/04/92	07:36	66.0	3.7	6.4	80.0	13.3	28.6
09/04/92	07:37	46.5	3.6	6.5	69.0	13.5	28.1
09/04/92	07:38	54.5	3.6	6.6	97.0	13.3	28.8
09/04/92	07:39	62.5	3.7	6.8	150.5	13.0	29.3
09/04/92	07:40	59.5	3.6	6.9	243.0	12.8	29.1
09/04/92	07:41	47.5	3.7	6.9	280.5	12.8	29.3
09/04/92	07:42	62.0	3.8	6.8	282.0	12.8	29.4
09/04/92	07:43	61.0	3.9	6.6	176.0	13.1	29.5
09/04/92	07:44	52.0	3.6	6.4	95.5	13.3	28.9
09/04/92	07:45	72.5	4.2	6.1	54.0	13.5	28.0

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMÇON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/04/92	07:46	74.0	3.7	6.0	35.0	13.9	27.4
09/04/92	07:47	76.0	4.1	5.9	29.5	14.0	26.6
09/04/92	07:48	94.0	4.0	5.8	31.5	14.0	26.5
09/04/92	07:49	77.5	3.7	6.2	35.0	13.9	27.3
09/04/92	07:50	88.5	4.4	6.4	45.0	13.4	28.3
09/04/92	07:51	88.0	3.9	6.5	54.0	13.3	28.9
09/04/92	07:52	76.0	4.0	6.6	73.0	13.2	29.1
09/04/92	07:53	92.5	4.1	6.7	91.5	13.0	29.0
09/04/92	07:54	67.0	3.6	6.8	118.0	12.9	29.5
09/04/92	07:55	65.0	3.8	6.8	125.5	12.9	29.4
09/04/92	07:56	88.5	4.0	6.6	126.0	12.9	29.4
09/04/92	07:57	83.0	4.1	6.3	79.5	13.3	28.8
09/04/92	07:58	85.5	4.1	6.3	68.0	13.3	28.6
09/04/92	07:59	81.5	4.4	6.3	64.5	13.3	28.6
09/04/92	08:00	51.5	3.6	6.3	60.5	13.4	28.5
09/04/92	08:01	47.0	3.9	6.2	57.5	13.4	28.6
09/04/92	08:02	79.0	4.1	6.2	59.0	13.4	28.6
09/04/92	08:03	61.0	3.8	6.0	46.0	13.7	28.0
09/04/92	08:04	82.0	4.2	6.0	39.0	13.7	28.1
09/04/92	08:05	80.5	4.5	6.2	40.5	13.6	28.4
09/04/92	08:06	83.5	4.6	6.7	131.0	13.0	29.6
09/04/92	08:07	83.0	4.6	6.8	329.5	12.4	29.9
09/04/92	08:08	73.0	4.4	6.5	305.0	12.8	29.6
09/04/92	08:09	77.0	4.4	6.4	241.5	12.8	29.9
09/04/92	08:10	59.5	4.4	6.3	129.0	13.1	29.3
09/04/92	08:11	78.5	4.6	6.1	64.5	13.4	27.1
09/04/92	08:12	82.0	4.8	5.8	40.5	13.6	26.1
09/04/92	08:13	82.0	4.8	5.8	26.5	13.8	25.9
09/04/92	08:14	77.5	4.4	5.7	22.0	13.9	26.3
09/04/92	08:15	65.0	4.4	5.8	27.0	13.9	27.3
09/04/92	08:16	78.0	4.7	5.8	29.0	13.8	28.0
09/04/92	08:17	69.5	4.6	5.9	36.5	13.7	28.6
09/04/92	08:18	53.0	4.5	6.0	58.5	13.5	29.1
09/04/92	08:19	66.5	4.4	6.0	62.5	13.4	29.3
09/04/92	08:20	48.5	4.3	5.8	48.0	13.7	28.8
09/04/92	08:21	66.0	4.5	5.7	31.0	13.8	27.5
09/04/92	08:22	55.5	4.6	5.5	21.5	14.1	26.4
09/04/92	08:23	52.5	3.8	5.6	19.5	14.1	26.5
09/04/92	08:24	62.5	4.4	5.7	20.5	14.0	26.6

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/04/92	08:25	44.0	4.2	5.7	22.5	13.9	27.3
09/04/92	08:26	63.0	4.2	6.0	32.5	13.6	28.4
09/04/92	08:27	52.0	3.7	6.4	86.0	13.2	29.3
09/04/92	08:28	48.5	3.8	6.5	132.5	12.9	29.6
09/04/92	08:29	63.5	4.4	6.4	132.5	13.0	29.8
09/04/92	08:30	57.5	4.1	6.3	83.5	13.2	29.4
09/04/92	08:31	54.0	4.2	6.2	55.0	13.3	28.9
09/04/92	08:32	63.5	4.0	6.0	38.0	13.5	28.3
09/04/92	08:33	68.5	3.9	5.9	27.5	13.7	27.9
09/04/92	08:34	41.5	3.8	5.9	26.5	13.7	28.0
09/04/92	08:35	53.0	3.8	5.9	26.0	13.7	28.0
09/04/92	08:36	65.0	4.1	6.1	29.5	13.6	28.6
09/04/92	08:37	63.5	4.3	6.2	42.5	13.4	29.3
09/04/92	08:38	62.5	3.9	6.4	58.5	13.2	29.8
09/04/92	08:39	61.0	4.3	6.4	76.5	13.1	30.1
09/04/92	08:40	60.0	4.2	6.4	78.5	13.1	30.0
09/04/92	08:41	52.5	4.0	6.1	50.5	13.4	29.0
09/04/92	08:42	60.5	4.0	5.7	25.5	13.8	27.1
09/04/92	08:43	58.5	4.1	5.7	21.0	14.1	26.0
09/04/92	08:44	46.5	3.9	5.8	24.5	14.0	26.8
09/04/92	08:45	57.0	3.8	5.9	32.5	13.8	27.3
09/04/92	08:46	58.5	4.1	6.1	41.5	13.7	27.5
09/04/92	08:47	46.0	3.8	6.1	65.5	13.5	27.9
09/04/92	08:48	37.0	3.9	6.1	72.0	13.5	27.9
09/04/92	08:49	49.5	4.1	6.0	75.0	13.6	27.5
09/04/92	08:50	46.0	3.9	6.4	51.0	13.6	28.5
09/04/92	08:51	34.0	4.0	6.2	39.0	13.5	27.9
Averages:		67.5	4.0	6.4	214.5	13.2	28.3

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/02/92	11:29	274.0	14.1	6.6	322.5	11.6	29.3
09/02/92	11:30	120.5	4.8	6.9	991.0	11.3	27.6
09/02/92	11:31	101.0	2.2	5.2	548.0	14.4	17.8
09/02/92	11:32	128.5	3.4	4.5	185.0	16.2	12.5
09/02/92	11:33	159.0	2.0	6.5	408.5	14.2	23.4
09/02/92	11:34	594.5	10.7	7.2	501.5	11.2	27.8
09/02/92	11:35	401.0	13.2	7.3	656.5	10.8	28.6
09/02/92	11:36	60.0	2.8	7.2	989.5	11.9	29.6
09/02/92	11:37	41.0	2.1	6.4	416.5	13.0	27.5
09/02/92	11:38	23.0	1.8	6.5	113.0	13.7	27.0
09/02/92	11:39	26.0	1.8	7.1	559.0	12.7	27.8
09/02/92	11:40	25.0	1.7	7.4	991.0	12.2	29.5
09/02/92	11:41	17.0	1.9	7.3	931.5	12.1	30.1
09/02/92	11:42	14.5	1.5	7.1	312.5	12.7	29.9
09/02/92	11:43	13.5	1.7	7.0	247.5	12.8	29.0
09/02/92	11:44	202.0	2.1	5.9	130.5	13.7	22.9
Averages:		137.5	4.2	6.6	519.0	12.8	26.3

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/02/92	12:11	791.0	7.9	7.1	780.0	12.9	25.6
09/02/92	12:12	798.0	19.6	7.7	828.5	10.4	29.1
09/02/92	12:13	149.0	10.5	7.9	678.0	10.8	30.3
09/02/92	12:14	58.5	2.5	7.6	961.0	12.1	29.3
09/02/92	12:15	55.5	2.0	7.0	275.5	13.5	27.0
09/02/92	12:16	71.0	1.9	7.2	135.5	13.7	26.3
09/02/92	12:17	71.5	2.1	7.7	312.5	13.1	28.0
09/02/92	12:18	56.0	2.2	8.2	957.0	12.0	29.4
09/02/92	12:19	50.0	2.3	8.1	755.0	12.2	30.1
09/02/92	12:20	50.5	2.1	7.6	455.5	12.7	28.6
09/02/92	12:21	45.0	1.9	7.1	113.0	13.7	26.6
09/02/92	12:22	48.5	2.1	7.6	129.5	13.5	26.8
09/02/92	12:23	74.0	2.5	8.3	839.0	12.1	27.4
09/02/92	12:24	42.0	2.5	8.2	991.0	12.1	28.1
09/02/92	12:25	19.5	2.0	8.1	903.5	12.1	29.8
09/02/92	12:26	15.5	1.9	8.3	456.0	12.2	30.3
09/02/92	12:27	14.0	2.0	7.9	181.5	12.7	29.5
09/02/92	12:28	14.0	2.0	8.1	150.0	12.8	29.5
09/02/92	12:29	17.0	2.0	8.4	411.5	12.3	29.4
09/02/92	12:30	39.5	2.0	8.6	924.5	11.9	29.3
09/02/92	12:31	61.0	2.5	8.7	991.0	11.6	29.8
09/02/92	12:32	51.0	2.6	8.7	990.5	11.5	30.8
09/02/92	12:33	50.0	2.4	8.7	990.5	11.7	31.1
09/02/92	12:34	51.0	2.3	8.6	877.5	11.9	31.3
09/02/92	12:35	21.5	2.1	8.3	416.5	12.5	31.4
09/02/92	12:36	14.5	2.2	7.9	188.5	13.0	30.5
09/02/92	12:37	13.0	2.1	7.7	139.0	13.3	30.0
09/02/92	12:38	12.0	2.0	7.7	90.0	13.4	29.8
09/02/92	12:39	268.5	3.4	5.8	77.0	14.6	23.0
Averages:		104.2	3.3	7.9	551.7	12.5	28.9

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/02/92	13:58	58.0	2.3	6.9	957.0	12.7	28.9
09/02/92	13:59	29.5	2.1	6.9	688.0	12.8	29.1
09/02/92	14:00	48.5	2.2	6.9	586.5	12.8	29.4
09/02/92	14:01	46.5	2.2	6.9	490.0	12.8	29.3
09/02/92	14:02	52.0	2.3	6.9	294.0	13.0	29.1
09/02/92	14:03	50.0	2.4	6.9	215.0	13.1	29.4
09/02/92	14:04	49.0	2.4	6.9	185.5	13.1	29.5
09/02/92	14:05	50.0	2.5	7.0	187.0	13.1	29.5
09/02/92	14:06	35.5	2.3	7.1	189.0	13.1	29.5
09/02/92	14:07	60.5	2.5	7.8	891.0	11.8	30.3
09/02/92	14:08	47.5	2.6	7.3	819.5	12.4	30.1
09/02/92	14:09	40.0	2.6	6.9	198.0	13.2	28.1
Averages:		47.3	2.4	7.0	475.0	12.8	29.4

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	08:37	73.0	4.4	7.1	991.0	11.4	33.8
09/03/92	08:38	49.0	3.6	6.3	837.5	12.0	33.9
09/03/92	08:39	52.0	3.3	5.5	107.0	13.9	32.9
09/03/92	08:40	59.0	3.2	5.9	63.5	14.0	36.0
09/03/92	08:41	58.5	2.9	6.5	97.0	13.3	41.1
09/03/92	08:42	64.5	2.9	7.2	604.5	12.2	45.3
09/03/92	08:43	75.5	3.1	7.2	991.0	11.6	48.0
09/03/92	08:44	51.5	2.5	7.1	991.5	11.7	48.5
09/03/92	08:45	49.5	2.3	7.1	521.0	12.1	47.5
09/03/92	08:46	52.0	2.1	7.0	208.5	12.4	46.6
09/03/92	08:47	44.0	2.2	7.0	190.0	12.5	46.1
09/03/92	08:48	50.0	2.2	7.4	464.5	12.2	46.4
09/03/92	08:49	242.5	6.0	7.6	937.5	11.4	46.8
09/03/92	08:50	104.0	3.9	7.6	991.5	10.9	45.8
09/03/92	08:51	51.5	2.5	7.7	991.0	11.3	44.8
09/03/92	08:52	44.0	2.4	6.7	461.5	12.6	39.9
09/03/92	08:53	59.5	2.0	7.0	205.0	12.9	39.6
09/03/92	08:54	70.5	2.2	7.8	801.5	11.8	42.0
09/03/92	08:55	64.0	2.2	7.7	991.5	11.5	41.6
09/03/92	08:56	54.5	2.0	7.3	834.5	12.1	40.8
09/03/92	08:57	49.0	2.0	7.3	465.0	12.3	40.1
09/03/92	08:58	45.5	2.1	7.7	506.0	11.9	40.3
09/03/92	08:59	64.0	2.0	7.7	417.0	11.9	39.9
09/03/92	09:00	197.5	4.8	7.7	852.0	11.4	38.6
09/03/92	09:01	121.0	4.2	7.6	991.5	11.1	39.8
09/03/92	09:02	63.0	2.3	7.7	991.0	11.4	40.8
09/03/92	09:03	58.0	2.3	7.7	973.0	11.6	42.8
09/03/92	09:04	66.5	2.3	7.8	954.0	11.6	43.5
09/03/92	09:05	61.0	2.4	7.7	991.5	11.7	42.8
09/03/92	09:06	56.5	2.2	7.6	991.5	11.7	40.5
09/03/92	09:07	47.0	2.1	7.5	834.0	11.9	38.4
09/03/92	09:08	47.0	2.1	7.3	533.5	12.2	36.5
09/03/92	09:09	50.0	2.1	7.1	261.5	12.6	36.0
09/03/92	09:10	52.0	2.0	7.3	235.5	12.4	37.0
09/03/92	09:11	89.0	2.7	7.5	569.0	12.2	37.5
09/03/92	09:12	118.5	3.4	7.7	991.0	11.3	38.3
09/03/92	09:13	123.5	4.2	7.8	991.0	10.9	38.9
09/03/92	09:14	82.5	3.0	7.5	991.0	11.2	39.1
09/03/92	09:15	94.0	3.1	7.4	991.0	11.4	39.0
09/03/92	09:16	73.5	3.0	7.7	991.5	11.3	38.4
09/03/92	09:17	49.5	2.5	7.6	991.5	11.4	37.5
09/03/92	09:18	49.0	2.2	7.4	837.0	11.8	36.8
09/03/92	09:19	51.0	2.1	7.2	475.0	12.1	36.1

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	09:20	50.5	2.4	7.2	739.0	11.9	35.5
09/03/92	09:21	54.0	2.2	7.2	853.0	11.9	35.6
09/03/92	09:22	53.5	2.3	7.3	912.5	11.9	35.4
09/03/92	09:23	50.0	2.3	7.1	634.0	12.0	35.9
09/03/92	09:24	51.0	2.2	7.0	343.5	12.3	35.9
09/03/92	09:25	48.0	2.5	7.0	344.0	12.3	35.9
09/03/92	09:26	44.5	2.3	6.8	295.5	12.5	36.6
09/03/92	09:27	52.0	2.2	7.1	335.0	12.3	37.1
09/03/92	09:28	52.0	2.3	7.2	651.5	12.0	38.4
09/03/92	09:29	53.5	2.1	7.2	732.5	11.9	40.4
09/03/92	09:30	64.0	2.4	7.4	813.0	11.8	43.3
09/03/92	09:31	110.5	3.6	7.7	991.0	11.2	46.0
09/03/92	09:32	152.0	4.6	7.7	991.0	10.9	47.6
09/03/92	09:33	150.0	4.8	7.7	991.0	10.7	50.5
09/03/92	09:34	123.0	4.5	7.7	991.0	10.7	52.8
09/03/92	09:35	90.5	3.4	7.6	991.5	11.1	53.6
09/03/92	09:36	73.5	2.9	7.6	991.0	11.2	55.1
09/03/92	09:37	61.0	2.5	7.5	991.0	11.3	54.9
09/03/92	09:38	56.5	2.5	7.4	991.0	11.5	53.5
09/03/92	09:39	50.0	2.4	7.2	834.5	12.0	52.4
09/03/92	09:40	44.0	2.3	7.0	593.0	12.1	51.3
09/03/92	09:41	48.0	2.6	6.2	102.0	13.2	46.5
09/03/92	09:42	56.5	2.3	6.4	78.5	13.3	47.0
09/03/92	09:43	59.0	2.3	6.9	221.5	12.6	49.1
09/03/92	09:44	51.5	2.5	6.9	350.5	12.3	48.5
09/03/92	09:45	43.0	2.3	6.9	343.5	12.2	48.8
09/03/92	09:46	45.5	2.4	6.8	225.5	12.4	48.1
09/03/92	09:47	55.0	2.6	6.6	137.0	12.6	47.5
09/03/92	09:48	50.0	2.4	6.6	92.5	12.7	46.8
09/03/92	09:49	51.5	2.4	7.1	369.0	12.1	47.8
09/03/92	09:50	50.0	2.6	7.2	817.5	11.7	49.1
09/03/92	09:51	43.0	2.5	7.2	991.0	11.5	49.8
09/03/92	09:52	49.5	2.6	7.3	883.5	11.6	49.8
09/03/92	09:53	45.5	2.7	7.0	668.0	11.7	49.1
09/03/92	09:54	42.5	2.1	7.0	147.5	12.4	49.0
09/03/92	09:55	47.0	2.7	7.4	397.0	11.7	50.1
09/03/92	09:56	55.0	2.3	7.4	603.0	11.5	49.1
09/03/92	09:57	50.0	2.6	7.4	575.5	11.6	47.8
09/03/92	09:58	42.5	2.5	7.3	556.0	11.6	46.0
09/03/92	09:59	42.5	2.7	7.2	351.0	11.9	44.0
Averages:		66.1	2.7	7.2	650.9	11.9	43.2

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	10:32	50.5	16.7	7.1	425.0	11.6	44.0
09/03/92	10:33	59.0	15.8	7.2	626.5	11.6	44.4
09/03/92	10:34	54.5	15.1	7.1	600.0	11.8	44.4
09/03/92	10:35	47.0	9.3	6.7	304.0	12.3	43.9
09/03/92	10:36	52.5	14.1	7.0	237.0	12.2	44.1
09/03/92	10:37	59.5	13.4	6.9	190.0	12.4	44.4
09/03/92	10:38	14.0	13.0	3.9	150.0	10.9	28.5
09/03/92	10:39	1.5	11.8	0.2	27.0	0.9	1.6
09/03/92	10:40	12.0	5.0	0.8	1.0	0.0	3.4
09/03/92	10:41	61.5	1.8	6.9	168.5	8.7	41.1
09/03/92	10:42	84.5	2.1	7.5	749.0	11.5	42.1
09/03/92	10:43	89.5	2.7	7.7	991.0	10.8	41.8
09/03/92	10:44	65.0	1.9	7.5	991.0	11.1	41.5
09/03/92	10:45	54.5	1.9	7.5	991.0	11.3	41.4
09/03/92	10:46	53.0	1.5	7.5	991.0	11.4	41.0
09/03/92	10:47	53.5	1.5	7.3	971.0	11.6	40.3
09/03/92	10:48	53.5	1.5	7.4	716.5	11.8	40.5
09/03/92	10:49	50.5	1.4	7.5	655.5	11.9	40.6
09/03/92	10:50	49.0	1.5	7.7	991.0	11.5	40.6
09/03/92	10:51	60.5	1.6	7.7	991.0	11.5	40.4
09/03/92	10:52	58.0	1.7	7.8	991.0	11.5	39.6
09/03/92	10:53	54.5	1.5	7.8	990.5	11.4	38.9
09/03/92	10:54	55.5	1.5	7.8	991.0	11.4	38.5
09/03/92	10:55	64.0	1.7	7.9	991.0	11.3	38.1
09/03/92	10:56	63.0	1.6	7.9	991.0	11.3	37.8
09/03/92	10:57	61.0	1.6	7.9	991.0	11.4	37.4
09/03/92	10:58	61.5	1.3	7.9	991.0	11.5	36.8
09/03/92	10:59	39.0	1.6	8.0	991.0	11.5	36.5
09/03/92	11:00	51.0	1.6	8.1	991.0	11.2	36.5
09/03/92	11:01	69.5	2.0	8.1	991.0	11.0	36.9
09/03/92	11:02	53.0	1.6	7.3	979.0	11.7	37.3
09/03/92	11:03	58.5	1.8	7.5	959.5	11.9	38.0
09/03/92	11:04	55.5	1.9	7.4	991.0	11.8	38.4
09/03/92	11:05	52.0	1.7	7.2	969.0	12.0	38.4
09/03/92	11:06	51.0	1.5	7.3	708.5	11.9	38.6
09/03/92	11:07	51.0	1.8	6.8	250.0	12.6	37.1
09/03/92	11:08	55.5	1.4	7.1	136.0	12.7	38.1
09/03/92	11:09	60.5	1.6	7.7	777.5	11.7	39.5
09/03/92	11:10	57.5	1.8	7.8	991.0	11.5	40.3
09/03/92	11:11	52.5	1.8	7.6	955.5	11.6	40.3
09/03/92	11:12	50.5	1.5	7.6	799.0	11.7	40.1

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	11:13	46.5	1.6	7.4	478.5	11.9	40.4
09/03/92	11:14	46.5	1.6	7.4	336.5	12.1	40.1
09/03/92	11:15	47.5	1.8	7.4	275.0	12.2	40.0
09/03/92	11:16	53.5	1.4	7.5	323.0	12.1	40.3
09/03/92	11:17	53.5	1.8	7.7	464.0	11.8	40.8
09/03/92	11:18	54.5	1.7	7.9	826.5	11.5	40.8
09/03/92	11:19	46.0	1.9	8.0	991.0	11.4	40.6
09/03/92	11:20	47.5	1.8	7.9	991.0	11.3	40.1
09/03/92	11:21	49.0	1.5	7.4	872.0	11.8	38.6
09/03/92	11:22	47.0	1.6	7.3	698.5	12.0	38.4
09/03/92	11:23	44.5	1.8	7.3	814.0	12.0	38.0
09/03/92	11:24	43.5	2.0	7.6	982.5	11.6	38.6
09/03/92	11:25	48.5	2.0	7.5	708.0	11.8	38.3
09/03/92	11:26	49.5	1.8	7.5	551.5	11.8	38.1
09/03/92	11:27	48.0	1.6	7.3	467.5	12.0	37.1
09/03/92	11:28	46.5	1.7	7.3	411.5	12.1	37.1
09/03/92	11:29	43.5	1.8	7.3	357.0	12.2	37.4
09/03/92	11:30	46.5	1.6	7.5	472.0	12.0	37.4
09/03/92	11:31	52.5	1.9	7.6	761.5	11.8	37.3
09/03/92	11:32	52.0	2.0	7.7	926.5	11.6	37.0
09/03/92	11:33	49.5	2.1	7.7	949.0	11.6	36.9
09/03/92	11:34	49.0	1.9	7.7	991.0	11.6	36.9
09/03/92	11:35	50.0	1.8	7.7	991.0	11.6	36.8
09/03/92	11:36	45.5	2.0	7.3	928.0	11.9	35.8
09/03/92	11:37	49.5	1.8	7.4	850.0	11.9	35.9
09/03/92	11:38	52.0	1.8	7.3	850.5	11.9	35.6
09/03/92	11:39	52.0	2.1	7.2	774.0	12.1	35.9
09/03/92	11:40	54.0	2.1	7.3	825.5	12.0	36.0
09/03/92	11:41	52.0	2.0	7.4	991.0	11.8	36.1
09/03/92	11:42	52.0	1.9	7.4	991.0	11.8	36.1
09/03/92	11:43	51.0	2.1	7.5	991.0	11.8	36.6
09/03/92	11:44	49.5	2.2	7.5	991.0	11.6	36.6
09/03/92	11:45	57.0	2.3	7.6	991.0	11.6	36.5
09/03/92	11:46	59.5	2.4	7.6	991.0	11.5	36.0
09/03/92	11:47	53.5	1.9	7.7	991.0	11.4	35.9
09/03/92	11:48	43.0	2.4	7.4	989.5	11.5	35.8
09/03/92	11:49	39.5	2.1	6.3	293.0	12.8	33.0
09/03/92	11:50	50.0	2.2	5.6	53.5	13.9	29.6
09/03/92	11:51	52.0	2.2	6.1	46.0	13.9	30.4
09/03/92	11:52	49.5	2.1	6.4	88.5	13.5	31.8
09/03/92	11:53	55.5	2.1	6.7	165.0	13.0	32.9
Averages:		51.6	3.0	7.2	715.0	11.5	37.4

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	13:14	59.0	1.2	7.5	795.5	11.7	38.9
09/03/92	13:15	56.5	1.4	7.6	781.0	11.7	39.5
09/03/92	13:16	54.0	1.7	7.6	769.0	11.7	39.8
09/03/92	13:17	51.5	2.3	7.6	806.0	11.7	39.6
09/03/92	13:18	45.5	2.0	7.6	656.5	11.8	40.0
09/03/92	13:19	44.0	2.1	7.4	403.5	12.1	39.3
09/03/92	13:20	49.0	2.2	7.3	323.0	12.2	37.9
09/03/92	13:21	53.0	2.3	7.2	263.5	12.4	37.3
09/03/92	13:22	48.5	2.2	7.3	279.0	12.4	37.1
09/03/92	13:23	44.0	2.2	7.3	283.5	12.3	37.1
09/03/92	13:24	45.0	2.2	7.3	312.5	12.3	36.9
09/03/92	13:25	48.5	2.3	7.4	365.0	12.3	36.5
09/03/92	13:26	52.0	2.2	7.4	378.5	12.2	36.1
09/03/92	13:27	49.5	2.2	7.4	357.5	12.2	35.9
09/03/92	13:28	46.0	2.3	7.4	331.0	12.2	35.6
09/03/92	13:29	44.0	2.3	7.5	347.0	12.2	35.6
09/03/92	13:30	47.5	2.4	7.6	405.5	12.1	35.5
09/03/92	13:31	48.5	2.4	7.6	483.5	12.0	35.6
09/03/92	13:32	49.5	2.4	7.7	605.5	11.8	35.6
09/03/92	13:33	51.0	2.3	7.8	618.0	11.8	35.8
09/03/92	13:34	51.0	2.4	7.7	571.5	11.8	35.4
09/03/92	13:35	49.5	2.4	7.7	529.5	11.9	35.1
09/03/92	13:36	47.5	2.5	7.6	594.5	12.0	34.8
09/03/92	13:37	44.0	2.3	7.6	515.0	12.0	34.8
09/03/92	13:38	42.0	2.5	7.6	411.5	12.0	34.4
09/03/92	13:39	47.0	2.5	7.5	343.5	12.1	34.0
09/03/92	13:40	50.0	2.5	7.4	280.0	12.3	33.8
09/03/92	13:41	48.5	2.7	7.4	232.0	12.4	33.5
09/03/92	13:42	43.5	2.6	7.3	233.0	12.5	33.3
09/03/92	13:43	37.5	2.6	7.3	216.5	12.5	33.0
09/03/92	13:44	46.5	2.4	7.3	205.0	12.4	32.6
09/03/92	13:45	47.0	2.3	7.3	206.5	12.4	32.9
09/03/92	13:46	48.5	2.3	7.3	189.0	12.4	32.8
09/03/92	13:47	49.0	2.4	7.2	212.5	12.5	32.4
09/03/92	13:48	46.5	2.6	7.1	191.5	12.6	31.9
09/03/92	13:49	44.0	2.2	7.0	133.0	12.8	31.1
09/03/92	13:50	45.5	2.8	7.0	120.5	12.9	29.0
09/03/92	13:51	48.5	2.6	7.5	289.5	12.4	30.4
09/03/92	13:52	55.5	2.6	7.5	497.0	12.1	30.1
09/03/92	13:53	36.5	2.4	7.5	563.5	12.0	29.8
09/03/92	13:54	52.5	2.5	7.5	521.0	12.1	28.9

FRED WEBER, INC. - NAPA

DATA LISTING

NAME: RAMCON ENVIRONMENTAL LOCATION: FRED WEBER - NAPA STATION ID:

CHAN NAME		HC	SO2	CO2	CO	O2	NOX
CHAN UNITS		PPM	PPM	%	PPM	%	PPM
FULL SCALE		100.0	100.0	20.0	1000.0	25.0	250.0
ZERO OFFSET		0.0	0.0	0.0	0.0	0.0	0.0
START / CHANNEL		01	02	03	04	05	06
09/03/92	13:55	52.5	2.6	7.5	494.0	12.0	28.3
09/03/92	13:56	46.0	2.7	7.5	436.5	12.1	22.5
09/03/92	13:57	50.0	2.7	7.5	415.0	12.2	22.6
09/03/92	13:58	51.0	2.7	7.4	446.0	12.2	22.9
09/03/92	13:59	49.0	2.8	7.4	412.0	12.3	22.5
09/03/92	14:00	47.0	2.6	7.4	406.5	12.3	21.9
09/03/92	14:01	46.5	2.7	7.5	393.5	12.3	20.9
09/03/92	14:02	45.0	2.5	7.4	356.0	12.2	21.8
09/03/92	14:03	44.0	2.6	7.4	331.0	12.3	21.8
09/03/92	14:04	41.5	2.7	7.5	315.5	12.3	21.9
09/03/92	14:05	45.0	2.7	7.5	356.5	12.2	21.1
09/03/92	14:06	70.5	2.8	7.5	370.0	12.2	20.3
09/03/92	14:07	245.5	3.5	7.5	377.0	12.2	16.3
09/03/92	14:08	146.5	4.0	7.5	375.0	12.2	20.0
09/03/92	14:09	75.0	3.4	7.4	343.0	12.2	19.8
09/03/92	14:10	55.5	3.3	7.4	306.0	12.3	19.4
09/03/92	14:11	55.5	3.0	7.4	313.0	12.3	19.6
09/03/92	14:12	26.5	2.8	7.4	302.5	12.3	20.5
09/03/92	14:13	18.0	2.5	7.4	309.5	12.3	20.1
09/03/92	14:14	15.0	2.3	7.4	328.5	12.3	20.8
09/03/92	14:15	13.5	2.4	7.5	336.0	12.3	21.1
09/03/92	14:16	14.5	2.3	7.6	462.0	12.1	20.1
Averages:		51.1	2.5	7.4	393.7	12.2	30.1

FIELD ANALYSIS DATA SHEETS

Plant Fred Weber Date 9-1-92

Location St. Louis Missouri

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	75
Ambient temp. (°C)		Program rate (°C/min)	—
Atmospheric press. (in. Hg)		Final (°C)/time (min)	75
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	30
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)	1	Injection time (24-hr basis)	
Sample loop volume (ml)	1	Chart speed (mm/min)	NA
Sample loop temp. (°C)	75	Dilution ratio	NA
Dilution gas flow rate (ml/min)	NA	Dilution gas used (symbol)	NA

2. Field Analysis Data: DAY 1 Condensables (1 Run)

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm) wet
A Methane	17.86	32		45.7
B "	4.87	"		34.9
C "	7.18	"		36.8
D "	15.78	"		43.9
E "	7.53	"		37.1

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
F Methane	3.72	32		33.9
G "	14.99	"		43.3

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)

FIELD ANALYSIS DATA SHEETS

Plant Fred Weber Date 9-2-92

Location

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	
Ambient temp. (°C)		Program rate (°C/min)	
Atmospheric press. (in. Hg)		Final (°C)/time (min)	
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)		Injection time (24-hr basis)	
Sample loop volume (ml)		Chart speed (mm/min)	
Sample loop temp. (°C)		Dilution ratio	
Dilution gas flow rate (ml/min)		Dilution gas used (symbol)	

2. Field Analysis Data: Run 2+3 Condensables

Run # 2 Time

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	364.91	32		334.93
B	29.35	"		55.30
C	31.29	"		56.92
D	6.91	"		36.66
E	14.46	"		42.9

Run # Time

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
F Methane	4.37	32		34.5
G	8.51	"		37.9

Run # 3 Time

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	4.80	32		34.8
B	76.54	"		89.6

FIELD ANALYSIS DATA SHEETS

Plant Fred Weber Date 9-3-92

Location _____

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	
Ambient temp. (°C)		Program rate (°C/min)	
Atmospheric press. (in. Hg)		Final (°C)/time (min)	
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)		Injection time (24-hr basis)	
Sample loop volume (ml)		Chart speed (mm/min)	
Sample loop temp. (°C)		Dilution ratio	
Dilution gas flow rate (ml/min)		Dilution gas used (symbol)	

2. Field Analysis Data: (3 runs Formaldehyde & 1 Run PAH).

Run # 1 Form Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	36.91	32		324.9
B "	29.35			55.36
C "	31.29			58.92
D "	6.91			36.6
E "	14.46			42.9

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
F "	15.70	32		43.9
G "	152.76			156.47

Run # 2 Form Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	13.54	32		42.1
B	5.15			35.1
C	6.33			36.1
D	15.26			46.1
E	16.66			44.7

FIELD ANALYSIS DATA SHEETS

Plant _____ Date 9-3-92

Location _____

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	
Ambient temp. (°C)		Program rate (°C/min)	
Atmospheric press. (in. Hg)		Final (°C)/time (min)	
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)		Injection time (24-hr basis)	
Sample loop volume (ml)		Chart speed (mm/min)	
Sample loop temp. (°C)		Dilution ratio	
Dilution gas flow rate (ml/min)		Dilution gas used (symbol)	

2. Field Analysis Data:

Run # Run 2 Form Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
E Methane	9.50	32		38.8
C "	6.42	"		35.4

Run # Run 3 Form Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	9.95	32		39.1
B	10.9	"		39.9
C	8.76			38.1
D	10.98			40.0
E	150.60			156.3

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
E Methane	30.89	32		56.6
C	12.56			41.3

FIELD ANALYSIS DATA SHEETS

Plant Fred Weber Date 9-3-92

Location

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	
Ambient temp. (°C)		Program rate (°C/min)	
Atmospheric press. (in. Hg)		Final (°C)/time (min)	
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)		Injection time (24-hr basis)	
Sample loop volume (ml)		Chart speed (mm/min)	
Sample loop temp. (°C)		Dilution ratio	
Dilution gas flow rate (ml/min)		Dilution gas used (symbol)	

2. Field Analysis Data:

Run # 1 PAIT Time

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	10.98	32		39.9
B	7.17			36.8
C	5.64			35.5
D	10.62			39.7
E	7.82			37.4

Run # Time

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
F Methane	8.99	32		38.3
G	9.01			38.3

Run # Time

Components	Area	Attenuation	A x A Factor	Concentration (ppm)

FIELD ANALYSIS DATA SHEETS

Plant Fred Weber Date 9-4-92

Location _____

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	
Ambient temp. (°C)		Program rate (°C/min)	
Atmospheric press. (in. Hg)		Final (°C)/time (min)	
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)		Injection time (24-hr basis)	
Sample loop volume (ml)		Chart speed (mm/min)	
Sample loop temp. (°C)		Dilution ratio	
Dilution gas flow rate (ml/min)		Dilution gas used (symbol)	

2. Field Analysis Data: (2 Runs PAH)

Run #2 PAH Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	52.27	32		74.4
B	60.62	"		81.4
C	57.12			78.4
D	35.6			60.5
E	27.56			53.8

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
F	31.66	32		57.2
G	15.54	"		43.8

Run #3 PAH Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
A Methane	1939	32		47.0
B	47761	"		428.8
C	41.38			341.5
D	16.21			36.0
E	5.42			35.4

FIELD ANALYSIS DATA SHEETS

Plant _____ Date 9-4-92

Location _____

1. General Information:

Source temp. (°C)		Columnar temperature:	
Probe temp. (°C)		Initial (°C)/time (min)	
Ambient temp. (°C)		Program rate (°C/min)	
Atmospheric press. (in. Hg)		Final (°C)/time (min)	
Source press. (in. Hg)		Carrier gas flow rate (ml/min)	
Absolute source press. (mm)		Detector temperature (°C)	
Sampling rate (liter/min)		Injection time (24-hr basis)	
Sample loop volume (ml)		Chart speed (mm/min)	
Sample loop temp. (°C)		Dilution ratio	
Dilution gas flow rate (ml/min)		Dilution gas used (symbol)	

2. Field Analysis Data:

Run #3 (PAH) Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)
F [illegible]	2.11	32		32.6
[illegible]	10.98			40.6

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)

Run # _____ Time _____

Components	Area	Attenuation	A x A Factor	Concentration (ppm)

FORM REC#03

DATA ON FACILITY BEING STACK TESTED

TODAY'S DATE: Sept. 4, 1992

COMPANY NAME Fred Weber, Inc. COMPANY REP. Gary Potter PHONE ( )

LOCATION OF FACILITY North St. Louis Facility ORIGINAL START-UP DATE DESIGNED CAPACITY

OEM MODEL NO. TYPE AC TYPE AC-20

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use #Fuel Oil Nat. Gas Propane Coal ~~Methane~~ other	3 Burner Setting	4 Blower Pressure	5 Production Rate Mix Aggregate TPH	5 Production Rate RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 Venturi Scrubber Baghouse Pressure Drop in w.g.	9 Venturi Scrubber Baghouse Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
6:55		33		285		4.6	330	150	2		68		42
7:00		30		285		4.6	363	192	2		68		40
7:15		30		285		4.3	367	206	2		68		40
7:30		30		285		4.5	367	207	2		68		41
7:45		27		285		4.5	363	195	2		68		40
8:00		27		285		4.5	369	197	2		68		41
8:15		26		285		4.5	372	200	2		69		42
8:30		27		285		4.5	368	196	2		69		41
8:45		26		285		4.5	361	194	2		69		41
9:00		26		285		4.5	362	186	2		69		43
9:15		27		285		4.5	367	189	2		69		42
9:30		26		285		4.5	375	193	2		70		41
9:45		26		285		4.5	370	189	2		70		43
10:00		26		285		4.5	366	187	2		70		42
10:15		27		285		4.5	356	193	2		70		41
10:30		28		285		4.5	362	197	2		71		41
10:45		29		285		4.5	357	201	2.1		72		44
11:00		35		337		4.5	359	206	2.2		73		44

285

PAGE ___ OF ___

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use ___#Fuel Oil ___Nat. Gas ___Propane ___Coal ___other	3 Burner Setting	4 Blower Pressure	5 Production Rate ___Mix ___Aggregate TPH	5 Production Rate ___RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 ___Venturi Scrubber ___Baghouse Pressure Drop in w.g.	9 ___Venturi Scrubber ___Baghouse Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
11:15		32		335		4.5		210	2		82		45
11:30		32		355		4.5		218	2.1		72		48
11:45		32		365		4.5		228	2.5		73		48
12:00		32		365		4.5		217	2.5		75		48
12:15		30		362		4.5		216	2.8		75		42
12:30		30		368		4.5		211	2		76		41
12:45		30		359		4.5		214	1.9		76		40
1:00		30		357		4.5		214	2		76		40
1:15		29		362		4.5		213	2		77		41
1:30		30		362		4.5		214	2		78		41
1:45		28		367		4.5		207	2.1		79		43
2:00	215 tons	29		359		4.5		205	1.5		80		45
2:15		35		381		4.5		217	2		80		44

215 tons

286

FORM REC#03

DATA ON FACILITY BEING STACK TESTED

TODAY'S DATE: 9-2-92

COMPANY NAME FRED WEBER COMPANY REP. PHONE ( ) 899 tons

LOCATION OF FACILITY ORIGINAL START-UP DATE DESIGNED CAPACITY

OEM MODEL NO. TYPE Mix X AC TYPE AC 20

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use: #Fuel Oil / Nat. Gas / Propane / Coal / other	3 Burner Setting	4 Blower Pressure	5 Production Rate: Mix ✓Aggregate TPH	5 Production Rate: RAP TPH	6 Asphalt Cement %	7 Agg Mix Temp. °F	8 Exhaust Gas Temp. °F	9 Venturi Scrubber / Baghouse: Pressure Drop in w.g.	9 Venturi Scrubber / Baghouse: Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
9:00		30%		290		4.6		185	1.5		73°		40%
9:15		28%		290		4.6		203	2		73°		45%
9:30		28%		290		4.6		209	2		73°		40%
9:45		29%		290		4.6		211	2		73°		42%
10:00	Shut Down	29%		290		4.6		201	2		73°		40%
10:45	Start-Up	29%		290		4.6		200	2		74°		40%
11:00		29%		290		4.6		201	2		74°		40%
11:15	Shut-Down	28%		290		4.6		207	2		74°		42%
11:25	Start-Up	30%		290		4.6		193	2		74°		38%
11:40	Shut Down	26%		290		4.6		195	2		74°		40%
12:05	START UP	25%		270		4.6		184	2		74°		40%
12:20		26%		275		4.6		194	2		75°		40%
12:35	Shut Down	27%		270		4.6		200	2		75°		40%
1:55	START UP	28%		270		4.6		198	2		78°		42%
3:15	START UP	29%		270		4.6		196	2		78°		40%
3:30	Shut Down	15%		270		4.6		170	1.5		78°		40%

PAGE ___ OF ___

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use ___#Fuel Oil ___Nat. Gas ___Propane ___Coal ___METH ___other	3 Burner Setting	4 Blower Pressure	5 Production Rate ___Mix ___Aggregate TPH	5 Production Rate ___RAP TPH	6 Asphalt Cement %	7 Avg Mix Temp. °F	8 Exhaust Gas Temp. °F	9 ___Venturi Scrubber ___Baghouse Pressure Drop in w.g.	9 ___Venturi Scrubber ___Baghouse Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
10:45		31%		339		4.9	365	204	1.8		77°		45%
11:00		32%		340		4.9	365	202	2		77°		43%
11:15		33%		340		4.9	365	211	2.5		78°		50%
11:30		29		320		4.9	365	206	2		80°		45%
11:45		28		320		4.9	365	207	2		80°		45%
12:00		32		330		4.9	365	210	2		80°		45%
12:15		32		328		4.9	364	209	2		80°		45%
12:30	SHUT Down	32		328		4.9	364	211	2		81°		45%
1:00	START up	33		320		4.9	360	189	2		82°		45%
1:15		32		320		4.9	362	211	2		82°		45%
1:30		33		326		4.9	367	212	2		82°		42%
1:45		33		325		4.9	366	209	2		83°		45%
2:00	SHUT DOWN	32		325		4.9	362	208	2		83°		42%

2485 ton

DATA ON FACILITY BEING STACK TESTED

COMPANY NAME Fred W. Allen, Inc. COMPANY REP. _____ PHONE ( ) _____

LOCATION OF FACILITY North Alabama Facility ORIGINAL START-UP DATE _____ DESIGNED CAPACITY _____

OEM _____ MODEL NO. _____ TYPE _____ AC TYPE AC-20

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use (#Fuel Oil, Nat. Gas ✓, Propane, Coal, MET FL, other)	3 Burner Setting	4 Blower Pressure	5 Production Rate: Mix (✓Aggregate) TPH	5 Production Rate: RAP TPH	6 Asphalt Cement %	7 Agg Mix Temp. °F	8 Exhaust Gas Temp. °F	9 (Venturi Scrubber / Baghouse): Pressure Drop in w.g.	9: Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
6:20 am		30%		300		4.9	365	181	2		71°		40%
6:35		33%		344		4.9	365	190	2.5		71°		45%
6:45		31		340		4.9	365	200	2		71		45%
7:00		37		370		4.9	365	211	2.2		71°		45%
7:15		34		340		4.9	365	211	2		71°		46%
7:30		31		340		4.9	365	204	2.2		71°		45%
7:45		25		280		4.6	365	184	2.2		720		40%
8:00		26		280		4.6	365	190	2		720		40%
8:15		31		280		4.9	365	210	2		730		40%
8:30		28		310		4.9	365	199	2.1		730		40%
8:45		30		315		4.9	365	200	2		740		42%
9:00		30		315		4.9	365	201	2.1		740		41%
9:15		31		340		4.9	365	205	2		750		42%
9:30		~~33~~		280		4.9	375	210	2		75°		45%
9:45		28%		300		4.9	365	203	2		75°		45%
10:00		32%		310		4.9	360	199	2		75°		42%
10:15		30%		305		4.9	364	200	2.1		76°		45%
10:30		30%		305		4.9	362	198	2		76°		45%

DATA ON FACILITY BEING STACK TESTED

TODAY'S DATE: 9/1/92

COMPANY NAME FRED WEBER COMPANY REP. PHONE ( ) 2706 tons 6:30am – 3:00pm

LOCATION OF FACILITY ORIGINAL START-UP DATE DESIGNED CAPACITY

OEM MODEL NO. TYPE AC TYPE AC 20

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use #Fuel Oil Nat. Gas ✓ Propane Coal METHANE other	3 Burner Setting	4 Blower Pressure	5 Production Rate Mix Aggregate TPH	5 Production Rate RAP TPH	6 Asphalt Cement %	7 Aggregate Mix Temp. °F	8 Exhaust Gas Temp. °F	9 Venturi Scrubber X Baghouse Pressure Drop in w.g.	9 Venturi Scrubber X Baghouse Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
6:30		30%		320		4.9	365	203°	2		64°		40%
6:45		33%		320		4.9	365	213	2		65°		45%
7:00		30%		325		4.9	365	200	2.5		65		40%
7:15		28%		325		4.9	365	195	2		68		40%
7:30		29%		325		4.9	365	198	2.5		68		40%
7:45		26%		300		4.9	365	190	2		68		40%
8:00		29%		300		4.9	365	190	2		69		40%
8:15		26%		300		4.6	365	185	2		69		40%
8:30		29%		300		4.6	365	202	2.1		69		40%
8:45		29%		303		4.9	365	192	2		70°		40%
9:00		28%		300		4.9	365	191	2		70°		40%
9:15		29%		305		4.9	365	193	2		71°		40%
9:30		32%		320		4.9	365	214	2		71°		45%
9:45		30%		327		4.9	365	203	2		72°		45%
10:00		30%		320		4.9	365	201	2		73°		45%
10:15		28%		320		4.9	365	197	2		73°		45%
10:30		29%		320		4.9	365	202	2		73°		40%
10:45		29%		320		4.9	365	198	2		73°		40%

PAGE ___ OF ___

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use __#Fuel Oil__ Nat. Gas___ Propane ___ Coal ___ _____ other	3 Burner Setting	4 Blower Pressure	5 Production Rate __Mix __✓Aggregate TPH	5 __RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 __Venturi Scrubber __Baghouse Pressure Drop in w.g.	9 Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
11:00		24%		325		4.9	365	195	2		78°		40%
11:15		36%		360		4.9	365	206	2		78°		45%
11:30		32		320		4.9	365	206	2		80°		42%
11:45		24%		320		4.9	365	197	2		80°		38%
12:00		30		310		4.9	365	198	2		80°		40%
12:15		30%		322		4.9	365	201	2		80°		40%
12:30		30%		320		4.9	365	199	2		80°		43%
12:45		29%		320		4.9	365	197	2		80°		42%
1:00		29%		330		4.9	365	198	2.2		80°		40%
1:15		30%		300		4.9	365	201	2		82°		40%
1:30		31%		310		4.9	365	197	2		82°		45%
1:45		28%		307		4.9	365	194	2		82°		42%
2:00		29%		308		4.9	365	211	2		82°		40%
2:15		29%		310		4.9	365	202	2		82°		43%
2:30		29%		310		4.9	365	203	2		81°		40%
2:45		29%		300		4.9	365	200	2		81°		40%

Name: Mr. Sumner Buck
Title: President

Qualifications: Mr. Buck is a graduate of the University of Mississippi with graduate studies at Memphis State University and State Technical Institute of Memphis. He is a graduate of the EPA 450 "Source Sampling for Particulate Pollutant's" course and the 474 "Continuous Emissions Monitoring" courses outlined by EPA at Research Triangle Park, N.C. He has been directly involved in conducting and supervising air emission testing for over 15 years. He has personally conducted over 400 air emission tests. He currently sponsors and directs visual emission certification schools for US EPA Method 9.

Project Duties: Mr. Buck is responsible for the overall supervision of each testing project. This includes the correspondence to the State Regulatory Agency and the plant personnel regarding scheduling, testing requirements, etc. He will assist in supervision of the project preparation for each team involved and the overall organization between the testing crew(s) and facility.

Name: Mr. Joe Sewell
Title: Vice President

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

Project Duties: Mr. Sewell provides staff engineering and project administration to ensure the integrity of the requested services. He serves as the primary contact person for RAMCON Environmental Corporation handling all correspondence between the facility personnel involved

in the project and respective state agency representative(s). He provides project leadership to RAMCON Environmental Corporation field supervisors and managers involved in the testing project.

Name: Mr. Ray Jenkins
Title: Source Sampling Director

Qualifications: Mr. Jenkins is serving as the Source Sampling Director for RAMCON Environmental Corporation. He was promoted to this leadership position after gaining a significant amount of experience in conducting and providing field supervision of a variety of air testing projects. Mr. Jenkins has personally conducted and/or supervised all of the prevalent EPA approved procedures with expertise in the instrumental analyzer procedures. He graduated from Memphis State University obtaining a Bachelor of Science degree in Biology. He is also currently certified to conduct US EPA Reference Method 9 for the visual determination of emission opacity.

Project Duties: Mr. Jenkins provides project leadership to the Team Leaders and Field Technicians. He ensures the test crew(s) involved in the test project will be properly informed to his respective duties and responsibilities during the testing process. Mr. Jenkins also serves as the Quality Assurance/Quality Control Coordinator and provides guidance in QA/QC to each Team Leader with regard to sample integrity.

Name: Mr. Tommy South
Title: Laboratory Technician

Qualifications: Mr. South is currently serving as Laboratory Technician. He is proficient in conducting many analysis procedures such as front and back-half particulate analysis, titrations, extractions, etc.

Project Duties: Mr. South conducts the laboratory analysis on the particulate samples. He is also responsible for accepting the remaining field samples from the Field Sample Bank Manager and performing inspection as to integrity. He documents the transfer on the chain of custody forms and distributed the subcontracted samples to the respective laboratories.

Name: Chuck Hughes
Title: Team Leader

Qualifications: Mr. Hughes is a Team Leader and has completed training in isokinetic and proportional test methods. Prior to his employment with RAMCON Environmental Corporation, Mr. Hughes served in the U.S. Army for four (4) years, with 3 years of leadership experience. During this 4-year period, Mr. Hughes spent 3 years at Total Army Command with duty at the Pentagon and 1 year at Headquarters 5th Infantry Division reporting unit strength estimates to the Commanding General and was among the highest levels of the Army Command structure.

Project Duties: Mr. Hughes is responsible for conducting isokinetic sampling procedures at the facility(s). He is also responsible for preparation, calibration and cleaning of the necessary equipment for this testing. His duties on-site include assembling the sample train, leak checking the system, operation of the train and recording the test data on the field data forms.