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Determination of VOC, Ethanol, and Acetaldehyde Emissions from Commercial Bakeries

Site 1 Test Report

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Radian Report Certification

This report has been reviewed by the following Radian personnel and is a true representation of the results obtained from the sampling program conducted at four commercial bakeries on behalf of the U.S. Environmental Protection Agency. The testing was conducted from May through July, 1992, except where noted, sampling and analytical methods were performed in accordance with U.S. EPA reference procedures.

APPROVAL:

Raymond G. Merrill, Program Manager — Date: 9/29/92

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1.0 EXECUTIVE SUMMARY

Radian was contracted by The U.S. Environmental Protection Agency, Emissions Measurement Branch, to conduct Volatile Organic Compound (VOC) emissions testing at four commercial bakeries. This test report will present the results from the Site 1 test program. Tests were conducted on a variety of bakery ovens while baking different product types. The test procedures used were the U.S. EPA Stationary Source Testing Method 25A for VOCs and Method 18 for methane, ethanol and acetaldehyde determinations. Method 25A was used to quantify total hydrocarbons (THC). Method 18 was employed to quantify methane and two of the most prevalent VOC compounds (acetaldehyde and ethanol) in the bakery emission stream. Flow rates were measured using U.S. EPA Methods 1-4 and were used to calculate emission rates of the above gas stream components.

As a part of the test program, process conditions were monitored by a separate U.S. EPA contractor. Research Triangle Institute (RTI) monitored parameters such as product type, production rates, yeast concentration, proofing time and others. This report will only present the emissions data collected by Radian and will not include any process information. A separate report completed by RTI will incorporate the emission values presented in this report with the specific bakery process information.

Two sets of emission data were calculated. The first set presents VOC as ethanol emissions calculated using the Method 25A and Method 18 methane test results. (Ethanol concentrations typically made up over 98% of the total ethanol and acetaldehyde concentrations). The second data set presents emission rates of ethanol and acetaldehyde calculated from the Method 25A and the Method 18 ethanol and acetaldehyde test results.

VOC as ethanol emissions were determined by first averaging concentrations of THC over the respective test period. Non-methane hydrocarbon

concentrations were then determined by removing the methane concentration from the THC values. VOC as ethanol concentrations were determined by dividing the non-methane hydrocarbon concentration by the ethanol carbon equivalent correction factor (CECF). The CECF was empirically determined during and following the test program. The VOC as ethanol concentrations were then multiplied by the respective stack gas flow rates to determine VOC as ethanol emission rates.

Separate emissions rates of ethanol and acetaldehyde were calculated using both the Method 25A THC and Method 18 test results. The average ethanol-to-THC ratio was multiplied times the average THC concentration to determine an average ethanol concentration and formulate a larger averaging data base within the testing time period. Average acetaldehyde concentrations were calculated in the same manner. This procedure assumed that the proportion of ethanol to THC and acetaldehyde to THC remained constant throughout the test period. This assumption did not prove always to be true; however, concentrations determined in this manner were very similar to concentrations determined by averaging the Method 18 results alone. Results from both calculation methods are presented. Ethanol and acetaldehyde emission rates were then calculated by multiplying the average concentrations by the stack gas flow rates.

1.1 VOC as Ethanol Emissions

Emissions at Site 1 ranged from 12.9 - 15.8 lbs/hr for the Bread Oven. The Site 1 Bun oven showed lower emissions of 4.3 lbs/hr. A complete listing of all test results is given in Section 3.0 and in the attached Appendices.

1.2 Ethanol and Acetaldehyde Emissions

Site 1 ethanol values ranged from 14.3 - 18.8 lbs/hr for the Bread oven. The corresponding acetaldehyde values ranged from 0.33 - 0.78 lbs/hr. The Site 1 Bun oven emissions of ethanol and acetaldehyde was 5.7 and 0.17 lbs/hr, respectively.

1.3 Data Quality Assurance

The majority of reference method QA acceptance criteria were met during this test program. There were 10 days of testing using two THC monitoring systems (20 system days). Method 25A daily calibration drift did not exceed the criterion of ±3% on nineteen of the twenty system days. The Site 1, Day 1 Method 25A test data exhibited a calibration drift of 3.2%; therefore, the drift was corrected by assuming linear drift between the initial and final calibration. Over 150 Method 25A calibration error checks were performed during the four site test program. The majority of these calibration error checks met the Method 25A criterion of ±5% of the gas concentration. Method 25A sample bias checks, as well as O_2 leak checks were also completed.

Method 18 QA/QC procedures were also followed. Initial and final calibrations were performed. Calibrations for methane, ethanol and acetaldehyde were all completed using 3 to 5 calibration points.

Sample bias checks were routinely conducted on the Method 18 sampling system and the majority verified acceptable non-biased sampling. However, some checks revealed sample bias caused by the loss of heat in the heated sample tubing adjacent to the gas chromatograph (GC). These data points were invalid and testing was discontinued until the problem was remedied and a successful bias check had been completed. More is discussed on this matter in Section 6.0.

1.4 Recommendations for Further Work

Further work is recommended to further characterize bakery emissions and to improve the test method. Compounds other than ethanol and acetaldehyde were not detected by the Method 18 analyses. However, trace (< 10 ppmv) levels of other compounds may be present in the bakery stream and although these compounds would not be expected to increase VOC emission rates, it would be interesting to identify them.

Another area which could be further examined is the comparison of Method 18 GC results to the Method 25A THC results. It was expected that the concentration of THC detected by the Method 25A analyzer would exceed the concentrations of the three targeted VOC compounds. However, throughout this test program, a higher concentration of compounds was determined by the GC than by the THC monitor. Comparisons were made by first correcting concentrations of each compound determined from the GC analysis from parts per million by volume (ppmv) to ppmv as Carbon (ppmC). This was done using the previously mentioned CECF of 1.42 for ethanol, 1.23 for acetaldehyde, and 1 for methane. The sum of the three corrected GC concentrations were then divided by the THC concentration. Typically, comparisons resulted in values of 120-140% of GC vs THC values. This error may be a result of inaccuracy in the CECF as it was applied to the sample gas matrix. Matrix effects may have somehow lowered the THC response (CECF) for ethanol as compared to the ethanol response in a dry, nitrogen calibration gas. Further work examining this Method 18 and Method 25A results comparison could be examined.

2.0 INTRODUCTION

2.1 Overview

The U.S. Environmental Protection Agency (U.S. EPA) has been requested to develop an alternative control technique (ACT) guidance document for controlling Volatile Organic Carbon (VOC) emissions from commercial baking operations. Interest has also been expressed in recalculating the AP-42[1] emission factors for bakery VOC emissions. Ethanol (C_2H_5OH) is the primary pollutant emitted from commercial bakeries.[2] Ethanol along with Carbon Dioxide (CO_2) is produced during the yeast metabolic process. Previous test data from bakeries has also revealed the presence of acetaldehyde (CH_3CHO).[2] Therefore, in conjunction with the development of an ACT document and new AP-42 emission factors, the U.S. EPA has contracted Radian Corporation to perform emissions testing of several commercial bakeries in order to gather the necessary background emissions data. This report will present the results of the U.S. EPA Bakeries test program for Site 1.

The test procedures used were the U.S. EPA Stationary Source Testing Method 25A for VOCs and Method 18 for methane, ethanol and acetaldehyde determinations. Method 25A was used to quantify total hydrocarbons (THC). Method 18 was employed to quantify methane and two of the most prevalent VOC compounds (acetaldehyde and ethanol) in the bakery emission stream. By combining both procedures, the VOC emissions were fully characterized.

As a part of this data gathering phase, U.S. EPA contracted Research Triangle Institute (RTI) to monitor the baking process parameters during the emissions

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[1]Compilation of Air Pollutant Emission Factors, Section 6.13, U.S. EPA (1972).

[2]Background Documentation for AP-42, Section 6.13, Bakeries, PES for U.S. EPA (1972).

tests. Items such as dough mixing process, fermentation (proofing) time, yeast concentration, production rates and others were monitored. However, this report will only present emissions data, that will be used with the process and production rate data to develop emission factors that will be presented in a separate document.

2.2 Test Objectives

The objectives of this test program was to determine VOC emission rates as well as ethanol and acetaldehyde emission rates. The data could then be used to determine of which air pollution control techniques would be effective for the bakery industry. As discussed above, it was also desirable to correlate the emissions data with process data to update and/or verify the emission factors for commercial bakeries.

2.3 Test Methods

Because each oven had at least two stacks, concentrations of THC were continuously and simultaneously monitored on each stack using two THC continuous emissions monitoring systems (CEMS). The THC data was typically recorded on every 10 seconds a computer disk. The resulting THC data were then averaged over each period of time corresponding to a distinct segment of the process operation (i.e., 30 minute sandwich bread baking process). Methane, ethanol and acetaldehyde concentrations were measured semi-continuously using discrete analyses by a Gas Chromatograph/Flame Ionization Detector (GC/FID). One GC/FID analyzer was used for this test program. One analysis of methane, acetaldehyde, and ethanol could be completed every 10 minutes; therefore, a full oven characterization could be completed every 20 minutes (2 stacks per oven).

Method 25A and Method 18 required extracting a sample stream of the gas from the stack through a heated Teflon® tube. A portion of the sample was directed to a THC analyzer which quantified THC on a real-time basis by a Flame Ionization

Detector (FID). The THC analyzer processes unconditional gas samples; therefore, concentrations are characterized ppmv, on a wet basis. A portion of the remaining gas stream was directed to the Method 18 gas chromatograph. The GC column separated individual hydrocarbons which were quantified with the FID.

Gas flow rate was determined by using the U.S. EPA Method 2. This method called for measuring the velocity of the gas stream and by multiplying it by the stack cross-sectional area, a volumetric flow rate was determined. Method 2 also called for point location determination to be made by Method 1, CO_2 and O_2 concentrations by Method 3 and moisture content by Method 4.

2.4 Data Reduction

As previously discussed, two sets of emission data were calculated. The first set presents VOC as ethanol emissions calculated using the Method 25A and the Method 18 methane test results. The second data set presents emission rates of ethanol and acetaldehyde calculated from the Method 25A and the Method 18 ethanol and acetaldehyde test results. The data reduction methods used are summarized in the following paragraphs.

Method 25A requires THC data to be reported in units of parts per million as Carbon (ppmC). Preliminary THC concentrations in units of ppmv as the calibration compound (i.e., propane) are multiplied by that respective compound's carbon equivalent correction factor (CECF) to correct the units to ppmC. The CECF for methane, ethane and propane are 1, 2 and 3, respectively. For example, if the Method 25A monitor was calibrated with propane, all resulting concentrations would be multiplied by the propane CECF of 3 to correct the concentration from ppmv as propane to ppmC. The THC values can be converted to ppmv of the compound of interest if 1) the specific CECF is known, and 2) the compound proportion of THC is known. For this test program, the THC monitors were calibrated with methane which has a CECF of 1, so the resulting

THC data was already in units of ppmC. However, correcting the THC concentration to VOC as ethanol concentration did require dividing the average non-methane THC concentration by the ethanol CECF. This process assumed that the non-methane hydrocarbons were made up entirely of ethanol. The resulting VOC as ethanol concentrations were then multiplied by the stack gas flow rates in order to determine VOC as ethanol emission rates.

Ethanol and acetaldehyde emissions were also calculated. Average ethanol and acetaldehyde concentrations were calculated by averaging the multiple Method 18 analytical results. However, only three Method 18 data points (per compound) were typically acquired per hour. In order to increase the number of data points in a given time period, the continuous Method 25A data was also used. An average ethanol-to-THC proportion from the above three analyses was calculated and then multiplied by the average THC value to calculate an average ethanol concentration. This method assumes that the ethanol-to-THC proportion is constant throughout the test run. Acetaldehyde calculations were performed in the same manner.

All data reduction procedures are fully explained in Section 7.0

2.5 Report Organization

A summary of the test results is presented in Section 3, a description of typical Oven Configurations and Sampling Locations is given in Section 4, and Sampling and Analytical Procedures are discussed in Section 5. Quality Assurance (QA) is presented in Section 6, and Data Reduction Procedures in Section 7. All field data and supporting calculations are included in the Appendices.

3.0 EMISSIONS RESULTS SUMMARY

This section will present the final results for the U.S. EPA Bakery emissions test program for Site 1. All raw data and calculations are included in the Appendices.

3.1 Test Program Summary

Four test sites were tested using Method 25A for THC determinations and Method 18 for methane, ethane, ethanol and acetaldehyde concentrations determinations. One of the test objectives was to quantify the VOC emissions which represent only the photochemically reactive volatile organic compounds. Non-reactive compounds such as methane and ethane are subtracted from the THC concentrations for determining VOC concentrations. The VOC concentrations and emissions for this test report were calculated by assuming that all of the non-methane hydrocarbons detected by the Method 25A tests were comprised of ethanol. This was consistently observed at all four test sites as ethanol concentrations determined from the Method 18 analyses typically made up over 98% of the total ethanol and acetaldehyde concentrations (target VOCs).

In Section 3, two sets of emissions data are given. The first data set presents emissions of VOC as ethanol as discussed above. The VOC concentration as ethanol was calculated by dividing the non-methane hydrocarbon concentration in units of ppmC by the ethanol THC Carbon Equivalent Correction Factor. The CECF was determined by observing the response of the THC analyzer to known concentrations of ethanol. The second data set presents emissions of ethanol and acetaldehyde emissions determined from the Method 18 ethanol and acetaldehyde results and the THC results. Emissions were calculated by multiplying the respective stack gas concentrations by the stack gas flow rate by the methods discussed above. All calculations are shown in Section 7.0.

Methane concentrations were higher than expected during the test program which did not allow for the resolution of the ethane GC peak at three of the test sites. However, ethane concentrations were expected to be fairly low and so the error in determining VOC is expected to be minimal.

The emissions of both direct- and indirect-fired ovens were measured (see Section 4.1.2) while baking a variety of bakery products. Production rate is the most critical factor related to the quantity of bakery VOC emissions. However, as discussed in the previous section, no product information or process data will be given in this report. The general category of ovens tested will be identified, differentiating direct-fired from indirect-fired and bread from bun ovens.

Thirty test runs were conducted for a typical sample period of 1 hour. Some of the runs were shorter than an hour due to the stoppage of the product being baked. Emissions was measured from only a single product at one time. Time periods when the ovens were in transient conditions, either from start up/shut down occurrences or from product changes or gaps in the product feed, were not included in the reported data base. However, all of the field data is included in the Appendices.

A general description of the commercial baking process and bakery ovens along with the types of ovens tested at each test site is given in Section 4. A total of two or three stacks were tested simultaneously from each oven. The total oven emissions were calculated by totaling the emissions from each of the stacks. Emissions from comfort hood stacks (see Figure 4-1) were not originally intended to be tested. However, it was noticed during the Site 2 test program that these emissions represented a significant portion of the total oven emission rates and from that point on, comfort hood emissions were tested. The Site 1 bread oven did have a comfort hood which was not tested during this test program. Therefore, the total bread oven emissions for that site may be somewhat lower than actual.

3.2 Site 1 Test Results

A large bread oven and a smaller bun oven were tested at the Site 1 commercial bakery. The bread oven was a direct-fired oven which had three vent stacks arranged longitudinally. The middle stack was used only during oven purging (start-up) and was capped off with a small metal drum during the emissions tests. The absence of flow at this stack was confirmed using a sensitive hot-wire anemometer (0-600 fpm scale). After the test was completed, it was later discovered that there was a comfort hood located at the oven bread exit. Gases from the hood were directed up through a vent stack on the roof. However, this stack was not tested and the resulting total oven emissions may be biased low.

3.2.1 Site 1 Test Log

Emissions tests were conducted on May 20 and 21, 1992. All tests were observed by an U.S. EPA/EMB observer. Five test runs were conducted on two ovens. On Day 1, two types of products were tested (Runs 1 & 2) and three runs on one type of product were conducted on Day 2. Table 3-1 presents a summary of the Site 1 sampling activities.

3.2.2 Site 1 VOC as Ethanol Emissions Test Results

Table 3-2 presents the VOC as ethanol test results. The table presents THC concentrations (including methane) as well as VOC concentrations derived by removing the methane concentrations from the THC values (ppmC/wet). Concentrations of VOCs are also given in ppmv as ethanol, calculated as discussed above. Emission rates from each stack are calculated from the VOC as ethanol concentrations. The total oven VOC emissions are then calculated by totaling the emissions from both vent stacks.

Table 3-1

Site 1 Bakery VOC Emissions Test Log EPA Bakeries (1992)

Run	Date	Sampling Time	Product	Number of GC injections	
				Front	Rear
1	5/20/92	11:58-13:16	Bread A	3	3
2	5/20/92	14:30-15:31	Bun B	3	3
3	5/21/92	07:37-09:14	Bread C	3	4
4	5/21/92	10:01-10:24	Bread A	1	1
5	5/21/92	21:03-22:41	Bread D	4	3

Table 3–2. VOC Emissions Assuming 100 % Ethanol
EPA Bakeries, Site 1 (1992)

Run	Run 1		Run 2		Run 3		Run 4		Run 5	
Stack Location	**Front**	**Rear**	**Front**	**Rear**	**Front**	**Rear**	**Front**	**Rear**	**Front**	**Rear**
THC Conc. (ppmC/wet)	1015.3	2822.8	2687.6	704.8	1035.4	3554.5	1125.8	3097.3	1075.2	3241.9
Methane Concentrations										
Methane Conc. (ppmv/wet) [1]	977	658.7	2006	212.1	779	1542.5	389	841	820.3	819
Methane/THC Ratio	0.859	0.231	0.737	0.276	0.626	0.451	0.332	0.263	0.729	0.257
Methane Conc. (ppmC/wet) [2]	872.14	652.06	1980.7	194.52	648.16	1603.0	373.76	814.58	783.82	833.168
VOC Emissions										
VOC Conc. (ppmC/wet) [3]	143.2	2170.7	706.8	510.3	387.2	1951.4	752.0	2282.7	291.4	2408.7
VOC Conc. as Ethanol (ppmv/wet) [4]	100.8	1528.7	497.8	359.3	272.7	1374.2	529.6	1607.5	205.2	1696.3
VOC Emission Rate as Ethanol (lb/hr) [4]	0.52	12.38	2.82	1.47	1.41	11.13	2.75	13.02	1.06	13.74
Total VOC Emissions as Ethanol (lbs/hr) [4]	12.908 [a]		4.290		12.548		15.771 [a]		14.807	

[1] Values calculated from average methane concentrations determined from multiple GC analyses.

-- Values calculated from average Methane to THC ratios (CH4/THC) incorporating both GC and THC analyses:

[2] Methane Conc. = Avg ($CH4_i / THC_i$) * (Avg THC)

[3] VOC Conc. = Avg ($1 - CH4_i / THC_i$) * (Avg THC)

[4] VOC Conc. as Ethanol = (VOC Conc) / 1.42 VOC Emissions as Ethanol = (VOC Conc. as Ethanol) * Flow; where 1.42 is the empirically derived carbon equivalent correction factor

[a] Ethanol GC Results are suspect. However, these values do not incorporate the ethanol GC results (methane only)

Runs 1 and 3-5 were conducted on the Bread oven. The total emissions for these runs may be biased slightly low as the comfort hood stack was not tested.

3.2.3 Site 1 Ethanol and Acetaldehyde Emission Test Results

Table 3-3 presents the emission rates of ethanol and acetaldehyde and presents the concentrations in two ways. The first method reports the ethanol concentration determined by averaging the results of the Method 18 analyses. The second method multiplies the average ethanol-to-THC ratio by the average THC value to determine average ethanol concentrations. The second method assumes a constant ethanol-to-THC proportion and by using the continuous THC data base (THC values every minute), incorporates a much larger data base for averaging. Ethanol emissions are calculated from concentrations determined by both methods. However, the total oven emissions were determined from concentrations using the THC data. Acetaldehyde values were calculated similarly. All data reduction procedures is given in Section 7.

3.2.4 Site 1 Method [illegible] and Method 18 Analytical Results

This section presents the results from the Method 18 analyses. The Method 25A THC concentrations are given for same time period that the GC injections were made. Typically, three injections were made during a test run at a specific sample location. The concentrations were then averaged. Some GC injections were made that did not fall into the test run time-frame. Results from these analyses are presented in the tables but are not included in the averages. Ethanol-to-THC and acetaldehyde-to-THC ratios were calculated for each injection as well. The ethanol and acetaldehyde values were not corrected to ppmC for this calculation; therefore, these values cannot be consid[illegible]red volumetric proportions of the THC stream. Their purpose was to be multiplied b[illegible]e average THC value to calculate average methane, ethanol,

Table 3–3. Ethanol and Acetaldehyde Emissions Test Results EPA Bakeries, Site 1 (1992)

Run	Run 1		Run 2		Run 3		Run 4		Run 5	
Stack Location	**Front**	**Rear**	**Front**	**Rear**	**Front**	**Rear**	**Front**	**Rear**	**Front**	**Rear**
THC Conc. (ppmC/wet)	1015.3	2822.8	2687.6	704.8	1035.4	3554.5	1125.8	3097.3	1075.2	3241.9
Ethanol Emissions										
Ethanol Conc. (ppmv/wet) [1]	464	S	677	503.7	270.3	2140	S	S	370	1930
Ethanol Conc. (ppmv/wet) [2]	413.2	1494.4 [a]	671.9	469.4	223.6	2178.9	525.9 [a]	1572.1 [a]	352.7	1961.3
Ethanol/THC Ratio	0.407	S	0.25	0.666	0.216	0.613	S	S	0.328	0.605
Ethanol Emission Rate (lb/hr) [1]	2.41	S	3.83	2.07	1.40	17.34	S	S	1.92	15.64
Ethanol Emission Rate (lb/hr) [2]	2.14	12.11	3.80	1.93	1.16	17.65	2.73	12.74	1.83	15.89
Total Ethanol Emission Rate (lbs/hr) [2]	14.25 [a]		5.73		18.81		15.47 [a]		17.72	
Acetaldehyde Emissions										
Acetaldehyde Conc. (ppmv/wet) [1]	8.78	39.60	29.40	4.59	14.70	99.70	4.27	40.90	11.80	45.10
Acetaldehyde Conc. (ppmv/wet) [2]	7.82	38.39	29.03	4.37	12.94	92.77	4.17	39.65	11.18	44.09
Acetaldehyde/THC Ratio	0.77	1.36	1.08	0.62	1.25	2.61	0.37	1.28	1.04	1.36
Acetaldehyde Emission Rate (lb/hr) [1]	0.044	0.307	0.159	0.018	0.073	0.773	0.021	0.317	0.059	0.349
Acetaldehyde Emission Rate (lb/hr) [2]	0.039	0.298	0.157	0.017	0.064	0.719	0.021	0.307	0.055	0.342
Total Acetaldehyde Emission Rate (lbs/hr) [2]	0.336		0.174		0.783		0.328		0.397	

[1] Values calculated from average concentrations determined from multiple GC analyses.

[2] Values calculated from average Ethanol/THC and Acetaldehyde/THC ratios (ETOH/THC and AA/THC) incorporating both GC and THC analyses: ETOH Conc. = Avg ($ETOH_i/THC_i$) * (Avg THC): ETOH Emissions = (Avg ETOH Conc.) * Flow

AA Conc. = Avg (AA_i/THC_i) * (Avg THC): AA Emissions = (Avg AA Conc.) * Flow

S = Suspect Ethanol GC Analysis

[a] Due to the invalidated ethanol GC results, the value was calculated as folows: {(VOC Conc.) − (A.A. Conc * 1.23)} / 1.42 where 1.23 and 1.42 are the carbon equivalent correction factors for A.A.:CH4 and Ethanol:CH4, respectively. Emissions calculated as shown above.

and acetaldehyde concentrations. This allowed ethanol and acetaldehyde concentrations to be calculated without incorporating the additional methane analysis.

Finally, a comparison of the total concentration of the three target compounds detected by the GC was made with the THC values for each discrete injection. This parameter is not required by the reference method QA procedures, but it was originally thought to be an indication what proportion of THC the three target compounds represented. It was expected that the sum of the GC concentrations would be somewhat lower that the total THC concentration taking into account trace concentrations of organics in the gas stream that were not detected by the GC analyses. However, this comparison may not be sufficiently accurate. The average ratio is calculated as follows:

$$\overline{\left(\frac{GC}{THC}\right)} = \frac{\sum_{i=1}^{N} \frac{GC_i}{THC_i}}{N} \times 100$$

where:

THC_i = THC concentrations determined from the Method 25A monitor at the same time as the GC injection (ppmC)

N = Number of GC injectors in the time period.

The units from the GC analyses have to be corrected to the same units as the THC concentrations (ppmC) as follows:

$$GC_i = \left(\frac{[ETOH]_i}{1.42} + \frac{[AA]_i}{1.23} + [CH_4]_i \right)$$

where:

$[ETOH]_i$	=	Ethanol concentration determined from a single GC analysis (ppmv/wet)
1.42	=	Ethanol THC Carbon Equivalent Correction Factor (empirically derived)
$[AA]_i$	=	Acetaldehyde concentration determined from a single GC analysis (ppmv/wet)
1.23	=	Acetaldehyde THC Carbon Equivalent Correction Factor (empirically derived)
$[CH_4]_i$	=	Methane concentration determined from a single GC analysis (ppmv/wet). NOTE: The methane CECF is 1.0.

The CECFs used for this test program were determined by challenging the THC analyzer with known, certified concentrations of ethanol and acetaldehyde and recording the response. For example, if a 200 ppmv ethanol gas standard responded as 300 ppmC THC, then the ethanol CECF was 1.5. The CECFs were determined over the entire range of concentrations observed during the test program. It is difficult to predict whether the THC analyzer responded to the ethanol in the bakery sample gas matrix the same (quantitatively) as to ethanol in a clean, dry calibration gas. Both sample gas moisture levels and O_2 levels were different than the calibration gas matrix (dry, N_2 balance). The unexpected high GC/THC ratios (> 100%) may have resulted from a variability in the actual sample CECF.

Tables 3-4 and 3-5 present the Method 18 and 25A test results for the Site 1 front and rear stacks , respectively. The test results have been discussed in detail in the previous sections; however, the following tables can provide an additional perspective into the data.

Table 3-4. Method 25A and Method 18 Emissions Tests Results, Front Stack, EPA Bakeries, Site 1 (1992).

FRONT/OVEN STACK									
RUN	TIME	METHOD 25A THC RESULTS[a] (ppmC/wet)	METHOD 18 GC RESULTS			GC/THC RATIO [b] (%)	THC PROPORTIONS [c]		
			ETHANOL (ppmv/wet)	METHANE (ppmv/wet)	ACET-ALDEHYDE (ppmv/wet)		ETH/THC RATIO	CH4/THC RATIO	AA/THC RATIO
1	11:55:54	1138.9	212	1181	11.7	131.4	0.186	1.037	0.010
1	12:33:55	1141.7	868	765	8.24	175.9	0.760	0.670	0.007
1	12:56:06	1132.3	312.1	985	6.43	126.8	0.276	0.870	0.006
1	**AVG**	**1015.3**	**464.0**	**977.0**	**8.8**	**144.7**	**0.407**	**0.859**	**0.008**
2	14:31:59	2834.1	581	2117	29	105.1	0.205	0.747	0.010
2	14:50:57	2669.1	858	2070	32.7	124.7	0.321	0.776	0.012
2	15:13:59	2655.1	592	1831	26.4	101.8	0.223	0.690	0.010
2	**AVG**	**2687.6**	**677.0**	**2006.0**	**29.4**	**110.5**	**0.250**	**0.737**	**0.011**
3	07:36:50	1211.3	236	760	8.88	91.3	0.195	0.627	0.007
3	07:57:48	1526.2	328	883	12.1	89.3	0.215	0.579	0.008
3	08:17:47	1032.5	247	694	23	103.9	0.239	0.672	0.022
3	**AVG**	**1035.4**	**270.3**	**779.0**	**14.7**	**94.9**	**0.216**	**0.626**	**0.013**
4	10:04:19	1170.4	122	389	4.27	48.5	0.104	0.332	0.004
4	**AVG**	**1125.8**	**122**	**389**	**4.27**	**48.4879**	**0.104**	**0.332**	**0.004**
5	21:03:59	1117.1	237	914	11.2	113.2	0.212	0.818	0.010
5	21:27:01	1091.9	368	730	11.4	116.0	0.337	0.669	0.010
5	22:15:00	1162.2	389	761	11.7	114.2	0.335	0.655	0.010
5	22:25:59	1133.0	353	876	12.2	122.9	0.312	0.773	0.011
5	**AVG**	**1075.2**	**336.8**	**820.3**	**11.6**	**116.6**	**0.299**	**0.729**	**0.010**

[a] THC averages calculated from the full CEM data base (not just the above entries)

[b] GC/THC RATIO = (ETOH/1.42+AA/1.23+CH4)/THC * 100 where: 1.42 = Ethanol CECF
1.23 = Acetaldehyde CECF

[c] THC proportions were calculated as:ETH/THC = ppmv ethanol/ppmC THC, CH4/THC = ppmv CH4/ pmC THC,
AA/THC = ppmv acetaldehyde/ ppmC THC

Table 3–5. Method 25A and Method 18 Emissions Tests Results, Rear Stack, EPA Bakeries, Site 1 (1992).

REAR/BURNER STACK										
RUN	TIME	METHOD 25A THC RESULTS[a] (ppmC/wet)	METHOD 18 GC RESULTS ETHANOL (ppmv/wet)	METHANE (ppmv/wet)	ACET–ALDEHYDE (ppmv/wet)	GC/THC RATIO [b] (%)	THC PROPORTIONS [c] ETH/THC RATIO	CH4/THC RATIO	AA/THC RATIO
1	12:05:57	3185.8	14100 [S]	601.0	49.9	649.3	4.426	0.189	0.016
1	12:44:54	2799.6	5850 [S]	793.0	29.2	326.3	2.090	0.283	0.010
1	13:06:05	2640.7	14600 [S]	582.0	39.0	809.0	5.529	0.220	0.015
1	**AVG**	**2822.8**	**S**	**658.7**	**39.4**	**594.9**	**4.015**	**0.231**	**0.014**
2	14:41:58	818.6	674.0	255.0	5.5	148.9	0.823	0.312	0.007
2	15:03:00	574.0	235.0	65.4	3.2	70.2	0.409	0.114	0.005
2	15:24:58	784.4	602.0	316.0	5.2	150.1	0.767	0.403	0.007
2	**AVG**	**704.8**	**503.7**	**212.1**	**4.6**	**123.1**	**0.667**	**0.276**	**0.006**
	07:46:49	3125.9	1940.0	1540	46.2	139.2	0.621	0.493	0.015
3	08:07:47	3947.2	2620.0	1480	225	138.8	0.664	0.375	0.057
3	08:28:46	2959.8	1660.0	1530	27.1	132.5	0.561	0.517	0.009
3	09:01:43	3867.9	2340.0	1620	47	129.3	0.605	0.419	0.012
3	**AVG**	**3554.5**	**2140.0**	**1542.5**	**86.3**	**134.9**	**0.613**	**0.451**	**0.023**
4	10:14:35	3192.4	7930 [S]	841	40.9	380.6	2.484	0.263	0.013
4	**AVG**	**3097.3**	**S**	**841**	**40.9**	**380.6**	**2.484**	**0.263**	**0.013**
NA	21:36:01	3271.3	3730.0	1070	43.6	196.3	1.140	0.327	0.013
NA	21:55:59	3528.2	5650.0	1040	55.9	258.8	1.601	0.295	0.016
5	21:15:02	3192.2	1930.0	819	40.3	113.1	0.605	0.257	0.013
5	**AVG**	**3241.9**	**1930.0**	**819.0**	**40.3**	**113.1**	**0.605**	**0.257**	**0.013**

[a] THC averages calculated from the full CEM data base (not just the above entries)

[b] GC/THC RATIO = (ETOH/1.42+AA/1.23+CH4)/THC * 100 where: 1.42 = Ethanol CECF
1.23 = Acetaldehyde CECF

[c] THC proportions were calculated as:ETH/THC = ppmv ethanol/ppmC THC, CH4/THC = ppmv CH4/ pmC THC, AA/THC = ppmv acetaldehyde/ ppmC THC

[S] = Suspect, data invalidated.

NA = Not Applicable. Values were not incorporated into the averages.

Four tests (Runs 1, 3-5) were conducted on the bread oven. Run 4 was a duplicate of Run 1 and was conducted for only 23 minutes. The ethanol-to-THC ratios for the front bread stack, were fairly consistent at approximately 0.20. Ratios for Run 1 ranged from 0.19 to 0.76. The ethanol-to-THC proportion for the rear stacks was approximately 0.60. Ethanol from Runs 1 and 4 (same product) appeared suspect, with ethanol-to-THC ratios of 2.0 to 5.5 (5850 - 14,100 ppmv ethanol vs 2,800- 3,200 ppmC THC, GC/THC values of 300 to 800 percent). The ethanol results from these two test runs were not used to calculate either VOC as ethanol emissions or ethanol emission rates.

The Run 2 results from the Site 1 Bun oven, showed consistent ethanol-to-THC proportions of about 0.25 for the front stack while the rear stack ranged from 0.40 - 0.80. The GC-to-THC ratios for this run were 105 and 108% for the front and rear Bun oven stack, respectively.

The Site 1 Method 25A and Method 18 results are presented graphically for Runs 1-5 in Figures 3-1 through 3-5, respectively. Method 18 concentrations have been corrected to ppmC for these plots.

3.2.5 Stack Gas Flow Rates

Table 3-6 presents the stack gas flow rates and the temperatures used for determining emission rates. A single Method 2 flow rate traverse and a Method 4 moisture determination were completed on the four stacks (2/bread oven & 2/bun oven). Flows were not corrected to a dry basis since Method 25A and 18 concentrations were determined on a wet basis and emissions calculations required both flows and concentrations be consistently on the same basis (wet or dry). Moisture content values are included in the Appendices.

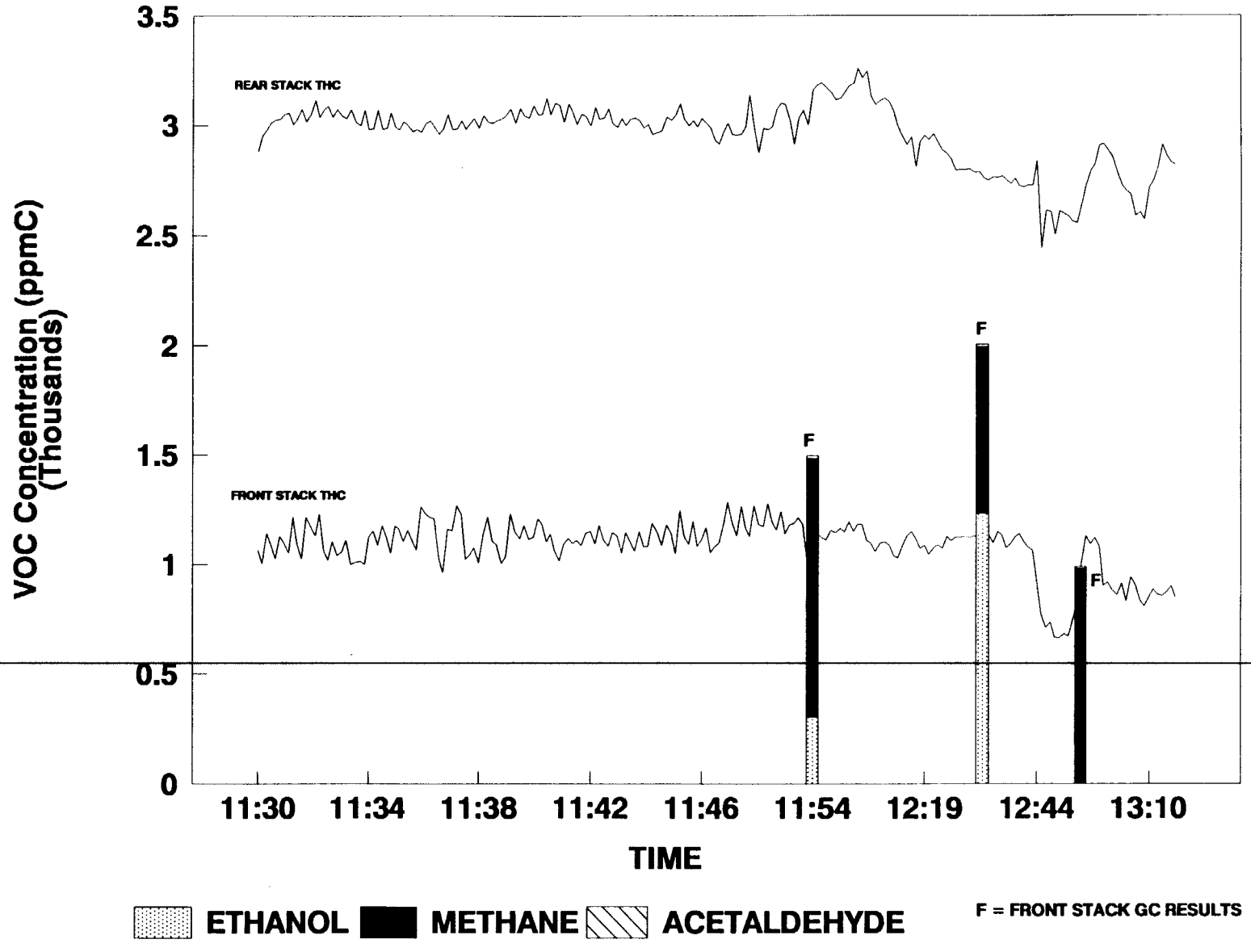

Figure 3-1. Run 1 Method 25A and Method 18 Results (adjusted to ppmC) .

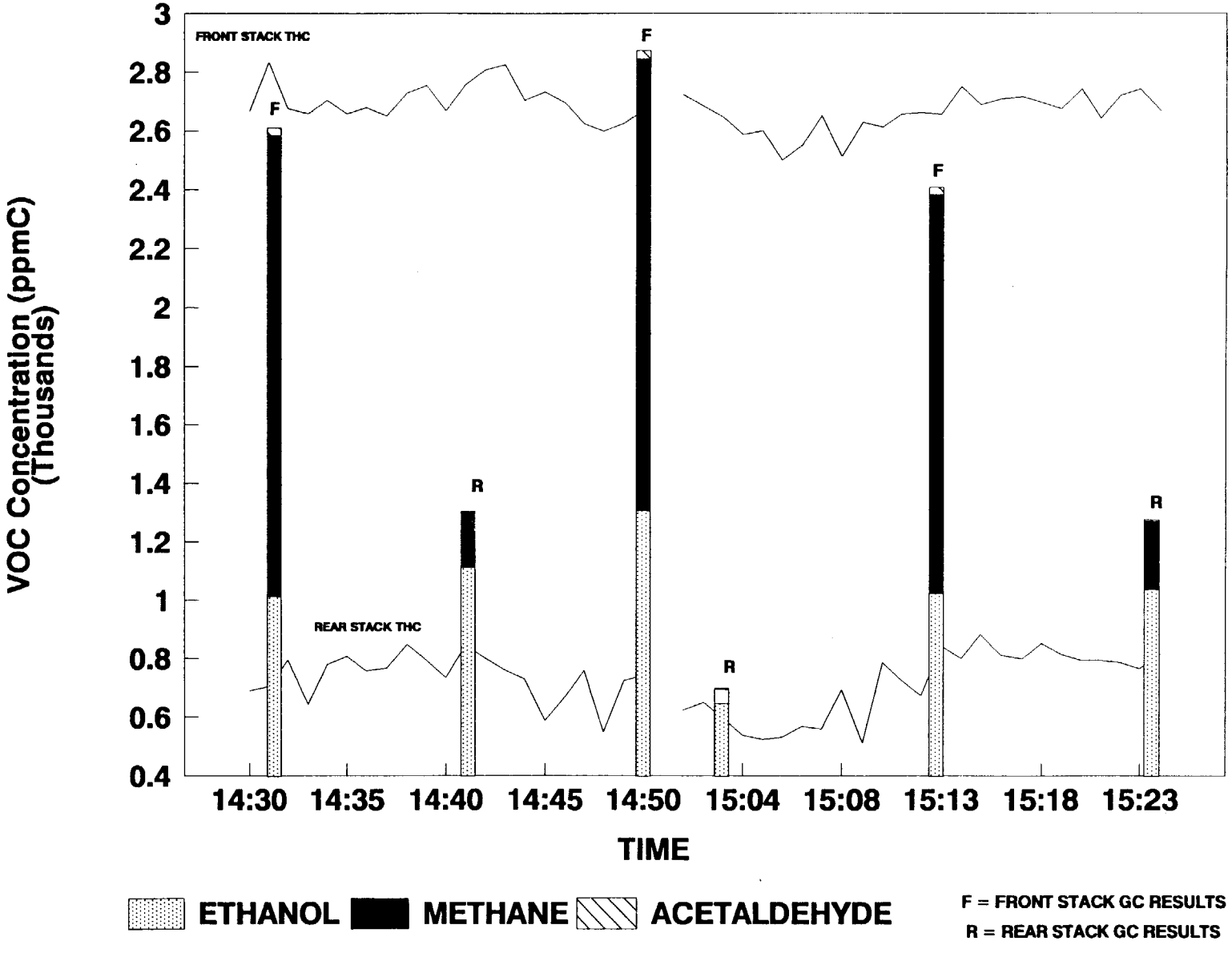

Figure 3-2. Run 2 Method 25A and Method 18 Results (adjusted to ppmC) .

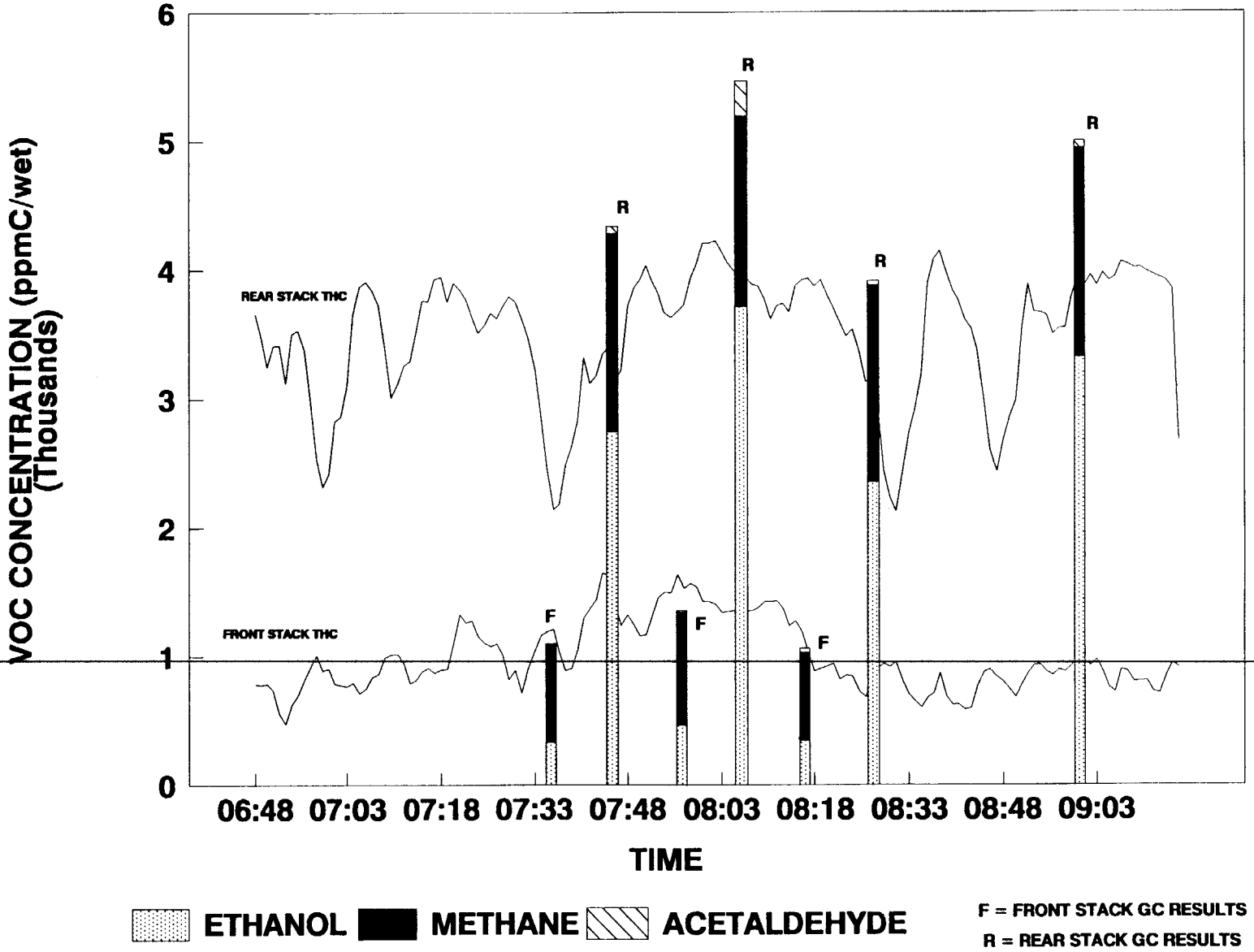

Figure 3-3. Run 3 Method 25A and Method 18 Results (adjusted to ppmC) .

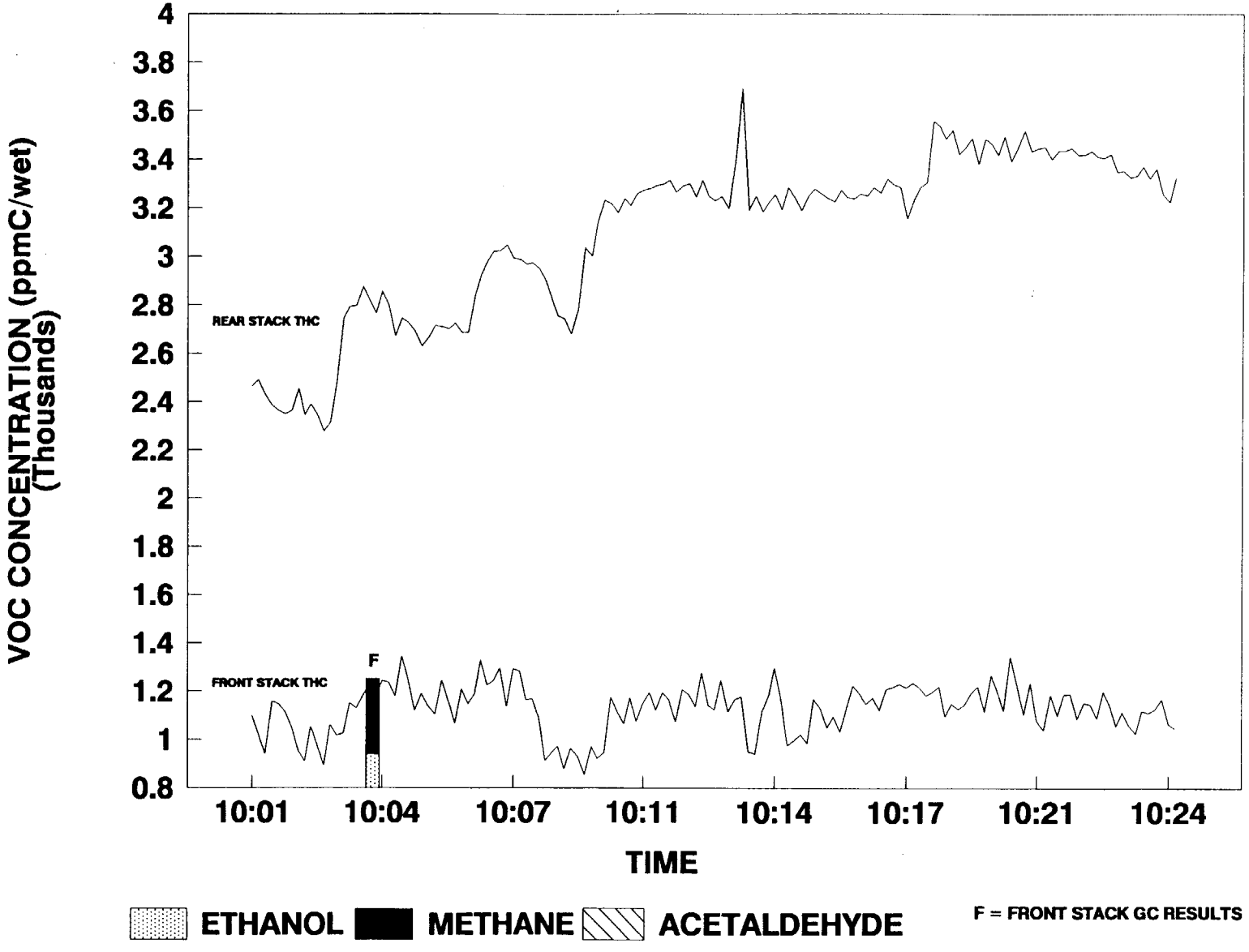

Figure 3-4. Run 4 Method 25A and Method 18 Results (adjusted to ppmC) .

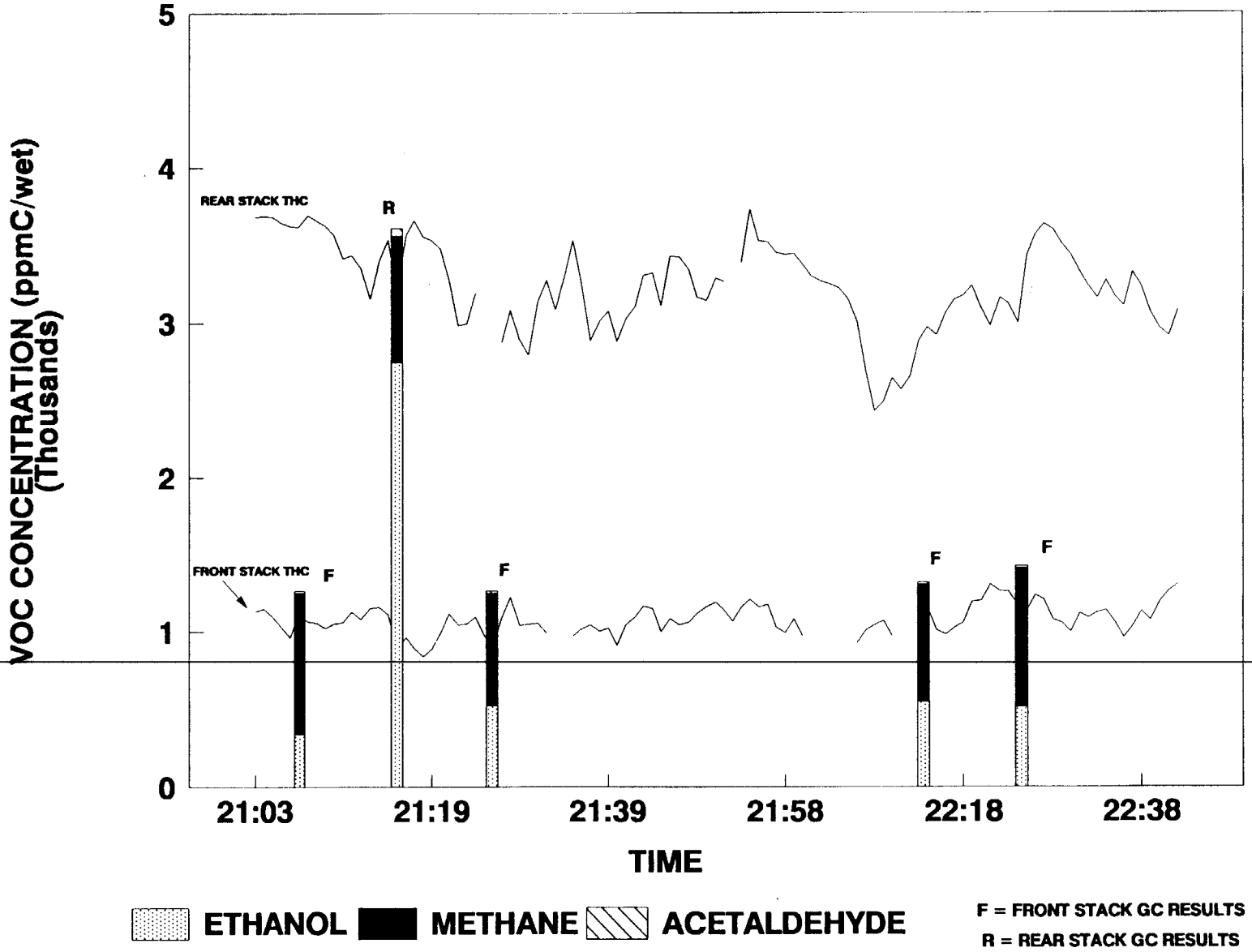

Figure 3-5. Run 5 Method 25A and Method 18 Results (adjusted to ppmC) .

Table 3–6. Summary of Flue Gas Sampling Parameters
EPA Bakeries, Site 1 (1992)

Run Number	Location	Stack Gas Temperature (deg F)	Barometric Pressure (in. Hg)	Stack Gas Static Pressure (in H2O)	Volumetric Flow Rate (acfm)	Volumetric Flow Rate (scfm)
Run 1	Front	259	29.9	−0.03	988	713
	Rear	362	29.9	−0.03	1,762	1,119
Run 2	Front	286	29.9	−0.04	1,117	781
	Rear	193	29.9	−0.02	709	567
Run 3	Front	259	29.9	−0.03	988	713
	Rear	362	29.9	−0.03	1,762	1,119
Run 4	Front	259	29.9	−0.03	988	713
	Rear	362	29.9	−0.03	1,762	1,119
Run 5	Front	259	29.9	−0.03	988	713
	Rear	362	29.9	−0.03	1,762	1,119

Flow rates ranged from 700 - 1100 standard cubic feet per minute (scfm) on the bread oven and 600-800 scfm on the bun oven. On each oven, one of the two stacks consistently had higher temperatures and higher VOC emission rates. The rear stack bread oven was the higher of the two bread oven stacks and the front stack on the bun oven was hotter and had higher VOCs of the two bun oven stacks. Specific process data is not included in this report however, these occurrences can probably be explained by burner type or burner maintenance status for the ovens.

3.3 Carbon Equivalent Correction Factor Determination

Table 3-7 presents the ethanol carbon equivalent correction factor (CECF) determination. As discussed before, the CECF is the relative response of the THC analyzer in units of ppmC to known concentrations of ethanol. The CECF was determined for both ethanol and acetaldehyde by observing the response of the THC analyzer in units of ppmC to known gas concentrations of the two target compounds. The observed response was divided by the known concentration to determine the CECF value. This was done both in the field and in the laboratory. Ethanol challenges were made in the field at only one concentration (typically 200 ppmv); therefore, it was decided to develop the ethanol CECF over a much wider range of concentrations that were encountered in the field. The CECF value used for this test program was determined in the laboratory using a wide range of ethanol concentration. The average CECF for ethanol was determined to be 1.42. The on-site ethanol QC challenges are presented in Section 6.0.

Table 3-8 presents the acetaldehyde CECF determination. This procedure was performed in the field with a single concentration of acetaldehyde. Only relatively low sample concentrations were observed during the test program (< 50 ppmv); therefore, extensive CECF development did not need to be completed. The acetaldehyde CECF used for this test program was 1.23.

Table 2-7. In-House Ethanol Carbon Equivalent Corretion Factor Determination. EPA BAkeries (1992)

Ethanol QC Gas Conc. (ppmC)	Instrument Response (ppmC)	Carbon Equivalent Correction Factor
498	628	1.26
1000	1294	1.29
1470	2055	1.40
2000	2773	1.39
1470	2022	1.38
1470	2097	1.43
498	732	1.47
1000	1499	1.50
1470	2287	1.56
2000	2997	1.50
	AVG	1.42

Table 2-8. Acetaldehyde Carbon Equivalent Correction Factor Determination. EPA BAkeries (1992)

Site	Test Day	Ethanol QC Gas Conc. (ppmC)	System 1		System 2	
			THC Instrument Response (ppmC)	Carbon Equivalent Correction Factor	THC Instrument Response (ppmC)	Carbon Equivalent Correction Factor
1	2	82.5	101.5	1.23	103.5	1.25
3	2	82.5	98.9	1.20	101	1.22
4	3	82.5	103.5	1.25	107	1.30
4	4	82.5	DOWN		100.5	1.22
			AVG	1.23	AVG	1.26

4.0 OVEN CONFIGURATIONS AND SAMPLING LOCATIONS

This section presents a general discussion of the oven stack locations, sampling port locations, and flow traverse point locations. Specific information is given for the Site 1 test program. The U.S. EPA Method 1 guidelines were used to determine the majority of test locations measuring gas flow rates. Method 25A and 18 samples were taken from the same port that the flow measurements were made. The sample point was located near the centroid of the duct (centrally located 10% area of the stack cross-section). All locations were at least 2 diameters upstream from the gas discharge to the atmosphere as required in Method 25A.

4.1 General Process Description

The following sections present a general description of the baking process and commercial baking ovens. It is not within the scope of this document to present detailed process information or production rates; therefore, these descriptions are only meant to familiarize the reader of the general principles and equipment used in the commercial baking industry.

4.1.1 Baking Process Description[1]

Bread baking at large commercial bread bakeries is a highly-mechanized process consisting of high-speed production lines with ovens capable of baking 20,000 pounds or more of bread per hour. The process starts with the mixing of flour, water, sugar, and yeast to form dough, thereby initiating a long series of complex biochemical changes which ends in the oven where the bread is baked.

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[1] Compilation of Air Pollutant Emission Factors (AP-42), Chapter 13.01, Bread Baking (Final Draft 1991)

There are four basic types of dough mixing processes: sponge dough, straight dough, brew, and continuous mix ("no-time"). These processes vary in the manner in which the various dough ingredients are mixed which determines the fermentation time available. Fermentation time can vary from 20 minutes or less for the continuous mix or "no-time" process, to 5 hours or more in the sponge dough process. The continuous mix or "no-time" process consists of mixing all of the dough ingredients at the same time; therefore, the fermentation time is minimized by using processing agents and higher temperatures. Sponge dough is formed when two-thirds of the flour, part of the water and the yeast are initially mixed and allowed to ferment before the remaining ingredients are added.

The baking process actually occurs in the oven which causes expansion of the loaf to final volume, crust formation, yeast and enzymatic activity inactivation, coagulation of dough proteins, partial gelatinization of starch, and reduction of loaf moisture. All of these processes are necessary to produce high quality, saleable bread products. To accomplish all of these product and process effects in the proper sequence, commercial bread ovens have between three and eight temperature gradient zones which are maintained in critical balance. Oven rise, which determines the final loaf volume and internal texture, occurs during the first 5-6 minutes of baking. Thermal degradation of the yeast occurs when the internal bread temperature reaches 140-145°F which stops the fermentation process. Protein is denatured between 140-180°F. At the end of the process, browning and crust color develop while ethanol and moisture are evaporated to cool the loaf and prevent the internal temperature from reaching the boiling point of water.[2]

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[2]J. W. Stitley, Baking Technology, Oven Emissions and Control Devices, American Institute of Baking, Manhattan, KS (1986).

There are three fundamental oven types: tunnel, tray, and spiral. Tunnel ovens, as shown in Figure 4-1 are long horizontal ovens where dough enters at one end and is conveyed to the opposite end where it exits as bread. Tray ovens as shown in Figure 4-2 are also horizonal; however, the dough enters the oven and exits on the same side after being conveyed the length of the oven. The tray is lowered to a second level and then conveyed to the exit near where it entered. In spiral ovens, dough enters at the top corner of the oven and is conveyed in a downward spiral to the bottom corner of the oven where it exits through an opening diagonally lower from where it entered the oven. No spiral ovens were tested during this test program. Tunnel and tray ovens typically contain three to five exhaust stacks with one stack typically used for purging the oven of natural gas during ignition and the remaining stacks used during normal baking operations. In contrast, spiral ovens usually contain just one stack which is used during both purging and normal operations.[3]

4.1.2 Oven Heating Systems[4]

Ovens may be divided into two general categories according to the manner in which they are heated, namely, direct-fired ovens and indirect-fired ovens. A third category makes use of semi-direct heating. In direct-fired ovens, the burners are located directly within the baking chamber and are usually ribbon type and burn natural gas. Modern ovens normally feature banks of ribbon burners located both above and below the baking surface, across the path of travel of the baking trays or oven band. Most such ovens are equipped with an external forced-air agitation system to augment the naturally formed convection currents within the baking chamber.

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[3]BAAQMD Staff Report Supporting Adoption of Rule 8-42 (July 1988).

[4] The Science of Baking, Lesson 26 Bakery Ovens, American Institute of Baking (no date)

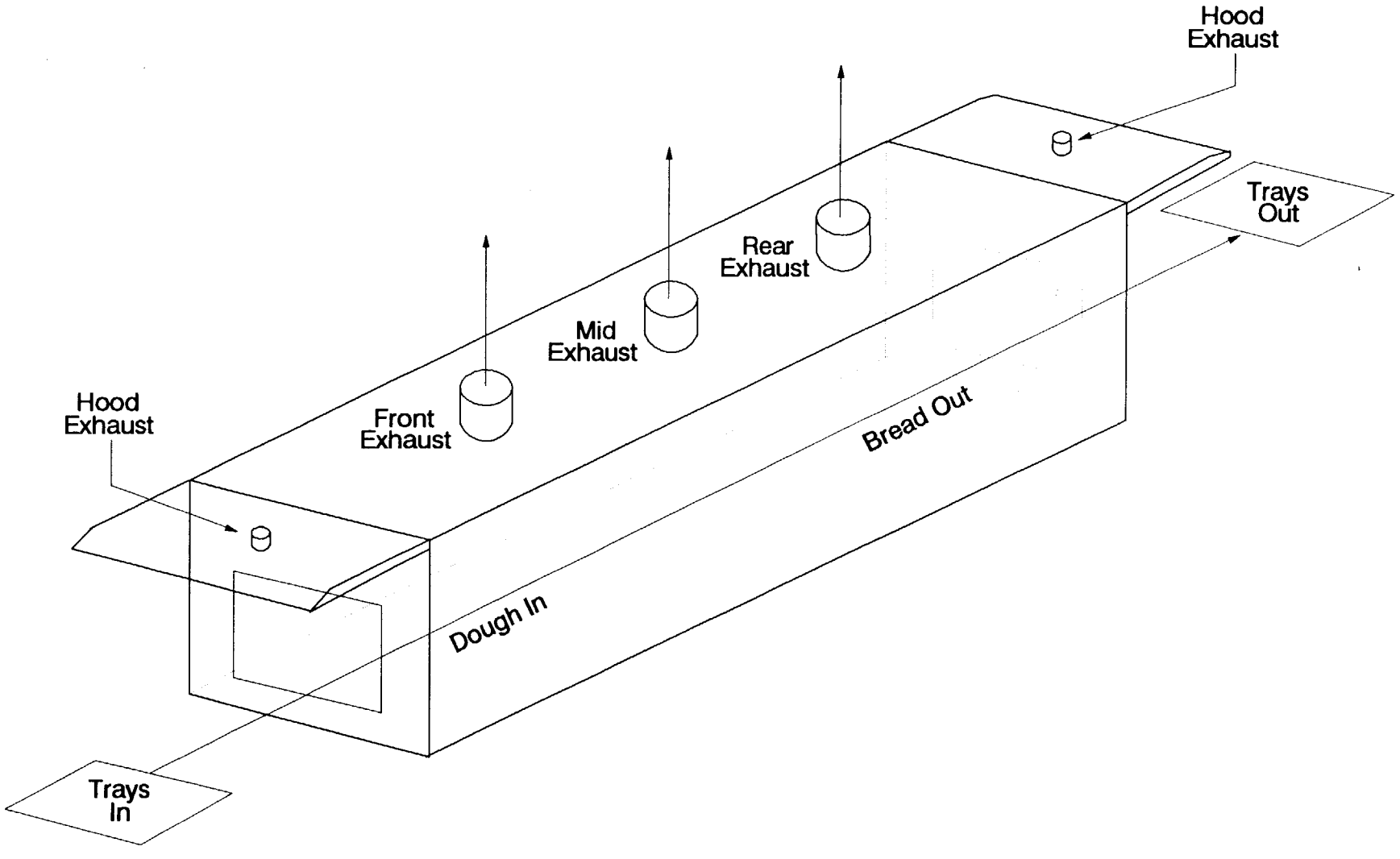


Figure 4-1. Generalized Schematic of a "Tunnel" Type Baking Oven EPA Bakeries (1992)

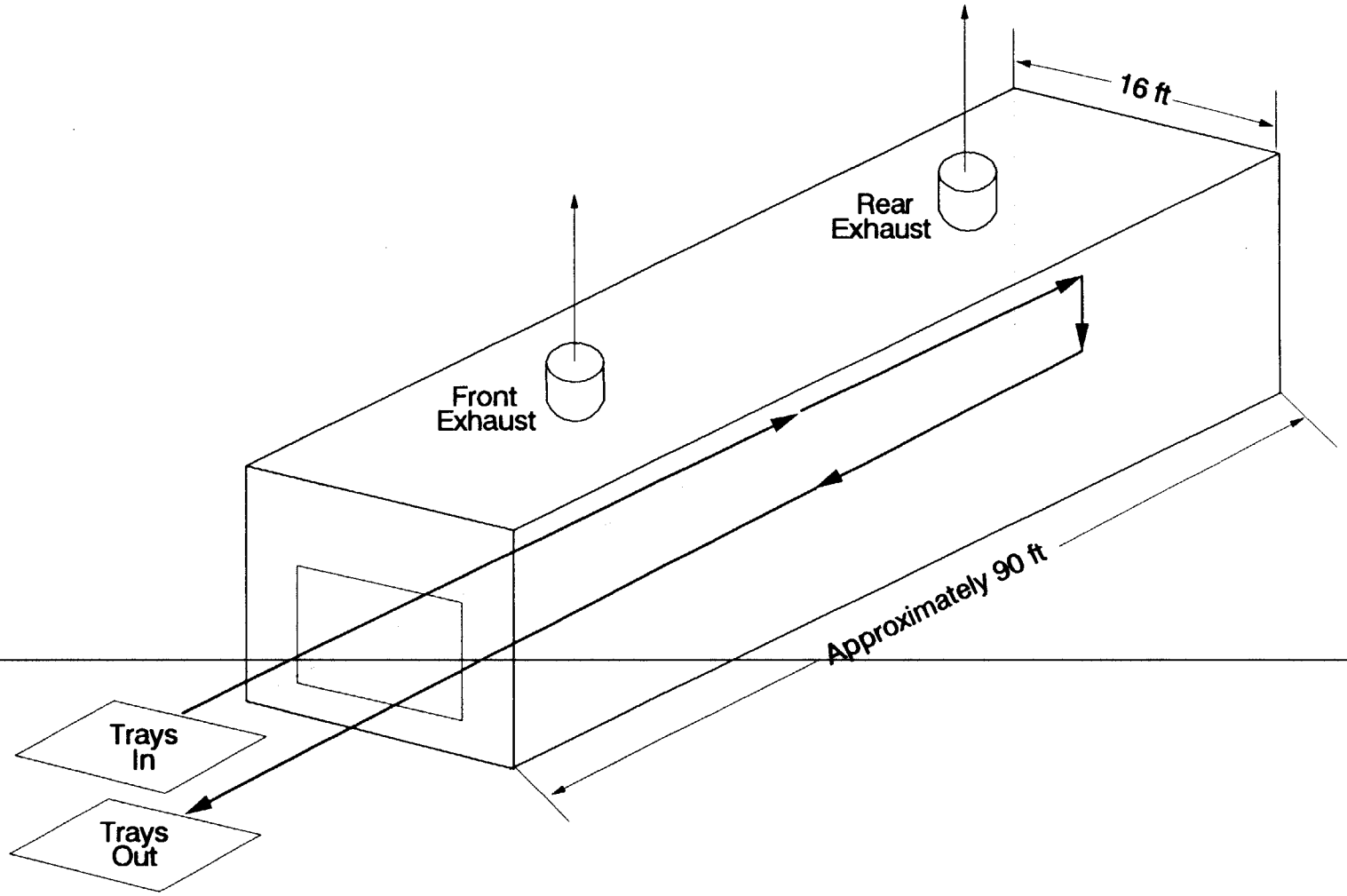


Figure 4-2. Generalized Schematic of a "Tray" Type Baking Oven EPA Bakeries (1992)

In indirect-fired ovens, the combustion chamber is isolated from the baking chamber. The heat is transferred from the hot combustion gases to the baking chamber by means of flues or radiator tubes. In these ovens, the products of combustion do not enter the baking chamber and thus do not come into direct contact with the baking products. The heat is generated by single high-capacity burners (one burner for each oven zone) and radiant heat is supplied by the flues and radiators within the baking chambers. Forced air agitation systems and improved oven efficiency are a general feature of indirect-fired ovens.

Semi-direct fired ovens (which are also referred to as semi-indirect fired ovens) closely resemble indirect-fired ovens in their use of separate combustion chambers and of radiator tubes for the heat transfer. In their case, however, the radiator tubes have either thin slots or small holes that allow the hot combustion gases to enter the baking chamber. These gases create convection currents whose intensity can be controlled by means of baffles. Thus, semi-direct fired ovens combine the advantages of both convection and radiant heat transfers.

4.2 Test Program Overview

This section will present a general discussion of the oven types and sample locations from all four sites. However, specific information will only be presented for the Site 1 facility.

This test program involved measuring the emissions from both direct- and indirect-fired ovens from the four sites tested. Some of the indirect fired units had their heat exchanger tubes drilled out to promote better heating efficiency. However, maintenance records were incomplete and plant personnel were uncertain whether this had been completed or not. In some instances, maintenance personnel stated that their indirect-fired ovens had not been drilled out and yet high concentrations of unburned methane (>1000 ppmv) were detected in the stack gases. So a strict direct/ indirect firing classification was not always possible.

Another important facet of the test program was that during steady-state operation, the gas flow in some of the stacks would almost be completely shut off with a flow damper to prevent oven heat loss. The Method 25A and 18 tests would detect fairly high concentrations of THC (>1000 ppmC) while flow rates would be minimal (< 100 cfm), resulting in fairly low emissions rates. The flow damper positions were always verified to ensure they were the same during both flow measurement tests and the Method 25A and 18 tests.

The majority of ovens tested had two stacks venting exhaust gases. If both stacks vented oven (baking) gases (i.e., direct-fired), they were referred to as the front stack and the rear stack depending on their respective location. Front stacks were located near the end of the oven where the bread dough entered, and the rear stacks were on the opposite end.

Indirect-fired ovens also typically had two stacks with one stack exhausting the oven gases and the other exhausting the burner gases. Gases from the burner stack were expected to be comprised mainly of unburned hydrocarbons (i.e. methane). However as previously mentioned, oven maintenance records were sometimes incomplete and what was expected to be purely a burner exhaust gas stream, was sometimes comprised of significant portions of gases from the baking processes (i.e. ethanol and acetaldehyde).

Three sites had a third stack (typically referred to as comfort hoods) venting the gases, which was either adjacent to the oven entrance or to the exit. (See Figure 4-1). Their purpose was to remove fugitive oven heat from worker areas. Gases were pulled from these locations through a ventilation hood configuration, typically spanning the width of the oven (10-15 feet) and 1 - 3 feet in length. The majority of stacks were small roof vent ducts with an inside diameter (ID) ranging from 12 to 16 inches. As shown in Figures 4-1 and 4-2, the stacks were typically arranged in a straight line (i.e., in line with the orientation of the oven). Most had rain caps installed over the

opening which was typically 6-15 feet above the roof. All stacks were accessed from the roofs of the facilities and sample ports were located from 2-6 feet above the roof line. A 1.75 inch hole in the duct walls allowed for full insertion of the Method 25A and 18 sample probe. Two ports were located 90° apart at the same elevation. The sample port that was not being used was always capped off to prevent any ambient air from diluting the sample stream.

Approximately 100 to 150 feet of heated Teflon® tubing was used to transport the gas sample from the stack to the mobile continuous emissions monitoring (CEM) vehicle that was typically parked adjacent to the bakery wall. In cases where there were three stacks originating from the oven, one sampling probe/heat trace system would be alternated from the second and third stack.

A general description of sample locations for the Site 1 test program is presented in the following section.

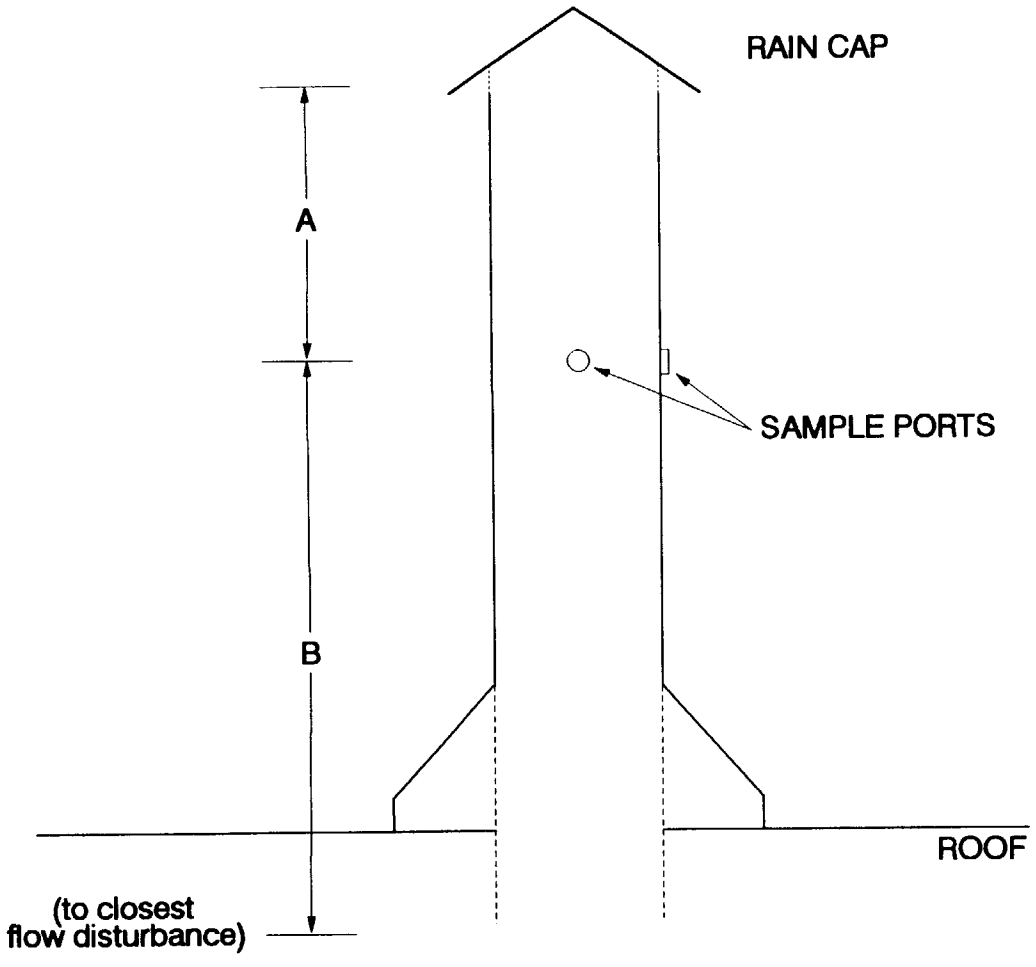
4.3 Site 1 Sample Locations

A large Bread oven and a smaller bun oven were tested at the first facility. Both ovens were tested with the CEM trailer parked in the same location on two separate test days.

The Bread oven was a direct-oven which had three main vent stacks arranged longitudinally. The middle stack is used only during the oven purging (start-up) and was capped off with a small metal drum during the emissions tests. The absence of flow at this stack was confirmed using a sensitive hot-wire anemometer (0-600 fpm scale). After the test was completed, it was later discovered that there was a comfort hood located at the oven exit. Gases from the hood were directed up through a vent stack on the roof. However, this stack was not tested during the test program.

The front stack on the Bread oven was sampled using a 150-foot length of heat-traced sample tubing. The location of the rear stack necessitated a 200-foot section, whereas the front stack was assessable with a 150-foot section. Both the front and rear stacks were approximately 7.5 feet high (from roof level) with 14-inch ID. As shown in Figure 4-3, both stacks had a rain cap configured on the gas exit. Ports on both stacks were located approximately 10-feet (8.5 diameters) downstream and 3-feet (2.5 diameters) upstream of the nearest flow disturbances. Eight traverse points was used to measure flows.

The Site 1 roll line used another direct-fired oven with two vent stacks. As shown in Figure 4-4, both stacks had a 12-inch ID with rain caps and were located approximately 8-feet (8 diameters) downstream and 3-feet (3 diameters) upstream of the nearest flow disturbances. Flows were measured at 8 traverse points.



SITE 1 BREAD OVEN
SAMPLING AND FLOW
MEASUREMENT LOCATIONS

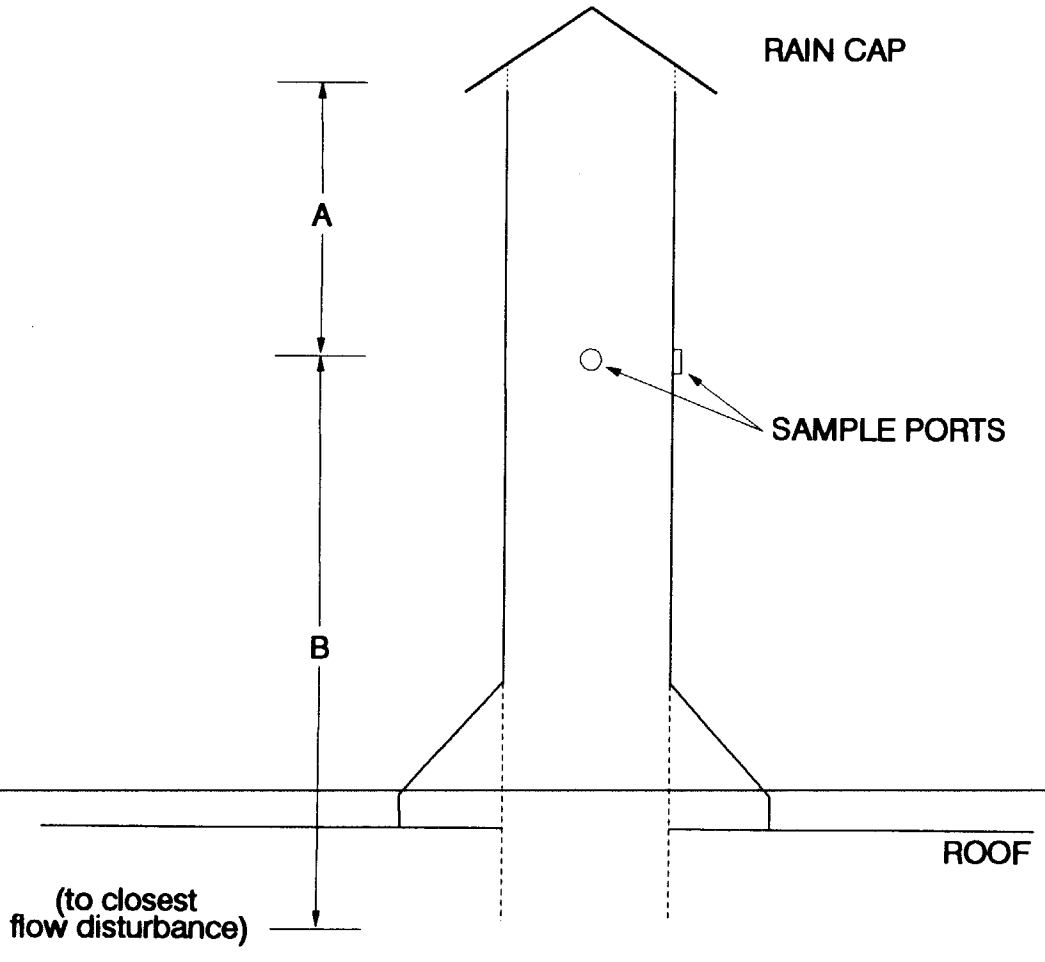
Front Stack

14 in. ID	No. of Flow Traverse Pts.
A = ~3 ft	
B = > 10 ft	8

Rear Stack

14 in. ID	No. of Flow Traverse Pts.
A = ~3 ft	
B = > 10 ft	8

FIGURE 4-3. SITE 1 BREAD OVEN STACK CONFIGURATION EPA BAKERIES (1992)



SITE 1 BUN OVEN
SAMPLING AND FLOW
MEASUREMENT LOCATIONS

Front Stack

12 in. ID	No. of Flow Traverse Pts.
A = ~3 ft	
B = > 8 ft	8

Rear Stack

12 in. ID	No. of Flow Traverse Pts.
A = ~3 ft	
B = > 8 ft	8

FIGURE 4-4. SITE 1 BUN OVEN STACK CONFIGURATION
EPA BAKERIES (1992)

5.0 SAMPLING AND ANALYTICAL METHODS

This section briefly summarizes the procedures used for sampling and analysis. Procedures are presented for Method 25A testing in Section 5.1, Method 18 procedures in Section 5.2, and Methods 1-4 procedures in Section 5.3. The detailed protocols can be found in the U.S. EPA reference methods located in the appendices.

5.1 Method 25A Sampling and Analysis for THC

Total hydrocarbon concentration was determined on a continuous basis using the U.S. EPA Method 25A procedure. Procedures incorporate QA/QC protocols stipulated as "Measurement System Performance Specifications" in the reference methods. The QA parameters will be reported in Section 6.0 while the QC procedures are fully detailed in the test plan written for this test program.

The following discussion presents Sample Extraction Equipment and Procedures in Section 5.1.1, THC Analyzers and Operating Principal in Section 5.1.2, Data Acquisition Procedures in Section 5.1.3, Instrument Calibration in Section 5.1.4, and an Example Daily Operating Procedure in Section 5.1.5.

5.1.1 Sample Extraction Equipment and Procedure

A continuous gas sample was extracted from the stack and transported to the analyzer through a heated Teflon® sample line (heat trace). The gas only came into contact with inert materials such as stainless steel, glass, or teflon. The sample gas temperature was maintained above 100°C (212°F) so that there was no condensation of moisture or hydrocarbons in the tubing. A generalized schematic of a typical extractive system is shown in Figure 5-1.

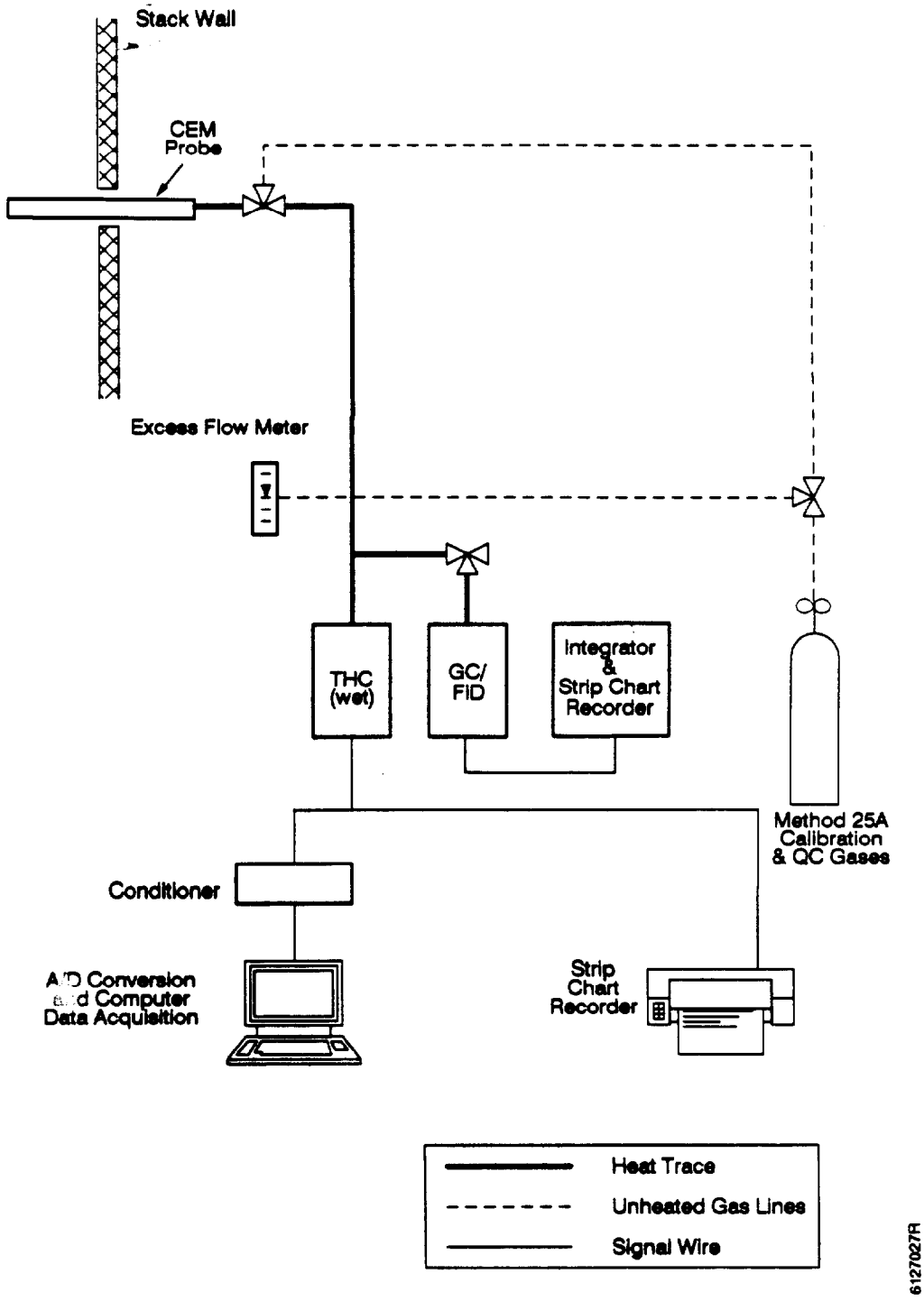


Figure 5-1. General Schematic of Method 18/25A Extractive Stack Gas Sampling System

The probe was used to extract gas from the stack was constructed of a short length of stainless steel or teflon tubing. The gas was extracted using a heated head pump that was placed just upstream of the THC analyzer. An excess flow dump was also upstream from the analyzer, so that the gas in the analyzer would not be under any back pressure created by the sample pump.

In addition to one heated sample tube for sample gas extraction, a separate tube was run from the calibration gas cylinders to the probe. This tube was connected to the system with a 3-way valve (calibration valve) at the junction of the probe and the heat trace. This allowed for leak checks, sample bias checks and calibration drift checks to be completed, as was discussed in Section 6. These procedures required a calibration or QC gas be directed to the probe and back through the entire sampling system. The difference between the resulting values and the values observed when the gas was passed directly to the instrument is referred to as sample bias. When the bias was above acceptable limits, corrective actions were implemented.

5.1.2 THC Analyzers and Analytical Principles

The THC analyzers used in Method 25A procedures employ a flame ionization detector (FID) to quantify the quantity of THC. As the flue gas enters the detection chamber, the hydrocarbons are combusted in a hydrogen flame. The ions and electrons formed in the flame enter an electron gap, decrease the gas resistance, and permit a flow in an electric circuit. The resulting current is proportional to the instantaneous concentration of the total hydrocarbons. These analyzers are not selective between species; however, different hydrocarbon species respond differently in the FID. Straight chain hydrocarbons (alkanes), alkenes, and aromatics respond in proportion to the number of carbons atoms in the molecule. For example, 100 ppmv propane (C_3H_8) responds approximately the same as 300 ppm methane (CH_4). When measuring THC of these type of compounds, there are no substantial inaccuracies in reporting THC as ppmv as methane. However, oxygenated compounds such as ethanol (CH_3CH_2OH) and

acetaldehyde (CH_3CHO) have a depressed response so that what appears to be 300 ppmv as methane may actually be 1200 ppmv ethanol. The resulting THC concentrations as ppmC were adjusted to ppmv ethanol or ppmv acetaldehyde based on the results of the Method 18 analysis.

5.1.3 Data Acquisition

The signal from the analyzer is typically an analog voltage response (i.e., 0-5 volts). The meter panel on the front of the instrument usually translates the voltage signal to concentration units (i.e., ppmv). However for long term data acquisition, the voltage signals coming from the electrical output leads need to be translated to actual concentration data. The system used to perform this function is known as the data acquisition system or DAS. This process will either be accomplished with the use of a strip chart recorder (SCR) or a computerized system. A SCR is the simplest procedure; howeverc additional man hours were needed to reduce the SCR trace to individual readings (i.e., 1/minute). If a computerized version is used, the analog signal is converted to a digital signal and directed to a computer so that the signal was translated to concentration units and saved to magnetic media. For this test program, a computerized DAS was used and a SCR was used as a back-up system.

5.1.4 Instrument Calibration

Calibrations were performed by passing known concentrations of a hydrocarbon gas standard through the instrument and recording the associated response. A response factor was then calculated and used to adjust sample gas responses to concentration units. Typical calibration calculations were completed as shown in Section 7. The THC instrument was calibrated twice daily. The first calibration was used to determine the response factor, and the second calibration was performed after completing the test runs so that calibration drift can be determined and the test data corrected for drift (if necessary). Calibrations were completed on a two point basis:

zero gas (generally N_2), and a high-range or "span" gas. Methane was used as the calibration gas, and the concentrations were reported as ppmv methane which are the same as ppmv Carbon (ppmC). The gas was certified by the manufacturer guaranteeing the concentration within $\pm 2\%$ accuracy.

Other QC operations were also performed to verify the accuracy of the data produced. These operations included calibration drift and calibration error determinations. Additional procedures such as linearity check, sample bias, leak checks, and gas stratification were also performed. These are further discussed in Section 6.

5.1.5 Example Daily Operating Procedure

The following is a detailed standard operating procedure for calibrating and operating the CEMS:

1. Turn on computer and printer, put printer on-line, and load the DAS program. Be sure that the THC instrument has been on with the FID flame lit for several hours.

2. Synchronize watch with sample location leaders.

3. Turn on strip chart recorders (SCR) and make appropriate notes on charts and in logbook (write down all procedures and observations in logbook and on SCRs as the day progresses).

4. Open all calibration gas cylinders so that they may be introduced to the instruments.

5. Perform daily pre-test leak check on CEMs as discussed in Section 6. If a zero gas is used for this procedure, zero all instruments at this time. Enter these values in the computer calibration routine. Be sure to check and maintain all flows throughout calibration and operation.

6. Introduce the THC span gas.

7. Make adjustments to the THC instrument as required and enter the value into the computer calibration routine.

8. Introduce QC gases to instruments to determine calibration error. Record at least one minute of data for each. If the QC gas response is not within $\pm 5\%$ of the calibration gas valve, the operator will recalibrate the instrument, or perform other corrective actions.

9. Begin sampling routine, with the computer on standby.

10. Start the data acquisition system when signaled by radio that system is in stack.

11. Carefully check all flows and pressures during the operation of the instruments and watch for apparent problems in any of the instruments, such as unusual readings or unreasonable fluctuations.

12. Stop the data acquisition system at the end of the test when signaled.

13. Perform the final calibration (Repeat Steps 5-8) except make no adjustments to the system. This procedure was completed through the calibration valve so that gas is extracted through the entire system.

15. Calculate calibration drift.

All QA/QC procedures are fully explained in Section 6.

5.2 Method 18 for Determining Ethanol and Acetaldehyde Concentrations

The following sections summarizes the sampling and analytical protocols for Method 18 testing procedures targeted for ethanol and acetaldehyde.

5.2.1 Sample Collection

A slip stream of sample gas was taken off the main heat trace line and directed to the GC injection loop as shown in Figure 5-2. Discrete GC injections were made to quantify the gas phase concentration of the two target analytes. This was accomplished by first allowing the gas to vent through the injection loop. Then the injection valve was turned so that the sample gas in the loop is directed into the GC/FID. The number of sample injections in a given testing time frame was determined based on how long it takes for the target compounds to elute from the GC column to the detector. This period of time is known as the retention time (RT). If other compounds are contained in the gas which elute at much longer RT than the target species, they may interfere with the later analyses and the column may have to be periodically cleaned. This is done by raising the oven temperature for a period of time. Cleaning the column decreases the number of GC injections that can be performed during the run time.

5.2.2 Sample Analysis

The U.S. EPA Method 18 analysis is performed using a GC/FID to separate hydrocarbon species present in the exhaust gas stream. The FID employed in the GC works in a similar manner to that discussed in Section 5.1.2. By using a column filled with a sorbent, the various hydrocarbons in a given gas stream were separated so that the instantaneous concentrations measured relate to a specific hydrocarbon. Before sampling the source gas, the GC/FID system was calibrated with standard gas mixtures containing the hydrocarbons of interest. The calibration procedure established both calibration curves (response factors) and retention times for the hydrocarbons. The retention times were used to identify similar compounds in the source samples and the calibration curve was used to quantify the concentrations of the hydrocarbons.

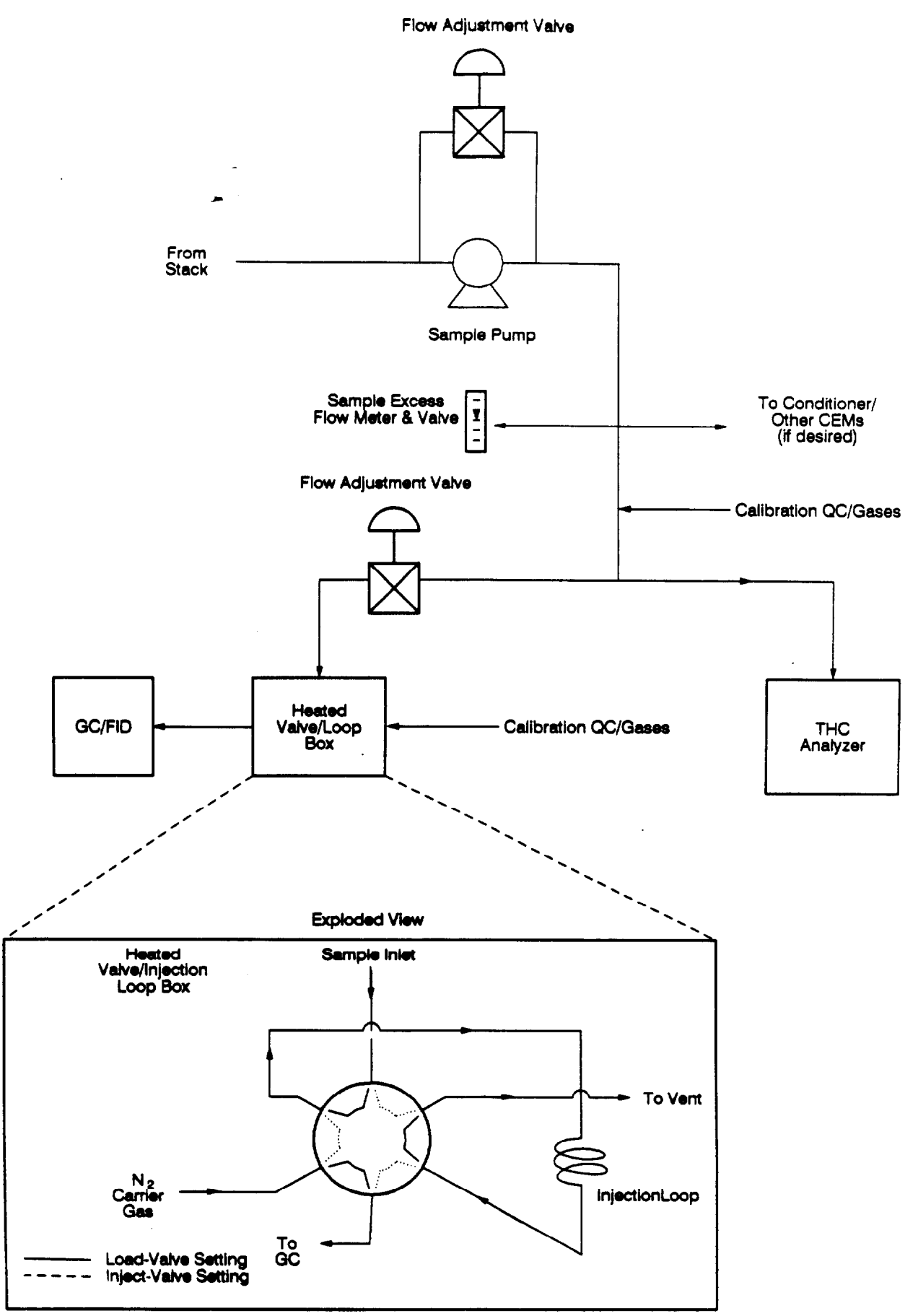


Figure 5-2. General Schematic of Method 18 Sample Injection System

To use Method 18 effectively, standards were prepared to include concentrations over the entire range expected. For ethanol, a suitable collection of standards for bakery emissions concentrations are 0, 200, 800, 2000 and 8000 ppmv ethanol. If stack concentrations are higher than the highest standard, then either higher standards need to be prepared or purchased or the sample needs to be diluted with a gas tight syringe. Levels of acetaldehyde were expected to be less than 100 ppmv, therefore, standards of 0, 20, and 80 ppmv acetaldehyde were used.

The response and retention times of the individual hydrocarbons were recorded on a strip chart recorder. An integrator was used to measure peak areas and compile retention times and area counts. The peaks on the integrator recording were identified from the established retention times for each hydrocarbon of interest and the associated concentrations determined using the calibration curve as a reference.

The column and conditions were as follows:

- Column - 80/120 Carbopack B AW/6.6% Carbowax 20M;
- Carrier Gas - N_2; and
- Temperature - 30°C (isothermal).

5.3 Determination of Volumetric Gas Flow Rates

Determination of gas flow rate incorporates the designation of traverse points by the U.S. EPA Method 1, the measurement of average duct gas velocity by Method 2, the measurement of gas molecular weight by Method 3, and the determination of gas moisture content by Method 4. The following sections discusses those procedures, and the U.S. EPA methods are included in the Appendices.

5.3.1 Method 2 Flow Rate by Pitot Tube

Methods 2 calls for flow determination by measuring the velocity pressure with either an S type pitot or a standard pitot. The following discussion presents the principals of a Method 2 flow determination.

The pitot tube measurements in the ducts were obtained by moving the pitot tube and thermocouple to each of the traverse points designated in Method 1. The velocity pressure and temperature readings at each of those points were recorde A static duct pressure deter.ined at a single sample point was usually sufficient. This was accomplished by first rotating the pitot tube perpendicular to the flow (as in the cyclonic flow check) until the pressure reading was zero. One leg of the tubing was then disconnected from the manometer and the static pressure was compared against ambient pressure. If the positive tube was left attached to the manometer and the reading was positive, then the overall static was positive. If the negative leg was left attached, and the reading was positive, then the static was negative. The average duct gas velocity and volumetric flow rate was then calculated as shown in Section 7.

5.3.2 Method 3 Molecular Weight Determination

The U.S. EPA Method 3 describes the procedures for obtaining the molecular weight of gas being sampled, which was necessary for the flow calculation. The composite molecular weight of the gas was determined from the relative amounts of individual constituents of the gas stream. In most cases, these principal constituents are oxygen, nitrogen, and carbon dioxide. Some stack gases, however, contain a significant amount of volatile organic or other compounds which can be included in the calculation.

The concentrations of O_2 and CO_2 were determined by a Fyrite analyzer. The molecular weights of such compounds were multiplied by their relative concentrations as shown in Section 7. The products were summed to give the dry

molecular weight of the gas being emitted. The final wet molecular weight calculation required gas moisture content values.

5.3.3 Method 4 Stack Gas Moisture Content

Method 4 is the U.S. EPA method for establishing the moisture content of a stack gas. There are two recognized ways to obtain this moisture content. The first measures the amount of direct condensation of gas moisture in an impinger train. An alternate approximation technique used for stack gases with a temperature lower than 59°C (138°F) employs a wet-bulb/dry-bulb measurement.

Method 4 explains how a sample of the gas is drawn into impingers and condensed using an ice bath. Following the condensation impingers is a desiccant impinger (filled with silica gel) which removes the remaining non-condensed moisture from the gas stream. At the end of the test, the volume of the gas was measured with a dry gas meter and recorded; the impinger weights and silica gel weights were also measured and recorded. These data were used to calculate the percent moisture in the gas stream.

It is important to perform sampling train leak checks at the start and finish of sampling as well as before and after a port change. The method only calls for a post-test leak check but completion of a pre-test leak check indicates that the post-test check was successful as well. To leak check the assembled train, the nozzle end was capped off and a vacuum was pulled in the system of 1 inch Hg higher than the highest measured vacuum. When the system is evacuated, the volume of gas flowing through the system was timed for 60 seconds. The leak rate was required to be less than 4% of the sample rate or 0.02 cfm, whichever was less. After the leak rate was determined, the cap was slowly removed from the nozzle end until the vacuum drops off, and then the pump was turned off.

If the leak rate requirement is not met, the train can be systematically checked by first capping the train at the filter, at the first impinger, etc., until the leak is located and corrected. In the event that a final leak rate is found to be above the minimum acceptable rate upon removal from a port, the run may be rejected.

When the sampling train was ready for operation, the leak rates and sampling stop/start times were recorded on the sampling test log. Other events that occur during sampling, such as pitot cleaning, thermocouple malfunctions, or any other unusual occurrences, were recorded on the test log.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

Specific Quality Assurance/Quality Control (QA/QC) procedures were completed during the test program to ensure the production of useful and valid data throughout the course of the project.

Section 6.1 presents a summary of the QA program and parameters attained. The definitions of the terminology used in conjunction with QA/QC information is presented in Section 6.2. Section 6.3 presents the QA parameters for Method 25A tests. Section 6.4 presents the QA parameters for the Method 18 analyses. Section 6.5 presents a discussion of the carbon equivalent correction factors as well as a comparison of the two methods.

6.1 QA Summary

The majority of reference method QA acceptance criteria were met during this test program. There were 10 days of testing using two THC monitoring systems (20 system days). Method 25A daily calibration drift did not exceed the criterion of $\pm 3\%$ on nineteen of the twenty system days. The Site 1, Day 1 Method 25A test data exhibited calibration drift of 3.2% and the drift was corrected by assuming linear drift between the initial and final calibration. Method 25A calibration error was determined extensively over the course of the test program. Over 150 calibration error checks were performed during the test program and the majority these checks met the Method 25A criterion of $\pm 5\%$ of the gas concentration. Method 25A sample bias checks, as well as O_2 leak checks, were also completed. The majority of these QA parameters met the acceptance limits.

Extensive Method 18 QA/QC procedures were also followed. Initial and final calibrations were performed. Calibrations for ethanol and acetaldehyde were all completed using from 3 to 5 calibration points. Multi-point calibrations were also

performed on methane for low concentrations on all of the test days (< 900 ppmC). On five of the test days, a single point calibration was used on higher methane values. This was due to the detector "overranging". After checking the methane values determined from a single point calibration against a multi-point calibration curve, no substantial difference was found.

Sample bias checks were also extensively conducted on the Method 18 sampling system. The majority of checks verified acceptable non-biased sampling. However, some bias checks revealed sample bias caused by the loss of heat in the heated tubing adjacent to the GC. These data points were invalid and testing was not continued until the problem was remedied and a successful bias check had been completed.

6.2 Definitions

The overall QA/QC objective was to ensure precision, accuracy, completeness, comparability, and representativeness for each major measurement parameter called for in this test program. The terms used to define the QA/QC objectives are designed as follows:

- Data Quality: The characteristics of a product (measurement data) that bear on its ability to satisfy a given purpose. These characteristics are defined as follows:
  - Precision - A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision can be expressed in terms of the standard deviation (or the relative standard deviation).
  - Accuracy - The degree of agreement of a measurement (or an average of measurements of the same thing), X, with an accepted reference or true value, T, usually expressed as the difference between two values, X-T, or the difference as a percentage of the reference or true value, 100 (X-T)/T, and

sometimes expressed as a ratio, X/T. Accuracy is a measure of the bias in a system.

- Completeness - A measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under prescribed test conditions.

- Comparability - A measure of the confidence with which one data set can be compared with another.

- Representativeness - The degree to which data accurately and precisely represent a characteristic of a population, variations of a parameter at a sampling point, or an environmental condition.

- Quality Control: The overall system of activities whose purpose is to provide a quality product or service: for example, the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

- Quality Assurance: A system of activities whose purpose is to provide assurance that the overall quality control is being done effectively. The completion of QA procedures generates indicating parameters that are a measurement of the general quality of the data.

6.3 Method 25A Sampling and Analytical QA Parameters

6.3.1 Calibration Drift

The Method 25A Calibration drift values are given in Table 6-1.

6.3.2 Calibration Error

The calibration error checks are presented in Table 6-2. Table 6-3 presents on-site response THC response to ethanol QC challenges.

Table 6-1

Method 25A Calibration Drift EPA Bakeries (1992)

Site	Day	System 1 Drift (% of Range)		System 2 Drift (% of range)	
		Zero Drift	Span Drift	Zero Drift	Span Drift
1	1	0.04	3.22	0.03	-0.69
1	2	-0.01	-0.01	0.16	0.39
2	1	0.09	-0.13	0.04	-0.2
2	2	ND	-1.34	ND	-2.57
3	1	0.07	0.02	-0.14	-0.61
3	2	ND	-0.06	ND	-0.2
4	1	0.17	-0.08	-0.01	0.16
4	2	0.08	0.04	0.04	-0.47
4	3	0.03	-0.13	0.04	0.14
4	4	-0.09	-0.05	-0.01	-0.24

Note: Full range of analyzer was 0-10,000 ppmC. All calibrations performed with methane.

ND = Not determined

Table 6–2. Method 25A Calibration Error Results.
EPA Bakeries, Site 1 (1992)

Methane QC Gas Conc. (ppmC)	System 1		System 2	
	THC Instrument Response (ppmC)	Calibration Error (%)	THC Instrument Response (ppmC)	Calibration Error (%)
SITE 1 – DAY 1				
2000	2039	2.0	2124	6.2
803	805	0.2	GC DOWN	NA
80.2	81.9	2.1	GC DOWN	NA
199.1	198.4	−0.4	GC DOWN	NA
0	4.3	NA	20.3	NA
0	2.7	NA	12.9	NA
2000	1982	−0.9	1963	−1.9
199.1	199.5	0.2	209.3	5.1
2000	1981	−1.0	2089	4.5
803	804.2	0.1	853.5	6.3
199.1	204.3	2.6	224	12.5
SITE 1 – DAY 2				
2000	2014	0.7	1980	−1.0
803	801	−0.2	807	0.5
199.1	197	−1.1	210	5.5
80.2	77.3	−3.6	89.6	11.7
2000	2003	0.2	1937	−3.2
0	3.7	NA	14	NA
2000	1990	−0.5	1986	−0.7
803	805	0.2	803	0.0
199.1	202	1.5	206	3.5

Table 6–2. Method 25A Calibration Error Results, (cont).
EPA Bakeries, Site 2 (1992)

Methane QC Gas Conc. (ppmC)	System 1 THC Instrument Response (ppmC)	System 1 Calibration Error (%)	System 2 THC Instrument Response (ppmC)	System 2 Calibration Error (%)
SITE 2 – DAY 1				
1490	1512.6	1.5	1514.2	1.6
798	812.9	1.9	814.2	2.0
199.1	213.6	7.3	217.6	9.3
3980	3979.6	−0.0	4013.4	0.8
199.1	215.9	8.4	204.9	2.9
798	807.6	1.2	748.6	−6.2
1490	1496.5	0.4	1436.1	−3.6
3980	3931.3	−1.2	3752.8	−5.7
1490	1493.1	0.2	1515.3	1.7
80.2	90.9	13.3	92.5	15.3
80.2	89.7	11.8	87.5	9.1
80.2	89	11.0	88.5	10.3
0	11.1	NA	1.5	NA
80.2	90	12.2	86.8	8.2
798	809.7	1.5	772.4	−3.2
199.1	212	6.5	217.9	9.4
1490	1505.1	1.0	1524.3	2.3
3980	3966.9	−0.3	3953.9	−0.7
0	9.2	NA	4.1	NA
SITE 2 – DAY 2				
199.1	209.3	5.1	206.3	3.6
798	782.6	−1.9	801.2	0.4
1490	1467.5	−1.5	1488.9	−0.1
2000	2041.4	2.1	1936.4	−3.2
2000	2099.5	5.0	1937.6	−3.1
3980	3924	−1.4	3836.6	−3.6
80.2	97.7	21.8	86.8	8.2
199.1	159.4	−19.9	102	−48.8
798	813.2	1.9	754.8	−5.4
1490	1481.1	−0.6	1428.9	−4.1
2000	2008	0.4	2031	1.6
3980	3846	−3.4	3723	−6.5

Table 6–2. Method 25A Calibration Error Results, (cont).
EPA Bakeries, Site 3 (1992)

Methane QC Gas Conc. (ppmC)	System 1 THC Instrument Response (ppmC)	System 1 Calibration Error (%)	System 2 THC Instrument Response (ppmC)	System 2 Calibration Error (%)
SITE 3 – DAY 1				
798	817	2.4	769.7	−3.5
1490	1490	0.0	1390	−6.7
0	1.9	NA	3.4	NA
1490	1490.3	0.0	1419	−4.8
1490	1491.5	0.1	1429.2	−4.1
2000	2030.7	1.5	2071.6	3.6
0	7.1	NA	−14.1	NA
SITE 3 – DAY 2				
0	1.16	NA	−1.5	NA
80.2	77.7	−3.1	68.1	−15.1
199.1	198	−0.6	183	−8.1
80.2	75.3	−6.1	82.5	2.9
199.1	198.4	−0.4	188.4	−5.4
2000	2023	1.2	1909	−4.6
2030	2011	−0.9	1944	−4.2
798	801.5	0.4	783.2	−1.9
3960	3948	−0.3	3849	−2.8
80.2	77.2	−3.7	81.5	1.6
199.1	197.5	−0.8	189.7	−4.7
798	798	0.0	789.4	−1.1
2000	2016	0.8	1874	−6.3
3960	3945	−0.4	3847.2	−2.8
0	−1.97	NA	23.8	NA
1490	1484.5	−0.4	1518.8	1.9

Table 6-2. Method 25A Calibration Error Results, (cont).
EPA Bakeries, Site 3 (1992)

Methane QC Gas Conc. (ppmC)	System 1 THC Instrument Response (ppmC)	System 1 Calibration Error (%)	System 2 THC Instrument Response (ppmC)	System 2 Calibration Error (%)
SITE 4 – DAY 1				
3960	3964	0.1	3966	0.2
80.2	72.9	-9.1	64.4	-19.7
199.1	180.7	-9.2	179.9	-9.6
80.2	60.1	-25.1	60	-25.2
0	-21.8	NA	-6.6	NA
798	810.2	1.5	801.9	0.5
1490	1507.4	1.2	1504.8	1.0
2000	2036	1.8	1939	-3.1
SITE 4 – DAY 2				
3960	3954	-0.2	3960.4	0.0
1490	1506.7	1.1	1506.1	1.1
0	2.1	NA	5.1	NA
80.2	84.5	5.4	75.2	-6.2
199.1	207	4.0	192.6	-3.3
798	804.9	0.9	804.8	0.9
1490	1499	0.6	1509	1.3
2000	2030.2	1.5	1943.2	-2.8
3960	3938	-0.6	3981	0.5
0	8.3	NA	4.05	NA
3960	3964	0.1	3912	-1.2
200	201.6	0.8	192.2	-3.9
200	205.1	2.5	194.3	-2.8
80.2	83.8	4.5	82.9	3.4

Table 6–2. Method 25A Calibration Error Results, (cont).
EPA Bakeries, Site 3 (1992)

Methane QC Gas Conc. (ppmC)	System 1 THC Instrument Response (ppmC)	System 1 Calibration Error (%)	System 2 THC Instrument Response (ppmC)	System 2 Calibration Error (%)
SITE 4 – DAY 3				
3960	3963	0.1	3958	−0.1
3960	3949	−0.3	3873	−2.2
0	−0.7	NA	−0.3	NA
3960	3954	−0.2	3941	−0.5
0	14.5	NA	−0.2	NA
3960	3936.5	−0.6	3930.6	−0.7
0	−0.96	NA	−2.7	NA
3960	3967.2	0.2	3988.9	0.7
199.1	202	1.5	189.3	−4.9
0	2.7	NA	3.8	NA
3960	3947	−0.3	3974	0.4
3960	3964	0.1	3969	0.2
3960	3948	−0.3	3990	0.8
798	796.5	−0.2	808.9	1.4
1490	1486.6	−0.2	1516.6	1.8
2030	2017.3	−0.6	2019.1	−0.5
SITE 4 – DAY 4				
199.1	202	1.5	187.7	−5.7
798	803	0.6	799.7	0.2
2030	2034.8	0.2	2032.8	0.1
80.2	84.4	5.2	67.6	−15.7
0	0.6	NA	−10.8	NA
0	−3.9	NA	−4.6	NA
199.1	200.2	0.6	187.4	−5.9
200	206.8	3.4	191.7	−4.2
2030	2034.6	0.2	2047.5	0.9
0	5.3	NA	−0.8	NA
199.1	199.6	0.3	193.7	−2.7
80.2	766	855.1	76.3	−4.9
0	−2.4	NA	−0.9	NA
80.2	77.8	−3.0	75.5	−5.9
199.1	196	−1.6	183.8	−7.7
798	793.2	−0.6	774.6	−2.9
80.2	83.5	4.1	75.1	−6.4
199.1	202.6	1.8	187.1	−6.0
798	796	−0.3	794.9	−0.4

Table 6-3. On-Site Ethanol QC Challenges to the Method 25A THC Monitor EPA Bakeries (1992)

Site	Test Day	Ethanol QC Gas Conc. (ppmC)	System 1		System 2	
			THC Instrument Response (ppmC)	Carbon Equivalent Correction Factor	THC Instrument Response (ppmC)	Carbon Equivalent Correction Factor
1	1	200	267.5	1.34	238.4	1.19
1	1	200	275.5	1.38	280.5	1.40
1	2	10000	11862	1.19	13569	1.36
1	2	2000	2852	1.43	2948	1.47
1	2	2000	2421	1.21	2731	1.37
1	2	200	272	1.36	274	1.37
			AVG	1.32	AVG	1.36
2	1	200	305.9	1.53	295.5	1.48
2	1	200	310.6	1.55	259.9	1.30
			AVG	1.54	AVG	1.39
3	1	200	320	1.60	283	1.42
3	1	200	302.4	1.51	277	1.39
3	1	498	763.2	1.53	720	1.45
3	1	498	759.6	1.53	694.9	1.40
3	1	498	756.6	1.52	756.6	1.52
3	2	200	307	1.54	286.2	1.43
3	2	200	300.1	1.50	316	1.58
3	2	498	755.5	1.52	765.7	1.54
			AVG	1.53	AVG	1.46
4	1	200	313.5	1.57	299.1	1.50
4	3	200	309.1	1.55	307.6	1.54
4	3	200	313.4	1.57	306.3	1.53
4	3	200	300	1.50	302	1.51
4	4	200	304.6	1.52	307.9	1.54
4	4	200	312.8	1.56	304.1	1.52
4	4	200	297.8	1.49	298.9	1.49
4	4	200	296.8	1.48	304.4	1.52
4	4	200	308.4	1.54	297.2	1.49
4	4	200	DOWN		300.2	1.50
			AVG	1.53	AVG	1.51

6.4 Method 18 QA Parameters

All calibration data from the Method 18 analyses is included in the Appendices. Both an initial and final calibration were performed on each day. Excessive drift was not found during any of the test days.

6.4.1 Sample Bias

Table 6-4 presents the Method 18 sample bias checks for Sites 2-4. The Site 1 bias check results are included in the appendices.

Table 6-4. Method 18 Sample Bias Checks
EPA Bakeries (1992)

INJ. NO	Site/Day	Oven Location	Stack/ System Location	GAS CONC.(ppm)	GC ANALYTICAL RESULT	(%) DIFF	COMMENTS
190	4/1		Rack	80.2 METHANE	97.4	21	
191	4/1		Table	80.2 METHANE	84.7	5.6	
192	4/1		Rack	199.1 METHANE	200.5	0.7	
193	4/1		Table	199.1 METHANE	201.2	1	
194	4/1		Rack	80.2 METHANE	80	−0.2	
195	4/1		Rack	80.2 METHANE	78.1	−2.6	
196	4/1		Rack	80.2 METHANE	76.1	−5.1	
208	4/1		Rack	798 METHANE	804	0.8	SINGLE PT RUN 284 (6/30/92)
209	4/1		Table	798 METHANE	810	1.5	SINGLE PT RUN 284 (6/30/92)
210	4/1		Rack	1490 METHANE	1502	0.8	SINGLE PT RUN 286 (6/30/92)
211	4/1		Table	1490 METHANE	1514	1.6	SINGLE PT RUN 286 (6/30/92)
212	4/1		Rack	2000 METHANE	2040	2	SINGLE PT RUN 287 6/30/92)
	4/1						
213	4/1		Table	2000 METHANE	2003	0.1	SINGLE PT RUN 287 6/30/92)
233	4/1		Rack	199.1 METHANE	196.3	−1.4	SINGLE PT RUN 288
234	4/1		Table	199.1 METHANE	194	−2.6	SINGLE PT RUN 288
235	4/1		Table	200 ETHANOL	207	3.5	
255	4/2		Rack	3980 METHANE	3898	−1.6	
256	4/2		Table	3980 METHANE	4026	1.2	
257	4/2		Rack	1490 METHANE	1499	0.6	
258	4/2		Table	1490 METHANE	1540	3.4	
269	4/2		Table	80.2 METHANE	64.9	−19	RUN ANOTHER CHECK AT SEVERAL LEVELS
270	4/2		Rack	199.1 METHANE	194.8	−2.2	
271	4/2		Table	199.1 METHANE	197.3	−0.9	
272	4/2		Table	798 METHANE	788	−1.2	SINGLE PT RUN #284
273	4/2		Rack	798 METHANE	797	−0.1	SINGLE PT RUN #284
274	4/2		Table	1490 METHANE	1515	1.7	SINGLE PT RUN #286
275	4/2		Rack	1490 METHANE	1534	3	SINGLE PT RUN #286
276	4/2		Table	2000 METHANE	2037	1.9	SINGLE PT RUN # 287
277	4/2		Rack	2000 METHANE	2014	0.7	SINGLE PT RUN # 287
298	4/2		Table	200 ETHANOL	212	6	

Table 6-4. Method 18 Sample Bias Checks (Cont)
EPA Bakeries (1992)

INJ. NO	Site/Day	Oven Location	Stack/ System Location	GAS CONC.(ppm)	GC ANALYTICAL RESULT	(%) DIFF	COMMENTS
27	2/1		Front	1490 METHANE	14.89	0.1	S.P.,COMPARISON TO SYRINGE INJECTION RUN 28
41	2/1			N2	485.121	NA	SMALL BACKGROUND < 15ppm
45	2/1	Bun	Rear	80.2 METHANE	77	-3.9	USED USED FINAL METHANE CAL.
46	2/1	Bun	Rear	80.2 METHANE	78.8	-1.6	
47	2/1	Bun	Front [a]	80.2 METHANE	43.2	-46	PROBLEM/CHECK REPLACE
48	2/1	Bun	Front [a]	80.2 METHANE	56.3	-30	PROBLEM/CHECK, RERUN/REPLACE
49	2/1	Bun	Front [a]	80.2 METHANE	77	-3.9	BETTER/CHECK/REPLACE
50	2/1	Bun	Front [a]	80.2 METHANE	78.8	-1.7	BETTER/CHECK/REPLACE
51	2/1		b		78.7	-1.9	REPLACEMENT
52	2/1		b		78.8	-1.7	REPLACEMENT O.K.
68	2/1		Rear	80.2 METHANE	70.6	-12	
70	2/1		Front	798 METHANE	771	-3.4	SINGLE PT. RUN #26
71	2/1		Rear	199.1 METHANE	189	-5	
72	2/1		Front	199.1 METHANE	188	-5.5	
73	2/1		Front	200 ETHANOL	204	2	
74	2/1		Rear	200 ETHANOL	209	4.5	
122	2/2		Front	80.2 METHANE	77.8	-2.9	
123	2/2		Front	80.2 METHANE	78.9	-1.6	
116	2/2		Front	2000 METHANE	1896	-5.2	SINGLE PT, CAL. UAING RUN 152
130	2/2		Front	798 METHANE	777	-2.6	SINGLE PT, CAL. USING RUN 151
135	2/2		Front	2000 METHANE	2099	-5	SINGLE PT, RUN 152
136	2/2		Rear	2000 METHANE	2012	-0.6	SINGLE PT
137	2/2		Front	3980 METHANE	3975	-0.1	
131	2/2		Rear	798 METHANE	779	-2.4	SINGLE PT, RUN 151

a Nitta Moore Heat Trace check.
New 1/4 inch H.T. jumper to replace Nitta Moore.

Table 6-4. Method 18 Sample Bias Checks (Cont)
EPA Bakeries (1992)

INJ. NO	Site/Day	Oven Location	Stack/ System Location	GAS CONC (ppm)	GC ANALYTICAL RESULT	(%) DIFF	COMMENTS
20	3/1	Bun	Burner	798 METHANE	799	0.1	SINGLE PT, RUN #19
21	3/1	Bun	Oven	798 METHANE	776	−2.8	SINGLE PT, RUN #19
26	3/1		Burner	200 ETHANOL	203	1.5	INITIAL CAL.
42	3/1		Oven	1490 METHANE	1512	1.5	SINGLE PT, RUN #45
	3/1						
43	3/1		Burner	1490 METHANE	1508	1.2	SINGLE PT, RUN #45
65	3/1		Burner	498 ETHANOL	482	−3.2	
66	3/1		Oven	498 ETHANOL	486	−2.4	
67	3/1			80.2 METHANE	88.6	10.5	
68	3/1			80.2 METHANE	86.7	8.1	
69	3/1			199.1 METHANE	214	7.5	
70	3/1			199.1 METHANE	213	7	
104	3/2		Burner	80.2METHANE	73.1	−8.9	
105	3/2		Oven	80.2 METHANE	82.6	3	
106	3/2		Burner	199.1 METHANE	168	−15.6	RERUN
107	3/2		Burner	199.1 METHANE	196	−1.5	O.K.
108	3/2		Oven	199.1 METHANE	205	3	
124	3/2		Burner	80.2 METHANE	80.6	0.5	
125	3/2		Oven	199.1 METHANE	198	−0.5	
126	3/2		Burner	199.1 METHANE	199	0	
147	3/2		Burner	80.2 METHANE	89.9	12.1	PEAK WIDTH SUSPECT
148	3/2		Oven	80.2 METHANE	76.3	−4.9	
149	3/2		Burner	199.1 METHANE	201	1	
150	3/2		Oven	199.1 METHANE	201	1	
151	3/2		Burner	798 METHANE	800	0.2	SINGLE PT RUN #158
153	3/2		Burner	798 METHANE	705	−11.6	RUN MIOMER LEVELS
154	3/2		Burner	2000 METHANE	2027	1.3	SINGLE PT RUN #159
155	3/2		Oven	2000 METHANE	2027	1.3	SINGLE PT RUN #159
156	3/2		Burner	3960 METHANE	3978	0.4	SINGLE PT RUN #160
157	3/2		Oven	3960 METHANE	3973	0.3	SINGLE PT RUN #160
161	3/2		Burner	200 ETHANOL	204	2	
162	3/2		Oven	498 ETHANOL	511	2.6	RERUN
163	3/2		Burner	82.5 ACETALDEHYDE	81.6	−1.1	
164	3/2		Oven	82.5 ACETALDEHYDE	79.3	−3.9	

Table 6-4. Method 18 Sample Bias Checks (Cont)
EPA Bakeries (1992)

INJ. NO	Site/Day	Oven Location	Stack/ System Location	GAS CONC.(ppm)	GC ANALYTICAL RESULT	(%) DIFF	COMMENTS
391	4/4		Table	200 ETHANOL	152	−24	
398	4/4		Table	200 ETHANOL	175	−13	
419	4/4		Table	200 ETHANOL	181	−9.5	
421	4/4		Rack	80.2 METHANOL	82.7	3.1	
422	4/4		Table	80.2 METHANE	82.3	2.6	
423	4/4		Rack	199.1 METHANE	199.3	0.1	

7.0 DATA REDUCTION PROCEDURES

The following section details the calculations used for the U.S. EPA Bakeries test program.

7.1 Emission Calculations

The objective of the U.S. EPA Bakeries test program was to determine emissions of Total VOC as well as emissions of two of the primary VOC constituents, namely ethanol and acetaldehyde. The emission calculations were done using several methods. All rates are in units of lbs/hr.

7.1.1 VOC Emissions

Emission rates of VOC as ethanol were calculated by multiplying the average VOC as ethanol concentration by the stack gas flow rate as follows:

$$\overset{o}{VOC}_{ETOH} = [\overline{VOC_{ETOH}}] \times Q_a \times \left(\frac{P_s}{T_s \times R \times 10^6}\right)$$

Where:

Q_a = Volumetric flow of stack gas (acf/hr)

P_s = Absolute stack Pressure (in Hg)

T_s = Stack Gas Temperature (°R)

R = Universal Gas Constant (21.85 in Hg-cf/lb-mole-°R)

7.1.2 Ethanol and Acetaldehyde Emissions

Ethanol and acetaldehyde emissions were calculated by multiplying the average concentration by the stack gas flow rates. Average concentrations were determined as shown in Section 7.2.2 through 7.2.5. Emission rates were calculated as follows:

$$\overset{o}{ETOH} = [\overline{ETOH}] \times Q_s \times \left(\frac{P_s}{T_s \times R \times 10^6}\right)$$

$$\overset{o}{AA} = [\overline{AA}] \times Q_s \times \left(\frac{P_s}{T_s \times R \times 10^6}\right)$$

7.2 Average VOC Concentration Calculations

The calculations used for determining concentrations are given in the following section.

7.2.1 Average VOC as Ethanol Concentration

The average VOC as ethanol concentration (ppmV as ethanol) was calculated as follows:

$$[\overline{VOC}]_{ETOH} = \frac{[\overline{NMHC}]}{1.42}$$

where:

1.42 = Ethanol Carbon Equivalent Correction Factor (i.e., 10 ppmv ethanol = 14 ppmC THC)

The average non-methane hydrocarbon concentration (ppmC/wet) was calculated as follows:

$$[\overline{NMHC}] = \left(1 - \left[\frac{\overline{CH_4}}{\overline{THC}}\right]\right) \times [\overline{THC}]$$

The average CH_4 to THC ratios (dimensionless) were calculated as follows:

$$\left[\frac{\overline{CH_4}}{\overline{THC}}\right] = \frac{\sum_{i=1}^{N}\left(\frac{[CH_4]_i}{[THC]_i}\right)}{N}$$

where:

N = Number of GC injections during test period

$[CH_4]_i$ = CH_4 concentration at the time of the GC injection (ppmC/wet)

$[THC]_i$ = THC concentration at the time of the GC injection (ppmC/wet)

The average THC concentration (ppmC/wet) was calculated as follows:

$$[\overline{THC}] = \frac{\sum_{i=1}^{n}[THC]_i}{n}$$

where:

n = Number of THC readings during the test period

7.2.2 Average Ethanol Concentration

The average ethanol concentration (ppmV/wet) using both the Method 18 ethanol and Method 25A THC results was calculated as follows:

$$[\overline{ETOH}]_{THC} = \left[\frac{\overline{ETOH}}{\overline{THC}}\right] \times [\overline{THC}]$$

The average ethanol-to-THC ratios (ppmV/ppmC) were calculated as follows:

$$\left[\frac{\overline{ETOH}}{\overline{THC}}\right] = \frac{\sum_{i=1}^{N}\left(\frac{[ETOH]_i}{[THC]_i}\right)}{N}$$

where:

$[ETOH]_i$ = Ethanol Concentration from GC analysis (ppmv/wet)

N = Number of GC injections

7.2.3 Average Ethanol Concentration By GC Only

The average ethanol concentrations (ppmV/wet) determined from the Method 18 analyses were calculated as follows:

$$\overline{[ETOH]}_{GC} = \frac{\sum_{i=1}^{N} [ETOH]_i}{N}$$

7.2.4 Acetaldehyde Concentration By GC and THC

The average acetaldehyde concentration (ppmV/wet) determined using both the Method 18 acetaldehyde and Method 25A THC results was calculated as follows:

$$\overline{[AA]}_{THC} = \left[\overline{\frac{AA}{THC}}\right] \times \overline{[THC]}$$

The average acetaldehyde to THC ratios (ppmV/ppmC) were calculated as follows:

$$\left[\overline{\frac{AA}{THC}}\right] = \frac{\sum_{i=1}^{N} \left(\frac{[AA]_i}{[THC]_i}\right)}{N}$$

7.2.5 Average Acetaldehyde Concentration By GC Only

The average acetaldehyde concentration (ppmV/wet) determined from the Method 18 analyses was calculated as follows:

$$[\overline{AA}]_{GC} = \frac{\sum_{i=1}^{N} [AA]_i}{N}$$

7.2.6 Comparison Of GC And THC Results

The comparison of the corrected sum of ethanol, acetaldehyde, and methane Method 18 concentrations to the THC concentration was determined as follows:

$$\left(\frac{\overline{GC}}{THC}\right) = \frac{\sum_{i=1}^{N} \frac{GC_i}{THC_i}}{N} \times 100$$

where:

THC_i = THC concentrations determined from the Method 25A monitor at the same time as the GC injection (ppmC).

$$GC_i = \left(\frac{[ETOH]_i}{1.42} + \frac{[AA]_i}{1.23} + [CH_4]_i\right)$$

where:

$[ETOH]_i$ = Ethanol concentration determined from a single GC analysis (ppmv/wet)

$[AA]_i$ = Acetaldehyde concentration determined from a single GC analysis (ppmv/wet)

$[CH_4]_i$ = Methane concentration determined from a single GC analysis (ppmv/wet)

7.3 Method 25A Calculations

This section briefly summarizes calculations used for the Method 25A analysis. The computer controlled data acquisition system scanned each channel approximately 1800 times per minute and stored periodic averages on disk and hard copy. The averaging computer period varied throughout the test program ranging from 10 seconds to 1 minute. Pre-test calibration, post-test calibration drift checks, and calibration error checks were saved on disk. Instrument drift was evaluated after the post-test calibration with an acceptable criterion of ± 3. The computer DAS reported THC concentrations calculated as follows:

$$C_{sample} = RSP_{sample} \times RFAC + C_{rsp=0}$$

where:

C_{sample} = Observed concentration of sample gas (ppmv or %v, dry)

RSP_{sample} = Observed instrument sample voltage response (volts)

$C_{rsp=0}$ = Calculated concentration corresponding to an instrument response of 0 volts (Y intercept)

RFAC = Calibration response factor (slope)

$$RFAC = \frac{(SPAN - ZERO)}{(RSP_{span} - RSP_{zero})}$$

where:

SPAN = Concentration of high (span) calibration gas (ppmv)

ZERO = Concentration of low (zero) calibration gas (ppmv)

RSP_{span} = Observed instrument voltage response to the span calibration gas (volts)

RSP_{zero} = Observed instrument voltage response to the zero calibration gas (volts)

Span and zero calibration drifts are calculated as follows:

$$\text{Drift} = \frac{(C_F - C_I)}{FULL\ RANGE} \times 100$$

where:

Drift = Span calibration drift (% of Scale)

Full Range = Full Range of the Instrument (i.e. 0-500 ppmv)

C_F = Observed concentration predicted by the final calibration - (ppmv)

C_I = Observed concentration predicted by the initial calibration (ppmv)

Average concentrations of THC were calculated for the test duration of interest.

7.3.1 Method 18 Data Reduction

The concentration of ethanol, acetaldehyde, methane and ethane in the stack gas was determined directly as parts per million by volume (ppmv) on a wet basis. An electronic integrator would convert the GC electrical peak signals to a peak area value. A linear regression was completed using calibration gas concentration versus peak area response. Sample responses (peak areas) were then used in the calibration regression to determine the respective concentration.

7.3.2 Manual Gas Sampling Methods

Calculations for determining flow rate, moisture content, and gas molecular weight are described in Figures 7-1 and 7-2.

RADIAN SOURCE TEST
EPA METHODS
DEFINITION OF TERMS

Parameter	Units	Definition
t	min.	Total Sampling Time
D_n	in.	Sampling Nozzle Diameter
V_m	ft^3	Absolute Volume of Gas Sample Measured by DGM (uncorrected)
M_w	g	Total Mass of Water Collected
M_p	g	Total Mass of Particulate Collected
P_m	in. Hg	Absolute Meter Pressure
ΔH	in. H_2O	Average Static Pressure of DGM
T_m	°F	Average Temperature of DGM
P_{bar}	in. Hg	Barometric Pressure
$\%CO_2$	% vol-dry	Carbon Dioxide Content of Flue Gas
$\%O_2$	% vol-dry	Oxygen Content of Flue Gas
$\%N_2$	% vol-dry	Nitrogen Content of Flue Gas (by difference)
A_s	ft^3	Cross-sectional Area of Stack (Duct)
T_s	°F	Temperature of Stack
P_s	in. Hg	Absolute Stack Gas Pressure
Static	in. H_2O	Stack Static Pressure
$V_{m(std)}$	dscf	Volume of Gas Sampled at Standard, Dry Conditions[a]
V_w	scf	Volume of Water Vapor in Gas Sample, Std

Figure 7-1. Definition of Terms for Method 1-4 Calculations

RADIAN SOURCE TEST
EPA METHODS
DEFINITION OF TERMS
(Continued)

Parameter	Units	Definition
B_{ws}		Fraction of Water Vapor in Stack Gas
M_d		Fraction by Volume of Dry Gas in Gas Sample ($1-B_{ws}$)
MW_d	lb/lb mole	Molecular Weight of Dry Stack Gas, Dry Basis
MW_s	lb/lb mole	Molecular Weight of Stack Gas, Wet Basis
C_p		Pitot Coefficient (typically 0.84)
C_s	grains/ft^3	Concentration of Particulate in Flue Gas
E	lb/hr	Emission Rate of Particulate
Q_{sd}	dry, ft^3/min.	Average Stack Dry Volumetric Flow Rate
V_s	ft/sec	Velocity of Stack Gas
Y		Test Meter Calibration Coefficient
ΔP	in. H_2O	Stack Gas Velocity Pressure

Figure 7-1. Continued

RADIAN SOURCE TEST
EPA METHOD 2 - 5
SAMPLE CALCULATION

1) Volume of dry gas sampled at standard conditions (68°F, 29.92 in. Hg):

$$V_{m(std)} = \frac{Y \times V_m \times 528 \times [P_{bar} + (\Delta H/13.6)]}{29.92 \times (T_m + 460)}$$

2) Volume of water vapor at standard conditions:

$$V_w = \frac{0.04715 ft^3}{g \times M_w}$$

3) Fractional moisutre content in stack gas:

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

4) Mole fraction of dry stack gas:

$$M_d = 1 - B_{ws}$$

5) Absolute stack gas pressure:

$$P_s = P_{bar} + \frac{Static}{13.6}$$

Figure 7-2. Example of Method 1-4 Calculations

6) Average molecular weight of dry stack gas:

$$\text{Dry: } MW_d = (0.32 \times \%O_2) + (0.44 \times \%CO_2) + [0.28 \times (100 - (\%O_2 + \%CO_2))]$$

7) Stack gas velocity at stack conditions:

$$V_s = 85.49 \times 0.84 \times \sqrt{\Delta P} \times \sqrt{\frac{T_s + 460}{P_s \times MW_s}}$$

8) Average stack gas volumetric flow at dry, standard conditions:

$$Q_{sd} = V_s \times A_s \times M_d \times \frac{528 \times P_m}{T_s \times 29.92} \times \frac{60 \text{ sec}}{\text{min}}$$

Figure 7-2. Continued

APPENDIX A

Site 1

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE _____ DATE 5/29/92 CHECKED _____ DATE _____

PROJECT EPA/EMB Bakeries Charlotte NC JOB NO. _____

SUBJECT Calibration/QC 2nd Run Event Data SHEET _____ OF _____ SHEETS

Test Date: 5/20/92 DAY 1

Time	Event	Result
10:58:37	pretest Calibration Summary THC Span = 2000ppm CH_4 O_2 Span = 20.9% O_2	β (N_2): THCR = .0036 volts; THCF = .0002 volts; O_2 = .0022 volts span (Boloppm CH_4): THCR = 8.092 volts; THCF = 8.129 volts; O_2 = .0790 (ambient 20.9%)
11:00:07 – 11:01:17	QC CH_4 = 2000 ppm	THCF, THCR: Instrument response: 2038.9 ppm; 2123.9 ppm
11:05:27 – 11:06:16	QC CH_4 = 803 ppm	THCF: 804.7 ppm THCR: Inst. flameout no data
11:17:48 – 11:18:27	QC CH_4 = 802 ppm	THCF: 81.9 ppm THCR: F.O. no data
11:27:03 – 11:28:12	QC CH_4 = 199.1 ppm	THCF: 198.4 ppm THCR: F.O. no data
11:58:58 – 13:16:04	Giant Run #1	THCF: Concentration = 1011.1 ppmc THCR: Concentration = 2842.7 ppmc
13:25:19 – 13:25:59	N_2 thru system/bias CHK and Leak ✓ O_2 analyzer at rear	THCF, THCR, O_2 @ Rear: response: 4.3 ppm; 20.3 ppm; 0.5%
13:26:59 – 13:27:59	N_2 thru system/bias CHK and Leak ✓	THCF, THCR, O_2 @ Front: response: 2.7 ppm; 12.9 ppm; 0.6%
13:29:42 – 13:30:12	QC O_2 = 18.00%	O_2 response = 18.4%

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RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE _____ DATE 5/29/92 CHECKED _____ DATE _____

PROJECT EPA/EMB Bakeries JOB NO. _____

SUBJECT _____ SHEET 2 OF 2 SHEETS

Time	Event	Result		DRIFT CORR
13:34:56 - 15:35:26	QC CH4 = 2000 ppm	THCF > response <	1981.7	
		THCR	1962.5	(1921)
13:38:47 - 13:39:37	Ethanol thru system 200 ppm	THCF	267.5 ppm	
		THCR	238.4 ppm	(231.4)
13:43:52 - 13:44:42	Ethanol direct 200 ppm	THCF	275.5 ppm	
		THCR	280.5 ppm	(272.4)
13:46:33 - 13:47:03	CH4 direct 199.1 ppm	THCF	199.5 ppm	
		THCR	209.3 ppm	(202.6)
14:29:58 - 14:50:57	Run # 2 Burn Line	THCF		
15:01:00 - 15:32:58		THCR		
15:42:57 - 15:43:46	QC CH4 = 2000 ppm	THCF	1980.6 ppm	
		THCR	2088.8 ppm	(2040.1)
15:45:48 - 15:46:38	QC CH4 = 803 ppm	THCF	804.2 ppm	
		THCR	853.5 ppm	(818.9)
15:49:31 - 15:50:31	QC CH4 = 199.1 ppm	THCF	204.3 ppm	
		THCR	223.7 ppm	(211.8)
16:02:23	Calibration Summary		0	span
		THCF	.0077 volts	8.417 volts
		THCR	.0030 volts	8.059 volts
		O_2	-.0022 volts (N2)	.079 volts (ambient)
16:07:35	CEM Instrument Drift Summary	THCR	.04	3.22
		THCRF	.03	-0.69
		O_2	0.00	

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RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE _____ DATE _____ CHECKED _____ DATE _____

PROJECT EPA/EMB Bakeries - Charlotte JOB NO. _____

SUBJECT THC LOG SHEET _____ OF _____ SHEETS

TEST DATE: 5/21 DAY 2

Time	Event	Result	
06:00	THC CAL <521bakea.cal>		
0619	" " <521bakeb.cal>		
06:22 - 06:24	2000 ac - duct	THC F	2014
		THC R	= 1980
0628 - 0630	803 ac - duct	THC F	800.9
		THC R	807.0
0633 - 0635	199.1 thru system	THC F	196.9
		THC R	209.5
06:40 - 06:42	80.2 thru syst	THC F	77.3
		THC R	89.6
06:48 - 09:14	Sample Gain DAS says OLD PASSION	THC F	992.1
		THC R	3509.6
09:20 - 09:22	80.2 thru syst	THC F	80.7
		THC R	83.4
09:24 - 09:28	199.1 thru system	THC F	200.9
		THC R	198.3
09:34 - 09:37	803 thru syst	THC F	808.7
		THC R	806.4
09:42 - 0945	2000 thru syst	THC F	2003.4
		THC R	1930.8
0954 - 0956	N_2 thru system	THC F	3.7
		THC R	14.0

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RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE _____ DATE _____ CHECKED _____ DATE _____

PROJECT _____ JOB NO. _____

SUBJECT _____ SHEET _____ OF _____ SHEETS

TEST DATE : 5/21 (cont)

TIME	EVENT	RESULT	
09:59 - 10:00	18% O_2 thru syst	F or R ??	19.1
10:01 - 10:24	GIANT RED 2 sample		
20:33	CAL <0521BAKEC.CAL>		
20:36 - 20:48	2000 thru syst	THC F	1990.0
		THC R	1986.2
20:46 - 20:49	803 ppm thru syst	THC F	805
		THC R	802.5
20:53 - 20:54	199.1 thru syst	THC F	202
		THC R	205.5
20:57 - 20:58	18% O_2 thru syst	F or R ??	18.4
21:03 - 22:08	Autumn Grain	THC F	1031.1
2		THC R	3279.4
22:43 - 22:46	10,000 Ethanol Direct	THC F	11,862.4
		THC R	13,568.6
23:13 - 23:14	2000 Direct (Ethanol)	THC F	2851.6
		THC R	2947.7
23:20 - 23:22	2000 Ethanol thru syst	THC F	2421.0
		THC R	2730.5

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE _____ DATE _____ CHECKED _____ DATE _____

PROJECT _____ JOB NO. _____

SUBJECT _____ SHEET _____ OF _____ SHEETS

TEST DATE: 5/21/92 (cont)

TIME	EVENT	RESULT	
23:34 - 23:38	200 ppm ethanol thru syst	THC F	271.9
		THC R	273.7
23:48 - 23:50	82.5 acetaldehyde thru syst	THC F	101.5
		THC R	103.7
00:05:21	(0521 baked, CAL)		
00:06	DRIFT summary CALCS.		

4-81-3361

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
10:59:38	2082.14	2007.018						
10:59:48	2054.67	1982.568						
11:00:07	2058.09	1971.776						
11:00:17	2128.15	2051.758						
11:00:27	2158.89	2046.557						
11:00:37	2141.39	2042.575						
11:00:47	2126.63	2045.738						
11:00:57	2123.46	2047.951						
11:01:07	2126.37	2052.646						
11:01:17	2123.72	2052.143						
11:01:29	2123.52	2049.966						
11:01:39	2121.13	2051.309						
11:01:49	1794.50	1040.783						
11:01:59	796.10	461.5521						
11:02:09	2768.82	1090.544						
11:02:18	2786.36	1481.764						
11:02:28	1893.42	949.3727						
11:02:38	1645.38	840.2676						
11:02:48	1489.35	833.6005						
11:02:58	1633.51	835.6381						
11:03:08	1621.29	824.6471						
11:03:18	1643.59	827.3267						
11:03:28	1642.04	824.9443						
11:03:38	1643.44	825.7101						
11:03:48	1652.11	811.0685						
11:03:58	1651.06	809.5605						
11:04:08	1648.39	811.7742						
11:04:18	1651.01	816.2088						
11:04:28	1657.53	809.1758						
11:04:38	1636.08	807.9536						
11:04:48	1644.89	805.1166						
11:04:58	1646.75	806.2694						
11:05:27	1629.03	805.647						
11:05:37	1591.63	803.3603						
11:05:46	1600.03	804.1639						
11:05:56	1604.74	805.3492						
11:06:06	1613.76	805.3521						
11:06:16	1622.36	804.1447						
11:06:26	1608.84	802.6691						
11:06:36	1622.53	804.0727						
11:06:46	2484.97	953.2706						
11:06:56	3187.35	1113.001						
11:07:06	3224.64	1035.833						
11:07:16	3205.48	1188.431						
11:07:26	3136.41	1160.138						
11:07:36	1361.15	1058.348						
11:07:46	216.55	1179.885						
11:07:56	113.40	1115.787						
11:08:06	80.05	1008.234						

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
11:08:16	64.34	1142.63						
11:08:26	63.36	1084.351						
11:08:35	57.13	1067.455						
11:08:45	54.92	1174.338						
11:08:55	46.33	1083.713						
11:09:05	39.26	1065.229						
11:09:15	36.20	1134.831						
11:09:25	31.90	1042.492						
11:09:35	30.81	1075.362						
11:09:45	33.83	1145.409						
11:09:55	32.08	1055.505						
11:10:05	29.22	1023.594						
11:10:15	26.00	1098.208						
11:10:25	23.95	1058.631						
11:10:35	22.54	1050.506						
11:10:45	22.14	1097.227						
11:10:55	24.68	1035.355						
11:11:05	22.52	1030.463						
11:11:15	28.75	1088.223						
11:11:24	29.86	1010.239						
11:11:34	37.58	1080.825						
11:11:44	45.14	1104.503						
11:11:54	29.45	1014.537						
11:12:04	30.19	1067.301						
11:12:14	26.70	1044.871						
11:12:24	29.04	963.0955						
11:12:34	29.88	1047.098						
11:12:44	31.54	1032.625						
11:12:54	28.76	946.952						
11:13:04	22.30	1125.832						
11:13:14	21.72	1156.712						
11:13:24	24.96	1120.929						
11:13:34	28.29	1200.221						
11:13:44	28.47	1018.155						
11:13:54	22.82	850.4693						
11:14:04	21.77	1057.577						
11:14:14	22.41	1120.166						
11:14:23	22.04	1164.475						
11:14:33	19.37	900.9916						
11:14:43	20.95	811.0695						
11:14:53	304.43	806.7064						
11:15:03	592.36	806.3228						
11:15:13	609.52	804.0588						
11:15:23	618.53	804.5359						
11:15:33	664.85	804.2813						
11:15:43	1203.28	803.6681						
11:15:53	1367.96	803.1663						
11:16:03	1398.59	802.9632						
11:16:13	1425.99	801.8355						

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet
11:16:23	1424.40	802.0385						
11:16:33	1438.78	802.0631						
11:16:43	1672.81	718.6046						
11:16:54	693.17	141.3903						
11:17:03	348.47	87.25561						
11:17:13	311.78	82.01173						
11:17:23	292.13	81.67613						
11:17:48	292.62	79.99628						
11:17:58	307.27	86.75791						
11:18:08	312.85	84.32983						
11:18:17	314.24	78.67344						
11:18:27	313.18	79.73033						
11:18:40	318.48	78.33594						
11:18:50	313.75	80.23941						
11:19:00	713.69	79.99226						
11:19:10	2787.77	683.0253						
11:19:20	3191.99	1138.147						
11:19:30	3207.67	1091.078						
11:19:40	3222.12	1012.433						
11:19:50	3229.71	1105.281						
11:20:00	3192.51	1056.524						
11:20:10	2915.84	1016.037						
11:20:20	877.11	1886.911						
11:20:30	6013.30	7349.502						
11:20:40	6967.57	7543.586						
11:20:50	6545.42	7573.119						
11:21:00	6813.70	7586.612						
11:21:09	7182.30	7585.232						
11:21:19	7052.57	7585.773						
11:21:29	2429.59	5656.719						
11:21:39	1594.88	2340.824						
11:21:49	271.29	178.6691						
11:21:59	152.71	113.212						
11:22:09	128.67	100.4966						
11:22:19	98.86	72.45442						
11:22:29	83.54	59.90437						
11:22:39	67.43	46.70115						
11:22:49	62.50	34.42335						
11:22:59	49.45	30.29888						
11:23:09	39.31	22.18709						
11:23:19	28.16	8.836989						
11:23:29	27.29	14.85458						
11:23:50	27.27	13.00114						
11:24:00	21.72	6.371534						
11:24:10	20.90	5.919281						
11:24:20	19.91	5.675852						
11:24:30	19.98	6.87816						
11:24:40	20.43	5.506568						
11:24:50	17.30	5.51517						

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
11:25:00	14.53	302.3325						
11:25:10	23.74	115.4362						
11:25:20	30.29	467.1752						
11:25:30	185.24	202.0322						
11:25:40	215.10	199.9762						
11:25:50	221.41	199.4323						
11:25:59	235.52	198.9614						
11:26:09	248.10	199.0742						
11:26:19	257.27	198.5845						
11:26:29	262.15	198.3236						
11:26:39	265.71	198.5735						
11:27:03	269.57	198.8173						
11:27:13	279.45	198.2957						
11:27:22	291.55	197.6907						
11:27:32	297.64	198.0339						
11:27:42	300.36	198.1819						
11:27:52	306.76	198.3297						
11:28:02	309.93	198.4201						
11:28:12	313.25	198.6338						
11:28:22	315.85	200.7838						
11:28:32	322.42	211.3322						
11:28:42	326.41	198.8992						
11:28:52	330.26	198.3115						
11:29:02	385.41	198.6494						
11:29:12	2376.98	758.3627						
11:29:22	2980.78	1121.375						
11:29:32	2941.81	1119.371						
11:29:42	2860.13	1047.264						
11:29:52	2798.33	1102.313						

05-20-1992 TIME	THC F ppmV		FRONT ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
11:30:02	2868.63	1063.525 11:30						
11:30:12	2940.16	1002.964 11:30						
11:30:22	2967.27	1142.806 11:30						
11:30:31	2996.32	1092.166 11:30						
11:30:41	3011.77	1026.516 11:30						
11:30:51	3014.52	1127.975 11:30						
11:31:01	3038.84	1094.046 11:31						
11:31:11	3042.36	1053.682 11:31						
11:31:21	2991.33	1218.038 11:31						
11:31:31	3018.01	1093.752 11:31						

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet
11:31:41	3061.82	1024.915	11:31			:			
11:31:51	3005.55	1216.909	11:31			:			
11:32:01	3036.96	1172.598	11:32			:			
11:32:11	3101.14	1132.379	11:32			:			
11:32:21	3024.26	1230.328	11:32			:			
11:32:31	3058.80	1060.278	11:32			:			
11:32:41	3073.76	1019.859	11:32			:			
11:32:51	3026.96	1103.232	11:32			:			
11:33:01	3057.91	1039.958	11:33			:			
11:33:11	3029.47	1057.654	11:33			:			
11:33:20	3018.91	1112.67	11:33			:			
11:33:30	3058.69	997.2377	11:33			:			
11:33:40	3001.41	1009.262	11:33			:			
11:33:50	2985.06	1014.243	11:33			:			
11:34:00	3055.77	999.131	11:34			:			
11:34:10	2968.74	1123.222	11:34			:			
11:34:20	2969.71	1153.307	11:34			:			
11:34:30	3055.95	1088.727	11:34			:			
11:34:40	2971.10	1179.566	11:34			:			
11:34:50	2973.03	1118.341	11:34			:			
11:35:00	3044.19	1051.474	11:35			:			
11:35:10	2978.95	1175.693	11:35			:			
11:35:20	2963.81	1163.166	11:35			:			
11:35:30	3001.73	1104.296	11:35			:			
11:35:40	2983.47	1155.588	11:35			:			
11:35:50	2959.18	1106.304	11:35			:			
11:36:00	2967.95	1066.104	11:36			:			
11:36:09	2953.88	1263.603	11:36			:			
11:36:19	2995.15	1229.965	11:36			:			
11:36:29	3006.10	1213.824	11:36			:			
11:36:39	2975.79	1210.566	11:36			:			
11:36:49	2945.89	1029.544	11:36			:			
11:36:59	2968.57	962.946	11:36			:			
11:37:09	3035.99	1162.763	11:37			:			
11:37:19	2967.58	1155.31	11:37			:			
11:37:29	2968.20	1268.413	11:37			:			
11:37:39	3007.84	1227.232	11:37			:			
11:37:49	2966.82	1022.657	11:37			:			
11:37:59	2996.33	1044.577	11:37			:			
11:38:09	3016.81	1077.061	11:38			:			
11:38:19	2970.79	1004.903	11:38			:			
11:38:29	3029.53	1137.354	11:38			:			
11:38:39	2998.29	1217.103	11:38			:			
11:38:49	2996.13	1104.633	11:38			:			
11:38:58	3006.74	1089.143	11:38			:			
11:39:08	3011.23	1003.982	11:39			:			
11:39:18	3028.59	1033.583	11:39			:			
11:39:28	3059.43	1230.522	11:39			:			
11:39:38	2993.23	1147.035	11:39			:			

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	:	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
11:39:48	3061.52	1116.029	11:39				:			
11:39:58	3027.76	1178.521	11:39				:			
11:40:08	3017.89	1114.25	11:40				:			
11:40:18	3072.23	1121.354	11:40				:			
11:40:28	3029.72	1205.804	11:40				:			
11:40:38	3034.85	1182.28	11:40				:			
11:40:48	3107.88	1101.605	11:40				:			
11:40:58	3033.07	1136.989	11:40				:			
11:41:08	3082.54	1057.713	11:41				:			
11:41:18	3074.39	1015.749	11:41				:			
11:41:28	2997.50	1092.633	11:41				:			
11:41:38	3081.52	1118.209	11:41				:			
11:41:47	3041.27	1095.626	11:41				:			
11:41:57	2986.92	1109.413	11:41				:			
11:42:07	3034.30	1085.88	11:42				:			
11:42:17	3023.71	1140.343	11:42				:			
11:42:27	2980.39	1150.758	11:42				:			
11:42:37	3063.73	1092.827	11:42				:			
11:42:47	3008.10	1177.46	11:42				:			
11:42:57	3015.41	1109.403	11:42				:			
11:43:07	3055.60	1083.049	11:43				:			
11:43:17	2989.27	1145.682	11:43				:			
11:43:27	2974.56	1132.5	11:43				:			
11:43:37	3014.11	1050.726	11:43				:			
11:43:47	2980.60	1144.486	11:43				:			
11:43:57	3008.89	1102.589	11:43				:			
11:44:07	3015.80	1060.176	11:44				:			
11:44:17	3005.22	1151.514	11:44				:			
11:44:27	2969.31	1080.714	11:44				:			
11:44:36	2988.04	1083.728	11:44				:			
11:44:46	2943.96	1189.884	11:44				:			
11:44:56	2948.56	1150.005	11:44				:			
11:45:06	2958.89	1087.95	11:45				:			
11:45:16	3021.24	1181.169	11:45				:			
11:45:26	3005.18	1141.475	11:45				:			
11:45:36	3026.60	1049.407	11:45				:			
11:45:46	3079.81	1248.679	11:45				:			
11:45:56	3008.53	1130.21	11:45				:			
11:46:06	2978.29	1091.715	11:46				:			
11:46:16	3004.06	1198.794	11:46				:			
11:46:26	2974.51	1081.809	11:46				:			
11:46:36	3013.36	1114.761	11:46				:			
11:46:46	2989.46	1168.413	11:46				:			
11:46:56	2969.79	1053.269	11:46				:			
11:47:06	2912.00	1082.264	11:47				:			
11:47:16	2897.74	1097.088	11:47				:			
11:47:25	2951.39	1173.175	11:47				:			
11:47:35	2989.45	1285.371	11:47				:			
11:47:45	2937.71	1191.032	11:47				:			

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	:	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
11:47:55	2937.08	1131.34	11:47				:			
11:48:05	2939.78	1267.872	11:48				:			
11:48:15	2974.04	1168.528	11:48				:			
11:48:25	3119.13	1127.712	11:48				:			
11:48:35	2968.72	1269.45	11:48				:			
11:48:45	2856.57	1182.792	11:48				:			
11:48:55	2965.62	1172.645	11:48				:			
11:49:05	2958.60	1279.168	11:49				:			
11:49:15	2973.47	1195.098	11:49				:			
11:49:25	3050.71	1156.137	11:49				:			
11:49:35	3080.36	1241.94	11:49				:			
11:49:45	3071.38	1137.06	11:49				:			
11:49:55	3003.81	1180.374	11:49				:			
11:50:55	2891.54	1186.771	11:50				:			
11:51:54	3006.59	1212.799	11:51				:			
11:52:54	3045.60	1182.197	11:52				:			
11:53:54	2980.26	979.7156	11:53				:			
11:54:54	3138.87	989.3599	11:54				:			
11:55:54	3159.92	1138.924	11:55	212	1181	11.7	:			
11:56:54	3167.73	1123.262	11:56	ETH/THC	CH4/THC	AA/THC	:			
11:57:54	3144.26	1112.055	11:57	18.61406028	103.6943	1.027285402	:			
11:58:58	3124.20	1154.081	11:58				:			
11:59:58	3090.13	1144.184	11:59				:			
12:00:57	3097.72	1163.532	12:00				:			
12:01:57	3122.66	1147.606	12:01				:			
12:02:57	3154.61	1194.838	12:02				:			
12:03:57	3501.00	1148.947	12:03				:			
12:04:57	3228.95	1183.834	12:04				:			
12:05:57	3185.81	1182.807	12:05				:	14100	601	49.9
12:06:57	3217.40	1108.128	12:06				:	ETH/THC		AA/THC
12:07:57	3102.71	1098.156	12:07				:	442.5870		1.566318558
12:08:57	3065.36	1059.389	12:08				:			
12:09:57	3082.80	1097.983	12:09				:			
12:10:57	3091.54	1101.956	12:10				:			
12:11:57	3071.71	1088.125	12:11				:			
12:12:57	3033.58	1040.985	12:12				:			
12:13:56	2966.78	1028.174	12:13				:			
12:14:56	2917.58	1081.849	12:14				:			
12:15:56	2881.49	1126.932	12:15				:			
12:16:56	2914.86	1148.979	12:16				:			
12:17:56	2782.92	1116.841	12:17				:			
12:18:56	2894.09	1075.069	12:18				:			
12:19:56	2922.09	1088.446	12:19				:			
12:20:56	2902.36	1045.085	12:20				:			
12:21:56	2926.42	1072.681	12:21				:			
12:22:56	2892.37	1090.117	12:22				:			
12:23:56	2852.17	1073.265	12:23				:			
12:24:56	2839.56	1129.913	12:24				:			

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TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	:	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
12:25:56	2816.72	1106.735	12:25				:			
12:26:55	2763.03	1122.918	12:26				:			
12:27:55	2764.46	1123.106	12:27				:			
12:28:55	2763.87	1128.36	12:28				:			
12:29:55	2767.71	1124.896	12:29				:			
12:30:55	2751.57	1128.702	12:30				:			
12:31:55	2756.13	1132.477	12:31				:			
12:32:55	2725.86	1107.719	12:32				:			
12:33:55	2715.23	1141.668	12:33	868	765	8.24	:			
12:34:55	2729.45	1098.013	12:34	ETH/THC		AA/THC	:			
12:35:55	2727.37	1150.507	12:35	76.02910828		0.721750981	:			
12:36:55	2733.74	1132.776	12:36				:			
12:37:55	2717.95	1076.661	12:37				:			
12:38:55	2695.68	1091.473	12:38				:			
12:39:54	2720.63	1121.398	12:39				:			
12:40:54	2683.96	1138.463	12:40				:			
12:41:54	2682.69	1100.471	12:41				:			
12:42:54	2689.87	1079.955	12:42				:			
12:43:54	2687.78	1064.597	12:43				:			
12:44:54	2799.55	926.5664	12:44				:	5850	793	29.2
12:45:54	2407.98	772.0908	12:45				:	ETH/THC		AA/THC
12:46:54	2575.09	709.2256	12:46				:	208.9618		1.043023374
12:47:54	2568.49	734.0308	12:47				:			
12:48:54	2465.75	665.6987	12:48				:			
12:49:54	2569.99	661.4749	12:49				:			
12:50:54	2557.39	680.8774	12:50				:			
12:51:54	2547.55	671.8589	12:51				:			
12:52:53	2523.37	740.8718	12:52				:			
12:54:06	2517.69	830.0999	12:54				:			
12:55:06	2592.95	1004.686	12:55				:			
12:56:06	2683.77	1132.305	12:56		985	6.43	:			
12:57:06	2747.27	1091.95	12:57				:			
12:58:06	2778.08	1119.837	12:58				:			
12:59:06	2861.51	1082.403	12:59				:			
13:00:06	2869.73	902.3463	13:00				:			
13:01:06	2843.04	918.1129	13:01				:			
13:02:05	2812.54	883.7747	13:02				:			
13:03:05	2745.47	861.2605	13:03				:			
13:04:05	2682.42	913.7244	13:04				:			
13:05:05	2657.70	831.2746	13:05				:			
13:06:05	2640.67	942.1808	13:06				:	14600	582	39
13:07:05	2543.82	903.8964	13:07				:	ETH/THC		AA/THC
13:08:05	2560.21	831.7003	13:08				:	552.8899		1.476897797
13:09:05	2525.87	809.0331	13:09				:			
13:10:05	2666.38	853.0743	13:10				:			
13:11:05	2696.90	884.5662	13:11				:			
13:12:05	2757.22	861.4969	13:12				:			
13:13:05	2862.55	856.5093	13:13				:			
13:14:05	2809.72	874.5862	13:14				:			

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TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
13:15:04	2778.67	900.0063	13:15			:			
13:16:04	2769.41	849.0098	13:16			:			
	2822.805	1015.278				:			
13:17:04	2680.87	864.912				:			
13:18:04	2781.78	955.4617				:			
13:19:04	2787.66	842.2566				:			
13:20:04	2734.95	764.5867				:			
13:21:04	2860.02	844.1234				:			
13:22:04	2308.30	695.962				:			
13:22:14	316.30	14.62137							
13:22:24	279.99	10.35757							
13:22:34	265.08	8.746519							
13:22:44	252.58	8.695385							
13:22:54	236.88	7.187514							
13:23:04	221.17	7.942718							
13:23:13	197.20	6.155147							
13:23:23	177.88	7.077129							
13:23:33	158.58	6.258177							
13:23:43	132.64	6.448812							
13:23:53	69.06	5.788451							
13:24:03	37.01	5.712183							
13:24:13	29.42	5.181901							
13:24:23	26.34	4.870288							
13:24:33	24.93	5.037684							
13:24:43	24.22	4.550106							
13:24:53	20.76	4.360604							
13:25:19	19.01	4.366869							
13:25:29	18.81	4.32706							
13:25:39	18.28	4.047433							
13:25:49	17.05	4.549288							
13:25:59	16.76	4.400725							
13:26:09	16.14	4.174765							
13:26:18	15.64	2.913159							
13:26:59	14.25	3.183067							
13:27:09	10.79	2.492962							
13:27:19	10.45	2.866606							
13:27:29	10.22	2.647132							
13:27:39	10.03	2.639084							
13:27:49	9.89	2.670508							
13:27:59	9.32	2.384221							
13:28:11	9.03	2.229905							
13:28:21	8.92	2.622601							
13:28:31	9.47	2.580122							
13:28:41	953.85	300.799							
13:28:51	2478.17	606.4969							

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TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
13:29:01	862.65	17.42793						
13:29:11	148.16	6.064427						
13:29:21	72.88	4.221133						
13:29:42	53.08	3.334529						
13:29:52	29.57	2.403543						
13:30:02	24.65	1.993908						
13:30:12	20.54	1.621194						
13:30:22	20.90	3.131309						
13:30:32	18.34	1.897009						
13:30:42	18.93	3.014026						
13:30:52	492.76	120.033						
13:31:02	2154.79	779.3388						
13:31:12	2621.41	841.0239						
13:31:22	2597.16	756.6191						
13:31:32	2694.93	726.9142						
13:31:42	2715.94	685.9485						
13:31:51	2710.86	671.4458						
13:32:01	2624.54	725.707						
13:32:11	2620.12	751.4211						
13:32:21	2585.88	765.4841						
13:32:31	2644.17	771.3234						
13:32:41	2753.33	786.4937						
13:32:51	2409.78	696.988						
13:33:01	2694.16	774.6851						
13:33:11	2749.81	798.0874						
13:33:21	2734.00	879.3341						
13:33:31	2792.24	853.6573						
13:33:41	2843.15	889.0253						
13:33:51	2630.69	1290.379						
13:34:01	2231.14	1866.406						
13:34:11	2025.41	1900.977						
13:34:21	1936.14	1905.326						
13:34:31	1922.64	1936.165						
13:34:56	1919.15	1974.021						
13:35:06	1922.39	1981.858						
13:35:16	1921.46	1984.693						
13:35:26	1921.30	1986.303						
13:35:39	1923.09	1987.023						
13:35:49	1923.83	1984.492						
13:35:59	1927.73	1986.903						
13:36:09	1926.81	1937.624						
13:36:19	2631.88	1104.95						
13:36:29	3022.30	805.7643						

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TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet) :	REAR GC RESULTS ETH-OH ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
13:36:39	3000.15	895.2322						
13:36:49	2940.98	794.5971						
13:36:59	3031.85	839.2534						
13:37:09	2636.18	790.4741						
13:37:19	621.11	273.6266						
13:37:29	354.09	276.5961						
13:37:39	301.48	274.7473						
13:37:49	276.83	273.5426						
13:37:59	261.91	272.6479						
13:38:08	252.06	271.5852						
13:38:18	243.95	268.8423						
13:38:47	243.93	268.8423						
13:38:57	230.80	267.7496						
13:39:07	229.85	267.6799						
13:39:17	228.71	267.1223						
13:39:27	227.92	266.7843						
13:39:37	227.35	266.6573						
13:39:47	227.19	266.4373						
13:39:57	226.51	267.0077						
13:40:07	226.57	267.5973						
13:40:17	997.61	406.8614						
13:40:27	2571.26	838.624						
13:40:37	2806.84	900.4837						
13:40:47	2843.93	929.0148						
13:40:57	2944.28	964.1663						
13:41:07	2942.24	872.4915						
13:41:17	2886.49	858.8496						
13:41:26	2886.31	963.8228						
13:41:36	2926.74	903.3038						
13:41:46	2866.66	936.2501						
13:41:56	2934.88	1001.094						
13:42:06	2903.32	842.7214						
13:42:16	2916.06	918.4286						
13:42:26	2894.47	1011.357						
13:42:36	1160.15	915.4652						
13:42:46	313.46	340.7065						
13:42:56	303.46	302.9053						
13:43:06	231.01	244.7743						
13:43:16	240.28	225.3763						
13:43:26	274.45	278.4221						

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TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
13:43:52	272.28	275.5079						
13:44:02	272.51	275.7312						
13:44:12	272.28	275.3471						
13:44:22	272.47	275.5183						
13:44:32	272.50	275.5295						
13:44:42	272.48	275.4009						
13:44:53	272.10	274.9033						
13:45:03	262.23	265.6922						
13:45:13	186.66	179.5933						
13:45:23	134.72	108.6227						
13:45:33	141.29	105.8395						
13:45:43	205.12	205.2346						
13:45:52	190.85	189.662						
13:46:02	199.41	201.0957						
13:46:33	204.79	200.7965						
13:46:43	202.02	199.04						
13:46:53	202.07	199.2229						
13:47:03	201.65	198.9481						
13:47:17	201.10	198.832						
13:47:27	43.79	47.92407						
13:47:37	-4.90	3.520381						
13:47:47	-4.92	1.164405						
13:47:57	1001.06	654.9312						
13:48:07	365.38	793.4391						
13:48:17	164.24	795.1665						
13:48:27	148.39	858.6031						
13:48:37	2913.12	932.5002						
13:48:47	3078.90	971.3979						
13:48:57	3174.72	955.0078						
13:49:07	3279.03	933.3375						
13:50:07	3249.35	940.6477						
13:51:07	3217.70	866.0467						
13:52:07	3152.42	850.5995						
13:53:07	3252.06	896.9772						
13:53:40	1702.17	292.6607						
13:53:50	109.94	8.715701						
13:53:59	76.84	6.748467						
13:54:09	59.99	7.500473						
13:54:19	47.75	6.650636						
13:54:29	40.57	5.662169						

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TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	:	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
13:54:39	31.62	4.906529								
13:54:49	30.81	3.970874								
13:54:59	27.42	3.418025								
13:55:09	308.30	8.145726								
13:55:19	2521.84	525.5525								
13:55:29	3285.08	746.5955								
13:55:39	3311.98	764.0634								
13:55:49	3293.41	849.2055								
13:55:59	3260.92	719.9076								
13:56:09	3193.48	744.1356								
14:06:09	2928.05	717.0479								
14:16:09	3172.52	64.21153								
14:26:09	1005.97	2431.238								
14:26:38	691.73	2702.866								
14:26:48	5084.02	2560.441								
14:26:58	7429.66	2649.201								
14:27:08	6861.07	2851.711								
14:27:18	6112.54	2441.737								
14:27:28	2351.43	2879.697								
14:27:38	533.23	2738.096								
14:27:48	438.34	2358.533								
14:27:58	547.37	2509.896								
14:28:58	684.27	2693.73								
14:29:58	692.82	2647.611								
14:30:58	668.98	2666.106	14:30				:			
14:31:59	683.11	2834.059	14:31	581	2117	29	:			
14:32:58	770.66	2674.477	14:32	ETH/THC		AA/THC	:			
14:33:58	622.54	2656.485	14:33	20.50063177		1.023267334	:			
14:34:58	756.12	2704.06	14:34				:			
14:35:58	783.95	2656.925	14:35				:			
14:36:58	733.41	2678.988	14:36				:			
14:37:58	743.65	2650.77	14:37				:			
14:38:58	822.01	2727.046	14:38				:			
14:39:58	769.82	2752.487	14:39				:			
14:40:58	710.98	2667.574	14:40				:			
14:41:58	818.61	2756.986	14:41				:	674	255	5.46
14:42:58	775.23	2807.176	14:42				:	ETH/THC		AA/THC
14:43:58	735.33	2823.547	14:43				:	82.33499		0.666986765
14:44:58	706.26	2703.718	14:44				:			
14:45:57	569.39	2731.208	14:45				:			
14:46:57	647.05	2694.67	14:46				:			
14:47:57	735.37	2624.82	14:47				:			
14:48:57	529.93	2598.136	14:48				:			

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TIME	THC R (ppmC)	THC F (ppmC)		FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	:	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
14:49:57	700.31	2625.005	14:49				:			
14:50:57	716.38	2669.132	14:50	858	2070	32.7	:			
			00:00	ETH/THC		AA/THC				
15:01:00	599.78	2723.687	15:01	32.14528168		1.225117379	:			
15:02:00	627.78	2682.387	15:02				:			
15:03:00	573.95	2644.966	15:03				:	235	65.4	3.15
15:04:00	517.54	2586.722	15:04				:	ETH/THC		AA/THC
15:05:00	505.47	2598.308	15:05				:	40.94410		0.548825216
15:06:00	511.71	2499.858	15:06				:			
15:07:00	546.27	2549.286	15:07				:			
15:08:00	538.24	2650.549	15:08				:			
15:08:59	666.92	2512.046	15:08				:			
15:09:59	493.06	2628.655	15:09				:			
15:10:59	757.74	2611.888	15:10				:			
15:11:59	700.05	2654.641	15:11				:			
15:12:59	648.19	2660.785	15:12				:			
15:13:59	811.99	2655.149	15:13	592	1831	26.4	:			
15:14:59	770.45	2750.508	15:14	ETH/THC		AA/THC	:			
15:15:59	850.89	2687.552	15:15	22.29630050		0.994294482	:			
15:16:59	781.94	2708.289	15:16				:			
15:17:59	769.64	2714.004	15:17				:			
15:18:59	821.12	2695.592	15:18				:			
15:19:59	785.86	2674.225	15:19				:			
15:20:59	763.53	2740.618	15:20				:			
15:21:58	763.82	2640.788	15:21				:			
15:22:58	757.13	2720.103	15:22				:			
15:23:58	737.23	2740.265	15:23				:			
15:24:58	784.43	2666.764	15:24				:	602	316	5.16
15:25:58	702.37	2667.832						ETH/THC		AA/THC
15:26:58	757.31	2691.865						76.74336		0.657800268
15:27:58	798.99	2765.396								
15:28:58	808.45	2880.096								
15:29:58	776.42	2884.034								
15:30:58	721.78	2766.4								
	704.7910	2687.627								
15:31:58	684.58	2745.005								
15:32:58	545.35	2682.168								
15:33:58	379.37	2504.005								
15:34:57	329.12	2289.365								
15:35:57	328.72	2227.417								
15:36:57	268.12	2229.011								
15:37:57	264.02	2255.396								
15:38:57	449.52	2375.331								
15:39:57	420.17	2473.268								
15:40:57	600.07	2651.623								

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TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet :	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
15:41:57	1002.74	2585.163						
15:42:07	2013.62	1958.587						
15:42:17	2023.16	1959.236						
15:42:27	2025.64	1970.226						
15:42:37	2003.98	1975.377						
15:42:57	2001.92	1977.031						
15:43:06	2009.07	1977.041						
15:43:16	2009.71	1974.815						
15:43:26	2012.38	1980.072						
15:43:36	2013.46	1986.266						
15:43:46	2014.68	1988.303						
15:43:56	2015.32	1983.213						
15:44:06	2015.23	1984.658						
15:44:16	2015.33	1985.546						
15:44:26	1212.32	2109.854						
15:44:36	1067.29	1007.589						
15:44:46	870.69	836.1503						
15:44:56	854.45	826.6167						
15:45:06	845.42	820.9363						
15:45:16	833.40	815.3431						
15:45:48	827.12	809.811						
15:45:58	819.09	803.8388						
15:46:08	817.70	803.7811						
15:46:18	816.97	802.9744						
15:46:28	815.96	802.8058						
15:46:38	816.28	802.0382						
	0.00							
15:46:50	815.38	801.4554						
15:47:00	814.88	801.2235						
15:47:09	813.90	800.9225						
15:47:19	813.70	800.41						
15:47:29	795.35	800.9132						
15:47:39	553.18	523.2807						
15:47:49	257.16	225.491						
15:47:59	233.82	217.6833						
15:48:09	227.44	213.9234						
15:48:19	220.87	208.9301						
15:48:29	219.53	209.4173						
15:48:39	217.70	208.0753						
15:48:49	216.97	207.7667						

05-20-1992 SITE 1 DAY 1

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
15:49:31	217.97	210.6952						
15:49:41	211.84	204.4133						
15:49:50	211.74	203.7348						
15:50:00	211.22	203.7095						
15:50:10	210.69	202.9989						
15:50:20	209.66	202.2201						
15:50:31	209.36	202.0806						
15:50:41	208.91	202.1135						
15:50:51	208.94	201.5674						
15:51:00	197.72	166.1683						
15:51:10	32.79	18.65187						
15:51:20	16.72	16.95858						
15:51:30	15.92	16.84114						
15:51:40	16.59	19.11742						
15:51:50	124.74	16.44343						
15:52:00	294.59	193.7178						
15:52:10	48.15	49.9139						

CEM INSTRUMENT DRIFT SUMMARY
05-20-1992 16:07:35

Chan.	Name	Units	Zero Conc. Actual	Zero Conc. Observed	Span Actual	Span Observed	Drift % of Scale Zero	Drift % of Scale Span
1	THC R	ppmV	0.000	4.008	8010.00	8332.02	0.04	3.22
2	THC F	ppmV	0.000	2.737	8010.00	7941.15	0.03	-0.69
3	O2	%V	0.000	0.000	20.90	0.00	0.00	-83.60
4			0.000	0.000	149.50	0.00	0.00	-14.95
5			0.000	0.000	0.00	0.00	0.00	0.00
6			0.000	0.000	0.00	0.00	0.00	0.00
7			0.000	0.000	0.00	0.00	0.00	0.00
8			0.000	0.000	0.00	0.00	0.00	0.00
9			0.000	0.000	0.00	0.00	0.00	0.00
10			0.000	0.000	0.00	0.00	0.00	0.00
11			0.000	0.000	0.00	0.00	0.00	0.00
12			0.000	0.000	0.00	0.00	0.00	0.00
13			0.000	0.000	0.00	0.00	0.00	0.00
14			0.000	0.000	0.00	0.00	0.00	0.00

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

CALIBRATION SUMMARY
05-20-1992 10:58:37
CALIBRATION FILE NAME =D:\CEMDATA\820BAKED.CAL

Chan.	Name	Units	Zero Conc.	Zero Resp.	Span Conc.	Span Resp.	Slope	Int.
1	THC R	ppmV	0.00	0.0036	8010.00	8.092	990.315	-3.57
2	THC F	ppmV	0.00	0.0002	8010.00	8.129	985.373	-0.24
3	O2	%V	0.00	-.0022	20.90	0.079	257.858	0.55
4			0.00	0.0027	149.50	0.747	200.922	-0.55
5			0.00	0.0000	0.00	0.000	1.000	0.00
6			0.00	0.0000	0.00	0.000	1.000	0.00
7			0.00	0.0000	0.00	0.000	1.000	0.00
8			0.00	0.0000	0.00	0.000	1.000	0.00
9			0.00	0.0000	0.00	0.000	1.000	0.00
10			0.00	0.0000	0.00	0.000	1.000	0.00
11			0.00	0.0000	0.00	0.000	1.000	0.00
12			0.00	0.0000	0.00	0.000	1.000	0.00
13			0.00	0.0000	0.00	0.000	1.000	0.00
14			0.00	0.0000	0.00	0.000	1.000	0.00

Site 1 Day 1

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

RADIAN CORPORATION QC CH4=2000

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 11:00:02
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
11:00:07	2058.5	1971.8	22.0
11:00:17	2128.6	2051.8	22.1
11:00:27	2158.4	2046.6	22.2

11:00:47	2127.3	2045.7	22.2
11:00:57	2124.1	2048.0	22.1
11:01:07	2127.1	2052.6	22.1
11:01:17	2124.5	2052.1	22.1
Avg.=	2123.9	2038.9	22.1

RADIAN CORPORATION QC CH4=803

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 11:05:22
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
11:05:27	1630.6	805.6	20.1
11:05:37	1593.2	803.4	20.1
11:05:46	1601.6	804.2	20.3
11:05:56	1606.4	805.3	20.3
11:06:06	1615.4	805.4	20.3
11:06:16	1624.1	804.1	20.2
Avg.=	1611.9	804.7	20.2

Post to Inst flame out unstable reading

RADIAN CORPORATION GC CH4=80.2

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 11:17:42
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\B20BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
11:17:48	293.6	80.0	21.3
11:17:58	308.3	86.8	21.4
11:18:08	313.9	84.3	21.3
11:18:17	315.3	78.7	21.5
11:18:27	314.3	79.7	21.5
Avg.=	309.1	81.9	21.4

RADIAN CORPORATION N2 THRU SYSTEM

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 11:23:44
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
11:23:50	27.7	13.0	2.2
11:24:00	22.1	6.4	1.8
11:24:10	21.3	5.9	1.9
11:24:20	20.3	5.7	1.8
11:24:30	20.4	6.9	1.8
11:24:40	20.8	5.5	1.5
11:24:50	17.7	5.5	1.6
11:25:00	[illegible]	302.3	2.1
11:25:10	[illegible]	[illegible]	[illegible]
11:25:20	[illegible]	[illegible]	[illegible]
11:25:30	[illegible]	202.0	[illegible]
Avg.=	~~37.0~~	~~103.3~~	4.7

O2 Monitor readings 1.5% high Non linear response due to flow

RADIAN CORPORATION CH4=199.1

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 11:26:57
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
11:27:03	270.9	198.8	21.6
11:27:13	280.9	198.3	21.7
11:27:22	293.0	197.7	21.9
11:27:32	299.2	198.0	21.9
11:27:42	301.9	198.2	21.9
11:27:52	308.3	198.3	21.9
11:28:02	311.5	198.4	22.0
11:28:12	314.9	198.6	22.1
11:28:22	317.5	200.8	22.2
11:28:32	324.1	211.3	23.2
11:28:42	328.1	198.9	22.1
11:28:52	332.0	198.3	22.1
11:29:02	387.3	198.6	22.0
11:29:12	2386.9	758.4	21.1
11:29:22	2993.2	1121.4	18.4
Avg.=	630.0	298.3	21.7

RADIAN CORPORATION N2 THRU SYSTEM

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:25:13
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\B20BAKED.CAL

O2 @ Rear

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:25:19	21.3	4.4	0.6
13:25:29	21.1	4.3	0.4
13:25:39	20.6	4.0	0.5
13:25:49	19.4	4.5	0.5
13:25:59	19.1	4.4	0.5
Avg.=	20.3	4.3	0.5

RADIAN CORPORATION 7 THRU SYSTEM @ FRONT

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:26:54
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:26:59	16.5	3.2	0.4
13:27:09	13.0	2.5	0.6
13:27:19	12.6	2.9	0.6
13:27:29	12.4	2.6	0.6
13:27:39	12.2	2.6	0.6
13:27:49	12.1	2.7	0.6
13:27:59	11.5	2.4	0.6
Avg.=	12.9	2.7	0.6

RADIAN CORPORATION O2=18%

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:29:37
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\B20BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:29:42	56.1	3.3	18.3
13:29:52	32.2	2.4	18.4
13:30:02	27.2	2.0	18.5
13:30:12	23.0	1.6	18.6
Avg.=	34.6	2.3	18.4

RADIAN CORPORATION CH4=2000 THRU SYSTEM

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:34:51
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\B20BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:34:56	1960.4	1974.0	21.6
13:35:06	1963.8	1981.9	21.6
13:35:16	1962.9	1984.7	21.7
13:35:26	1962.7	1986.3	21.7
Avg.=	1962.5	1981.7	21.6

RADIAN CORPORATION ETHANOL THRU SYSTEM 200 ppM

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:38:42
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:38:47	251.2	268.8	0.5
13:38:57	237.8	267.7	0.5
13:39:07	236.8	267.7	0.5
13:39:17	235.7	267.1	0.5
13:39:27	234.9	266.8	0.5
13:39:37	234.3	266.7	0.5
Avg.=	238.4	267.5	0.5

RADIAN CORPORATION ETHANOL 200ppm DIRECT

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:43:47
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\B20BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:43:52	280.4	275.5	19.5
13:44:02	280.6	275.7	19.2
13:44:12	280.4	275.3	19.2
13:44:22	280.6	275.5	18.9
13:44:32	280.6	275.5	19.0
13:44:42	280.6	275.4	19.0
Avg.=	280.5	275.5	19.1

RADIAN CORPORATION CH4 DIRECT 199.1 ppm

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 13:46:28
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
13:46:33	211.5	200.8	19.0
13:46:43	208.7	199.0	18.7
13:46:53	208.8	199.2	19.1
13:47:03	208.3	198.9	19.1
Avg.=	209.3	199.5	19.0

RADIAN CORPORATION QC thru SYS 2000ppm CH4

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 15:42:52
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
15:42:57	2080.1	1977.0	21.7
15:43:06	2087.5	1977.0	21.5
15:43:16	2088.2	1974.8	21.5
15:43:26	2091.0	1980.1	21.7
15:43:36	2092.2	1986.3	21.6
15:43:46	2093.5	1988.3	21.7
Avg.=	2088.8	1980.6	21.6

RADIAN CORPORATION QC THRU SYSTEM 803ppm

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 15:45:43
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
15:45:48	862.0	809.8	21.7
15:45:58	853.7	803.8	21.7
15:46:08	852.3	803.8	21.7
15:46:18	851.5	803.0	21.7
15:46:28	850.5	802.8	21.8
15:46:38	850.8	802.0	21.8
Avg.=	853.5	804.2	21.8

RADIAN CORPORATION GC THRU SYSTEM 199.1 ppm CH4

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-20-1992 Current Time = 15:49:26
File Name = D:\CEMDATA\052092.PRN Calibration File:D:\CEMDATA\820BAKED.CAL

05-20-1992 Time	THC R ppmV	THC F ppmV	O2 %V
15:49:31	230.1	210.7	22.0
15:49:41	223.8	204.4	21.8
15:49:50	223.7	203.7	21.7
15:50:00	223.2	203.7	21.8
15:50:10	222.6	203.0	21.8
15:50:20	221.6	202.2	21.7
15:50:31	221.2	202.1	21.8
Avg.=	223.7	204.3	21.8

CALIBRATION SUMMARY
05-20-1992 16:02:23
CALIBRATION FILE NAME =D:\CEMDATA\5208AKEE.CAL

Chan.	Name	Units	Zero		Span		Slope	Int.
			Conc.	Resp.	Conc.	Resp.		
1	THC R	ppmV	0.00	0.0077	8010.00	8.417	952.487	-7.29
2	THC F	ppmV	0.00	0.0030	8010.00	8.059	994.251	-3.00
3	O2	%V	0.00	-.0022	20.90	0.079	257.858	0.55
4			0.00	0.0027	149.50	0.747	200.922	-0.55
5			0.00	0.0000	0.00	0.000	1.000	0.00
6			0.00	0.0000	0.00	0.000	1.000	0.00
7			0.00	0.0000	0.00	0.000	1.000	0.00
8			0.00	0.0000	0.00	0.000	1.000	0.00
9			0.00	0.0000	0.00	0.000	1.000	0.00
10			0.00	0.0000	0.00	0.000	1.000	0.00
11			0.00	0.0000	0.00	0.000	1.000	0.00
12			0.00	0.0000	0.00	0.000	1.000	0.00
13			0.00	0.0000	0.00	0.000	1.000	0.00
14			0.00	0.0000	0.00	0.000	1.000	0.00

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
06:48:51	3663.915	781.7408						
06:49:51	3478.347	776.9979						
06:50:51	3251.503	784.6341						
06:51:51	3412.573	734.3455						
06:52:51	3420.812	551.5997						
06:53:51	3121.296	476.0573						
06:54:51	3507.944	625.0062						
06:55:51	3535.684	697.6085						
06:56:51	3378.11	816.3085						
06:57:51	2972.852	920.7045						
06:58:51	2528.176	1006.792						
06:59:53	2316.903	888.0732						
07:00:52	2414.731	901.6454						
07:01:52	2827.56	785.8716						
07:02:52	2866.299	776.0383						
07:03:52	3103.06	765.7955						
07:04:52	3668.125	794.0143						
07:05:52	3874.989	711.3903						
07:06:52	3911.807	748.7825						
07:07:52	3838.595	840.5423						
07:08:52	3729.905	862.3826						
07:09:52	3394.886	990.7615						
07:10:52	3013.056	1017.794						
07:11:52	3120.675	1012.167						
07:12:52	3262.331	945.4166						
07:13:51	3293.839	786.3459						
07:14:51	3519.974	815.0262						
07:15:51	3766.301	883.9208						
07:16:51	3762.093	909.2355						
07:17:51	3932.338	872.527						
07:18:51	3946.559	895.4022						
07:19:51	3756.963	898.9722						
07:20:51	3905.446	1104.233						
07:21:51	3849.606	1322.69						
07:22:51	3779.37	1258.145						
07:23:51	3641.022	1278.503						
07:24:51	3514.059	1155.101						
07:25:51	3575.967	1101.455						
07:26:51	3668.317	1075.898						
07:27:50	3625.926	1098.083						
07:28:50	3720.454	1009.145						
07:29:50	3797.007	821.1882						
07:30:50	3762.283	892.8307						
07:31:50	3626.681	715.058						
07:32:50	3479.292	905.5906						
07:33:50	3241.203	1043.724						
07:34:50	2859.405	1162.126						
07:35:50	2467.935	1188.279						

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet)	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet)	ACETALDEHYDE (ppmV/wet)
07:36:50	2143.431	1211.334	236	760	8.88 :			
07:37:50	2183.042	1038.322			:			
07:38:50	2479.375	890.9489			:			
07:39:50	2636.265	903.8683			:			
07:40:49	2835.514	1051.733			:			
07:41:49	3326.565	1292.982			:			
07:42:49	3125.616	1369.776			:			
07:43:49	3181.325	1434.199			:			
07:44:49	3344.959	1646.553			:			
07:45:49	3407.168	1628.481			:			
07:46:49	3125.938	1410.582			:	1940	1540	46.2
07:47:49	3229.749	1238.743			:			
07:48:49	3719.377	1318.915			:			
07:49:49	3861.713	1245.557			:			
07:50:49	3927.787	1157.137			:			
07:51:49	4037.977	1165.365			:			
07:52:49	3914.265	1311.038			:			
07:53:48	3826.173	1451.628			:			
07:54:48	3668.669	1497.442			:			
07:55:48	3632.515	1493.765			:			
07:56:48	3679.748	1636.349			:			
07:57:48	3731.547	1526.194	328	883	12.1 :			
07:58:48	3930.414	1564.203			:			
07:59:48	4048.171	1535.349			:			
08:00:48	4208.56	1422.262			:			
08:01:48	4208.96	1421.44			:			
08:02:48	4224.149	1400.821			:			
08:03:48	4143.092	1342.436			:			
08:04:48	4059.455	1347.275			:			
08:05:48	3995.248	1352.697			:			
08:06:47	3963.454	1355.297			:			
08:07:47	3947.208	1348.235			:	2620	1480	225
08:08:47	3887.92	1351.349			:			
08:09:47	3872.63	1379.644			:			
08:10:47	3771	1422.453			:			
08:11:47	3621.111	1424.54			:			
08:12:47	3726.071	1429.274			:			
08:13:47	3739.441	1370.623			:			
08:14:47	3675.407	1233.736			:			
08:15:47	3878.399	1272.125			:			
08:16:47	3924.114	1189.616			:			
08:17:47	3934.016	1032.463	247	694	23 :			
08:18:47	3876.639	887.0588			:			
08:19:46	3925.359	905.6998			:			
08:20:46	3811.788	921.5294			:			
08:21:46	3708.941	942.3102			:			
08:22:46	3599.353	816.6818			:			
08:23:46	3488.229	853.8722			:			

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
08:24:46	3540.273	843.0213			:			
08:25:46	3361.64	723.019			:			
08:26:46	3131.576	684.5803			:			
08:27:46	3159.639	797.1671			:			
08:28:46	2959.795	904.8581			:	1660	1530	27.1
08:29:46	2446.278	941.7469			:			
08:30:46	2242.07	917.5589			:			
08:31:46	2127.53	955.3561			:			
08:32:45	2433.366	809.6292			:			
08:33:45	2729.464	702.7211			:			
08:34:45	2931.5	651.8781			:			
08:35:45	3200.789	601.4401			:			
08:36:45	3896.604	678.9973			:			
08:37:45	4083.227	711.7917			:			
08:38:45	4149.953	872.3427			:			
08:39:45	3984.691	682.0481			:			
08:40:45	3840.051	624.518			:			
08:41:45	3769.426	626.9976			:			
08:42:45	3617.743	584.0308			:			
08:43:45	3548.222	598.4222			:			
08:44:45	3380.072	761.5713			:			
08:45:44	2979.212	880.0504			:			
08:46:44	2599.747	895.4071			:			
08:47:44	2436.083	841.2396			:			
08:48:44	2682.696	799.4246			:			
08:49:44	2855.226	745.0424			:			
08:50:44	2989.686	682.1859			:			
08:51:44	3562.657	780.34			:			
08:52:44	3891.253	864.4246			:			
08:53:44	3678.087	929.6581			:			
08:54:44	3670.963	932.609			:			
08:55:44	3649.786	879.0683			:			
08:56:44	3503.011	851.4167			:			
08:57:44	3548.089	895.6698			:			
08:58:43	3552.054	878.4779			:			
08:59:43	3793.49	923.6927			:			
09:00:43	3952.532	980.5794			:			
09:01:43	3867.93	967.6098			:	2340	1620	47
09:02:43	3959.409	925.2234			:			
09:03:43	3882.236	973.8903			:			
09:04:43	3977.886	885.0068			:			
09:05:43	3921.01	758.0957			:			
09:06:43	3947.906	725.2266			:			
09:07:43	4062.979	896.778			:			
09:08:43	4046.34	887.0824			:			
09:09:43	4014.912	804.5886			:			
09:10:43	4023.975	808.035			:			
09:11:42	3989.897	809.069			:			

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet) :	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
09:12:42	3962.945	721.5807			:			
09:13:42	3944.434	710.9326			:			
09:14:42	3923.057	847.2379			:			
09:15:42	3856.703	947.4276			:			
09:16:17	2675.514	911.6567			:			
					:			
					:			
	GIANT BREAD RUN 2				:			
					:			
10:01:10	2464.353	1099.08			:			
10:01:20	2489.844	1022.995			:			
10:01:30	2428.316	940.0309			:			
10:01:40	2384.509	1157.945			:			
10:01:50	2362.841	1146.738			:			
10:02:00	2349.512	1114.156			:			
10:02:10	2361.767	1048.817			:			
10:02:20	2453.566	950.2084			:			
10:02:30	2343.947	909.9313			:			
10:02:40	2387.101	1053.249			:			
10:02:50	2345.941	972.4129			:			
10:03:00	2278.052	891.9636			:			
10:03:09	2313.033	1058.645			:			
10:03:19	2478.542	1018.072			:			
10:03:29	2746.154	1025.892			:			
10:03:39	2792.314	1151.645			:			
10:03:49	2796.647	1128.607			:			
10:03:59	2876.311	1183.455			:			
10:04:09	2823.962	1225.208			:			
10:04:19	2766.947	1170.377	122	389	4.27 :			
10:04:29	2857.056	1243.118			:			
10:04:39	2797.031	1236.698			:			
10:04:49	2671.815	1178.912			:			
10:04:59	2746.622	1344.106			:			
10:05:09	2726.848	1254.716			:			
10:05:19	2692.738	1120.506			:			
10:05:29	2629.18	1191.492			:			
10:05:39	2663.931	1139.973			:			
10:05:49	2714.53	1105.001			:			
10:05:58	2708.813	1244.746			:			
10:06:08	2700.303	1157.367			:			
10:06:18	2724.905	1065.783			:			
10:06:28	2686.337	1209.007			:			
10:06:38	2686.933	1147.994			:			
10:06:48	2834.126	1187.936			:			
10:06:58	2922.04	1328.225			:			
10:07:08	2982.069	1224.971			:			
10:07:18	3020.041	1241.854			:			
10:07:28	3022.227	1294.69			:			

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
10:07:38	3048.361	1136.126			:			
10:07:48	2993.354	1291.785			:			
10:07:58	2989.386	1280.904			:			
10:08:08	2968.679	1165.776			:			
10:08:18	2974.083	1166.793			:			
10:08:28	2950.155	1087.679			:			
10:08:38	2904.01	911.7074			:			
10:08:47	2823.408	945.0972			:			
10:08:57	2753.029	970.9905			:			
10:09:07	2742.437	876.5021			:			
10:09:17	2679.44	961.7961			:			
10:09:27	2781.334	930.0077			:			
10:09:37	3037.038	853.4911			:			
10:09:47	3001.247	969.7643			:			
10:09:57	3143.361	920.7884			:			
10:10:07	3233.298	945.8198			:			
10:10:17	3217.464	1175.261			:			
10:10:27	3179.667	1112.898			:			
10:10:37	3237.556	1064.018			:			
10:10:47	3210.952	1172.232			:			
10:10:57	3259.036	1075.42			:			
10:11:07	3272.672	1149.194			:			
10:11:17	3279.695	1194.625			:			
10:11:27	3291.737	1121.376			:			
10:11:36	3296.907	1194.629			:			
10:11:46	3315.57	1164.595			:			
10:11:56	3264.991	1072.587			:			
10:12:06	3290.829	1205.922			:			
10:12:16	3298.497	1185.472			:			
10:12:26	3245.28	1137.469			:			
10:12:36	3314.384	1278.905			:			
10:12:46	3247.657	1140.103			:			
10:12:56	3230.156	1122.858			:			
10:13:06	3247.43	1246.034			:			
10:13:16	3198.243	1113.972			:			
10:13:26	3406.758	1167.755			:			
10:13:36	3689.965	1178.152			:			
10:13:46	3190.846	950.2388			:			
10:13:56	3250.639	939.856			:			
10:14:06	3184.515	1115.271			:			
10:14:16	3227.438	1180.049			:			
10:14:25	3257.051	1297.87			:			
10:14:35	3192.441	1166.136			:	7930	841	40.9
10:14:45	3283.771	975.9022			:			
10:14:55	3242.109	994.3135			:			
10:15:05	3189.692	1020.952			:			
10:15:15	3248.096	985.0125			:			
10:15:25	3277.512	1167.515			:			

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet)	ACETALDEHYDE (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet)	ACETALDEHYDE (ppmV/wet)
10:15:35	3259.624	1128.557						
10:15:45	3239.229	1049.157						
10:15:55	3225.789	1095.87						
10:16:05	3275.485	1032.121						
10:16:15	3243.849	1123.907						
10:16:25	3239.963	1221.76						
10:16:35	3259.562	1188.939						
10:16:45	3250.469	1147.369						
10:16:55	3283.157	1173.078						
10:17:05	3260.501	1121.693						
10:17:15	3318.565	1208.657						
10:17:24	3295.99	1217.757						
10:17:34	3282.987	1229.496						
10:17:44	3156.608	1215.291						
10:17:54	3233.945	1234.202						
10:18:04	3285.841	1215.276						
10:18:14	3304.471	1182.353						
10:18:24	3555.884	1196.205						
10:18:34	3537.59	1218.471						
10:18:44	3486.063	1093.702						
10:18:54	3520.446	1147.824						
10:19:04	3420.933	1124.621						
10:19:14	3447.172	1142.49						
10:19:24	3486.944	1190.082						
10:19:34	3380.999	1218.805						
10:19:44	3483.963	1115.366						
10:19:54	3460.466	1266.853						
10:20:04	3417.781	1199.55						
10:20:13	3494.193	1120.479						
10:20:23	3391.127	1341.751						
10:20:33	3450.143	1222.332						
10:20:43	3516.471	1103.437						
10:20:53	3433.379	1234.136						
10:21:03	3443.8	1077.18						
10:21:13	3450.589	1038.133						
10:21:23	3399.715	1184.799						
10:21:33	3435.27	1099.013						
10:21:43	3434.99	1186.228						
10:21:53	3445.281	1187.691						
10:22:03	3417.708	1086.921						
10:22:13	3418.536	1150.45						
10:22:23	3433.067	1144.082						
10:22:33	3408.609	1087.938						
10:22:43	3406.539	1197.906						
10:22:53	3421.219	1144.507						
10:23:02	3347.903	1055.116						
10:23:12	3350.912	1114.638						
10:23:22	3325.051	1057.6						

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE: (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
10:23:32	3332.637	1025.249						
10:23:42	3371.066	1120.308						
10:23:52	3321.251	1110.196						
10:24:02	3359.208	1125.312						
10:24:12	3254.369	1167.668						
10:24:22	3222.383	1064.841						
10:24:32	3323.948	1047.7						
05-21-1992		AUTUMN GRAIN BREAD						
TIME								
21:03:09	3684.336	1133.843						
21:03:19	3687.564	1150.52						
21:03:29	3683.912	1100.817						
21:03:39	3645.626	1034.877						
21:03:49	3624.93	964.7186						
21:03:59	3620.129	1117.122	237	914	11.2			
21:04:59	3695.768	1064.961						
21:05:59	3661.516	1057.325						
21:06:59	3626.773	1024.79						
21:07:59	3568.408	1050.832						
21:08:59	3416.587	1063.626						
21:09:59	3436.475	1130.659						
21:11:02	3354.474	1082.454						
21:12:02	3154.607	1154.941						
21:13:02	3399.399	1159.943						
21:14:02	3534.256	1110.129						
21:15:02	3192.227	893.351				1930	819	40.3
21:16:02	3566.39	964.4096						
21:17:02	3661.797	893.3272						
21:18:02	3555.143	841.8953						
21:19:02	3529.744	887.8066						
21:20:02	3476.958	992.8106						
21:21:02	3278.786	1118.101						
21:22:02	2986.696	1045.402						
21:23:02	2994.623	1051.171						
21:24:01	3191.759	1098.943						
21:25:01		969.031						
21:26:01		912.5004	368	730	11.4			
21:27:01	2877.604	1091.941						
21:28:01	3083.202	1226.779						
21:29:01	2894.188	1039.991						
21:30:01	2796.386	1048.845						
21:31:01	3138.775	1054.07						
21:32:01	3277.998	989.88						
21:33:01	3086.6							

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet)	ACETALDEHYDE (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet)	CH4 (ppmV/wet)	ACETALDEHYDE (ppmV/wet)
21:34:01	3290.057							
21:35:01	3533.214	975.5346						
21:36:01	3271.303	1017.643				3730	1070	43.6
21:37:00	2887.115	1045.69						
21:38:00	3014.411	1004.1						
21:39:00	3075.062	1024.784						
21:40:00	2880.069	914.3754						
21:41:00	3020.848	1046.438						
21:42:00	3104.464	1095.101						
21:43:00	3306.238	1168.197						
21:44:00	3320.284	1151.497						
21:45:00	3110.873	998.8357						
21:46:00	3430.107	1087.636						
21:47:00	3426.194	1043.973						
21:48:00	3346.223	1061.794						
21:49:00	3166.718	1118.38						
21:49:59	3144.084	1161.877						
21:50:59	3286.751	1190.376						
21:51:59	3266.111	1144.947						
21:52:59		1070.674						
21:53:59	3391.891	1160.583						
21:54:59	3732.547	1211.813						
21:55:59	3528.217	1159.05				5650	1040	55.9
21:56:59	3520.992	1175.994						
21:57:59	3452.623	1029.591						
21:58:59	3439.933	993.7963						
21:59:59	3446.269	1081.609						
22:00:59	3377.447	971.9722						
22:01:59	3300.448							
22:02:58	3272.299							
22:03:58	3249.097							
22:04:58	3224.447							
22:05:58	3153.658							
22:06:58	3010.701	930.3425						
22:07:58	2688.757	1011.822						
22:08:58	2428.829	1043.293						
22:10:00	2490.528	1073.037						
22:11:00	2644.147	974.871						
22:12:00	2570.294							
22:13:00	2651.688							
22:14:00	2890.175	681.7849						
22:15:00	2969.262	1162.171	389	761	11.7			
22:15:59	2920.297	1011.508						
22:16:59	3065.252	984.8979						
22:17:59	3147.789	1025.134						
22:18:59	3176.78	1059.596						
22:19:59	3238.094	1193.229						
22:20:59	3094.043	1202.198						

05-21-1992

TIME	THC R (ppmC)	THC F (ppmC)	FRONT GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)	REAR GC RESULTS ETH-OH (ppmV/wet	CH4 (ppmV/wet	ACETALDEHYDE (ppmV/wet)
22:21:59	2980.24	1307.681						
22:22:59	3161.634	1264.781						
22:23:59	3124.952	1261.757						
22:24:59	2998.121	1167.675						
22:25:59	3432.901	1132.966	353	876	12.2			
22:26:59	3571.212	1239.627						
22:27:59	3636.735	1208.359						
22:28:58	3600.771	1078.077						
22:29:58	3508.22	1060.618						
22:30:58	3439.919	1003.03						
22:31:58	3328.72	1120.387						
22:32:58	3235.317	1092.701						
22:33:58	3162.737	1127.26						
22:34:58	3274.167	1140.458						
22:35:58	3168.68	1058.012						
22:36:58	3112.696	961.1247						
22:37:58	3327.868	1035.368						
22:38:58	3237.176	1134.454						
22:39:58	3069.529	1076.534						
22:40:58	2967.079	1192.708						
22:41:08	2914.497	1265.852						
22:41:17	3085.131	1306.47						

CALIBRATION SUMMARY
05-21-1992 06:00:15
CALIBRATION FILE NAME =D:\CEMDATA\521bakea.CAL

Chan.	Name	Units	Zero Conc.	Zero Resp.	Span Conc.	Span Resp.	Slope	Int.
1	THC R	ppmV	0.00	-.0001	8010.00	8.094	989.628	0.12
2	THC F	ppmV	0.00	0.0013	8010.00	8.075	992.086	-1.34
3	O2	%V	0.00	-.0043	20.90	0.077	258.408	1.10
4			0.00	0.0027	149.50	0.747	200.922	-0.55
5			0.00	0.0000	0.00	0.000	1.000	0.00
6			0.00	0.0000	0.00	0.000	1.000	0.00
7			0.00	0.0000	0.00	0.000	1.000	0.00
8			0.00	0.0000	0.00	0.000	1.000	0.00
9			0.00	0.0000	0.00	0.000	1.000	0.00
10			0.00	0.0000	0.00	0.000	1.000	0.00
11			0.00	0.0000	0.00	0.000	1.000	0.00
12			0.00	0.0000	0.00	0.000	1.000	0.00
13			0.00	0.0000	0.00	0.000	1.000	0.00
14			0.00	0.0000	0.00	0.000	1.000	0.00

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

CALIBRATION SUMMARY
05-21-1992 06:19:00
CALIBRATION FILE NAME =D:\CEMDATA\521bakeb.CAL

Chan.	Name	Units	Zero Conc.	Zero Resp.	Span Conc.	Span Resp.	Slope	Int.
1	THC R	ppmV	0.00	0.0006	8010.00	8.093	989.796	-0.61
2	THC F	ppmV	0.00	0.0013	8010.00	8.075	992.086	-1.34
3	O2	%V	0.00	-.0043	20.90	0.077	258.408	1.10
4			0.00	0.0027	149.50	0.747	200.922	-0.55
5			0.00	0.0000	0.00	0.000	1.000	0.00
6			0.00	0.0000	0.00	0.000	1.000	0.00
7			0.00	0.0000	0.00	0.000	1.000	0.00
8			0.00	0.0000	0.00	0.000	1.000	0.00

9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	0.00	0.0000	0.00	0.000	1.000	0.00
11	0.00	0.0000	0.00	0.000	1.000	0.00
12	0.00	0.0000	0.00	0.000	1.000	0.00
13	0.00	0.0000	0.00	0.000	1.000	0.00
14	0.00	0.0000	0.00	0.000	1.000	0.00

==========

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

RADIAN CORPORATION qc thru system ch4=2000

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 06:22:17
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
06:22:22	1978.1	2002.8	22.0
06:22:32	1973.5	2018.0	22.0
06:22:42	1972.8	2015.8	22.0
06:22:51	1971.4	2014.6	22.0
06:23:01	1970.9	2010.1	22.1
06:23:11	1978.2	2012.5	22.1
06:23:21	1996.1	2015.4	22.1
06:23:31	1996.8	2024.8	22.1
Avg.=	1979.7	2014.2	22.0

RADIAN CORPORATION QC THRU SYSTEM CH4=803

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 06:28:16
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
06:28:22	806.5	801.5	22.3
06:28:32	805.6	802.4	22.2
06:28:42	805.1	801.5	22.2
06:28:52	805.1	801.5	22.2
06:29:01	806.5	802.7	22.2
06:29:11	808.5	803.0	22.2
06:29:21	808.0	799.0	22.2
06:29:31	808.2	801.4	22.2
06:29:41	808.3	799.9	22.2
06:29:51	807.3	800.6	22.3
06:30:01	807.3	798.2	22.2
06:30:11	807.8	798.7	22.2
Avg.=	807.0	800.9	22.2

QC thru System

CH4 199.1 ppm

RADIAN CORPORATION

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 06:32:31
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
06:32:36	219.8	202.6	22.0
06:32:46	212.6	197.9	22.3
06:32:56	211.5	197.8	22.4
06:33:06	210.5	197.2	22.3
06:33:16	209.3	197.1	22.3
06:33:26	208.9	197.1	22.3
06:33:36	209.0	196.9	22.3
06:33:46	209.1	196.4	22.3
06:33:56	208.7	194.7	22.4
06:34:06	207.9	194.4	22.4
06:34:16	207.5	195.1	22.4
06:34:26	207.0	195.6	22.3
06:34:35	206.9	196.1	22.3
06:34:45	206.9	197.1	22.3
06:34:55	207.1	197.4	22.3
Avg.=	209.5	196.9	22.3

RADIAN CORPORATION QC THRU SYSTEM CH4=80.2ppm

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 06:40:05
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
06:40:10	99.3	79.4	22.2
06:40:20	91.8	77.8	22.2
06:40:30	90.7	78.1	22.2
06:40:40	89.7	76.9	22.2
06:40:50	89.0	76.9	22.2
06:41:00	88.6	77.1	22.2
06:41:10	88.1	76.9	22.2
06:41:20	87.5	77.1	22.2
06:41:30	87.3	76.9	22.2
06:41:40	86.8	76.5	22.2
06:41:50	87.3	76.6	22.2
Avg.=	89.6	77.3	22.2

RADIAN CORPORATION QC THRU SYSTEM CH4=80.2 ppm\

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 09:19:27
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
09:19:32	115.0	80.3	22.3
09:19:42	90.8	81.6	21.8
09:19:52	92.7	81.9	21.8
09:20:02	80.5	81.3	21.8
09:20:12	76.0	80.8	21.8
09:20:22	78.9	81.0	21.8
09:20:32	79.1	79.5	21.9
09:20:42	79.8	80.7	21.9
09:20:52	78.4	80.7	21.9
09:21:02	78.7	80.5	22.0
09:21:12	77.9	80.3	21.9
09:21:22	76.9	80.2	21.8
09:21:32	79.9	80.2	21.8
Avg.=	83.4	80.7	21.9

RADIAN CORPORATION QC THRU SYSTEM CH4=199.1 ppm

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 09:24:17
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
09:24:22	189.6	199.4	21.8
09:24:32	192.9	199.4	22.2
09:24:42	195.6	198.4	22.3
09:24:52	197.8	197.8	22.3
09:25:02	198.7	198.0	22.2
09:25:12	198.2	197.7	22.2
09:25:22	198.4	198.0	22.2
09:25:32	198.9	198.6	22.2
09:25:42	199.0	199.4	22.3
09:25:52	198.7	199.9	22.3
09:26:02	197.8	199.6	22.3
09:26:12	197.9	201.0	22.3
09:26:22	207.9	200.4	22.3
09:26:32	214.1	204.1	22.4
09:26:42	212.5	204.1	22.3
09:26:52	197.5	204.0	22.4
09:27:01	195.1	203.8	22.3
09:27:11	194.1	203.6	22.3
09:27:21	193.8	203.6	22.4
09:27:31	193.4	203.8	22.3
09:27:41	193.4	204.4	22.3
Avg.=	198.3	200.9	22.3

RADIAN CORPORATION QC THRU SYSTEM CH4=803 ppm

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 09:33:50
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
09:33:55	806.0	816.6	22.6
09:34:05	808.0	785.0	22.3
09:34:15	806.7	802.2	22.3
09:34:25	806.4	808.3	22.3
09:34:35	807.0	808.7	22.3
09:34:45	806.6	809.2	22.3
09:34:55	807.2	809.3	22.3
09:35:05	807.0	809.5	22.3
09:35:15	806.4	809.3	22.4
09:35:25	806.0	808.7	22.3
09:35:35	805.9	808.3	22.3
09:35:45	806.0	809.6	22.3
09:35:55	806.5	810.0	22.3
09:36:05	806.3	809.5	22.3
09:36:15	805.5	809.0	22.3
09:36:25	805.3	808.6	22.3
09:36:34	805.9	808.1	22.3
09:36:44	955.5	808.8	22.3
09:36:54	937.1	809.5	22.3
09:37:04	791.8	809.4	22.3
09:37:14	791.5	808.7	22.3
09:37:24	791.4	809.4	22.3
Avg.=	817.1	808.0	22.3

806.4 808.7

RADIAN CORPORATION QC THRU SYSTEM CH4=2000 ppm

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 09:42:00
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\S21bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
09:42:05	1915.2	2014.5	22.2
09:42:15	1923.2	2001.9	22.2
09:42:25	1925.2	2002.8	22.3
09:42:35	1926.8	2003.6	22.3
09:42:45	1927.9	2002.5	22.2
09:42:55	1927.3	2002.0	22.3
09:43:05	1926.9	2002.5	22.1
09:43:15	1929.3	2001.4	22.2
09:43:25	1930.9	2001.8	22.2
09:43:35	1932.7	2002.7	22.2
09:43:45	1934.5	2003.2	22.2
09:43:55	1941.6	2002.6	22.3
09:44:05	1949.7	2003.8	22.3
09:44:15	1957.3	2003.2	22.2
09:44:24	1960.1	2002.2	22.2
09:44:34	1959.6	2003.9	22.2
09:44:44	1957.4	2003.4	22.3
Avg.=	1936.8	2003.4	22.2

RADIAN CORPORATION QC N2 THRU SYSTEM

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 09:54:03
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bakeb.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
09:54:09	16.2	5.3	1.3
09:54:19	15.2	3.9	1.1
09:54:29	15.2	4.2	1.1
09:54:39	14.8	4.1	1.0
09:54:49	14.6	3.5	1.0
09:54:59	13.2	4.0	1.0
09:55:09	14.9	2.6	0.9
09:55:19	13.2	3.4	1.1
09:55:28	13.1	4.0	1.1
09:55:38	13.7	4.1	1.1
09:55:48	12.4	3.8	1.1
09:55:58	13.8	2.8	0.9
09:56:08	12.5	3.4	1.1
09:56:18	12.6	3.1	1.1
Avg.=	14.0	3.7	1.1

RADIAN CORPORATION QC THRU SYSTEM O2=18.00%

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 09:58:34
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521bake5.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
09:58:41	160.3	2.9	19.0
09:58:51	135.9	3.7	19.2
09:59:01	138.3	3.2	19.2
09:59:11	139.7	3.3	19.0
09:59:21	141.6	2.7	19.1
09:59:31	140.2	3.0	19.2
09:59:41	140.3	3.0	19.2
09:59:51	135.7	3.1	19.2
10:00:01	135.5	3.1	19.2
10:00:11	141.5	3.3	19.3
Avg.=	140.9	3.1	19.1

CALIBRATION SUMMARY
05-21-1992 20:33:28
CALIBRATION FILE NAME =D:\CEMDATA\521BAKEC.CAL

Chan.	Name	Units	Zero Conc.	Zero Resp.	Span Conc.	Span Resp.	Slope	Int.
1	THC R	ppmV	0.00	-.0005	8010.00	8.072	992.217	0.51
2	THC F	ppmV	0.00	0.0013	8010.00	8.068	993.023	-1.29
3	O2	%V	0.00	-.0030	20.90	0.077	261.402	0.78
4			0.00	0.0027	149.50	0.747	200.922	-0.55
5			0.00	0.0000	0.00	0.000	1.000	0.00
6			0.00	0.0000	0.00	0.000	1.000	0.00
7			0.00	0.0000	0.00	0.000	1.000	0.00
8			0.00	0.0000	0.00	0.000	1.000	0.00
9			0.00	0.0000	0.00	0.000	1.000	0.00
10			0.00	0.0000	0.00	0.000	1.000	0.00
11			0.00	0.0000	0.00	0.000	1.000	0.00
12			0.00	0.0000	0.00	0.000	1.000	0.00
13			0.00	0.0000	0.00	0.000	1.000	0.00
14			0.00	0.0000	0.00	0.000	1.000	0.00

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

DRIFT calcs

SPAN R => 7989.0 ppm => -0.21 %

SPAN F => -0.07 %

ZERO R => -.01 %

ZERO F => ~~.0052~~ NA

RADIAN CORPORATION QC THRU SYSTEM 2000ppm CH4

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 20:36:14
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
20:36:19	2000.3	2010.6	21.4
20:36:29	1969.7	1980.4	22.0
20:36:39	1968.9	1978.2	22.1
20:36:49	1963.2	1973.9	21.9
20:36:59	1962.5	1973.0	22.1
20:37:09	1965.1	1972.1	22.1
20:37:19	1993.0	1971.2	22.1
20:37:28	1995.8	2035.9	22.0
20:37:38	1996.0	2017.4	22.2
20:37:48	1986.6	1980.8	22.3
20:37:58	1987.7	1979.6	22.2
20:38:08	1988.8	1978.7	22.1
20:38:18	1989.9	1980.6	22.1
20:38:28	1992.1	1978.7	22.2
20:38:38	1990.5	1980.6	22.3
20:38:48	1990.8	1986.9	22.2
20:38:58	1990.6	1987.4	22.0
20:39:08	1991.1	1989.2	22.2
20:39:18	1989.6	1987.8	22.3
20:39:28	1988.4	1988.7	22.3
20:39:38	1988.8	1989.5	22.2
20:39:48	1988.7	1989.4	22.1
20:39:58	1988.2	1988.7	22.3
20:40:08	1989.3	1989.3	22.4
20:40:17	1984.5	1989.7	22.3
20:40:27	1990.3	1987.5	22.2
20:40:37	1989.6	1987.8	22.2
20:41:07	1991.5	1989.1	22.2
20:41:37	1988.2	2029.4	22.2
20:42:07	1985.1	2000.3	22.2
20:42:37	1987.2	2018.3	22.2
Avg.=	1986.2	1990.0	22.1

RADIAN CORPORATION QC THRU SYSTEM CH4=803

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 20:45:39
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
20:45:44	796.8	795.3	24.5
20:45:54	789.0	793.4	22.8
20:46:04	788.1	792.6	22.9
20:46:14	794.0	792.7	23.1
20:46:24	845.1	797.6	26.4
20:46:33	812.1	806.9	26.3
20:47:03	781.4	809.8	22.9
20:47:33	789.1	817.0	22.9
20:48:03	790.4	815.0	22.9
20:48:33	812.8	813.2	22.9
20:49:03	815.6	813.1	22.9
20:49:33	815.4	813.4	22.9
Avg.=	802.5	805.0	23.6

RADIAN CORPORATION QC THRU SYSTEM CH4=199.1

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 20:52:36
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
20:52:40	215.0	208.9	22.7
20:52:50	205.9	201.8	23.0
20:53:00	205.0	201.9	23.0
20:53:10	204.6	201.5	23.0
20:53:20	204.2	201.0	23.0
20:53:30	203.9	201.2	23.0
20:53:40	203.5	200.8	23.0
20:53:50	203.6	200.3	23.0
20:54:00	203.3	200.7	23.0
Avg.=	205.5	202.0	23.0

RADIAN CORPORATION QC THRU SYSTEM O2= 18.00%

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 20:57:05
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
20:57:10	260.0	3.1	18.4
20:57:20	240.2	3.0	18.5
20:57:30	244.1	3.1	18.5
20:57:40	255.0	2.8	18.4
20:57:50	259.2	3.1	18.5
20:58:00	260.5	2.3	18.4
20:58:10	260.4	2.3	18.4
20:58:19	261.4	2.4	18.4
20:58:29	265.9	2.8	18.5
Avg.=	256.3	2.8	18.4

RADIAN CORPORATION 10000 ppm ETHANOL

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 22:42:43
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
22:42:47	13913.2	12662.8	17.4
22:42:57	13253.4	12554.1	17.7
22:43:07	13817.5	12266.1	17.9
22:43:17	13700.0	12300.1	17.6
22:43:27	13685.4	12255.8	17.1
22:43:37	13661.2	12324.9	17.3
22:43:47	13560.2	12233.1	17.7
22:43:57	13494.9	12187.5	17.7
22:44:07	14423.0	12216.4	17.8
22:44:17	14219.1	12314.3	17.9
22:44:27	13928.3	12099.0	17.8
22:44:37	13677.3	12001.3	17.5
22:44:47	13435.5	11130.1	17.1
22:44:57	11916.6	9195.8	17.8
22:45:07	12951.5	10415.4	17.7
22:45:16	12141.7	11435.9	17.6
22:45:26	13781.3	12196.1	17.3
22:45:36	14084.2	11964.9	17.3
22:45:46	13949.1	12038.9	17.5
22:45:56	13778.6	11455.5	17.6
Avg.=	13568.6	11862.4	17.6

Direct

RADIAN CORPORATION ETHANOL 2000ppm Duct

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 23:12:51
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
23:12:56	2976.3	2775.7	17.2
23:13:06	2960.0	2776.1	17.6
23:13:16	2958.9	2776.2	17.5
23:13:26	2954.5	2775.0	17.9
23:13:36	2952.9	2846.5	18.0
23:13:46	2947.9	2894.9	18.0
23:13:56	2943.8	2924.7	18.1
23:14:06	2937.7	2922.0	18.0
23:14:16	2928.7	2916.3	17.9
23:14:26	2916.4	2908.3	17.8
Avg.=	2947.7	2851.6	17.8

three systems

RADIAN CORPORATION ETHAnol 2000PPM

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 23:20:05
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
23:20:09	2687.0	2592.5	0.9
23:20:19	2735.6	2629.1	0.7
23:20:29	2726.3	2724.6	0.7
23:20:39	2753.5	2724.5	0.6
23:20:49	2753.2	2651.5	0.7
23:20:59	2760.7	2469.6	1.6
23:21:09	2760.3	2298.0	2.1
23:21:19	2747.8	2172.7	3.4
23:21:29	2706.6	2043.5	4.7
23:21:39	2673.8	1904.3	5.5
Avg.=	2730.5	2421.0	2.1

RADIAN CORPORATION methanol 200 PPM thru system

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 23:33:44
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
23:33:48	282.2	270.2	0.4
23:33:58	278.5	268.3	0.7
23:34:09	277.6	267.4	0.8
23:34:19	279.5	268.8	0.7
23:34:29	281.2	268.8	0.7
23:34:39	283.9	268.4	0.7
23:34:49	285.3	271.4	0.7
23:34:59	277.6	273.4	0.7
23:35:09	269.7	273.3	0.7
23:35:19	267.9	273.2	0.7
23:35:29	267.5	272.8	0.7
23:35:39	268.6	273.2	0.7
23:35:49	268.1	273.4	0.7
23:35:59	267.7	273.0	0.7
23:36:08	268.2	272.9	0.7
23:36:18	269.0	272.9	0.7
23:36:28	271.0	273.2	0.7
23:36:38	270.9	272.8	0.7
23:36:48	273.3	272.5	0.7
23:36:58	274.5	273.1	0.7
23:37:08	278.7	273.3	0.7
23:37:18	279.4	272.7	0.7
23:37:28	270.9	273.0	0.7
23:37:38	266.6	273.3	0.7
23:37:48	265.6	272.6	0.7
Avg.=	273.7	271.9	0.7

RADIAN CORPORATION acetaldehyde 82.5 PPM thru sys.

Field Testing and Process Engineering Dept.
Continuous Emissions Monitoring Data
MERITA BAKERIES
CHARLOTTE,NC
Performed for: EPA\EMB
Date Printed = 05-21-1992 Current Time = 23:47:37
File Name = D:\CEMDATA\052192.PRN Calibration File:D:\CEMDATA\521BAKEC.CAL

05-21-1992 Time	THC R ppmV	THC F ppmV	O2 %V
23:47:43	114.9	101.8	1.1
23:47:53	106.6	101.6	1.1
23:48:03	105.8	102.0	1.2
23:48:12	105.0	101.8	1.2
23:48:22	105.4	102.2	1.2
23:48:32	105.1	101.9	1.2
23:48:42	104.8	102.0	1.2
23:48:52	103.3	101.5	1.2
23:49:02	103.3	101.7	1.1
23:49:12	103.0	101.6	1.2
23:49:22	100.9	101.2	1.3
23:49:32	101.1	101.4	1.2
23:49:42	102.0	101.4	1.2
23:49:52	100.1	100.7	1.2
23:50:02	100.5	100.7	1.2
23:50:12	101.5	101.0	1.1
23:50:22	99.9	101.0	1.2
Avg.=	103.7	101.5	1.2

CALIBRATION SUMMARY
05-22-1992 00:05:21
CALIBRATION FILE NAME =D:\CEMDATA\521baked.CAL

Chan.	Name	Units	Zero		Span		Slope	Int.
			Conc.	Resp.	Conc.	Resp.		
1	THC R	ppmV	0.00	-.0015	8010.00	8.112	987.291	1.45
2	THC F	ppmV	0.00	-.0002	8010.00	8.084	990.805	0.18
3	O2	%V	0.00	-.0030	20.90	0.077	261.402	0.78
4			0.00	0.0027	149.50	0.747	200.922	-0.55
5			0.00	0.0000	0.00	0.000	1.000	0.00
6			0.00	0.0000	0.00	0.000	1.000	0.00
7			0.00	0.0000	0.00	0.000	1.000	0.00
8			0.00	0.0000	0.00	0.000	1.000	0.00
9			0.00	0.0000	0.00	0.000	1.000	0.00
10			0.00	0.0000	0.00	0.000	1.000	0.00
11			0.00	0.0000	0.00	0.000	1.000	0.00
12			0.00	0.0000	0.00	0.000	1.000	0.00
13			0.00	0.0000	0.00	0.000	1.000	0.00
14			0.00	0.0000	0.00	0.000	1.000	0.00

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

CEM INSTRUMENT DRIFT SUMMARY
05-22-1992 00:06:04

Chan.	Name	Units	Zero Conc. Actual	Zero Conc. Observed	Span Actual	Span Observed	Drift % of Scale Zero	Drift % of Scale Span
1	THC R	ppmV	0.000	-.945	8010.00	8048.84	-0.01	0.39
2	THC F	ppmV	0.000	%-1.465	8010.00	8026.29	-0.01	0.16
3	O2	%V	0.000	0.000	20.90	0.00	0.00	-83.60
4			0.000	0.000	149.50	0.00	0.00	-14.95
5			0.000	0.000	0.00	0.00	0.00	0.00
6			0.000	0.000	0.00	0.00	0.00	0.00
7			0.000	0.000	0.00	0.00	0.00	0.00
8			0.000	0.000	0.00	0.00	0.00	0.00
9			0.000	0.000	0.00	0.00	0.00	0.00
10			0.000	0.000	0.00	0.00	0.00	0.00
11			0.000	0.000	0.00	0.00	0.00	0.00
12			0.000	0.000	0.00	0.00	0.00	0.00
13			0.000	0.000	0.00	0.00	0.00	0.00
14			0.000	0.000	0.00	0.00	0.00	0.00

Press Shift-PrtSc to Print Out Table
Press <C> to Continue

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M.D. BRYANT DATE 5-20-92 CHECKED _____ DATE _____

PROJECT EPA BAKERIES: Interstate Brands Corp. JOB NO. _____

SUBJECT Initial Calibration 5-20-92 SHEET _____ OF _____ SHEETS

ACETALDEHYDE:

Run #	Conc. (ppm)	AREA
18	3.03	84,393
19	14.8	427,075
20	44.3	1,248,049
21	82.5	2,607,830

r = 0.9981
m = 31,612
b = -51,178

Ethanol:

Run #	Conc. (ppm)	AREA
23	201	495,011
24	402	1,079,076
25	1005	2,658,008
26	2010	5,228,973

r = 0.9999
m = 2.605
b = 8,500

METHANE:

Run #	Conc. (ppm)	AREA
29	80.2	2,894,534
30	199.1	7,047,280
31	401.5	14,165,944
32	803	28,593,968
33	2000	62,156,760

r = 0.9982
m = 30,754
b = 1,543,834

(Run 29-32)
r = 0.9999
m = 35,583
b = -23,914

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M.D. _____ DATE 5/20/92 CHECKED _____ DATE _____

PROJECT EPA BAKERIES: Interstate Brands Co. JOB NO. _____

SUBJECT RESULTS: Bread QUEN (GIANT) SHEET _____ OF _____ SHEETS

RUN #	TIME	FRONT OR REAR STACK	METHANE AREA	Acetaldehyde AREA	Ethanol AREA	METHANE CONC. (ppm)	Acetaldehyde CONC. (ppm)	Ethanol CONC. (ppm)
35	11:56:05	FRONT	37,867,296	318,535	560,088	1,181	11.7	212
36	12:05:00	REAR	20,035,504	1,525,555	36,734,624	601	49.9	14,100
++37	12:14:10	FRONT	22,912,544	198,331	—	694++	7.89++	—#
++38	12:22:20	REAR	31,826,880	822,325	4,011,462	985++	27.6++	1540++
39	12:33:40	FRONT	25,064,688	209,270	2,268,782	765	8.24	868
40	12:44:55	REAR	25,925,328	871,377	15,259,536	793	29.2	5850
41	12:55:40	FRONT	31831,392	152,070	—	985	6.43	—
42	13:06:25	REAR	19,442,544	1,181,400	38,101,664	582	39.0	14,600

++ RUN 37/38, SUSPECT - BASELINE PROBLEM (UNDER RANGE) RUN TIME changed from 8.5 minutes to 10 minutes to allow baseline to settle after huge Ethanol peaks from the REAR STACK.

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M.D. _____ DATE 5/20/92 CHECKED _____ DATE _____

PROJECT EPA BAKERIES: Interstate Brands Co. JOB NO. _____

SUBJECT RESULTS / RUN OVEN SHEET _____ OF _____ SHEETS

RUN #	TIME	FRONT/REAR	METHANE AREA	Acetaldehyde AREA	Ethanol AREA	CONC (ppm) METHANE	Acetaldehyde	Ethanol
48	~~14:29:53~~ ~~14:55:22~~	FRONT	66,649,568	865,703	1,521,942	2117	29.0	581
49	14:41:17	REAR	9,385,850	121,489	1,764,409	255	5.46	674
50	14:51:48	FRONT	65,195,008	982,106	2,242,557	2070	32.7	858
51	15:02:18	REAR	3,555,294	48,406	620,661	65.4	3.15	235
52	15:12:43	FRONT	57,844,256	782,084	1,549,899	1831	26.4	592
53	15:23:13	REAR	11,267,840	142,015	1,575,607	316	5.16	602

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE Michael Wyatt DATE 5/20/92 CHECKED _____ DATE _____

PROJECT EPA BAKERIES: Interstate Brands JOB NO. _____

SUBJECT FINAL CALIBRATION SHEET _____ OF _____ SHEETS

METHANE

Run #	Conc. (ppm)	AREA
58	80.2	2,593,010
60	199.1	6,047,533
61	401.5	15,756,248
62	803	26,546,784
63	2000	59,933,248

r = 0.9973
m = 29,557
b = 1,581,234

ACETALDEHYDE

Run #	Conc. (ppm)	AREA
65	14.8	384,716
66	44.3	1,275,250
67	82.5	2,194,691
68	82.5	2,386,230

65, 67
r = 0.9979
m = 26,607
b = 29,033

65, 66, 68
r = 0.9997
m = 28,622
b = -22,234

Ethanol

Run #	Conc. (ppm)	AREA
70	402	1,065,892
71	1005	2,800,806
72	2010	5,279,226

r = 0.9979
m = 2596
b = 118,030

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M.D. _____ DATE 5/21/92 CHECKED _____ DATE _____

PROJECT EPA BAKERIES: Interstate Brands Co. JOB NO. _____

SUBJECT RESULTS: BREAD LINE (OLD FASHIONED) SHEET _____ OF _____ SHEETS

RUN #	TIME	FRONT (F) REAR (R)	METHANE AREA	ACETALDEHYDE AREA	Ethanol AREA	METHANE CONC. (ppm)	ACETALDEHYDE CONC. (ppm)	Ethanol CONC. (ppm)
90	07:35:40	FRONT	24,952,976	260,958	667,841	760	8.88	236
91	07:45:59	REAR	48,710,912	1,409,051	5,165,299	1,540	46.2	1940
92	07:56:30	FRONT	28,699,584	359,033	91,050	883	12.1	328
93	08:07:00	REAR	46,953,088	1,439,876	6,930,314	1,480	225	2620
94	08:17:29	FRONT	22,942,864	274,366	697,433	694	23.0	247
95	08:28:15	REAR	48,480,512	823,626	4,402,131	1,530	27.1	1660
96	08:38:40	FRONT	see below					
97	08:50:40	FRONT	see below					
98	09:00:59	REAR	51,028,864	1,433,562	6,193,821	1,620	47.0	2340
111	10:03:20	FRONT (GIANT)	13,681,016	119,012	367,041	389	4.27	122
112	10:13:45	REAR (GIANT)	27,425,168	1,248,395	20,903,328	841	40.9	7930

① RUN # 96/97 FRONT HEAT TRACE JUMPER FROM THC had problems. CHECKED heat / RAN QC to check out the problems.

② RUN # 111/112 to take advantage of opportunity to run same bread line product as the 5/20/92 RUNS.

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M.D. _____ DATE 5/21/92 CHECKED _____ DATE _____

PROJECT EPA BAKERIES: Interstate Brands Co. JOB NO. _____

SUBJECT RESULTS: Bread Line (AUTUMN GRAIN) SHEET _____ OF _____ SHEETS

Run #	TIME	FRONT / REAR	METHANE AREA	Acetaldehyde AREA	Ethanol AREA	METHANE CONC. (ppm)	Acetaldehyde CONC. (ppm)	Ethanol CONC. (ppm)
120	21:03:24	FRONT	29,641,376	332,319	671,376	914	11.2	237
121	21:13:54	REAR	26,760,800	1,229,003	5136,973	819	40.3	1930
122	21:24:54	FRONT	24,040,880	338,593	1,014,972	730	11.4	368
123	21:35:19	REAR	34,458,432	1,329,342	9,856,256	1,070	43.6	3730
124	21:45:45	FRONT	HEAT TRACE PROBLEM			~~1,040~~	—	—
125	21:54:59	REAR	33,472,768	1,709,420	14,921,424	1040	55.9	5650
126	22:05:34	FRONT	HEAT	TRACE	PROBLEM	—	—	—
127	22:13:45	FRONT (SYRINGE)	24,561,568	347,179	1,071,936	761	11.7	389
128	22:25:14	FRONT	28,502,352	361,801	975,100	876	12.2	353

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M. D. Bryant DATE 5/21/92 CHECKED _____ DATE _____

PROJECT EPA BATTERIES: Interstate Boards JOB NO. _____

SUBJECT Initial Calibration: 5-21-92 SHEET _____ OF _____ SHEETS

METHANE:

Run #	Conc (ppm)	AREA
85	199.1	6,734,752
86	401.5	14,026,048
87	803	28,073,472
88	2000	62,082,304

r = 0.9986
m = 30,418
b = 1,846,891

ACETALDEHYDE:

Run #	Conc. (ppm)	AREA
80	3.03	93,454
81	14.8	428,723
82	44.3	972,908
83	82.5	2,530,138
84	44.3	1,293,554

r = 0.985
m = 29,973
b = -77,435
↑ RERUN 44.3ppm

w/o Run 82
r = 0.9999
m = 30,792
b = -12,332
↑ USE THIS CAL.

Ethanol:

Run #	Conc (ppm)	AREA
76	201	556,906
77	402	1,079,251
78	1005	2,766,782
79	2010	5,304,691

r = 0.9997
m = 26.31
b = 47,944

4-81-3361

RADIAN CORPORATION

CALCULATION SHEET

CALC. NO. _____

SIGNATURE M.D. [illegible] DATE 5/21/92 CHECKED _____ DATE _____

PROJECT EPA BATTERIES: Interstate Brands Co. JOB NO. _____

SUBJECT Final Calibration; 5-21-92 SHEET _____ OF _____ SHEETS

METHANE

RUN #	CONC. (ppm)	AREA
139	199.1	6,971,818
140	40.1	1,427,114
141	401.5	14,448,654
142	803	28,121,040
143	2000	62,511,616

r = 0.9987
m = 30,981
b = 1,358,000

ACETALDEHYDE

RUN #	CONC. (ppm)	AREA
134	82.5	2538,573
135	27.5	854,564
136	41.2	1,295,374

r = 0.9999
m = 30,499
b = 25,710

Ethanol QC CHECKS

RUN #	Sample ID	AREA	NOTES
129	10,000 ppm Ethanol	27,049,584	2.6% difference
131	2010 ppm Ethanol	5,575,997	4.5% difference
132	2010 ppm Ethanol	5,551,805	FRONT HEAT TRACE QC CHECK (4.1% difference)

4-81-3361

```
*TIME 13:19:55
MAY 19, 1992  13:19:55

*  TIME 10  STOP
*  ZERO 5  @
*  ATT 2^ 6  @
*  CHT SP 1  @
*  AR REJ 10000  @
*  THRSH 4  @
*  PK WD .1  @
*  LIST: LIST
PEAK CAPACITY:  1244

ZERO   =  5. 1083.306
ATT 2^ =  6
CHT SP =  1.0
AR REJ =  10000
THRSH  =  4
PK WD  =  0.10


*  TIME 10  STOP
*  RUN #    1      MAY 19, 1992  15:38:53
START: not ready
```

METHOD BLANK

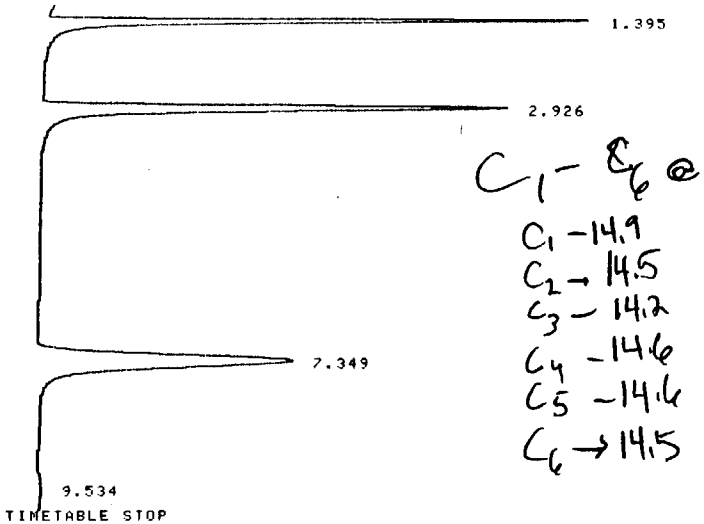
```
TIMETABLE STOP


RUN#     1          MAY 19, 1992  15:38:53

NO RUN PEAKS STORED


*
BREAK

*  RUN #    2      MAY 19, 1992  15:53:19
```



$C_1 - C_6$ @ ~14.5ppm

C_1 - 14.9
C_2 → 14.5
C_3 - 14.2
C_4 - 14.6
C_5 - 14.6
C_6 → 14.5

TIMETABLE STOP

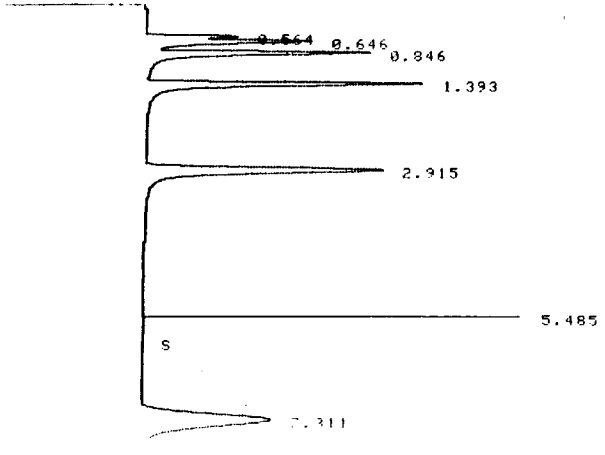
RUN# 2 MAY 19, 1992 15:53:19

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.254	17396	BP	.092	.18763
.561	326801	PV	.057	3.52479
.645	991043	VV	.083	10.68914
.845	1304222	VB	.081	14.06701
1.395	1727321	BB	.086	18.63044
2.926	2203043	PB	.128	23.76146
7.349	2616245	PB	.275	28.21814
9.534	85429	I PH	.426	.92142

TOTAL AREA=9.2715E+06
MUL FACTOR=1.0000E+00

* RUN # 3 MAY 19, 1992 16:04:58
START



1:2 Dilution
C_1-C_6 (see above)

9.327

TIMETABLE STOP

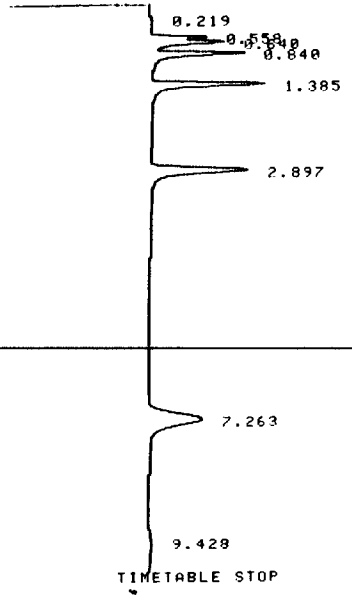
RUN# 3 MAY 19, 1992 16:04:58

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.564	201431	PV	.058	4.09890
.646	515671	VV	.083	10.49333
.846	659920	VB	.080	13.42864
1.393	882046	BB	.086	17.94866
2.915	1129233	PB	.127	22.97863
5.485	130564	SPB	.009	2.65683
7.311	1334938	PB	.273	27.16450
9.327	60471	BV	.354	1.23052

TOTAL AREA=4914275
MUL FACTOR=1.0000E+00

* RUN # 4 MAY 19, 1992 16:18:05
START



1:5 Dilution
C1-C6 (see Run #2)

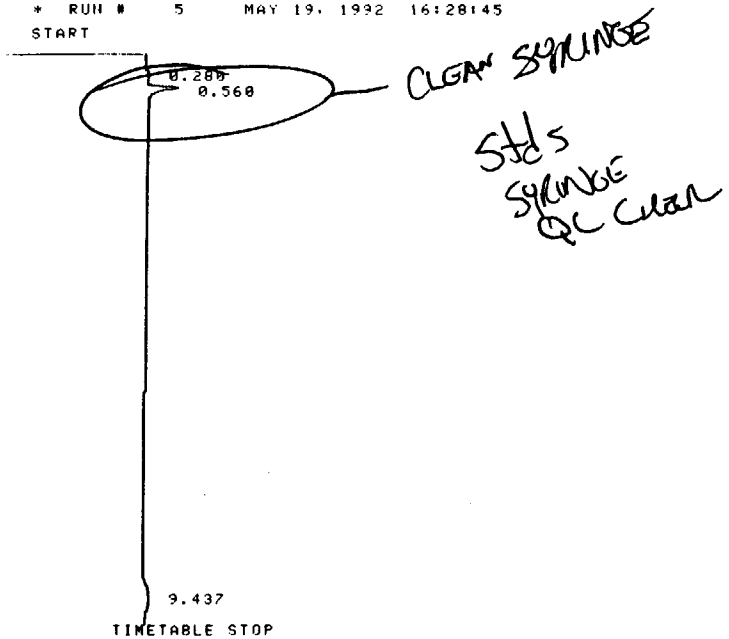
TIMETABLE STOP

RUN# 4 MAY 19, 1992 16:18:05

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.219	12163	PP	.085	.56739
.558	129410	PV	.061	6.03687
.640	229375	VV	.084	10.70016
.840	278550	VB	.080	12.99414
1.385	358978	BB	.085	16.74604
2.897	463005	PB	.127	21.59082
7.263	565021	VB	.278	26.35779
9.428	107157	PH	.494	4.99879

* RUN # 5 MAY 19, 1992 16:28:45
START



CLEAN SYRINGE

Stds
SYRINGE
QC Clean

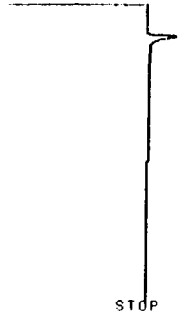
RUN# 5 MAY 19, 1992 16:28:45

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.280	13741	BV	.100	5.24272
.560	114294	VV	.094	43.60754
9.437	134062	I PH	.483	51.14974

TOTAL AREA= 262097
MUL FACTOR=1.0000E+00

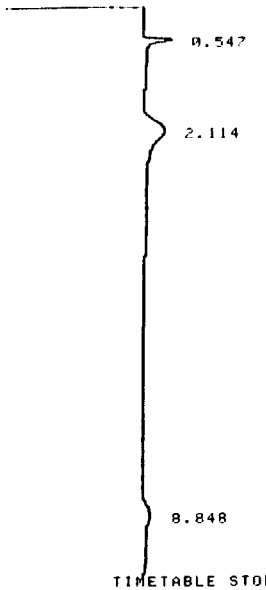
* RUN # 6 MAY 19, 1992 16:52:32
START



.547 93083 FB .085 100.00000

TOTAL AREA= 93083
MUL FACTOR=1.0000E+00

* RUN # 7 MAY 19, 1992 16:58:27
START



TIMETABLE STOP

RUN# 7 MAY 19, 1992 16:58:27

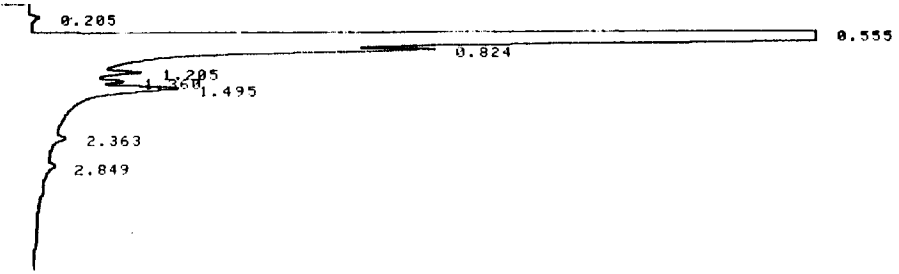
AREA%

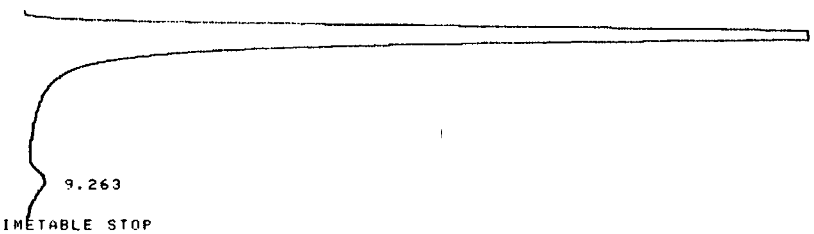
RT	AREA	TYPE	WIDTH	AREA%
.547	94407	PV	.089	14.66025
2.114	408456	BV	.515	63.42819
8.848	141103	VV	.434	21.91156

TOTAL AREA= 643966
MUL FACTOR=1.0000E+00

SPLINE Sample

* RUN # 8 MAY 19, 1992 17:20:38
START





RUN# 8 MAY 19, 1992 17:20:38

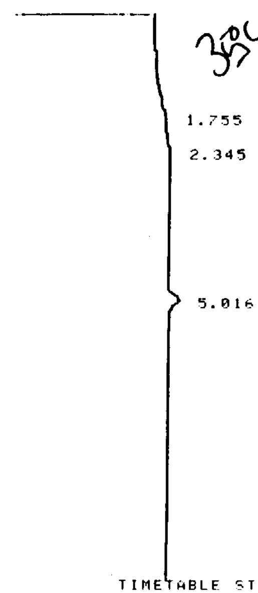
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.205	36612	BH	.087	.07646
.555	34226080	SHB	.103	71.47949
.824	260967	TBB	.057	.54502
1.205	94158	TBP	.064	.19664
1.360	73899	TPV	.065	.15433
1.495	438517	TVB	.129	.91582
2.363	49473	TBB	.101	.10332
2.849	45864	TBB	.127	.09578
6.701	12354720	PB	.341	25.80223
9.263	302117	I BP	.469	.63096

TOTAL AREA=4.7882E+07
MUL FACTOR=1.0000E+00

* RUN # 9 MAY 19, 1992 17:34:25
START

35°C to 100°C
Check for
Late eluting PEAKS

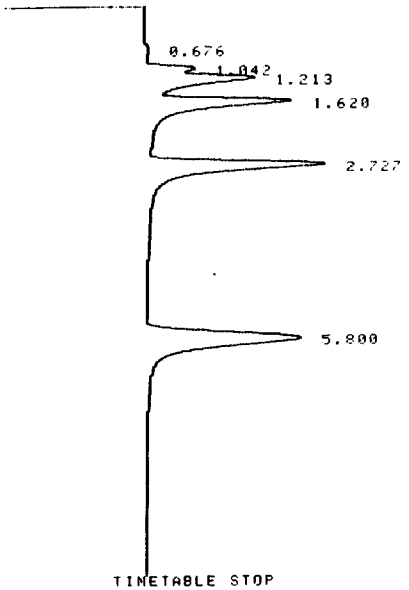


RUN# 9 MAY 19, 1992 17:34:25

2.345	1.4445	VV	.052	46.62334
5.016	119865	PV	.258	29.03334

TOTAL AREA= 412853
MUL FACTOR=1.0000E+00

* RUN # 10 MAY 19, 1992 17:53:31
START



TIMETABLE STOP

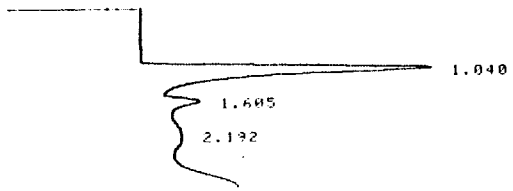
RUN# 10 MAY 19, 1992 17:53:31

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.676	24006	PP	.153	.46097
1.042	218463	PV	.116	4.19496
1.213	786953	VV	.192	15.11119
1.620	1075713	VB	.200	20.65600
2.727	1373853	BB	.210	26.38092
5.800	1728763	PB	.299	33.19595

TOTAL AREA=5207750
MUL FACTOR=1.0000E+00

* RUN # 11 MAY 19, 1992 18:05:02
START



TIMETABLE STOP

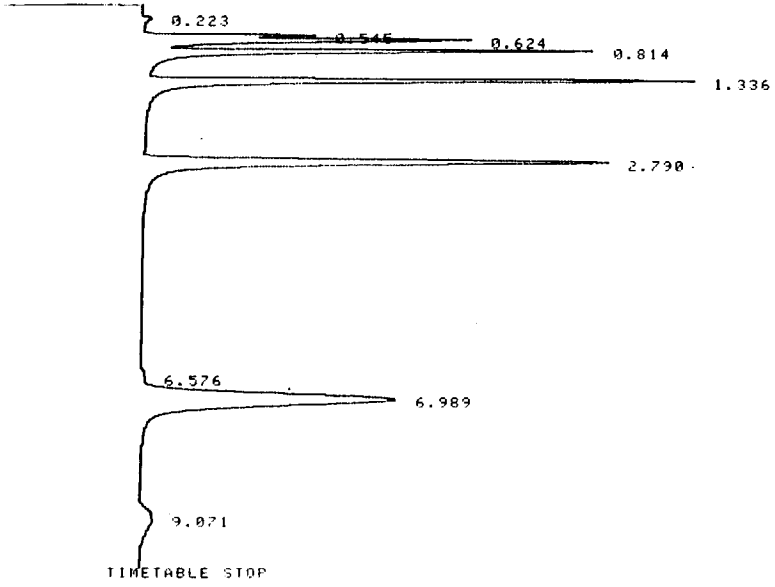
RUN# 11 MAY 19, 1992 18:05:02

AREA%

RT	AREA	TYPE	WIDTH	AREA%
1.040	2205037	PV	.203	34.10090
1.605	510741	VV	.231	7.89861
2.192	927712	VV	.601	14.34707
3.106	2547214	VB	.703	39.39267
7.755	275509	BP	.887	4.26075

TOTAL AREA=6466211
MUL FACTOR=1.0000E+00

* RUN # 12 MAY 19, 1992 18:23:08
START



TIMETABLE STOP

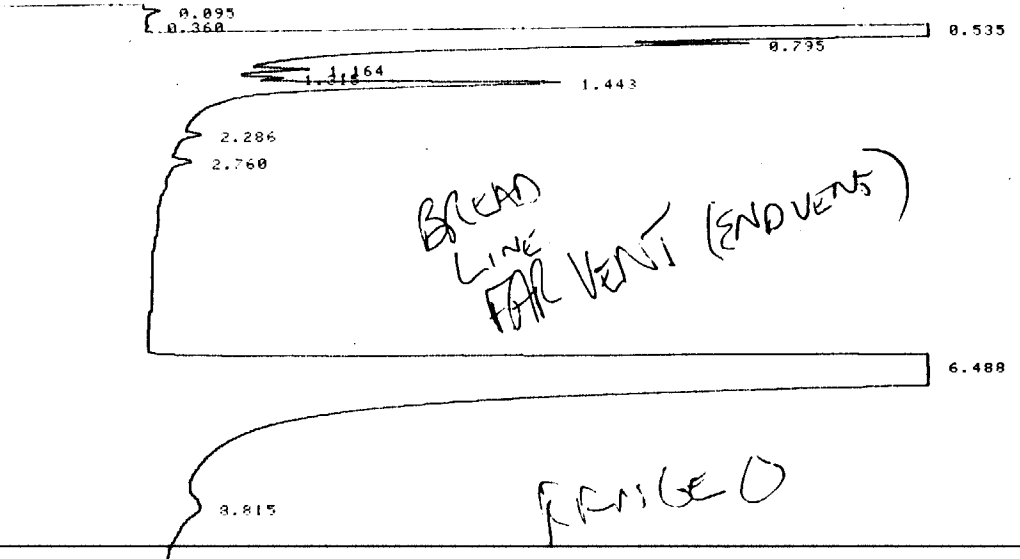
RUN# 12 MAY 19, 1992 18:23:08

AREA%

.624	938572	VV	.0..	10.40.16
.814	1221068	VB	.074	13.53957
1.336	1622418	BB	.080	17.98986
2.790	2076961	PB	.121	23.02996
6.576	45563	BV	.199	.50522
6.989	2495678	VB	.263	27.67282
9.071	243224	BP	.456	2.69694

TOTAL AREA=9.0185E+06
MUL FACTOR=1.0000E+00

* RUN # 13 MAY 19, 1992 18:55:24
START



TIMETABLE STOP

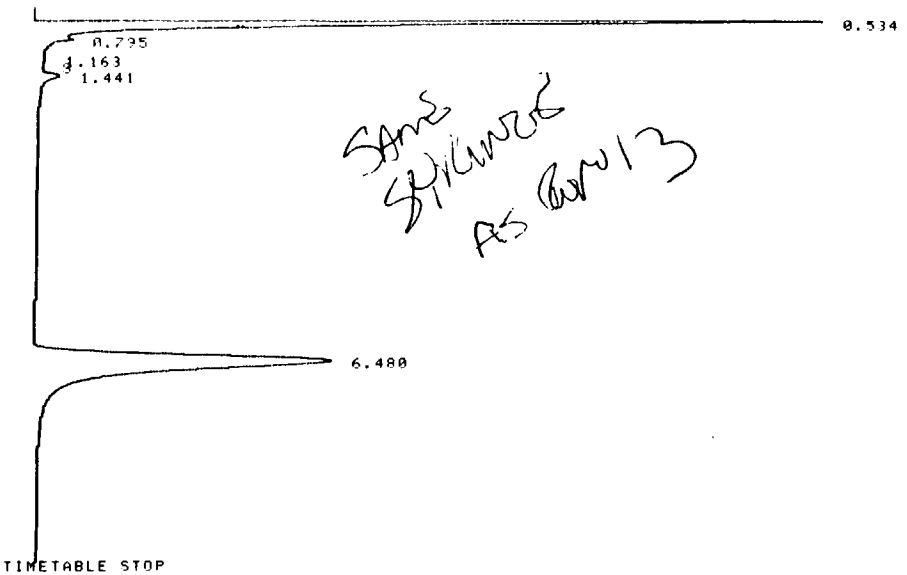
RUN# 13 MAY 19, 1992 18:55:24

AREA%

PT	AREA	TYPE	WIDTH	AREA%
.095	51616	PV	.080	.03906
.360	12979	VH	.065	.00982
.535	49652096	SHB	.100	37.57690
.795	373499	TBB	.055	.28267
1.164	138543	TBP	.061	.10485
1.315	103130	TPV	.059	.07805
1.443	1671107	TVB	.135	1.26470
2.286	69897	TBP	.093	.05290
2.760	95895	TPV	.115	.07257
6.488	79642368	ISBH	.353	60.27365
8.815	323544	TBP	.460	.24486

TOTAL AREA=1.3213E+08
MUL FACTOR=1.0000E+00

RANGE 4



SAME SPECIMEN AS RUN 13

TIMETABLE STOP

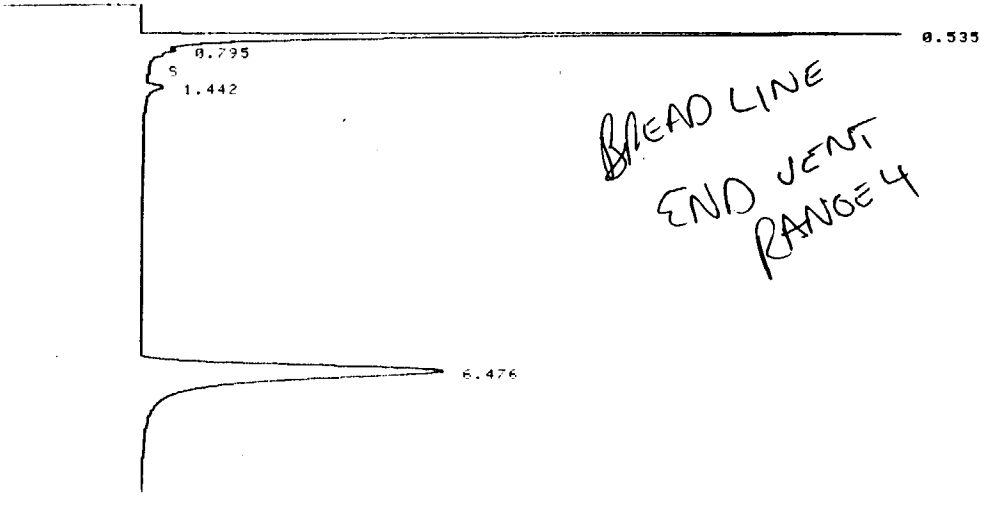
RUN# 14 MAY 19, 1992 19:06:22

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.534	2737234	SBB	.091	42.66494
.795	22670	TBB	.055	.35335
1.441	98461	VB	.136	1.53470
6.480	3557286	PB	.324	55.44702

TOTAL AREA=6415651
MUL FACTOR=1.0000E+00

* RUN # 15 MAY 19, 1992 19:18:00
START



BASELINE
END VENT
RANGE 4

TIMETABLE STOP

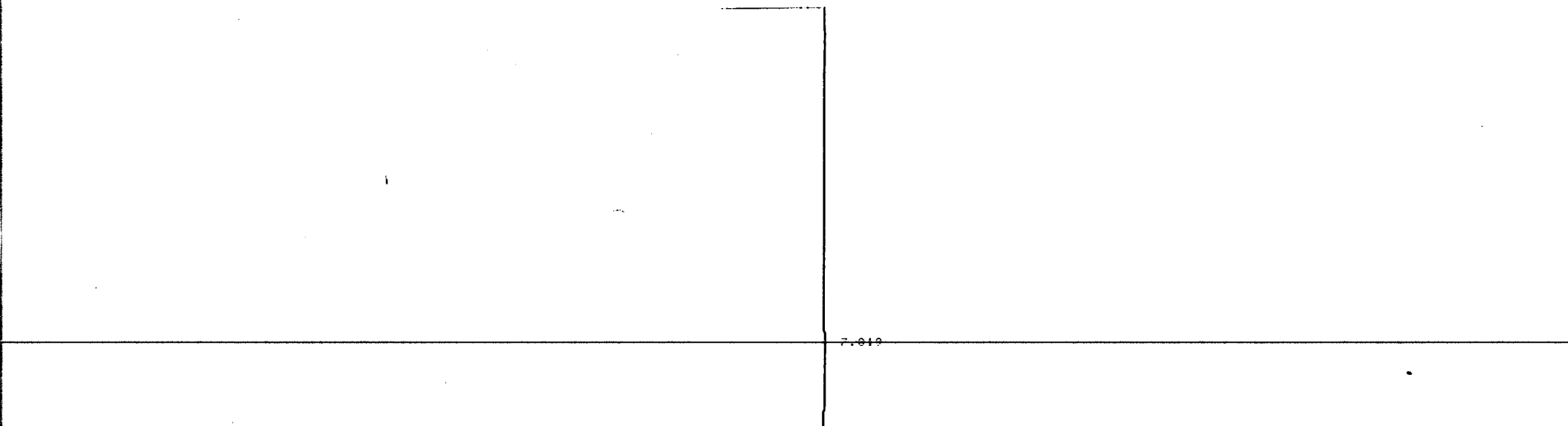
RUN# 15 MAY 19, 1992 19:18:00

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.535	2529653	SPB	.089	40.36101
.795	20626	TBB	.054	.32909
1.442	84730	VB	.132	1.35188
6.476	3632557	PB	.321	57.95800

TOTAL AREA=6267565
MUL FACTOR=1.000AE+00

* RUN # 16 MAY 20, 1992 08:36:39
START



TIMETABLE STOP

RUN# 16 MAY 20, 1992 08:36:39

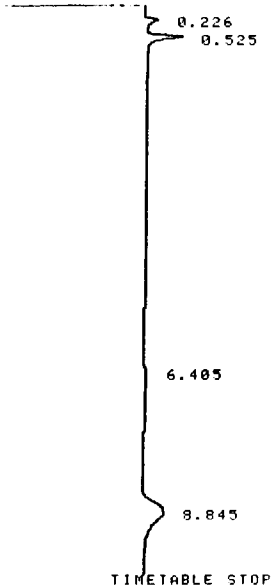
AREA%

RT	AREA	TYPE	WIDTH	AREA%
7.819	66183	PB	.414	100.00000

TOTAL AREA= 66183
MUL FACTOR=1.0000E+00

*

```
* RUN #   17     MAY 20, 1992  08:50:03
START
```



LAB TRAILER AIR

METHOD BLANK 2

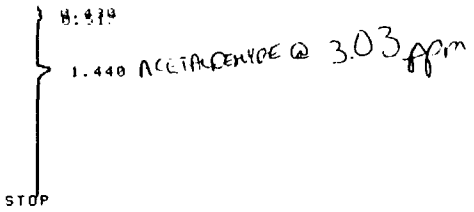
```
RUN#    17          MAY 20, 1992  08:50:03

AREA%
      RT       AREA TYPE  WIDTH      AREA%
    .226      38068   BP    .078    6.57768
    .525     119457   PB    .085   20.64070
   6.405      46400   PV    .358    8.01735
   8.845     374820 I BH    .450   64.76429

TOTAL AREA= 578745
MUL FACTOR=1.0000E+00


* LIST: LIST
PEAK CAPACITY:  1244

ZERO    =  5, 0.048
ATT 2^  =  6
CHT SP  =  1.0
AR REJ  =  10000
THRSH   =  4
PK WD   =  0.10
```



1.440 ACETALDEHYDE @ 3.03 ppm

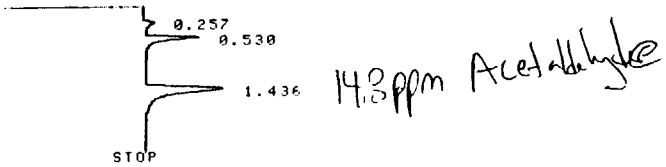
RUN# 18 MAY 20, 1992 09:14:49

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.169	46484	BV	.084	26.78360
.430	14093	VV	.063	8.12024
.517	28584	VV	.104	16.46980
1.440	84393	BB	.149	48.62635

TOTAL AREA= 173554
MUL FACTOR=1.0000E+00

* RUN # 19 MAY 20, 1992 09:31:33
START



14.3 ppm Acetaldehyde

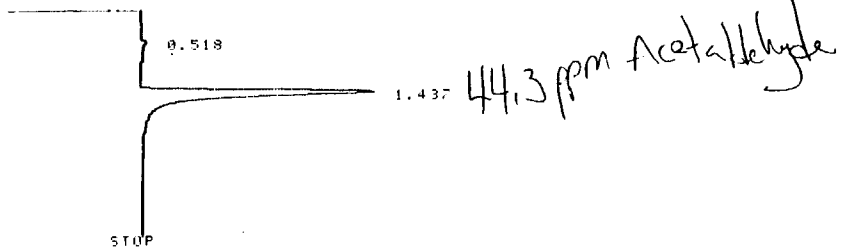
RUN# 19 MAY 20, 1992 09:31:33

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.257	38553	BP	.089	6.14666
.530	161591	PB	.080	25.76310
1.436	427075	BB	.143	68.09027

TOTAL AREA= 627219
MUL FACTOR=1.0000E+00

* RUN # 20 MAY 20, 1992 09:34:36
START



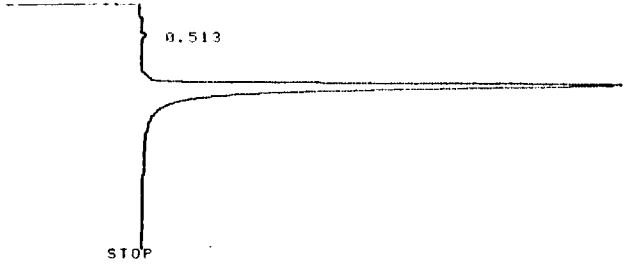
44.3 ppm Acetaldehyde

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.518	23960	PB	.091	1.88363
1.437	1248049	PB	.145	98.11635

TOTAL AREA=1272009
MUL FACTOR=1.0000E+00

* RUN # 21 MAY 20, 1992 09:39:07
START



82.5 ppm ACETALDEHYDE

*

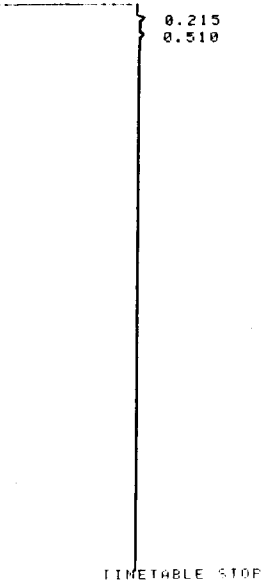
RUN# 21 MAY 20, 1992 09:39:07

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.513	21271	PB	.084	.80906
1.431	2607830	PB	.147	99.19094

TOTAL AREA=2629101
MUL FACTOR=1.0000E+00

* RUN # 22 MAY 20, 1992 09:51:33
START



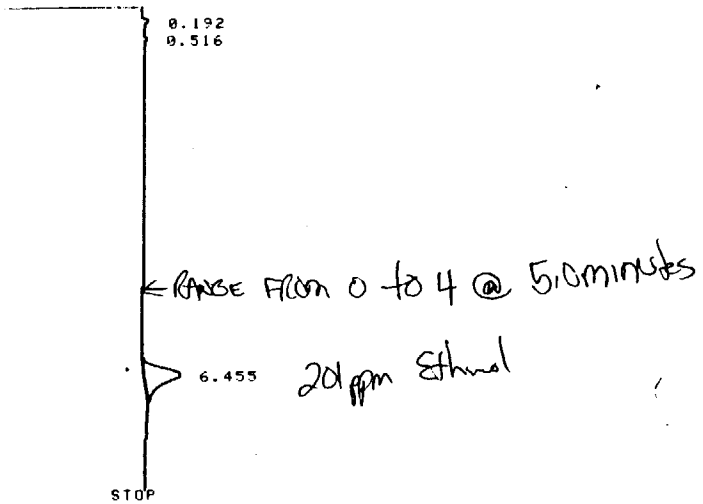
10.2 ppm Ethanol

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.215	26401	BV	.086	52.31030
.510	24069	VB	.036	47.68971

TOTAL AREA= 50470
MUL FACTOR=1.0000E+00

* RUN # 23 MAY 20, 1992 10:03:42
START



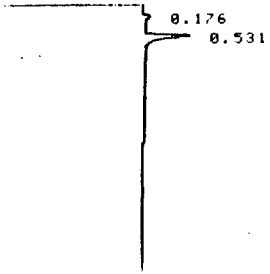
RUN# 23 MAY 20, 1992 10:03:42

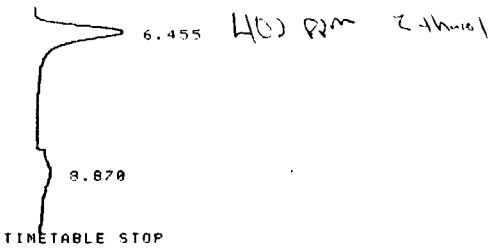
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.192	23429	BV	.082	4.30282
.516	26064	VB	.117	4.78674
6.455	495011	PB	.351	90.91046

TOTAL AREA= 544504
MUL FACTOR=1.0000E+00

* RUN # 24 MAY 20, 1992 10:16:47
START





400 ppm Ethanol

TIMETABLE STOP

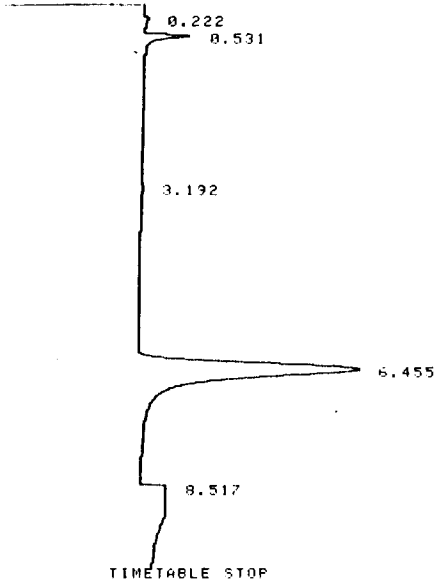
RUN# 24 MAY 20, 1992 10:16:47

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.176	23415	PP	.080	1.35588
.531	143951	PB	.083	8.33568
6.455	1079076	PB	.327	62.48538
8.870	480483	I PH	.811	27.82304

TOTAL AREA=1726925
MUL FACTOR=1.0000E+00

* RUN # 25 MAY 20, 1992 10:27:09
START



1005ppm Ethanol

TIMETABLE STOP

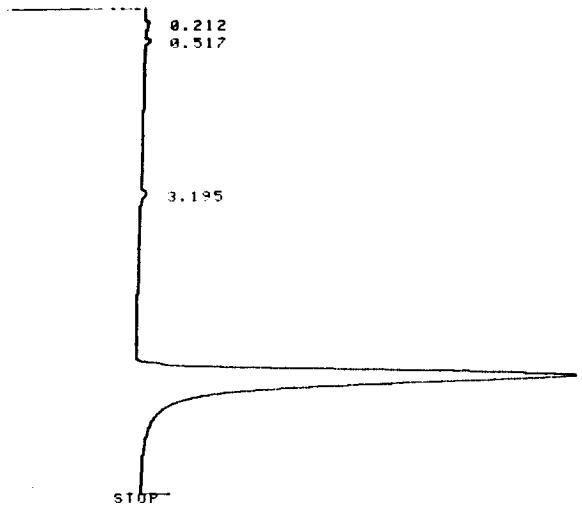
RUN# 25 MAY 20, 1992 10:27:09

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.222	18210	PP	.080	.60421
.531	155769	PB	.087	5.16841
3.192	27253	VB	.157	.90425

MUL FACTOR=1.0000E+00

* RUN # 26 MAY 20, 1992 10:37:51
START



2010 ppm Ethanol

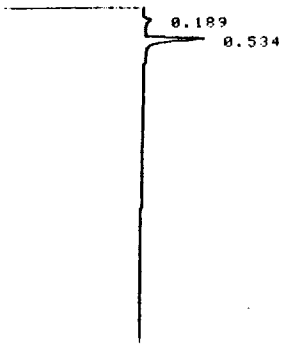
RUN# 26 MAY 20, 1992 10:37:51

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.212	19220	PV	.082	.36061
.517	27728	VV	.097	.52024
3.195	53971	PB	.168	1.01261
6.458	5229973	BB	.221	98.10653

TOTAL AREA=5329891
MUL FACTOR=1.0000E+00

* TIME 8.5-* STOP
* TIME 8.5 STOP
* RUN # 27 MAY 20, 1992 10:52:31
START



TIMETABLE STOP

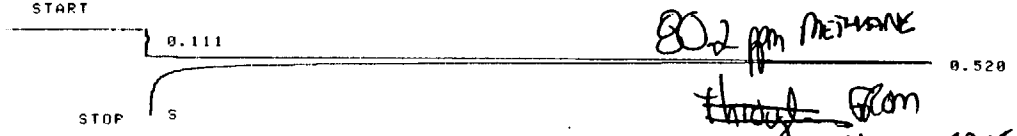
RUN# 27 MAY 20, 1992 10:52:31

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.189	25067	BP	.080	9.27978
.534	190093	PB	.083	70.37222
6.490	54965	BB	.369	20.34799

TOTAL AREA= 270125
MUL FACTOR=1.0000E+00

* RUN # 28 MAY 20, 1992 11:18:49
START



80.2 ppm METHANE through from HEAT TRACE FRONT

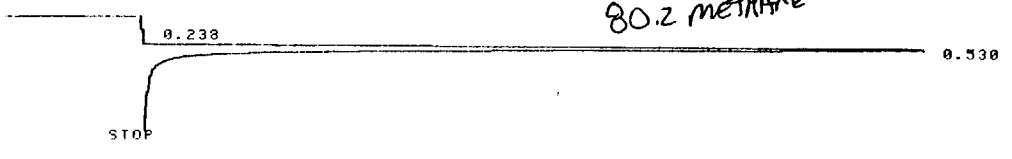
RUN# 28 MAY 20, 1992 11:18:49

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.520	2758661	SBB	.086	100.00000

TOTAL AREA=2758661
MUL FACTOR=1.0000E+00

* RUN # 29 MAY 20, 1992 11:24:10
START



80.2 METHANE

RUN# 29 MAY 20, 1992 11:24:10

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.238	11498	BH	.088	.39566
.530	2894534	ISHH	.092	99.60435

TOTAL AREA=2906032
MUL FACTOR=1.0000E+00

* RUN # 30 MAY 20, 1992 11:33:14

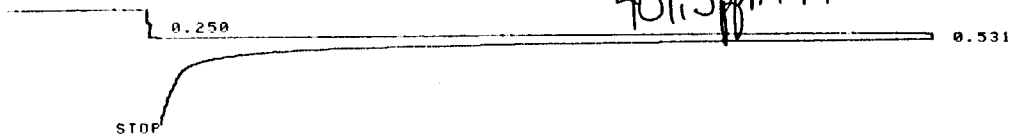
RUN# 30 MAY 20, 1992 11:29:14

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.534	7047280	ISBH	.090	100.00000

TOTAL AREA=7047280
MUL FACTOR=1.0000E+00

* RUN # 31 MAY 20, 1992 11:36:47
START



401.5ppm METHANE

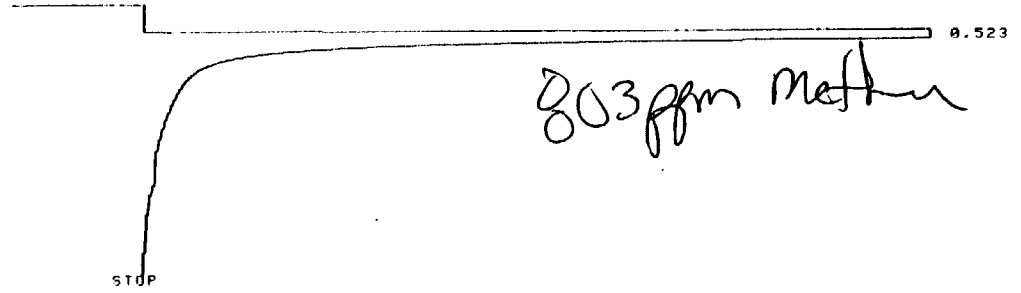
RUN# 31 MAY 20, 1992 11:36:47

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.250	13670	BH	.081	.09641
.531	14165944	ISHH	.090	99.90358

TOTAL AREA=1.4180E+07
MUL FACTOR=1.0000E+00

* RUN # 32 MAY 20, 1992 11:40:12
START



803ppm Methane

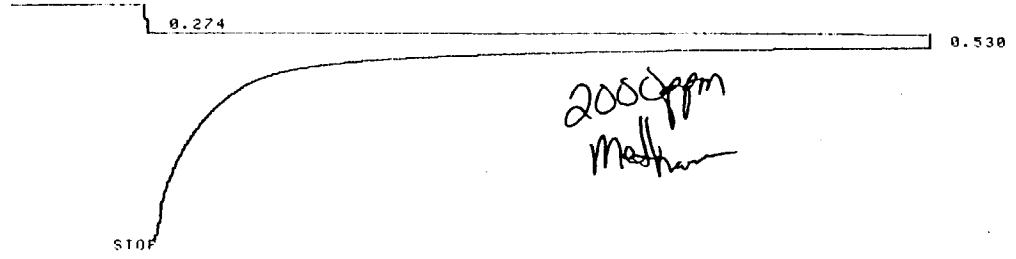
RUN# 32 MAY 20, 1992 11:40:12

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.523	28593968	ISFF	.092	100.00000

TOTAL AREA=2.8594E+07

* RUN # 33 MAY 20, 1992 11:45:21
START



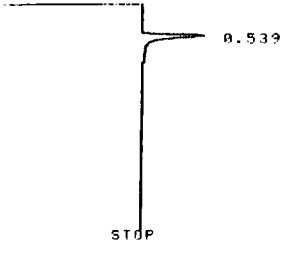
RUN# 33 MAY 20, 1992 11:45:21

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	62156768	VSPB	.120	100.00000

TOTAL AREA=6.2157E+07
MUL FACTOR=1.0000E+00

* RUN # 34 MAY 20, 1992 11:51:13
START



LAB AIR CHECK

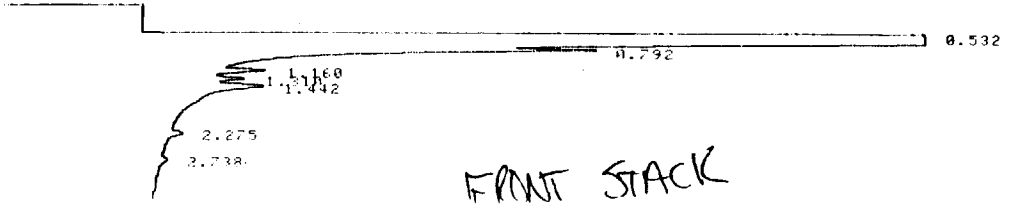
RUN# 34 MAY 20, 1992 11:51:13

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.539	187400	BB	.081	100.00000

TOTAL AREA= 187400
MUL FACTOR=1.0000E+00

* RUN # 35 MAY 20, 1992 11:56:05
START



FRONT STACK

Full man Oven

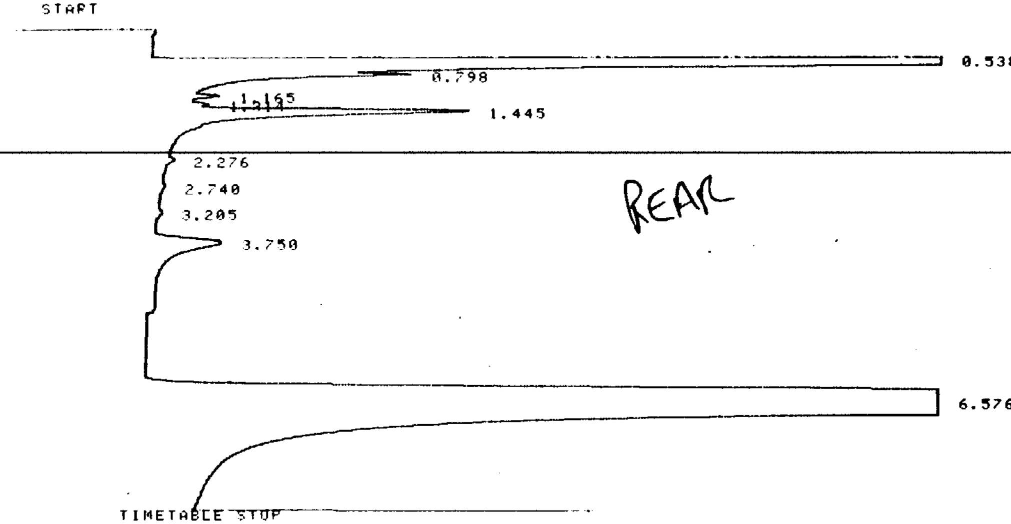
RUN# 35 MAY 20, 1992 11:56:05

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.532	37867296	SBB	.099	96.33507
.792	288504	TBB	.056	.73396
1.160	105997	TBP	.063	.26966
1.310	82966	TPV	.064	.21107
1.442	318535	TVB	.143	.81036
2.275	51335	TBP	.092	.13060
2.738	33204	TPB	.111	.08447
6.485	560088	PB	.324	1.42487

TOTAL AREA=3.9308E+07
MUL FACTOR=1.0000E+00

* RUN # 36 MAY 20, 1992 12:05:00
START



REAR

RUN# 36 MAY 20, 1992 12:05:00

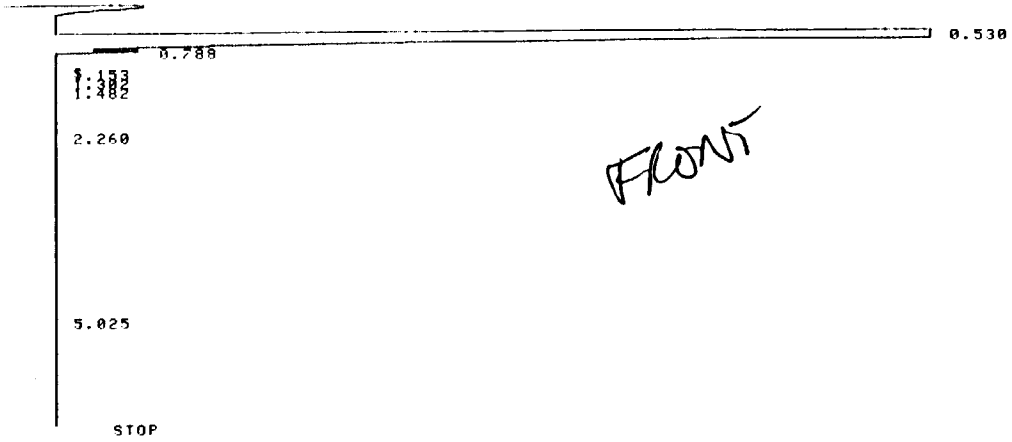
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.538	20035504	SPB	.098	33.69219
.798	167771	TBB	.053	.28213

2.740	17368	TBB	.033	.02921
3.205	33993	BP	.140	.05716
3.750	816241	PV	.310	1.37261
6.576	36734624	PB	.326	61.77381

TOTAL AREA=5.9466E+07
MUL FACTOR=1.0000E+00

* RUN # 37 MAY 20, 1992 12:14:10
START



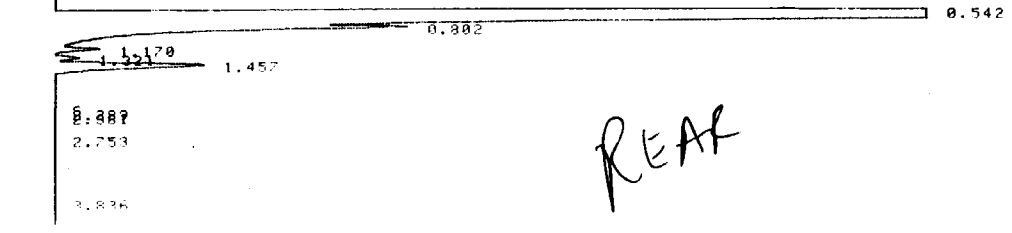
RUN# 37 MAY 20, 1992 12:14:10

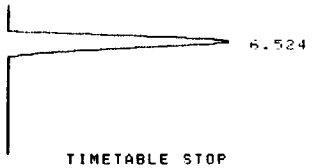
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	22912544	SBB	.088	93.97072
.788	186823	TBB	.055	.76621
1.153	65248	BP	.060	.26760
1.302	55704	PP	.064	.22846
1.482	198331	PB	.113	.81341
2.260	329848	BV	.689	1.35280
5.025	634146	PB	.349	2.60081

TOTAL AREA=2.4383E+07
MUL FACTOR=1.0000E+00

* RUN # 38 MAY 20, 1992 12:22:20
START





TIMETABLE STOP

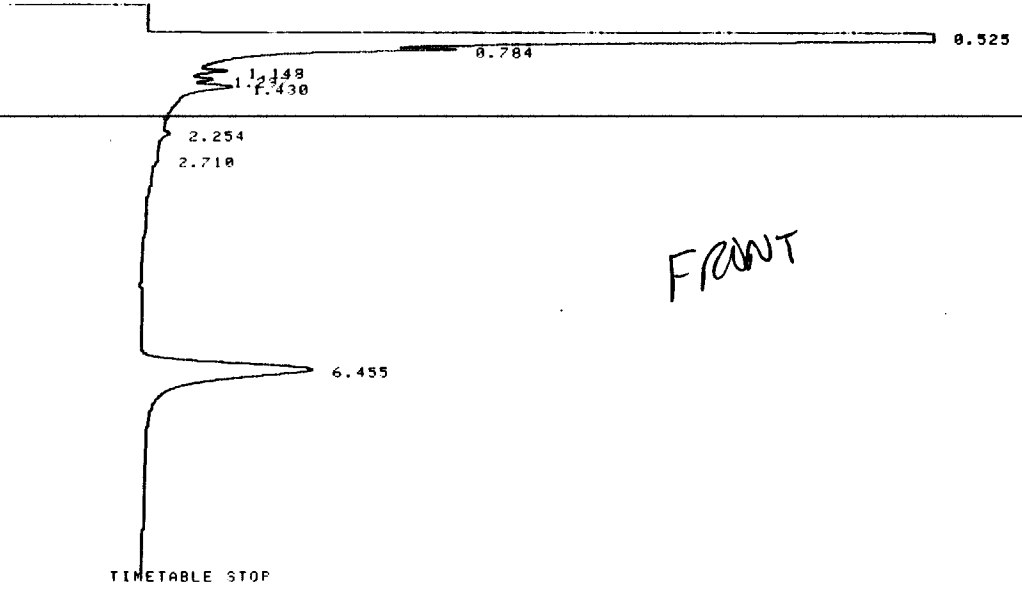
RUN# 38 MAY 20, 1992 12:22:20

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.542	31826880	SBB	.096	84.91270
.802	255796	TBB	.054	.68245
1.170	94048	TBP	.061	.25092
1.321	72431	TPV	.061	.19324
1.457	822315	TVB	.134	2.19390
2.289	37075	BV	.070	.09891
2.361	57550	VP	.064	.15354
2.753	35744	PP	.116	.09536
3.836	268588	VP	.523	.71658
6.524	4011462	PB	.370	10.70240

TOTAL AREA=3.7482E+07
MUL FACTOR=1.0000E+00

* TIME 10 STOP
* RUN # 39 MAY 20, 1992 12:33:40
START



FRONT

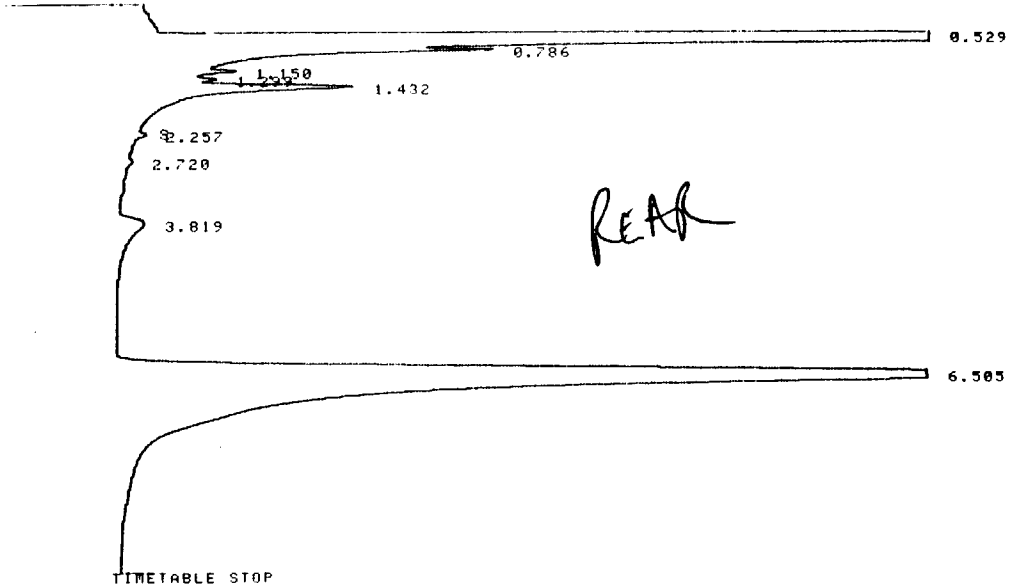
TIMETABLE STOP

RUN# 39 MAY 20, 1992 12:33:40

1.148	68952	TBP	.061	.24698
1.297	54097	TPV	.063	.19377
1.430	209270	TVB	.119	.74958
2.254	34631	TBV	.093	.12404
2.710	19461	TPB	.103	.06971
6.455	2268782	PB	.357	8.12655

TOTAL AREA=2.7918E+07
MUL FACTOR=1.0000E+00

* RUN # 40 MAY 20, 1992 12:44:55
START



TIMETABLE STOP

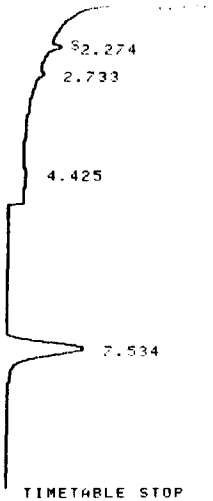
RUN# 40 MAY 20, 1992 12:44:55

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.529	25925328	SBB	.098	60.42227
.786	210732	TBB	.054	.49114
1.150	75609	TBP	.060	.17622
1.299	55907	TPV	.059	.13030
1.432	871377	TVB	.138	2.03085
2.257	25894	BP	.070	.06035
2.720	25307	PP	.111	.05898
3.819	457227	PP	.435	1.06563
6.505	15259536	PB	.430	35.56429

TOTAL AREA=4.2907E+07
MUL FACTOR=1.0000E+00

* RUN # 41 MAY 20, 1992 12:55:40
START



FRONT

TIMETABLE STOP

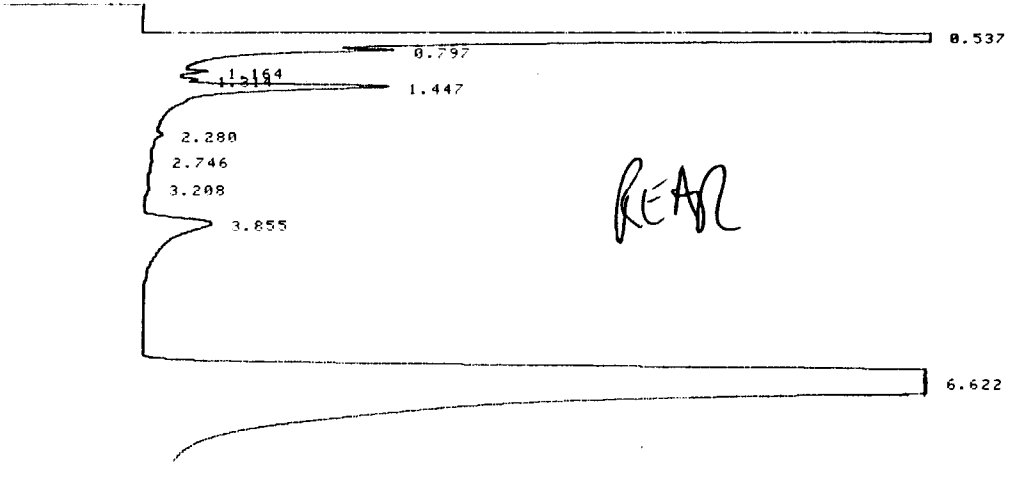
RUN# 41 MAY 20, 1992 12:55:40

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.543	31831392	SBB	.095	95.25357
.801	270384	TBB	.056	.80911
1.166	96788	TBV	.063	.28963
1.315	77444	TVP	.065	.23175
1.490	152070	TPB	.082	.45506
2.274	44113	BP	.090	.13201
4.425	123600	VV	.389	.36987
7.534	821744	PB	.280	2.45902

TOTAL AREA=3.3418E+07
NUL FACTOR=1.0000E+00

* RUN # 42 MAY 20, 1992 13:06:25
START



REAR

TIMETABLE STOP

RUN# 42 MAY 20, 1992 13:06:25

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.537	19442544	SPB	.097	32.30826
.797	160703	TBB	.053	.26704
1.164	57420	TBP	.059	.09542
1.314	43497	TPV	.058	.07228
1.447	1181400	TVP	.148	1.96317
2.280	28164	TPB	.093	.04680
2.746	23617	BV	.131	.03925
3.208	27781	VP	.145	.04616
3.855	1111484	PB	.417	1.84699
6.622	38101664	PB	.379	63.31467

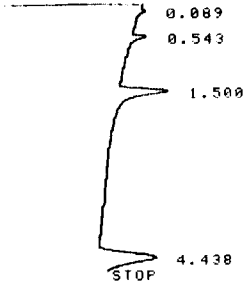
TOTAL AREA=6.0178E+07
MUL FACTOR=1.0000E+00

* RUN # 43 MAY 20, 1992 13:19:15
START
STOP

RUN# 43 MAY 20, 1992 13:19:15

NO RUN PEAKS STORED

* RUN # 44 MAY 20, 1992 13:19:24
START; not ready



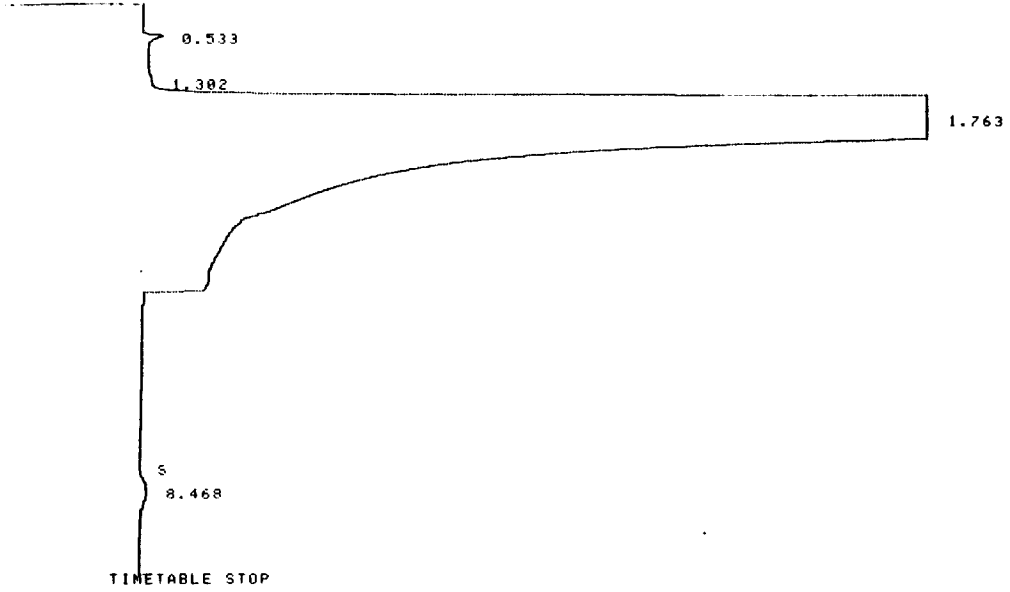
RUN# 44 MAY 20, 1992 13:19:24

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.543	62053	PB	.093	7.28753
1.500	301861	BB	.158	35.45067
4.438	487582	I PH	.221	57.26181

TOTAL AREA= 851496

```
 *  RUN #    45      MAY 20, 1992  13:25:00
START
```



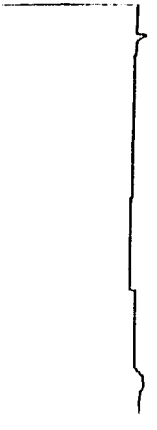

```
TIMETABLE STOP
```

```
RUN#     45          MAY 20, 1992  13:25:00

AREA%
      RT       AREA TYPE  WIDTH      AREA%
    .533      88369   BV   .117      .03942
   1.302     143135   VH   .370      .06384
   1.763  223781360 >SHB   .431    99.81584
   8.468     181461   BB   .510      .08094

TOTAL AREA=2.2419E+08
MUL FACTOR=1.0000E+00

 *  RUN #    46      MAY 20, 1992  13:42:25
START
```



QC CHECK

TEXCAR /

TIMETABLE STOP

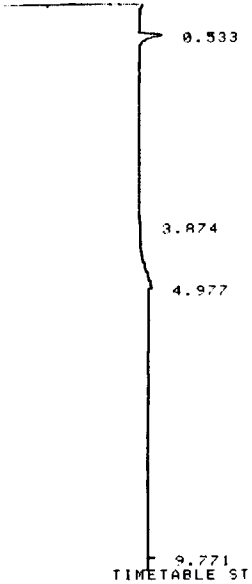
RUN# 46 MAY 20, 1992 13:42:25

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.531	35656	BB	.081	8.57181
6.590	380312	PB	.974	91.42819

TOTAL AREA= 415968
MUL FACTOR=1.0000E+00

* RUN # 47 MAY 20, 1992 13:55:22
START



REAR VENT QC CHECK
N_2 BLANK – HEAT TRACE

TIMETABLE STOP

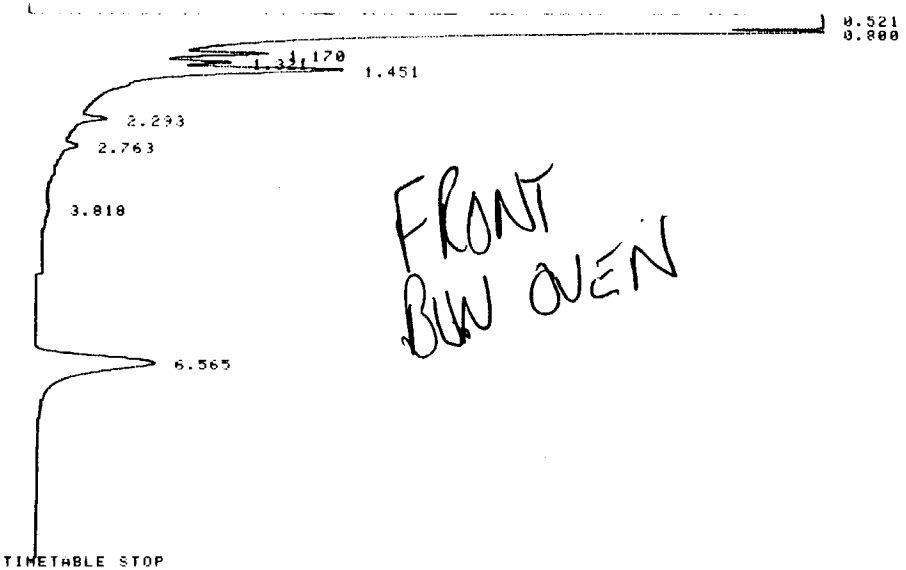
RUN# 47 MAY 20, 1992 13:55:22

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.533	83510	PB	.094	42.48206
3.874	22532	PV	.237	11.46218
4.977	90535	VB	.340	46.05574

TOTAL AREA= 196577
MUL FACTOR=1.0000E+00

*TIME14:25:45
MAY 20, 1992 14:25:45



FRONT BLW OVEN

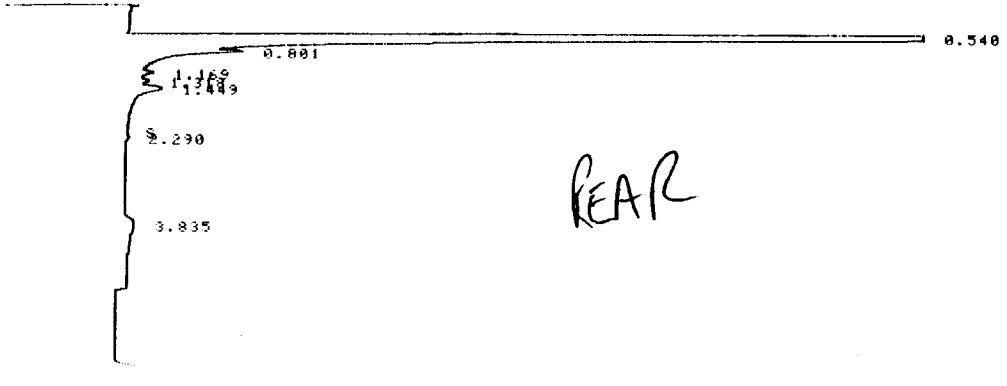
RUN# 48 MAY 20, 1992 14:29:53

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.521	66649568	SBB	.128	94.93523
.800	565125	TBB	.056	.80496
1.170	206263	TBP	.063	.29380
1.321	158997	TPV	.062	.22647
1.451	865703	TVB	.121	1.23310
2.293	105499	TBP	.095	.15027
2.763	63551	TPP	.108	.09052
3.818	68217	TBP	.269	.09788
6.565	1521942	PB	.342	2.16784

TOTAL AREA=7.0205E+07
MUL FACTOR=1.0000E+00

* RUN # 49 MAY 20, 1992 14:41:17
START



REAR

TIMETABLE STOP

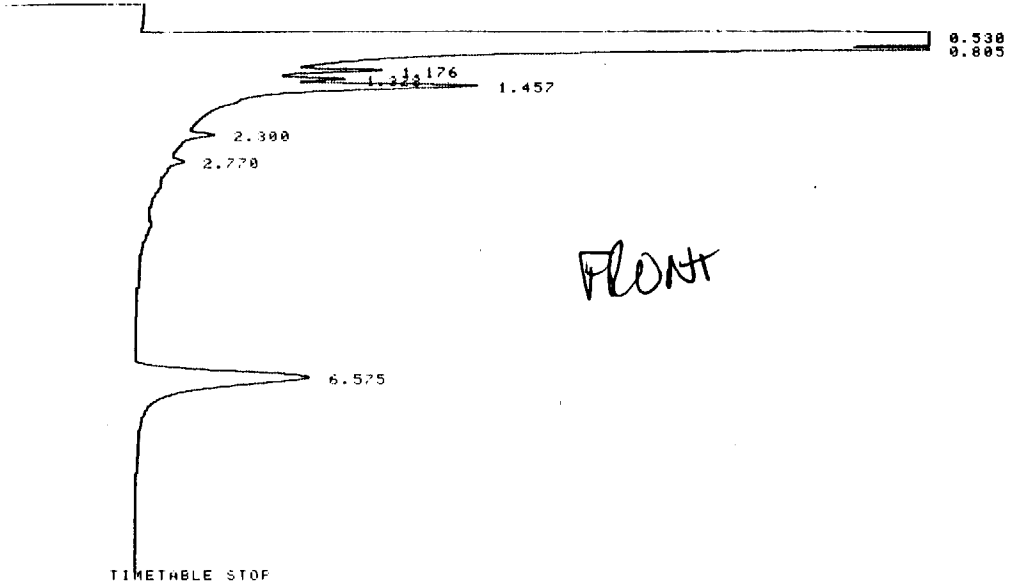
RUN# 49 MAY 20, 1992 14:41:17

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.540	9385850	SBB	.094	78.06589
.801	83697	TBB	.056	.69614
1.169	30115	TBV	.062	.25048
1.318	28253	TVV	.068	.23499
1.449	121489	TVB	.123	1.01047
2.290	17842	BP	.104	.14840
3.835	591337	VB	.953	4.91839
6.544	1764409	PB	.340	14.67530

TOTAL AREA=1.2023E+07
MUL FACTOR=1.0000E+00

* RUN # 50 MAY 20, 1992 14:51:48
START



FRONT

TIMETABLE STOP

RUN# 50 MAY 20, 1992 14:51:48

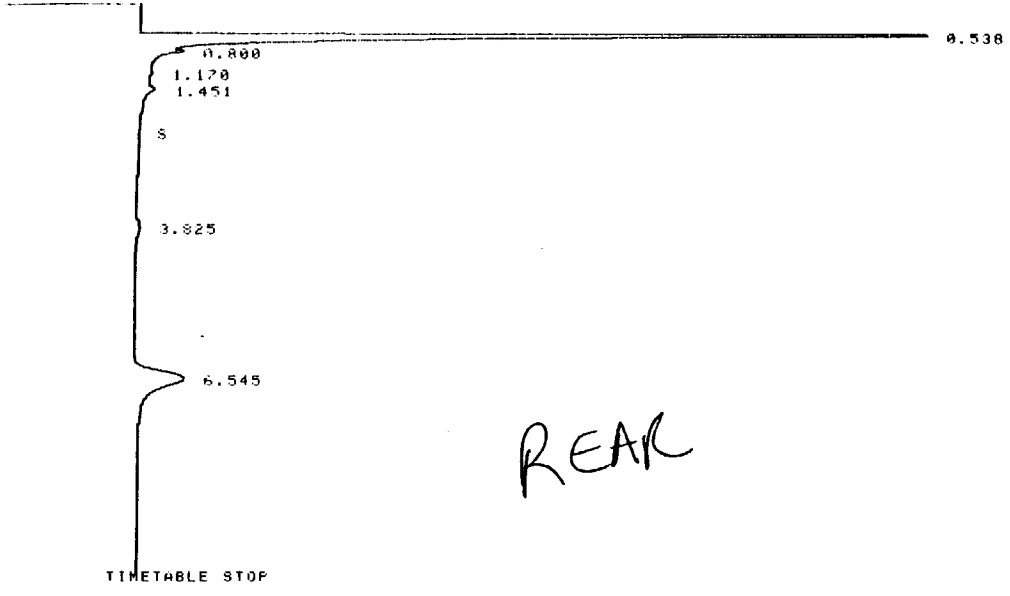
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	65195008	SBB	.125	93.78125
.805	551897	TBB	.056	.79389
1.176	212248	TBP	.063	.30531

6.575	234255?	PB	.343	3.22585

TOTAL AREA=6.9518E+07
MUL FACTOR=1.0000E+00

* RUN # 51 MAY 20, 1992 15:02:18
START



REAR

TIMETABLE STOP

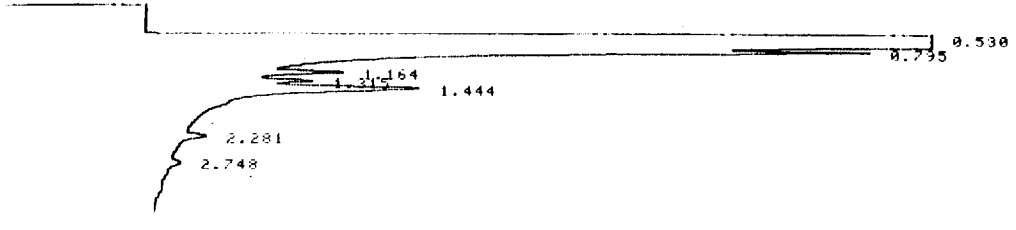
RUN# 51 MAY 20, 1992 15:02:18

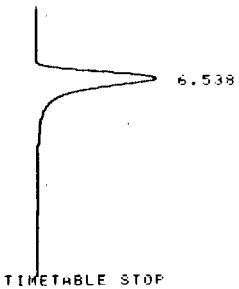
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.538	3555294	SBB	.098	81.82941
.800	31500	TBB	.056	.72501
1.170	13422	TBV	.068	.30892
1.451	48406	TVB	.121	1.11412
3.825	75481	BP	.295	1.73729
6.545	620661	PB	.343	14.28526

TOTAL AREA=4344765
MUL FACTOR=1.0000E+00

* RUN # 52 MAY 20, 1992 15:12:43
START





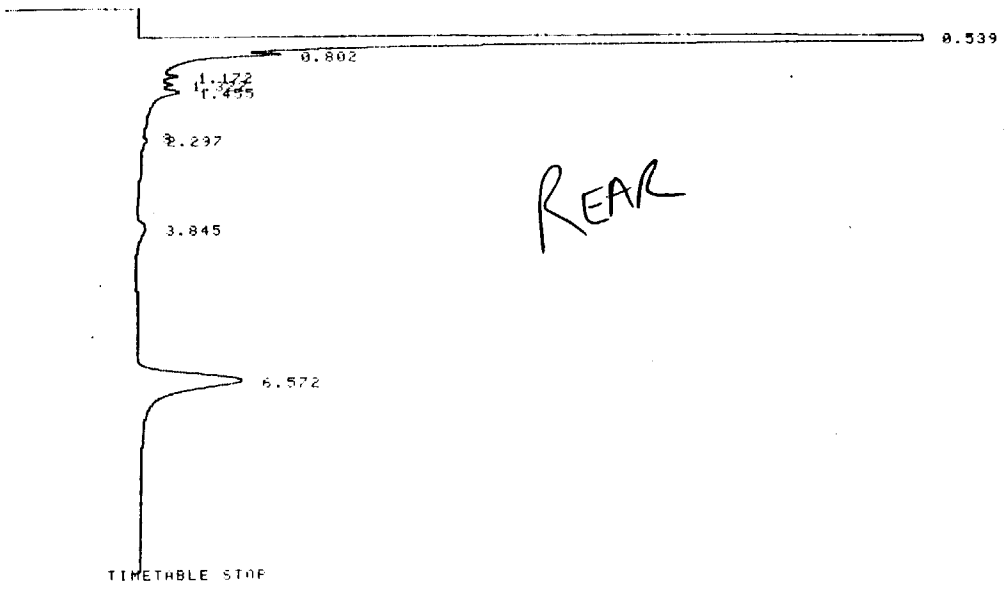
RUN# 52 MAY 20, 1992 15:12:43

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	57844256	VSPB	.111	94.62323
.795	449420	TBB	.055	.73517
1.164	173284	TBP	.063	.28346
1.315	133152	TPV	.062	.21781
1.444	782084	TVB	.120	1.27935
2.281	92596	TBP	.101	.15147
2.748	48449	TVB	.102	.07925
3.809	58031	TPB	.264	.09493
6.538	1549899	PB	.341	2.53537

TOTAL AREA=6.1131E+07
MUL FACTOR=1.0000E+00

* RUN # 53 MAY 20, 1992 15:23:13
START



REAR

.539	11267840	SPB	.096	84.83645
.802	98937	TBB	.056	.74490
1.172	38131	TBV	.064	.28709
1.322	35805	TVV	.071	.26958
1.455	112015	TVB	.122	.84337
2.297	19542	BP	.095	.14713
3.845	133967	PV	.308	1.00865
6.572	1575607	PB	.397	11.86287

TOTAL AREA=1.3282E+07
MUL FACTOR=1.0000E+00

* RUN # 54 MAY 20, 1992 15:36:33
START

0.536

6.579

METHOD BLANK
TECHNICAL BHB/N2

TIMETABLE STOP

RUN# 54 MAY 20, 1992 15:36:33

AREA%

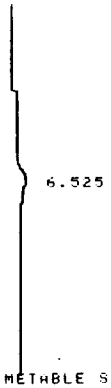
RT	AREA	TYPE	WIDTH	AREA%
.536	43738	BB	.097	39.60090
6.579	66709	PB	.364	60.39910

TOTAL AREA= 110447
MUL FACTOR=1.0000E+00

* RUN # 55 MAY 20, 1992 15:52:05
START

0.087

0.525



TIMETABLE STOP

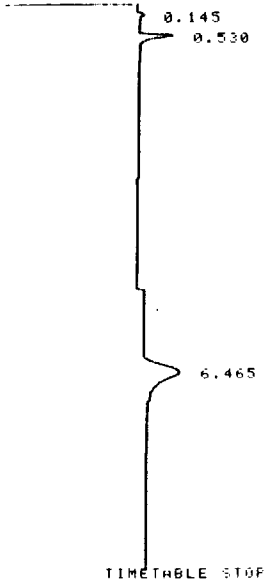
RUN# 55 MAY 20, 1992 15:52:05

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.087	26643	BV	.081	3.94383
.525	15763	PV	.084	2.33332
6.525	633156	PB	1.404	93.72288

TOTAL AREA= 675562
MUL FACTOR=1.0000E+00

* RUN # 56 MAY 20, 1992 16:03:58
START



TIMETABLE STOP

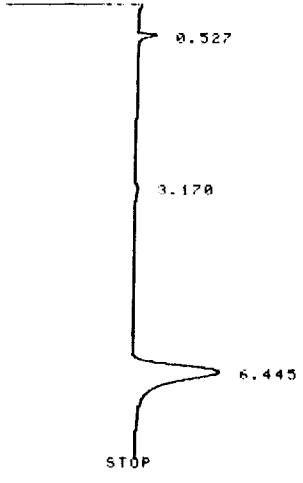
RUN# 56 MAY 20, 1992 16:03:58

AREA%

6.465 446351 PB .338 [illegible]

TOTAL AREA= 573883
MUL FACTOR=1.0000E+00

* RUN # 57 MAY 20, 1992 16:14:14
START



RUN# 57 MAY 20, 1992 16:14:14

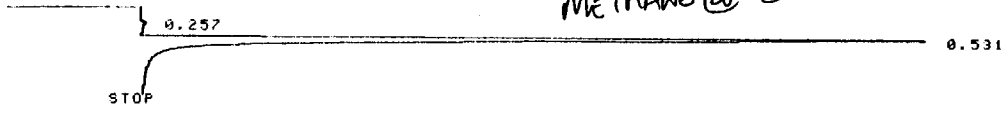
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.527	66700	PV	.084	5.53802
3.170	26220	PV	.147	2.17702
6.445	1111481	PB	.343	92.28496

TOTAL AREA=1204401
MUL FACTOR=1.0000E+00

* RUN # 58 MAY 20, 1992 16:25:24
START

METHANE @ 80.2

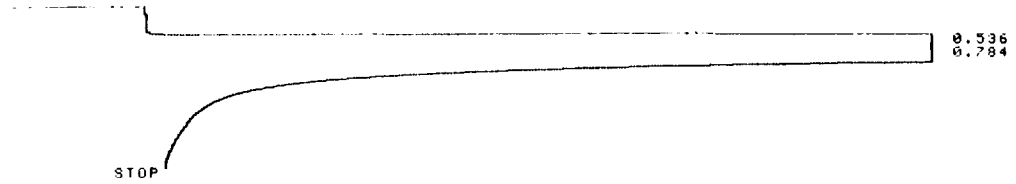


RUN# 58 MAY 20, 1992 16:25:24

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.257	18012	BP	.081	.68984
.531	2593010	ISPH	.087	99.31014

TOTAL AREA=2611022
MUL FACTOR=1.0000E+00



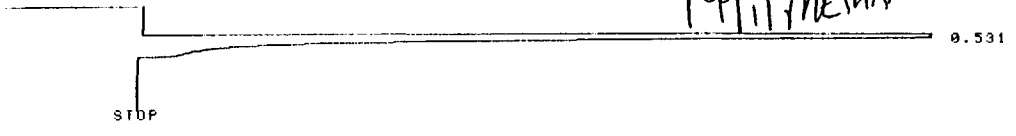
RUN# 59 MAY 20, 1992 16:31:04

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.536	23345168	ISPH	.304	63.68603
.784	13311488	TBB	.243	36.31398

TOTAL AREA=3.6657E+07
MUL FACTOR=1.0000E+00

* RUN # 60 MAY 20, 1992 16:35:12
START; not ready



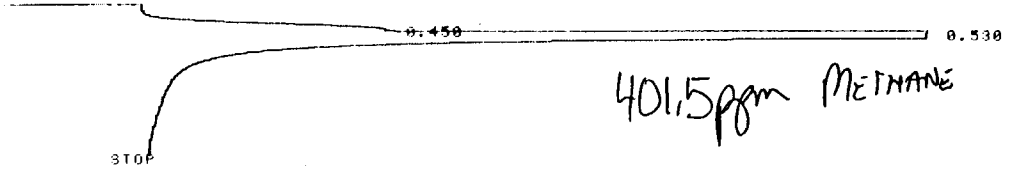
RUN# 60 MAY 20, 1992 16:35:12

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.531	6047533	SPB	.083	100.00000

TOTAL AREA=6047533
MUL FACTOR=1.0000E+00

* RUN # 61 MAY 20, 1992 16:41:11
START

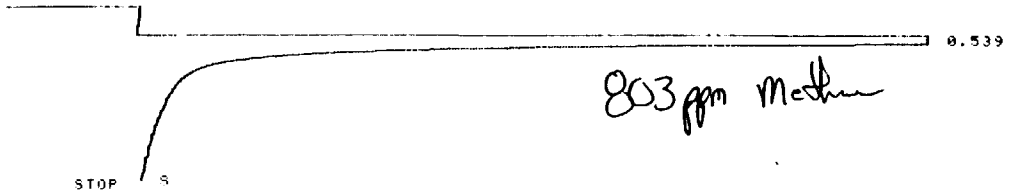


RUN# 61 MAY 20, 1992 16:41:11

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.450	1391958	PH	.153	8.11723
.530	15756248	ISHH	.100	91.88278

* RUN # 62 MAY 20, 1992 16:44:14
START



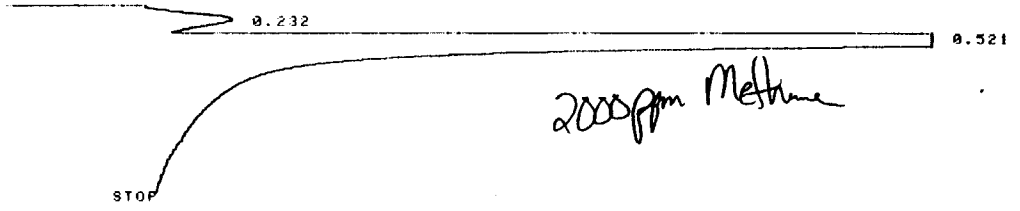
RUN# 62 MAY 20, 1992 16:44:14

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.539	26546784	SPB	.090	100.00000

TOTAL AREA=2.6547E+07
MUL FACTOR=1.0000E+00

* RUN # 63 MAY 20, 1992 16:50:26
START



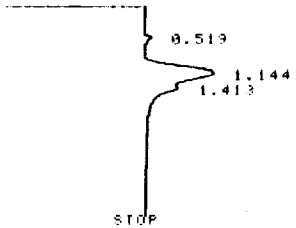
RUN# 63 MAY 20, 1992 16:50:26

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.232	841812	BH	.269	1.38513
.521	59933248	>SHH	.115	98.61491

TOTAL AREA=6.0775E+07
MUL FACTOR=1.0000E+00

* RUN # 64 MAY 20, 1992 16:55:39
START

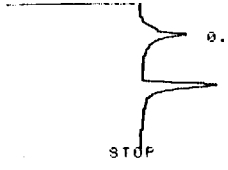


AREA%

RT	AREA	TYPE	WIDTH	AREA%
.519	26730	BV	.087	2.43033
1.144	773590	VV	.292	70.33587
1.413	299531	VV	.230	27.23378

TOTAL AREA=1099851
MUL FACTOR=1.0000E+00

* RUN # 65 MAY 20, 1992 17:01:37
START



14.8 ppm ACETALDEHYDE

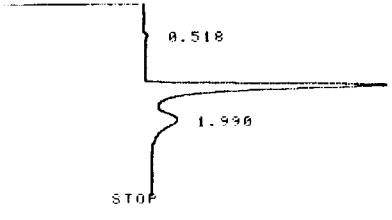
RUN# 65 MAY 20, 1992 17:01:37

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.525	355285	BB	.201	48.01142
1.425	384716	BB	.134	51.98859

TOTAL AREA= 740001
MUL FACTOR=1.0000E+00

* RUN # 66 MAY 20, 1992 17:06:03
START



44.3 ppm ACETALDEHYDE

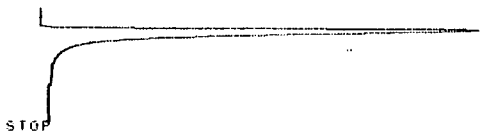
RUN# 66 MAY 20, 1992 17:06:03

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.518	19102	PP	.095	1.09284
1.425	1275250	PV	.140	72.95782
1.990	453576	VV	.380	25.94936

TOTAL AREA=1747928
MUL FACTOR=1.0000E+00

* RUN # 67 MAY 20, 1992 17:13:30



82.5ppm

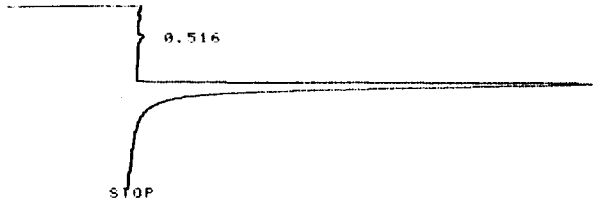
RUN# 67 MAY 20, 1992 17:13:20

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.233	10462	PV	.076	.46789
.518	30831	VB	.093	1.37886
1.416	2194691	PB	.136	98.15325

TOTAL AREA=2235984
MUL FACTOR=1.0000E+00

* RUN # 68 MAY 20, 1992 17:20:36
START



82.5ppm ACETALDEHYDE

RUN# 68 MAY 20, 1992 17:20:36

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.516	33460	PV	.119	1.41798
1.415	2326230	BB	.137	98.58202

TOTAL AREA=2359690
MUL FACTOR=1.0000E+00

* RUN # 69 MAY 20, 1992 17:27:26
START

Razels BASELINE to high
walk @ PEAK straight
Ethanol @ 201ppm

STOP

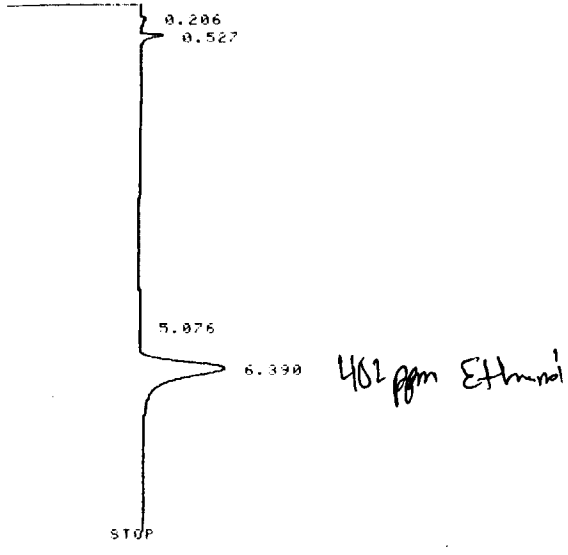
RUN# 69 MAY 20, 1992 17:27:26

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.508	15841	PP	.082	.87350
5.110	427803	PV	.425	23.58975
6.396	1369868	VB	.678	75.53674

TOTAL AREA=1813512
MUL FACTOR=1.0000E+00

* RUN # 70 MAY 20, 1992 17:39:26
START



402 ppm Ethanol

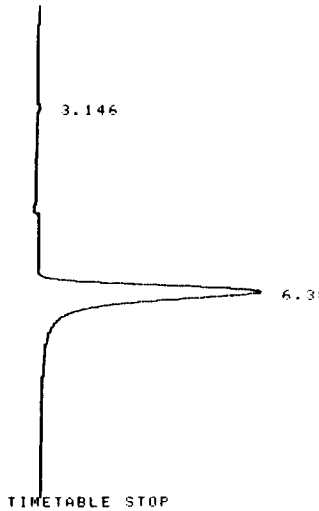
RUN# 70 MAY 20, 1992 17:39:26

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.206	25114	BV	.099	2.05815
.527	75302	PV	.081	6.17117
5.076	53915	PB	.429	4.41845
6.390	1065892	PB	.336	87.35222

TOTAL AREA=1220223
MUL FACTOR=1.0000E+00

* RUN # 71 MAY 20, 1992 17:49:11
START



1005 ppm Ethanol

TIMETABLE STOP

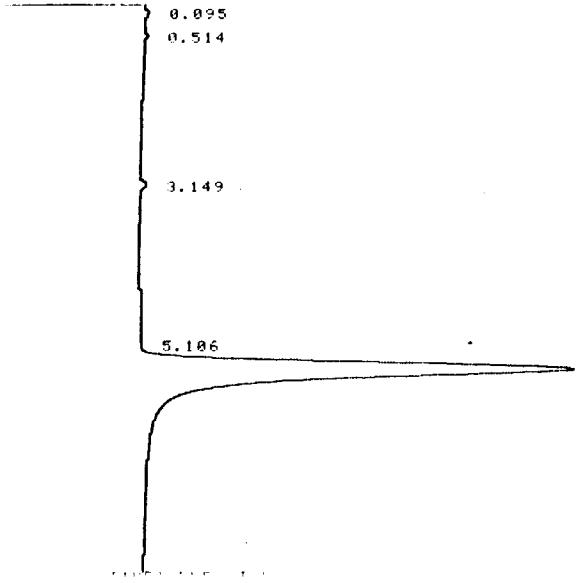
RUN# 71 MAY 20, 1992 17:49:11

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.523	51970	PV	.081	1.75490
3.146	28644	BV	.152	.96724
6.388	2880806	PB	.350	97.27786

TOTAL AREA=2961421
MUL FACTOR=1.0000E+00

* RUN # 72 MAY 20, 1992 18:00:28
START



2010 ppm Ethanol

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.095	14646	BP	.073	.26756
.514	16970	VP	.082	.31002
3.149	51342	BB	.151	.93795
5.106	111652	PB	.517	2.03974
6.395	5279226	PB	.331	96.44474

TOTAL AREA=5473834
MUL FACTOR=1.0000E+00

* RUN # 73 MAY 20, 1992 18:15:29
START

0.155
0.512
6.411

CARBOVERLIN SYRINGE
RERUN ON 5-21-92

TIMETABLE STOP

PUN# 73 MAY 20, 1992 18:15:29

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.155	24855	PV	.081	2.84338
.512	22806	VB	.111	2.60898
6.411	826474	PB	.491	94.54765

TOTAL AREA= 874135
MUL FACTOR=1.0000E+00

* RUN # 74 MAY 20, 1992 18:28:22
START

0.522

TIMETABLE STOP

RUN# 74 MAY 20, 1992 18:28:22

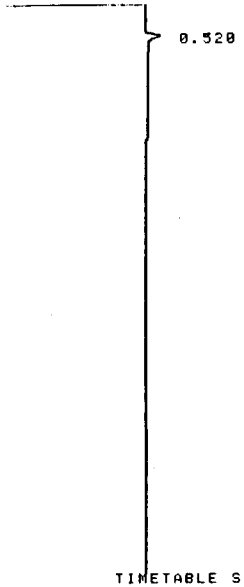
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.522	32897	BB	.082	5.84872
6.409	529568	PB	1.393	94.15126

TOTAL AREA= 562465
MUL FACTOR=1.0000E+00

*

```
*  RUN #   75      MAY 21, 1992  05:37:39
START
```



METHOD BLANK
TEDLAR BAG/N_2

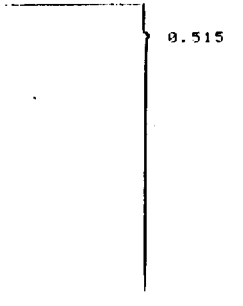
```
TIMETABLE STOP

RUN#    75          MAY 21, 1992  05:37:39

AREA%
      RT      AREA TYPE  WIDTH      AREA%
    .520     46666   PB   .086  100.00000

TOTAL AREA=  46666
MUL FACTOR=1.0000E+00


*  RUN #   76      MAY 21, 1992  05:49:59
START
```



TIMETABLE STOP

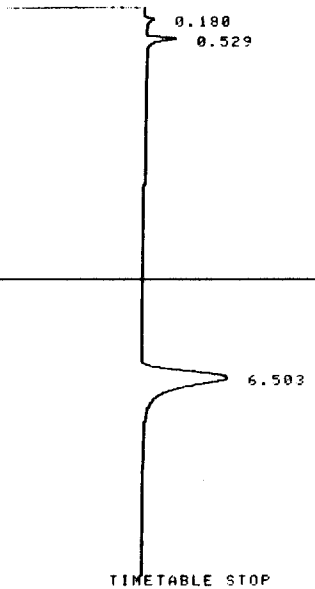
RUN# 76 MAY 21, 1992 05:49:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.515	26338	PB	.125	4.51578
6.530	556906	PB	.358	95.48422

TOTAL AREA= 583244
MUL FACTOR=1.0000E+00

* RUN # 77 MAY 21, 1992 06:04:03
START


0.180
0.529
6.503

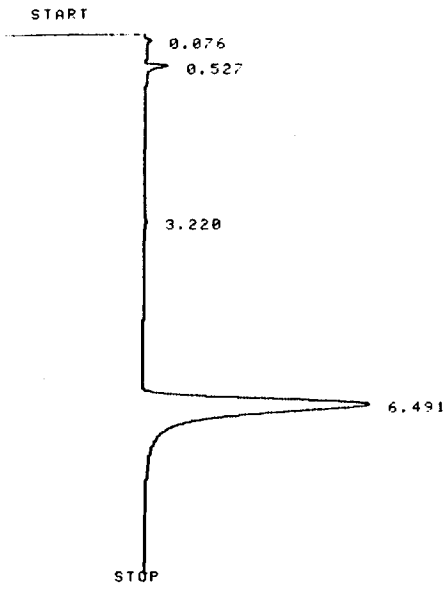
TIMETABLE STOP

RUN# 77 MAY 21, 1992 06:04:03

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.180	28922	PV	.080	2.37993
.529	107074	VB	.093	8.81088
6.503	1079251	PB	.334	88.80922

TOTAL AREA=1215247.
MUL FACTOR=1.0000E+00



1005 ppm Ethanol

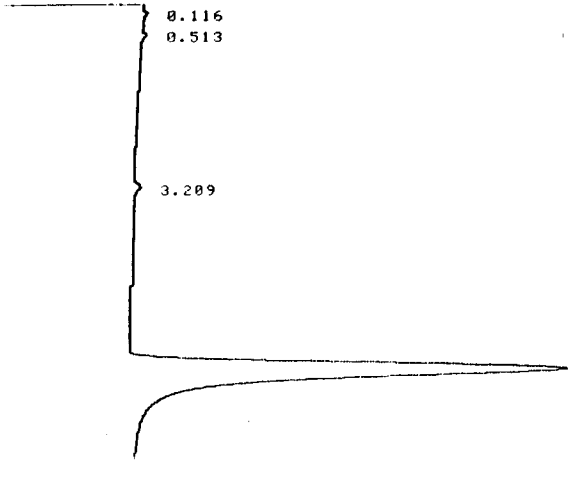
RUN# 78 MAY 21, 1992 06:14:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.076	16474	PP	.067	.56947
.527	80810	PB	.092	2.79344
3.220	28786	VB	.178	.99507
6.491	2766782	PB	.328	95.64202

TOTAL AREA=2892853
MUL FACTOR=1.0000E+00

* RUN # 79 MAY 21, 1992 06:24:58



2010 ppm Ethanol

TIMETABLE STOP

RUN# 79 MAY 21, 1992 06:24:58

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.116	14371	BP	.075	.26640
.513	23731	VV	.092	.43991
3.209	51748	PB	.166	.95927
6.485	5304691	PB	.326	98.33443

TOTAL AREA=5394541
MUL FACTOR=1.0000E+00

* RUN # 80 MAY 21, 1992 06:39:59
START

0.519
1.449 ACETALDEHYDE @ 3,03ppm

STOP

RUN# 80 MAY 21, 1992 06:39:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.519	18687	PV	.088	16.60434
1.449	93454	BV	.154	83.39565

TOTAL AREA= 112061
MUL FACTOR=1.0000E+00

* RUN # 81 MAY 21, 1992 06:48:01
START

0.185
0.530
1.444 ACETALDEHYDE 14,8 ppm

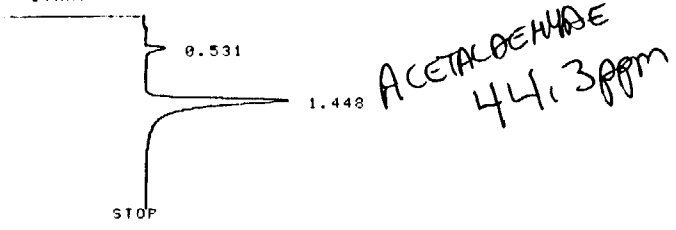
STOP

RUN# 81 MAY 21, 1992 06:48:01

AREA%

TOTAL AREA= 529311
MUL FACTOR=1.0000E+00

* RUN # 82 MAY 21, 1992 06:53:02
START



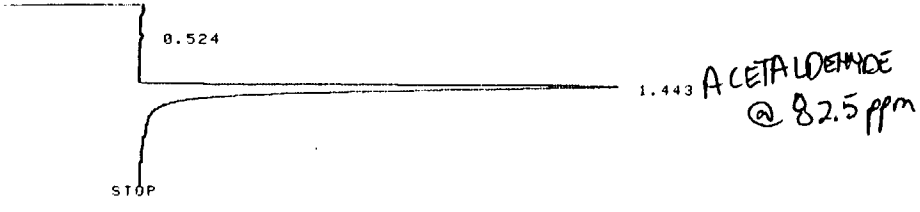
RUN# 82 MAY 21, 1992 06:53:02

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.531	69461	PB	.084	6.66377
1.448	972908	PB	.182	93.33626

TOTAL AREA=1042369
MUL FACTOR=1.0000E+00

* RUN # 83 MAY 21, 1992 06:59:47
START



RUN# 83 MAY 21, 1992 06:59:47

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.524	16910	PB	.082	.66391
1.443	2530138	PB	.142	99.33610

TOTAL AREA=2547048
MUL FACTOR=1.0000E+00

* RUN # 84 MAY 21, 1992 07:07:46
START

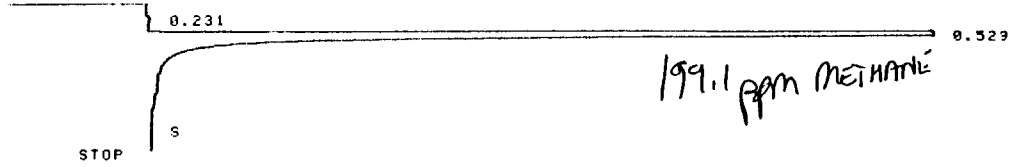
RUN# 84 MAY 21, 1992 07:07:46

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.135	12926	PB	.075	.97894
.517	13925	BV	.081	1.05460
1.440	1293554	PB	.143	97.96646

TOTAL AREA=1320405
MUL FACTOR=1.0000E+00

* RUN # 85 MAY 21, 1992 07:14:11
START



199.1 ppm METHANE

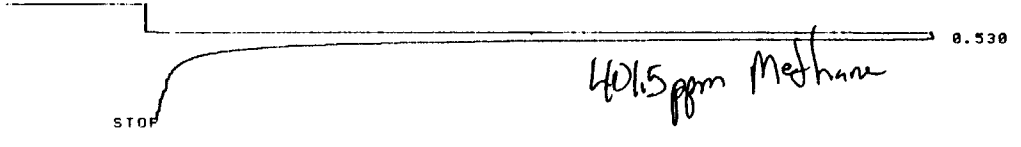
RUN# 85 MAY 21, 1992 07:14:11

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.231	11404	BB	.079	.16904
.529	6734752	SPB	.088	99.83098

TOTAL AREA=6746157
MUL FACTOR=1.0000E+00

* RUN # 86 MAY 21, 1992 07:17:19
START



401.5 ppm Methane

RUN# 86 MAY 21, 1992 07:17:19

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	14026048	ISBH	.089	100.00000

TOTAL AREA=1.4026E+07
MUL FACTOR=1.0000E+00

* RUN # 87 MAY 21, 1992 07:19:44
START

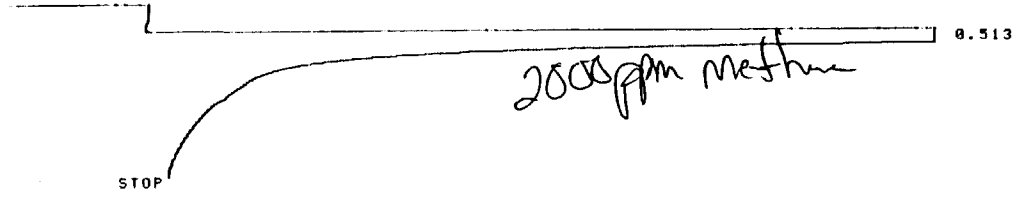
RUN# 87 MAY 21, 1992 07:19:44

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.533	28075472	ISPH	.090	100.00000

TOTAL AREA=2.8075E+07
MUL FACTOR=1.0000E+00

* RUN # 88 MAY 21, 1992 07:23:05
START



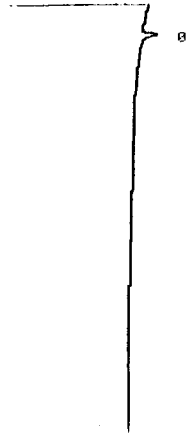
RUN# 88 MAY 21, 1992 07:23:05

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.513	62082304	VSPH	.119	100.00000

TOTAL AREA=6.2082E+07
MUL FACTOR=1.0000E+00

* RUN # 89 MAY 21, 1992 07:26:33
START



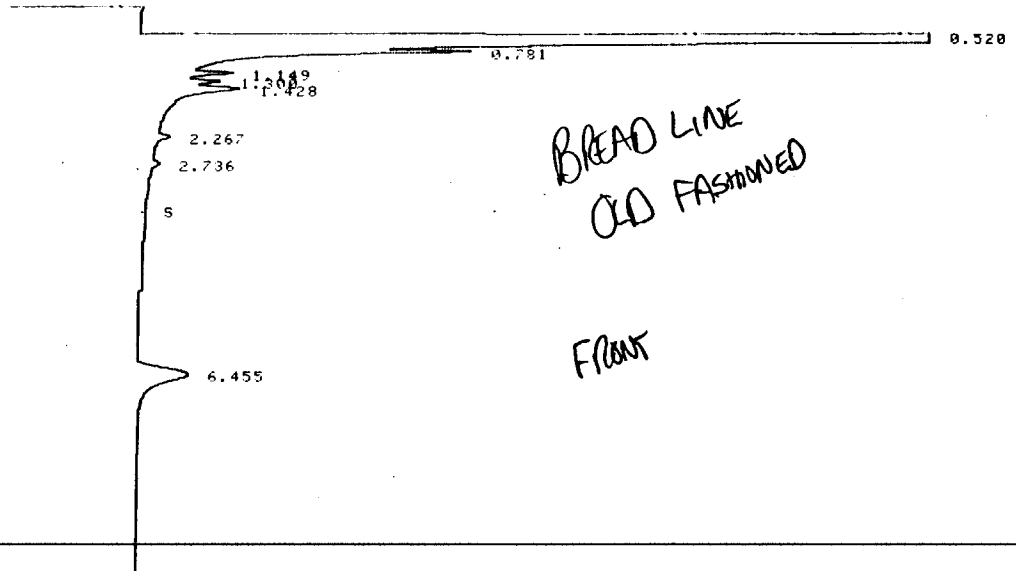
RUN# 89 MAY 21, 1992 07:26:33

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.514	58027	BB	.091	100.00000

TOTAL AREA= 58027
MUL FACTOR=1.0000E+00

* RUN # 90 MAY 21, 1992 07:35:40
START



BREAD LINE
OLD FASHIONED

FRONT

TIMETABLE STOP

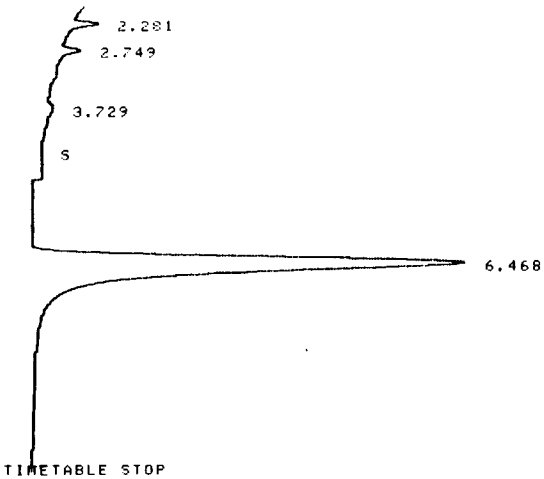
RUN# 90 MAY 21, 1992 07:35:40

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.520	24952976	SPB	.098	94.47952
.781	250829	TBB	.056	.94971
1.149	98095	TBV	.063	.37142
1.300	84935	TVV	.065	.32159
1.428	260958	TVB	.121	.98807
2.267	54835	TBP	.099	.20762
2.736	40539	TPB	.113	.15349
6.455	667841	PB	.333	2.52865

TOTAL AREA=2.6411E+07
MUL FACTOR=1.0000E+00

* RUN # 91 MAY 21, 1992 07:45:59
START



TIMETABLE STOP

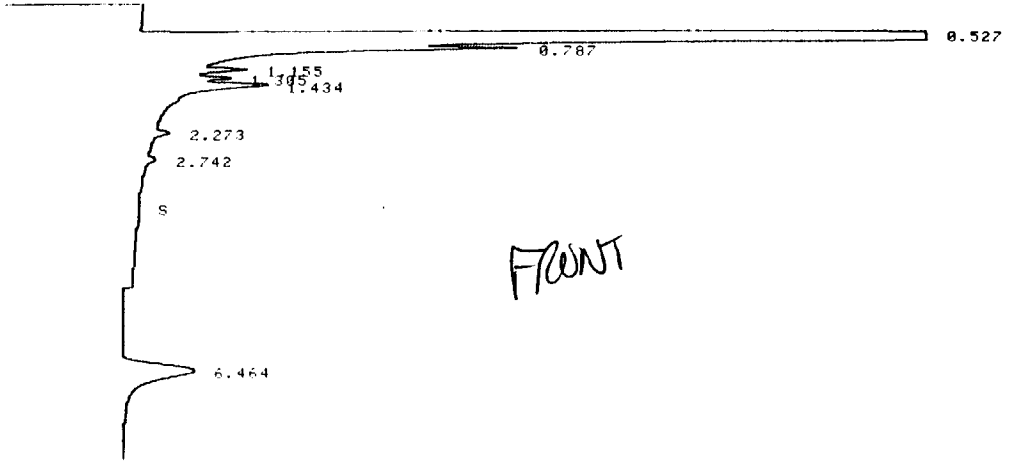
RUN# 91 MAY 21, 1992 07:45:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.534	48710912	SPB	.101	86.40672
.795	483801	TBB	.056	.85820
1.162	183514	TBV	.063	.32553
1.313	156533	TVV	.062	.27767
1.440	1409851	TVV	.130	2.49947
2.281	100361	TBP	.096	.17803
2.749	89880	TPP	.117	.15944
3.729	74652	TPB	.261	.13242
6.468	5165299	PB	.323	9.16256

TOTAL AREA=5.6374E+07
MUL FACTOR=1.0000E+00

* RUN # 92 MAY 21, 1992 07:56:30
START



TIMETABLE STOP

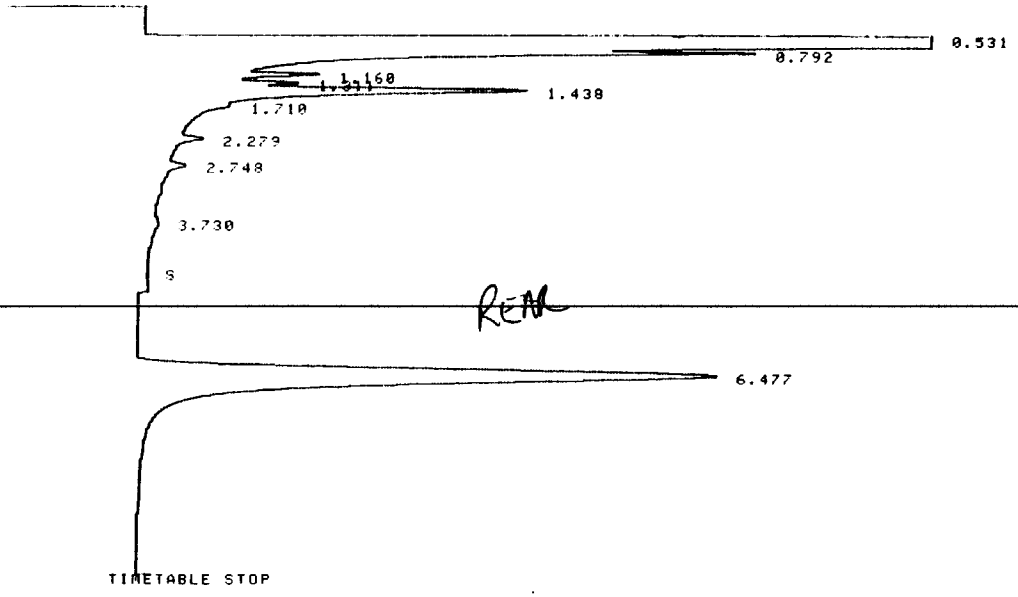
RUN# 92 MAY 21, 1992 07:56:30

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.527	28699584	SPB	.098	93.90790
.787	290549	TBB	.056	.95070
1.155	107430	TBV	.062	.35152
1.305	90539	TVV	.064	.29625
1.434	359033	TVB	.120	1.17479
2.273	58891	TBP	.098	.19270
2.742	44353	TPB	.113	.14513
6.464	911050	PB	.336	2.98105

TOTAL AREA=3.0561E+07
MUL FACTOR=1.0000E+00

* RUN # 93 MAY 21, 1992 08:07:00
START



TIMETABLE STOP

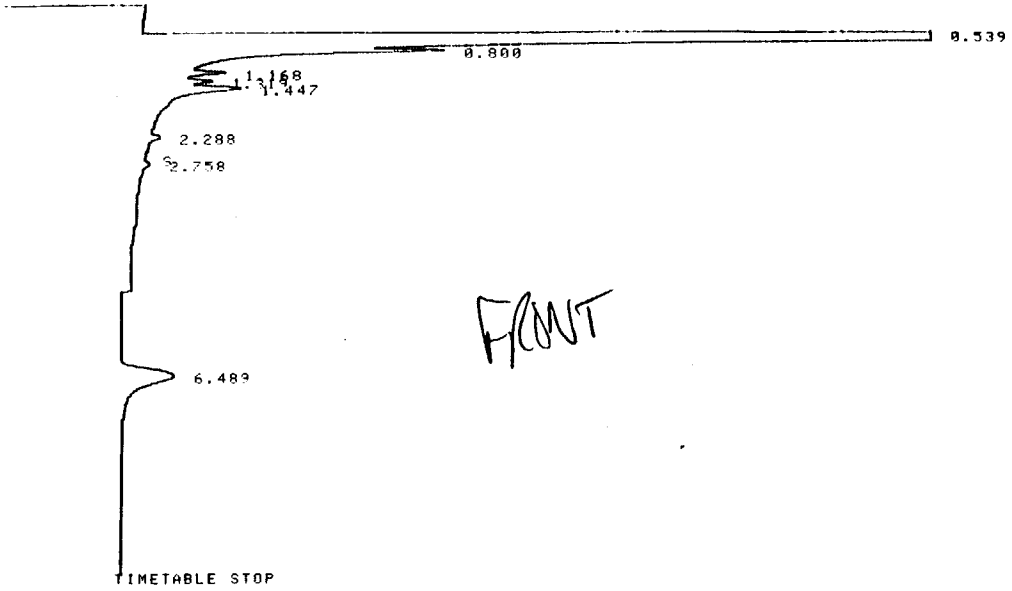
RUN# 93 MAY 21, 1992 08:07:00

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.531	46953088	SPB	.101	83.27472
.792	448175	TBB	.056	.79487
1.160	172914	TBP	.062	.30668
1.311	141534	TPV	.061	.25102
1.438	1439876	TVV	.129	2.55372
1.710	47706	TVP	.062	.08461
2.279	87873	TPB	.094	.15585

TOTAL AREA=5.6383E+07
MUL FACTOR=1.0000E+00

* RUN # 94 MAY 21, 1992 08:17:29
START



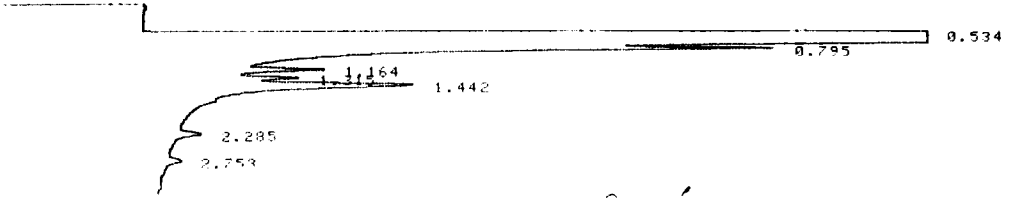
RUN# 94 MAY 21, 1992 08:17:29

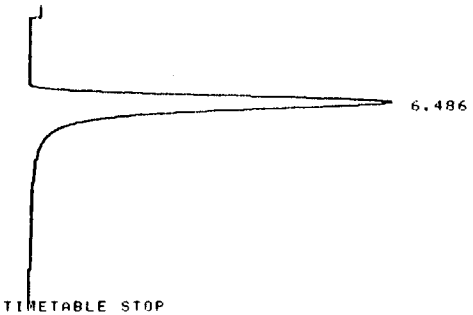
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.539	22942864	SBB	.096	94.16352
.800	225353	TBB	.056	.92491
1.168	85349	TBP	.062	.35029
1.319	70794	TPV	.063	.29056
1.447	274366	TVB	.117	1.12607
2.288	44675	TBB	.097	.18336
2.758	24097	BB	.083	.09890
6.489	697433	PB	.339	2.86245

TOTAL AREA=2.4365E+07
MUL FACTOR=1.0000E+00

* RUN # 95 MAY 21, 1992 08:28:15
START





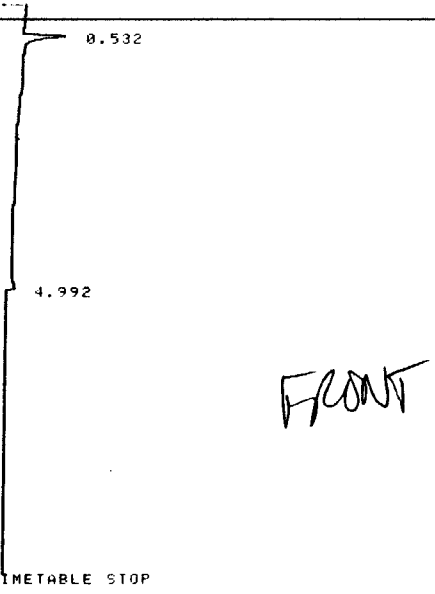
RUN# 95 MAY 21, 1992 08:28:15

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.534	4848095\2	SPB	.099	88.49939
.795	475703	TBB	.057	.86838
1.164	181313	TBP	.062	.33098
1.315	143785	TPV	.062	.26247
1.442	823626	TVB	.120	1.50350
2.285	96598	TBP	.098	.17634
2.753	74870	TPP	.115	.13667
3.742	102102	BV	.405	.18638
6.486	4402131	PB	.328	8.03593

TOTAL AREA=5.4781E+07
MUL FACTOR=1.0000E+00

* RUN # 96 MAY 21, 1992 08:38:40
START

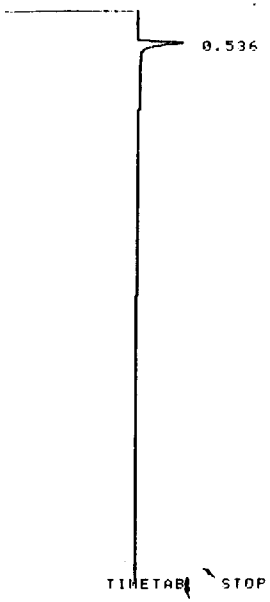


FRONT

RT	AREA	TYPE	WIDTH	AREA%
.532	135780	BB	.083	56.08520
4.992	106316	BB	.264	43.91482

TOTAL AREA= 242096
MUL FACTOR=1.0000E+00

* RUN # 97 MAY 21, 1992 09:50:10
START



FRONT

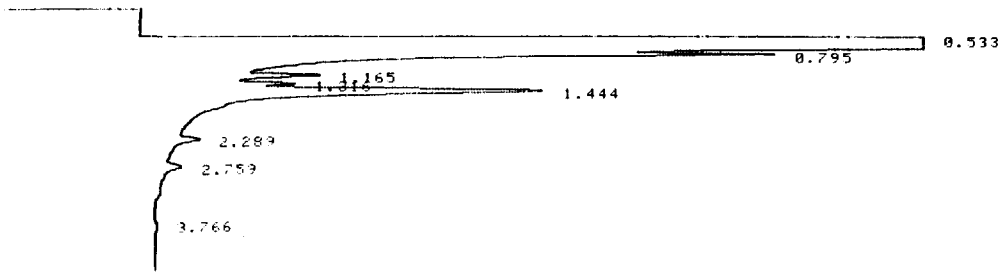
JUN# 97 MAY 21, 1992 08:50:10

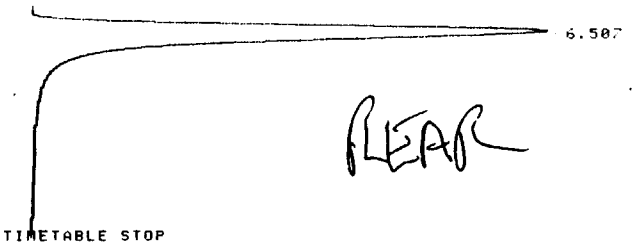
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.536	145139	PB	.085	100.00000

TOTAL AREA= 145139
MUL FACTOR=1.0000E+00

* RUN # 98 MAY 21, 1992 09:00:59
START





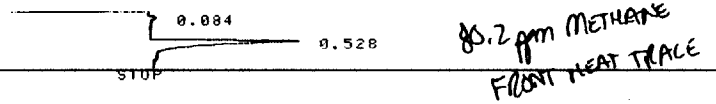
RUN# 98 MAY 21, 1992 09:00:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.533	51028864	SBB	.104	84.82362
.795	457461	TBB	.056	.76042
1.165	173932	TBP	.062	.28912
1.316	130343	TPV	.060	.21666
1.444	1433562	TVB	.123	2.38296
2.289	89813	TBP	.097	.14929
2.759	77042	TPP	.116	.12806
3.766	85341	TPV	.289	.14186
4.882	488654	TVB	.545	.81227
6.507	6193821	PB	.325	10.29578

TOTAL AREA=6.0159E+07
MUL FACTOR=1.0000E+00

* RUN # 99 MAY 21, 1992 09:17:25
START



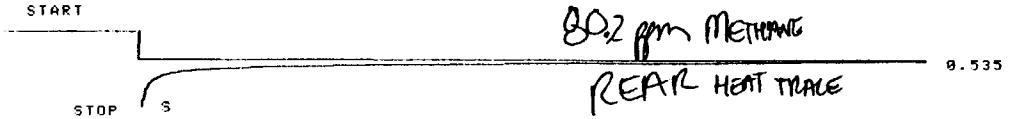
RUN# 99 MAY 21, 1992 09:17:25

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.084	24130	BV	.083	4.51245
.528	510613	VV	.090	95.48755

TOTAL AREA= 534743
MUL FACTOR=1.0000E+00

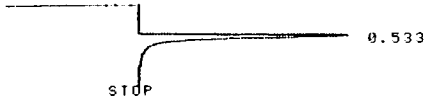
* RUN # 100 MAY 21, 1992 09:19:04
START



RUN# 100 MAY 21, 1992 09:19:04

TOTAL AREA=2663693
MUL FACTOR=1.0000E+00

* RUN # 101 MAY 21, 1992 09:20:58
START



80.2 ppm METHANE
FRONT HEAT TRACE

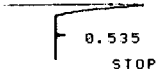
RUN# 101 MAY 21, 1992 09:20:58

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.533	624389	PB	.079	100.00000

TOTAL AREA= 624389
MUL FACTOR=1.0000E+00

* RUN # 102 MAY 21, 1992 09:24:14
START



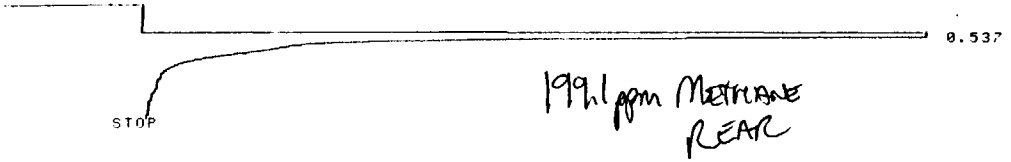
RUN# 102 MAY 21, 1992 09:24:14

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.535	113826	BB	.067	100.00000

TOTAL AREA= 113826
MUL FACTOR=1.0000E+00

* RUN # 103 MAY 21, 1992 09:26:45
START



199.1 ppm METHANE
REAR

RUN# 103 MAY 21, 1992 09:26:45

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.537	8003779	ISBH	.104	100.00000

TOTAL AREA=8003779

* RUN # 104 MAY 21, 1992 09:29:54
START

991 ppm METHANE FRONT

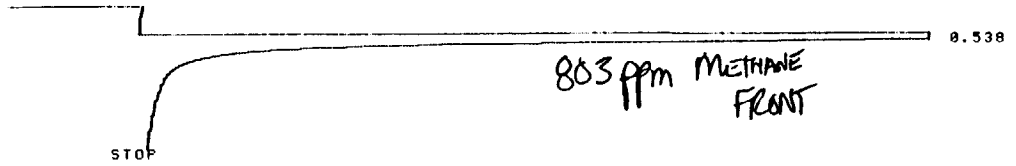
PUN# 104 MAY 21, 1992 09:29:54

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.544	6841821	ISBH	.094	100.00000

TOTAL AREA=6841821
MUL FACTOR=1.0000E+00

* RUN # 105 MAY 21, 1992 09:33:40
START



803 ppm METHANE FRONT

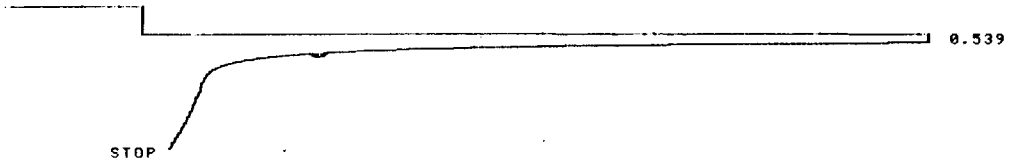
RUN# 105 MAY 21, 1992 09:33:40

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.538	14791560	ISBH	.091	100.00000

TOTAL AREA=1.4792E+07
MUL FACTOR=1.0000E+00

* RUN # 106 MAY 21, 1992 09:37:00
START

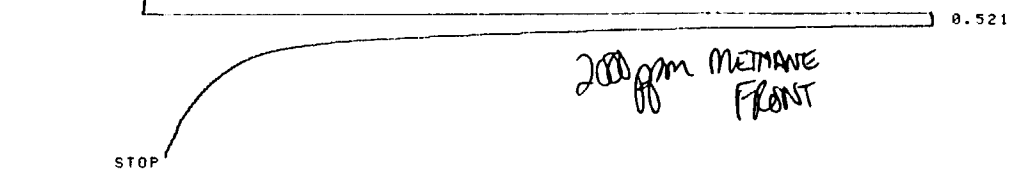


PUN# 106 MAY 21, 1992 09:37:00

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.539	29468784	ISPH	.095	100.00000

TOTAL AREA=2.9469E+07
MUL FACTOR=1.0000E+00



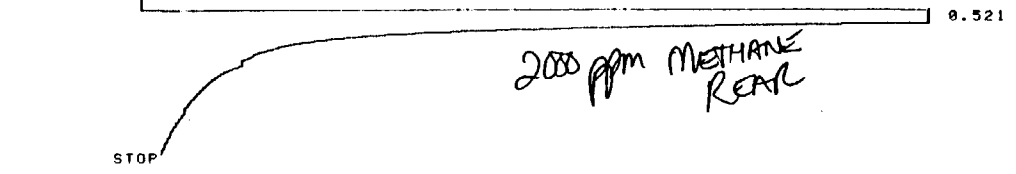
RUN# 107 MAY 21, 1992 09:41:00

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.521	58498464	>SPH	.113	100.00000

TOTAL AREA=5.8498E+07
MUL FACTOR=1.0000E+00

* RUN # 108 MAY 21, 1992 09:45:12
START



RUN# 108 MAY 21, 1992 09:45:12

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.521	61309792	>SPH	.118	100.00000

TOTAL AREA=6.1310E+07
MUL FACTOR=1.0000E+00

* RUN # 109 MAY 21, 1992 09:52:05
START! not ready
STOP

RUN# 109 MAY 21, 1992 09:52:05

NO RUN PEAKS STORED

* RUN # 110 MAY 21, 1992 09:52:58
START

Nitrogen
FRONT
HEAT TRACE

TIMETABLE STOP

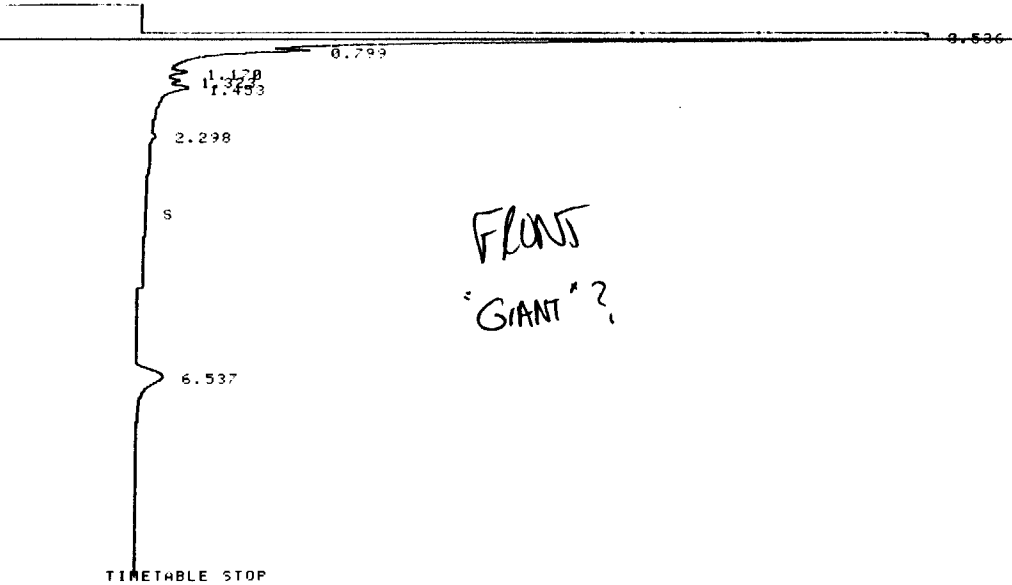
RUN# 110 MAY 21, 1992 09:52:58

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.540	84865	BB	.081	100.00000

TOTAL AREA= 84865
MUL FACTOR=1.0000E+00

* RUN # 111 MAY 21, 1992 10:03:20
START



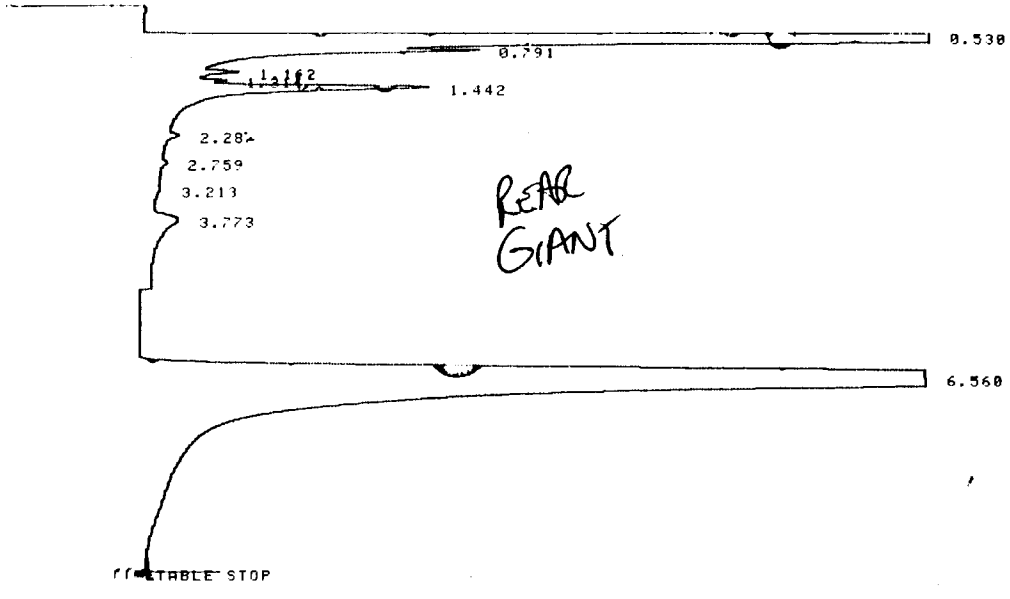
FRONT
"GIANT"?

TIMETABLE STOP

.799	113793	TBB	.056	.79120
1.170	43750	TBP	.063	.30419
1.323	35678	TPV	.064	.24807
1.453	119012	TVB	.120	.82740
2.298	22039	TBP	.096	.15365
6.537	367041	PB	.343	2.55272

TOTAL AREA=1.4382E+07
MUL FACTOR=1.0000E+00

* RUN # 112 MAY 21, 1992 10:13:45
STAR(

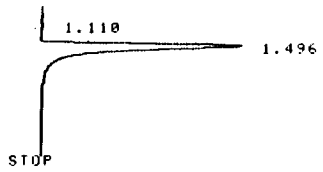


RUN# 112 MAY 21, 1992 10:13:45

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	27425168	SPB	.106	54.27594
.791	229500	TBB	.054	.45419
1.162	89042	TBP	.061	.17622
1.314	69836	TPV	.059	.13821
1.442	1248395	TVP	.140	2.47064
2.287	42851	TPB	.094	.08480
2.759	32403	TBV	.110	.06413
3.213	31995	TVV	.161	.06332
3.773	456656	TVV	.433	.90375
6.560	20903328	PB	.369	41.36883

TOTAL AREA=5.0529E+07
MUL FACTOR=1.0000E+00



ACETALDEHYDE @ 44.3ppm

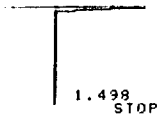
RUN# 113 MAY 21, 1992 20:22:54

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.305	659106	PV	.085	34.90195
.580	135809	VB	.092	7.19156
1.110	12675	BP	.078	.67118
1.496	1080861	PB	.145	57.23533

TOTAL AREA=1888451
MUL FACTOR=1.0000E+00

* RUN # 114 MAY 21, 1992 20:29:56
START



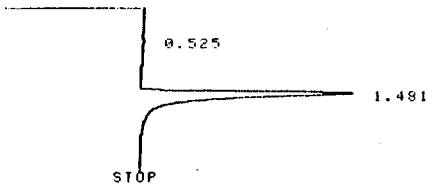
RUN# 114 MAY 21, 1992 20:29:56

AREA%

RT	AREA	TYPE	WIDTH	AREA%
1.498	1043125	I BH	.133	100.00000

TOTAL AREA=1043125
MUL FACTOR=1.0000E+00

* RUN # 115 MAY 21, 1992 20:32:57
START

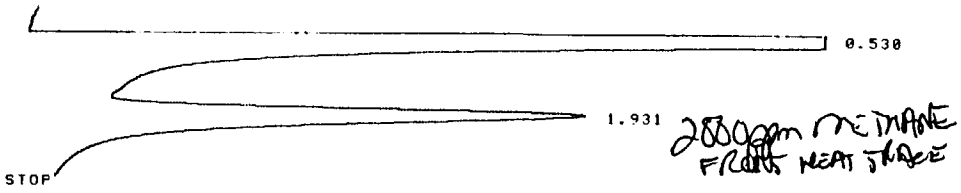


ACETALDEHYDE @ 44.3ppm

RUN# 115 MAY 21, 1992 20:32:57
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.525	14553	PV	.091	1.25504
1.481	1134978	PB	.143	98.70995

TOTAL AREA=1149811
MUL FACTOR=1.0000E+00



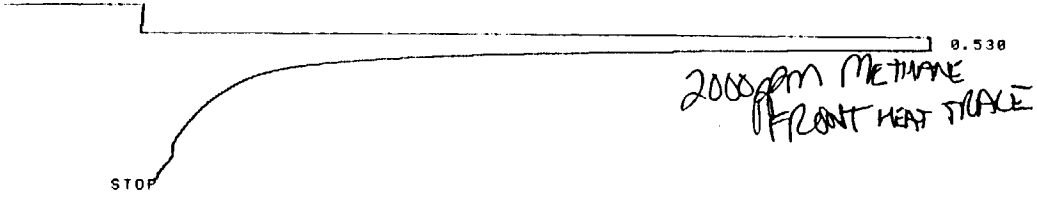
RUN# 116 MAY 21, 1992 20:37:44

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	61624288	>SBH	.119	91.10128
1.931	6019427	ITBB	.332	8.89873

TOTAL AREA=6.7644E+07
MUL FACTOR=1.0000E+00

* RUN # 117 MAY 21, 1992 20:41:49
START



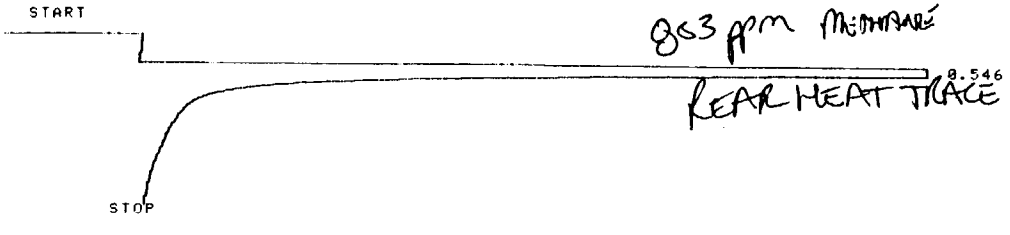
RUN# 117 MAY 21, 1992 20:41:49

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	61683552	>SPH	.119	100.00000

TOTAL AREA=6.1684E+07
MUL FACTOR=1.0000E+00

* RUN # 118 MAY 21, 1992 20:46:40
START

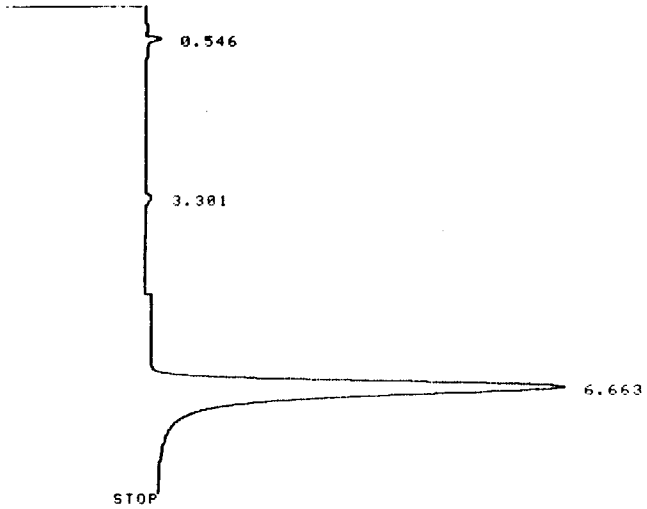


RUN# 118 MAY 21, 1992 20:46:40

AREA%

MUL FACTOR=1.0000E+00

* RUN # 119 MAY 21, 1992 20:53:17
START



Ethanol @ 2010 ppm

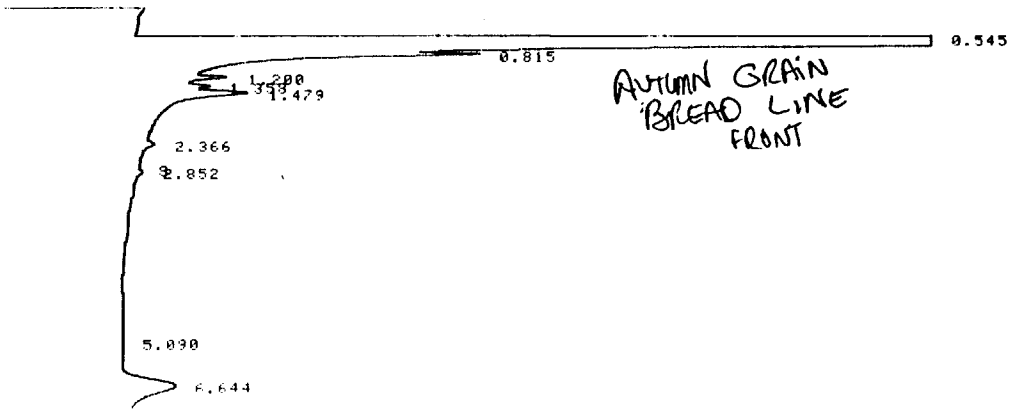
PUN# 119 MAY 21, 1992 20:53:17

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.546	55913	PV	.088	1.03547
3.301	56589	VP	.180	1.04799
6.663	5287267	PB	.348	97.91654

TOTAL AREA=5399770
MUL FACTOR=1.0000E+00

* RUN # 120 MAY 21, 1992 21:03:24
START



AUTUMN GRAIN BREAD LINE FRONT

TIMETABLE STOP

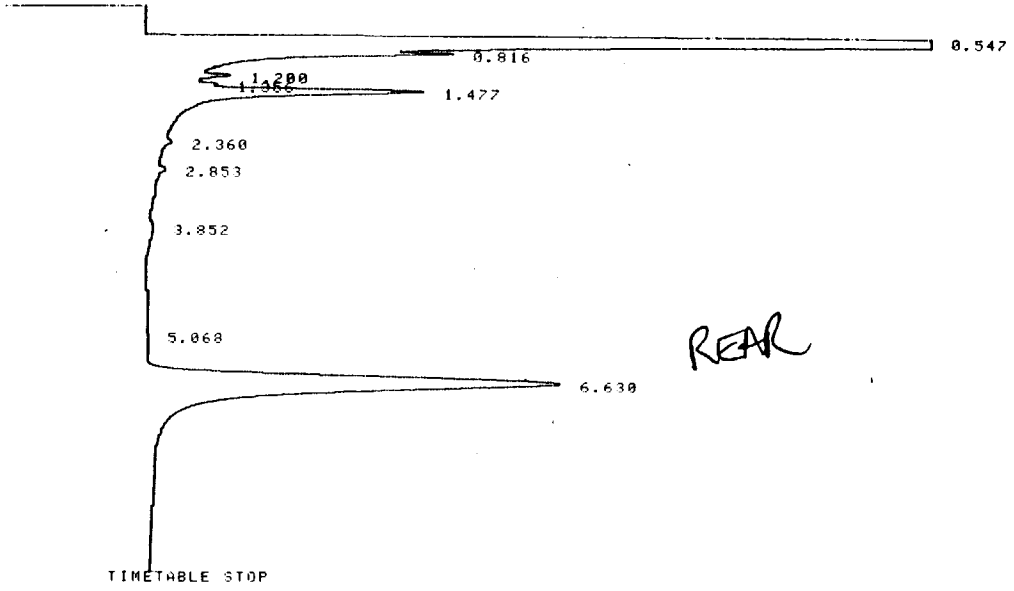
RUN# 120 MAY 21, 1992 21:03:24

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.545	29641376	SPB	.099	95.14026
.815	213384	TBB	.057	.68490
1.200	84671	TBP	.065	.27177
1.358	60469	TPV	.063	.19409
1.479	332319	TVB	.128	1.06665
2.366	43303	TBB	.102	.13899
2.852	27774	BB	.105	.08915
5.090	80792	BB	.563	.25932
6.644	671376	PB	.343	2.15492

TOTAL AREA=3.1155E+07
MUL FACTOR=1.0000E+00

* RUN # 121 MAY 21, 1992 21:13:54
START



TIMETABLE STOP

RUN# 121 MAY 21, 1992 21:13:54

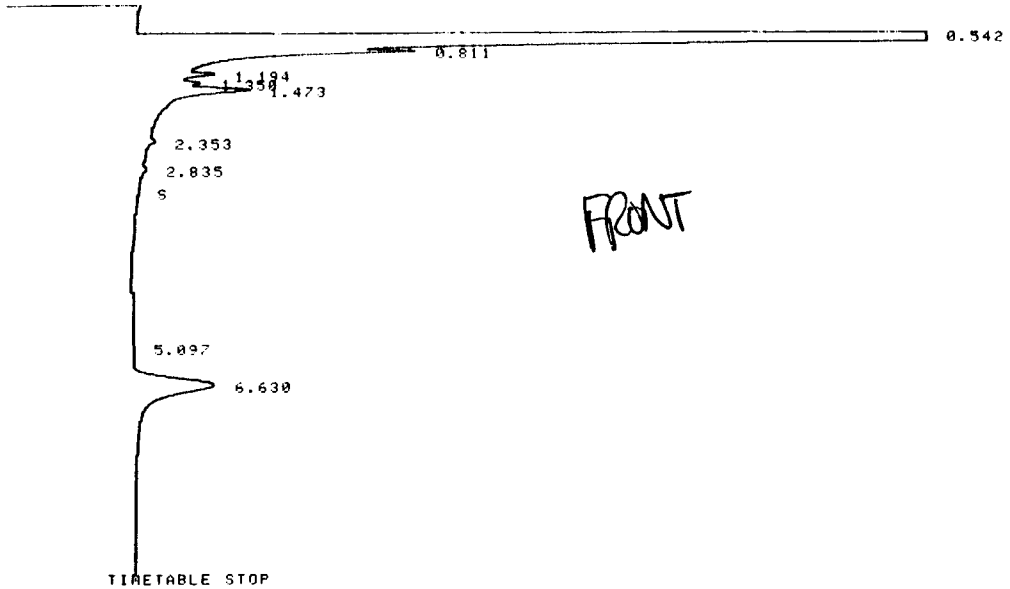
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.547	26760800	SPB	.105	79.43510
.816	191127	TBB	.056	.56733
1.200	74119	TBP	.063	.22001
1.356	48948	TPV	.054	.14529

3.852	83856	TPB	.323	.24691
5.068	78005	PB	.485	.23155
6.630	5136973	PB	.336	15.24828

TOTAL AREA=3.3689E+07
MUL FACTOR=1.0000E+00

* RUN # 122 MAY 21, 1992 21:24:54
START



TIMETABLE STOP

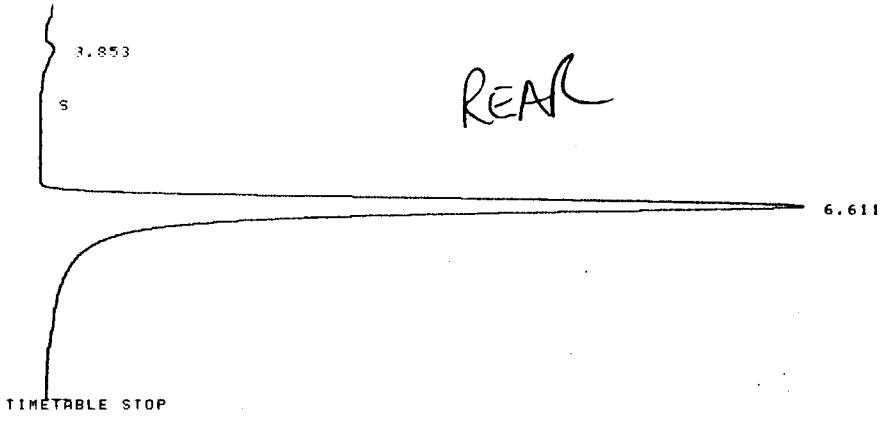
RUN# 122 MAY 21, 1992 21:24:54

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.542	24040880	SPB	.101	93.08326
.811	166042	TBB	.056	.64289
1.194	66867	TBP	.064	.25890
1.350	46093	TPV	.062	.17847
1.473	338593	TVB	.125	1.31099
2.353	26369	TBP	.084	.10210
2.835	22885	TPB	.102	.08861
5.097	104593	PB	.570	.40497
6.630	1014972	PB	.342	3.92984

TOTAL AREA=2.5827E+07
MUL FACTOR=1.0000E+00

* RUN # 123 MAY 21, 1992 21:35:19
START



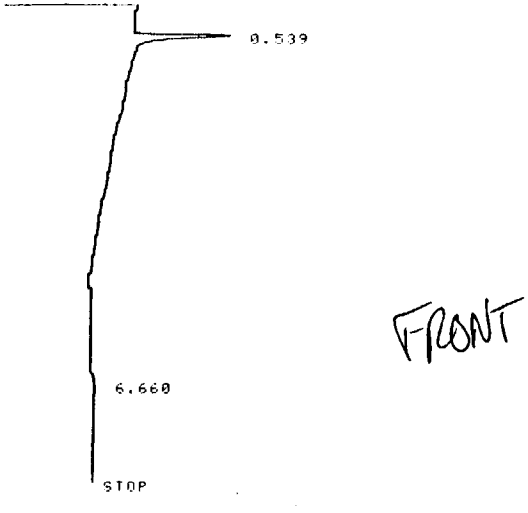
RUN# 123 MAY 21, 1992 21:35:19

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.540	34458432	SBB	.102	74.46032
.807	247265	TBB	.055	.53431
1.187	96193	TBP	.062	.20786
1.343	63920	TPV	.055	.13812
1.463	1329342	TVB	.139	2.87254
2.340	46032	TBP	.096	.09947
2.826	40381	TPB	.101	.08726
3.853	139758	TPB	.320	.30200
6.611	9856256	PB	.353	21.29814

TOTAL AREA=4.6278E+07
MUL FACTOR=1.0000E+00

* RUN # 124 MAY 21, 1992 21:45:45
START

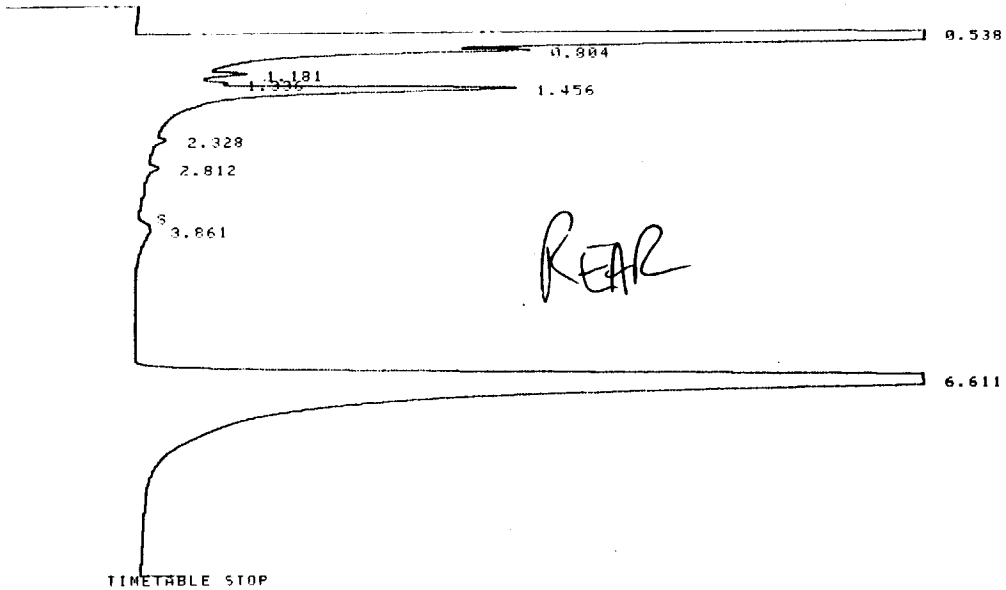


APEA%

RT	AREA	TYPE	WIDTH	AREA%
.539	314067	BB	.086	82.98640
6.660	64389	PB	.384	17.01360

TOTAL AREA= 378456
MUL FACTOR=1.0000E+00

* RUN # 125 MAY 21, 1992 21:54:59
START



TIMETABLE STOP

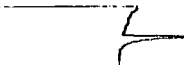
RUN# 125 MAY 21, 1992 21:54:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.538	33472768	SBB	.101	65.89328
.804	234351	TBB	.054	.46133
1.181	92386	TBP	.062	.18187
1.336	58309	TPV	.053	.11479
1.456	1709420	TVP	.142	3.36510
2.328	40423	TPB	.092	.07958
2.812	64119	TBV	.131	.12622
3.861	205284	BP	.382	.40411
6.611	14921424	PB	.391	29.37378

TOTAL AREA=5.0798E+07
MUL FACTOR=1.0000E+00

* RUN # 126 MAY 21, 1992 22:05:34
START



FRONT

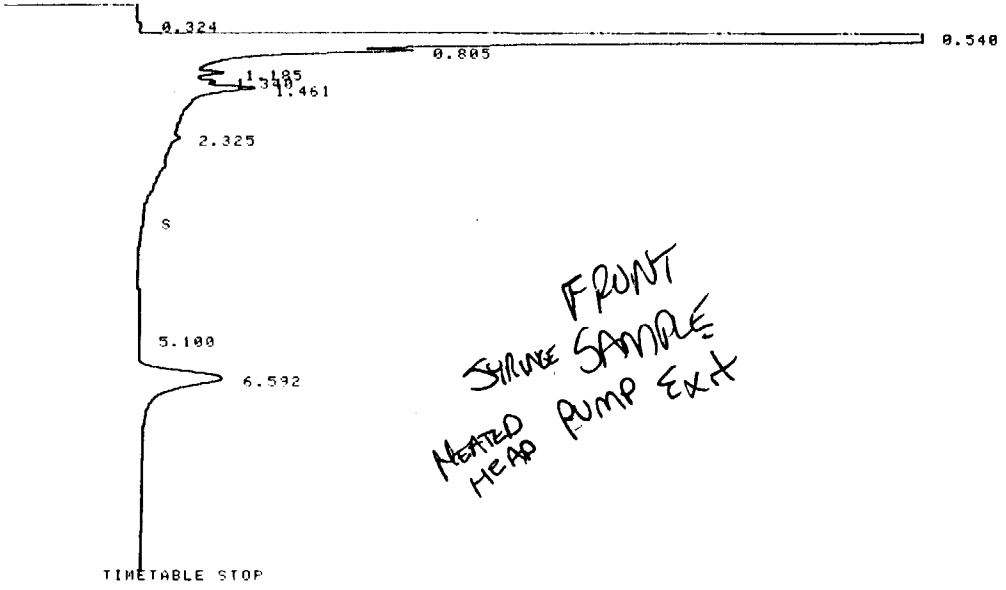
PUN# 126 MAY 21, 1992 22:05:34

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.539	189170	BB	.081	50.16070
6.663	187958	I BP	1.084	49.83931

TOTAL AREA= 377128
MUL FACTOR=1.0000E+00

* RUN # 127 MAY 21, 1992 22:13:45
START



FRONT
SYRINGE SAMPLE
HEATED HEAD PUMP EXT

PUN# 127 MAY 21, 1992 22:13:45

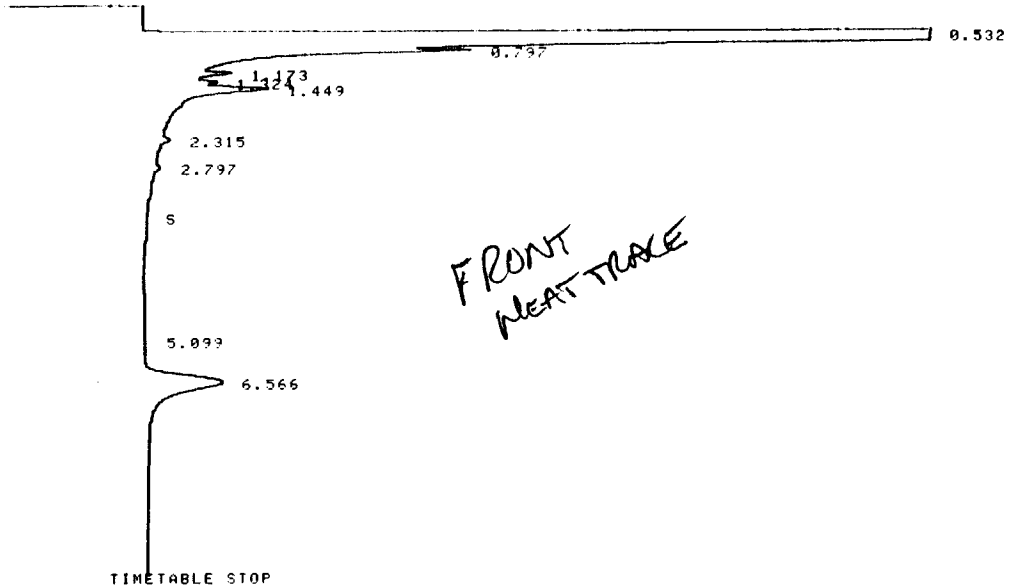
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.324	17526	PH	.100	.06526
.540	24991568	SHP	.104	93.05213

2.325	41472	TVV	.126	.15441
5.100	96906	BB	.559	.36081
6.592	1071936	PB	.345	3.99119

TOTAL AREA=2.6858E+07
MUL FACTOR=1.0000E+00

* RUN # 128 MAY 21, 1992 22:25:14
START



FRONT HEAT TRACE

TIMETABLE STOP

RUN# 128 MAY 21, 1992 22:25:14

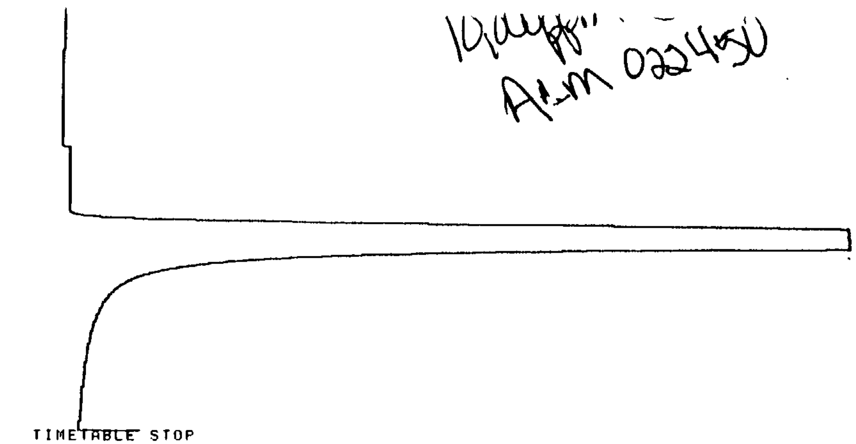
AREA%

RT	AREA	TYPE	WIDTH	AREA%
.532	28502352	SPB	.098	94.04192
.797	192492	TBB	.055	.63512
1.173	75583	TBF	.063	.24938
1.324	54016	TPV	.061	.17822
1.449	361801	TVB	.122	1.19374
2.315	37775	TBP	.100	.12464
2.797	31683	TPP	.120	.10454
5.099	77336	PB	.492	.25517
6.566	975100	PB	.343	3.21729

TOTAL AREA=3.0308E+07
MUL FACTOR=1.0000E+00

* RUN # 129 MAY 21, 1992 22:42:04
START

10 µg/ml – A-M 022450



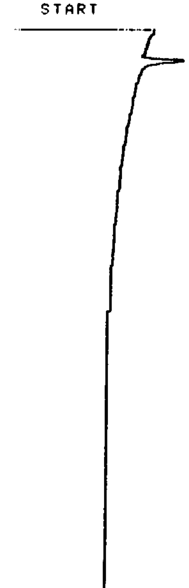
RUN# 129 MAY 21, 1992 22:42:04

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.515	15591	BV	.090	.05761
6.589	27049584	PB	.311	99.94240

TOTAL AREA=2.7065E+07
MUL FACTOR=1.0000E+00

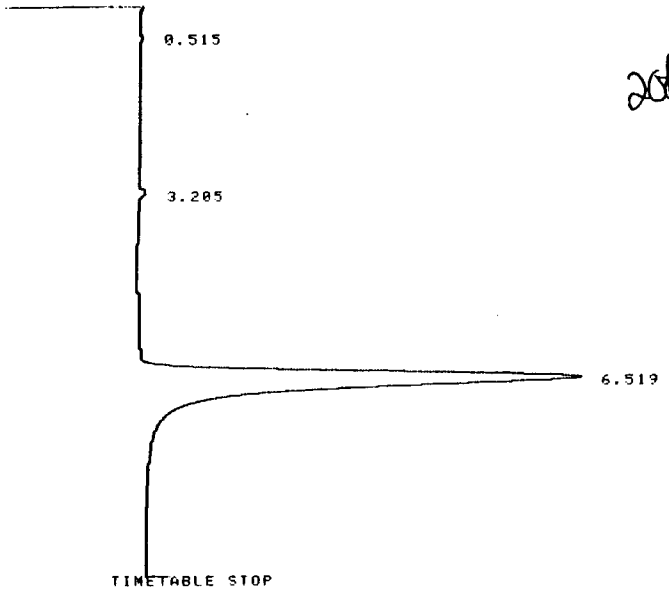
* RUN # 130 MAY 21, 1992 22:54:01
START



RUN# 130 MAY 21, 1992 22:54:01

TOTAL AREA= 142414
MUL FACTOR=1.0000E+00

* RUN # 131 MAY 21, 1992 23:08:34
START



200ppm Ethanol

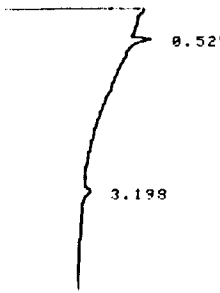
RUN# 131 MAY 21, 1992 23:08:34

AREA%

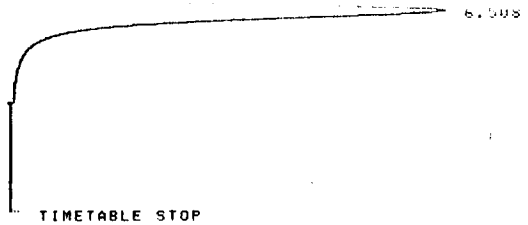
RT	AREA	TYPE	WIDTH	AREA%
.515	21213	PV	.106	.37563
3.285	50102	BB	.149	.88718
6.519	5575997	BB	.345	98.73718

TOTAL AREA=5647312
MUL FACTOR=1.0000E+00

* RUN # 132 MAY 21, 1992 23:20:19
START



BIAS CHECK
2010ppm Ethanol
FOINT HEAT TRACE



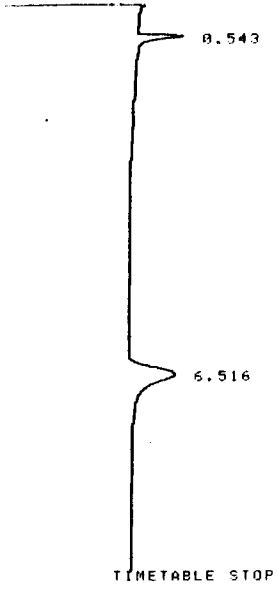
RUN# 132 MAY 21, 1992 23:20:19

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.525	87605	BB	.107	1.51652
3.198	36734	BB	.110	.63590
5.104	100568	PP	.796	1.74092
6.508	5551805	PB	.341	96.10666

TOTAL AREA=5776710
MUL FACTOR=1.0000E+00

* RUN # 133 MAY 21, 1992 23:31:37
START



201 ppm Ethanol
REAR HEAT TRACE
SAMPLE PRESSURE
HIGH → RERUN/check
REAR W/ACETALDEHYDE
WATCH PRESSURE

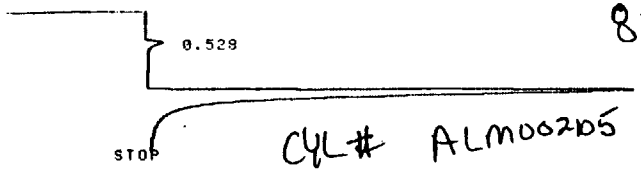
RUN# 133 MAY 21, 1992 23:31:37

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.543	155546	BV	.087	17.99110
6.516	709026	PB	.411	82.00890

TOTAL AREA= 864572

* RUN # 134 MAY 21, 1992 23:46:44
START



82.5ppm ACETALDEHYDE
REAR HEPT TRAP
CYL# ALM002105

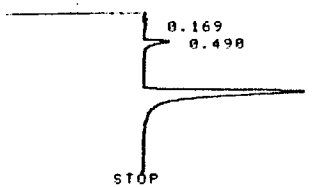
RUN# 134 MAY 21, 1992 23:46:44

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.528	60609	BV	.093	2.33185
1.435	2538573	PB	.141	97.66816

TOTAL AREA=2599181
MUL FACTOR=1.0000E+00

* RUN # 135 MAY 21, 1992 23:56:54
START



27.5ppm ACETALDEHYDE
1:3 dilution CYL# ALM002105

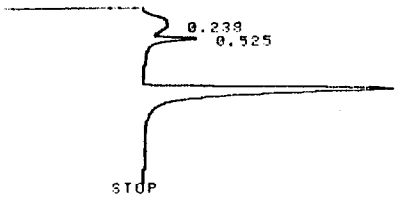
RUN# 135 MAY 21, 1992 23:56:54

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.169	14548	BV	.088	1.51641
.490	90261	VP	.088	9.40833
1.398	854564	PB	.141	89.07526

TOTAL AREA= 959373
MUL FACTOR=1.0000E+00

* RUN # 136 MAY 22, 1992 00:03:08
START



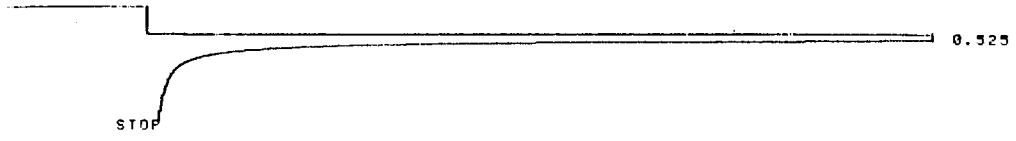
41.2ppm ACETALDEHYDE

RUN# 136 MAY 22, 1992 00:03:08

.525	176463	VB	.090	10.20094
1.431	1295379	PB	.140	74.88304

TOTAL AREA=1729870
MUL FACTOR=1.0000E+00

* RUN # 137 MAY 22, 1992 00:10:59
START



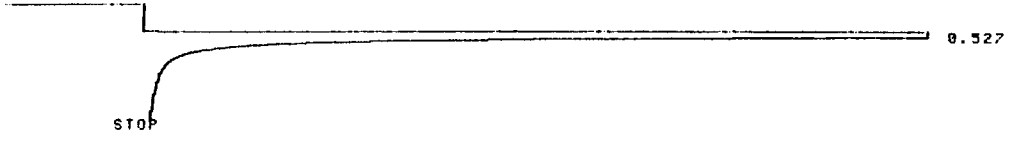
RUN# 137 MAY 22, 1992 00:10:59

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.525	11801144	ISBH	.089	100.00000

TOTAL AREA=1.1801E+07
MUL FACTOR=1.0000E+00

* RUN # 138 MAY 22, 1992 00:14:04
START



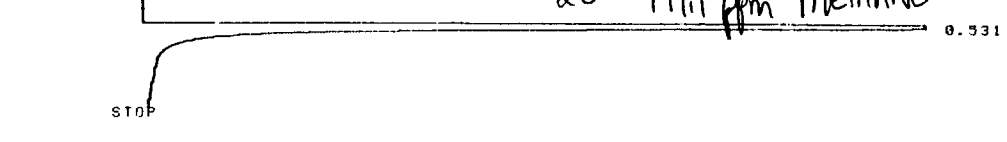
RUN# 138 MAY 22, 1992 00:14:04

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.527	9997619	ISBH	.089	100.00000

TOTAL AREA=9.9976E+06
MUL FACTOR=1.0000E+00

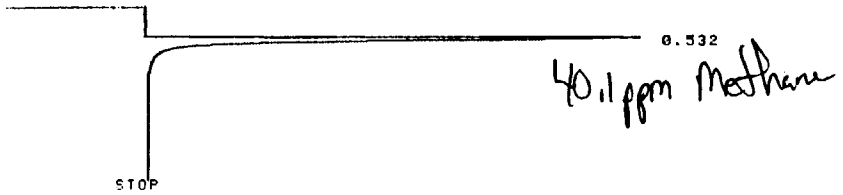
* RUN # 139 MAY 22, 1992 00:18:11
START



RUN# 139 MAY 22, 1992 00:18:11

TOTAL AREA=6971818
MUL FACTOR=1.0000E+00

* RUN # 140 MAY 22, 1992 00:22:37
START



40.1 ppm Methane

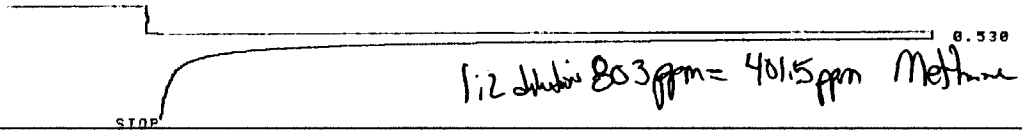
RUN# 140 MAY 22, 1992 00:22:37

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.532	1427114	PB	.077	100.00000

TOTAL AREA=1427114
MUL FACTOR=1.0000E+00

* RUN # 141 MAY 22, 1992 00:29:35
START



1:2 dilution 803 ppm = 401.5 ppm Methane

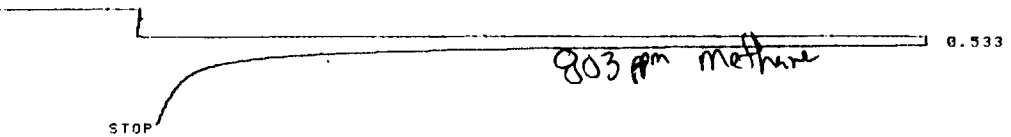
RUN# 141 MAY 22, 1992 00:29:35

AREA%

RT	AREA	TYPE	WIDTH	AREA%
.530	14448656	ISPH	.089	100.00000

TOTAL AREA=1.4449E+07
MUL FACTOR=1.0000E+00

* RUN # 142 MAY 22, 1992 00:31:59
START

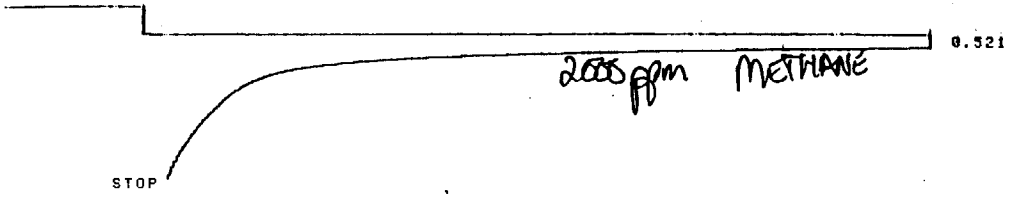


803 ppm Methane

RUN# 142 MAY 22, 1992 00:31:59

```
TOTAL AREA=2.8121E+07
MUL FACTOR=1.0000E+00


*  RUN #  143     MAY 22, 1992  00:36:42
START
```




```
RUN#   143          MAY 22, 1992  00:36:42

AREA%
      RT      AREA TYPE  WIDTH      AREA%
    .521  62511616 >SPH   .120  100.00000

TOTAL AREA=6.2512E+07
MUL FACTOR=1.0000E+00


*  LIST: LIST
PEAK CAPACITY:  1244

ZERO   =  5, 0.324
ATT 2^ =  6
CHT SP =  1.0
AR REJ =  10000
THRSH  =  4
PK WD  =  0.10

*
```

```
*!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
pqrstuvwxyz{|}~ 0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
```

Performing self test: unit will

RADIAN
CORPORATION

Plant Merita

Date 5/20

Location Bread oven stack ⇒ REAR Bread

Stack I.D. 14"

Barometric pressure, in. Hg

Stack gauge pressure, in. H_2O -0.03

Operators CRP

Checked by 18:18 MS

Schematic of Traverse Point Layout

Traverse Point Number	Velocity Head (Δp_s), in. H_2O	Stack Temperature (T_s), °F	Cyclonic Flow Check
A1	0.11	350	0
A2	0.16	357	0
A3	0.18	360	0
A4	0.135	355	<5°
B1	0.11	360	0
B2	0.15	365	0
B3	0.17	375	0
B4	0.15	370	<5°
Average			

11816.6BR

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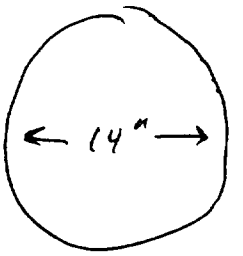

Plant Merrimack

Date 5/20/92

Location Bread Oven ⇒ FRONT

Stack I.D. 14

Barometric pressure, in. Hg

Stack gauge pressure, in. H_2O -0.03 " H_2O

Operators CRP

Checked by

PTS	(%D)	(in.)
1	6.7	1.0
2	25	3.5
3	75	10.5
4	93	13

Schematic of Traverse Point Layout

Traverse Point Number	Velocity Head (Δp_s), in. H_2O	Stack Temperature (T_s), °F	Cyclonic Flow Check
A1	0.04	260	0
2	0.055	260	0
3	0.06	265	0
4	0.05	263	0
B1	0.045	254	0
2	0.06	254	0
3	0.065	~~252~~ 257	0
4	0.06	260	0
Average			

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Plant MERIT

Date 5/21

Location BUN OVEN – Rear

Stack I.D. 12"

Barometric pressure, in. Hg

Stack gauge pressure, in. H_2O – 0.02

Operators CKP

Checked by

Schematic of Traverse Point Layout

Traverse Point Number	Velocity Head (Δp_s), in. H_2O	Stack Temperature (T_s), °F	Cyclonic Flow Check
4,	0.055	180	0
2	0.06	194	0
3	0.06	193	0
4	0.07	198	0
B1	0.035	190	0
2	0.04	190	0
3	0.06	195	0
4	0.07	200	0
Average			

Velocity Traverse Form

Plant	Site 1
Date	5/21 21:46
Location	Bun Oven - Front
Stack ID (in)	12"
Barometric Pressure (in Hg)	29.55
Ambient Temperature (°F)	~72
Static Pressure (in H2O)	-.04
Operators	CRP

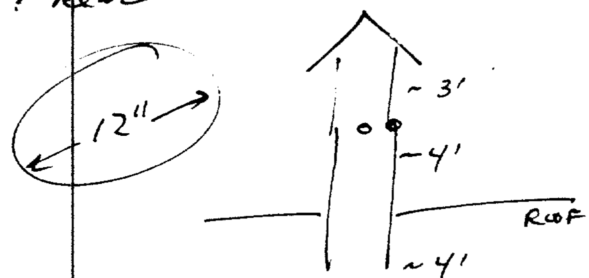
Schematic of Traverse Point Layout (Cross Section of Duct)

Traverse Point Number	Velocity Head ΔP, (in H2O)	Stack Temperature Ts, (°F)	Traverse Point Number	Velocity Head ΔP, (in H2O)	Stack Temperature Ts, (°F)
A1	0.12	281	B1	0.11	275
A2	0.13	288	B2	0.12	284
A3	0.13	284	B3	0.12	291
A4	0.11	288	B4	0.13	293

Traverse Point Location Form

Plant	Site 1
Date	5/19
Sampling Location	Bun Oven - FRONT & Rear
Total Duct Depth (Distance A)	
(Inside Far Wall to Outside of Nipple/Port)	
Nipple/Port Length (Distance B)	
(Inside Near Wall to Outside End of Nipple/Port)	
Stack Depth (Dist A – Dist B)	
Stack Width (If rectangular)	
From Nearest Upstream Disturbance	3'
From Nearest Downstream Disturbance	>8'
Calculator	

Sample Ports Information: Number ~~I.D. (in)~~



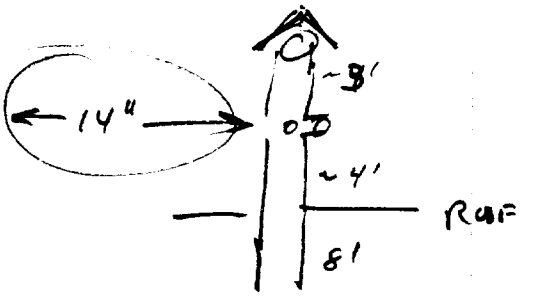
Schematic of Sampling Location (Cross Section of Duct)

1 Traverse Point Number	2 Percent Fraction of Stack ID	3 Stack ID (in)	4 Product of Columns 2 & 3 (to nearest 1/8 inch)	5 Distance B (in)	6 Traverse Point Location from Outside of Nipple (sum of columns 4 & 5)
1	6.7	12"	1.0		
2	25	↓	3.0		
3	75		9.0		
4	93.3		11.0		

Traverse Point Location Form

Plant	Site 1
Date	5/14
Sampling Location	Bread Oven - Front & Rear
Total Duct Depth (Distance A)	
(Inside Far Wall to Outside of Nipple/Port)	
Nipple/Port Length (Distance B)	
(Inside Near Wall to Outside End of Nipple/Port)	
Stack Depth (Dist A – Dist B)	
Stack Width (If rectangular)	
From ~~Nearest~~ Upstream Disturbance	~ 3'
From ~~Near~~est Downstream Disturbance	~ >8'
Calculator	CRP

Sample Ports Information: Number ~~I.D. (in)~~



Schematic of Sampling Location (Cross Section of Duct)

1 Traverse Point Number	2 Percent Fraction of Stack ID	3 Stack ID (in)	4 Product of Columns 2 & 3 (to nearest 1/8 inch)	5 Distance B (in)	6 Traverse Point Location from Outside of Nipple (sum of columns 4 & 5)
1	6.7	14"	1.0		
2	25	↓	3.5		
3	75	↓	10.5		
4	93.3	↓	13		
	X No PORT NIPPLES, JUST HOLES IN SHEET METAL				

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 2
PAGE 1 OF 1

PLANT	MERIDA
DATE	5/20
SAMPLING LOCATION	Blend Over - Rear
SAMPLE TYPE	H_2O
RUN NUMBER	# 2
OPERATOR	CAP

Meter Box A-36
Y = 0.9910

INITIAL LEAK (V) = 0.003 (@) 10"
FINAL LEAK (V) = 006 (@) 8"

Impinger Volo

	INITIAL	FINAL
1	150 ml	125
2	150 ml	158
3	0	82
4	702.4 g	712.5 / 715.1

O_2 = 18.5 % Fyrite

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F)			Pump Vacuum (in. Hg)
								Dry Gas Meter		Impinger Exit	
								Inlet (Tm in)	Outlet (Tm out)		
	0	1719	82.447								
A	5	1724	85.1	NA	351	0.77	NA	94	98	78	6
	10	1729	87.5	NA	349	0.77	NA	106	95	67	6
	16	1735	90.5	NA	344	0.76	NA	108	98	52	6
	21	1740	93.0	NA	357	0.76	NA	111	100	51	6
	31	1750	98.1	NA	353	0.76	NA	113	102	48	6
	43	1802	104	NA	352	0.76	NA	113	105	51	6
	50	1809	107.582	NA	334	0.76	NA	113	107	49	6

COMMENTS:

295 g = 223.5
147 = 76.2

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 1
PAGE 1 OF 1

PLANT	MERITA
DATE	5/20
SAMPLING LOCATION	BREAD OVEN - FRONT
SAMPLE TYPE	H_2O
RUN NUMBER	1
OPERATOR	CRP

METER # A-36
Y = 0.9910

Impingers

	INITIAL	FINAL
1	150 ml	150
2	150 ml	160
3	0	1
4	697.6 g	702.4 / 15.8

O_2 = 16.5%, Fyrite

INITIAL LEAK = 0.005 @ 10"
FINAL LEAK = 0.003 @ 8"

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F)			Pump Vacuum (in. Hg)
								Dry Gas Meter			
								Inlet (Tm in)	Outlet (Tm out)	Impinger Exit *	
	0	1548	656.664								
Port B	5	1553	69.5	NA	261	0.82	NA	110	98	80	5
	10	1558	71.9	NA	261	0.82	NA	113	101	78	5
	15	1603	74.4	NA	257	0.82	NA	114	103	75	5
	20	1608	77.1	NA	257	0.82	NA	116	106	74	5
	25	1613	79.7	NA	278	0.82	NA	116	106	74	5
	30	1618	82.350	NA	267	0.82	NA	118	108	74	5

COMMENTS: BALANCE CHECK 147g = 77.2
295g = 224.2

* Impingers Iced down for 15 min prior. (Sun on T/C)

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 3
PAGE 1 OF 1

PLANT	MERRIMAC
DATE	5/21
SAMPLING LOCATION	BUN - REAR
SAMPLE TYPE	H_2O
RUN NUMBER	3
OPERATOR	CMO

1	150	116
2	152	187
3	0	3
4	710.2	715.5

INITIAL LEAK = 0.005 @ 10"
FINAL LEAK = 0.004 @ 8"

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F)			Pump Vacuum (in. Hg)
								Dry Gas Meter		Impinger Exit	
								Inlet (Tm in)	Outlet (Tm out)		
	0	0820	107.932								
B	5	0826	110.8	NA	175	0.83	NA	81	73	53	5
	10	0831	113.3	NA	176	0.83	NA	70	76	52	5
	15	0840	117.3	NA	174	0.81	NA	93	78	54	5
	30	0850	122.3	NA	174	0.81	NA	98	84	56	5
	40	0900	127.5	NA	166	0.82	NA	100	88	57	5
	50	0910	133.7	NA	150	0.83	NA	105	92	57	5
	60	0920	138.694	NA	146	0.83	NA	106	96	63	5

COMMENTS:

147.5 = 768 g

Revision: 11/90

RADIAN CORPORATION

METHOD 5
FIELD DATA

RUN 4
PAGE 1 OF 1

PLANT	Merida
DATE	5/21/92
SAMPLING LOCATION	Bun - Front
SAMPLE TYPE	H_2O
RUN NUMBER	4
OPERATOR	CRP

Y = 0.9910
B_{ox} = A-36

Stack Temps
(Front) (Rear)
(°F)
285/202

21:46 (Vs)

A
1 0.12 281 5°
2 0.13 288 0
3 0.13 284 0
4 0.11 288 0

B (ΔP) (°F) Bun Front
1 0.11 275 0
2 0.12 284 0
3 0.12 291 <5°
4 0.13 293 10°

- 0.04

INITIAL LEAK ⊙ = 0.005 @ 8"
FINAL LEAK ⊙ = 0.004 @ 10"

286

H_2O TRAIN

	INITIAL	FINAL
1	150	147
2	150	147
3	0	41
4	770g	781

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (Vm), cu.ft	Velocity Head (Δ Ps), in. H2O	Flue Gas Temperature (°F)	Orifice Pressure Differential (Δ H, in. H2O)	Filter Temperature (°F)	Temperature (°F) Dry Gas Meter Inlet (Tm in)	Dry Gas Meter Outlet (Tm out)	Impinger Exit	Pump Vacuum (in. Hg)
	0	2028	138.891								
B	16	2044	146.9	NA	262	0.77	NA	91	84	78	5
B	36	2104	157	NA	256	0.77	NA	107	96	72	5
↓	56	2120	165.1	NA	250	0.77	NA	114	105	75	5
	60	2128	169.122	NA	252	0.76	NA	118	111	70	5

COMMENTS:

PLANT	Site-1	STD METERED VOLUME (scf).....	29.06
DATE	5/21/92	MOISTURE COLLECTED (g).....	11.30
SAMPLING LOCATION	BUN REAR	% O2.....	21.00 *
RUN	BUN REAR-RUN1	% CO2.....	0.00 *
AMBIENT TEMPERATUR	72.00	%N2.....	79.00
BAROMETRIC PRESSUR	29.55	PERCENT MOISTURE IN STACK.....	1.80
STATIC PRESSURE (in H2	-0.02	MOLE FRAC. of DRY STACK GAS...	0.98
OPERATOR	CRP	DRY MOLECULAR	28.84
METER TEMP (deg. F)....	90.00	WET MOLECULAR	28.64
METER ORIFICE dH (" H2	0.82	STACK DIAMETER (I	12.00
METERED VOLUME (cu.f	30.86	STACK AREA (sq ft)	0.79
METER Y.....	0.9910		

Traverse Point Number	Velocity Head P (in H2O)	Stack Ts (F)	Square Root of P	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A1	0.06	180	0.23	14.64	878.46
A2	0.06	194	0.24	15.46	927.51
A3	0.06	193	0.24	15.45	926.80
A4	0.07	198	0.26	16.75	1004.88
B1	0.04	190	0.19	11.77	706.22
B2	0.05	190	0.22	14.07	844.10
B3	0.06	195	0.24	15.47	928.21
B4	0.07	200	0.26	16.77	1006.41
Averages		192.50	0.24	15.04	902.62

STACK GAS ACTUAL VOL FLOW (acfm)	708.92
STACK GAS STANDARD VOL FLOW (scfm)	566.53
STACK GAS STANDARD DRY VOL FLOW (ds	556.33

* ESTIMATED

PLANT	Site 1	STD METERED VOLUME (scf).....	14.28
DATE	5/20/92	MOISTURE COLLECTED (g).....	15.80
SAMPLING LOCATION	BREAD FRONT	% O2.....	16.50
RUN	BREAD FRONT-RUN1	% CO2.....	3.00 *
AMBIENT TEMPERATUR	72.00	%N2.....	80.50
BAROMETRIC PRESSUR	29.55	PERCENT MOISTURE IN STACK.....	4.96
STATIC PRESSURE (in H2	-0.03	MOLE FRAC. of DRY STACK GAS...	0.95
OPERATOR	CRP	DRY MOLECULAR	29.14
METER TEMP (deg. F)....	109.00	WET MOLECULAR	28.59
METER ORIFICE dH (" H2	0.82	STACK DIAMETER (I	14.00
METERED VOLUME (cu.f	15.69	STACK AREA (sq ft)	1.07
METER Y.....	0.9910		

Traverse Point Number	Velocity Head P (in H2O)	Stack Ts (F)	Square Root of P	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A1	0.04	260	0.20	13.26	795.42
A2	0.06	260	0.23	15.55	932.71
A3	0.06	265	0.24	16.29	977.57
A4	0.05	263	0.22	14.85	891.16
B1	0.05	254	0.21	14.00	840.15
B2	0.06	254	0.24	16.17	970.12
B3	0.07	257	0.25	16.86	1011.85
B4	0.06	260	0.24	16.24	974.19
Averages		259.13	0.23	15.40	924.14

STACK GAS ACTUAL VOL FLOW (acfm)	987.92
STACK GAS STANDARD VOL FLOW (scfm)	716.33
STACK GAS STANDARD DRY VOL FLOW (ds	680.81

* ESTIMATED

PLANT	Site 1	STD METERED VOLUME (scf).....	23.05
DATE	5/20/92	MOISTURE COLLECTED (g).....	75.10
SAMPLING LOCATION	BREAD REAR	% O2.....	18.50
RUN	BREAD REAR-RUN1	% CO2.....	1.00 *
AMBIENT TEMPERATUR	72.00	%N2.....	80.50
BAROMETRIC PRESSUR	29.55	PERCENT MOISTURE IN STACK.....	13.31
STATIC PRESSURE (in H2	-0.03	MOLE FRAC. of DRY STACK GAS...	0.87
OPERATOR	CRP	DRY MOLECULAR	28.90
METER TEMP (deg. F)....	104.50	WET MOLECULAR	27.45
METER ORIFICE dH (" H2	0.76	STACK DIAMETER (I	14.00
METERED VOLUME (cu.f	25.13	STACK AREA (sq ft)	1.07
METER Y.....	0.9910		

Traverse Point Number	Velocity Head P (in H2O)	Stack Ts (F)	Square Root of P	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A1	0.11	350	0.33	23.80	1427.84
A2	0.16	351	0.40	28.72	1723.10
A3	0.18	360	0.42	30.63	1837.74
A4	0.14	355	0.37	26.44	1586.67
B1	0.11	360	0.33	23.94	1436.63
B2	0.15	365	0.39	28.05	1682.73
B3	0.17	375	0.41	30.04	1802.23
B4	0.15	376	0.39	28.23	1693.91
Averages		361.50	0.38	27.48	1648.55

STACK GAS ACTUAL VOL FLOW (acfm)	1762.32
STACK GAS STANDARD VOL FLOW (scfm)	1118.60
STACK GAS STANDARD DRY VOL FLOW (ds	969.66

* ESTIMATED

PLANT	Site-1	STD METERED VOLUME (scf).....	27.75
DATE	5/21/92	MOISTURE COLLECTED (g).....	46.00
SAMPLING LOCATION	BUN FRONT	% O2.....	21.00 *
RUN	BUN FRONT-RUN1	% CO2.....	0.00 *
AMBIENT TEMPERATUR	72.00	%N2.....	79.00
BAROMETRIC PRESSUR	29.55	PERCENT MOISTURE IN STACK.....	7.25
STATIC PRESSURE (in H2	-0.04	MOLE FRAC. of DRY STACK GAS...	0.93
OPERATOR	CRP	DRY MOLECULAR	28.84
METER TEMP (deg. F)....	104.00	WET MOLECULAR	28.05
METER ORIFICE dH (" H2	0.77	STACK DIAMETER (I	12.00
METERED VOLUME (cu.f	30.23	STACK AREA (sq ft)	0.79
METER Y.....	0.9910		

Traverse Point Number	Velocity Head P (in H2O)	Stack Ts (F)	Square Root of P	Stack Gas Velocity (fps)	Stack Gas Velocity (fpm)
A1	0.12	281	0.35	23.52	1410.91
A2	0.13	288	0.36	24.59	1475.44
A3	0.13	284	0.36	24.52	1471.49
A4	0.11	288	0.33	22.62	1357.21
B1	0.11	275	0.33	22.42	1345.36
B2	0.12	284	0.35	23.56	1413.76
B3	0.12	291	0.35	23.67	1420.40
B4	0.13	293	0.36	24.67	1480.37
Averages		285.50	0.35	23.70	1421.79

STACK GAS ACTUAL VOL FLOW (acfm)	1116.67
STACK GAS STANDARD VOL FLOW (scfm)	781.03
STACK GAS STANDARD DRY VOL FLOW (ds	724.41

* ESTIMATED

Monday 5/18 - ∞

1530 - arrived on-site. Mark & Mike drove separately and have been there a while. Trailer in place and A/C units working. However no power @ outlets and lights.

1830 - OFF SITE.

5/17 Tuesday

0915 On-Site ... Power still not hooked up. Getting 110 at the plugs (Radian's switch) - but wont power up equipment. box appears to be Battery power supply.

~1200 Switched power supplies to 440 V / transformer to 220 single phase. Hooked up Radians switch box and trailer box in parallel. Works fine.

1400-600 Mike, myself & Solomon broke for lunch.

Leak Checked New Sections of Heat Trace Ran Heat Trace, Had Holes Drilled into stack. Put up probe supports. Took prelim stack gas GC samples. Trace looks pretty clean except high methane

~0730 OFF SITE

5/20 Wed

0600 On-Site. THC/FID Rack had gone out over the night. Had major problems w/ purge. Supply pressure oscillated, Flame not steady. 2000 ppm QC reading 3500 → real bad.
Finally Mark got it smoothed out – nailed QC's.

~1100 Started sampling. Mike B was not fully calibrated for Methane – of which he saw a lot (~2000 ppm). Ran stack has 3X the THC as front. Ethanol approximately at 14000 ppm. Probably need to dilute if we see that again.

1305 Stopped to shoot QC's and switch to burn over

~1430 ?? Got started on the burn over. It was interesting to note that Ethanol QC (200 ppm) was seen as 200 ppmC and a 200 ppm CH4 also as 200 ppm. No response factor difference. Will call Scott to verify concentrations

~1530 Stopped sampling the burn over. Mark & Mike ran QC's. It ran moisture and flows

~1900 OFF-SITE

THURSDAY 5/21

0530 - ON-SITE. A/C UNITS WENT DOWN (FROZE) OVER THE NIGHT. TRAILER WAS ABOUT 110°F (+). RESTARTED EVERYTHING - WORKED OUT OK. MIKE HAD TO RECAL SO WE DIDN'T GET ON LINE TILL 7:30 → RAN W/ WALLY TILL ABOUT 8:45. HOWEVER FRONT STACK DEVELOPING PROBLEM. DON'T SEE ANY STACK GASES → JUMPER FROM THC TO GC HEAT (ON GC) IS FUNKY. GOT IT WORKING AGAIN → DON'T NO WAY IT HAPPENED ⇒ BUT IT SEEMS TO BE EITHER WORKING OR NOT ⇒ (NO PARTIAL ERRORS)

8

~1100 OFF SITE

1930 BACK ON-SITE

~~[illegible]~~ 1930 (JAR

~~[illegible]~~

~~[illegible]~~

5/22 Fri

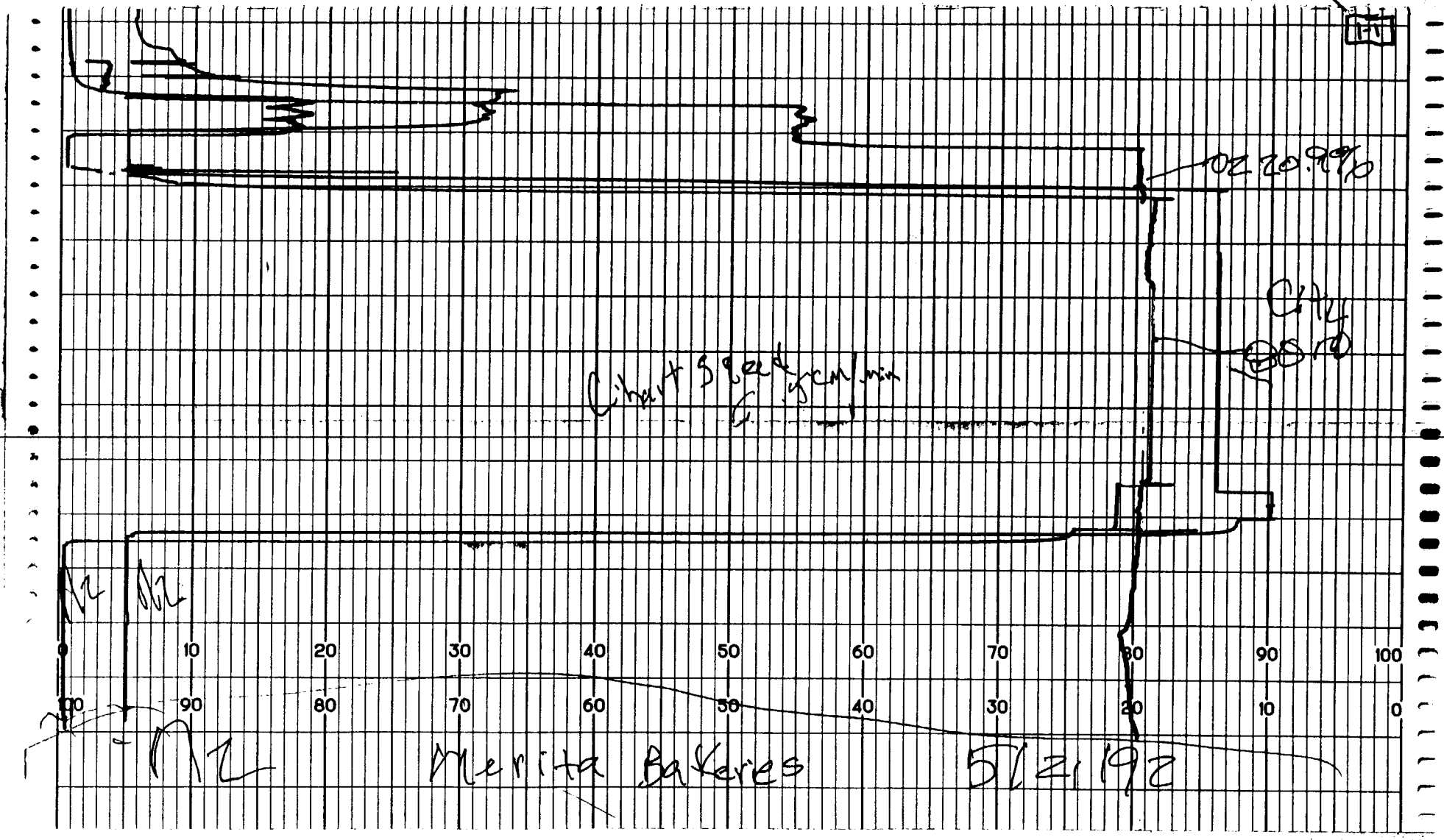
0930 ON - SITE

Packed up

1200 OFF - SITE

SITE #01
MERITA (Interstate Brands)
Charlotte, NC

SITE #1 - PAGE #1



SITE 01 : MERITA BAKERY ; Charlotte, NC 5-21-92

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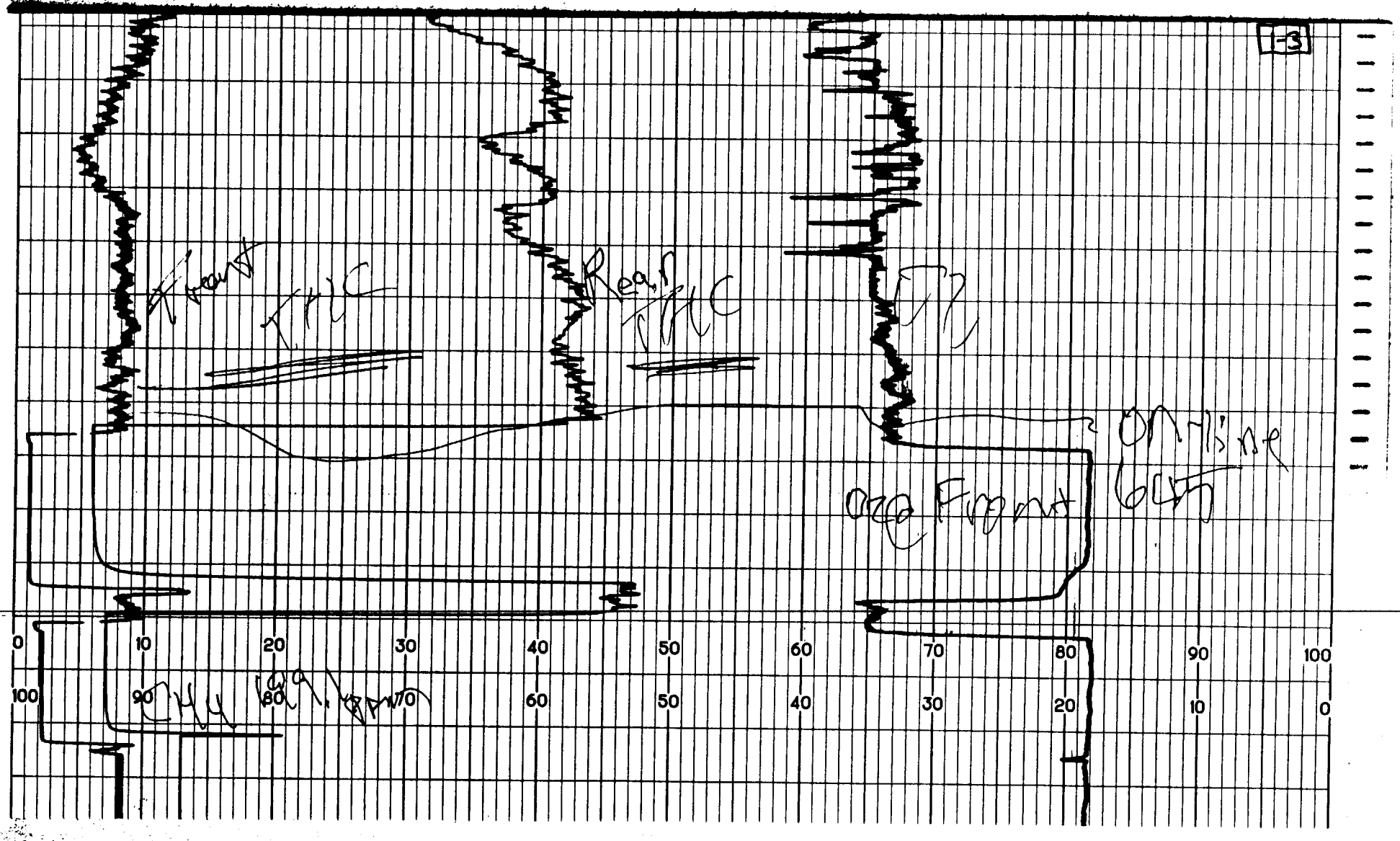
PART NO. L0/8011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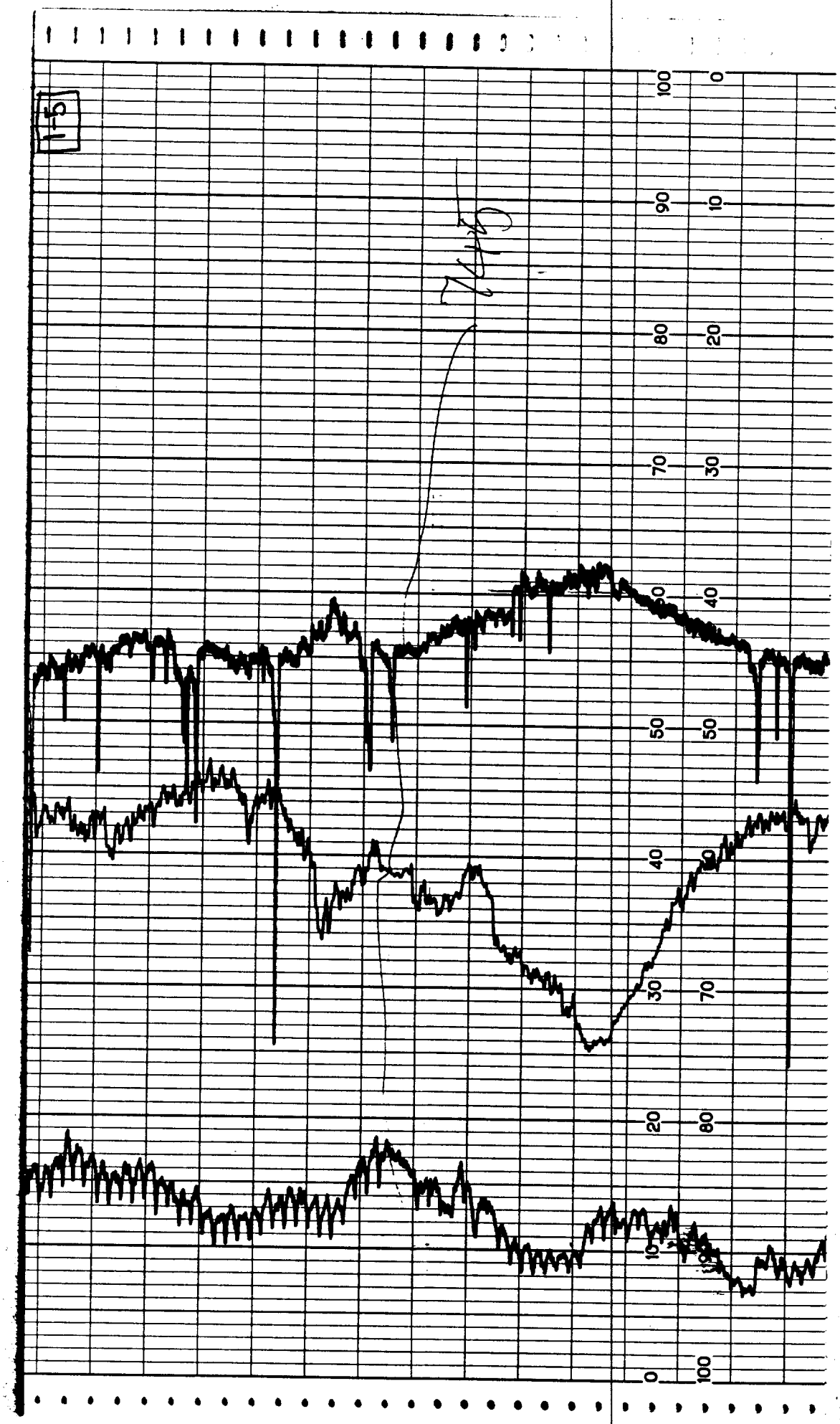
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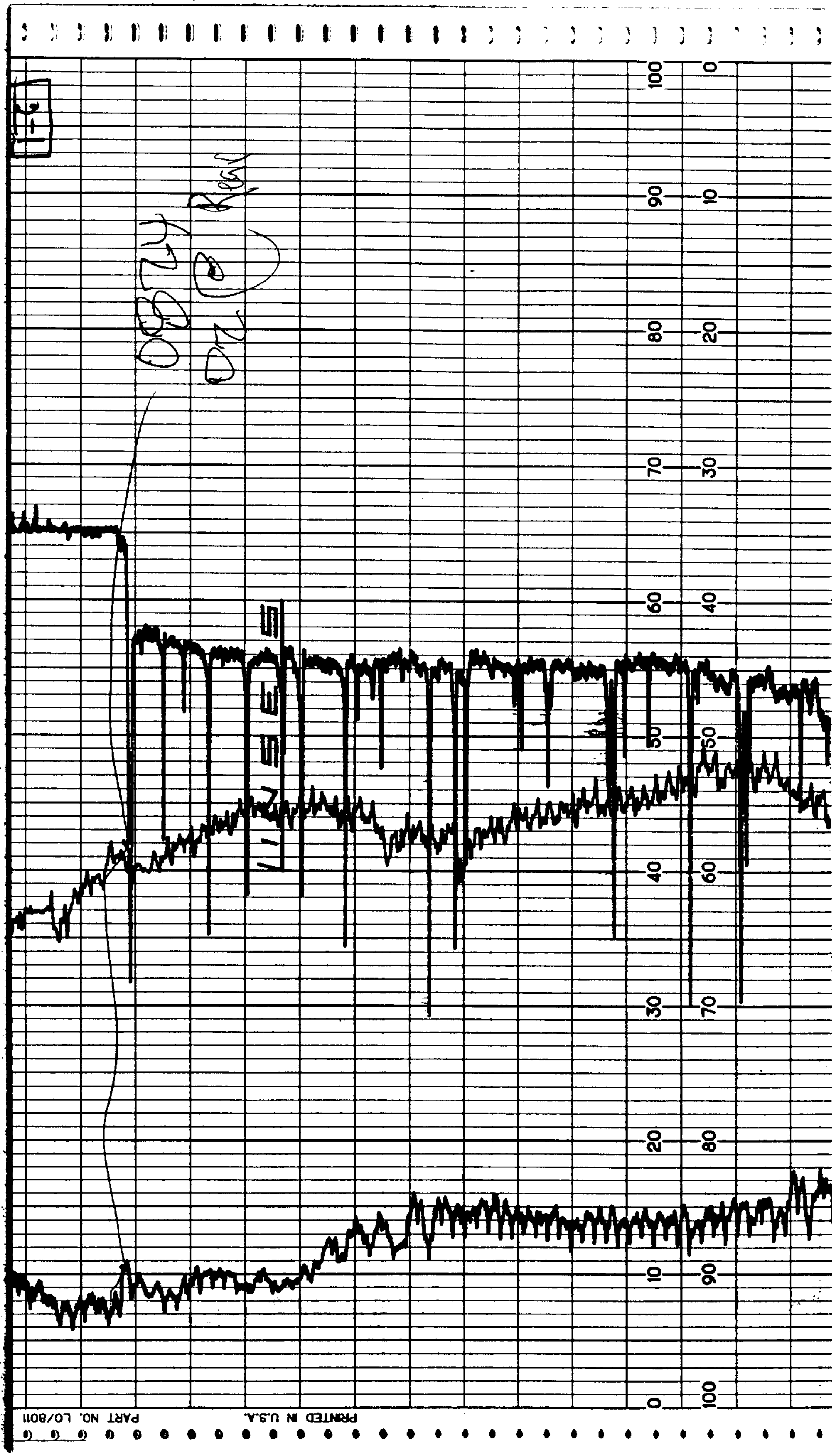
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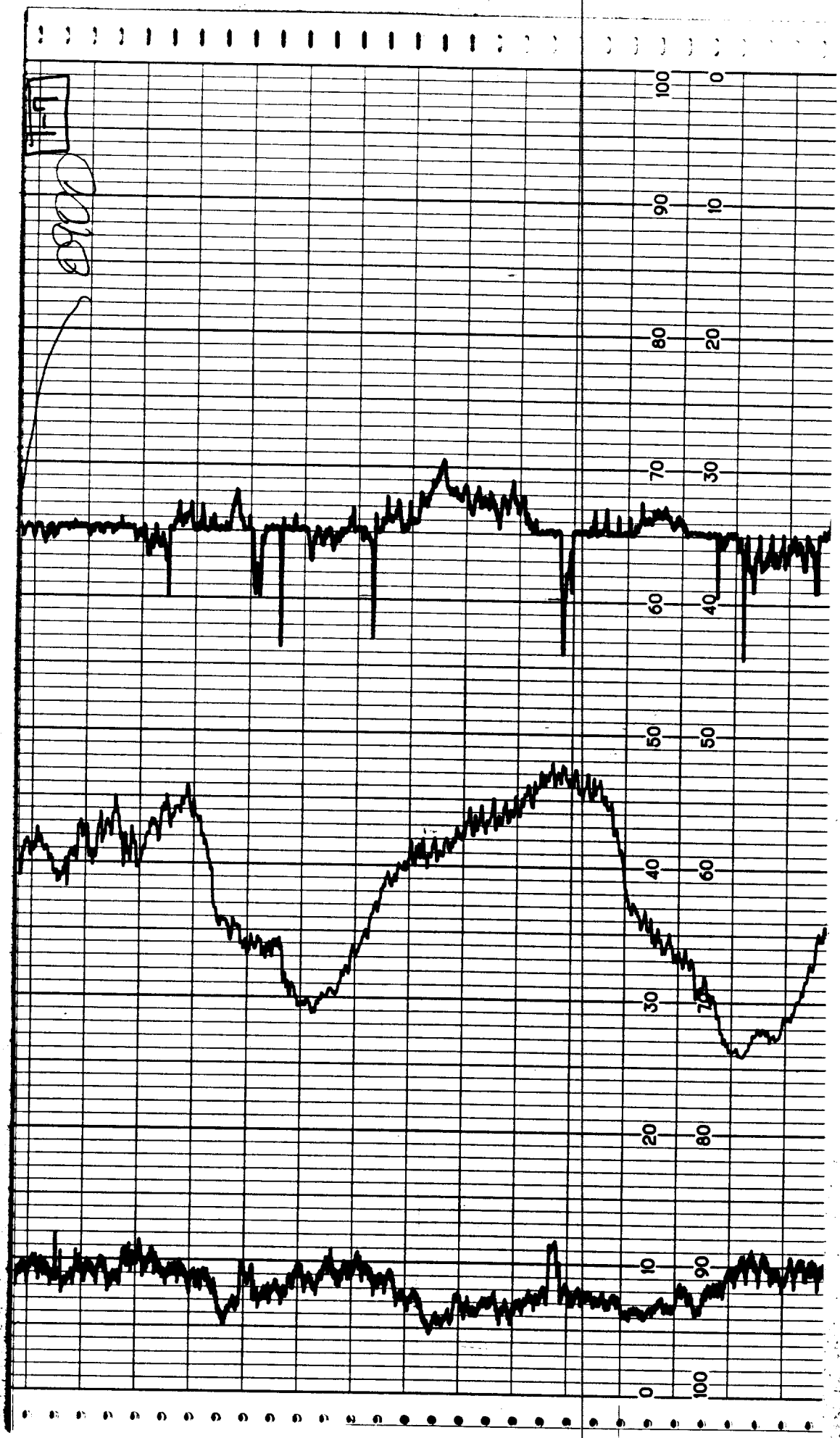
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50 50
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30 70
20 80
10 90
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T-8

TIME 0910

VISES

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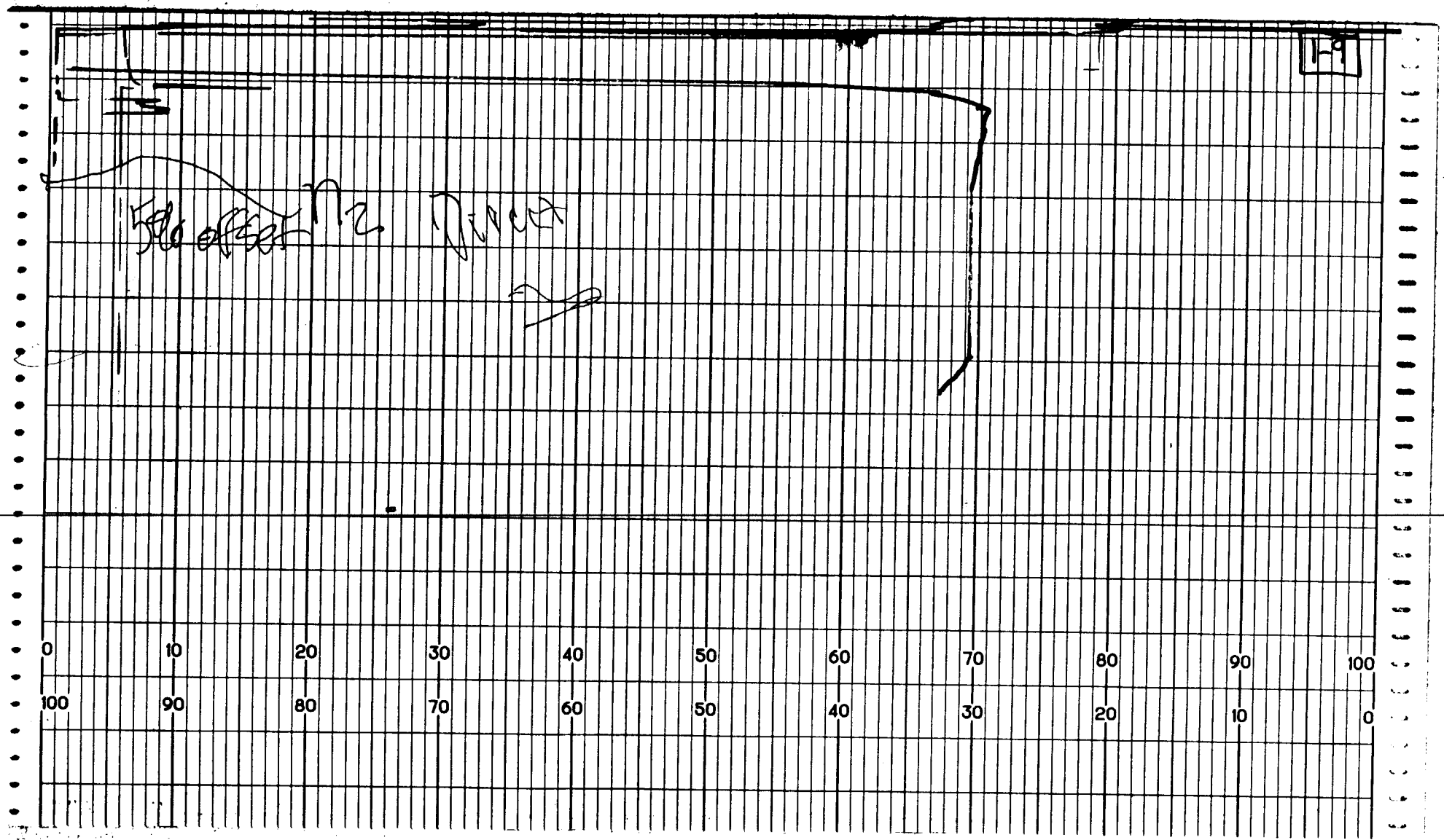
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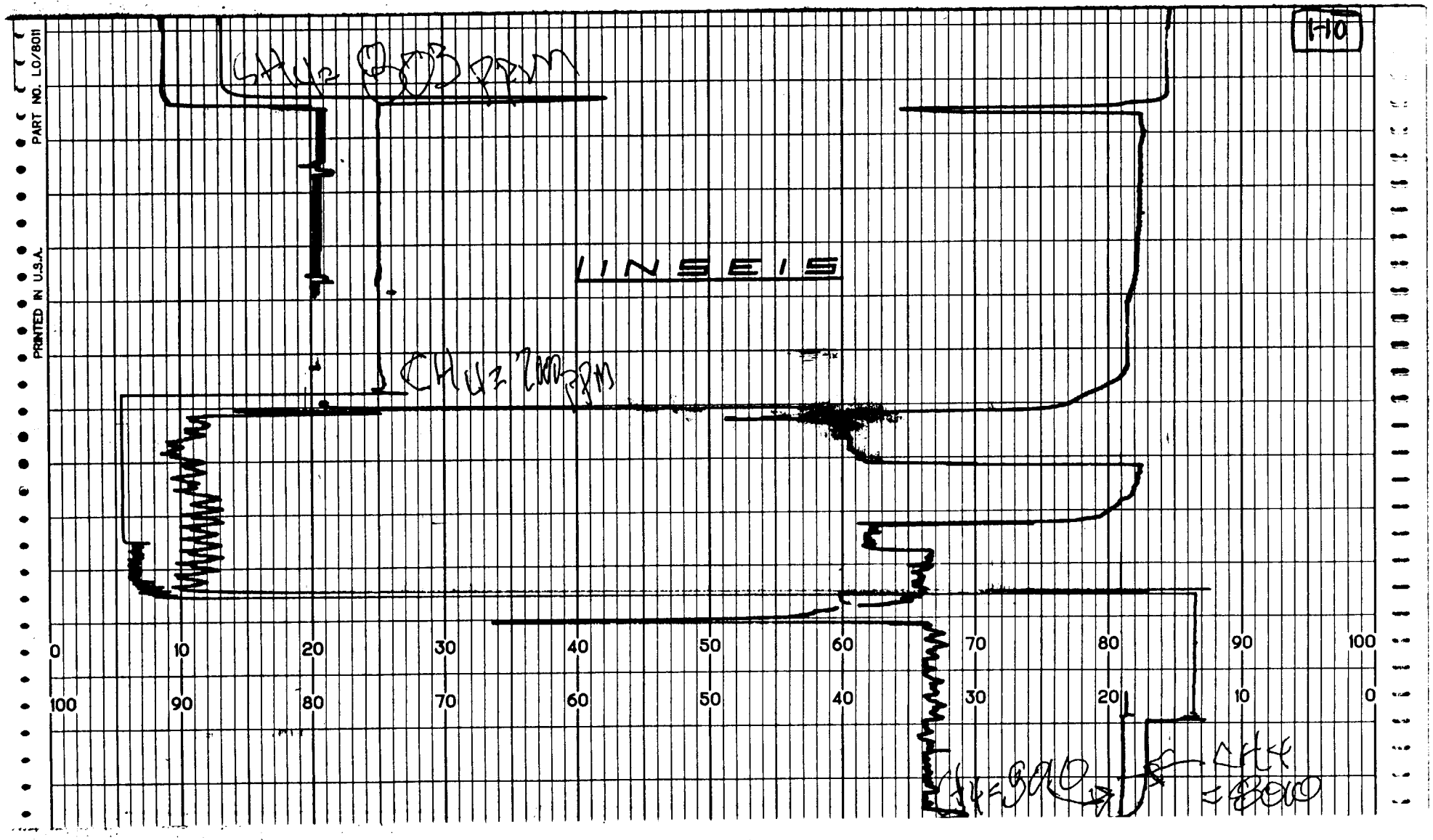
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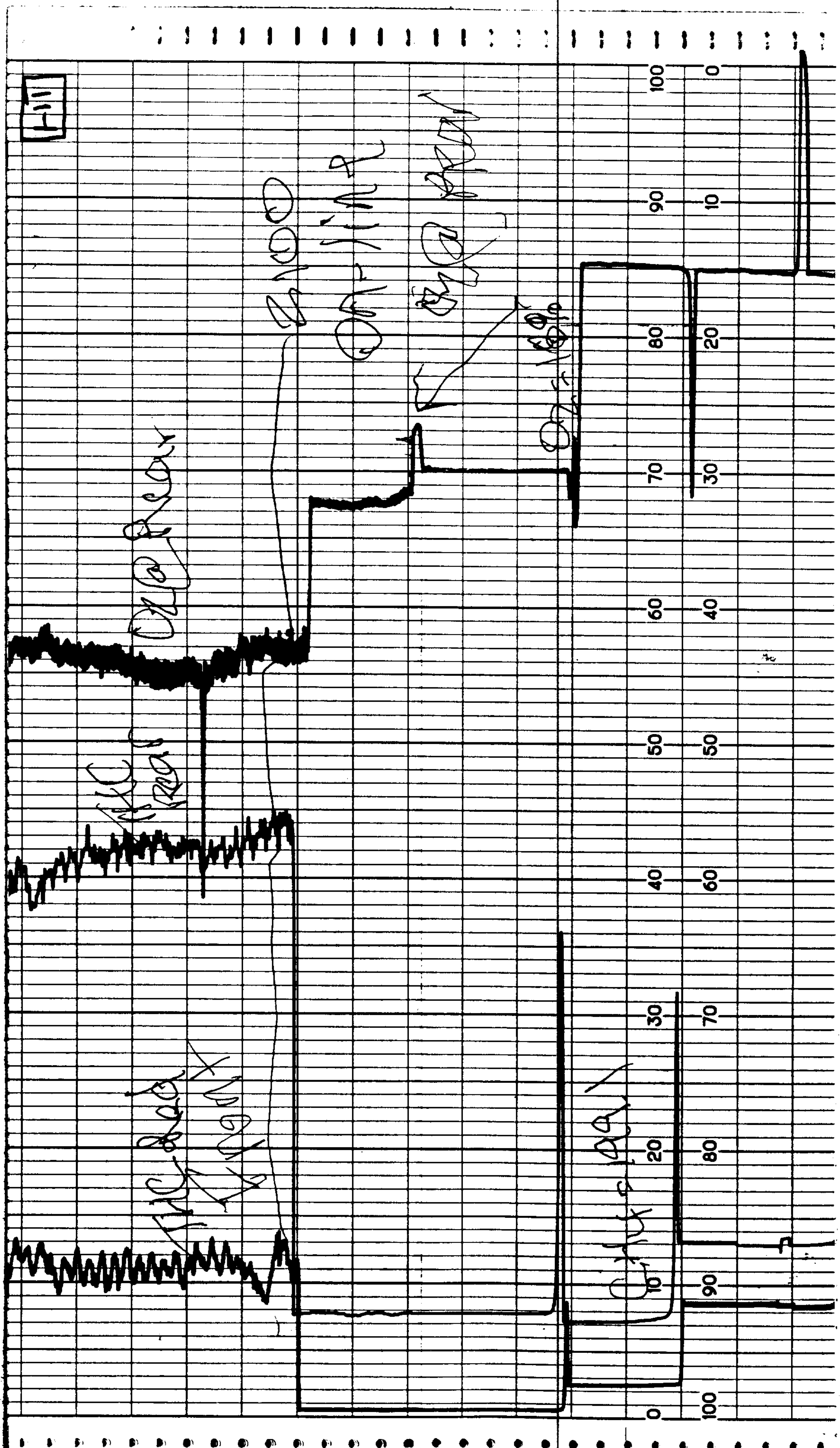

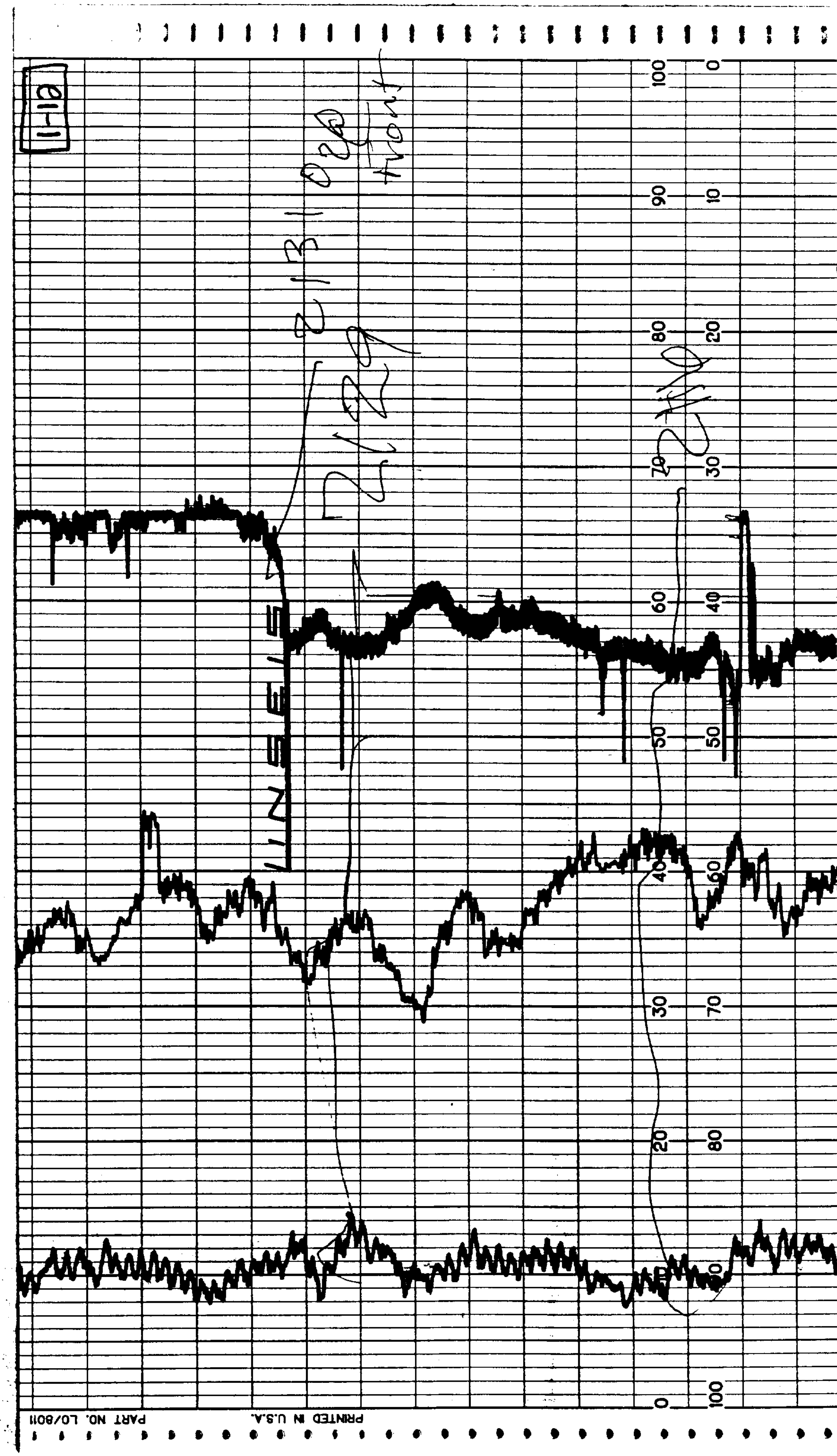
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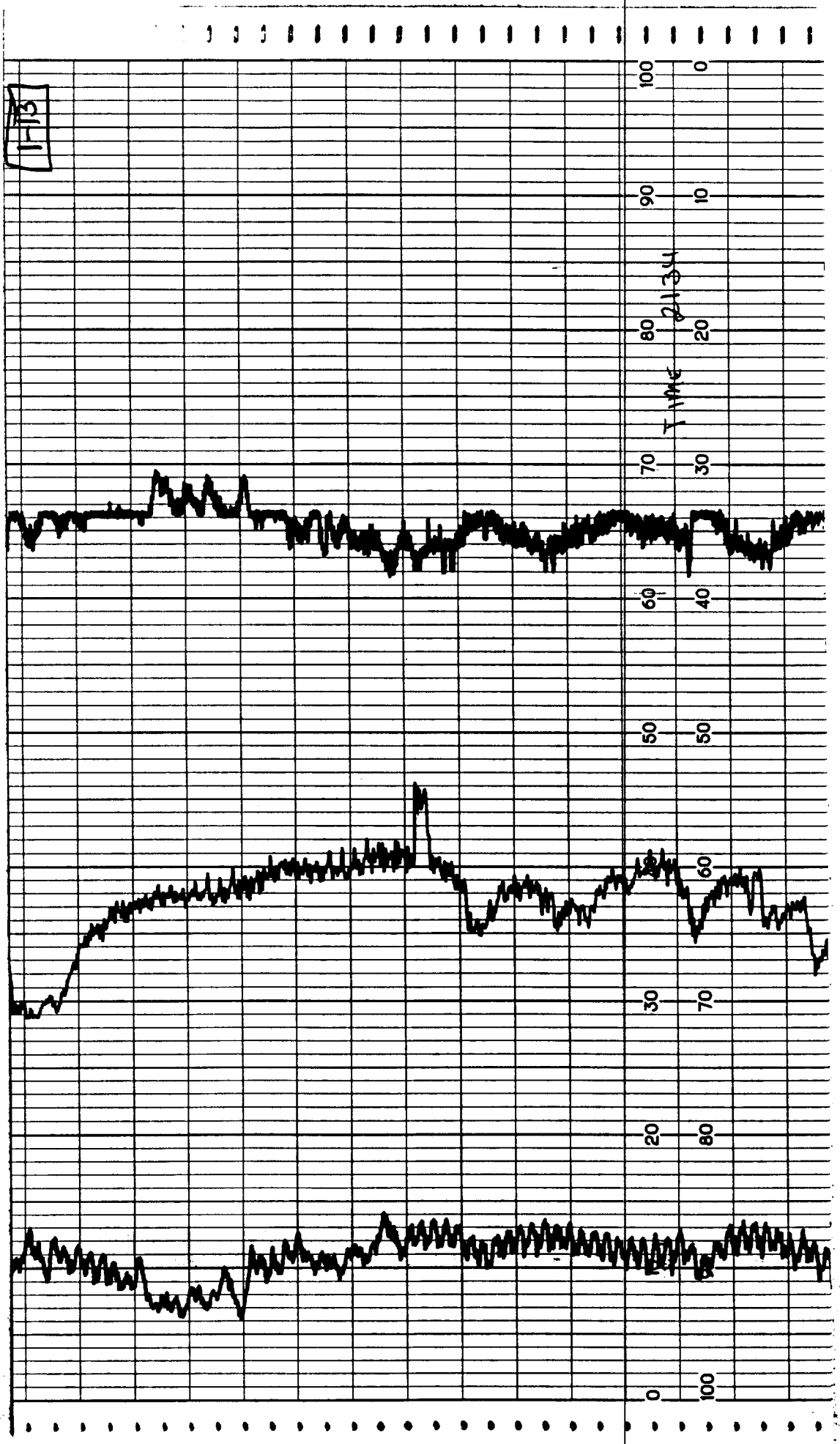
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11-14
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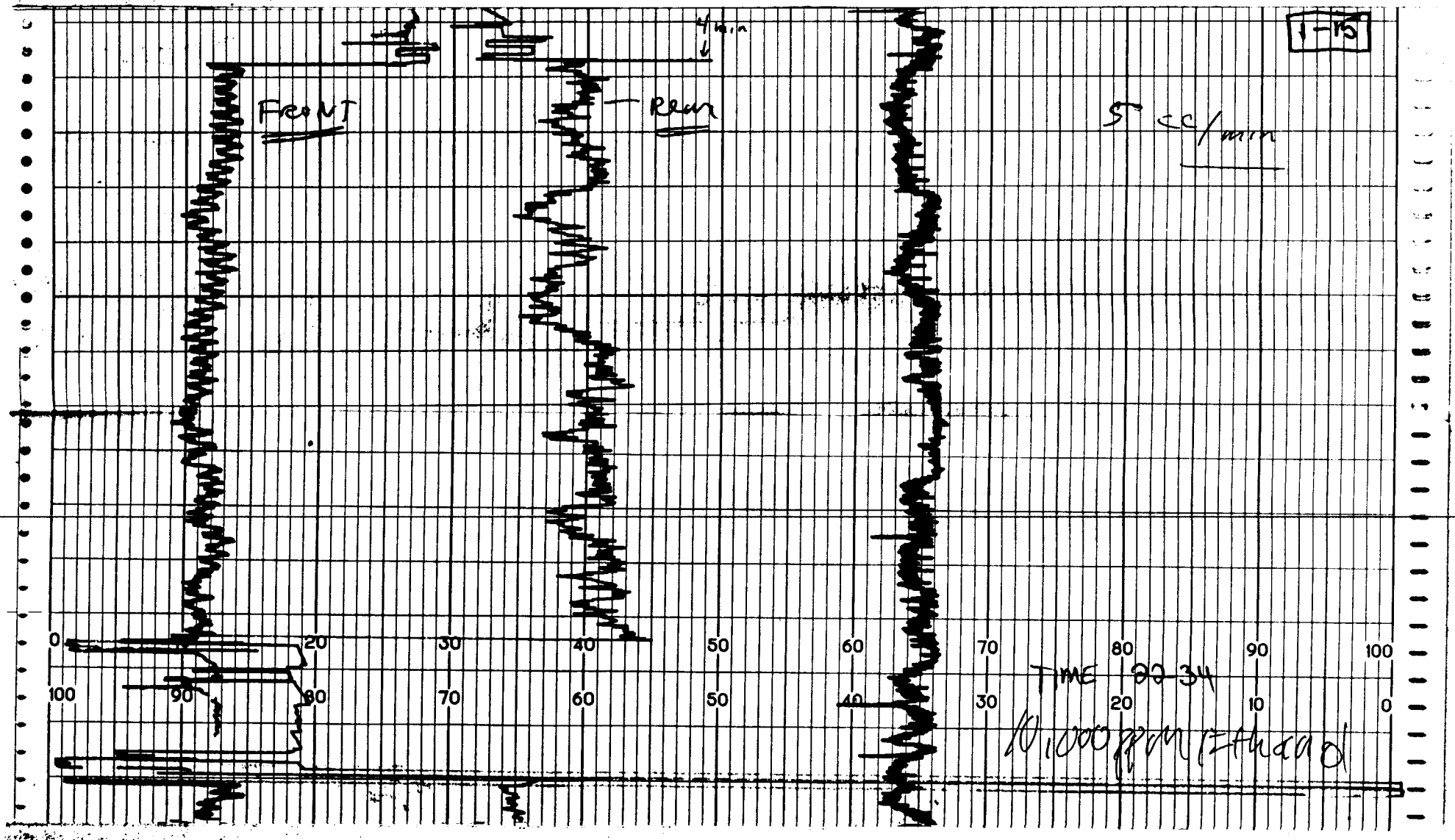
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Rear
5 cc/min
4 min
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TIME 22:34
10,000 RPM (Thread)

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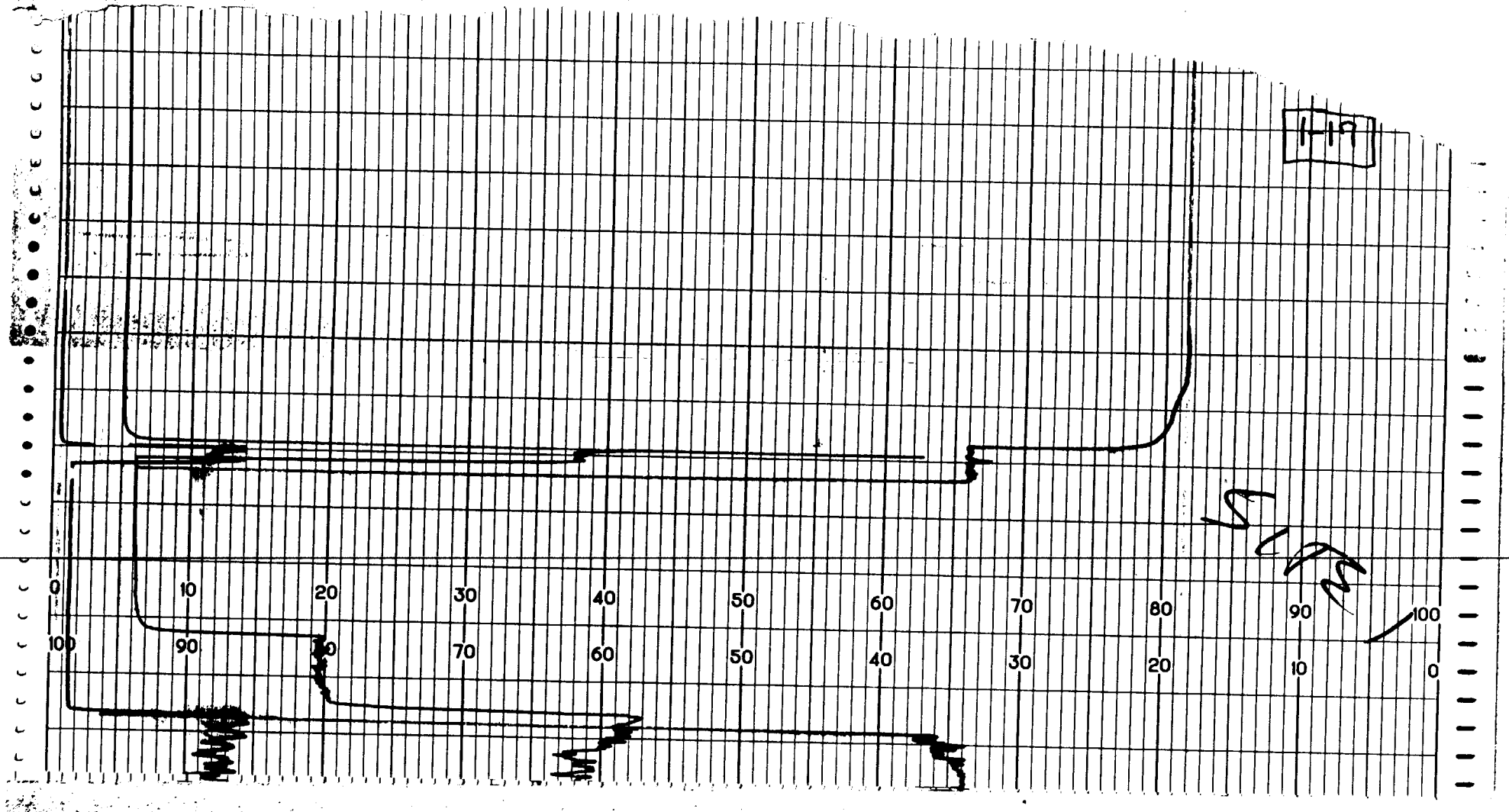
PART NO. L0/8011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