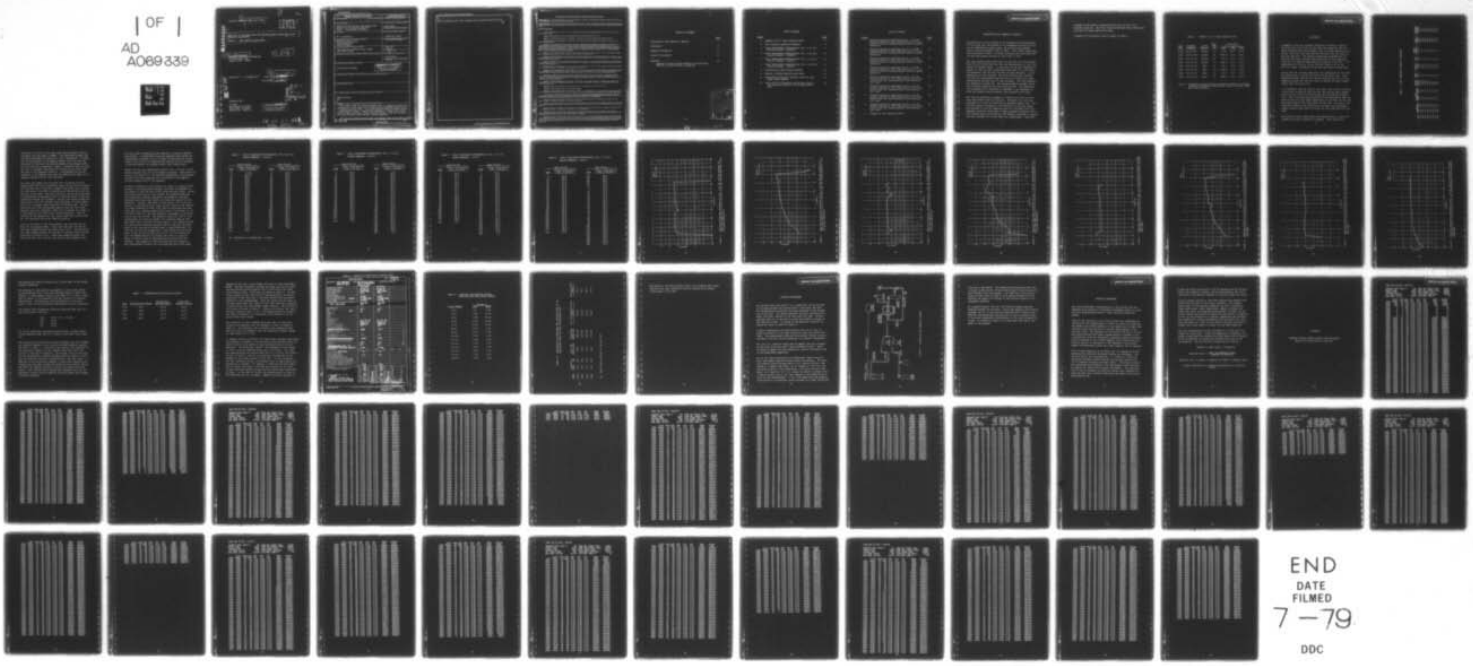
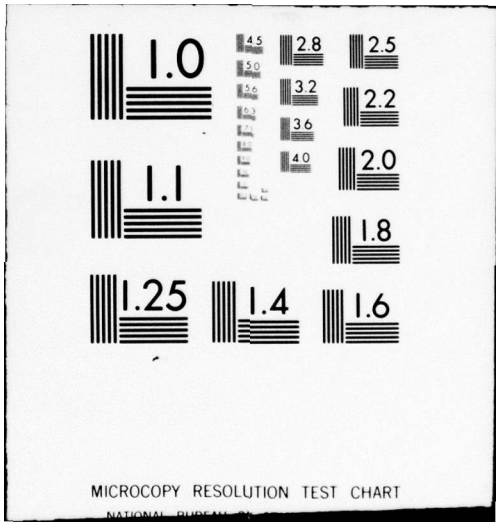
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(6) ANALYSIS OF THE EMISSIONS FROM STORAGE TANKS DURING JP-4 FUEL TRANSFER OPERATIONS.

PHASE I. WARM WEATHER CONDITIONS.

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This report summarizes the warm weather phase of a program to measure the concentration of JP-4 vapor that is emitted to the atmosphere during filling of underground storage tanks. Tests were conducted with and without pressure - vacuum breather valves. Samples were analyzed by a portable total hydrocarbon analyzer containing a flame ionization detector. Data was recorded at one minute intervals during the fuel transfer operations.

All data was collected during August and September 1978 from 50,000 (continued)

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gallon underground JP-4 fuel storage tanks at Wright-Patterson AFB, OH.

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INTRODUCTION AND SUMMARY OF RESULTS

The objective of this program is to determine the concentration of JP-4 vapor that is emitted to the atmosphere during the filling of underground storage tanks, during both warm weather (~85°F) and cold weather (40°F or less). This report summarizes data collected at Area C of Wright Patterson Air Force Base during the warm weather portion of the study in 1978.

The test program began after Tank 273 and Tank 275 were cleaned. Tank 273 was filled with JP-4 fuel and maintained in a full condition for several weeks. At the start of the test sequence on August 24, the fuel was transferred from Tank 273 to 275 while the emissions from the vent of Tank 275 were measured. At the completion of this transfer, the flow direction was reversed and fuel was transferred from Tank 275 to 273 while the vapor concentration emitted from 273 was measured. The test sequence was repeated on August 28. The vacuum-pressure breather valve was in normal operation for both test periods. Two additional test sequences were conducted on September 1 and September 8, with the pressure-vacuum breather valve manually held open.

The vent was partially enclosed in a Mylar film tent to eliminate wind effects and air dilution. The Mylar film tent was connected to a dilution device by an aluminum sample line. The dilution device, providing a 1:20 dilution of the vent vapor, was attached to the gas sampling valve of a portable total hydrocarbon analyzer containing a flame ionization detector (FID). The diluted vapor was burned and the detector provided a response that was recorded on a strip chart as a sharp peak. Data were

recorded at one minute intervals during the 2-2½ hour fuel transfer operation. The fuel flow was reversed and an additional 2-2½ hours of measurements were made.

A summary of the emission data is shown in Table 1.

TABLE 1. SUMMARY OF JP-4 VAPOR EMISSION DATA

1978 Date	Transfer Sequence	Valve Position	Fuel Temp. (°F)	Emissions (Vol. % as CH_4) Avg.	Min.	Max.
8/24	273 to 275	Closed	70	42.9	38.9	44.0
8/24	275 to 273	Closed	70	Note A	19.4	44.0
8/28	273 to 275	Closed	69	39.2	37.0	41.0
8/28	275 to 273	Closed	70	Note A	22.8	49.6
9/01	273 to 275	Open	70	38.7	36.6	43.8
9/01	275 to 273	Open	73	Note A	17.0	38.8
9/08	273 to 275	Open	70	40.6	39.5	42.5
9/08	275 to 273	Open	69	Note A	32.5	40.5

Note A - Emissions on these transfer sequences tended to increase gradually through the test period, thus an average value has little meaning.

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DISCUSSION

A summary of the fuel transfer operations is shown in Table 2. The first four data lines in the table are concerned with the tests conducted with the breather valve in normal operating condition, while the last four provide the data with the valve in the open position. The ambient temperature exceeded 85°F for three of the eight transfer operations and for the remaining five runs the ambient temperature was between 79 and 85°F. The temperature of the fuel in the tank was found to be in the 69°-73°F range, considerably less than the ambient temperature.

During the fuel transfer operation, the temperature of the vapor was measured as it exited the vent into the Mylar tent. The aluminum colored vents were in direct sunlight for most of the sampling periods and care was taken to shield the vapor thermocouple from the direct sun.

It is apparent from the results that some vapor heating occurred in the vent as shown by the fact that the average vapor temperature for six of the runs was higher than the ambient temperature. This is further substantiated by the observation that for most of the runs, the vapor temperature at the start of the runs was higher than in the latter part of the runs. Initially, the vapor was heated by the vent and as the vapor flow continued, gradual cooling took place as cooler air was displaced from the tank.

The receiving tank liquid depth was measured prior to start of transfer and when transfer was complete. This figure was

TABLE 2. FUEL TRANSFER OPERATION SEQUENCE

Date	Time Start	Time Finish	Tank Transfer Sequence From	Tank Transfer Sequence To	Breather Valve Position	Ambient Temp. °F	Barometric Pressure " Hg	Fuel Temp. °F	Average Vapor Temperature °F	Fuel Transferred (gal)	Flow Rate Calculated gal/min
8/24	1218	1423	273	275	Closed	86	29.52	70	87	46555	372.4
8/24	1515	1736	275	273	Closed	86	29.52	70	85	42540	301.7
8/28	1148	1350	273	275	Closed	78	29.32	69	87	46444	380.7
8/28	1415	1639	275	273	Closed	80	29.34	70	90	44300	307.0
9/01	1041	1242	273	275	Open	83	29.70	70	82	46000	380.2
9/01	1258	1523	275	273	Open	79	29.46	73	89	45475	313.6
9/08	1146	1357	273	275	Open	83	30.04	70	85	46078	351.0
9/08	1500	1730	275	273	Open	90	30.01	69	97	46355	309.0

converted to gallons in the tank using the conversion factors available from the staff at WPAFB. The difference between the two values provided the quantity of fuel transferred. As there were no flow meters in the pumping system, the flow rate was calculated by dividing the gallons pumped by the pumping time. The flow rate data presented in Table 1 indicates that the pumping rate in transfer from Tank 275 to Tank 273 was lower than the rate in the opposite direction. Considerable day to day variation in the pumping flow rate was observed and there is no apparent explanation for this variation.

The vapor was pumped from the Mylar tent enclosing the vent through about 100 feet of aluminum tubing to the dilution device. The dilution device contained a sample flow meter and a diluent gas flow meter to provide an indication of the dilution and variability of the flow. The actual dilution factor was determined by experimental measurements prior to each run using a high concentration methane gas standard. Typical flow rates through the system were 0.19-0.21 standard cubic feet/hour of vapor sample and 3.9-4.0 standard cubic feet/hour of dilution gas. The sampling flow rate was considerably smaller than the vent vapor emission rate and, therefore, there was no outside air drawn into the sampling tent during the filling operation. This was verified by the observation that vapor fumes were visible from the tent openings during the sampling periods.

Prior to the start of the test program, the fuel was held in Tank 273 for several weeks. After the first test day (8/24), four days elapsed before the second test (8/28). An additional four days elapsed between the 2nd day of testing (8/28) and the third day of testing (9/1). Seven days elapsed between the third test day (9/1) and the final day of this sequence (9/8).

The JP-4 vapor concentration was measured in terms of methane equivalents. A calibration curve was prepared using known concentrations of methane in air in order to determine the linear range of the FID and to establish the dilution factor necessary to provide samples for analysis within this linear range.

Tables 3-6 list the concentration data in Vol. % as CH_4 at five minute intervals for all of the sampling periods. These data are plotted in Figures 1-8. The detailed information at one-minute intervals for each sampling run is provided on the computer printout sheets given in the Appendix.

As shown in Tables 2-5 and Figures 1-8, there is a distinct difference in the hydrocarbon emission rate that is dependent on the length of time the tank to be filled has been empty. During the periods when Tank 275 was filled, the observed emissions were relatively constant throughout the sampling intervals. Emissions were much lower before and after the actual filling operation. However, when Tank 273 was filled, the filling occurred in a relatively short time interval after it was emptied. The tests conducted on 8/24, 8/28, and 9/1 indicated the emissions were at a reduced concentration level at the start of the filling of Tank 273, and then gradually increased in concentration as the tank filled. The apparent reason for this is that considerable air would be present in a recently emptied tank that would tend to dilute the fuel vapors. Over longer periods, the vapors would gradually displace the air and thus the head space in the tank would contain vapor in equilibrium with the tank fuel at the fuel temperature. This effect was not as obvious in the filling of Tank 273 on 9/8. In this particular test, the WPAFB operator circulated the fuel in a loop for about 35 minutes prior to the beginning of the actual fuel transfer. This appears to have agitated the fuel enough so that considerable dilution air was displaced and liquid-vapor

TABLE 3. TOTAL HYDROCARBON CONCENTRATION (VOL. % AS CH_4) DURING TRANSFER - 8/24/78

Tank 273-275		Tank 275-273	
Time	Actual Concentration (Vol. % as CH_4)	Time	Actual Concentration (Vol. % as CH_4)
-3	1.16	0	17.2
0	N.A.(A)	5	19.4
5	40.6	10	20.9
10	42.8	15	23.4
15	42.8	20	27.1
20	44.0	25	29.3
25	42.8	30	31.6
30	42.8	35	32.1
35	44.0	40	33.3
40	43.4	45	34.4
45	43.4	50	34.9
50	43.4	55	36.1
55	43.4	60	37.2
60	38.9	65	38.3
65	41.7	70	38.3
70	42.3	75	38.9
75	42.3	80	38.9
80	42.8	85	40.6
85	43.4	90	40.6
90	42.8	95	40.6
95	42.8	100	41.7
100	43.4	105	41.7
105	43.4	110	41.7
110	43.4	115	42.3
115	44.0	120	42.3
120	44.0	125	41.7
125	44.0	130	44.0
126	42.3	135	43.4
127	17.5	140	44.0
128	2.3	145	19.2
129	1.7	150	6.2
Avg.	42.9		

(A) Adjustment of attenuation - no data

TABLE 4. TOTAL HYDROCARBON CONCENTRATION (VOL. % AS CH_4) DURING TRANSFER - 8/28/78

Tank 273-275	
Time	Actual Concentration (Vol. % as CH_4)
0	38.7
5	40.4
10	33.6
15	39.8
20	39.3
25	39.9
30	39.9
35	39.9
40	39.3
45	39.9
50	39.9
55	40.4
60	39.9
65	40.4
70	40.4
75	40.4
80	39.9
85	39.3
90	38.7
95	34.2
100	39.3
105	39.3
110	37.0
115	41.0
120	40.4
122	37.0
Avg.	39.2

Tank 275-273	
Time	Actual Concentration (Vol. % as CH_4)
0	1.6
5	22.8
10	20.5
15	21.6
20	23.9
25	28.2
30	31.3
35	33.6
40	35.3
45	34.7
50	36.5
55	37.0
60	37.0
65	38.7
70	39.9
75	41.0
80	41.0
85	41.6
90	39.3
95	43.9
100	43.3
105	49.6
110	47.3
115	46.1
120	46.1
125	43.3
130	45.0
135	45.0
140	45.6
143	43.3
144	22.2
145	12.5
146	11.4
147	9.1

TABLE 5. TOTAL HYDROCARBON CONCENTRATION (VOL. % AS CH_4) DURING TRANSFER - 9/1/78

Tank 273-275	
Time	Actual Concentration (Vol. % as CH_4)
0	43.3
5	43.8
10	37.9
15	37.7
20	37.7
25	38.2
30	38.2
35	37.7
40	37.2
45	37.7
50	37.7
55	37.7
60	38.2
65	38.8
70	38.2
75	38.2
80	38.2
85	38.2
90	38.8
95	39.3
100	39.3
105	40.3
110	40.3
115	41.4
120	36.6
121	36.6
Avg.	38.7

Tank 275-273	
Time	Actual Concentration (Vol. % as CH_4)
0	10.1
5	17.0
10	17.5
15	19.6
20	21.8
25	23.4
30	26.0
35	27.6
40	28.1
45	29.2
50	29.7
55	30.8
60	31.9
65	32.4
70	32.9
75	30.8
80	35.0
85	35.6
90	35.0
95	35.6
100	36.6
105	36.6
110	37.2
115	37.2
120	37.7
125	38.2
130	38.2
135	38.2
140	38.8
145	25.5
146	20.2
147	11.6
148	7.4
149	4.2

TABLE 6. TOTAL HYDROCARBON CONCENTRATION (VOL. % AS CH_4) DURING TRANSFER - 9/8/78

Tank 273-275		Tank 275-273	
Time	Actual Concentration (Vol. % as CH_4)	Time	Actual Concentration (Vol. % as CH_4)
0	20.0	-35	19.2
5	40.0	-30	20.0
10	40.5	-25	24.0
15	41.0	-20	26.0
20	41.0	-15	27.5
25	41.5	-10	32.0
30	41.0	-5	32.0
35	41.0	0	34.0
40	41.0	5	32.5
45	40.5	10	36.0
50	40.5	15	36.5
55	40.0	20	37.0
60	39.5	25	37.0
65	39.5	30	38.5
70	39.5	35	38.5
75	39.5	40	38.5
80	40.0	45	38.5
85	40.0	50	39.0
90	40.5	55	39.5
95	40.0	60	38.5
100	40.0	65	39.0
105	41.0	70	39.5
110	41.0	75	39.5
115	40.5	80	40.0
120	41.0	85	40.0
125	42.5	90	40.0
130	41.0	95	40.0
131	41.0	100	40.5
132	41.0	105	40.0
133	41.0	110	40.5
Avg.	40.6	115	40.5
		120	40.5
		125	40.0
		130	40.5
		135	40.0
		140	40.5
		145	40.5
		150	39.5

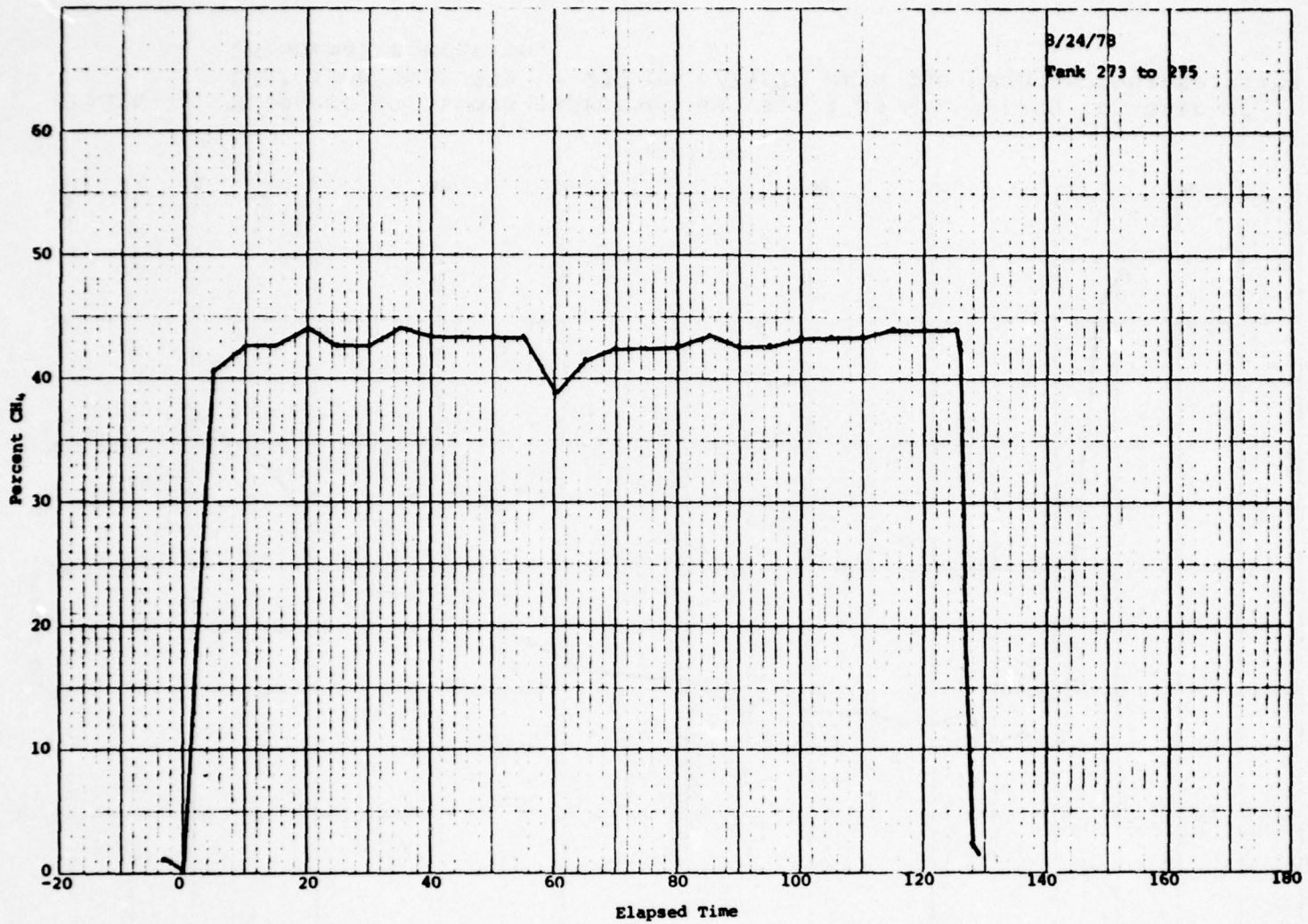


Figure 1. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 273 to 275 on 8/24/78 with the vacuum-pressure valve in normal operation.

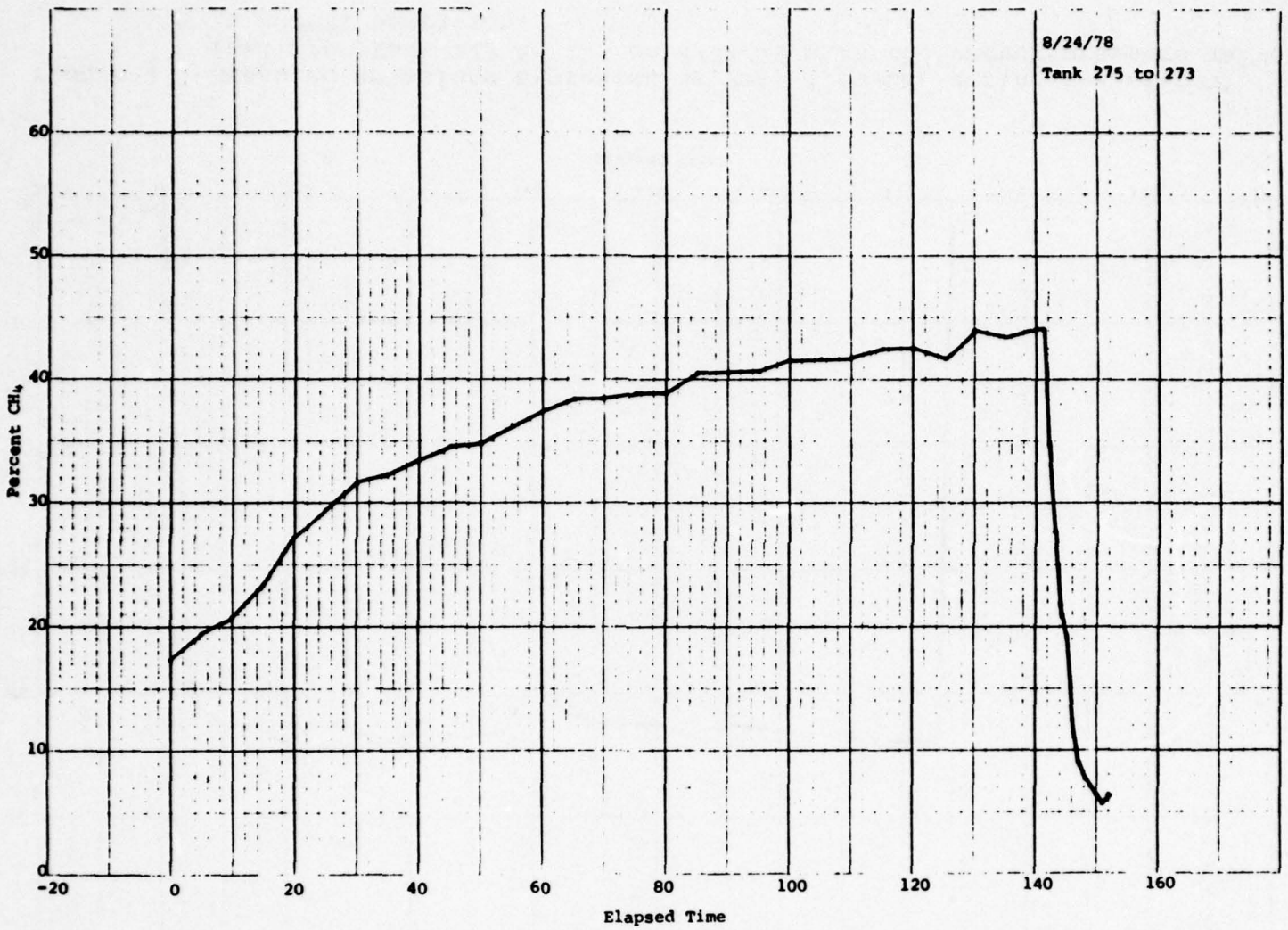


Figure 2. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 275 to 273 on 8/24/78 with the vacuum-pressure valve in normal operation.

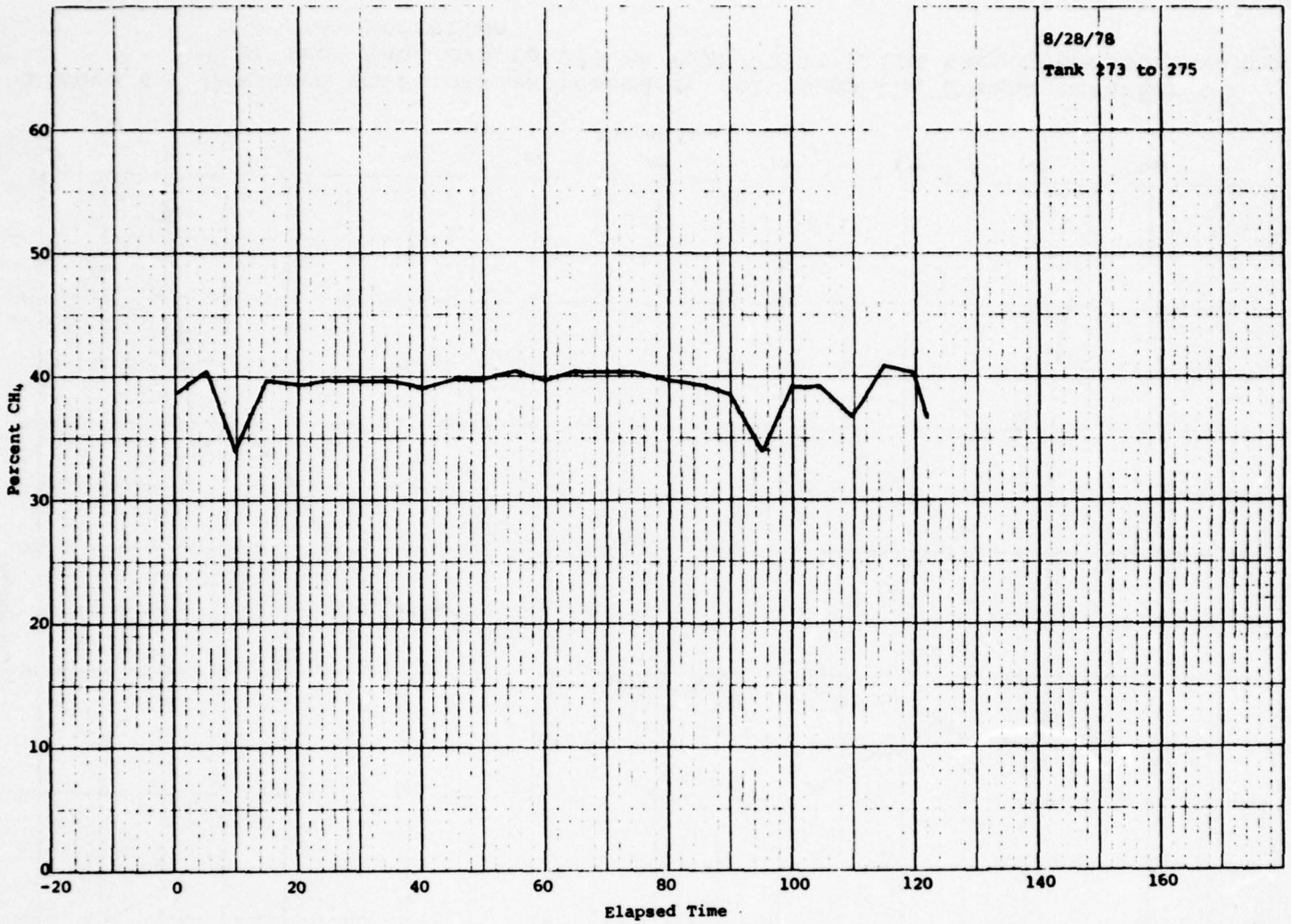


Figure 3. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 273 to 275 on 8/28/78 with the vacuum-pressure valve in normal operation.

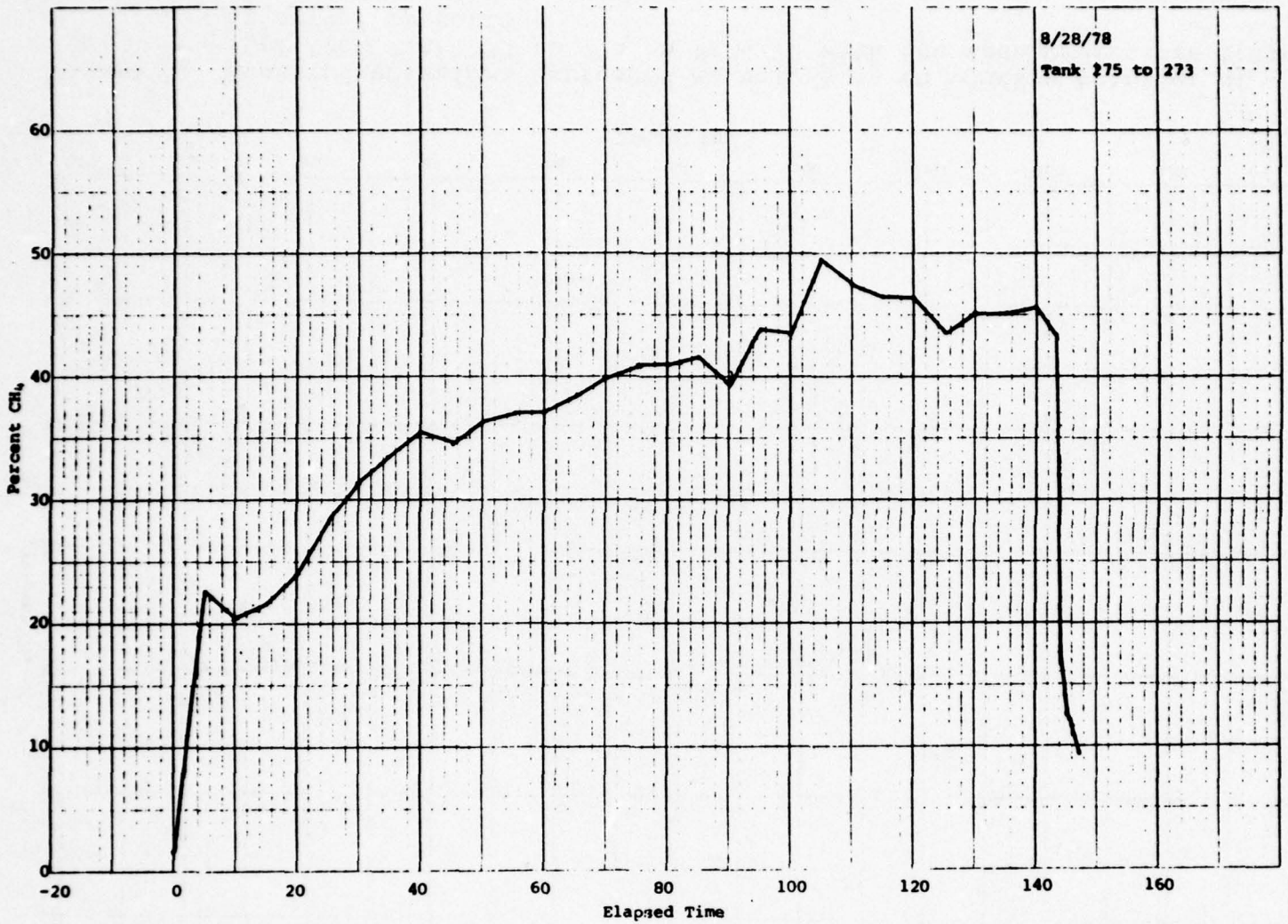


Figure 4. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 275 to 273 on 8/28/78 with the vacuum-pressure valve in normal operation.

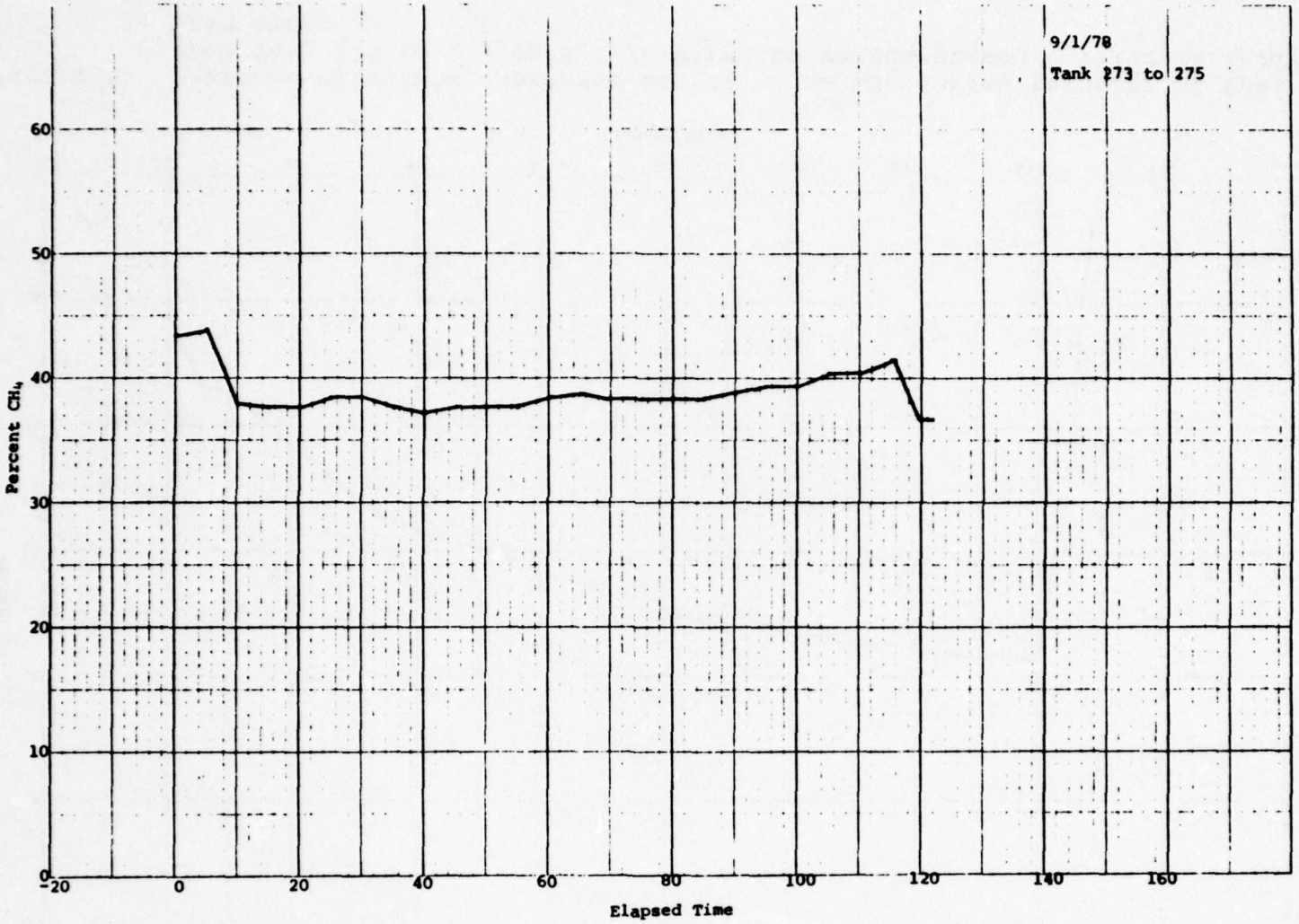


Figure 5. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 273 to 275 on 9/1/78 with the vacuum-pressure valve manually held open.

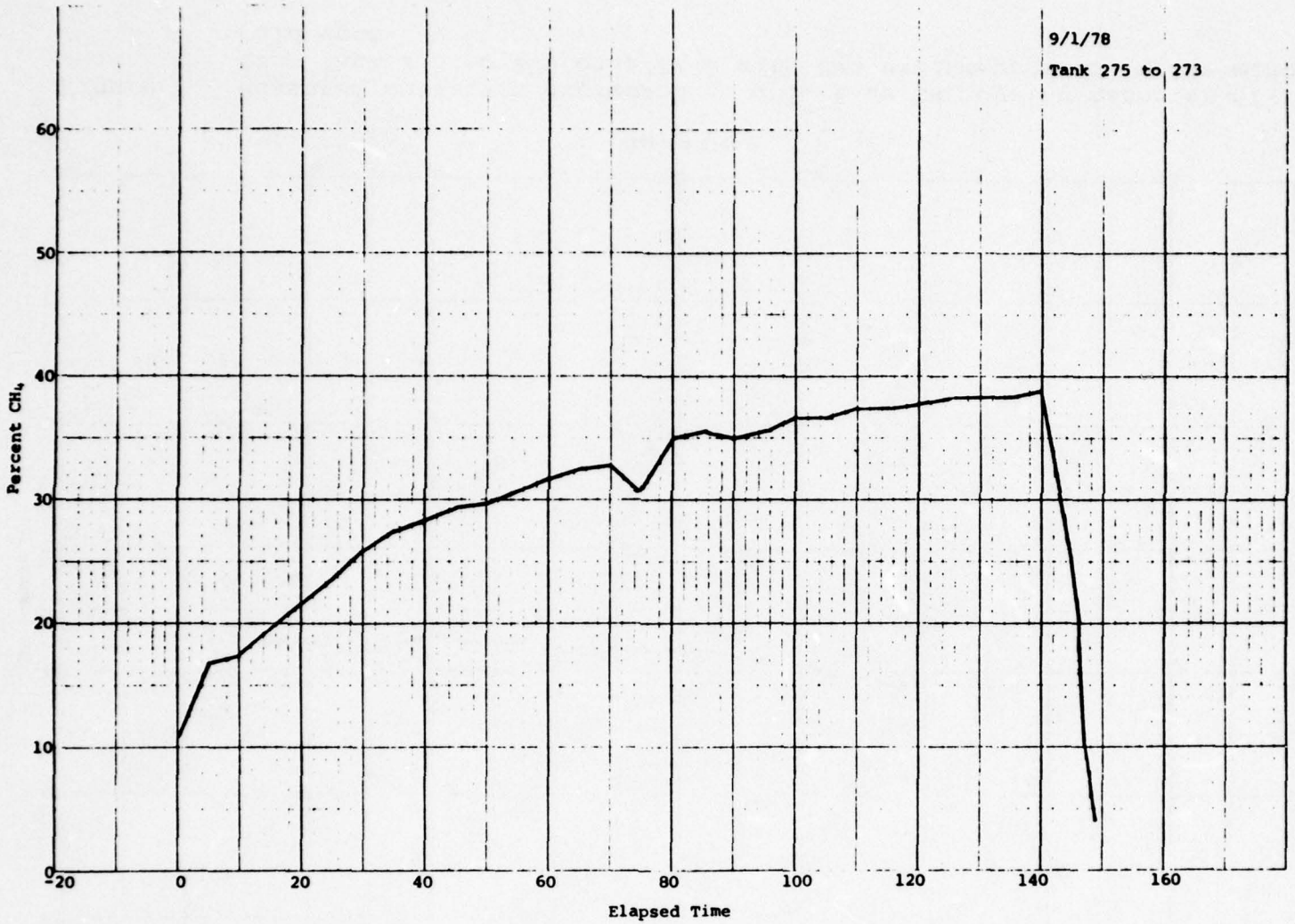


Figure 6. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 275 to 273 on 9/1/78 with the vacuum-pressure valve manually held open.

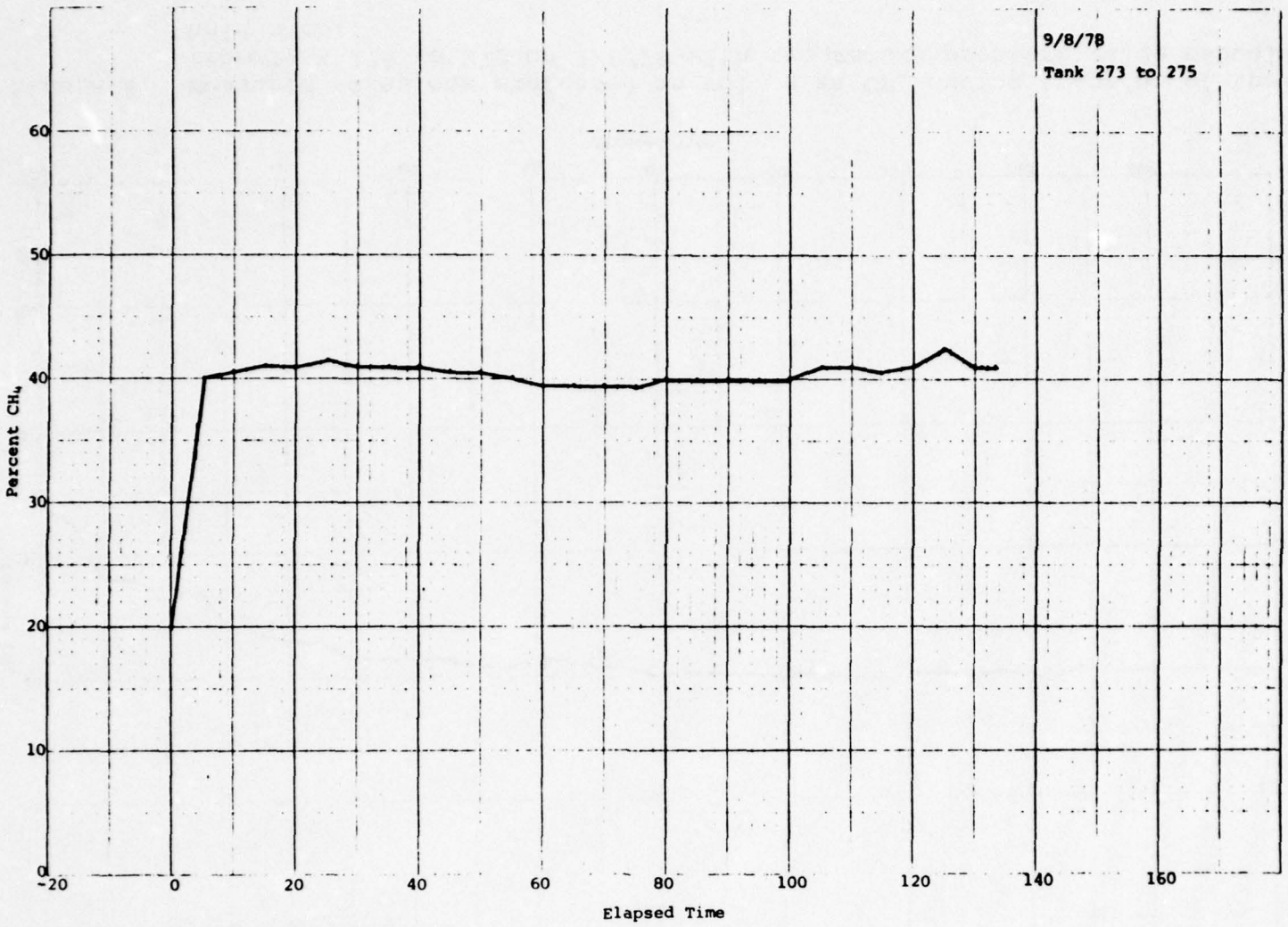


Figure 7. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 273 to 275 on 9/8/78 with the vacuum-pressure valve manually held open.

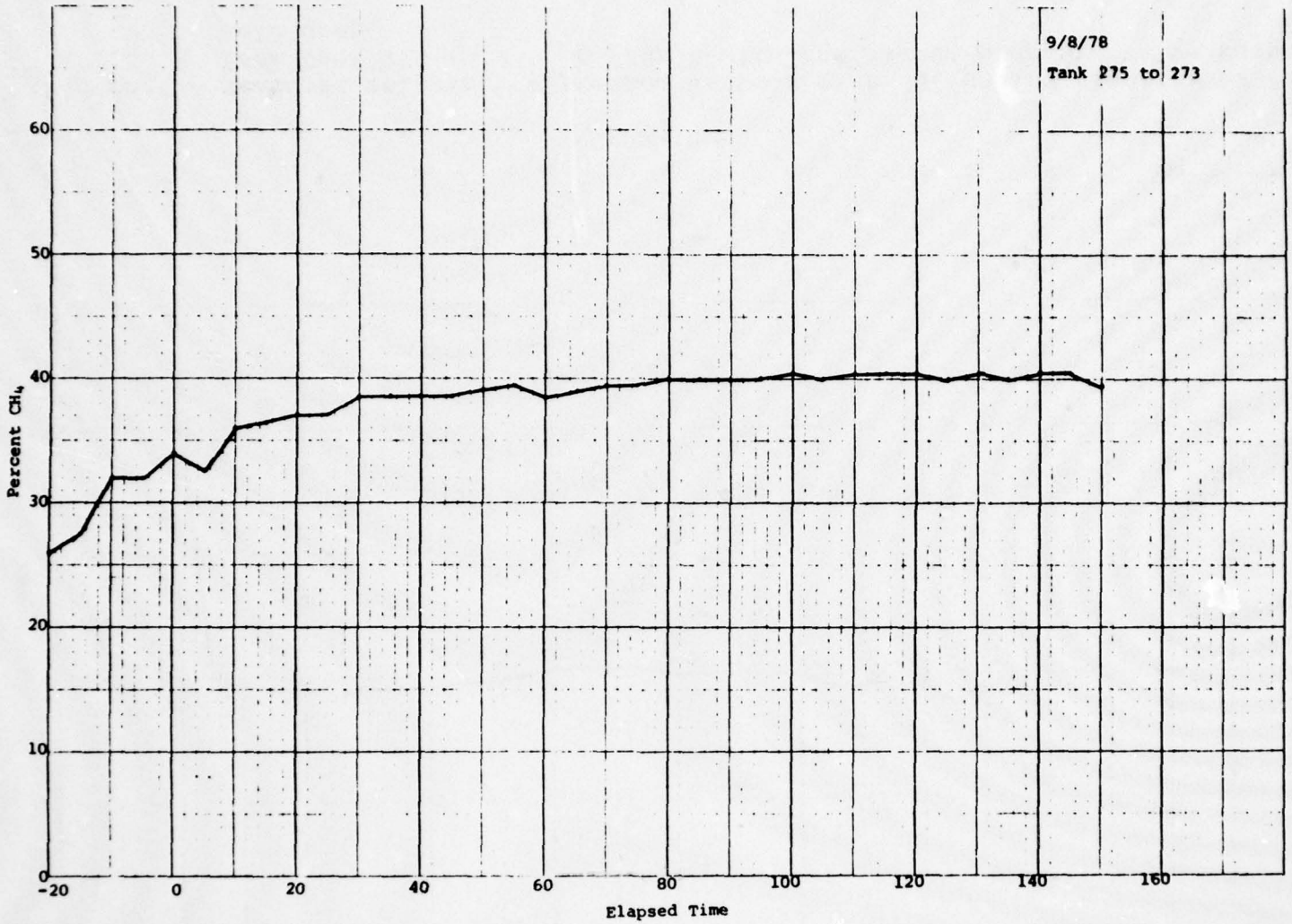


Figure 8. Measured emissions expressed as vol. % as CH_4 during transfer of fuel from Tank 275 to 273 on 9/8/78 with the vacuum-pressure valve manually held open.

equilibrium was nearly attained prior to the start of the actual transfer operation.

The presence of the breather cap appears to have little effect on the emissions from a tank that has been empty for some time. However, it would appear, based on the data of 9/1, that it does have an effect on the emissions from the filling of a recently emptied tank. Unfortunately, the recirculation of the fuel prior to the run on 9/8 prevents confirmation of this conclusion.

The average total hydrocarbon emissions measured when Tank 275 was filled were as follows:

8/24	42.9% (vol. % as CH_4)
8/28	39.2%
9/1	38.7%
9/8	40.6%

Due to the constantly increasing emission rate, average values of the emissions when Tank 273 is being filled have little meaning.

The concentration and dilution factors obtained from the standard gas mixtures (methane in air) during the WPAFB sampling periods are shown in Table 7. Calibration gas mixtures were analyzed before sampling, between the two transfer steps and after completion of each day of sampling. The average value of the slope for the concentration against response curve was used to calculate the measured (diluted) concentration of the fuel vapor. In addition to the calibration samples, a known high concentration standard was analyzed through the dilution device before, during and after the sampling periods to obtain the average dilution factor. This average factor showed good agreement with the approximate dilution factors obtained from the sample and nitrogen flow meter readings.

TABLE 7. CONCENTRATION AND DILUTION FACTORS

Date	Concentration Factor	Experimental Dilution Factor	Calculated Dilution Factor
8/24	.0433	20.34	22.05
8/28	.0466	19.10	22.05
9/01	.0426	19.47	19.57
9/08	.0401	19.47	19.57

Samples of the fuel in both Tanks (273 and 275) were analyzed at WPAFB. The data collected included the vapor pressure at 100°F, the API Gravity and the results from a distillation and other specification tests. These data are shown in Table 8. An additional sample of fuel from Tank 273 was analyzed by the Dayton Laboratory of MRC utilizing a simulated distillation procedure employing a gas chromatograph. Both the liquid and the vapor in the head space above the liquid at 70°F were analyzed to provide a weight percent for each carbon number interval. The results of this study are shown in Table 9. Based on this data, the vapor analysis indicates that at 70°F, the average molecular weight of the vapor corresponds to a hydrocarbon with between a six and seven carbon chain length.

The conversion of the % methane data when Tank 275 was being filled to the emission rate (as methane) in lb/hr is shown in Table 10. This emission rate is based on the assumption that each gallon of fuel added to the tank displaces an equal volume of vapor laden air at 70°F.

In summary, based on the data from these eight transfer operations, the presence or absence of the pressure-vacuum breather valve appears to have little effect on the emissions during a filling operation. The emissions, however, are dependent on the length of time a tank has remained empty prior to filling. If a tank has remained empty for several days prior to filling, the concentration of vapor in the air is relatively constant and is dependent on the vapor pressure of the fuel. In this situation, the fuel vaporizes and air is displaced until an equilibrium concentration is reached. If, however, a tank has only been empty for 1-2 hours, the vapor is diluted with outside air as insufficient time has elapsed for equilibrium liquid-vapor conditions to exist. As the tank is filled, the concentration of vapor in the displaced air will increase. Based on the data obtained in

TABLE 8. RESULTS OF WPAFB SPECIFICATION TESTS

FUELS TEST REPORT			DATE Completed 17 Aug 78
SUBMITTED BY 2750 ABW/DMSFT WPAFB OH 45324	TEST LABORATORY AND LOCATION Det 13 SA/ALC/SFQLA WPAFB OH 45433		ORIGIN OR CONTRACTOR
LABORATORY TEST NUMBER	78-F-1824	78-F-1825	
DATE RECEIVED IN LAB	16 Aug 78	16 Aug 78	
SPECIFICATION NUMBER	MIL-T-5624	MIL-T-5624	
GRADE NUMBER	JP-4	JP-4	
CONTRACT NUMBER			
QUANTITY REPRESENTED (GALS)	50,000	6,000	
TYPE CONTAINER AND NUMBER (Plain)	2 1-Gal Cans	2 1-Gal Cans	
SAMPLE NUMBER	78-1200	78-1201	
REMARKS (PERTAINING TO SAMPLE AS RECEIVED) EPA - Spec Tests	Tank Nbr 273	Tank Nbr 275	
LABORATORY DATA			
GRAVITY °A.P.I.	55.7	55.8	
WSIM MSS	98	98	
APPEARANCE			
COLOR			
ODOR			
WATER REACTION			
FREEZING POINT °F	0.0 #1 #1	0.0 #1 #1	
CORROSION	Below -72	Below -72	
EXISTENT GUM, MG/100 ML	Negative	Negative	
POTENTIAL GUM, MG/100 ML	1.4	1.6	
OXIDATION PPT. MG/100 ML			
[redacted] Hydrogen Wt. %	14.51	14.51	
MERCAPTAN SULFUR, % WT			
TOTAL SULFUR, % WT.			
VAPOR PRESSURE, P.S.I @ 100° F	2.7	2.6	
ANILINE POINT °F			
[redacted]TU	18749	18757	
SMOKE POINT MM (OR SMOKE VOL INDEX)			
AROMATICS, %	10.8	10.3	
OLEFINS, %	0.8	0.5	
TE[redacted] Cond., CU	5	7	
[redacted] Filtration Time @27	5 Min	27 Min	
KNOCK RATING	LEAN RICH	LEAN RICH	LEAN RICH
TOTAL SOLIDS, MG/[redacted] Liter	0.1	0.2	
FIBROUS MATERIAL PER/QT			
VISIBLE FREE WATER ML/GAL	0.0	0.0	
NONCOMBUSTIBLE SOLIDS MG/GAL			
TOTAL WATER, PPM BY VOL BY KARL FISCHER			
THERMAL STABILITY, TUBE DEPOSIT CODE NO.,			
THERMAL STABILITY, PRESSURE DIFF. (IN. HG.)			
MIL-I-27686 ICING INHIBITOR, % BY VOL	0.10	0.10	
DISTILLATION	IBP °F 138 167 °F	IBP °F 142 167 °F	IBP °F 167 °F
REMARKS (PERTAINING TO USABILITY AND DISPOSITION OF MATERIAL)	10% 196 221	10% 194 221	10% 221
	20% 218 275	20% 216 275	20% 275
	40% 290 56	40% 290 54	40% 290
MATERIAL REPRESENTED BY SAMPLE NO. 78-1200 IS [redacted] SATISFACTORY FOR USE	50% 278 370 81	50% 280 370 78	50% 370
Sample Nbr 78-1201 does not meet filtration time limits.	90% 418 400 86	90% 419 400 86	90% 400
	10% 50% 470 96	10% 50% 470 96	10% 50% 470
	E PT. 475 REC 98.0	E PT. 477 REC 98.0	E PT. REC
	RES % 1.0 LOSS 1.0	RES % 1.0 LOSS 1.0	RES % LOSS
	APPROVED BY: (NAME AND SIGNATURE)		

THOMAS J. O'SHAUGHNESSY
Chief, Aerospace Fuels Laboratory
Directorate of Engineering Management

AFTO FORM MAR 77 473 REPLACES AFTO FORM 68, WHICH WILL BE USED

TABLE 9. SIMULATED DISTILLATION RESULTS FROM FUEL AND VAPOR SPACE SAMPLES

Carbon Number	Weight %	
	Fuel	Vapor
C_3-C_4	0.1	0.45
C_4-C_5	2.84	14.21
C_5-C_6	5.84	25.34
C_6-C_7	12.90	18.95
C_7-C_8	18.52	27.60
C_8-C_9	14.63	6.91
C_9-C_{10}	12.44	2.84
C_{10}-C_{11}	9.63	1.36
C_{11}-C_{12}	8.20	0.54
C_{12}-C_{13}	6.38	0.30
C_{13}-C_{14}	4.24	0.30
C_{14}-C_{15}	2.44	0.10
C_{15}-C_{16}	1.08	0.30
C_{16}-C_{17}	0.46	0.40

TABLE 10. CALCULATION OF EMISSIONS AND EMISSION RATE IN CH_4 EQUIVALENT BASED ON TOTAL HYDROCARBON DATA

Date	Transfer From	Transfer To	Avg. THC as CH_4 (%)	Emissions mg/m^3 (A)	Air Displacement Rate m^3/hr	Emission Rate lb/hr
8/24	273	275	42.9	280,000	84.46	52.2
8/28	273	275	39.2	255,000	86.34	48.5
9/01	273	275	38.7	255,000	86.23	48.4
9/08	273	275	40.6	270,000	79.61	47.4

(A) Data given at 29.92 in. Hg and 70°F

this phase of the test program, there is no evidence that would indicate that vapor emissions could be reduced by increased ullage space in the tank.

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SAMPLING PROCEDURES

The storage tank vents were 4" I.D. pipes that run up the side of the pump building and extend about 3 feet above the roof. The vacuum-pressure breather valve was attached to the extreme end of the pipe. The entire breather valve was enclosed with a Mylar film tent, secured to the vent with duct tape. Several openings were cut in the tent to allow the vapors to escape as the tank was filled. A diagram of the apparatus required to sample the vents is shown in Figure 9.

A Type K thermocouple was positioned in the tent so that it would be directly in the vapor stream but away from direct sunlight. The thermocouple extension wire passed through a hole in the Mylar film tent and was connected to a digital thermometer.

The 1/8" O.D. aluminum tubing used as sample line was attached to the Mylar film tent with a nylon bulkhead fitting. About 100 feet of sample line was required to connect the sample tent to the measurement apparatus.

Due to the high concentration of hydrocarbon vapors from the vent, the sample required dilution prior to analysis. The dilution device, which provided about a 20:1 dilution factor, consisted of a sample flow meter, an 18" length of 1/16" O.D. tubing which acted as a flow restrictor, a dilution nitrogen flow meter, a 6" length of 1/8" O.D. tubing to restrict nitrogen flow, a mixing section, and a 1/4" line leading to the sampling valve inlet on the chromatograph. A 1/4" line leads from the sampling valve outlet to an isolation valve and then to a pump, throttling

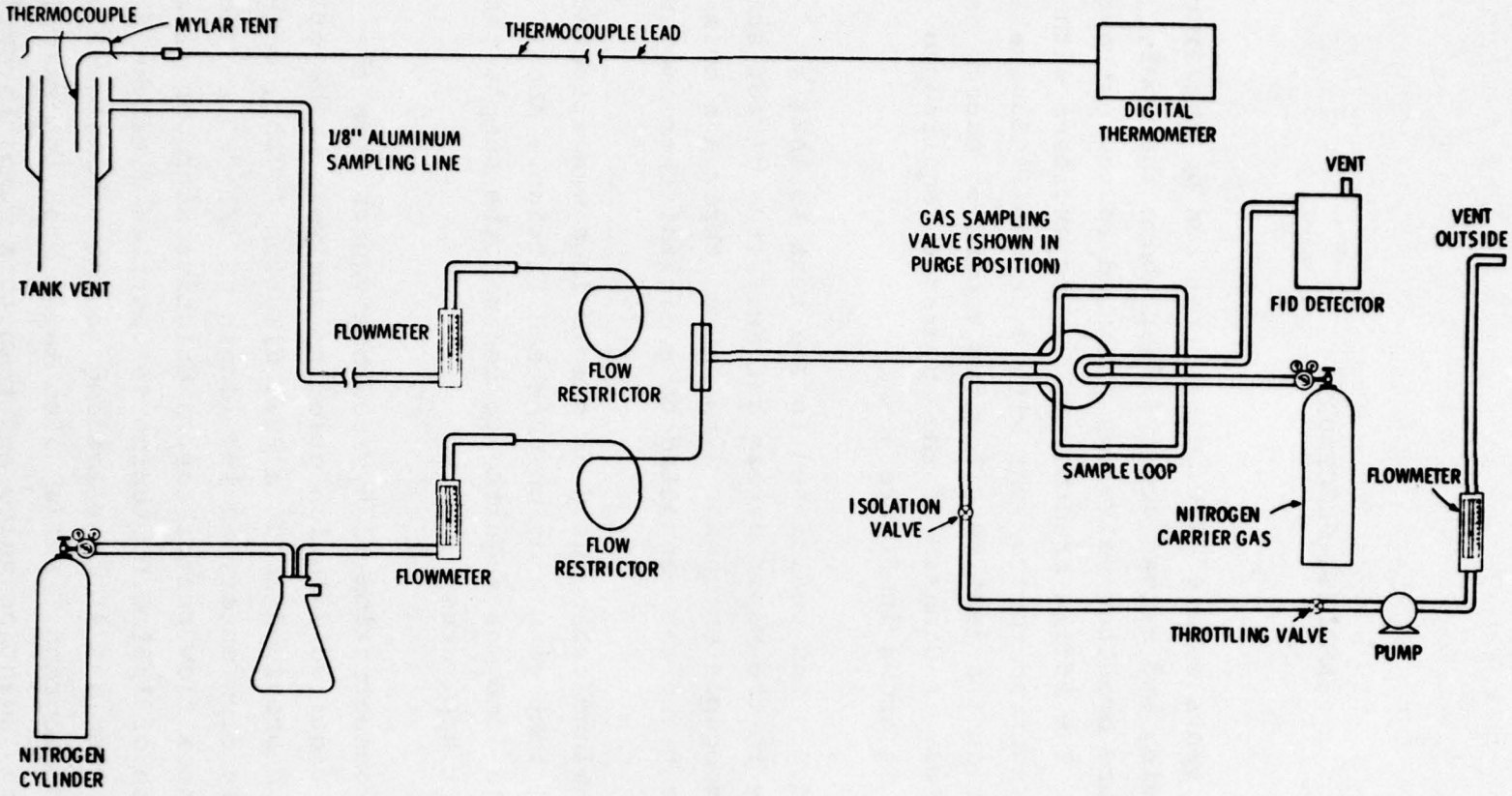


Figure 9. Diagram of the sampling system.

valve and a flow meter. The prepurified nitrogen was fed into a suction flask and out of the suction flask to the dilution device through a two hole stopper. The side arm of the suction flask was left open in order to vent excess nitrogen and thus maintain the supply of nitrogen to the dilution device at one atmosphere pressure.

As a safety measure, the exit line from the sample pump was directed outside the building. During the sampling and analysis program, the air in the room was monitored with a Century Systems OVA 128 hydrocarbon analyzer set to give an audible alarm if the total hydrocarbon concentration in the room increased by 10 ppm. No buildup of vapor in the room was noted during any phase of the program.

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ANALYSIS PROCEDURES

The total hydrocarbon concentrations in the diluted fuel was measured by an Analytical Instrument Development Model 511 Portable Gas Chromatograph having a flame ionization detection system.

Prior to the field work, the dilution device was assembled and connected to the chromatograph in order to verify its operation. The lengths and inside diameters of the sample and nitrogen flow limiting lines were adjusted to provide approximately a 20:1 dilution ratio. The operation of the dilutor and the GC instrument were verified with known concentrations of methane in air. A calibration curve was obtained by analyzing various concentrations of methane in air (5-100% methane) after dilution by the dilution device, to determine if the response of the diluted sample was maintained within the linear range of the GC detector.

Prior to each sampling run at WPAFB, the GC response curve was determined by analyzing undiluted methane gas standards. The dilution device was calibrated by: (1) analyzing a high concentration methane standard through the dilution device and, (2) by directly analyzing the same sample. The dilution factor was calculated and compared to the approximate factor obtained by reading the sample and nitrogen flow meters. The determination of the GC response and dilution factors were repeated between the two daily transfer operations and again at the end of each sampling day.

Slight day-to-day variations in the GC response and the dilution factor were observed, however, during each sampling day little variation in the detector response or dilution factor was noted.

During transfer operations, data were recorded and samples were diluted and analyzed at one minute intervals. The computer sheets shown in the Appendix summarize the time, attenuation range, peak height, vapor temperature, sample, nitrogen and total flow rates, the measured concentration (diluted) and the actual concentration before dilution for each minute of sampling as well as the information on ambient temperature and pressure, fuel temperature, gallons transferred and calculated fuel flow rates for each run. Data at five minute intervals were used to prepare the curves shown in Figures 1-8 and data summaries.

The total hydrocarbon data were recorded on a strip chart recorder as a sharp peak. After the completion of sampling, the height of each peak was measured and this height was multiplied by the attenuation to provide the response data used in the calculations. The calculations required are as follows:

$$\text{Response} = \text{peak height} \times \text{attenuation}$$

$$\text{Response factor} = \frac{\text{conc. of standard in ppm}}{\text{response of standard}}$$

$$\text{Measured conc. of sample} = \text{response of sample} \times \text{response factor}$$

$$\text{Actual concentration} = \text{measured concentration} \times \text{dilution factor}$$

APPENDIX

COMPUTER PRINTOUT SHEETS SHOWING THE CALCULATED RESULTS FOR EACH MINUTE OF SAMPLING

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TANK 273 TO 275 - 8/24/78

AMBIENT TEMP (DEG F)	86	TANK VOL START (GAL)	2678.
START TIME	1218	TANK VOL FINISH (GAL)	49233.
FINISH TIME	1423	FUEL TRANS (GAL)	46555.
TOT TIME (MINS)	125	FLOW RATE (GAL/MIN)	372.4
BAR PRES (IN HG)	29.52	LIQ TEMP (DEG F)	70

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1215	400	33	99	0.19	4.00	4.19	572.	11626.
1216	400	33	101	0.19	4.00	4.19	572.	11626.
1217	0	0	102	0.19	4.00	4.19	0.	0.
1218	0	0	102	0.19	4.00	4.19	0.	0.
1219	0	0	90	0.19	4.00	4.19	0.	0.
1220	0	0	90	0.19	4.00	4.19	0.	0.
1221	0	0	90	0.19	4.00	4.19	0.	0.
1222	0	0	90	0.19	4.00	4.19	0.	0.
1223	6400	72	90	0.19	4.00	4.19	19953.	405837.
1224	6400	72	90	0.19	4.00	4.19	19953.	405837.
1225	6400	76	90	0.19	4.00	4.19	21061.	428383.
1226	6400	76	89	0.19	4.00	4.19	21061.	428383.
1227	6400	76	89	0.19	4.00	4.19	21061.	428383.
1228	6400	76	88	0.19	4.00	4.19	21061.	428383.
1229	6400	76	88	0.19	4.00	4.19	21061.	428383.
1230	6400	74	88	0.19	4.00	4.19	20507.	417110.
1231	6400	76	88	0.19	4.00	4.19	21061.	428383.
1232	6400	76	87	0.19	4.00	4.19	21061.	428383.
1233	6400	76	87	0.19	4.00	4.19	21061.	428383.
1234	6400	76	87	0.19	4.00	4.19	21061.	428383.
1235	6400	76	87	0.19	4.00	4.19	21061.	428383.
1236	6400	76	86	0.19	4.00	4.19	21061.	428383.
1237	6400	78	86	0.19	4.00	4.19	21615.	439656.
1238	6400	78	86	0.19	4.00	4.19	21615.	439656.
1239	6400	76	86	0.19	4.00	4.19	21061.	428383.
1240	6400	76	86	0.19	4.00	4.19	21061.	428383.
1241	6400	76	86	0.19	4.00	4.19	21061.	428383.
1242	6400	76	86	0.19	4.00	4.19	21061.	428383.
1243	6400	76	85	0.19	4.00	4.19	21061.	428383.
1244	6400	76	86	0.19	4.00	4.19	21061.	428383.
1245	6400	76	86	0.19	4.00	4.19	21061.	428383.
1246	6400	78	85	0.19	4.00	4.19	21615.	439656.
1247	6400	76	85	0.19	4.00	4.19	21061.	428383.
1278	6400	76	85	0.19	4.00	4.19	21061.	428383.
1279	6400	76	85	0.19	4.00	4.19	21061.	428383.
1250	6400	76	85	0.19	4.00	4.19	21061.	428383.
1251	6400	78	85	0.19	4.00	4.19	21615.	439656.
1252	6400	78	85	0.19	4.00	4.19	21615.	439656.
1253	6400	78	85	0.19	4.00	4.19	21615.	439656.
1254	6400	77	85	0.19	4.00	4.19	21338.	434020.
1255	6400	77	85	0.19	4.00	4.19	21338.	434020.
1256	6400	77	85	0.19	4.00	4.19	21338.	434020.
1257	6400	77	85	0.19	4.00	4.19	21338.	434020.
1258	6400	77	85	0.19	4.00	4.19	21338.	434020.
1259	6400	77	85	0.19	4.00	4.19	21338.	434020.
1300	6400	78	85	0.19	4.00	4.19	21615.	439656.
1301	6400	77	85	0.19	4.00	4.19	21338.	434020.
1302	6400	77	85	0.19	4.00	4.19	21338.	434020.
1303	6400	77	85	0.19	4.00	4.19	21338.	434020.
1304	6400	77	85	0.19	4.00	4.19	21338.	434020.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1305	6400	77	85	0.19	4.00	4.19	21338.	434020.
1306	6400	77	85	0.19	4.00	4.19	21338.	434020.
1307	6400	77	85	0.19	4.00	4.19	21338.	434020.
1308	6400	77	85	0.19	4.00	4.19	21338.	434020.
1309	6400	77	85	0.19	4.00	4.19	21338.	434020.
1310	6400	79	85	0.19	4.00	4.19	21892.	445293.
1311	6400	77	85	0.19	4.00	4.19	21338.	434020.
1312	6400	77	85	0.19	4.00	4.19	21338.	434020.
1313	6400	77	85	0.19	4.00	4.19	21338.	434020.
1314	6400	78	85	0.19	4.00	4.19	21615.	439656.
1315	6400	78	85	0.19	4.00	4.19	21615.	439656.
1316	6400	77	85	0.19	4.00	4.19	21338.	434020.
1317	6400	70	86	0.19	4.00	4.19	19398.	394563.
1318	6400	69	86	0.19	4.00	4.19	19121.	388927.
1319	6400	72	86	0.19	4.00	4.19	19953.	405837.
1320	6400	72	86	0.19	4.00	4.19	19953.	405837.
1321	6400	71	86	0.19	4.00	4.19	19676.	400200.
1322	6400	73	86	0.19	4.00	4.19	20230.	411473.
1323	6400	74	86	0.19	4.00	4.19	20507.	417110.
1324	6400	74	86	0.19	4.00	4.19	20507.	417110.
1325	6400	71	86	0.19	4.00	4.19	19676.	400200.
1326	6400	76	86	0.19	4.00	4.19	21061.	428383.
1327	6400	75	86	0.19	4.00	4.19	20784.	422747.
1328	6400	75	86	0.19	4.00	4.19	20784.	422747.
1329	6400	75	86	0.19	4.00	4.19	20784.	422747.
1330	6400	75	86	0.19	4.00	4.19	20784.	422747.
1331	6400	76	86	0.19	4.00	4.19	21061.	428383.
1332	6400	76	86	0.19	4.00	4.19	21061.	428383.
1333	6400	75	86	0.19	4.00	4.19	20784.	422747.
1334	6400	76	86	0.19	4.00	4.19	21061.	428383.
1335	6400	76	86	0.19	4.00	4.19	21061.	428383.
1336	6400	75	86	0.19	4.00	4.19	20784.	422747.
1337	6400	76	86	0.19	4.00	4.19	21061.	428383.
1338	6400	76	86	0.19	4.00	4.19	21061.	428383.
1339	6400	77	86	0.19	4.00	4.19	21338.	434020.
1340	6400	77	87	0.19	4.00	4.19	21338.	434020.
1341	6400	78	87	0.19	4.00	4.19	21615.	439656.
1342	6400	78	87	0.19	4.00	4.19	21615.	439656.
1343	6400	77	87	0.19	4.00	4.19	21338.	434020.
1344	6400	78	87	0.19	4.00	4.19	21615.	439656.
1345	6400	78	87	0.19	4.00	4.19	21615.	439656.
1346	6400	77	87	0.19	4.00	4.19	21338.	434020.
1347	6400	76	87	0.19	4.00	4.19	21061.	428383.
1348	6400	76	87	0.19	4.00	4.19	21061.	428383.
1349	6400	76	87	0.19	4.00	4.19	21061.	428383.
1350	6400	75	87	0.19	4.00	4.19	20784.	422747.
1351	6400	76	87	0.19	4.00	4.19	21061.	428383.
1352	6400	76	87	0.19	4.00	4.19	21061.	428383.
1353	6400	76	87	0.19	4.00	4.19	21061.	428383.
1354	6400	76	87	0.19	4.00	4.19	21061.	428383.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1355	6400	75	87	0.19	4.00	4.19	20784.	422747.
1356	6400	76	86	0.19	4.00	4.19	21061.	428383.
1357	6400	78	86	0.19	4.00	4.19	21615.	439656.
1358	6400	77	86	0.19	4.00	4.19	21338.	434020.
1359	6400	76	86	0.19	4.00	4.19	21061.	428383.
1400	6400	77	86	0.19	4.00	4.19	21338.	434020.
1401	6400	77	86	0.19	4.00	4.19	21338.	434020.
1402	6400	77	86	0.19	4.00	4.19	21338.	434020.
1403	6400	77	86	0.19	4.00	4.19	21338.	434020.
1404	6400	77	86	0.19	4.00	4.19	21338.	434020.
1405	6400	78	86	0.19	4.00	4.19	21615.	439656.
1406	6400	78	86	0.19	4.00	4.19	21615.	439656.
1407	6400	77	86	0.19	4.00	4.19	21338.	434020.
1408	6400	77	86	0.19	4.00	4.19	21338.	434020.
1409	6400	77	86	0.19	4.00	4.19	21338.	434020.
1410	6400	78	86	0.19	4.00	4.19	21615.	439656.
1411	6400	78	86	0.19	4.00	4.19	21615.	439656.
1412	6400	78	86	0.19	4.00	4.19	21615.	439656.
1413	6400	78	86	0.19	4.00	4.19	21615.	439656.
1414	6400	78	86	0.19	4.00	4.19	21615.	439656.
1415	6400	80	86	0.19	4.00	4.19	22170.	450930.
1416	6400	79	86	0.19	4.00	4.19	21892.	445293.
1417	6400	79	86	0.19	4.00	4.19	21892.	445293.
1418	6400	78	86	0.19	4.00	4.19	21615.	439656.
1419	6400	78	86	0.19	4.00	4.19	21615.	439656.
1420	6400	78	86	0.19	4.00	4.19	21615.	439656.
1421	6400	78	86	0.19	4.00	4.19	21615.	439656.
1422	6400	79	86	0.19	4.00	4.19	21892.	445293.
1423	6400	78	86	0.19	4.00	4.19	21615.	439656.
1424	6400	75	86	0.19	4.00	4.19	20784.	422747.
1425	6400	31	0	0.19	4.00	4.19	8591.	174735.
1426	6400	4	0	0.19	4.00	4.19	1108.	22546.
1427	6400	3	0	0.19	4.00	4.19	831.	16910.

TANK 275 TO 273 - 8/24/78

AMBIENT TEMP (DEG F)	86	TANK VOL START (GAL)	3400.
START TIME	1515	TANK VOL FINISH (GAL)	45940.
FINISH TIME	1736	FUEL TRANS (GAL)	42540.
TOT TIME (MINS)	141	FLOW RATE (GAL/MIN)	301.7
BAR PRES (IN HG)	29.52	LIQ TEMP (DEG F)	70

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1515	3200	61	93	0.19	4.00	4.19	8452.	171917.
1516	3200	62	92	0.19	4.00	4.19	8591.	174735.
1517	3200	66	92	0.19	4.00	4.19	9145.	186008.
1518	3200	64	90	0.19	4.00	4.19	8868.	180372.
1519	3200	67	90	0.19	4.00	4.19	9284.	188827.
1520	3200	69	90	0.19	4.00	4.19	9561.	194463.
1521	3200	68	90	0.19	4.00	4.19	9422.	191645.
1522	3200	69	90	0.19	4.00	4.19	9561.	194463.
1523	3200	58	90	0.19	4.00	4.19	8036.	163462.
1524	3200	72	90	0.19	4.00	4.19	9976.	202918.
1525	3200	74	90	0.19	4.00	4.19	10253.	208555.
1526	3200	77	89	0.19	4.00	4.19	10669.	217010.
1527	3200	79	89	0.19	4.00	4.19	10946.	222646.
1528	3200	82	89	0.19	4.00	4.19	11362.	231101.
1529	3200	82	89	0.19	4.00	4.19	11362.	231101.
1530	3200	83	89	0.19	4.00	4.19	11500.	233920.
1531	3200	86	88	0.19	4.00	4.19	11916.	242375.
1532	3200	88	88	0.19	4.00	4.19	12193.	248011.
1533	3200	88	88	0.19	4.00	4.19	12193.	248011.
1534	3200	90	88	0.19	4.00	4.19	12470.	253648.
1535	3200	96	88	0.19	4.00	4.19	13302.	270558.
1536	3200	98	88	0.19	4.00	4.19	13579.	276194.
1537	6400	50	88	0.19	4.00	4.19	13856.	281831.
1538	6400	51	88	0.19	4.00	4.19	14133.	287468.
1539	6400	51	88	0.19	4.00	4.19	14133.	287468.
1540	6400	52	88	0.19	4.00	4.19	14410.	293104.
1541	6400	53	88	0.19	4.00	4.19	14687.	298741.
1542	6400	54	88	0.19	4.00	4.19	14964.	304377.
1543	6400	55	87	0.19	4.00	4.19	15242.	310014.
1544	6400	55	87	0.19	4.00	4.19	15242.	310014.
1545	6400	56	87	0.19	4.00	4.19	15519.	315651.
1546	6400	56	87	0.19	4.00	4.19	15519.	315651.
1547	6400	57	87	0.19	4.00	4.19	15796.	321287.
1548	6400	57	87	0.19	4.00	4.19	15796.	321287.
1549	6400	57	87	0.19	4.00	4.19	15796.	321287.
1550	6400	57	87	0.19	4.00	4.19	15796.	321287.
1551	6400	58	87	0.19	4.00	4.19	16073.	326924.
1552	6400	57	87	0.19	4.00	4.19	15796.	321287.
1553	6400	57	87	0.19	4.00	4.19	15796.	321287.
1554	6400	49	87	0.19	4.00	4.19	13579.	276194.
1555	6400	59	87	0.19	4.00	4.19	16350.	332561.
1556	6400	58	87	0.19	4.00	4.19	16073.	326924.
1557	6400	60	87	0.19	4.00	4.19	16627.	338197.
1558	6400	61	87	0.19	4.00	4.19	16904.	343834.
1559	6400	60	87	0.19	4.00	4.19	16627.	338197.
1600	6400	61	87	0.19	4.00	4.19	16904.	343834.
1601	6400	61	87	0.19	4.00	4.19	16904.	343834.
1602	6400	61	87	0.19	4.00	4.19	16904.	343834.
1603	6400	62	87	0.19	4.00	4.19	17181.	349470.
1604	6400	62	87	0.19	4.00	4.19	17181.	349470.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1605	6400	62	87	0.19	4.00	4.19	17181.	349470.
1606	6400	62	83	0.19	4.00	4.19	17181.	349470.
1607	6400	63	83	0.19	4.00	4.19	17459.	355107.
1608	6400	64	83	0.19	4.00	4.19	17736.	360744.
1609	6400	64	83	0.19	4.00	4.19	17736.	360744.
1610	6400	64	83	0.19	4.00	4.19	17736.	360744.
1611	6400	64	83	0.19	4.00	4.19	17736.	360744.
1612	6400	65	83	0.19	4.00	4.19	18013.	366380.
1613	6400	65	83	0.19	4.00	4.19	18013.	366380.
1614	6400	66	82	0.19	4.00	4.19	18290.	372017.
1615	6400	66	82	0.19	4.00	4.19	18290.	372017.
1616	6400	66	82	0.19	4.00	4.19	18290.	372017.
1617	6400	67	82	0.19	4.00	4.19	18567.	377654.
1618	6400	66	82	0.19	4.00	4.19	18290.	372017.
1619	6400	67	82	0.19	4.00	4.19	18567.	377654.
1620	6400	68	82	0.19	4.00	4.19	18844.	383290.
1621	6400	67	82	0.19	4.00	4.19	18567.	377654.
1622	6400	68	82	0.19	4.00	4.19	18844.	383290.
1623	6400	71	82	0.19	4.00	4.19	19676.	400200.
1624	6400	74	82	0.19	4.00	4.19	20507.	417110.
1625	6400	68	82	0.19	4.00	4.19	18844.	383290.
1626	6400	68	82	0.19	4.00	4.19	18844.	383290.
1627	6400	69	82	0.19	4.00	4.19	19121.	388927.
1628	6400	70	82	0.19	4.00	4.19	19398.	394563.
1629	6400	68	82	0.19	4.00	4.19	18844.	383290.
1630	6400	69	82	0.19	4.00	4.19	19121.	388927.
1631	6400	68	82	0.19	4.00	4.19	18844.	383290.
1632	6400	68	82	0.19	4.00	4.19	18844.	383290.
1633	6400	70	82	0.19	4.00	4.19	19398.	394563.
1634	6400	70	82	0.19	4.00	4.19	19398.	394563.
1635	6400	69	82	0.19	4.00	4.19	19121.	388927.
1636	6400	70	82	0.19	4.00	4.19	19398.	394563.
1637	6400	68	82	0.19	4.00	4.19	18844.	383290.
1638	6400	69	82	0.19	4.00	4.19	19121.	388927.
1639	6400	71	82	0.19	4.00	4.19	19676.	400200.
1640	6400	72	82	0.19	4.00	4.19	19953.	405837.
1641	6400	71	82	0.19	4.00	4.19	19676.	400200.
1642	6400	72	82	0.19	4.00	4.19	19953.	405837.
1643	6400	70	82	0.19	4.00	4.19	19398.	394563.
1644	6400	72	82	0.19	4.00	4.19	19953.	405837.
1645	6400	72	82	0.19	4.00	4.19	19953.	405837.
1646	6400	71	82	0.19	4.00	4.19	19676.	400200.
1647	6400	71	82	0.19	4.00	4.19	19676.	400200.
1648	6400	72	82	0.19	4.00	4.19	19953.	405837.
1649	6400	73	82	0.19	4.00	4.19	20230.	411473.
1650	6400	72	83	0.19	4.00	4.19	19953.	405837.
1651	6400	73	83	0.19	4.00	4.19	20230.	411473.
1652	6400	72	83	0.19	4.00	4.19	19953.	405837.
1653	6400	73	84	0.19	4.00	4.19	20230.	411473.
1654	6400	73	84	0.19	4.00	4.19	20230.	411473.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1655	6400	74	84	0.19	4.00	4.19	20507.	417110.
1656	6400	74	85	0.19	4.00	4.19	20507.	417110.
1657	6400	73	84	0.19	4.00	4.19	20230.	411473.
1658	6400	74	86	0.19	4.00	4.19	20507.	417110.
1659	6400	73	84	0.19	4.00	4.19	20230.	411473.
1700	6400	74	84	0.19	4.00	4.19	20507.	417110.
1701	6400	74	84	0.19	4.00	4.19	20507.	417110.
1702	6400	75	84	0.19	4.00	4.19	20784.	422747.
1703	6400	73	84	0.19	4.00	4.19	20230.	411473.
1704	6400	74	84	0.19	4.00	4.19	20507.	417110.
1705	6400	74	84	0.19	4.00	4.19	20507.	417110.
1706	6400	73	84	0.19	4.00	4.19	20230.	411473.
1707	6400	74	84	0.19	4.00	4.19	20507.	417110.
1708	6400	74	84	0.19	4.00	4.19	20507.	417110.
1709	6400	76	84	0.19	4.00	4.19	21061.	428383.
1710	6400	75	84	0.19	4.00	4.19	20784.	422747.
1711	6400	75	84	0.19	4.00	4.19	20784.	422747.
1712	6400	75	84	0.19	4.00	4.19	20784.	422747.
1713	6400	75	84	0.19	4.00	4.19	20784.	422747.
1714	6400	76	84	0.19	4.00	4.19	21061.	428383.
1715	6400	75	84	0.19	4.00	4.19	20784.	422747.
1716	6400	76	84	0.19	4.00	4.19	21061.	428383.
1717	6400	77	84	0.19	4.00	4.19	21338.	434020.
1718	6400	75	84	0.19	4.00	4.19	20784.	422747.
1719	6400	75	84	0.19	4.00	4.19	20784.	422747.
1720	6400	74	84	0.19	4.00	4.19	20507.	417110.
1721	6400	76	84	0.19	4.00	4.19	21061.	428383.
1722	6400	76	84	0.19	4.00	4.19	21061.	428383.
1723	6400	76	84	0.19	4.00	4.19	21061.	428383.
1724	6400	77	85	0.19	4.00	4.19	21338.	434020.
1725	6400	78	85	0.19	4.00	4.19	21615.	439656.
1726	6400	78	85	0.19	4.00	4.19	21615.	439656.
1727	6400	77	85	0.19	4.00	4.19	21338.	434020.
1728	6400	77	84	0.19	4.00	4.19	21338.	434020.
1729	6400	76	84	0.19	4.00	4.19	21061.	428383.
1730	6400	77	84	0.19	4.00	4.19	21338.	434020.
1731	6400	78	84	0.19	4.00	4.19	21615.	439656.
1732	6400	76	84	0.19	4.00	4.19	21061.	428383.
1733	6400	69	84	0.19	4.00	4.19	19121.	388927.
1734	6400	78	84	0.19	4.00	4.19	21615.	439656.
1735	6400	78	84	0.19	4.00	4.19	21615.	439656.
1736	6400	78	87	0.19	4.00	4.19	21615.	439656.
1737	6400	62	88	0.19	4.00	4.19	17181.	349470.
1738	6400	49	88	0.19	4.00	4.19	13579.	276194.
1739	6400	37	89	0.19	4.00	4.19	10253.	208555.
1740	6400	34	90	0.19	4.00	4.19	9422.	191645.
1741	6400	22	92	0.19	4.00	4.19	6097.	124006.
1742	6400	16	92	0.19	4.00	4.19	4434.	90186.
1743	6400	14	92	0.19	4.00	4.19	3880.	78913.
1744	6400	16	92	0.19	4.00	4.19	4434.	90186.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1745	6400	11	93	0.19	4.00	4.19	3048.	62003.
1746	6400	10	93	0.19	4.00	4.19	2771.	56366.
1747	6400	11	92	0.19	4.00	4.19	3048.	62003.

TANK 273 TO 275 - 8/28/78

AMBIENT TEMP (DEG F)	78	TANK VOL START (GAL)	2678.
START TIME	1148	TANK VOL FINISH (GAL)	49122.
FINISH TIME	1350	FUEL TRANS (GAL)	46444.
TOT TIME (MINS)	122	FLOW RATE (GAL/MIN)	380.7
BAR PRES (IN HG)	29.32	LIQ TEMP (DEG F)	69

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1148	6400	68	95	0.19	4.00	4.19	20280.	387354.
1149	6400	70	93	0.19	4.00	4.19	20877.	398747.
1150	6400	70	93	0.19	4.00	4.19	20877.	398747.
1151	6400	70	89	0.19	4.00	4.19	20877.	398747.
1152	6400	71	88	0.19	4.00	4.19	21175.	404443.
1153	6400	71	88	0.19	4.00	4.19	21175.	404443.
1154	6400	70	88	0.19	4.00	4.19	20877.	398747.
1155	6400	68	88	0.19	4.00	4.19	20280.	387354.
1156	6400	70	88	0.19	4.00	4.19	20877.	398747.
1157	6400	71	88	0.19	4.00	4.19	21175.	404443.
1158	6400	59	87	0.19	4.00	4.19	17596.	336087.
1159	6400	56	88	0.19	4.00	4.19	16701.	318997.
1200	6400	68	87	0.19	4.00	4.19	20280.	387354.
1201	6400	69	87	0.19	4.00	4.19	20579.	393050.
1202	6400	68	87	0.19	4.00	4.19	20280.	387354.
1203	6400	70	87	0.19	4.00	4.19	20877.	398747.
1204	6400	70	86	0.19	4.00	4.19	20877.	398747.
1205	6400	71	86	0.19	4.00	4.19	21175.	404443.
1206	6400	71	86	0.19	4.00	4.19	21175.	404443.
1207	6400	70	86	0.19	4.00	4.19	20877.	398747.
1208	6400	69	86	0.19	4.00	4.19	20579.	393050.
1209	6400	70	86	0.19	4.00	4.19	20877.	398747.
1210	6400	60	86	0.19	4.00	4.19	17894.	341783.
1211	6400	70	86	0.19	4.00	4.19	20877.	398747.
1212	6400	70	86	0.19	4.00	4.19	20877.	398747.
1213	6400	70	86	0.19	4.00	4.19	20877.	398747.
1214	6400	69	86	0.19	4.00	4.19	20579.	393050.
1215	6400	70	86	0.19	4.00	4.19	20877.	398747.
1216	6400	71	86	0.19	4.00	4.19	21175.	404443.
1217	6400	69	86	0.19	4.00	4.19	20579.	393050.
1218	6400	70	86	0.19	4.00	4.19	20877.	398747.
1219	6400	56	86	0.19	4.00	4.19	16701.	318997.
1220	6400	68	86	0.19	4.00	4.19	20280.	387354.
1221	6400	70	86	0.19	4.00	4.19	20877.	398747.
1222	6400	68	86	0.19	4.00	4.19	20280.	387354.
1223	6400	70	86	0.19	4.00	4.19	20877.	398747.
1224	6400	55	86	0.19	4.00	4.19	16403.	313301.
1225	6400	70	86	0.19	4.00	4.19	20877.	398747.
1226	6400	69	86	0.19	4.00	4.19	20579.	393050.
1227	6400	66	86	0.19	4.00	4.19	19684.	375961.
1228	6400	69	86	0.19	4.00	4.19	20579.	393050.
1229	6400	71	86	0.19	4.00	4.19	21175.	404443.
1230	6400	54	86	0.19	4.00	4.19	16105.	307605.
1231	6400	71	85	0.19	4.00	4.19	21175.	404443.
1232	6400	70	85	0.19	4.00	4.19	20877.	398747.
1233	6400	70	86	0.19	4.00	4.19	20877.	398747.
1234	6400	70	86	0.19	4.00	4.19	20877.	398747.
1235	6400	69	86	0.19	4.00	4.19	20579.	393050.
1236	6400	69	86	0.19	4.00	4.19	20579.	393050.
1237	6400	70	86	0.19	4.00	4.19	20877.	398747.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1238	6400	70	86	0.19	4.00	4.19	20877.	398747.
1239	6400	69	86	0.19	4.00	4.19	20579.	393050.
1240	6400	69	86	0.19	4.00	4.19	20579.	393050.
1241	6400	70	86	0.19	4.00	4.19	20877.	398747.
1242	6400	70	87	0.19	4.00	4.19	20877.	398747.
1243	6400	71	87	0.19	4.00	4.19	21175.	404443.
1244	6400	72	87	0.19	4.00	4.19	21473.	410140.
1245	6400	72	87	0.19	4.00	4.19	21473.	410140.
1246	6400	71	87	0.19	4.00	4.19	21175.	404443.
1247	6400	71	87	0.19	4.00	4.19	21175.	404443.
1248	6400	70	87	0.19	4.00	4.19	20877.	398747.
1249	6400	71	88	0.19	4.00	4.19	21175.	404443.
1250	6400	71	88	0.19	4.00	4.19	21175.	404443.
1251	6400	70	88	0.19	4.00	4.19	20877.	398747.
1252	6400	71	87	0.19	4.00	4.19	21175.	404443.
1253	6400	71	87	0.19	4.00	4.19	21175.	404443.
1254	6400	71	87	0.19	4.00	4.19	21175.	404443.
1255	6400	70	87	0.19	4.00	4.19	20877.	398747.
1256	6400	70	87	0.19	4.00	4.19	20877.	398747.
1257	6400	71	87	0.19	4.00	4.19	21175.	404443.
1258	6400	71	87	0.19	4.00	4.19	21175.	404443.
1259	6400	70	87	0.19	4.00	4.19	20877.	398747.
1300	6400	71	87	0.19	4.00	4.19	21175.	404443.
1301	6400	70	87	0.19	4.00	4.19	20877.	398747.
1302	6400	71	88	0.19	4.00	4.19	21175.	404443.
1303	6400	71	88	0.19	4.00	4.19	21175.	404443.
1304	6400	72	88	0.19	4.00	4.19	21473.	410140.
1305	6400	71	88	0.19	4.00	4.19	21175.	404443.
1306	6400	72	88	0.19	4.00	4.19	21473.	410140.
1307	6400	68	88	0.19	4.00	4.19	20280.	387354.
1308	6400	70	88	0.19	4.00	4.19	20877.	398747.
1309	6400	58	88	0.19	4.00	4.19	17298.	330390.
1310	6400	70	88	0.19	4.00	4.19	20877.	398747.
1311	6400	58	88	0.19	4.00	4.19	17298.	330390.
1312	6400	67	88	0.19	4.00	4.19	19982.	381658.
1313	6400	69	88	0.19	4.00	4.19	20579.	393050.
1314	6400	70	87	0.19	4.00	4.19	20877.	398747.
1315	6400	60	87	0.19	4.00	4.19	17894.	341783.
1316	6400	59	87	0.19	4.00	4.19	17596.	336087.
1317	6400	69	87	0.19	4.00	4.19	20579.	393050.
1318	6400	68	87	0.19	4.00	4.19	20280.	387354.
1319	6400	58	87	0.19	4.00	4.19	17298.	330390.
1320	6400	70	88	0.19	4.00	4.19	20877.	398747.
1321	6400	66	88	0.19	4.00	4.19	19684.	375961.
1322	6400	71	88	0.19	4.00	4.19	21175.	404443.
1323	6400	60	88	0.19	4.00	4.19	17894.	341783.
1324	6400	58	87	0.19	4.00	4.19	17298.	330390.
1325	6400	56	87	0.19	4.00	4.19	16701.	318997.
1326	6400	71	88	0.19	4.00	4.19	21175.	404443.
1327	6400	71	88	0.19	4.00	4.19	21175.	404443.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1328	6400	69	88	0.19	4.00	4.19	20579.	393050.-
1329	6400	57	88	0.19	4.00	4.19	17000.	324694.
1330	6400	58	88	0.19	4.00	4.19	17298.	330390.
1331	6400	58	88	0.19	4.00	4.19	17298.	330390.
1332	6400	58	88	0.19	4.00	4.19	17298.	330390.
1333	6400	69	88	0.19	4.00	4.19	20579.	393050.-
1334	6400	71	88	0.19	4.00	4.19	21175.	404443.
1335	6400	58	88	0.19	4.00	4.19	17298.	330390.
1336	6400	70	88	0.19	4.00	4.19	20877.	398747.
1337	6400	72	88	0.19	4.00	4.19	21473.	410140.
1338	6400	65	88	0.19	4.00	4.19	19386.	370265.-
1339	6400	63	88	0.19	4.00	4.19	18789.	358872.
1340	6400	71	88	0.19	4.00	4.19	21175.	404443.
1341	6400	60	88	0.19	4.00	4.19	17894.	341783.
1342	6400	60	88	0.19	4.00	4.19	17894.	341783.
1343	6400	72	88	0.19	4.00	4.19	21473.	410140.-
1344	6400	61	87	0.19	4.00	4.19	18193.	347479.
1345	6400	72	87	0.19	4.00	4.19	21473.	410140.
1346	6400	53	87	0.19	4.00	4.19	15807.	301908.
1347	6400	57	87	0.19	4.00	4.19	17000.	324694.
1348	6400	71	87	0.19	4.00	4.19	21175.	404443.-
1349	6400	73	87	0.19	4.00	4.19	21772.	415836.
1350	6400	65	87	0.19	4.00	4.19	19386.	370265.

TANK 275 TO 273 - 8/28/78

AMBIENT TEMP (DEG F)	80	TANK VOL START (GAL)	3400.
START TIME	1415	TANK VOL FINISH (GAL)	47700.
FINISH TIME	1639	FUEL TRANS (GAL)	44300.
TOT TIME (MINS)	144	FLOW RATE (GAL/MIN)	307.0
BAR PRES (IN HG)	29.34	LIQ TEMP (DEG F)	70

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1415	400	44	92	0.19	4.00	4.19	820.	15665.
1416	400	42	92	0.19	4.00	4.19	783.	14953.
1417	6400	55	92	0.19	4.00	4.19	16403.	313301.
1418	6400	56	92	0.19	4.00	4.19	16701.	318997.
1419	6400	56	92	0.19	4.00	4.19	16701.	318997.
1420	6400	40	92	0.19	4.00	4.19	11930.	227855.
1421	6400	54	92	0.19	4.00	4.19	16105.	307605.
1422	6400	54	92	0.19	4.00	4.19	16105.	307605.
1423	6400	50	92	0.19	4.00	4.19	14912.	284819.
1424	6400	37	91	0.19	4.00	4.19	11035.	210766.
1425	6400	36	91	0.19	4.00	4.19	10737.	205070.
1426	6400	31	91	0.19	4.00	4.19	9245.	176588.
1427	3200	70	91	0.19	4.00	4.19	10438.	199373.
1428	3200	76	92	0.19	4.00	4.19	11333.	216463.
1429	3200	75	92	0.19	4.00	4.19	11184.	213614.
1430	3200	76	92	0.19	4.00	4.19	11333.	216463.
1431	3200	69	91	0.19	4.00	4.19	10289.	196525.
1432	3200	83	91	0.19	4.00	4.19	12377.	236400.
1433	3200	88	91	0.19	4.00	4.19	13123.	250641.
1434	3200	88	91	0.19	4.00	4.19	13123.	250641.
1435	3200	84	91	0.19	4.00	4.19	12526.	239248.
1436	3200	83	91	0.19	4.00	4.19	12377.	236400.
1437	3200	91	91	0.19	4.00	4.19	13570.	259185.
1438	3200	93	91	0.19	4.00	4.19	13868.	264882.
1439	3200	95	91	0.19	4.00	4.19	14166.	270578.
1440	3200	99	91	0.19	4.00	4.19	14763.	281971.
1441	6400	52	91	0.19	4.00	4.19	15508.	296212.
1442	6400	41	91	0.19	4.00	4.19	12228.	233552.
1443	6400	45	91	0.19	4.00	4.19	13421.	256337.
1444	6400	49	91	0.19	4.00	4.19	14614.	279123.
1445	6400	55	91	0.19	4.00	4.19	16403.	313301.
1446	6400	57	91	0.19	4.00	4.19	17000.	324694.
1447	6400	59	91	0.19	4.00	4.19	17596.	336087.
1448	6400	59	91	0.19	4.00	4.19	17596.	336087.
1449	6400	59	91	0.19	4.00	4.19	17596.	336087.
1450	6400	59	91	0.19	4.00	4.19	17596.	336087.
1451	6400	68	91	0.19	4.00	4.19	20280.	387354.
1452	6400	61	91	0.19	4.00	4.19	18193.	347479.
1453	6400	62	91	0.19	4.00	4.19	18491.	353176.
1454	6400	62	91	0.19	4.00	4.19	18491.	353176.
1455	6400	62	91	0.19	4.00	4.19	18491.	353176.
1456	6400	63	91	0.19	4.00	4.19	18789.	358872.
1457	6400	64	90	0.19	4.00	4.19	19087.	364569.
1458	6400	63	90	0.19	4.00	4.19	18789.	358872.
1459	6400	69	89	0.19	4.00	4.19	20579.	393050.
1500	6400	61	89	0.19	4.00	4.19	18193.	347479.
1501	6400	64	90	0.19	4.00	4.19	19087.	364569.
1502	6400	58	90	0.19	4.00	4.19	17298.	330390.
1503	6400	64	89	0.19	4.00	4.19	19087.	364569.
1504	6400	66	91	0.19	4.00	4.19	19684.	375961.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1505	6400	64	91	0.19	4.00	4.19	19087.	364569.-
1506	6400	63	91	0.19	4.00	4.19	18789.	358872.
1507	6400	48	91	0.19	4.00	4.19	14316.	273426.
1508	6400	60	91	0.19	4.00	4.19	17894.	341783.
1509	6400	35	91	0.19	4.00	4.19	10438.	199373.
1510	6400	65	91	0.19	4.00	4.19	19386.	370265.-
1511	6400	65	91	0.19	4.00	4.19	19386.	370265.
1512	6400	66	91	0.19	4.00	4.19	19684.	375961.
1513	6400	66	91	0.19	4.00	4.19	19684.	375961.
1514	6400	66	90	0.19	4.00	4.19	19684.	375961.
1515	6400	65	89	0.19	4.00	4.19	19386.	370265.-
1516	6400	69	90	0.19	4.00	4.19	20579.	393050.
1517	6400	69	90	0.19	4.00	4.19	20579.	393050.
1518	6400	70	90	0.19	4.00	4.19	20877.	398747.
1519	6400	70	91	0.19	4.00	4.19	20877.	398747.
1520	6400	68	91	0.19	4.00	4.19	20280.	387354.-
1521	6400	70	91	0.19	4.00	4.19	20877.	398747.
1522	6400	69	91	0.19	4.00	4.19	20579.	393050.
1523	6400	70	91	0.19	4.00	4.19	20877.	398747.
1524	6400	70	91	0.19	4.00	4.19	20877.	398747.
1525	6400	70	91	0.19	4.00	4.19	20877.	398747.-
1526	6400	70	91	0.19	4.00	4.19	20877.	398747.
1527	6400	67	91	0.19	4.00	4.19	19982.	381658.
1528	6400	70	91	0.19	4.00	4.19	20877.	398747.
1529	6400	72	91	0.19	4.00	4.19	21473.	410140.
1530	6400	72	91	0.19	4.00	4.19	21473.	410140.-
1531	6400	70	91	0.19	4.00	4.19	20877.	398747.
1532	6400	68	91	0.19	4.00	4.19	20280.	387354.
1533	6400	73	91	0.19	4.00	4.19	21772.	415836.
1534	6400	73	91	0.19	4.00	4.19	21772.	415836.
1535	6400	72	91	0.19	4.00	4.19	21473.	410140.-
1536	6400	73	90	0.19	4.00	4.19	21772.	415836.
1537	6400	71	90	0.19	4.00	4.19	21175.	404443.
1538	6400	74	89	0.19	4.00	4.19	22070.	421532.
1539	6400	73	89	0.19	4.00	4.19	21772.	415836.
1540	6400	73	89	0.19	4.00	4.19	21772.	415836.-
1541	6400	74	90	0.19	4.00	4.19	22070.	421532.
1542	6400	74	90	0.19	4.00	4.19	22070.	421532.
1543	6400	70	90	0.19	4.00	4.19	20877.	398747.
1544	6400	74	90	0.19	4.00	4.19	22070.	421532.
1545	6400	69	89	0.19	4.00	4.19	20579.	393050.-
1546	6400	75	90	0.19	4.00	4.19	22368.	427229.
1547	6400	75	89	0.19	4.00	4.19	22368.	427229.
1548	6400	76	89	0.19	4.00	4.19	22666.	432925.
1549	6400	75	90	0.19	4.00	4.19	22368.	427229.
1550	6400	77	89	0.19	4.00	4.19	22964.	438622.-
1551	6400	75	89	0.19	4.00	4.19	22368.	427229.
1552	6400	75	89	0.19	4.00	4.19	22368.	427229.
1553	6400	74	89	0.19	4.00	4.19	22070.	421532.
1554	6400	75	89	0.19	4.00	4.19	22368.	427229.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1555	6400	76	89	0.19	4.00	4.19	22666.	432925.
1556	6400	81	89	0.19	4.00	4.19	24157.	461407.
1557	6400	81	89	0.19	4.00	4.19	24157.	461407.
1558	6400	83	89	0.19	4.00	4.19	24754.	472800.
1559	6400	86	89	0.19	4.00	4.19	25649.	489889.
1600	6400	87	89	0.19	4.00	4.19	25947.	495585.
1601	6400	85	89	0.19	4.00	4.19	25350.	484193.
1602	6400	86	89	0.19	4.00	4.19	25649.	489889.
1603	6400	90	89	0.19	4.00	4.19	26842.	512675.
1604	6400	86	88	0.19	4.00	4.19	25649.	489889.
1605	6400	83	87	0.19	4.00	4.19	24754.	472800.
1606	6400	82	87	0.19	4.00	4.19	24456.	467103.
1607	6400	81	87	0.19	4.00	4.19	24157.	461407.
1608	6400	81	87	0.19	4.00	4.19	24157.	461407.
1609	6400	81	87	0.19	4.00	4.19	24157.	461407.
1610	6400	81	87	0.19	4.00	4.19	24157.	461407.
1611	6400	81	86	0.19	4.00	4.19	24157.	461407.
1612	6400	81	87	0.19	4.00	4.19	24157.	461407.
1613	6400	80	86	0.19	4.00	4.19	23859.	455711.
1614	6400	80	86	0.19	4.00	4.19	23859.	455711.
1615	6400	81	87	0.19	4.00	4.19	24157.	461407.
1616	6400	72	87	0.19	4.00	4.19	21473.	410140.
1617	6400	76	87	0.19	4.00	4.19	22666.	432925.
1618	6400	76	87	0.19	4.00	4.19	22666.	432925.
1619	6400	76	88	0.19	4.00	4.19	22666.	432925.
1620	6400	76	88	0.19	4.00	4.19	22666.	432925.
1621	6400	78	88	0.19	4.00	4.19	23263.	444318.
1622	6400	79	88	0.19	4.00	4.19	23561.	450014.
1623	6400	80	88	0.19	4.00	4.19	23859.	455711.
1624	6400	75	88	0.19	4.00	4.19	22368.	427229.
1625	6400	79	88	0.19	4.00	4.19	23561.	450014.
1626	6400	79	88	0.19	4.00	4.19	23561.	450014.
1627	6400	78	87	0.19	4.00	4.19	23263.	444318.
1628	6400	79	88	0.19	4.00	4.19	23561.	450014.
1629	6400	68	88	0.19	4.00	4.19	20280.	387354.
1630	6400	79	88	0.19	4.00	4.19	23561.	450014.
1631	6400	79	88	0.19	4.00	4.19	23561.	450014.
1632	6400	79	88	0.19	4.00	4.19	23561.	450014.
1633	6400	80	88	0.19	4.00	4.19	23859.	455711.
1634	6400	80	87	0.19	4.00	4.19	23859.	455711.
1635	6400	80	87	0.19	4.00	4.19	23859.	455711.
1636	6400	78	88	0.19	4.00	4.19	23263.	444318.
1637	6400	80	89	0.19	4.00	4.19	23859.	455711.
1638	6400	76	91	0.19	4.00	4.19	22666.	432925.
1639	6400	39	90	0.19	4.00	4.19	11631.	222159.
1640	6400	22	90	0.19	4.00	4.19	6561.	125320.
1641	6400	20	90	0.19	4.00	4.19	5965.	113928.
1642	6400	16	90	0.19	4.00	4.19	4772.	91142.

TANK 273 TO 275 - 9/1/78

AMBIENT TEMP (DEG F)	83	TANK VOL START (GAL)	3122.
START TIME	1041	TANK VOL FINISH (GAL)	49122.
FINISH TIME	1242	FUEL TRANS (GAL)	46000.
TOT TIME (MINS)	121	FLOW RATE (GAL/MIN)	380.2
BAR PRES (IN HG)	29.70	LIQ TEMP (DEG F)	70

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1041	6400	79	84	0.21	4.00	4.21	21539.	432710.
1042	6400	80	82	0.21	4.00	4.21	21811.	438187.
1043	6400	80	81	0.21	4.00	4.21	21811.	438187.
1044	6400	79	81	0.21	4.00	4.21	21539.	432710.
1045	6400	79	80	0.21	4.00	4.21	21539.	432710.
1046	6400	80	78	0.21	4.00	4.21	21811.	438187.
1047	6400	78	78	0.21	4.00	4.21	21266.	427232.
1048	6400	79	78	0.21	4.00	4.21	21539.	432710.
1049	6400	79	78	0.21	4.00	4.21	21539.	432710.
1050	6400	68	78	0.21	4.00	4.21	18540.	372459.
1051	6400	69	78	0.21	4.00	4.21	18812.	377936.
1052	6400	71	78	0.21	4.00	4.21	19357.	388891.

TANK 273 TO 275 - 9/1/78

AMBIENT TEMP (DEG F)	83	TANK VOL START (GAL)	3122.
START TIME	1041	TANK VOL FINISH (GAL)	49122.
FINISH TIME	1242	FUEL TRANS (GAL)	46000.
TOT TIME (MINS)	121	FLOW RATE (GAL/MIN)	380.2
BAR PRES (IN HG)	29.70	LIQ TEMP (DEG F)	70

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1053	6400	73	78	0.21	4.00	4.21	19903.	387506.
1054	6400	72	78	0.21	4.00	4.21	19630.	382198.
1055	6400	72	78	0.21	4.00	4.21	19630.	382198.
1056	6400	71	78	0.21	4.00	4.21	19357.	376889.
1057	6400	71	78	0.21	4.00	4.21	19357.	376889.
1058	6400	72	78	0.21	4.00	4.21	19630.	382198.
1059	6400	71	78	0.21	4.00	4.21	19357.	376889.
1100	6400	72	78	0.21	4.00	4.21	19630.	382198.
1101	6400	71	78	0.21	4.00	4.21	19357.	376889.
1102	6400	71	78	0.21	4.00	4.21	19357.	376889.
1103	6400	72	78	0.21	4.00	4.21	19630.	382198.
1104	6400	70	78	0.21	4.00	4.21	19085.	371581.
1105	6400	71	78	0.21	4.00	4.21	19357.	376889.
1106	6400	72	78	0.21	4.00	4.21	19630.	382198.
1107	6400	72	78	0.21	4.00	4.21	19630.	382198.
1108	6400	71	79	0.21	4.00	4.21	19357.	376889.
1109	6400	71	79	0.21	4.00	4.21	19357.	376889.
1110	6400	70	79	0.21	4.00	4.21	19085.	371581.
1111	6400	72	79	0.21	4.00	4.21	19630.	382198.
1112	6400	71	78	0.21	4.00	4.21	19357.	376889.
1113	6400	70	79	0.21	4.00	4.21	19085.	371581.
1114	6400	70	79	0.21	4.00	4.21	19085.	371581.
1115	6400	69	79	0.21	4.00	4.21	18812.	366273.
1116	6400	71	79	0.21	4.00	4.21	19357.	376889.
1117	6400	70	80	0.21	4.00	4.21	19085.	371581.
1118	6400	70	80	0.21	4.00	4.21	19085.	371581.
1119	6400	71	80	0.21	4.00	4.21	19357.	376889.
1120	6400	70	80	0.21	4.00	4.21	19085.	371581.
1121	6400	70	80	0.21	4.00	4.21	19085.	371581.
1122	6400	69	81	0.21	4.00	4.21	18812.	366273.
1123	6400	71	81	0.21	4.00	4.21	19357.	376889.
1124	6400	31	81	0.21	4.00	4.21	8452.	164557.
1125	6400	70	81	0.21	4.00	4.21	19085.	371581.
1126	6400	71	81	0.21	4.00	4.21	19357.	376889.
1127	6400	70	81	0.21	4.00	4.21	19085.	371581.
1128	6400	70	81	0.21	4.00	4.21	19085.	371581.
1129	6400	70	81	0.21	4.00	4.21	19085.	371581.
1130	6400	69	81	0.21	4.00	4.21	18812.	366273.
1131	6400	71	81	0.21	4.00	4.21	19357.	376889.
1132	6400	72	81	0.21	4.00	4.21	19630.	382198.
1133	6400	70	81	0.21	4.00	4.21	19085.	371581.
1134	6400	71	81	0.21	4.00	4.21	19357.	376889.
1135	6400	71	81	0.21	4.00	4.21	19357.	376889.
1136	6400	71	81	0.21	4.00	4.21	19357.	376889.
1137	6400	71	81	0.21	4.00	4.21	19357.	376889.
1138	6400	72	81	0.21	4.00	4.21	19630.	382198.
1139	6400	72	81	0.21	4.00	4.21	19630.	382198.
1140	6400	71	82	0.21	4.00	4.21	19357.	376889.
1141	6400	72	82	0.21	4.00	4.21	19630.	382198.
1142	6400	72	82	0.21	4.00	4.21	19630.	382198.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1143	6400	72	82	0.21	4.00	4.21	19630.	382198.
1144	6400	72	82	0.21	4.00	4.21	19630.	382198.
1145	6400	71	82	0.21	4.00	4.21	19357.	376889.
1146	6400	73	82	0.21	4.00	4.21	19903.	387506.
1147	6400	72	82	0.21	4.00	4.21	19630.	382198.
1148	6400	72	82	0.21	4.00	4.21	19630.	382198.
1149	6400	72	82	0.21	4.00	4.21	19630.	382198.
1150	6400	73	82	0.21	4.00	4.21	19903.	387506.
1151	6400	72	82	0.21	4.00	4.21	19630.	382198.
1152	6400	72	82	0.21	4.00	4.21	19630.	382198.
1153	6400	72	82	0.21	4.00	4.21	19630.	382198.
1154	6400	73	82	0.21	4.00	4.21	19903.	387506.
1155	6400	73	82	0.21	4.00	4.21	19903.	387506.
1156	6400	72	82	0.21	4.00	4.21	19630.	382198.
1157	6400	72	82	0.21	4.00	4.21	19630.	382198.
1158	6400	72	82	0.21	4.00	4.21	19630.	382198.
1159	6400	73	83	0.21	4.00	4.21	19903.	387506.
1200	6400	73	83	0.21	4.00	4.21	19903.	387506.
1201	6400	72	83	0.21	4.00	4.21	19630.	382198.
1202	6400	73	83	0.21	4.00	4.21	19903.	387506.
1203	6400	71	83	0.21	4.00	4.21	19357.	376889.
1204	6400	73	83	0.21	4.00	4.21	19903.	387506.
1205	6400	74	83	0.21	4.00	4.21	20175.	392814.
1206	6400	72	83	0.21	4.00	4.21	19630.	382198.
1207	6400	72	83	0.21	4.00	4.21	19630.	382198.
1208	6400	73	83	0.21	4.00	4.21	19903.	387506.
1209	6400	73	83	0.21	4.00	4.21	19903.	387506.
1210	6400	74	83	0.21	4.00	4.21	20175.	392814.
1211	6400	73	83	0.21	4.00	4.21	19903.	387506.
1212	6400	72	83	0.21	4.00	4.21	19630.	382198.
1213	6400	73	83	0.21	4.00	4.21	19903.	387506.
1214	6400	74	83	0.21	4.00	4.21	20175.	392814.
1215	6400	74	83	0.21	4.00	4.21	20175.	392814.
1216	6400	74	83	0.21	4.00	4.21	20175.	392814.
1217	6400	74	83	0.21	4.00	4.21	20175.	392814.
1218	6400	74	83	0.21	4.00	4.21	20175.	392814.
1219	6400	76	83	0.21	4.00	4.21	20721.	403431.
1220	6400	75	83	0.21	4.00	4.21	20448.	398123.
1221	6400	74	84	0.21	4.00	4.21	20175.	392814.
1222	6400	75	84	0.21	4.00	4.21	20448.	398123.
1223	6400	74	84	0.21	4.00	4.21	20175.	392814.
1224	6400	76	84	0.21	4.00	4.21	20721.	403431.
1225	6400	74	84	0.21	4.00	4.21	20175.	392814.
1226	6400	76	84	0.21	4.00	4.21	20721.	403431.
1227	6400	76	84	0.21	4.00	4.21	20721.	403431.
1228	6400	75	84	0.21	4.00	4.21	20448.	398123.
1229	6400	76	84	0.21	4.00	4.21	20721.	403431.
1230	6400	75	84	0.21	4.00	4.21	20448.	398123.
1231	6400	76	84	0.21	4.00	4.21	20721.	403431.
1232	6400	76	84	0.21	4.00	4.21	20721.	403431.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1233	6400	76	84	0.21	4.00	4.21	20721.	403431.
1234	6400	76	84	0.21	4.00	4.21	20721.	403431.
1235	6400	78	84	0.21	4.00	4.21	21266.	414047.
1236	6400	78	84	0.21	4.00	4.21	21266.	414047.-
1237	6400	78	84	0.21	4.00	4.21	21266.	414047.
1238	6400	78	84	0.21	4.00	4.21	21266.	414047.
1239	6400	79	84	0.21	4.00	4.21	21539.	419356.
1240	6400	79	84	0.21	4.00	4.21	21539.	419356.
1241	6400	69	84	0.21	4.00	4.21	18812.	366273.-
1242	6400	69	84	0.21	4.00	4.21	18812.	366273.-

TANK 275 TO 273 - 9/1/78

AMBIENT TEMP (DEG F)	79	TANK VOL START (GAL)	3650.
START TIME	1258	TANK VOL FINISH (GAL)	49125.
FINISH TIME	1523	FUEL TRANS (GAL)	45475.
TOT TIME (MINS)	145	FLOW RATE (GAL/MIN)	313.6
BAR PRES (IN HG)	29.46	LIQ TEMP (DEG F)	73

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1258	6400	19	98	0.21	3.90	4.11	5180.	100858.
1259	6400	31	92	0.21	3.90	4.11	8452.	164557.
1300	6400	31	91	0.21	3.90	4.11	8452.	164557.
1301	6400	31	91	0.21	3.90	4.11	8452.	164557.
1302	6400	32	91	0.21	3.90	4.11	8724.	169866.
1303	6400	32	92	0.21	3.90	4.11	8724.	169866.
1304	6400	33	91	0.21	3.90	4.11	8997.	175174.
1305	6400	32	91	0.21	3.90	4.11	8724.	169866.
1306	6400	33	91	0.21	3.90	4.11	8997.	175174.
1307	6400	33	90	0.21	3.90	4.11	8997.	175174.
1308	6400	33	90	0.21	3.90	4.11	8997.	175174.
1309	6400	32	89	0.21	3.90	4.11	8724.	169866.
1310	6400	32	88	0.21	3.90	4.11	8724.	169866.
1311	6400	34	88	0.21	3.90	4.11	9270.	180482.
1312	6400	35	88	0.21	3.90	4.11	9542.	185791.
1313	6400	37	88	0.21	3.90	4.11	10088.	196407.
1314	6400	38	88	0.21	3.90	4.11	10360.	201715.
1315	6400	38	88	0.21	3.90	4.11	10360.	201715.
1316	6400	40	88	0.21	3.90	4.11	10906.	212332.
1317	6400	40	88	0.21	3.90	4.11	10906.	212332.
1318	6400	41	88	0.21	3.90	4.11	11178.	217640.
1319	6400	43	88	0.21	3.90	4.11	11724.	228257.
1320	6400	44	88	0.21	3.90	4.11	11996.	233565.
1321	6400	45	88	0.21	3.90	4.11	12269.	238874.
1322	6400	45	88	0.21	3.90	4.11	12269.	238874.
1323	6400	44	88	0.21	3.90	4.11	11996.	233565.
1324	6400	46	87	0.21	3.90	4.11	12541.	244182.
1325	6400	46	87	0.21	3.90	4.11	12541.	244182.
1326	6400	48	87	0.21	3.90	4.11	13087.	254798.
1327	6400	49	87	0.21	3.90	4.11	13359.	260107.
1328	6400	49	87	0.21	3.90	4.11	13359.	260107.
1329	6400	50	87	0.21	3.90	4.11	13632.	265415.
1330	6400	50	87	0.21	3.90	4.11	13632.	265415.
1331	6400	51	87	0.21	3.90	4.11	13905.	270723.
1332	6400	51	87	0.21	3.90	4.11	13905.	270723.
1333	6400	52	87	0.21	3.90	4.11	14177.	276032.
1334	6400	51	87	0.21	3.90	4.11	13905.	270723.
1335	6400	51	87	0.21	3.90	4.11	13905.	270723.
1336	6400	48	87	0.21	3.90	4.11	13087.	254798.
1337	6400	53	88	0.21	3.90	4.11	14450.	281340.
1338	6400	53	88	0.21	3.90	4.11	14450.	281340.
1339	6400	54	88	0.21	3.90	4.11	14723.	286648.
1340	6400	54	88	0.21	3.90	4.11	14723.	286648.
1341	6400	54	88	0.21	3.90	4.11	14723.	286648.
1342	6400	54	87	0.21	3.90	4.11	14723.	286648.
1343	6400	55	87	0.21	3.90	4.11	14995.	291957.
1344	6400	55	87	0.21	3.90	4.11	14995.	291957.
1345	6400	55	87	0.21	3.90	4.11	14995.	291957.
1346	6400	55	87	0.21	3.90	4.11	14995.	291957.
1347	6400	56	87	0.21	3.90	4.11	15268.	297265.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1348	6400	56	87	0.21	3.90	4.11	15268.	297265.
1349	6400	56	87	0.21	3.90	4.11	15268.	297265.
1350	6400	58	87	0.21	3.90	4.11	15813.	307881.
1351	6400	57	87	0.21	3.90	4.11	15540.	302573.
1352	6400	58	87	0.21	3.90	4.11	15813.	307881.
1353	6400	58	87	0.21	3.90	4.11	15813.	307881.
1354	6400	58	88	0.21	3.90	4.11	15813.	307881.
1355	6400	59	88	0.21	3.90	4.11	16086.	313190.
1356	6400	59	88	0.21	3.90	4.11	16086.	313190.
1357	6400	59	88	0.21	3.90	4.11	16086.	313190.
1358	6400	60	88	0.21	3.90	4.11	16358.	318498.
1359	6400	60	88	0.21	3.90	4.11	16358.	318498.
1400	6400	59	88	0.21	3.90	4.11	16086.	313190.
1401	6400	61	88	0.21	3.90	4.11	16631.	323806.
1402	6400	61	88	0.21	3.90	4.11	16631.	323806.
1403	6400	61	88	0.21	3.90	4.11	16631.	323806.
1404	6400	62	88	0.21	3.90	4.11	16904.	329115.
1405	6400	63	88	0.21	3.90	4.11	17176.	334423.
1406	6400	62	88	0.21	3.90	4.11	16904.	329115.
1407	6400	62	88	0.21	3.90	4.11	16904.	329115.
1408	6400	62	88	0.21	3.90	4.11	16904.	329115.
1409	6400	63	88	0.21	3.90	4.11	17176.	334423.
1410	6400	63	88	0.21	3.90	4.11	17176.	334423.
1411	6400	59	89	0.21	3.90	4.11	16086.	313190.
1412	6400	58	89	0.21	3.90	4.11	15813.	307881.
1413	6400	58	90	0.21	3.90	4.11	15813.	307881.
1414	6400	63	90	0.21	3.90	4.11	17176.	334423.
1415	6400	64	90	0.21	3.90	4.11	17449.	339731.
1416	6400	64	89	0.21	3.90	4.11	17449.	339731.
1417	6400	64	89	0.21	3.90	4.11	17449.	339731.
1418	6400	66	88	0.21	3.90	4.11	17994.	350348.
1419	6400	65	88	0.21	3.90	4.11	17722.	345040.
1420	6400	66	88	0.21	3.90	4.11	17994.	350348.
1421	6400	64	88	0.21	3.90	4.11	17449.	339731.
1422	6400	68	88	0.21	3.90	4.11	18540.	360964.
1423	6400	67	88	0.21	3.90	4.11	18267.	355656.
1424	6400	66	88	0.21	3.90	4.11	17994.	350348.
1425	6400	67	88	0.21	3.90	4.11	18267.	355656.
1426	6400	66	88	0.21	3.90	4.11	17994.	350348.
1427	6400	66	88	0.21	3.90	4.11	17994.	350348.
1428	6400	66	88	0.21	3.90	4.11	17994.	350348.
1429	6400	66	88	0.21	3.90	4.11	17994.	350348.
1430	6400	67	88	0.21	3.90	4.11	18267.	355656.
1431	6400	67	88	0.21	3.90	4.11	18267.	355656.
1432	6400	67	88	0.21	3.90	4.11	18267.	355656.
1433	6400	67	88	0.21	3.90	4.11	18267.	355656.
1434	6400	65	88	0.21	3.90	4.11	17722.	345040.
1435	6400	70	88	0.21	3.90	4.11	19085.	371581.
1436	6400	69	88	0.21	3.90	4.11	18812.	366273.
1437	6400	68	88	0.21	3.90	4.11	18540.	360964.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1438	6400	69	89	0.21	3.90	4.11	18812.	366273.
1439	6400	70	90	0.21	3.90	4.11	19085.	371581.
1440	6400	70	90	0.21	3.90	4.11	19085.	371581.
1441	6400	68	91	0.21	3.90	4.11	18540.	360964.
1442	6400	69	91	0.21	3.90	4.11	18812.	366273.
1443	6400	69	91	0.21	3.90	4.11	18812.	366273.
1444	6400	69	91	0.21	3.90	4.11	18812.	366273.
1445	6400	69	91	0.21	3.90	4.11	18812.	366273.
1446	6400	69	91	0.21	3.90	4.11	18812.	366273.
1447	6400	69	91	0.21	3.90	4.11	18812.	366273.
1448	6400	70	91	0.21	3.90	4.11	19085.	371581.
1449	6400	70	91	0.21	3.90	4.11	19085.	371581.
1450	6400	70	91	0.21	3.90	4.11	19085.	371581.
1451	6400	70	91	0.21	3.90	4.11	19085.	371581.
1452	6400	69	91	0.21	3.90	4.11	18812.	366273.
1453	6400	70	92	0.21	3.90	4.11	19085.	371581.
1454	6400	69	92	0.21	3.90	4.11	18812.	366273.
1455	6400	71	92	0.21	3.90	4.11	19357.	376889.
1456	6400	70	92	0.21	3.90	4.11	19085.	371581.
1457	6400	71	92	0.21	3.90	4.11	19357.	376889.
1458	6400	71	92	0.21	3.90	4.11	19357.	376889.
1459	6400	71	92	0.21	3.90	4.11	19357.	376889.
1500	6400	71	92	0.21	3.90	4.11	19357.	376889.
1501	6400	72	92	0.21	3.90	4.11	19630.	382198.
1502	6400	72	92	0.21	3.90	4.11	19630.	382198.
1503	6400	72	87	0.21	3.90	4.11	19630.	382198.
1504	6400	72	87	0.21	3.90	4.11	19630.	382198.
1505	6400	73	89	0.21	3.90	4.11	19903.	387506.
1506	6400	73	90	0.21	3.90	4.11	19903.	387506.
1507	6400	73	91	0.21	3.90	4.11	19903.	387506.
1508	6400	72	91	0.21	3.90	4.11	19630.	382198.
1509	6400	72	91	0.21	3.90	4.11	19630.	382198.
1510	6400	72	91	0.21	3.90	4.11	19630.	382198.
1511	6400	73	91	0.21	3.90	4.11	19903.	387506.
1512	6400	73	91	0.21	3.90	4.11	19903.	387506.
1513	6400	72	89	0.21	3.90	4.11	19630.	382198.
1514	6400	71	86	0.21	3.90	4.11	19357.	376889.
1515	6400	72	86	0.21	3.90	4.11	19630.	382198.
1516	6400	72	85	0.21	3.90	4.11	19630.	382198.
1517	6400	73	87	0.21	3.90	4.11	19903.	387506.
1518	6400	73	88	0.21	3.90	4.11	19903.	387506.
1519	6400	73	89	0.21	3.90	4.11	19903.	387506.
1520	6400	73	89	0.21	3.90	4.11	19903.	387506.
1521	6400	73	89	0.21	3.90	4.11	19903.	387506.
1522	6400	59	88	0.21	3.90	4.11	16086.	313190.
1523	6400	48	88	0.21	3.90	4.11	13087.	254798.
1524	6400	38	89	0.21	3.90	4.11	10360.	201715.
1525	6400	22	89	0.21	3.90	4.11	5998.	116783.
1526	6400	14	89	0.21	3.90	4.11	3817.	74316.
1527	6400	8	89	0.21	3.90	4.11	2181.	42466.

TANK 273 TO 275 - 9/8/78

AMBIENT TEMP (DEG F)	83	TANK VOL START (GAL)	3122.
START TIME	1146	TANK VOL FINISH (GAL)	49200.
FINISH TIME	1357	FUEL TRANS (GAL)	46078.
TOT TIME (MINS)	131	FLOW RATE (GAL/MIN)	351.0
BAR PRES (IN HG)	30.04	LIQ TEMP (DEG F)	70

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1146	6400	40	93	0.21	3.90	4.11	10266.	199871.
1147	6400	12	94	0.21	3.90	4.11	3080.	59961.
1148	6400	18	93	0.21	3.90	4.11	4620.	89942.
1149	6400	75	92	0.21	3.90	4.11	19248.	374758.
1150	6400	80	92	0.21	3.90	4.11	20531.	399742.
1151	6400	80	90	0.21	3.90	4.11	20531.	399742.
1152	6400	82	90	0.21	3.90	4.11	21044.	409736.
1153	6400	82	90	0.21	3.90	4.11	21044.	409736.
1154	6400	82	89	0.21	3.90	4.11	21044.	409736.
1155	6400	82	89	0.21	3.90	4.11	21044.	409736.
1156	6400	81	87	0.21	3.90	4.11	20788.	404739.
1157	6400	82	87	0.21	3.90	4.11	21044.	409736.
1158	6400	82	87	0.21	3.90	4.11	21044.	409736.
1159	6400	82	84	0.21	3.90	4.11	21044.	409736.
1200	6400	82	84	0.21	3.90	4.11	21044.	409736.
1201	6400	82	84	0.21	3.90	4.11	21044.	409736.
1202	6400	81	84	0.21	3.90	4.11	20788.	404739.
1203	6400	82	82	0.21	3.90	4.11	21044.	409736.
1204	6400	82	82	0.21	3.90	4.11	21044.	409736.
1205	6400	82	82	0.21	3.90	4.11	21044.	409736.
1206	6400	82	82	0.21	3.90	4.11	21044.	409736.
1207	6400	82	82	0.21	3.90	4.11	21044.	409736.
1208	6400	82	82	0.21	3.90	4.11	21044.	409736.
1209	6400	83	82	0.21	3.90	4.11	21301.	414733.
1210	6400	83	82	0.21	3.90	4.11	21301.	414733.
1211	6400	83	82	0.21	3.90	4.11	21301.	414733.
1212	6400	83	82	0.21	3.90	4.11	21301.	414733.
1213	6400	81	82	0.21	3.90	4.11	20788.	404739.
1214	6400	81	82	0.21	3.90	4.11	20788.	404739.
1215	6400	82	82	0.21	3.90	4.11	21044.	409736.
1216	6400	82	82	0.21	3.90	4.11	21044.	409736.
1217	6400	82	82	0.21	3.90	4.11	21044.	409736.
1218	6400	81	82	0.21	3.90	4.11	20788.	404739.
1219	6400	82	82	0.21	3.90	4.11	21044.	409736.
1220	6400	82	82	0.21	3.90	4.11	21044.	409736.
1221	6400	82	82	0.21	3.90	4.11	21044.	409736.
1222	6400	82	82	0.21	3.90	4.11	21044.	409736.
1223	6400	83	82	0.21	3.90	4.11	21301.	414733.
1224	6400	83	82	0.21	3.90	4.11	21301.	414733.
1225	6400	82	82	0.21	3.90	4.11	21044.	409736.
1226	6400	82	83	0.21	3.90	4.11	21044.	409736.
1227	6400	81	82	0.21	3.90	4.11	20788.	404739.
1228	6400	81	82	0.21	3.90	4.11	20788.	404739.
1229	6400	81	83	0.21	3.90	4.11	20788.	404739.
1230	6400	81	83	0.21	3.90	4.11	20788.	404739.
1231	6400	81	83	0.21	3.90	4.11	20788.	404739.
1232	6400	82	83	0.21	3.90	4.11	21044.	409736.
1233	6400	78	83	0.21	3.90	4.11	20018.	389749.
1234	6400	81	83	0.21	3.90	4.11	20788.	404739.
1235	6400	81	83	0.21	3.90	4.11	20788.	404739.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1236	6400	81	83	0.21	3.90	4.11	20788.	404739.
1237	6400	81	83	0.21	3.90	4.11	20788.	404739.
1238	6400	80	83	0.21	3.90	4.11	20531.	399742.
1239	6400	80	83	0.21	3.90	4.11	20531.	399742.
1240	6400	80	83	0.21	3.90	4.11	20531.	399742.
1241	6400	80	83	0.21	3.90	4.11	20531.	399742.
1242	6400	80	83	0.21	3.90	4.11	20531.	399742.
1243	6400	78	83	0.21	3.90	4.11	20018.	389749.
1244	6400	78	83	0.21	3.90	4.11	20018.	389749.
1245	6400	78	83	0.21	3.90	4.11	20018.	389749.
1246	6400	79	83	0.21	3.90	4.11	20275.	394746.
1247	6400	79	83	0.21	3.90	4.11	20275.	394746.
1248	6400	79	83	0.21	3.90	4.11	20275.	394746.
1249	6400	79	83	0.21	3.90	4.11	20275.	394746.
1250	6400	78	83	0.21	3.90	4.11	20018.	389749.
1251	6400	79	83	0.21	3.90	4.11	20275.	394746.
1252	6400	80	83	0.21	3.90	4.11	20531.	399742.
1253	6400	78	83	0.21	3.90	4.11	20018.	389749.
1254	6400	78	83	0.21	3.90	4.11	20018.	389749.
1255	6400	79	83	0.21	3.90	4.11	20275.	394746.
1256	6400	79	83	0.21	3.90	4.11	20275.	394746.
1257	6400	78	83	0.21	3.90	4.11	20018.	389749.
1258	6400	78	83	0.21	3.90	4.11	20018.	389749.
1259	6400	78	83	0.21	3.90	4.11	20018.	389749.
1300	6400	79	83	0.21	3.90	4.11	20275.	394746.
1301	6400	79	83	0.21	3.90	4.11	20275.	394746.
1302	6400	80	83	0.21	3.90	4.11	20531.	399742.
1303	6400	80	83	0.21	3.90	4.11	20531.	399742.
1304	6400	79	83	0.21	3.90	4.11	20275.	394746.
1305	6400	79	83	0.21	3.90	4.11	20275.	394746.
1306	6400	80	83	0.21	3.90	4.11	20531.	399742.
1307	6400	78	83	0.21	3.90	4.11	20018.	389749.
1308	6400	79	83	0.21	3.90	4.11	20275.	394746.
1309	6400	79	83	0.21	3.90	4.11	20275.	394746.
1310	6400	79	84	0.21	3.90	4.11	20275.	394746.
1311	6400	80	84	0.21	3.90	4.11	20531.	399742.
1312	6400	80	84	0.21	3.90	4.11	20531.	399742.
1313	6400	82	84	0.21	3.90	4.11	21044.	409736.
1314	6400	79	84	0.21	3.90	4.11	20275.	394746.
1315	6400	81	84	0.21	3.90	4.11	20788.	404739.
1316	6400	81	84	0.21	3.90	4.11	20788.	404739.
1317	6400	80	86	0.21	3.90	4.11	20531.	399742.
1318	6400	81	87	0.21	3.90	4.11	20788.	404739.
1319	6400	80	87	0.21	3.90	4.11	20531.	399742.
1320	6400	80	88	0.21	3.90	4.11	20531.	399742.
1321	6400	80	88	0.21	3.90	4.11	20531.	399742.
1322	6400	79	88	0.21	3.90	4.11	20275.	394746.
1323	6400	79	88	0.21	3.90	4.11	20275.	394746.
1324	6400	80	88	0.21	3.90	4.11	20531.	399742.
1325	6400	80	88	0.21	3.90	4.11	20531.	399742.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1326	6400	80	88	0.21	3.90	4.11	20531.	399742.-
1327	6400	80	88	0.21	3.90	4.11	20531.	399742.
1328	6400	79	88	0.21	3.90	4.11	20275.	394746.
1329	6400	80	88	0.21	3.90	4.11	20531.	399742.
1330	6400	80	88	0.21	3.90	4.11	20531.	399742.
1331	6400	82	88	0.21	3.90	4.11	21044.	409736.-
1332	6400	81	89	0.21	3.90	4.11	20788.	404739.
1333	6400	81	89	0.21	3.90	4.11	20788.	404739.
1334	6400	81	89	0.21	3.90	4.11	20788.	404739.
1335	6400	82	89	0.21	3.90	4.11	21044.	409736.
1336	6400	82	89	0.21	3.90	4.11	21044.	409736.-
1337	6400	82	89	0.21	3.90	4.11	21044.	409736.
1338	6400	82	89	0.21	3.90	4.11	21044.	409736.
1339	6400	83	89	0.21	3.90	4.11	21301.	414733.
1340	6400	83	89	0.21	3.90	4.11	21301.	414733.
1341	6400	81	89	0.21	3.90	4.11	20788.	404739.-
1342	6400	82	89	0.21	3.90	4.11	21044.	409736.
1343	6400	82	89	0.21	3.90	4.11	21044.	409736.
1344	6400	81	89	0.21	3.90	4.11	20788.	404739.
1345	6400	81	89	0.21	3.90	4.11	20788.	404739.
1346	6400	82	89	0.21	3.90	4.11	21044.	409736.-
1347	6400	82	90	0.21	3.90	4.11	21044.	409736.
1348	6400	81	89	0.21	3.90	4.11	20788.	404739.
1349	6400	81	89	0.21	3.90	4.11	20788.	404739.
1350	6400	83	89	0.21	3.90	4.11	21301.	414733.
1351	6400	85	89	0.21	3.90	4.11	21814.	424726.-
1352	6400	86	89	0.21	3.90	4.11	22071.	429723.
1353	6400	84	89	0.21	3.90	4.11	21558.	419730.
1354	6400	85	89	0.21	3.90	4.11	21814.	424726.
1355	6400	81	90	0.21	3.90	4.11	20788.	404739.
1356	6400	82	92	0.21	3.90	4.11	21044.	409736.-
1357	6400	82	92	0.21	3.90	4.11	21044.	409736.
1358	6400	82	0	0.21	3.90	4.11	21044.	409736.
1359	6400	82	0	0.21	3.90	4.11	21044.	409736.-

TANK 275 TO 273 - 9/8/78

AMBIENT TEMP (DEG F)	90	TANK VOL START (GAL)	3483.
START TIME	1500	TANK VOL FINISH (GAL)	49838.
FINISH TIME	1730	FUEL TRANS (GAL)	46355.
TOT TIME (MINS)	150	FLOW RATE (GAL/MIN)	309.0
BAR PRES (IN HG)	30.01	LIQ TEMP (DEG F)	69

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC	
1423	3200	13	93	0.21	3.90	4.11	1668.	32479.	
1424	3200	13	93	0.21	3.90	4.11	1668.	32479.	
1425	3200	77	95	0.21	3.90	4.11	9881.	192376.	-
1426	3200	50	95	0.21	3.90	4.11	6416.	124920.	
1427	3200	77	95	0.21	3.90	4.11	9881.	192376.	
1428	3200	82	95	0.21	3.90	4.11	10522.	204868.	
1429	3200	81	97	0.21	3.90	4.11	10394.	202370.	
1430	3200	80	97	0.21	3.90	4.11	10266.	199871.	-
1431	3200	86	97	0.21	3.90	4.11	11036.	214862.	
1432	3200	86	97	0.21	3.90	4.11	11036.	214862.	
1433	3200	90	97	0.21	3.90	4.11	11549.	224855.	
1434	3200	95	99	0.21	3.90	4.11	12190.	237347.	
1435	6400	48	99	0.21	3.90	4.11	12319.	239845.	-
1436	6400	48	99	0.21	3.90	4.11	12319.	239845.	
1437	6400	48	99	0.21	3.90	4.11	12319.	239845.	
1438	6400	49	99	0.21	3.90	4.11	12575.	244842.	
1439	6400	50	101	0.21	3.90	4.11	12832.	249839.	
1440	6400	52	101	0.21	3.90	4.11	13345.	259833.	-
1441	6400	52	102	0.21	3.90	4.11	13345.	259833.	
1442	6400	54	102	0.21	3.90	4.11	13859.	269826.	
1443	6400	55	102	0.21	3.90	4.11	14115.	274823.	
1444	6400	56	102	0.21	3.90	4.11	14372.	279820.	
1445	6400	55	102	0.21	3.90	4.11	14115.	274823.	-
1446	6400	57	103	0.21	3.90	4.11	14628.	284816.	
1447	6400	59	103	0.21	3.90	4.11	15142.	294810.	
1448	6400	62	103	0.21	3.90	4.11	15912.	309800.	
1449	6400	62	105	0.21	3.90	4.11	15912.	309800.	
1450	6400	64	105	0.21	3.90	4.11	16425.	319794.	-
1451	6400	64	108	0.21	3.90	4.11	16425.	319794.	
1452	6400	68	108	0.21	3.90	4.11	17452.	339781.	
1453	6400	64	108	0.21	3.90	4.11	16425.	319794.	
1454	6400	64	108	0.21	3.90	4.11	16425.	319794.	
1455	6400	64	107	0.21	3.90	4.11	16425.	319794.	-
1456	6400	64	107	0.21	3.90	4.11	16425.	319794.	
1457	6400	64	107	0.21	3.90	4.11	16425.	319794.	
1458	6400	64	108	0.21	3.90	4.11	16425.	319794.	
1459	6400	64	107	0.21	3.90	4.11	16425.	319794.	
1500	6400	68	106	0.21	3.90	4.11	17452.	339781.	-
1501	6400	55	105	0.21	3.90	4.11	14115.	274823.	
1502	6400	58	105	0.21	3.90	4.11	14885.	289813.	
1503	6400	69	105	0.21	3.90	4.11	17708.	344778.	
1504	6400	75	103	0.21	3.90	4.11	19248.	374758.	
1505	6400	65	103	0.21	3.90	4.11	16682.	324791.	-
1506	6400	69	103	0.21	3.90	4.11	17708.	344778.	
1507	6400	71	99	0.21	3.90	4.11	18221.	354771.	
1508	6400	73	99	0.21	3.90	4.11	18735.	364765.	
1509	6400	73	98	0.21	3.90	4.11	18735.	364765.	
1510	6400	72	98	0.21	3.90	4.11	18478.	359768.	-
1511	6400	71	99	0.21	3.90	4.11	18221.	354771.	
1512	6400	73	101	0.21	3.90	4.11	18735.	364765.	

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1513	6400	73	101	0.21	3.90	4.11	18735.	364765.
1514	6400	73	102	0.21	3.90	4.11	18735.	364765.
1515	6400	73	102	0.21	3.90	4.11	18735.	364765.
1516	6400	72	99	0.21	3.90	4.11	18478.	359768.
1517	6400	71	99	0.21	3.90	4.11	18221.	354771.
1518	6400	73	98	0.21	3.90	4.11	18735.	364765.
1519	6400	74	96	0.21	3.90	4.11	18991.	369762.
1520	6400	74	95	0.21	3.90	4.11	18991.	369762.
1521	6400	73	96	0.21	3.90	4.11	18735.	364765.
1522	6400	75	95	0.21	3.90	4.11	19248.	374758.
1523	6400	74	94	0.21	3.90	4.11	18991.	369762.
1524	6400	76	94	0.21	3.90	4.11	19505.	379755.
1525	6400	74	94	0.21	3.90	4.11	18991.	369762.
1526	6400	78	95	0.21	3.90	4.11	20018.	389749.
1527	6400	75	96	0.21	3.90	4.11	19248.	374758.
1528	6400	76	96	0.21	3.90	4.11	19505.	379755.
1529	6400	77	96	0.21	3.90	4.11	19761.	384752.
1530	6400	77	97	0.21	3.90	4.11	19761.	384752.
1531	6400	77	96	0.21	3.90	4.11	19761.	384752.
1532	6400	77	96	0.21	3.90	4.11	19761.	384752.
1533	6400	76	96	0.21	3.90	4.11	19505.	379755.
1534	6400	77	95	0.21	3.90	4.11	19761.	384752.
1535	6400	77	96	0.21	3.90	4.11	19761.	384752.
1536	6400	77	96	0.21	3.90	4.11	19761.	384752.
1537	6400	76	96	0.21	3.90	4.11	19505.	379755.
1538	6400	76	97	0.21	3.90	4.11	19505.	379755.
1539	6400	77	96	0.21	3.90	4.11	19761.	384752.
1540	6400	77	95	0.21	3.90	4.11	19761.	384752.
1541	6400	77	96	0.21	3.90	4.11	19761.	384752.
1542	6400	78	96	0.21	3.90	4.11	20018.	389749.
1543	6400	77	96	0.21	3.90	4.11	19761.	384752.
1544	6400	45	96	0.21	3.90	4.11	11549.	224855.
1545	6400	77	96	0.21	3.90	4.11	19761.	384752.
1546	6400	77	96	0.21	3.90	4.11	19761.	384752.
1547	6400	77	95	0.21	3.90	4.11	19761.	384752.
1548	6400	77	95	0.21	3.90	4.11	19761.	384752.
1549	6400	78	95	0.21	3.90	4.11	20018.	389749.
1550	6400	78	96	0.21	3.90	4.11	20018.	389749.
1551	6400	78	96	0.21	3.90	4.11	20018.	389749.
1552	6400	78	96	0.21	3.90	4.11	20018.	389749.
1553	6400	78	95	0.21	3.90	4.11	20018.	389749.
1554	6400	78	96	0.21	3.90	4.11	20018.	389749.
1555	6400	79	95	0.21	3.90	4.11	20275.	394746.
1556	6400	78	95	0.21	3.90	4.11	20018.	389749.
1557	6400	78	95	0.21	3.90	4.11	20018.	389749.
1558	6400	78	95	0.21	3.90	4.11	20018.	389749.
1559	6400	78	95	0.21	3.90	4.11	20018.	389749.
1600	6400	77	95	0.21	3.90	4.11	19761.	384752.
1601	6400	79	95	0.21	3.90	4.11	20275.	394746.
1602	6400	78	94	0.21	3.90	4.11	20018.	389749.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1603	6400	78	94	0.21	3.90	4.11	20018.	389749.
1604	6400	78	94	0.21	3.90	4.11	20018.	389749.
1605	6400	78	94	0.21	3.90	4.11	20018.	389749.
1606	6400	78	94	0.21	3.90	4.11	20018.	389749.
1607	6400	78	94	0.21	3.90	4.11	20018.	389749.
1608	6400	78	94	0.21	3.90	4.11	20018.	389749.
1609	6400	78	94	0.21	3.90	4.11	20018.	389749.
1610	6400	79	94	0.21	3.90	4.11	20275.	394746.
1611	6400	47	94	0.21	3.90	4.11	12062.	234849.
1612	6400	78	94	0.21	3.90	4.11	20018.	389749.
1613	6400	79	94	0.21	3.90	4.11	20275.	394746.
1614	6400	78	94	0.21	3.90	4.11	20018.	389749.
1615	6400	79	94	0.21	3.90	4.11	20275.	394746.
1616	6400	79	95	0.21	3.90	4.11	20275.	394746.
1617	6400	79	95	0.21	3.90	4.11	20275.	394746.
1618	6400	80	96	0.21	3.90	4.11	20531.	399742.
1619	6400	80	96	0.21	3.90	4.11	20531.	399742.
1620	6400	80	98	0.21	3.90	4.11	20531.	399742.
1621	6400	79	99	0.21	3.90	4.11	20275.	394746.
1622	6400	79	99	0.21	3.90	4.11	20275.	394746.
1623	6400	80	96	0.21	3.90	4.11	20531.	399742.
1624	6400	80	96	0.21	3.90	4.11	20531.	399742.
1625	6400	80	95	0.21	3.90	4.11	20531.	399742.
1626	6400	80	95	0.21	3.90	4.11	20531.	399742.
1627	6400	80	96	0.21	3.90	4.11	20531.	399742.
1628	6400	80	96	0.21	3.90	4.11	20531.	399742.
1629	6400	80	95	0.21	3.90	4.11	20531.	399742.
1630	6400	80	96	0.21	3.90	4.11	20531.	399742.
1631	6400	80	96	0.21	3.90	4.11	20531.	399742.
1632	6400	81	96	0.21	3.90	4.11	20788.	404739.
1633	6400	79	96	0.21	3.90	4.11	20275.	394746.
1634	6400	80	96	0.21	3.90	4.11	20531.	399742.
1635	6400	80	96	0.21	3.90	4.11	20531.	399742.
1636	6400	80	96	0.21	3.90	4.11	20531.	399742.
1637	6400	80	96	0.21	3.90	4.11	20531.	399742.
1638	6400	81	94	0.21	3.90	4.11	20788.	404739.
1639	6400	81	94	0.21	3.90	4.11	20788.	404739.
1640	6400	81	94	0.21	3.90	4.11	20788.	404739.
1641	6400	81	94	0.21	3.90	4.11	20788.	404739.
1642	6400	80	94	0.21	3.90	4.11	20531.	399742.
1643	6400	82	93	0.21	3.90	4.11	21044.	409736.
1644	6400	81	94	0.21	3.90	4.11	20788.	404739.
1645	6400	80	95	0.21	3.90	4.11	20531.	399742.
1646	6400	81	95	0.21	3.90	4.11	20788.	404739.
1647	6400	81	96	0.21	3.90	4.11	20788.	404739.
1648	6400	81	96	0.21	3.90	4.11	20788.	404739.
1649	6400	81	96	0.21	3.90	4.11	20788.	404739.
1650	6400	81	95	0.21	3.90	4.11	20788.	404739.
1651	6400	82	96	0.21	3.90	4.11	21044.	409736.
1652	6400	80	96	0.21	3.90	4.11	20531.	399742.

TIME	ATTN RANGE	PEAK HT	VPR TEMP	SMP FLO	N/2 FLO	TOT FLO	MEAS CONC	ACTUAL CONC
1653	6400	81	95	0.21	3.90	4.11	20788.	404739.
1654	6400	82	95	0.21	3.90	4.11	21044.	409736.
1655	6400	81	95	0.21	3.90	4.11	20788.	404739.
1656	6400	80	95	0.21	3.90	4.11	20531.	399742.
1657	6400	81	95	0.21	3.90	4.11	20788.	404739.
1658	6400	80	95	0.21	3.90	4.11	20531.	399742.
1659	6400	81	95	0.21	3.90	4.11	20788.	404739.
1700	6400	81	95	0.21	3.90	4.11	20788.	404739.
1701	6400	80	95	0.21	3.90	4.11	20531.	399742.
1702	6400	80	95	0.21	3.90	4.11	20531.	399742.
1703	6400	80	95	0.21	3.90	4.11	20531.	399742.
1704	6400	80	95	0.21	3.90	4.11	20531.	399742.
1705	6400	80	95	0.21	3.90	4.11	20531.	399742.
1706	6400	81	95	0.21	3.90	4.11	20788.	404739.
1707	6400	81	94	0.21	3.90	4.11	20788.	404739.
1708	6400	75	94	0.21	3.90	4.11	19248.	374758.
1709	6400	80	94	0.21	3.90	4.11	20531.	399742.
1710	6400	81	94	0.21	3.90	4.11	20788.	404739.
1711	6400	81	94	0.21	3.90	4.11	20788.	404739.
1712	6400	80	94	0.21	3.90	4.11	20531.	399742.
1713	6400	80	94	0.21	3.90	4.11	20531.	399742.
1714	6400	80	94	0.21	3.90	4.11	20531.	399742.
1715	6400	80	94	0.21	3.90	4.11	20531.	399742.
1716	6400	79	94	0.21	3.90	4.11	20275.	394746.
1717	6400	81	94	0.21	3.90	4.11	20788.	404739.
1718	6400	80	94	0.21	3.90	4.11	20531.	399742.
1719	6400	81	94	0.21	3.90	4.11	20788.	404739.
1720	6400	81	94	0.21	3.90	4.11	20788.	404739.
1721	6400	81	95	0.21	3.90	4.11	20788.	404739.
1722	6400	81	94	0.21	3.90	4.11	20788.	404739.
1723	6400	80	94	0.21	3.90	4.11	20531.	399742.
1724	6400	81	94	0.21	3.90	4.11	20788.	404739.
1725	6400	81	94	0.21	3.90	4.11	20788.	404739.
1726	6400	80	94	0.21	3.90	4.11	20531.	399742.
1727	6400	80	94	0.21	3.90	4.11	20531.	399742.
1728	6400	79	94	0.21	3.90	4.11	20275.	394746.
1729	6400	80	94	0.21	3.90	4.11	20531.	399742.
1730	6400	79	94	0.21	3.90	4.11	20275.	394746.