Stack Test Report # 9

AP-42 Section 9.12.1
Reference 11
Report Sect. 4
Reference 19

STACK EMISSIONS SURVEY
ADOLPH COORS COMPANY
BREWERY COMPLEX
GOLDEN, COLORADO

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FILE NUMBER 9110-111

Prepared By:

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INTRODUCTION

Western Environmental Services and Testing, Inc. (WEST, Inc.) of Casper, Wyoming conducted a Stack Emissions Survey at Adolph Coors Company's Brewery Complex located in Golden, Colorado, on February 13-16, 1991. The purpose of this survey was to determine the emissions of particulate matter, particulate size, carbon monoxide, and total hydrocarbons from the NB4 Dryer Stacks and the K-1 Dryer Inlet and Outlet Stacks.

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, methods 1, 2, 3, 4, 5, 10, and 25A.

Persons present during sampling were:

Adolph Coors Company	Ms. Jere Zimmerman
	Mr. Marlin Hull
Western Environmental	Mr. Mike Reynolds
	Mr. Matt Tikka
	Mr. Tim McCullough
	Mr. Ron Thomas
	Mr. Randall Hanson

SUMMARY OF RESULTS

NB4 North Dryer Stack

The principal conclusions are:

1. The emissions of particulate matter from the NB4 North Dryer Stack were equal to 0.912 pounds per hour (0.0166 grains per dry standard cubic foot), based on the average of the "front-half" collections of the three test runs for particulates.

2. The emission of particulate matter less than or equal to 10 microns from the stack were 0.394 pounds per hour, based on the average of the Anderson Mark III cascade impactor collections of three runs.

3. The emissions of total hydrocarbons (as propane, less methane and ethane) from the North Dryer Stack were equal to 2.23 pounds per hour (52.1 parts per million), based on the average of the three test runs.

4. The emissions of carbon monoxide were equal to 1.23 pounds per hour (46 parts per million), based on the average of the three test runs.

SUMMARY OF RESULTS

NB4 South Dryer Stack

The principal conclusions are:

1. The emissions of particulate matter from the NB4 South Dryer Stack were equal to 0.438 pounds per hour (0.013 grains per dry standard cubic foot), based on the average of the "front-half" collections of the three test runs for particulates.

2. The emissions of particulate matter less than or equal to 10 microns from the stack were 0.070 pounds per hour, based on the catch from the Anderson Mark III cascade impactor, the average of three runs.

3. The emissions of total hydrocarbons (as propane, less methane and ethane) from the South Dryer Stack were equal to 0.54 pounds per hour (20.2 parts per million), based on the average of the three test runs.

4. The emissions of carbon monoxide were equal to 0.25 pounds per hour (16 parts per million), based on the average of the three test runs.

SUMMARY OF RESULTS

K-1 Dryer Inlet

The principal conclusions are:

1. The emissions of particulate matter from the K-1 Dryer Inlet were equal to 100.97 pounds per hour (7.775 grains per dry standard cubic foot), based on the average of the "front-half" collections of the three test runs for particulates.

2. The emissions of particulate matter less than or equal to 10 microns from the inlet were 0.659 pounds per hour, based on the catch from the Anderson Mark III cascade impactor, the average of three runs.

3. The emissions of total hydrocarbons (as propane, less methane and ethane) from the Dryer Inlet were equal to 0.27 pounds per hour (25.9 parts per million), based on the average of the three test runs.

4. The emissions of carbon monoxide were equal to 0.02 pounds per hour (3 parts per million), based on the average of the three test runs.

SUMMARY OF RESULTS

K-1 Dryer Outlet Stack

The principal conclusions are:

1. The emissions of particulate matter from the K-1 Dryer Outlet were equal to 0.184 pounds per hour (0.0095 grains per dry standard cubic foot), based on the average of the "front-half" collections of the three test runs for particulates.

2. The emissions of particulate matter less than or equal to 10 microns from the outlet were 0.044 pounds per hour, based on the catch from the Anderson Mark III cascade impactor, the average of two runs.

3. The emissions of total hydrocarbons (as propane, less methane and ethane) from the Outlet Stack were equal to 0.62 pounds per hour (40.9 parts per million), based on the average of the three test runs.

4. The emissions of carbon monoxide were equal to 0.12 pounds per hour (12 parts per million), based on the average of the three test runs.

SUMMARY OF RESULTS

NB4 North Dryer Stack

Run Number		1	2	3
Stack Flow Rate - ACFM		19470	18661	16371
Stack Flow Rate - DSCFM*		6984	6598	5508
% Water Vapor - % Volume		47.65	48.17	50.52
% CO_2 - % Volume		0.2	0.2	0.2
% O_2 - % Volume		20.8	21.0	20.8
% Excess Air At Sampling Point		-----	-----	-----
Particulates				
Probe, Cyclone & Filter Catch grains/dscf*	(C_{an})	0.0176	0.0171	0.0151
grains/cf at Stack Conditions	(C_{at})	0.0063	0.0060	0.0051
lbs/hr	(C_{aw})	1.051	0.970	0.714
Carbon Monoxide	ppm	31	40	67
	lbs/hr	0.944	1.151	1.609
Total Hydrocarbons as Propane (less methane and ethane)	ppm	49.3	39.8	67.2
	lbs/hr	2.361	1.800	2.538
PM - 10	lbs/hr	0.399	0.500	0.282

* 68 Deg. F., 29.92 "Hg (20 Deg. C., 760 mm Hg)

SUMMARY OF RESULTS

NB4 South Dryer Stack

Run Number		1	2	3
Stack Flow Rate - ACFM		7874	9249	8473
Stack Flow Rate - DSCFM*		3710	4205	3984
% Water Vapor - % Volume		32.70	34.74	32.80
% CO_2 - % Volume		0.4	0.2	0.4
% O_2 - % Volume		21.2	21.0	20.8
% Excess Air At Sampling Point		-----	-----	-----
Particulates				
Probe, Cyclone & Filter Catch grains/dscf*	(C_{an})	0.0147	0.0098	0.0144
grains/cf at Stack Conditions	(C_{at})	0.0069	0.0045	0.0068
lbs/hr	(C_{aw})	0.466	0.354	0.493
Carbon Monoxide	ppm	29	7	13
	lbs/hr	0.469	0.128	0.226
Total Hydrocarbons as Propane (less methane and ethane)	ppm	24.1	18.0	18.5
	lbs/hr	0.613	0.519	0.505
PM - 10	lbs/hr	0.055	0.069	0.085

* 68 Deg. F., 29.92 "Hg (20 Deg. C., 760 mm Hg)

SUMMARY OF RESULTS

K-1 Dryer Inlet

Run Number		1	2	3
Stack Flow Rate - ACFM		5490	5369	5687
Stack Flow Rate - DSCFM*		1484	1481	1600
% Water Vapor - % Volume		59.40	58.51	57.69
% CO_2 - % Volume		0.0	0.0	0.0
% O_2 - % Volume		20.0	20.0	20.0
% Excess Air At Sampling Point		-----	-----	-----
Particulates				
Probe, Cyclone & Filter Catch grains/dscf*	(C_{an})	7.3178	9.4518	6.5563
grains/cf at Stack Conditions	(C_{at})	1.9708	2.5986	1.8377
lbs/hr	(C_{aw})	93.056	119.983	89.875
Carbon Monoxide	ppm	4	4	2
	lbs/hr	0.026	0.026	0.014
Total Hydrocarbons as Propane (less methane and ethane)	ppm	25.9	31.2	20.7
	lbs/hr	0.264	0.317	0.227
PM - 10	lbs/hr	0.838	0.600	0.539

* 68 Deg. F., 29.92 "Hg (20 Deg. C., 760 mm Hg)

SUMMARY OF RESULTS

K-1 Dryer Outlet Stack

Run Number		1	2	3
Stack Flow Rate - ACFM		6193	6092	6124
Stack Flow Rate - DSCFM*		2123	2513	2144
% Water Vapor - % Volume		49.47	40.08	48.57
% CO_2 - % Volume		0.4	0.4	0.2
% O_2 - % Volume		20.6	20.6	20.8
% Excess Air At Sampling Point		----	----	----
Particulates				
Probe, Cyclone & Filter Catch grains/dscf*	(C_{an})	0.0145	0.0082	0.0059
grains/cf at Stack Conditions	(C_{at})	0.0050	0.0034	0.0021
lbs/hr	(C_{aw})	0.264	0.178	0.109
Carbon Monoxide	ppm	10	23	2
	lbs/hr	0.092	0.252	0.019
Total Hydrocarbons as Propane (less methane and ethane)	ppm	48.3	28.1	46.3
	lbs/hr	0.703	0.484	0.680
PM - 10	lbs/hr	0.058	0.031	-----

* 68 Deg. F., 29.92 "Hg (20 Deg. C., 760 mm Hg)

DISCUSSION OF RESULTS

NB4 North Dryer

The three tests (Runs 1, 2, & 3) appeared to be valid representations of the actual emissions during the tests. The moisture percentages for the three runs were within 3.6 percent of the mean value. The measured flow rates (Qs) for the tests were within 13.4 percent of the mean value. The calculated "front-half" particulate emissions (pounds per hour) of the three test runs showed a range of +15.3 percent to -21.7 percent variation from the mean value. The isokinetic sampling rate was within the specified sampling requirements, the greatest deviation being 7.8 percent.

NB4 South Dryer

The three tests (Runs 1, 2, & 3) appeared to be valid representations of the actual emissions during the tests. The moisture percentages for the three runs were within 4.0 percent of the mean value. The measured flow rates (Qs) for the tests were within 6.5 percent of the mean value. The calculated "front-half" particulate emissions (pounds per hour) of the three test runs showed a range of +12.6 percent to -19.1 percent variation from the mean value. The isokinetic sampling rate was within the specified sampling requirements for runs two and three, with the deviation of run one being 10.03 percent.

DISCUSSION OF RESULTS

K-1 Dryer Inlet

The three tests (Runs 1, 2, & 3) appeared to be valid representations of the actual emissions during the tests. The moisture percentages for the three runs were within 1.5 percent of the mean value. The measured flow rates (Qs) for the tests were within 5.1 percent of the mean value. The calculated "front-half" particulate emissions (pounds per hour) of the three test runs showed a range of +18.8 percent to -11.0 percent variation from the mean value. The isokinetic sampling rate was within the specified sampling requirements for runs two and three, with the deviation of run one being 11.73 percent.

K-1 Dryer Outlet

The three tests (Runs 1, 2, & 3) appeared to be valid representations of the actual emissions during the tests. The moisture percentages for the three runs were within 12.9 percent of the mean value. The measured flow rates (Qs) for the tests were within 11.2 percent of the mean value. The calculated "front-half" particulate emissions (pounds per hour) of the three test runs showed a range of +43.7 percent to -40.6 percent variation from the mean value. The isokinetic sampling rate was within the specified sampling requirements for runs one and three, with the deviation of run two being 18.79 percent.

DESCRIPTION OF SAMPLING LOCATION

NB4 Dryer Stacks

The sampling ports are located on the rectangular exhaust stacks on the fifth floor of the Brewery Complex building. The sampling was done from four ports on the rectangular ducts located 25 feet 4-3/4 inches (5.63 stack diameters) downstream of a disturbance and 9 feet 10-1/2 inches (2.19 stack diameters) upstream of a disturbance. The area of the two ducts is 2937 square inches. Port and wall thickness is 1/8 inch.

K-1 Dryer Inlet

The sampling ports are located on the circular duct on the second floor of the Brewery Complex Building. The sampling was done from two ports on the circular stack located 12 feet 9-1/2 inches (3.24 stack diameters) downstream of a disturbance and 12 feet 5-1/2 inches (3.14 stack diameters) upstream of a disturbance. The area of the stack is 1256 square inches. Port and wall thickness is one and 3/16 inches.

K-1 Dryer Outlet

The sampling ports are located on the circular exhaust stack on the K-1 roof of the Brewery Complex. The sampling was done from two ports on the circular stack located 22 feet 7 inches (7.58 stack diameters) downstream of a disturbance and 22 feet 9 inches (7.58 stack diameters downstream of a disturbance. The area of the stack is 1004 square inches. Port and wall thickness is 1/8 inch.

SAMPLING AND ANALYTICAL PROCEDURES

The sampling and analytical procedures used followed the procedures outlined in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, methods 1, 2, 3, 4, 5, 10, 18, and 25A.

NB4 North Dryer Stack

A preliminary velocity traverse was performed at each of the four ports in order to determine the uniformity of flow in the stack. Particulate samples of 3 minute duration at each of the five traverse points were taken from the four ports using an EPA-type, heated, glass lined probe. A total of 20 points were sampled.

NB4 South Dryer Stack

A preliminary velocity traverse was performed at each of the four ports in order to determine the uniformity of flow in the stack. Particulate samples of 4-1/2 minute duration at each of the five traverse points were taken from the four ports using an EPA-type, heated, glass-lined probe. A total of 20 points were sampled. The sampling time for each run was extended to 90 minutes due to extremely low flows.

K-1 Dryer Inlet Duct

A preliminary velocity traverse was made at each port in order to determine the uniformity of flow in the stack. Particulate samples of 2-1/2 minute duration at each of the twelve traverse points were taken from each port using an EPA-type, heated, glass lined probe. A total of 24 points were utilized. A flex probe was also used between the probe and the filter assembly. Run number three was stopped short due to particulate matter plugging the sampling train.

K-1 Dryer Outlet Stack

A preliminary velocity traverse was made at each port in order to determine the uniformity of flow in the stack. Particulate samples of 5 minute duration at each of the six traverse points were taken from each port using an EPA-type, heated, glass-lined probe. A total of 12 points were utilized. The third particle size run on this stack was deleted due to sample contamination.

Before each test the sampling train was leak-checked at 15 inches of mercury. After each test the train was again leak-checked at the highest recorded vacuum reading during the test. Final leak-checking was performed in order to predetermine the possibility of a diluted sample.

Before and after each test period, the pitot lines were checked for leaks under both a vacuum and pressure. Also the lines were checked for clearance and the zero manometer reading verified, before and after each test. A Dwyer micromanometer was utilized for all tests on each stack.

The particulate emissions were calculated using the front-half collections of the EPA-type sampling train. Total hydrocarbon, and carbon monoxide samples were taken simultaneously with the particulate runs on each stack using Methods 25A and 10, respectively. Integrated 22 liter bag samples were also taken simultaneously with each test run for methane and ethane analyses by Method 18.

An orsat analyses was performed for each test using an integrated grab sample.

DESCRIPTION OF TESTS

Personnel from WEST, Inc. arrived at the Adolph Coors Brewery Complex at 0700 hours on Wednesday, February 13, 1991. After meeting with plant personnel, the equipment was set up on the NB4 North Dryer and after electrical power was obtained, readied for testing. Preliminary data were taken and testing began at 1441 hours and continued without difficulty until the completion of three runs at 1954 hours. The equipment was then moved over to the South Dryer Stack and secured for the night by 2030 hours.

On Thursday, February 14, 1991 personnel arrived at the plant at 0700 hours. The equipment was readied for testing on the South Dryer Stack by 0800 hours. Some preliminary data were taken and testing began at 0904 hours and continued without difficulty until the completion of three runs at 1723.5 hours. The equipment was moved off the NB4 South Dryer Stack and moved to the location of the K-1 Dryer Inlet duct. The sampling equipment were then secured for the night by 1900 hours.

On Friday, February 15, 1991 work began at 0600 hours. The equipment was readied for testing and preliminary data taken by 1000 hours. A one hour delay was encountered due to leakage in the sampling train. Testing of the K-1 Dryer inlet began at 1054 hours and continued until 1700 hours.

The equipment was then moved from the K-1 Dryer Inlet area to the K-1 Dryer Outlet location. The equipment was readied for testing and preliminary data taken by 2100 hours.

Testing of the K-1 Dryer Outlet Stack began at 2111 hours and continued without difficulty until the completion of three runs at 0202 hours on Saturday, February 16, 1991.

The sampling equipment was moved off the stack and loaded into the mobile laboratory. All recovered samples were taken to WEST Inc.'s laboratory in Casper, Wyoming for further analysis and evaluation.

Testing at Adolph Coors Company's Brewery Complex located in Golden, Colorado, was completed at 0330 hours on Saturday, February 16, 1991.

James E. Meador, Jr.
Vice President

Alan D. Roylance
Manager of Operations

APPENDICES

A. Location of Sampling Points

B. Source Emissions Calculations

C. Calibration of Equipment

D. Field Testing Data

E. Analytical Data

F. Particle Size Data

G. Chain of Custody and Analysis Request

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APPENDIX A

Location of Sampling Points

APPENDIX A

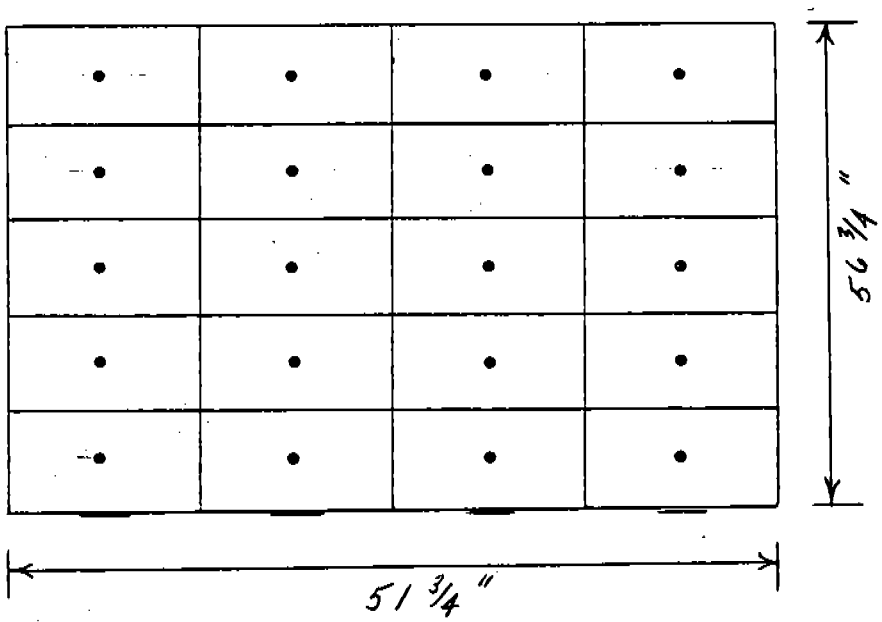
Location of Sampling Points
NB4 Dryer Stacks

The sampling ports are located on the rectangular stack 25 feet 4-3/4 inches (5.63 equivalent stack diameters downstream of a disturbance and 9 feet 10-1/2 inches (2.19 equivalent stack diameters) upstream of a disturbance. The location of the sampling points were calculated as follows:

Port and Wall Thickness = 1/2 inch

Area of Stack = 2937 square inches

Sampling was performed on a 4x5 grid



APPENDIX A

Location of Sampling Points
K-1 Dryer Inlet

The sampling ports are located on the second floor of the Brewing Complex The locations of the sampling points were calculated as follows:

Inside Stack Diameter = 40 inches

Port and Wall Thickness = 1-3/16 inch

Area of Stack = 1256 square inches

Point Number	Percent of Diameter From Wall	Distance From Wall (inches)
1	2.1	1*
2	6.7	2-11/16
3	11.8	4- 3/4
4	17.7	7- 1/16
5	25.0	10
6	35.6	14- 1/4
7	64.4	25- 3/4
8	75.0	30
9	82.3	32-15/16
10	88.2	35- 1/4
11	93.3	37- 5/16
12	97.9	39*

* Locations adjusted away from stack wall.

APPENDIX A

Location of Sampling Points
K-1 Dryer Outlet Stack

The sampling ports are located on the roof of the K-1 area of the Brewery Complex. The locations of the sampling points were calculated as follows:

Inside Stack Diameter = 35-3/4 inches

Port and Wall Thickness = 1/8 inch

Area of Stack = 1004 square inches

Point Number	Percent of Diameter From Wall	Distance From Wall (inches)
1	4.4	1- 9/16
2	14.6	5- 1/4
3	29.6	10- 9/16
4	70.4	25- 3/16
5	85.4	30- 1/2
6	95.6	34- 3/16

APPENDIX B

Source Emission Calculations

Nomenclature for Particulate Calculations

Symbol	English Units	Metric Units	Description
A_s	$in.^2$	m^2	Stack Area
C_{an}	gr/dscf	g/dscm	Particulate - Probe, Cyclone and Filter
C_{ao}	gr/dscf	g/dscm	Particulate - Total
C_{at}	gr/CF @ Stack Conditions	g/m^3	Particulate - Probe, Cyclone and Filter
C_{au}	gr/CF @ Stack Conditions	g/m^3	Particulate - Total
C_{aw}	lbs/hr	kg/hr	Particulate - Probe, Cyclone and Filter
C_{ax}	lbs/hr	kg/hr	Particulate - Total
C_p			Pitot Tube Calibration Factor
D_n	in.	m	Sampling Nozzle Diameter
%EA			Percent Excess Air At Sampling Point
g	32.2 ft/sec^2		Acceleration of Gravity
%I			Percent Isokinetic
%M			Percent Moisture in the Stack Gas by Volume

* 528° R, 29.92 "Hg (20°C, 760 mm Hg)

Symbol	English Units	Metric Units	Description
M_d			Mole Fraction of Dry Gas
mf	mg	mg	Particulate - Probe, Cyclone and Filter
M_{H_2O}	18 lb/lb-mole		Molecular Weight of Water
m_t	mg	mg	Particulate - Total
MW_{air}	lb/lb-mole	g/g-mole	Molecular Weight Of Stack Gas
MW	28.95 lb/ lb-mole		Molecular Weight Of Air
MW_d	lb/lb-mole	g/g-mole	Molecular Weight Of Dry Stack Gas
P_b	"Hg Absolute	mm Hg	Barometric Pressure
P_m	"H_2O	mm H_2O	Orifice Pressure Drop
P_s	"Hg Absolute	mm Hg	Stack Pressure
ΔP_s	"H_2O	mm H_2O	Velocity Head of Stack Gas
P_{std}	29.92 "Hg	760 mm Hg	Standard Barometric Pressure
Q_a	ACFM	m^3/hr	Stack Gas Volume At Actual Stack Conditions
Q_s	DSCFM	dscm/hr	Stack Gas Volume At 29.92 "Hg, 528°R, Dry
R	21.83 "Hg ft^3/lb-mole-°R		Universal Gas Constant

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

Symbol	English Units	Metric Units	Description
T_m	°F	°C	Average Gas Meter Temperature
T_t	min	min	Net Time of Test
T_s	°F	°C	Stack Temperature
T_{std}	528°R	293°K	Standard Temperature
V_m	ft^3	m^3	Volume of Dry Gas Sampled @ Meter Conditions
$V_{m_{std}}$	dscf	dscm	Volume of Dry Gas Sampled @ Standard Conditions
V_s	fpm	m/sec	Stack Velocity @ Stack Conditions
V_w	ml	ml	Total water Collected in Impingers And Silica Gel
$V_{w_{gas}}$	scf	scm	Volume of Water Vapor Collected @ Standard Conditions
ρ_{air}	0.0748 lbs/ft^3		Density of Air
ρ_{H_2O}	1 g/ml		Density of Water
ρ_{man}	51.63 lbs/ft^3		Density of Manometer Oil

Standard Conditions: 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Example Particulate Calculations

1. Volume of Dry Gas Sampled At Standard Conditions.*

$$V_{m_{std}} = V_m \left[\frac{T_{std}}{T_m + 460} \right] \left[\frac{P_b + \frac{P_m}{13.6}}{P_{std}} \right]$$

$$V_{m_{std}} = 17.65\ V_m \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460} \right] = \text{dscf}$$

$$V_{m_{std}} = \text{dscf} \times 0.028317 - \text{dscm}$$

2. Volume of Water Vapor Collected At Standard Conditions.*

$$V_{w_{gas}} = \frac{(V_w - \text{gms } SO_2 - \text{gms } H_2S)\ \rho_{H_2O}\ R\ T_{std}}{P_{std}\ M_{H_2O}\ 453.6}$$

$$V_{w_{gas}} = 0.0472\ (V_w - \text{gms } SO_2 - \text{gms } H_2S) = \text{scf}$$

$$V_{w_{gas}} = \text{scf} \times 0.028317 = \text{scm}$$

3. Percent Moisture in Stack Gas.

$$\%M = \frac{V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}} \times 100 = \%$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

4. Mole Fraction of Dry Gas.

$$M_d = \frac{100 - \%M}{100}$$

5. Average Molecular Weight of Dry Stack Gas.

$$MW_d = \left(\%CO_2 \times \frac{44}{100}\right) + \left(\%O_2 \times \frac{32}{100}\right) + \left(\%N_2 \times \frac{28}{100}\right) + \left(\%CO \times \frac{28}{100}\right) = \text{lb/lb-mole}$$

$$= \text{g/g-mole}$$

6. Molecular Weight of Stack Gas.

$$MW = MW_d \times M_d + 18\ (1-M_d) = \frac{\text{lb}}{\text{lb-mole}} = \text{g/g-mole}$$

7. Percent Excess Air At Sampling Point.

$$\%EA = \frac{100\ (\%O_2 - 0.5\%\ CO)}{0.265\ (\%N_2) - (\%O_2) + 0.5\ (\%CO)}$$

8. Stack Pressure.

$$P_s = P_b + \frac{\text{stack pressure } "H_2O}{13.6} = "\text{Hg Absolute}$$

$$P_s = "\text{Hg Abs.} \times 25.4 = \text{mm Hg}$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

9. Stack Velocity At Stack Conditions.

$$V_s = C_p\ 60 \left[\frac{2g \times \rho_{man} \times P_{std} \times MW_{air} \times (T_s + 460) \times \Delta P_s}{12 \times \rho_{air} \times P_s \times MW \times T_{std}} \right]^{1/2}$$

$$V_s = 5123.8\ C_p \left[\frac{(T_s + 460)}{P_s \times MW} \right]^{\frac{1}{2}} \times \text{Average} \left[(\Delta P)^{\frac{1}{2}} \right] = \text{fpm}$$

$$V_s = \text{fpm} \times 0.00508 = \text{m/sec}$$

10. Dry Stack Gas Volume At Standard Conditions.*

$$Q_s = \frac{1}{144} V_s \times A_s \times M_d \times \frac{T_{std}}{T_s + 460} \times \frac{P_s}{P_{std}}$$

$$Q_s = \frac{0.123\ V_s \times A_s \times M_d \times P_s}{T_s + 460} = \text{DSCFM}$$

$$Q_s = \text{DSCFM} \times 1.6990 = \text{dscm/hr}$$

11. Actual Stack Gas Volume At Stack Conditions.

$$Q_a = \frac{V_s \times A_s}{144} = \text{ACFM}$$

$$Q_a = \text{ACFM} \times 1.6990 = \text{m}^3/\text{hr}$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

12. Percent Isokinetic

$$\%I = \frac{V_{m_{std}} \times (T_s + 460) \times P_{std} \times 100 \times 144}{M_d \times T_{std} \times P_s \times T_t \times V_s \times \frac{\pi D_n^2}{4}}$$

$$\%I = \frac{1039\ V_{m_{std}} \times (T_s + 460)}{M_d \times P_s \times T_t \times V_s\ D_n^2}$$

13. Particulate - Probe, Cyclone, and Filter.

$$C_{an} = \frac{m_f}{V_{m_{std}}} \times \frac{1\ gr}{64.8\ mg}$$

$$C_{an} = 0.0154\ \frac{m_f}{V_{m_{std}}} = gr/dscf$$

$$C_{an} = gr/dscf \times 2.290 = g/dscm$$

14. Particulate - Total.

$$C_{ao} = 0.0154 \times \frac{m_t}{V_{m_{std}}} = gr/dscf$$

$$C_{ao} = gr/dscf \times 2.290 = g/dscm$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

15. Particulate - Probe, Cyclone, and Filter At Stack Conditions.

$$C_{at} = C_{an} \times \frac{P_s}{P_{std}} \times \frac{(T_{std})}{(T_s + 460)} \times M_d$$

$$C_{at} = \frac{17.65 \times C_{an} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{at} = gr/CF \times 2.290 = g/m^3$$

16. Particulate - Total, At Stack Conditions.

$$C_{au} = \frac{17.65 \times C_{ao} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{au} = gr/CF \times 2.290 = g/m^3$$

17. Particulate - Probe, Cyclone, and Filter.

$$C_{aw} = C_{an} \times Q_s \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{1 \text{ lb}}{7000 \text{ gr}}$$

$$C_{aw} = 0.00857 \times C_{an} \times Q_s = lbs/hr$$

$$C_{aw} = lbs/hr \times 0.4536 = kg/hr$$

18. Particulate - Total.

$$C_{ax} = 0.00857 \times C_{ao} \times Q_s = lbs/hr$$

$$C_{ax} = lbs/hr \times 0.4536 = kg/hr$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

SAMPLE CALCULATIONS

CO ppm x 4.361×10^{-6} x Qs = lbs/hr CO

THC ppm x 6.856×10^{-6} x Qs = lbs/hr THC

COORS BREWING COMPANY
GOLDEN, COLORADO
STACK EMISSIONS SURVEY

FEBRUARY 1991

FILE NUMBER 9110-111

SOURCE EMISSIONS CALCULATIONS

Symbol	Description	Units	N.DRYER	N.DRYER	N.DRYER
Run No.			1	2	3
Date			02/13/91	02/13/91	02/13/91
Begin			1441 MST	1648 MST	1848 MST
End			1551 MST	1756 MST	1954 MST
Pb	barometric pressure	"Hg Abs. (mm Hg)	24.40 619.76	24.40 619.76	24.40 619.76
Pm	orifice pressure drop	"H2O (mm H2O)	1.62 41.21	1.55 39.31	1.21 30.65
Vm	volume dry gas sampled @ meter conditions	cu. ft. (cu. m.)	51.419 1.456	51.984 1.472	45.002 1.274
Tm	avg. gas meter temp	deg. F (deg. C)	107 41	107 41	107 42
Vmstd	volume dry gas sampled @ standard conditions*	dscf (dscm)	39.275 1.112	39.696 1.124	34.304 .971
Vw	total H2O collected, impingers & silica gel	ml	757.4	781.6	741.9
Vwgas	volume water vapor collected @ standard conditions*	scf (scm)	35.749 1.012	36.892 1.045	35.018 .992
%M	moisture in stack gas by volume	%	47.65	48.17	50.52

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	N.DRYER	N.DRYER	N.DRYER
Run No.			1	2	3
Md	mole fraction of dry gas	-------	.5235	.5183	.4948
CO2		%	.2	.2	.2
O2		%	20.8	21.0	20.8
N2		%	79.0	78.8	79.0
%EA	excess air @ sampling point	%	---	---	---
MWd	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.86 28.86	28.87 28.87	28.86 28.86
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	23.69 23.69	23.64 23.64	23.38 23.38
dP's	velocity head of stack gas	"H2O (mm H2O)	.048 1.23	.044 1.11	.033 .85
Ts	stack temperature	deg. F (deg. C)	170 77	173 78	175 80
Ps	stack pressure	"Hg Abs. (mm Hg)	24.39 619.48	24.39 619.48	24.39 619.48
Vs	stack velocity @ stack conditions	fpm (m/sec)	955 4.85	915 4.65	803 4.08
As	stack area	sq. in. (sq. met.)	2937 1.89	2937 1.89	2937 1.89
Qs	dry stack volume @ standard conditions*	DSCFM (dscm/hr)	6984 11866.54	6598 11210.22	5508 9358.66
Qa	actual stack gas volume @ stack conditions	ACFM (cu.m./hr)	19470 33079.88	18661 31705.83	16371 27813.63

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	N.DRYER	N.DRYER	N.DRYER
Run No.			1	2	3
Tt	net time of test	min.	60	60	60
Dn	sampling nozzle diameter	in. (m)	.618 .016	.618 .016	.618 .016
%I	percent isokinetic	%	92.11	98.54	102.00
mf	particulate - probe, cyclone and filter	mg	44.8	44.2	33.7
mt	particulate - total	mg	.0	.0	.0
Can	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0176 .0402	.0171 .0393	.0151 .0346
Cao	particulate - total	gr/dscf* (g/dscm)	.0000 .0000	.0000 .0000	.0000 .0000
Cat	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/cu.m.)	.0063 .0144	.0060 .0138	.0051 .0116
Cau	particulate - total @ stack conditions	gr/cf (g/cu.m.)	.0000 .0000	.0000 .0000	.0000 .0000
Caw	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	1.051 .477	.970 .440	.714 .324
Cax	particulate - total	lbs/hr (kg/hr)	.000 .000	.000 .000	.000 .000

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

COORS BREWING COMPANY
GOLDEN, COLORADO
STACK EMISSIONS SURVEY

FEBRUARY 1991

FILE NUMBER 9110-111

SOURCE EMISSIONS CALCULATIONS

Symbol	Description	Units	S.DRYER	S.DRYER	S.DRYER
Run No.			1	2	3
Date			02/14/91	02/14/91	02/14/91
Begin			0904 MST	1208 MST	1547 MST
End			1039.5 MST	1342.5 MST	1723.5 MST
Pb	barometric pressure	"Hg Abs.	24.38	24.38	24.38
		(mm Hg)	619.25	619.25	619.25
Pm	orifice pressure drop	"H2O	.39	.62	.55
		(mm H2O)	9.94	15.71	13.97
Vm	volume dry gas sampled @ meter conditions	cu. ft.	39.953	49.004	45.990
		(cu. m.)	1.131	1.388	1.302
Tm	avg. gas meter temp	deg. F	103	104	103
		(deg. C)	39	40	40
Vmstd	volume dry gas sampled @ standard conditions*	dscf	30.568	37.458	35.196
		(dscm)	.866	1.061	.997
Vw	total H2O collected, impingers & silica gel	ml	314.7	422.4	363.9
Vwgas	volume water vapor collected @ standard conditions*	scf	14.854	19.937	17.176
		(scm)	.421	.565	.486
%M	moisture in stack gas by volume	%	32.70	34.74	32.80

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	S.DRYER	S.DRYER	S.DRYER
Run No.			1	2	3
Md	mole fraction of dry gas	-------	.6730	.6526	.6720
CO2		%	.4	.2	.4
O2		%	21.2	21.0	20.8
N2		%	78.4	78.8	78.8
%EA	excess air @ sampling point	%	---	---	---
MWd	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.91 28.91	28.87 28.87	28.90 28.90
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	25.34 25.34	25.10 25.10	25.32 25.32
dP's	velocity head of stack gas	"H2O (mm H2O)	.009 .22	.012 .30	.010 .25
Ts	stack temperature	deg. F (deg. C)	156 69	160 71	157 69
Ps	stack pressure	"Hg Abs. (mm Hg)	24.37 618.92	24.37 618.92	24.37 618.92
Vs	stack velocity @ stack conditions	fpm (m/sec)	386 1.96	453 2.30	415 2.11
As	stack area	sq. in. (sq. met.)	2937 1.89	2937 1.89	2937 1.89
Qs	dry stack volume @ standard conditions*	DSCFM (dscm/hr)	3710 6303.34	4205 7144.56	3984 6769.01
Qa	actual stack gas volume @ stack conditions	ACFM (cu.m./hr)	7874 13378.25	9249 15713.89	8473 14396.06

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	S.DRYER	S.DRYER	S.DRYER
Run No.			1	2	3
Tt	net time of test	min.	90	90	90
Dn	sampling nozzle diameter	in. (m)	.618 .016	.618 .016	.618 .016
%I	percent isokinetic	%	89.97	97.27	96.47
mf	particulate - probe, cyclone and filter	mg	29.1	23.9	33.0
mt	particulate - total	mg	.0	.0	.0
Can	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0147 .0336	.0098 .0225	.0144 .0331
Cao	particulate - total	gr/dscf* (g/dscm)	.0000 .0000	.0000 .0000	.0000 .0000
Cat	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/cu.m.)	.0069 .0158	.0045 .0102	.0068 .0155
Cau	particulate - total @ stack conditions	gr/cf (g/cu.m.)	.0000 .0000	.0000 .0000	.0000 .0000
Caw	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	.466 .211	.354 .161	.493 .224
Cax	particulate - total	lbs/hr (kg/hr)	.000 .000	.000 .000	.000 .000

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

COORS BREWING COMPANY
GOLDEN, COLORADO
STACK EMISSIONS SURVEY

FEBRUARY 1991

FILE NUMBER 9110-111

SOURCE EMISSIONS CALCULATIONS

Symbol	Description	Units	K-1 INLET	K-1 INLET	K-1 INLET
Run No.			1	2	3
Date			02/15/91	02/15/91	02/15/91
Begin			1054 MST	1317 MST	1608 MST
End			1156 MST	1419 MST	1709 MST
Pb	barometric pressure	"Hg Abs. (mm Hg)	24.50 622.30	24.50 622.30	24.50 622.30
Pm	orifice pressure drop	"H2O (mm H2O)	.56 14.11	.46 11.80	.51 13.06
Vm	volume dry gas sampled @ meter conditions	cu. ft. (cu. m.)	29.739 .842	26.376 .747	21.864 .619
Tm	avg. gas meter temp	deg. F (deg. C)	84 29	89 32	93 34
Vmstd	volume dry gas sampled @ standard conditions*	dscf (dscm)	23.669 .670	20.799 .589	17.127 .485
Vw	total H2O collected, impingers & silica gel	ml	733.7	621.4	494.7
Vwgas	volume water vapor collected @ standard conditions*	scf (scm)	34.631 .981	29.330 .831	23.350 .661
%M	moisture in stack gas by volume	%	59.40	58.51	57.69

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	K-1 INLET	K-1 INLET	K-1 INLET
Run No.			1	2	3
Md	mole fraction of dry gas	-------	.4060	.4149	.4231
CO2		%	.0	.0	.0
O2		%	20.0	20.0	20.0
N2		%	80.0	80.0	80.0
%EA	excess air @ sampling point	%	---	---	---
MWd	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.80 28.80	28.80 28.80	28.80 28.80
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	22.38 22.38	22.48 22.48	22.57 22.57
dP's	velocity head of stack gas	"H2O (mm H2O)	.019 .48	.019 .47	.022 .55
Ts	stack temperature	deg. F (deg. C)	191 89	192 89	192 89
Ps	stack pressure	"Hg Abs. (mm Hg)	24.48 621.87	24.48 621.87	24.48 621.87
Vs	stack velocity @ stack conditions	fpm (m/sec)	629 3.20	616 3.13	652 3.31
As	stack area	sq. in. (sq. met.)	1256 .81	1256 .81	1256 .81
Qs	dry stack volume @ standard conditions*	DSCFM (dscm/hr)	1484 2521.00	1481 2516.63	1600 2717.62
Qa	actual stack gas volume @ stack conditions	ACFM (cu.m./hr)	5490 9327.97	5369 9121.40	5687 9661.69

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	K-1 INLET	K-1 INLET	K-1 INLET
Run No.			1	2	3
Tt	net time of test	min.	60	60	48
Dn	sampling nozzle diameter	in. (m)	.618 .016	.618 .016	.618 .016
%I	percent isokinetic	%	111.73	98.36	93.75
mf	particulate - probe, cyclone and filter	mg	11247.0	12765.5	7291.8
mt	particulate - total	mg	.0	.0	.0
Can	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	7.3178 16.7578	9.4518 21.6446	6.5563 15.0140
Cao	particulate - total	gr/dscf* (g/dscm)	.0000 .0000	.0000 .0000	.0000 .0000
Cat	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/cu.m.)	1.9708 4.5132	2.5986 5.9509	1.8377 4.2083
Cau	particulate - total @ stack conditions	gr/cf (g/cu.m.)	.0000 .0000	.0000 .0000	.0000 .0000
Caw	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	93.056 42.210	119.983 54.424	89.875 40.767
Cax	particulate - total	lbs/hr (kg/hr)	.000 .000	.000 .000	.000 .000

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

COORS BREWING COMPANY
GOLDEN, COLORADO
STACK EMISSIONS SURVEY

FEBRUARY 1991

FILE NUMBER 9110-111

SOURCE EMISSIONS CALCULATIONS

Symbol	Description	Units	K-1 OUTLET	K-1 OUTLET	K-1 OUTLET
Run No.			1	2	3
Date			02/15/91	02/15/91	02/16/91
Begin			2111 MST	2305 MST	0100 MST
End			2216 MST	0010 MST	0202 MST
Pb	barometric pressure	"Hg Abs. (mm Hg)	24.30 617.22	24.30 617.22	24.30 617.22
Pm	orifice pressure drop	"H2O (mm H2O)	1.18 29.93	1.21 30.82	1.35 34.21
Vm	volume dry gas sampled @ meter conditions	cu. ft. (cu. m.)	43.109 1.221	43.840 1.241	48.816 1.382
Tm	avg. gas meter temp	deg. F (deg. C)	58 15	56 13	56 13
Vmstd	volume dry gas sampled @ standard conditions*	dscf (dscm)	35.812 1.014	36.594 1.036	40.731 1.153
Vw	total H2O collected, impingers & silica gel	ml	742.9	518.6	815.1
Vwgas	volume water vapor collected @ standard conditions*	scf (scm)	35.065 .993	24.478 .693	38.473 1.089
%M	moisture in stack gas by volume	%	49.47	40.08	48.57

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	K-1 OUTLET	K-1 OUTLET	K-1 OUTLET
Run No.			1	2	3
Md	mole fraction of dry gas	-------	.5053	.5992	.5143
CO2		%	.4	.4	.2
O2		%	20.6	20.6	20.8
N2		%	79.0	79.0	79.0
%EA	excess air @ sampling point	%	---	---	---
MWd	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.89 28.89	28.89 28.89	28.86 28.86
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	23.50 23.50	24.52 24.52	23.59 23.59
dP's	velocity head of stack gas	"H2O (mm H2O)	.040 1.01	.041 1.03	.039 .99
Ts	stack temperature	deg. F (deg. C)	174 79	165 74	172 78
Ps	stack pressure	"Hg Abs. (mm Hg)	24.29 616.98	24.29 616.98	24.29 616.98
Vs	stack velocity @ stack conditions	fpm (m/sec)	892 4.53	877 4.46	882 4.48
As	stack area	sq. in. (sq. met.)	1000 .65	1000 .65	1000 .65
Qs	dry stack volume @ standard conditions*	DSCFM (dscm/hr)	2123 3606.98	2513 4269.65	2144 3643.22
Qa	actual stack gas volume @ stack conditions	ACFM (cu.m./hr)	6193 10522.51	6092 10350.11	6124 10404.15

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

Source Emission Calculations

COORS BREWING COMPANY
FILE NUMBER 9110-111

Symbol	Description	Units	K-1 OUTLET	K-1 OUTLET	K-1 OUTLET
Run No.			1	2	3
Tt	net time of test	min.	60	60	60
Dn	sampling nozzle diameter	in. (m)	.618 .016	.618 .016	.618 .016
%I	percent isokinetic	%	94.07	81.21	105.93
mf	particulate - probe, cyclone and filter	mg	33.7	19.6	15.7
mt	particulate - total	mg	.0	.0	.0
Can	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0145 .0332	.0082 .0189	.0059 .0136
Cao	particulate - total	gr/dscf* (g/dscm)	.0000 .0000	.0000 .0000	.0000 .0000
Cat	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/cu.m.)	.0050 .0113	.0034 .0078	.0021 .0047
Cau	particulate - total @ stack conditions	gr/cf (g/cu.m.)	.0000 .0000	.0000 .0000	.0000 .0000
Caw	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	.264 .120	.178 .081	.109 .049
Cax	particulate - total	lbs/hr (kg/hr)	.000 .000	.000 .000	.000 .000

* 68 deg. F., 29.92 "Hg (20 deg. C., 760 mm Hg)

APPENDIX C

Calibration of Equipment

APPENDIX C

Calibration Data

December 4, 1990

DRY GAS METERS

Unit Number	Calibration Factor
1	1.035
2	0.977
3	1.070
4	0.986

APPENDIX C

Calibration Data

December 4, 1990

NOZZLES

Set A

Nozzle No.	Diameter (inches)
1A	0.203
2A	0.194
3A	0.257
4A	0.328
5A	0.360
6A	0.392
7A	0.456
8A	0.501
9A	0.525
10A	0.582

Set B

Nozzle No.	Diameter (inches)
1B	0.132
2B	0.175
3B	0.241
4B	0.326
5B	0.360
6B	0.366
7B	0.515

Set I

Nozzle No.	Diameter (inches)
I-1	0.133
I-2	0.196
I-3	0.246
I-4	0.313
I-5	0.379
I-6	0.430
I-7	0.491
I-8	0.574
I-9	0.619

Set II

Nozzle No.	Diameter (inches)
II-1	0.125
II-2	0.198
II-3	0.251
II-4	0.314
II-5	0.378
II-6	0.444
II-7	0.504
II-8	0.565
II-9	0.615

Set III

Nozzle No.	Diameter (inches)
III-1	0.137
III-2	MIA
III-3	0.255
III-4	0.381
III-5	0.382
III-6	0.440
III-7	0.501
III-8	0.569
III-9	0.618

APPENDIX C

Calibration Data

December 4, 1990

PITOT TUBES

Pitot Length (effective length)	Calibration Factor		Pitot Length (effective length)	Calibration Factor	
32-2	High	0.819	76-2	High	0.831
	Low	0.822		Low	0.831
40-1	High	0.830	77-1	High	0.825
	Low	0.828		Low	0.828
40-2	High	0.834	122-1	High	0.822
	Low	0.831		Low	0.821
40-3	High	0.832	124-1	High	0.826
	Low	0.836		Low	0.831
48-1	High	0.830	128-1	High	0.819
	Low	0.827		Low	0.819
60-1	High	0.810	132-1	High	0.820
	Low	0.815		Low	0.816
74-1	High	0.817	132-2	High	0.825
	Low	0.816		Low	0.833
76-1	High	0.816	156-1	High	0.826
	Low	0.824		Low	0.827

Appendix C Addendum 01/16/90

47-1	High	0.833	59-2	High	0.834
	Low	0.838		Low	0.837
47-2	High	0.839	83-1	High	0.839
	Low	0.832		Low	0.837
59-1	High	0.832	83-2	High	0.838
	Low	0.832		Low	0.834

3. SPECIFICATIONS

Model	:	SGD-710
Generated pressure	:	0.2 ∿ 0.7 kg/cm²G (at inlet pressure)
Generated flow rate	:	2 ∿ 5 ℓ/min (at inlet pressure)
Concentration division	:	10 divisions
Reponse speed	:	Within 10 sec
Dividing accuracy	:	±0.5% F.S.
Repeatability	:	±0.2% F.S.
Operating temperature	:	0 ∿ 40°C
Supplying pressure of material gas	:	0.2 ∿ 1.5 kg/cm²G
Consumption of material gas	:	Same as generated flow rate
Material	:	SUS-304 (Stainless steel), Viton

APPLICABLE GASES

As stated in "2". THE OUTLINE AND PRINCIPLE OF THE SGD NON-BLEEDING GAS DIVIDER", the flow rate in the capillaries is determined by the viscosity of gas, the inlet and the outlet pressures. When the inlet and outlet pressure is uniform, it is determined by the viscosity of gas.
The dividing accuracy of SGD-710 (±0.5%FS) is satisfied when the viscosity of component gas can be considered to be equivalent to that of dilution gas. In case N_2 is used for dilution gas, the concentration range of component gas which can be regarded as equivalent to N_2 is shown in Table 1.

Name of gas	Concentration range (N_2 basis)	Name of gas	Concentration range (N_2 basis)
Ar	0 ∿ 1 %	CH_4	0 ∿ 0.5 %
CO	0 ∿ 100 %	C_2H_6	0 ∿ 0.5 %
CO_2	0 ∿ 1 %	C_3H_8	0 ∿ 0.5 %
H_2	0 ∿ 0.5 %	1 - C_4H_{10}	0 ∿ 0.5 %
N_2O	0 ∿ 1 %	Others	0 ∿ 1 %
O_2	0 ∿ 1 %		

Table 1

Scott Specialty Gases

a division of
Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Our Project # : 18574

Your P.O. # : MR90210

Customer :
WESTERN ENV SERV & TEST
6756 URANIUM ROAD
CASPER WY 82604

*** * * * CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES * * * ***

PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Procedure # G1
Protocol # 1

Expiration Date : 6-17-92

Cylinder Number ALM-012879

- File # P06997

Cylinder Pressure 1900 psig

Certified Accuracy 1 % NBS Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENT	CERTIFIED CONC.	SRM # (CRM #)	CYLINDER NUMBER	CONC.	MAKE/MODEL	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
PROPANE	85.98 PPM	1668B	CLM-000360	95.00 PPM	GAS CHROMOTAGRAPHY 5710	12-17-90	FLAME IONIZATION DETECTOR
		GMIS*	AAL-16321	49.98 PPM			

BALANCE GAS : NITROGEN

CERTIFIED EPA PROTOCOL

ANALYSIS DATE : 12-17-90

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	(mV)	RESULTS PPM
0.00	712.41	85.939	95.00 PPM	787.49	95.073
0.00	714.04	86.137		786.46	94.948
0.00	711.80	85.864		786.71	94.978
	CALCULATED RESULTS	85.873			
		86.184			
		85.884			
	AVERAGE :	85.980 PPM			

CALIBRATION CURVE 2 nd DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
1668B	95.00	100	786.89	95.00	0.00
	49.98	53	416.23	50.05	0.15
	25.80	27	214.23	25.72	-0.32
	0.0000	0	0.00	0.0000	0.00
		0		0.00	0.00
		0		0.00	0.00
		0		0.00	0.00
GMIS	25.80	LOW	214.23	25.72	-0.32
N/A	49.98	GMIS*	416.23	50.05	0.15

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : Don Eichl Jr

Approved By : A Hatel

Scott Specialty Gases, Inc.

Electronics Group

500 WEAVER PARK ROAD, LONGMONT, CO 80501 PHONE: (303) 442-4700

WESTERN EVN SERV & TEST
6756 URANIUM ROAD
CASPER, WY 82604

Date 8/08/90

Cust. P.O. NR-90163

Inv. No. 0802776

Q.C. No. SEE BELOW

CERTIFICATION

CYLINDER NO	COMPONENT	REQUESTED	ACTUAL
ALM-013952 QC# 22039001	CARBON MONOXIDE NITROGEN CGA 350 PSIG 2000	900 PPM BALANCE	880 PPM BALANCE
ALM-013834 QC# 22039002	CARBON MONOXIDE NITROGEN CGA 350 PSIG 2000	400 PPM BALANCE	389 PPM BALANCE

All values reported in Mole percent unless otherwise noted.

Accuracy tolerance on all values greater than 10 ppm within ± 2% unless otherwise specified.

JOHN LANDOLT ANALYST

RIC SCHMELTEKOPF SUPERVISOR

METHOD 25A ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # J.U.M VE-7

Source I.D. NBA North Dryer Stack

Operator M. Tikka Calibration Data for runs 1-3

Date 2/13/91 Analyzer Span 100

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
Mid-range gas	51.6	51.2	51.2	0.4	0.4
High-range gas	86	86.1	86.1	0.1	0.1

Zero gas N_2 Cylinder Pressure 1750 psi Cylinder # —

Span gas 85.98 ppm Cylinder Pressure 1650 Cylinder # ALM-012879

Mid-range 51.6 Cylinder Pressure — Cylinder # 60% of 85.98 ppm

Low-range 34.4 Cylinder Pressure — Cylinder # 40% of 85.98 ppm

METHOD 25A ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # J.U.M. VE-7

Source I.D. NB4 South Dryer Stack

Operator M. Tikka Calibration Data for runs 1-3

Date 2/14/91 Analyzer Span 100

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
Mid-range gas	51.6	51.0	51	0.6	0.6
High-range gas	86	87.0	87	1	1.0

Zero gas N_2 Cylinder Pressure 1700 psi Cylinder # —

Span gas 85.98 ppm Cylinder Pressure 1620 Cylinder # ALM-012879

Mid-range 51.6 Cylinder Pressure — Cylinder # 60% of 85.98 ppm

Low-range 34.4 Cylinder Pressure — Cylinder # 40% of 85.98 ppm

METHOD 25A ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # Bethlehem 8555

Source I.D. K-1 Inlet

Operator M. Tikka Calibration Data for runs 1-3

Date 2/15/91 Analyzer Span 100

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
Mid-range gas	51.6	51.6	51.6	0	0.0
High-range gas	86	86.0	84	0	0.0

Zero gas N_2 Cylinder Pressure 1600 psi Cylinder # —

Span gas 85.98 ppm Cylinder Pressure 1600 Cylinder # ALM-012879

Mid-range 51.4 Cylinder Pressure — Cylinder # 60% of 85.98 ppm

Low-range 34.4 Cylinder Pressure — Cylinder # 40% of 85.98 ppm

METHOD 25A ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # Rosemount RS-55

Source I.D. K-1 Outlet

Operator M. Tikka Calibration Data for runs 1-3

Date 2/15-2/16/91 Analyzer Span 100

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
Mid-range gas	51.6	51.4	51.4	0.2	0.2
High-range gas	86	86.0	86	0	0.0

Zero gas N_2 Cylinder Pressure 1450 psi Cylinder # —

Span gas 83.98 ppm Cylinder Pressure 1550 Cylinder # ALM-012879

Mid-range 51.6 Cylinder Pressure — Cylinder # 60% of 83.98 ppm

Low-range 34.4 Cylinder Pressure — Cylinder # 40% of 83.98 ppm

METHOD 10 ANALYZER CALIBRATION DATA

Source Location Golden, CO Analyzer # PIR-2000 Unit #2

Source I.D. NB4 North Dryer Stack

Operator M. Tikka Calibration Data for runs 1-3

Date 2/13/91 Analyzer Span 500

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.2	1	1	0.2
~~Mid~~ Low-range gas	38.9	7.6	38	0.9	0.18
High-range gas	389	77.5	387.5	1.5	0.3

Zero gas N_2 Cylinder Pressure 1750 psi Cylinder # —

Span gas 389 ppm Cylinder Pressure 1800 Cylinder # ALM-013834

Mid-range 155.6 Cylinder Pressure — Cylinder # 40% of 389 ppm

Low-range 38.9 Cylinder Pressure — Cylinder # 10% of 389 ppm

METHOD 10 ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # TIR-2000 Un.7 #2

Source I.D. NB4 South Dryer Stack

Operator M. Tikka Calibration Data for runs 1-3

Date 2/14/91 Analyzer Span 500

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
~~Mid~~ Low-range gas	38.9	7.8	39	0.1	0.02
High-range gas	389	77.6	388	1	0.2

Zero gas N_2 Cylinder Pressure 1700 psi Cylinder # —

Span gas 389 ppm Cylinder Pressure 1800 Cylinder # ALM-013834

Mid-range 155.6 Cylinder Pressure — Cylinder # 40% of 389 ppm

Low-range 38.9 Cylinder Pressure — Cylinder # 10% of 389 ppm

METHOD 10 ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # Horiba PIR-2000 Un. 1 #2

Source I.D. K-1 Inlet

Operator M. Tikka Calibration Data for runs 1-3

Date 2/15/91 Analyzer Span 500

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
~~Mid~~ Low-range gas	38.9	7.4	37	1.9	0.38
High-range gas	389	77.5	387.5	1.5	0.3

Zero gas N_2 Cylinder Pressure 1600 psi Cylinder # —

Span gas 389 ppm Cylinder Pressure 1750 Cylinder # ALM-013834

Mid-range 155.6 Cylinder Pressure — Cylinder # 40% of 389 ppm

Low-range 38.9 Cylinder Pressure — Cylinder # 10% of 389 ppm

METHOD 10 ANALYZER CALIBRATION DATA

Source Location Coors Brewing Co. Analyzer # TEI-2000 Unit #2

Source I.D. K-1 Outlet

Operator M. Tikka Calibration Data for runs 1-3

Date 2/15-2/16/91 Analyzer Span 500

	Cylinder Value (ppm)	Analyzer Calibration Response		Absolute Difference (ppm)	Difference Percent of Span
		% Chart	(ppm)		
Zero gas	0	0.0	0	0	0.0
~~Mid~~ Low-range gas	38.9	6.0	30	8.9	1.78
High-range gas	389	77.0	385	4	0.8

Zero gas N_2 Cylinder Pressure 1450 psi Cylinder # —

Span gas 389 ppm Cylinder Pressure 1700 Cylinder # ALM-013834

Mid-range 155.6 Cylinder Pressure — Cylinder # 40% of 389 ppm

Low-range 38.9 Cylinder Pressure — Cylinder # 10% of 389 ppm

APPENDIX D

Field Testing Data

PARTICULATE

Job No. 9110-111 Part FIELD DATA

Job Name Coors

Run No. 1

Location NB4 North Dryer Stack

Read and Record at the Start of Each Test Point

Date 2-13-91

Operator McCullough/Thomas

Sample Box No. 5 Meter Box No. 4 ✓

ΔPs Pm Ts Tm

K Factor 31.7

Ambient Temp. °F 102°

Assumed Moisture % 30%

Probe Length 6' glass

Pitot Tube Leak Check Before ok / After ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-5	1441	808.829	0.038	1.20	1.20	3.0	159	255	259	68	105	106	
4	1444	811.05	0.038	1.20	1.20	3.5	159	248	253	67	105	106	
3	1447	813.22	0.048	1.50	1.50	3.0	159	246	253	65	104	106	
2	1450	815.28	0.024	0.80	0.80	3.0	176	242	255	64	104	107	K=33.0
1	1453	817.88	0.032	1.05	1.05	3.5	169	246	256	64	104	107	
END	1456	820.010	—	—	—	—	—	—	—	—	—	—	
A-5	1459	820.010	0.052	1.75	1.75	5.0	169	258	260	68	104	107	K=34
4	1502	822.66	0.056	1.90	1.90	5.0	170	251	258	68	105	108	
3	1505	825.44	0.054	1.85	1.85	5.5	169	247	258	66	104	108	
2	1508	828.27	0.034	1.15	1.15	4.0	169	245	260	66	103	108	Leak check
1	1511	830.60	0.042	1.45	1.45	4.5	169	257	254	67	104	109	833.113 →
END	1514	833.113	—	—	—	—	—	—	—	—	—	—	833.220
C-5	1518	833.220	0.058	1.95	1.95	5.0	171	256	257	68	105	110	
4	1521	836.04	0.056	1.90	1.90	5.0	170	249	250	66	105	110	
3	1524	838.89	0.056	1.90	1.90	5.5	172	245	252	61	104	110	
2	1527	841.73	0.048	1.65	1.65	5.5	174	242	252	58	104	110	
1	1530	844.45	0.040	1.35	1.35	5.0	175	242	264	54	104	110	
END	1533	846.206	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 51.419 MER 51.630 ft³

Water Collected V_w 252.4 ✓ ml

Time of Test T_t 60 min

Baro. Press. P_b 24.40 "Hg

$\%CO_2$ 0.2 %CO 0.0

$\%O_2$ 20.8 $\%N_2$ 79.0

Area Stack A_2 2937 in²

Stack Press. −0.15 in. H_2O

Sample Purge: Initial ⌐ Final ⌐

Probe Tip No. 3-9 ✓ Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 ✓ × 52.149 MER 52.368 ✓

Dry Gas Meter _____ ft³ − (T_t ____ min × Leak Rate _____ cf

= _____

M_F = _____ M_T = _____

Location NB4 North Dryer Stack

Date 2-13-91

Point	Clock Time	Dry Gas Meter, CF	A Ps Pitot in. H_2O	Pm Orifice All in. H_2O Desired	Pm Orifice All in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
D-5	1536	846.906	0.060	2.05	2.05	6.0	175	251	259	68	105	111	
4	1539	849.75	0.060	2.05	2.05	7.0	177	243	250	63	105	111	
3	1542	852.63	0.058	1.95	1.95	8.0	177	239	250	60	104	111	
2	1545	855.47	0.052	1.75	1.75	7.0	178	241	258	68	104	111	
1	1548	858.20	0.060	2.05	2.05	7.5	178	244	256	67	104	111	
END	1551	861.085	—	—	—	—	—	—	—	—	—	—	
ALL													

IMPINGER CATCH

SAMPLE NO. 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 818.0 Initial 599.2 Wt. Gain 218.8
2	DI	100	G.-Smith	Final 842.3 Initial 608.5 Wt. Gain 233.8
3	Dry	—	Modif.	Final 783.9 Initial 500.9 Wt. Gain 283.0
4	Silica Gel	—	Modif.	Final 754.1 Initial 732.3 Wt. Gain 21.8
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 757.4

DATE: 2/13/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.2

O_2 20.8

CO 0.0

N_2 79.0

DATE: 2/13/91

SIGNATURE: Michael E. Reynolds

TIME: 1600

4/85

Job No. 9110-111
Job Name Coors
Run No. 2
Location NB4 North Dryer Stack

Date 2-13-91

Operator McCullough / Thomas

Sample Box No. 4 Meter Box No. 4 ✓
ΔPs Pm Ts

Part B FIELD DATA

Read and Record at the Start of Each Test Point

K Factor ~~34~~ 34
Ambient Temp. °F 102°
Assumed Moisture % ~~48~~ 48
Probe Length 6'

Pitot Tube Leak Check Before ~~ok~~ / After ~~ok~~

Initial Leak ● 15.0 "Hg = 0.000 cfm

Final Leak ● 10.0 "Hg = 0.000 cfm
Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
D-5	1648	867.587	~~0.044~~	1.50	1.50	~~3.5~~	180	237	239	84	106	107	
4	1651	870.05	0.032	1.10	1.10	4.0	180	256	238	72	105	107	
3	1654	872.36	0.038	1.30	1.30	4.0	180	246	252	62	105	106	
2	1657	874.71	0.038	1.30	1.35	4.5	180	241	258	60	105	107	K=3.5
1	1700	877.11	0.044	1.55	1.55	5.0	177	250	258	61	104	107	Leak check 879.719
END	1703	879.719	—	—	—	—	—	—	—	—	—	—	
C 5	1707	879.805	0.052	1.80	1.80	5.0	173	254	258	68	105	107	879.805
4	1710	882.57	0.048	1.70	1.70	5.0	169	250	258	64	105	108	
3	1713	885.26	0.042	1.50	1.50	5.0	171	251	256	63	105	108	
2	1716	887.87	0.042	1.50	1.50	5.0	170	250	252	65	104	108	
1	1719	890.49	0.048	1.70	1.70	5.5	167	251	253	68	104	107	
END	1722	893.267	—	—	—	—	—	—	—	—	—	—	
A 5	1724	893.267	0.046	1.65	1.65	5.0	169	260	254	76	105	109	K=3.6
4	1727	895.91	0.046	1.65	1.65	5.5	170	253	258	64	105	110	
3	1730	898.66	0.042	1.50	1.50	5.0	171	254	253	65	104	110	
2	1733	901.35	0.042	1.50	1.50	5.5	170	253	253	64	104	110	
1	1736	904.05	0.050	1.80	1.80	6.0	171	251	254	65	104	110	
END	1739	906.918	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 54.641 51.884 MER ft³ %CO_2 0.2 %CO 0.0

Water Collected V_w 781.6 ✓ ml %O_2 21.0 %N_2 78.8

Time of Test T_t 60 min Area Stack A_2 2937 in²

Baro. Press. P_b 24.40 "Hg Stack Press. -0.15 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. ~~3-9~~ 3-9 ✓ Probe Tip Dia. ~~0.625~~ 0.618 ✓ in.

V_m=Dry Gas Meter Calibration Factor 0.986 ✓ X 55.417 52.722 MER

Dry Gas Meter _____ ft³ - (T_t ____ min x Leak Rate _____ cfm) = _____

M_F = _____ M_T = _____

Run [redacted] - [redacted] CU [redacted] FI [redacted] DA [redacted]

Location NBA North Dryer Stack

Date 2-13-91

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Ts Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Ts Probe Temp °F	Ts Oven Temp °F	Ts Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
A-5	1741	906.918	0.044	1.60	1.60	5.5	172	255	259	75	105	110	
4	1744	909.62	0.042	1.50	1.50	5.0	173	252	262	65	104	110	
3	1747	912.27	0.046	1.65	1.65	6.0	174	249	261	63	104	116	
2	1750	914.99	0.044	1.60	1.60	6.5	173	249	259	62	104	110	
1	1753	917.72	0.042	1.50	1.50	5.5	173	249	256	62	104	110	
END	1756	920.395	—	—	—	—	—	—	—	—	—	—	
ALL													

IMPINGER CATCH

SAMPLE NO. 2

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 841.4 Initial 609.8 Wt. Gain 231.6
2	DI	100	G.-Smith	Final 828.6 Initial 582.3 Wt. Gain 246.3
3	Dry	—	Modif.	Final 757.1 Initial 469.3 Wt. Gain 287.8
4	Silica Gel	—	Modif.	Final 728.0 Initial 712.1 Wt. Gain 15.9
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 781.6

DATE: 2/13/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.2

O_2 21.0

CO 0.0

N_2 78.8

DATE: 2/7/91

SIGNATURE: Michael E. Reynolds

TIME: 1805

4/85

Job No. 9110-111
Job Name Coors
Run No. 3
Location NB4 North Dryer Stack
Date 2-13-91
Operator McCullough/Thomas
Sample Box No. 6 Meter Box No. 4 / ΔPs Pm

Part FIELD DATA

Read and Record at the Start of Each Test Point

K Factor 36
Ambient Temp. °F 102°
Assumed Moisture % 48°
Probe Length 6' glass
Pitot Tube Leak Check Before 8/2 / After
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 11.0 "Hg = 0.000 cfm
Ts Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-5	1848	938.313	0.028	1.00	1.00	4.0	178	244	247	68	105	106	
4	1851	940.42	0.042	1.50	1.50	6.0	178	244	252	69	105	107	
3	1854	942.98	0.038	1.35	1.35	6.5	179	241	248	61	105	107	
2	1857	945.51	0.034	1.25	1.25	6.0	179	239	258	61	105	107	
1	1900	947.96	0.024	0.86	0.86	4.8	177	261	251	56	105	107	
END	1903	949.972	—	—	—	—	—	—	—	—	—	—	
D-5	1906	949.972	0.022	0.80	0.80	4.0	175	258	260	69	105	108	
4	1909	951.83	0.038	1.35	1.35	5.5	174	261	266	63	105	108	
3	1912	954.19	0.036	1.30	1.30	6.0	173	259	267	61	105	108	
2	1915	956.60	0.028	1.00	1.00	5.0	171	249	266	62	105	109	
1	1918	958.73	0.024	0.86	0.86	4.5	171	248	266	63	105	109	
END	1921	960.684	—	—	—	—	—	—	—	—	—	—	
C-5	1923	960.684	0.032	1.15	1.15	5.0	171	253	258	70	106	110	
4	1926	962.85	0.048	1.75	1.75	7.0	172	253	268	62	105	110	
3	1929	965.59	0.041	1.50	1.50	6.5	173	249	269	62	105	110	
2	1932	968.43	0.037	1.35	1.35	6.0	174	248	269	63	105	110	
1	1935	970.59	0.026	0.94	0.84	5.0	175	247	268	64	105	110	
END	1938	972.613	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 / Pitot Tube No. 74-1 /
Volume Collected V_m 45.002 ft³
Water Collected V_w 741.9 / ml
Time of Test Tt 60 min
Baro. Press. P_b 24.40 "Hg
$\%CO_2$ 0.2 $\%CO$ 0.0
$\%O_2$ 20.8 $\%N_2$ 79.0
Area Stack A2 29.37 in²
Stack Press. −0.15 in. H_2O

Sample Purge: Initial — Final —
Probe Tip No. 3-9 / Probe Tip Dia. 0.618 / in.
V_m=Dry Gas Meter Calibration Factor 0.986 / x 45.641 /
Dry Gas Meter _____ ft³ - (Tt ____ min x Leak Rate _____ cf = _____
M_F = _____ M_T = _____

Run [redacted] ICU [redacted] FI [redacted] DA [redacted]

Location NB 4 North Dryer Stack

Date 2-13-91

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
D-5	1939	972.612	0.042	1.50	1.50	7.0	176	254	266	67	106	111	
4	1942	975.11	0.044	1.60	1.60	7.5	178	248	267	63	105	110	
3	1945	977.73	0.037	1.35	1.35	6.0	178	247	268	64	105	110	
2	1948	980.14	0.024	0.86	0.86	5.0	178	247	268	66	105	111	
1	1951	982.10	0.024	0.86	0.86	5.0	176	248	269	67	105	111	
END	1954	983.954	—	—	—	—	—	—	—	—	—	—	
ALL													

IMPINGER CATCH

SAMPLE NO. 3

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 820.6 Initial 538.3 Wt. Gain 262.3
2	DI	100	G.-Smith	Final 863.9 Initial 581.6 Wt. Gain 282.3
3	Dry	—	Modif.	Final 718.9 Initial 532.8 Wt. Gain 186.1
4	Silica Gel	—	Modif.	Final 707.7 Initial 696.5 Wt. Gain 11.2
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 741.9

DATE: 2/13/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.2

O_2 20.8

CO 0.0

N_2 79.0

DATE: 2/13/91

SIGNATURE: Michael E. Reynolds

TIME: 2001

4/85

Job No. 9110-111
Job Name Coors
Run No. 1
Location NB4 South Dryer Stack

Date 2-14-91

Operator McCullough / Thomas

Sample Box No. 4 Meter Box No. 4 ✓
ΔPs Pm Ts Tm

Part FIELD DATA

Read and Record at the Start of Each Test Point

K Factor 45
Ambient Temp. °F 98°
Assumed Moisture % 40%
Probe Length 6' glass
Pitot Tube Leak Check Before ok / After ok
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 5.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-5	0904	000.292	0.006	0.27	0.27	1.0	156	238	255	76	98	99	
4	0908.5	001.93	0.006	0.27	0.27	1.0	155	253	257	60	98	99	
3	0913	003.58	0.004	0.18	0.18	1.0	155	256	264	58	98	99	
2	0917.5	005.13	0.006	0.27	0.27	1.0	155	261	262	67	99	100	
1	0922	006.77	0.010	0.45	0.45	1.0	156	257	272	67	100	101	
END	0926.5	008.787	—	—	—	—	—	—	—	—	—	—	
B-5	0928	008.787	0.008	0.36	0.36	1.0	158	256	251	62	101	102	
4	0932.5	10.70	0.008	0.36	0.36	1.0	159	254	253	59	101	103	
3	0937	12.59	0.008	0.36	0.36	1.0	159	255	254	59	102	103	
2	0941.5	14.55	0.012	0.54	0.54	2.0	161	251	257	65	102	104	
1	0946	16.89	0.008	0.36	0.36	2.0	161	255	260	64	102	104	
END	0950.5	18.847	—	—	—	—	—	—	—	—	—	—	
C-5	0953	18.847	0.012	0.54	0.54	2.0	160	251	253	63	103	105	
4	0957.5	21.20	0.010	0.45	0.45	2.0	162	250	254	59	103	105	
3	1002	23.39	0.008	0.36	0.36	2.0	162	256	253	61	103	106	
2	1006.5	25.42	0.006	0.27	0.27	2.0	162	258	252	63	103	106	
1	1011	27.30	0.010	0.45	0.45	2.0	160	260	260	65	104	107	
END	1015.5	29.533	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 39.953 ft³

Water Collected V_w 314.7 ✓ ml

Time of Test T_t 90 min

Baro. Press. P_b 24.38 "Hg

$\%CO_2$ 0.4 $\%CO$ 0.0

$\%O_2$ 21.2 $\%N_2$ 78.4

Area Stack A_2 2937 in²

Stack Press. −0.18 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.618 ✓ in.

V_m=Dry Gas Meter Calibration Factor 0.986 ✓ x 40.52 ✓

Dry Gas Meter _____ ft³ - (T_t ____ min x Leak Rate ____ cf = _____

M_F = _____ M_T = _____

[redacted] Run [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] LCU [redacted] FI [redacted] DA [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted]

Location NB4 South Dryer Stack

Date 2-14-91

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	ΔHa Orifice ΔH in. H_2O Desired	ΔHa Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
0-5	1017	29.533	0.010	0.45	0.45	2.0	157	254	251	66	105	108	
4	1021.5	31.79	0.014	0.63	0.63	2.5	156	251	250	64	105	108	
3	1026	34.38	0.02	0.54	0.54	2.5	153	258	259	62	105	108	
2	1030.5	36.83	0.008	0.36	0.36	2.0	146	250	251	63	104	108	
1	1035	38.85	0.008	0.36	0.36	2.0	136	253	251	65	104	108	
END	1039.5	40.812	—	—	—	—	—	—	—	—	—	—	
ALL													

PM

IMPINGER CATCH

SAMPLE NO. 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 865.1 Initial 595.3 Wt. Gain 269.8
2	DI	100	G.-Smith	Final 621.2 Initial 585.3 Wt. Gain 35.9
3	Dry	—	Modif.	Final 470.8 Initial 468.2 Wt. Gain 2.6
4	SilicaGel	—	Modif.	Final 712.7 Initial 706.3 Wt. Gain 6.4
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 314.7

DATE: 2/14/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.1

O_2 21.2

CO 0.0

N_2 78.4

DATE: 2/14/91

SIGNATURE: Michael E. Reynolds

TIME: 1045

4/85

Job No. 9110-111
Job Name Coors
Run No. 2
Location NB4 S. Dryer Stack
Date 2-14-90
Operator McCullough / Thomas

Part FIELD DATA

Read and Record at the Start of Each Test Point

K Factor 48
Ambient Temp. °F 100
Assumed Moisture % 35
Probe Length 6' glass
Pitot Tube Leak Check Before OK / After OK
Initial Leak @ 15.0 "Hg = 0.000 cfm
Final Leak @ 6.0 "Hg = 0.000 cfm

Sample Box No. 5 Meter Box No. 4 ✓
ΔPs Pm Ts Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
D-5	1208	57.213	0.014	0.67	0.67	2.0	156	247	249	75	102	103	
4	1212.5	59.76	0.016	0.77	0.77	2.0	158	248	250	72	102	102	
3	1217	62.56	0.018	0.94	0.94	3.0	160	248	254	68	101	102	K=52
2	1221.5	65.56	0.018	0.94	0.94	3.0	157	248	257	64	101	103	
1	1226	68.59	0.008	0.44	0.44	2.0	158	250	260	63	100	103	K=55
END	1230.5	70.837	—	—	—	—	—	—	—	—	—	—	
C-5	1232	70.837	0.012	0.66	0.66	2.0	159	259	270	74	101	103	
4	1236.5	73.35	0.012	0.66	0.66	2.0	159	254	271	66	101	104	
3	1241	75.89	0.014	0.69	0.67	2.0	160	253	272	54	102	105	
2	1245.5	78.44	0.012	0.66	0.66	2.0	161	253	273	54	102	106	
1	1250	81.06	0.014	0.67	0.67	2.0	159	255	272	55	102	106	
END	1254.5	83.458	—	—	—	—	—	—	—	—	—	—	
B-5	1256	83.458	0.014	0.67	0.67	2.5	159	255	272	67	103	107	
4	1300.5	86.11	0.008	0.44	0.44	2.0	160	254	271	60	103	107	
3	1305	88.33	0.010	0.55	0.55	2.0	161	253	270	57	104	107	
2	1309.5	90.62	0.012	0.66	0.66	2.0	161	255	269	58	104	107	
1	1314	93.25	0.008	0.44	0.44	2.0	161	256	267	59	103	107	
END	1318.5	95.433	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.819 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 49.004 ft³

Water Collected V_w 422.4 ✓ ml

Time of Test T_t 90 min

Baro. Press. P_b 24.38 "Hg

$\%CO_2$ 0.2 $\%CO$ 0.0

$\%O_2$ 21.0 $\%N_2$ 78.8

Area Stack A_2 2937 in²

Stack Press. −0.18 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.68 ✓ in.

V_m=Dry Gas Meter Calibration Factor 0.986 ✓ x 49.7 ✓

Dry Gas Meter _____ ft³ − (T_t ____ min x Leak Rate _____ c = _____

M_F = _____ M_T = _____

Run [redacted] 9 [redacted] - [redacted] (3) [redacted] [redacted] [redacted] CU [redacted] FI [redacted] DAT [redacted]

Location NB4 So. Dryer Stack

Date 2-14-94

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum in. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
A-5	1320	95.433	0.012	0.66	0.66	2.5	159	256	251	73	104	107	
4	1324.5	98.02	0.008	0.44	0.44	2.0	161	256	251	65	104	107	
3	1329	100.21	0.010	0.55	0.55	2.5	161	256	253	66	104	108	
2	1333.5	102.61	0.008	0.44	0.44	2.5	161	255	253	66	104	108	
1	1338	104.96	0.008	0.44	0.44	2.5	159	257	250	68	104	107	
END	1342.5	106.913	—	—	—	—	—	—	—	—	—	—	
Avg													

IMPINGER CATCH

SAMPLE NO. 2

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 876.6 Initial 597.4 Wt. Gain 279.2
2	DI	100	G.-Smith	Final 731.8 Initial 603.4 Wt. Gain 128.4
3	Dry	—	Modif.	Final 506.1 Initial 500.6 Wt. Gain 5.5
4	Silica Gel	—	Modif.	Final 700.4 Initial 691.1 Wt. Gain 9.3
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 422.4

DATE: 2/14/91

SIGNATURE: Michael E Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.2

O_2 21.0

CO 0.0

N_2 78.8

DATE: 2/14/91

SIGNATURE: Michael E Reynolds

TIME: 1400

4/85

Job No. C[redacted]5 [redacted] FIELD DATA K Factor .6

Job Name 9110 - 111

Run No. 3

Location NB4 So. Dryer Stack

Date 2-14-91

Operator McCullough / Thomas

Sample Box No. 6 Meter Box No. 4 ✓

Read and Record at the Start of Each Test Point

Ambient Temp. °F 100

Assumed Moisture % 35%

Probe Length 6' glass

Pitot Tube Leak Check Before OK / After OK

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 6.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-5	1547	136.713	0.010	0.55	0.55	2.5	157	259	257	76	101	102	
4	1551.5	139.07	0.006	0.33	0.33	2.0	159	253	262	69	101	102	
3	1556	140.95	0.006	0.33	0.33	2.0	160	255	266	65	102	102	
2	1600.5	142.82	0.010	0.55	0.55	2.5	161	250	266	64	102	102	
1	1605	145.08	0.008	0.44	0.44	2.5	161	247	260	63	102	103	
END	1609.5	147.248	—	—	—	—	—	—	—	—	—	—	
A-5	1611	147.248	0.012	0.66	0.66	3.0	160	249	252	70	102	103	
4	1615.5	149.76	0.010	0.55	0.55	2.5	160	248	253	65	102	103	
3	1620	152.11	0.008	0.44	0.44	2.5	160	245	256	64	102	104	
2	1624.5	154.23	0.012	0.66	0.66	3.0	161	247	258	67	102	104	
1	1629	156.73	0.012	0.66	0.66	3.0	162	245	259	68	102	105	
END	1633.5	159.286	—	—	—	—	—	—	—	—	—	—	
C-5	1636	159.286	0.010	0.55	0.55	3.0	162	245	259	72	103	105	
4	1640.5	161.65	0.008	0.44	0.44	2.5	161	244	258	68	103	105	
3	1645	163.97	0.012	0.66	0.66	3.0	160	243	257	66	103	105	
2	1649.5	166.29	0.010	0.55	0.55	3.0	159	242	258	64	103	105	
1	1654	168.67	0.008	0.44	0.44	3.0	157	242	255	66	103	105	
END	1658.5	170.892	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 45.99 ft³

Water Collected V_w 363.9 ✓ ml

Time of Test T_t 90 min

Baro. Press. P_b 24.38 "Hg

%CO_2 0.4 %CO 0.0

%O_2 20.8 %N_2 78.8

Area Stack A_2 1931 in²

Stack Press. −0.18 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. TT-9 ✓ Probe Tip Dia. 0.618 ✓ in.

V_m=Dry Gas Meter Calibration Factor 0.986 ✓ x 46.643 ✓

Dry Gas Meter _____ ft³ - (T_t ____ min x Leak Rate _____ cfm = _____

M_F = _____ M_T = _____

Location NB4 So. Dryer Stack

Date 2-14-91

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	ΔPm Orifice All in. H_2O Desired	ΔPm Orifice All in. H_2O Actual	Pump Vacuum in. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
D-5	1701	170.892	0.014	0.77	0.77	3.0	143	247	253	72	103	106	
4	1705.5	173.66	0.010	0.55	0.55	3.0	145	245	254	70	103	106	
3	1710	176.03	0.016	0.88	0.88	3.5	148	244	254	68	102	106	
2	1714.5	178.89	0.010	0.55	0.55	3.0	149	243	255	66	102	105	
1	1719	181.25	0.008	0.44	0.44	2.5	152	245	254	68	102	105	
END	1723.5	183.356	—	—	—	—	—	—	—	—	—	—	
ALL													

IMPINGER CATCH

SAMPLE NO. 3

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 860.2 Initial 559.6 Wt. Gain 300.6
2	DI	100	G.-Smith	Final 631.7 Initial 580.1 Wt. Gain 51.6
3	Dry	—	Modif.	Final 537.0 Initial 533.4 Wt. Gain 3.6
4	Silica Gel	—	Modif.	Final 724.5 Initial 716.4 Wt. Gain 8.1
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 363.9

DATE: 2/14/91

SIGNATURE: Michael C. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.4

O_2 20.8

CO 0.0

N_2 78.8

DATE: 2/14/91

SIGNATURE: Michael C. Reynolds

TIME: 1730

4/85

Job No. 9110-111 | Part | FIELD DATA

Job Name Coors

Run No. 1

Location K-1-Inlet

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 4 Meter Box No. 4 ✓

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP 24 ΔH —

Ambient Temp. °F 80

Assumed Moisture % 55

Probe Length 6' S.S.

Pitot Tube Leak Check ok / ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 8.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
		A Ps				Pm		Ts				Tm	
A-12	1054	206.721	0.012	0.29	0.39	1.0	190	249	272	70	80	81	24
11	1056.5	207.58	0.006	0.14	0.14	2.0	193	253	270	67	80	80	
10	1059	208.37	0.020	0.48	0.48	2.5	191	246	269	64	80	80	
9	1101.5	209.56	0.022	0.53	0.53	3.5	191	241	268	59	80	80	
8	1104	210.84	0.026	0.68	0.68	4.0	193	231	269	59	80	81	26=K
7	1106.5	212.23	0.022	0.58	0.58	4.0	192	244	269	54	80	81	
6	1109	213.52	0.024	0.62	0.62	3.5	191	232	270	58	80	81	
5	1111.5	214.88	0.040	1.10	1.10	6.0	192	235	262	59	80	81	K=28
4	1114	216.69	0.024	0.67	0.67	5.0	192	233	259	67	81	82	
3	1116.5	218.24	0.022	0.80	0.80	4.5	191	259	253	71	81	82	K=32
2	1119	219.77	0.016	0.51	0.51	4.0	192	257	252	70	81	83	
1	1121.5	221.05	0.012	0.38	0.38	3.5	192	266	249	73	82	85	
END	1124	222.145	—	—	—	—	—	—	—	—	—	—	
B-12	1126	222.145	0.004	0.13	0.13	2.0	191	246	240	28	83	85	
11	1128.5	222.82	0.010	0.32	0.32	2.5	192	236	237	73	84	85	
10	1131	223.80	0.028	0.90	0.90	4.0	192	237	242	66	85	86	
9	1133.5	225.36	0.024	0.77	0.77	4.0	192	243	248	60	86	87	
8	1136	226.80	0.026	0.83	0.83	4.5	193	251	251	60	86	88	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 29.739 ft^3

Water Collected V_w 733.7 ✓ ml

Time of Test T_t 60 min

Baro. Press. P_b 24.5 "Hg

%CO_2 0.0 %CO 0.0

%O_2 20.0 %N_2 80.0

Area Stack A_2 1256 in^2

Stack Press. −0.23 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.618 ✓ 1

V_m = Dry Gas Meter Calibration Factor 0.986 ✓ x 30.161 ✓

Dry Gas Meter Reading _____ ft^3 − (T_t _____ min x Leak Rate _____ cfm

M_F = _____ M_T = _____

Run No. 1

Location K-1 Inlet

Date 2-15-91

PARTICULATE FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	ΔHm Orifice ΔH in. H_2O Desired	ΔHm Orifice ΔH in. H_2O Actual	Pump Vacuum in. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remark
B.M	1138.5	228.35	0.020	0.64	0.64	3.5	192	252	252	60	87	89	
6	1141	229.71	0.020	0.64	0.64	3.5	191	270	263	61	87	89	
5	1143.5	231.04	0.022	0.70	0.70	3.5	190	261	265	63	88	90	
4	1146	232.47	0.016	0.51	0.51	3.0	191	241	265	64	88	90	
3	1148.5	233.70	0.016	0.51	0.51	3.0	190	253	240	62	88	90	
2	1151	234.90	0.006	0.19	0.19	2.5	190	258	254	67	89	91	
1	1153.5	235.73	0.016	0.51	0.51	3.0	190	254	257	68	90	92	
END	1156	236.882	—	—	—	—	—						
All													

IMPINGER CATCH

SAMPLE NO. 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 887.4 Initial 599.4 Wt. Gain 283.0
2	DI	100	G.-Smith	Final 888.3 Initial 584.8 Wt. Gain 303.5
3	Dry	—	Modif.	Final 599.4 Initial 468.8 Wt. Gain 130.6
4	Silica Gel	—	Modif.	Final 754.5 Initial 737.9 Wt. Gain 16.6
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 733.7

DATE: 2/15/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.0

O_2 20.0

CO 0.0

N_2 80.0

DATE: 2/15/91

SIGNATURE: Michael E. Reynolds

TIME: 1200

4/85

Job No. 9110-[illegible] Part FIELD DATA

Job Name Coors

Run No. 2

Location K-1 INLET

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 5 Meter Box No. 4 ✓

ΔPs Pm Ts Tm

K Factor .28

Ambient Temp. °F 80

Assumed Moisture % 59

Probe Length 6' S.S.

Read and Record at the Start of Each Test Point

Pitot Tube Leak Check Before ok / After ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 8.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-12	1317	242.282	0.008	0.22	0.22	1.0	194	254	268	64	82	82	.28=K
11	1319.5	243.10	0.014	0.39	0.39	1.0	194	250	245	63	82	82	
10	1322	244.17	0.016	0.45	0.45	2.0	195	252	243	60	82	82	
9	1324.5	245.27	0.016	0.99	0.39	2.0	195	248	246	56	83	82	K=24
8	1327	246.32	0.020	0.48	0.48	2.5	195	254	256	53	83	83	
7	1329.5	247.47	0.020	0.48	0.48	2.5	196	255	258	54	83	83	
6	1332	248.60	0.014	0.33	0.33	2.0	193	252	264	55	84	84	
5	1334.5	249.82	0.016	0.45	0.45	2.0	187	252	259	58	85	86	
4	1337	250.91	0.018	0.50	0.50	5.0	192	261	264	62	86	86	
3	1339.5	252.01	0.030	0.84	0.84	4.0	192	260	262	61	87	88	
2	1342	253.20	0.010	0.29	0.29	3.5	192	254	256	63	87	89	
1	1344.5	254.20	0.012	0.29	0.29	3.5	191	250	254	66	88	89	
END	1347	255.144	—	—	—	—	—	—	—	—	—	—	
B-12	1349	255.144	0.006	0.14	0.14	2.5	193	238	257	67	91	91	
11	1351.5	255.81	0.034	0.82	0.82	5.0	193	234	258	65	91	92	
10	1354	257.22	0.036	0.86	0.86	5.5	193	252	257	58	91	93	
9	1356.5	258.76	0.010	0.24	0.24	3.0	193	244	256	57	93	94	
8	1359	259.69	0.018	0.43	0.43	3.5	194	245	255	60	93	94	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 26.376 ft^3 %CO_2 0.0 %CO 0.0

Water Collected V_w 621.4 ✓ ml %O_2 20.0 %N_2 80.0

Time of Test T_t 60 min Area Stack A_2 1256 in^2

Baro. Press. P_b 24.50 "Hg Stack Press. −0.23 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-5 ✓ Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 ~ x 26.75 ✓

Dry Gas Meter _____ ft^3 - (T_t ____ min x Leak Rate ____ cfm = _____

M_F = M_T =

PARTICULATE FIELD DATA

Run No. 2

Location K-1-INLET

Date 2-15-91

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum in. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remark
B-7	1401.5	260.78	0.030	0.72	0.72	5.0	193	256	254	60	93	95	
6	1404	262.18	0.024	0.58	0.58	4.5	191	253	248	60	93	95	
5	1406.5	263.51	0.036	0.86	0.86	5.0	192	259	243	61	97	95	
4	1409	265.02	0.018	0.43	0.43	3.5	190	254	242	66	97	96	
3	1411.5	266.16	0.010	0.24	0.24	3.0	187	249	240	65	95	96	
2	1414	267.04	0.024	0.58	0.58	4.5	190	252	241	65	95	96	
1	1416.5	268.24	0.008	0.19	0.19	3.0	186	258	240	63	95	96	
END	1419	269.032	—	—	—	—	—	—	—	—	—	—	
ALL													

IMPINGER CATCH

SAMPLE NO. 2

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 878.7 Initial 603.5 Wt. Gain 275.2
2	DI	100	G.-Sm.Th	Final 851.8 Initial 604.5 Wt. Gain 247.3
3	Dry	—	Modif.	Final 592.6 Initial 502.2 Wt. Gain 90.4
4	Silicabel	—	Modif.	Final 737.3 Initial 728.8 Wt. Gain 8.5
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 621.4

DATE: 2/15/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.0

O_2 20.0

CO 0.0

N_2 80.0

DATE: 2/15/91

SIGNATURE: Michael E. Reynolds

TIME: 1430

4/85

Job No. 9110-111 Part FIELD DATA

Job Name COORS

Run No. 3

Location K-1 INLET

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 6 Meter Box No. 4 ✓

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP 24 ΔH

Ambient Temp. °F 88°

Assumed Moisture % 59%

Probe Length 6' S.S.

Pitot Tube Leak Check ok / ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 13.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-12	1608	274.296	0.010	0.24	0.24	1.0	192	243	264	61	87	86	K=24
11	1610.5	275.01	0.012	0.28	0.28	3.0	192	245	258	57	87	87	
10	1613	275.90	0.018	0.43	0.43	5.0	192	244	262	56	87	87	
9	1615.5	277.07	0.016	0.38	0.38	4.0	191	256	256	55	88	87	
8	1618	278.15	0.018	0.43	0.43	5.0	193	245	262	57	88	88	
7	1620.5	279.37	0.022	0.53	0.53	4.5	193	253	264	66	89	89	
6	1623	280.63	0.018	0.43	0.43	2.0	192	259	256	65	89	89	
5	1625.5	281.70	0.028	0.67	0.67	3.0	191	259	253	68	90	90	
4	1628	283.06	0.026	0.62	0.62	3.5	191	262	253	70	91	91	
3	1630.5	284.39	0.022	0.53	0.53	3.0	193	264	256	67	91	92	
2	1633	285.60	0.012	0.28	0.28	2.5	193	259	259	66	92	93	
1	1635.5	286.41	0.008	0.19	0.19	2.0	193	255	262	67	94	94	
END	1638	287.312	—	—	—	—	—	—	—	—	—	—	
B-12	1639	287.312	0.010	0.24	0.24	2.5	192	246	264	70	95	96	
11	1641.5	288.21	0.030	0.72	0.72	4.5	193	242	261	66	96	96	
10	1644	289.59	0.032	0.76	0.76	5.0	192	240	255	60	97	97	
9	1646.5	291.02	0.018	0.43	0.43	4.5	192	239	252	60	98	99	
8	1649	292.21	0.024	0.58	0.58	4.5	193	245	252	59	99	98	

Pitot Tube Calibration Factor C_p 0.817 ✓ Pitot Tube No. 74-1 ✓

Volume Collected V_m 21.864 ft^3

Water Collected V_w 494.7 ✓ ml

Time of Test T_t ~~60~~ 48 min

Baro. Press. P_b 24.5 "Hg

$\%CO_2$ 0.0 %CO 0.0

$\%O_2$ 20.0 $\%N_2$ 80.0

Area Stack A_2 1256 in^2

Stack Press. −0.23 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.618 in

V_m = Dry Gas Meter Calibration Factor 0.986 ✓ X 22.174 ✓

Dry Gas Meter Reading ____ ft^3 − (T_t ____ min x Leak Rate ____ cfm

M_F = ____ M_T = ____

PARTICULATE FIELD DATA

Run No. 3

Location K-1 INLET

Date 2-15-91

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	ΔPm Orifice ΔH in. H_2O Desired	ΔPm Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
6-7	1651.5	293.49	0.036	0.86	0.86	6.0	193	257	252	61	98	100	at 165
6	1654	295.00	0.030	0.72	0.72	10.0	193	259	252	61	99	100	plugge
5	1656.5	296.47	0.040	0.96	0.96	12.0	193	260	254	60	99	100	up
4	1659		0.032	0.76									297.0
3	1701.5		0.018	0.43									
2	1704		0.020	0.48									
1	1706.5		0.012	0.28									
END	1709		—	—	—	—	—	—	—	—	—	—	
ALL													

IMPINGER CATCH

SAMPLE NO. 3

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 774.1 Initial 558.6 Wt. Gain 165.5
2	DI	100	G.-Smith	Final 790.2 Initial 583.4 Wt. Gain 206.8
3	Dry	—	Modif.	Final 640.0 Initial 534.5 Wt. Gain 105.5
4	Silica Gel	—	Modif.	Final 750.4 Initial 733.5 Wt. Gain 16.9
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 494.7

DATE: 2/15/91

SIGNATURE: Michael E. Ruggeldt

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.0

O_2 20.0

CO 0.0

N_2 80.0

DATE: 2/15/91

SIGNATURE: Michael E. Ruggeldt

TIME: 1705

4/85

Job No. 9110-111 Part FIELD DATA

Job Name Coors

Run No. 1

Location K-1 outlet

Date 2-15-91

Operator McCullough

Sample Box No. 4 Meter Box No. 4 ✓

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP K=28.3 ΔH

Ambient Temp. °F 55°

Assumed Moisture % 5%

Probe Length 5'

Pitot Tube Leak Check ok / ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
		A Ps			Pm		Ts				Tm		
B-6	2111	305.642	0.026	0.74	0.74	2.5	174	243	249	50	64	64	28.3=K
5	2116	308.48	0.046	1.30	1.30	7.0	176	262	265	48	61	63	
4	2121	312.15	0.040	1.15	1.15	6.0	174	244	270	49	69	61	
3	2126	315.91	0046	1.40	1.40	7.0	176	250	268	56	58	59	K=30
2	2131	319.88	0.030	0.90	0.90	4.5	174	261	269	60	57	58	
1	2136	323.02	0.038	1.15	1.15	5.0	175	259	271	65	57	58	
END	2141	326.671	—	—	—	—	—	—	—	—	—	—	
A-6	2146	326.671	0.040	1.20	1.20	4.5	173	268	269	68	58	57	
5	2151	330.36	0.044	1.30	1.30	5.0	174	256	267	48	58	59	
4	2156	334.21	0.042	1.25	1.25	4.5	173	251	255	46	57	58	
3	2201	337.94	0.040	1.20	1.20	5.0	174	246	248	45	55	55	
2	2206	341.71	0.048	1.45	1.45	6.5	173	249	242	45	55	54	
1	2211	345.76	0036	1.10	1.10	5.0	174	251	238	45	54	55	
END	2216	349.363	—	—	—	—	—	—	—	—	—	—	
ALL													

Pitot Tube Calibration Factor C_p 0.832 ✓ Pitot Tube No. 59-1 ✓

Volume Collected V_m 43.109 ft^3

Water Collected V_w 742.9 ✓ ml

Time of Test T_t 60 min

Baro. Press. P_b 24.3 "Hg

$\%CO_2$ 0.4 %CO 0.0

$\%O_2$ 20.6 $\%N_2$ 79.0

Area Stack A_2 1000 in^2

Stack Press. -0.13 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.618 ✓ in

V_m = Dry Gas Meter Calibration Factor 0.986 ✓ x 43.721 ✓

Dry Gas Meter Reading ____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_F = ____ M_T = ____

IMPINGER CATCH

SAMPLE NO. 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 859.9 Initial 600.1 Wt. Gain 259.8
2	DI	100	G.-Smith	Final 836.1 Initial 584.5 Wt. Gain 251.6
3	Dry	—	Modif.	Final 674.3 Initial 469.5 Wt. Gain 204.8
4	Silica Gel	—	Modif.	Final 793.0 Initial 766.3 Wt. Gain 26.7
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 742.9

DATE: 2/15/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.4

O_2 20.6

CO 0.0

N_2 79.0

DATE: 2/15/91

SIGNATURE: Michael E Reynolds

TIME: 2220

4/85

Job No. 9110-111 — Part — FIELD DATA

Job Name Coors

Run No. 2

Location K-1 Outlet

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 5 Meter Box No. 4 ✓

ΔPs — Pm — Ts — Tm

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP _____ ΔH _____

Ambient Temp. °F 55

Assumed Moisture % 52

Probe Length 5' glass

Pitot Tube Leak Check ok / ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 8.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-6	2305	356.107	0.044	1.30	1.30	4.0	161	246	255	50	56	56	Back
5	2310	360.02	0.048	1.45	1.45	4.5	167	242	251	46	55	55	
4	2315	363.83	0.040	1.20	1.20	4.5	166	246	253	47	55	56	
3	2320	367.64	0.042	1.25	1.25	4.5	165	255	246	49	55	56	
2	2325	371.46	0.046	1.40	1.40	5.0	166	251	246	50	54	55	0.046
1	2330	375.40	0.040	1.20	1.20	5.0	166	247	248	51	54	55	
END	2335	379.356	—	—	—	—	—	—	—	—	—	—	
B-6	2340	379.336	0.032	0.96	0.96	4.0	164	246	242	56	56	57	
5	2345	382.48	0.044	1.30	1.30	5.0	164	255	248	49	56	57	
4	2350	386.36	0.042	1.25	1.25	5.5	164	243	251	49	56	57	
3	2355	389.89	0.038	1.15	1.15	4.5	164	245	253	50	55	57	
2	2400	393.28	0.034	1.00	1.00	4.0	162	245	255	50	55	57	
1	2405	376.89	0.036	1.10	1.10	4.5	164	247	256	52	55	57	
END	2410	400.569	—	—	—	—	—	—	—	—	—	—	
ALL													

Pitot Tube Calibration Factor C_p 0.832 ✓ Pitot Tube No. 99-1 ✓

Volume Collected V_m 43.84 ft^3 %CO_2 0.4 %CO 0.0

Water Collected V_w 518.6 ✓ ml %O_2 20.6 %N_2 79.0

Time of Test T_t 60 min Area, Stack A_2 1008 in^2

Baro. Press. P_b 24.3 "Hg Stack Press. -0.13 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.618 ✓ in

V_m = Dry Gas Meter Calibration Factor 0.986 ✓ x 44.462 ✓

Dry Gas Meter Reading _____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_F = _____ M_P = _____

1

IMPINGER CATCH

SAMPLE NO. 2

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 876.7 Initial 595.0 Wt. Gain 281.7
2	DI	100	G.-Smith	Final 835.4 Initial 618.1 Wt. Gain 217.3
3	Dry	—	Modif.	Final 509.8 Initial 502.9 Wt. Gain 6.9
4	Silica Gel	—	Modif.	Final 746.1 Initial 733.4 Wt. Gain 12.7
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 518.6

DATE: 2/16/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.4

O_2 20.6

CO 0.0

N_2 79.0

DATE: 2/16/91

SIGNATURE: Michael E. Reynolds

TIME: 0015

4/85

Job No. 9110-111 — Port — FIELD DATA

Job Name Coors

Run No. 3

Location K-1

Date 2-16-91

Operator McCullough / Thomas

Sample Box No. 6 Meter Box No. 4 ✓

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP _____ ΔH _____

Ambient Temp. °F 52

Assumed Moisture % 45

Probe Length 5' 9/16"

Pitot Tube Leak Check ok / ok

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

A Ps Pm Ts Tm

Point	Clock Time 0100	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
B-6	[illegible]	416.133	0.031	0.93	0.93	4.0	171	262	270	53	56	56	
5	0105	419.30	0.040	1.20	1.20	6.0	172	249	266	50	56	57	
4	0110	423.40	0.044	1.55	1.55	8.0	173	244	251	55	56	57	K=35
3	0115	427.78	0.038	1.35	1.35	8.0	173	265	280	60	55	57	
2	0120	431.99	0.042	1.50	1.50	8.0	172	257	254	61	55	57	
1	0125	436.26	0.036	1.25	1.25	8.0	169	255	265	61	56	57	
END	0130	440.276	—	—	—	—	—	—	—	—	—	—	
A-6	0132	440.276	0.042	1.50	1.50	7.0	172	269	270	60	56	58	
5	0137	444.49	0.044	1.55	1.55	8.0	173	265	269	56	56	58	
4	0142	448.88	0.036	1.25	1.25	8.0	174	264	272	58	55	57	
3	0147	453.12	0.040	1.40	1.40	8.0	172	255	265	59	55	57	
2	0152	457.48	0.032	1.15	1.15	7.0	171	259	264	59	54	56	
1	0157	461.39	0.042	1.50	1.50	8.0	170	256	264	59	54	56	
END	0202	465.642	—	—	—		—	—	—	—	—	—	
AIC											✓		

Pitot Tube Calibration Factor C_p 0.832 ✓ Pitot Tube No. SH ✓

Volume Collected V_m 48.777 ft³ 48.866 MER

Water Collected V_w 815.1 ✓ ml

Time of Test T_t 60 min

Baro. Press. P_b 24.3 "Hg

$\%CO_2$ 0.0 $\%CO$ 0.0

$\%O_2$ 20.8 $\%N_2$ 79.0

Area Stack A_2 1000 in²

Stack Press. −0.13 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 ✓ Probe Tip Dia. 0.618 ✓ in

V_m = Dry Gas Meter Calibration Factor 0.986 ✓ × 49.469 MER 49.509

Dry Gas Meter Reading _____ ft³ − (T_t ___ min × Leak Rate ___ cfm)

M_F = _____ M_T = _____

IMPINGER CATCH

SAMPLE NO. 3

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	Modif.	Final 783.0 Initial 556.5 Wt. Gain 226.5
2	DI	100	G.-Smith	Final 825.9 Initial 572.8 Wt. Gain 253.1
3	Dry	—	Modif.	Final 857.4 Initial 533.6 Wt. Gain 323.8
4	Silica Gel	—	Modif.	Final 676.5 Initial 664.8 Wt. Gain 11.7
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask	Ø			Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 815.1

DATE: 2/16/91

SIGNATURE: Michael E. Reynolds

ORSAT ANALYSIS RESULTS
Gas Fractional Part

CO_2 0.2

O_2 20.8

CO 0.0

N_2 79.0

DATE: 2/16/91

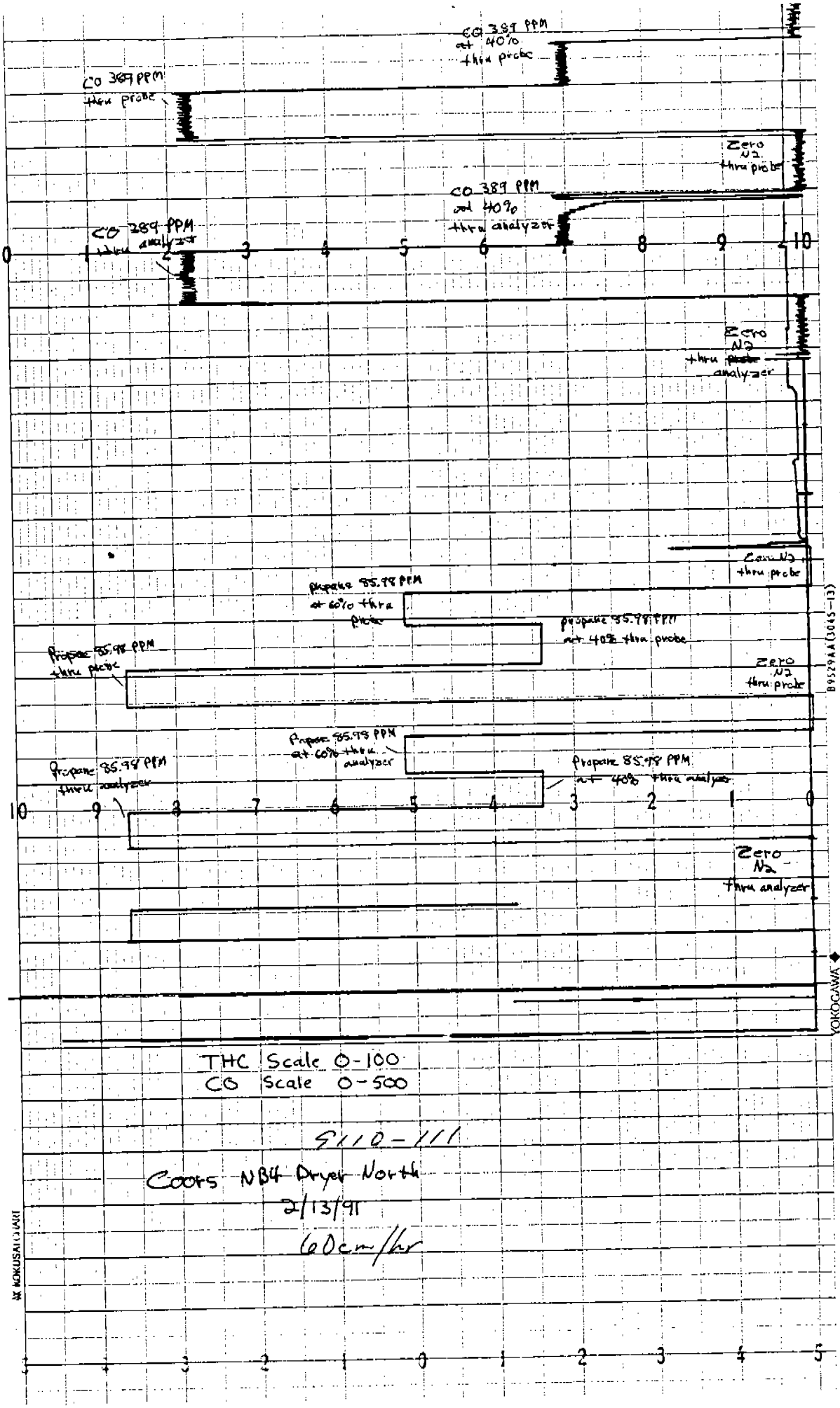
SIGNATURE: Michael E. Reynolds

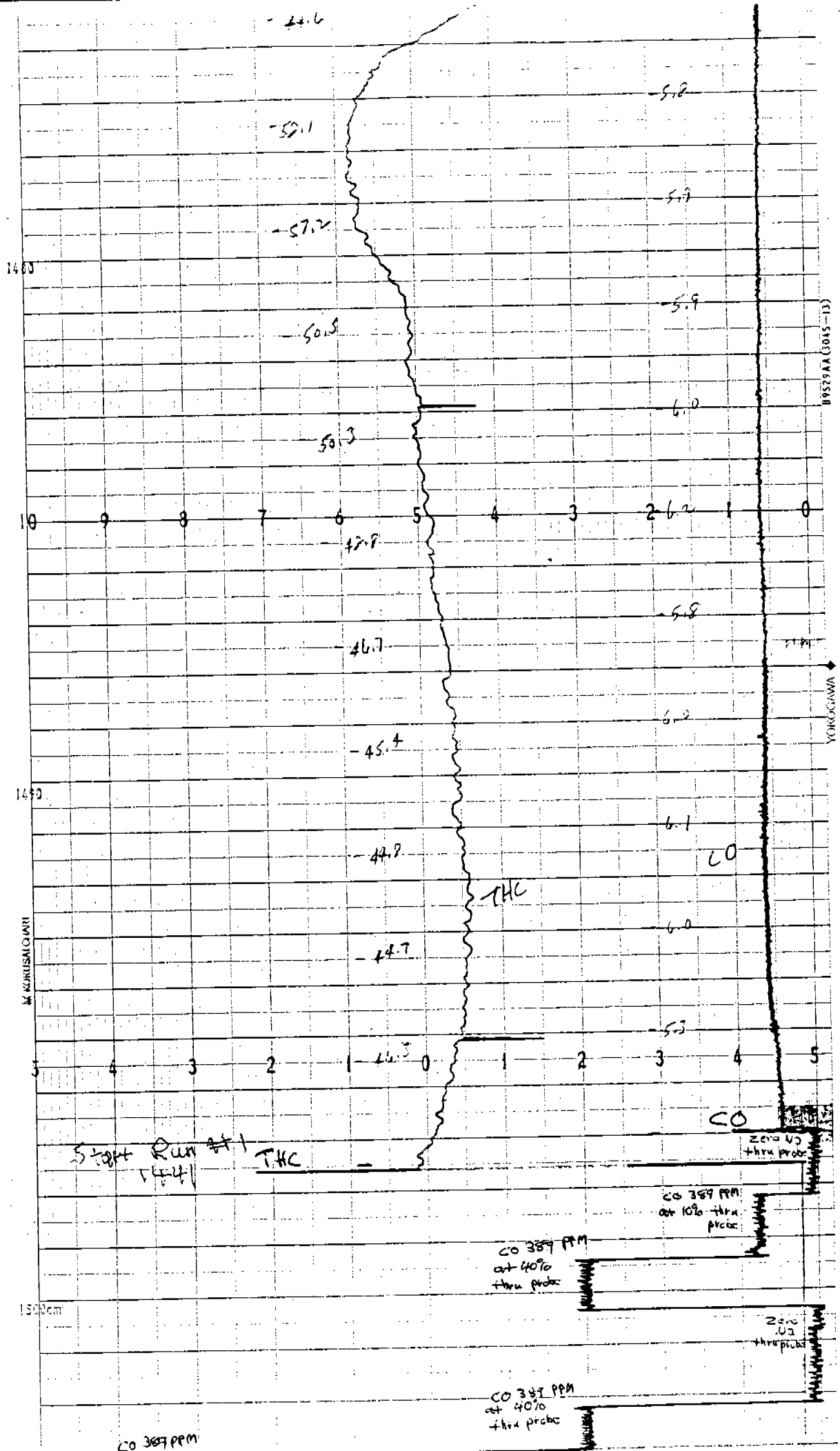
TIME: 0210

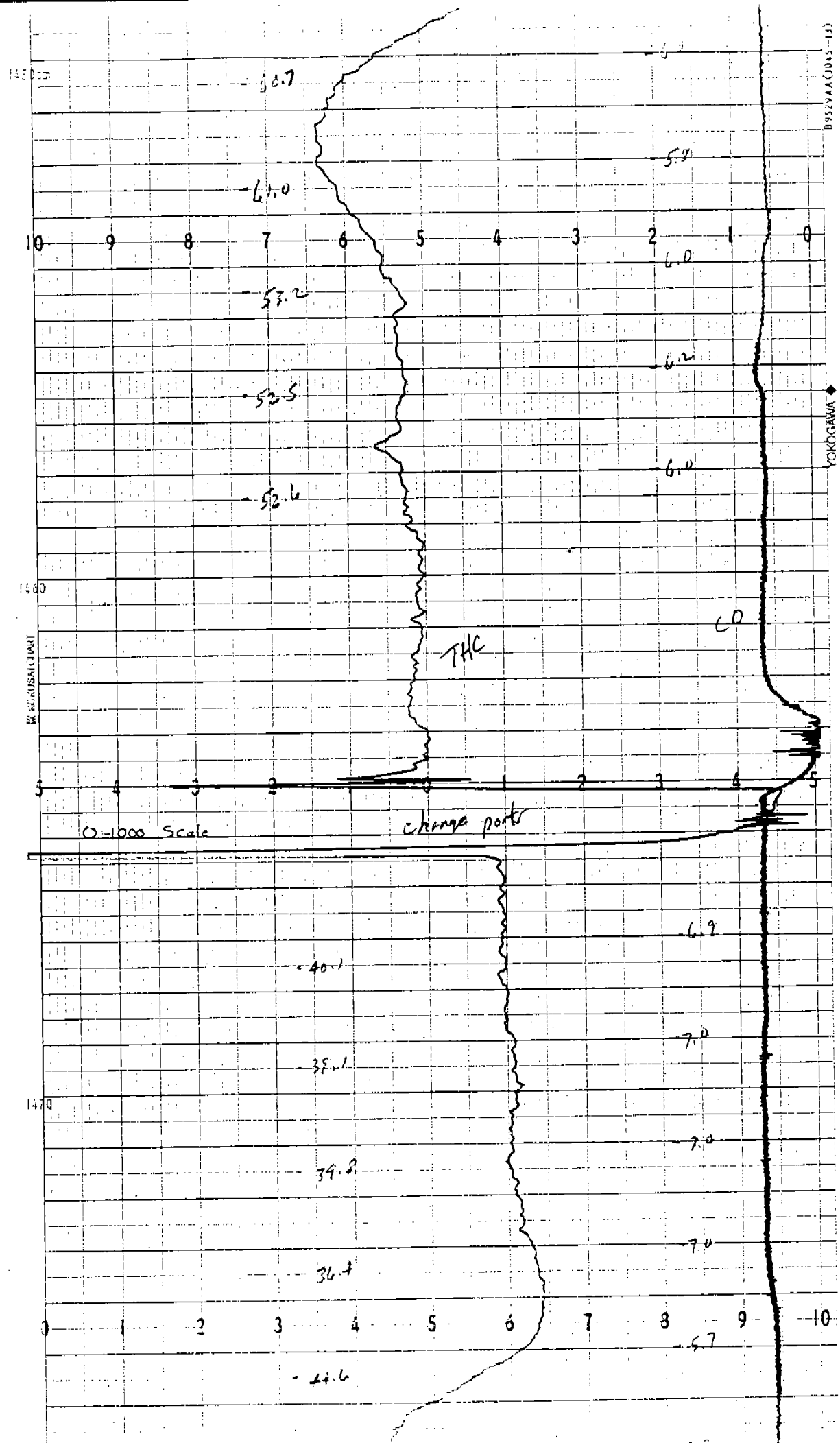
4/85

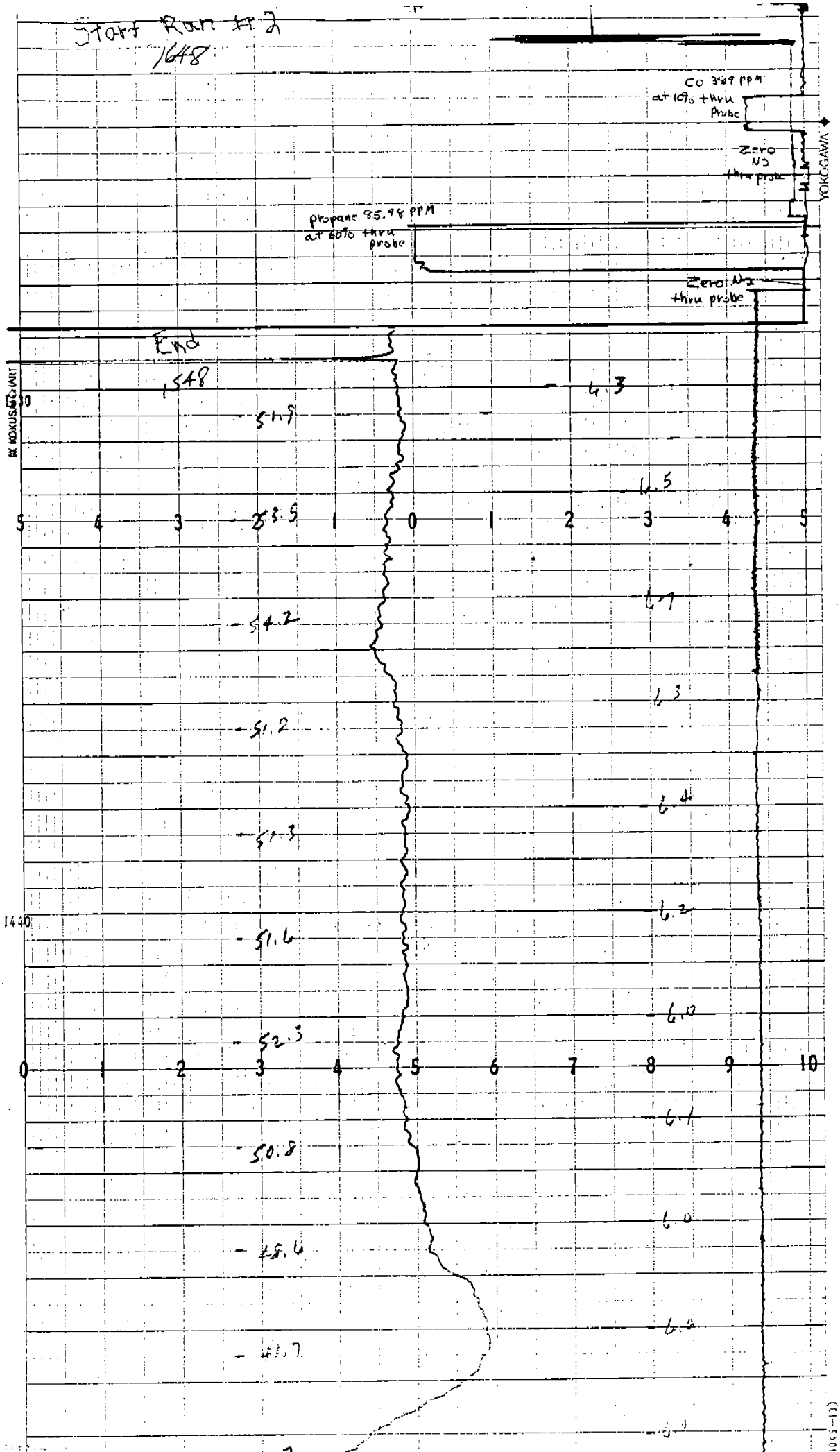
ANALYZER DATA

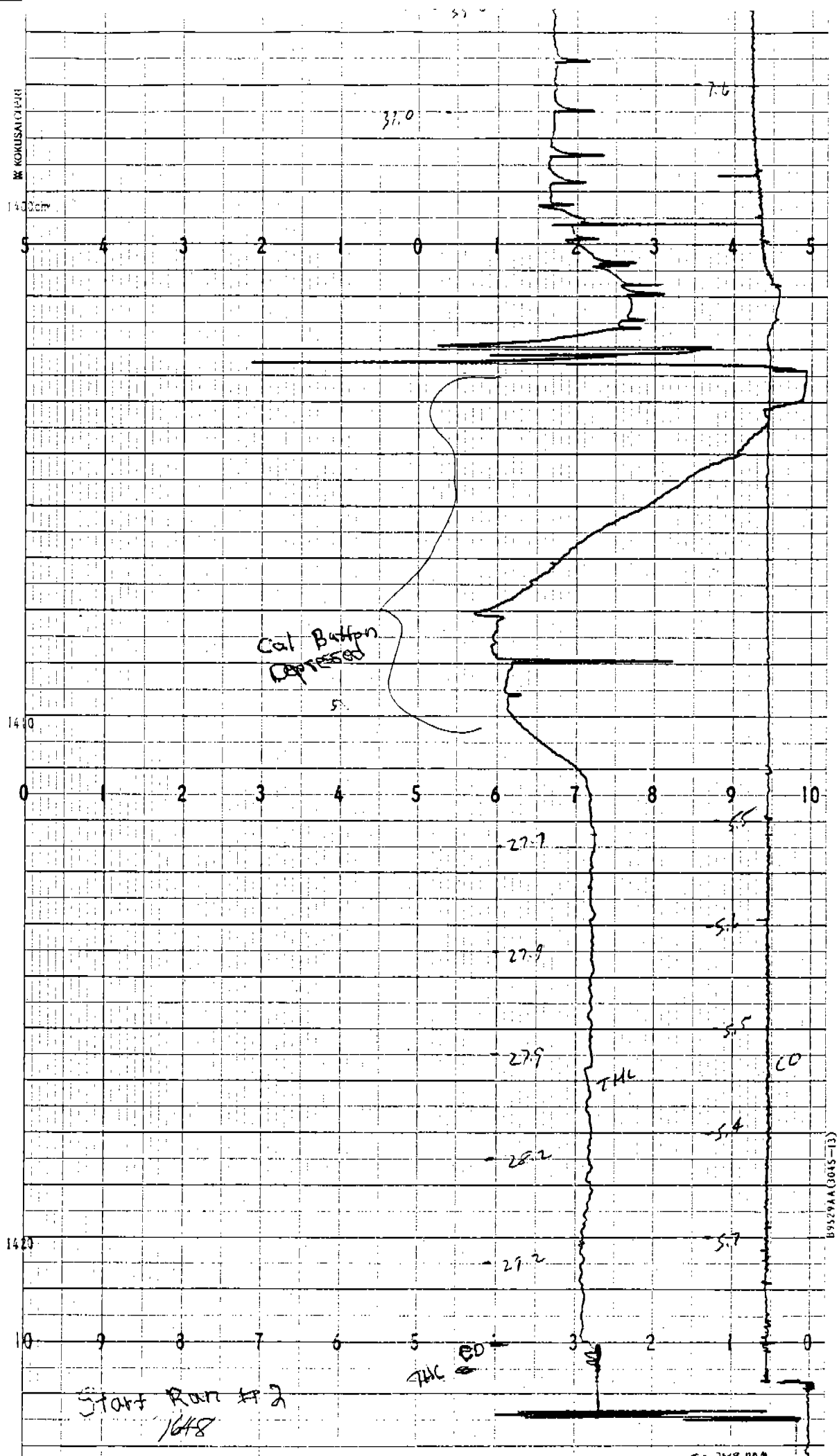
NB4 NORTH DRYER STACK

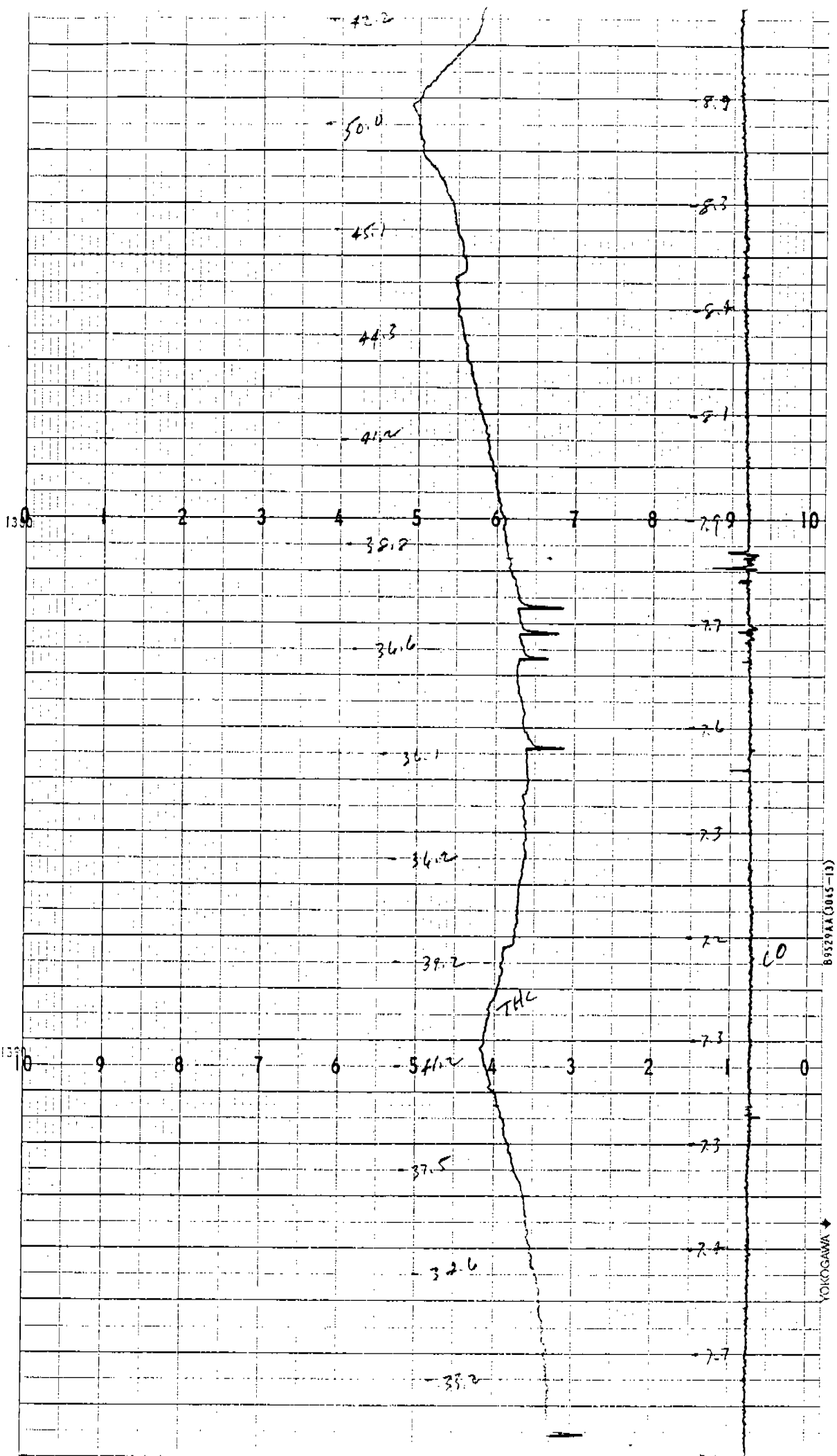

CO 389 PPM at 40% thru probe
CO 389 PPM thru probe
Zero N2 thru probe
CO 389 PPM at 40% thru analyzer
CO 389 PPM thru analyzer
Zero N2 thru probe analyzer
Zero N2 thru probe
Propane 85.98 PPM at 60% thru probe
Propane 85.98 PPM at 40% thru probe
Propane 85.98 PPM thru probe
Zero N2 thru probe
Propane 85.98 PPM at 60% thru analyzer
Propane 85.98 PPM thru analyzer
Propane 85.98 PPM at 40% thru analyzer
Zero N2 thru analyzer
0 1 2 3 4 5 6 7 8 9 10
10 9 8 7 6 5 4 3 2 1 0
5 4 3 2 1 0 1 2 3 4 5
B9529AA (3045-13)
YOKOGAWA
THC Scale 0-100
CO Scale 0-500
5110-111
Coors NB4 Dryer North
2/13/91
60cm/hr
KOKUSAI DENKI

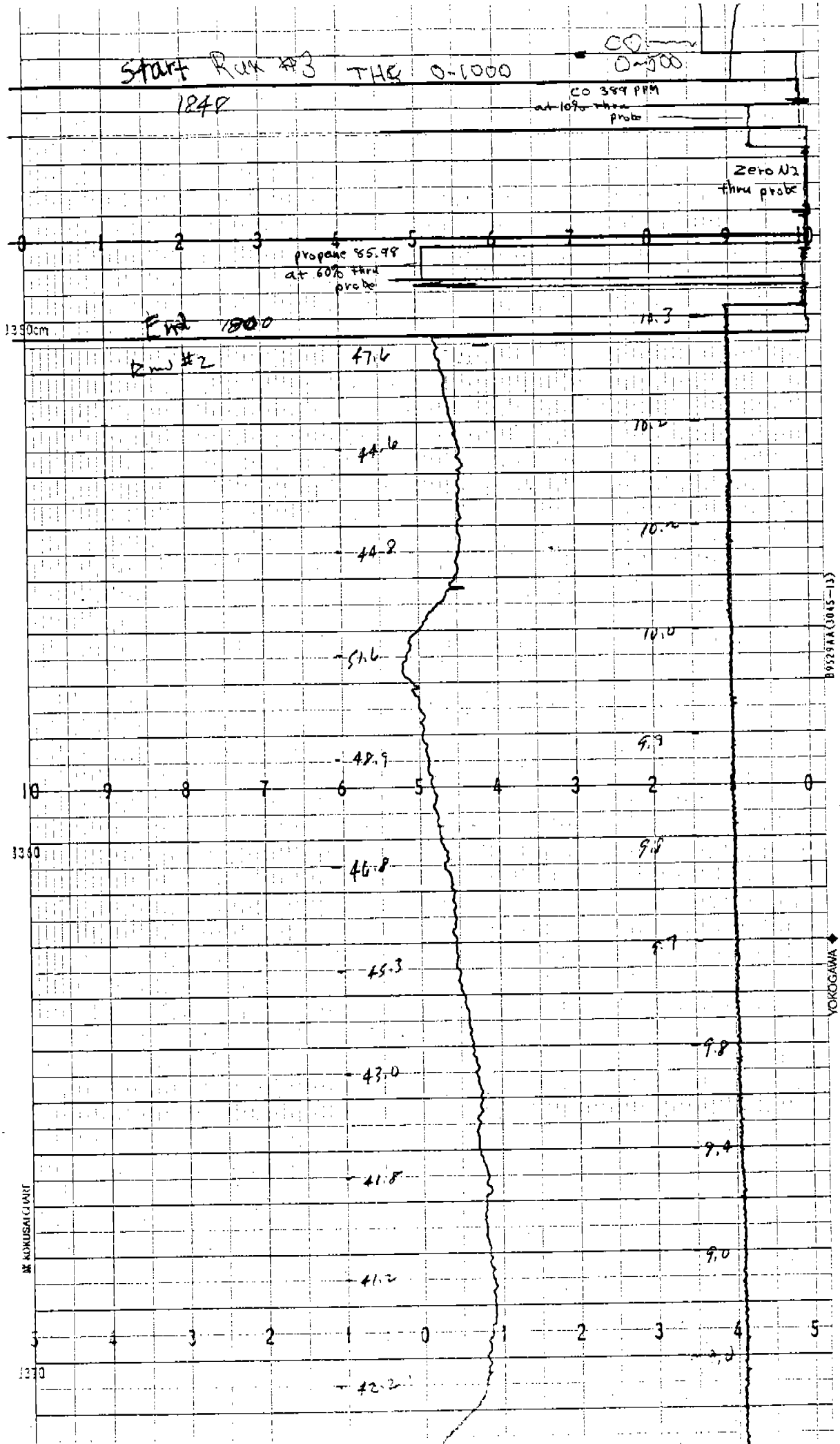

-44.6
-5.8
-59.1
-57.2
5.7
1480
-5.9
-50.5
B9S29AA(3045-13)
6.0
-50.3
10 9 8 7 6 5 4 3 2 1 0
-47.8
-5.8
-46.7
YOKOGAWA
6.2
-45.4
1490
6.1
CO
-44.9
THC
6.0
-44.7
5.7
5 4 3 2 1 0 1 2 3 4 5
-44.3
CO
Zero O2 thru probe
Start Run #1
THC
CO 389 PPM at 10% thru probe
CO 389 PPM at 40% thru probe
1500rpm
Zero O2 thru probe
CO 389 PPM at 40% thru probe
CO 389 PPM

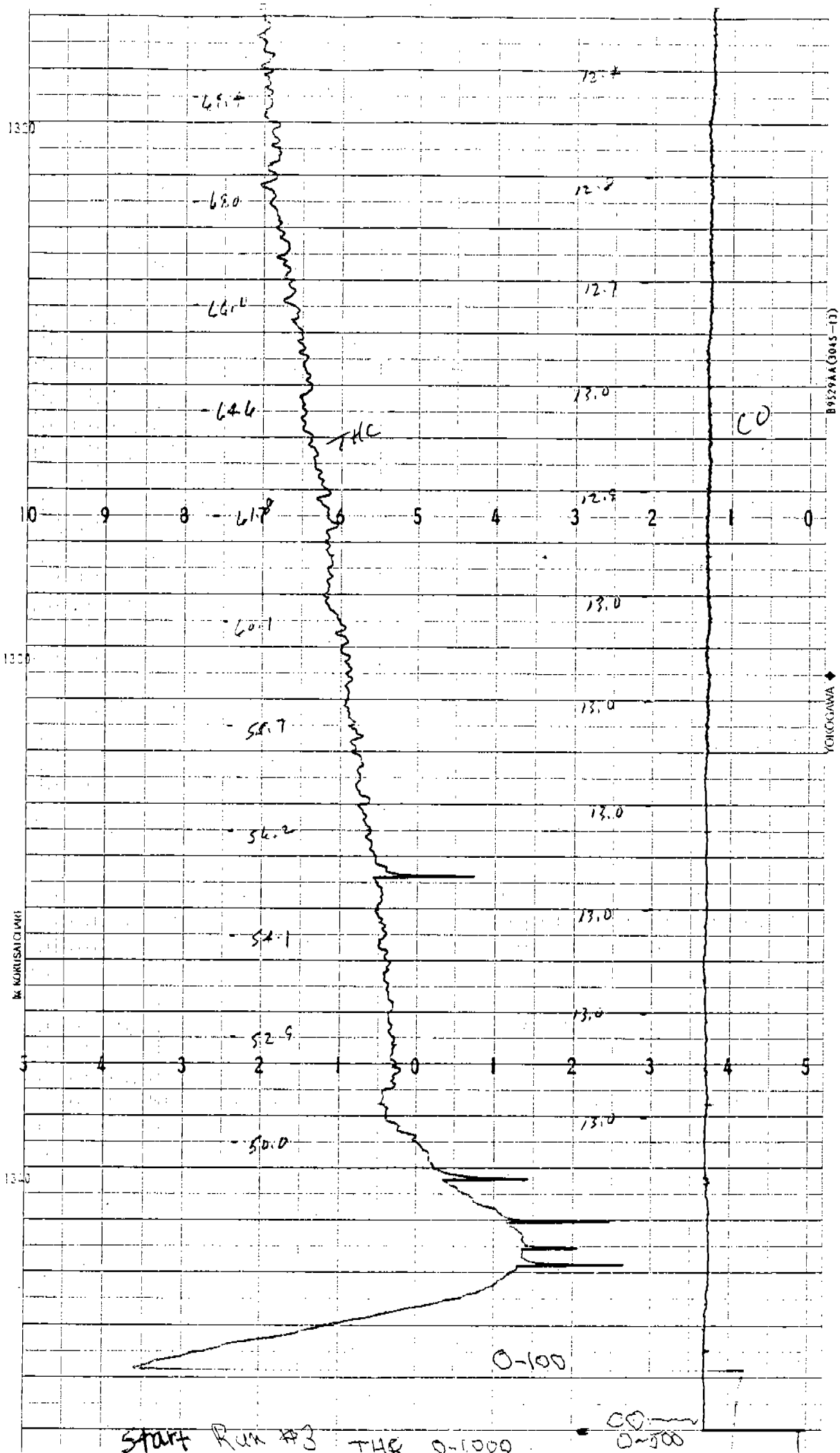

THC
CO
0-1000 Scale
change port
YOKOGAWA
B9529AA (1045-15)

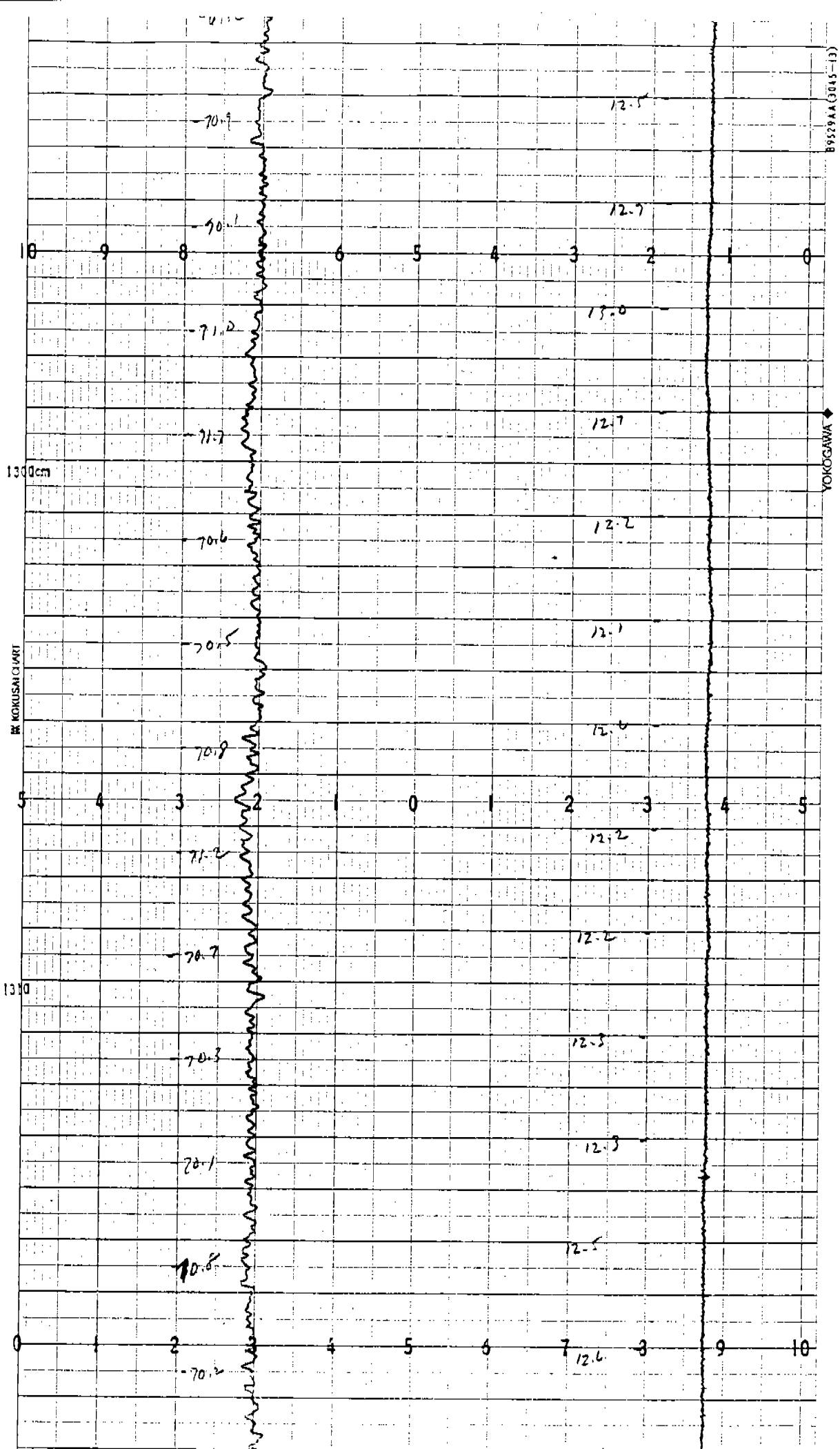

Start Run #2
1648
CO 387 PPM
at 10% thru
Probe
Zero
N2
thru probe
YOKOGAWA
propane 85.98 PPM
at 60% thru
probe
Zero N2
thru probe
End
1548
KOKUSAI
1440
-51.9
-54.2
-51.2
-51.3
-51.6
-52.3
-50.8
-45.6
-41.7
-43.3
4.3
4.5
4.7
4.3
4.4
4.2
4.0
4.1
4.0
4.0
5 4 3 2 1 0 1 2 3 4 5
0 1 2 3 4 5 6 7 8 9 10

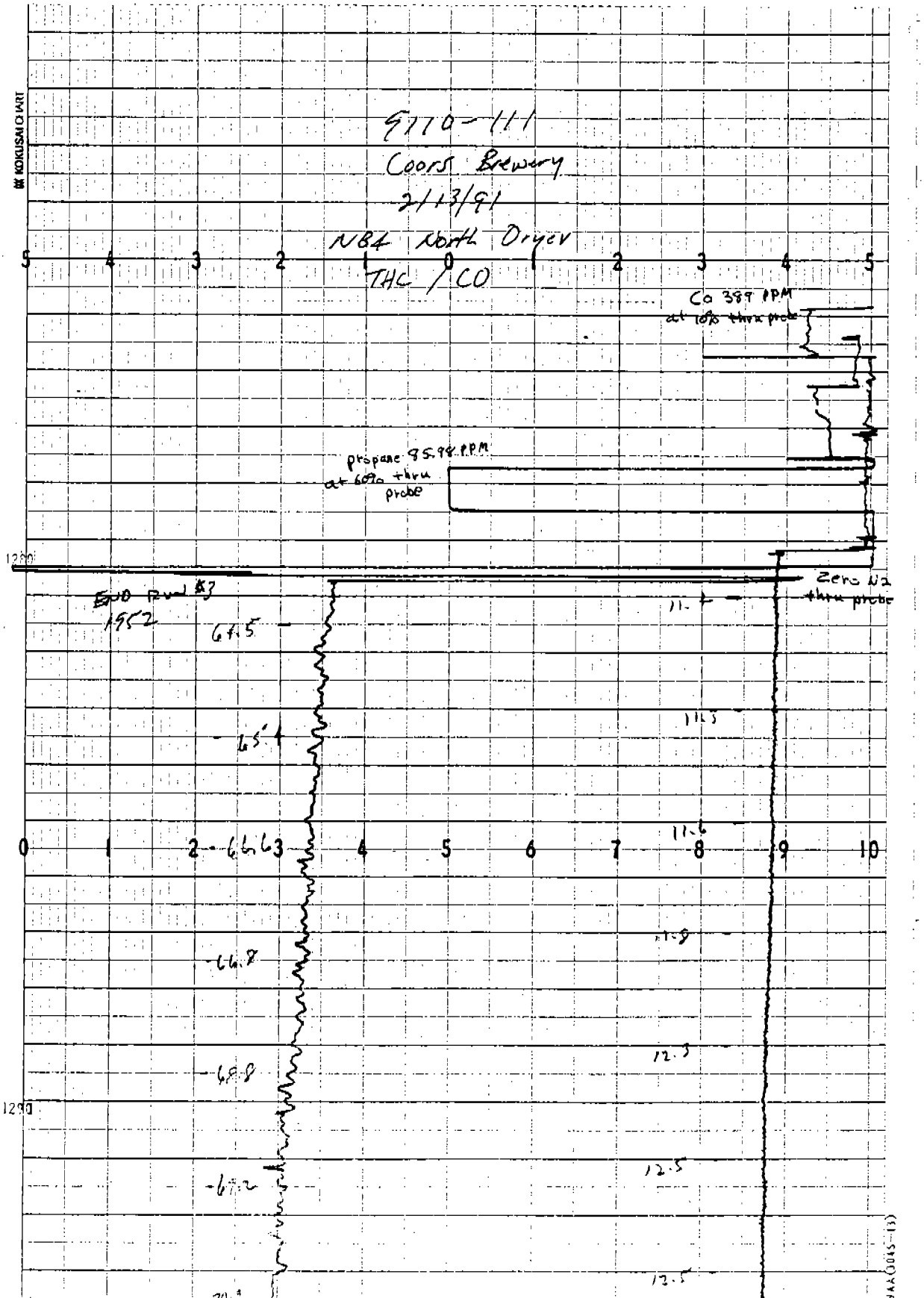

KOKUSAI
1400cm
37.0
7.6
5 4 3 2 1 0 1 2 3 4 5
Cal Button Depressed
5.
1440
0 1 2 3 4 5 6 7 8 9 10
27.7
5.6
5.4
27.9
5.5
27.9
THC
CO
5.4
28.2
B9529AA(3045-13)
1420
27.2
5.7
10 9 8 7 6 5 4 3 2 1 0
THC
ED
Start Run #2
1648


42.2
50.0
45.1
44.3
41.2
38.2
36.6
36.1
34.2
39.2
THC
37.5
32.6
37.2
8.9
8.3
8.4
8.1
7.7
7.6
7.3
7.2
7.3
7.3
7.4
7.7
CO
0
1
2
3
4
5
6
7
8
9
10
B9529AA(3045-13)
YOKOGAWA

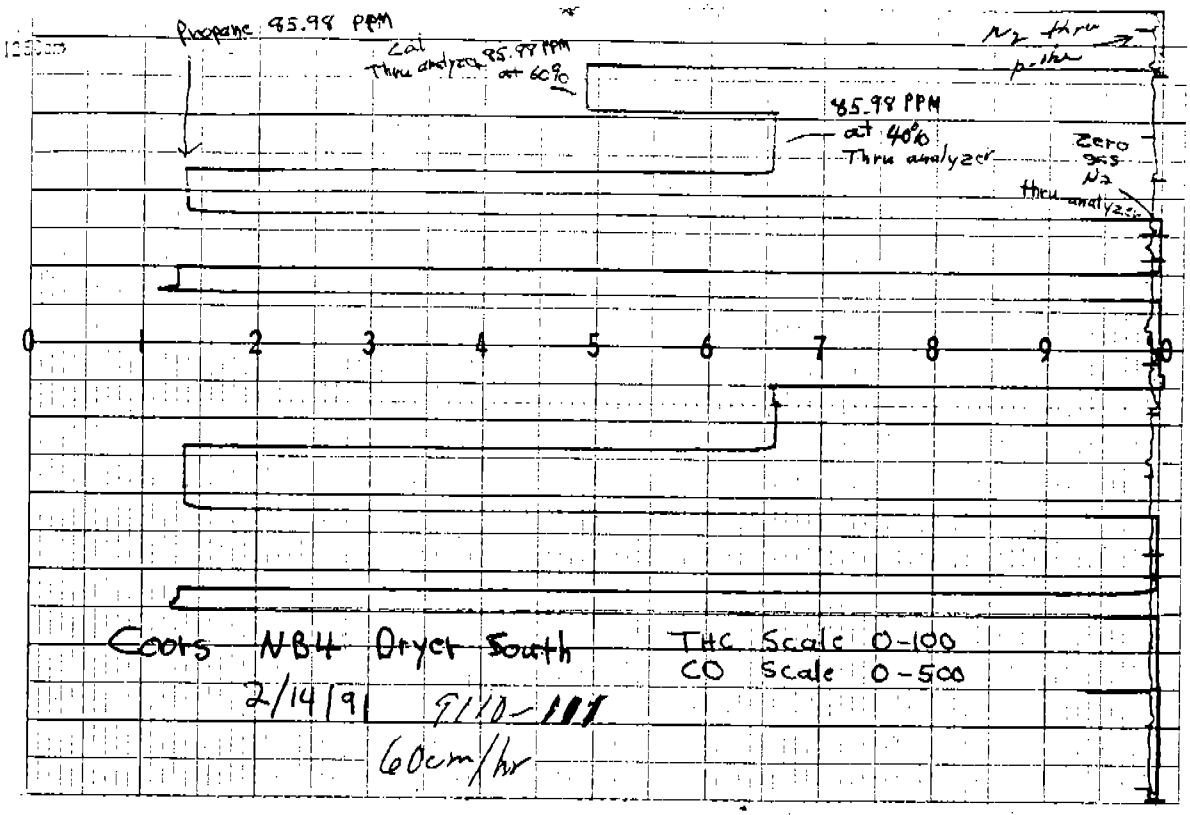

Start Run #3 THR 0-1000
1848
CO
0-500
CO 389 PPM
at 10% thru probe
Zero N2
thru probe
propane 85.98
at 60% thru probe
1350cm
End 1900
Run #2
47.6
44.6
44.2
51.6
48.9
46.8
45.3
43.0
41.8
41.2
42.2
10.3
10.2
10.0
10.0
9.9
9.8
9.7
9.8
9.4
9.0
9.0
B9529AA (3045-13)
YOKOGAWA
KOKUSAI CHART

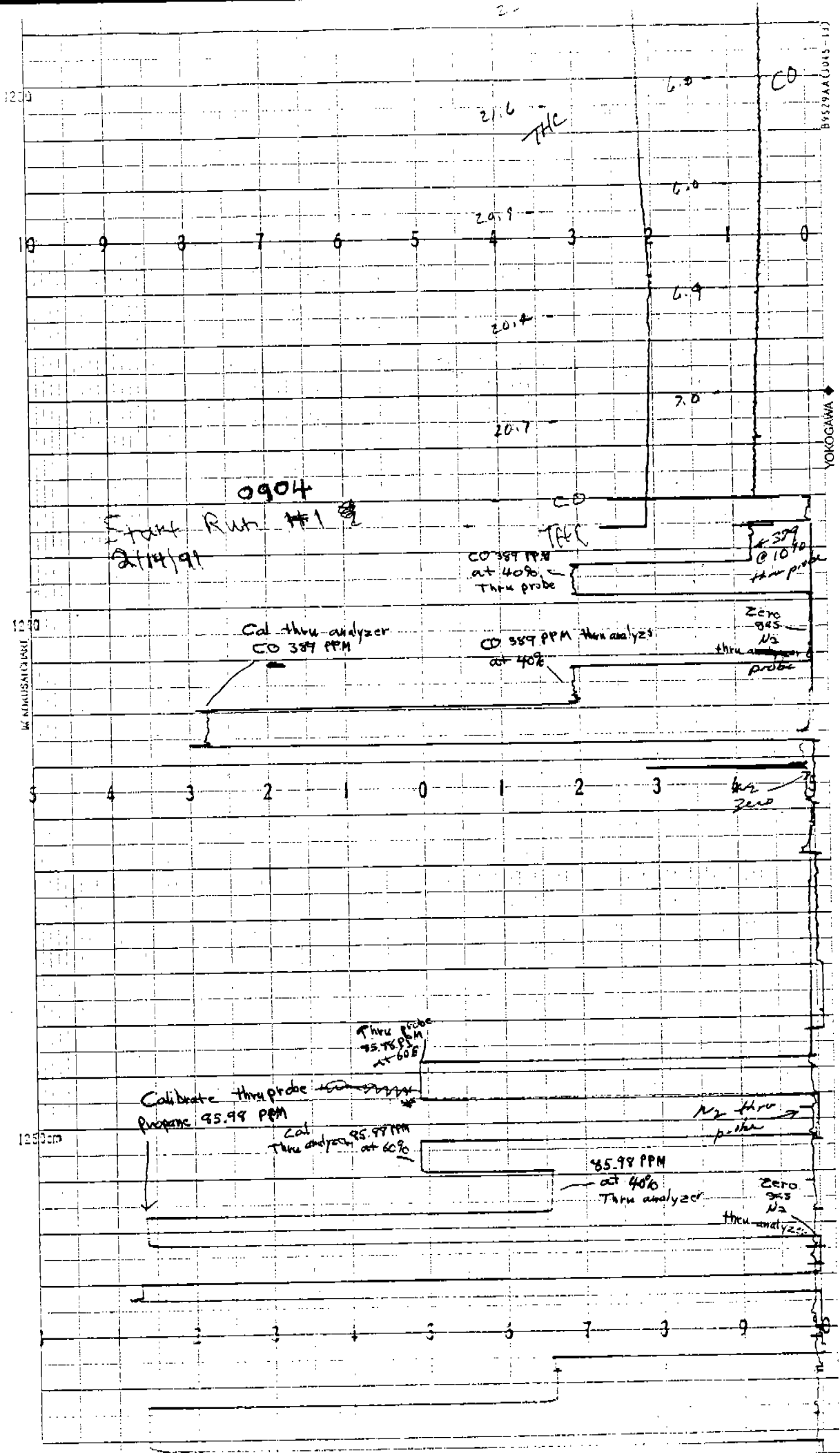

1330
1330
1340
-65.4
-65.0
-64.6
-64.2
-64.1
-60.1
-55.7
-54.2
-54.1
-52.9
-50.0
12.4
12.5
12.7
13.0
13.0
13.0
13.0
13.0
13.0
THC
CO
10 9 8 7 6 5 4 3 2 1 0
5 4 3 2 1 0 1 2 3 4 5
0-100
CO
0-500
Start Run #3 THC 0-1000
KORUSAI CLWR
YOKOGAWA
B9529AA (3045-11)

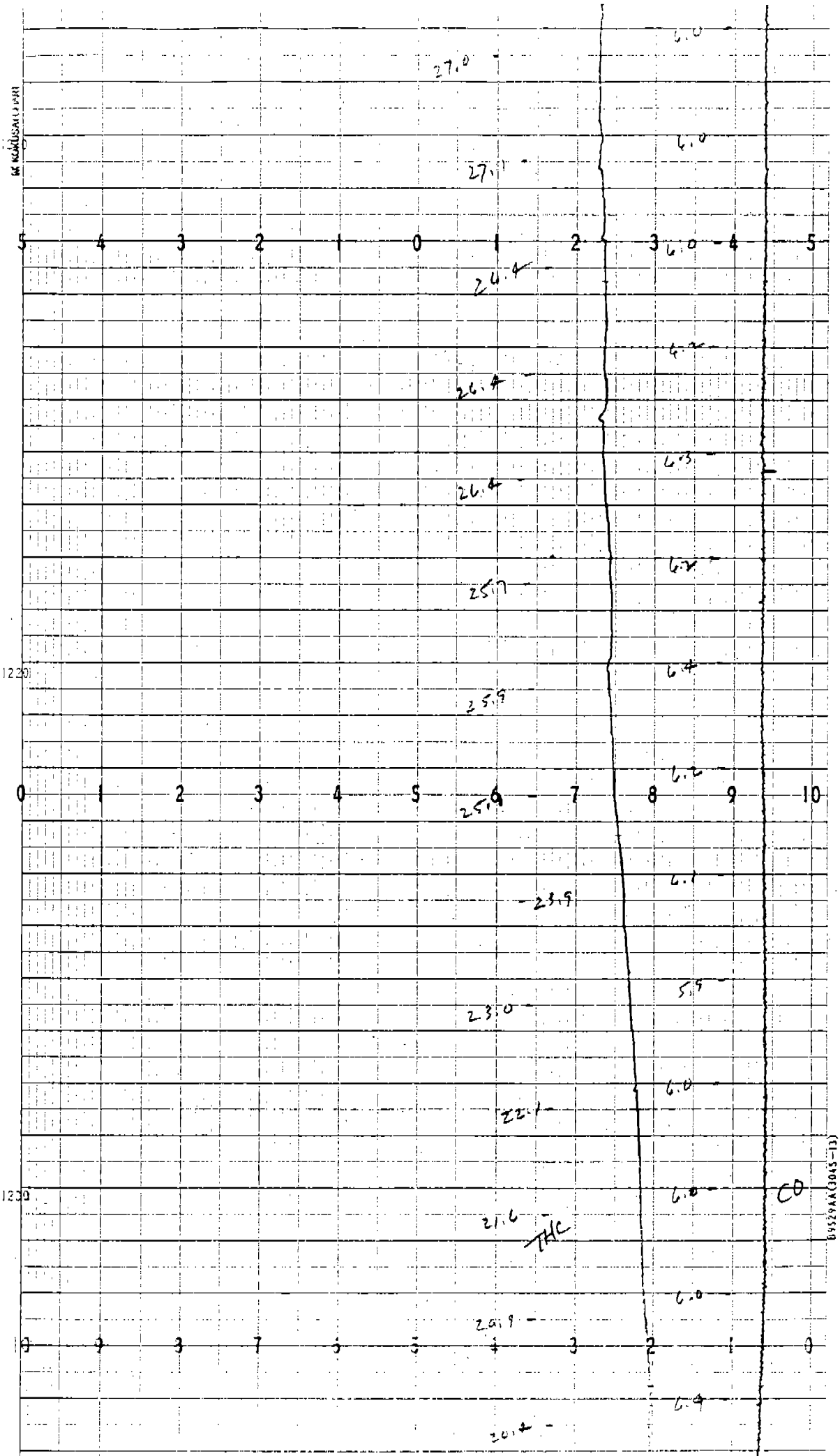

B9529AA(3045-13)
YOKOGAWA
KOKUSAI CHART
1300cm
1310
10 9 8 6 5 4 3 2 1 0
5 4 3 2 1 0 1 2 3 4 5
0 1 2 4 5 6 7 8 9 10
70.9
71.0
71.7
70.6
70.5
70.9
71.2
70.7
70.3
70.1
70.6
70.2
12.5
12.7
13.0
12.7
12.2
12.1
12.0
12.2
12.2
12.3
12.3
12.5
12.6

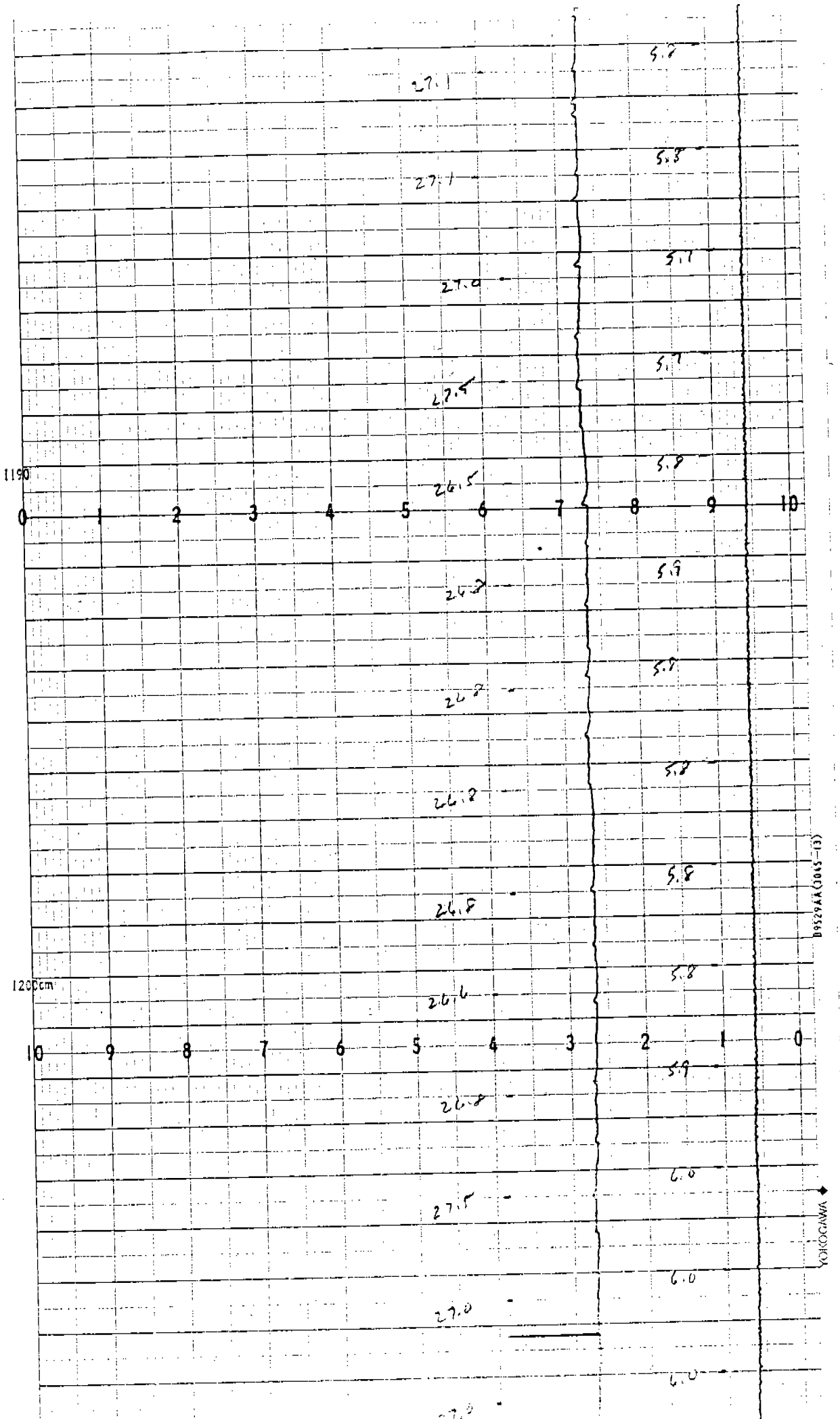

KOKUSAI OHART
5110-111
Coors Brewery
2/13/91
NB4 North Dryer
THC / CO
Co 389 PPM
at 10% thru probe
propane 95.98 PPM
at 60% thru probe
Zero N2
thru probe
1250
1290
END Run #3
1952
64.5
65.1
66.3
66.8
68.8
68.2
11.6
11.9
12.3
12.5
12.5
0
1
2
3
4
5
6
7
8
9
10

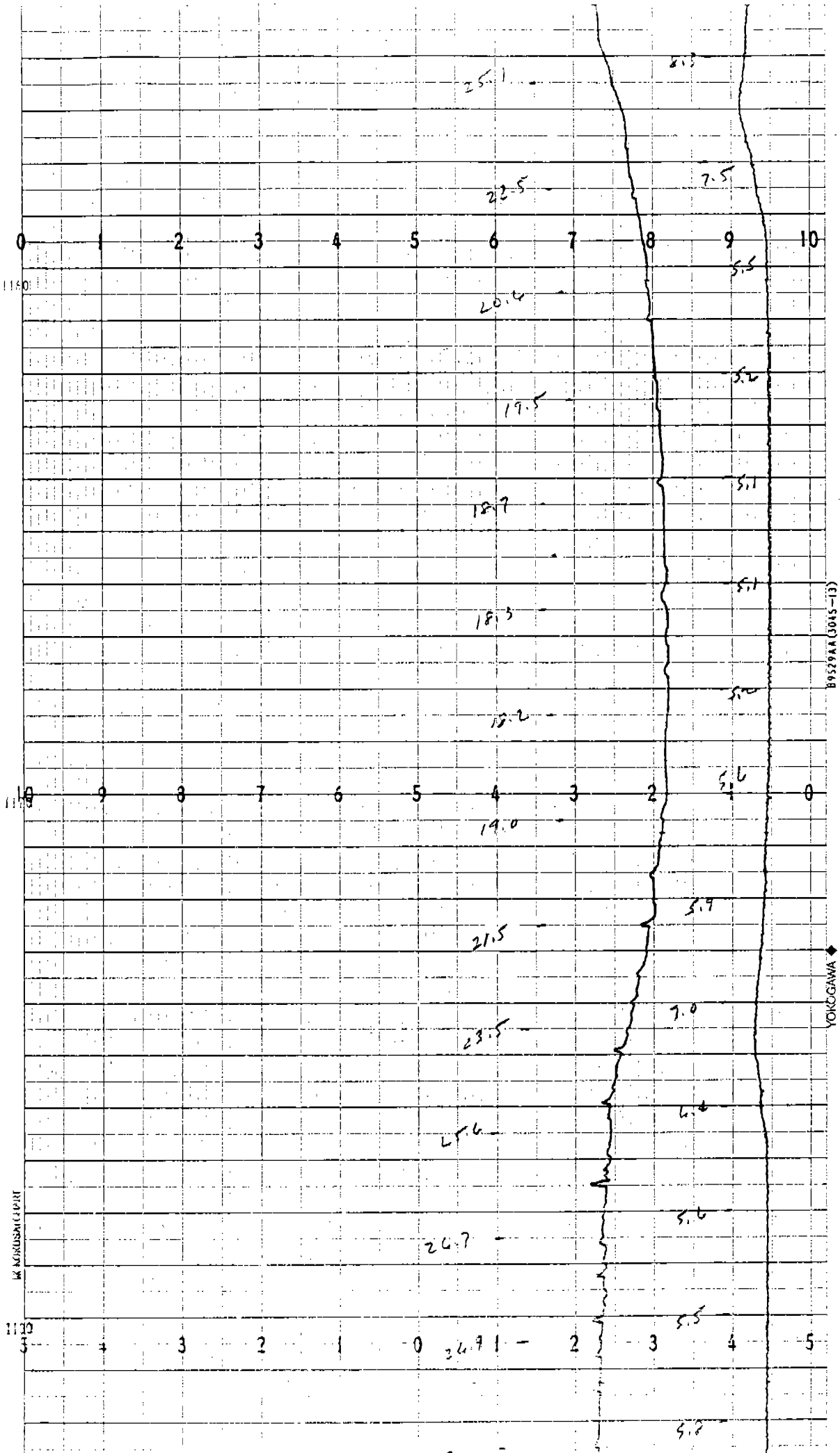
NB4 SOUTH DRYER STACK

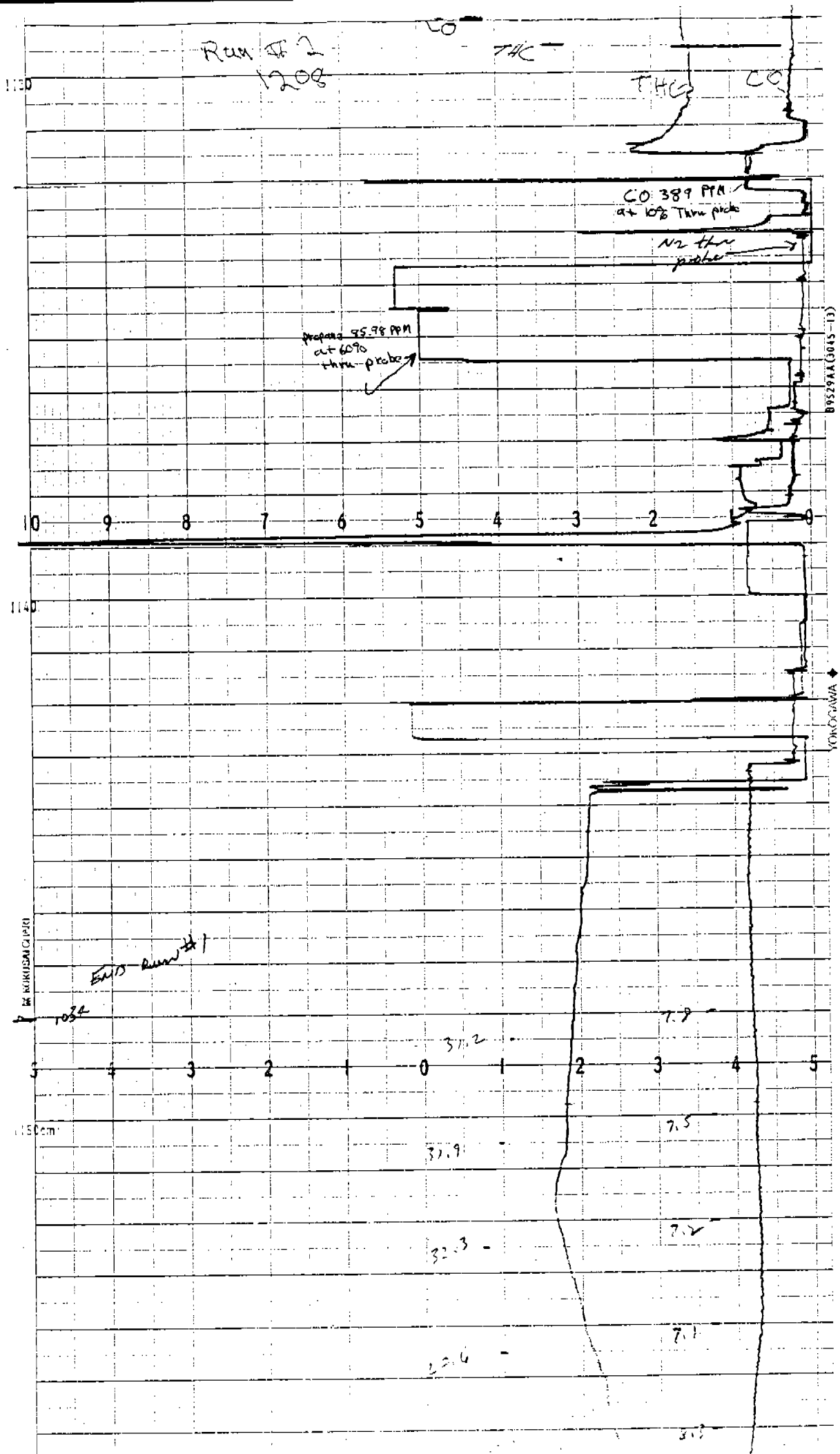

Propane 85.98 PPM
Cal
Thru analyzer 85.98 PPM
at 60%
N2 thru
p-line
85.98 PPM
at 40%
Thru analyzer
Zero
gas
N2
thru analyzer
0
1
2
3
4
5
6
7
8
9
10
Coors NB4 Dryer South
2/14/91 GVD-111
60cm/hr
THC Scale 0-100
CO Scale 0-500

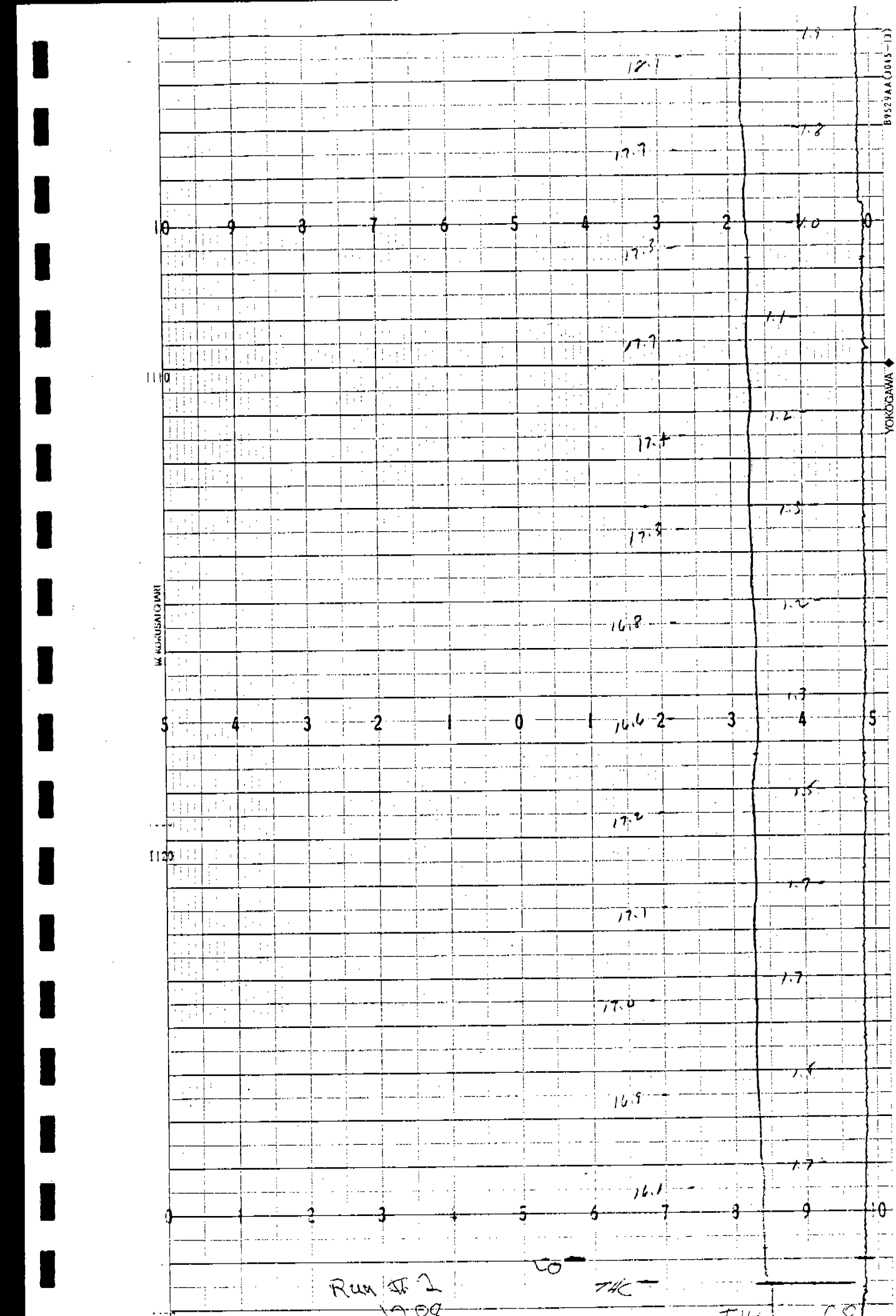

CO
THC
21.6
20.9
20.4
20.7
6.0
6.0
6.9
7.0
YOKOGAWA
0904
Start Run #1
2/14/91
CO
THC
CO 389 PPM at 40% Thru probe
389 @ 1040 thru probe
Cal thru analyzer CO 389 PPM
CO 389 PPM thru analyzer at 40%
Zero gas N2 thru analyzer & probe
N2 Zero
Thru probe 95.98 PPM at 60%
Calibrate thru probe Propane 95.98 PPM
Cal Thru analyzer 95.98 PPM at 60%
N2 thru probe
95.98 PPM at 40% Thru analyzer
Zero gas N2 thru analyzer

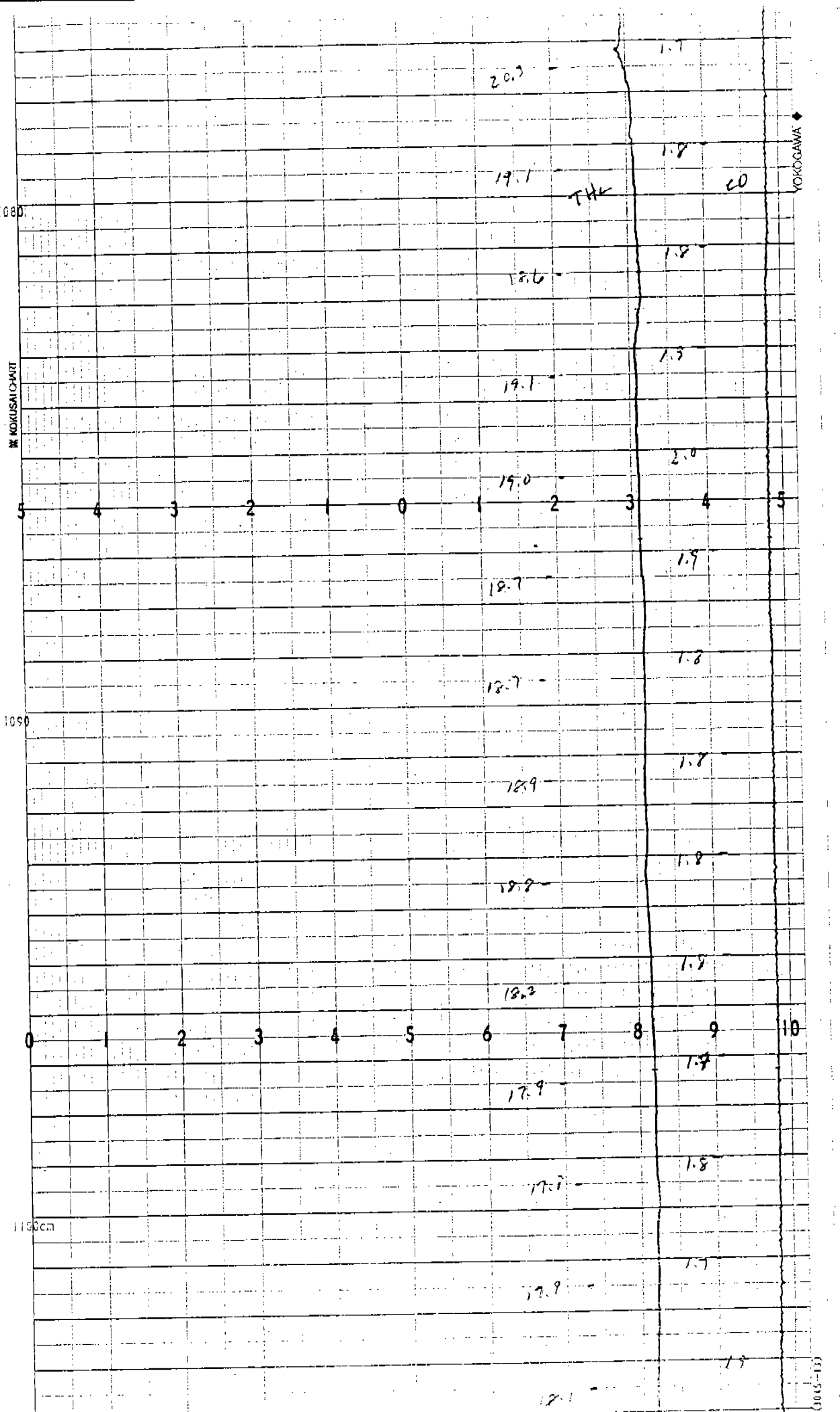

27.0
27.1
24.4
26.4
26.4
25.7
25.9
25.9
23.9
23.0
22.1
21.6
THC
20.9
20.4
6.0
6.0
6.0
6.3
6.4
6.4
6.2
6.1
5.9
6.0
6.0
6.0
5.4
CO
5 4 3 2 1 0 1 2 3 4 5
0 1 2 3 4 5 6 7 8 9 10
0 9 8 7 6 5 4 3 2 1 0
1230
1230

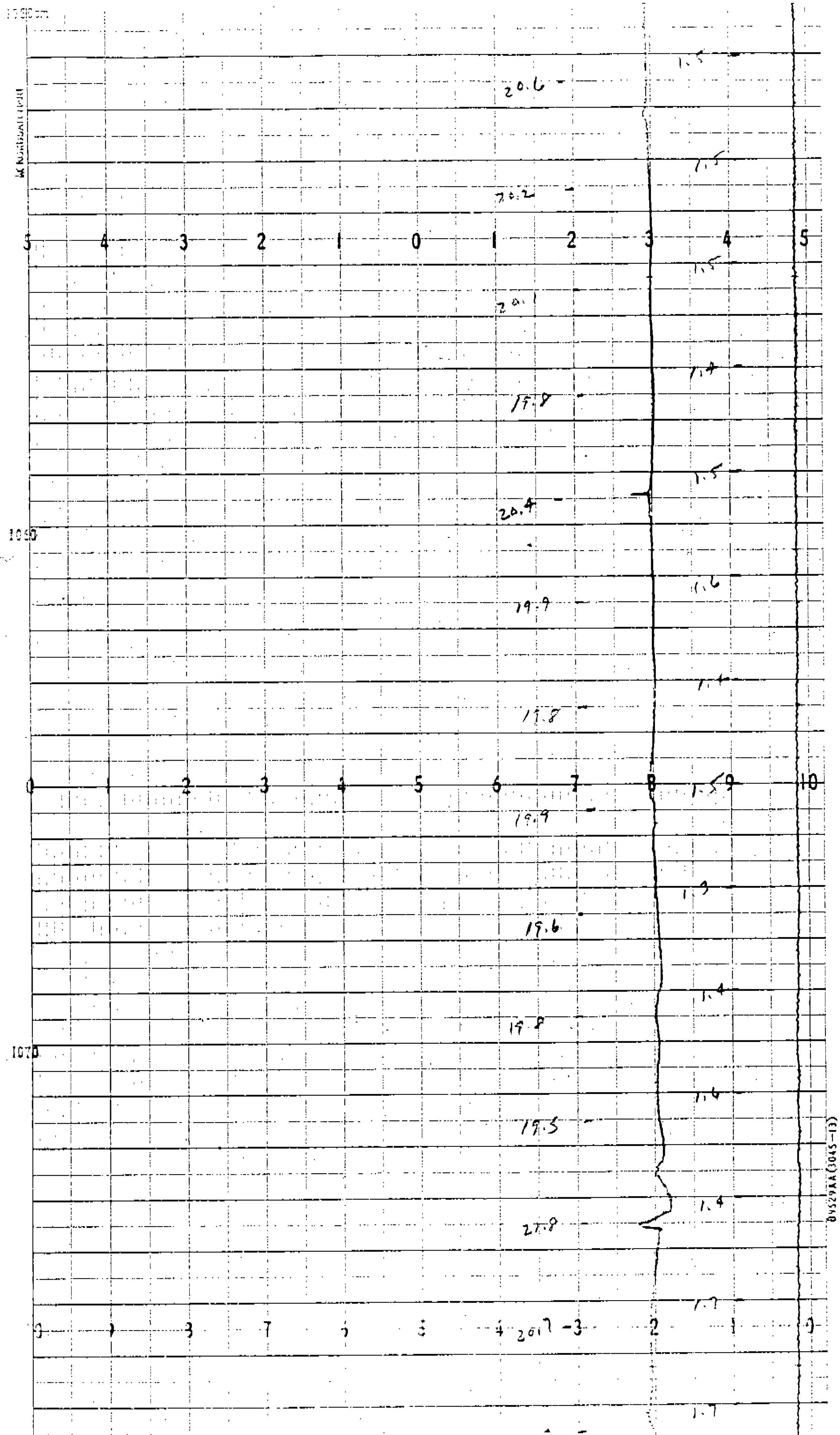

1190
0 1 2 3 4 5 6 7 8 9 10
1200cm
10 9 8 7 6 5 4 3 2 1 0
27.1
27.1
27.9
27.5
26.5
26.7
26.7
26.8
26.8
26.6
26.8
27.5
27.0
5.6
5.8
5.7
5.7
5.8
5.9
5.9
5.8
5.8
5.8
5.9
6.0
6.0
6.0
B9529AA(0045-13)
YOKOGAWA


25.1
22.5
0 1 2 3 4 5 6 7 8 9 10
20.4
19.5
18.7
18.3
19.2
10 9 8 7 6 5 4 3 2 1 0
14.0
21.5
23.5
24.6
24.7
3 2 1 0 1 2 3 4 5
B9529AA (3045-13)
YOKOGAWA

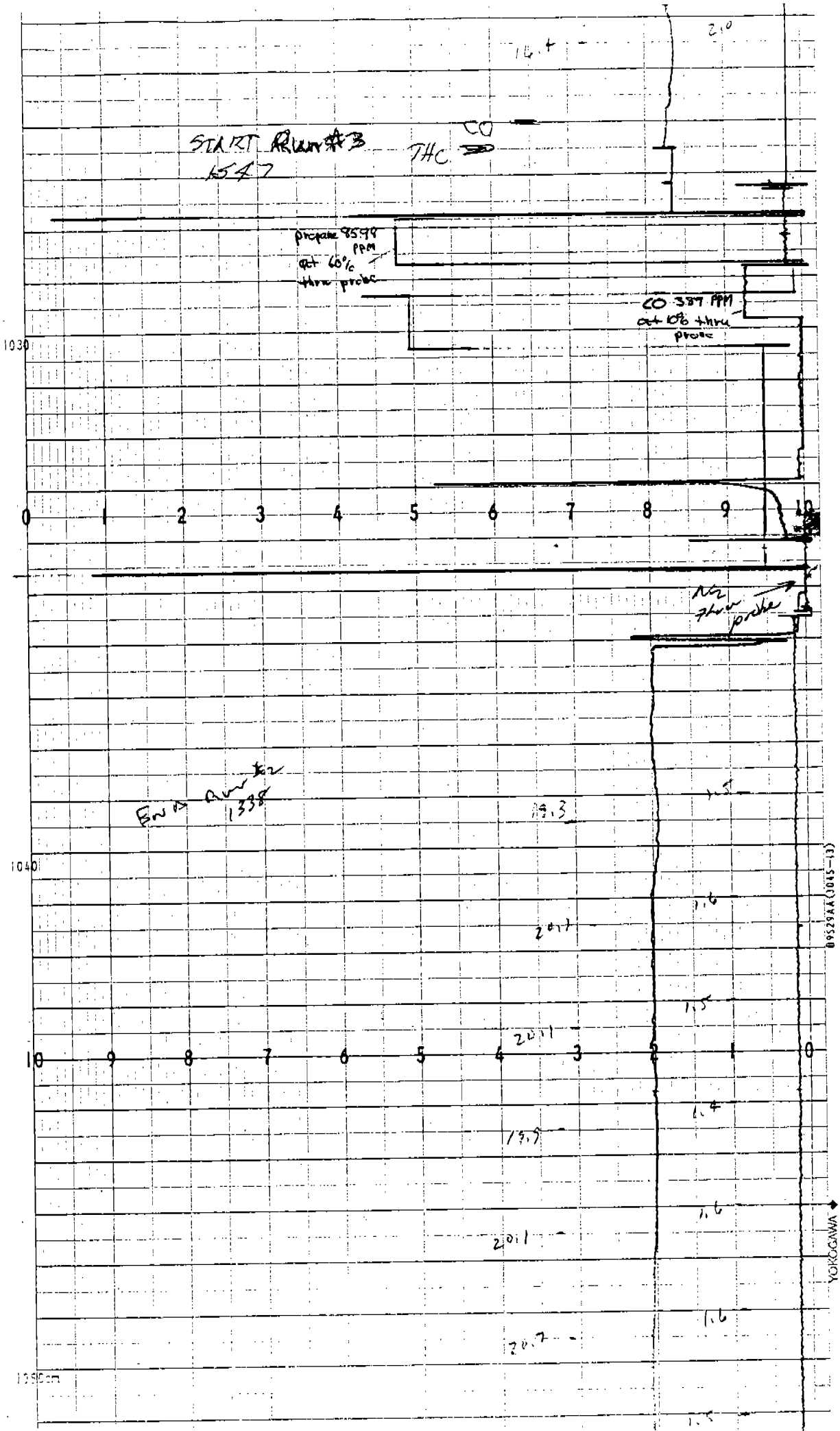

Run # 2
1208
CO
THC
THC
CO
CO 389 PPM
at 10% Thru probe
N2 thru probe
Propane 95.98 PPM
at 60% thru probe
10 9 8 7 6 5 4 3 2 0
1140
B9529AA (3045-13)
YOKOGAWA
End Run #1
7.9
37.2
5 4 3 2 1 0 1 2 3 4 5
7.5
37.9
7.2
32.3
7.1
2:6
3:1

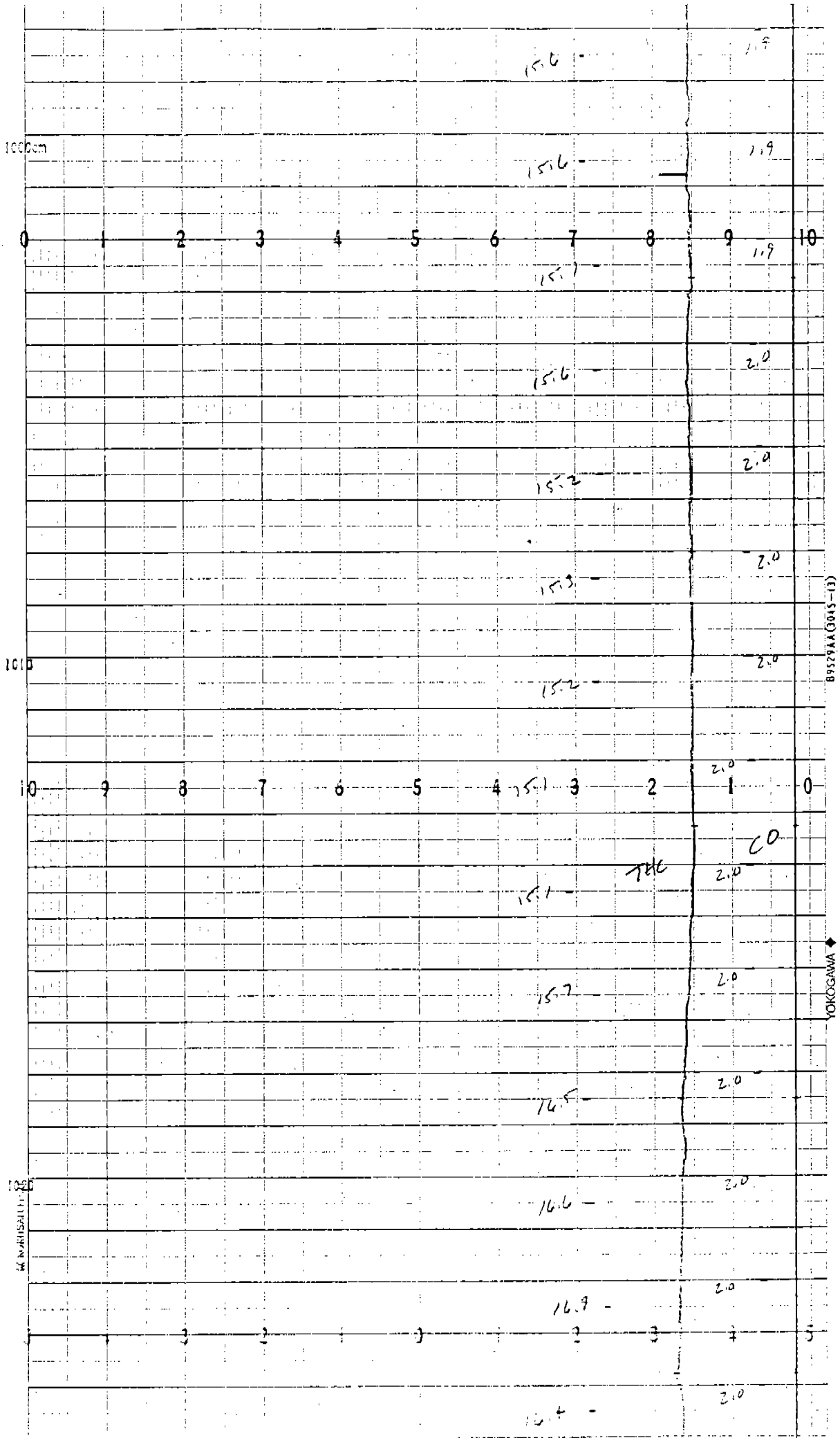

YOKOGAWA
RUN Run 2

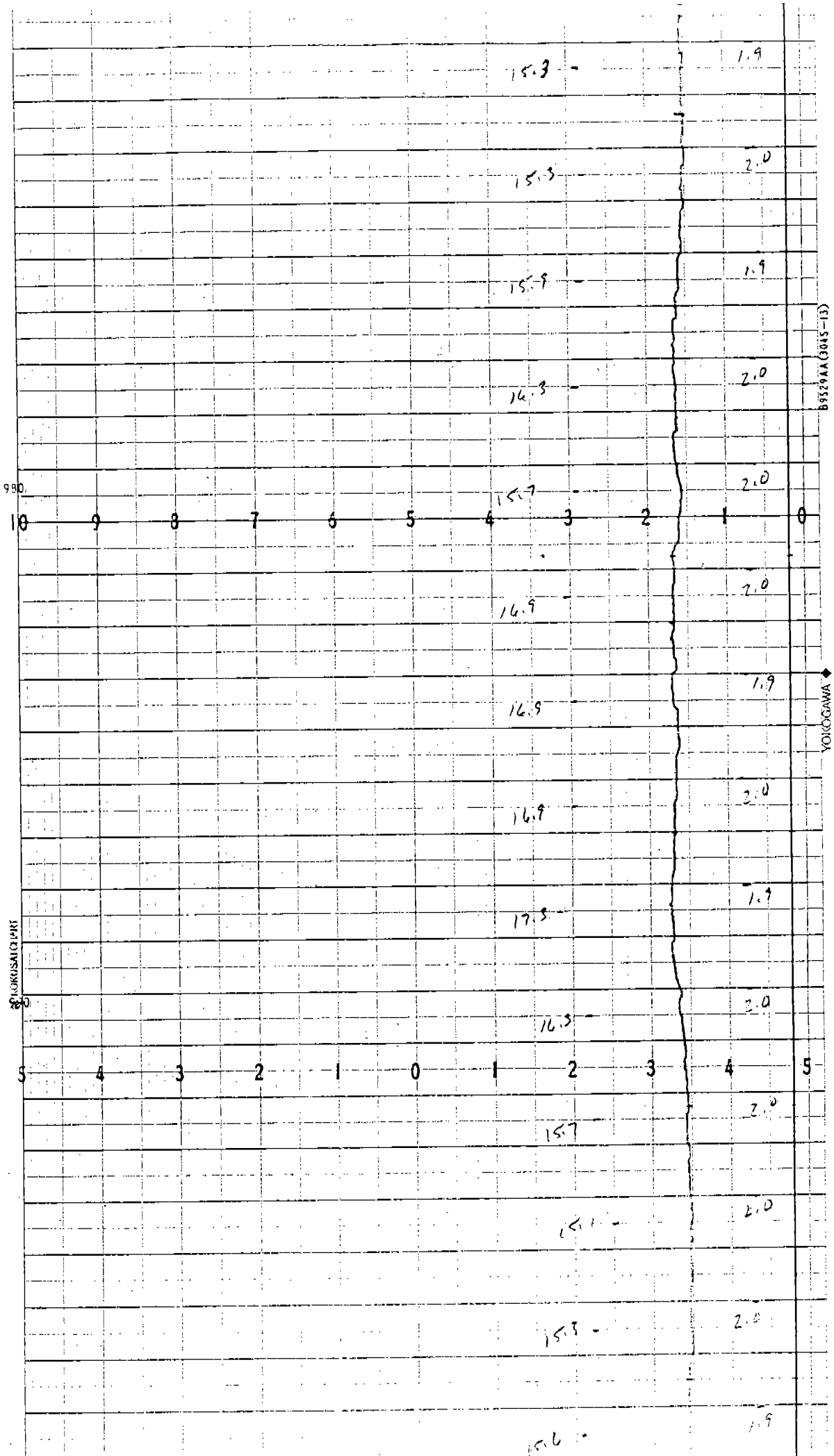

YOKOGAWA
KOKUSAI CHART
1080
1090
1100cm
THK
CO
20.3
19.1
18.6
19.1
19.0
18.7
18.7
18.9
18.9
18.2
17.9
17.9
17.9
1.7
1.8
1.8
1.7
2.0
1.9
1.8
1.8
1.8
1.8
1.7
1.8
1.7
1.9
5 4 3 2 1 0 1 2 3 4 5
0 1 2 3 4 5 6 7 8 9 10

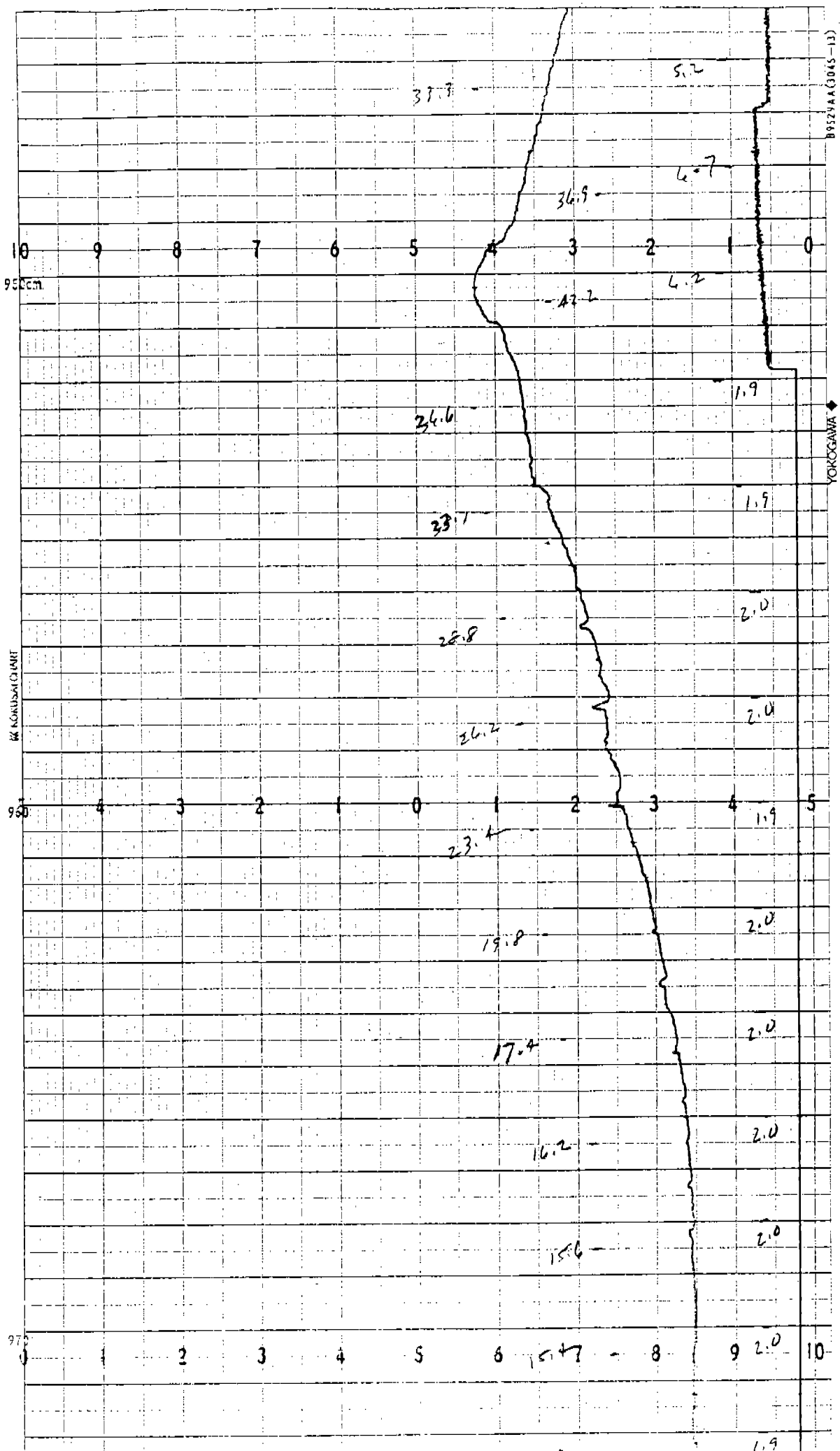


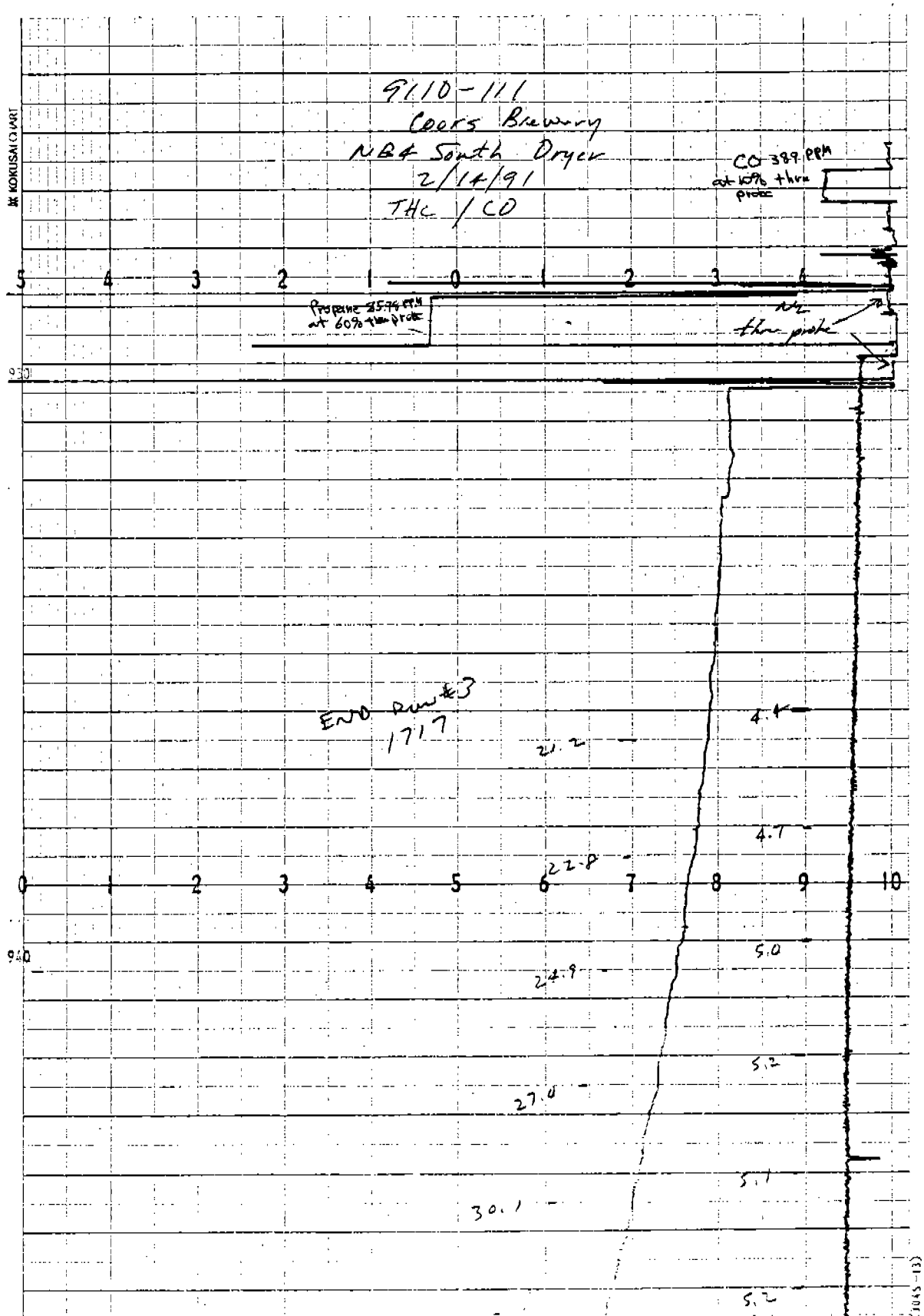
20.6
1.5
20.2
5 4 3 2 1 0 1 2 3 4 5
1.5
1.4
19.8
1.5
20.4
1060
1.6
19.9
19.8
0 1 2 3 4 5 6 7 8 9 10
19.9
19.6
1.4
19.8
1070
1.6
19.5
1.4
27.8
1.7
2017
1.7
04529AA(3045-13)


START RUN #3
1547
THC
CO
propane 9598 PPM
at 60% thru probe
CO 387 PPM
at 10% thru probe
1030
0 1 2 3 4 5 6 7 8 9 10
N2 thru probe
END RUN
1338
1040
10 9 8 7 6 5 4 3 2 1 0
YOKOGAWA
09529AA (0045-13)

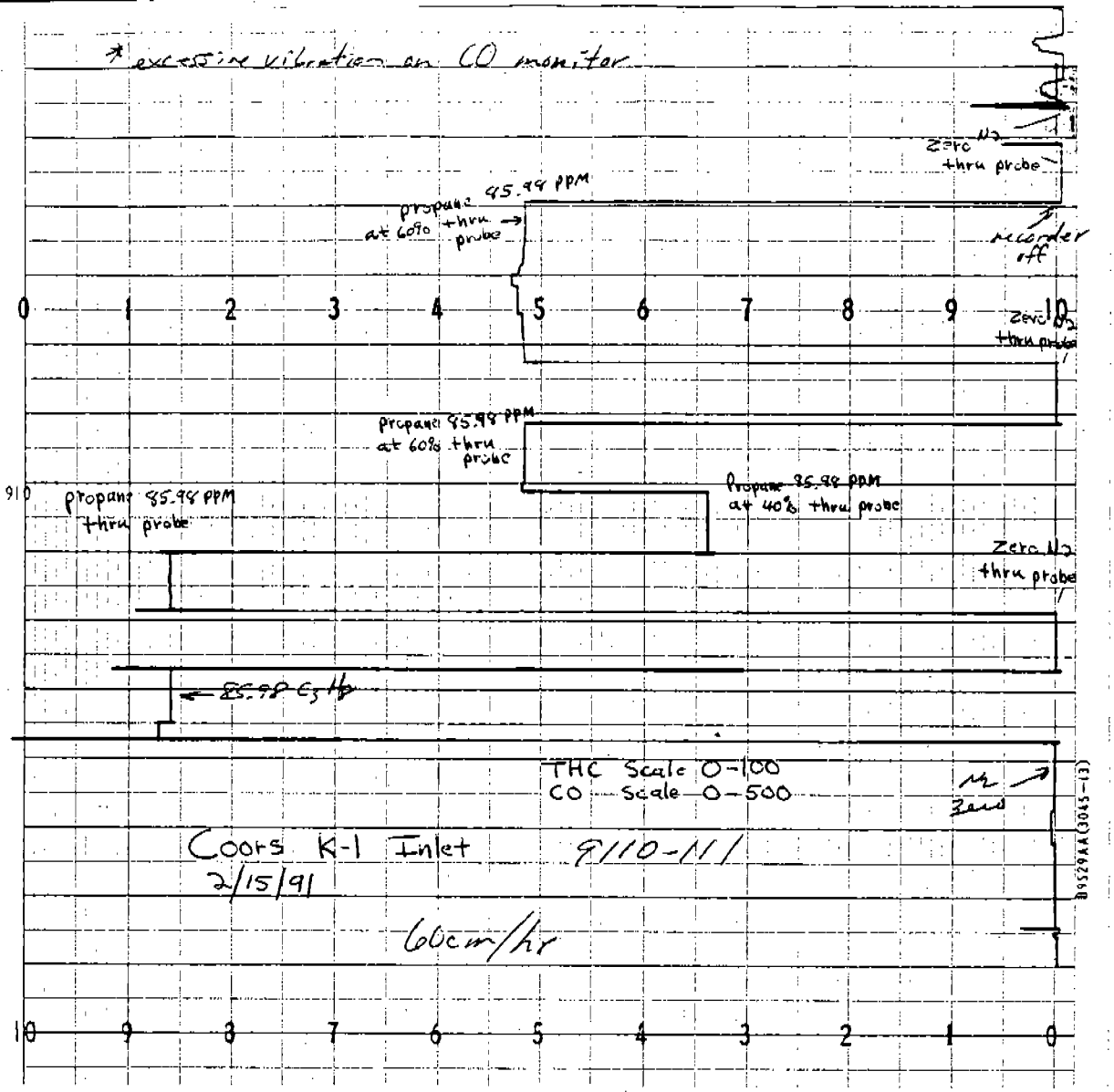

1000cm
0 1 2 3 4 5 6 7 8 9 10
1010
10 9 8 7 6 5 4 3 2 1 0
CO
THC
YOKOGAWA
B9529AA(3045-13)

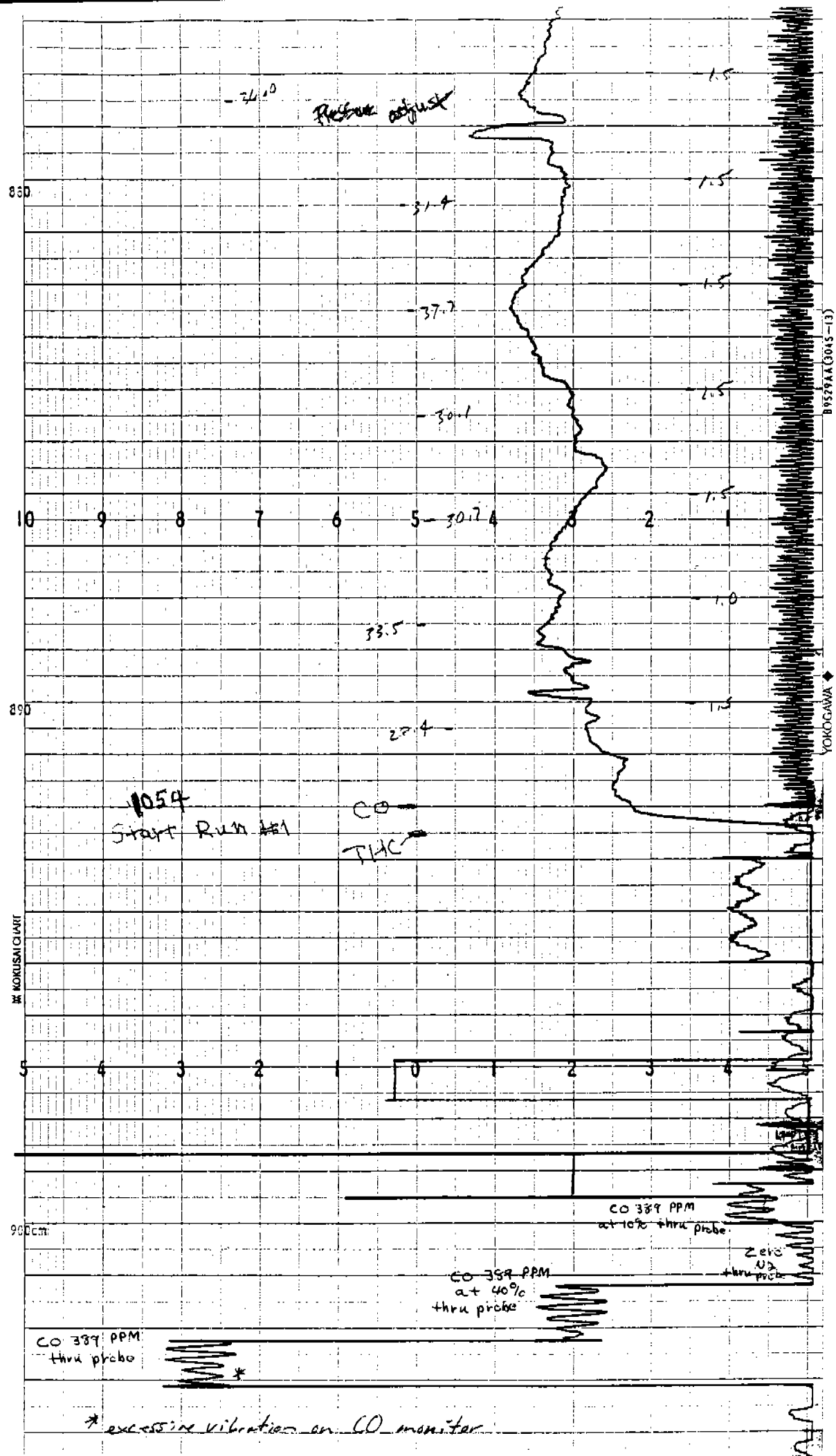

B9529AA (3045-13)
YOKOGAWA
990
10 9 8 7 6 5 4 3 2 1 0
5 4 3 2 1 0 1 2 3 4 5

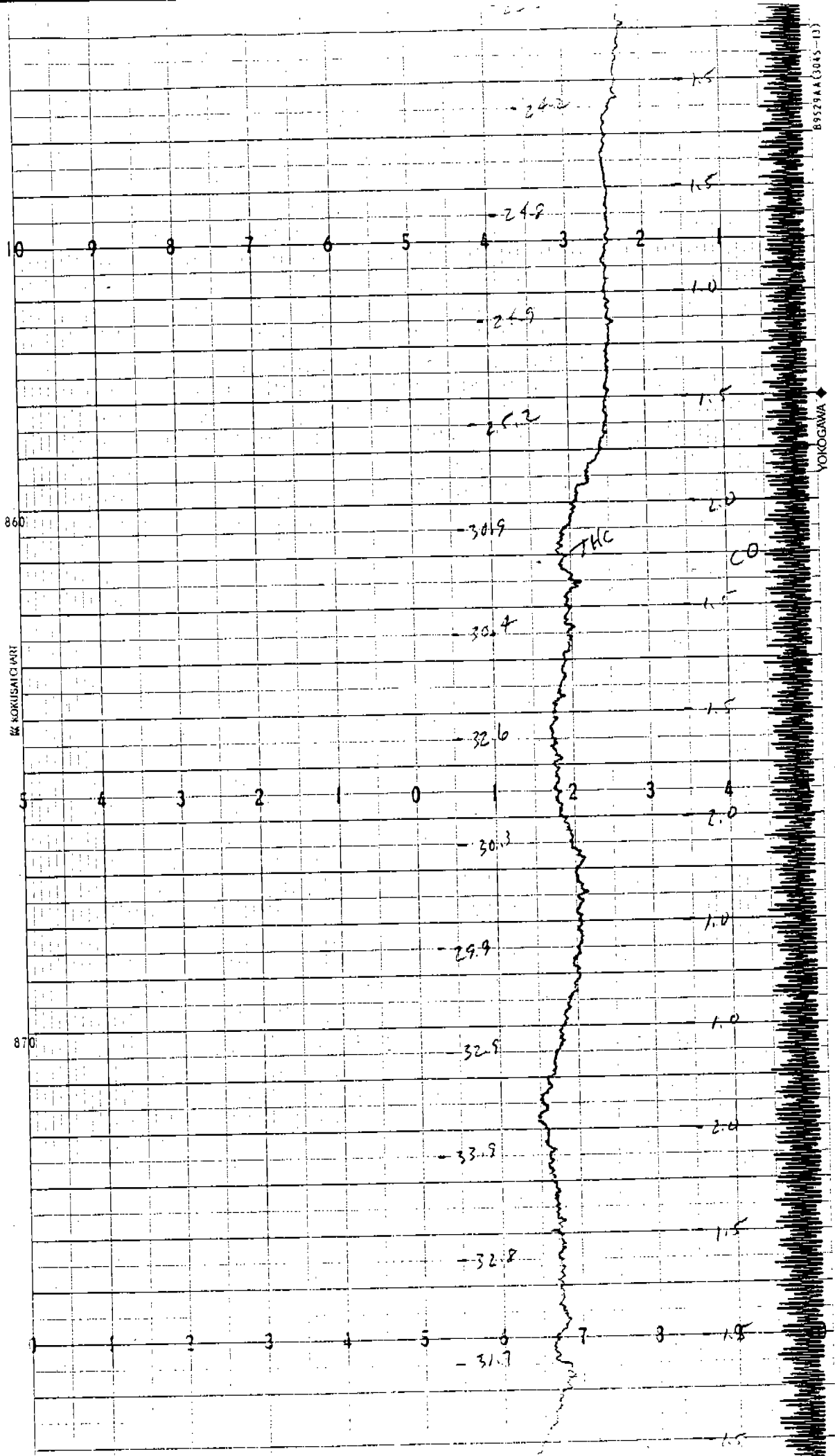

B9529AA(3045-13)
YOKOGAWA
KOKUSAI CHART
950cm
37.7
36.9
34.6
33.1
28.8
26.2
23.4
19.8
17.4
16.2
15.6
15.7
5.2
4.7
4.2
4.2
1.9
1.9
2.0
2.0
1.9
2.0
2.0
2.0
2.0
2.0
1.9
10 9 8 7 6 5 4 3 2 1 0
4 3 2 1 0 1 2 3 4 5
0 1 2 3 4 5 6 7 8 9 10

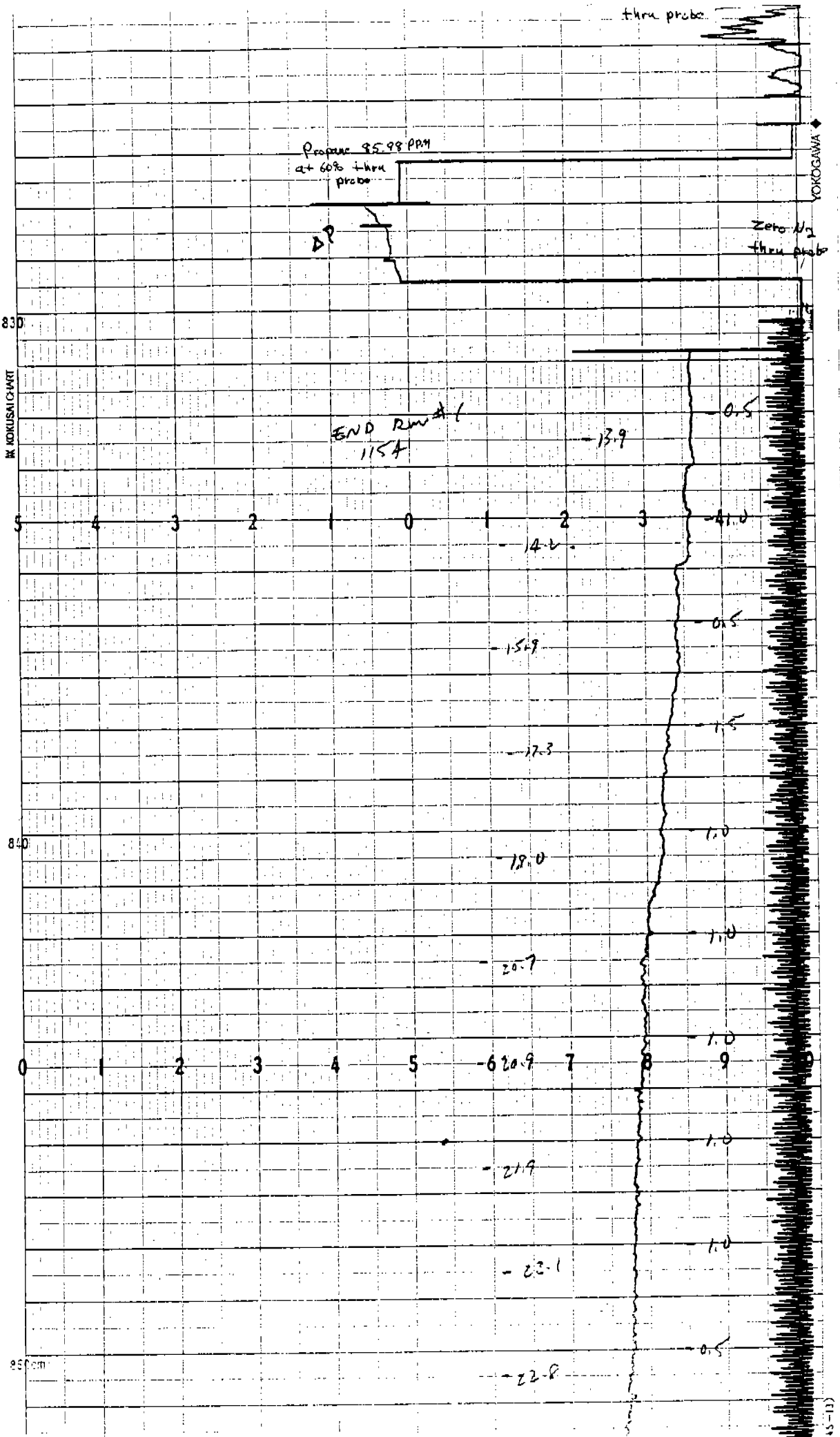

9110-111
Coors Brewery
NBA South Dryer
2/14/91
THC / CO
KOKUSAI CHART
CO 389 PPM
at 60% thru probe
Propane 35.74 PPM
at 60% thru probe
thru probe
END Run #3
1717
21.2
22.8
24.9
27.0
30.1
4.1
4.7
5.0
5.2
5.1
5.2
9:30
9:40

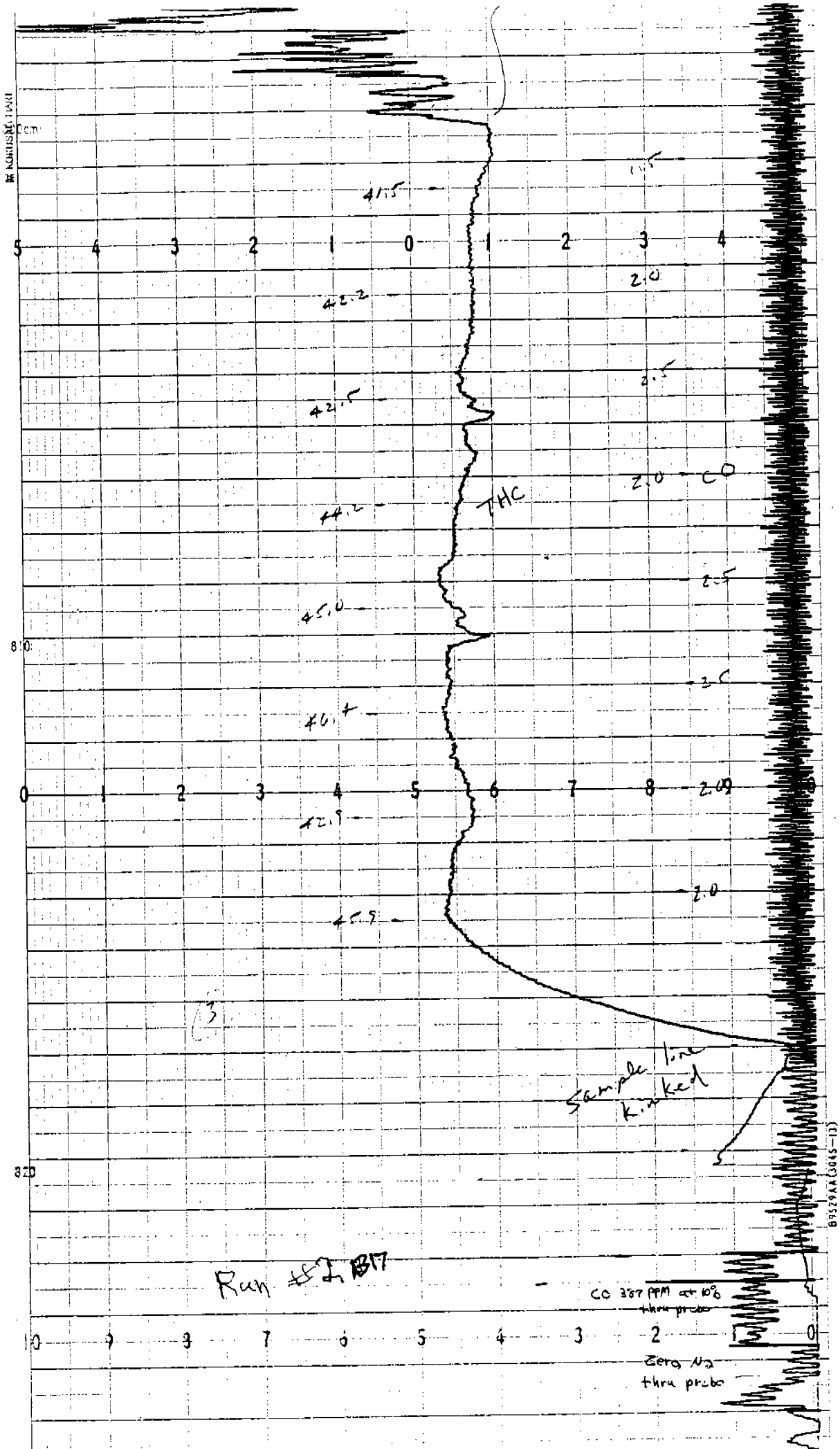
K-1 DRYER INLET

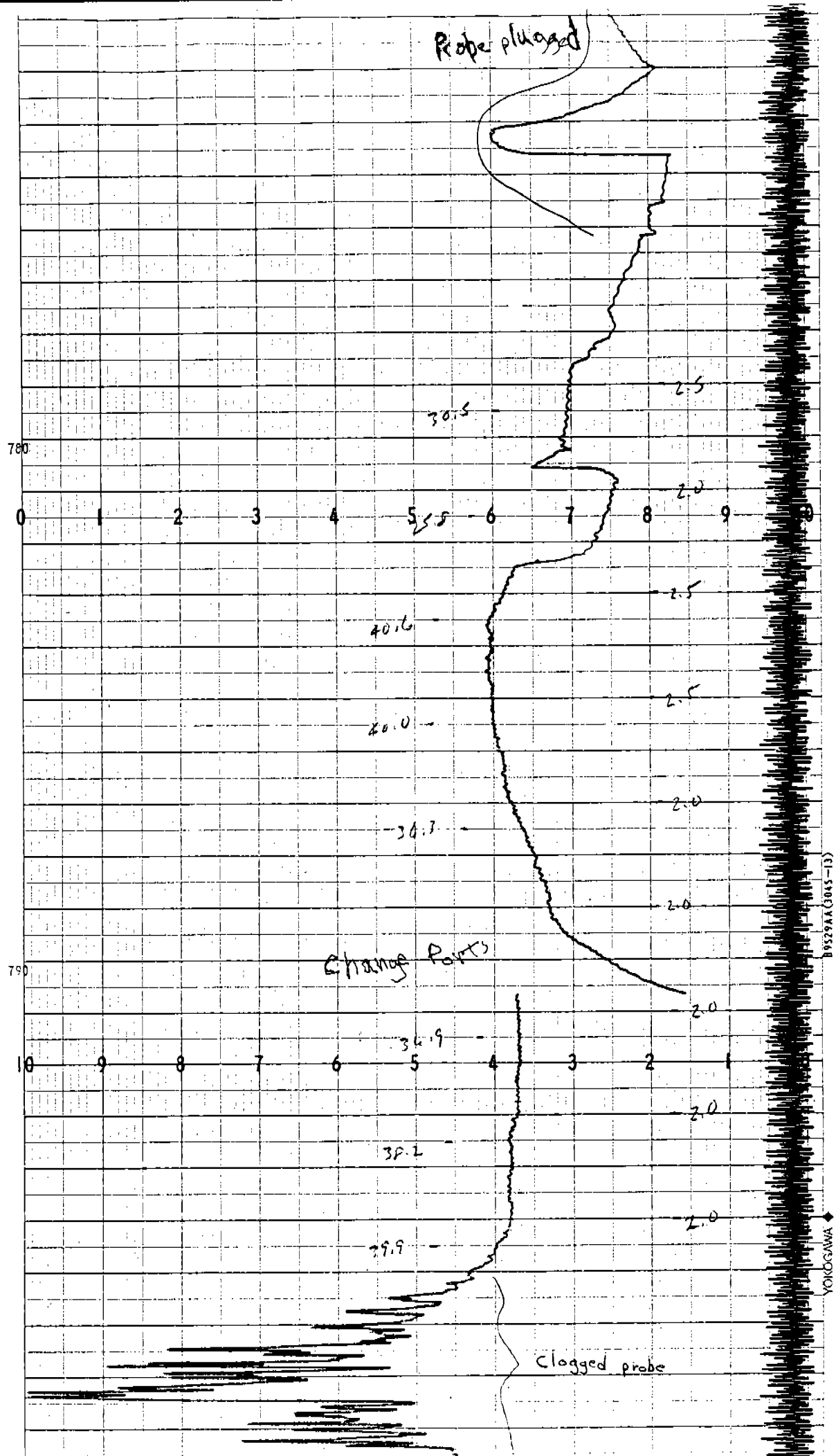

* excessive vibration on CO monitor
Zero N2 thru probe
propane 95.98 PPM at 60% thru probe
recorder off
0 1 2 3 4 5 6 7 8 9 10
Zero N2 thru probe
Propane 95.98 PPM at 60% thru probe
910
Propane 95.98 PPM thru probe
Propane 95.98 PPM at 40% thru probe
Zero N2 thru probe
95.98 C3H8
THC Scale 0-100
CO Scale 0-500
Zero
Coors K-1 Inlet
2/15/91
9/10-11/
60cm/hr
10 9 8 7 6 5 4 3 2 1 0
B9529AA(3045-13)

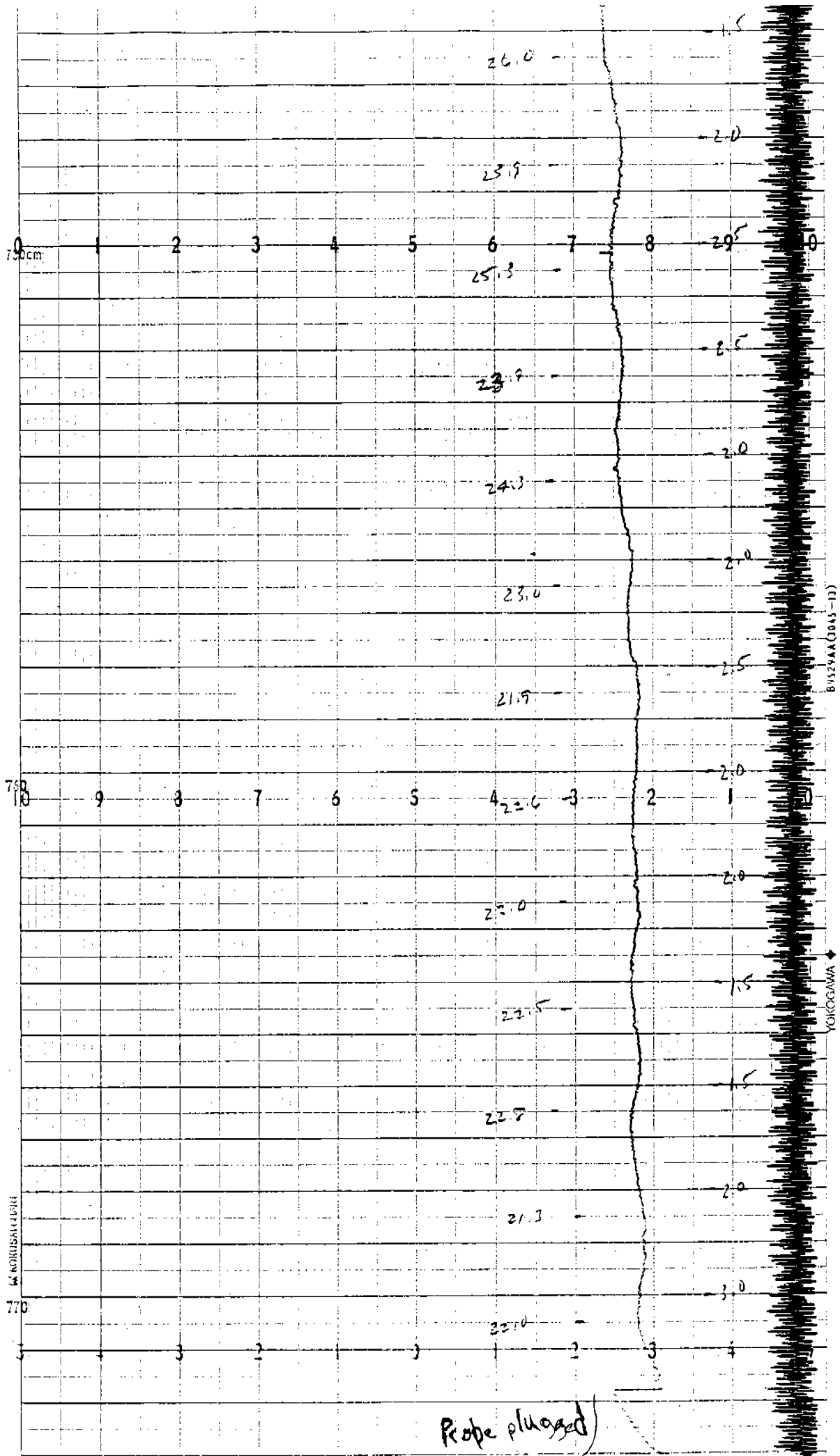

Pressure adjust
-24.0
-31.4
-37.7
-30.1
-30.7
-33.5
-27.4
1.5
1.5
1.5
1.5
1.0
1.5
850
890
10 9 8 7 6 5 4 3 2 1
5 4 3 2 1 0 1 2 3 4
1054
start Run #1
CO
THC
CO 389 PPM
at 10% thru probe
Zero
O2
thru probe
CO 389 PPM
at 40%
thru probe
CO 389 PPM
thru probe
* excessive vibration on CO monitor
B9529AA(3045-13)
YOKOGAWA
M KOKUSAI CLART

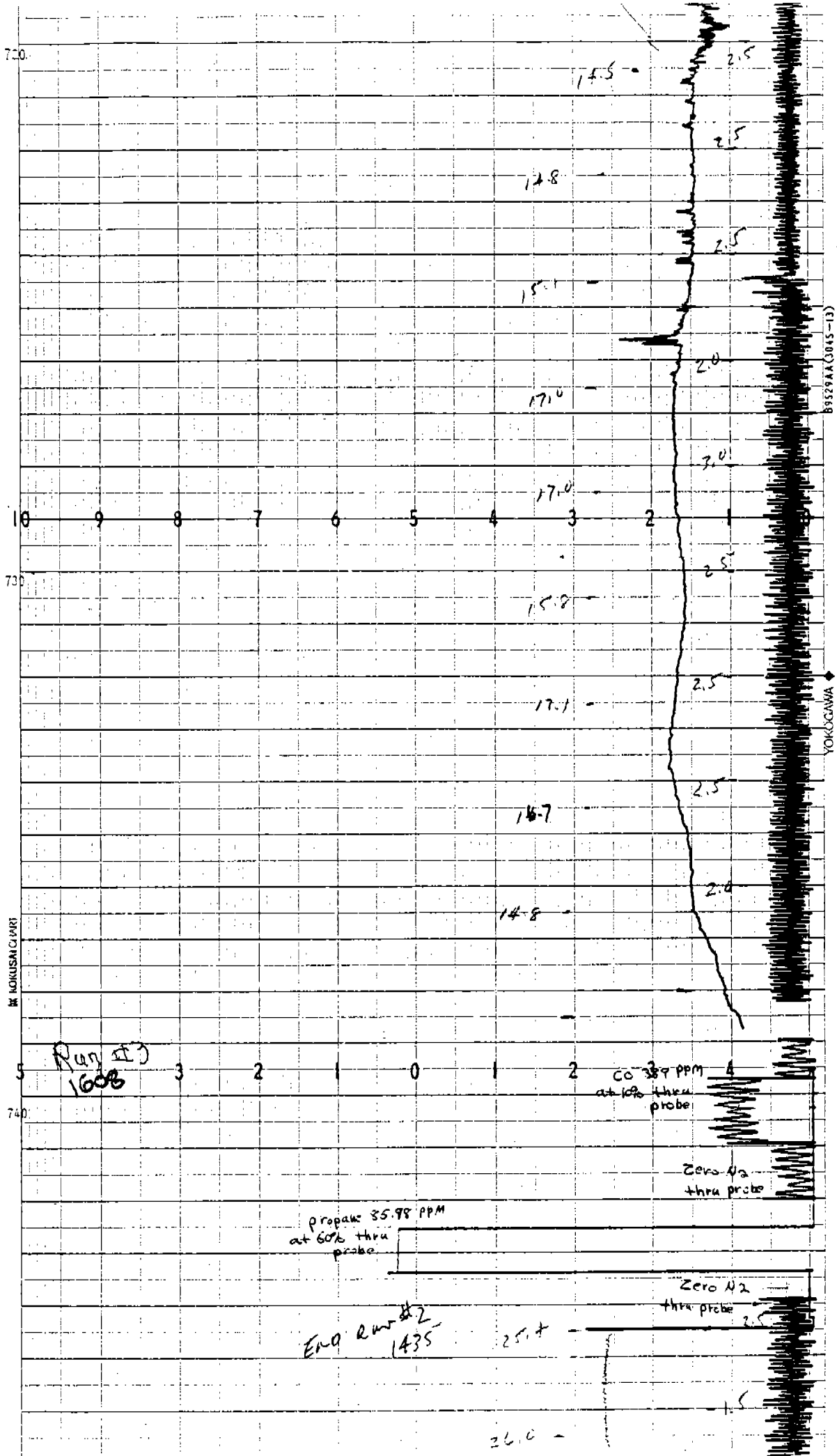

B9529AA(3045-13)
YOKOGAWA
KOKUSAI CHART
THC
CO
10 9 8 7 6 5 4 3 2 1
860
5 4 3 2 1 0 1 2 3 4
870
1 2 3 4 5 6 7 8 9
-24.2
-24.8
-24.9
-24.2
-30.9
-30.4
-32.6
-30.3
-29.9
-32.5
-33.9
-32.8
-31.7
1.5
1.5
1.0
1.5
2.0
1.5
1.5
2.0
1.0
1.0
2.0
1.5
1.5

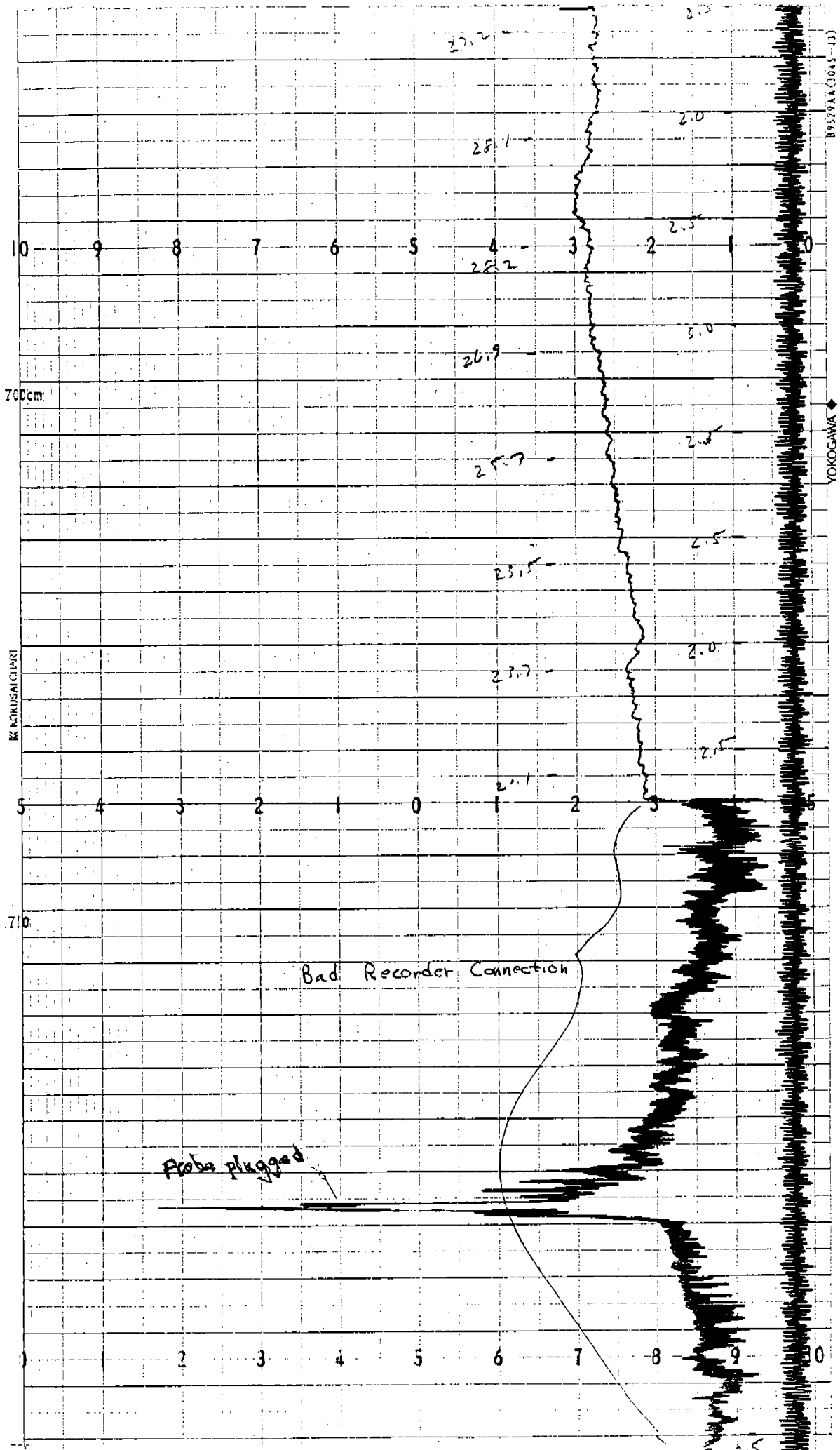

thru probe
Propane 95.98 PPM
at 60% thru
probe
DP
Zero N2
thru probe
YOKOGAWA
KOKUSAI CHART
END Run #1
1154
830
840
850cm
-13.9
-14.2
-15.9
-17.3
-18.0
-20.7
-20.9
-21.9
-23.1
-22.8
0.5
0.5
1.5
1.0
1.0
1.0
1.0
0.5

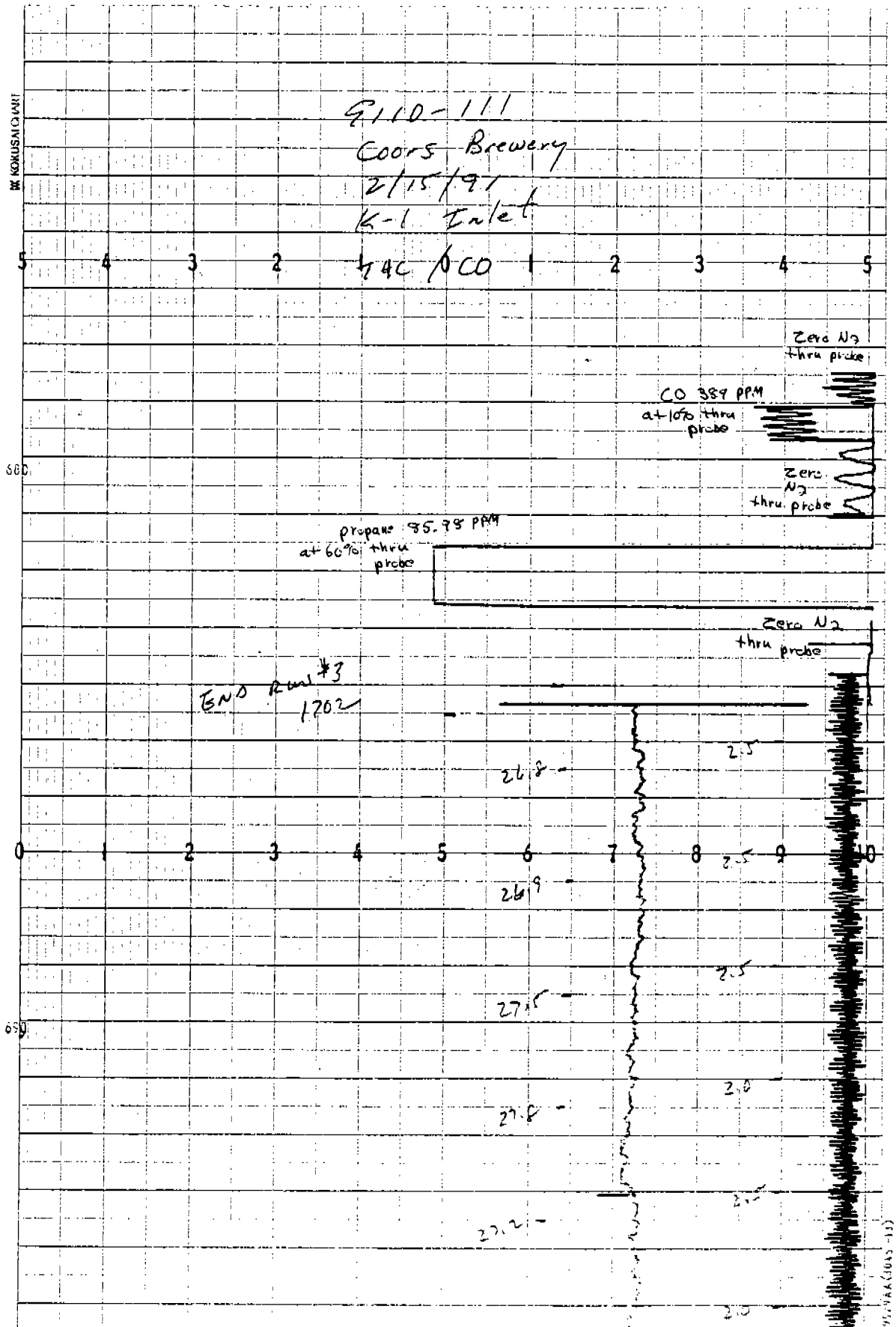

415
42.2
42.5
44.2
45.0
46.4
42.9
45.9
THC
2.0 - CO
Sample line kinked
Run #2, B17
CO 387 PPM at 10% thru probe
Zero N2 thru probe


Probe plugged
780
0 1 2 3 4 5 5.5 6 7 8 9 10
30.5
40.6
40.0
34.1
790
Change Point
10 9 8 7 6 5 4 3 2 1
34.9
32.2
29.9
2.5
2.0
2.5
2.5
2.0
2.0
2.0
2.0
2.0
Clogged probe
B9529AK(3045-13)
YOKOGAWA

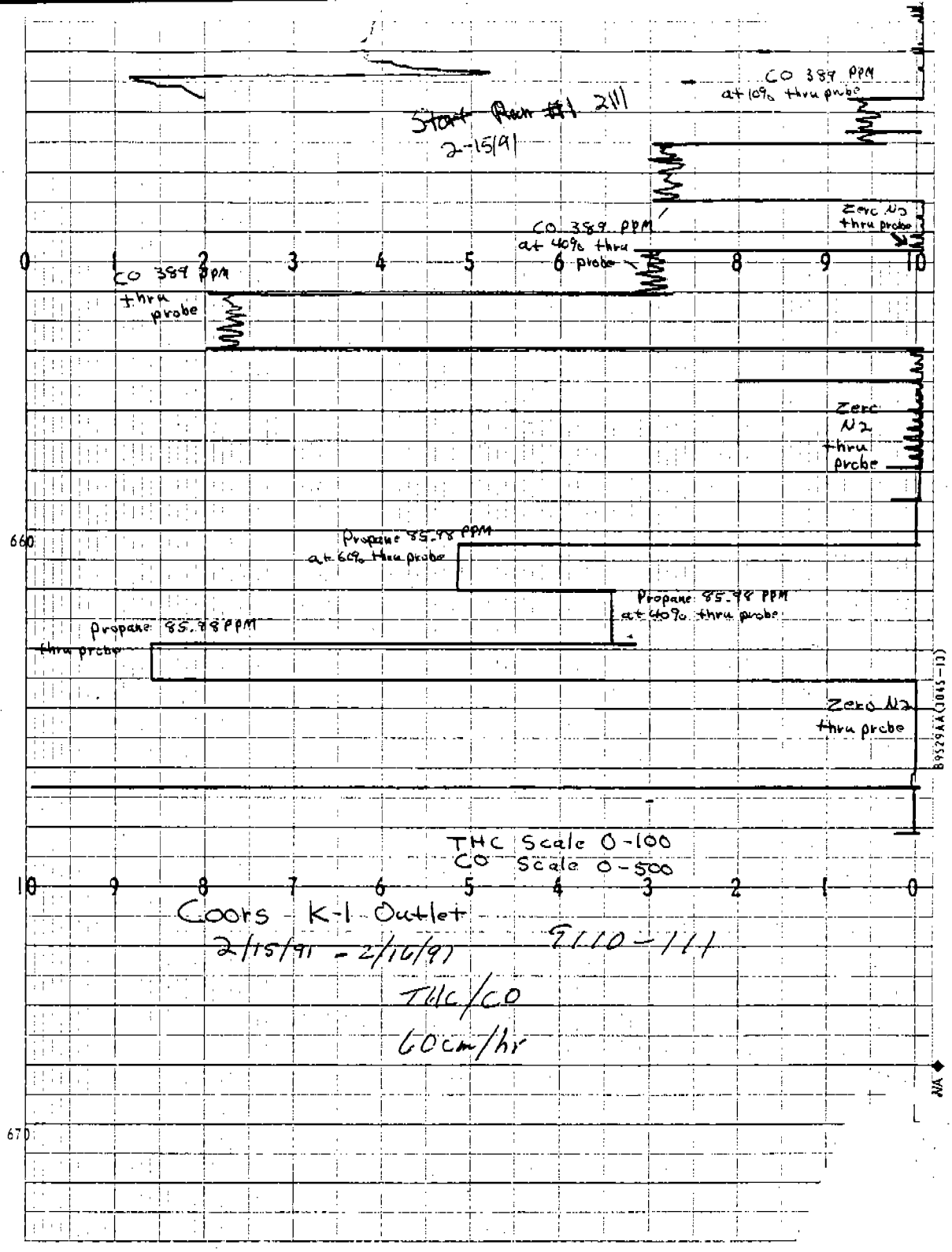

26.0
25.9
25.3
23.9
24.3
23.0
21.9
22.6
22.0
22.5
22.8
21.3
22.0
Probe plugged
YOKOGAWA

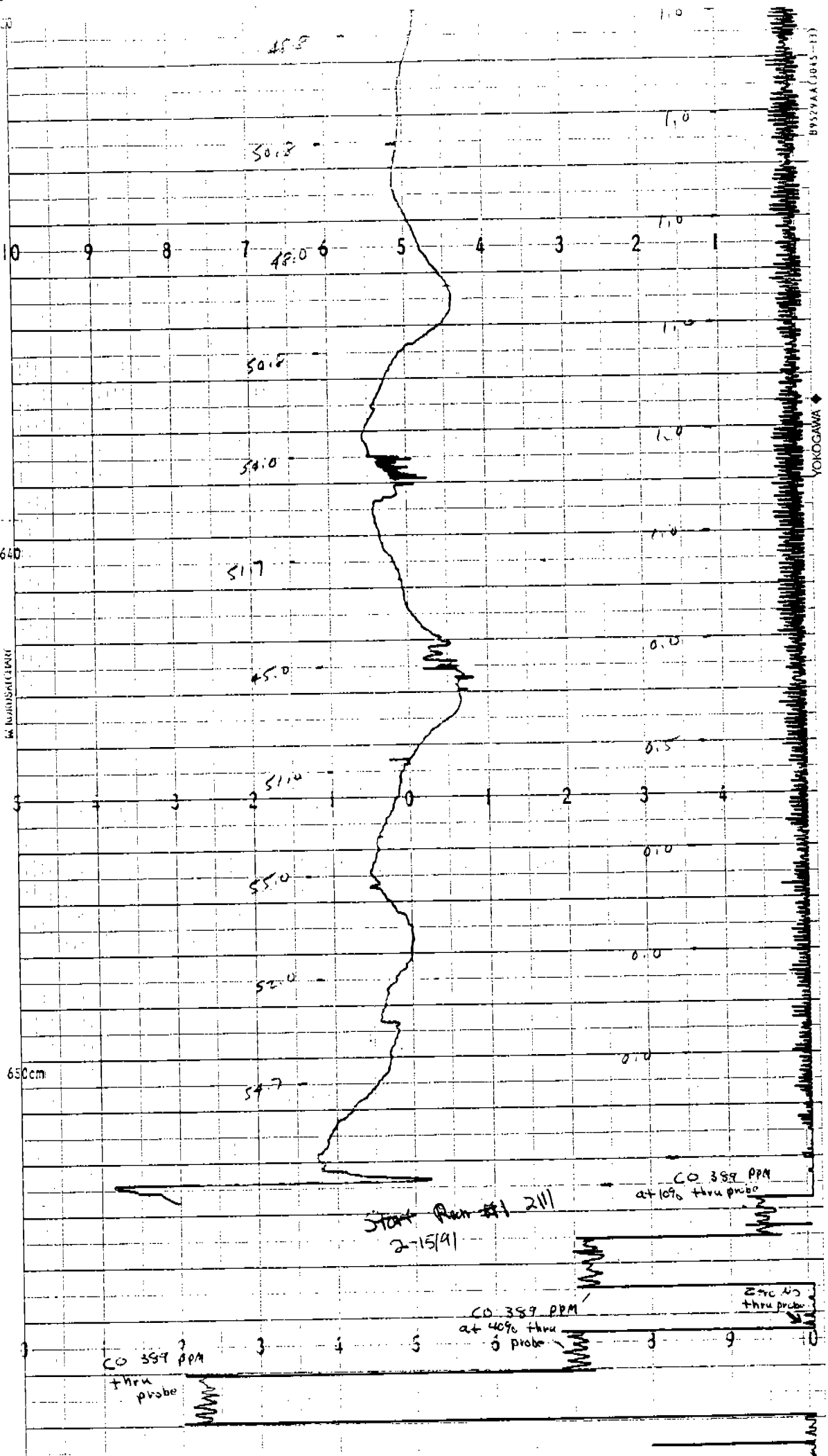

720
730
740
14.5
12.8
15.1
17.0
17.0
15.8
17.1
14.7
14.8
25.4
2.5
2.5
2.5
2.0
2.0
2.5
2.5
2.5
2.0
10 9 8 7 6 5 4 3 2 1 0
5 4 3 2 1 0 1 2 3 4
Run #1
1608
CO 389 ppm
at 10% thru
probe
Zero N2
thru probe
propane 35.98 ppm
at 60% thru
probe
Zero N2
thru probe
End Run #2
1435
KOKUSAI CHART
B9529AA(3045-13)
YOKOGAWA

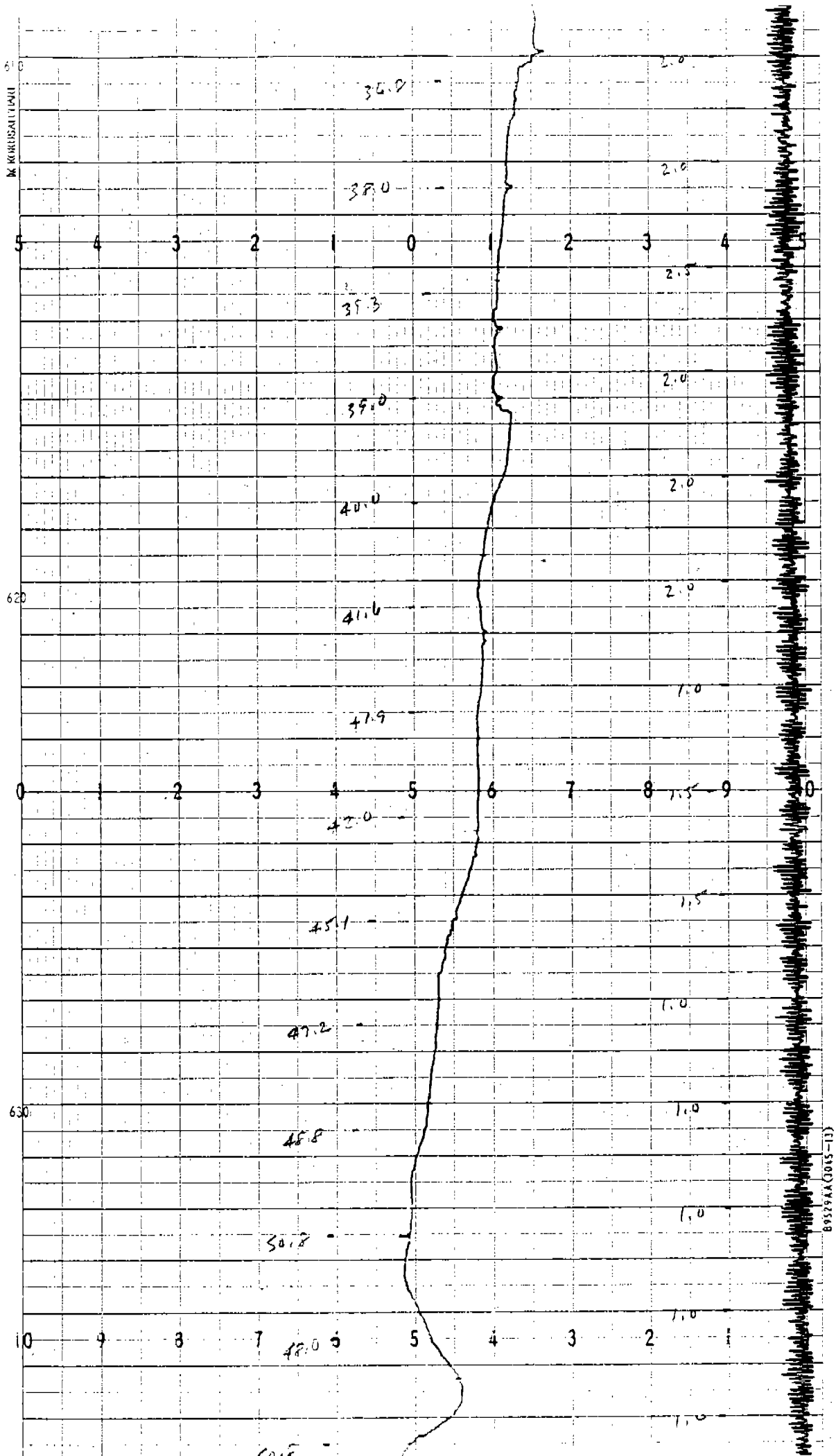

B9579AA (3045-13)
YOKOGAWA
KOKUSAI CHRI
700cm
710
Bad Recorder Connection
Probe plugged

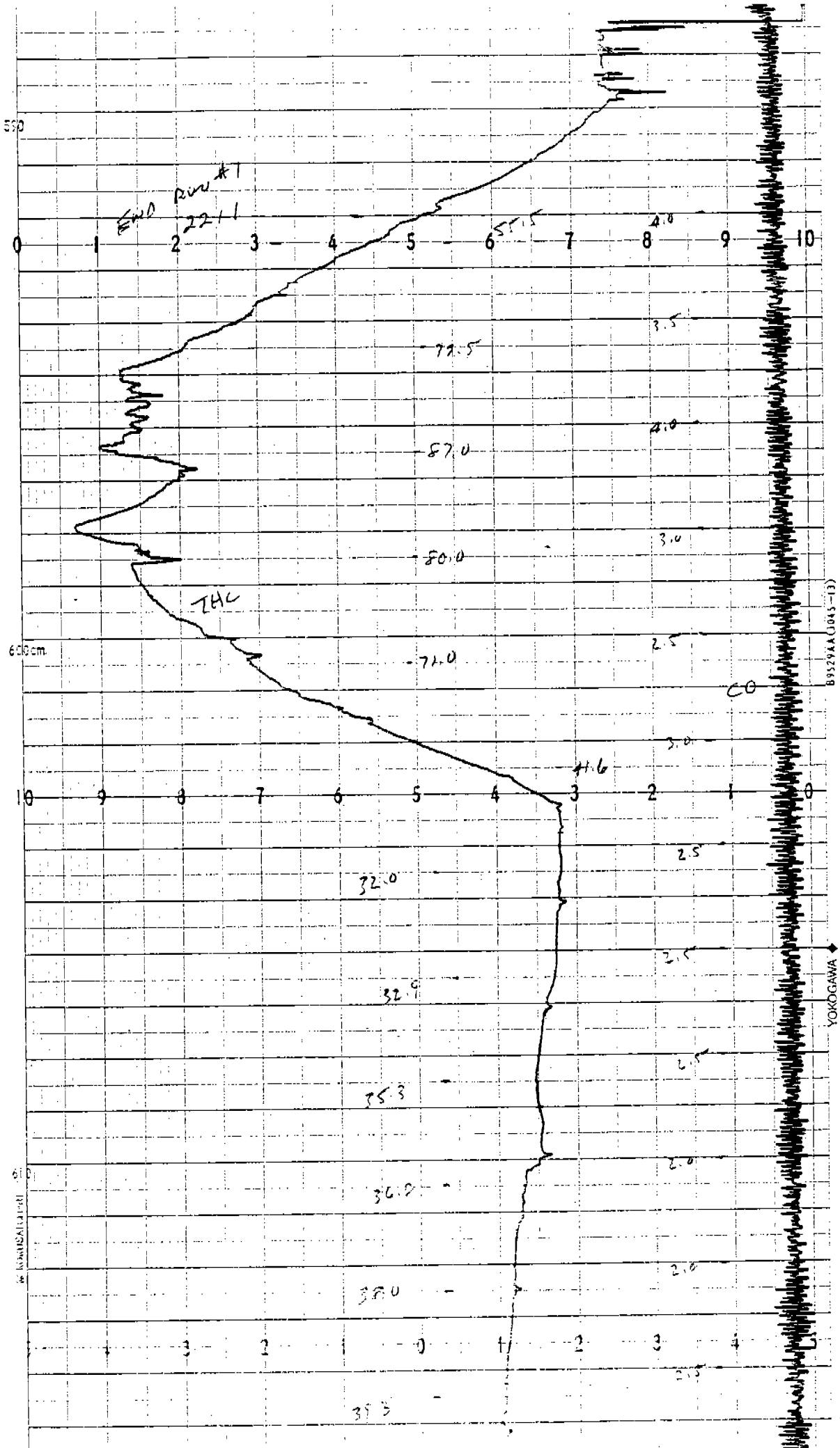

KOKUSAI GIKEN
G110-111
Coors Brewery
2/15/91
K-1 Inlet
%HC %CO
5 4 3 2 1 0 1 2 3 4 5
Zero N2 thru probe
CO 389 PPM at 100 thru probe
Zero N2 thru probe
Propane 85.78 PPM at 60% thru probe
Zero N2 thru probe
END Run #3
1702
2.5
2.5
2.5
2.0
2.0
0 1 2 3 4 5 6 7 8 9 10
660
650

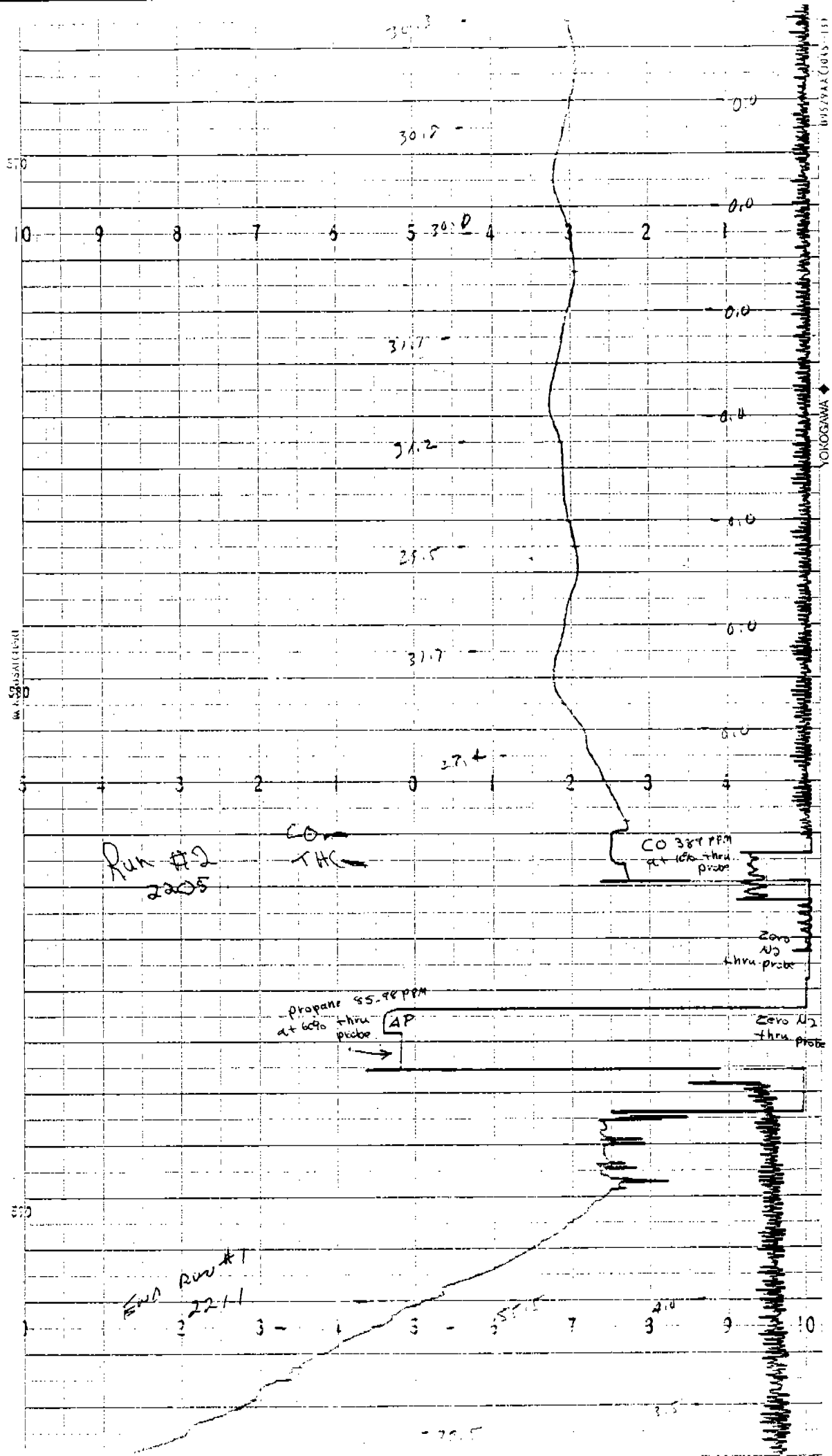
K-1 DRYER OUTLET STACK

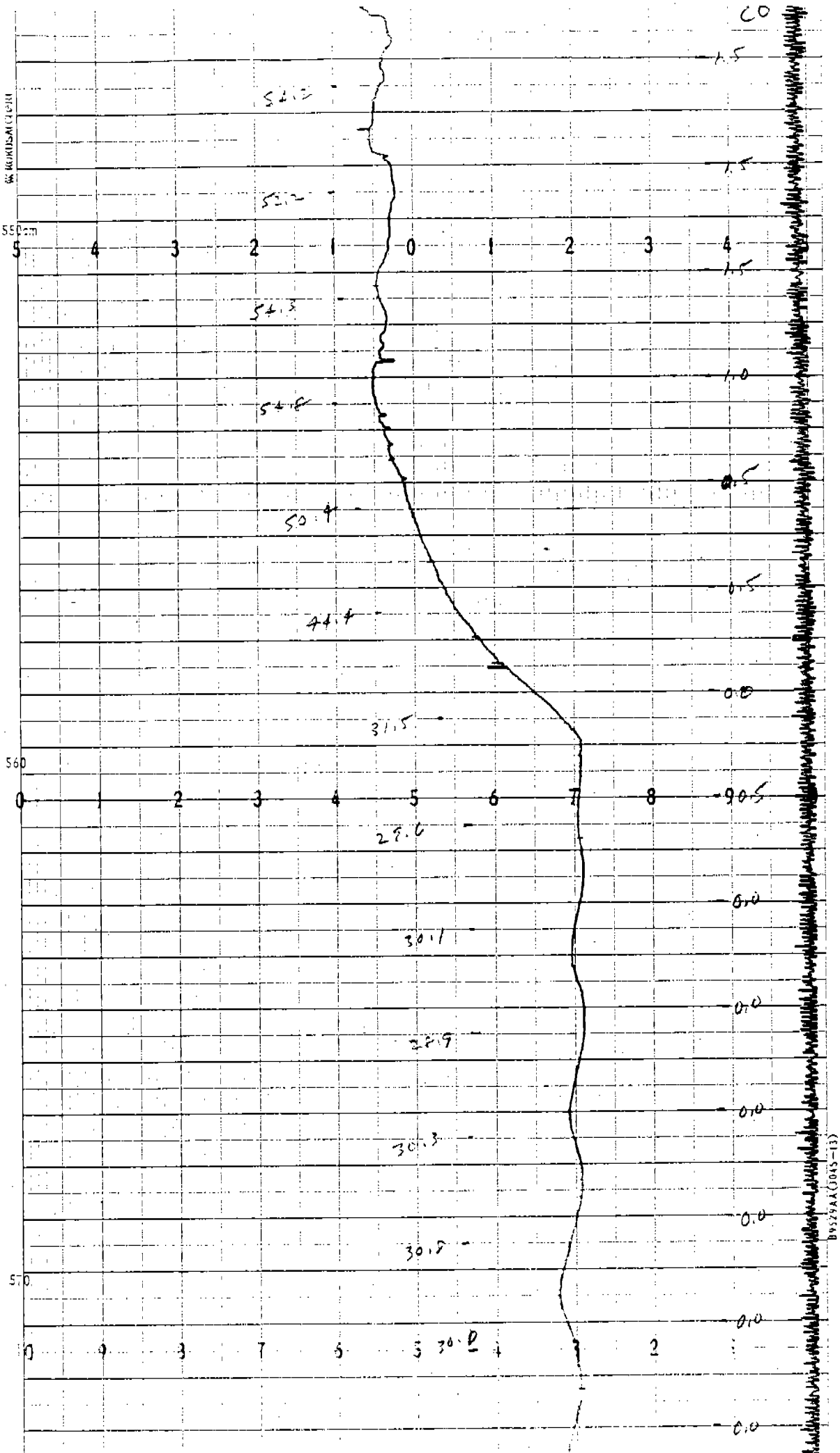

Start Run #1 2111
2-15-91
CO 389 PPM at 10% thru probe
CO 389 PPM at 40% thru probe
Zero N2 thru probe
CO 389 PPM thru probe
Zero N2 thru probe
Propane 85.98 PPM at 60% thru probe
Propane 85.98 PPM at 40% thru probe
Propane 85.98 PPM thru probe
Zero N2 thru probe
0 1 2 3 4 5 6 7 8 9 10
660
670
THC Scale 0-100
CO Scale 0-500
10 9 8 7 6 5 4 3 2 1 0
Coors - K-1 Outlet
2/15/91 - 2/16/91
7110-111
THC/CO
60cm/hr
B9529AA(3045-13)

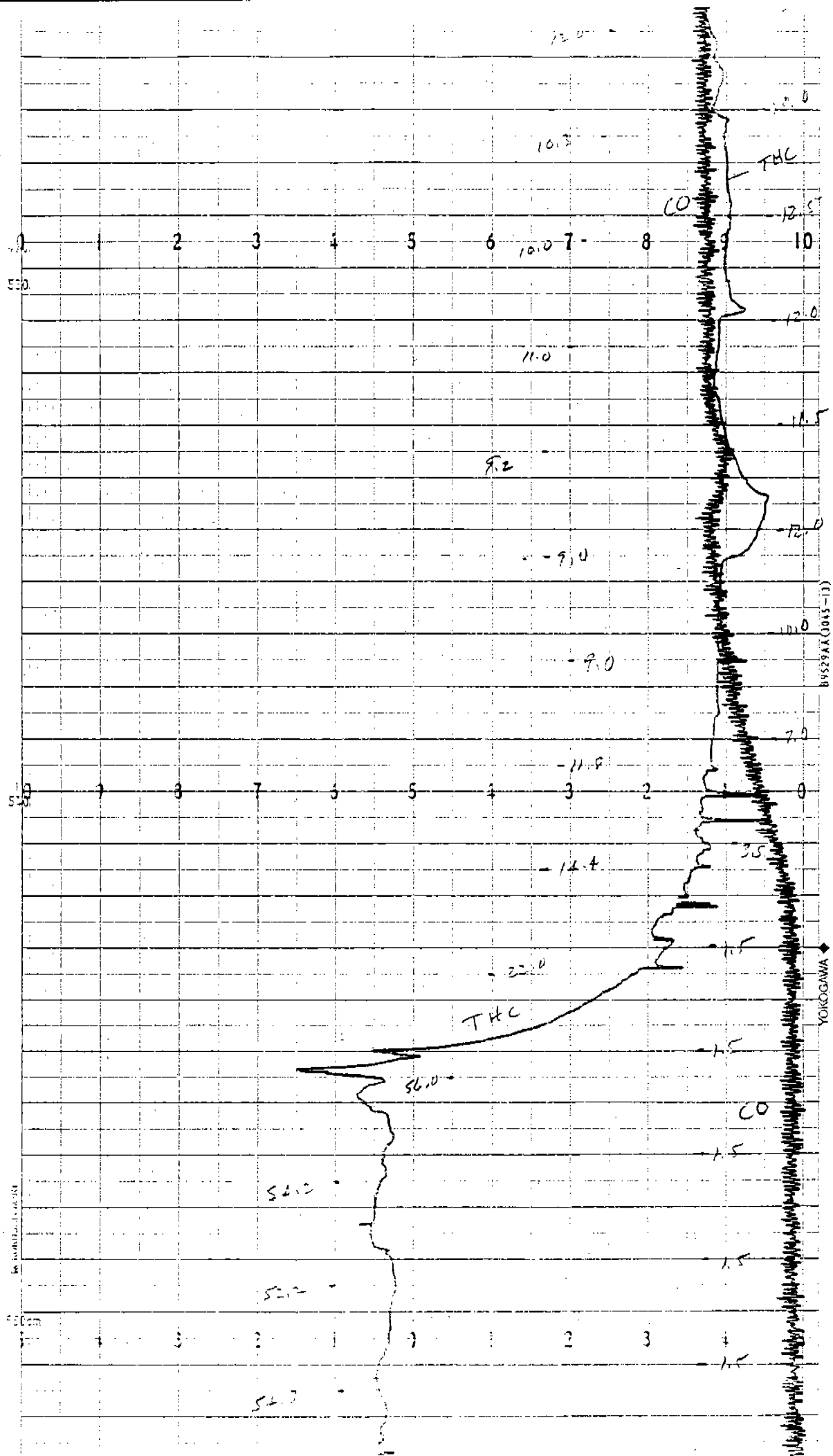

45.2
50.2
48.0
50.2
54.0
51.7
45.0
51.4
55.0
52.0
54.7
Start Run #1 2111
2-15-91
CO 359 PPM
at 10% thru probe
Zero Air
thru probe
CO 359 PPM
at 40% thru
probe
CO 359 PPM
thru
probe
YOKOGAWA

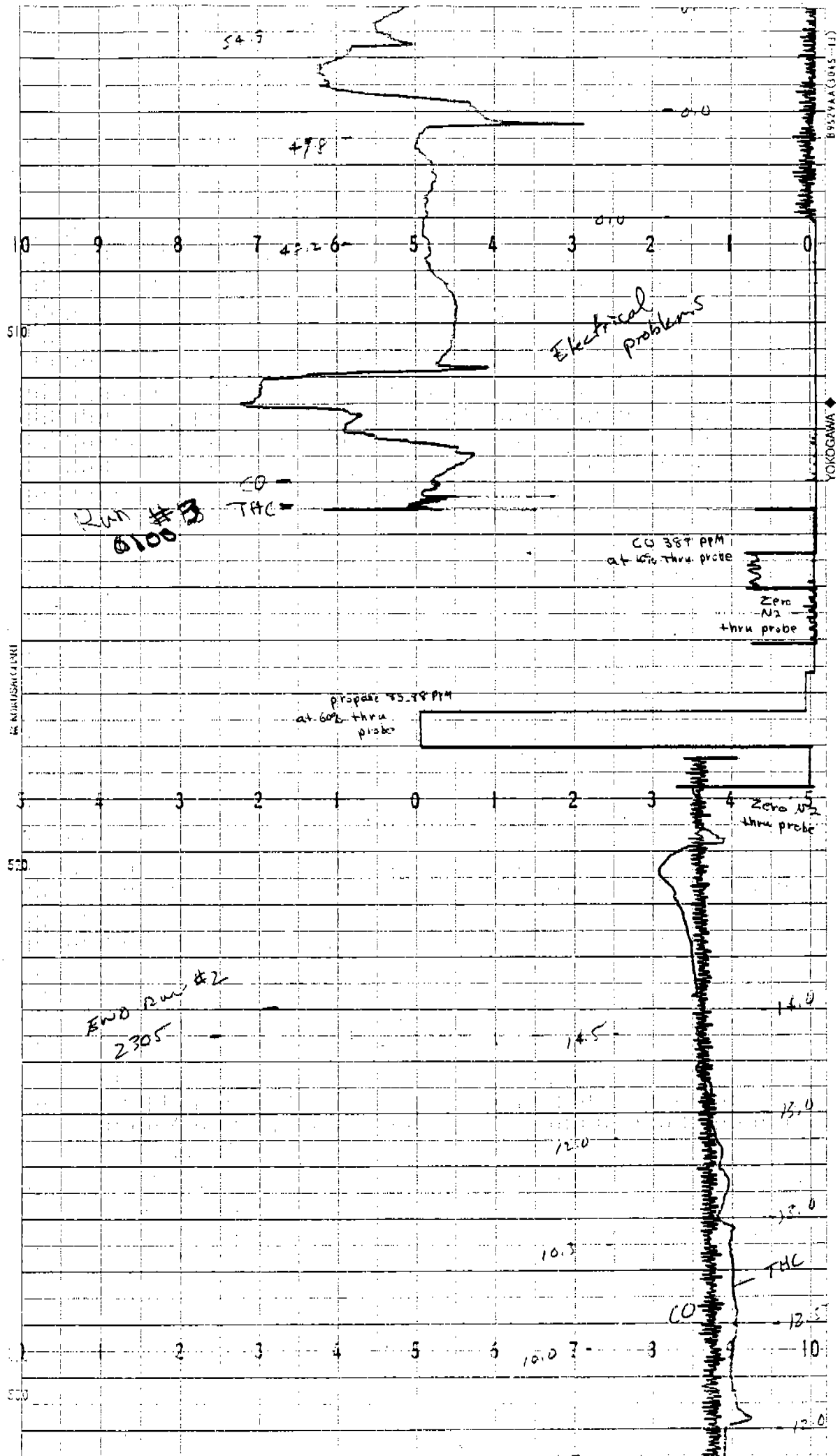

610
620
630
36.0
38.0
39.3
39.0
40.0
41.6
47.9
42.0
45.1
47.2
48.8
50.8
48.0
2.0
2.0
2.5
2.0
2.0
2.0
1.0
1.5
1.5
1.0
1.0
1.0
1.0
0 1 2 3 4 5 6 7 8 9 10
10 9 8 7 6 5 4 3 2 1 0
5 4 3 2 1 0 1 2 3 4 5
B9529AA(3045-13)

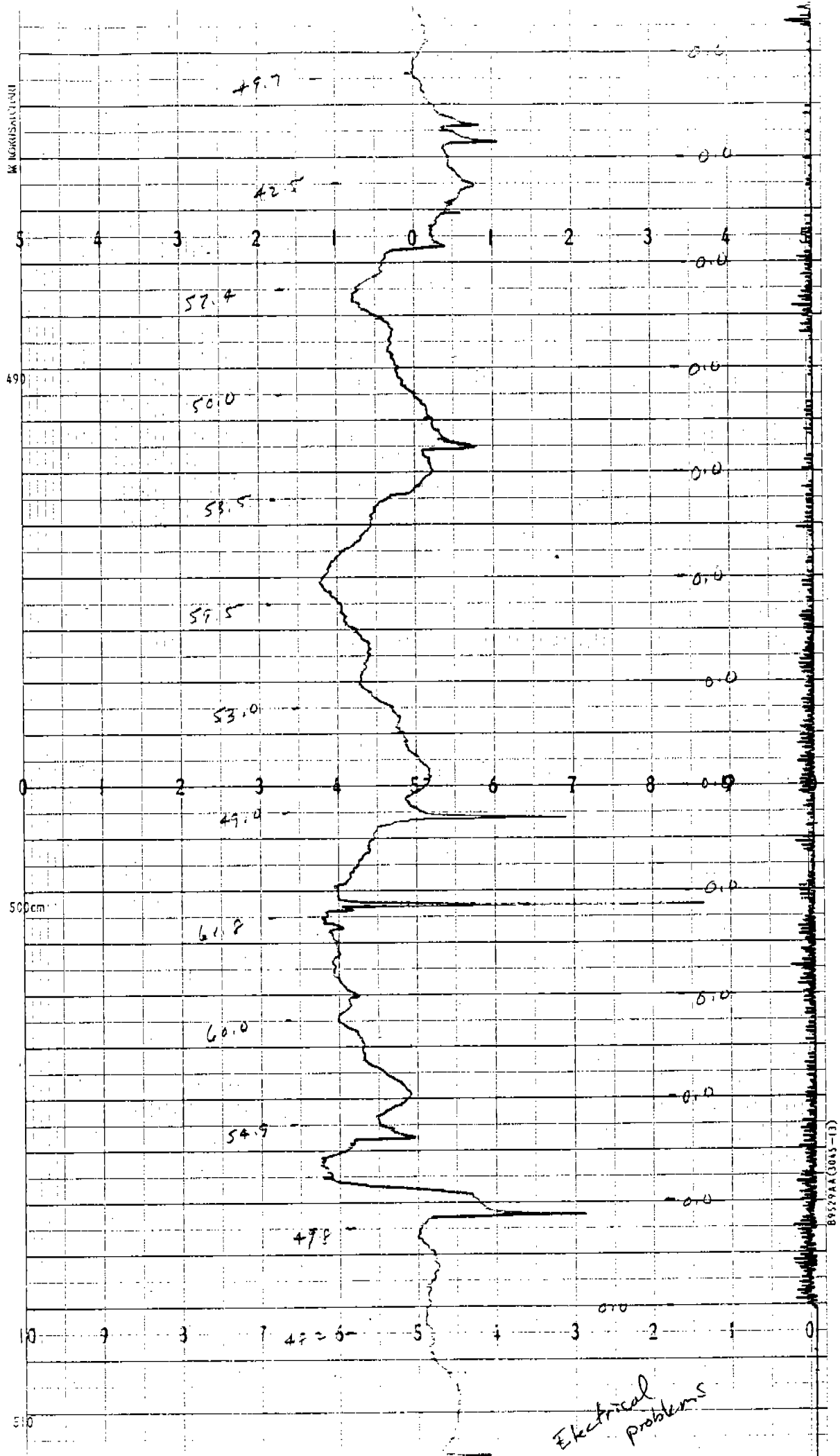

End run #1
2211
THC
CO
77.5
87.0
80.0
71.0
41.6
32.0
32.9
35.3
36.0
35.0
YOKOGAWA


Run #2
2205
CO
THC
CO 384 PPM
at 16th thru probe
Zero N2 thru probe
propane 55.98 PPM
at 6090 thru probe
ΔP
Zero N2 thru probe
End Run #1
2211
YOKOGAWA

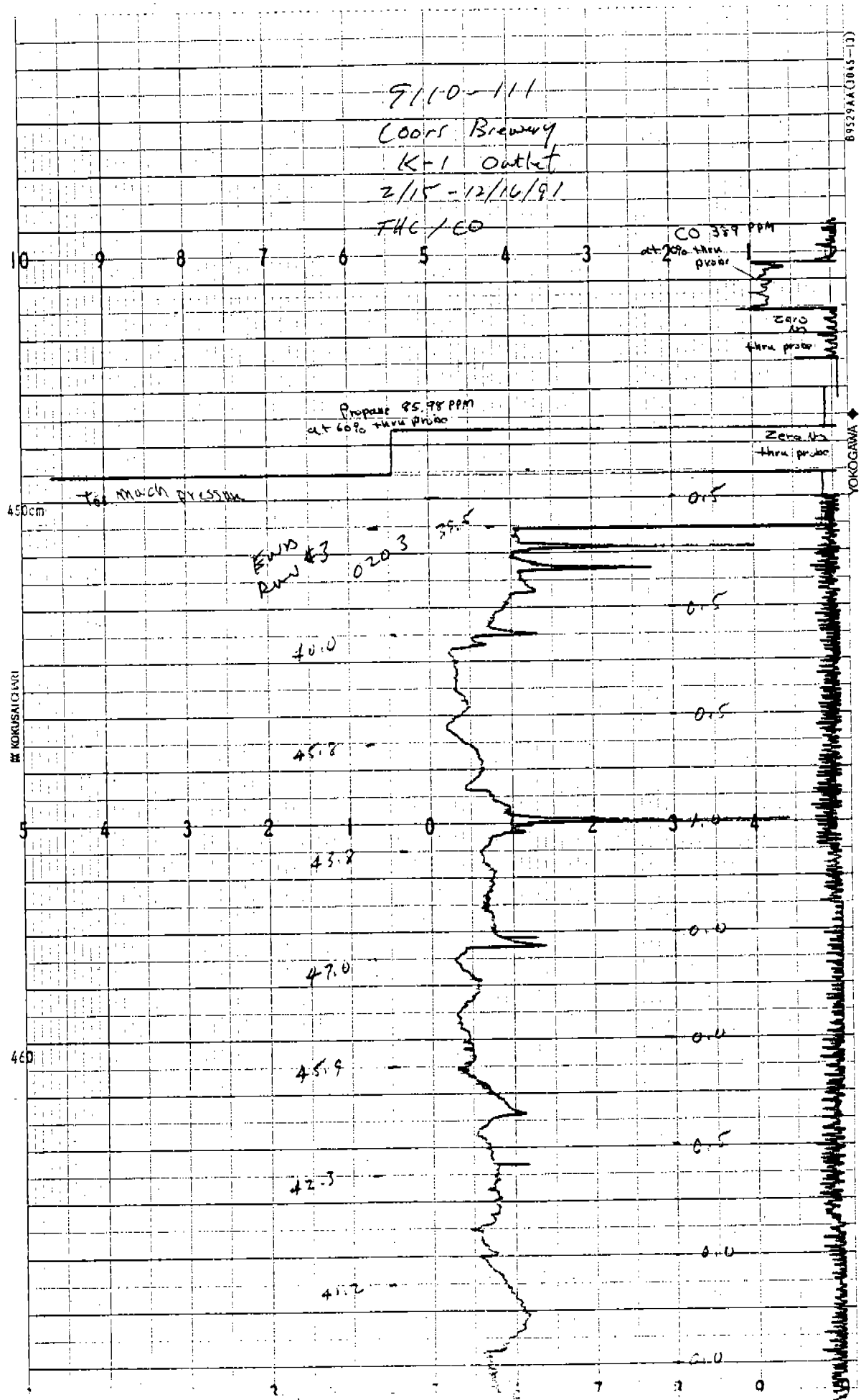

CO
1.5
1.5
1.5
1.0
0.5
0.5
0.0
0.0
0.0
0.0
0.0
0.0
0.0
550cm
560
570
5 4 3 2 1 0 1 2 3 4
0 1 2 3 4 5 6 7 8 9 0.5
51.2
51.2
54.3
54.8
50.4
44.4
31.5
29.6
30.1
27.9
30.3
30.5
30.2
B9529AA(0845-13)


THC
CO
THC
CO
YOKOGAWA


54.7
+7.8
0.0
0.0
10 9 8 7 6 5 4 3 2 1 0
510
Electrical problems
CO
THC
Run #3
0100
CO 387 PPM
at 60% thru probe
Zero N2
thru probe
propane 95.88 PPM
at 60% thru probe
5 4 3 2 1 0 1 2 3 4 5
Zero N2
thru probe
500
END Run #2
2305
14.5
14.0
13.0
12.0
10.5
10.0
THC
CO
10 9 8 7 6 5 4 3 2 1
500
YOKOGAWA


49.7
42.5
57.4
50.0
53.5
57.5
53.0
49.0
61.8
60.0
54.9
47.8
490
500cm
510
Electrical problems

42.3
41.2
42.4
47.2
48.0
41.7
31.7
45.8
45.0
52.5
49.7
42.5
57.2
0 1 2 3 4 5 6 7 8 9
9 8 7 6 5 4 3 2 1
0.0
1.0
0.0
0.0
1.0
0.0
0.5
0.0
3.0
0.0
0.0
473
490
B9529AA (3045-11)
YOKOGAWA


91-0-114
Coors Brewery
K-1 Outlet
2/15-12/16/91
THC/CO
CO 389 PPM
at 2% thru probe
Zero Air
thru probe
Propane 85.98 PPM
at 60% thru probe
Zero Air
thru probe
YOKOGAWA
KOKUSAI ELECTRIC
450cm
460
35.6
40.0
45.8
43.8
47.0
45.9
42.3
41.2
0.5
0.5
1.0
0.0
0.0
0.5
0.0
0.0

APPENDIX E

Analytical Data

PARTICULATE

WESTERN ENVIRONMENTAL
SERVICES & TESTING, INC.

PARTICULATE ANALYSIS

Job No. 9110-111

Name Coors Brewing Co.

Source Name NB4 North Dryer

Run No 1

Filter No T-605 Front Wash 250 ml Impinger Catch - Backhalf — ml

Final	0.7093		105.3245	
Initial	0.6936		105.2936	
	0.0157	15.7 mg	0.0309	30.9 mg
				- 1.8 Blank
				29.1 mg

MF 44.8 mg MT _____ mg

Run No 2

Filter No T-537 Front Wash 250 ml Impinger Catch - Backhalf — ml

Final	0.6849		106.6580	
Initial	0.6640		106.6329	
	0.0209	20.9 mg	0.0251	25.1 mg
				- 1.8 Blank
				23.3

MF 44.2 mg MT _____ mg

Run No 3

Filter No T-606 Front Wash 230 ml Impinger Catch - Backhalf — ml

Final	0.7118		104.8591	
Initial	0.6985		104.8371	
	0.0133	13.3 mg	0.0220	22.0 mg
				- 1.6 Blank
				20.4

MF 33.7 mg MT _____ mg

Acetone Blank:

Volume 225 ml

Blank: 0.0071 mg/ml

Final 102.1321
Initial 102.1305
0.0016

Total Weight 1.6 mg

D.I. Blank:

Volume _____ ml

Blank: _____ mg/ml

Final
Initial _____

Total Weight _____ mg

WESTERN ENVIRONMENTAL
SERVICES & TESTING, INC.

PARTICULATE ANALYSIS

Job No. 9110-111

Name Coors Brewing Co.

Source Name NB4 South Dryer

Run No 1

Filter No T-607 Front Wash 200 ml Impinger Catch - Backhalf — ml

Final	0.7048		105.4912		
Initial	0.6955		105.4700		
	0.0093	9.3 mg	0.0212	21.2 mg	
				- 1.4 Blank	
				19.8	

MF 29.1 mg MT — mg

Run No 2

Filter No T-604 Front Wash 250 ml Impinger Catch - Backhalf — ml

Final	0.7044		99.6238		
Initial	0.7013		99.6002		
	0.0031	3.1 mg	0.0226	22.6 mg	
				- 1.8 Blank	
				20.8	

MF 23.9 mg MT — mg

Run No 3

Filter No T-647 Front Wash 300 ml Impinger Catch - Backhalf — ml

Final	0.6957		105.5730		
Initial	0.6874		105.5462		
	0.0083	8.3 mg	0.0268	26.8 mg	
				- 2.1 Blank	
				24.7	

MF 33.0 mg MT — mg

Acetone Blank:

Volume 225 ml

Blank: 0.0071 mg/ml

Final 102.1321
Initial 102.1305
0.0016

Total Weight 1.6 mg

D.I. Blank:

Volume _____ ml

Blank: _____ mg/ml

Final
Initial _____

Total Weight _____ mg

WESTERN ENVIRONMENTAL
SERVICES & TESTING, INC.

PARTICULATE ANALYSIS

Job No. 9110-111

Name Coors Brewing Co.

Source Name K-1 Dryer Inlet

Run No 1

Filter No T-610 Front Wash 520 ml Impinger Catch - Backhalf — ml

Final	10.6713		113.0212	
Initial	0.6860		111.7558	
	9.9853	9985.3 mg	1.2654	1265.4 mg
				- 3.7 Blank
				1261.7 mg

MF 11,247.0 mg MT — mg

Run No 2

Filter No T-611 Front Wash 875 ml Impinger Catch - Backhalf — ml

Final	1.3867		113.8000	
Initial	0.6990		101.7160	
	0.6877	687.7 mg	12.0840	12084.0 mg
				- 6.2 Blank
				12077.8 mg

MF 12765.5 mg MT — mg

Run No 3

Filter No T-612 Front Wash 650 ml Impinger Catch - Backhalf — ml

Final	2.9975		104.4896	
Initial	0.6936		99.4971	
	2.3039	2303.9 mg	4.9925	4992.5 mg
				- 4.6 Blank
				4987.9

MF 7291.8 mg MT — mg

Acetone Blank:

Volume 225 ml

Blank: 0.0071 mg/ml

Final 102.1321
Initial 102.1305
0.0016

Total Weight 1.6 mg

D.I. Blank:

Volume _____ ml

Blank: _____ mg/ml

Final
Initial _____

Total Weight _____ mg

WESTERN ENVIRONMENTAL
SERVICES & TESTING, INC.

PARTICULATE ANALYSIS

Job No. 9110-111

Name Coors Brewing Co.

Source Name K-1 Dryer Outlet

Run No 1

Filter No T-613 Front Wash 275 ml Impinger Catch - Backhalf — ml

Final 0.6977
Initial 0.6952
0.0025 2.5 mg

109.5170
109.4838
0.0332

33.2 mg
- 2.0 Blank
31.2 mg

MF 33.7 mg MT — mg

Run No 2

Filter No T-616 Front Wash 225 ml Impinger Catch - Backhalf — ml

Final 0.6950
Initial 0.6911
0.0039 3.9 mg

103.7714
103.7541
0.0173

17.3 mg
1.6 Blank
15.7

MF 19.6 mg MT — mg

Run No 3

Filter No T-615 Front Wash 225 ml Impinger Catch - Backhalf — ml

Final 0.6885
Initial 0.6867
0.0018 1.8 mg

107.8909
107.8750
0.0159

15.9 mg
- 2.0 Blank
13.9 mg

MF 15.7 mg MT — mg

Acetone Blank:

Volume 225 ml

Final 102.1321
Initial 102.1305
0.0016

Blank: 0.0071 mg/ml

Total Weight 1.6 mg

D.I. Blank:

Volume _____ ml

Final
Initial _____

Blank: _____ mg/ml

Total Weight _____ mg

ANALYZER DATA

TOTAL HYDROCARBONS

NB4 NORTH DRYER STACK

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. NB4 North Dryer Stack Span 100

Operator M. Tikka Date 2/13/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	-0.3	-0.3	0.2	0.2	0.5
Upscale gas	51.2	50.9	-0.3	49.6	1.6	-1.3

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 North Dryer Stack

Run Number 1 Date 2/13/91

$\bar{C}$ = 49.35

C_o = -0.05

C_m = 50.25

C_{ma} = 51.6

$$C_{gas} = (49.35 - (-0.05)) \frac{51.6}{50.25 - (-0.05)}$$

= 50.7 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/13/91

Sample location NB4 North Dryer Stack

Run number 1 Time 1441 - 1548

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C3H8 (from cal. curve)
1	46.3	
2	44.7	
3	44.8	
4	45.4	
5	46.7	
6	48.8	
7	50.3	
8	50.5	
9	57.2	
10	58.1	
11	44.6	
12	36.4	
13	39.8	
14	39.1	
15	40.1	
16	52.6	
17	52.5	
18	53.2	
19	61.0	
20	60.7	
21	41.7	
22	40.6	
23	50.8	
24	52.3	
25	51.6	
26	51.3	
27	51.8	
28	54.2	
29	53.5	
30	51.9	
Average	49.35	50.7

= 50.7 ppm (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. NB4 North Dryer Stack Span 100

Operator M. Tikka Date 2/13/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0.2	0.2	-0.4	-0.4	-0.6
Upscale gas	51.2	49.6	1.6	49.2	2.0	-0.4

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 North Dryer Stack

Run Number 2 Date 2/13/91

$\bar{C}$ = 39.52

C_o = -0.1

C_m = 49.4

C_{ma} = 51.6

$$C_{gas} = (39.52 - (-0.1)) \frac{51.6}{49.4 - (-0.1)}$$

= 41.3 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/13/91

Sample location NBA North Dryer Stack

Run number 2 Time 1648-1800

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, %(0-100)	ppm CHe (from cal. curve)
1	29.2	
2	28.2	
3	27.9	
4	27.9	
5	27.7	
6	33.0	
7	33.2	
8	34.6	
9	37.5	
10	41.2	
11	39.2	
12	36.2	
13	36.1	
14	36.6	
15	38.8	
16	41.2	
17	44.3	
18	45.1	
19	50.0	
20	42.2	
21	41.2	
22	41.8	
23	43.0	
24	45.3	
25	46.8	
26	48.9	
27	51.6	
28	44.8	
29	44.6	
30	47.6	
Average	39.52	41.3

= 41.3 ppm (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. NB4 North Dryer Stack Span 100

Operator M. Tikka Date 2/13/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	-0.4	-0.4	-0.4	-0.4	0.0
Upscale gas	51.2	49.2	2.0	50.1	1.1	0.9

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 North Dryer Stack

Run Number 3 Date 2/13/91

$\bar{C}$ = 66.10

C_o = -0.4

C_m = 49.65

C_{ma} = 51.6

$$C_{gas} = (66.10 - (-0.4)) \frac{51.6}{49.65 - (-0.4)}$$

= 68.6 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/13/91

Sample location NB4 North Dryer Stack

Run number 3 Time 1848-1952

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, %(0-100)	ppm C3H8 (from cal. curve)
1	50.0	
2	52.9	
3	54.1	
4	56.2	
5	58.7	
6	60.1	
7	61.8	
8	64.6	
9	66.0	
10	69.0	
11	69.4	
12	70.2	
13	70.8	
14	70.1	
15	70.3	
16	70.7	
17	71.2	
18	70.8	
19	70.5	
20	70.6	
21	71.7	
22	71.0	
23	70.1	
24	70.9	
25	69.2	
26	68.8	
27	66.8	
28	66.6	
29	65.4	
30	64.5	
Average	66.10	68.6

= 68.6 ppm (dry basis)

NB4 SOUTH DRYER STACK

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 3 Time 1547-1717

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_3H_8 (from cal. curve)
1	16.4	
2	16.9	
3	16.6	
4	16.5	
5	15.7	
6	15.1	
7	15.1	
8	15.2	
9	15.3	
10	15.2	
11	15.6	
12	15.1	
13	15.6	
14	15.6	
15	15.3	
16	15.1	
17	15.7	
18	16.3	
19	17.3	
20	16.9	
21	16.9	
22	16.9	
23	15.7	
24	16.3	
25	15.9	
26	15.3	
27	15.3	
28	15.4	
29	15.6	
30	16.2	
Average		cont'd

= _____ ppm (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location N24 South Dryer Stack

Run number 3 (contid) Time 1547-1717

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, %(0-100)	ppm C6H6 (from cal. curve)
1	17.4	
2	19.8	
3	23.4	
4	26.2	
5	28.8	
6	33.1	
7	36.6	
8	42.2	
9	36.9	
10	33.3	
11	30.1	
12	27.0	
13	24.9	
14	22.8	
15	21.2	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
Average	19.99	19.6

= 19.6 ppm (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. NB4 South Dryer Stack Span 100

Operator M. Tikka Date 2/14/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0.2	0.2	-0.4	-0.4	-0.6
Upscale gas	51	51	0.0	50.1	-0.9	-0.9

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 South Dryer Stack

Run Number 1 Date 2/14/91

$\bar{C}$ = 24.96

C_o = -0.1

C_m = 50.55

C_{ma} = 51.6

$$C_{gas} = (24.96 - (-0.1)) \frac{51.6}{50.55 - (-0.1)}$$

= 25.5 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 1 Time 0904 - 1034

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, %(0-100)	ppm C_2H_6 (from cal. curve)
1	20.7	
2	20.4	
3	20.9	
4	21.6	
5	22.1	
6	23.0	
7	23.9	
8	25.1	
9	25.9	
10	25.7	
11	26.4	
12	26.4	
13	26.4	
14	27.1	
15	27.0	
16	27.0	
17	27.5	
18	26.8	
19	26.6	
20	26.8	
21	26.8	
22	26.8	
23	26.8	
24	26.5	
25	27.5	
26	27.0	
27	27.1	
28	27.1	
29	26.9	
30	26.7	
Average		cont'd

= ____ ppm (dry basis)

25A CONTINUOUS ANALYSIS

Plant Boost Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 1 (cont'd) Time 0904 - 1034

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_3H_8 (from cal. curve)
1	25.6	
2	23.5	
3	21.5	
4	19.0	
5	18.2	
6	18.3	
7	18.7	
8	19.5	
9	20.6	
10	22.5	
11	25.1	
12	28.6	
13	32.3	
14	31.9	
15	31.2	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
Average	24.96	25.5

= 25.5 ppm (dry basis)

METHOD 7E SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. NB4 South Dryer Stack Span 100

Operator M. Tikka Date 2/14/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	-0.4	-0.4	0.2	0.2	0.6
Upscale gas	51	50.1	-0.9	52.2	1.2	1.1

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 South Dryer Stack

Run Number 2 Date 2/14/91

$\bar{C}$ = 18.86

C_o = -0.1

C_m = 51.15

C_{ma} = 51.6

$$C_{gas} = (18.86 - (0.1)) \frac{51.6}{51.15 - [-0.1]}$$

= 19.1 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NBF South Dryer Stack

Run number 2 Time 1208-1338

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_3H_8 (from cal. curve)
1	16.1	
2	16.9	
3	17.0	
4	17.1	
5	17.2	
6	16.6	
7	16.8	
8	17.3	
9	17.4	
10	17.7	
11	17.3	
12	17.7	
13	18.1	
14	17.9	
15	17.8	
16	17.9	
17	18.2	
18	18.8	
19	18.9	
20	18.7	
21	18.7	
22	19.0	
23	19.1	
24	18.6	
25	19.1	
26	20.3	
27	20.7	
28	21.8	
29	19.5	
30	19.8	
Average		cont'd

= _____ ppm (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 2 (cont'd) Time 1208 - 1338

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_4H_8 (from cal. curve)
1	19.6	
2	19.9	
3	19.8	
4	19.9	
5	20.4	
6	19.8	
7	20.1	
8	20.2	
9	20.6	
10	20.7	
11	20.1	
12	19.9	
13	20.1	
14	20.1	
15	19.3	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
Average	18.86	19.1

= 19.1 ppm (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. NB4 South Dryer Stack Span 100

Operator M. Tikka Date 2/14/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0.2	0.2	-0.3	-0.3	-0.5
Upscale gas	51	52.2	1.2	53.0	2.0	0.8

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NBA South Dryer Stack

Run Number 3 Date 2/14/91

$\bar{C}$ = 19.99

C_o = −0.05

C_m = 53.6

C_{ma} = 51.6

$$C_{gas} = (19.99 - (-0.05)) \frac{51.6}{52.6 - (-0.05)}$$

= 19.6 ppm, (dry basis)

K-1 DRYER INLET

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. K-1 Inlet Span 100

Operator M. Tikka Date 2/15/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	-0.5	-0.5	-0.5	-0.5	0.0
Upscale gas	51.6	51.6	0.0	50.9	-0.7	-0.7

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Inlet

Run Number 1 Date 2/15/91

$\bar{C}$ = 26.67

C_o = −0.5

C_m = 51.25

C_{ma} = 51.6

$$C_{gas} = (26.67 - (-0.5)) \frac{51.6}{51.25 - (-0.5)}$$

= 27.1 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Inlet

Run number 1 Time 1054-1154

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_3H_8 (from cal. curve)
1	28.4	
2	33.5	
3	30.7	
4	30.1	
5	37.7	
6	31.4	
7	36.0	
8	31.7	
9	32.8	
10	33.9	
11	32.9	
12	29.9	
13	30.3	
14	32.6	
15	30.4	
16	30.9	
17	25.2	
18	24.9	
19	24.8	
20	24.2	
21	22.8	
22	22.1	
23	21.9	
24	20.9	
25	20.7	
26	18.0	
27	17.3	
28	15.9	
29	14.2	
30	13.9	
Average	26.67	27.1

= 27.1 ppm (dry basis)

METHOD 7E SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. K-1 Inlet Span 100

Operator M. Tikka Date 2/15/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	-0.5	-0.5	0	0.0	0.5
Upscale gas	51.6	50.9	-0.7	52.2	0.6	1.3

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Inlet

Run number 2 Time 1317 - 1435

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, %(0-100)	ppm C_3H_8 (from cal. curve)
1	45.9	
2	42.9	
3	46.4	
4	45.0	
5	44.2	
6	42.5	
7	42.2	
8	41.5	
9	39.9	
10	38.2	
11	36.9	
12	36.3	
13	40.0	
14	40.6	
15	25.8	
16	30.5	
17	22.0	
18	21.3	
19	22.8	
20	22.5	
21	22.0	
22	22.6	
23	21.9	
24	23.0	
25	24.3	
26	23.9	
27	25.3	
28	23.9	
29	26.10	
30	25.4	
Average	32.19	32.3

= 32.3 ppm (dry basis)

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Inlet

Run Number 2 Date 2/15/91

$\bar{C}$ = 32.19

C_o = -0.25

C_m = 51.55

C_{ma} = 51.6

$$C_{gas} = (32.19 - (-0.25)) \frac{51.6}{51.55 - (-0.25)}$$

= 32.3 ppm, (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. K-1 Inlet Span 100

Operator M. Tikka Date 2/15/91

	Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	-0.5	-0.5	-0.5
Upscale gas	51.6	52.2	0.6	51.3	-0.3	-0.9

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Inlet

Run Number 3 Date 2/15/91

$\bar{C}$ = 21.72

C_o = -0.25

C_m = 51.75

C_{ma} = 51.6

$$C_{gas} = (21.72 - (-0.25)) \frac{51.6}{51.75 - (-0.25)}$$

= 21.8 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Inlet

Run number 3 Time 1608 - 1702

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, %(0-100)	ppm C_3H_8 (from cal. curve)
1	14.8	
2	16.7	
3	17.1	
4	15.8	
5	17.0	
6	17.0	
7	15.1	
8	14.8	
9	14.5	
10	—	
11	—	
12	—	
13	—	
14	—	
15	—	
16	21.1	
17	23.7	
18	23.5	
19	25.7	
20	26.9	
21	28.2	
22	28.1	
23	27.2	
24	27.8	
25	27.5	
26	26.9	
27	26.8	
28	—	
29	—	
30	—	
Average	21.72	21.8

= 21.8 ppm (dry basis)

K-1 DRYER OUTLET STACK

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. K-1 Outlet Span 100

Operator M. Tibbs Date 2/15 - 2/16/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	0	0.0	0.0
Upscale gas	51.4	51.4	0.0	51.8	0.4	0.4

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Outlet

Run Number 1 Date 2/15/91

$\bar{C}$ = 49.58

C_o = 0

C_m = 51.6

C_{ma} = 51.6

$$C_{gas} = (49.58 - 0) \frac{51.6}{51.6 - 0}$$

= 49.6 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Outlet

Run number 1 Time 2111-2211

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_6H_6 (from cal. curve)
1	54.7	
2	52.0	
3	55.0	
4	51.0	
5	45.0	
6	51.7	
7	54.0	
8	50.8	
9	48.0	
10	50.8	
11	48.8	
12	47.2	
13	45.1	
14	42.0	
15	41.9	
16	41.6	
17	40.0	
18	39.0	
19	39.3	
20	38.0	
21	36.8	
22	35.3	
23	32.9	
24	32.0	
25	41.6	
26	71.0	
27	80.0	
28	87.0	
29	79.5	
30	55.5	
Average	49.58	49.6

= 49.6 ppm (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. K-1 Outlet Span 100

Operator M. Tikka Date 2/15-2/16/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	0.2	0.2	0.2
Upscale gas	51.4	51.8	0.4	49.5	1.9	2.3

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Outlet

Run Number 2 Date 2/15/91

$\bar{C}$ = 28.72

C_o = 0.1

C_m = 50.65

C_{ma} = 51.6

$$C_{gas} = (28.72 - 0.1) \frac{51.6}{50.65 - 0.1}$$

= 29.2 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Outlet

Run number 2 Time 2205 - 2305

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_3H_8 (from cal. curve)
1	27.4	
2	31.7	
3	29.5	
4	31.2	
5	31.1	
6	30.0	
7	30.8	
8	30.3	
9	28.9	
10	30.1	
11	29.6	
12	31.5	
13	44.4	
14	50.4	
15	54.8	
16	54.3	
17	52.2	
18	54.2	
19	56.0	
20	22.0	
21	14.4	
22	11.8	
23	9.0	
24	9.0	
25	9.2	
26	11.0	
27	10.0	
28	10.3	
29	12.0	
30	14.5	
Average	28.72	29.2

= 29.2 ppm (dry basis)

METHOD 25A SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. K-1 Outlet Span 100

Operator M. Tikka Date 2/15/91 - 2/16/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0.2	0.2	0.8	0.8	0.6
Upscale gas	51.4	49.5	1.9	54.6	3.2	5.1

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 25A EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Outlet

Run Number 3 Date 2/16/91

$\bar{C}$ = 47.87

C_o = 0.5

C_m = 52.05

C_{ma} = 51.6

$$C_{gas} = (47.87 - 0.5) \frac{51.6}{52.05 - 0.5}$$

= 47.4 ppm, (dry basis)

25A CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/16/91

Sample location K-1 Dryer Outlet

Run number 3 Time 0100 - 0203

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection, % (0-100)	ppm C_3H_8 (from cal. curve)
1	48.2	
2	49.8	
3	54.9	
4	60.0	
5	61.8	
6	49.0	
7	53.0	
8	59.5	
9	53.5	
10	50.0	
11	57.4	
12	42.5	
13	49.7	
14	52.5	
15	45.0	
16	45.8	
17	31.7	
18	41.8	
19	49.0	
20	47.8	
21	42.4	
22	43.2	
23	41.2	
24	42.3	
25	45.9	
26	47.0	
27	43.8	
28	45.8	
29	40.0	
30	39.5	
Average	47.87	47.4

= 47.4 ppm (dry basis)

CARBON MONOXIDE

NB4 NORTH DRYER STACK

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. NB4 North Dryer Stack Span 500

Operator M. Tikka Date 2/13/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	1	2.5	0.3	1	0.0	-0.3
Upscale gas	38.9	38	-0.18	37.5	-0.28	-0.1

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB# North Dryer Stack

Run Number 1 Date 2/13/91

$\bar{C}$ = 30.85

C_o = 1.75

C_m = 37.75

C_{ma} = 38.9

$$C_{gas} = (30.85 - 1.75) \frac{38.9}{37.75 - 1.75}$$

= 31.4 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/13/91

Sample location NB4 North Dryer Stack

Run number 1 Time 1441 - 1548

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	5.3	
2	6.0	
3	6.1	
4	6.0	
5	5.8	
6	6.2	
7	6.0	
8	5.9	
9	5.9	
10	5.8	
11	5.7	
12	7.0	
13	7.0	
14	7.0	
15	6.9	
16	6.0	
17	6.2	
18	6.0	
19	5.8	
20	6.0	
21	6.0	
22	6.0	
23	6.1	
24	6.0	
25	6.2	
26	6.4	
27	6.3	
28	6.7	
29	6.5	
30	6.3	
Average	6.17	31.4

F_{CO_2} = 0.2 %/100 = 0.002

$C_{COSTACK} = C_{CONDIR} (1 - F_{CO_2})$

= 31.4 (1 - 0.002)

= 31 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. NB4 North Dryer Stack Span 500

Operator M. Tikkun Date 2/13/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	1	1	0.0	0	-0.2	-0.2
Upscale gas	38.9	37.5	-0.28	36	-0.58	-0.3

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 North Dryer Stack

Run Number 2 Date 2/13/91

$\bar{C}$ = 40.6

C_o = 0.5

C_m = 36.75

C_{ma} = 38.9

$$C_{gas} = (40.6 - 0.5) \frac{38.9}{36.75 - 0.5}$$

= 40.0 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/13/91

Sample location N84 North Dryer Stack

Run number 2 Time 1648-1800

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	5.7	
2	5.4	
3	5.5	
4	5.6	
5	5.5	
6	7.6	
7	7.7	
8	7.4	
9	7.3	
10	7.3	
11	7.2	
12	7.3	
13	7.6	
14	7.7	
15	7.9	
16	8.1	
17	8.4	
18	8.3	
19	8.9	
20	9.0	
21	9.0	
22	9.4	
23	9.8	
24	9.7	
25	9.8	
26	9.9	
27	10.0	
28	10.2	
29	10.2	
30	10.3	
Average	8.12	40.0

F_{CO_2} = 0.2 %/100 = 0.002

$C_{COSTACK} = C_{CONDIR} (1 - F_{CO_2})$

= 40.0 (1 - 0.002)

= 40 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. N84 North Dryer Stack Span 500

Operator M. Tibbs Date 2/13/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	1	0	-0.2	3	0.4	0.6
Upscale gas	38.9	36	-0.58	38	-0.18	0.4

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NBA North Dryer Stack

Run Number 3 Date 2/13/91

$\bar{C}$ = 62.45

C_o = 2

C_m = 37

C_{ma} = 38.9

$$C_{gas} = (62.45 - 2) \frac{38.9}{37 - 2}$$

= 67.2 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/13/91

Sample location N34 North Dryer Stack

Run number 3 Time 1848-1952

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	13.0	
2	13.0	
3	13.0	
4	13.0	
5	13.0	
6	13.0	
7	12.9	
8	13.0	
9	12.7	
10	12.8	
11	12.4	
12	12.6	
13	12.5	
14	12.3	
15	12.3	
16	12.2	
17	12.2	
18	12.6	
19	12.1	
20	12.2	
21	12.7	
22	13.0	
23	12.7	
24	12.5	
25	12.5	
26	12.3	
27	11.8	
28	11.6	
29	11.3	
30	11.4	
Average	12.49	67.2

F_{CO_2} = 0.2 %/100 = 0.002

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 67.2 (1 - 0.002)

= 67 ppm (dry basis)

NB4 SOUTH DRYER STACK

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. NB4 South Dryer Stack Span 500

Operator M. Tikka Date 2/14/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	2	0.4	2.5	0.5	0.1
Upscale gas	39	39	0.0	40	0.2	0.2

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 South Dryer Stack

Run Number 1 Date 2/14/91

$\bar{C}$ = 30.65

C_o = 2.25

C_m = 39.5

C_{ma} = 38.9

$$C_{gas} = (30.65 - 2.25) \frac{38.9}{39.5 - 2.25}$$

$$= 29.6 \text{ ppm, (dry basis)}$$

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 1 Time 0904 - 1034

Operator H. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	7.0	
2	6.4	
3	6.0	
4	6.0	
5	6.0	
6	5.9	
7	6.1	
8	6.2	
9	6.4	
10	6.2	
11	6.3	
12	6.2	
13	6.0	
14	6.0	
15	6.0	
16	6.0	
17	6.0	
18	5.9	
19	5.8	
20	5.8	
21	5.8	
22	5.8	
23	5.9	
24	5.8	
25	5.7	
26	5.7	
27	5.8	
28	5.8	
29	5.5	
30	5.6	
Average		cont'd

F_{CO_2} = ____ %/100 = ____

$C_{COSTACK} = C_{CONDIR} / (1 - F_{CO_2})$

= ____ / (1 - ____)

= ____ ppm (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 1 (control) Time 0904 - 1034

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	6.4	
2	7.0	
3	5.9	
4	5.6	
5	5.2	
6	5.1	
7	5.1	
8	5.2	
9	5.5	
10	7.5	
11	8.3	
12	7.1	
13	7.2	
14	7.5	
15	7.8	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
Average	6.13	29.6

F_{CO_2} = 0.4 %/100 = 0.004

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 29.6 (1 - 0.004)

= 29 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. NB4 South Dryer Stack Span 500

Operator M. Tikka Date 2/14/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	2.5	0.5	0	0.0	-0.5
Upscale gas	39	40	0.2	37	-0.4	-0.6

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 South Dryer Stack

Run Number 2 Date 2/14/91

$\bar{C}$ = 7.9

C_o = 1.25

C_m = 38.5

C_{ma} = 38.9

$$C_{gas} = (7.9 - 1.25) \frac{38.9}{38.5 - 1.25}$$

$$= 6.9 \text{ ppm, (dry basis)}$$

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 2 Time 1208 - 1338

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	1.7	
2	1.6	
3	1.7	
4	1.7	
5	1.5	
6	1.3	
7	1.2	
8	1.3	
9	1.2	
10	1.1	
11	1.0	
12	1.8	
13	1.9	
14	1.7	
15	1.8	
16	1.7	
17	1.8	
18	1.8	
19	1.8	
20	1.8	
21	1.9	
22	2.0	
23	1.9	
24	1.8	
25	1.8	
26	1.7	
27	1.7	
28	1.4	
29	1.6	
30	1.4	
Average		cont'd

F_{CO_2} = ____ %/100 = ____

$C_{COSTACK} = C_{CONDIR} / (1 - F_{CO_2})$

= ____ / (1 - ____)

= ____ ppm (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 2 (cont'd) Time 1208-1338

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	1.3	
2	1.5	
3	1.4	
4	1.6	
5	1.5	
6	1.4	
7	1.5	
8	1.5	
9	1.5	
10	1.6	
11	1.6	
12	1.4	
13	1.5	
14	1.6	
15	1.5	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
Average	1.58	6.9

F_{CO_2} = 0.2 %/100 = 0.002

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 6.9 (1 - 0.002)

= 7 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. NB4 South Dryer Stack Span 500

Operator M. Tikka Date 2/14/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	1	0.2	0.2
Upscale gas	39	37	-0.4	37.5	-0.3	0.1

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location NB4 South Dryer Stack

Run Number 3 Date 2/14/91

$\bar{C}$ = 12.85

C_o = 0.5

C_m = 37.25

C_{ma} = 38.9

$$C_{gas} = (12.85 - 0.5) \frac{38.9}{37.25 - 0.5}$$

= 13.1 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location N84 South Dryer Stack

Run number 3 Time 1547-1717

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	2.0	
2	2.0	
3	2.0	
4	2.0	
5	2.0	
6	2.0	
7	2.0	
8	2.0	
9	2.0	
10	2.0	
11	2.0	
12	1.9	
13	1.9	
14	1.9	
15	2.0	
16	2.0	
17	2.0	
18	2.0	
19	1.9	
20	2.0	
21	1.9	
22	2.0	
23	2.0	
24	2.0	
25	1.9	
26	2.0	
27	1.9	
28	2.0	
29	2.0	
30	2.0	
Average		cont'd

F_{CO_2} = ____ %/100 = ____

$C_{COSTACK}$ = C_{CONDIR} $(1-F_{CO_2})$

= ____ (1 - ____)

= ____ ppm (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/14/91

Sample location NB4 South Dryer Stack

Run number 3 (cont'd) Time 1547-1717

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	2.0	
2	2.0	
3	1.9	
4	2.0	
5	2.0	
6	1.9	
7	1.9	
8	6.2	
9	6.7	
10	5.2	
11	5.1	
12	5.2	
13	5.0	
14	4.7	
15	4.4	
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
Average	2.57	13.1

F_{CO_2} = 0.4 %/100 = 0.004

$C_{COSTACK} = C_{CONDIR}\ (1-F_{CO_2})$

= 13.1 (1 - 0.004)

= 13 ppm (dry basis)

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76 Imperial Drive, Unit I
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307/789-6420

Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-4

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-4	North NB-4 RUN #1 02-13-91	C1	ppm	4.1
		C2	ppm	*
		C3	ppm	*
		C4	ppm	2.4
		C5	ppm	9.0
		C6	ppm	*
		C7	ppm	1.4
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Nils L Rasmussen
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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-5

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-5	North NB-4 RUN #2 02-13-91	C1	ppm	4.6
		C2	ppm	*
		C3	ppm	*
		C4	ppm	4.3
		C5	ppm	9.1
		C6	ppm	*
		C7	ppm	0.7
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Neil L Rasmussen
Laboratory Supervisor

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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-6

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-6	North NB-4 RUN #3 02-13-91	C1	ppm	4.3
		C2	ppm	*
		C3	ppm	*
		C4	ppm	3.9
		C5	ppm	8.0
		C6	ppm	*
		C7	ppm	*
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Niels L Rasmussen
Laboratory Supervisor

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307/789-6420

Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-10

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-10	South NB4 Dryer Stack Run #1 02-14-91	C1	ppm	4.3
		C2	ppm	*
		C3	ppm	*
		C4	ppm	2.3
		C5	ppm	2.6
		C6	ppm	*
		C7	ppm	*
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Nick L Rasmussen

Laboratory Supervisor

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307/789-6420

LAB# : 91-2321-11

Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-11	South NB4 Dryer Stack Run #2 02-14-91	C1	ppm	3.4
		C2	ppm	*
		C3	ppm	*
		C4	ppm	2.1
		C5	ppm	3.1
		C6	ppm	*
		C7	ppm	0.5
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Neil L Rasmussen
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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-12

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-12	South NB4 Dryer Stack Run #3 02-14-91	C1	ppm	3.6
		C2	ppm	*
		C3	ppm	*
		C4	ppm	1.8
		C5	ppm	2.5
		C6	ppm	*
		C7	ppm	*
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Nick L. Rasmussen

Laboratory Supervisor

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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-1

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-1	K-1 Inlet Run #1 02-15-91	C1	ppm	3.7
		C2	ppm	*
		C3	ppm	*
		C4	ppm	4.6
		C5	ppm	7.7
		C6	ppm	*
		C7	ppm	0.5
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Jeb F Rasmussen
Laboratory Supervisor

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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-2

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-2	K-1 Inlet Run #2 02-15-91	C1	ppm	3.4
		C2	ppm	*
		C3	ppm	*
		C4	ppm	1.6
		C5	ppm	6.9
		C6	ppm	*
		C7	ppm	0.7
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Niels L. Rasmussen
Laboratory Supervisor

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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-3

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-3	K-1 Inlet Run #3 02-15-91	C1	ppm	3.3
		C2	ppm	*
		C3	ppm	*
		C4	ppm	2.6
		C5	ppm	33.9
		C6	ppm	*
		C7	ppm	*
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Nick L Rasmussen
Laboratory Supervisor

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LAB# : 91-2321-7

Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-7	K-1 outlet Run #1 02-15-91	C1	ppm	3.8
		C2	ppm	*
		C3	ppm	*
		C4	ppm	0.5
		C5	ppm	5.6
		C6	ppm	*
		C7	ppm	0.4
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Niels L Rasmussen

Laboratory Supervisor

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307/234-5511

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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-8

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-8	K-1 Outlet Run #2 02-15-91	C1	ppm	3.3
		C2	ppm	*
		C3	ppm	*
		C4	ppm	*
		C5	ppm	2.8
		C6	ppm	*
		C7	ppm	*
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Niels L Rasmussen

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Client : Coors
Address: Golden Colorado
Attention: Jere Zimmerman

LAB# : 91-2321-9

Sample Type : Air Bags
Submitted By: Western Environmental
Analyzed By : Huffman Labs
Subject : 9110-111

Date Sampled :
Date Submitted: 02-18-91
Date Analyzed : 02-26-91

Sample #	Sample I.D.	Parameter	Units	Level
2321-9	K-1 Outlet Run #3 02-15-91	C1	ppm	3.3
		C2	ppm	*
		C3	ppm	*
		C4	ppm	1.6
		C5	ppm	3.1
		C6	ppm	*
		C7	ppm	*
		C8	ppm	*
		C9	ppm	*
		C10	ppm	*

* = Not Detected

Nick L Rasmussen

Laboratory Supervisor

K-1 DRYER OUTLET STACK

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. K-1 Outlet Span 500

Operator M. Tikka Date 2/15 - 2/16/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	0	0.0	0.0
Upscale gas	30	30	0.0	32.5	0.5	0.5

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Outlet

Run Number 1 Date 12/15/91

$\bar{C}$ = 8.6

C_o = 0

C_m = 31.25

C_{ma} = 38.9

$$C_{gas} = (8.6 - 0) \frac{38.9}{31.25 - 0}$$

= 10.7 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Outlet

Run number 1 Time 2111 - 2211

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	0.0	
2	0.0	
3	0.0	
4	0.5	
5	0.0	
6	1.0	
7	1.0	
8	1.0	
9	1.0	
10	1.0	
11	1.0	
12	1.0	
13	1.5	
14	1.5	
15	1.0	
16	2.0	
17	2.0	
18	2.0	
19	2.5	
20	2.0	
21	2.0	
22	2.5	
23	2.5	
24	2.5	
25	3.0	
26	2.5	
27	3.0	
28	4.0	
29	3.5	
30	4.0	
Average	1.72	10.7

F_{CO_2} = 0.4 %/100 = 0.004

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 10.7 (1 - 0.004)

= 10 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. K-1 Outlet Span 500

Operator M. Tikka Date 2/15-2/16/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	-2	-0.4	-0.4
Upscale gas	30	32.5	0.5	35	1.0	0.5

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o)\ \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Outlet

Run Number 2 Date 2/15/91

$\bar{C}$ = 19.75

C_o = -1

C_m = 33.75

C_{ma} = 38.9

$$C_{gas} = (19.75 - (-1))\ \frac{38.9}{33.75 - (-1)}$$

= 23.2 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Outlet

Run number 2 Time 2205-2305

Operator M. Tikka Intervals 2min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	0.0	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	0.0	
8	0.0	
9	0.0	
10	0.0	
11	0.5	
12	0.0	
13	0.5	
14	0.5	
15	1.0	
16	1.5	
17	1.5	
18	1.5	
19	1.5	
20	1.5	
21	3.5	
22	7.0	
23	10.0	
24	12.0	
25	11.5	
26	12.0	
27	12.5	
28	13.0	
29	13.0	
30	14.0	
Average	3.95	23.2

F_{CO_2} = 0.4 %/100 = 0.004

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 23.2 (1 - 0.004)

= 23 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. K-1 Outlet Span 500

Operator M. Tikka Date 2/15 - 2/16 - 91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	-2	-0.4	-1	-0.2	0.2
Upscale gas	30	35	1.0	40	2.0	1.0

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

K-1 DRYER INLET

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 1

Source I.D. K-1 Inlet Span 500

Operator M. Tikka Date 2/15/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	0	0.0	5	1.0	1.0
Upscale gas	37	37	0.0	37.5	0.5	0.5

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Inlet

Run Number 1 Date 2/15/91

$\bar{C}$ = 6.4

C_o = 2.5

C_m = 37.25

C_{ma} = 38.9

$$C_{gas} = (6.4 - 2.5) \frac{38.9}{37.25 - 2.5}$$

= 4.4 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Inlet

Run number 1 Time 1054-1154

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	1.5	
2	1.0	
3	1.5	
4	1.5	
5	1.5	
6	1.5	
7	1.5	
8	1.5	
9	1.5	
10	2.0	
11	1.0	
12	1.0	
13	2.0	
14	1.5	
15	1.5	
16	2.0	
17	1.5	
18	1.0	
19	1.5	
20	1.5	
21	0.5	
22	1.0	
23	1.0	
24	1.0	
25	1.0	
26	1.0	
27	1.5	
28	0.5	
29	1.0	
30	0.5	
Average	1.28	4.4

F_{CO_2} = 0.0 %/100 = 0.000

$C_{COSTACK} = C_{CONDIR} (1 - F_{CO_2})$

= 4.4 (1 - 0.000)

= 4 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 2

Source I.D. K-1 Inlet Span 500

Operator M. Tikka Date 2/15/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	5	1.0	10	2.0	1.0
Upscale gas	37	37.5	0.5	45	1.6	1.5

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Inlet

Run Number 2 Date 2/15/91

$\bar{C}$ = 10.6

C_o = 7.5

C_m = 41.25

C_{ma} = 38.9

$$C_{gas} = (10.6 - 7.5) \frac{38.9}{41.25 - 7.5}$$

= 3.6 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Inlet

Run number 2 Time 1317-1435

Operator M. Tikka Intervals 2min.

Interval	Chart Recorder Deflection (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	2.0	
2	2.0	
3	2.5	
4	2.5	
5	2.0	
6	2.5	
7	2.0	
8	1.5	
9	2.0	
10	2.0	
11	2.0	
12	2.0	
13	2.0	
14	2.5	
15	2.5	
16	2.0	
17	2.5	
18	3.0	
19	2.0	
20	1.5	
21	1.5	
22	2.0	
23	2.0	
24	2.5	
25	2.0	
26	2.0	
27	2.5	
28	2.5	
29	2.0	
30	1.5	
Average	2.12	3.6

F_{CO_2} = 0.0 %/100 = 0.000

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 3.6 (1 - 0.000)

= 4 ppm (dry basis)

METHOD 10 SYSTEM CALIBRATION BIAS AND DRIFT DATA

Source Location Coors Brewing Co. Run # 3

Source I.D. K-1 Inlet Span 500

Operator M. Tikka Date 2/15/91

		Initial Values		Final Values		
	Analyzer Calibration Response (ppm)	System Cal. Response (ppm)	System Cal. Bias % of Span	System Cal. Response (ppm)	System Cal. Bias % of Span	Drift % of Span
Zero gas	0	10	2.0	10	2.0	0.0
Upscale gas	37	45	1.6	47.5	2.1	0.5

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response} - \text{Analyzer Cal. Response}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Response} - \text{Initial System Cal. Response}}{\text{Span}} \times 100$$

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Inlet

Run Number 3 Date 2/15/91

$\bar{C}$ = 12.15

C_o = 10

C_m = 46.25

C_{ma} = 38.9

$$C_{gas} = (12.15 - 10) \frac{38.9}{46.25 - 10}$$

= 2.3 ppm, (dry basis)

METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/15/91

Sample location K-1 Dryer Inlet

Run number 3 Time 1608 - 1702

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-300)	C_{CONDIR}-ppm (from cal. curve)
1	2.0	
2	2.5	
3	2.5	
4	2.5	
5	3.0	
6	2.0	
7	2.5	
8	2.5	
9	2.5	
10	—	
11	—	
12	—	
13	—	
14	—	
15	—	
16	2.5	
17	2.0	
18	2.5	
19	2.5	
20	3.0	
21	2.5	
22	2.0	
23	2.5	
24	2.0	
25	2.5	
26	2.5	
27	2.5	
28	—	
29	—	
30	—	
Average	2.43	2.3

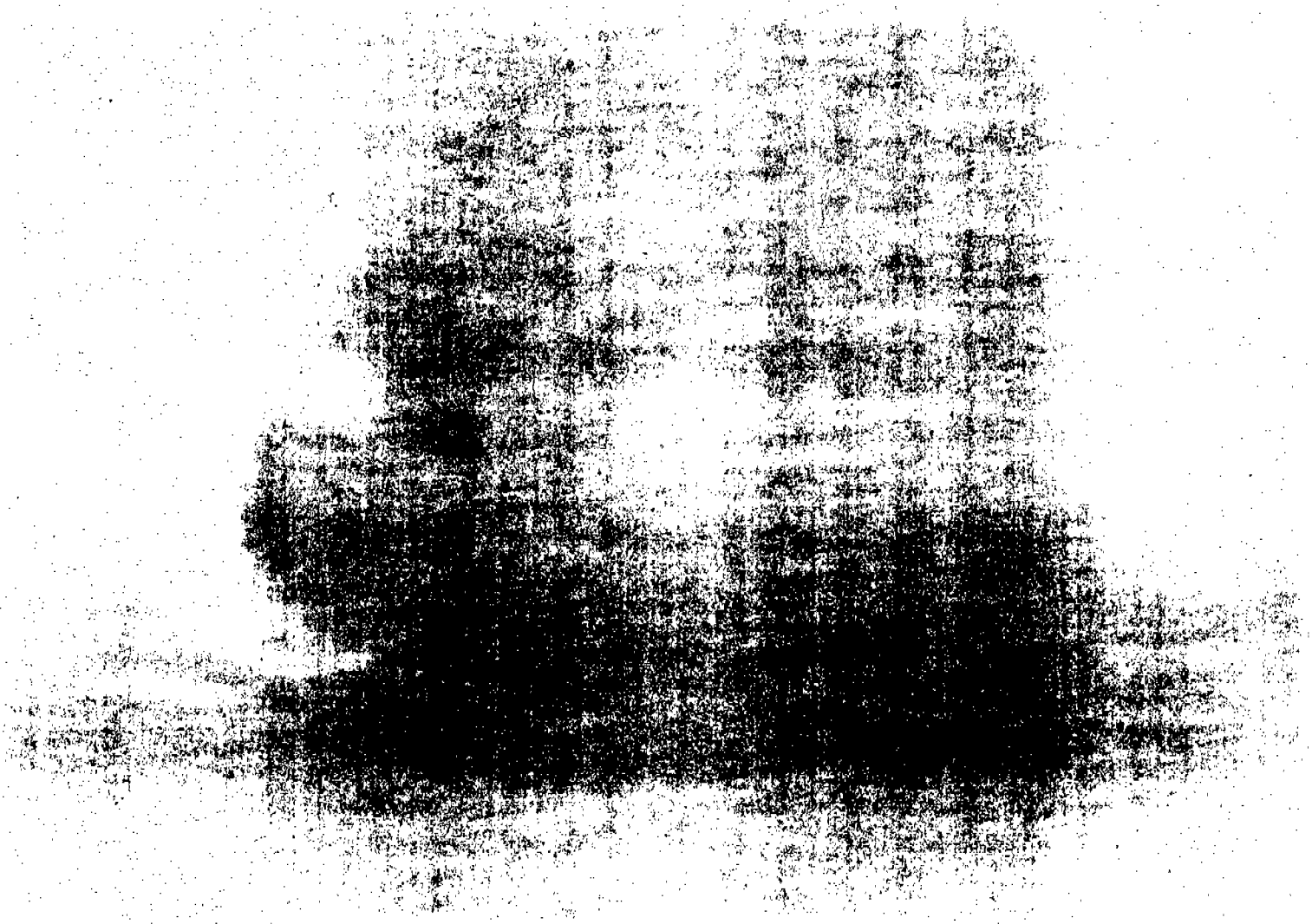
F_{CO_2} = 0.0 %/100 = 0.000

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 2.3 (1 - 0.000)

= 2 ppm (dry basis)

INTEGRATED BAG SAMPLES



METHOD 10 ANALYTICAL DATA & CALCULATIONS
CONTINUOUS ANALYSIS

Plant Coors Brewing Co. Date 2/16/91

Sample location K-1 Dryer Outlet

Run number 3 Time 0100 – 0203

Operator M. Tikka Intervals 2 min.

Interval	Chart Recorder Deflection % (0-500)	C_{CONDIR}-ppm (from cal. curve)
1	0.0	
2	0.0	
3	0.0	
4	0.0	
5	0.0	
6	0.0	
7	0.0	
8	0.0	
9	0.0	
10	0.0	
11	0.0	
12	0.0	
13	0.0	
14	0.0	
15	0.5	
16	0.0	
17	1.0	
18	0.0	
19	0.0	
20	1.0	
21	0.0	
22	0.0	
23	0.5	
24	0.0	
25	0.0	
26	1.0	
27	0.5	
28	0.5	
29	0.5	
30	0.0	
Average	0.18	2.4

F_{CO_2} = 0.2 %/100 = 0.002

$C_{COSTACK} = C_{CONDIR}(1-F_{CO_2})$

= 2.4 (1 - 0.002)

= 2 ppm (dry basis)

METHOD 10 EMISSION CALCULATIONS

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.

C_{ma} = Actual concentration of the upscale calibration gas, ppm.

Location K-1 Dryer Outlet

Run Number 3 Date 2/16/91

$\bar{C}$ = 0.9

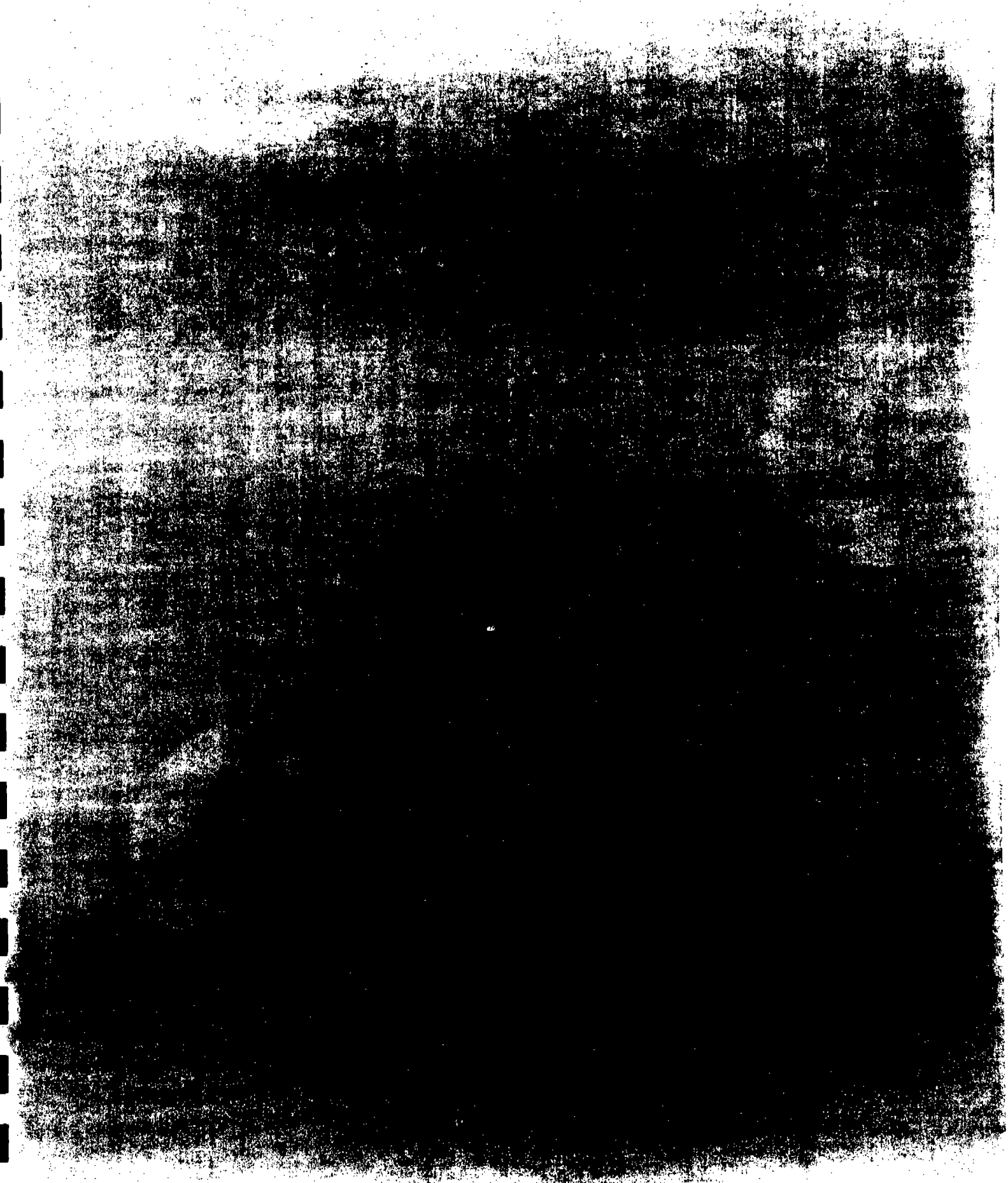
C_o = -1.5

C_m = 37.5

C_{ma} = 38.9

$$C_{gas} = (0.9 - (-1.5)) \frac{38.9}{37.5 - (-1.5)}$$

= 2.4 ppm, (dry basis)



[redacted] No. [redacted] 11 [redacted] Method 5 FIELD DATA [redacted] K Factor 3[redacted]

Job Name Cooks

Run No. 1

Location NB4 Dryer Stack (North)

Date 2-13-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

Read and Record at the Start of Each Test Point

Ambient Temp. °F 102

Assumed Moisture % 46%

Probe Length 5'

Pitot Tube Leak Check Before — After —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A-3	1623	861.432	0.48	1.65	1.65	9.0	110	—	—	—	108	109	
A-3	1628	865.69	0.48	1.65	1.65	12.0	110	—	—	—	106	108	
A-3	1630	867.404	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 Pitot Tube No. 74-1

Volume Collected V_m 5.888 ft³ %CO_2 0.2 %CO 0.0

Water Collected V_w — ml %O_2 20.8 %N_2 79.0

Time of Test T_t 7 min Area Stack A2 2937 in²

Baro. Press. P_b 24.40 "Hg Stack Press. -0.15 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. 3-9 Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 X 5.972

Dry Gas Meter _____ ft³ - (T_t ____ min x Leak Rate _____ cfm) = _____

M_F = M_T =

PARTICLE SIZE DATA

Run No: 1

Date: 02-13-91

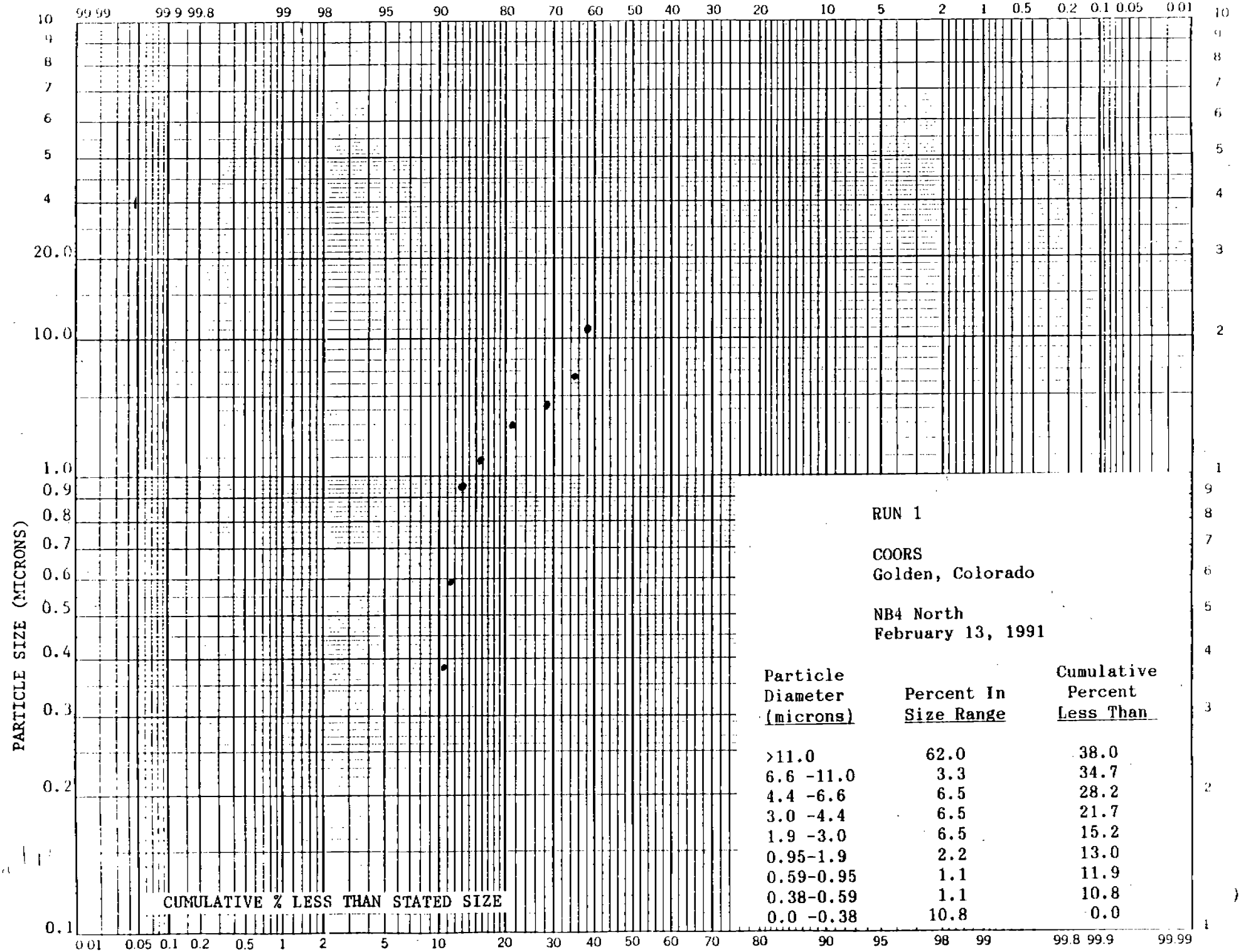
Time: 1623-1630

Location: NB4 North

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.2133	0.2190	5.7	62.0	38.0 37.3	>11.0 10.0
1	0.1574	0.1577	0.3	3.3	34.7	6.6
2	0.1397	0.1403	0.6	6.5	28.2	4.4
3	0.1556	0.1562	0.6	6.5	21.7 18.7	3.0
4	0.1400	0.1406	0.6	6.5	15.2	1.9
5	0.1591	0.1593	0.2	2.2	13.0	0.95
6	0.1400	0.1401	0.1	1.1	11.9	0.59
7	0.1574	0.1575	0.1	1.1	10.8	0.38
F	0.3524	0.3534	1.0 9.2	10.8 100.0	0.0	---

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.048	"H_2O (ΔP_s)
Stack Temperature:	170	°F (T_s)
Molecular Weight:	23.69	lbs/lb-mole (MW)
Stack Pressure:	24.39	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	1.65	"H_2O (P_m)
Sample Volume:	5.888	ft^3 (V_m)
Meter Temperature:	108	°F (T_m)
Sampling Rate:	0.841	ACFM (Q_a)
% I:	89.83	%
Emissions:	0.0316	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



RUN 1

COORS
Golden, Colorado

NB4 North
February 13, 1991

Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>11.0	62.0	38.0
6.6 -11.0	3.3	34.7
4.4 -6.6	6.5	28.2
3.0 -4.4	6.5	21.7
1.9 -3.0	6.5	15.2
0.95-1.9	2.2	13.0
0.59-0.95	1.1	11.9
0.38-0.59	1.1	10.8
0.0 -0.38	10.8	0.0

Job No. 9110-111
Job Name Coors
Run No. 2
Location NB4 North Dryer Stack

Date 2-13-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4
ΔPs Pm

Part Size FIELD DATA

Read and Record at the Start of Each Test Point

K Factor 36
Ambient Temp. °F 102
Assumed Moisture % 48
Probe Length 5'

Pitot Tube Leak Check Before — / After —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm
Ts Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
D-5	1813	920.608	0.044	1.60	1.60	8.0	180	—	—	—	109	110	
	1818	924.84	0.044	1.60	1.60	11.0	180	—	—	—	107	109	
	1823	929.25	0.044	1.60	1.60	11.0	180	—	—	—	105	107	
	1828	933.69	0.044	1.60	1.60	11.0	180	—	—	—	104	107	
	1833	938.082	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 74-1 Pitot Tube No. 0817

Volume Collected V_m 17.229 ft³

Water Collected V_w — ml

Time of Test T_t 20 min

Baro. Press. P_b 24.40 "Hg

$\%CO_2$ 0.2 $\%CO$ 0.0

$\%O_2$ 21.0 $\%N_2$ 78.8

Area Stack A_2 29.37 in²

Stack Press. −0.15 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. 3-9 Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 x 17.474

Dry Gas Meter _____ ft³ - (T_t ____ min x Leak Rate _____ cfm) = _____

M_F = _____ M_T = _____

PARTICLE SIZE DATA

Run No: 2

Date: 02-13-91

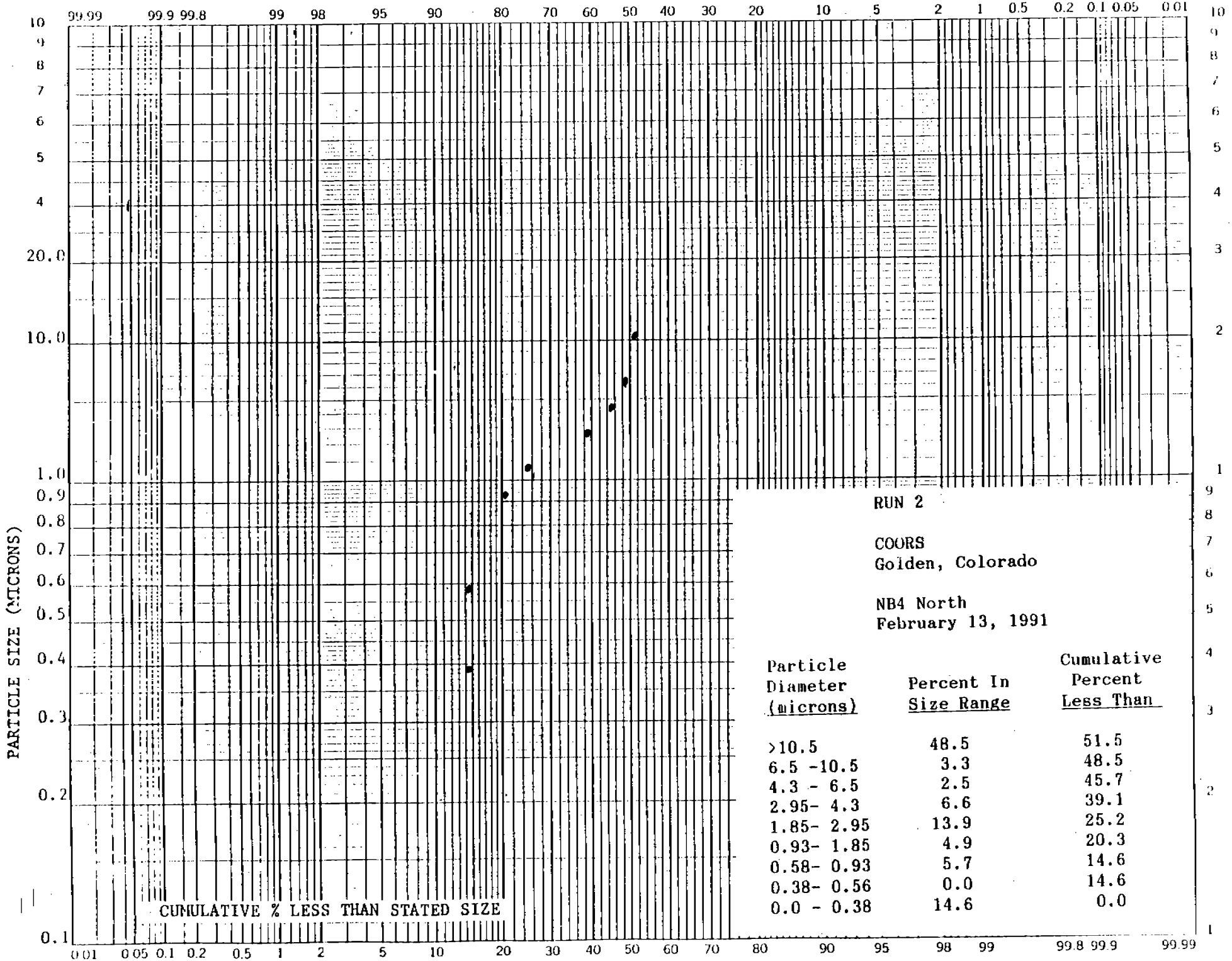
Time: 1813-1833

Location: NB4 North

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.0631	0.0690	5.9	48.5	51.5 51.1	>10.5 10
1	0.1566	0.1570	0.4	3.3	48.2	6.5
2	0.1396	0.1399	0.3	2.5	45.7	4.3
3	0.1554	0.1562	0.8	6.6	39.1 33.4	2.95 2.5
4	0.1382	0.1399	1.7	13.9	25.2	1.85
5	0.1566	0.1572	0.6	4.9	20.3	0.93
6	0.1400	0.1407	0.7	5.7	14.6	0.58
7	0.1571	0.1571	0.0	0.0	14.6	0.38
F	0.3569	0.3587	1.8 12.2	14.6 100.0	0.0	---

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.044	$"H_2O$ (ΔP_s)
Stack Temperature:	180	°F (T_s)
Molecular Weight:	23.64	lbs/lb-mole (MW)
Stack Pressure:	24.39	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	1.60	$"H_2O$ (P_m)
Sample Volume:	17.229	ft^3 (V_m)
Meter Temperature:	107	°F (T_m)
Sampling Rate:	0.861	ACFM (Q_a)
% I:	97.87	%
Emissions:	0.0143	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>10.5	48.5	51.5
6.5 -10.5	3.3	48.5
4.3 - 6.5	2.5	45.7
2.95- 4.3	6.6	39.1
1.85- 2.95	13.9	25.2
0.93- 1.85	4.9	20.3
0.58- 0.93	5.7	14.6
0.38- 0.56	0.0	14.6
0.0 - 0.38	14.6	0.0

Job No. 7110-111 Port Inj FIELD DATA

Job Name Coors

Run No. 3

Location NBA North Dryer Stack (2 Dryers)

Date 2/13/91

Operator McCullough/Thomas

Sample Box No. — Meter Box No. 4

ΔPs Pm Ts Tm

K Factor 36

Ambient Temp. °F 102

Assumed Moisture % 18

Probe Length 5'

Read and Record at the Start of Each Test Point

Pitot Tube Leak Check Before — After —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
C-5	2009	984.739	0.032	1.15	1.15	6.0	171				108	110	
5	2014	988.40	0.032	1.15	1.15	8.0	171				107	109	
5	2019	992.16	0.032	1.15	1.15	8.0	171				106	108	
END	2024	995.912	—	—	—	—	—				—	—	
ALL													

Pitot Tube Calibration Factor C_p 0.817 Pitot Tube No. 74-1

Volume Collected V_m 11.017 ft³

Water Collected V_w — ml

Time of Test T_t 15 min

Baro. Press. P_b 24.40 "Hg

$\%CO_2$ 0.2 %CO 0.0

$\%O_2$ 20.8 $\%N_2$ 79.0

Area Stack A_2 2937 in²

Stack Press. −0.15 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 Probe Tip Dia. 0.615 in.

V_m=Dry Gas Meter Calibration Factor 0.986 x 11.173

Dry Gas Meter ____ ft³ - (T_t ____ min x Leak Rate ____ cfm) = ____

M_r = M_T =

PARTICLE SIZE DATA

Run No: 3

Date: 02-13-91

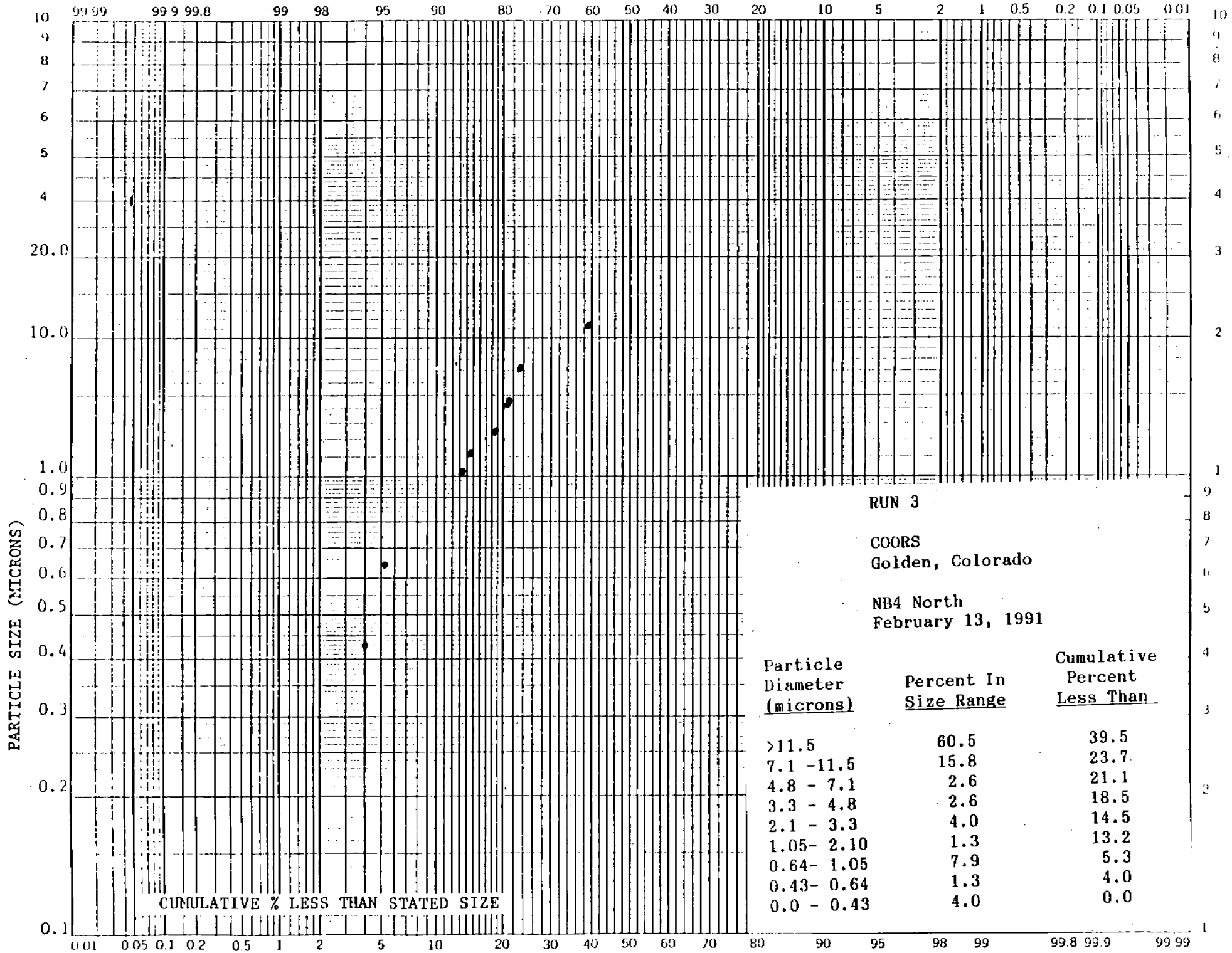
Time: 2009-2024

Location: NB4 North

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.6253	0.6299	4.6	60.5	39.5	>11.5
1	0.1548	0.1560	1.2	15.8	23.7	7.1
2	0.1388	0.1390	0.2	2.6	21.1	4.8
3	0.1538	0.1540	0.2	2.6	18.5	3.3
4	0.1400	0.1403	0.3	4.0	14.5	2.1
5	0.1543	0.1544	0.1	1.3	13.2	1.05
6	0.1398	0.1404	0.6	7.9	5.3	0.64
7	0.1575	0.1576	0.1	1.3	4.0	0.43
F	0.3565	0.3568	0.3	4.0	0.0	---
			7.6	100.0		

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.032	$"H_2O$ (ΔP_s)
Stack Temperature:	171	°F (T_s)
Molecular Weight:	23.38	lbs/lb-mole (MW)
Stack Pressure:	24.39	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	1.15	$"H_2O$ (P_m)
Sample Volume:	11.017	ft^3 (V_m)
Meter Temperature:	106	°F (T_m)
Sampling Rate:	0.734	ACFM (Q_a)
% I:	101.25	%
Emissions:	0.0139	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



RUN 3

COORS
Golden, Colorado

NB4 North
February 13, 1991

Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>11.5	60.5	39.5
7.1 -11.5	15.8	23.7
4.8 - 7.1	2.6	21.1
3.3 - 4.8	2.6	18.5
2.1 - 3.3	4.0	14.5
1.05- 2.10	1.3	13.2
0.64- 1.05	7.9	5.3
0.43- 0.64	1.3	4.0
0.0 - 0.43	4.0	0.0

Job No. 1116-111 — Test Site FIELD DATA — K Factor .45

Job Name Cooper

Run No. 1

Location NB4 South Dryer Stack — Read and Record at the Start of Each Test Point

Date 2-14-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

Ambient Temp. °F 100

Assumed Moisture % 40

Probe Length 5'

Pitot Tube Leak Check — Before: — After: —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = ____ cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
B-5	1130	43.973	0.008	0.36	0.36	3.0	156	—	—	—	103	104	
B-5	1135	46.08	0.008	0.36	0.36	3.0	156	—	—	—	103	103	
B-5	1140	48.28	0.008	0.36	0.36	3.0	156	—	—	—	102	103	
B-5	1145	50.31	0.008	0.36	0.36	5.5	156	—	—	—	102	103	
B-5	1150	52.46	0.008	0.36	0.36	9.0	156	—	—	—	103	103	
B-5	1155	54.71	0.008	0.36	0.36	9.0	156	—	—	—	101	102	
B-5	1200	57.024	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 — Pitot Tube No. 14-1

Volume Collected V_m 12.868 ft³ — %CO_2 0.4 — %CO 0.0

Water Collected V_w — ml — %O_2 21.2 — %N_2 78.4

Time of Test T_t 30 min — Area Stack A_2 1937 in²

Baro. Press. P_b 24.38 "Hg — Stack Press. −0.18 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 — Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 x 13.051

Dry Gas Meter ____ ft³ - (T_t ____ min x Leak Rate ____ cfm) = ____

Mf = — Mr = —

PARTICLE SIZE DATA

Run No: 1

Date: 02-14-91

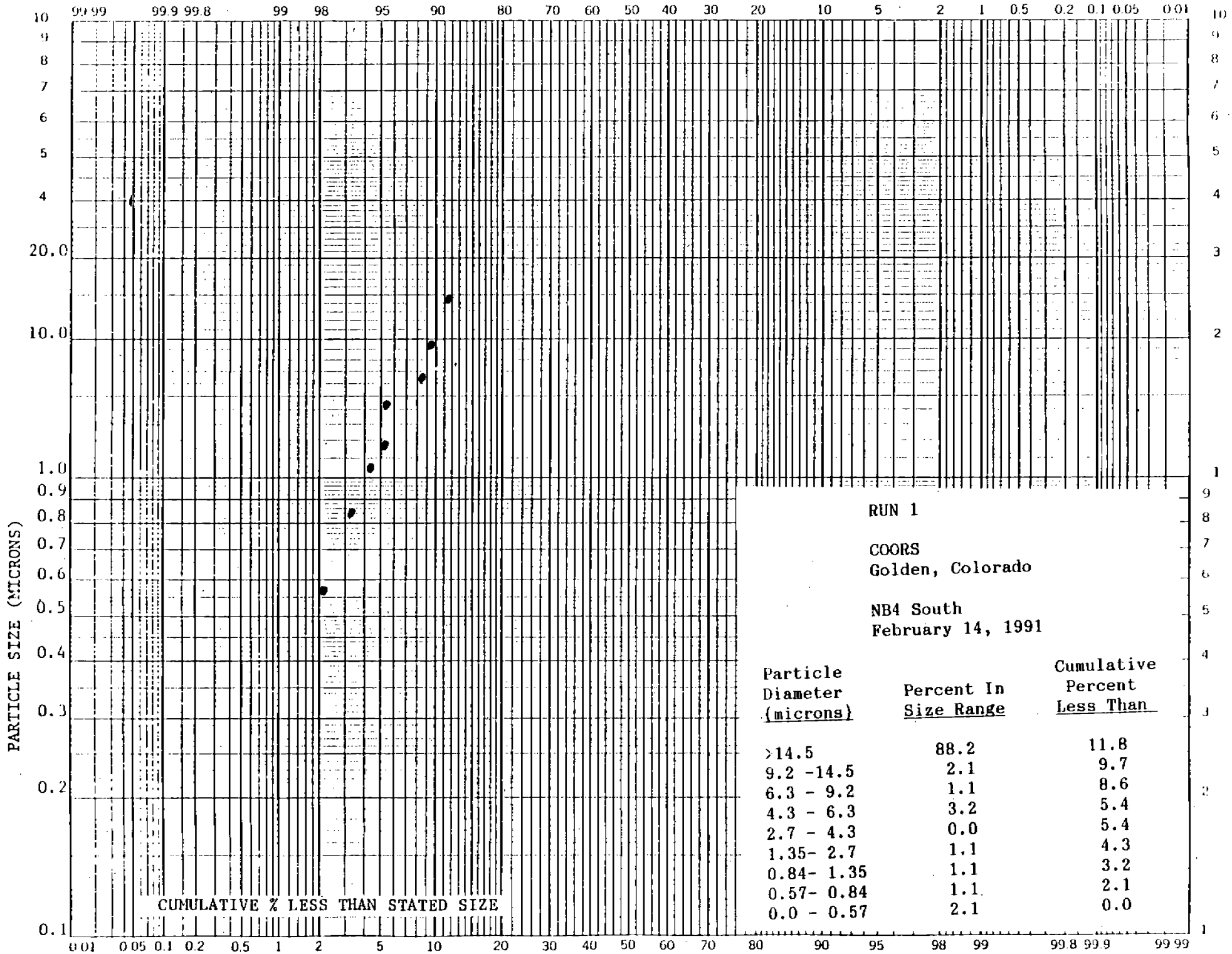
Time: 1130-1200

Location: NB4 South

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.4589	0.4671	8.2	88.2	11.8 10.9	>14.5 13.2
1	0.1579	0.1581	0.2	2.1	9.7	9.2
2	0.1375	0.1376	0.1	1.1	8.6	6.3
3	0.1569	0.1572	0.3	3.2	5.4	4.3
4	0.1382	0.1382	0.0	0.0	5.4 5.2	2.7 2.4
5	0.1588	0.1589	0.1	1.1	4.3	1.35
6	0.1392	0.1393	0.1	1.1	3.2	0.84
7	0.1582	0.1583	0.1	1.1	2.1	0.57
F	0.3583	0.3585	0.2 9.3	2.1 100.0	0.0	---

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.008	"H_2O (ΔP_s)
Stack Temperature:	156	°F (T_s)
Molecular Weight:	25.34	lbs/lb-mole (MW)
Stack Pressure:	24.37	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	0.36	"H_2O (P_m)
Sample Volume:	12.868	ft^3 (V_m)
Meter Temperature:	103	°F (T_m)
Sampling Rate:	0.429	ACFM (Q_a)
% I:	89.69	%
Emissions:	0.0145	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>14.5	88.2	11.8
9.2 -14.5	2.1	9.7
6.3 - 9.2	1.1	8.6
4.3 - 6.3	3.2	5.4
2.7 - 4.3	0.0	5.4
1.35- 2.7	1.1	4.3
0.84- 1.35	1.1	3.2
0.57- 0.84	1.1	2.1
0.0 - 0.57	2.1	0.0

Job No. [redacted] Test Site FIELD DATA K Factor .55

Job Name Coors Ambient Temp. °F 100

Run No. 2 Assumed Moisture % 35

Location NB4 So. Dryer Stack Probe Length 5'

Date McCullough/Thomas Read and Record at the Start of Each Test Point Pitot Tube Leak Check Before — After —

Operator 2-14-91 Initial Leak @ 10.0 "Hg = 0.000 cfm

Sample Box No. 9 Meter Box No. 4 Final Leak @ 10.0 "Hg = 0.000 cfm

ΔPs Pm Ts Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
C-5	1358	107.100	0.012	0.66	0.66	4.0	159	—	—	—	109	110	
C-5	1403	109.91	0.012	0.66	0.66	4.0	159	—	—	—	105	107	
C-5	1408	112.72	0.012	0.66	0.66	4.0	159	—	—	—	104	106	
C-5	1413	115.53	0.012	0.66	0.66	4.0	159	—	—	—	104	106	
C-5	1418	118.33	0.012	0.66	0.66	4.0	159	—	—	—	103	106	
C-5	1423	121.20	0.012	0.66	0.66	4.5	159	—	—	—	103	106	
END	1428	123.961	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 Pitot Tube No. 24-1

Volume Collected V_m 16.625 ft³ %CO_2 0.2 %CO 0.0

Water Collected V_w — ml %O_2 21.0 %N_2 18.8

Time of Test T_t ~~30~~ 30 min Area Stack A_2 2937 in²

Baro. Press. P_b 24.38 "Hg Stack Press. −0.18 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-5 Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 X 16.841

Dry Gas Meter _____ ft³ - (T_t _____ min x Leak Rate _____ cfm) = _____

M_F - M_F -

PARTICLE SIZE DATA

Run No: 2

Date: 02-14-91

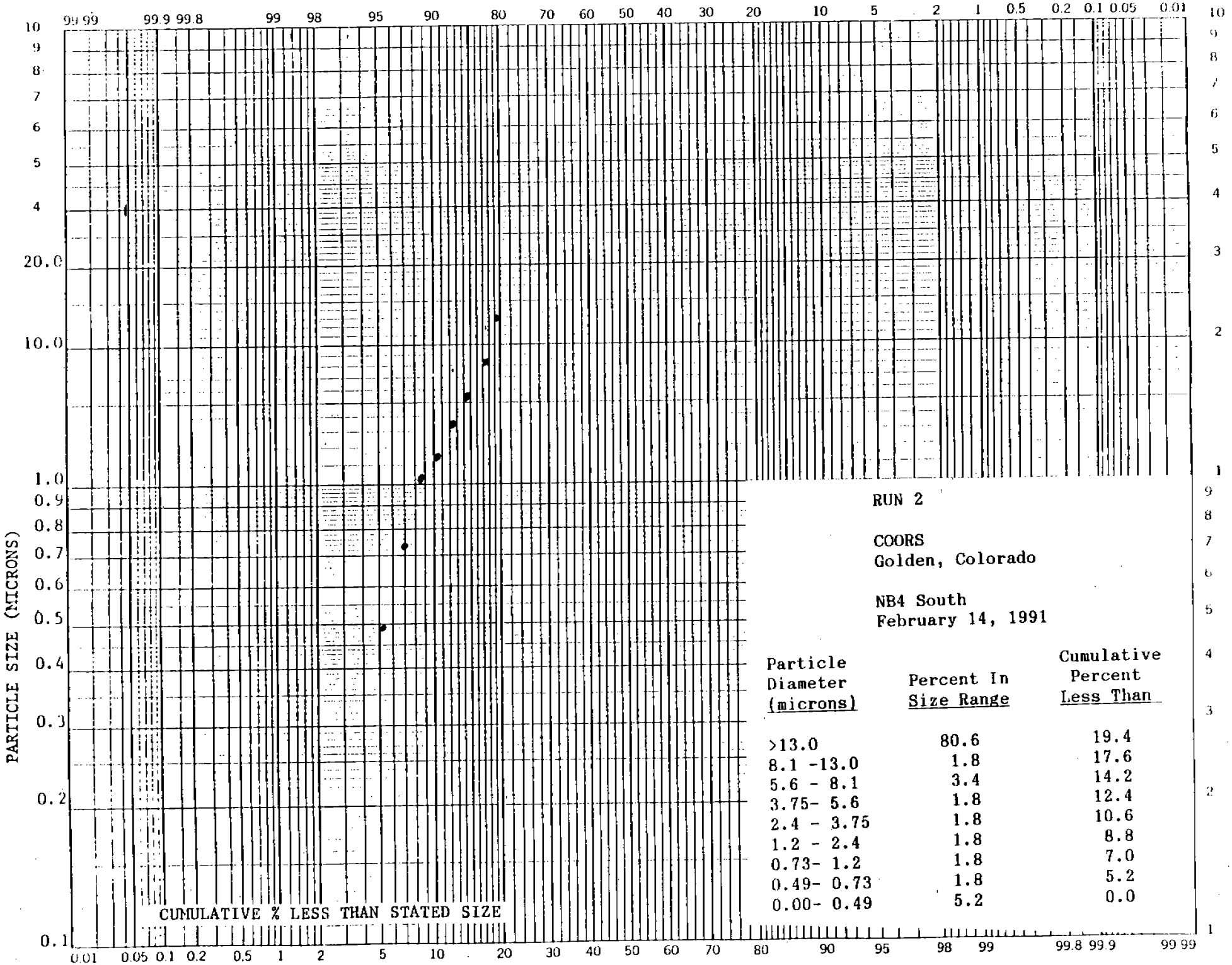
Time: 1358-1428

Location: NB4 South

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.7053	0.7099	4.6	80.6	19.4 18.3	>13.0 10.3
1	0.1573	0.1574	0.1	1.8	17.6	8.1
2	0.1407	0.1409	0.2	3.4	14.2	5.6
3	0.1578	0.1579	0.1	1.8	12.4 10.7	3.75 2.5
4	0.1372	0.1373	0.1	1.8	10.6	2.4
5	0.1570	0.1571	0.1	1.8	8.8	1.2
6	0.1375	0.1376	0.1	1.8	7.0	0.73
7	0.1552	0.1553	0.1	1.8	5.2	0.49
F	0.3533	0.3536	0.3 5.7	5.2 100.0	0.0	---

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.012	"H_2O (ΔP_s)
Stack Temperature:	159	°F (T_s)
Molecular Weight:	25.10	lbs/lb-mole (MW)
Stack Pressure:	24.37	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	0.66	"H_2O (P_m)
Sample Volume:	16.625	ft^3 (V_m)
Meter Temperature:	106	°F (T_m)
Sampling Rate:	0.554	ACFM (Q_a)
% I:	96.89	%
Emissions:	0.0069	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>13.0	80.6	19.4
8.1 -13.0	1.8	17.6
5.6 - 8.1	3.4	14.2
3.75- 5.6	1.8	12.4
2.4 - 3.75	1.8	10.6
1.2 - 2.4	1.8	8.8
0.73- 1.2	1.8	7.0
0.49- 0.73	1.8	5.2
0.00- 0.49	5.2	0.0

Job No. [redacted] Last Size FIELD DATA

Job Name Coors

Run No. 3

Location NB4 Dryer Stack

Date 2-14-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

ΔPs Pm Ts Tm

Read and Record at the Start of Each Test Point

K Factor .55

Ambient Temp. °F 98

Assumed Moisture % 35

Probe Length 5'

Pitot Tube Leak Check Before — / After —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot In. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vac In. Hg Gauge	Stack Temp. °F	Probe Temp. °F	Oven Temp. °F	Effluent Temp. °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
C-5	1738	183.583	0.010	0.55	0.55	4.0	160	—	—	—	104	105	
C-5	1743	186.15	0.010	0.55	0.55	4.0	160	—	—	—	104	105	
C-5	1748	188.74	0.010	0.55	0.55	4.0	160	—	—	—	103	105	
C-5	1753	191.31	0.010	0.55	0.55	4.0	160	—	—	—	103	105	
C-5	1758	193.97	0.010	0.55	0.55	4.0	160	—	—	—	103	105	
C-5	1803	195.92	0.010	0.55	0.55	9.0	160	—	—	—	103	105	
END	1808	198.547	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 Pitot Tube No. 24-1

Volume Collected V_m 14.755 ft³

Water Collected V_w — ml

Time of Test T_t 30 min

Baro. Press. P_b 24.38 "Hg

$\%CO_2$ 0.4 %CO 0.0

$\%O_2$ 20.8 $\%N_2$ 78.8

Area Stack A_2 2937 in²

Stack Press. -0.18 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 Probe Tip Dia. 0.618 in.

V_m=Dry Gas Meter Calibration Factor 0.986 X 14.964

Dry Gas Meter _____ ft³ - (T_t ____ min x Leak Rate _____ cfm) = _____

M_F = M_T =

PARTICLE SIZE DATA

Run No: 3

Date: 02-14-91

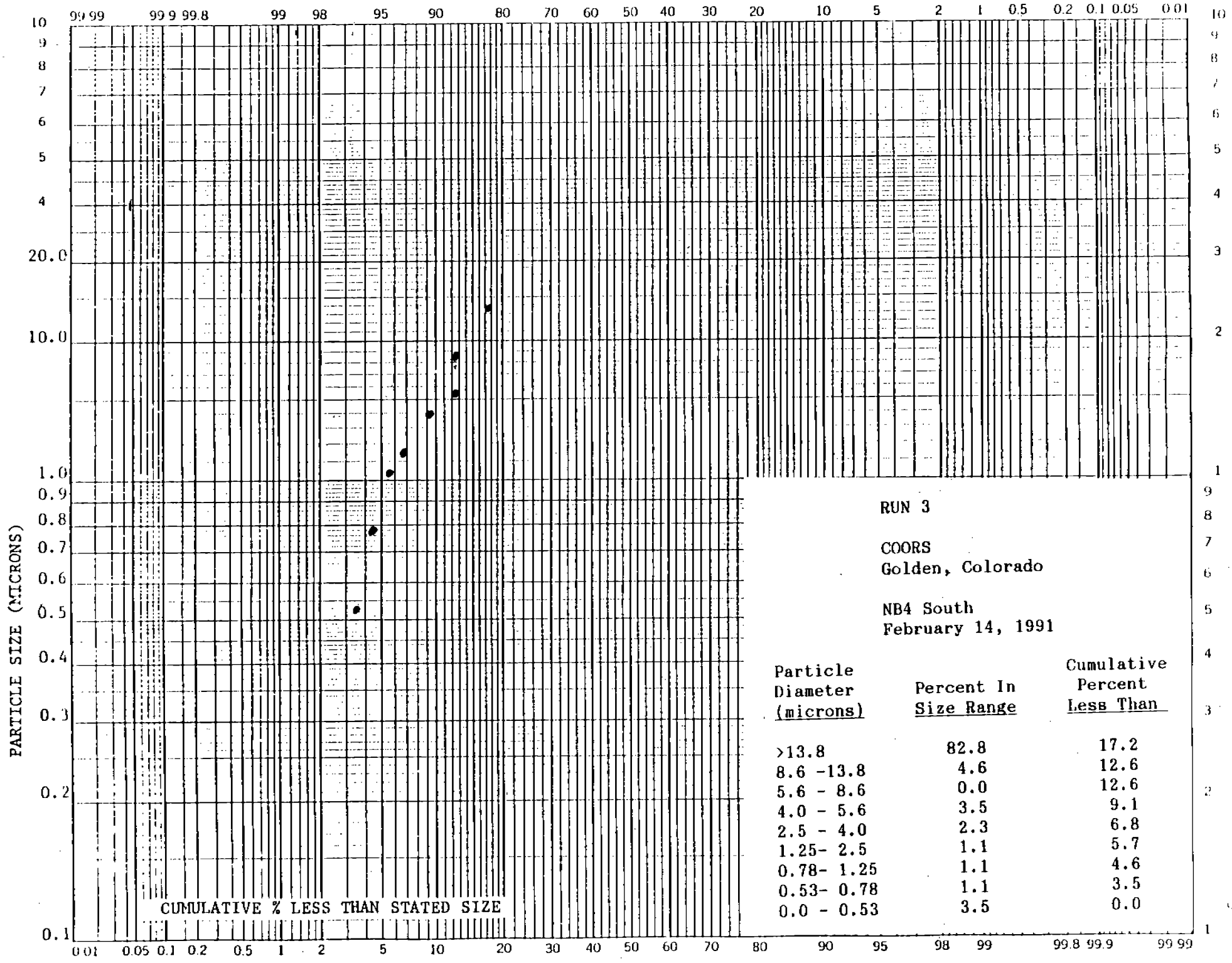
Time: 1738-1808

Location: NB4 South

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.7978	0.8050	7.2	82.8	17.2	>13.8
1	0.1587	0.1591	0.4	4.6	12.6	8.6
2	0.1390	0.1390	0.0	0.0	12.6	5.9
3	0.1586	0.1589	0.3	3.5	9.1	4.0
4	0.1404	0.1406	0.2	2.3	6.8	2.5
5	0.1598	0.1599	0.1	1.1	5.7	1.25
6	0.1400	0.1401	0.1	1.1	4.6	0.78
7	0.1588	0.1589	0.1	1.1	3.5	0.53
F	0.3581	0.3584	0.3	3.5	0.0	---
			8.7	100.0		

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.010	"H_2O (ΔP_s)
Stack Temperature:	160	°F (T_s)
Molecular Weight:	25.32	lbs/lb-mole (MW)
Stack Pressure:	24.37	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	0.55	"H_2O (P_m)
Sample Volume:	14.755	ft^3 (V_m)
Meter Temperature:	104	°F (T_m)
Sampling Rate:	0.492	ACFM (Q_a)
% I:	92.25	%
Emissions:	0.0119	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>13.8	82.8	17.2
8.6 -13.8	4.6	12.6
5.6 - 8.6	0.0	12.6
4.0 - 5.6	3.5	9.1
2.5 - 4.0	2.3	6.8
1.25- 2.5	1.1	5.7
0.78- 1.25	1.1	4.6
0.53- 0.78	1.1	3.5
0.0 - 0.53	3.5	0.0

· No. 9110-111

o Name Coors

Run No. 1

Location K-1 INLET

Date 2-15-90

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

Post Size FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP 32 ΔH _____

Ambient Temp. °F 81

Assumed Moisture % 55

Probe Length 5'

Pitot Tube Leak Check —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F (Ts)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet (Tm)	Dry Gas Temp °F Outlet	Remarks
A-10	1233	237.068	0.020	0.64	0.64	3.0	191	—	—	—	80	80	
A-10	1238	239.83	0.020	0.64	0.64	4.0	191	—	—	—	79	80	
	1242.5	242.068	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.819 Pitot Tube No. 74-1

Volume Collected V_m 4.930 ft^3 $\%CO_2$ 0.0 %CO 0.0

Water Collected V_w — ml $\%O_2$ 20.0 $\%N_2$ 80.0

Time of Test T_t 9.5 min Area Stack A_2 1256 in^2

Baro. Press. P_b 24.50 "Hg Stack Press. -0.23 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 Probe Tip Dia. 0.618 in

V_m = Dry Gas Meter Calibration Factor 0.986 X 5.000

[Dry Gas Meter Reading _____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)]

M_F = _____ M_T = _____

PARTICLE SIZE DATA

Run No: 1

Date: 02-15-91

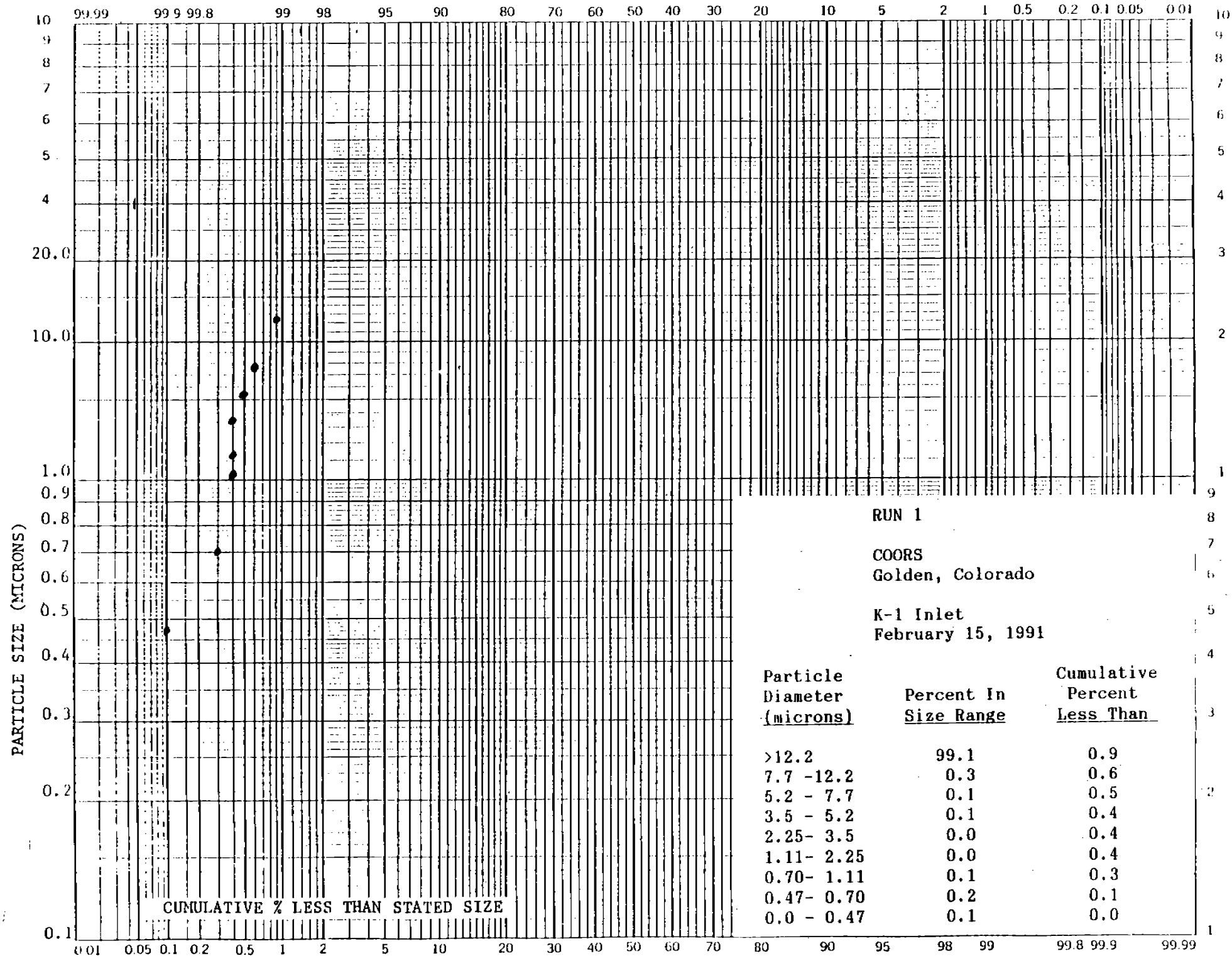
Time: 1233-1242.5

Location: K-1 Inlet

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.5312	0.8519	320.7	99.1	0.9 0.75	>12.2 10.0
1	0.1576	0.1585	0.9	0.3	0.6	7.7
2	0.1411	0.1413	0.2	0.1	0.5	5.2
3	0.1572	0.1575	0.3	0.1	0.4 0.4	3.5 2.5
4	0.1400	0.1400	0.0	0.0	0.4	2.25
5	0.1588	0.1589	0.1	0.0	0.4	1.11
6	0.1411	0.1413	0.2	0.1	0.3	0.70
7	0.1592	0.1600	0.8	0.2	0.1	0.47
F	0.3559	0.3562	0.3	0.1	0.0	---
			323.5	100.0		

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.020	"H_2O ($\triangle P_s$)
Stack Temperature:	191	°F (T_s)
Molecular Weight:	22.38	lbs/lb-mole (MW)
Stack Pressure:	24.48	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	0.64	"H_2O (P_m)
Sample Volume:	4.930	ft^3 (V_m)
Meter Temperature:	80	°F (T_m)
Sampling Rate:	0.519	ACFM (Q_a)
% I:	114.97	%
Emissions:	1.2596	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



RUN 1

COORS
Golden, Colorado

K-1 Inlet
February 15, 1991

Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>12.2	99.1	0.9
7.7 -12.2	0.3	0.6
5.2 - 7.7	0.1	0.5
3.5 - 5.2	0.1	0.4
2.25- 3.5	0.0	0.4
1.11- 2.25	0.0	0.4
0.70- 1.11	0.1	0.3
0.47- 0.70	0.2	0.1
0.0 - 0.47	0.1	0.0

7

Job No. 9110-111

Job Name COORS

Run No. 2

Location K-1 INLET

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

Vat Size FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP _____ ΔH _____

Ambient Temp. °F 88

Assumed Moisture % 5.9°

Probe Length 5'

Pitot Tube Leak Check —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O (ΔPs)	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F (Ts)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F (Tm) Inlet	Dry Gas Temp °F (Tm) Outlet	Remarks
B-8	1443	269.228	0.018	0.50	0.50	3.0	190	—	—	—	93	93	24-1K
	1448	271.67	0.018	0.50	0.50	4.0	190	—	—	—	92	92	
	1450.5	272.906	—	—				—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 Pitot Tube No. 79-1

Volume Collected V_m 3.627 ft^3

Water Collected V_w — ml

Time of Test T_t 7½ min

Baro. Press. P_b 24.80 "Hg

$\%CO_2$ 0.0 %CO 0.0

$\%O_2$ 20.0 $\%N_2$ 80.0

Area Stack A_2 1256 in^2

Stack Press. −0.23 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 Probe Tip Dia. 0.618 In

V_m = Dry Gas Meter Calibration Factor 0.986 X 3.678

Dry Gas Meter Reading _____ ft^3 − (T_t ____ min x Leak Rate ____ cfm)

M_F = _____ M_T = _____

PARTICLE SIZE DATA

Run No: 2

Date: 02-15-91

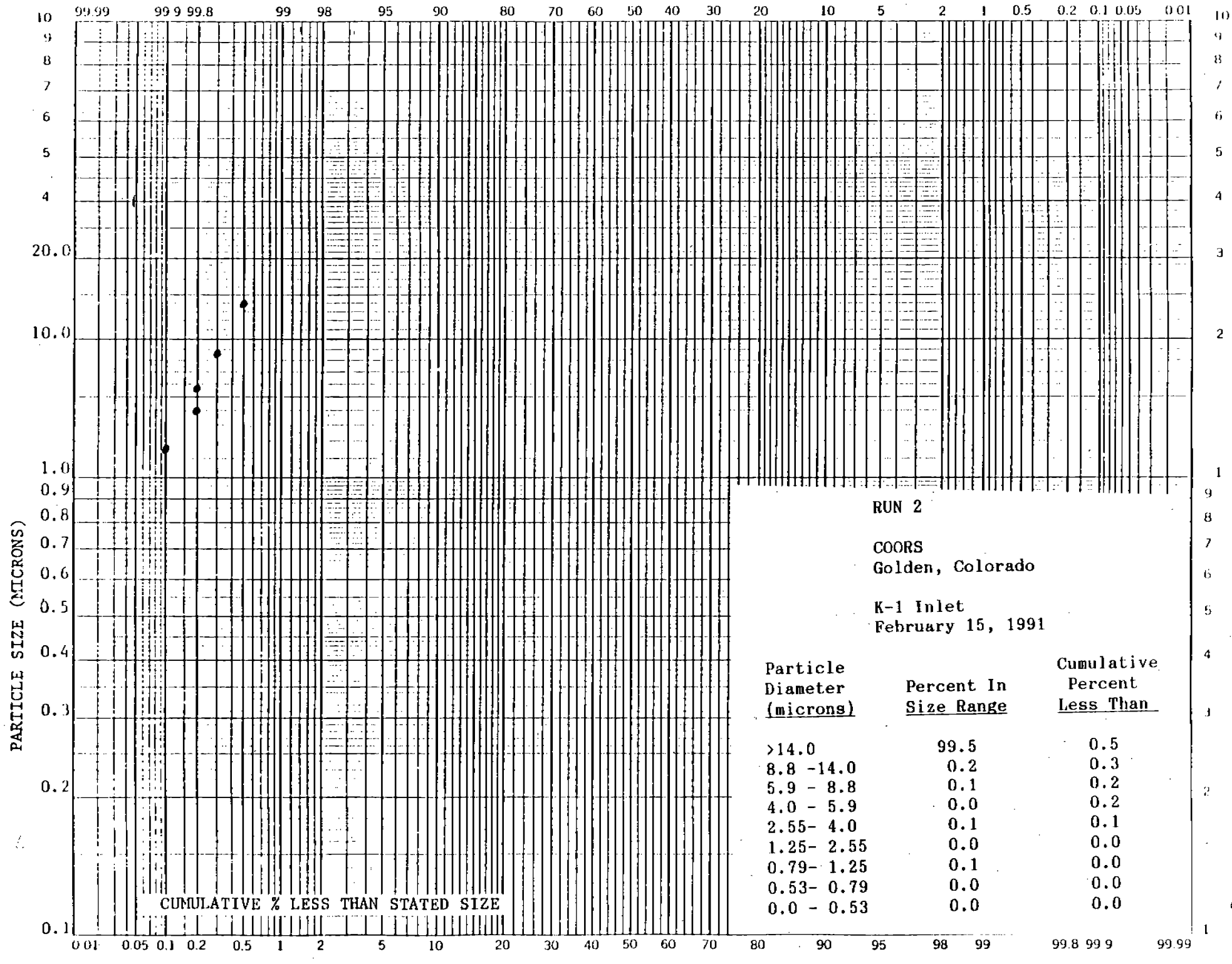
Time: 1443-1450.5

Location: K-1 Inlet

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.2794	1.2405	961.1	99.5	0.5 2.55	>14.0 10.0
1	0.1557	0.1574	1.7	0.2	0.3	8.8
2	0.1415	0.1421	0.6	0.1	0.2	5.9
3	0.1548	0.1550	0.2	0.0	0.2	4.0
4	0.1410	0.1415	0.5	0.1	0.1 0.1	2.55 2.5
5	0.1568	0.1570	0.2	0.0	0.0	1.25
6	0.1403	0.1409	0.6	0.1	0.0	0.79
7	0.1566	0.1568	0.2	0.0	0.0	0.53
F	0.3548	0.3552	0.4	0.0	0.0	---
			965.5	100.0		

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.018	"H_2O (ΔP_s)
Stack Temperature:	190	°F (T_s)
Molecular Weight:	22.48	lbs/lb-mole (MW)
Stack Pressure:	24.48	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	0.50	"H_2O (P_m)
Sample Volume:	3.627	ft^3 (V_m)
Meter Temperature:	93	°F (T_m)
Sampling Rate:	0.484	ACFM (Q_a)
% I:	108.02	%
Emissions:	5.2355	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>14.0	99.5	0.5
8.8 -14.0	0.2	0.3
5.9 - 8.8	0.1	0.2
4.0 - 5.9	0.0	0.2
2.55- 4.0	0.1	0.1
1.25- 2.55	0.0	0.0
0.79- 1.25	0.1	0.0
0.53- 0.79	0.0	0.0
0.0 - 0.53	0.0	0.0

Job No. 9110-111

Job Name Coors

Run No. 3

Location K-1-INLET

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

Part Size FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP _____ ΔH _____

Ambient Temp. °F 89

Assumed Moisture % 59

Probe Length 5'

Pitot Tube Leak Check —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F (Ts)	Probe Temp °F (Pm)	Oven Temp °F	Effluent Temp °F (Ps)	Dry Gas Temp °F Inlet (Tm)	Dry Gas Temp °F Outlet	Remarks
~~B-8~~	1721	297.232	0.020	0.48	0.48	4.0	193	—	—	—	87	87	K=24
A-1	1126	299.65	0.020	0.48	0.48	5.0	193	—	—	—	85	85	
	1729.5	301.358	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.817 Pitot Tube No. 74-1

Volume Collected V_m 4.068 ft^3

Water Collected V_w — ml

Time of Test T_t 8 1/2 min

Baro. Press. P_b 24.5 "Hg

$\%CO_2$ 0.0 %CO 0.0

$\%O_2$ 20.0 $\%N_2$ 80.0

Area Stack A_2 1256 in^2

Stack Press. −0.23 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. III-9 Probe Tip Dia. 0.60 in

V_m = Dry Gas Meter Calibration Factor 0.986 X 4.126

Dry Gas Meter Reading _____ ft^3 − (T_t ___ min x Leak Rate ___ cfm)

M_F = _____ M_T = _____

PARTICLE SIZE DATA

Run No: 3

Date: 02-15-91

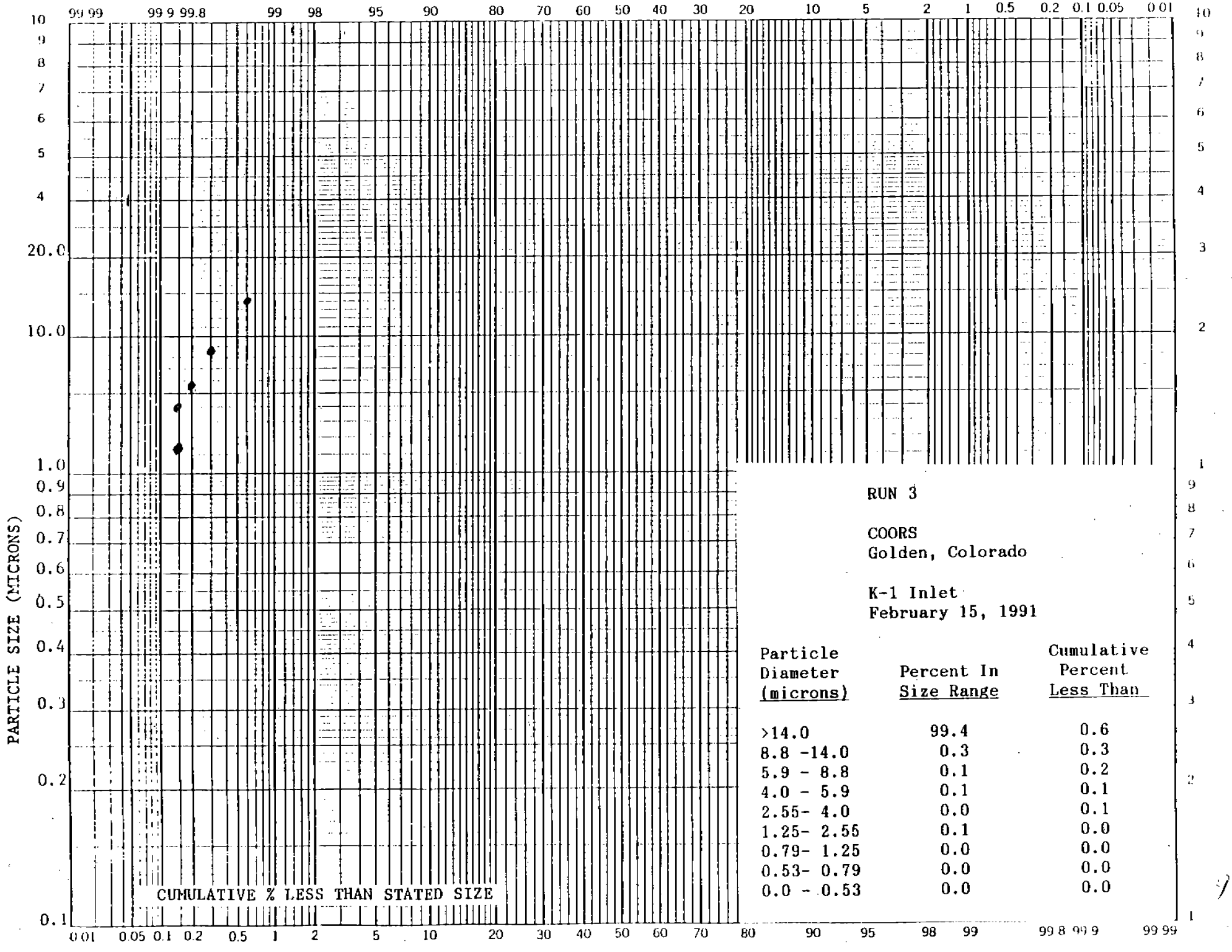
Time: 1721-1729.5

Location: K-1 Inlet

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	7.9236	9.2004	1276.8	99.4	0.6 0.37	>14.0 10.0
1	0.1563	0.1600	3.7	0.3	0.3	8.8
2	0.1400	0.1409	0.9	0.1	0.2	5.9
3	0.1558	0.1573	1.5	0.1	0.1	4.0
4	0.1399	0.1400	0.1	0.0	0.1 3.	2.55 2.5
5	0.1550	0.1555	0.5	0.1	0.0	1.25
6	0.1399	0.1400	0.1	0.0	0.0	0.79
7	0.1548	0.1549	0.1	0.0	0.0	0.53
F	0.3596	0.3599	0.3	0.0	0.0	---
			1284.0	100.0		

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.020	"H_2O (ΔP_s)
Stack Temperature:	193	°F (T_s)
Molecular Weight:	22.57	lbs/lb-mole (MW)
Stack Pressure:	24.48	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	0.48	"H_2O (P_m)
Sample Volume:	4.068	ft^3 (V_m)
Meter Temperature:	86	°F (T_m)
Sampling Rate:	0.479	ACFM (Q_a)
% I:	101.15	%
Emissions:	6.1294	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3


99 99 99 9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0 01
10 9 8 7 6 5 4 20.0 10.0 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
PARTICLE SIZE (MICRONS)
CUMULATIVE % LESS THAN STATED SIZE
0 01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99 8 99 9 99 99
RUN 3
COORS
Golden, Colorado
K-1 Inlet
February 15, 1991
Particle Diameter (microns) | Percent In Size Range | Cumulative Percent Less Than
>14.0 | 99.4 | 0.6
8.8 -14.0 | 0.3 | 0.3
5.9 - 8.8 | 0.1 | 0.2
4.0 - 5.9 | 0.1 | 0.1
2.55- 4.0 | 0.0 | 0.1
1.25- 2.55 | 0.1 | 0.0
0.79- 1.25 | 0.0 | 0.0
0.53- 0.79 | 0.0 | 0.0
0.0 - 0.53 | 0.0 | 0.0

Job No. 9110-111

Job Name Coors

Run No. 1

Location K-1 outlet

Date 2-15-91

Operator McCullough / Thomas

Sample Box No. 9 Meter Box No. 4

Part Size FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP _____ ΔH _____

Ambient Temp. °F 54

Assumed Moisture % 53

Probe Length 5'

Pitot Tube Leak Check —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot ΔPs in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum Pm In. Hg Gauge	Stack Temp Ts °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp Tm °F Inlet	Dry Gas Temp Tm °F Outlet	Remarks
B-4	2239	349.628	0.040	1.20	1.20	5.0	174	—	—	—	55	55	30=K
	2244	353.42	0.040	1.20	1.20	9.0	174	—	—	—	55	55	
	2249	355.693	—	—	—	—	—	—	—	—	—	—	
↓	2254												END 2246.5

Pitot Tube Calibration Factor C_p 0.832 Pitot Tube No. 59-1

Volume Collected V_m 5.980 ft^3

Water Collected V_w — ml

Time of Test T_t 7 1/2 min

Baro. Press. P_b 24.30 "Hg

$\%CO_2$ 0.4 %CO 0.0

$\%O_2$ 20.6 $\%N_2$ 79.0

Area Stack A_2 1000 in^2

Stack Press. -0.13 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. A-9 Probe Tip Dia. 0.618 in

V_m = Dry Gas Meter Calibration Factor 0.986 X 6.065

Dry Gas Meter Reading _____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_F = _____ M_T = _____

PARTICLE SIZE DATA

Run No: 1

Date: 02-15-91

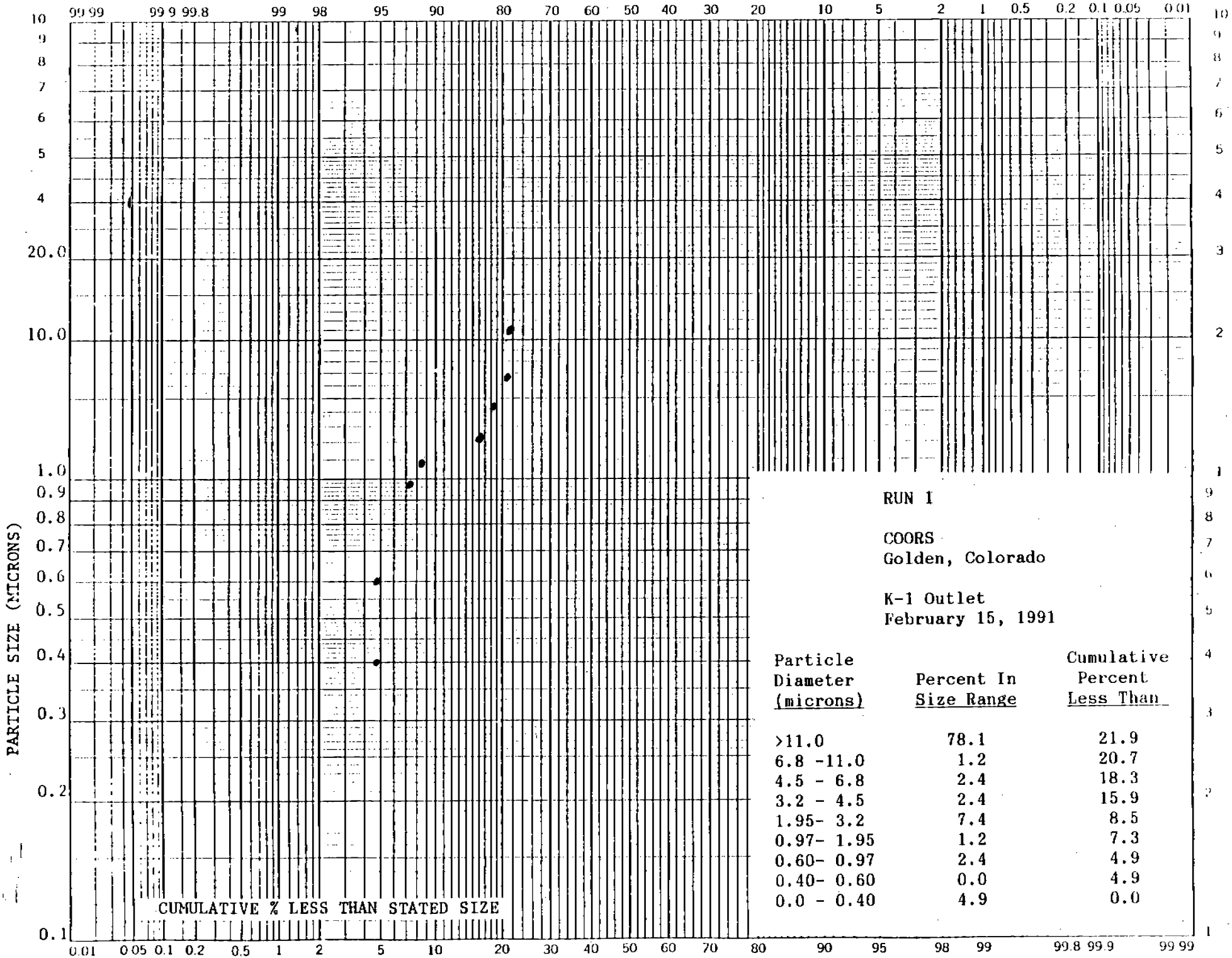
Time: 2239-2254

Location: K-1 Outlet

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.6461	0.6525	6.4	78.1	21.9 21.6	>11.0 10.0
1	0.1584	0.1585	0.1	1.2	20.7	6.8
2	0.1387	0.1389	0.2	2.4	18.3	4.5
3	0.1581	0.1583	0.2	2.4	15.9 11.8	3.2 2.5
4	0.1404	0.1410	0.6	7.4	8.5	1.95
5	0.1566	0.1567	0.1	1.2	7.3	0.97
6	0.1415	0.1417	0.2	2.4	4.9	0.60
7	0.1595	0.1595	0.0	0.0	4.1	0.40
F	0.3466	0.3470	0.4 8.2	4.9 100.0	0.0	---

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.040	"H_2O (ΔP_s)
Stack Temperature:	174	°F (T_s)
Molecular Weight:	23.50	lbs/lb-mole (MW)
Stack Pressure:	24.29	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	1.20	"H_2O (P_m)
Sample Volume:	5.980	ft^3 (V_m)
Meter Temperature:	55	°F (T_m)
Sampling Rate:	0.797	ACFM (Q_a)
% I:	104.23	%
Emissions:	0.0253	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3



RUN 1

COORS
Golden, Colorado

K-1 Outlet
February 15, 1991

Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>11.0	78.1	21.9
6.8 -11.0	1.2	20.7
4.5 - 6.8	2.4	18.3
3.2 - 4.5	2.4	15.9
1.95- 3.2	7.4	8.5
0.97- 1.95	1.2	7.3
0.60- 0.97	2.4	4.9
0.40- 0.60	0.0	4.9
0.0 - 0.40	4.9	0.0

Job No. 9110-111

Job Name Coors

Run No. 2

Location K-1 outlet

Date 2-16-90

Operator McCullough/Thomas

Sample Box No. 9 Meter Box No. 4

Part Size FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP — ΔH —

Ambient Temp. °F 54

Assumed Moisture % 52

Probe Length 5'

Pitot Tube Leak Check —

Initial Leak @ 10.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

A Ps Pm Ts Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O		Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F		Remarks
				Desired	Actual						Inlet	Outlet	
A-1	0026	400.977	0.040	1.20	1.30	7.0	166	—	—	—	57	57	
A-1	0031	404.60	0.040	1.20	1.20	8.0	166	—	—	—	55	56	
	0036	408.33	0.040	1.20	1.20	8.0	166	—	—	—	55	56	
↓	0041	412.17	0.040	1.20	1.20	8.0	166	—	—	—	55	56	
END	0046	415.962	—	—	—	—	—	—	—	—	—	—	
ALL													

Pitot Tube Calibration Factor C_p 0.832 Pitot Tube No. 59-1

Volume Collected V_m 14.992 ft^3

Water Collected V_w — ml

Time of Test T_t 20 min

Baro. Press. P_b 24.3 "Hg

$\%CO_2$ 0.2 %CO 0.0

$\%O_2$ 20.8 $\%N_2$ 79.0

Area Stack A_2 1000 in^2

Stack Press. -0.13 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. II-9 Probe Tip Dia. 0.618 in

V_m = Dry Gas Meter Calibration Factor 0.986 X 15.185

Dry Gas Meter Reading ____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_F = ____ M_T = ____

PARTICLE SIZE DATA

Run No: 2

Date: 02-16-91

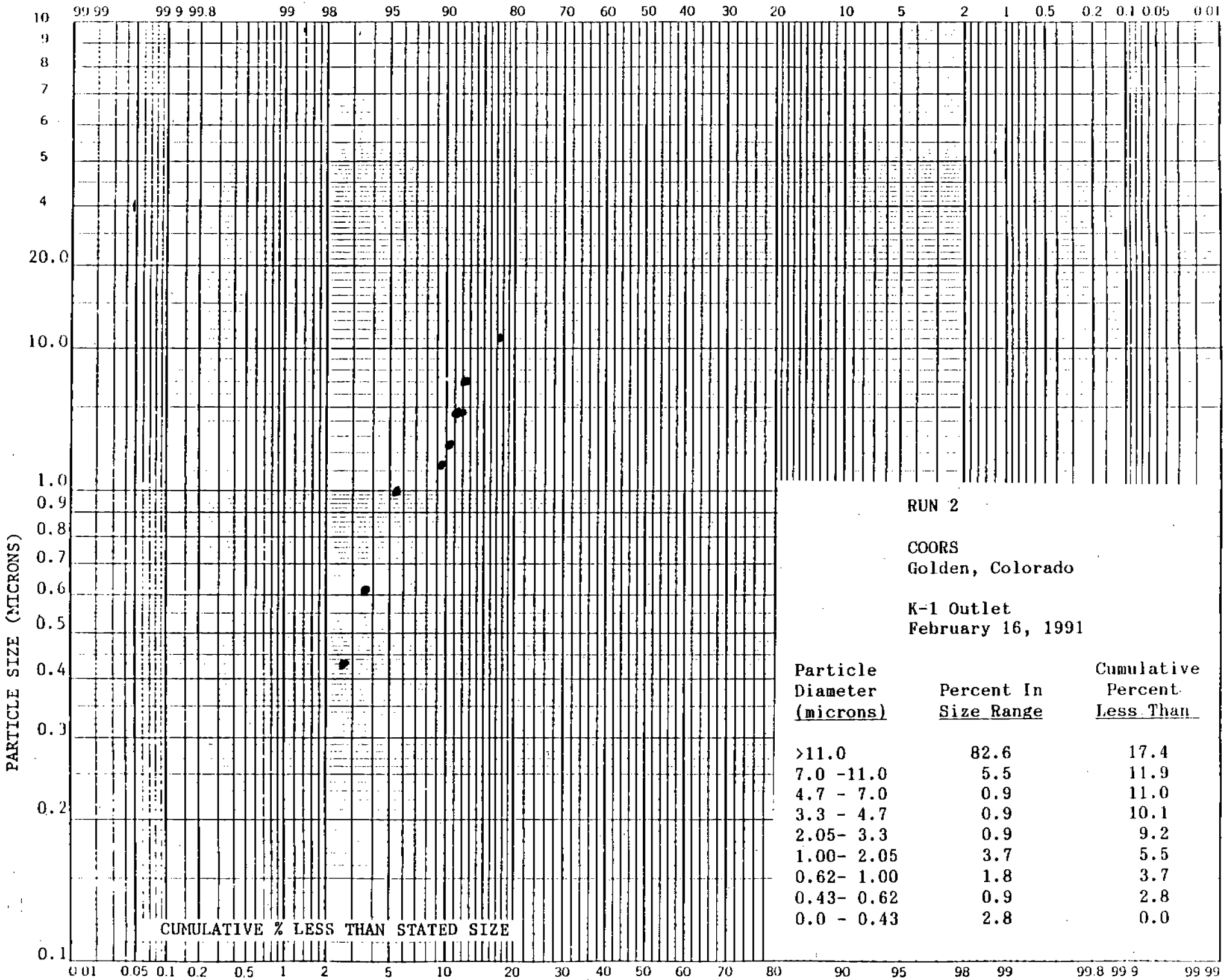
Time: 0026-0046

Location: K-1 Outlet

Plate Number	Initial Weight (g)	Final Weight (g)	Increase (mg)	% of Total	Cum. % < Size Range	Effective Cut-Off Diameter* (microns)
0	0.7614	0.7704	9.0	82.6	17.4 15.2	>11.0 10.2
1	0.1573	0.1579	0.6	5.5	11.9	7.0
2	0.1415	0.1416	0.1	0.9	11.0	4.7
3	0.1595	0.1596	0.1	0.9	10.1 9.5	3.3 2.5
4	0.1408	0.1409	0.1	0.9	9.2	2.05
5	0.1582	0.1586	0.4	3.7	5.5	1.00
6	0.1393	0.1395	0.2	1.8	3.7	0.62
7	0.1573	0.1574	0.1	0.9	2.8	0.43
F	0.3532	0.3535	0.3 10.9	2.8 100.0	0.0	---

Particle Density*:	1.00	gm/cm^3
Velocity Head:	0.040	"H_2O (ΔP_s)
Stack Temperature:	166	°F (T_s)
Molecular Weight:	24.52	lbs/lb-mole (MW)
Stack Pressure:	24.29	"Hg (P_s)
Nozzle Diameter:	0.618	inches (D_n)
Orifice Head:	1.20	"H_2O (P_m)
Sample Volume:	14.972	ft^3 (V_m)
Meter Temperature:	56	°F (T_m)
Sampling Rate:	0.749	ACFM (Q_a)
% I:	83.58	%
Emissions:	0.0134	gr/dscf (C_{an})

*Assumed Particle Density of 1.00 gm/cm^3

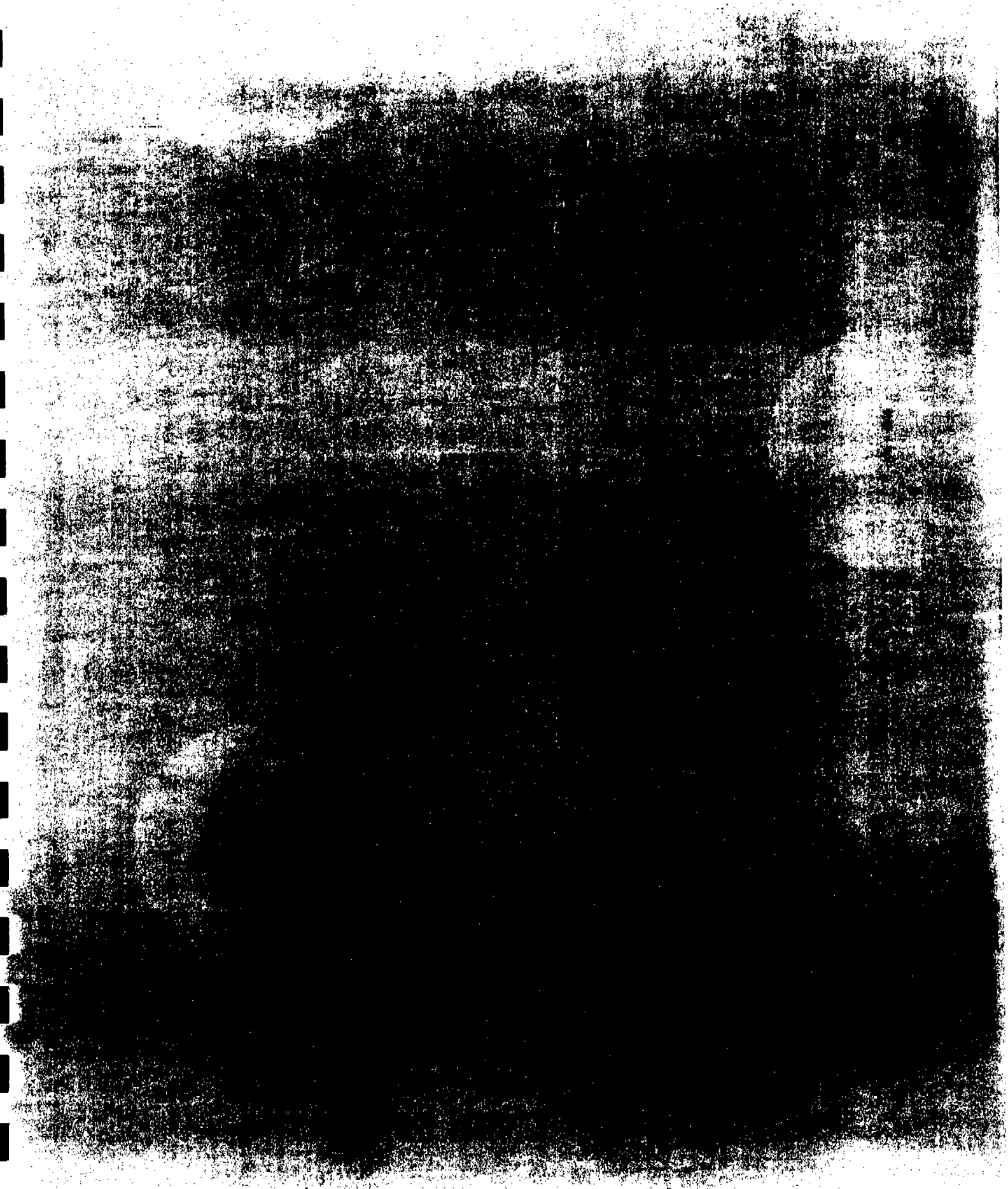


RUN 2

COORS
Golden, Colorado

K-1 Outlet
February 16, 1991

Particle Diameter (microns)	Percent In Size Range	Cumulative Percent Less Than
>11.0	82.6	17.4
7.0 -11.0	5.5	11.9
4.7 - 7.0	0.9	11.0
3.3 - 4.7	0.9	10.1
2.05- 3.3	0.9	9.2
1.00- 2.05	3.7	5.5
0.62- 1.00	1.8	3.7
0.43- 0.62	0.9	2.8
0.0 - 0.43	2.8	0.0



WESTERN ENVIRONMENTAL SERVICES AND TESTING, INC.

Chain of Custody and Analysis Request

Job Number 9110-111 Date(s) Sampled 2/13/91

Job Name Coors Brewing Co. Number of Runs 6 (3 particle size)

Source Location Golden, CO

Unit Tested N84 North Dryer Stak

Absorbing Solution/Analysis For

Run	Filter Number	Imp 1	Imp 2	Imp 3	Imp 4	Probe Wash
1	T-605	DI / moist.	DI / moist.	Dry / moist.	Silica gel / moist.	Acetone / Particulate
2	T-537	"	"	"	"	"
3	T-606	"	"	"	"	"
4	—	—	—	—	—	—

NO_x: —

Other Particle size

Total Number of Sample Bottles: 6

Total Number of Filters: 27

Comments: Orsat samples were analyzed on site

Person Responsible for Samples: Michael E. Reynolds

Sample No.	Recovered by	Date	Time	Location
1	R. Hanson	2/13/91	1600	On site
2	R. Hanson	2/13/91	1805	On site
3	R. Hanson	2/13/91	2001	On site
4		—	—	—

Samples Received By Michael E. Reynolds for transport Date: 2/16/91 Time: 0345

Samples Received at Lab by Nick L Rasmussen Date: 2/18/91 Time: 0800

Samples Analyzed by Nick L Rasmussen Date: 2/25/91 Time: —

4/85

WESTERN ENVIRONMENTAL SERVICES AND TESTING, INC.

Chain of Custody and Analysis Request

Job Number 9110-111 Date(s) Sampled 2/14/91

Job Name Coors Brewing Co. Number of Runs 6 (3 particle size)

Source Location Golden, CO

Unit Tested NB4 South Dryer Stack

Absorbing Solution/Analysis For

Run	Filter Number	Imp 1	Imp 2	Imp 3	Imp 4	Probe Wash
1	T-607	DI / moist.	DI / moist.	Dry / moist.	Silica gel / moist.	Acetone / particulate
2	T-604	"	"	"	"	"
3	T-647	"	"	"	"	"
4	—	—	—	—	—	—

No_x: —

Other Particle size

Total Number of Sample Bottles: 6

Total Number of Filters: 27

Comments: Orsat sample were analyzed on site

Person Responsible for Samples: Michael E Reynolds

Sample No.	Recovered by	Date	Time	Location
1	R. Hanson	2/14/91	1045	On site
2	R. Hanson	2/14/91	1400	On site
3	R. Hanson	2/14/91	1730	On site
4		—	—	—

Samples Received By Michael E Reynolds for transport Date: 2/16/91 Time: 0345

Samples Received at Lab by Nick L Rasmussen Date: 2/18/91 Time: 0800

Samples Analyzed by Nick L Rasmussen Date: 2/25/91 Time: —

4/85

WESTERN ENVIRONMENTAL SERVICES AND TESTING, INC.

Chain of Custody and Analysis Request

Job Number 9110-111

Date(s) Sampled 2/15/91

Job Name Coors Brewing Co.

Number of Runs 6 (3 particle size)

Source Location Golden, CO

Unit Tested K-1 Dryer Inlet

Absorbing Solution/Analysis For

Run	Filter Number	Imp 1	Imp 2	Imp 3	Imp 4	Probe Wash
1	T-610	DI / moist.	DI / moist.	Dry / moist.	Silica gel / moist.	Acetone / Part. cutter
2	T-611	"	"	"	"	"
3	T-612	"	"	"	"	"
4	—	—	—	—	—	—

No_x: —

Other Particle size

Total Number of Sample Bottles: 6

Total Number of Filters: 27

Comments: Osat samples were analyzed on site

Person Responsible for Samples: Michael C. Reynolds

Sample No.	Recovered by	Date	Time	Location
1	R. Hanson	2/15/91	1200	On site
2	R. Hanson	2/15/91	1430	On site
3	R. Hanson	2/15/91	1705	On site
4	—	—	—	—

Samples Received By Michael C. Reynolds for transport Date: 2/16/91 Time: 0345

Samples Received at Lab by Niels L Rasmussen Date: 2/18/91 Time: 0800

Samples Analyzed by Niels L Rasmussen Date: 2/25/91 Time: —

4/85

WESTERN ENVIRONMENTAL SERVICES AND TESTING, INC.

Chain of Custody and Analysis Request

Job Number 9110-111

Date(s) Sampled 2/15-2/16/91

Job Name Coors Brewing Co.

Number of Runs 6 (3 particle size)

Source Location Golden, CO

Unit Tested K-1 Dryer Outlet

Absorbing Solution/Analysis For

Run	Filter Number	Imp 1	Imp 2	Imp 3	Imp 4	Probe Wash
1	T-613	DI / moist.	DI / moist.	Dry / moist.	Silica gel / moist.	Acetone / particulate
2	T-616	"	"	"	"	"
3	T-615	"	"	"	"	"
4	—	—	—	—	—	—

No_x: —

Other Particle size

Total Number of Sample Bottles: 6

Total Number of Filters: 27

Comments: Oset samples were analyzed on site

Person Responsible for Samples: Michael C. Reynolds

Sample No.	Recovered by	Date	Time	Location
1	R. Hanson	2/15/91	2220	On site
2	R. Hanson	2/16/91	0015	On site
3	R. Hanson	2/16/91	0210	On site
4				

Samples Received By Michael C. Reynolds for transport Date: 2/16/91 Time: 0345

Samples Received at Lab by Nick L Rasmussen Date: 2/18/91 Time: 0800

Samples Analyzed by Nick L Rasmussen Date: 2/25/91 Time: _____

4/85

ALAN D. ROYLANCE

CURRENT: 04/18/86 to present	Manager of Operations, Western Environmental Services and Testing, Inc., Casper, WY, and Evanston, WY; an environmental monitoring and consulting firm.
PROFESSIONAL: 10/24/86 to 04/17/86	Air Quality Supervisor, Western Environmental Services Western Environmental Services and Testing, Inc.
03/04/85 to 10/23/86	Laboratory Supervisor, Western Environmental Services and Testing, Inc.
06/08/84 to 03/03/85	Field Testing Supervisor, Western Environmental Services and Testing, Inc.
02/01/83 to 06/07/84	Senior Technician, Western Environmental Services and Testing, Inc.
10/01/78 to 06/07/81	Surveyor, Pioneer Nuclear, Inc., Casper, WY; a uranium exploration firm
EDUCATION:	Bachelor of Science in Wildlife Science - Utah State University, Logan, UT, 1977
TECHNICAL EXPERIENCE:	Assisted in over 180 source emission surveys in the western and southwestern United States; assisted in the set up and maintenance of over 15 ambient air networks.
CERTIFICATIONS:	Visible Emissions Evaluator
PROFESSIONAL MEMBERSHIPS:	Air Pollution Control Association Society of Mining Engineers of A.I.M.E.

MICHAEL E. REYNOLDS

CURRENT: 01/90 to present	Field Testing Supervisor, Western Environmental Services and Testing, Inc., Casper, Wyoming, and Evanston, Wyoming; an environmental monitoring and consulting firm.
PROFESSIONAL: 04/89 to 01/90	Senior Technician, Western Environmental Services and Testing, Inc., Casper, Wyoming, and Evanston, Wyoming; an environmental monitoring and consulting firm.
EDUCATION:	South Dakota School of Mines and Technology, Mining Engineering, September 1978 to May 1980. University of Wyoming, Laramie, Undergraduate business courses consistent with M.B.A. program Bachelor of Science, Petroleum Engineering, December 1983
TECHNICAL EXPERIENCE:	Assisted in over 75 source emissions surveys and the maintenance of various ambient air networks.

TIMOTHY A. McCULLOUGH

CURRENT: 3/88 to present	Technician, Western Environmental Services and Testing, Inc., Casper, WY, and Evanston, WY, an environmental monitoring and consulting firm.
EDUCATION:	Graduate, Kelly Walsh High School, Casper, Wyoming; Casper College, Architectural Engineering, Casper, Wyoming
TECHNICAL EXPERIENCE:	Assisted in over 50 source emissions surveys; run various methods for soil and water analysis in the laboratory.

MATT A. TIKKA

CURRENT: 10/89 to present	Technician, Western Environmental Services and Testing, Inc., Casper, Wyoming, and Evanston, Wyoming; an environmental monitoring and consulting firm.
PROFESSIONAL:	President, Ramrod Resources, Douglas, WY; an agricultural services company.
EDUCATION:	University of Denver, B.A. English, Denver, Colorado; November, 1984
TECHNICAL EXPERIENCE:	Assisted in over 25 source emissions surveys in the western and southwestern United States.

RON THOMAS

CURRENT: 11/90 to present	Technician, Western Environmental Services and Testing, Inc., Casper, Wyoming, and Evanston, Wyoming; an environmental monitoring and consulting firm.
EDUCATION:	Airline High School, Bossier City, Louisiana Bossier Skill Center, 2 year Advanced Automotive
TECHNICAL EXPERIENCE:	Assisted in over 25 source emissions surveys in the western and southwestern United States.

RON THOMAS

CURRENT: 11/90 to present	Technician, Western Environmental Services and Testing, Inc., Casper, Wyoming, and Evanston, Wyoming; an environmental monitoring and consulting firm.
EDUCATION:	Airline High School, Bossier City, Louisiana Bossier Skill Center, 2 year Advanced Automotive
TECHNICAL EXPERIENCE:	Assisted in over 25 source emissions surveys in the western and southwestern United States.