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Filler Rooms Diagnostic VOC Test Report for Coors Brewing Company

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Introduction

Air Pollution Testing was contracted by Coors Brewing Company to conduct a series of source emissions tests on the air inlets and outlets from the #3 Bottle Filler, #5 Can Filler, #6 Can Filler, and #9 Can Filler rooms. The purpose of the testing was to determine mass flow rates of volatile organic compounds (VOCs), believed to be primarily ethanol, at each location. The testing was conducted intermittently from 12-2-92 through 12-16-92.

Summary of Procedures

VOC testing was conducted in accordance with "EPA Method 25A - Measurement of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer" as detailed in Code of Federal Regulations, Title 40, Part 60, Appendix A. At each location (except #9 Can Filler), three one hour sampling runs were conducted using a JUM Model 3-100 Flame Ionization Analyzer (FIA). A sample of duct gas was continuously extracted through a heated PTFE sample line and pumped directly into the inlet port of the analyzer. The concentration of VOCs (expressed as parts per million by volume on a wet basis as propane) was displayed on the front panel of the analyzer and recorded on a strip chart. At the beginning of each sampling day, the analyzer was calibrated with hydrocarbon-free air and a high level calibration gas, and challenged with a mid level calibration gas to verify the linearity of response. After each one hour sampling period, the analyzer was again challenged with the hydrocarbon-free air and one of the calibration gases to quantify zero and span drift for the previous sampling period. At this point the analyzer was also recalibrated as necessary. The strip chart data from each sampling period was averaged in one to three minute increments, and reported as parts per million by volume on a wet basis as propane, with all data corrected for zero and span drift. Identical sampling and analysis procedures were conducted at the #9 Can Filler location, with longer sampling times and less frequent calibration cycles. To ensure accurate data collection, all calibration gases were prepared and certified in accordance with EPA Protocol 1, and were introduced to the analyzer at the sampling probe tip. Additionally, during each sampling period, Tedlar gas bags were filled with duct gas from each inlet location and analyzed immediately using the FIA. Tedlar gas bag samples were also occasionally collected and analyzed from points around the filler rooms.

Concurrent with each method 25A sampling run, methods 1, 2, and 4 were used to determine the duct gas velocity and volumetric flow rates at the inlet and outlet locations. Each filler room tested had a single outlet duct where room air was pulled out of the room, and two or three inlet ducts where air was pumped into the room. At all locations, temperature and differential pressure traverses were conducted in accordance with method 2 along a grid of sampling points selected in accordance with method 1. Method 4 sampling runs were conducted at all outlet locations to determine the outlet duct gas moisture content. Inlet locations were assumed to have negligible moisture content, and ambient concentrations of carbon dioxide (0.0%) and oxygen (20.9%) were assumed for all locations. This data was combined to determine the gas velocity and volumetric flow rate at each location.

Additional Notes

Propane to Ethanol Conversion

Although flame ionization analyzers (FIAs) are designed to detect carbon atoms in organic molecules without respect to the remainder of the molecule, experiments have demonstrated that FIA response is somewhat dependent on molecular structure. Because the VOC emissions from the filler rooms are believed to be primarily ethanol, the data presented in the results section has been corrected from propane calibrated FIA data to theoretical ethanol values. This can be achieved through consideration of stoichiometry and published carbon-basis response factors, or an empirical conversion factor can be experimentally determined. In this report, the conversion factor was determined experimentally using the same FIA used for all field measurements. Experimental determination of the response factor was conducted using syringe injections of precisely known masses of reagent grade ethanol into Tedlar gas bags. The gas bags were filled with a known volume of ambient air using an SKC personal sampling pump with a an NIST traceable bubble calibrator. The mass of ethanol injected was determined by tare and final weights of the syringe using a certified 0.1 mg analytical balance. The volume of air was determined using the average of six flow measurements recorded at the beginning and end of each filling, along with the total filling time. The liquid/gas samples were allowed to evaporate and mix, and were then pumped into the analyzer, which was calibrated with EPA Protocol 1 propane calibration gases immediately before and after bag sampling. A total of 5 bag samples were prepared and analyzed. An average conversion factor was calculated and used to convert other propane calibrated analyzer data to ethanol values. The experimental conversion factor was compared with correction values published by the manufacturer. These values agreed to within 5.3%.

Theoretical Mass Emission Rates

Because the filler rooms are necessarily maintained at positive pressure with respect to the brewery facilities surrounding them, the total air flows measured at the inlet ducts to each filler room were greater than the flows measured at the outlet locations, with the difference presumably leaking out of the rooms at any non-sealed points. Consequently, the total VOC emissions from the rooms were calculated using the concentrations measured at the outlets, and the flows measured at the inlets. These calculations assume that the air within the rooms was well mixed, and no significant VOC concentration gradients existed in the rooms. To demonstrate the validity of this assumption, several Tedlar gas bag samples were collected at points around the rooms during the sampling programs. The results indicated that the VOC concentration of the escaping air was typically similar to the outlet measurements. The "Theoretical Total" values calculate the emissions using the outlet VOC concentrations and the inlet flows. The "Theoretical from Filling" values calculate the emissions using the outlet minus inlet concentrations and the inlet flows.

#9 Can Filler Inlet Flow

During the first 2 days of VOC testing at the #9 Can Filler location, the #2 inlet duct did not have adequately sized sampling ports along the vertical axis for temperature and differential pressure measurements. Only a single port at the center of the underside of the duct was adequate. This port was sampled at three points selected in accordance with method 1, and the data recorded for subsequent conversion. At a later date, three adequate ports along the vertical axis had been installed. Method 2 sampling traverses were conducted at these ports as well as at the previously sampled port on the underside of the duct, with a total of three traverses conducted from each port. The ratio of the average square root of the differential pressure of the three ports along the vertical axis to the average square root of the differential pressure of the three points along the underside port was calculated. The average ratio from the three runs was used to convert the center-line method 2 data collected in the first set of sampling runs to true method 2 data for the entire duct. The method 2 traverses of the entire duct indicated that using only the center-line data would substantially overstate the total duct flow.

#5 Can Filler Inlet Flow

At the #5 Can Filler inlet locations, ports for method 2 sampling were not installed at the time of the testing. During subsequent testing at another location, method 2 data was collected from the #5 Can inlet ducts and used for calculations.

Results

The results of the testing are presented in the following tables. Any testing parameters not presented in the tables may be found in Appendix 1 - Sample Calculations and Testing Parameters.

Coors Brewing Company
#3 Bottle Filler
12-2-92
VOC Mass Emission Rates

		Run #1	Run #2	Run #3	Averages
Field Data					
Outlet					
	VOC conc. (ppm wet)	28.6	30.3	30.6	29.8
	% H2O	1.3	0.9	0.5	0.9
	volumetric flow rate (dscfm)	1499	1494	1528	1507
Inlet #1					
	VOC conc. (ppm)	2.0	3.5	3.0	2.8
	volumetric flow rate (dscfm)	1874	2359	1923	2052
Inlet #2					
	VOC conc. (ppm)	2.5	1.0	1.5	1.7
	volumetric flow rate (dscfm)	1871	1825	1879	1858
Inlet #3					
	VOC conc. (ppm)	3.0	3.0	3.0	3.0
	volumetric flow rate (dscfm)	1829	2333	2646	2269
Production					
	beer filling (bbl/hr)	85.3	85.3	85.3	85.3
Calculations		Run #1	Run #2	Run #3	Averages
Theoretical Total					
	VOC lb/hr as propane	1.11	1.37	1.36	1.28
	VOC lb/hr as ethanol	2.78	3.43	3.41	3.21
	VOC lb/bbl as ethanol	0.0326	0.0402	0.0400	0.0376
Theoretical from Filling					
	VOC lb/hr as propane	1.01	1.25	1.25	1.17
	VOC lb/hr as ethanol	2.54	3.13	3.13	2.93
	VOC lb/bbl as ethanol	0.0298	0.0367	0.0367	0.0344

Table 1 - VOC Mass Emission Rates
#3 Bottle Filler

Results (continued)

Coors Brewing Company
#5 Can Filler
12-2-92
VOC Mass Emission Rates

Field Data		Run #1	Run #2	Run #3	Averages
Outlet					
	VOC conc. (ppm wet)	93.4	87.2	85.5	88.7
	% H2O	1.3	0.9	0.5	0.9
	volumetric flow rate (dscfm)	3130	3116	3009	3085
Inlet #1					
	VOC conc. (ppm)	1.0	1.0	1.3	1.1
	volumetric flow rate (dscfm)*	2108	2129	2090	2109
Inlet #2					
	VOC conc. (ppm)**	1.0	1.0	1.3	1.1
	volumetric flow rate (dscfm)*	2615	3059	2526	2733
Production					
	beer filling (bbl/hr)	207.7	207.7	207.7	207.7
Calculations		Run #1	Run #2	Run #3	Averages
Theoretical Total					
	VOC lb/hr as propane	3.07	3.13	2.72	2.98
	VOC lb/hr as ethanol	7.69	7.86	6.82	7.46
	VOC lb/bbl as ethanol	0.0370	0.0378	0.0329	0.0359
Theoretical from Filling					
	VOC lb/hr as propane	3.04	3.10	2.68	2.94
	VOC lb/hr as ethanol	7.61	7.77	6.72	7.37
	VOC lb/bbl as ethanol	0.0366	0.0374	0.0324	0.0355

* - measured 1-27-93
** - not measured due to bag leak, inlet #1 data assumed

Table 2 - VOC Mass Emission Rates
#5 Can Filler

Two Tedlar bag samples collected under the filler room doors during run #3 measured 65.0 and 67.0 ppm as propane.

Results (continued)

Coors Brewing Company
#6 Can Filler
12-16-92
VOC Mass Emission Rates

Field Data		Run #1	Run #2	Run #3	Averages
Outlet	VOC conc. (ppm wet)	113.5	111.1	111.5	112.0
	% H2O	1.5	0.8	1.1	1.2
	volumetric flow rate (dscfm)	1927	1930	1847	1901
Inlet #1	VOC conc. (ppm)	1.5	1.5	2.5	1.8
	volumetric flow rate (dscfm)	3766	1660	1030	2152
Inlet #2	VOC conc. (ppm)*	1.0	1.0	1.0	1.0
	volumetric flow rate (dscfm)	1803	1643	2335	1927
Production	beer filling (bbl/hr)	216.7	216.7	216.7	216.7
Calculations		Run #1	Run #2	Run #3	Averages
Theoretical Total	VOC lb/hr as propane	4.41	2.54	2.61	3.18
	VOC lb/hr as ethanol	11.04	6.37	6.53	7.98
	VOC lb/bbl as ethanol	0.0510	0.0294	0.0301	0.0368
Theoretical from Filling	VOC lb/hr as propane	4.35	2.51	2.57	3.15
	VOC lb/hr as ethanol	10.91	6.29	6.44	7.88
	VOC lb/bbl as ethanol	0.0504	0.0290	0.0297	0.0364

* - run #1 not measured due to bag leak, average of runs 2 and 3 assumed

Table 3 - VOC Mass Emission Rates
#6 Can Filler

Three Tedlar gas bag samples collected under the filler room door during runs #1, #2, and #3 measured 144.0 ppm, 128.0 ppm, and 142.0 ppm as propane respectively.

Results (continued)

The #9 Can Filler was sampled continuously from 07:30 on 12-2-92 through 00:12 on 12-5-92. The results of the testing are presented as two hour averages in the following tables. Flow data are the averages of 5 sampling traverses. Production data is an average for the entire period.

Coors Brewing Company
#9 Can Filler
12-3-92 through 12-5-92
VOC Mass Emission Rates

Field Data	hrs 1-2	hrs 3-4	hrs 5-6	hrs 7-8	hrs 9-10	Averages
Outlet						
VOC conc. (ppm wet)	7.6	8.6	12.0	14.8	39.6	16.5
% H2O	0.6	0.6	0.6	0.6	0.6	0.6
volumetric flow rate (dscfm)	2359	2359	2359	2359	2359	2359
Inlet #1						
VOC conc. (ppm)	2.5	2.5	2.5	2.5	2.5	2.5
volumetric flow rate (dscfm)	6392	6392	6392	6392	6392	6392
Inlet #2						
VOC conc. (ppm)	2.7	2.7	2.7	2.7	2.7	2.7
volumetric flow rate (dscfm)	2379	2379	2379	2379	2379	2379
Production						
beer filling (bbl/hr)	*	*	*	*	153.8	153.8
Calculations	hrs 1-2	hrs 3-4	hrs 5-6	hrs 7-8	hrs 9-10	Averages
Theoretical Total						
VOC lb/hr as propane	0.46	0.52	0.73	0.90	2.40	1.00
VOC lb/hr as ethanol	1.15	1.31	1.82	2.25	6.01	2.51
VOC lb/bbl as ethanol	*	*	*	*	0.0391	0.0391
Theoretical from Filling						
VOC lb/hr as propane	0.31	0.37	0.57	0.74	2.24	0.85
VOC lb/hr as ethanol	0.77	0.92	1.43	1.86	5.62	2.12
VOC lb/bbl as ethanol	*	*	*	*	0.0366	0.0366

* - filler room sterilization was conducted for the first eight hours of sampling, no beer filling took place during this time

Table 4 - VOC Mass Emission Rates
#9 Can Filler
(hours 1 through 10)

Results (continued)

Coors Brewing Company
#9 Can Filler
12-3-92 through 12-5-92
VOC Mass Emission Rates

Field Data		hrs 11-12	hrs 13-14	hrs 15-16	hrs 17-18	hrs 19-20	Averages
Outlet							
	VOC conc. (ppm wet)	43.0	42.9	33.4	49.1	46.3	42.9
	% H2O	0.6	0.6	0.6	0.6	0.6	0.6
	volumetric flow rate (dscfm)	2359	2359	2359	2359	2359	2359
Inlet #1							
	VOC conc. (ppm)	2.5	2.5	2.5	2.5	2.5	2.5
	volumetric flow rate (dscfm)	6392	6392	6392	6392	6392	6392
Inlet #2							
	VOC conc. (ppm)	2.7	2.7	2.7	2.7	2.7	2.7
	volumetric flow rate (dscfm)	2379	2379	2379	2379	2379	2379
Production							
	beer filling (bbl/hr)	153.8	153.8	153.8	153.8	153.8	153.8
Calculations		hrs 11-12	hrs 13-14	hrs 15-16	hrs 17-18	hrs 19-20	Averages
Theoretical Total							
	VOC lb/hr as propane	2.60	2.60	2.02	2.97	2.80	2.60
	VOC lb/hr as ethanol	6.53	6.51	5.07	7.45	7.03	6.52
	VOC lb/bbl as ethanol	0.0424	0.0423	0.0330	0.0484	0.0457	0.0424
Theoretical from Filling							
	VOC lb/hr as propane	2.45	2.44	1.87	2.82	2.65	2.45
	VOC lb/hr as ethanol	6.14	6.12	4.68	7.06	6.64	6.13
	VOC lb/bbl as ethanol	0.0399	0.0398	0.0304	0.0459	0.0432	0.0399

Table 5 - VOC Mass Emission Rates
#9 Can Filler
(hours 11 through 20)

Results (continued)

Coors Brewing Company
#9 Can Filler
12-3-92 through 12-5-92
VOC Mass Emission Rates

Field Data		hrs 21-22	hrs 23-24	hrs 25-26	hrs 27-28	hrs 29-30	Averages
Outlet							
	VOC conc. (ppm wet)	48.4	39.5	35.7	36.3	41.2	40.2
	% H2O	0.6	0.6	0.6	0.6	0.6	0.6
	volumetric flow rate (dscfm)	2359	2359	2359	2359	2359	2359
Inlet #1							
	VOC conc. (ppm)	2.5	2.5	2.5	2.5	2.5	2.5
	volumetric flow rate (dscfm)	6392	6392	6392	6392	6392	6392
Inlet #2							
	VOC conc. (ppm)	2.7	2.7	2.7	2.7	2.7	2.7
	volumetric flow rate (dscfm)	2379	2379	2379	2379	2379	2379
Production							
	beer filling (bbl/hr)	153.8	153.8	153.8	153.8	153.8	153.8

Calculations		hrs 21-22	hrs 23-24	hrs 25-26	hrs 27-28	hrs 29-30	Averages
Theoretical Total							
	VOC lb/hr as propane	2.93	2.39	2.16	2.20	2.50	2.44
	VOC lb/hr as ethanol	7.35	6.00	5.42	5.51	6.25	6.10
	VOC lb/bbl as ethanol	0.0478	0.0390	0.0352	0.0358	0.0407	0.0397
Theoretical from Filling							
	VOC lb/hr as propane	2.78	2.24	2.01	2.04	2.34	2.28
	VOC lb/hr as ethanol	6.96	5.61	5.03	5.12	5.87	5.72
	VOC lb/bbl as ethanol	0.0452	0.0365	0.0327	0.0333	0.0381	0.0372

Table 6 - VOC Mass Emission Rates
#9 Can Filler
(hours 21 through 30)

Two Tedlar gas bag samples collected under the filler room door during hour 27 measured 58.5 ppm and 69.0 ppm as propane.

Results (continued)

Coors Brewing Company
#9 Can Filler
12-3-92 through 12-5-92
VOC Mass Emission Rates

Field Data		hrs 31-32	hrs 33-34	hrs 35-36	hrs 37-38	hrs 39-40	Averages
Outlet							
	VOC conc. (ppm wet)	37.9	50.6	35.9	45.2	49.7	43.9
	% H2O	0.6	0.6	0.6	0.6	0.6	0.6
	volumetric flow rate (dscfm)	2359	2359	2359	2359	2359	2359
Inlet #1							
	VOC conc. (ppm)	2.5	2.5	2.5	2.5	2.5	2.5
	volumetric flow rate (dscfm)	6392	6392	6392	6392	6392	6392
Inlet #2							
	VOC conc. (ppm)	2.7	2.7	2.7	2.7	2.7	2.7
	volumetric flow rate (dscfm)	2379	2379	2379	2379	2379	2379
Production							
	beer filling (bbl/hr)	153.8	153.8	153.8	153.8	153.8	153.8
Calculations		hrs 31-32	hrs 33-34	hrs 35-36	hrs 37-38	hrs 39-40	Averages
Theoretical Total							
	VOC lb/hr as propane	2.30	3.06	2.17	2.74	3.01	2.66
	VOC lb/hr as ethanol	5.75	7.68	5.45	6.86	7.54	6.66
	VOC lb/bbl as ethanol	0.0374	0.0499	0.0354	0.0446	0.0490	0.0433
Theoretical from Filling							
	VOC lb/hr as propane	2.14	2.91	2.02	2.58	2.86	2.50
	VOC lb/hr as ethanol	5.36	7.29	5.06	6.47	7.16	6.27
	VOC lb/bbl as ethanol	0.0349	0.0474	0.0329	0.0421	0.0465	0.0408

Table 7 - VOC Mass Emission Rates
#9 Can Filler
(hours 31 through 40)

Two Tedlar gas bag samples collected under the filler room door during hour 33 measured 87.0 ppm and 83.0 ppm as propane.

Results (continued)

The 33 hour averages exclude the data collected during the first eight hours of sampling, when no beer filling was conducted.

Coors Brewing Company
#9 Can Filler
12-3-92 through 12-5-92
VOC Mass Emission Rates

Field Data		hour 41	33 hour Averages (exclude sterilization)
Outlet			
	VOC conc. (ppm wet)	39.8	42.1
	% H2O	0.6	0.6
	volumetric flow rate (dscfm)	2359	2359
Inlet #1			
	VOC conc. (ppm)	2.5	2.5
	volumetric flow rate (dscfm)	6392	6392
Inlet #2			
	VOC conc. (ppm)	2.7	2.7
	volumetric flow rate (dscfm)	2379	2379
Production			
	beer filling (bbl/hr)	153.8	153.8
Calculations		hour 41	33 hour Averages (exclude sterilization)
Theoretical Total			
	VOC lb/hr as propane	2.41	2.55
	VOC lb/hr as ethanol	6.04	6.39
	VOC lb/bbl as ethanol	0.0393	0.0416
Theoretical from Filling			
	VOC lb/hr as propane	2.26	2.40
	VOC lb/hr as ethanol	5.65	6.00
	VOC lb/bbl as ethanol	0.0368	0.0390

Table 8 - VOC Mass Emission Rates
#9 Can Filler
(hour 41 and 33 hour averages)

Results (continued)

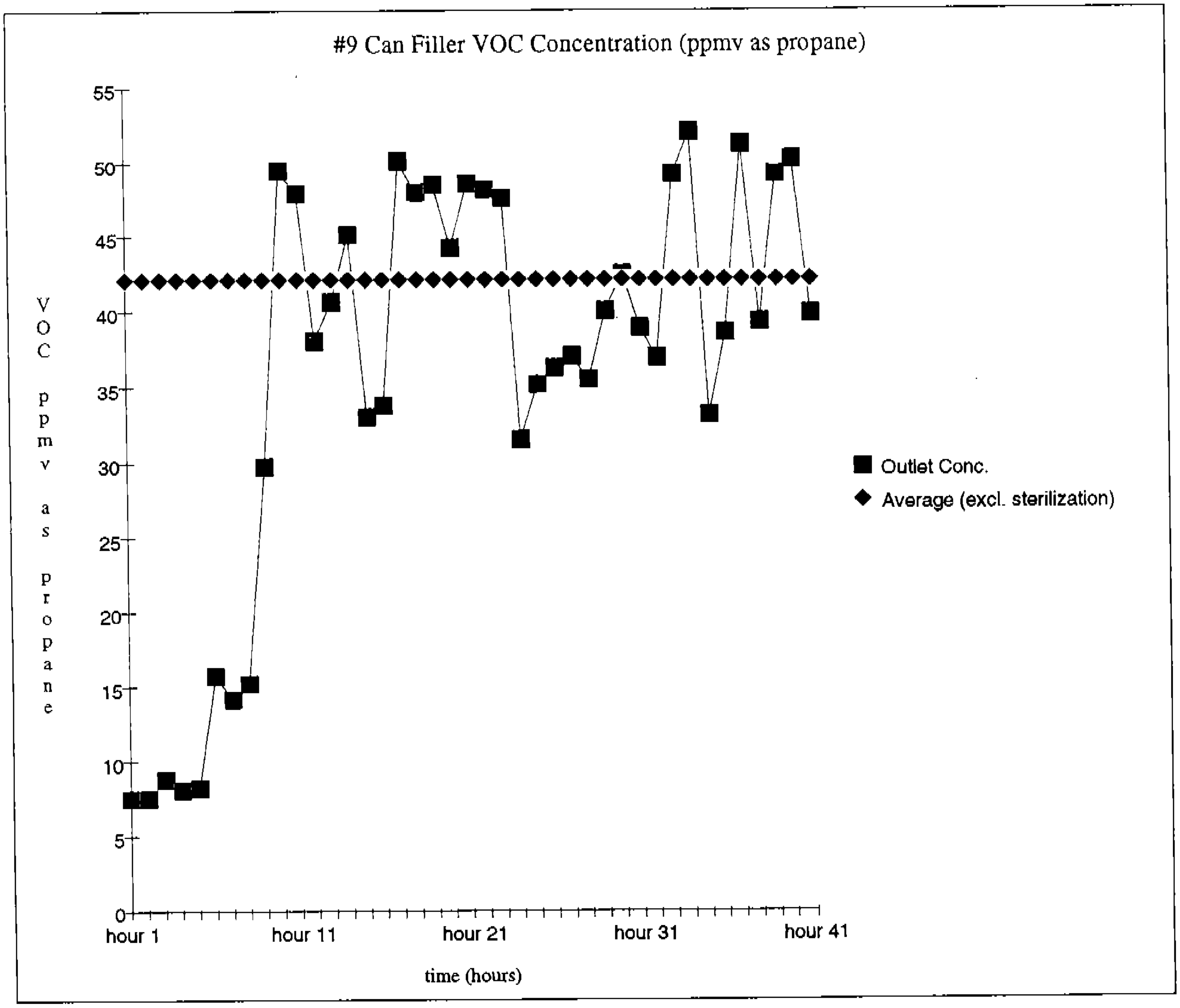


Chart 1 - VOC Concentration
#9 Can Filler

Appendix 1
Testing Parameters

#3 Bottle Filler
Testing Parameters

Coors Brewing Company

#3 Bottle Filler Exhaust Vent

12-2-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
sample volume (ft3)	31.480	43.288	47.742	40.837
sampling time (minutes)	32	40	40	37
stack temp. (oF)	72	69	68	70
meter temp. (oF)	84	93	94	90
barometric pressure (mbar)	833	833	833	833
barometric pressure (" Hg)	24.604	24.604	24.604	24.604
static press. (in. water)	0.07	0.08	0.07	0.07
moisture (grams)	7.5	7.0	4.0	6.2
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
delta H	3.00	3.10	3.50	3.20
(delta p)^1/2	0.1885	0.1867	0.1900	0.1884
meter box Y	1.0389	1.0389	1.0389	1.0389
delta H@	1.683	1.683	1.683	1.683
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)	22.0	22.0	22.0	22.0

Calculations	Run #1	Run #2	Run #3	Averages
sample volume (dscf)	26.329	35.627	39.268	33.741
moisture volume (scf)	0.353	0.329	0.188	0.290
moisture content (%/100)	0.0132	0.0092	0.0048	0.0091
molecular weight (dry)	28.836	28.836	28.836	28.836
molecular weight (actual)	28.693	28.737	28.784	28.738
gas velocity (ft/sec)	11.7	11.6	11.8	11.7
gas flow (acfm)	1861	1837	1866	1855
gas flow (dscfm)	1499	1494	1528	1507

Coors Brewing Company

#3 Bottle Filler Inlet #1

12-2-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	65	64	64	64
barometric pressure (mbar)	833	833	829	832
barometric pressure (" Hg)	24.604	24.604	24.485	24.564
static press. (in. water)	3.80	3.80	3.90	3.83
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.1935	0.2433	0.1988	0.2119
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	24.0	24.0	24.0	24.0

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	11.9	14.9	12.2	13.0
gas flow (acfm)	2241	2815	2305	2453
gas flow (dscfm)	1874	2359	1923	2052

* - equivalent diameter of a round stack

Coors Brewing Company

#3 Bottle Filler Inlet #2

12-2-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	70	70	70	70
barometric pressure (mbar)	833	833	829	832
barometric pressure (" Hg)	24.604	24.604	24.485	24.564
static press. (in. water)	1.20	1.40	1.40	1.33
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.5808	0.5664	0.5846	0.5773
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	13.9	13.9	13.9	13.9

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	36.0	35.1	36.3	35.8
gas flow (acfm)	2275	2218	2295	2263
gas flow (dscfm)	1871	1825	1879	1858

* - equivalent diameter of a round stack

Coors Brewing Company

#3 Bottle Filler Inlet #3

12-2-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	69	68	68	68
barometric pressure (mbar)	833	833	829	832
barometric pressure (" Hg)	24.604	24.604	24.485	24.564
static press. (in. water)	1.00	1.00	1.10	1.03
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.3989	0.5082	0.5777	0.4949
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	16.6	16.6	16.6	16.6

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	24.7	31.4	35.8	30.6
gas flow (acfm)	2222	2828	3222	2757
gas flow (dscfm)	1829	2333	2646	2269

* - equivalent diameter of a round stack

Coors Brewing Company

#3 Bottle Filler Exhaust Vent

12-2-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #1

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	09:00	0.0	39.5	40.1
Stop	10:00	0.5	39.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	41.0	41.9	26	23.0	23.4
2	38.5	39.3	27	23.0	23.4
3	35.0	35.7	28	29.0	29.6
4	28.0	28.5	29	30.5	31.1
5	21.0	21.3	30	31.0	31.6
6	16.5	16.7	31	31.5	32.1
7	14.0	14.1	32	31.0	31.6
8	20.0	20.3	33	31.0	31.6
9	25.0	25.4	34	31.0	31.6
10	23.0	23.4	35	31.0	31.6
11	18.0	18.3	36	30.5	31.1
12	14.5	14.7	37	30.5	31.1
13	14.5	14.7	38	30.5	31.1
14	24.5	24.9	39	30.0	30.6
15	29.5	30.1	40	27.5	28.0
16	31.5	32.1	41	24.0	24.4
17	32.0	32.6	42	28.5	29.0
18	32.0	32.6	43	31.0	31.6
19	32.0	32.6	44	31.0	31.6
20	32.0	32.6	45	29.0	29.6
21	32.0	32.6	46	23.0	23.4
22	33.0	33.7	47	20.5	20.8
23	32.0	32.6	48	26.0	26.5
24	32.0	32.6	49	27.5	28.0
25	29.0	29.6	50	29.0	29.6
averages:	27.2	27.7		28.9	29.5

Drift Cal. Avg. VOC (ppm as propane) $\boxed{28.6}$

Coors Brewing Company

#3 Bottle Filler Exhaust Vent

12-2-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #2

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	11:00	0.0	40.0	40.1
Stop	12:00	0.0	40.5	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	31.0	30.9	26	31.0	30.9
2	31.0	30.9	27	31.5	31.4
3	36.0	35.9	28	30.5	30.4
4	33.0	32.9	29	32.5	32.4
5	32.5	32.4	30	33.0	32.9
6	32.5	32.4	31	32.0	31.9
7	32.0	31.9	32	31.5	31.4
8	32.0	31.9	33	32.0	31.9
9	32.0	31.9	34	31.0	30.9
10	32.5	32.4	35	27.5	27.4
11	32.5	32.4	36	25.5	25.4
12	32.0	31.9	37	23.0	22.9
13	31.5	31.4	38	21.5	21.4
14	31.5	31.4	39	23.0	22.9
15	32.0	31.9	40	25.5	25.4
16	31.5	31.4	41	29.0	28.9
17	31.5	31.4	42	30.0	29.9
18	31.5	31.4	43	30.0	29.9
19	31.5	31.4	44	30.0	29.9
20	32.0	31.9	45	30.0	29.9
21	31.5	31.4	46	30.0	29.9
22	30.5	30.4	47	30.0	29.9
23	30.0	29.9	48	31.0	30.9
24	30.5	30.4	49	30.0	29.9
25	30.5	30.4	50	24.5	24.4
averages:	31.8	31.7		29.0	28.9

Drift Cal. Avg. VOC (ppm as propane) $\boxed{30.3}$

Coors Brewing Company

#3 Bottle Filler Exhaust Vent

12-2-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #3

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	12:30	0.0	40.5	40.1
Stop	13:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	31.0	30.5	26	33.0	32.5
2	30.5	30.0	27	33.0	32.5
3	30.5	30.0	28	32.5	32.0
4	30.5	30.0	29	32.5	32.0
5	31.0	30.5	30	32.5	32.0
6	31.0	30.5	31	32.0	31.5
7	31.5	31.0	32	31.5	31.0
8	30.0	29.5	33	31.5	31.0
9	31.0	30.5	34	31.5	31.0
10	31.5	31.0	35	31.5	31.0
11	31.5	31.0	36	31.0	30.5
12	31.0	30.5	37	30.5	30.0
13	31.0	30.5	38	31.0	30.5
14	30.5	30.0	39	31.5	31.0
15	30.0	29.5	40	31.0	30.5
16	30.0	29.5	41	31.0	30.5
17	30.0	29.5	42	31.0	30.5
18	30.0	29.5	43	31.0	30.5
19	30.5	30.0	44	33.5	33.0
20	31.0	30.5	45	30.0	29.5
21	31.0	30.5	46	30.0	29.5
22	31.0	30.5	47	31.0	30.5
23	30.0	29.5	48	27.0	26.6
24	30.0	29.5	49	21.5	21.2
25	30.0	29.5	50	20.0	19.7
averages:	30.6	30.2		31.6	31.1

Drift Cal. Avg. VOC (ppm as propane) $\boxed{30.6}$

#5 Can Filler
Testing Parameters

Coors Brewing Company

#5 Can Filler Exhaust Vent

12-2-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
sample volume (ft3)	56.039	30.818	33.329	40.062
sampling time (minutes)	50	30	30	37
stack temp. (oF)	68	68	68	68
meter temp. (oF)	82	88	88	86
barometric pressure (mbar)	828	828	827	828
barometric pressure (" Hg)	24.456	24.456	24.426	24.446
static press. (in. water)	-2.60	-2.80	-2.40	-2.60
moisture (grams)	9.0	5.0	6.0	6.7
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
delta H	3.50	3.50	3.50	3.50
(delta p)^1/2	0.8462	0.8428	0.8145	0.8345
meter box Y	1.0389	1.0389	1.0389	1.0389
delta H@	1.683	1.683	1.683	1.683
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)	15.0	15.0	15.0	15.0

Calculations	Run #1	Run #2	Run #3	Averages
sample volume (dscf)	46.833	25.473	27.516	33.274
moisture volume (scf)	0.424	0.235	0.282	0.314
moisture content (%/100)	0.0090	0.0092	0.0102	0.0094
molecular weight (dry)	28.836	28.836	28.836	28.836
molecular weight (actual)	28.739	28.737	28.726	28.734
gas velocity (ft/sec)	52.9	52.7	50.9	52.2
gas flow (acfm)	3894	3879	3750	3841
gas flow (dscfm)	3130	3116	3009	3085

Coors Brewing Company

#5 Can Filler Inlet #1

1-27-93

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	72	73	73	73
barometric pressure (mbar)	837	838	838	838
barometric pressure (" Hg)	24.722	24.751	24.751	24.741
static press. (in. water)	0.29	0.34	0.32	0.32
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.5268	0.5321	0.5224	0.5271
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	15.5	15.5	15.5	15.5

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	32.7	33.0	32.4	32.7
gas flow (acfm)	2568	2595	2548	2570
gas flow (dscfm)	2108	2129	2090	2109

* - equivalent diameter of a round stack

Coors Brewing Company

#5 Can Filler Inlet #2

1-27-93

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	78	77	78	78
barometric pressure (mbar)	837	838	838	838
barometric pressure (" Hg)	24.722	24.751	24.751	24.741
static press. (in. water)	1.30	1.30	1.30	1.30
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.3014	0.3520	0.2909	0.3148
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	22.9	22.9	22.9	22.9

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	18.8	21.9	18.1	19.6
gas flow (acfm)	3212	3746	3099	3352
gas flow (dscfm)	2615	3059	2526	2733

* - equivalent diameter of a round stack

Coors Brewing Company

#5 Can Filler Exhaust Vent

12-2-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #1

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	17:00	0.0	45.5	91.3
Stop	18:00	0.0	45.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	49.5	99.9	26	45.0	90.8
2	51.5	103.9	27	48.0	96.8
3	51.5	103.9	28	47.0	94.8
4	51.0	102.9	29	41.5	83.7
5	51.0	102.9	30	43.0	86.8
6	51.5	103.9	31	46.5	93.8
7	51.0	102.9	32	47.5	95.8
8	51.0	102.9	33	48.0	96.8
9	50.0	100.9	34	47.0	94.8
10	50.0	100.9	35	47.5	95.8
11	50.0	100.9	36	48.5	97.9
12	51.0	102.9	37	48.0	96.8
13	50.5	101.9	38	44.0	88.8
14	50.5	101.9	39	41.0	82.7
15	49.5	99.9	40	42.5	85.8
16	50.0	100.9	41	44.5	89.8
17	49.5	99.9	42	37.0	74.7
18	50.0	100.9	43	29.0	58.5
19	50.0	100.9	44	24.5	49.4
20	49.5	99.9	45	32.0	64.6
21	49.5	99.9	46	40.0	80.7
22	50.0	100.9	47	46.5	93.8
23	43.0	86.8	48	48.0	96.8
24	38.0	76.7	49	48.5	97.9
25	41.5	83.7	50	48.0	96.8
averages:	49.2	99.3		43.3	87.4

Drift Cal. Avg. VOC (ppm as propane) $\boxed{93.4}$

Coors Brewing Company

#5 Can Filler Exhaust Vent

12-2-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #2

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	18:06	0.0	45.0	91.3
Stop	19:06	0.0	45.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	49.5	100.4	26	38.0	77.1
2	49.5	100.4	27	36.5	74.1
3	49.0	99.4	28	39.5	80.1
4	49.0	99.4	29	42.0	85.2
5	44.0	89.3	30	44.0	89.3
6	25.0	50.7	31	45.0	91.3
7	18.5	37.5	32	46.0	93.3
8	23.0	46.7	33	47.5	96.4
9	32.5	65.9	34	47.5	96.4
10	40.0	81.2	35	48.5	98.4
11	44.0	89.3	36	49.0	99.4
12	44.5	90.3	37	48.5	98.4
13	45.5	92.3	38	49.5	100.4
14	47.0	95.4	39	49.0	99.4
15	44.0	89.3	40	49.0	99.4
16	43.5	88.3	41	49.0	99.4
17	39.5	80.1	42	51.0	103.5
18	41.0	83.2	43	50.5	102.5
19	42.0	85.2	44	49.0	99.4
20	43.0	87.2	45	50.0	101.4
21	41.0	83.2	46	54.5	110.6
22	34.0	69.0	47	52.0	105.5
23	28.5	57.8	48	45.0	91.3
24	26.5	53.8	49	45.0	91.3
25	33.0	67.0	50	46.0	93.3
averages:	39.1	79.3		46.9	95.1

Drift Cal. Avg. VOC (ppm as propane) | 87.2 |

Coors Brewing Company

#5 Can Filler Exhaust Vent

12-2-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

<u>Strip Chart Data</u>

Run #3

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	19:10	0.0	45.0	91.3
Stop	20:10	0.0	45.5	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	18.5	37.3	26	50.0	100.9
2	18.0	36.3	27	51.0	102.9
3	16.5	33.3	28	50.0	100.9
4	14.0	28.2	29	45.0	90.8
5	13.5	27.2	30	47.0	94.8
6	23.5	47.4	31	49.5	99.9
7	27.5	55.5	32	50.5	101.9
8	28.5	57.5	33	52.0	104.9
9	28.5	57.5	34	51.5	103.9
10	32.0	64.6	35	51.0	102.9
11	39.5	79.7	36	50.5	101.9
12	44.0	88.8	37	50.5	101.9
13	46.5	93.8	38	48.0	96.8
14	49.0	98.9	39	42.5	85.8
15	50.5	101.9	40	45.5	91.8
16	50.0	100.9	41	45.0	90.8
17	50.5	101.9	42	46.5	93.8
18	49.0	98.9	43	46.0	92.8
19	42.0	84.7	44	46.0	92.8
20	38.5	77.7	45	47.5	95.8
21	39.5	79.7	46	48.5	97.9
22	42.5	85.8	47	49.0	98.9
23	47.0	94.8	48	49.5	99.9
24	49.0	98.9	49	49.0	98.9
25	50.0	100.9	50	49.5	99.9
averages:	36.3	73.3		48.4	97.7

Drift Cal. Avg. VOC (ppm as propane) $\boxed{85.5}$

#6 Can Filler
Testing Parameters

Coors Brewing Company

#6 Can Filler Exhaust Vent

12-16-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
sample volume (ft3)	28.974	31.148	35.014	31.712
sampling time (minutes)	30	30	30	30
stack temp. (oF)	68	68	72	69
meter temp. (oF)	81	91	85	86
barometric pressure (mbar)	836	834	836	835
barometric pressure (" Hg)	24.692	24.633	24.692	24.672
static press. (in. water)	-0.49	-0.48	-0.47	-0.48
moisture (grams)	8.0	4.5	7.0	6.5
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
delta H	3.00	3.00	3.50	3.17
(delta p)^1/2	0.3817	0.3805	0.3659	0.3760
meter box Y	1.0389	1.0389	1.0389	1.0389
delta H@	1.683	1.683	1.683	1.683
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)	17.5	17.5	17.5	17.5

Calculations	Run #1	Run #2	Run #3	Averages
sample volume (dscf)	24.455	25.751	29.379	26.528
moisture volume (scf)	0.377	0.212	0.329	0.306
moisture content (%/100)	0.0152	0.0082	0.0111	0.0115
molecular weight (dry)	28.836	28.836	28.836	28.836
molecular weight (actual)	28.672	28.748	28.716	28.712
gas velocity (ft/sec)	23.7	23.6	22.8	23.4
gas flow (acfm)	2374	2366	2283	2341
gas flow (dscfm)	1927	1930	1847	1901

Coors Brewing Company

#6 Can Filler Inlet #1

12-16-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	74	74	74	74
barometric pressure (mbar)	836	834	836	835
barometric pressure (" Hg)	24.692	24.633	24.692	24.672
static press. (in. water)	0.28	0.27	0.27	0.27
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.3807	0.1680	0.1041	0.2176
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	24.4	24.4	24.4	24.4

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	23.7	10.5	6.5	13.5
gas flow (acfm)	4611	2037	1261	2636
gas flow (dscfm)	3766	1660	1030	2152

* - equivalent diameter of a round stack

Coors Brewing Company

#6 Can Filler Inlet #2

12-16-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Averages
stack temp. (oF)	71	71	71	71
barometric pressure (mbar)	836	834	836	835
barometric pressure (" Hg)	24.692	24.633	24.692	24.672
static press. (in. water)	0.94	0.92	1.80	1.22
oxygen (%)	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0
(delta p)^1/2	0.3784	0.3454	0.4896	0.4045
pitot tube constant	0.84	0.84	0.84	0.84
stack diameter (inches)*	16.9	16.9	16.9	16.9

Calculations	Run #1	Run #2	Run #3	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	23.4	21.4	30.3	25.0
gas flow (acfm)	2190	2002	2830	2341
gas flow (dscfm)	1803	1643	2335	1927

* - equivalent diameter of a round stack

Coors Brewing Company

#6 Can Filler Exhaust Vent

12-16-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #1

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	10:00	0.0	46.0	91.3
Stop	11:00	0.0	44.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	46.0	93.3	21	61.0	123.8	41	69.0	140.0
2	43.0	87.2	22	62.0	125.8	42	54.0	109.6
3	31.0	62.9	23	60.0	121.7	43	62.0	125.8
4	25.0	50.7	24	59.0	119.7	44	65.0	131.9
5	38.0	77.1	25	47.0	95.4	45	68.0	138.0
6	48.0	97.4	26	33.0	67.0	46	66.0	133.9
7	54.0	109.6	27	25.0	50.7	47	48.0	97.4
8	57.0	115.6	28	27.0	54.8	48	36.0	73.0
9	60.0	121.7	29	42.0	85.2	49	42.0	85.2
10	62.0	125.8	30	49.0	99.4	50	58.0	117.7
11	62.0	125.8	31	46.0	93.3	51	62.0	125.8
12	62.0	125.8	32	52.0	105.5	52	60.0	121.7
13	63.0	127.8	33	57.0	115.6	53	53.0	107.5
14	63.0	127.8	34	59.0	119.7	54	61.0	123.8
15	62.0	125.8	35	58.0	117.7	55	66.0	133.9
16	63.0	127.8	36	57.0	115.6	56	68.0	138.0
17	62.0	125.8	37	58.0	117.7	57	69.0	140.0
18	62.0	125.8	38	64.0	129.8	58	69.0	140.0
19	63.0	127.8	39	68.0	138.0	59	70.0	142.0
20	62.0	125.8	40	69.0	140.0	60	69.0	140.0
averages:	54.4	110.4		52.6	106.8		60.8	123.3

Drift Cal. Avg. VOC (ppm as propane) $\boxed{113.5}$

Coors Brewing Company

#6 Can Filler Exhaust Vent

12-16-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #2

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	11:30	0.0	46.0	91.3
Stop	12:30	0.0	44.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	51.0	103.5	21	65.0	131.9	41	61.0	123.8
2	56.0	113.6	22	69.0	140.0	42	57.0	115.6
3	58.0	117.7	23	70.0	142.0	43	36.0	73.0
4	52.0	105.5	24	70.0	142.0	44	28.0	56.8
5	56.0	113.6	25	70.0	142.0	45	44.0	89.3
6	58.0	117.7	26	68.0	138.0	46	56.0	113.6
7	59.0	119.7	27	70.0	142.0	47	59.0	119.7
8	59.0	119.7	28	70.0	142.0	48	54.0	109.6
9	61.0	123.8	29	70.0	142.0	49	53.0	107.5
10	61.0	123.8	30	68.0	138.0	50	64.0	129.8
11	54.0	109.6	31	62.0	125.8	51	67.0	135.9
12	40.0	81.2	32	52.0	105.5	52	66.0	133.9
13	30.0	60.9	33	59.0	119.7	53	42.0	85.2
14	24.0	48.7	34	64.0	129.8	54	32.0	64.9
15	29.0	58.8	35	66.0	133.9	55	34.0	69.0
16	42.0	85.2	36	66.0	133.9	56	49.0	99.4
17	41.0	83.2	37	60.0	121.7	57	56.0	113.6
18	50.0	101.4	38	38.0	77.1	58	61.0	123.8
19	55.0	111.6	39	39.0	79.1	59	63.0	127.8
20	57.0	115.6	40	51.0	103.5	60	65.0	131.9
averages:	49.6	100.7		62.4	126.5		52.4	106.2

Drift Cal. Avg. VOC (ppm as propane) 111.1

Coors Brewing Company

#6 Can Filler Exhaust Vent

12-16-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Run #3

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	13:00	0.0	46.0	91.3
Stop	14:00	1.0	47.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	61.0	120.1	21	61.0	120.1	41	43.0	84.4
2	40.0	78.4	22	61.0	120.1	42	55.0	108.2
3	40.0	78.4	23	61.0	120.1	43	62.0	122.1
4	50.0	98.2	24	49.0	96.3	44	65.0	128.0
5	56.0	110.2	25	38.0	74.4	45	67.0	132.0
6	59.0	116.1	26	30.0	58.6	46	66.0	130.0
7	47.0	92.3	27	24.0	46.6	47	67.0	132.0
8	37.0	72.4	28	42.0	82.4	48	66.0	130.0
9	36.0	70.5	29	52.0	102.2	49	66.0	130.0
10	54.0	106.2	30	57.0	112.1	50	66.0	130.0
11	57.0	112.1	31	60.0	118.1	51	66.0	130.0
12	60.0	118.1	32	61.0	120.1	52	65.0	128.0
13	61.0	120.1	33	61.0	120.1	53	66.0	130.0
14	60.0	118.1	34	61.0	120.1	54	66.0	130.0
15	60.0	118.1	35	62.0	122.1	55	66.0	130.0
16	61.0	120.1	36	61.0	120.1	56	67.0	132.0
17	60.0	118.1	37	61.0	120.1	57	67.0	132.0
18	60.0	118.1	38	61.0	120.1	58	56.0	110.2
19	61.0	120.1	39	60.0	118.1	59	49.0	96.3
20	61.0	120.1	40	57.0	112.1	60	48.0	94.3
averages:	54.0	106.3		54.0	106.2		62.0	122.0

Drift Cal. Avg. VOC (ppm as propane) 111.5

#9 Can Filler
Testing Parameters

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92 through 12-5-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

<u>**Field Data**</u>	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
sample volume (ft3)	41.325	31.521	32.206	32.111	31.678	33.768
sampling time (minutes)	40	30	30	30	30	32
stack temp. (oF)	70	70	70	71	71	70
meter temp. (oF)	91	84	82	83	84	85
barometric pressure (mbar)	828	827	829	828	827	828
barometric pressure (" Hg)	24.456	24.426	24.485	24.456	24.426	24.450
static press. (in. water)	-3.00	-3.00	-2.90	-3.00	-3.00	-2.98
moisture (grams)	4.0	3.0	3.5	2.5	4.0	3.4
oxygen (%)	20.9	20.9	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0	0.0	0.0
delta H	3.50	3.50	3.50	3.50	3.50	3.50
(delta p)^1/2	0.5894	0.5988	0.5967	0.5990	0.6030	0.5974
meter box Y	1.0389	1.0389	1.0389	1.0389	1.0389	1.0389
delta H@	1.683	1.683	1.683	1.683	1.683	1.683
pitot tube constant	0.84	0.84	0.84	0.84	0.84	0.84
stack diameter (inches)	15.5	15.5	15.5	15.5	15.5	15.5

<u>**Calculations**</u>	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
sample volume (dscf)	33.972	26.214	26.947	26.786	26.345	28.053
moisture volume (scf)	0.188	0.141	0.165	0.118	0.188	0.160
moisture content (%/100)	0.0055	0.0054	0.0061	0.0044	0.0071	0.0057
molecular weight (dry)	28.836	28.836	28.836	28.836	28.836	28.836
molecular weight (actual)	28.776	28.778	28.770	28.789	28.759	28.774
gas velocity (ft/sec)	36.9	37.5	37.3	37.5	37.8	37.4
gas flow (acfm)	2901	2949	2935	2951	2974	2942
gas flow (dscfm)	2328	2364	2358	2366	2375	2359

Coors Brewing Company

#9 Can Filler Inlet #1

12-3-92 through 12-5-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
stack temp. (oF)	76	75	76	74	74	75
barometric pressure (mbar)	828	827	829	828	827	828
barometric pressure (" Hg)	24.456	24.426	24.485	24.456	24.426	24.450
static press. (in. water)	1.20	1.90	1.40	1.40	1.30	1.44
oxygen (%)	20.9	20.9	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0	0.0	0.0
(delta p)^1/2	0.7367	0.8922	0.8057	0.8063	0.7857	0.8053
pitot tube constant	0.84	0.84	0.84	0.84	0.84	0.84
stack diameter (inches)*	21.9	21.9	21.9	21.9	21.9	21.9

Calculations	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	46.0	55.7	50.3	50.3	49.0	50.3
gas flow (acfm)	7226	8740	7896	7892	7696	7890
gas flow (dscfm)	5840	7083	6393	6406	6238	6392

* - equivalent diameter of a round stack

Coors Brewing Company

#9 Can Filler Inlet #2

12-3-92 through 12-5-92

EPA Methods 1-4 : Determination of Volumetric Flow Rate and Molecular Weight

Field Data	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
stack temp. (oF)	76	76	72	71	72	73
barometric pressure (mbar)	828	827	829	828	827	828
barometric pressure (" Hg)	24.456	24.426	24.485	24.456	24.426	24.450
static press. (in. water)	-0.41	-0.40	-0.29	-0.40	-0.35	-0.37
oxygen (%)	20.9	20.9	20.9	20.9	20.9	20.9
carbon dioxide (%)	0.0	0.0	0.0	0.0	0.0	0.0
(delta p)^1/2 (center line)**	0.9722	1.0110	1.1221	0.9689	0.9743	1.0097
(delta p)^1/2 (corrected)**	0.6592	0.6855	0.7608	0.6569	0.6606	0.6846
pitot tube constant	0.84	0.84	0.84	0.84	0.84	0.84
stack diameter (inches)*	14.5	14.5	14.5	14.5	14.5	14.5

Calculations	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
molecular weight (dry)	28.836	28.836	28.836	28.836	28.836	28.836
gas velocity (ft/sec)	41.3	43.0	47.4	41.0	41.2	42.8
gas flow (acfm)	2841	2956	3265	2818	2838	2944
gas flow (dscfm)	2285	2375	2650	2288	2298	2379

* - equivalent diameter of a round stack

** - When the original flow measurements were taken, only the center port was accessible. Subsequent flow measurements of all ports were used to develop an empirical constant (0.678) to determine total duct flow from the center port differential pressure measurements.

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 1 - 2

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	07:30	0.0	40.0	40.1
Stop	09:30	0.0	39.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	8.0	8.1	21	7.0	7.1
2	8.0	8.1	22	7.0	7.1
3	8.0	8.1	23	7.0	7.1
4	8.0	8.1	24	6.0	6.1
5	8.0	8.1	25	6.0	6.1
6	8.0	8.1	26	6.0	6.1
7	8.0	8.1	27	6.0	6.1
8	8.0	8.1	28	6.0	6.1
9	8.0	8.1	29	7.0	7.1
10	8.0	8.1	30	7.0	7.1
11	7.0	7.1	31	8.0	8.1
12	7.0	7.1	32	8.0	8.1
13	7.0	7.1	33	8.0	8.1
14	7.0	7.1	34	8.0	8.1
15	7.0	7.1	35	8.0	8.1
16	7.0	7.1	36	8.0	8.1
17	7.0	7.1	37	9.0	9.1
18	7.0	7.1	38	9.0	9.1
19	7.0	7.1	39	9.0	9.1
20	7.0	7.1	40	9.0	9.1
averages:	7.5	7.6		7.5	7.6

Drift Cal. Avg. VOC (ppm as propane) $\boxed{7.6}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 3 - 4

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	09:30	0.0	40.0	40.1
Stop	11:30	0.0	39.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	9.0	9.1	21	8.0	8.1
2	9.0	9.1	22	8.0	8.1
3	9.0	9.1	23	8.0	8.1
4	9.0	9.1	24	8.0	8.1
5	9.0	9.1	25	8.0	8.1
6	9.0	9.1	26	8.0	8.1
7	9.0	9.1	27	8.0	8.1
8	9.0	9.1	28	8.0	8.1
9	9.0	9.1	29	8.0	8.1
10	9.0	9.1	30	8.0	8.1
11	9.0	9.1	31	8.0	8.1
12	9.0	9.1	32	9.0	9.1
13	9.0	9.1	33	9.0	9.1
14	9.0	9.1	34	9.0	9.1
15	9.0	9.1	35	8.0	8.1
16	9.0	9.1	36	8.0	8.1
17	8.0	8.1	37	8.0	8.1
18	8.0	8.1	38	8.0	8.1
19	8.0	8.1	39	7.0	7.1
20	8.0	8.1	40	8.0	8.1
averages:	8.8	8.9		8.1	8.2

Drift Cal. Avg. VOC (ppm as propane) $\boxed{8.6}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 5 - 6

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	11:30	0.0	40.0	40.1
Stop	13:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	8.0	7.9	21	12.0	11.9
2	8.0	7.9	22	13.0	12.9
3	8.0	7.9	23	16.0	15.8
4	8.0	7.9	24	24.0	23.8
5	8.0	7.9	25	20.0	19.8
6	9.0	8.9	26	18.0	17.8
7	9.0	8.9	27	17.0	16.8
8	9.0	8.9	28	18.0	17.8
9	8.0	7.9	29	16.0	15.8
10	8.0	7.9	30	16.0	15.8
11	8.0	7.9	31	17.0	16.8
12	8.0	7.9	32	17.0	16.8
13	8.0	7.9	33	15.0	14.9
14	8.0	7.9	34	14.0	13.9
15	8.0	7.9	35	13.0	12.9
16	8.0	7.9	36	12.0	11.9
17	8.0	7.9	37	12.0	11.9
18	8.0	7.9	38	13.0	12.9
19	9.0	8.9	39	16.0	15.8
20	11.0	10.9	40	20.0	19.8
averages:	8.3	8.3		15.9	15.8

Drift Cal. Avg. VOC (ppm as propane) $\boxed{12.0}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 7 - 8

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	13:30	0.0	40.0	40.1
Stop	15:30	0.0	41.0	

	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
	1	18.0	17.8	21	13.0	12.9
	2	18.0	17.8	22	15.0	14.9
	3	17.0	16.8	23	15.0	14.9
	4	17.0	16.8	24	13.0	12.9
	5	16.0	15.8	25	12.0	11.9
	6	16.0	15.8	26	12.0	11.9
	7	16.0	15.8	27	12.0	11.9
	8	15.0	14.9	28	12.0	11.9
	9	14.0	13.9	29	11.0	10.9
	10	13.0	12.9	30	11.0	10.9
	11	13.0	12.9	31	10.0	9.9
	12	12.0	11.9	32	10.0	9.9
	13	12.0	11.9	33	10.0	9.9
	14	13.0	12.9	34	16.0	15.8
	15	13.0	12.9	35	15.0	14.9
	16	13.0	12.9	36	19.0	18.8
	17	12.0	11.9	37	24.0	23.8
	18	13.0	12.9	38	26.0	25.7
	19	13.0	12.9	39	27.0	26.7
	20	13.0	12.9	40	27.0	26.7
averages:		14.3	14.2		15.5	15.3

Drift Cal. Avg. VOC (ppm as propane) $\boxed{14.8}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 9 - 10

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	15:30	0.0	41.0	40.1
Stop	17:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	28.0	27.4	21	48.0	46.9
2	26.0	25.4	22	50.0	48.9
3	25.0	24.5	23	50.0	48.9
4	25.0	24.5	24	49.0	47.9
5	25.0	24.5	25	54.0	52.8
6	23.0	22.5	26	55.0	53.8
7	25.0	24.5	27	50.0	48.9
8	20.0	19.6	28	52.0	50.9
9	16.0	15.6	29	50.0	48.9
10	13.0	12.7	30	52.0	50.9
11	13.0	12.7	31	49.0	47.9
12	22.0	21.5	32	52.0	50.9
13	calibrate	calibrate	33	51.0	49.9
14	33.0	32.3	34	52.0	50.9
15	48.0	46.9	35	50.0	48.9
16	52.0	50.9	36	50.0	48.9
17	50.0	48.9	37	50.0	48.9
18	50.0	48.9	38	47.0	46.0
19	39.0	38.1	39	51.0	49.9
20	45.0	44.0	40	51.0	49.9
averages:	30.4	29.8		50.6	49.5

Drift Cal. Avg. VOC (ppm as propane) $\boxed{39.6}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 11 - 12

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	17:30	0.0	41.0	40.1
Stop	19:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	50.0	48.9	21	48.0	46.9
2	50.0	48.9	22	48.0	46.9
3	50.0	48.9	23	48.0	46.9
4	50.0	48.9	24	50.0	48.9
5	54.0	52.8	25	39.0	38.1
6	50.0	48.9	26	35.0	34.2
7	51.0	49.9	27	44.0	43.0
8	51.0	49.9	28	52.0	50.9
9	50.0	48.9	29	51.0	49.9
10	50.0	48.9	30	50.0	48.9
11	49.0	47.9	31	46.0	45.0
12	53.0	51.8	32	49.0	47.9
13	50.0	48.9	33	51.0	49.9
14	49.0	47.9	34	52.0	50.9
15	50.0	48.9	35	45.0	44.0
16	48.0	46.9	36	21.0	20.5
17	50.0	48.9	37	17.0	16.6
18	34.0	33.3	38	14.0	13.7
19	41.0	40.1	39	12.0	11.7
20	49.0	47.9	40	8.0	7.8
averages:	49.0	47.9		39.0	38.1

Drift Cal. Avg. VOC (ppm as propane) $\boxed{43.0}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 13 - 14

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	19:30	0.0	41.0	40.1
Stop	21:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	5.0	4.9	21	49.0	47.9
2	5.0	4.9	22	49.0	47.9
3	22.0	21.5	23	48.0	46.9
4	42.0	41.1	24	54.0	52.8
5	41.0	40.1	25	51.0	49.9
6	45.0	44.0	26	53.0	51.8
7	50.0	48.9	27	46.0	45.0
8	50.0	48.9	28	43.0	42.1
9	48.0	46.9	29	42.0	41.1
10	51.0	49.9	30	calibrate	calibrate
11	50.0	48.9	31	46.0	45.0
12	47.0	46.0	32	46.0	45.0
13	46.0	45.0	33	46.0	45.0
14	46.0	45.0	34	45.5	44.5
15	49.0	47.9	35	calibrate	calibrate
16	49.0	47.9	36	calibrate	calibrate
17	44.0	43.0	37	43.0	42.1
18	50.0	48.9	38	44.0	43.0
19	50.0	48.9	39	35.0	34.2
20	40.0	39.1	40	44.0	43.0
averages:	41.5	40.6		46.1	45.1

Drift Cal. Avg. VOC (ppm as propane) $\boxed{42.9}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 15 - 16

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	21:30	0.0	41.0	40.1
Stop	23:30	0.0	42.0	

	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
	1	47.5	45.9	21	11.5	11.1
	2	38.0	36.7	22	9.5	9.2
	3	19.0	18.4	23	8.0	7.7
	4	13.0	12.6	24	8.0	7.7
	5	26.0	25.1	25	11.0	10.6
	6	42.0	40.6	26	8.0	7.7
	7	44.0	42.5	27	32.0	30.9
	8	43.0	41.5	28	46.5	44.9
	9	47.0	45.4	29	50.0	48.3
	10	48.0	46.4	30	49.0	47.3
	11	46.0	44.4	31	44.0	42.5
	12	44.5	43.0	32	38.0	36.7
	13	42.0	40.6	33	23.5	22.7
	14	41.5	40.1	34	50.0	48.3
	15	48.0	46.4	35	51.0	49.3
	16	12.0	11.6	36	52.0	50.2
	17	4.5	4.3	37	53.0	51.2
	18	23.0	22.2	38	53.0	51.2
	19	38.0	36.7	39	47.5	45.9
	20	17.0	16.4	40	54.0	52.2
averages:		34.2	33.0		35.0	33.8

Drift Cal. Avg. VOC (ppm as propane) 33.4

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-3/4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

<u>Strip Chart Data</u>

Hours 17 - 18

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	23:30	0.0	41.0	40.1
Stop	01:30	0.0	42.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	44.0	42.5	21	54.0	52.2
2	50.0	48.3	22	53.0	51.2
3	54.0	52.2	23	54.0	52.2
4	54.0	52.2	24	52.5	50.7
5	50.5	48.8	25	51.5	49.8
6	52.0	50.2	26	32.5	31.4
7	51.0	49.3	27	28.5	27.5
8	52.0	50.2	28	48.0	46.4
9	51.0	49.3	29	49.5	47.8
10	51.5	49.8	30	51.0	49.3
11	51.0	49.3	31	51.0	49.3
12	53.0	51.2	32	51.0	49.3
13	53.0	51.2	33	52.0	50.2
14	54.0	52.2	34	53.0	51.2
15	53.0	51.2	35	47.5	45.9
16	52.5	50.7	36	49.5	47.8
17	53.5	51.7	37	53.0	51.2
18	51.0	49.3	38	54.5	52.7
19	53.0	51.2	39	54.5	52.7
20	53.0	51.2	40	53.0	51.2
averages:	51.9	50.1		49.7	48.0

Drift Cal. Avg. VOC (ppm as propane) $\boxed{49.1}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 19 - 20

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	01:30	0.0	41.0	40.1
Stop	03:30	0.0	42.0	

	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
	1	52.0	50.2	21	52.0	50.2
	2	53.5	51.7	22	41.0	39.6
	3	52.0	50.2	23	35.0	33.8
	4	54.0	52.2	24	25.5	24.6
	5	53.5	51.7	25	41.0	39.6
	6	49.5	47.8	26	51.0	49.3
	7	53.0	51.2	27	49.5	47.8
	8	54.0	52.2	28	52.0	50.2
	9	53.5	51.7	29	53.0	51.2
	10	50.5	48.8	30	52.0	50.2
	11	45.0	43.5	31	54.5	52.7
	12	49.0	47.3	32	52.0	50.2
	13	36.0	34.8	33	42.5	41.1
	14	33.0	31.9	34	31.5	30.4
	15	51.0	49.3	35	30.0	29.0
	16	54.0	52.2	36	45.0	43.5
	17	50.0	48.3	37	51.0	49.3
	18	52.0	50.2	38	51.0	49.3
	19	55.0	53.1	39	53.0	51.2
	20	52.5	50.7	40	53.0	51.2
averages:		50.1	48.5		45.8	44.2

Drift Cal. Avg. VOC (ppm as propane) $\boxed{46.3}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 21 - 22

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	03:30	0.0	41.0	40.1
Stop	05:30	0.0	42.0	

	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
	1	51.5	49.8	21	48.0	46.4
	2	51.0	49.3	22	47.0	45.4
	3	52.0	50.2	23	46.0	44.4
	4	53.0	51.2	24	47.0	45.4
	5	52.0	50.2	25	45.0	43.5
	6	53.0	51.2	26	49.5	47.8
	7	53.0	51.2	27	49.5	47.8
	8	53.0	51.2	28	50.0	48.3
	9	53.5	51.7	29	51.0	49.3
	10	53.0	51.2	30	50.5	48.8
	11	47.0	45.4	31	52.0	50.2
	12	50.0	48.3	32	51.0	49.3
	13	51.0	49.3	33	51.0	49.3
	14	49.0	47.3	34	52.0	50.2
	15	51.0	49.3	35	52.0	50.2
	16	51.0	49.3	36	51.0	49.3
	17	52.0	50.2	37	51.0	49.3
	18	40.0	38.7	38	53.0	51.2
	19	41.0	39.6	39	calibrate	calibrate
	20	48.0	46.4	40	51.0	49.3
averages:		50.3	48.6		49.9	48.2

Drift Cal. Avg. VOC (ppm as propane) 48.4

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 23 - 24

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	05:30	0.0	41.0	40.1
Stop	07:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	52.0	50.9	21	50.0	48.9
2	55.0	53.8	22	48.0	46.9
3	54.0	52.8	23	44.0	43.0
4	54.0	52.8	24	44.0	43.0
5	35.0	34.2	25	47.0	46.0
6	26.0	25.4	26	48.0	46.9
7	46.0	45.0	27	46.0	45.0
8	46.0	45.0	28	46.0	45.0
9	50.0	48.9	29	40.0	39.1
10	50.0	48.9	30	46.0	45.0
11	52.0	50.9	31	46.0	45.0
12	52.0	50.9	32	50.0	48.9
13	50.0	48.9	33	35.0	34.2
14	52.0	50.9	34	20.0	19.6
15	48.0	46.9	35	9.0	8.8
16	48.0	46.9	36	7.0	6.8
17	54.0	52.8	37	6.0	5.9
18	50.0	48.9	38	4.0	3.9
19	50.0	48.9	39	4.0	3.9
20	49.0	47.9	40	4.0	3.9
averages:	48.6	47.6		32.2	31.5

Drift Cal. Avg. VOC (ppm as propane) $\boxed{39.5}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 25 - 26

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	07:30	0.0	41.0	40.1
Stop	09:30	0.0	41.0	

	point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
	1	4.0	3.9	21	36.0	35.2
	2	20.0	19.6	22	35.0	34.2
	3	36.0	35.2	23	34.0	33.3
	4	42.0	41.1	24	32.0	31.3
	5	42.0	41.1	25	31.0	30.3
	6	39.0	38.1	26	34.0	33.3
	7	39.0	38.1	27	34.0	33.3
	8	37.0	36.2	28	36.0	35.2
	9	26.0	25.4	29	32.0	31.3
	10	42.0	41.1	30	39.0	38.1
	11	31.0	30.3	31	38.0	37.2
	12	42.0	41.1	32	40.0	39.1
	13	42.0	41.1	33	38.0	37.2
	14	37.0	36.2	34	34.0	33.3
	15	42.0	41.1	35	41.0	40.1
	16	42.0	41.1	36	41.0	40.1
	17	43.0	42.1	37	42.0	41.1
	18	35.0	34.2	38	42.0	41.1
	19	40.0	39.1	39	42.0	41.1
	20	38.0	37.2	40	42.0	41.1
averages:		36.0	35.2		37.1	36.3

Drift Cal. Avg. VOC (ppm as propane) $\boxed{35.7}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 27 - 28

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	09:30	0.0	41.0	40.1
Stop	11:30	0.0	41.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	35.0	34.2	21	39.0	38.1
2	31.0	30.3	22	41.0	40.1
3	41.0	40.1	23	31.0	30.3
4	41.0	40.1	24	36.0	35.2
5	42.0	41.1	25	39.0	38.1
6	43.0	42.1	26	40.0	39.1
7	41.0	40.1	27	37.0	36.2
8	39.0	38.1	28	38.0	37.2
9	28.0	27.4	29	40.0	39.1
10	30.0	29.3	30	calibrate	calibrate
11	42.0	41.1	31	calibrate	calibrate
12	40.0	39.1	32	37.0	36.2
13	calibrate	calibrate	33	39.0	38.1
14	calibrate	calibrate	34	37.0	36.2
15	calibrate	calibrate	35	39.0	38.1
16	calibrate	calibrate	36	41.0	40.1
17	36.5	35.7	37	calibrate	calibrate
18	39.0	38.1	38	calibrate	calibrate
19	39.0	38.1	39	36.0	35.2
20	40.0	39.1	40	11.0	10.8
averages:	38.0	37.1		36.3	35.5

Drift Cal. Avg. VOC (ppm as propane) $\boxed{36.3}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 29 - 30

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	11:30	0.0	41.0	40.1
Stop	13:30	0.5	39.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	27.0	27.0	21	43.0	43.1
2	40.0	40.1	22	29.0	29.0
3	43.0	43.1	23	52.0	52.2
4	43.0	43.1	24	49.0	49.2
5	29.0	29.0	25	46.0	46.2
6	37.0	37.1	26	46.0	46.2
7	42.0	42.1	27	45.0	45.1
8	43.0	43.1	28	45.0	45.1
9	43.0	43.1	29	43.0	43.1
10	43.0	43.1	30	36.0	36.1
11	43.0	43.1	31	42.0	42.1
12	36.0	36.1	32	41.0	41.1
13	42.0	42.1	33	39.0	39.1
14	44.0	44.1	34	46.0	46.2
15	46.0	46.2	35	33.0	33.0
16	29.0	29.0	36	38.0	38.1
17	37.0	37.1	37	44.0	44.1
18	44.0	44.1	38	43.0	43.1
19	44.0	44.1	39	44.0	44.1
20	43.0	43.1	40	43.0	43.1
averages:	39.9	40.0		42.4	42.5

Drift Cal. Avg. VOC (ppm as propane) $\boxed{41.2}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 31 - 32

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	13:30	0.0	41.0	40.1
Stop	15:30	0.5	39.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	44.0	44.1	21	43.0	43.1
2	45.0	45.1	22	44.0	44.1
3	22.0	21.9	23	40.0	40.1
4	40.0	40.1	24	37.0	37.1
5	43.0	43.1	25	31.0	31.0
6	43.0	43.1	26	20.0	19.9
7	43.0	43.1	27	33.0	33.0
8	42.0	42.1	28	27.0	27.0
9	44.0	44.1	29	37.0	37.1
10	27.0	27.0	30	32.0	32.0
11	42.0	42.1	31	25.0	25.0
12	41.0	41.1	32	28.0	28.0
13	36.0	36.1	33	27.0	27.0
14	36.0	36.1	34	46.0	46.2
15	19.0	18.9	35	45.0	45.1
16	37.5	37.6	36	45.0	45.1
17	41.0	41.1	37	45.0	45.1
18	45.0	45.1	38	44.0	44.1
19	42.0	42.1	39	45.0	45.1
20	44.0	44.1	40	44.0	44.1
averages:	38.8	38.9		36.9	37.0

Drift Cal. Avg. VOC (ppm as propane) $\boxed{37.9}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 33 - 34

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	15:30	0.0	40.0	40.1
Stop	17:30	0.0	40.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	36.0	36.1	21	54.0	54.1
2	41.0	41.1	22	55.0	55.1
3	40.0	40.1	23	51.0	51.1
4	38.5	38.6	24	51.0	51.1
5	51.0	51.1	25	55.0	55.1
6	53.0	53.1	26	54.0	54.1
7	54.0	54.1	27	49.0	49.1
8	calibrate	calibrate	28	52.0	52.1
9	54.5	54.6	29	55.0	55.1
10	calibrate	calibrate	30	53.0	53.1
11	calibrate	calibrate	31	46.0	46.1
12	calibrate	calibrate	32	51.0	51.1
13	44.0	44.1	33	42.0	42.1
14	53.0	53.1	34	49.0	49.1
15	53.0	53.1	35	53.0	53.1
16	53.0	53.1	36	54.0	54.1
17	54.0	54.1	37	53.0	53.1
18	54.0	54.1	38	54.0	54.1
19	53.0	53.1	39	53.0	53.1
20	54.0	54.1	40	54.0	54.1
averages:	49.1	49.2		51.9	52.0

Drift Cal. Avg. VOC (ppm as propane) 50.6

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 35 - 36

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	17:30	0.0	40.0	40.1
Stop	19:30	0.0	40.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	54.0	54.1	21	30.0	30.1
2	55.0	55.1	22	50.0	50.1
3	54.0	54.1	23	27.0	27.1
4	54.0	54.1	24	30.0	30.1
5	49.0	49.1	25	43.0	43.1
6	50.0	50.1	26	44.0	44.1
7	51.0	51.1	27	42.0	42.1
8	55.0	55.1	28	31.0	31.1
9	55.0	55.1	29	45.0	45.1
10	54.0	54.1	30	52.0	52.1
11	44.0	44.1	31	48.0	48.1
12	20.0	20.1	32	51.0	51.1
13	14.0	14.0	33	51.0	51.1
14	11.0	11.0	34	47.0	47.1
15	9.0	9.0	35	24.0	24.1
16	8.0	8.0	36	43.0	43.1
17	6.5	6.5	37	39.0	39.1
18	6.0	6.0	38	44.0	44.1
19	5.5	5.5	39	20.0	20.1
20	5.0	5.0	40	10.0	10.0
averages:	33.0	33.1		38.5	38.6

Drift Cal. Avg. VOC (ppm as propane) $\boxed{35.9}$

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 37 - 38

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	19:30	0.0	40.0	40.1
Stop	21:30	0.0	40.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	18.0	18.0	21	55.0	55.1
2	49.0	49.1	22	56.0	56.1
3	53.0	53.1	23	55.0	55.1
4	52.0	52.1	24	56.0	56.1
5	45.0	45.1	25	56.0	56.1
6	58.0	58.1	26	38.0	38.1
7	57.0	57.1	27	52.0	52.1
8	56.0	56.1	28	45.0	45.1
9	52.0	52.1	29	46.0	46.1
10	49.0	49.1	30	55.0	55.1
11	55.0	55.1	31	37.0	37.1
12	53.0	53.1	32	41.0	41.1
13	48.0	48.1	33	52.0	52.1
14	54.0	54.1	34	41.0	41.1
15	47.0	47.1	35	27.0	27.1
16	55.0	55.1	36	17.0	17.0
17	55.0	55.1	37	8.0	8.0
18	58.0	58.1	38	6.0	6.0
19	54.0	54.1	39	5.5	5.5
20	53.5	53.6	40	35.0	35.1
averages:	51.1	51.2		39.2	39.3

Drift Cal. Avg. VOC (ppm as propane) 45.2

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hours 39 - 40

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	21:30	0.0	40.0	40.1
Stop	23:30	0.0	40.0	

point #	%FS VOC	ppm VOC	point #	%FS VOC	ppm VOC
1	40.0	40.1	21	51.0	51.1
2	43.0	43.1	22	52.0	52.1
3	47.0	47.1	23	54.0	54.1
4	53.0	53.1	24	55.0	55.1
5	42.0	42.1	25	55.0	55.1
6	52.0	52.1	26	51.0	51.1
7	50.0	50.1	27	calibrate	calibrate
8	52.0	52.1	28	calibrate	calibrate
9	53.0	53.1	29	calibrate	calibrate
10	51.0	51.1	30	55.0	55.1
11	53.0	53.1	31	55.0	55.1
12	55.0	55.1	32	50.0	50.1
13	55.0	55.1	33	52.0	52.1
14	55.0	55.1	34	53.0	53.1
15	45.0	45.1	35	51.5	51.6
16	53.5	53.6	36	52.0	52.1
17	51.0	51.1	37	51.0	51.1
18	27.0	27.1	38	37.0	37.1
19	51.0	51.1	39	29.0	29.1
20	54.0	54.1	40	48.0	48.1
averages:	49.1	49.2		50.1	50.2

Drift Cal. Avg. VOC (ppm as propane) 49.7

Coors Brewing Company

#9 Can Filler Exhaust Vent

12-4/5-92

Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Analyzer

Strip Chart Data

Hour 41

		Zero (%FS)	Span (%FS)	Actual Span (ppm)
Start	23:30	0.0	40.0	40.1
Stop	24:12	0.0	40.0	

	point #	%FS VOC	ppm VOC
	1	49.0	49.1
	2	50.0	50.1
	3	50.0	50.1
	4	51.0	51.1
	5	32.0	32.1
	6	34.0	34.1
	7	50.0	50.1
	8	50.0	50.1
	9	51.0	51.1
	10	46.0	46.1
	11	43.0	43.1
	12	28.0	28.1
	13	16.0	16.0
	14	5.5	5.5
averages:		39.7	39.8

Drift Cal. Avg. VOC (ppm as propane) $\boxed{39.8}$

Appendix 2
Sample Calculations

EPA Methods 1 - 4 : Determination of Volumetric Flow Rate and Molecular Weight

__Sample Calculations__

sample volume (dscf)

$= [17.64\ (°R/\text{in Hg})]V_mY[P_{bar} + (\Delta H/13.6)]/T_m$

$= (17.64\ °R/\text{in Hg})(31.480\ ft^3)(1.0389)[24.604+(3.0/13.6)\ \text{inches Hg}]/(84+460\ °R)$

$= 26.329$ dscf

moisture volume (scf)

$= (0.04707\ ft^3/ml)V_{lc}$

$= (0.04707\ ft^3/ml)(7.5)$

$= 0.353$ scf

moisture content (%/100)

$= V_{w(std)}/(V_{m(std)} + V_{w(std)})$

$= (0.353\ scf)/(26.329\ dscf + 0.353\ scf)$

$= 0.0132$

molecular weight dry (grams/mole)

$= 0.440(\%CO_2) + 0.320(\%O_2) + 0.280(\%N_2 + \%CO)$

$= 0.440(0.0\ \%CO_2) + (0.320)(20.9\ \%O_2) + (0.280)(79.1\ \%N_2)$

$= 28.836$ grams/mole

molecular weight actual (grams/mole)

$= M_d(1 - B_{ws}) + 18.0(B_{ws})$

$= (28.836\ \text{grams/mole})(1 - 0.0132) + (18.0)(0.0132)$

$= 28.693$ grams/mole

gas velocity (ft/sec)

$= \{85.49\ \text{ft/sec}\ [(\text{lb/lb-mole})(\text{in. Hg})/(°R)(\text{in. } H_2O)]^{1/2}\}C_p(\Delta p^{1/2})_{avg}(T_{s(avg)}/P_sM_s)^{1/2}$

$= (85.49)(0.84)(0.1885)\{(72+460)/[(24.604+0.07/13.6)(28.693)]\}^{1/2}$

$= 11.7$ ft/sec

gas flow (acfm)

$= Av_s(60\ \text{seconds/minute})$

$= (\Pi)(22.0/12\ ft)^2(11.7\ ft/sec)(60)/4$

$= 1861$ acfm

gas flow (dscfm)

$= (60\ \text{seconds/minute})(1 - B_{ws})v_sAT_{std}P_s/(T_{s(avg)}P_{std})$

$= (60)(1-0.0353)(11.7)(\Pi)(22.0/12\ ft)^2(528)(24.604+0.07/13.6)/[(72+460)(29.92)(4)]$

$= 1499$ dscfm

EPA Methods 1 - 4 : Determination of Volumetric Flow Rate and Molecular Weight

Variables

A = Stack cross-sectional area (ft^2)
B_{ws} = Water vapor in the gas stream, proportion by volume
C_p = Pitot coefficient (0.84 dimensionless)
ΔH = Average pressure differential across the orifice meter (in. H_2O)
Δp = Velocity head of stack gas (in. H_2O)
M_d = Molecular weight of dry stack gas (lb/lb mole)
M_s = Molecular weight of wet stack gas (lb/lb mole)
P_{bar} = Barometric pressure (in. Hg)
P_g = Sack pressure relative to ambient (in. H_2O)
P_s = Absolute stack pressure (in. Hg)
P_{std} = Standard atmospheric pressure (29.92 in. Hg)
Q_a = Actual volumetric air flow out of stack (acfm)
Q_{std} = Volumetric air flow out of stack corrected to standard conditions (dscfm)
T_m = Average meter temperature (°F + 460 = °R)
$T_{s(avg)}$ = Average stack temperature (°F + 460 = °R)
T_{std} = Standard temperature (528 °R)
V_{lc} = volume of moisture collected from gas sample (ml)
v_s = Stack gas velocity (ft/sec)
V_m = Volume of gas through dry gas meter (ft^3)
$V_{m(std)}$ = Volume of gas through dry gas meter corrected to standard conditions (dscf)
$V_{w(std)}$ = Volume of water vapor in gas sample at standard conditions (scf)
Y = Dry gas meter calibration factor (dimensionless)
Q = Total sampling time (minutes)

EPA Method 25A : Measurement of Total Organic Concentration Using a Flame Ionization Aanlyzer

<u>Sample Calculations</u>

drift cal. ppm as propane

$$= \frac{[(\%FS \text{ analyzer stack value}) - (\%FS \text{ analyzer average 0 value})](\text{span gas value ppm})}{[(\%FS \text{ analyzer average span value}) - (\%FS \text{ analyzer average 0 value})]}$$

$$= \frac{(28.0\ \%FS) - [(0.0\ \%FS + 0.5\ \%FS) / 2](40.1\ ppm)}{[(39.5\ \%FS + 39.0\ \%FS) / 2]-[(0.0\ \%FS + 0.5\ \%FS)/2]}$$

= 28.6 ppm VOC as propane

VOC emissions, Theoretical Total (lb/hr as propane)

$$= \frac{[\text{avg. VOC conc. (ppm)}][\text{stack flow (dscfm)}](60\ \text{min/hr})(28.317\ \text{liter/ft}^3)(44.09\ \text{g/mole})(2.205\ \text{lb/kg})}{(24.055\ \text{liters/mole @ STP})(1000\ \text{g/kg})(1\text{x}10^6)(1 - \%H_2O/100)}$$

$$= \frac{(28.6\ ppm)(1874 + 1871 + 1829\ dscfm)(60)(28.317)((44.09)(2.205)}{(24.055)(1000)(1\text{x}10^6)(1 - 0.013)}$$

= 1.11 lb/hr VOC

VOC emissions, Theoretical from Filling (lb/hr as propane)

$$= \frac{\{[\text{VOC outlet (ppm)}][\Sigma\text{flow (dscfm)}] - \Sigma[(\text{VOC ppm})(\text{flow dscfm) inlet}]\}(60)(28.317)(44.09)(2.205)}{(24.055\ \text{liters/mole @ STP})(1000\ \text{g/kg})(1\text{x}10^6)(1 - \%H_2O/100)}$$

$$= \frac{[(28.6\ ppm)(5574\ dscfm)-(2.0)(1874)-(2.5)(1871)-(3.0)(1829)](60)(28.317)(44.09)(2.205)}{(24.055)(1000)(1\text{x}10^6)(1 - 0.013)}$$

= 1.01 lb/hr as propane

VOC emissions (lb/hr as ethanol)

= [VOC emissions (lb/hr as propane)](2.506 empirical conversion factor)

= 2.78 lb/hr as ethanol

VOC emissions (lb/bbl as ethanol)

= [VOC emissions (lb/hr as ethanol)]/[beer filling rate (bbl/hr)]

= (2.78)/(85.3)

= 0.0326 lb/bbl as ethanol

Ethanol / Propane Conversion

Sample Calculations

ethanol (mg/dscm)

$$= \frac{[\text{mass ethanol (g)}][\text{temp (°F)} + 460][1013 \text{ (std. press. mbar)}][1000 \text{ (ltrs/m}^3)][1000 \text{ (mg/g)}]}{[\text{sampling time (min)}][\text{sampling rate (lpm)}][528 \text{ (std. temp. R)}][\text{Pb (mbar)}]}$$

$$= \frac{(0.0204)(70 + 460)(1013)(1000)(1000)}{(15.0)(1.85)(528)(842)}$$

= 890 mg/dscm ethanol

propane (mg/dscm)

= [propane conc. (ppm)][44.09 (mg/mmole propane)]/[24.055 (ml/mmole @ STP)]

= (201.4)(44.09)/(24.055)

= 369 mg dscm propane

conversion factor

= [ethanol (mg/dscm)]/[propane (mg/dscm)]

= (890)/(369)

= 2.411 mass/volume conversion factor

carbon-basis conversion factor

$$= \frac{\text{(carbon mass fraction, propane)}}{\text{(carbon mass fraction, ethanol)(empirical mass/vol conversion factor)}}$$

= (36/44.09)/[(24/46.07)(2.506)]

= 0.625

published carbon-basis conversion factor

= 0.66

carbon-basis conversion factor % difference

$$= \frac{[\text{(experimental conversion factor)} - \text{(published conversion factor)}](100)}{\text{(published conversion factor)}}$$

$$= \frac{[(0.625) - (0.66)](100)}{(0.66)}$$

= -5.3% difference

Appendix 3
Field Data

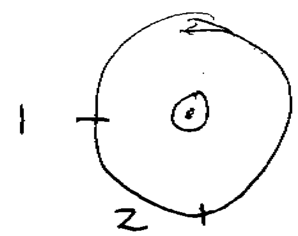
#3 Bottle Filler
Methods 1 - 4
Field Data Sheets

2 604

Plant	Coors	Date	12-2-92
Location	3 Bottle outlet		
Operator	PO/MM		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	1.683	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@10"Hg	Post-Test Pump Leak Check	0@10"Hg

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



A=2.64

D=22"

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	/	Barometric Pressure (mbar)	833
Ambient Temperature (oF)	75	Probe Material	PTFE
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	7.5
Nozzle Diameter (in)	/	Start Time	09:13
Static Pressure (in H2O)	+0.07	Stop Time	09:36
Filter ID#	/	Method	1-4

Yd=1.0389 PC: CB30105

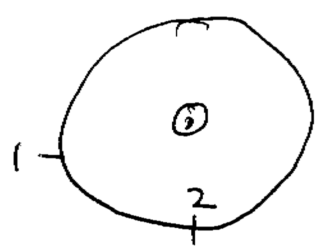
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
					245.972							Vcc = 1.0 ml + 6.5 g
1-1	10	7	.030	3.0	256.02	74			80	79	52	
2	20	7	.035	3.0	266.18	73			85	82	56	acfm ~ 1865
3	32	7	.040	3.0	277.452	74			92	85	58	dscfm ~ 1495
4			.035		~~277.452~~	73						
2-1			.030			~~83~~ 72						
2			.035			~~8~~70						
3			.040			70						
4			.040			69						
			.1885 ✓		31.480 ✓	72 ✓			84 ✓			

Plant	Coors	Date	12-2-92
Location	3 Bottle Outlet		
Operator	PO/MM		
Run Number	2	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	1.683	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@20"Hg	Post-Test Pump Leak Check	0@10"Hg

PC: CB 30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



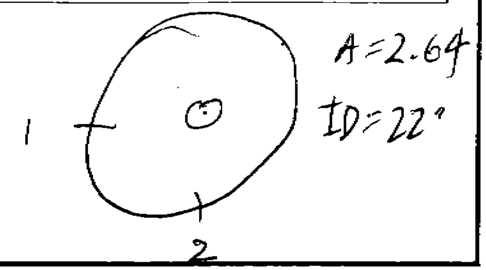
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	1	Barometric Pressure (mbar)	830
Ambient Temperature (oF)	75	Probe Material	PTFE
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	7.0
Nozzle Diameter (in)	/	Start Time	10:55
Static Pressure (in H2O)	+0.08	Stop Time	
Filter ID#	/	Method	1-4

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 277.616	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10	7	0.030	3.0	288.03	71			88	88	68	Vlc = 0.0 ml + 7.0g
2	20	7	0.035	3.0	298.41	70			89	92	62	
3	30	7	0.040	3.0	309.60	70			90	97	62	
~~2~~ 4	40	7	0.035	3.5	320.904	69			93	105	64	
1-1	~~50~~		0.030			70						
2	~~60~~		0.030			69						
3			0.040			68						
4			0.040			67						
B												
		✓	.1867 ✓	3.1 ✓	43.288	69 ✓			93 ✓			

Plant	Coors	Date	12-2-92
Location	3 Bottle Outlet		
Operator	PO/MM		
Run Number	3	Pitot Tube Coefficient	0.84
Sample Box ID#	—	Meter Box ID#	
Meter ΔH@	1.683	C Factor	—
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@12"Hg	Post-Test Pump Leak Check	0@12"Hg

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	~~20~~ 0.0	O2 (%)	20.9
Assumed Moisture (%)	—	Barometric Pressure (mbar)	833
Ambient Temperature (oF)	75	Probe Material	PTFE
Probe Length (ft)	2	Filter Temperature (oF)	—
Probe Temperature (oF)	—	Moisture (grams)	4.0
Nozzle Diameter (in)	—	Start Time	12:30
Static Pressure (in H2O)	+0.07	Stop Time	
Filter ID#	—	Method	1-~~4~~

Yd= 1.0389

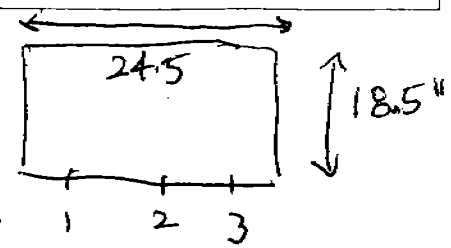
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 321.103	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
												V_{LC} = −3.0ml + 7.0g
1-1	10	7	.035	3.5	332.00	75			88	87	65	
2	20	7	.035	3.5	343.85	75			93	89	64	
3	30	7	.040	3.5	357.26	74			98	93	62	
4	40	7	.045	3.5	368.845	73			104	96	62	
2-1			0.030			~~6~~4						
2			0.035			63						
3			0.030			62						
4			0.040			62						
			0.1900 ✓			68 ✓						
			~~0.1438~~	3.5 ✓	47.742	~~[illegible]~~			94	✓		

Plant	Coors	Date	12-2-92
Location	3 Bottle Inlet 1		
Operator	PO/MM		
Run Number	1	Pitot Tube Coefficient	0.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



A=3.15

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	833
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	+3.8	Stop Time	/
Filter ID#	/	Method	1-2

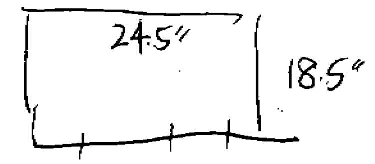
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			.010			68						acfm ~ 2263
2			.090			65						dscfm ~ 1849
3			.090			65						
2-1			0.000			65						
2			.020			65						dscfm ~ 2087
3			.090			64						
3-1			0.000			64						
2			.090			64						
3			.090			64						
		✓	0.1935			65 ✓						

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

Plant: Coors	Date: 12-2-92
Location: 3 Bottle Inlet #1	
Operator: PO/MM	
Run Number: 2	Pitot Tube Coefficient: .84
Sample Box ID#: —	Meter Box ID#: —
Meter ΔH@: —	C Factor: —
Pre-Test Pitot Leak Check: ✓	Post-Test Pitot Leak Check: ✓
Pre-Test Pump Leak Check: —	Post-Test Pump Leak Check: —



A=3.15

CO_2 (%): 0.0	O_2 (%): 20.9
Assumed Moisture (%): 0	Barometric Pressure (mbar): 833
Ambient Temperature (oF): 70	Probe Material: SS
Probe Length (ft): 4	Filter Temperature (oF): —
Probe Temperature (oF): —	Moisture (grams): —
Nozzle Diameter (in): —	Start Time: —
Static Pressure (in H2O): +3.8"	Stop Time: —
Filter ID#: —	Method: 1-2

PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			0.010			~~70~~ 65	80					
2			0.090			65						
3			0.110			64						
2-1			0.010			64						
2			0.090			64						
3			0.090			63						
3-1			0.020			63						
2			0.090			63						
3			0.100			63						
		✓	0.2433			64 ✓						

Plant: Coors | Date: 12-2-92
Location: 3 Bottle Inlet 1
Operator: PO / M M
Run Number: 3 | Pitot Tube Coefficient: .84
Sample Box ID#: / | Meter Box ID#: /
Meter ΔH@: / | C Factor: /
Pre-Test Pitot Leak Check: ✓ | Post-Test Pitot Leak Check: ✓
Pre-Test Pump Leak Check: / | Post-Test Pump Leak Check: /

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

24.5"

18.5"

CO2 (%): 0.0 | O2 (%): 20.9
Assumed Moisture (%): 0 | Barometric Pressure (mbar): 829
Ambient Temperature (oF): 70 | Probe Material: /
Probe Length (ft): 4 | Filter Temperature (oF): /
Probe Temperature (oF): / | Moisture (grams): /
Nozzle Diameter (in): / | Start Time: /
Static Pressure (in H2O): +3.9 | Stop Time: /
Filter ID#: / | Method: 1-2

PC: CB30105

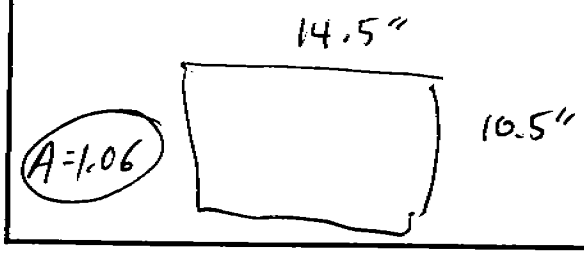
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			0.010			64						
2			0.110			64						
3			0.100			63						
2-1			-0.020			64						
2			0.090			64						
3			0.090			64						
3-1			0.000			64						
2			0.080			64						
3			0.090			64						
		√	.1988			64 √						

Plant	Coors	Date	12-2-92
Location	3 Baffle Inlet 2		
Operator	PO/MM		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	1.683	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

PC: CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

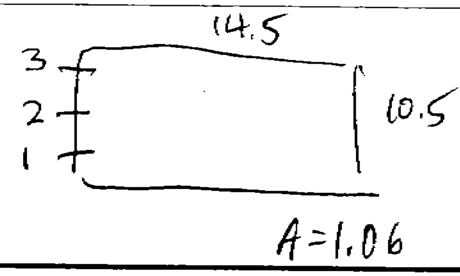


CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	~~0.0~~	Barometric Pressure (mbar)	833
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	+1.2	Stop Time	/
Filter ID#	/	Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			.48			70						
2			.45			70						
3			.41			70						
2-1			.40			70						
2			.25			70						
3			.17			70						
3-1			.31			70						
2			.34			70						
3			.29			70						
		✓	0.5808			70 ✓						

Plant Coors   Date 12-2-92
Location 3 Bottle Inlet 2
Operator PO / MM
Run Number 2   Pitot Tube Coefficient .84
Sample Box ID# /   Meter Box ID# /
Meter ΔH@ /   C Factor /
Pre-Test Pitot Leak Check ✓   Post-Test Pitot Leak Check ✓
Pre-Test Pump Leak Check /   Post-Test Pump Leak Check /

Air Pollution Testing, Inc.
Schematic of Stack Cross Section



CO2 (%) 0.0   O2 (%) 20.9
Assumed Moisture (%) 0   Barometric Pressure (mbar) 833
Ambient Temperature (oF) 70   Probe Material SS
Probe Length (ft) 4   Filter Temperature (oF) /
Probe Temperature (oF) /   Moisture (grams) /
Nozzle Diameter (in) /   Start Time /
Static Pressure (in H2O) +1.4   Stop Time /
Filter ID# /   Method 1-2

PC: CB30105

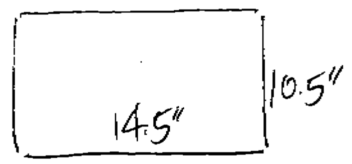
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			0.47			70						acfm ~ 2237
2			0.42			70						dscfm ~ 1814
3			0.28			70						
2-1			0.40			70						
2			0.23			70						dscfm ~ 1837
3			0.22			70						
3-1			0.32			70						
2			0.37			70						
3			0.23			70						
		✓	0.5664		✓	70						

Plant	Coors	Date	12-2-92
Location	3 Bottle Inlet 2		
Operator	PO/MM		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

PC: CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



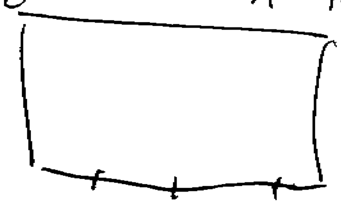
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	833
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	+1.4	Stop Time	
Filter ID#		Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			0.47			70						
2			0.45			70						
3			0.39			70						
2-1			0.41			70						
2			0.22			70						
3			0.20			70						
2-1			0.43			70						
2			0.40			70						
3			0.41			70						
			0.1980									
			.5846 ✓			70 ✓						

Plant	Coors	Date	12-2-92
Location	3 Bottle Inlet #3		
Operator	Po / GM		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.
Schematic of Stack Cross Section

12" x 18" A = 1.50



CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	833
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	+1.0	Stop Time	/
Filter ID#	/	Method	1-2

PC: CB30105

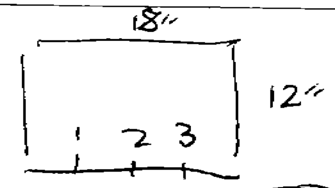
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			0.000	~~[illegible]~~		69						acfm ~ 2230
2			.110			68						dscfm ~ 1807
3			1.10			68						
2-1			-0.030			68						dscfm ~ 2055
2			.070			69						
3			1.10			70						
3-1			-.040			69						
2			.090			68						
3			0.94			68						
		✓	0.3889			69 ✓						

Plant: Coors	Date: 12-2-92
Location: 3Bottle Inlet #3	
Operator: PO/MM	
Run Number: 2	Pitot Tube Coefficient: .84
Sample Box ID#:	Meter Box ID#:
Meter ΔH@:	C Factor:
Pre-Test Pitot Leak Check: ✓	Post-Test Pitot Leak Check: ✓
Pre-Test Pump Leak Check:	Post-Test Pump Leak Check:

PC: CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



4>1.50

CO2 (%): 0.0	O2 (%): 20.9
Assumed Moisture (%): 0	Barometric Pressure (mbar): 833
Ambient Temperature (oF): 70	Probe Material: SS
Probe Length (ft): 4	Filter Temperature (oF):
Probe Temperature (oF):	Moisture (grams):
Nozzle Diameter (in):	Start Time:
Static Pressure (in H2O): +1.0	Stop Time:
Filter ID#:	Method: 1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			0.000			68						
2			0.36			68						
3			1.50			68						
2-1			-0.04			69						
2			0.17			69						
3			1.20			68						
3-1			0.00			68						
2			0.19			68						
3			1.01			67						
		✓	0.5082			68 ✓						

Plant Coors		Date 12-2-92	
Location 3 Bottle Inlet 3			
Operator PO/MM			
Run Number 3		Pitot Tube Coefficient 0.84	
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

PC:CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

18.0"

12.0"

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	829
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)		Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	+1.1	Stop Time	
Filter ID#		Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			0.000			69						
2			0.44			69						
3			0.94			69						
2-1			-0.040			69						
2			0.230			68						
3			1.40			68						
3-1		1.70	[illegible]			68						
2			0.280			67						
3			1.30			66						
			.5777 ✓			68 ✓						

#5 Can Filler
Methods 1 - 4
Field Data Sheets

Plant Coors		Date 12-2-92	
Location 5 Can outlet			
Operator PO/MM			
Run Number 1		Pitot Tube Coefficient 0.84	
Sample Box ID#		Meter Box ID#	
Meter ΔH@ 1.683		C Factor	
Pre-Test Pitot Leak Check ✓		Post-Test Pitot Leak Check ✓	
Pre-Test Pump Leak Check 0@12"Hg		Post-Test Pump Leak Check 0@15"Hg	

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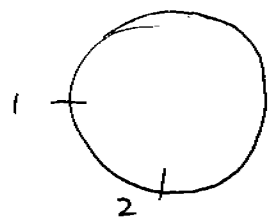
Air Pollution Testing, Inc.

Schematic of Stack Cross Section



ID = 15.0"

CO2 (%) 0.0	O2 (%) 20.9
Assumed Moisture (%) 75	Barometric Pressure (mbar) 828
Ambient Temperature (oF) 75	Probe Material PTFE
Probe Length (ft) 3	Filter Temperature (oF)
Probe Temperature (oF)	Moisture (grams) 9.0
Nozzle Diameter (in)	Start Time 17:02
Static Pressure (in H2O) -2.6	Stop Time 17:52
Filter ID#	Method 1-4

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 368.980	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
												Vlc = -1.0ml + 10.0 g
1-1	10	7	0.32	3.5	380.10	70			77	77	62	
2	20	7	0.41	3.5	391.31	70			80	78	58	
3	30	7	0.31	3.5	402.61	69			83	79	54	
4	40	7	0.29	3.5	413.75	69			90	81	55	
~~4~~5	50	7	0.50	3.5	425.019	68			94	83	57	
6			0.93			67						
7			1.14			67						
8			1.29			67						
2-1			1.10			69						
2			0.91			69						
3			0.85			68						
4			0.60			67						
5			0.75			67						
6			0.83			66						
7 / 8			0.92 / 0.86		✓ 56.039	66 / 66						
			✓ 0.8462			68 ✓			82 ✓			

Plant: Coors		Date: 12-2-92	
Location: S Can outlet			
Operator: PO/MM			
Run Number: 2		Pitot Tube Coefficient: 0.84	
Sample Box ID#: /		Meter Box ID#: /	
Meter ΔH@: 1.683		C Factor: /	
Pre-Test Pitot Leak Check: ✓		Post-Test Pitot Leak Check: ✓	
Pre-Test Pump Leak Check: 0 @ 10"Hg		Post-Test Pump Leak Check: 0 @ 10"Hg	

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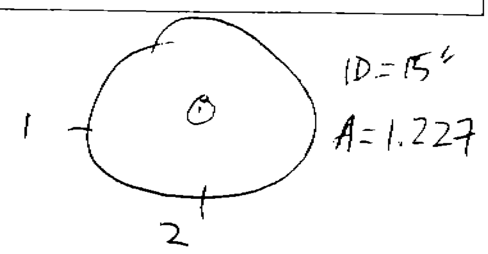
Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%): 0.0	O2 (%): 20.9
Assumed Moisture (%):	Barometric Pressure (mbar): 828
Ambient Temperature (oF): 75	Probe Material: PTFE
Probe Length (ft): 3	Filter Temperature (oF): /
Probe Temperature (oF): /	Moisture (grams): 5.0
Nozzle Diameter (in): /	Start Time: 18:15
Static Pressure (in H2O): -2.8	Stop Time:
Filter ID#: /	Method: 1-4

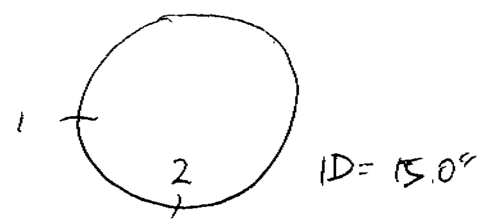
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 425.111	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10		0.31	3.5	435.33	71			84	81		Vlc = 5.0g + 0.0 ml
2	20		0.35	3.5	445.61	71			94	84		acfm ~ 3877
3	30		0.33	3.5	455.929	71			96	86		dscfm ~ 3105
4			0.28			70						
5			0.53			69						
6			0.91			67						
7			1.10			67						
8			1.25			66						
2-1			1.15			69						
2			0.93			69						
3			0.83			68						
4			0.59			67						
5			0.73			66						
6			0.87			66						
7			0.91			66						
8			0.86		30.818 ✓	66		88 ✓				
			.8428 ✓			68 ✓						

Plant	Cors	Date	12-2-92
Location	5 Can outlet		
Operator	ioo /am		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@	1.683	C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@18"Hg	Post-Test Pump Leak Check	0@17"Hg

PC: CB 30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)		Barometric Pressure (mbar)	827
Ambient Temperature (oF)	78	Probe Material	PTFE
Probe Length (ft)	3	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	19:20
Static Pressure (in H2O)	-2.4	Stop Time	19:50
Filter ID#		Method	1-4

Traverse Point Number	Sampling Time (minutes)	Vaccuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
					456.115							V_{lc} = 6.0 g + 0.0 ml
1-1	10	7	0.44	3.5	466.61	71			83	83	69	
2	20	7	0.32	3.6	477.96	70			94	84	62	
3	30	7	0.40	3.6	489.444	70			95	88	65	
4			0.37			70						
5			0.34			69						
6			0.56			67						
7			1.10			67						
8			1.30			67						
2-1			0.87			69						
2			0.71			68						
3			0.71			67						
4			0.63			66						
5			0.71			66						
6			0.87			65						
7 / 8			0.86 / 0.86		33.329 ✓	65 / 65			88			
			✓ .8145			✓ [illegible]			✓			

Plant	Coors Brewing	Date	1-27-93
Location	#5 can Inlet #2		
Operator	PO / MM		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

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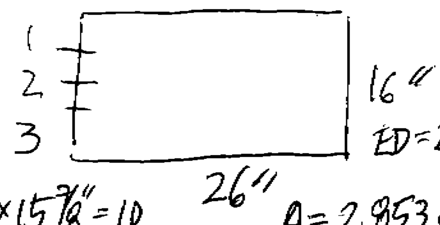
Air Pollution Testing, Inc.

Schematic of Stack Cross Section



ED=22.87

$25\frac{7}{8}" \times 15\frac{7}{8}" = ID$

A=2.853 sf

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	837
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	+1.3	Stop Time	
Filter ID#		Method	1-2

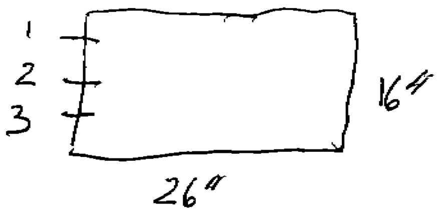
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			-.05			78						
2			-.10			78						
3			-.08			78						
2-1			.17			78						
2			.18			78						
3			.18			78						
3-1			.18			78						
2			1.2			78						
3			.57			78						
			.3014			78						

Plant	Coors Brewing	Date	1-27-93
Location	#5 can Inlet 2		
Operator	PO/MM		
Run Number	2	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

PC: GB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	838
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	+1.3	Stop Time	
Filter ID#		Method	1-2

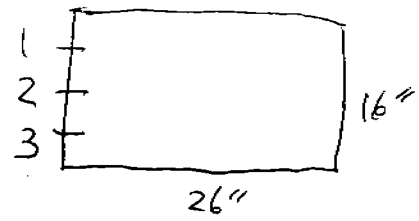
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			-.03			77						
2			-.05			77						
3			-.02			77						
2-1			.34			77						
2			.25			77						
3			.21			77						
3-1			.25			77						
2			1.1			77						
3			.38			77						
			.3520			77						

Plant	Coors Brewing	Date	1-27-93
Location	5 can Inlet #2		
Operator	PO/MM		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

PC:CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



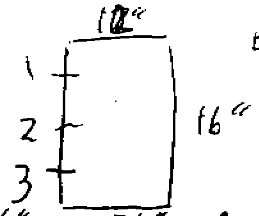
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	838
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	+1.3	Stop Time	/
Filter ID#	/	Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			-.05			78						
2			-.10			78						
3			-.04			78						
2-1			.18			78						
2			.14			78						
3			.15			78						
3-1			.36			78						
2			.93			78						
3			.37			78						
			.2909 ✓			78 ✓						

Plant	Coors Brewing	Date	1-27-93
Location	7 can inlet #1		
Operator	PO/MM		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



ED = 15.5

$\frac{\pi d^2}{4}$

ID = 11 7/8" x 15 7/8" A = 1.309

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	837
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	+.29	Stop Time	/
Filter ID#	/	Method	1-2

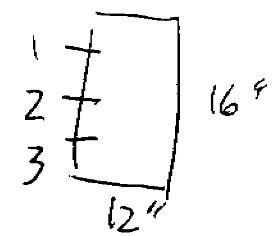
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.28			72						
2			.30			72						
3			.28			72						
2-1			.28			72						
2			.29			72						
3			.29			72						
3-1			.27			72						
2			.27			72						
3			.24			72						
			.5268 ✓			72 ✓						

Plant	Coors Brewing
Date	1-27-97
Location	#5 can Inlet 1
Operator	PO/MM
Run Number	2
Pilot Tube Coefficient	.84
Sample Box ID#	/
Meter Box ID#	/
Meter ΔH@	/
C Factor	/
Pre-Test Pilot Leak Check	✓
Post-Test Pilot Leak Check	✓
Pre-Test Pump Leak Check	/
Post-Test Pump Leak Check	/

Air Pollution Testing, Inc. [illegible]

Schematic of Stack Cross Section



CO_2 (%)	[illegible]	O_2 (%)	[illegible]
Assumed Moisture (%)	0	Barometric Pressure (mbar)	838
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	.34	Stop Time	/
Filter ID#	/	Method	1-2

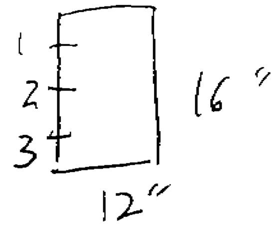
PC: CB 30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.29			73						
2			.29			73						
3			.30			73						
2-1			.29			73						
2			.29			73						
3			.30			73						
3-1			.28			73						
2			.26			73						
3			.25			73						
			.532			73						

Plant	Coors Brewing	Date	1-27-93
Location	#5 Can Inlet #1		
Operator	PD/MM		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	20.[illegible]
Assumed Moisture (%)	0	Barometric Pressure (mbar)	838
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	.32	Stop Time	/
Filter ID#	/	Method	1-2

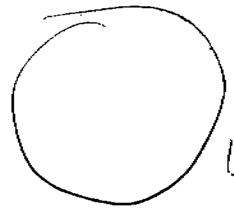
PC!CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.28			73						
2			.28			73						
3			.30			73						
2-1			.28			73						
2			.30			73						
3			.29			73						
3-1			.24			73						
2			.25			73						
3			.24			73						
			.5224									
			~~.467~~			73						

#6 Can Filler
Methods 1 - 4
Field Data Sheets

Plant	Coors Brewing
Date	12-16-92
Location	#6 Can Filter Vent
Operator	PO / MV
Run Number	1
Pitot Tube Coefficient	.84
Sample Box ID#	/
Meter Box ID#	/
Meter ΔH@	1.683
C Factor	/
Pre-Test Pitot Leak Check	✓
Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@11"Hg
Post-Test Pump Leak Check	0@10"Hg

Air Pollution Testing, Inc
Schematic of Stack Cross Section



ID=17.5"

CO2 (%)	0.0
Assumed Moisture (%)	/
Barometric Pressure (mbar)	836
Ambient Temperature (oF)	75
Probe Material	PTFE
Probe Length (ft)	2
Filter Temperature (oF)	/
Probe Temperature (oF)	/
Moisture (grams)	8.0
Nozzle Diameter (in)	/
Start Time	10:00
Static Pressure (in H2O)	-0.49
Stop Time	10:30
Filter ID#	/
Method	1-4

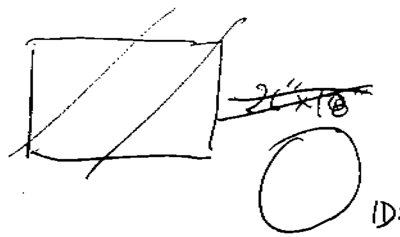
PC: CB 30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 135.198	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10	5	.15	3.0	143.51	75			79	78	65	V_{LC} = 8.0g -4.0ml +4.0ml
2	20	5	.13	3.0	153.20	73			80	76	60	
3	30	5	.14	3.0	164.172	72			94	80	61	
4			.13			72						
5			.17			72						
6			.18			71						
7			.17			72						
8			.16			72						
2-1			.16			66						
2			.13			66						
3			.15			65						
4			.15			63						
5			.15			62						
6			.13			62						
7 8			.13 .11	3.0	28.974	63 62			81			
			.3817			68			8			

Plant	Coors Brewing	Date	12-16-92
Location	#6 Can Filler Vent		
Operator	PO/MJ		
Run Number	2	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@	1.683	C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0 @ 12" Hg	Post-Test Pump Leak Check	0 @ 11" Hg

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO_2 (%)	4.0	O_2 (%)	20.9
Assumed Moisture (%)		Barometric Pressure (mbar)	834
Ambient Temperature (oF)	75	Probe Material	PTFE
Probe Length (ft)	2	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	4.5
Nozzle Diameter (in)		Start Time	11:30
Static Pressure (in H2O)	-0.48	Stop Time	12:00
Filter ID#		Method	1-4

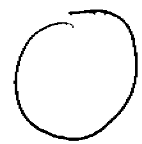
PC: CB 30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 165.555	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
												Vlc = 4.5 g + 0 ml
1-1	10	5	.15	3.0	175.30	75			91	82	60	
2	20	5	.14	3.0	185.11	74			95	87	51	
3	30	5	.13	3.0	196.703	74			101	89	50	
4			.14			73						
5			.19			72						
6			.17			72						
7			.16			73						
8			.17			72						
2-1			.18			65						
2			.13			66						
3			.14			64						
4			.15			63						
5			.13			63						
6			.11			63						
7			.13			62						
8			.11			63						
				3.0	31.148				91			
			.3805			68						

Plant	Coors Brewing	Date	12-16-92
Location	#6 Can Filler Vent		
Operator	PO / MJ		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	1.683	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@12"Hg	Post-Test Pump Leak Check	0@12"Hg

Air Pollution Testing Inc

Schematic of Stack Cross Section



ID = 17.5"

CO_2 (%)	0.0	O_2 (%)	[illegible]
Assumed Moisture (%)	0.0	Barometric Pressure (mbar)	836
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	7.0
Nozzle Diameter (in)	/	Start Time	13:00
Static Pressure (in H2O)	-0.47	Stop Time	13:30
Filter ID#	/	Method	1-2

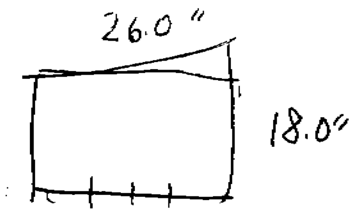
PC: GB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
					197.003							VLC = 6.0g + 1.0 ml
1-1	10	6	.17	3.5	209.00	71			82	79	61	
2	20	6	.14	3.5	220.56	72			88	86	52	
3	30	6	.14	3.5	232.017	71			98	83	51	
4			.13			69						
5			.14			69						
6			.15			66						
7			.14			64						
8			.13			63						
2-1			.09			76						
2			.14			76						
3			.13			76						
4			.14			76						
5			.14			76						
6			.13			76						
7			.12			76						
8			.12	3.5	35.014	76			85			
			.3659			72						

Plant Coors Brewing		Date 12-11-22	
Location #6 Can Filler Filtered Air Inlet			
Operator PO / MJ			
Run Number 1		Pitot Tube Coefficient .84	
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check ✓		Post-Test Pitot Leak Check ✓	
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2(%) 0.0		O2(%) 20.9	
Assumed Moisture (%) 0.0		Barometric Pressure (mbar) 836	
Ambient Temperature (oF) 75		Probe Material SS	
Probe Length (ft) 4		Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time 10:30	
Static Pressure (in H2O) +.28		Stop Time	
Filter ID#		Method 1-2	

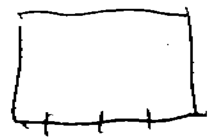
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			1.4			74						~~ED = 23.9"~~
2			1.2			72						ED = 24.4"
3			-.04			70						
2-1			.90			76						
2			.10			76						
3			.08			75						
3-1			0.0			75						
2			0.0			76						
3			-0.04			76						
			.3807 ✓			74						

Plant	Coors Brewing	Date	12-16-92
Location	#6 Can Filler Filtered Air Inlet		
Operator	PO/MJ		
Run Number	2	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



26" x 18"

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0.0	Barometric Pressure (mbar)	834
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	12:00
Static Pressure (in H2O)	+.27	Stop Time	
Filter ID#		Method	1-2

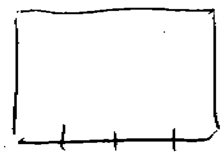
PC: CB 30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			-.17			72						
2			-.17			70						
3			.84			69						
2-1			.99			76						
2			.18			76						
3			.14			76						
3-1			0.00			76						
2			-.03			76						
3			-.04			76						
			.1680			74						

Plant Coors Brewing	Date 12-16-92
Location #6 Can Filler Filtered Air Inlet	
Operator PO / MJ	
Run Number 3	Pitot Tube Coefficient .84
Sample Box ID#	Meter Box ID#
Meter ΔH@	C Factor
Pre-Test Pitot Leak Check ✓	Post-Test Pitot Leak Check ✓
Pre-Test Pump Leak Check	Post-Test Pump Leak Check

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



26" x 18"

CO2 (%) 0.0	O2 (%) 20.9
Assumed Moisture (%) 0.0	Barometric Pressure (mbar) 836
Ambient Temperature (oF) 75	Probe Material SS
Probe Length (ft) 4	Filter Temperature (oF)
Probe Temperature (oF)	Moisture (grams)
Nozzle Diameter (in)	Start Time 13:30
Static Pressure (in H2O) +.27	Stop Time
Filter ID#	Method 1-2

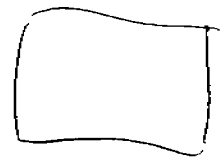
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			-.10			72						
2			-.15			70						
3			1.6			70						
2-1			1.1			75						
2			-.25			75						
3			.09			75						
3-1			0.00			76						
2			-.03			76						
3			-.09			76						
			.1041			74 ✓						

Plant	Coors Brewing	Date	12-16-92
Location	#6 Can Filler Inlet #2		
Operator	PO / MJ		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



15"x15"

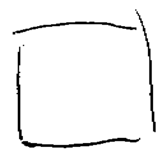
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0.0	Barometric Pressure (mbar)	836
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	+.94	Stop Time	
Filter ID#		Method	1-2

PC CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.16			71						
2			.15			71						
3			.17			71						
2-1			.27			71						
2			.23			71						
3			.25			71						
3-1			.04			71						
2			.05			71						
3			.08			71						
			.3784			71						

Plant: Coors Brewing	Date: 12-16-92
Location: #6 Can Filler Inlet #2	
Operator: PO/MJ	
Run Number: 2	Pitot Tube Coefficient: .84
Sample Box ID#: /	Meter Box ID#: /
Meter ΔH@: /	C Factor: /
Pre-Test Pitot Leak Check: ✓	Post-Test Pitot Leak Check: ✓
Pre-Test Pump Leak Check: /	Post-Test Pump Leak Check: /

Air Pollution Testing, Inc.
Schematic of Stack Cross Section



15" x 15"

CO2 (%): 0.0	O2 (%): 20.9
Assumed Moisture (%): 0.0	Barometric Pressure (mbar): 834
Ambient Temperature (oF): 75	Probe Material: SS
Probe Length (ft): 4	Filter Temperature (oF): /
Probe Temperature (oF): /	Moisture (grams): /
Nozzle Diameter (in): /	Start Time: /
Static Pressure (in H2O): .92	Stop Time: /
Filter ID#: /	Method: 1-2

PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			.13			71						
2			.14			70						
3			.16			71						
2-1			.21			71						
2			.24			71						
3			.23			71						
3-1			.03			71						
2			.04			71						
3			.03			71						
			.3454			71						

Plant	Coors Brewing	Date	12-16-92
Location	#6 Can Filler Inlet #2		
Operator	PO / MJ		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@		C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check		Post-Test Pump Leak Check	

PC: GB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

15" x 15"

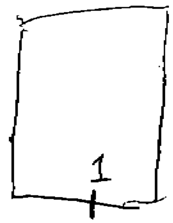
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0.0	Barometric Pressure (mbar)	836
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	+1.8	Stop Time	
Filter ID#		Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.21			71						ED = 16.9"
2			.26			71						
3			.30			70						
2-1			.46			70						
2			.52			71						
3			.47			71						
3-1			.03			71						
2			.06			71						
3			.15			71						
			.4896			71						

#9 Can Filler
Methods 1 - 4
Field Data Sheets

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



$11\frac{7}{8}'' \times 13\frac{7}{8}''$

Plant	Coors Brewing	Date	12-3-92
Location	#9 Can Filter Inlet #2 (Small)		
Operator	RO/arm		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

CO_2 (%)	0.0	O_2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	828
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	-0.41	Stop Time	/
Filter ID#	/	Method	1-2

PC: CB30105

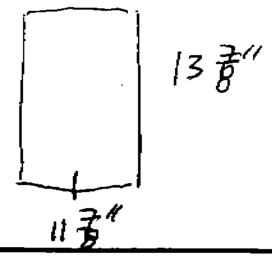
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			1.0			76						
2			1.0			76						
3			.84			76						
			.9722			76						

Plant	Coors Brewing	Date	12-3-92
Location	#9 Can Inlet #2		
Operator	PO/MM		
Run Number	2	Pitot Tube Coefficient	.84
Sample Box ID#	—	Meter Box ID#	—
Meter ΔH@	—	C Factor	—
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	—	Post-Test Pump Leak Check	—

PC: CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



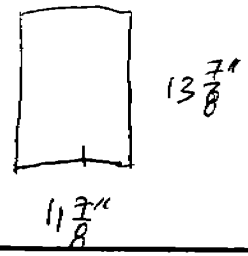
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	827
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	—
Probe Temperature (oF)	—	Moisture (grams)	—
Nozzle Diameter (in)	—	Start Time	—
Static Pressure (in H2O)	-0.40	Stop Time	—
Filter ID#	—	Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			1.1			76						
2			1.2			76						
3			.79			76						
			1.0110			76						

Plant Coors Brewing		Date 12-4-92	
Location #9 Can Filler Inlet #2			
Operator PO/MM			
Run Number 3		Pitot Tube Coefficient .84	
Sample Box ID# /		Meter Box ID# /	
Meter ΔH@ /		C Factor /	
Pre-Test Pitot Leak Check ✓		Post-Test Pitot Leak Check ✓	
Pre-Test Pump Leak Check /		Post-Test Pump Leak Check /	

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%) 0.0	O2 (%) 20.9
Assumed Moisture (%) 0	Barometric Pressure (mbar) 829
Ambient Temperature (oF) 75	Probe Material SS
Probe Length (ft) 4	Filter Temperature (oF) /
Probe Temperature (oF) /	Moisture (grams) /
Nozzle Diameter (in) /	Start Time /
Static Pressure (in H2O) -0.29	Stop Time /
Filter ID# /	Method 1-2

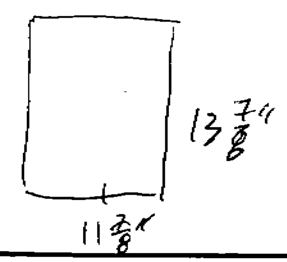
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			1.4			72						
2			1.4			72						
3			1.0			72						
			1.1221			72						

Plant	Coors Brewing	Date	12-4-92
Location	#9 Can Filler Inlet #2		
Operator	PO/MM		
Run Number	4	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	828
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	-0.40	Stop Time	/
Filter ID#	/	Method	12

PC:CB3005

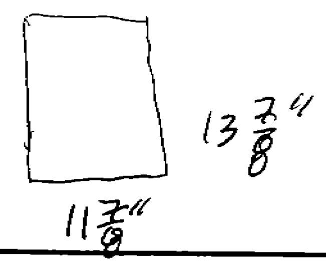
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.95			71						
2			1.1			71						
3			.78			70						
			.9689			71						

Plant	Coors Brewing	Date	12-4-92
Location	#9 Can Inlet #2		
Operator	PO/MM		
Run Number	5	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

PC: CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	209
Assumed Moisture (%)	0	Barometric Pressure (mbar)	827
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	-0.35	Stop Time	/
Filter ID#	/	Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			.96			72						
2			1.1			72						
3			.80			72						
		.9743			72							

Plant Coors Brewing Date 12-3-92

Location #9 Can Inlet #1 (large)

Operator PO/MM

Run Number 2 Pitot Tube Coefficient .84

Sample Box ID# / Meter Box ID# /

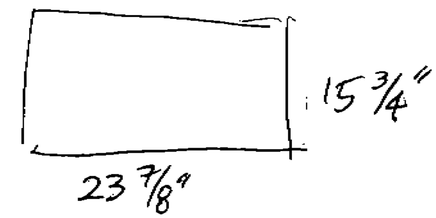
Meter ΔH@ / C Factor /

Pre-Test Pitot Leak Check ✓ Post-Test Pitot Leak Check ✓

Pre-Test Pump Leak Check / Post-Test Pump Leak Check /

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%) 0.0 O2 (%) 20.9

Assumed Moisture (%) 0 Barometric Pressure (mbar) 827

Ambient Temperature (oF) 75 Probe Material SS

Probe Length (ft) 4 Filter Temperature (oF) /

Probe Temperature (oF) / Moisture (grams) /

Nozzle Diameter (in) / Start Time /

Static Pressure (in H2O) +1.90 Stop Time /

Filter ID# / Method 1-2

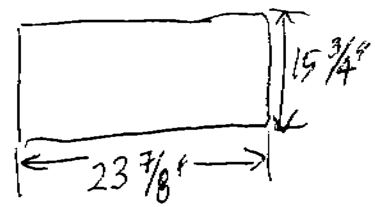
PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			1.8			76						
2			1.6			76						
3			.54			75						
2-1			1.3			75						
2			.99			75						
3			.25			75						
3-1			.93			75						
2			.68			75						
3			.07			75						
			.8922			75						

Plant	Cors Brewing	Date	12-3-92
Location	9 can Inlet #1		
Operator	PO/MM		
Run Number	1	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	829
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	1.20	Stop Time	/
Filter ID#	/	Method	1-2

PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1		.47				76						
2		.92				76						
3		1.5				76						
2-1		.17				76						
2		.52				76						
3		.92				76						
3-1		.04				76						
2		.31				76						
3		.83				76						
		.7367				76						

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

23 7/8" X 15 3/4"

Plant	Coors Brewing	Date	12-3-92
Location	#9 Can Filler Inlet #1		
Operator	PO/MM		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	829
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	+1.40	Stop Time	/
Filter ID#	/	Method	1-2

Pc: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			1.5			76						
2			1.4			76						
3			.46			76						
2-1			.91			76						
2			.73			76						
3			.18			76						
3-1			.87			76						
2			.57			76						
3			.06			76						
			.8057			76						

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

$23\frac{7}{8}'' \times 15\frac{3}{4}''$

Plant	Coors Brewing
Date	12-4-92
Location	#9 Can Filler Inlet #1
Operator	PD/MM
Run Number	4
Pitot Tube Coefficient	.84
Sample Box ID#	
Meter Box ID#	
Meter ΔH@	
C Factor	
Pre-Test Pitot Leak Check	✓
Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	
Post-Test Pump Leak Check	

CO_2 (%)	0.0
O_2 (%)	20.9
Assumed Moisture (%)	0
Barometric Pressure (mbar)	828
Ambient Temperature (oF)	75
Probe Material	SS
Probe Length (ft)	4
Filter Temperature (oF)	
Probe Temperature (oF)	
Moisture (grams)	
Nozzle Diameter (in)	
Start Time	
Static Pressure (in H2O)	+1.40
Stop Time	
Filter ID#	
Method	1-2

PC: CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			1.4			74						
2			1.2			74						
3			.53			74						
2-1			.97			74						
2			.78			74						
3			.20			74						
3-1			.83			74						
2			.64			74						
3			.05			73						
			.8063			74						

Plant	Coors Brewing	Date	12-4-92
Location	#9 Can Filler Inlet #1		
Operator	PO/MM		
Run Number	5	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

23 7/8" x 15 3/4"

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	827
Ambient Temperature (oF)	75	Probe Material	SS
Probe Length (ft)	4	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	1.30	Stop Time	/
Filter ID#	/	Method	1-2

PC: CB 30105

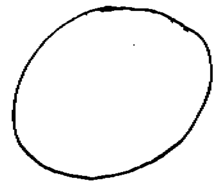
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			1.4			75						
2			1.1			74						
3			.47			74						
2-1			.92			74						
2			.70			74						
3			.18			74						
3-1			.79			74						
2			.58			74						
3			.08			74						
						74						

Plant: Coors Brewing	Date: 12-3-92
Location: #9 Can Filler Vent	
Operator: PO / MM	
Run Number: 1	Pitot Tube Coefficient: 0.84
Sample Box ID#	Meter Box ID#
Meter ΔH@: 1.683	C Factor: —
Pre-Test Pitot Leak Check: ✓	Post-Test Pitot Leak Check: ✓
Pre-Test Pump Leak Check: 0@10" Hg	Post-Test Pump Leak Check: 0@10" Hg

Yd = 1.0389 PC: GB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



ID = 15.5"

CO2 (%): 0.0	O2 (%): 20.9
Assumed Moisture (%): —	Barometric Pressure (mbar): 828
Ambient Temperature (oF): 75	Probe Material
Probe Length (ft)	Filter Temperature (oF): —
Probe Temperature (oF): —	Moisture (grams): 4.0
Nozzle Diameter (in): —	Start Time
Static Pressure (in H2O): -3.0	Stop Time
Filter ID#: —	Method: 1-4

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 489.692	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1	10	7	.66	3.5	500.02	70			88	87	62	
2	20	7	.62	3.5	510.31	70			89	87	50	
3	30	7	.53	3.5	520.65	70			94	88	51	
4	40	7	.44	3.5	531.017	70			101	91	51	
5			.20			70						
6			.18			70						
7			.16			70						
8			.22			70						
2-1			.31			70						
2			.26			70						
3			.21			70						
4			.22			70						
5			.36			70						
6			.46			70						
7 8			.47 .55	3.5 ✓	41.325 ✓	70 70			91 ✓			
			.5894 ✓			70 ✓						

Plant	Coors Brewing	Date	12-3-92
Location	#9 Can Filler Vent		
Operator	PO / MM		
Run Number	2	Pitot Tube Coefficient	0.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@	1.683	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0 @ 11"Hg	Post-Test Pump Leak Check	0 @ 10"Hg

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

ID = 15.5"

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	/	Barometric Pressure (mbar)	827
Ambient Temperature (oF)	75	Probe Material	
Probe Length (ft)		Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	3.0
Nozzle Diameter (in)	/	Start Time	
Static Pressure (in H2O)	-3.0	Stop Time	
Filter ID#	/	Method	1-4

Yd = 1.0389

PCCB 30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 538.510	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10	7	.55	3.5	548.65	72			81	80	67	
2	20	7	.62	3.5	559.11	72			85	81	48	
3	30	7	.46	3.5	570.031	71			93	82	49	
4			.34			71						
5			.23			71						
6			.19			70						
7			.28			70						
8			.31			70						
2-1			.29			70						
2			.31			70						
3			.25			69						
4			.22			69						
5			.38			69						
6			.41			69						
7			.48			68						
8			.60			68						
				3.5	31.521				84			
			.5988			70						

Plant Coors Brewing | Date 12-4-92

Location #9 Can Filler Vent

Operator PO /MM

Run Number 3 | Pitot Tube Coefficient .84

Sample Box ID# | Meter Box ID#

Meter ΔH@ 1.683 | C Factor /

Pre-Test Pitot Leak Check ✓ | Post-Test Pitot Leak Check ✓

Pre-Test Pump Leak Check 0 @ 11" Hg | Post-Test Pump Leak Check 0 @ 10" Hg

Yd = 1.0389

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

CO2 (%) 0.0 | O2 (%) 20.9

Assumed Moisture (%) / | Barometric Pressure (mbar) 829

Ambient Temperature (oF) 75 | Probe Material

Probe Length (ft) | Filter Temperature (oF) /

Probe Temperature (oF) / | Moisture (grams) 3.5

Nozzle Diameter (in) / | Start Time

Static Pressure (in H2O) -2.9 | Stop Time

Filter ID# / | Method 1-4

PC: CB 30105

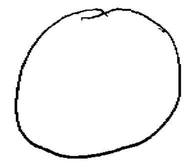
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 570.665	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10	7	.59	3.5	581.42	72			78	77	52	
2	20	7	.57	3.5	592.16	72			84	78	53	
3	30	7	.47	3.5	602.871	72			95	79	53	
4			.36			71						
5			.39			71						
6			.28			71						
7			.16			71						
8			.09			70						
2-1			.38			71						
2			.31			70						
3			.31			69						
4			.16			69						
5			.39			69						
6			.42			68						
7			.50			68						
8			.60	3.5	32.206	68			82			
			.5967			70.2						

Plant	Coors Brewing	Date	12-4-92
Location	#9 Can Filler Vent		
Operator	PO/MM		
Run Number	4	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@	1.683	C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@12"Hg	Post-Test Pump Leak Check	0@12"Hg

Yd = 1.0389

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



ID = 15.5"

CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)		Barometric Pressure (mbar)	828
Ambient Temperature (oF)		Probe Material	
Probe Length (ft)		Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	2.5
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	-3.0	Stop Time	
Filter ID#		Method	1-4

PC CB30105

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 603.111	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10	7	.63	3.5	613.95	71			77	77	58	
2	20	7	.55	3.5	624.81	71			87	79	52	
3	30	7	.47	3.5	635.222	71			96	82	52	
4			.36			71						
5			.22			71						
6			.22			71						
7			.29			71						
8			.28			71						
2-1			.30			71						
2			.31			71						
3			.17			70						
4			.29			70						
5			.40			70						
6			.48			70						
7			.44	3.5	32.111	70			83			
8			.51			70						
			.5990			71						

Plant	Coors Brewing	Date	12-4-92
Location	#9 Can Filler Vent		
Operator	PD/MM		
Run Number	5	Pitot Tube Coefficient	.84
Sample Box ID#		Meter Box ID#	
Meter ΔH@	1.683	C Factor	
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	0@11"Hg	Post-Test Pump Leak Check	0@10"Hg

Yd = 1.8289 PC: CB 30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

ID = 15.5"

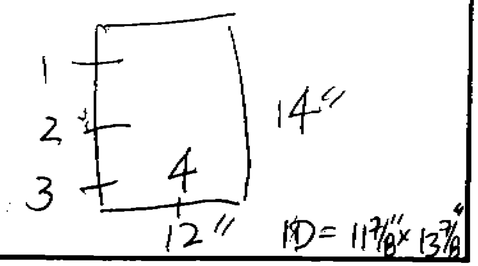
CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)		Barometric Pressure (mbar)	827
Ambient Temperature (oF)	75	Probe Material	
Probe Length (ft)		Filter Temperature (oF)	
Probe Temperature (oF)		Moisture (grams)	4.0
Nozzle Diameter (in)		Start Time	
Static Pressure (in H2O)	-3.0	Stop Time	
Filter ID#		Method	1-4

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume 635.826	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1	10	7	.60	3.5	646.21	71			79	80	66	
2	20	7	.58	3.5	656.91	70			86	80	60	
3	30	7	.51	3.5	667.504	70			97	82	65	
4			.32			70						
5			.25			71						
6			.25			71						
7			.31			71						
8			.41			71						
2-1			.30			71						
2			.29			71						
3			.15			70						
4			.27			71						
5			.36			71						
6			.45			71						
7 8			.44 .50	3.5	31.678	71 71			84			
			.6030			71						

Plant: Coors Brewing Co Date: 1-27-93
Location: 9 can Inlet (Small)
Operator: PO/MM
Run Number: 1 Pitot Tube Coefficient: .84
Sample Box ID#: — Meter Box ID#: —
Meter ΔH@: — C Factor: —
Pre-Test Pitot Leak Check: ✓ Post-Test Pitot Leak Check: ✓
Pre-Test Pump Leak Check: — Post-Test Pump Leak Check: —

PC: CB 30105

Air Pollution Testing, Inc.
Schematic of Stack Cross Section



CO2 (%): 0.0 O2 (%): 20.9
Assumed Moisture (%): 0 Barometric Pressure (mbar): 838
Ambient Temperature (oF): 70 Probe Material: SS
Probe Length (ft): 2 Filter Temperature (oF): —
Probe Temperature (oF): — Moisture (grams): —
Nozzle Diameter (in): — Start Time: —
Static Pressure (in H2O): -.44 Stop Time: —
Filter ID#: — Method: 1-2

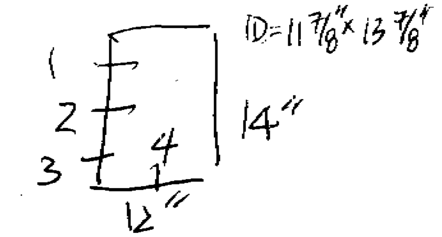
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet(oF)	Condenser Temp. (oF)	Notes
1-1			.41			73						
2			.99			73						
3			.31			73						
2-1			.45			73						
2			1.2			74						
3			.44			73						
3-1			.25			73						
2			.86			73						
3			.39			73						
4-1			1.4			73						
2			1.3			73						
3			1.0			73						
			.7415 ✓ 1.108 ✓			73 ✓						

Plant	Coors Brewing	Date	1-27-93
Location	9 can Inlet (Small)		
Operator	PO/MAN		
Run Number	2	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

PC:CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section



CO2 (%)	0.0	O2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	839
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	-.130	Stop Time	/
Filter ID#	/	Method	1-2

Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.44			72						
2			1.2			72						
3			.68			72						
2-1			.56			72						
2			1.4			72						
3			.69			72						
3-1			.25			72						
2			1.1			72						
3			.23			72						
4-1			1.4			72						
2			1.5			72						
3			1.0			72						
			.8192 ✓ 1.136 ✓			72 ✓						

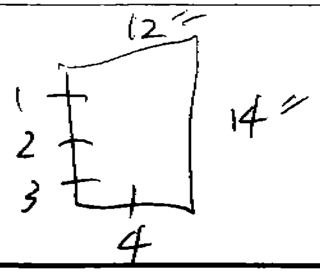
Plant	Coors Brewing	Date	1-27-93
Location	9 Can Inlet (Small)		
Operator	PO/MM		
Run Number	3	Pitot Tube Coefficient	.84
Sample Box ID#	/	Meter Box ID#	/
Meter ΔH@	/	C Factor	/
Pre-Test Pitot Leak Check	✓	Post-Test Pitot Leak Check	✓
Pre-Test Pump Leak Check	/	Post-Test Pump Leak Check	/

PC: CB30105

Air Pollution Testing, Inc.

Schematic of Stack Cross Section

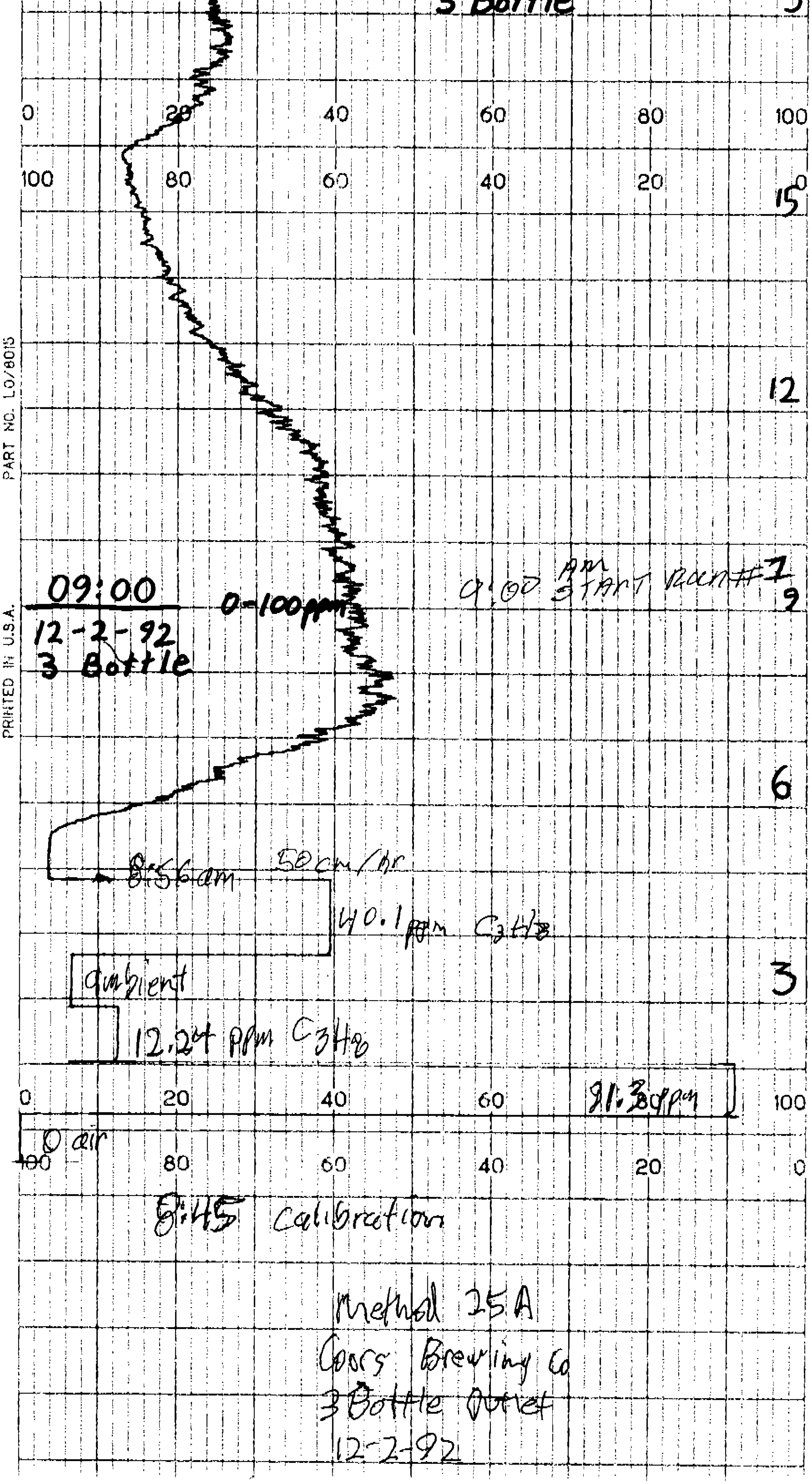
11 7/8" x 13 7/8" = ID



CO_2 (%)	0.0	O_2 (%)	20.9
Assumed Moisture (%)	0	Barometric Pressure (mbar)	838
Ambient Temperature (oF)	70	Probe Material	SS
Probe Length (ft)	2	Filter Temperature (oF)	/
Probe Temperature (oF)	/	Moisture (grams)	/
Nozzle Diameter (in)	/	Start Time	/
Static Pressure (in H2O)	-.25	Stop Time	/
Filter ID#	/	Method	1-2

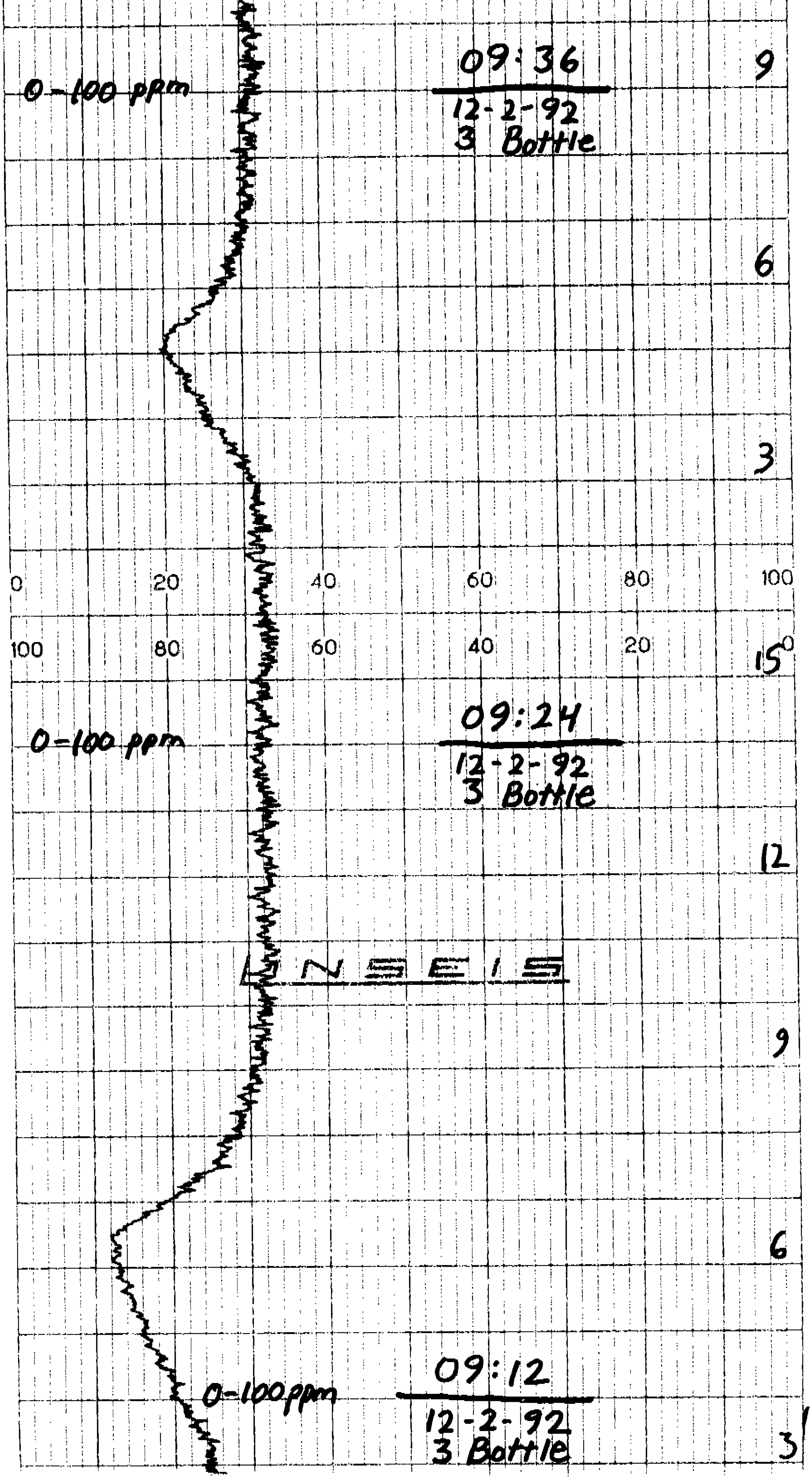
Traverse Point Number	Sampling Time (minutes)	Vacuum (in Hg)	Velocity Head (in H2O)	Pressure Differential (in H2O)	Gas Volume (ft3) Initial Volume	Stack Temp. (oF)	Probe Temp. (oF)	Filter Temp. (oF)	Gas Temp. Inlet (oF)	Gas Temp. Outlet (oF)	Condenser Temp. (oF)	Notes
1-1			.37			73						
2			1.1			73						
3			.08			73						
2-1			.73			73						
2			1.2			73						
3			.25			73						
3-1			.15			73						
2			.95			73						
3			.33			73						
4-1			1.3			73						
2			1.3			73						
3			.89			73						
			.7029 1.0931			73						

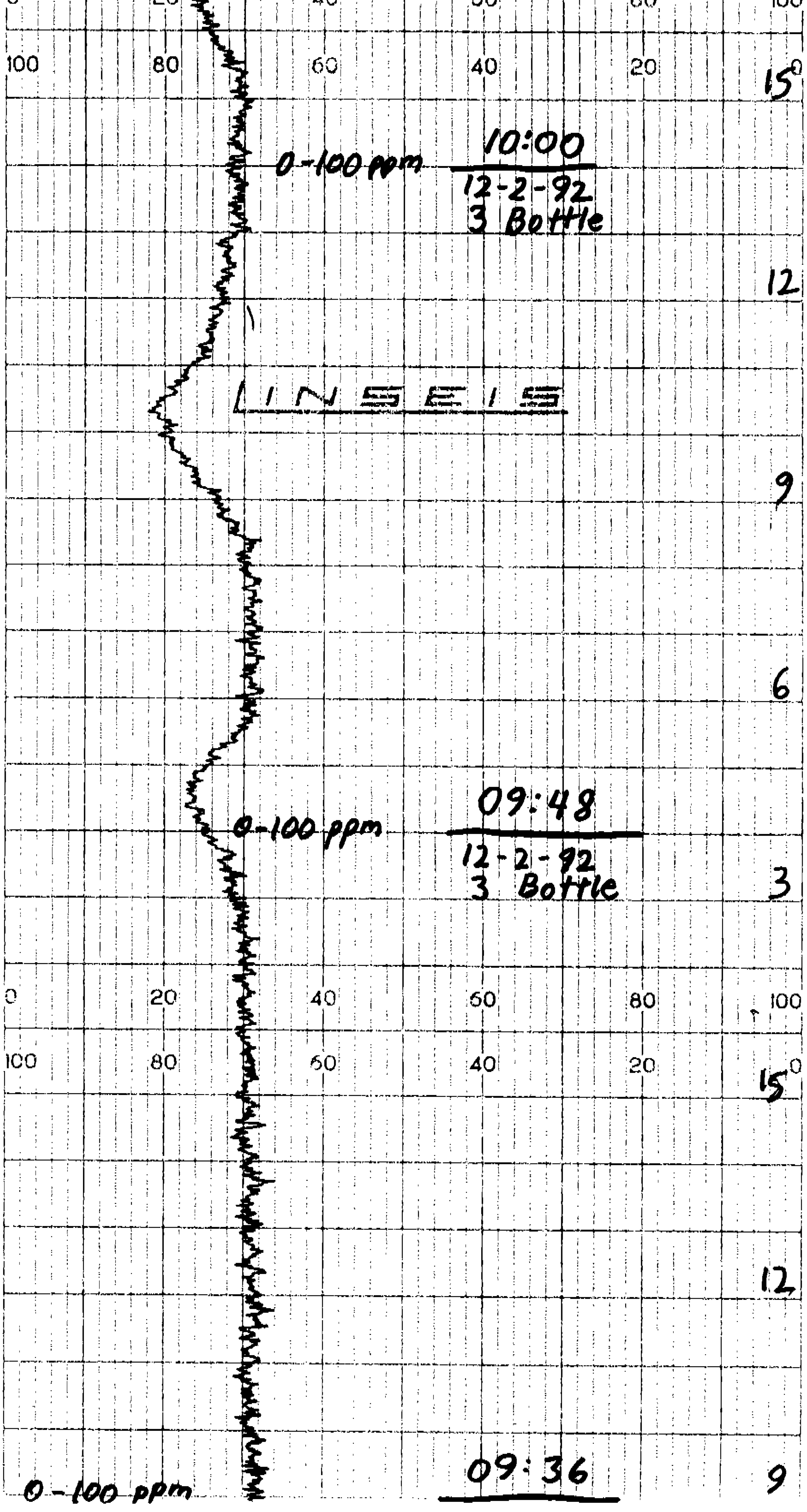
#3 Bottle Filler
Method 25A
Strip Chart Data



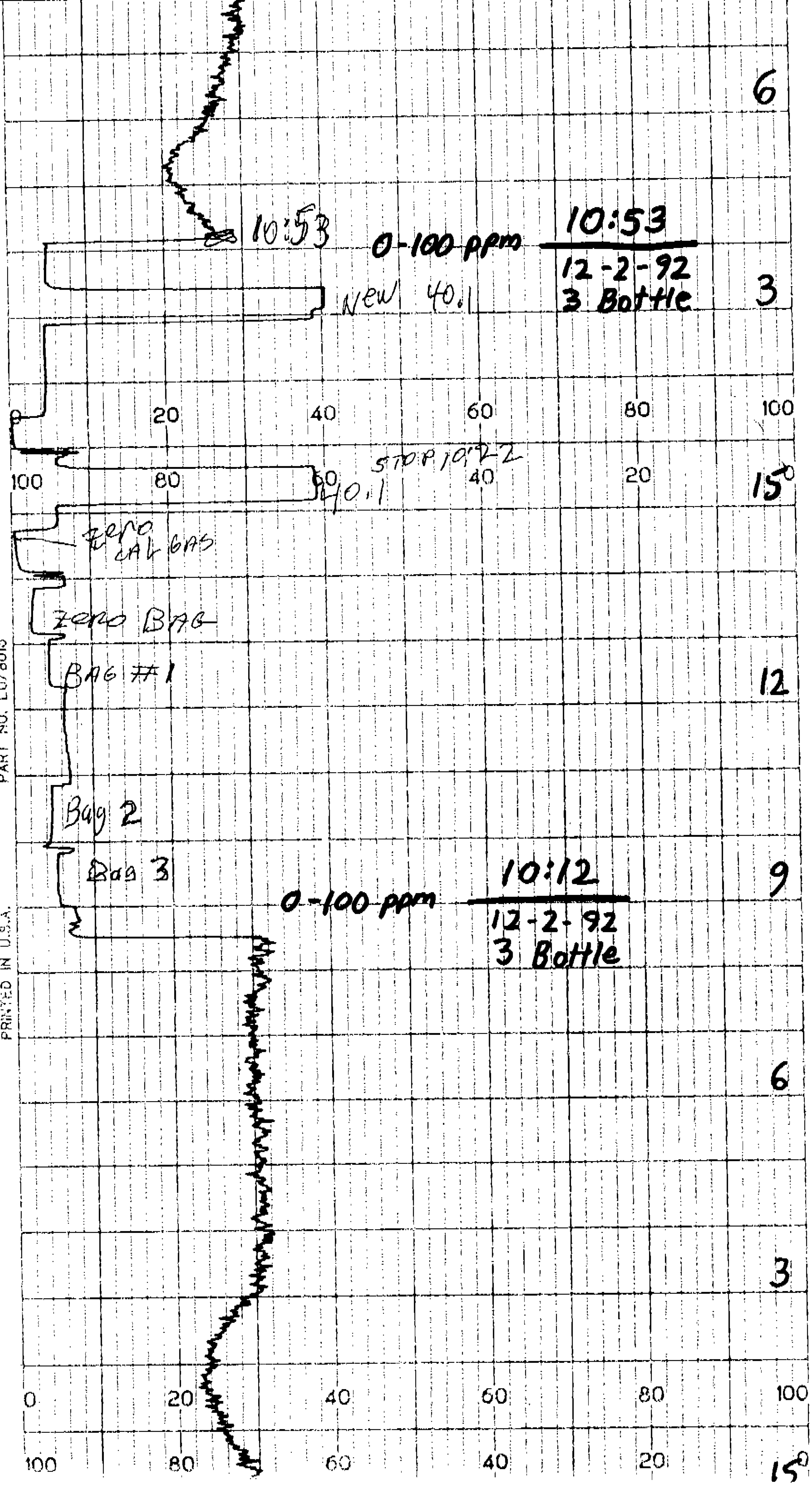
3 Bottle
PART NO. LO/8015
PRINTED IN U.S.A.
0 20 40 60 80 100
100 80 60 40 20 0
15
12
9
6
3
09:00
12-2-92
3 Bottle
0-100ppm
9:00 AM START Run #1
8:56am
50cm/hr
40.1 ppm C3H8
ambient
12.24 ppm C3H8
81.3 ppm
0 air
8:45 calibration
Method 25A
Coors Brewing Co
3 Bottle Outlet
12-2-92

PRINTED IN U.S.A.

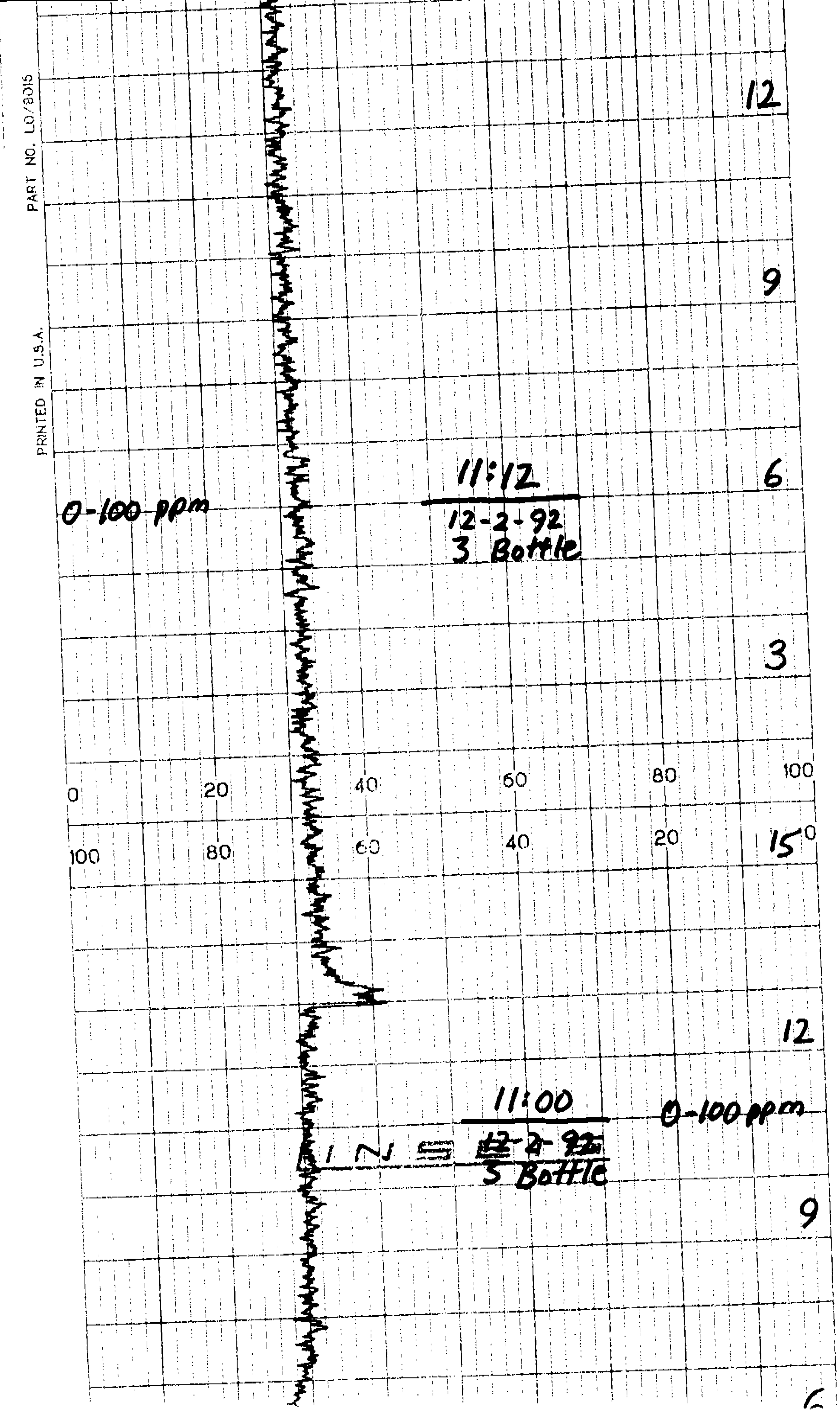


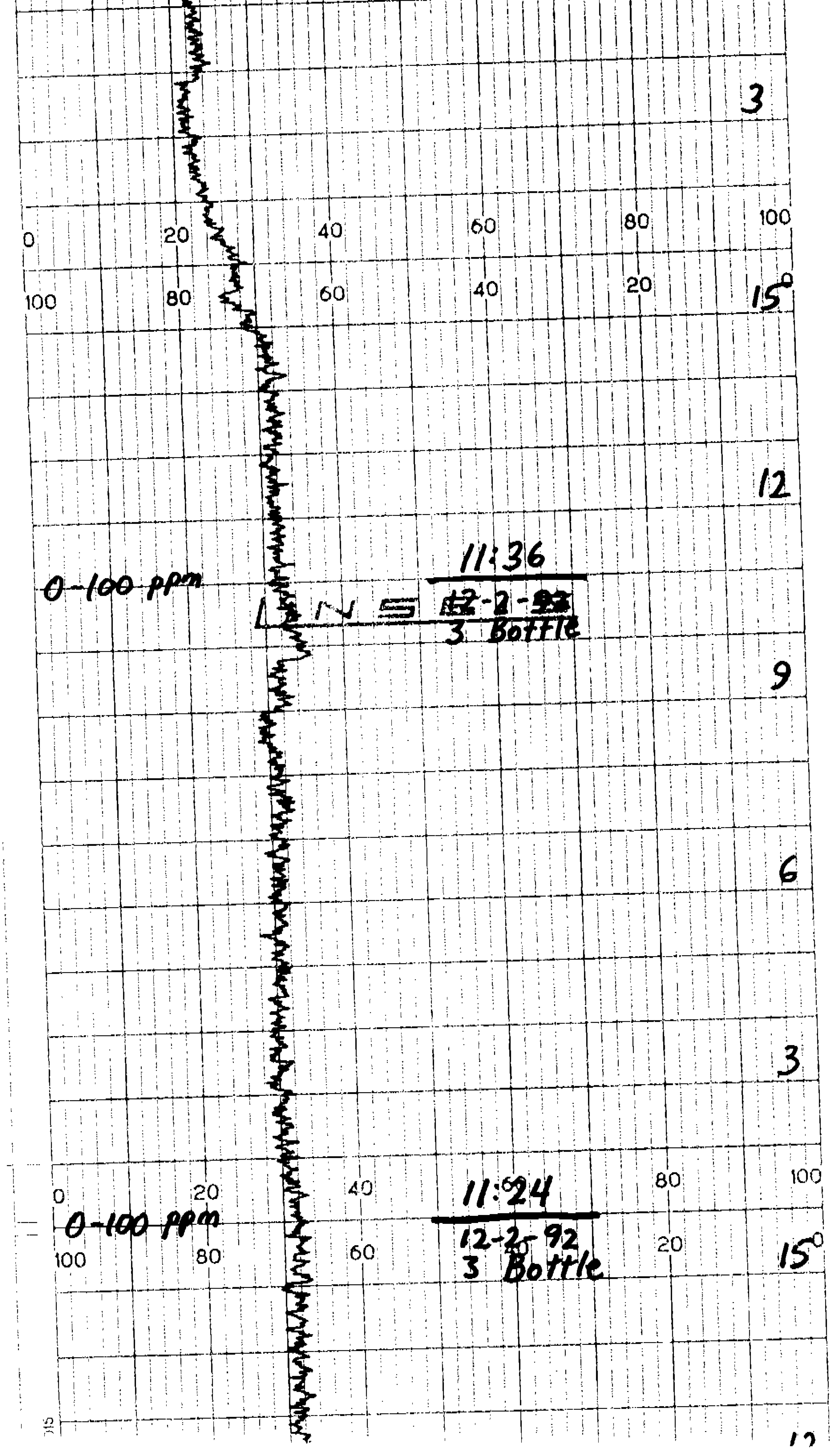


PART NO. L0/8015

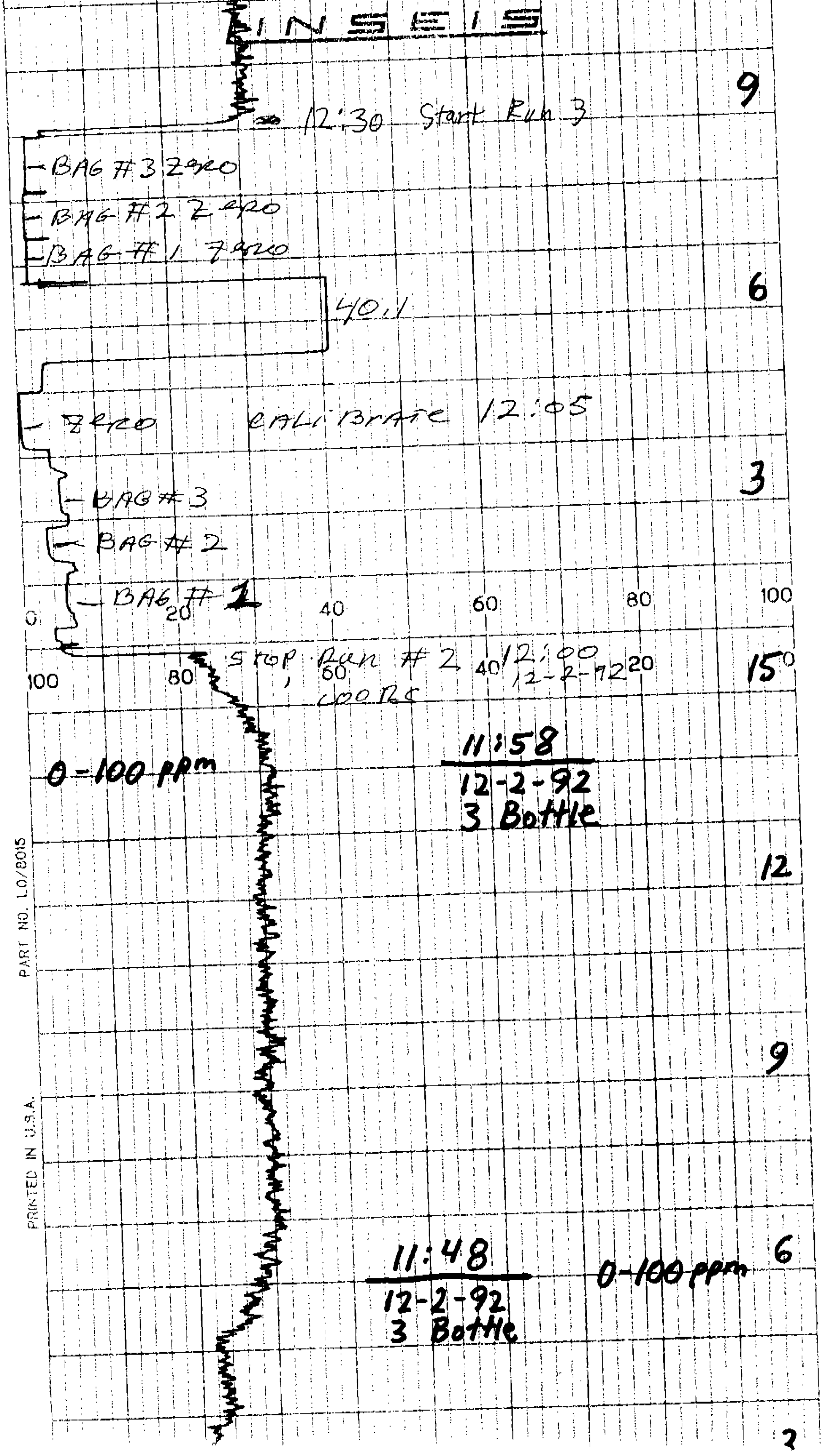


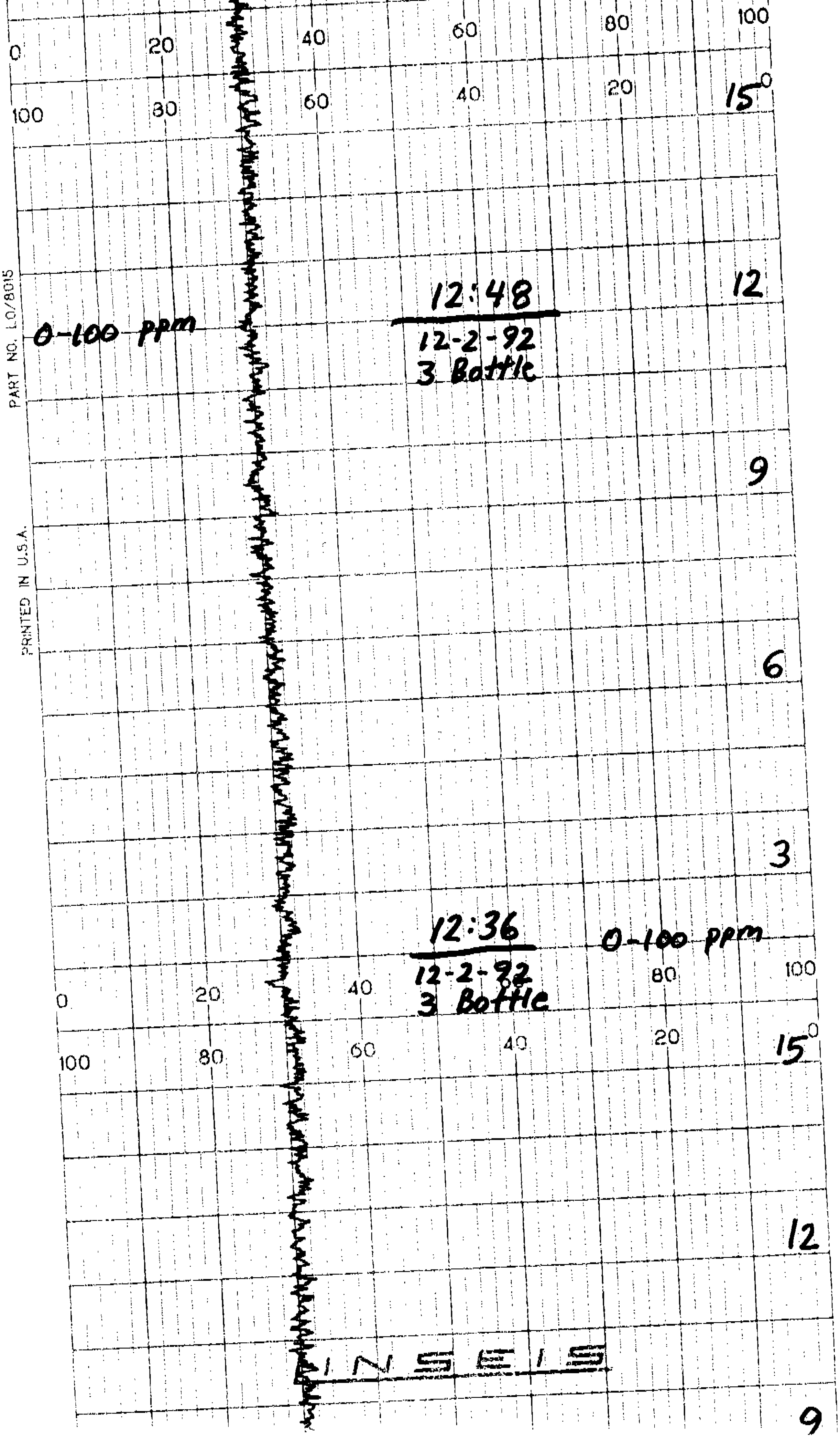
6
10:53
0-100 ppm
10:53
12-2-92
3 Bottle
3
New 40.1
0
20
40
60
80
100
100
80
60
40
20
15°
STOP 10:22
40.1
zero CAL GAS
zero BAG
BAG #1
12
Bag 2
Bag 3
9
0-100 ppm
10:12
12-2-92
3 Bottle
6
3
0
20
40
60
80
100
100
80
60
40
20
15°
PART NO. LG/8015
PRINTED IN U.S.A.


PART NO. LO/3015
PRINTED IN U.S.A.
12
9
6
11:12
12-2-92
3 Bottle
0-100 ppm
3
0
20
40
60
80
100
100
80
60
40
20
0
15
12
11:00
0-100 ppm
~~12-2-92~~
5 Bottle
9
6



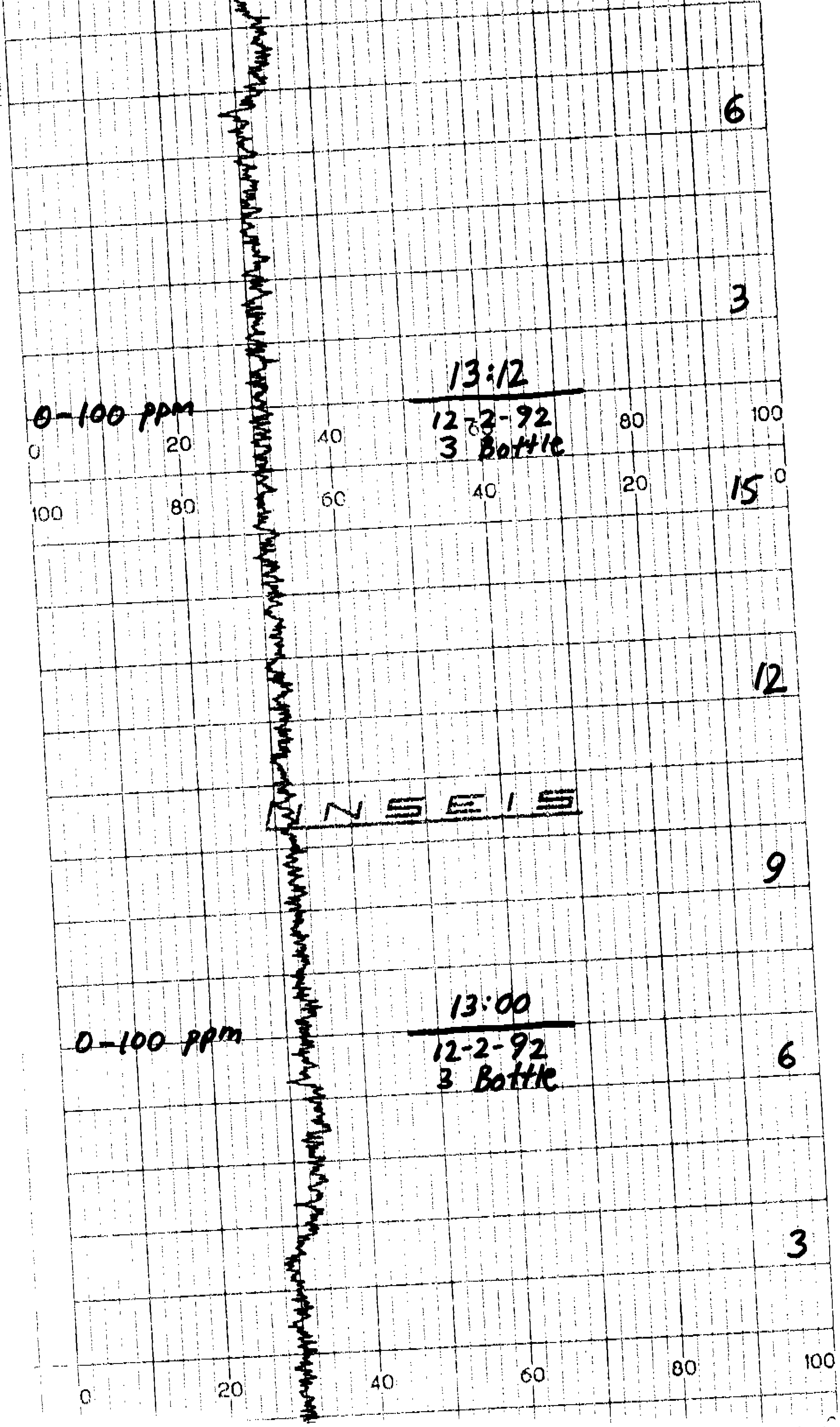
3
0 20 40 60 80 100
100 80 60 40 20 0
15
12
11:36
0-100 ppm
3 Bottle
9
6
3
0 20 40 60 80 100
11:24
0-100 ppm
12-2-92
3 Bottle
100 80 60 40 20 0
15

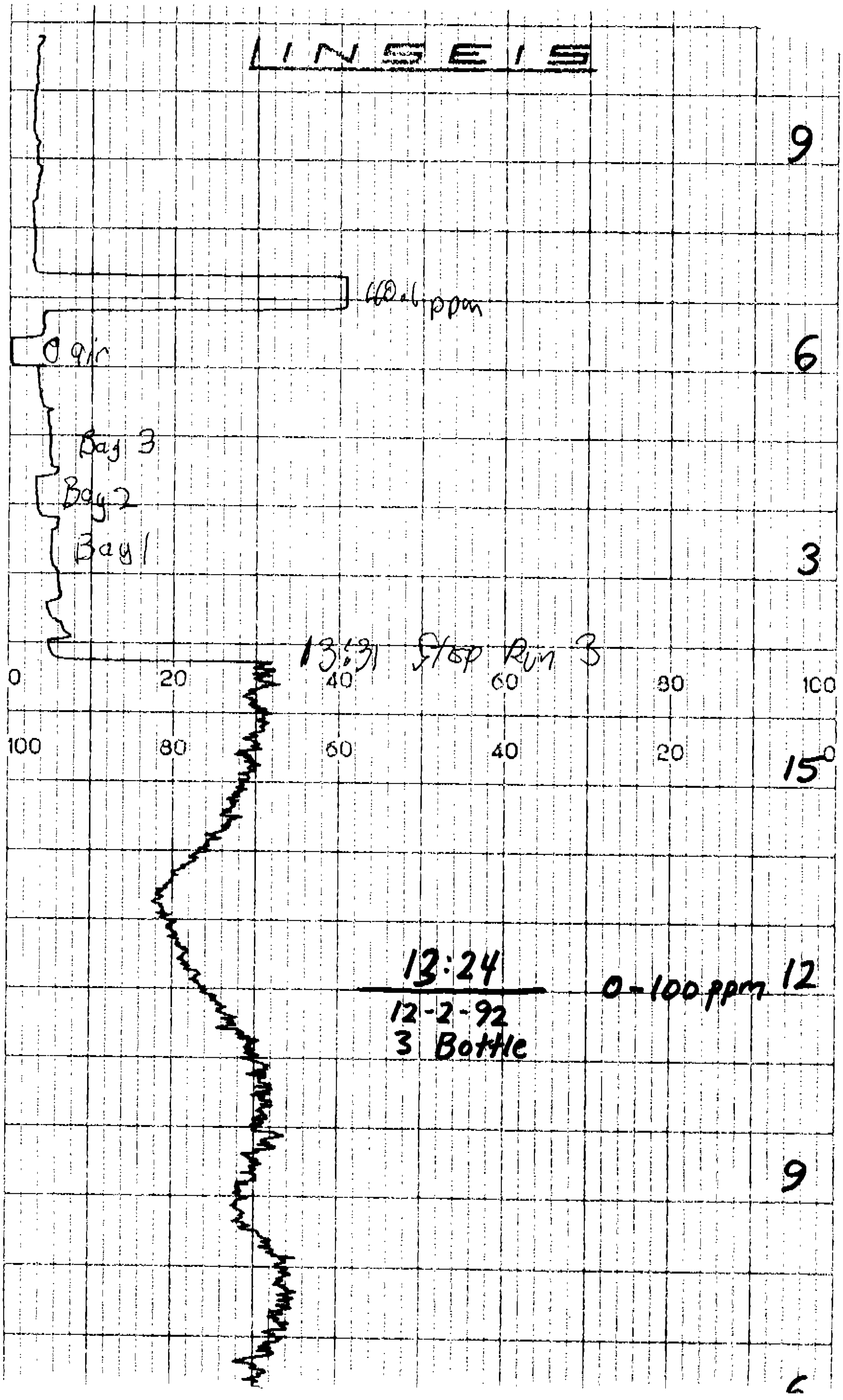

LINSEIS
9
12:30 Start Run 3
BAG #3 Zero
BAG #2 Zero
BAG #1 Zero
6
40.1
Zero
CALIBRATE 12:05
3
BAG #3
BAG #2
BAG #1
0 20 40 60 80 100
Stop Run # 2
12:00
12-2-92
100 80 60 40 20 0
15
11:58
12-2-92
3 Bottle
0-100 ppm
12
PART NO. LO/8015
9
PRINTED IN U.S.A.
11:48
12-2-92
3 Bottle
0-100 ppm
6
2



0
20
40
60
80
100
100
80
60
40
20
0
15
PART NO. LO/8015
12:48
12-2-92
3 Bottle
0-100 ppm
12
9
PRINTED IN U.S.A.
6
3
12:36
12-2-92
3 Bottle
0-100 ppm
0
20
40
80
100
100
80
60
40
20
0
15
12
LINSEIS
9

PRINTED IN U.S

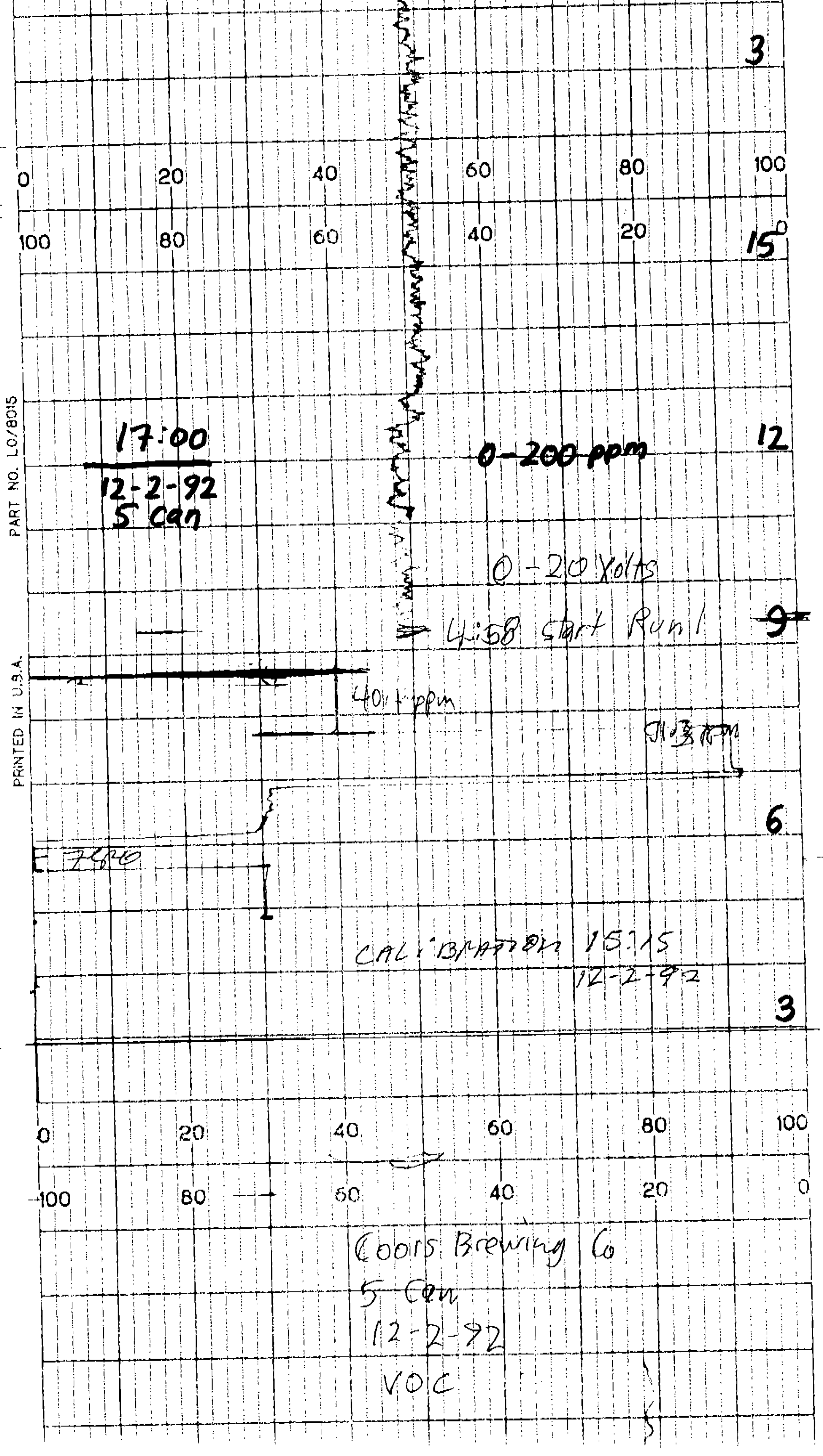




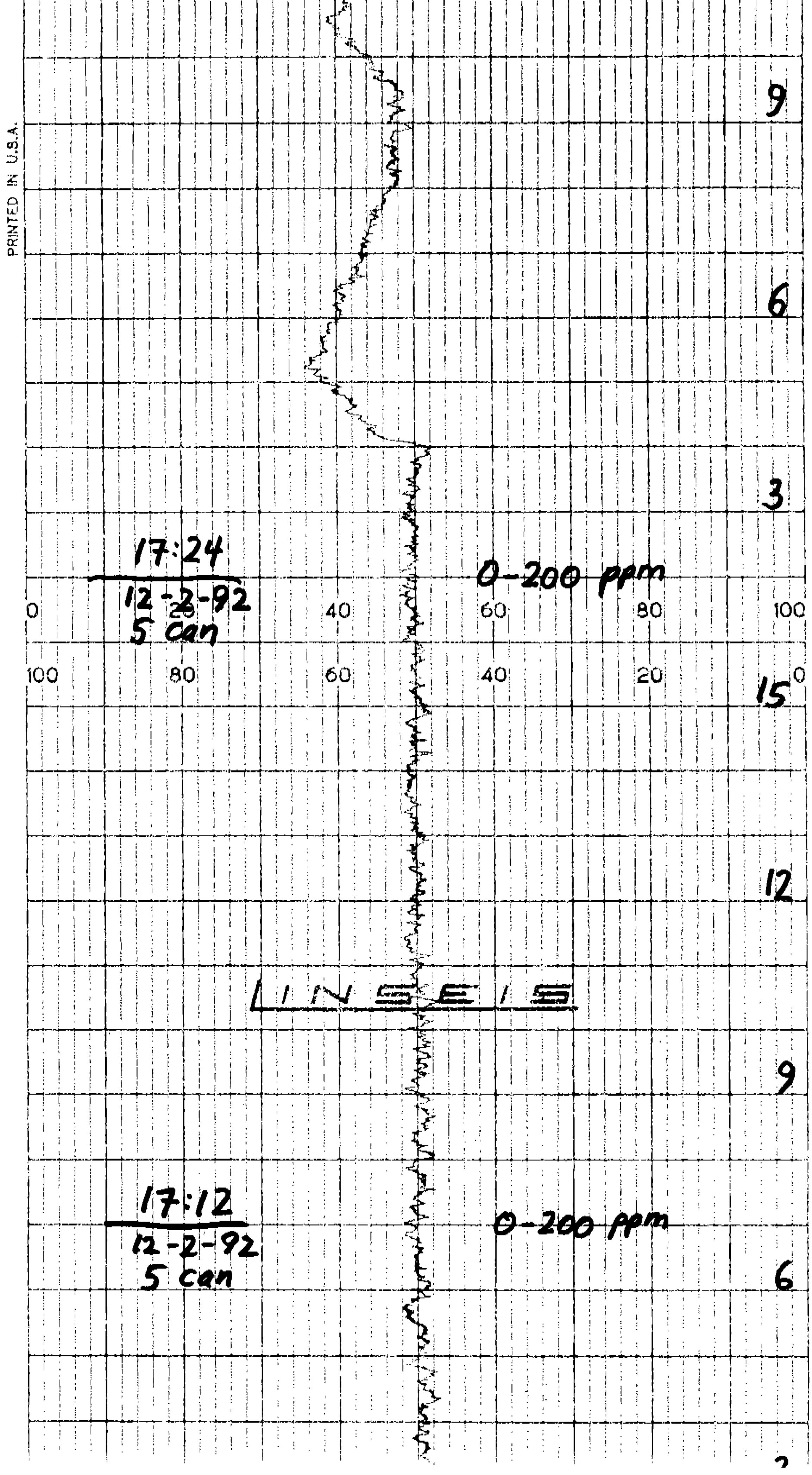
PART NO. LO/8015

PRINTED IN U.S.A.

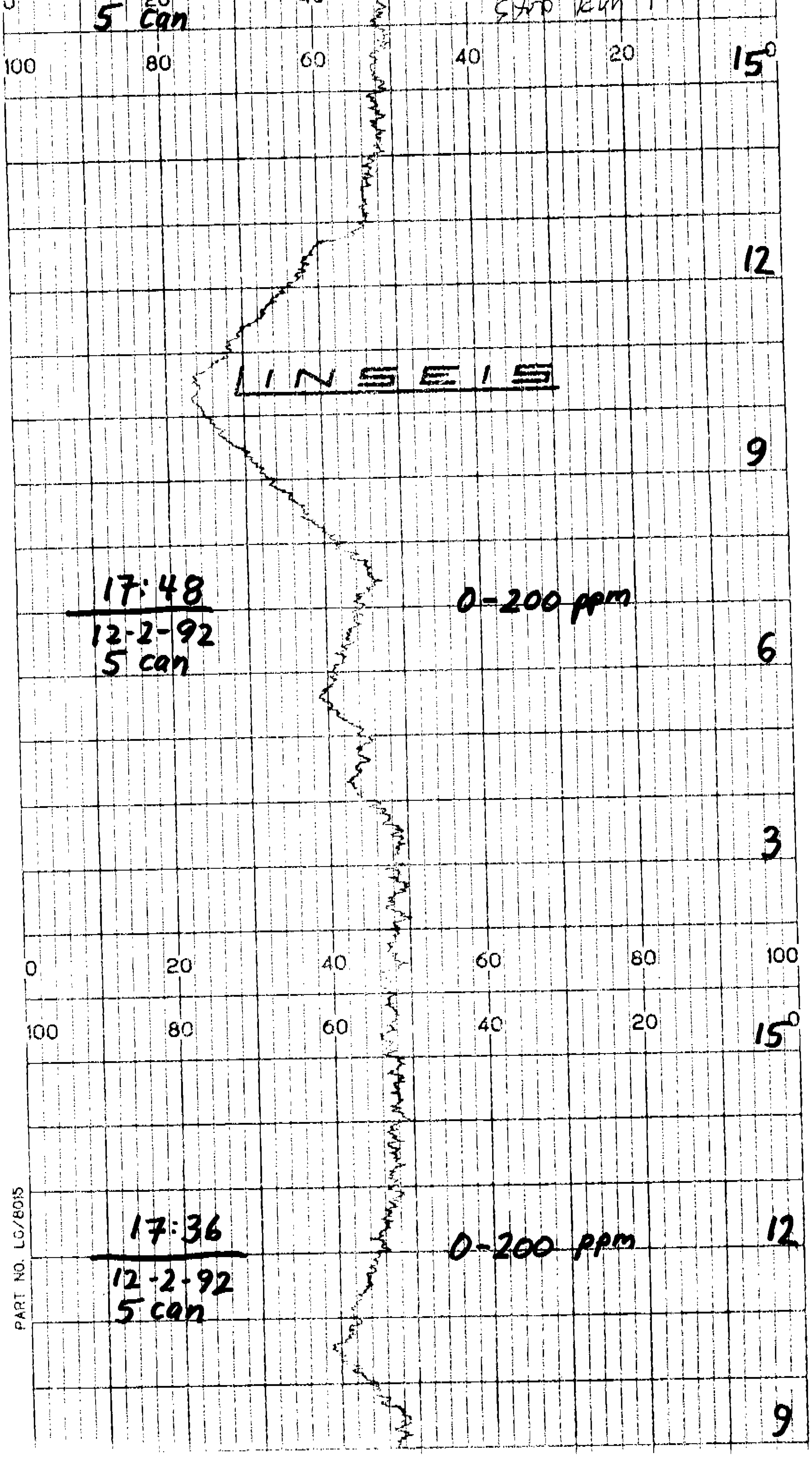
#5 Can Filler
Method 25A
Strip Chart Data

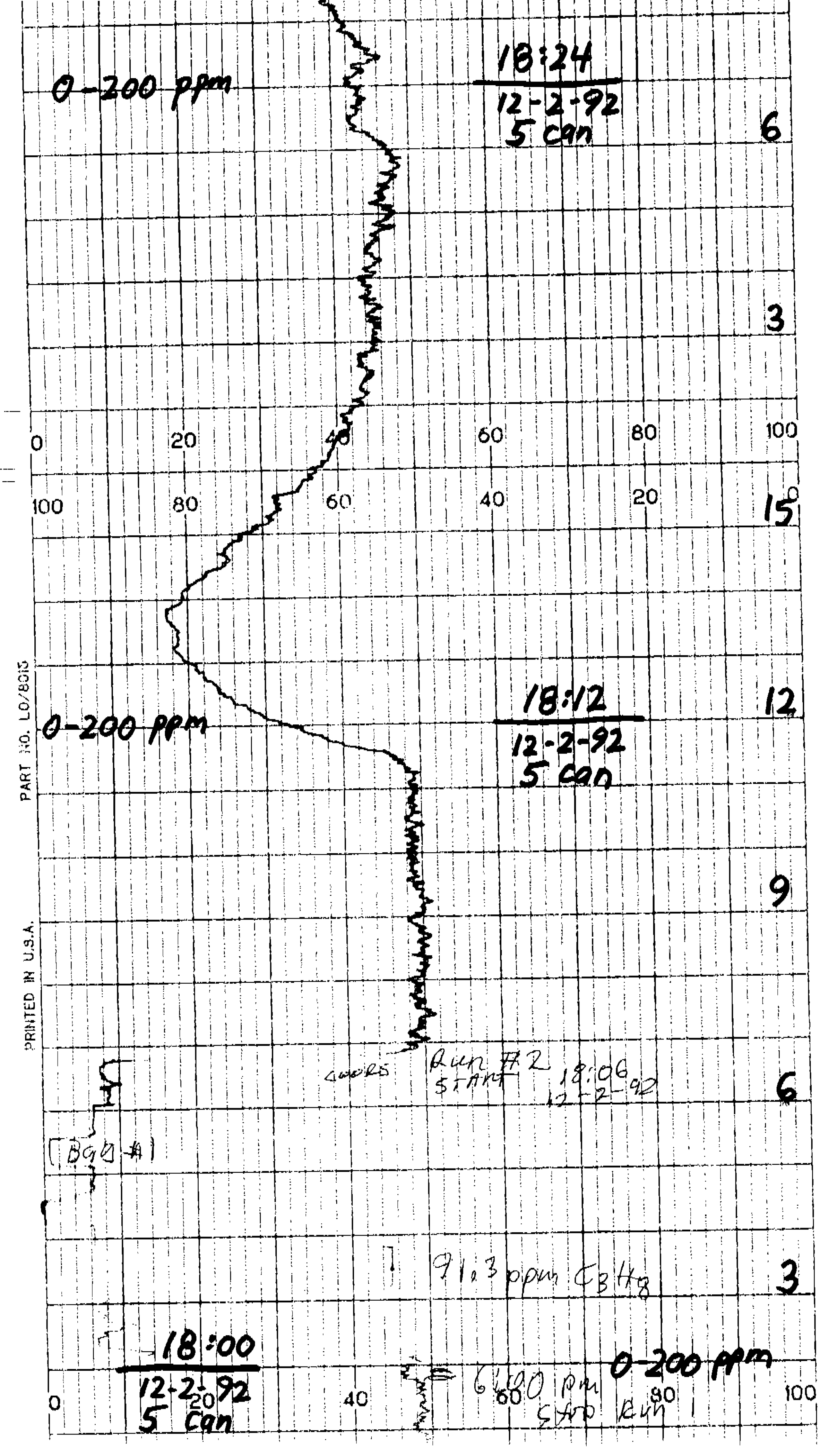


3
0 20 40 60 80 100
100 80 60 40 20 0
15
PART NO. LO/8015
17:00
12-2-92
5 Can
0-200 ppm
12
0-20 Volts
4:58 start Run 1
9
PRINTED IN U.S.A.
40.1 ppm
6
CALIBRATION 15:15
12-2-92
3
0 20 40 60 80 100
100 80 60 40 20 0
Coors Brewing Co
5 Can
12-2-92
VOC

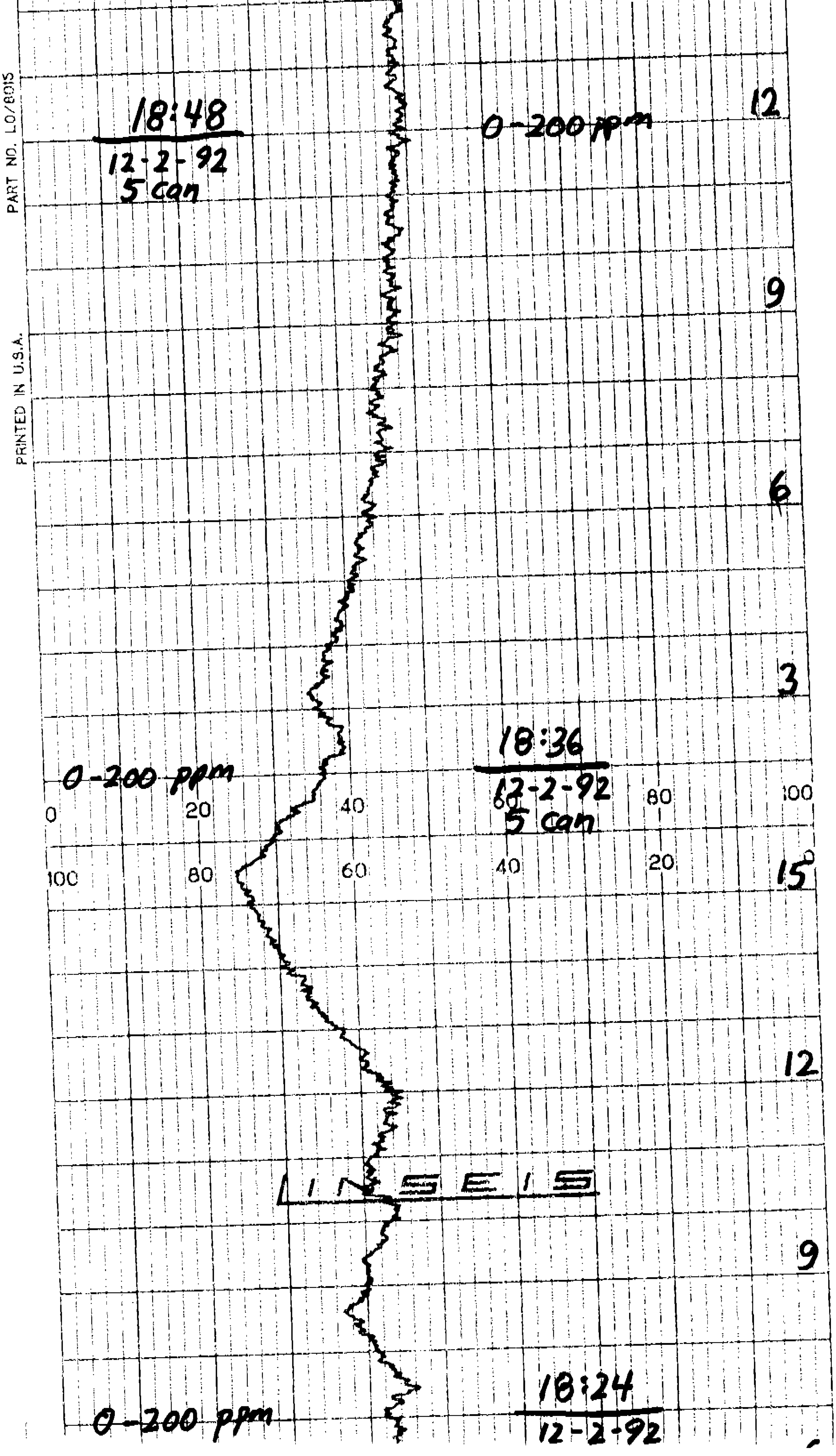


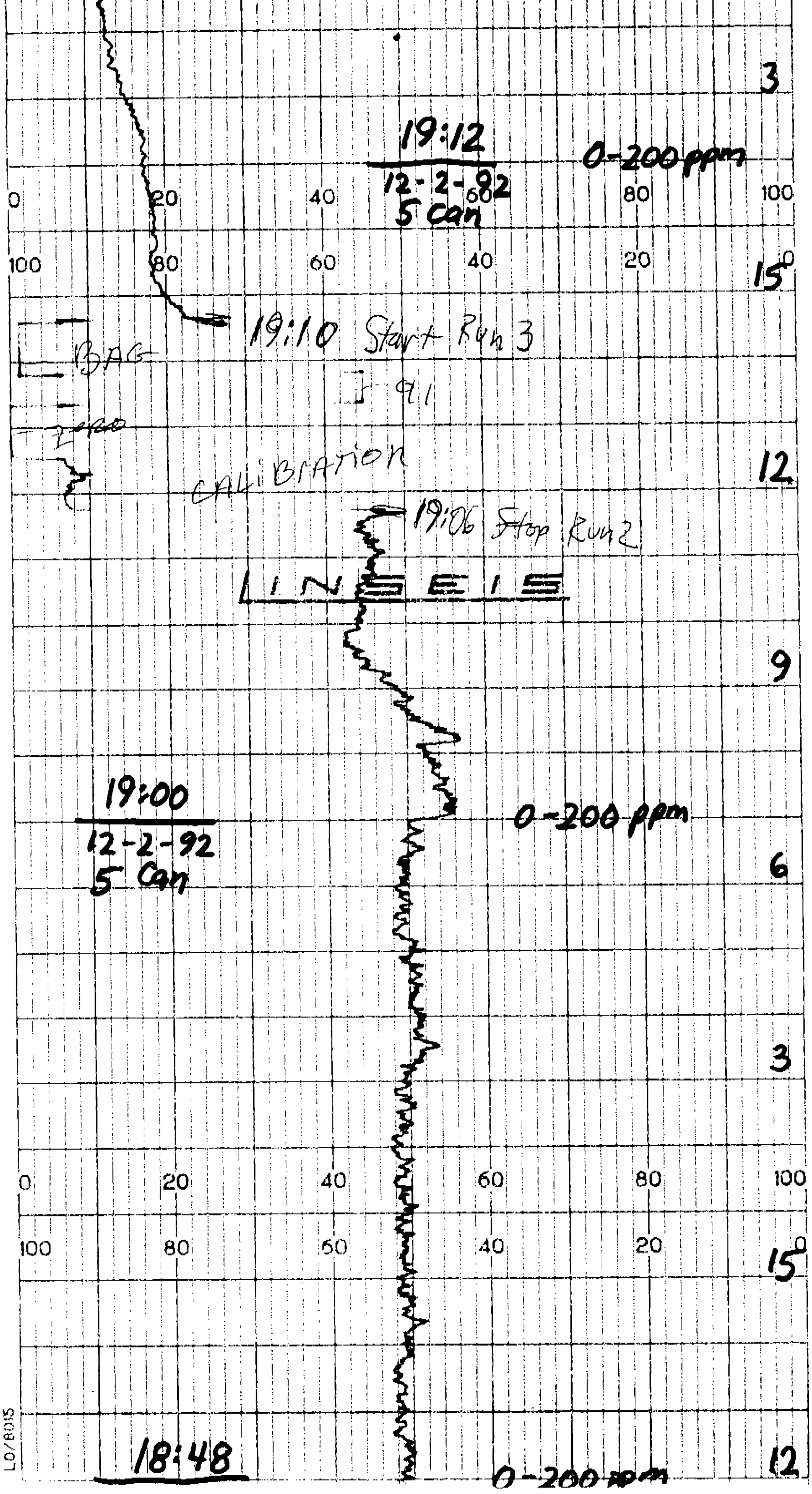
PRINTED IN U.S.A.
9
6
3
17:24
12-2-92
5 can
0-200 ppm
0 20 40 60 80 100
100 80 60 40 20 0
15
12
LINSEIS
9
17:12
12-2-92
5 can
0-200 ppm
6


5 can
100
80
60
40
20
15
12
LINSEIS
9
17:48
12-2-92
5 can
0-200 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
15
17:36
12-2-92
5 can
0-200 ppm
12
9
PART NO. LC/8015

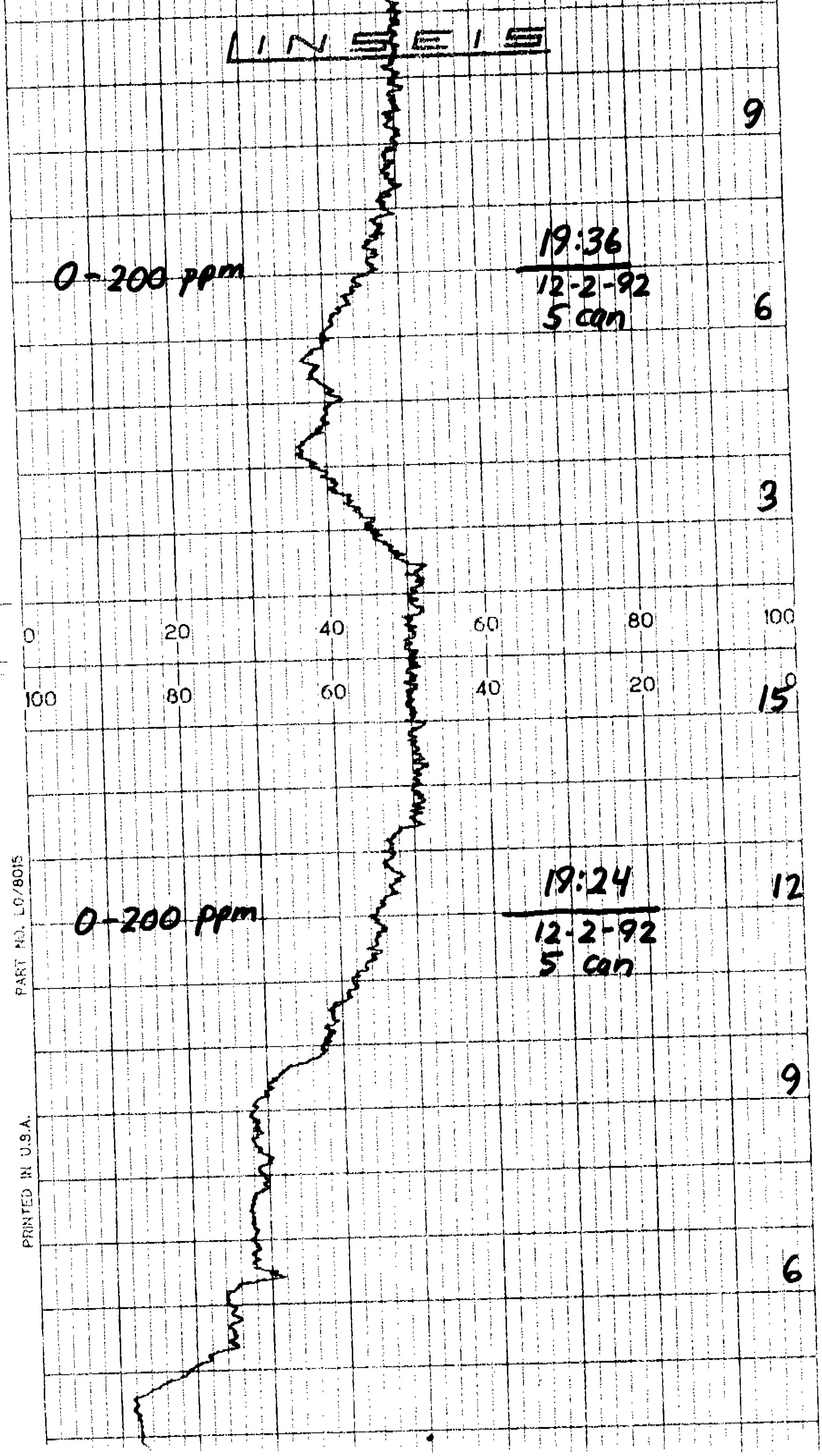


0-200 ppm
18:24
12-2-92
5 Can
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
18:12
12-2-92
5 can
12
0-200 ppm
PART NO. LO/8013
9
PRINTED IN U.S.A.
Run #2
START
18:06
12-2-92
6
[B90-A]
91.3 ppm C3H8
3
18:00
12-2-92
5 Can
0-200 ppm
0 20 40 60 80 100

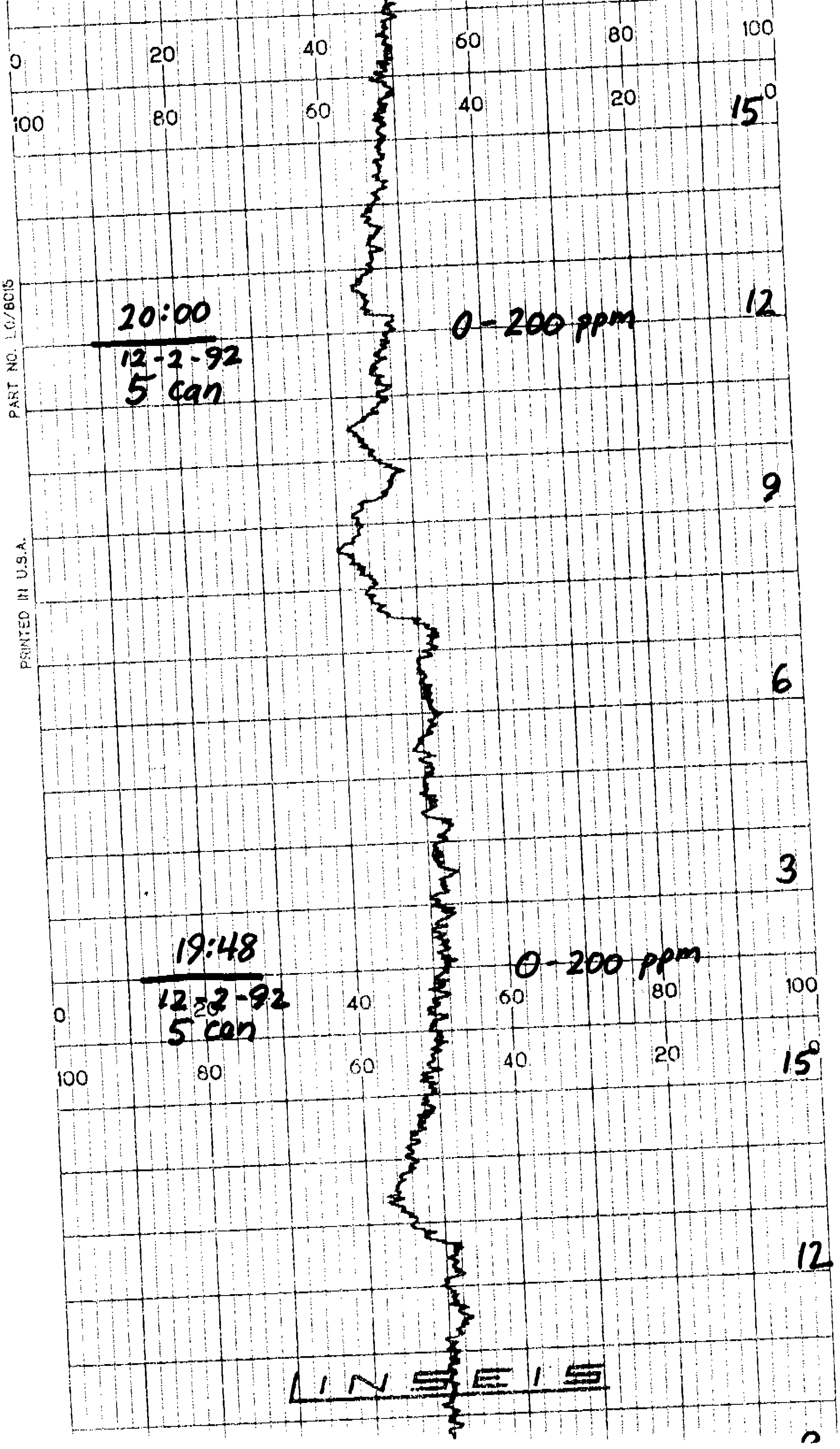

PART NO. LO/8015
PRINTED IN U.S.A.
18:48
12-2-92
5 can
0-200 ppm
12
9
6
3
18:36
12-2-92
5 can
0-200 ppm
0
20
40
60
80
100
100
80
60
40
20
0
15
12
LINSEIS
9
18:24
12-2-92
0-200 ppm

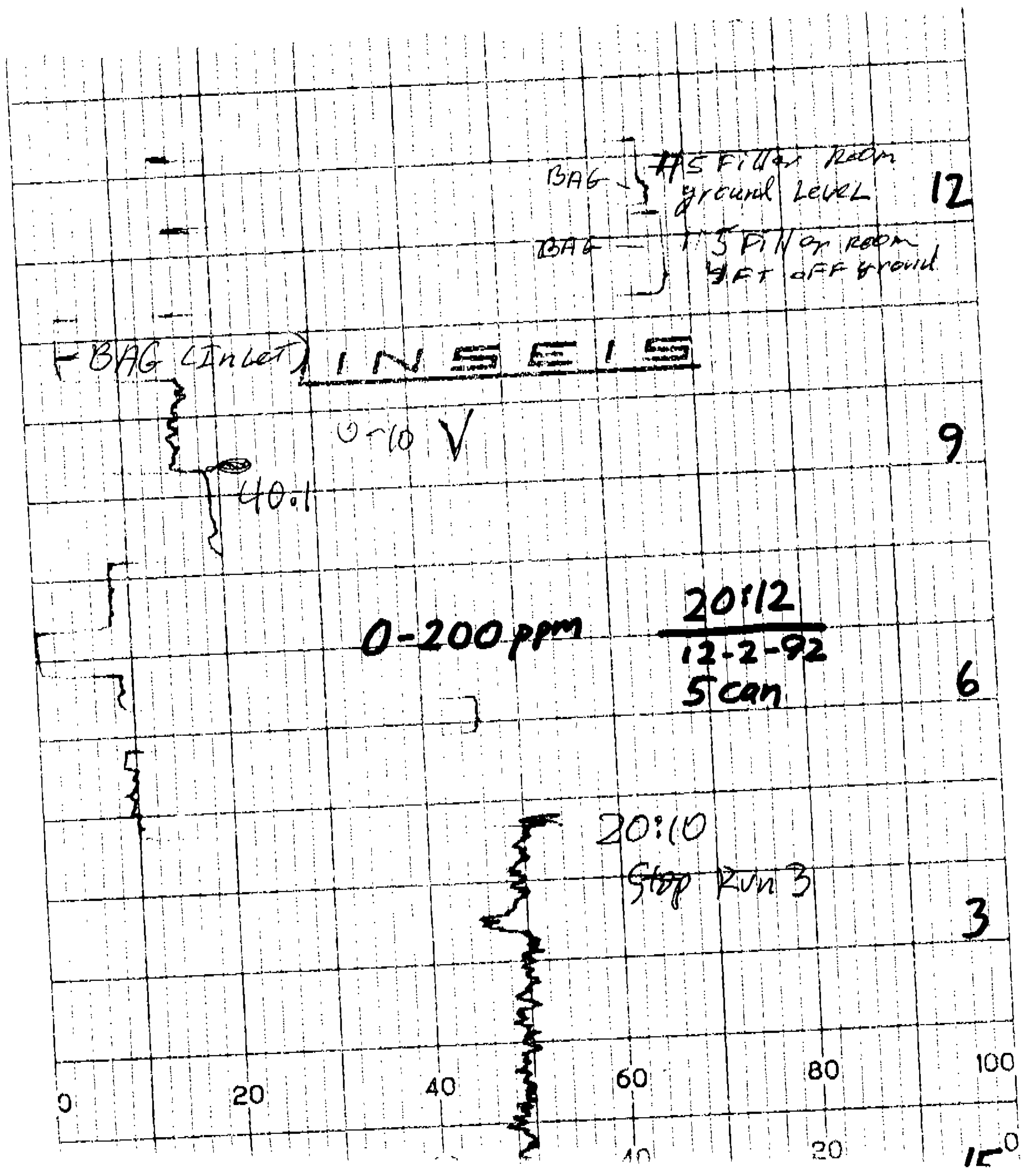


3
19:12
12-2-92
5 Can
0-200 ppm
0
20
40
60
80
100
100
80
60
40
20
0
15
19:10 Start Run 3
BAG
91
ZERO
12
CALIBRATION
19:06 Stop Run 2
LINSEIS
9
19:00
12-2-92
5 Can
0-200 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
L0/8015
18:48
0-200 ppm
12

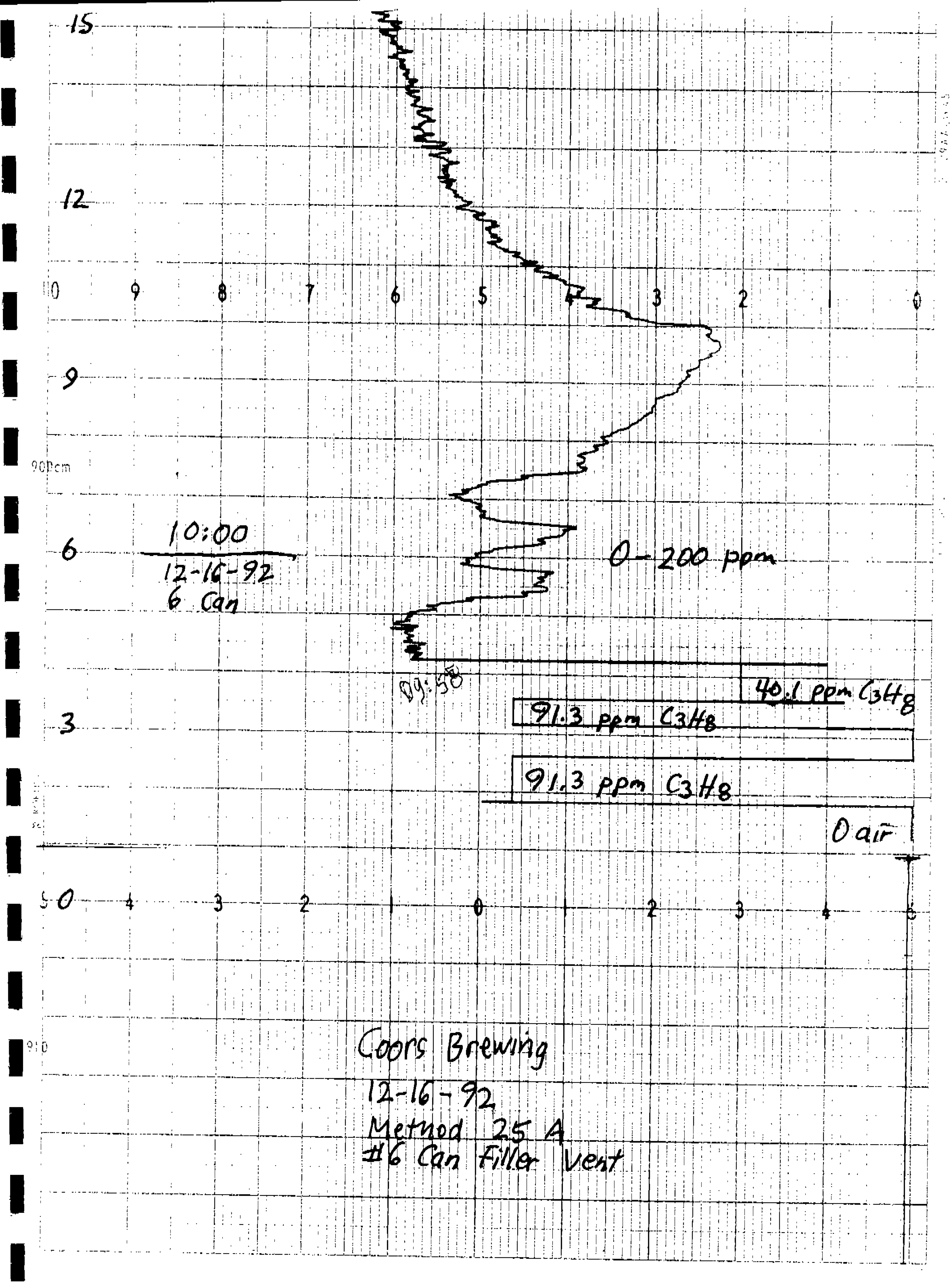


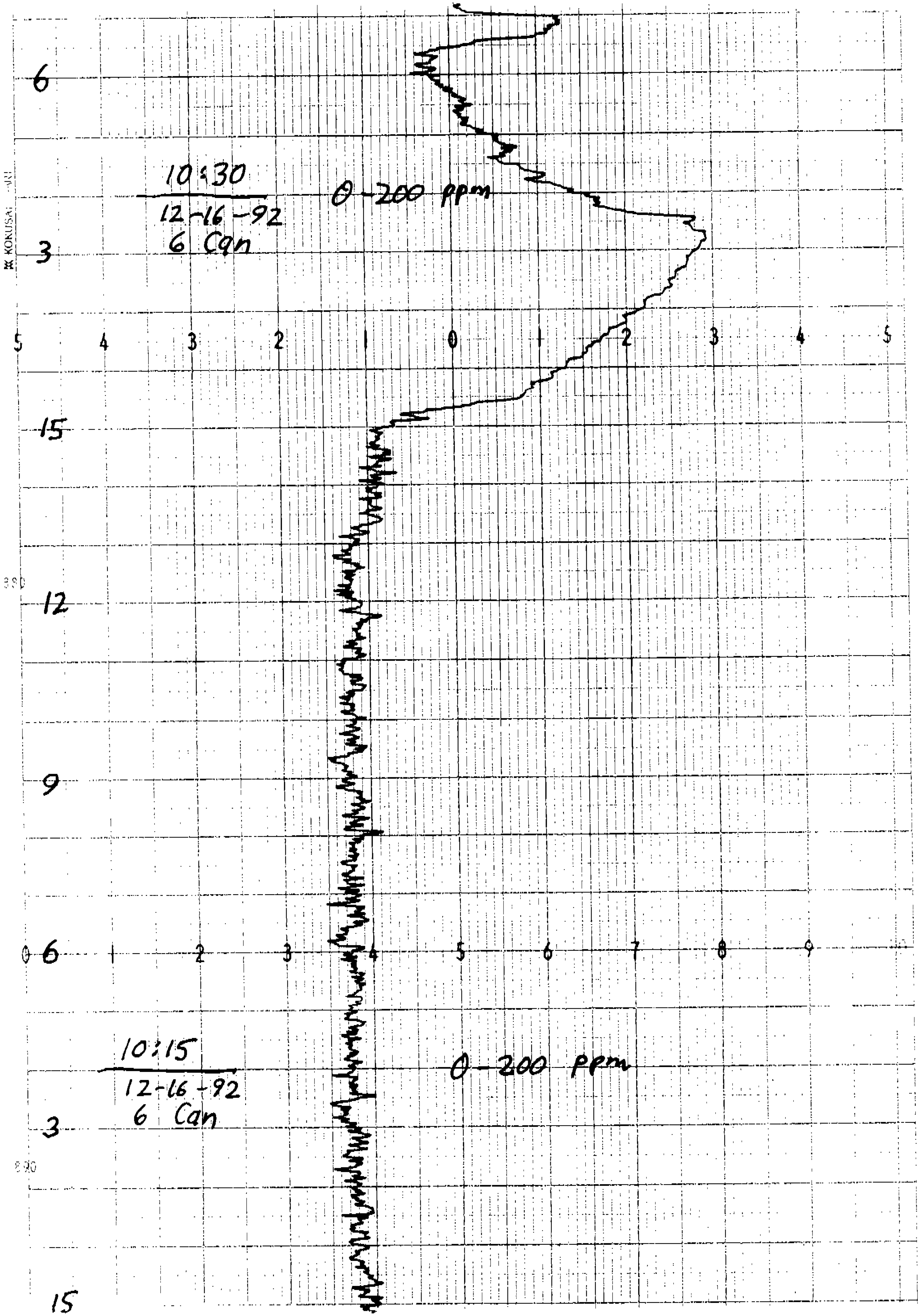
LINSEIS
9
19:36
12-2-92
5 can
0-200 ppm
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
19:24
12-2-92
5 can
0-200 ppm
12
9
6
PART NO. L0/8015
PRINTED IN U.S.A.


0 20 40 60 80 100
100 80 60 40 20 0
15
PART NO. LO/8015
20:00
12-2-92
5 can
0-200 ppm
12
9
PRINTED IN U.S.A.
6
3
19:48
12-2-92
5 can
0-200 ppm
0 20 40 60 80 100
100 80 60 40 20 0
15
12
LINSEIS

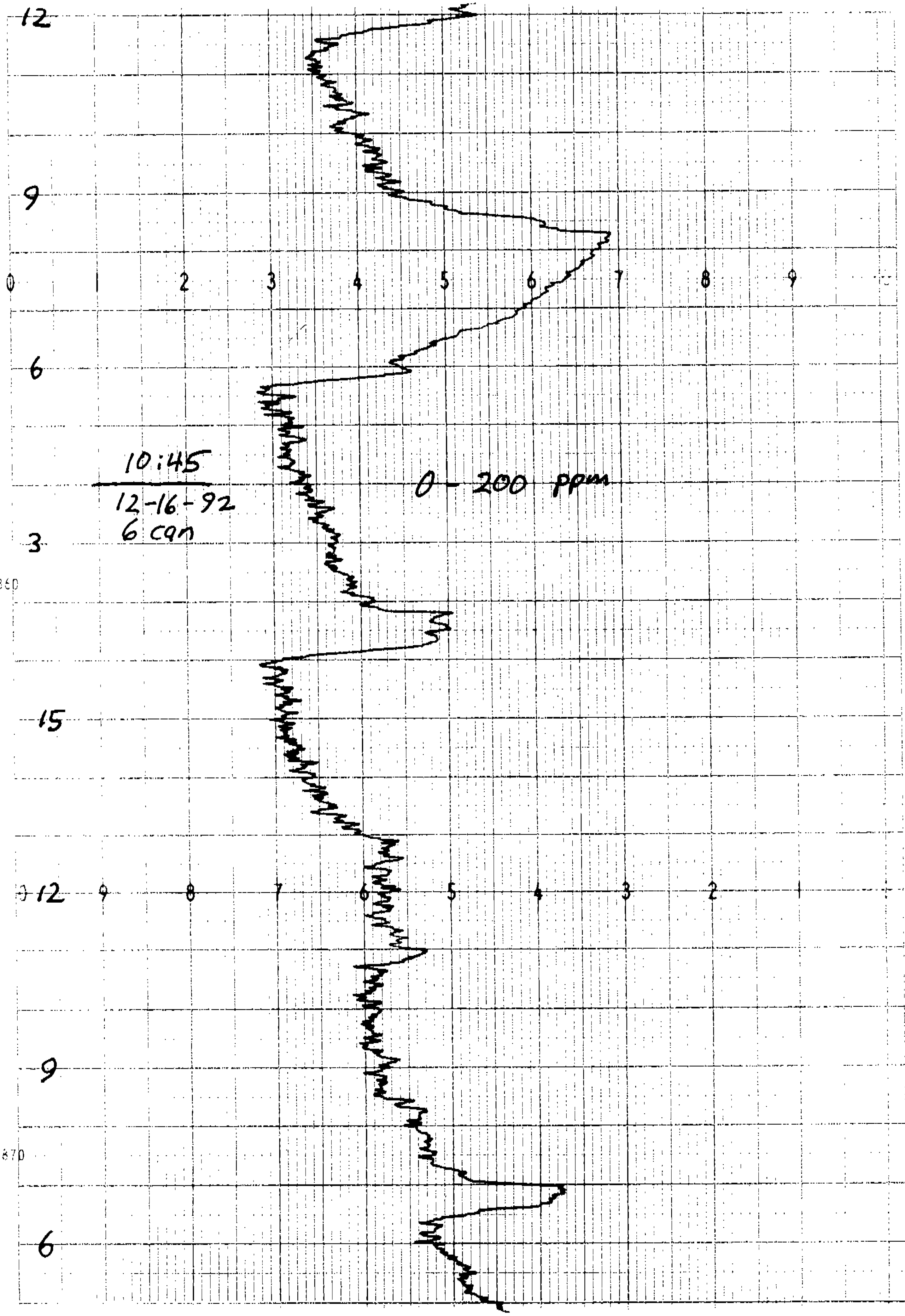

BAG #5 Filler Room ground Level
BAG 5 Filler room 4 FT off ground
BAG (Inlet)
LINSEIS
0-10 V
40.1
0-200 ppm
20:12
12-2-92
5 can
20:10
Stop Run 3
12
9
6
3
0
20
40
60
80
100

#6 Can Filler
Method 25A
Strip Chart Data

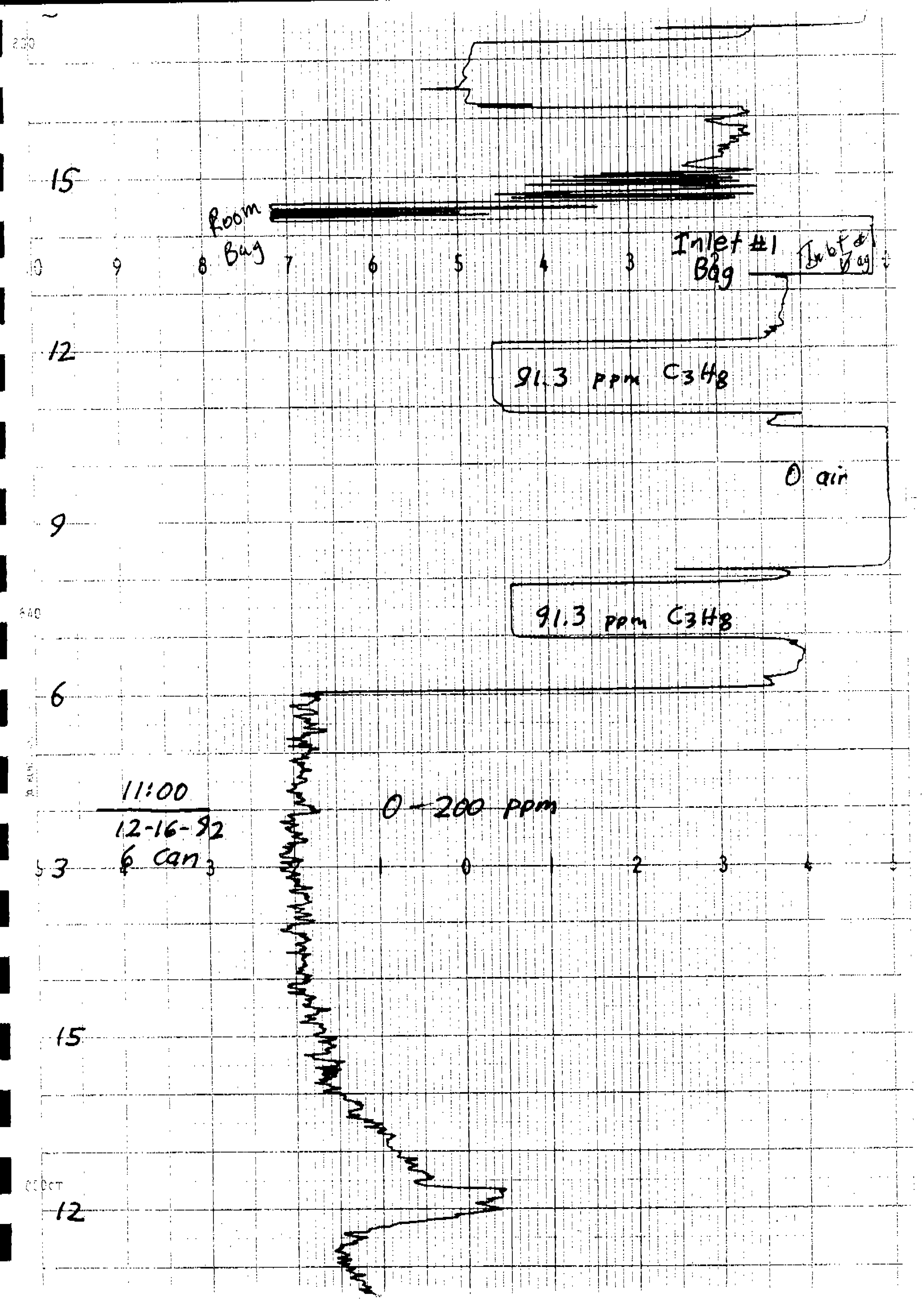

15
12
10
9
8
7
6
5
4
3
2
1
0
9
6
3
10:00
12-16-92
6 Can
0-200 ppm
09:58
40.1 ppm C_3H_8
91.3 ppm C_3H_8
91.3 ppm C_3H_8
0 air
Coors Brewing
12-16-92
Method 25 A
#6 Can Filler Vent

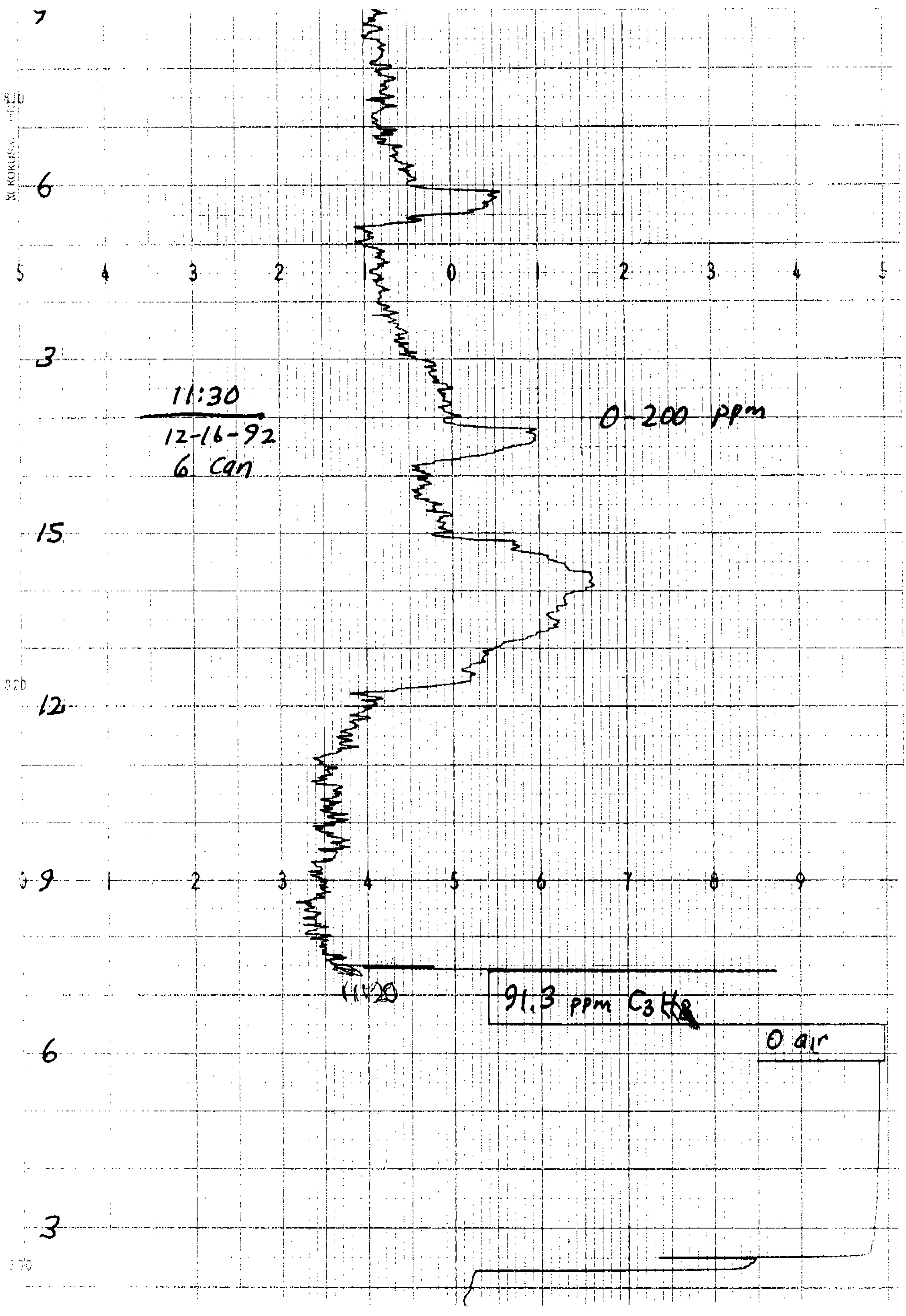


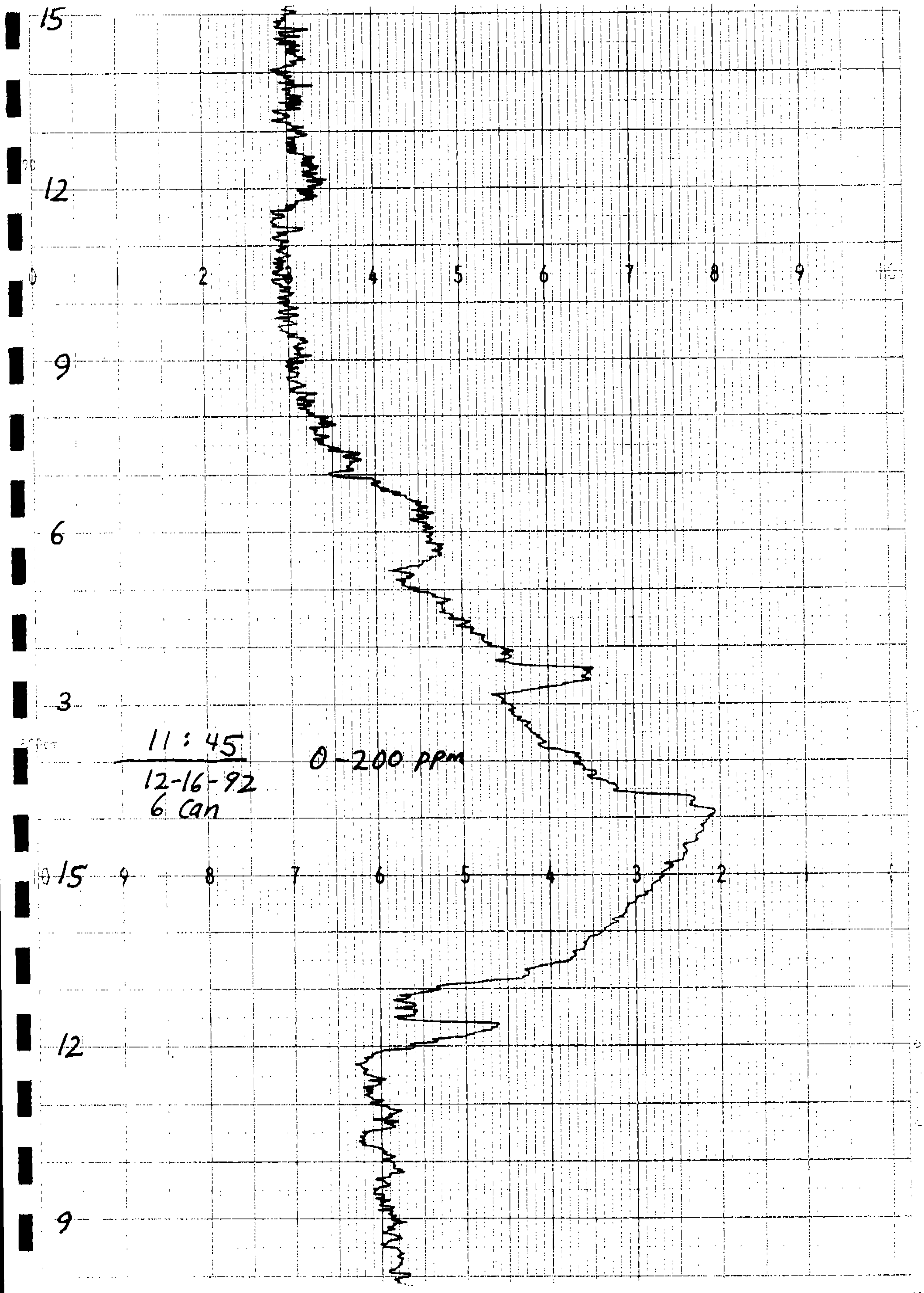
6
10:30
12-16-92
6 Can
0-200 ppm
3
KOKUSAI
5 4 3 2 1 0 1 2 3 4 5
15
12
9
6
1 2 3 4 5 6 7 8 9
10:15
12-16-92
6 Can
0-200 ppm
3
15

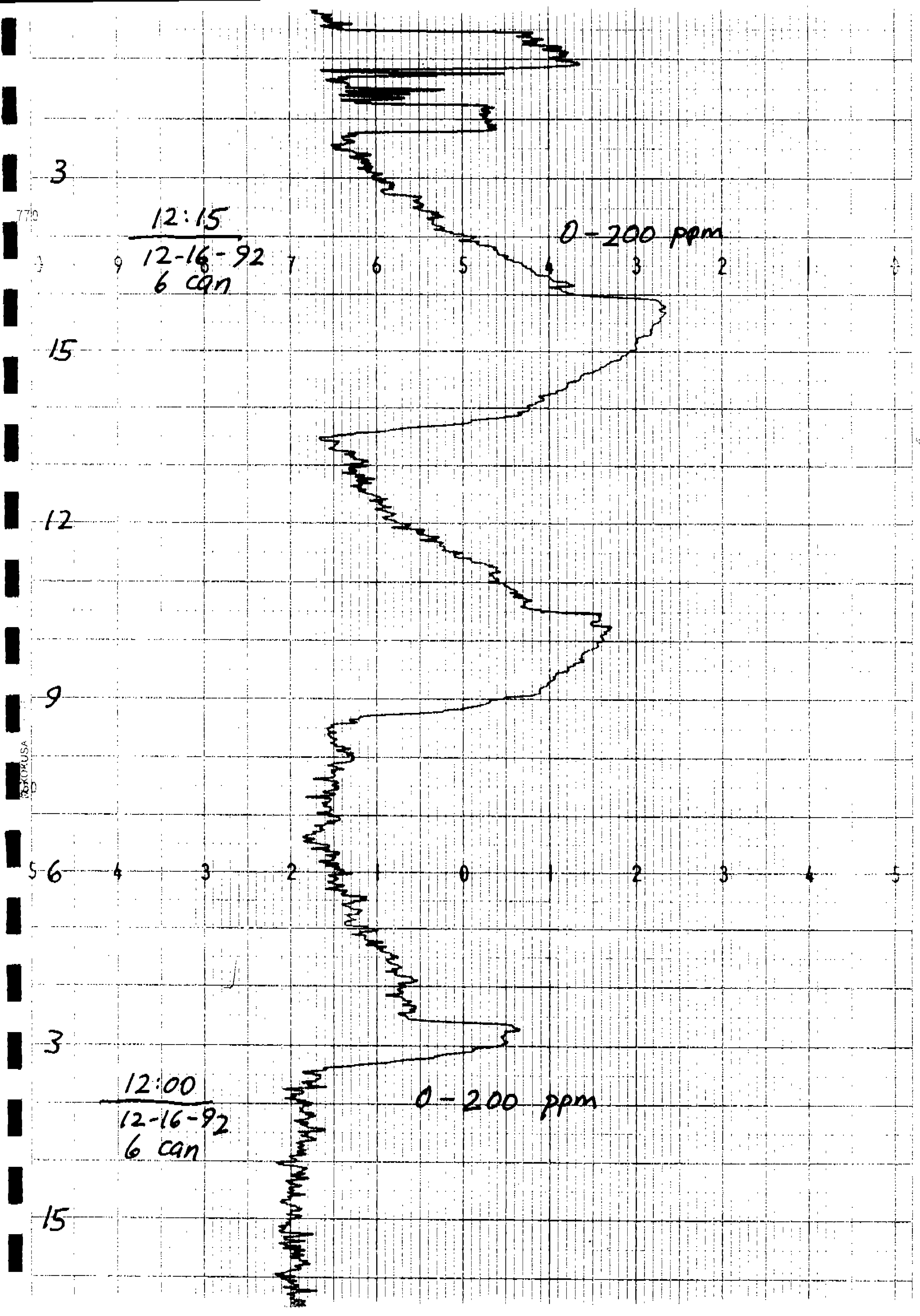


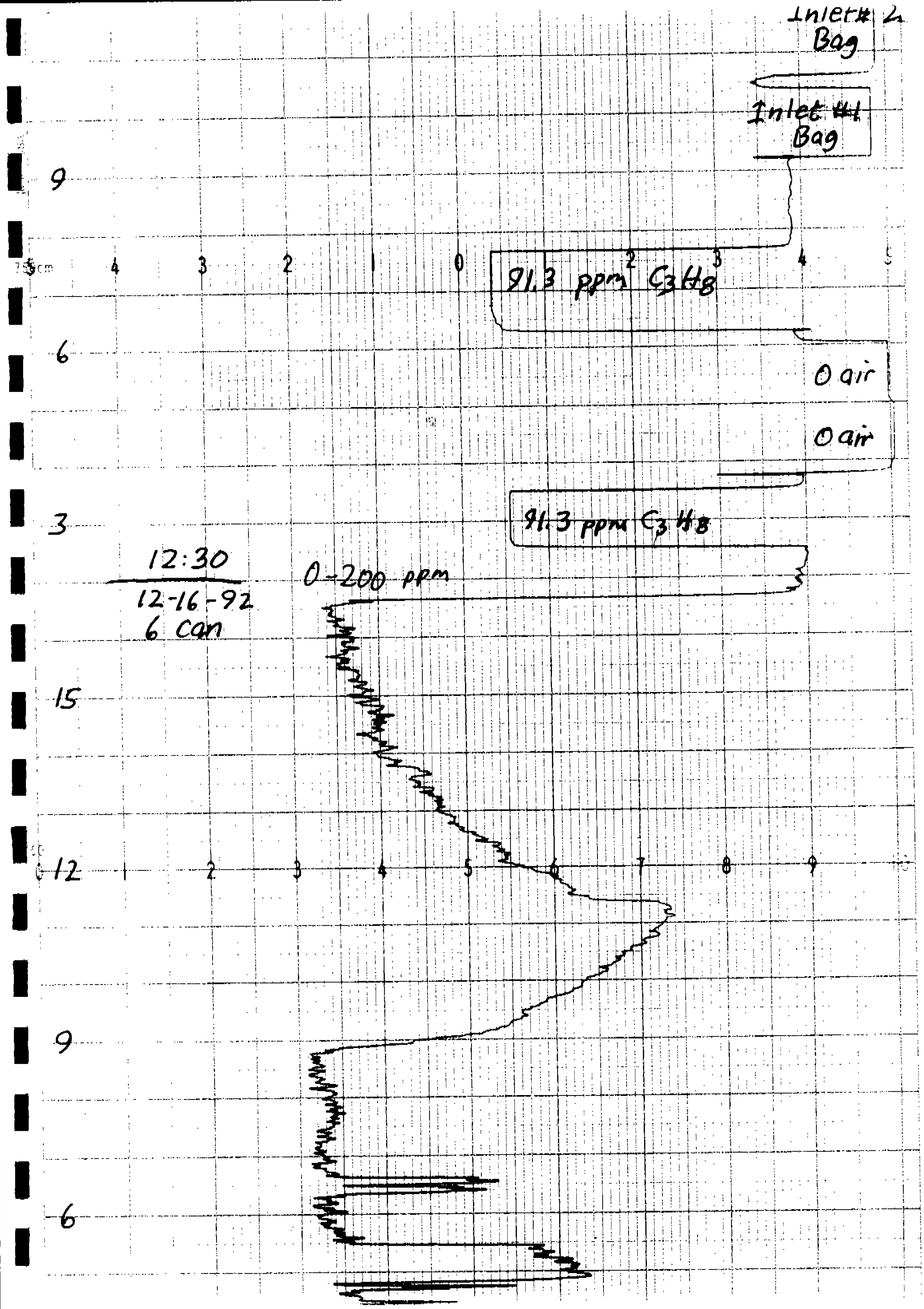
12
9
0 1 2 3 4 5 6 7 8 9
6
10:45
12-16-92
6 can
0 - 200 ppm
3
860
15
12 9 8 7 6 5 4 3 2
9
870
6

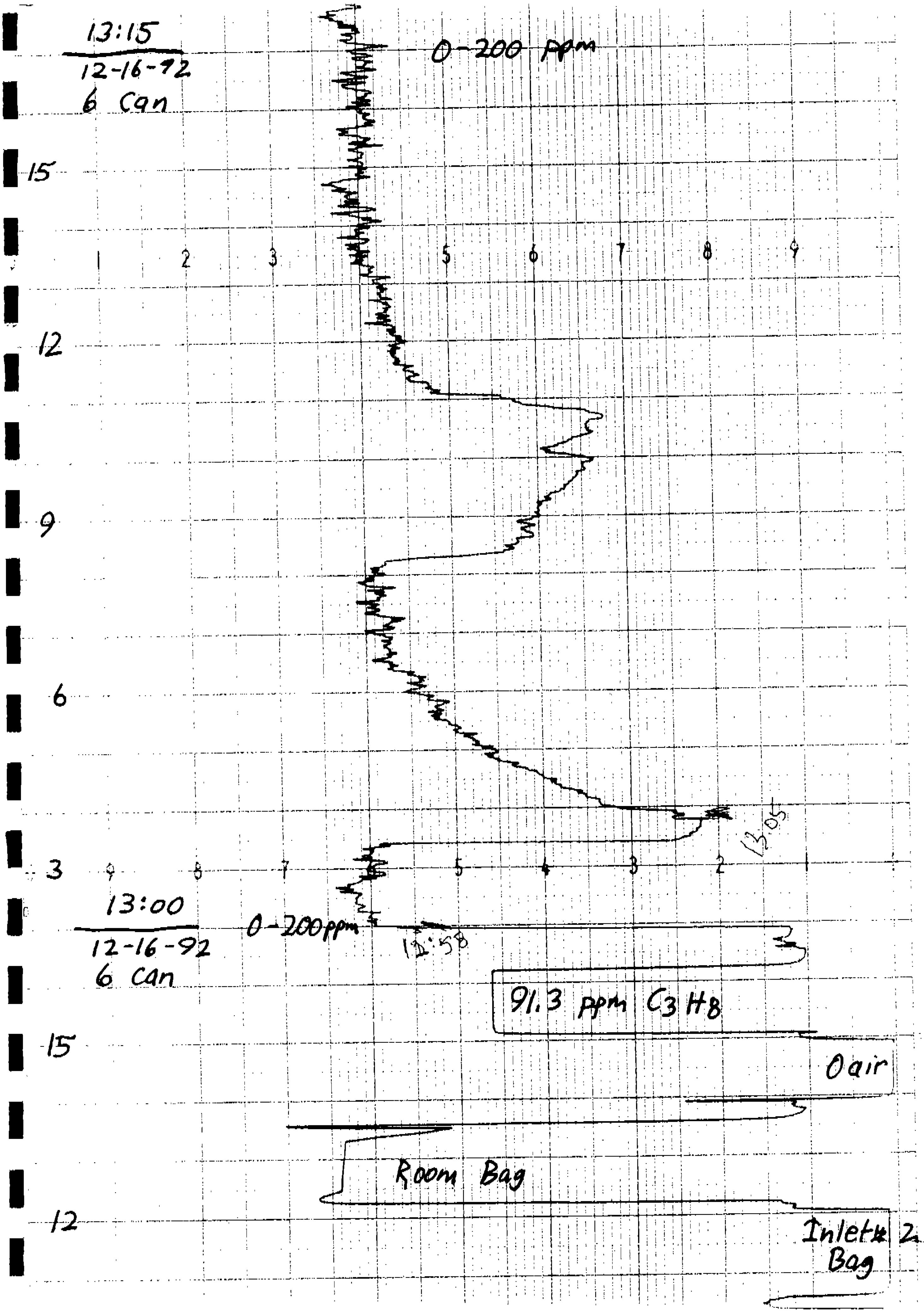

15
Room Bag
Inlet #1 Bag
12
91.3 ppm C_3H_8
0 air
9
91.3 ppm C_3H_8
6
11:00
12-16-92
6 Can
0-200 ppm
3
15
12

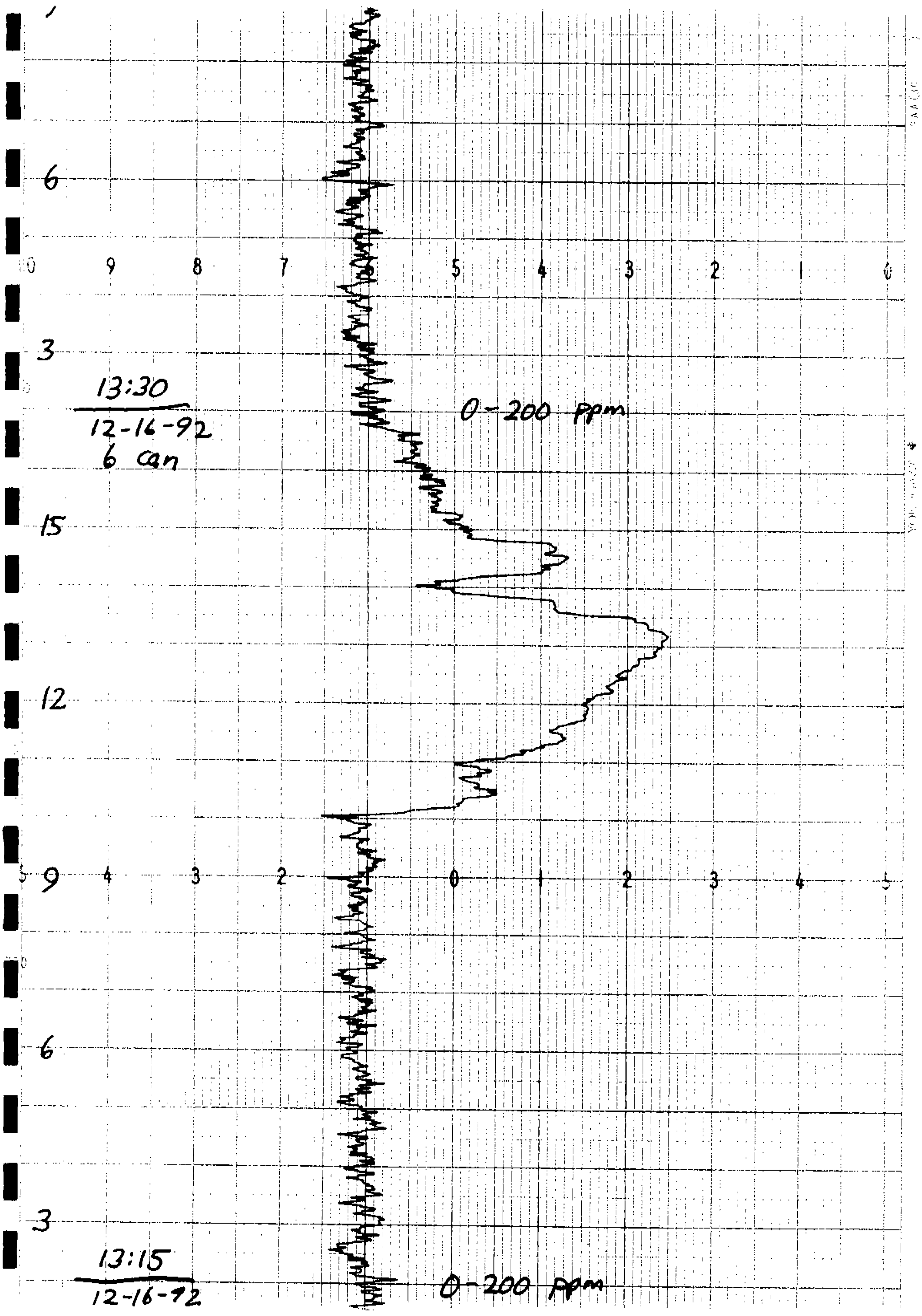

11:30
12-16-92
6 Can
0-200 ppm
11:20
91.3 ppm C_3H_8
0 air

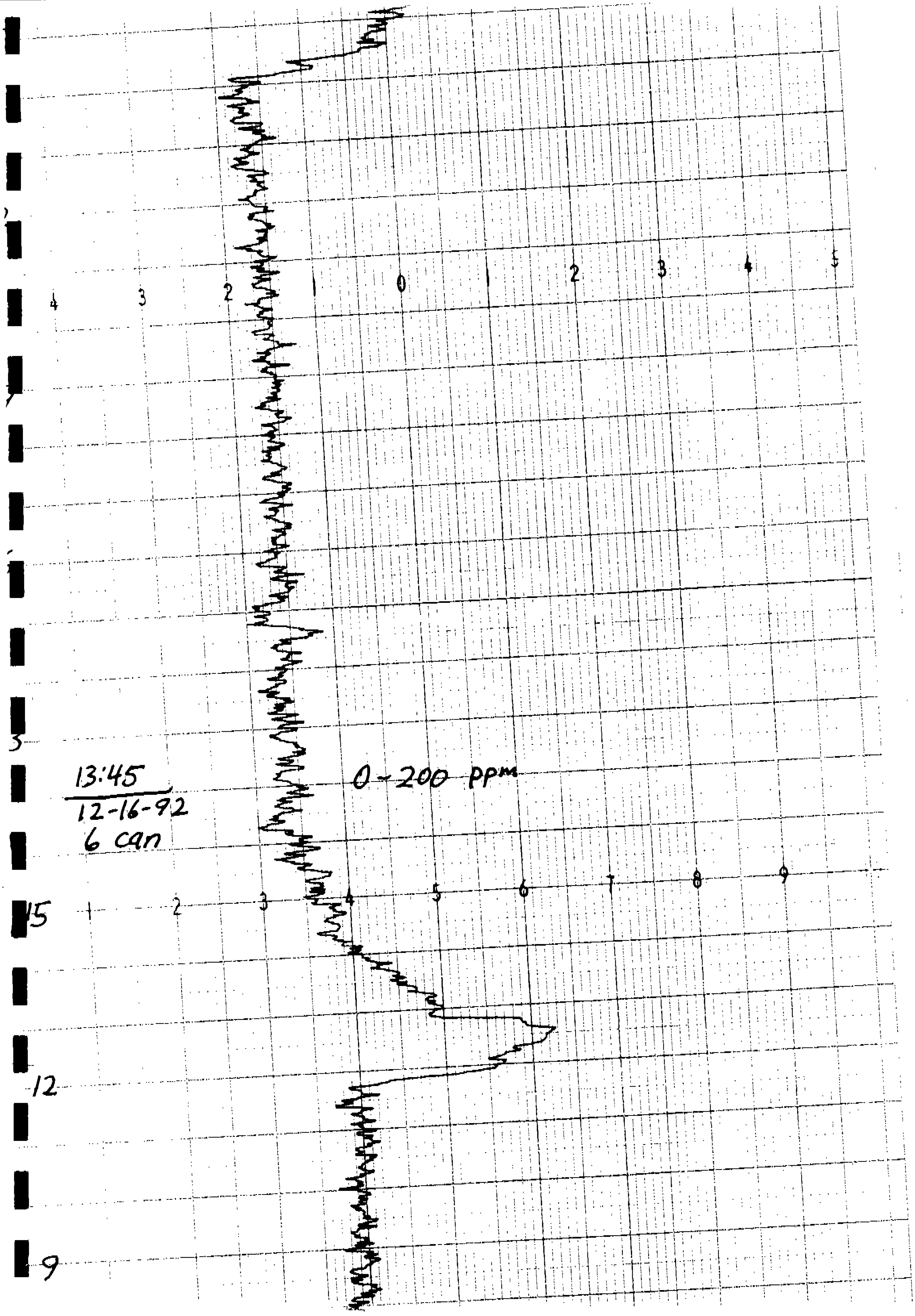

15
12
9
6
3
11 : 45
12-16-92
6 Can
0-200 ppm
15
12
9
0
2
3
4
5
6
7
8
9
10
9
8
7
6
5
4
3
2
1

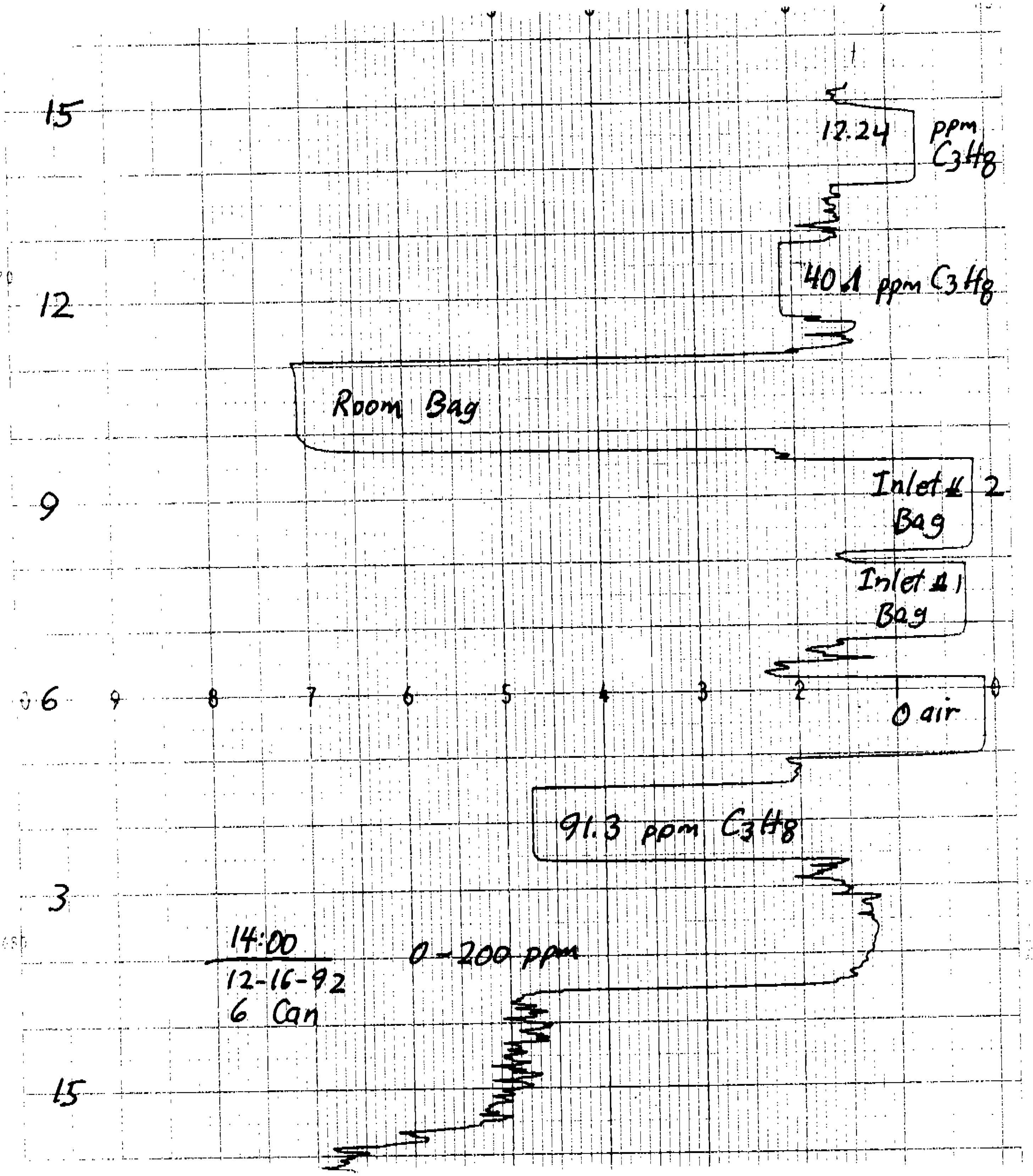

3
12:15
12-16-92
6 can
0-200 ppm
15
12
9
6
3
12:00
12-16-92
6 can
0-200 ppm
15


Inlet # 2
Bag
Inlet #1
Bag
9
91.3 ppm C_3H_8
6
0 air
0 air
91.3 ppm C_3H_8
3
12:30
12-16-92
6 can
0-200 ppm
15
12
9
6

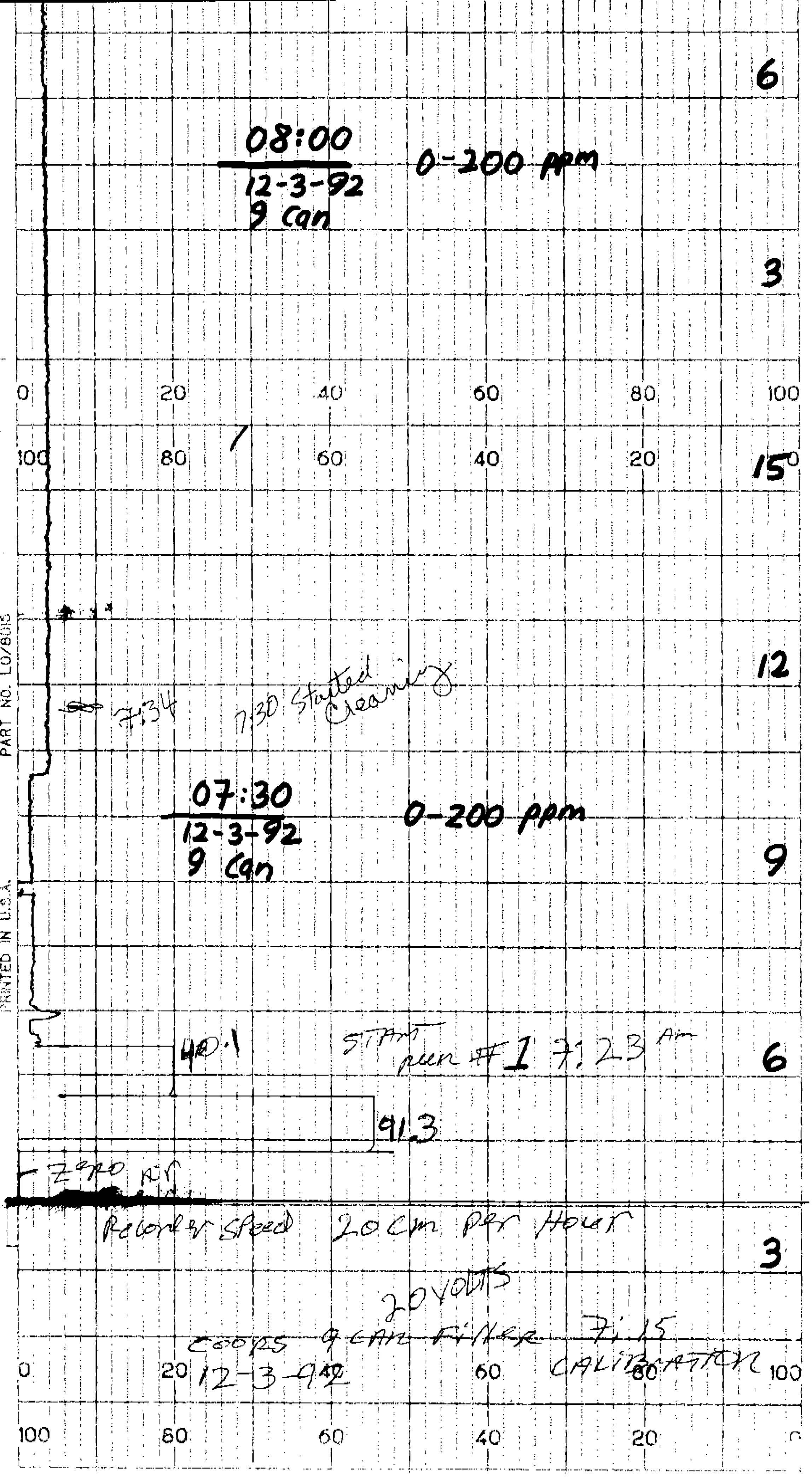

13:15
12-16-92
6 Can
0-200 ppm
15
1
2
3
5
6
7
8
9
12
9
6
13:05
3
9
8
7
5
4
3
2
13:00
12-16-92
6 Can
0-200ppm
12:58
91.3 ppm C_3H_8
15
0 air
Room Bag
12
Inlet # 2
Bag


6
3
13:30
12-16-92
6 can
0-200 ppm
15
12
9
6
3
13:15
12-16-92
0-200 ppm


13:45
12-16-92
6 can
0-200 PPM
4 3 2 1 0 1 2 3 4 5
15 1 2 3 4 5 6 7 8 9
12
9


15
12.24 ppm C_3H_8
12
40.1 ppm C_3H_8
Room Bag
9
Inlet # 2 Bag
Inlet # 1 Bag
6
9
8
7
6
5
4
3
2
0 air
91.3 ppm C_3H_8
3
14:00
12-16-92
6 Can
0 - 200 ppm
15

#9 Can Filler
Method 25A
Strip Chart Data



6
08:00
12-3-92
9 Can
0-200 ppm
3
0
20
40
60
80
100
100
80
60
40
20
15
0
12
7:34
7:30 Started Cleaning
07:30
12-3-92
9 Can
0-200 ppm
9
PART NO. LO/8015
PRINTED IN U.S.A.
40.1
START run #1 7:23 Am
6
91.3
Zero Air
Recorder Speed 20 Cm per Hour
3
20 VOLTS
Coors 9 can Filter 7:15
12-3-92
CALIBRATION
0
20
60
80
100
100
80
60
40
20
0

PART NO. LD/8015

PRINTED IN U.S.A.

12

09:00
12-3-92
9 Can

0-200 ppm

9

6

3

0 20 40 60 80 100

100 80 60 40 20 0

08:30
12-3-92
9 Can

0-200 ppm

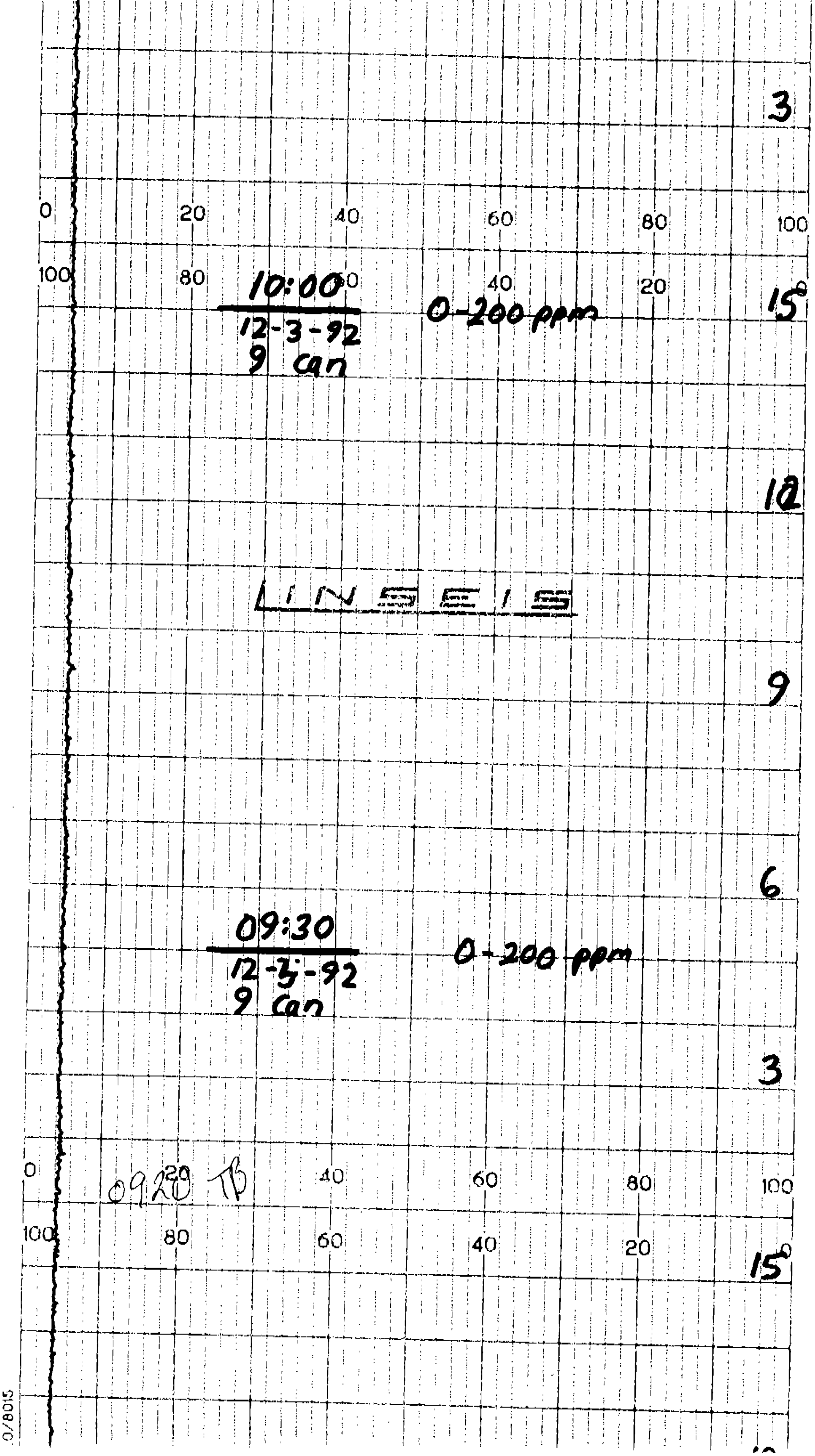
15

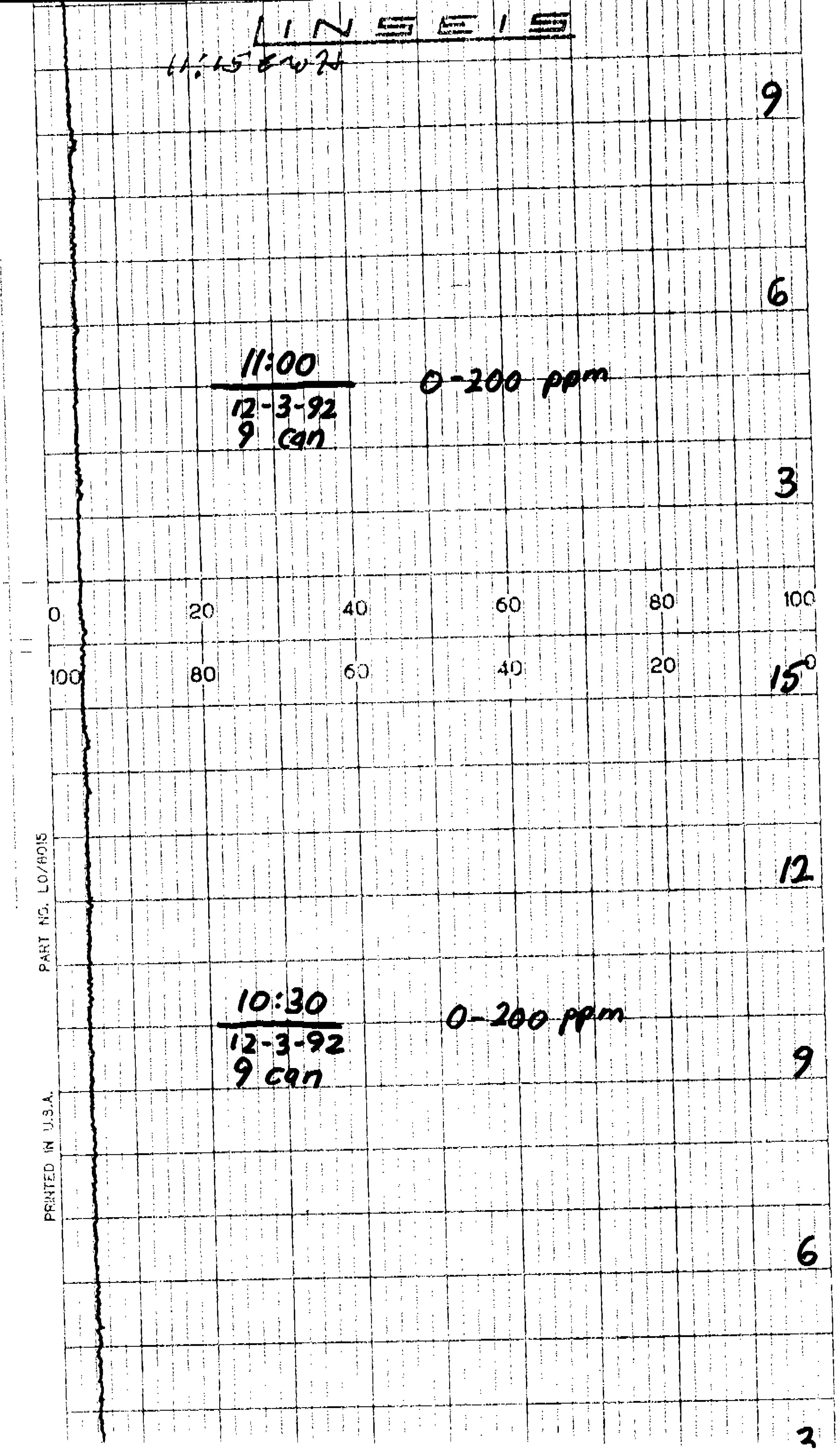
12

LINSEIS

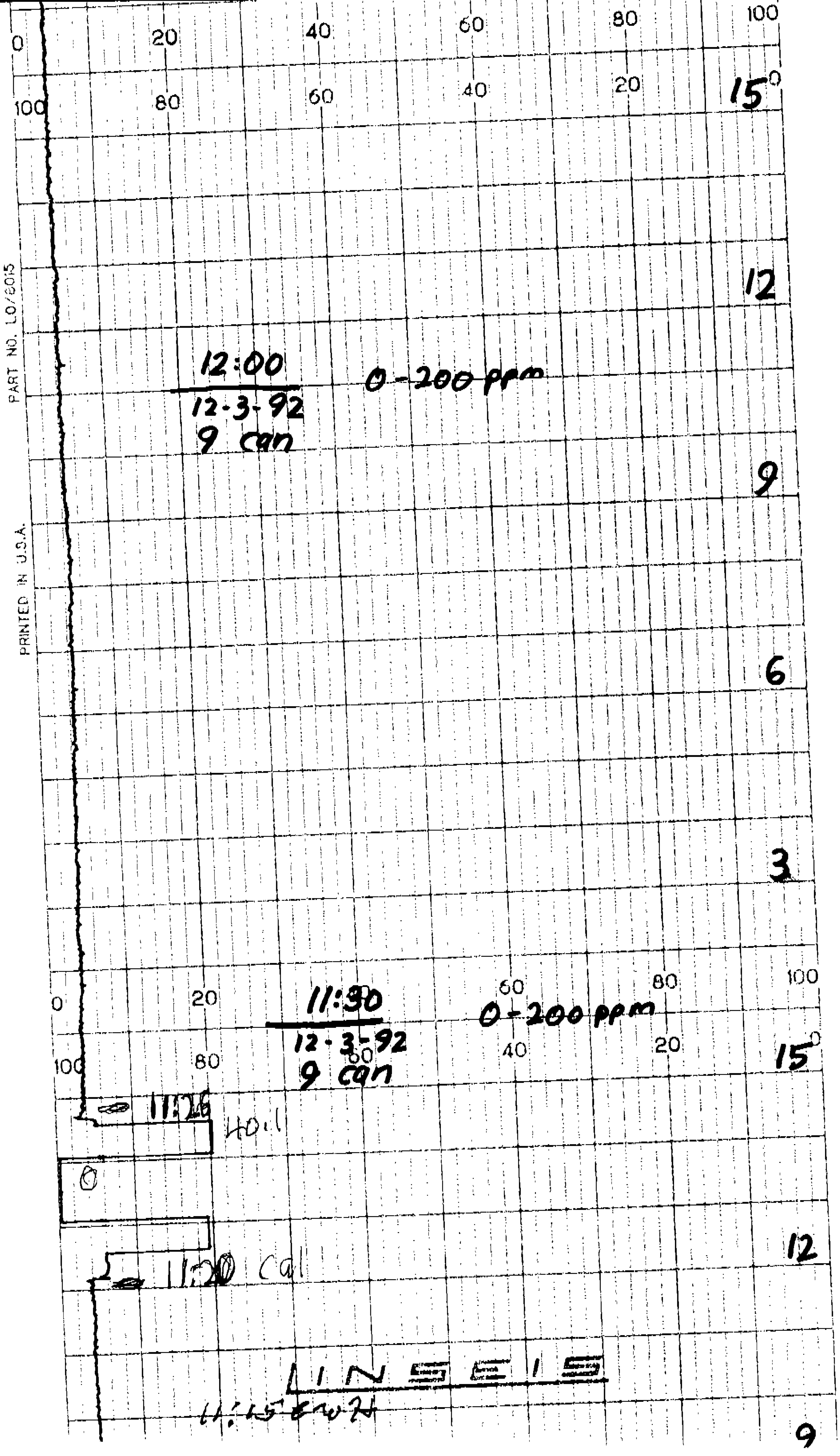
9

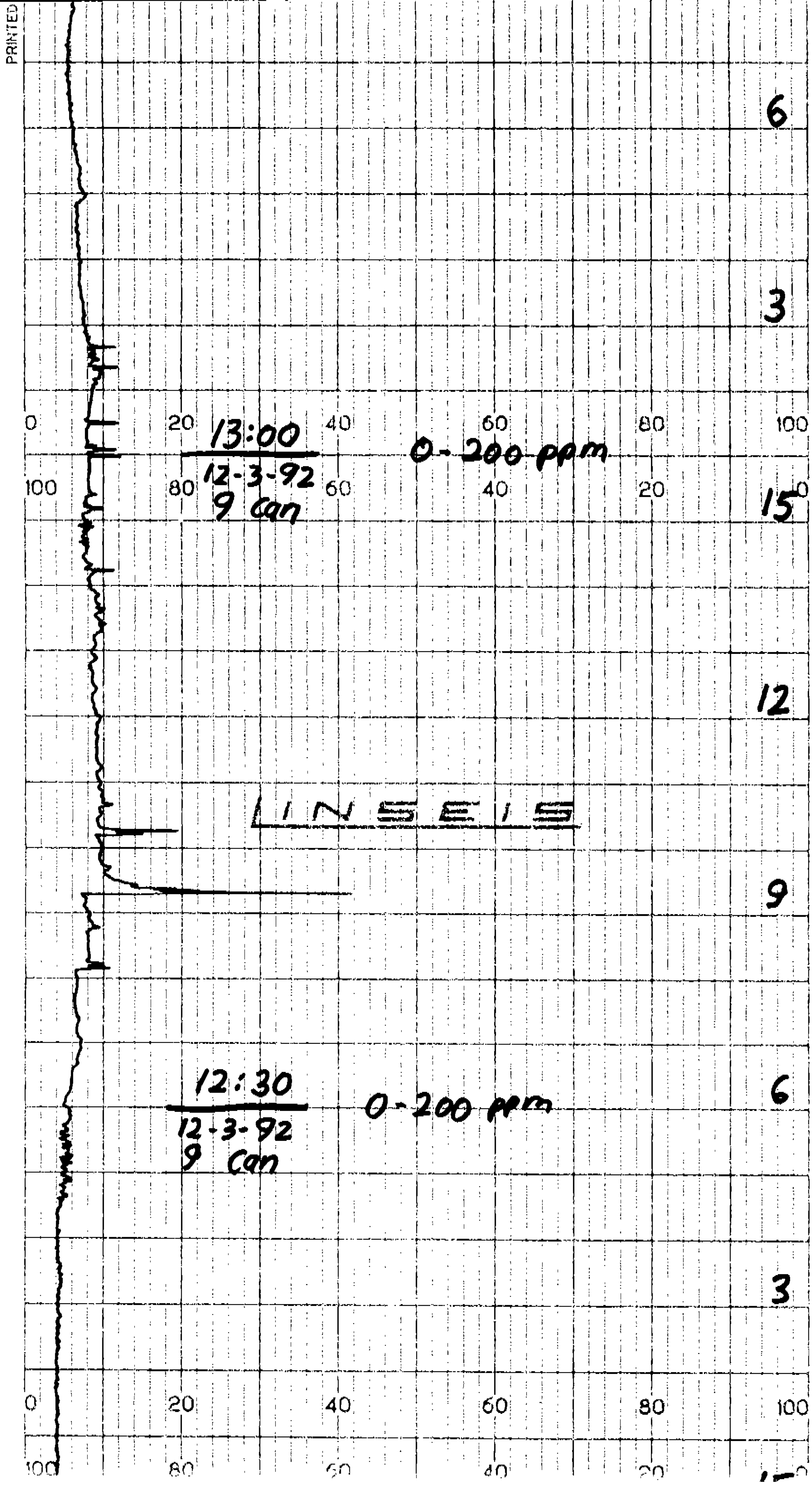
6

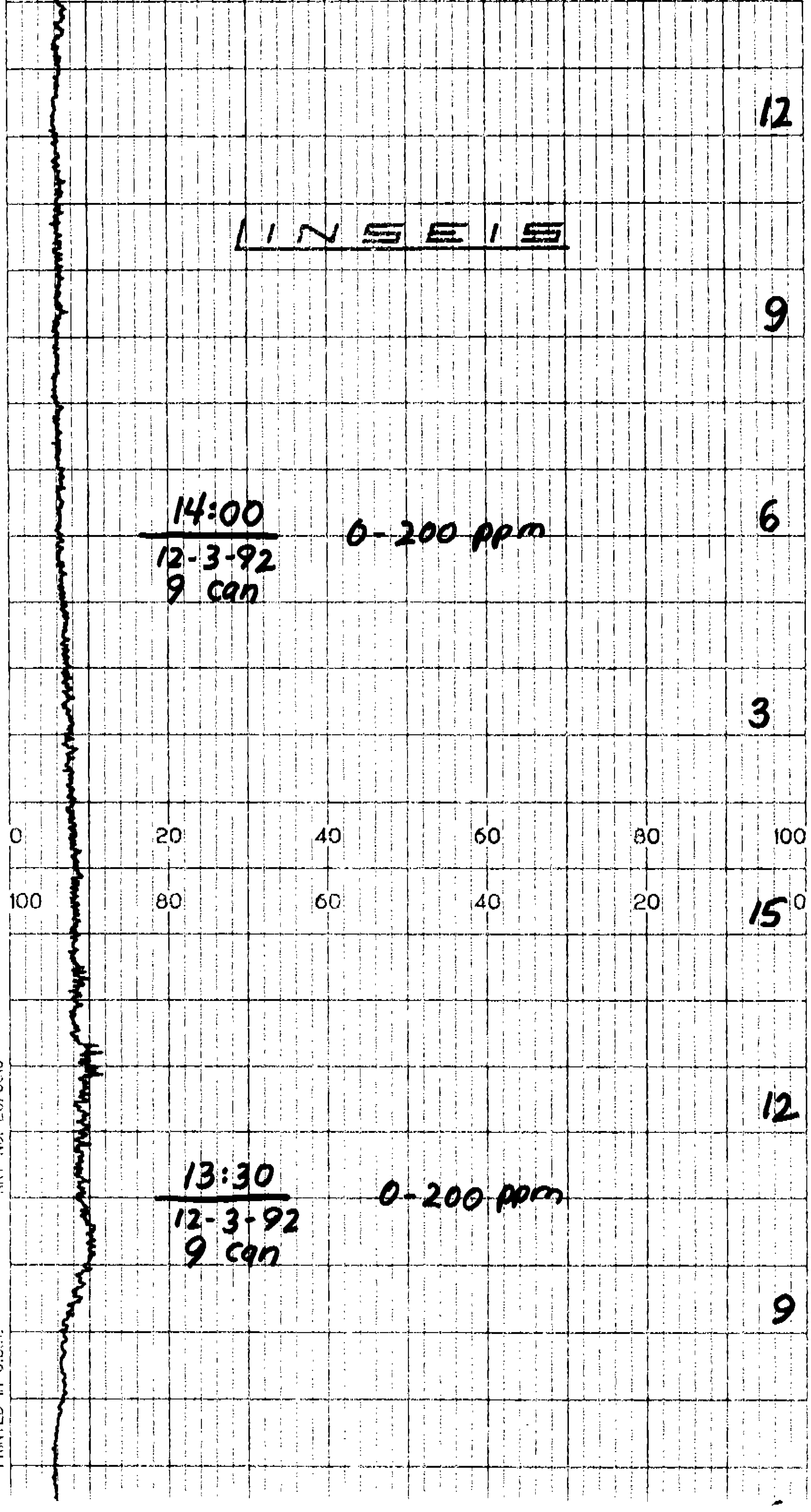

3
0 20 40 60 80 100
100 80 60 40 20 0
10:00
12-3-92
9 can
0-200 ppm
15
12
LINSEIS
9
6
09:30
12-3-92
9 can
0-200 ppm
3
0920 TB
0 20 40 60 80 100
100 80 60 40 20 0
15
0/8015



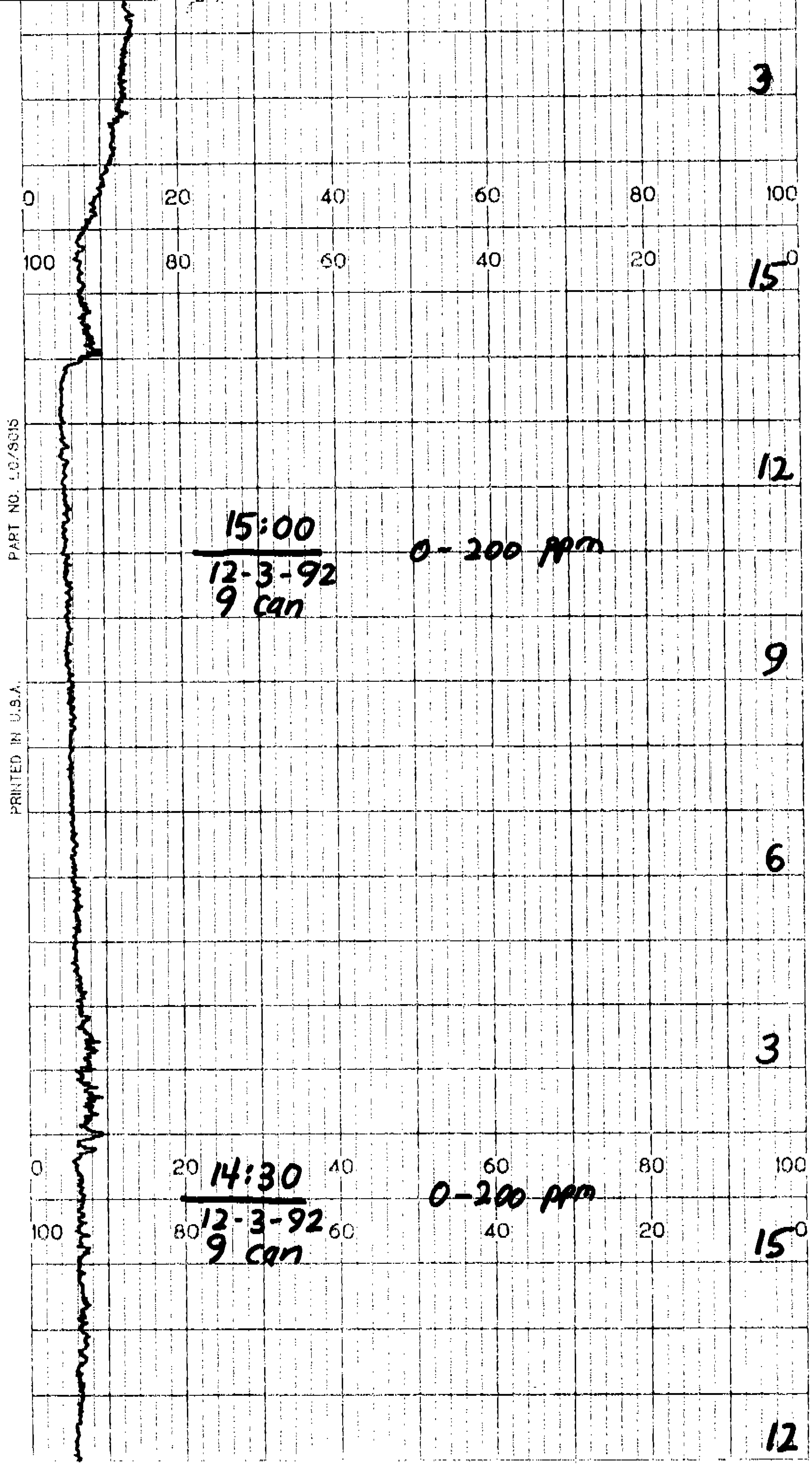
LINSEIS
11:15 END
9
6
11:00
12-3-92
9 can
0-200 ppm
3
0
20
40
60
80
100
100
80
60
40
20
0
15
12
PART NO. LO/8015
10:30
12-3-92
9 can
0-200 ppm
9
PRINTED IN U.S.A.
6
3


PART NO. LO/6015
PRINTED IN U.S.A.
0 20 40 60 80 100
100 80 60 40 20 0
15
12
12:00
12-3-92
9 can
0-200 ppm
9
6
3
11:30
12-3-92
9 can
0-200 ppm
15
11:26 Hold
0
12
11:20 Cal
LINDE
9

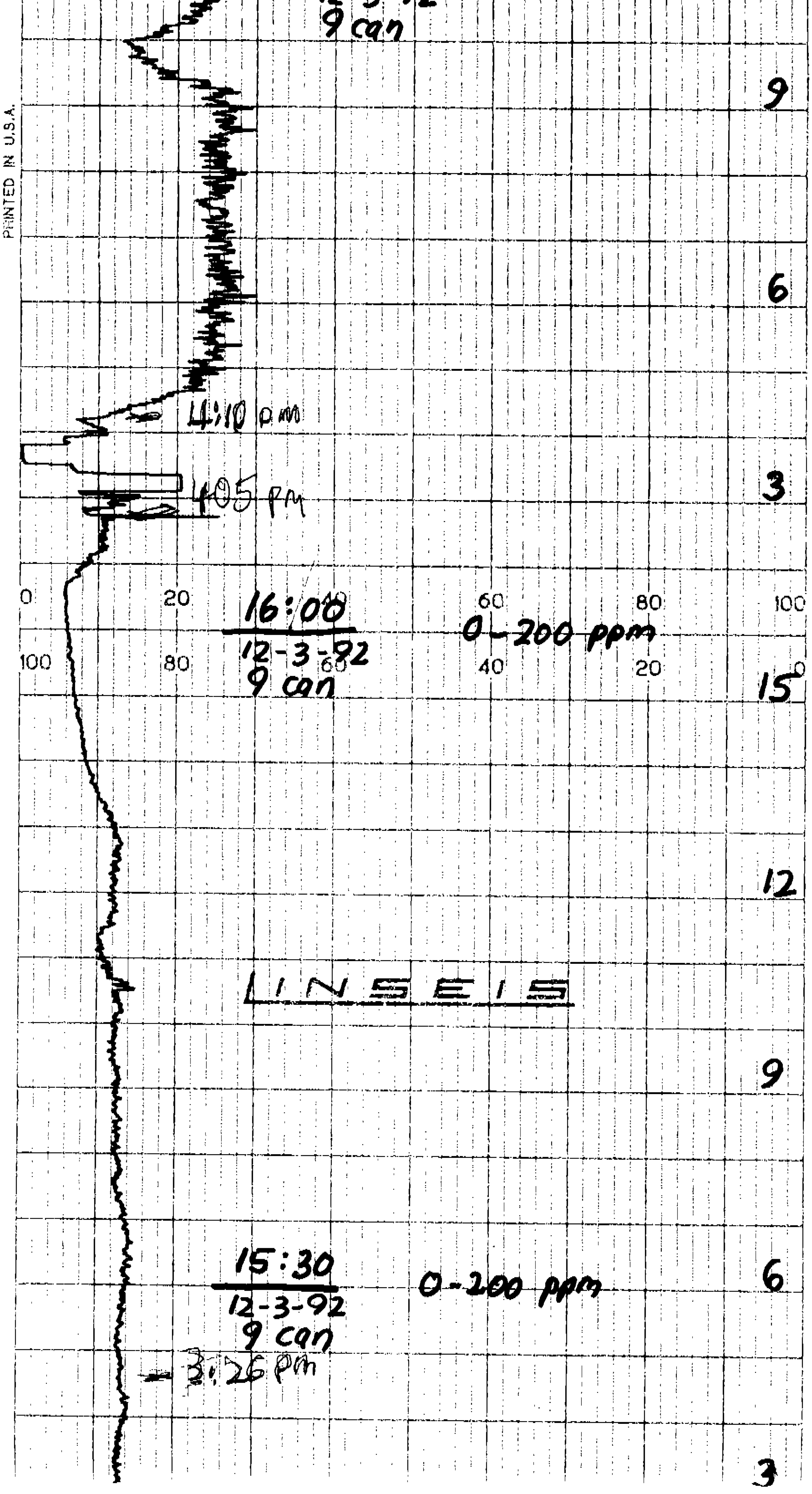

PRINTED
6
3
0 20 40 60 80 100
100 80 60 40 20 0
13:00
12-3-92
9 Can
0-200 ppm
15
12
LINSEIS
9
12:30
12-3-92
9 Can
0-200 ppm
6
3
0 20 40 60 80 100
100 80 60 40 20

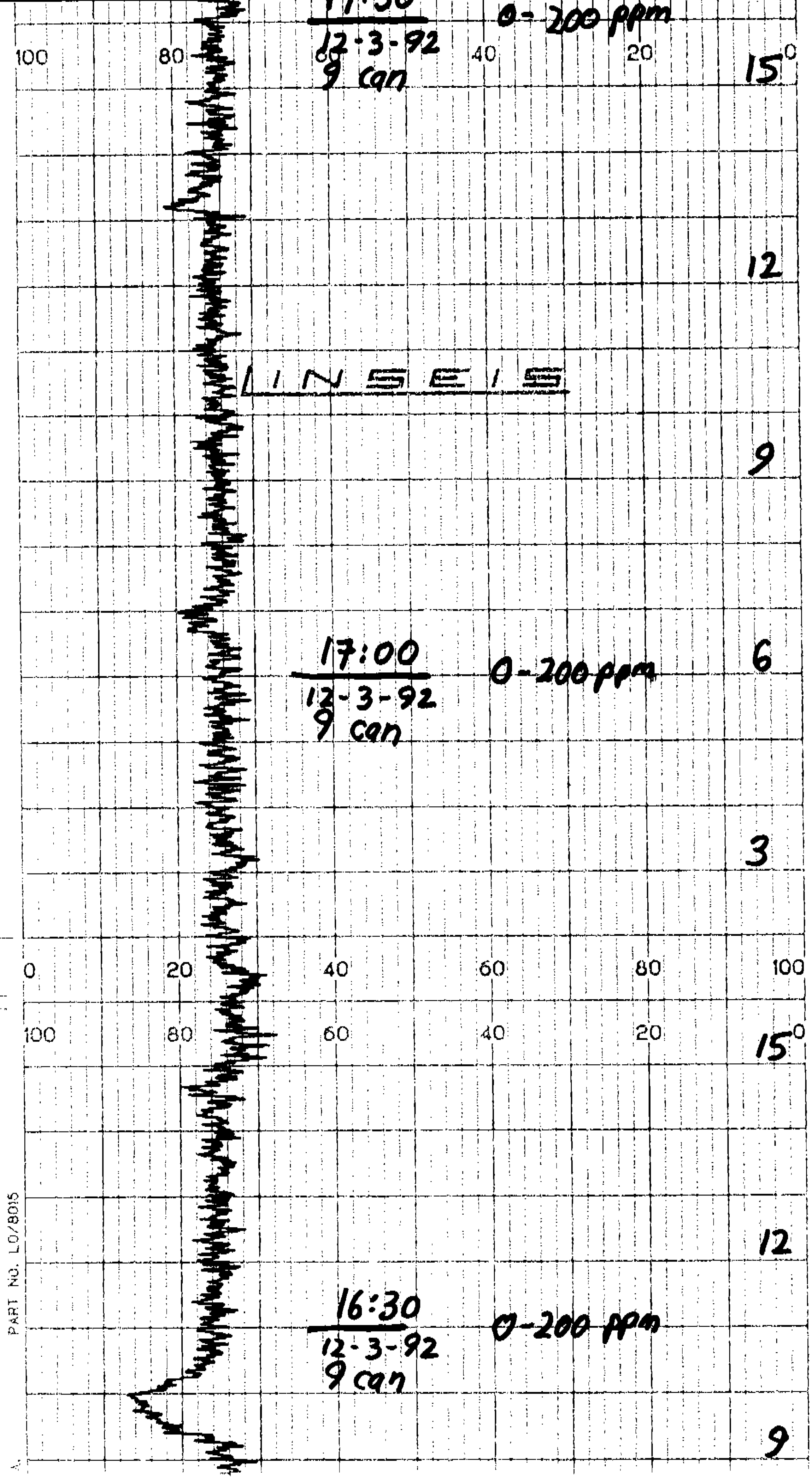


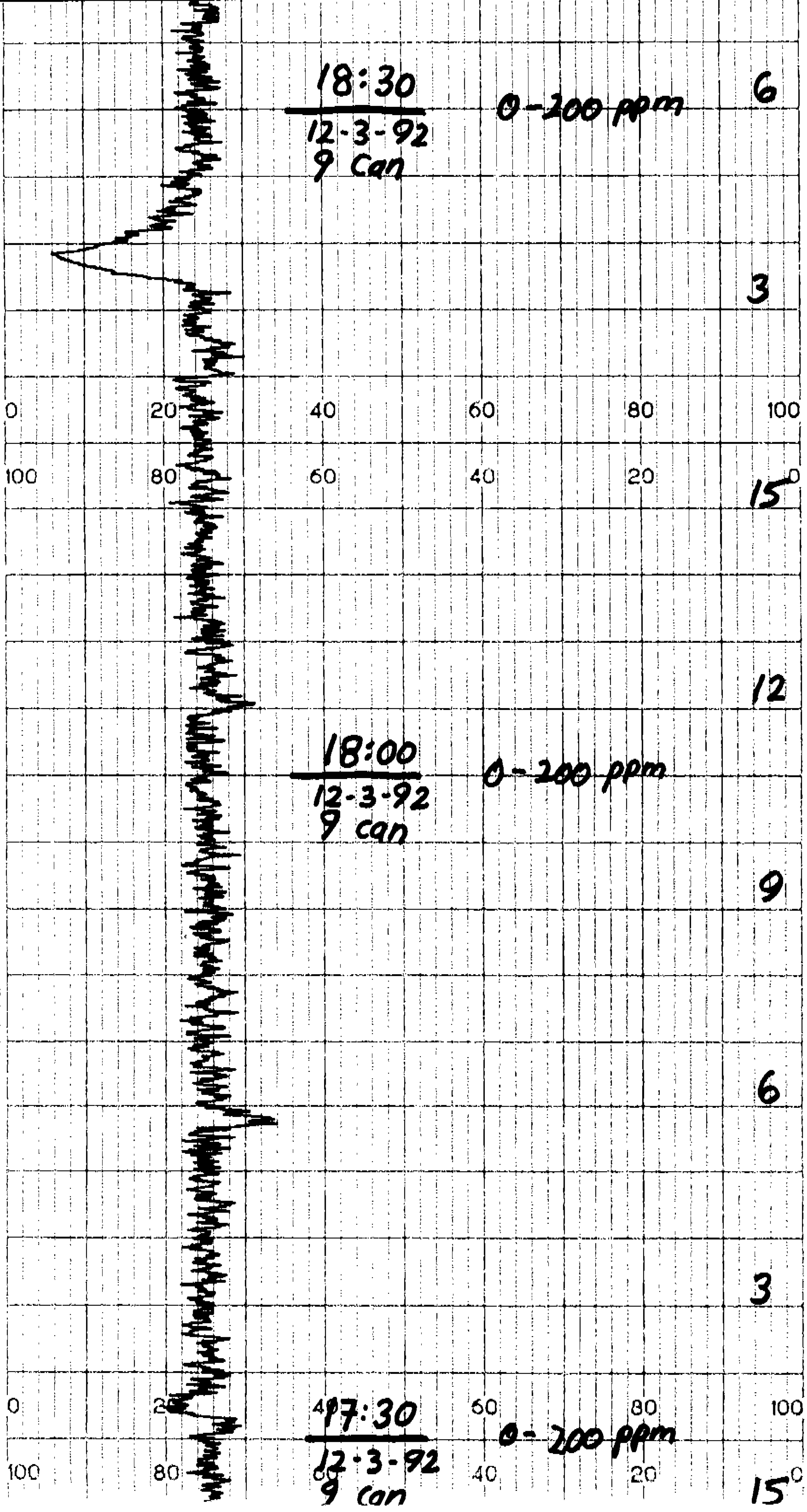
PRINTED IN U.S.A. PART NO. LO/9015



3
0 20 40 60 80 100
100 80 60 40 20 0
15
PRINTED IN U.S.A.
12
15:00
12-3-92
9 can
0-200 ppm
9
6
3
0 20 40 60 80 100
14:30
12-3-92
9 can
0-200 ppm
100 80 60 40 20 0
15
12

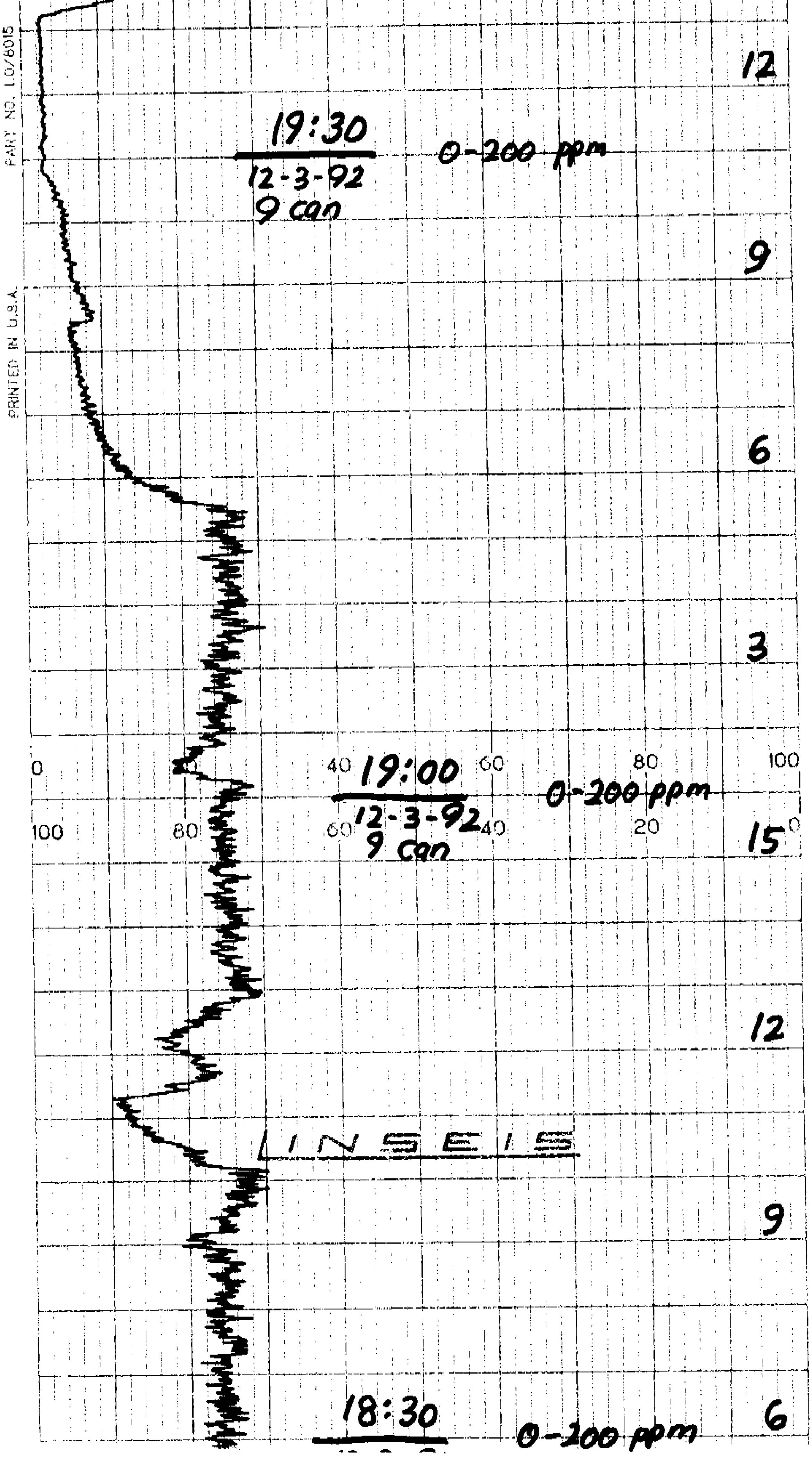

9 can
9
PRINTED IN U.S.A.
6
4:10 pm
3
405 pm
0
20
40
60
80
100
16:00
12-3-92
9 can
0-200 ppm
100
80
60
40
20
0
15
12
LINSEIS
9
15:30
12-3-92
9 can
0-200 ppm
6
3:26 pm
3

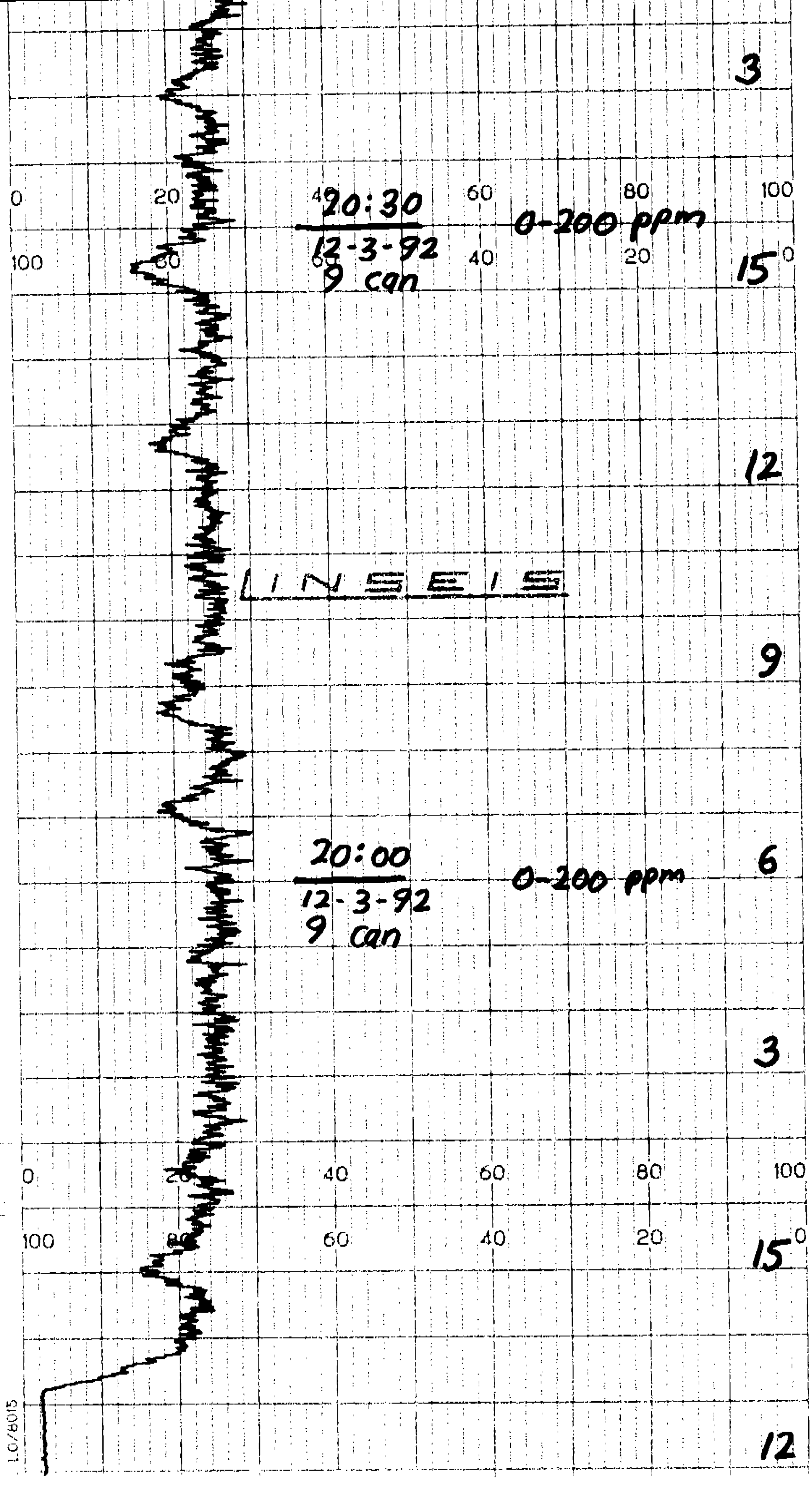

0-200 ppm
12-3-92
9 can
100
80
60
40
20
0
15
12
LINSEIS
9
17:00
12-3-92
9 can
0-200 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
12
16:30
12-3-92
9 can
0-200 ppm
9
PART NO. L0/8015

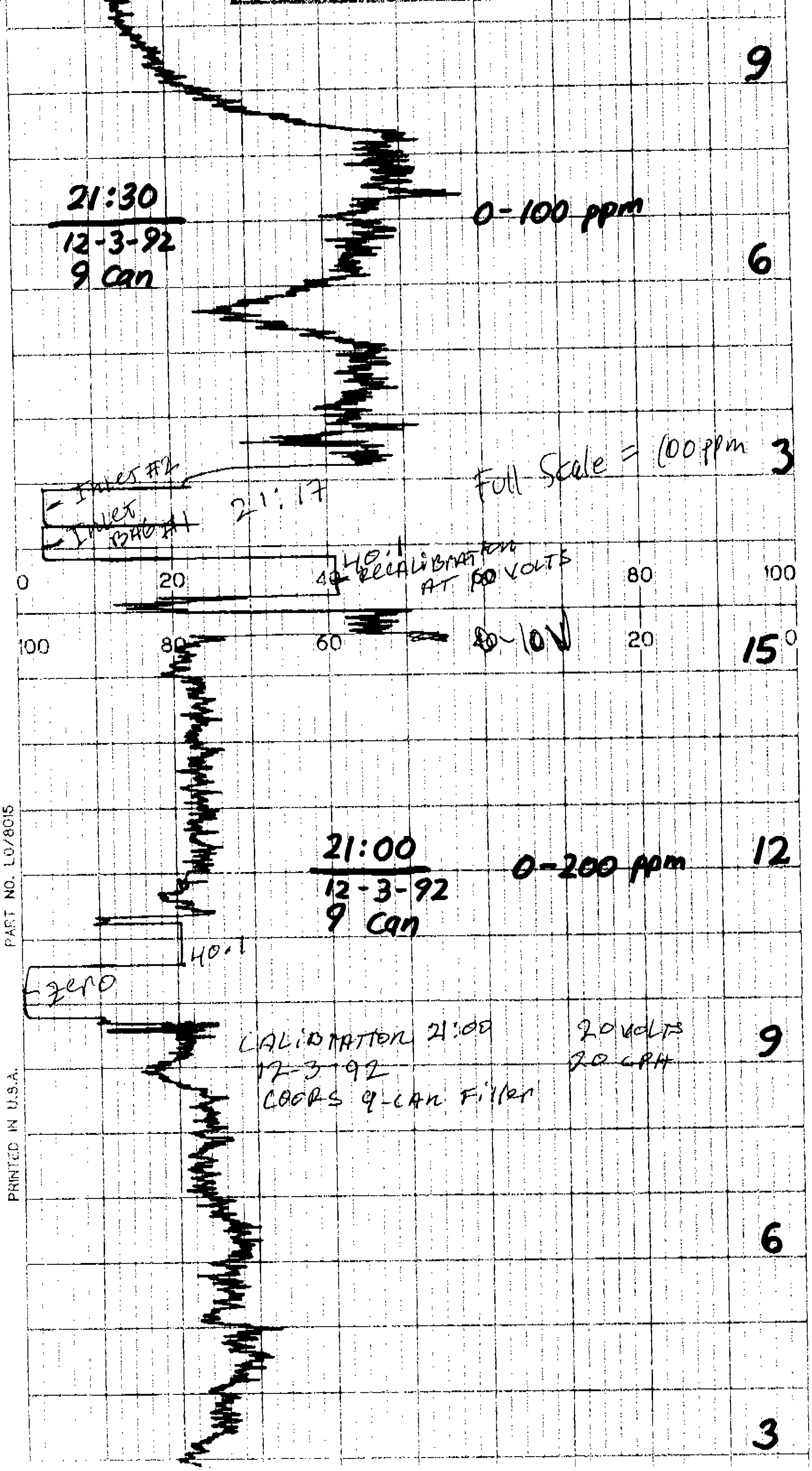


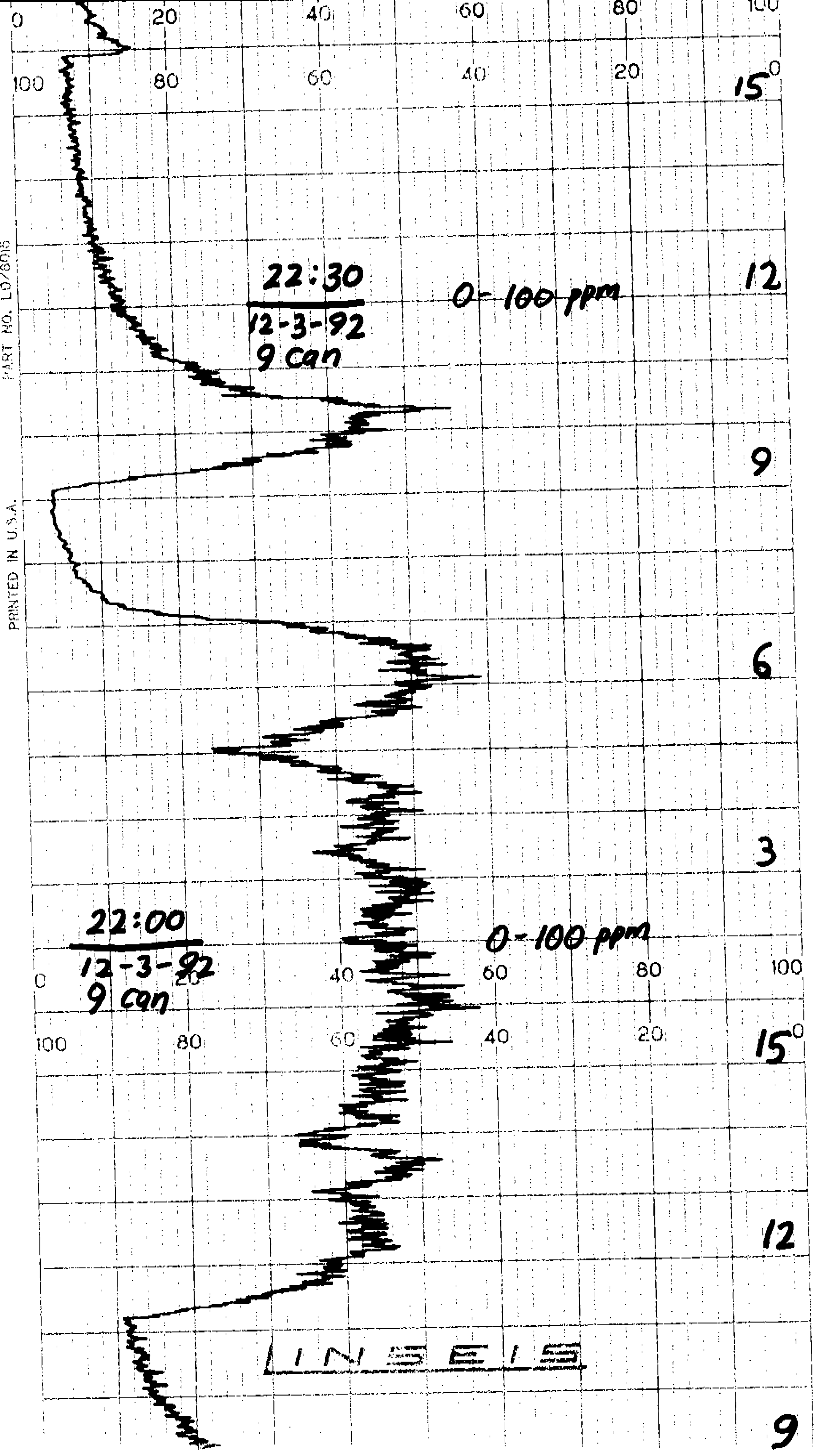
PART NO. L0/6015

PRINTED IN U.S.A.

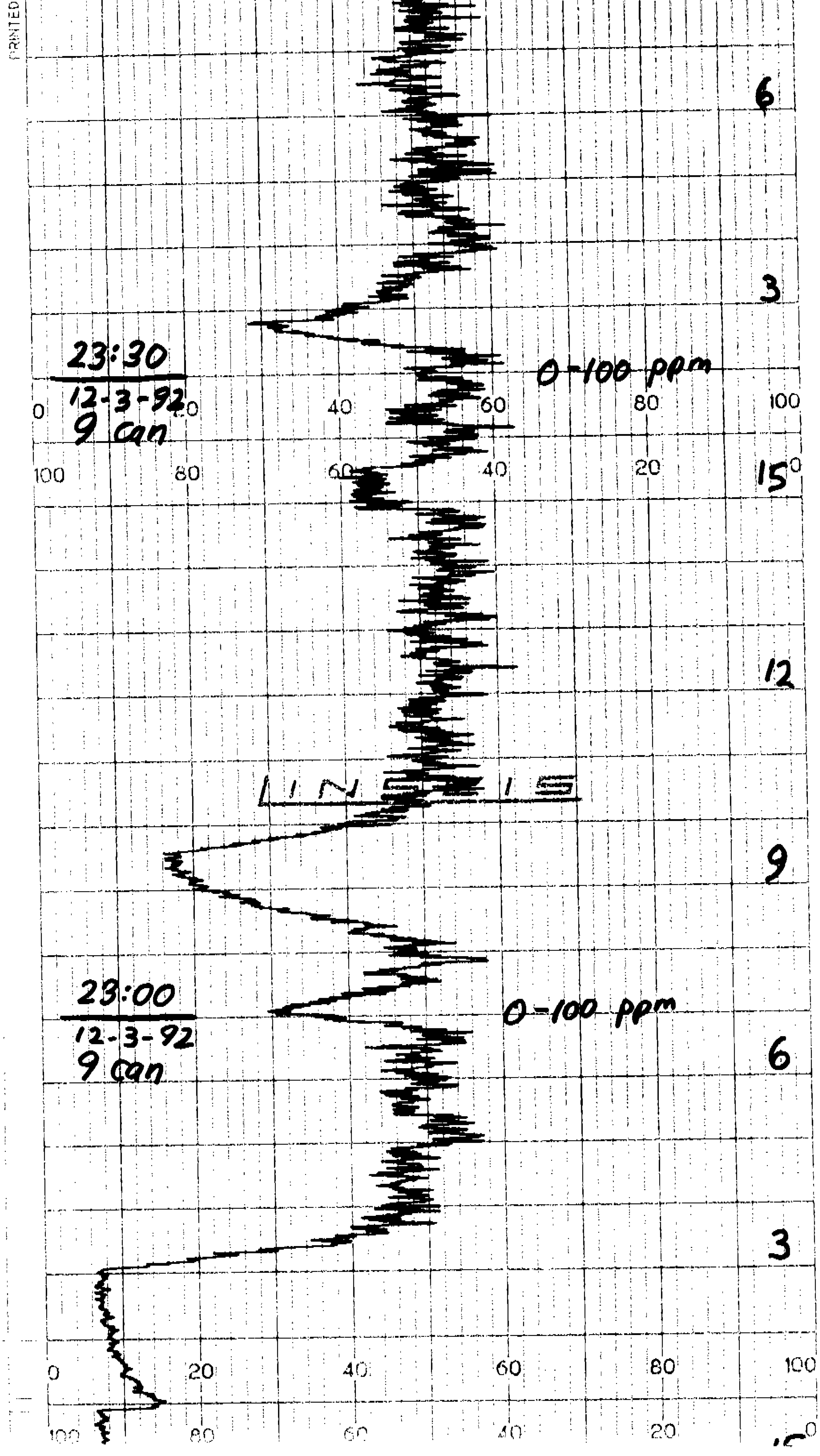

PART NO. L0/8015
PRINTED IN U.S.A.
12
19:30
12-3-92
9 can
0-200 ppm
9
6
3
0
40
60
80
100
19:00
12-3-92
9 can
0-200 ppm
100
80
60
40
20
0
15
12
LINSEIS
9
6
18:30
0-200 ppm


3
0 20 40 60 80 100
20:30
12-3-92
9 can
0-200 ppm
100 80 60 40 20 0
15
12
LINSEIS
9
20:00
12-3-92
9 can
0-200 ppm
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
12

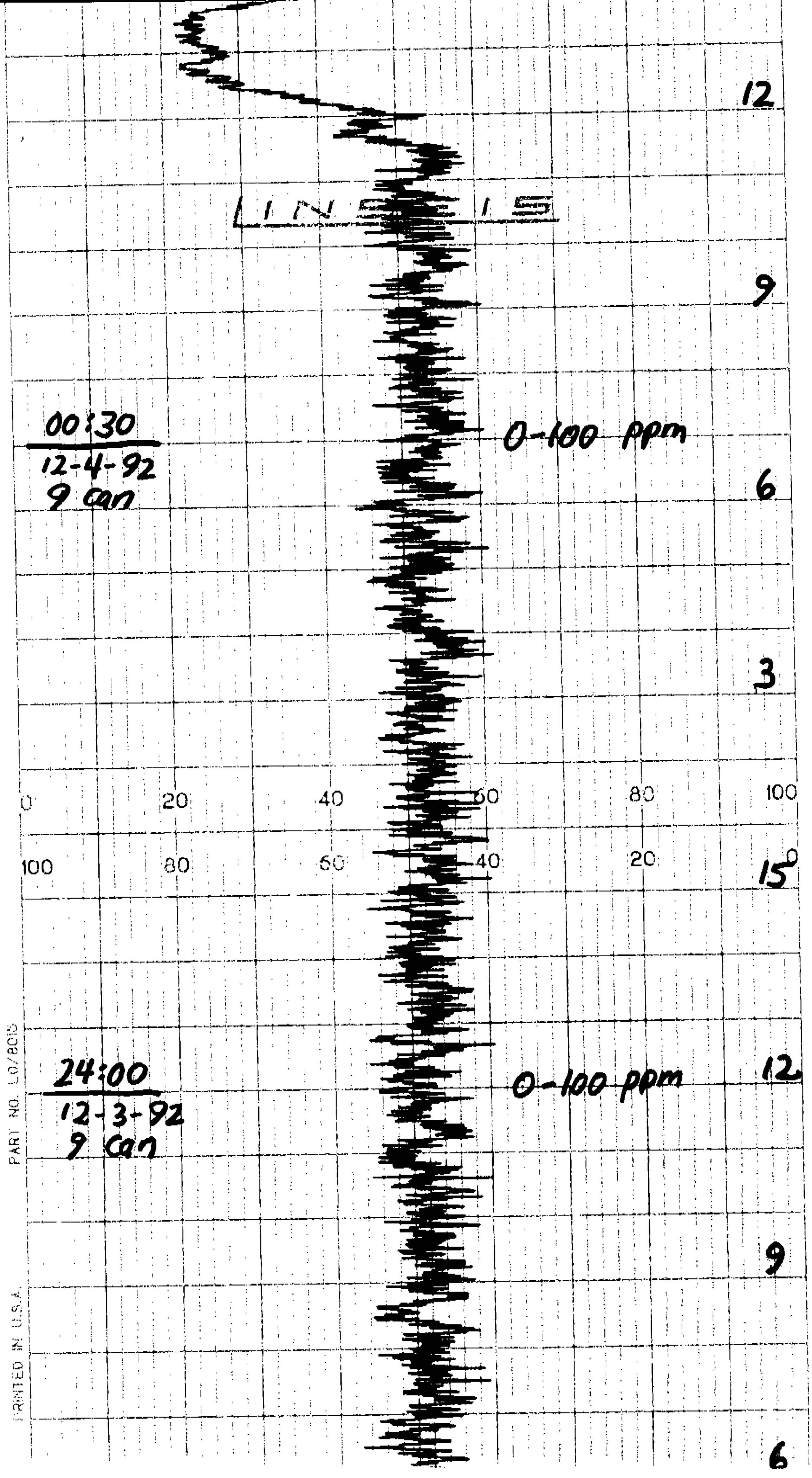

9
21:30
12-3-92
9 Can
0-100 ppm
6
3
Full Scale = 100 ppm
Inlet #2
Inlet
BAG #1
21:17
40:1 RECALIBRATION
AT 20 VOLTS
0
20
40
80
100
100
80
60
20
0
0-10V
15
21:00
12-3-92
9 Can
0-200 ppm
12
40:1
zero
CALIBRATION 21:00
12-3-92
COORS 9-CAN Filler
20 volts
2.0 GPH
9
6
3
PART NO. L0/8015
PRINTED IN U.S.A.



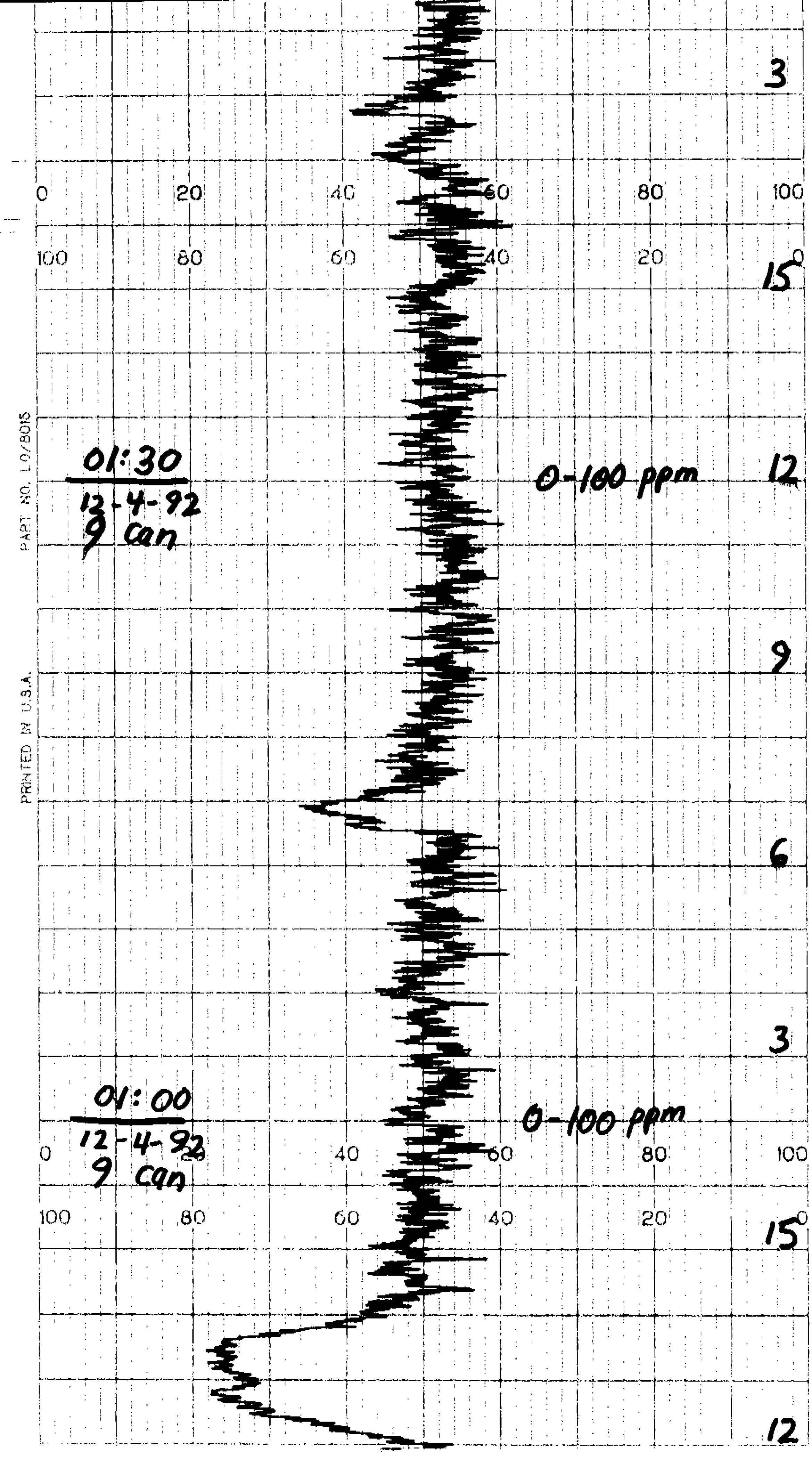
0 20 40 60 80 100
100 80 60 40 20 15°
22:30
12-3-92
9 can
0-100 ppm
12
9
PRINTED IN U.S.A.
6
3
22:00
12-3-92
9 can
0-100 ppm
0 20 40 60 80 100
100 80 60 40 20 15°
12
LINSEIS
9

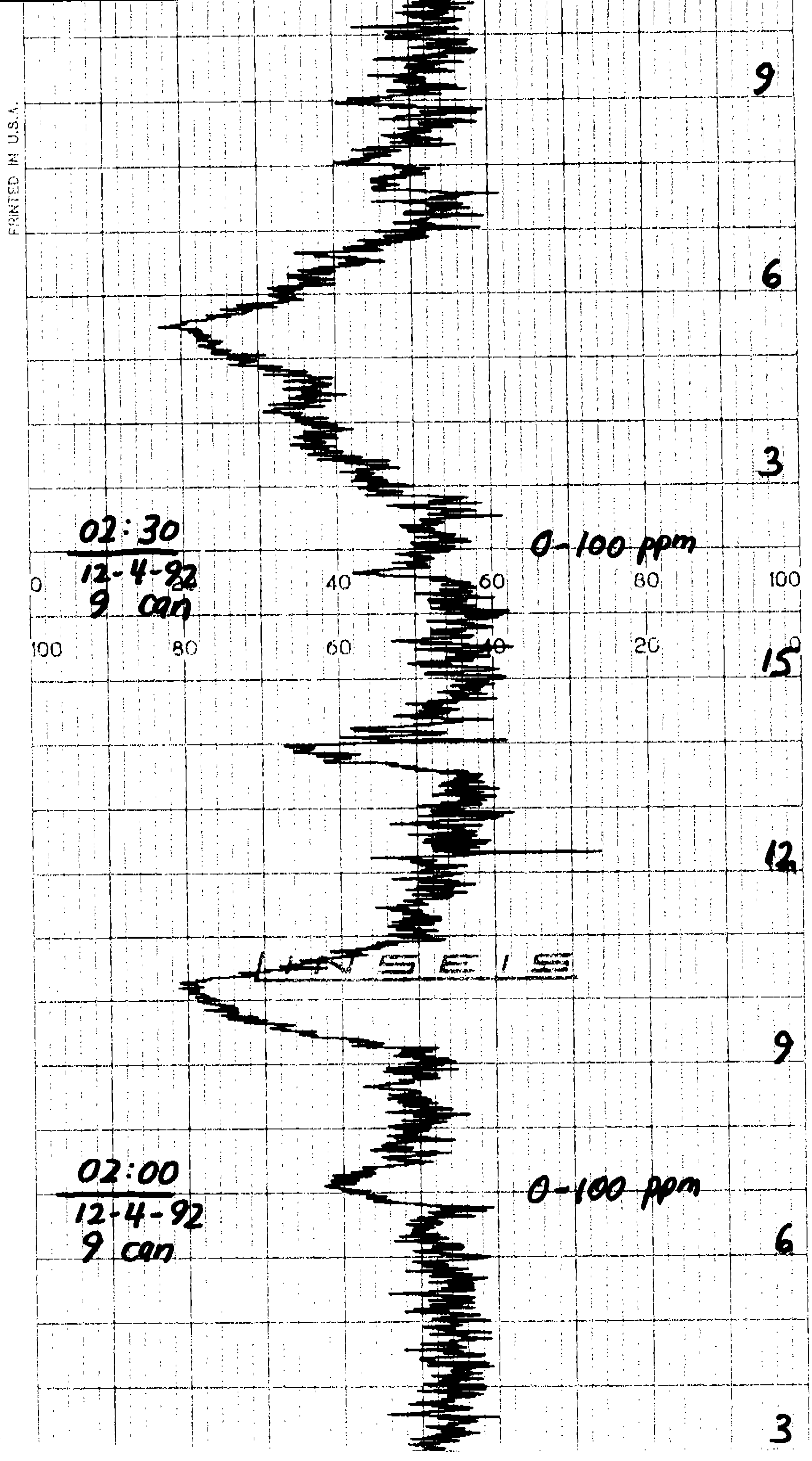


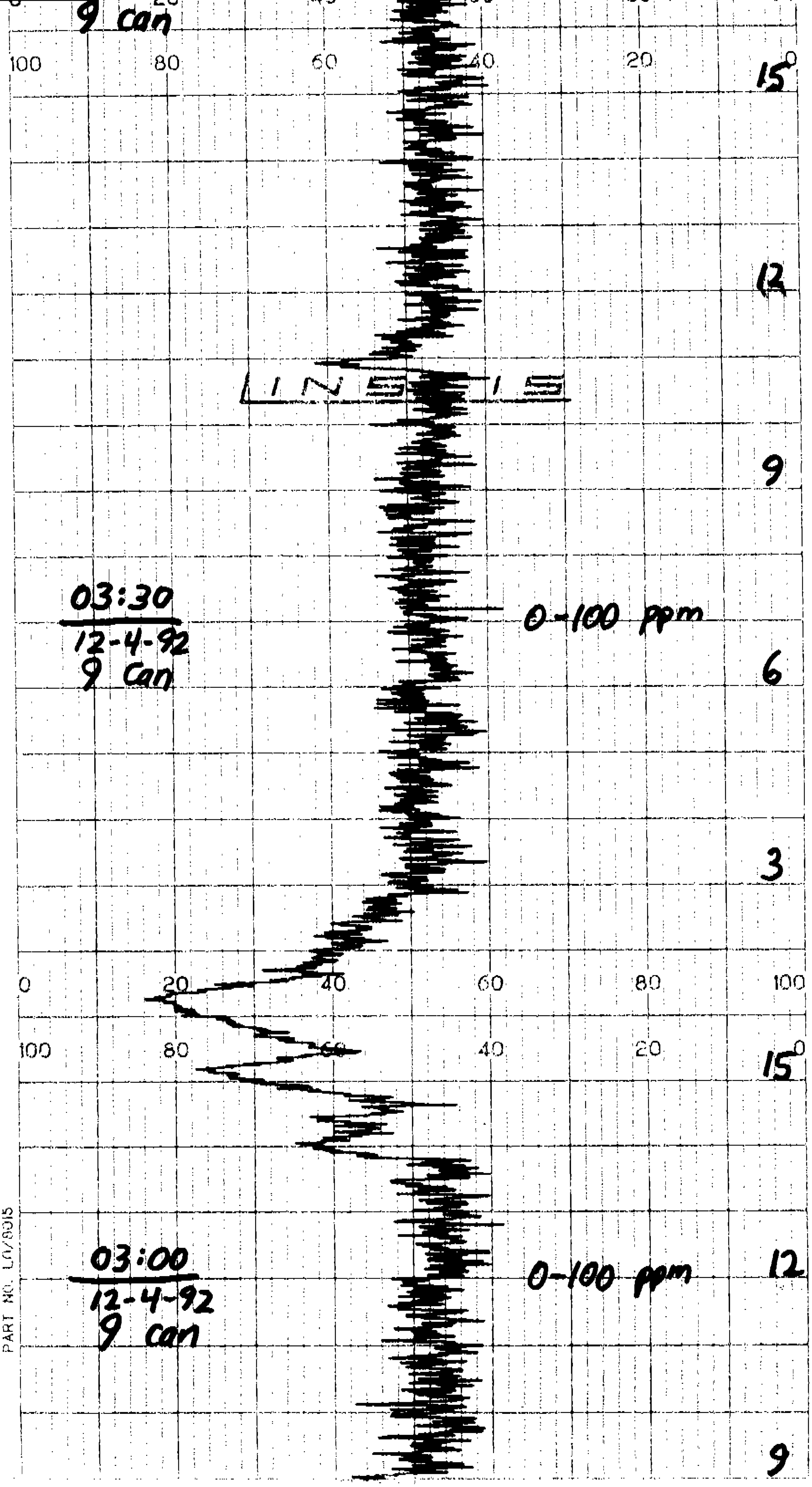
6
3
23:30
12-3-92
9 can
0-100 ppm
0
40
60
80
100
100
80
60
40
20
15
12
LINSEIS
9
23:00
12-3-92
9 can
0-100 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20

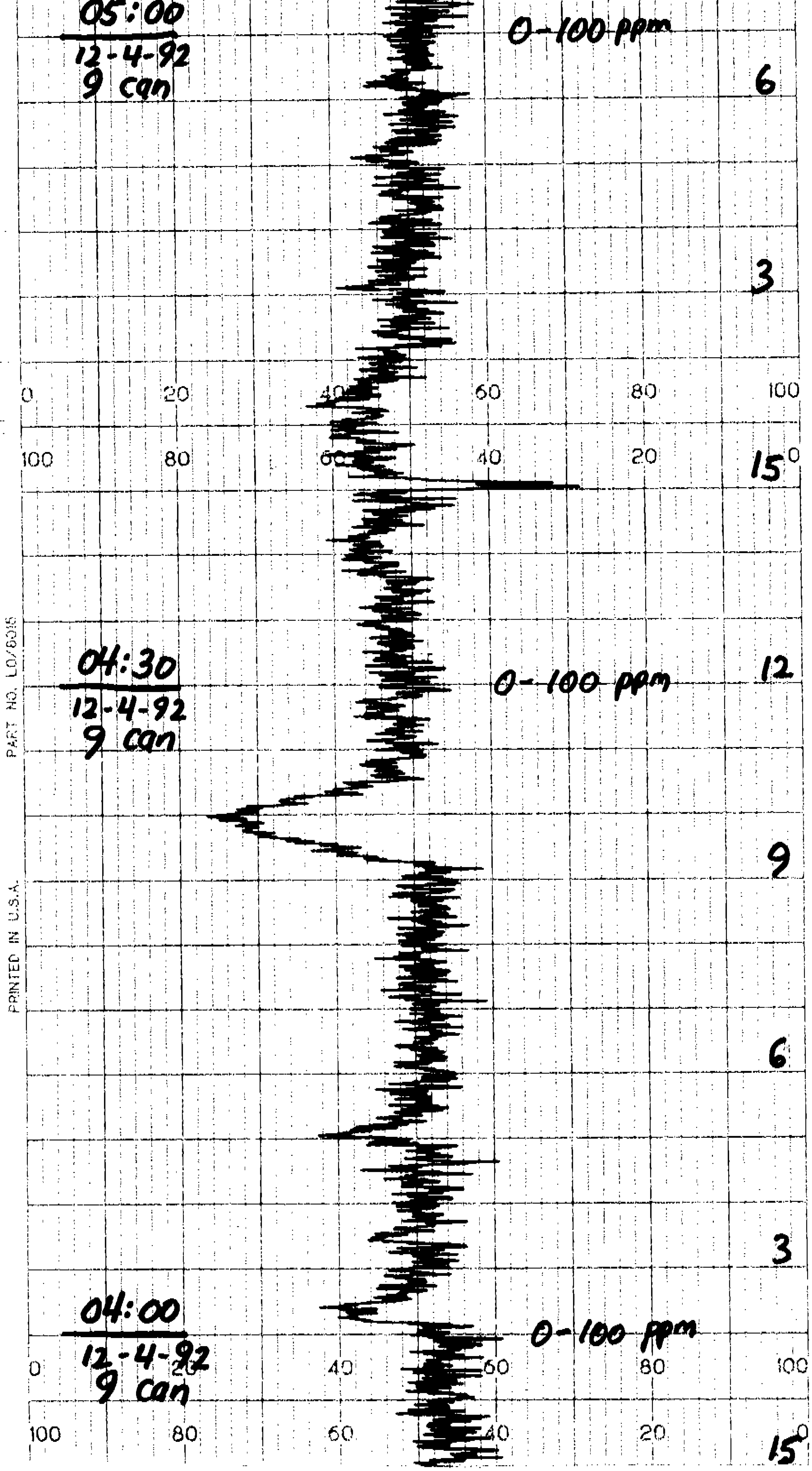


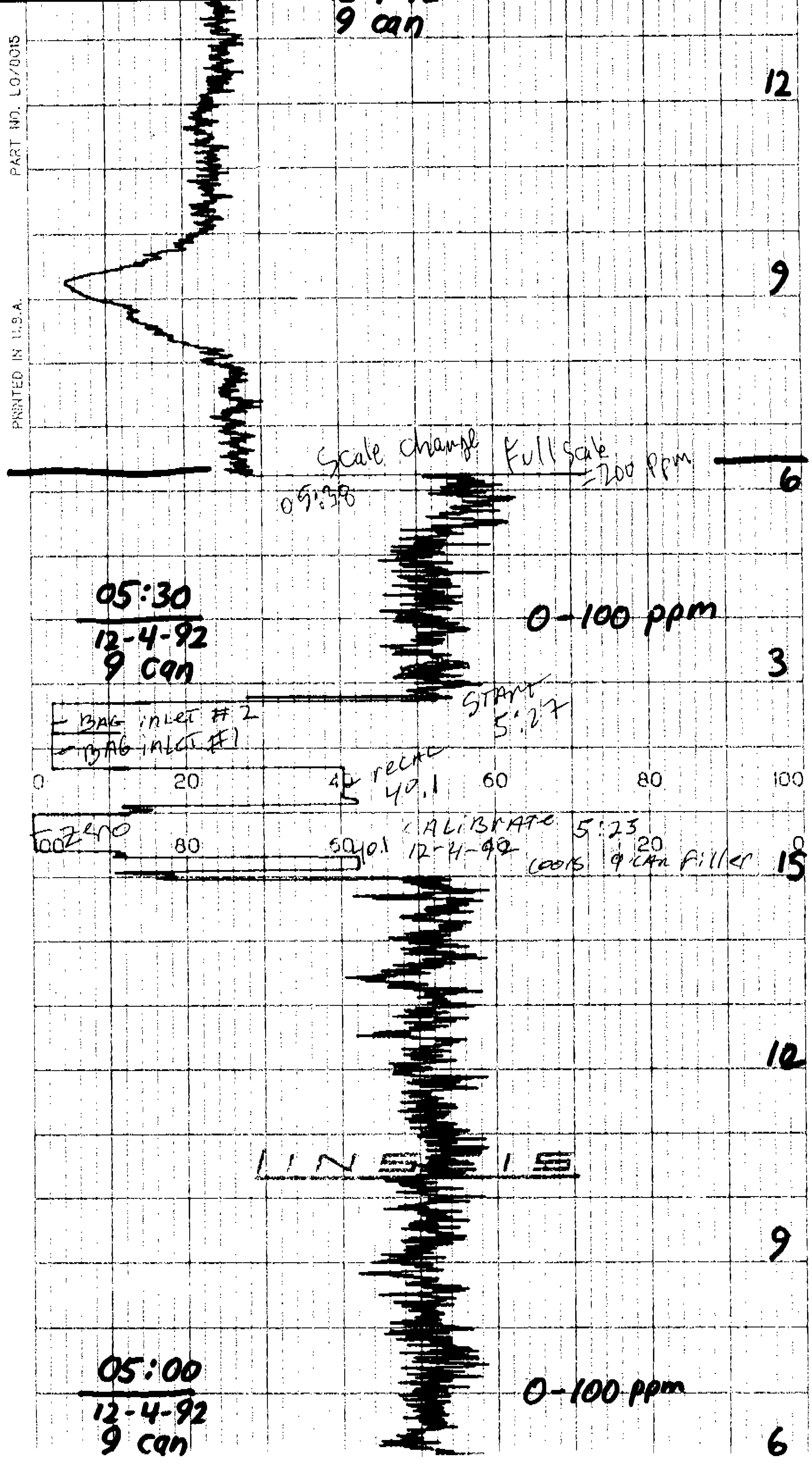
12
LIN 15
9
00:30
12-4-92
9 can
0-100 ppm
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
PART NO.
24:00
12-3-92
9 can
0-100 ppm
12
9
PRINTED IN U.S.A.
6

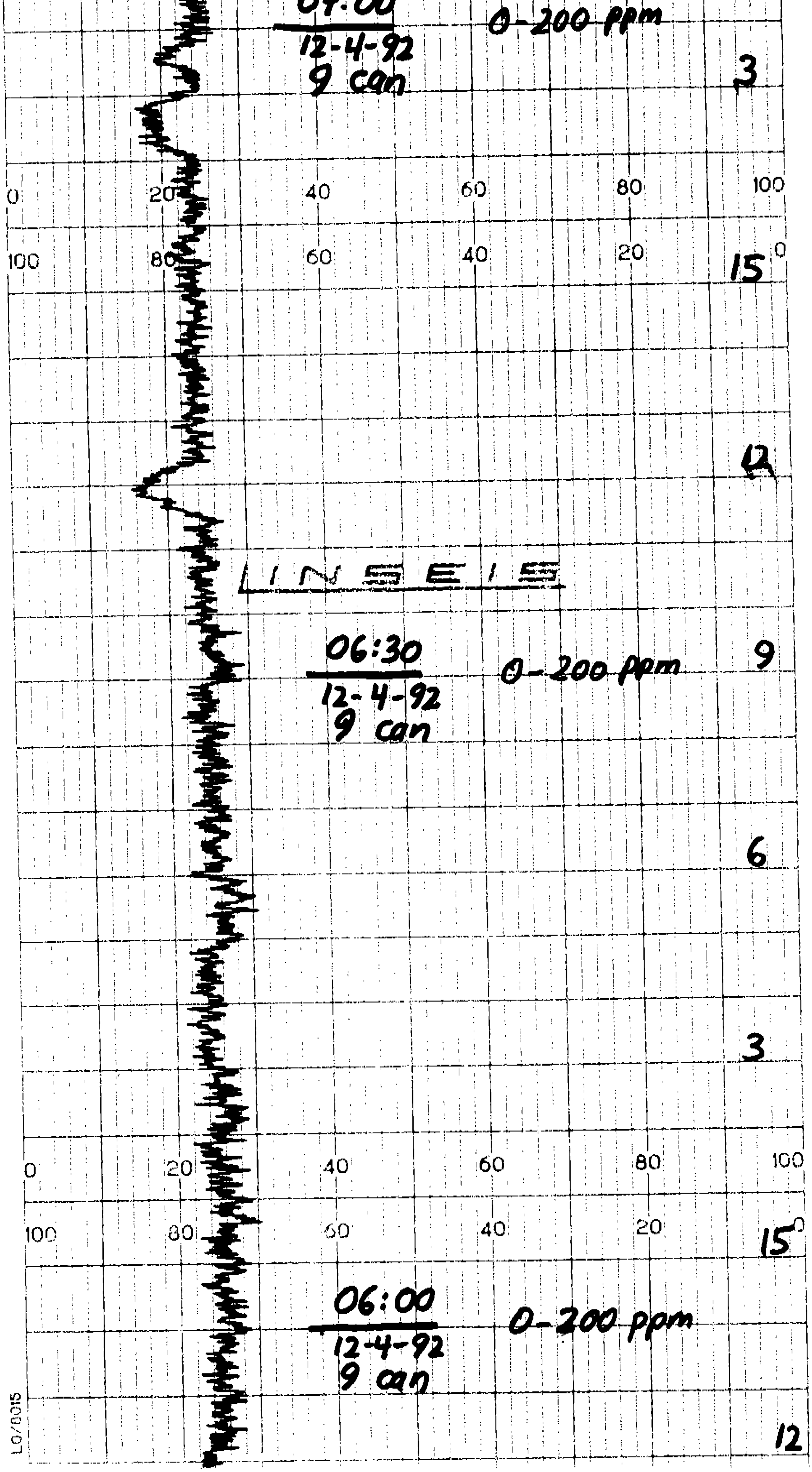

3
0 20 40 60 80 100
100 80 60 40 20 0
15
PART NO. L0/8015
01:30
12-4-92
9 can
0-100 ppm
12
9
PRINTED IN U.S.A.
6
3
01:00
12-4-92
9 can
0-100 ppm
0 20 40 60 80 100
100 80 60 40 20 0
15
12


PRINTED IN U.S.A.
9
6
3
02:30
12-4-92
9 can
0-100 ppm
0 20 40 60 80 100
100 80 60 40 20 0
15
12
LINSEIS
9
02:00
12-4-92
9 can
0-100 ppm
6
3

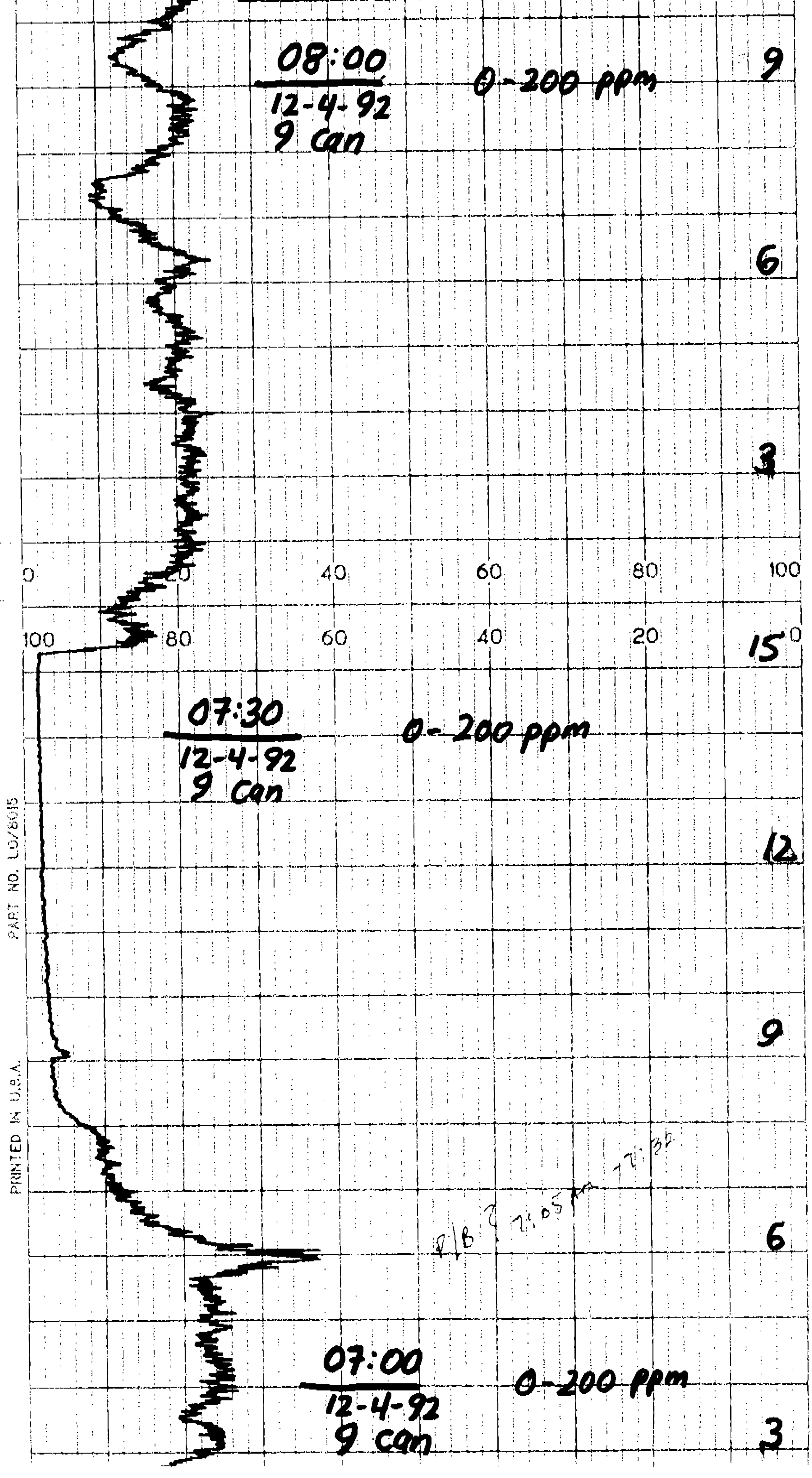

9 can
100 80 60 40 20 0
15
12
LINSEIS
9
03:30
12-4-92
9 Can
0-100 ppm
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
PART NO. LO/9015
03:00
12-4-92
9 can
0-100 ppm
12
9

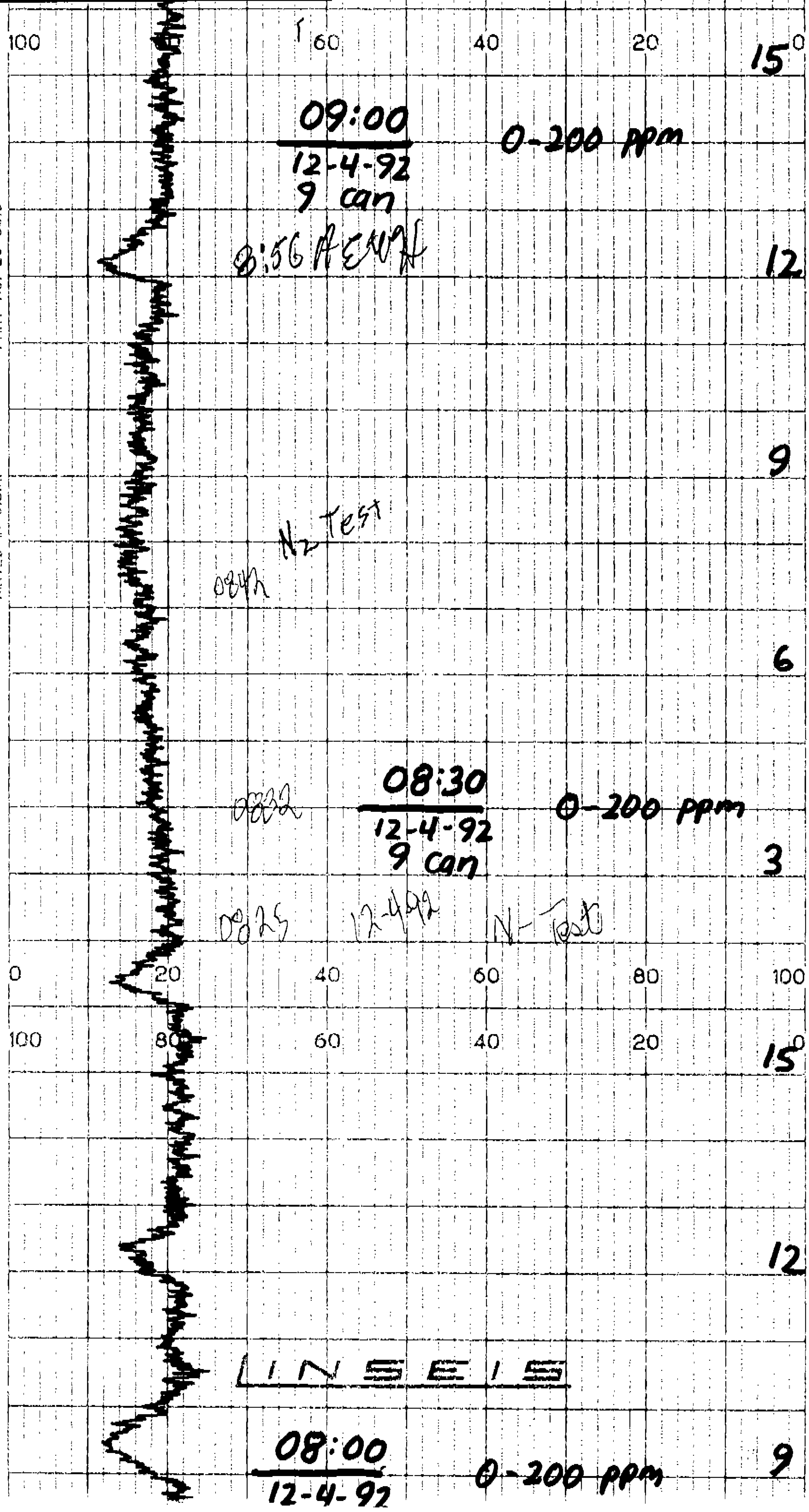

05:00
12-4-92
9 can
0-100 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
PART NO. LO/6015
04:30
12-4-92
9 can
0-100 ppm
12
9
PRINTED IN U.S.A.
6
3
04:00
12-4-92
9 can
0-100 ppm
0
20
40
60
80
100
100
80
60
40
20
0
15

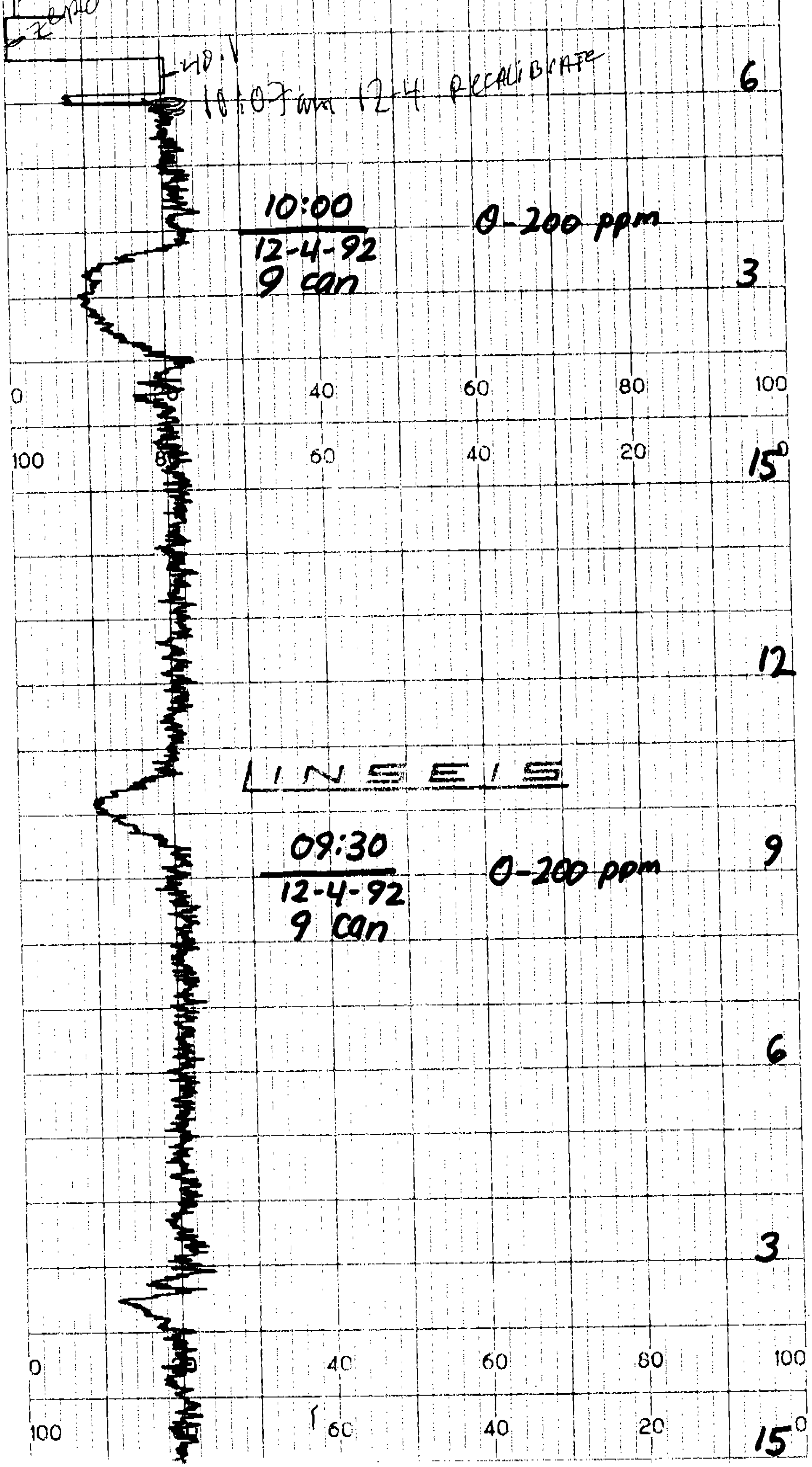

9 can
PART NO. LO/0015
PRINTED IN U.S.A.
12
9
Scale change Full scale =200 ppm
6
05:38
05:30
12-4-92
9 can
0-100 ppm
3
START 5:27
BAG inLet #2
BAG inLet #1
0
20
40
60
80
100
recal 40.1
Zero
CALIBRATE 5:23
100
80
50
40.1 12-4-92
20
0
LOOTS 9 can Filler
15
12
LINE 15
9
05:00
12-4-92
9 can
0-100 ppm
6



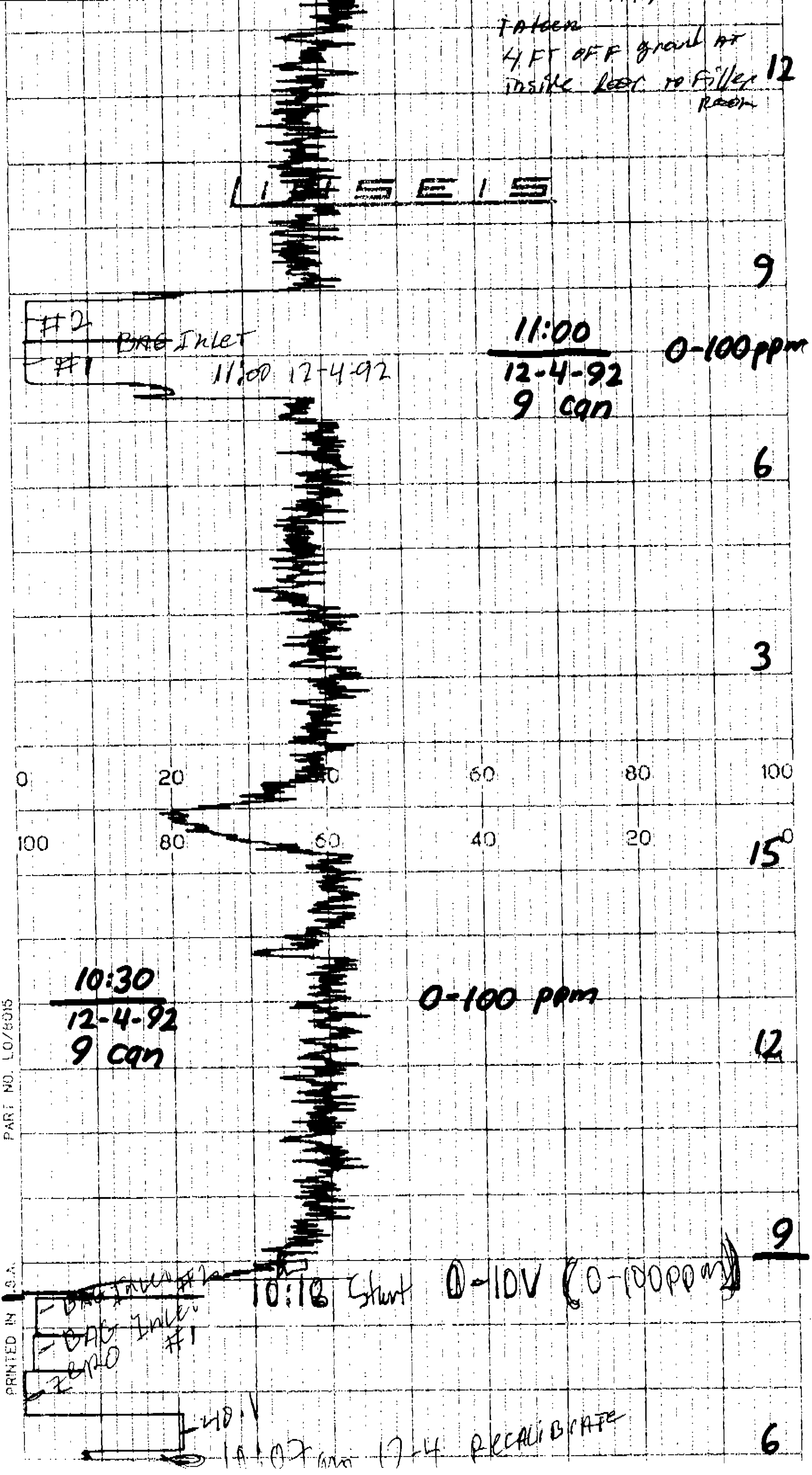
0-200 ppm
12-4-92
9 can
3
0 20 40 60 80 100
100 80 60 40 20 0
15
12
LINSEIS
06:30
0-200 ppm
12-4-92
9 can
9
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
06:00
0-200 ppm
12-4-92
9 can
12
L0/8015


08:00
12-4-92
9 Can
0-200 ppm
9
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
07:30
12-4-92
9 Can
0-200 ppm
12
9
6
07:00
12-4-92
9 can
0-200 ppm
3
PART NO. LD/8015
PRINTED IN U.S.A.

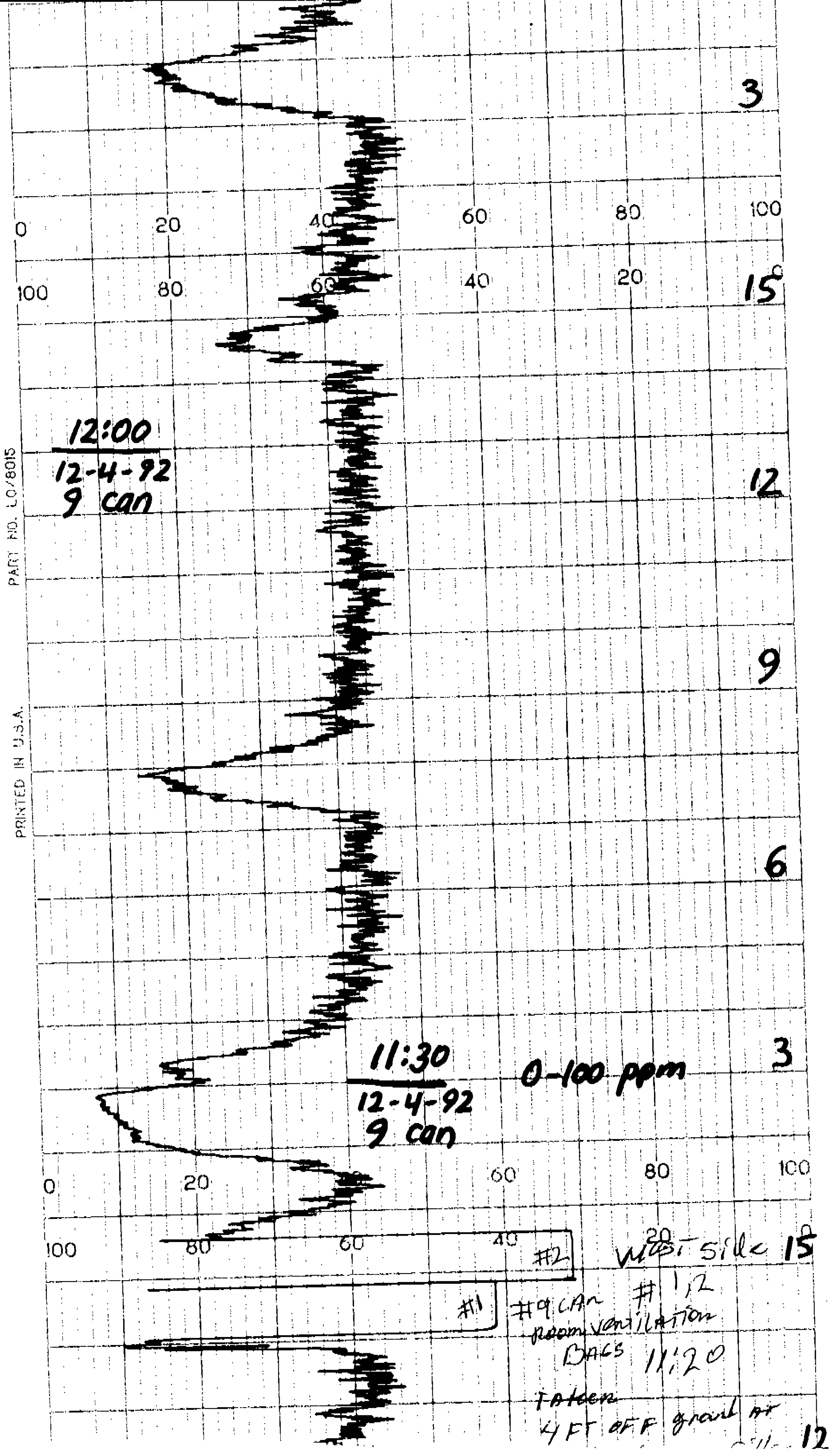

100
60
40
20
0
15
09:00
12-4-92
9 can
0-200 ppm
PART NO. LO/8015
8:56 AEWA
12
9
PRINTED IN U.S.A.
N2 Test
0842
6
0832
08:30
12-4-92
9 can
0-200 ppm
3
0825
12-4-92
N- Test
0
20
40
60
80
100
100
80
60
40
20
0
15
12
LINSEIS
08:00
12-4-92
0-200 ppm
9



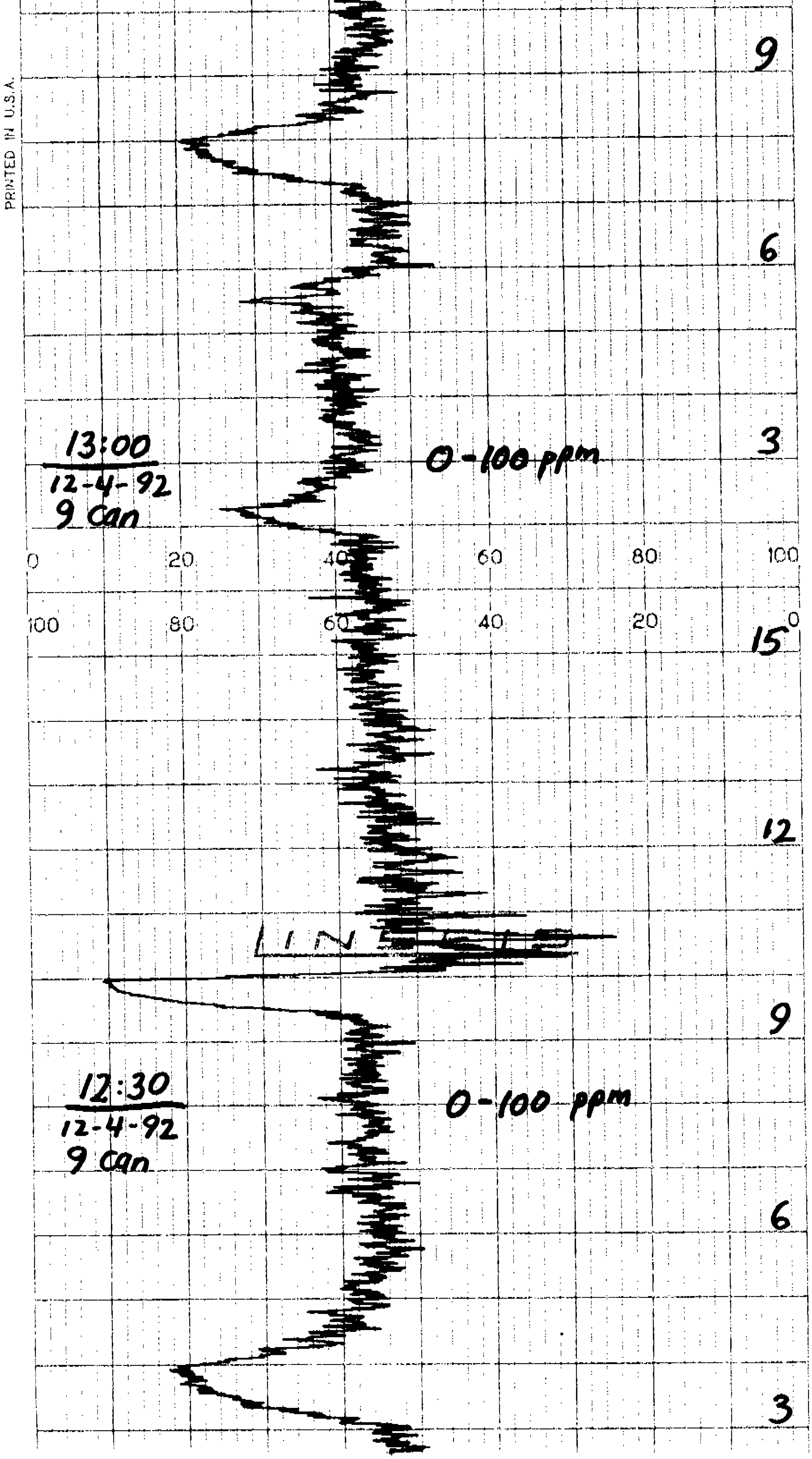
ZERO
40.1
10:07am 12-4 RECALIBRATE
6
10:00
12-4-92
9 can
0-200 ppm
3
0
40
60
80
100
100
80
60
40
20
15
0
12
LINSEIS
09:30
12-4-92
9 can
0-200 ppm
9
6
3
0
40
60
80
100
100
60
40
20
15
0

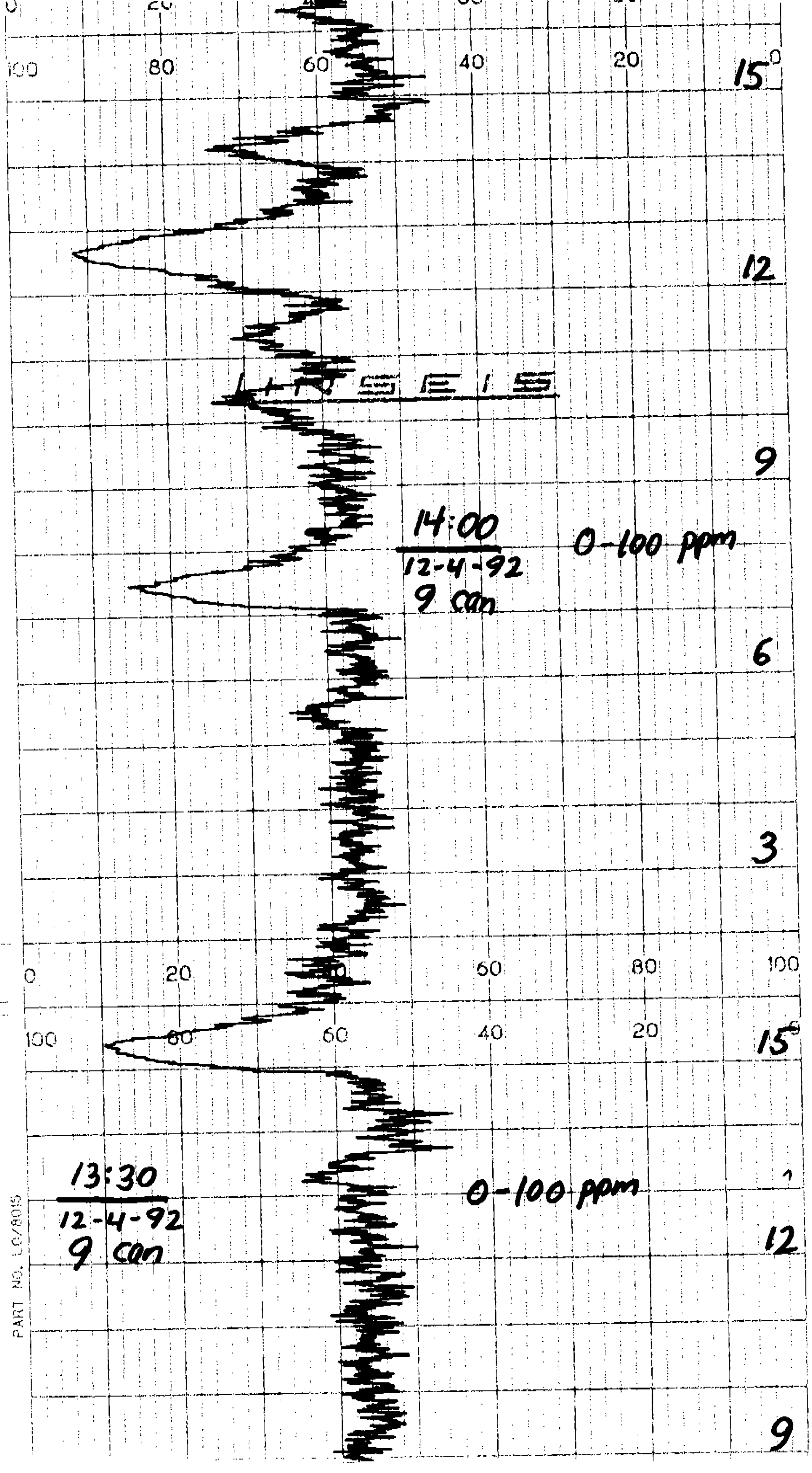


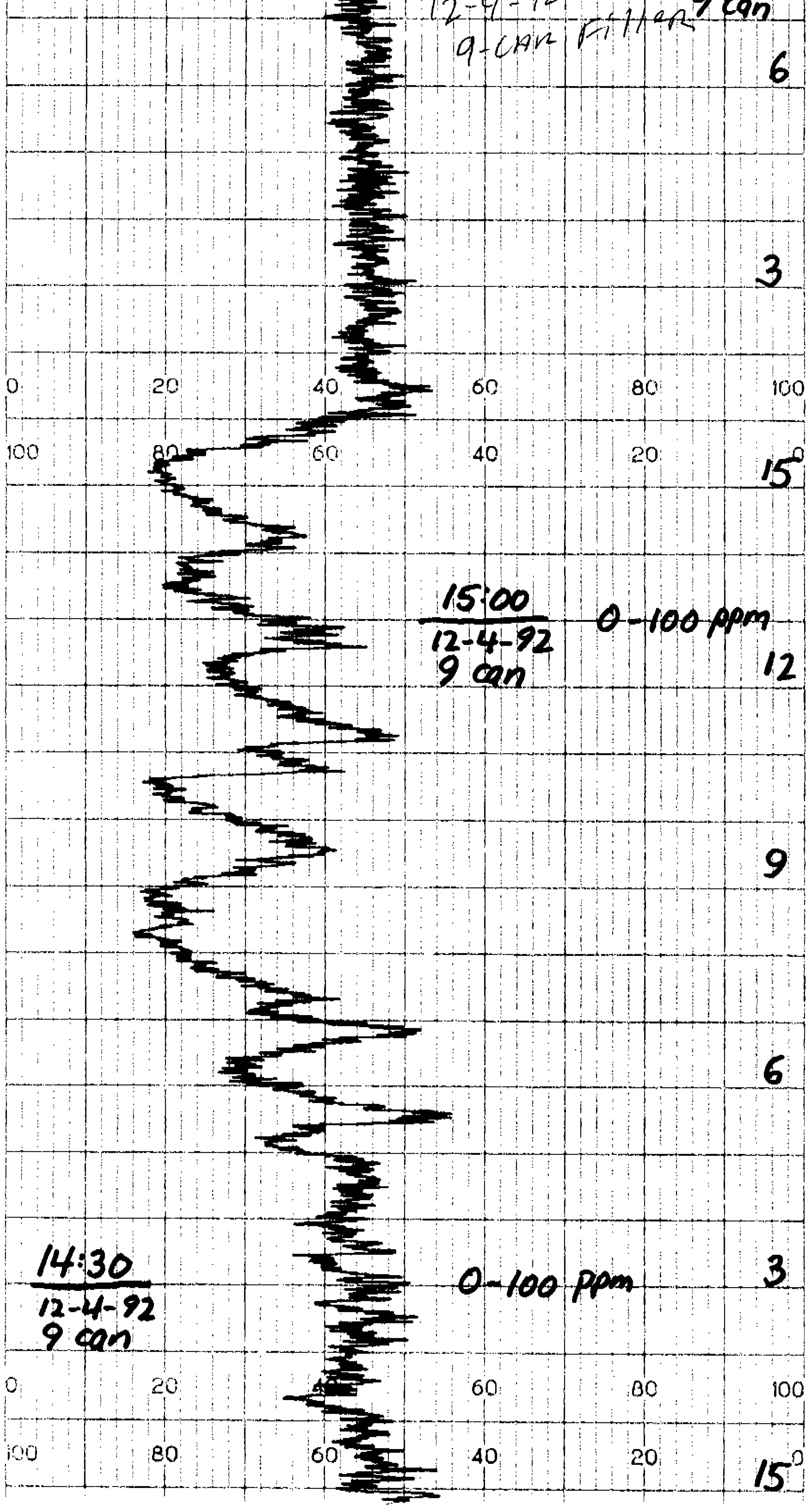
taken
4 FT OFF ground at
inside door to Filler room
12
LINSEIS
9
#2
BAG Inlet
#1
11:00 12-4-92
11:00
12-4-92
9 can
0-100ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
10:30
12-4-92
9 can
0-100 ppm
12
9
10:18 Start 0-10V (0-100ppm)
BAG Inlet #2
BAG Inlet #1
ZERO
40
10:07 am 12-4 RECALIBRATE
6
PART NO. L0/8015
PRINTED IN U.S.A.

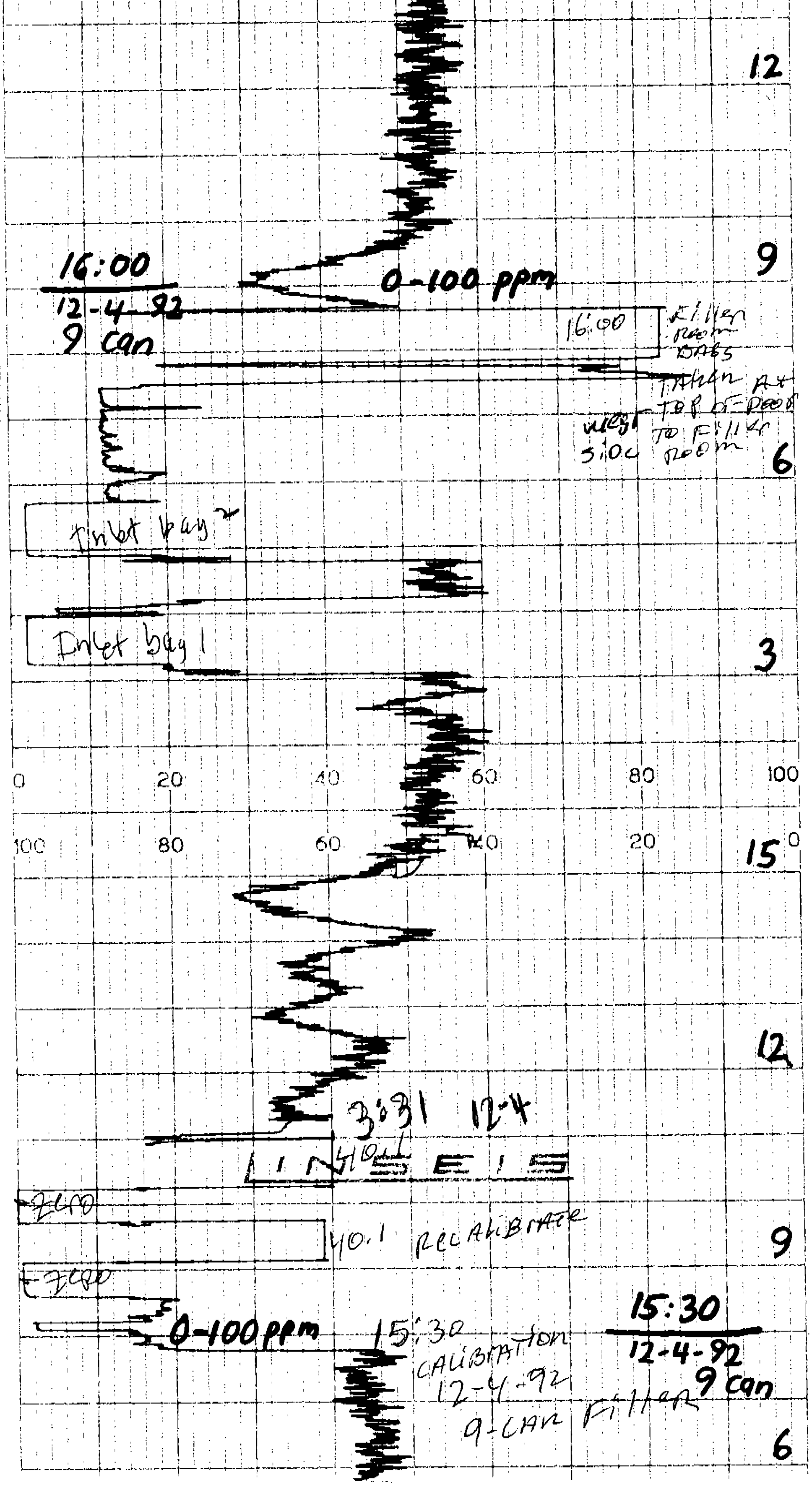


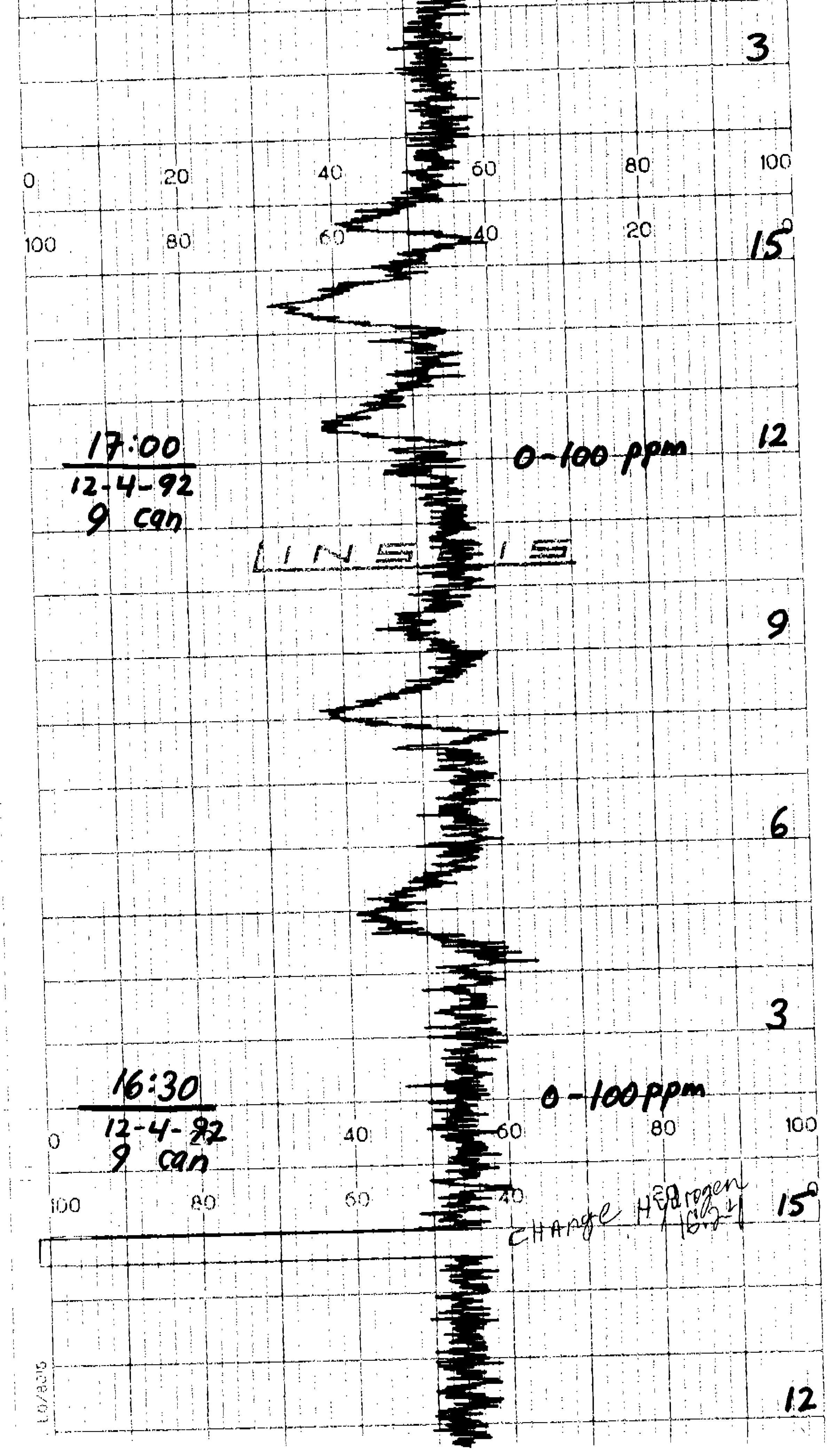
3
0
20
40
60
80
100
100
80
60
40
20
0
15
12:00
12-4-92
9 can
PART NO. LC/8015
12
9
PRINTED IN U.S.A.
6
3
11:30
12-4-92
9 can
0-100 ppm
0
20
60
80
100
100
80
60
40
20
0
#2
West side 15
#1
#9 CAN #1,2
room ventilation
BAGS 11:20
taken
4 FT off gravel
12


PRINTED IN U.S.A.
9
6
13:00
12-4-92
9 Can
0-100 ppm
3
0
20
40
60
80
100
100
80
60
40
20
0
15
12
9
12:30
12-4-92
9 Can
0-100 ppm
6
3

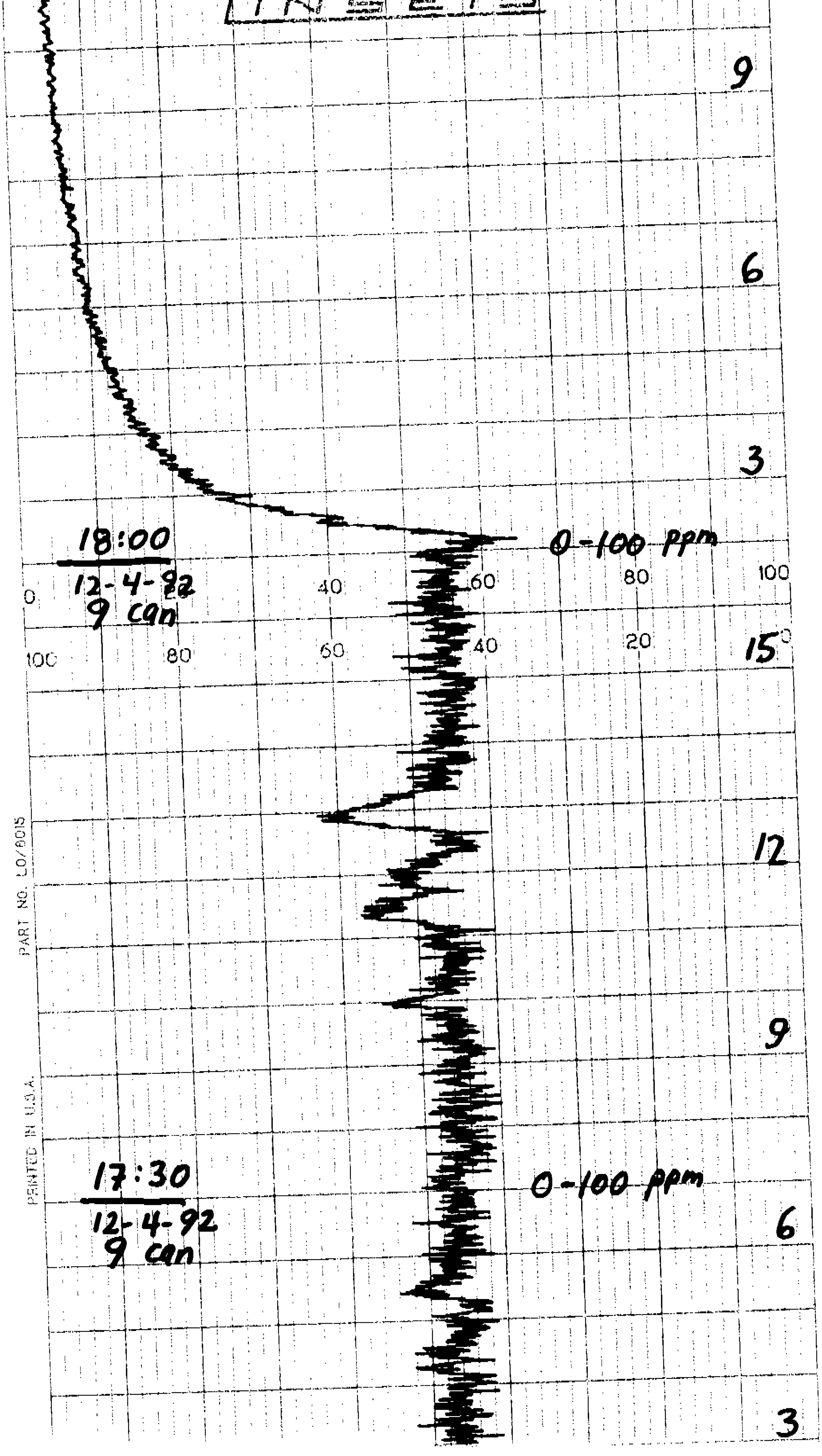

100
80
60
40
20
0
15
12
LINSEIS
9
14:00
12-4-92
9 can
0-100 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
13:30
12-4-92
9 can
0-100 ppm
12
9
PART NO. LO/8015


9-CAN Filter 9 can
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
15:00
12-4-92
9 can
0-100 ppm
12
9
6
14:30
12-4-92
9 can
0-100 ppm
3
0 20 40 60 80 100
100 80 60 40 20 0
15
PRINTED IN U.S.A.
PART NO.

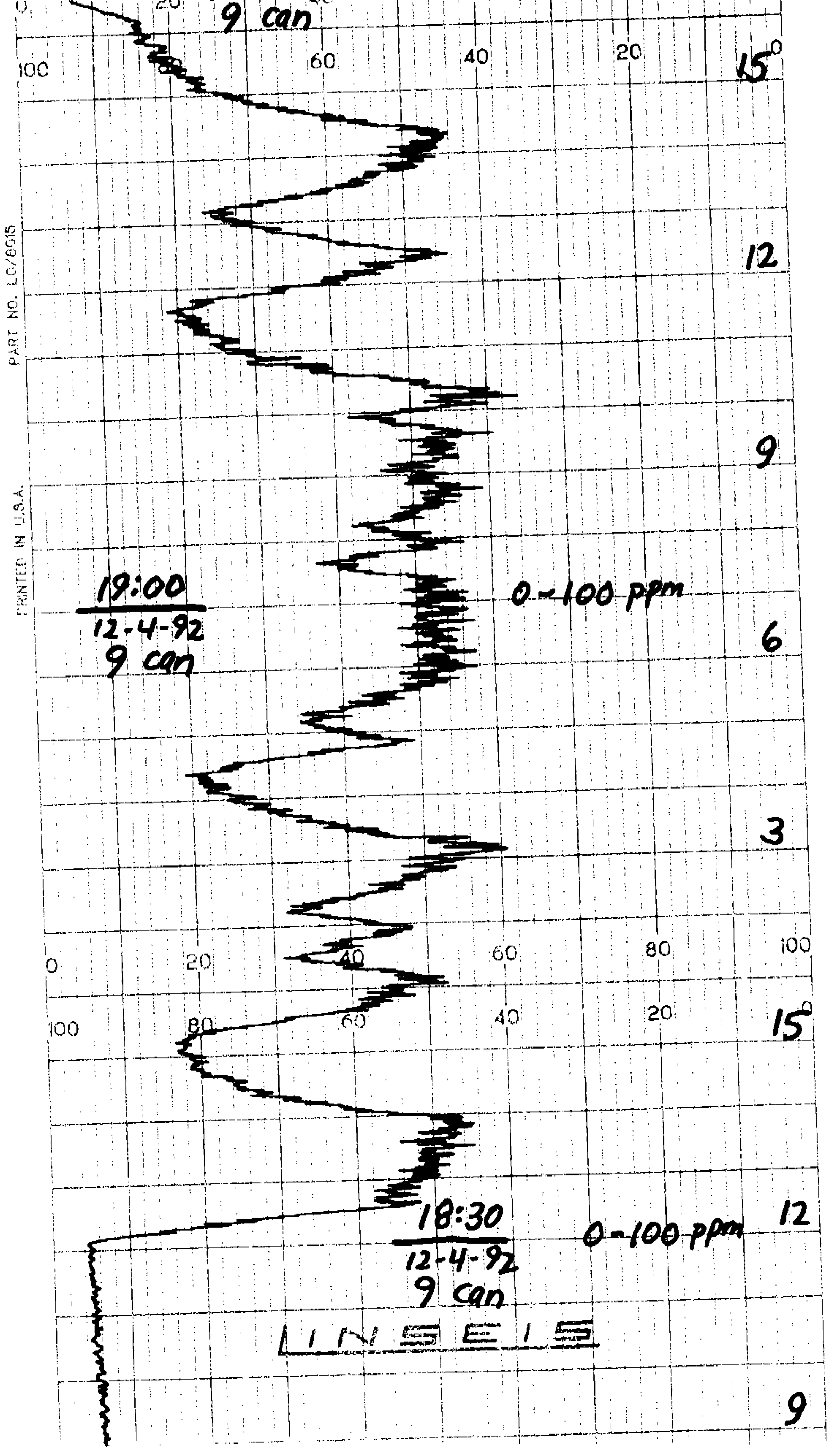

PRINTED IN U.S.A.
12
9
16:00
12-4-92
9 can
0-100 ppm
16:00
Filler room bags taken at top of door
west to filler room
5:0c
6
Inlet bay 2
Inlet bay 1
3
0 20 40 60 80 100
100 80 60 40 20 0
15
12
3:31 12-4
40.1
LINSEIS
zero
40.1 recalibrate
9
zero
0-100 ppm
15:30
calibration
12-4-92
9-can filler
15:30
12-4-92
9 can
6

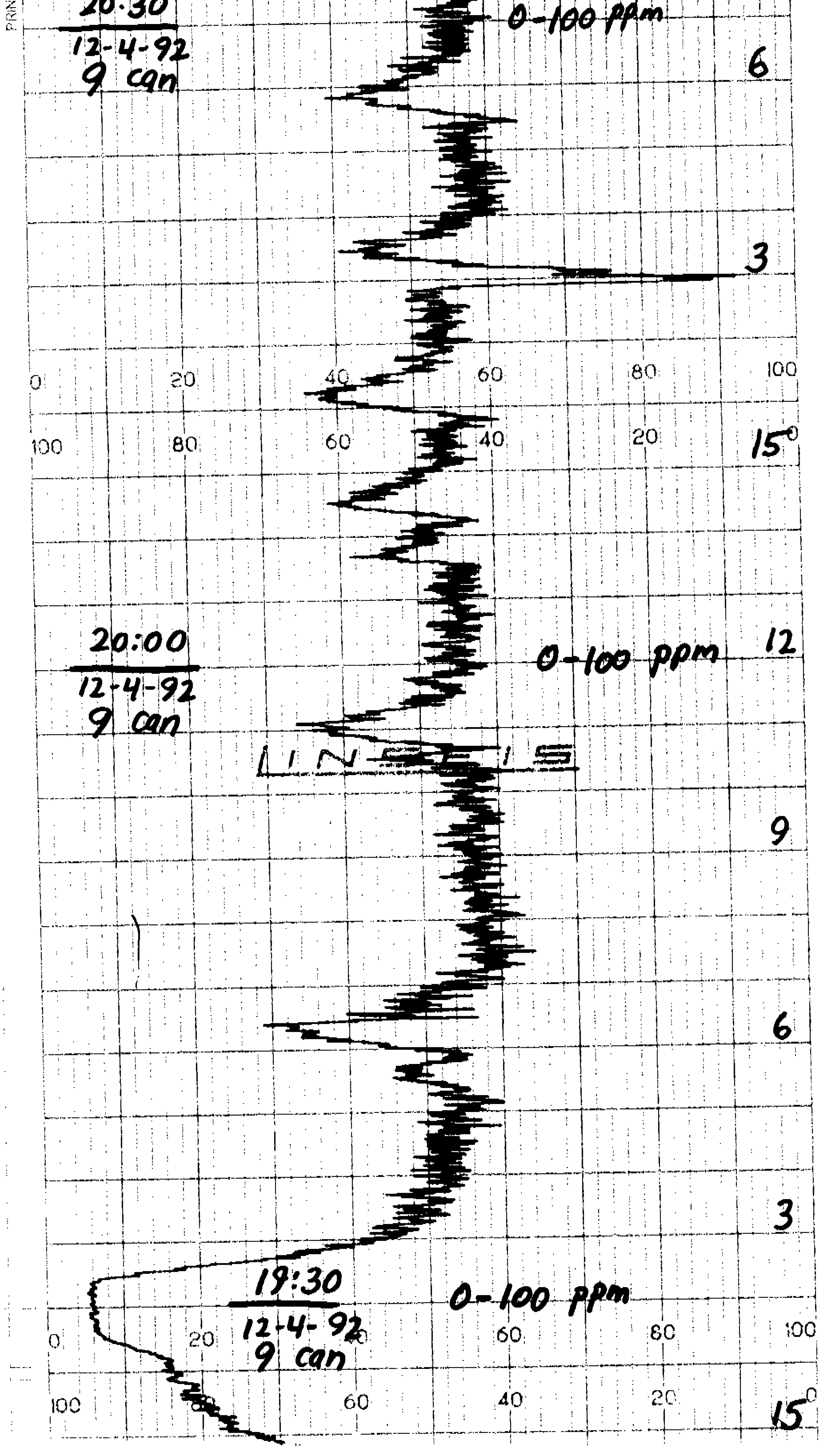


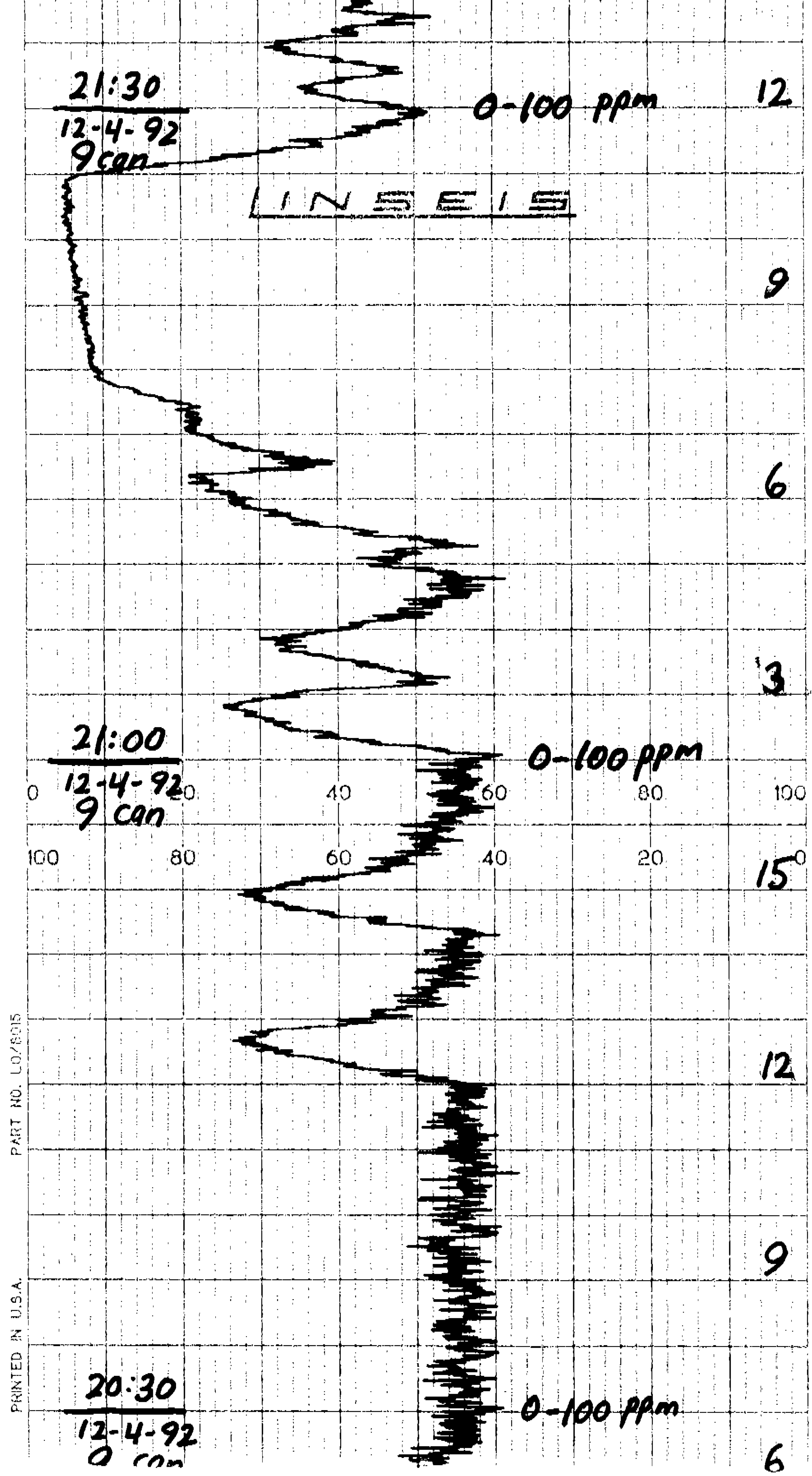
17:00
12-4-92
9 can
0-100 ppm
LINSEIS
16:30
12-4-92
9 can
0-100 ppm
Change Hydrogen

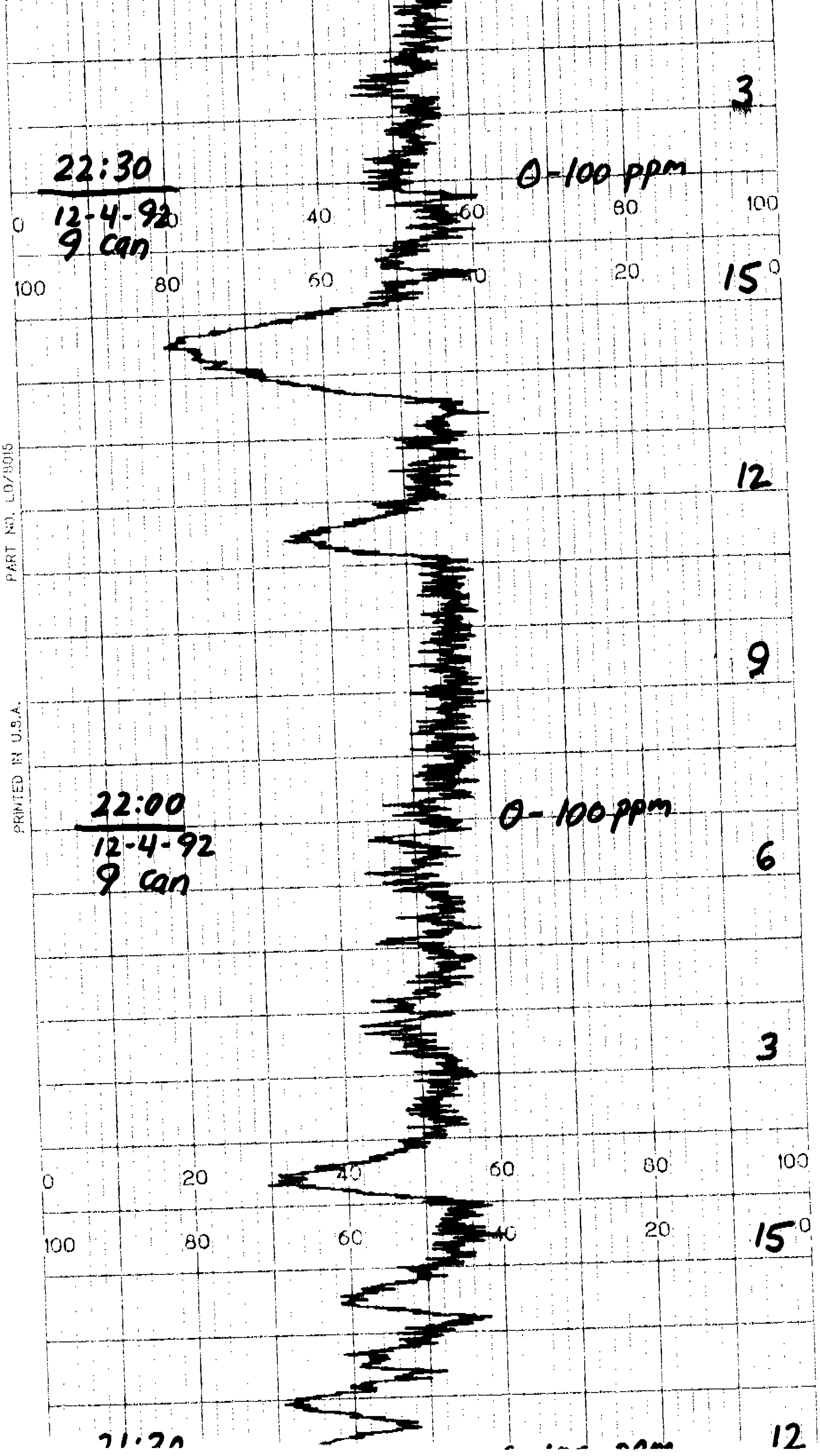


9
6
3
18:00
12-4-92
9 can
0-100 ppm
0
40
60
80
100
100
80
60
40
20
0
15
PART NO. LO/6015
12
9
PRINTED IN U.S.A.
17:30
12-4-92
9 can
0-100 ppm
6
3

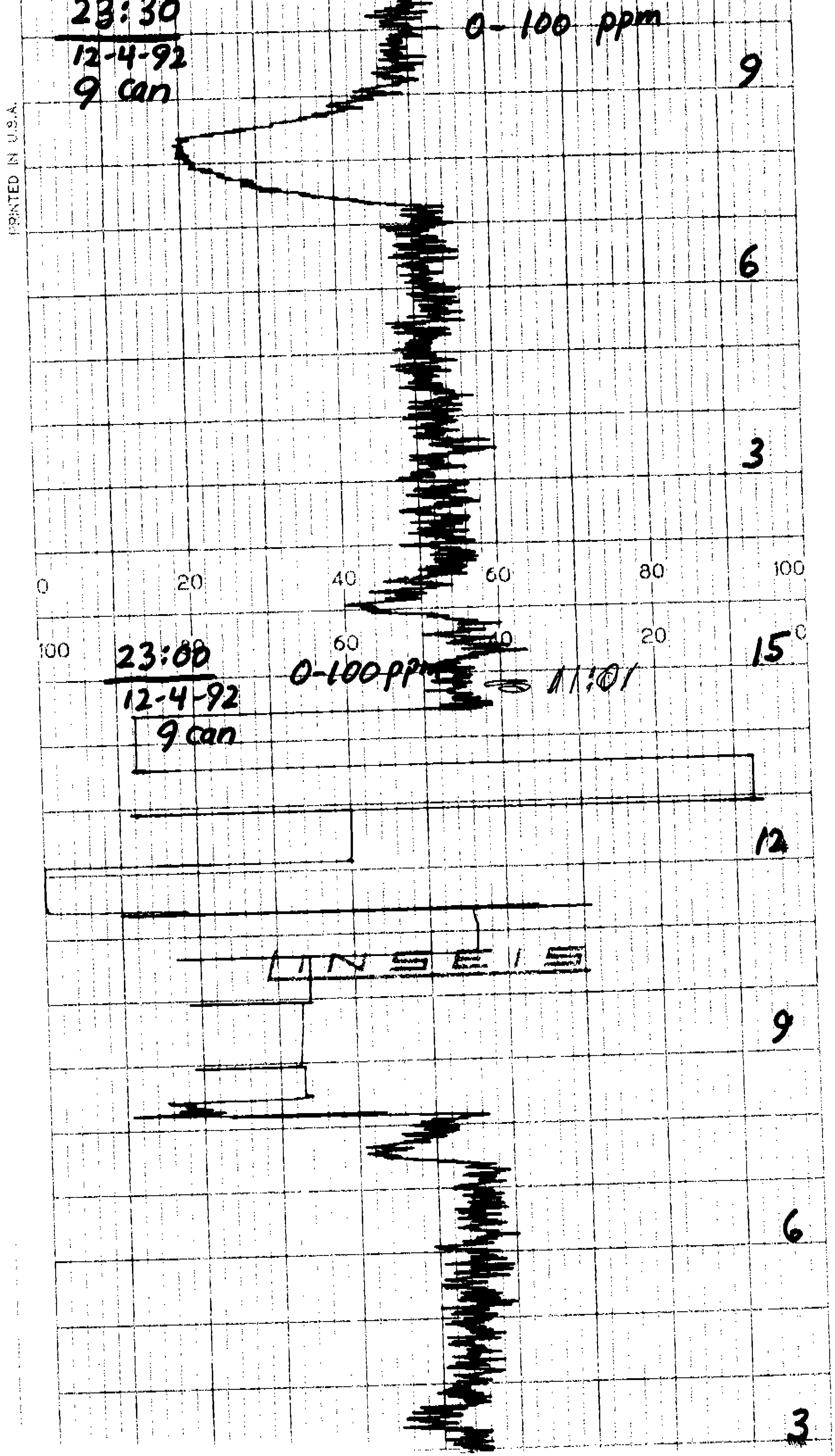

9 can
100
80
60
40
20
0
15
12
PART NO. LC/8015
9
PRINTED IN U.S.A.
19:00
12-4-92
9 can
0-100 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
18:30
12-4-92
9 can
0-100 ppm
12
LINSEIS
9

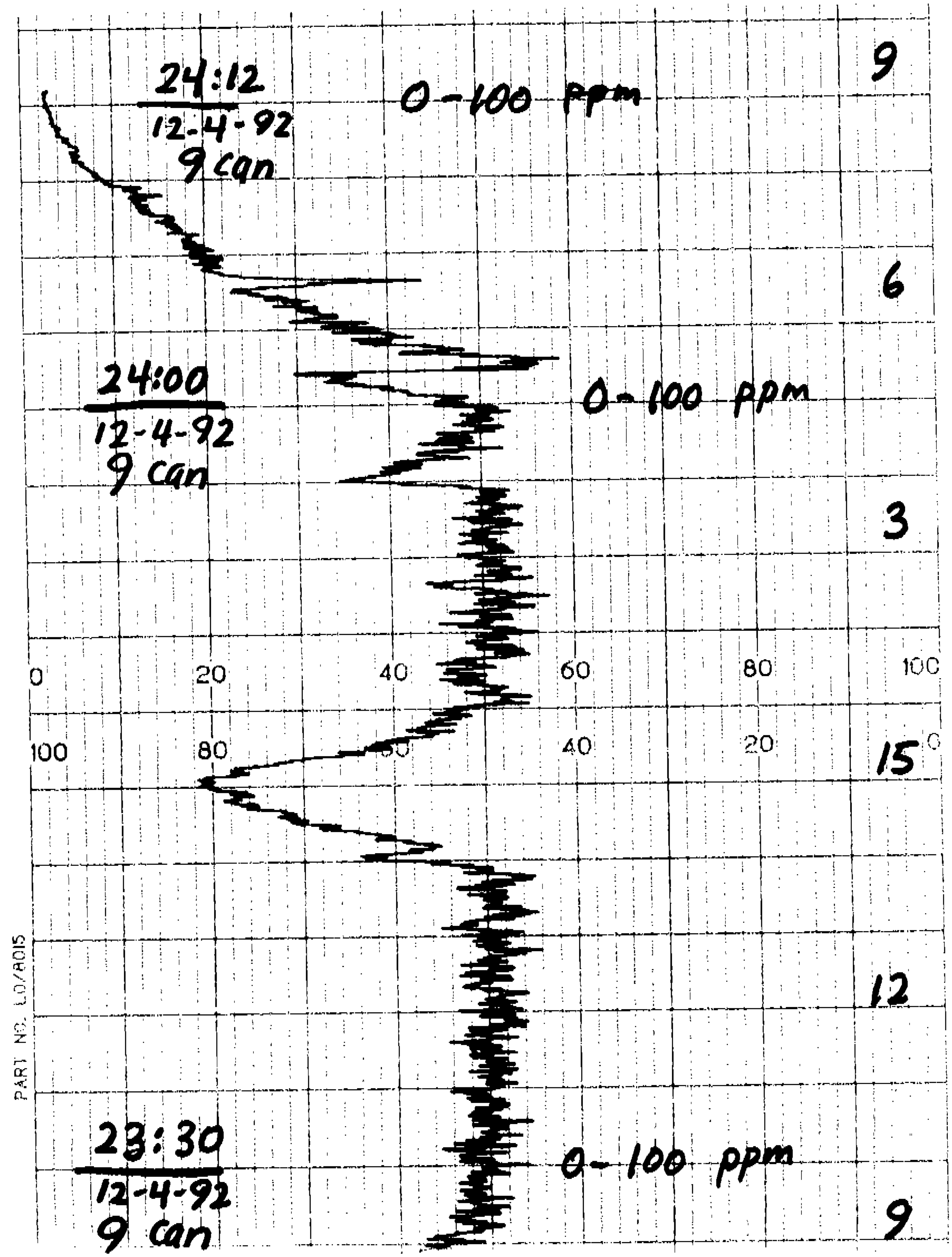

20:30
12-4-92
9 can
0-100 ppm
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
20:00
12-4-92
9 can
0-100 ppm
12
LINSEIS
9
6
3
19:30
12-4-92
9 can
0-100 ppm
0 20 40 60 80 100
100 80 60 40 20 0
15


21:30
12-4-92
9 can
0-100 ppm
LINSEIS
12
9
6
3
21:00
12-4-92
9 can
0-100 ppm
0
20
40
60
80
100
100
80
60
40
20
0
15
12
9
PART NO. LO/6015
PRINTED IN U.S.A.
20:30
12-4-92
0-100 ppm
6



3
22:30
12-4-92
9 can
0-100 ppm
0
40
60
80
100
100
80
60
20
15
12
PART NO. LD/8015
9
PRINTED IN U.S.A.
22:00
12-4-92
9 can
0-100 ppm
6
3
0
20
40
60
80
100
100
80
60
40
20
15
12


23:30
12-4-92
9 can
0-100 ppm
9
PRINTED IN U.S.A.
6
3
0 20 40 60 80 100
100 80 60 40 20 0
15
23:00
12-4-92
9 can
0-100 ppm
11:01
12
LINSEIS
9
6
3



9
24:12
12-4-92
9 can
0-100 ppm
6
24:00
12-4-92
9 can
0-100 ppm
3
0 20 40 60 80 100
100 80 40 20 0
15
12
23:30
12-4-92
9 can
0-100 ppm
9
PART NO.

Appendix 4
Ethanol / Propane Conversion

Ethanol / Propane Conversion

An empirical constant for conversion of propane calibrated FIA data to true ethanol values was experimentally determined. Tedlar gas bags were filled with known volumes of hydorcarbon-free air using an SKC personal sampling pump and an NIST traceable bubble flow calibrator. The bags were then injected with precisely known masses of reagent grade ethanol, using a syringe that was weighed on a certified 0.1 mg scale before and after injection. The bags were allowed time to mix thoroughly and were analyzed using the FIA used for all filler room data collection presented in this report. Immediately before and after each bag was analyzed, the analyzer was challenged with hydorcarbon-free air and calibration gas prepared and certified in accordance with EPA Protocol 1.

Coors Brewing Company
Ethanol / Propane Conversion

Strip Chart Data

run #1	zero %FS	span %FS	span ppm
start	0.0	69.8	701
stop	0.2	69.0	
	bag %FS	bag ppm	
	20.0	201.4	

run #2	zero %FS	span %FS	span ppm
start	0.0	70.0	701
stop	0.2	69.5	
	bag %FS	bag ppm	
	24.0	240.5	

run #3	zero %FS	span %FS	span ppm
start	0.0	69.5	701
stop	0.2	68.0	
	bag %FS	bag ppm	
	68.0	693.3	

run #4	zero %FS	span %FS	span ppm
start	0.0	68.0	701
stop	0.0	67.5	
	bag %FS	bag ppm	
	21.3	220.4	

run #5	zero %FS	span %FS	span ppm
start	0.0	69.5	701
stop	0.0	69.5	
	bag %FS	bag ppm	
	30.0	302.6	

Table A4:1
Ethanol Propane Conversion
Strip Chart Data

Ethanol / Propane Conversion (continued)

Coors Brewing Company
Ethanol / Propane Conversion Data
1-14-93

Laboratory Data

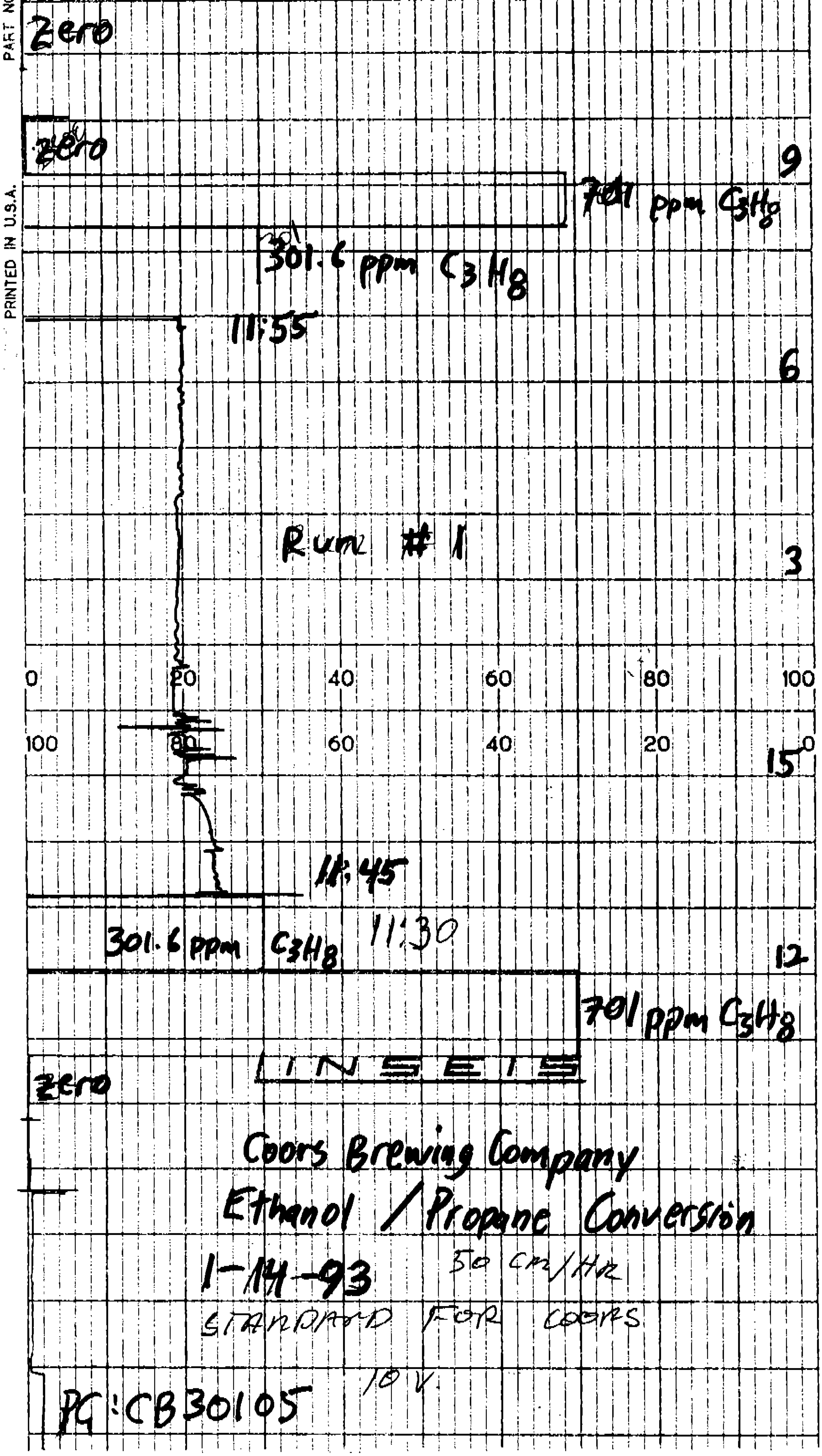
	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
baro. press. (mbar)	842	842	842	842	842	842
temp. (oF)	70	70	70	70	70	70
flow (lpm)	1.85	1.89	1.90	2.37	2.32	2.07
time (min.)	15.0	16.0	15.0	18.0	17.0	16.2
ethanol (g)	0.0204	0.0281	0.0773	0.0350	0.0461	0.0414
propane (ppm)	201.4	240.5	693.3	220.4	302.6	331.6

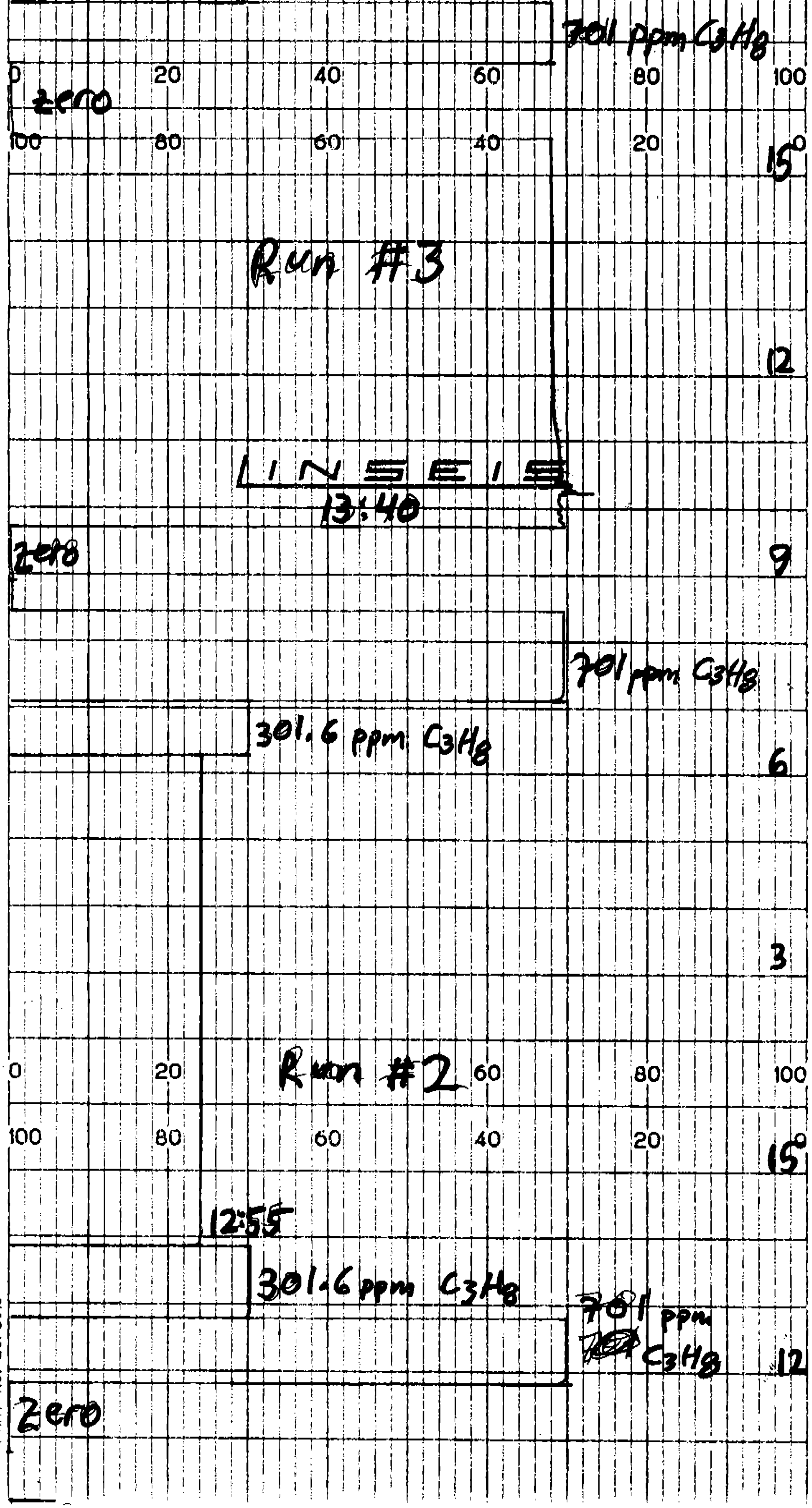
Calculations

	Run #1	Run #2	Run #3	Run #4	Run #5	Averages
ethanol (mg/scm)	890	1120	3275	991	1412	1538
propane (mg/scm)	369	441	1271	404	555	608
conversion factor	2.411	2.541	2.578	2.453	2.545	2.506

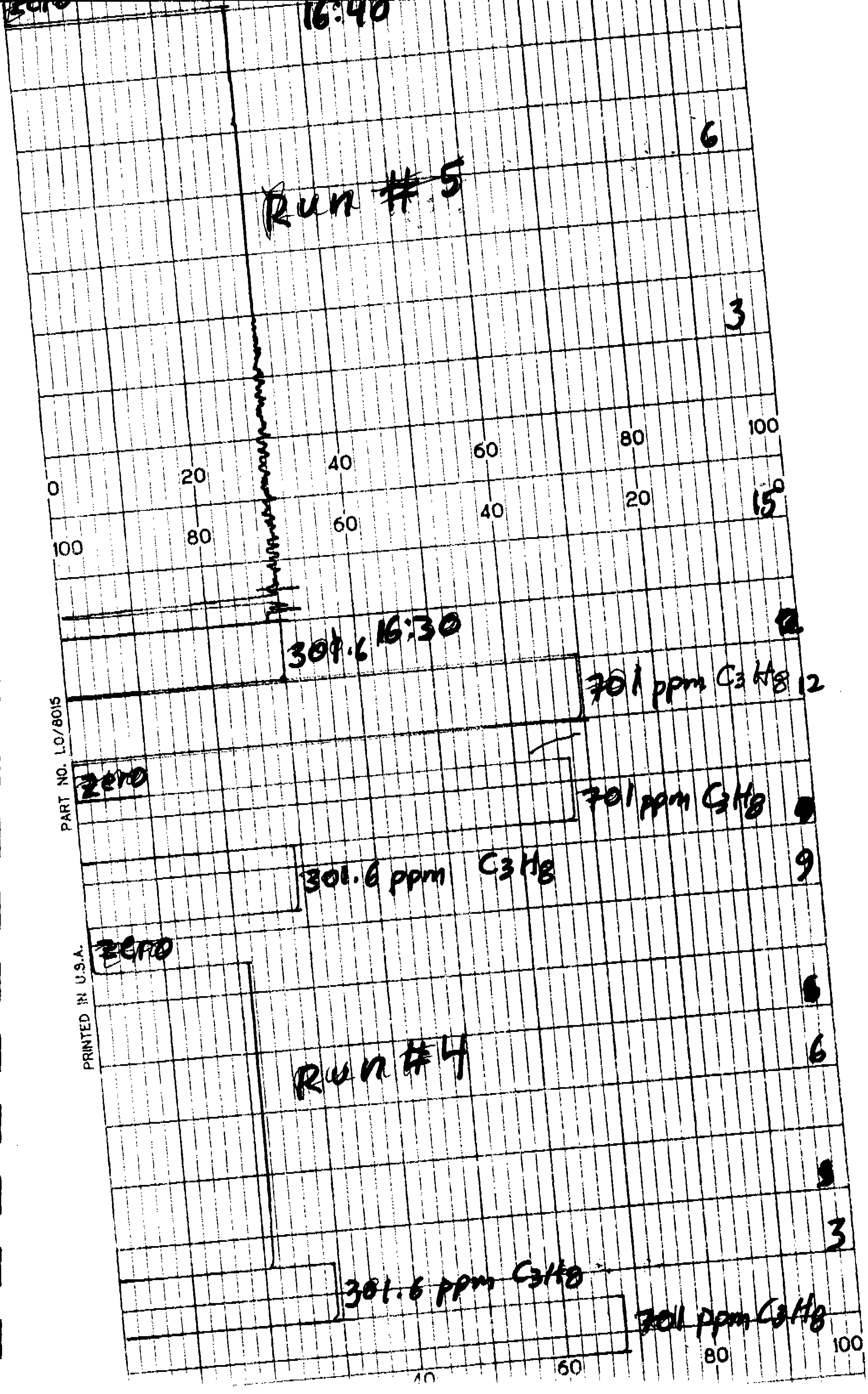
Table A4:2
Ethanol / Propane Conversion
Laboratory Data and Calculations

Ethanol / Propane Conversion
Laboratory Data

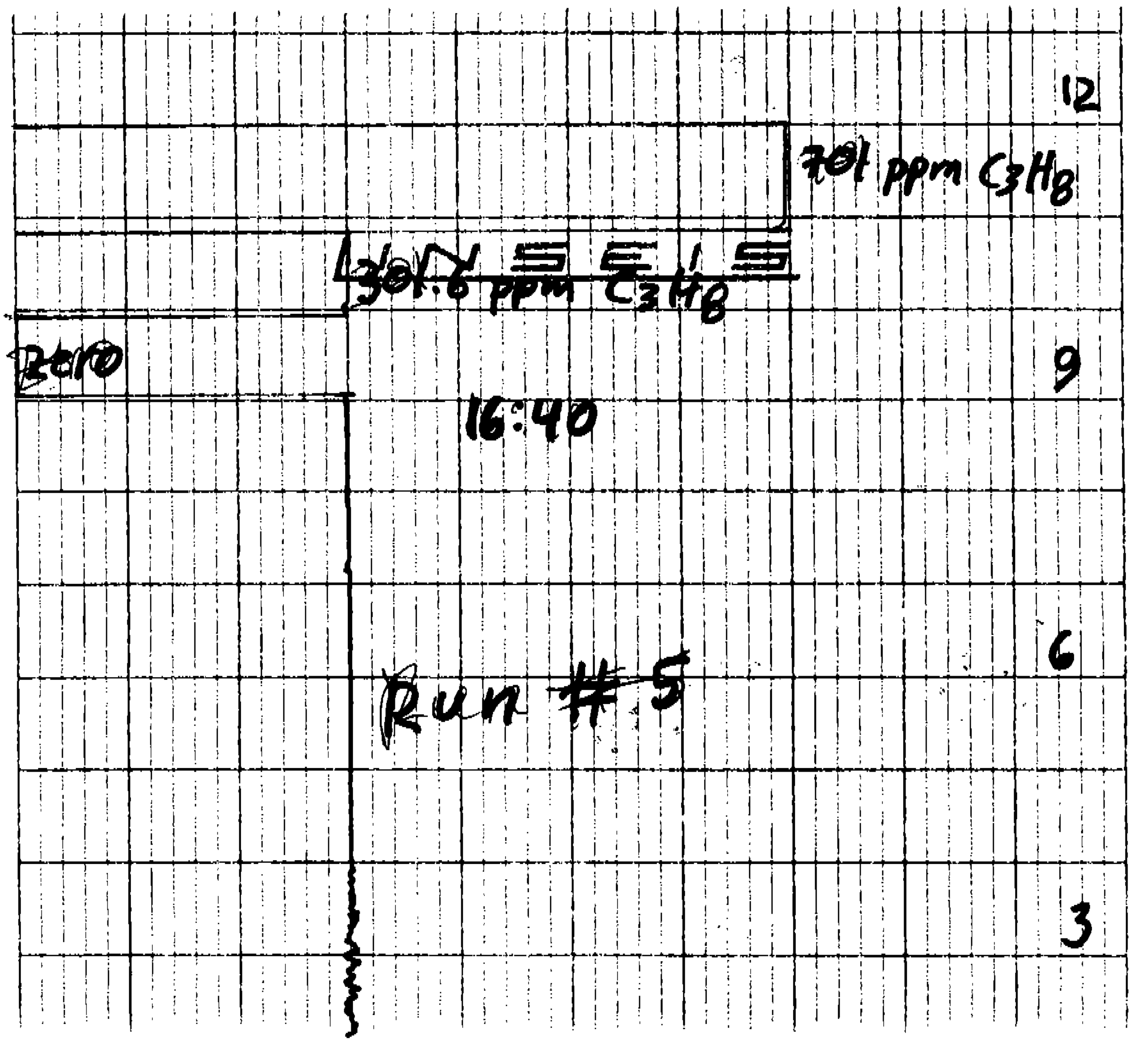

PART NO
PRINTED IN U.S.A.
Zero
zero
9
701 ppm C_3H_8
301.6 ppm C_3H_8
11:55
6
Run #1
3
0 20 40 60 80 100
100 80 60 40 20 0
15
11:45
301.6 ppm C_3H_8
11:30
12
701 ppm C_3H_8
LINSEIS
zero
Coors Brewing Company
Ethanol / Propane Conversion
1-14-93
50 cm/Hr
STANDARD FOR COORS
10 V
PG: CB30105



PART NO. LO/8015



Run #5
6
3
0
20
40
60
80
100
100
80
60
40
20
0
15
301.6
16:30
701 ppm C_3H_8
12
zero
701 ppm C_3H_8
301.6 ppm C_3H_8
9
zero
PART NO. L0/8015
PRINTED IN U.S.A.
Run #4
6
3
301.6 ppm C_3H_8
701 ppm C_3H_8
60
80
100


12
701 ppm C3H8
301.6 ppm C3H8
Zero
9
16:40
6
Run #5
3

AIR POLLUTION TESTING, INC.

Client	Coors Brewing Co
	Golden, CO
Date	1-14-93

Sketch Location 1	Sketch Location 2

Pump # PCXR7		Pre-test flow (liter/min)	Post-test flow (liter/min)	Mid-test flow (liter/min)	Notes: Run #1
Method # Ethanol → Propane		1.88	1.85		Syringe Mass
Ta 70	Pb 842	1.82	1.86		2.0275 tare
Start time 11:25	Stop time 11:40	1.86	1.85		2.0071 final
Average Flows (liter/min)	1.85	1.85	1.85		0.0204 diff

Pump # PCXR 7		Pre-test flow (liter/min)	Post-test flow (liter/min)	Mid-test flow (liter/min)	Notes: Run #2
Method # Ethanol → Propane		1.89	1.90		Syringe Mass
Ta 70	Pb 842	1.89	1.88		2.0249 tare
Start time 12:34	Stop time 12:50	1.91	1.86		1.9968 final
Average Flows (liter/min)	1.89	1.90	1.88		0.0281 diff

AIR POLLUTION TESTING, INC.

Client	Coors Brewing Co
	Golden, Co
Date	1-14-93

Sketch Location 1	Sketch Location 2

Pump # PCXR7		Pre-test flow (liter/min)	Post-test flow (liter/min)	Mid-test flow (liter/min)	Notes: Run #3
Method # Ethanol ⇒ Propane		1.88	1.89		Syringe Mass
Ta 70	Pb 842	1.88	1.90		2.0783 tare
Start time 13:20	Stop time 13:35	1.96	1.89		2.0010 final
Average Flows (liter/min)	1.90	1.91	1.89		0.0773 diff

Pump # PCXR7		Pre-test flow (liter/min)	Post-test flow (liter/min)	Mid-test flow (liter/min)	Notes: Run #4
Method # Ethanol ⇒ Propane		2.41	2.35		Syringe Mass
Ta 70	Pb 842	2.40	2.36		2.0415 tare
Start time 14:25	Stop time 14:43	2.36	2.35		2.0065 final
Average Flows (liter/min)	2.37	2.39	2.35		0.0350 diff

AIR POLLUTION TESTING, INC.

Client Coors Brewing Co	
Golden, CO	
Date 1-14-93	

Sketch Location 1	Sketch Location 2

Pump # PCXR7		Pre-test flow (liter/min)	Post-test flow (liter/min)	Mid-test flow (liter/min)	Notes: Run #5
Method # Ethanol → Propane		2.34	2.33		Syringe Mass
Ta 70	Pb 842	2.31	2.30		2.0334 tare
Start time 16:08	Stop time 16:25	2.29	2.33		1.9873 final
Average Flows (liter/min)	2.32	2.31	2.32		0.0461 diff

Pump #		Pre-test flow (liter/min)	Post-test flow (liter/min)	Mid-test flow (liter/min)	Notes:
Method #					
Ta	Pb				
Start time	Stop time				
Average Flows (liter/min)					

Hydrocarbon Response Factors

6/90

Component	Resp.-Factor JUM-1	Resp.-Factor JUM-2
Methane	1.02	1.04
Propane	1.00	1.00
Acetylene	0.92	0.94
n-Butane	0.98	0.98
n-Hexane	0.85	0.86
n-Heptane	0.91	0.95
iso-Octane	0.99	0.98
cyclo-Hexane	0.93	0.94
Methanol	0.69	0.68
Ethanol	0.65	0.67
iso-Propanol	0.82	0.81
Benzene	1.05	1.05
Toluene	1.02	1.03
4-Ethyltoluene	0.88	0.89
p-Xylene	0.91	0.90
Acetone	0.72	0.73
Diethylether	0.75	0.77
Acetic Acid	0.58	0.55
Acetic Acid Ethylester	0.70	0.72
Acetic Acid Isobutylester	0.88	0.89
Dichlormethane	1.09	1.06
Chloroform	0.82	0.78
1, 1, 1,-Trichlorethane	1.06	1.02
Trichlorethane	1.03	1.01
Tetrachlorethene	1.22	1.20
Chlorbenzene	1.01	1.04
Number of Compounds	26	26
Average	0.903	0.903
Standard Tolerance	0.154	0.152

Data Compiled By :Tuv
Analyzer Type :Model VE-7
Fuel Type :100% H_2
Calibration Gas :Propane

Note: The respone factors are calculated as mg (carbon) per m^3.

Appendix 5
Production Data

M E M O R A N D U M

DECEMBER 08, 1992

TO: TOM BUEB

FROM: MIKE MURPHY

SUBJECT: BARRELAGE DURING PACKAGING STACK TESTING

The following is a listing of the number of cases/barrels produced during the air emissions stack testing on December 2,3 and 4, 1992:

 # 3 BOTTLE FILLER ROOM VENT

Total cs/bbls.
9 a.m. - 1 p.m. - 4700 cs. (12 oz.) => 341 bbls.

NOTE: The testing consisted of three one hour runs, with calibration time (approx. 10 min.) in between. Since these tests did not start exactly on the hour or half hour, it is very difficult to estimate the exact number of cases/barrels produced during the actual test runs.

 # 5F/1CAN FILLER ROOM VENT

Total cs/bbls.
5 p.m. - 8:15 p.m. - 9300 cs. (12 oz.) => 675 bbls.

NOTE: The testing consisted of three one hour runs, with calibration time (approx. 10 min.) in between. Since these tests did not start exactly on the hour or half hour, it is very difficult to estimate the exact number of cases/barrels produced during the actual test runs.

 # 9-1 FILLER ROOM VENT

Total cs/bbls.
7 a.m. Thursday (12/3)-
11:59 p.m. Friday (12/4)- 69934 cs. (12 oz.) => 5076 bbls.

Considerations:
- 7 a.m. - 3 p.m. (12/3) Sterilization of this filler.
- 7 a.m. - 7:20 a.m. (12/4) Pushback from Repeal Coors to 3.2 Coors beer.
- 8:20 a.m. - 8:55 a.m. (12/4) Nitrogen test conducted.

Conversion factors for cases to barrels are:
12 oz. (cans or btls.) - (# cs. * .07258)

#3-1 BOTTLE FILLER ROOM

DATE AND TIME	ROOM STATIC + "WC	ROOM LEAKAGE IN FPM	ROOM TEMP IN F	ROOM HUMID-ITY % RH	ROOF WIND DIRECT-ION	ROOF WIND SPEED IN MPH	ROOF AIR TEMP IN F	NOTE
12/2/92 9:30 AM	0.02	870	69	33	WEST	2.4	28	*1
12/2/92 10:00 AM	0.02	850	68	36	--	--	--	*2
12/2/92 10:30 AM	0.02	840	67	35	SE	6.2	28	*3
12/2/92 11:00 AM	0.02	860	67	42	--	--	--	*4
12/2/92 11:30 AM	0.02	880	66	38	SE	3.9	30	*4
12/2/92 12:NOON	0.018	860	66	38	--	--	--	*4
12/2/92 12:30 PM	0.018	830	67	35	SE	3.7	31	*4
12/2/92 1:00 PM	0.018	850	65	37	--	--	--	*5

*1. START RUNNING 9:00AM, #3-2 FILLER DOWN.
*2. #3-1 RUNNING, #3-2 DOWN.
*3. #3-1 DOWN, CAPPER PROBLEM, 5-10 MIN.
*4. #3-1 RUNNING, #3-2 DOWN.
*5. END OF TEST.

FILRMTST

#5 CAN FILLER ROOM

DATE AND TIME	ROOM STATIC + "WC	ROOM LEAKAGE IN FPM	ROOM TEMP IN F	ROOM HUMID-ITY % RH	ROOF WIND DIRECT-ION	ROOF WIND SPEED IN MPH	ROOF AIR TEMP IN F	NOTE
12/2/92 5:10 PM	0.006	340	72	33	ESE	3.9	28	
12/2/92 5:30 PM	0,01	350	72	33	ESE	3.4	26	*1
12/2/92 5:50 PM	0.005	330	72	33	WEST	4.3	25	*2

*1. SEAMER DOWN TWO MINUTES DURING ROOM TEST.

*2. FILLER DOWN TWO MINUTES DURING ROOM TEST.

#9-1 CAN FILLER ROOM

DATE AND TIME	ROOM STATIC + " WC	ROOM LEAKAGE IN FPM	ROOM TEMP IN F	ROOM HUMID-ITY % RH	ROOF WIND DIRECT-ION	ROOF WIND SPEED IN MPH	ROOF AIR TEMP IN F	NOTE
12/3/92 9:45 AM	0.01	1140	73	20	SW	3.4	24	*1
12/3/92 2:15 PM	0.08	1130	78	17	SE	2.5	21	*2
12/3/92 3:50 PM	0.09	1290	72	27	SE	6.2	21	*3
12/4/92 8:30 AM	0.085	1300	69	24	CALM	0.0	20	*4
12/4/92 1:00 PM	0.09	1320	69	24	CALM	0.0	20	*5

*1. FILLER DOWN, NO PRODUCTION.

*2. FILLER DOWN, NO PRODUCTION, SNOW FALLING.

*3. PRODUCTION STARTED RUNNING 3:15 PM.

*4. FILLER RUNNING, SNOW FALLING.

*5. FILLER DOWN ONE MIN DURING ROOM TEST.

FILLER ROOM CO2 CONCENTRATION AND POSITIVE PRESSURE DATA:

PHIL BARKER 12-7-92

DATE	TIME	%CO2	ROOM PRESSURE
#3 BOTTLE LINE			
12/2/92	9:30 AM	.55	.02 IN. OF H20
	10:00	.50	.02
	10:30	.55	.018
	11:00	.65	.019
	11:30	.70	.017
	12:00	.80	.018
	12:30 PM	.80	.018
	1:00	.90	.018
#5 CAN LINE			
12/2/92	5:30 PM	.15	.01
	6:30	.15	.01
	7:30	.15	.00
	8:30	.15	.00
#9 CAN LINE			
12/4/92	11:30 AM	.01***	***
	4:00 PM	.02	.02
12/5/92	7:30 AM	.02	.018
	3:00 PM	.18	.018

*** READING TAKEN PRIOR TO START-UP

Filler Room VOC Test's

Ed Hudson's Notes
&
observations.

3 Bottle (12/2/92)

9AM - start of Run, intermittent operation at first. - Keystone light

9:20AM - Consistent and steady filling operation

9:57 - intermittent operation.

11AM - 2nd hour of VOC monitoring on exhaust duct started.

overall preliminary results from ATP

Inlet 6000 dscfm
Outlet 1500 dscfm

Inlet VOC = 2-3 ppm

Out let VOC = 30 ppm

Filler #5

(12/2/92)

5PM - started Sampling
Ambient Air in basement = 30ppm CO_2
Continuous sampling of exhaust
for 3 1 hr samples.

Pull bag samples on shroud air supply for VOC levels.

Holes for velocity transverse measurements not cut, will have to get velocity profiles at later date.

5:45 - filler idle, table full
5:47 - " " " "
5:49 - " " " ", operator using pop gun.

5:51 - filler stopped by operator

5:52 - Running

Outlet air velocity = 3900 acfm
= 3105 dscfm

7:30 - Noticed static pressure gauge went to a negative peg.

8:15 - End of exhaust monitoring
Ambient air CO_2 = 16 ppm

8:24 - static pressure gauge again pegged negative

9 Filler

12/3/92

3:15 pm ~~started~~ Filler started

12/4/92

6:21 AM - Beer spill in filler room-bent can.

~~CB~~
before shot down CO_2 = 0.05 - 0.1%
Pushback

7:06 AM - ~~Beer Out~~ Finished filling
beer dumped on floor

7:08 AM - CO_2 peaked at 0.7%
at operator head level.

7:11 AM - CO_2 = 0.2%

7:13 AM - started Wash down
CO_2 = 0.1%

7:17 AM - ~~start~~ Finished Wash down
CO_2 = 0.1%

7:35 AM - started Filling

7:43 AM - CO_2 = 0.18
static Pressure = 0.9" H_2O

7:51 Wash down

9 Filler

(continued)

8:21A – steam in closure off
N_2 on

8:23A – Positive N_2 flow – didn't
have N_2 before this time

8:48A – N_2 off
steam ON

Time hack to Tom Bueb's
watch from which times
around N_2 Test were written
on strip chart.

Tom B Time + 30 seconds = time
of my observations.

Coors Brewing Company
#6 Can Filler Room
Production Data

12-22-92

Verbal from Mike Murphy, Coors Brewing Company:

Beer filling on 12-16-92 for period of VOC testing was 650 bbls.

Relayed to:

Paul Ottenstein

Paul Ottenstein
Project Manager

Appendix 6
Calibration Certificates

Scott Specialty Gases, Inc.

E. P. A. PROTOCOL CERTIFICATE OF ANALYSIS

Shipped from:
Scott Specialty Gases
Route 611
Plumsteadville, PA 18949
Purchase order :
91047

Shipped to:
AIR POLLUTION TESTING INC
ATTN: PO#91047
4535 W 68TH AVE
WESTMINSTER, CO 80030

Project No 0134629

Certified per E.P.A. Protocol # 1 Procedure #G1 Section # 3.0.4
Certified accuracy +/- 1 % NIST Traceable

Cylinder number	ALM002673	Cylinder pressure 2000 psig.	Date of assay:	1/23/92
Component		Certified concentration	Expiration date:	7/23/93
PROPANE		12.24 ppm		
NITROGEN		Balance		

Standard		Analyzer	
Type	GMIS	Make	: VARIAN
Concentration	14.99 ppm	Model	: VA3300
Cylinder #	AAL-12327	Serial number	: 7945
		Analytical principle	: FID
		Date of calibration	: 1/23/92

Raw data units:		AREA	:	: Concentration of Customer Cylinder	:
Analysis		1/23/92	:	:	:
Z1=0.00	R1=67168	T1=54766	:	: 12.22 ppm	:
R2=67173	Z2=0.00	T2=54787	:	: 12.23 ppm	:
Z3=0.00	T3=54905	R3=67021	:	: 12.28 ppm	:

Analyst Pa Q Smith

Approved by Ted Neeme
Mark S. Sirinides/Ted Neeme

Scott Specialty Gases, Inc.

E. P. A. PROTOCOL CERTIFICATE OF ANALYSIS

Shipped from:
Scott Specialty Gases
Route 611
Plumsteadville, PA 18949
Purchase order :
91047

Shipped to:
AIR POLLUTION TESTING INC
ATTN: PO#91047
4535 W 68TH AVE
WESTMINSTER, CO 80030

Project No 0134629

Certified per E.P.A. Protocol # 1 Procedure #G1 Section # 3.0.4
Certified accuracy +/- 1 % NIST Traceable

Cylinder number	ALM016822	Cylinder pressure 2000 psig.	Date of assay:	1/23/92
Component		Certified concentration	Expiration date:	7/23/93
PROPANE		40.1 ppm		
NITROGEN		Balance		

Standard		Analyzer	
Type	GMIS	Make	: VARIAN
Concentration	98.21 ppm	Model	: VA3300
Cylinder #	CAL4282	Serial number	: 7945
		Analytical principle	: FID
		Date of calibration	: 1/23/92

Raw data units:	AREA		Concentration of Customer Cylinder
Analysis	1/23/92		
Z1=0.00	R1=433693	T1=176863	40.1 ppm
R2=432885	Z2=0.00	T2=177019	40.2 ppm
Z3=0.00	T3=176482	R3=432460	40.1 ppm

Analyst Pa Ce Ditte

Approved by Ted Neeme
Mark S. Sirinides/Ted Neeme

Scott Specialty Gases, Inc.

E. P. A. PROTOCOL CERTIFICATE OF ANALYSIS

Shipped from:
Scott Specialty Gases
Route 611
Plumsteadville, PA 18949
Purchase order :
91047

Shipped to:
AIR POLLUTION TESTING INC
ATTN: PO#91047
4535 W 68TH AVE
WESTMINSTER, CO 80030

Project No 0134629

Certified per E.P.A. Protocol # 1 Procedure #G1 Section # 3.0.4
Certified accuracy +/- 1 % NIST Traceable

Cylinder number ALM019712 Cylinder pressure 2000 psig. Date of assay: 1/23/92

Component	Certified concentration	
PROPANE	91.3 ppm	Expiration date: 7/23/93
NITROGEN	Balance	

Standard		Analyzer	
Type	GMIS	Make	: VARIAN
Concentration	98.21 ppm	Model	: VA3300
Cylinder #	CAL4282	Serial number	: 7945
		Analytical principle	: FID
		Date of calibration	: 1/23/92

Raw data units:		AREA	Concentration of Customer Cylinder
Analysis		1/23/92	
Z1=0.00	R1=432474	T1=402119	91.3 ppm
R2=432431	Z2=0.00	T2=402018	91.3 ppm
Z3=0.00	T3=402149	R3=432116	91.4 ppm

Analyst [signature]

Approved by [signature]
Mark S. Sirinides/Ted Neeme

Scott Specialty Gases

500 WEAVER PARK ROAD, LONGMONT, COLORADO 80501 (303) 442-4700 Fax (303) 772-7673

Shipped From : Scott Colorado
Date Shipped : 8-18-92
Our Project # : 808272
Your P.O. # : 92-693
Page ____ of ____
Expiration Date : 02/07/94

Cylinder Number AAL-6506

Cylinder Pressure 2000 psig

CGA Fitting 350

QC Number 22139217

Customer : AIR POLLUTION TESTING INC
4535 W. 68TH AVE
WESTMINSTER CO 80030

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

Certified Per Traceability Protocol # 1 — Section 3.0.4

File # APT301C3

Certified Accuracy 1 % NIST Traceable

COMPONENT	CERTIFIED CONC.	SRM # (CRM #)	CYLINDER NUMBER	CONC.	MAKE/MODEL	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
		REFERENCE STDS			GAS ANALYZER		
PROPANE	301.6 PPM	2646	AAL-18342	973.0 PPM	HEWLETT-PACKARD/5890A	07-13-92	FLAME IONIZATION
		GMIS*	1L-14382	314.0 PPM	3115A34623		

BALANCE GAS : NITROGEN

FIRST ANALYSIS DATE : 07/31/92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	0.3020	302.0	314.0 PPM	0.3140	314.0
0.00	0.3020	302.0		0.3140	314.0
0.00	0.3020	302.0		0.3140	314.0

CALCULATED RESULTS 302.0 / 302.0 / 302.0

AVERAGE : 302.0 PPM

SECOND ANALYSIS DATE : 08/07/92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
0.00	0.3011	301.1	314.0 PPM	0.3140	314.0
0.00	0.3011	301.1		0.3140	314.0
0.00	0.3011	301.1		0.3140	314.0

CALCULATED RESULTS 301.1 / 301.1 / 301.1

AVERAGE : 301.1 PPM

CALIBRATION CURVE 1 st DEGREE

SRM # (CRM #)	CONC. %	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
	0.00	0	0.00	0.00	0.00
	0.00	0	0.00	0.00	0.00
	0.00	0	0.00	0.00	0.00
	0.00	0	0.00	0.00	0.00
	0.00	0	0.00	0.00	0.00
	0.00			0.00	0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : David Chapman
DAVID CHAPMAN

Approved By : RS
RIC SCHMELTEKOPF

Scott Specialty Gases, Inc.

E. P. A. PROTOCOL CERTIFICATE OF ANALYSIS

Shipped from:
Scott Specialty Gases
Route 611
Plumsteadville, PA 18949
Purchase order :
91047

Shipped to:
AIR POLLUTION TESTING INC
ATTN: PO#91047
4535 W 68TH AVE
WESTMINSTER, CO 80030

Project No 0134629

Certified per E.P.A. Protocol # 1 Procedure #G1 Section # 3.0.4
Certified accuracy +/- 1 % NIST Traceable

Cylinder number	ALM016808	Cylinder pressure 2000 psig.	Date of assay:	1/20/92
Component		Certified concentration	Expiration date:	7/20/93
PROPANE		701 ppm		
NITROGEN		Balance		

Standard		Analyzer	
Type	GMIS	Make	: VARIAN
Concentration	750.4 ppm	Model	: VA3300
Cylinder #	A-012415	Serial number	: 7945
		Analytical principle	: FID
		Date of calibration	: 11/11/91

Raw data units:		AREA	Concentration of Customer Cylinder
Analysis		1/20/92	
Z1=0.00	R1=60210	T1=56314	702 ppm
R2=60103	Z2=0.00	T2=56091	700 ppm
Z3=0.00	T3=56017	R3=60025	700 ppm

Analyst [signature]

Approved by [signature]
Mark S. Sirinides/Ted Neeme

Denver Instrument Company

Certificate of Calibration

Model A-160 — Date 11/12/91

Serial Number B033653

We hereby certify that the referenced instrument was manufactured in the United States and that it has been calibrated to full capacity using NBS Class S-1 weights. This instrument has been fully inspected and has passed all quality tests as specified by Denver Instrument Company quality control guidelines.

To assure proper operation, it may be necessary to recalibrate the instrument periodically using known weights.

Cari Scott — Quality Technician

Flavio Szilagyi — Quality Control Manager

Denver Instrument Company
6542 Fig Street • Arvada, Colorado 80004 • 1-800-321-1135

MANUFACTURER'S CALIBRATION CERTIFICATE

The following record shows the accuracy of your digital flowmeter at tested flow rates compared to NBS (NIST) calibrated standard TN 242118 TELEDYNE HBM-1A #1337.

CALIBRATION DATE: 07-18-91

INTERNAL UNIT #: 10516 SERIAL #: 302143

PRESSURE (mb): 1004

TEMPERATURE (C): 21

REL. HUMIDITY (%): 48

CALIBRATION FLOW (ml/min)	% ERROR
49.28	0.84
499.12	-0.84
2982.08	-0.53

CALIBRATED BY: krr

SCIENTIFIC INDUSTRIES, INC.
2207 Bluebell Avenue
Boulder, Colorado 80302-8029
Phone 303-443-7087

AIR POLLUTION TESTING, INC.

4535 West 68th Avenue • Westminster, CO 80030 (303) 426-0402 Fax (303) 426-1922

Meter Calibration Data Sheet

Client	
Date Pre-Test Cal 7-6-92	Pb (mbar) 839
Date Post-Test Cal 1-17-93	Pb (mbar) 841
Max Vaccuum 5 HG	

ΔH	V_{meter}	V_{ref}	T_{ref}	T_{inlet}	T_{outlet}	ΔP	Θ	
0.5	30.115	502.765	70	73	72	.12	0	Y_d 1.0447
0.5	40.000	512.743	72	75	74	.12	22	ΔH@ 1.537
0.5	9.885	9.978	71	74	73	.12		
1.0	40.000	512.743	72	75	74	.16		Y_d 1.0434
1.0	52.103	524.995	72	79	77	.16		ΔH@ 1.073
1.0	12.103	12.252	72	77	75.5	.16		
2.5	54.000	526.792	72	79	77	.28		Y_d 1.0286
2.5	68.100	540.955	73	81	79	.28		ΔH@ 1.809
2.5	14.100	14.163	72.5	80	78	.28		$\overline{Y_d}$ = 1.0389 $\overline{ΔH@}$ = 1.683

ΔH	V_{meter}	V_{ref}	T_{ref}	T_{inlet}	T_{outlet}	ΔP	Θ	
.5	233.185	951.220	68	48	45	.08	0	Y_d 1.065
.5	250.050	969.090	70	68	59	.08	40	ΔH@ 1.62
	16.865	17.87	69	58	52	.08	40	
1.5	250.050	969.090	70	75	64	.16	0	Y_d 1.071
1.5	264.818	984.522	70	81	68	.16	21	ΔH@ 1.78
	14.768	15.422	70	78	66	.16	21	
3.0	264.818	984.522	70	81	68	.29	0	Y_d 1.065
3.0	280.060	000.422	70	89	74	.29	15	ΔH@ 1.73
	15.242	15.900	70	85	71	.29	15	$\overline{Y_d}$ = 1.067 $\overline{ΔH@}$ = 1.71