TEST REPORT FOR 2019 INFORMATIONAL PARTICULATE (PM_{10}) AT THE DESERT VIEW POWER, MECCA PLANT UNIT 2

Prepared for:

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Test Date: **May 1, 2019**
Production Date: **May 23, 2019**
Report Number: **002AS-320471-RT-1502**

STAC STACK TESTING ACCREDITATION COUNCIL

ACCREDITED TO ASTM D7036 ONLY CERT #3925.01

MONTROSE AIR QUALITY SERVICES

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REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature: _____ Date: 5/23/2019

Name: Dave Wonderly Title: Client Project Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: _____ Date: 5/23/2019

Name: Dave Wonderly Title: Client Project Manager

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1.0 INTRODUCTION

Montrose Air Quality Services, LLC (MAQS) was contracted by Desert View Power, to conduct informational particulate <10 microns, testing at the Desert View Power Project, Unit 2 located in Mecca, California. The testing was performed to assist in the correlation of stack opacity measurement to particulate matter less than 10 microns. Testing was conducted on May 1, 2019. The MAQS test team consisted of Dave Wonderly and Robert Howard. Kevin Lawrence of Desert View Power, coordinated plant operations and data retrieval during the test program.

Measurement of filterable particulate was performed using EPA Method 201A.

Tables 1-1 summarize the results of the emissions tests.

TABLE 1-1
SUMMARY OF RESULTS
DESERT VIEW POWER UNIT 2
MAY 1, 2019

Parameter	1-PM_{10}	2-PM_{10}	3-PM_{10}	Average
PM_{10} Catch, mg	0.100	3.000	3.300	2.133
Mass Emissions, lb/hr	0.019	0.553	0.584	0.385
PM_{10} Filterable Catch, mg	0.000	0.000	0.600	0.200
Mass Emissions, lb/hr	0.000	0.000	0.106	0.035
Average Opacity%	2.82	3.00	2.71	2.84

2.0 UNIT DESCRIPTION

The Desert View Power, plant consists of two 297 MMBtu/hour, circulating bed, biomass-fired boilers. The combined units are designed to produce 47 MW of net electrical output. Each unit is equipped with the following pollution control systems:

- An ammonia injection system for control of NO_x emissions;
- Cyclonic mixing of injected ammonia with flue gas to provide for a minimum amount of ammonia slip (emission);
- A limestone injection system to limit emissions of SO_2;
- A reverse air baghouse to control opacity and emissions of sulfates and particulate to very low levels;

The plant CEMS system for each unit includes measurements opacity. The opacity monitor is located on the common stack.

TABLE 2-1
OPACITY MONITOR
DESERT VIEW POWER

Species	Manufacturer	Model/Serial Number	Range
Opacity	Monitor Labs	Lighthawk 560	0-100%

2.1 TEST CONDITIONS

The tests were conducted on Unit 2 while at or near maximum steady state unit load conditions. Limestone injection rate, fuel combustion rate, ammonia injection rate, ash handling operations, excess air level, combustion air distribution, and combustor temperature were set to maintain stable unit operation. For the purposes of this testing Unit 1 was not operating during the test. All particulate at the opacity monitor was from Unit 2. Pertinent operating conditions were recorded by Desert View Power personnel during the tests as presented in Table 2-2.

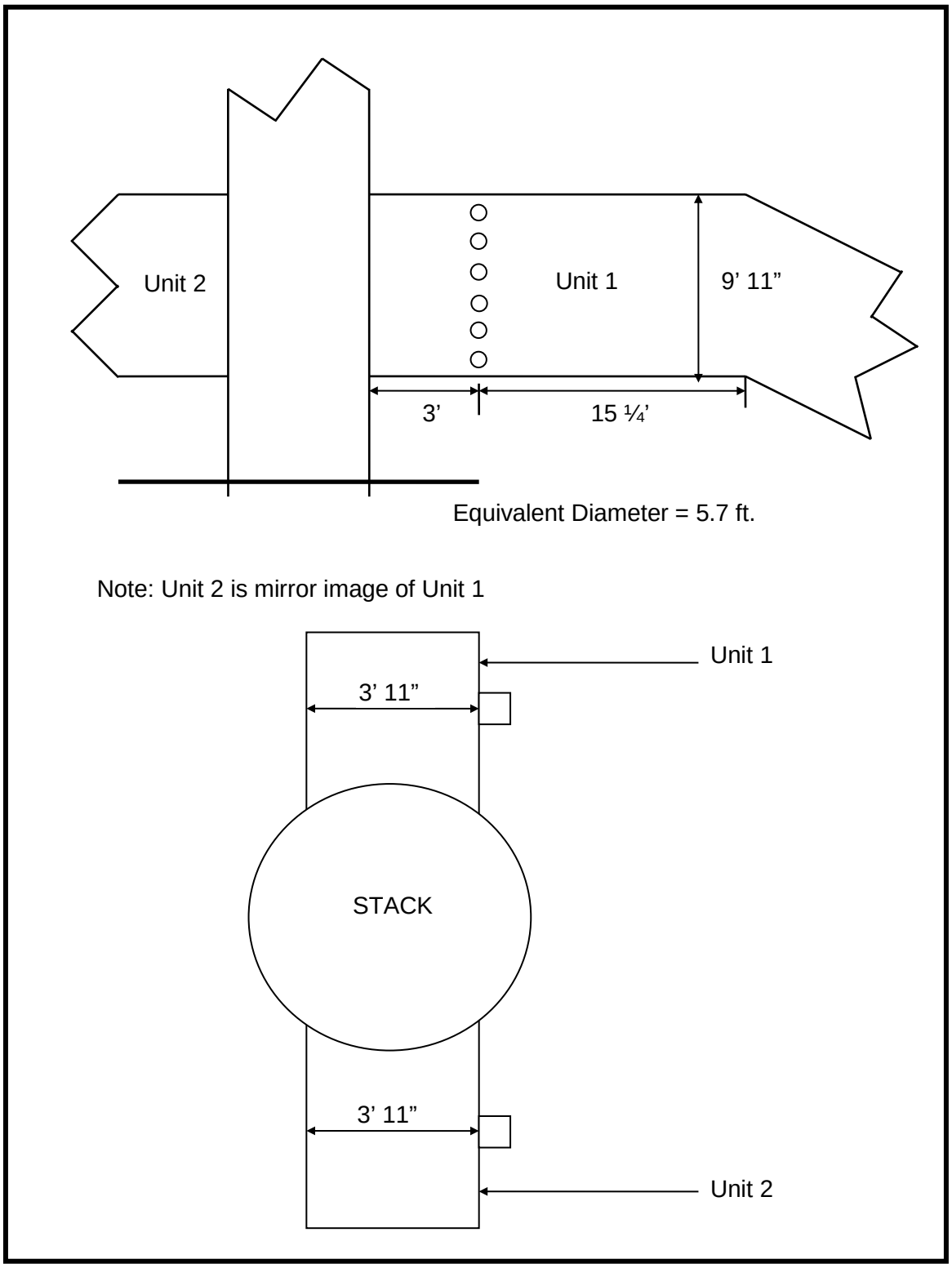
TABLE 2-2
AVERAGE DAILY UNIT DATA
DESERT VIEW POWER
MAY 1, 2019

Date	Unit No.	Steam Flow klbm/hr	Boiler Input MMBtu/hr
5/1/2019	2	201	327

2.2 SAMPLE LOCATIONS

Samples were collected at the stack breaching duct to the stack. Desert View Power previously conducted three dimensional flow testing and stratification testing on the baghouse exhaust ducts on each unit. This testing was performed in accordance to SCAQMD Chapter X, Section 1 and 13 and was presented in the report titled "Stack Gas Stratification and Absence of Flow Disturbance Testing at Desert View Power" (R106E622.T) submitted to SCAQMD in October of 1994. All testing was conducted at the sample location presented in Figure 2-1.

FIGURE 2-1
SCHEMATIC OF THE DESERT VIEW POWER, SAMPLE LOCATION



3.0 TEST DESCRIPTIONS

The test procedures that were used are listed in Table 3-1. Tables 3-2 and 3-3 present the test schedule. The performance test runs for gaseous plant emissions were in some cases also used for RATA test runs. A minimum of nine reference method tests are required for all gaseous species relative accuracy (RA) determinations.

TABLE 3-1
TEST MATRIX PER UNIT
DESERT VIEW POWER

Parameter	No. of Tests	Measurement Principle	Reference Method	Duration per Test
CO_2	3	Non-Dispersive Infrared	EPA 3A	~180 minutes
O_2	3	Electrochemical	EPA 3A	~180 minutes
Filterable PM_{10}	3	Gravimetric	EPA 201A	~180 minutes
Stack Gas Flow Rate	--	S-Type Pitot Traverse	EPA 2	--
Moisture	--	Condensation/Gravimetric	EPA 4	--

3.1 O_2, AND CO_2

O_2 and CO_2 were measured according to EPA reference methods using MAQS' continuous emissions monitoring system (CEM). O_2 and CO_2 concentrations were determined using MAQS' mobile emission measurement laboratory. The laboratory is housed in a truck outfitted to provide a clean, quiet, environmentally controlled base for the testing operations. The laboratory has lighting, electrical distribution, air conditioning and heating to support the test instruments and provide for optimal test performance.

Concentrations of these gaseous species were measured using an extractive sampling system consisting of a stainless steel probe to minimize reactions, a heat traced Teflon sample line connected to a thermo-electrically cooled sample dryer. Following the dryer, the sample is drawn into a Teflon lined pump where it is pressurized and then filtered for delivery to the gas analysis portion of the system. Gaseous samples were collected at a single point. Three 60-minute compliance tests were performed.

Oxygen concentration was determined using an AMI electro-chemical cell analyzer (model #201). The analyzer full scale range was 20%. The cell contains an electrolytic fluid that reacts with oxygen to generate an electrical signal proportional to the concentration.

CO_2 was measured using a non-dispersive infrared analyzer manufactured by Horiba (model #PIR 2000). The analyzer full scale range was 20%.

The analyzers and sampling system were subjected to a variety of calibration and quality assurance procedures including leak checks, linearity and calibration error determinations before sampling, and system bias and drift determinations as part of each test run. Data are corrected for any observed bias or drift in accordance with the reference methods.

3.2 FILTERABLE PM_{10} BY EPA METHOD 201A

Triplicate PM_{10} samples were collected at the stack using EPA Method 201A for both filterable PM_{10} and condensable PM_{10}.

This method separates particulate matter less than 10μm from the flue gas using a cyclone of an EPA approved design. The sample train is operated isokinetically at a constant flow rate using a correctly sized sampling nozzle. Pretest velocity traverses are required in order to correctly calculate the sampling rate. The cyclone is followed by the sample probe, a filter and a series of impingers containing 100 ml of DI water in the first two impingers followed by one empty impinger and an impinger containing silica gel.

The sample train separates PM greater than 10μm and less than 10μm. The components that represent these fractions are:

- nozzle and cyclone wash PM_{10}μm;
- cyclone fittings and probe PM_{10}μm;
- filter, PM_{10};

Sample recovery consisted of:

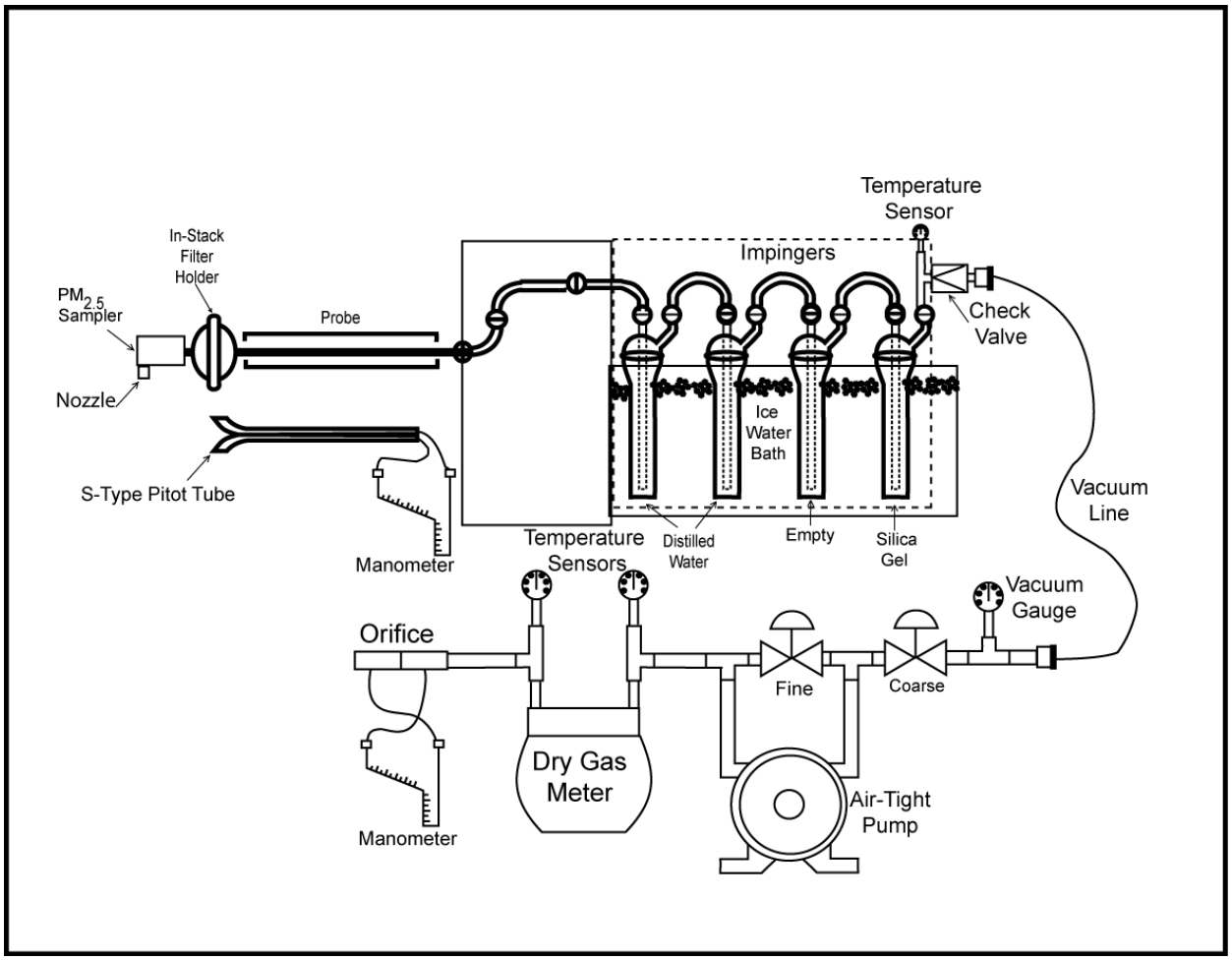
- acetone washing and brushing of the nozzle and cyclone;
- acetone washing and brushing of the cyclone fittings, probe and front half of the filter holder;

Sample analysis of the acetone rinses and filter consists of evaporating or drying the sample, desiccating and weighing the sample.

A SCAQMD Method 5.1 condensable particulate analysis was performed on the back half portion of the sample train for reporting condensable PM_{10}.

Figure 3-2 shows the configuration of the sample train.

FIGURE 3-2
EPA METHOD 201A SAMPLE TRAIN



4.0 RESULTS

This section presents the results of the PM_{10} testing.

All supporting data sheets, CEM data, instrument strip charts, and plant data are included in Appendix A. Laboratory reports and sample chain of custody records are contained in Appendix B. Quality assurance information is contained in Appendix D.

4.1 UNIT 2 PM_{10} TEST RESULTS

TABLE 4-1
PM_{10} TEST RESULTS
DESERT VIEW POWER UNIT 2
MAY 1, 2019

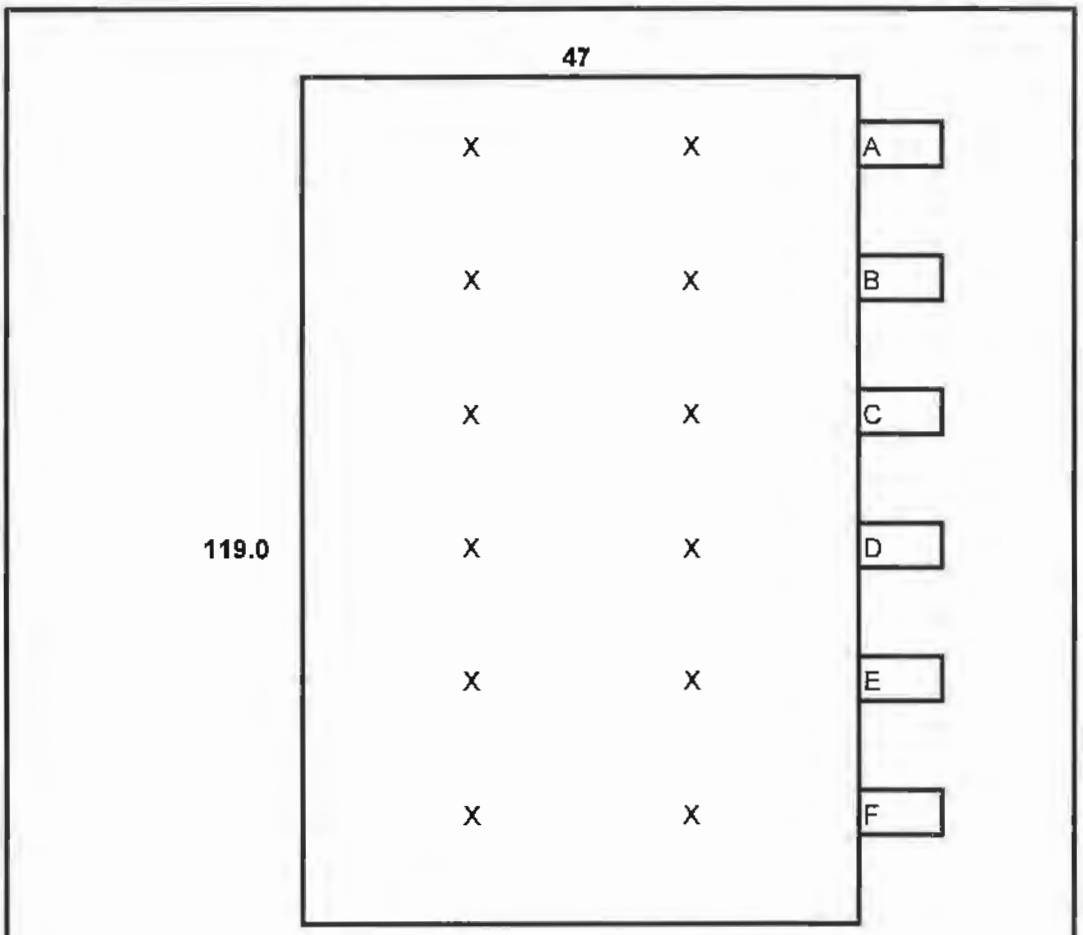
Parameter	1-PM_{10}	2-PM_{10}	3-PM_{10}
Date	5/1/2019	5/1/2019	5/1/2019
Start Time	6:32:00	10:08:00	13:31:00
Stop Time	9:43:15	13:10:00	16:46:15
Stack Gas Velocity (ft/sec)	68.99	67.05	69.97
Stack Temperature (°F)	328.0	343.8	350.6
Moisture Fraction	13.35%	13.23%	12.82%
Stack Flow Rate (wacfm)	160,782	156,244	163,066
Stack Flow Rate (dscfm)	93,764	89,510	93,016
Stack O_2 (%)	8.40	8.62	8.48
Stack CO_2 (%)	12.28	12.04	12.22
PM_{10} Catch, mg	0.1	3.0	3.3
Grain Loading, gr/dscf	0.00002	0.00072	0.00073
Grain Loading @ 3% O_2	0.00003	0.00105	0.00106
Mass Emissions, lb/hr	0.019	0.553	0.584
PM_{10} Filterable Catch, mg	0.0	0.0	0.6
Grain Loading, gr/dscf	0.00000	0.00000	0.00013
Grain Loading @ 3% O_2	0.00000	0.00000	0.00019
Mass Emissions, lb/hr	0.000	0.000	0.106
Total Particulate lb/hr	0.019	0.553	0.691
Total Particulate PM_{10} lb/hr	0.000	0.000	0.106
Opacity %	2.82	3.00	2.71

APPENDIX A
FIELD AND PLANT OPERATING DATA

Appendix A.1
Unit 2 Sample Location

Client: Desert View Power Date: 5/1/2019

Sample Location: Unit 2 Prepared By: Dave Wonderly



H (in.)	**119.0**
W (in.)	**47.0**
Nipple length	**13.0**
Stack Area (ft^2)	**38.84**
istance between points	**23.50**

Sample Points

	inches from stack wall	Inches from port nipple
1	11.8	24.8
2	35.3	48.3

Appendix A.2
CEM Data

Date	Time	O2 %	CO2 %	NOx ppm	CO ppm
5/1/2019	5:49	19.05	19.21		
5/1/2019	5:50	19.01	19.04	High	
5/1/2019	5:51	13.04	13.23		
5/1/2019	5:52	10.64	10.59	Mid	
5/1/2019	5:53	1.89	2.31		
5/1/2019	5:54	0.00	0.02	Zero Bias	
5/1/2019	5:55	0.00	0.02		
5/1/2019	5:56	11.66	4.38		
5/1/2019	5:57	8.71	11.84		
5/1/2019	5:58	8.56	12.05		
5/1/2019	5:59	7.98	12.59		
5/1/2019	6:00	8.33	12.24		
5/1/2019	6:01	8.83	11.73		
5/1/2019	6:02	9.22	11.34		
5/1/2019	6:03	8.38	12.25		
5/1/2019	6:04	8.43	12.15		
5/1/2019	6:05	8.24	12.36		
5/1/2019	6:06	8.12	12.46		
5/1/2019	6:07	7.88	12.69		
5/1/2019	6:08	8.52	12.06		
5/1/2019	6:09	8.83	11.71		
5/1/2019	6:10	9.18	11.42		
5/1/2019	6:11	9.64	10.90		
5/1/2019	6:12	9.39	11.21		
5/1/2019	6:13	9.27	11.33		
5/1/2019	6:14	9.03	11.53		
5/1/2019	6:15	8.50	12.12		
5/1/2019	6:16	8.45	12.13		
5/1/2019	6:17	8.69	11.92		
5/1/2019	6:18	8.82	11.74		
5/1/2019	6:19	8.68	11.91		
5/1/2019	6:20	8.42	12.16		
5/1/2019	6:21	8.17	12.39		
5/1/2019	6:22	8.59	12.03		
5/1/2019	6:23	7.64	12.97		
5/1/2019	6:24	7.89	12.70		
5/1/2019	6:25	8.59	11.95		
5/1/2019	6:26	8.98	11.58		
5/1/2019	6:27	8.53	12.06		
5/1/2019	6:28	8.50	12.13		
5/1/2019	6:29	7.42	13.15		
5/1/2019	6:30	7.42	13.15		
5/1/2019	6:31	8.60	11.96		
5/1/2019	6:32	8.72	11.83		
5/1/2019	6:33	3.24	2.45		
5/1/2019	6:34	0.01	0.04		
5/1/2019	6:35	0.00	0.04		

5/1/2019	6:36	0.00	0.03	
5/1/2019	6:37	0.00	0.03	
5/1/2019	6:38	0.10	0.34	
5/1/2019	6:39	8.71	10.39	
5/1/2019	6:40	10.58	10.53	O2 CO2 Bias
5/1/2019	6:41	2.30	2.02	
5/1/2019	6:42	0.00	0.04	Zero Bias
5/1/2019	6:43	5.09	9.08	
5/1/2019	6:44	7.93	12.61	
5/1/2019	6:45	8.91	11.63	
5/1/2019	6:46	8.69	11.87	
5/1/2019	6:47	8.82	11.74	
5/1/2019	6:48	9.02	11.53	
5/1/2019	6:49	9.38	11.22	
5/1/2019	6:50	8.00	12.58	
5/1/2019	6:51	7.75	12.83	
5/1/2019	6:52	8.05	12.54	
5/1/2019	6:53	7.79	12.78	
5/1/2019	6:54	7.75	12.84	
5/1/2019	6:55	8.57	11.96	
5/1/2019	6:56	8.27	12.34	
5/1/2019	6:57	8.49	12.07	
5/1/2019	6:58	8.69	11.87	
5/1/2019	6:59	9.16	11.37	
5/1/2019	7:00	8.83	11.74	
5/1/2019	7:01	7.88	12.72	
5/1/2019	7:02	7.38	13.24	
5/1/2019	7:03	6.98	13.58	
5/1/2019	7:04	8.78	11.73	
5/1/2019	7:05	8.67	11.90	
5/1/2019	7:06	8.54	12.04	
5/1/2019	7:07	9.17	11.39	
5/1/2019	7:08	8.32	12.25	
5/1/2019	7:09	8.92	11.61	
5/1/2019	7:10	9.35	11.18	
5/1/2019	7:11	8.27	12.35	
5/1/2019	7:12	8.14	12.42	
5/1/2019	7:13	8.31	12.22	
5/1/2019	7:14	8.61	11.95	
5/1/2019	7:15	8.24	12.34	
5/1/2019	7:16	8.15	12.39	
5/1/2019	7:17	8.30	12.28	
5/1/2019	7:18	8.02	12.52	
5/1/2019	7:19	8.26	12.29	
5/1/2019	7:20	8.61	11.93	
5/1/2019	7:21	8.35	12.19	
5/1/2019	7:22	7.93	12.62	
5/1/2019	7:23	8.64	11.83	
5/1/2019	7:24	8.50	12.05	

5/1/2019	7:25	8.39	12.16
5/1/2019	7:26	8.60	11.92
5/1/2019	7:27	8.67	11.86
5/1/2019	7:28	8.57	11.99
5/1/2019	7:29	7.98	12.60
5/1/2019	7:30	7.76	12.73
5/1/2019	7:31	7.66	12.94
5/1/2019	7:32	7.36	13.18
5/1/2019	7:33	7.99	12.53
5/1/2019	7:34	8.74	11.78
5/1/2019	7:35	7.95	12.60
5/1/2019	7:36	7.83	12.70
5/1/2019	7:37	8.76	11.77
5/1/2019	7:38	8.20	12.30
5/1/2019	7:39	8.78	11.73
5/1/2019	7:40	8.59	11.98
5/1/2019	7:41	8.41	12.07
5/1/2019	7:42	8.79	11.71
5/1/2019	7:43	9.22	11.34
5/1/2019	7:44	8.84	11.72
5/1/2019	7:45	8.31	12.23
5/1/2019	7:46	7.67	12.94
5/1/2019	7:47	7.51	13.03
5/1/2019	7:48	7.52	13.02
5/1/2019	7:49	8.14	12.38
5/1/2019	7:50	8.40	12.11
5/1/2019	7:51	8.55	12.00
5/1/2019	7:52	9.08	11.45
5/1/2019	7:53	8.40	12.15
5/1/2019	7:54	8.45	12.09
5/1/2019	7:55	7.96	12.63
5/1/2019	7:56	8.22	12.32
5/1/2019	7:57	8.24	12.32
5/1/2019	7:58	8.20	12.39
5/1/2019	7:59	7.66	12.90
5/1/2019	8:00	7.65	12.89
5/1/2019	8:01	7.25	13.29
5/1/2019	8:02	8.51	12.03
5/1/2019	8:03	8.58	11.99
5/1/2019	8:04	7.67	12.93
5/1/2019	8:05	7.58	12.98
5/1/2019	8:06	8.86	11.61
5/1/2019	8:07	9.63	10.98
5/1/2019	8:08	8.24	12.32
5/1/2019	8:09	9.18	11.36
5/1/2019	8:10	8.20	12.41
5/1/2019	8:11	8.50	12.00
5/1/2019	8:12	9.33	11.23
5/1/2019	8:13	9.12	11.42

5/1/2019	8:14	8.44	12.14
5/1/2019	8:15	8.76	11.80
5/1/2019	8:16	8.05	12.54
5/1/2019	8:17	7.84	12.75
5/1/2019	8:18	7.81	12.78
5/1/2019	8:19	7.97	12.58
5/1/2019	8:20	8.27	12.33
5/1/2019	8:21	8.02	12.53
5/1/2019	8:22	7.81	12.74
5/1/2019	8:23	8.23	12.34
5/1/2019	8:24	8.25	12.28
5/1/2019	8:25	8.57	12.02
5/1/2019	8:26	7.93	12.64
5/1/2019	8:27	7.04	13.52
5/1/2019	8:28	8.50	12.02
5/1/2019	8:29	8.99	11.56
5/1/2019	8:30	8.36	12.21
5/1/2019	8:31	8.03	12.54
5/1/2019	8:32	9.07	11.44
5/1/2019	8:33	8.72	11.84
5/1/2019	8:34	8.67	11.88
5/1/2019	8:35	8.42	12.16
5/1/2019	8:36	8.93	11.57
5/1/2019	8:37	8.63	11.98
5/1/2019	8:38	7.62	12.96
5/1/2019	8:39	7.95	12.64
5/1/2019	8:40	8.09	12.49
5/1/2019	8:41	8.40	12.12
5/1/2019	8:42	8.98	11.55
5/1/2019	8:43	8.94	11.60
5/1/2019	8:44	8.98	11.60
5/1/2019	8:45	7.94	12.64
5/1/2019	8:46	8.14	12.43
5/1/2019	8:47	8.14	12.45
5/1/2019	8:48	7.78	12.81
5/1/2019	8:49	7.86	12.66
5/1/2019	8:50	8.19	12.36
5/1/2019	8:51	8.23	12.34
5/1/2019	8:52	7.96	12.61
5/1/2019	8:53	7.95	12.59
5/1/2019	8:54	8.02	12.58
5/1/2019	8:55	7.82	12.69
5/1/2019	8:56	8.39	12.17
5/1/2019	8:57	8.84	11.71
5/1/2019	8:58	8.86	11.67
5/1/2019	8:59	9.14	11.38
5/1/2019	9:00	7.96	12.66
5/1/2019	9:01	7.59	12.99
5/1/2019	9:02	8.10	12.46

5/1/2019	9:03	8.99	11.51	
5/1/2019	9:04	9.07	11.51	
5/1/2019	9:05	8.63	11.96	
5/1/2019	9:06	8.77	11.80	
5/1/2019	9:07	8.38	12.20	
5/1/2019	9:08	8.15	12.43	
5/1/2019	9:09	8.59	11.96	
5/1/2019	9:10	8.39	12.18	
5/1/2019	9:11	8.07	12.51	
5/1/2019	9:12	8.24	12.31	
5/1/2019	9:13	8.30	12.25	
5/1/2019	9:14	8.39	12.18	
5/1/2019	9:15	7.74	12.83	
5/1/2019	9:16	8.29	12.24	
5/1/2019	9:17	8.45	12.06	
5/1/2019	9:18	8.70	11.84	
5/1/2019	9:19	9.05	11.48	
5/1/2019	9:20	8.76	11.75	
5/1/2019	9:21	8.91	11.61	
5/1/2019	9:22	8.94	11.59	
5/1/2019	9:23	8.14	12.50	
5/1/2019	9:24	7.49	13.05	
5/1/2019	9:25	7.23	13.32	
5/1/2019	9:26	7.64	12.89	
5/1/2019	9:27	8.53	11.99	
5/1/2019	9:28	8.81	11.76	
5/1/2019	9:29	8.23	12.29	
5/1/2019	9:30	7.64	12.95	
5/1/2019	9:31	7.51	13.03	
5/1/2019	9:32	7.90	12.63	
5/1/2019	9:33	8.49	12.05	
5/1/2019	9:34	8.76	11.81	
5/1/2019	9:35	7.59	12.94	
5/1/2019	9:36	8.86	11.63	
5/1/2019	9:37	8.93	11.62	
5/1/2019	9:38	8.24	12.32	
5/1/2019	9:39	8.47	12.10	
5/1/2019	9:40	7.87	12.69	
5/1/2019	9:41	8.42	12.08	
5/1/2019	9:42	8.63	11.91	
5/1/2019	9:43	8.51	12.05	
Average		8.33	12.22	
5/1/2019	9:44	3.22	3.99	
5/1/2019	9:45	0.00	0.04	
5/1/2019	9:46	-0.01	0.04	Zero Bias
5/1/2019	9:47	0.02	0.11	
5/1/2019	9:48	10.04	10.17	
5/1/2019	9:49	10.56	10.52	O2 CO2 Bias
5/1/2019	9:50	0.97	1.23	

5/1/2019	9:51	-0.01	0.02	Zero
5/1/2019	9:52	9.41	9.00	
5/1/2019	9:53	10.63	10.55	
5/1/2019	9:54	10.63	10.56	Span
5/1/2019	9:55	10.00	10.81	
5/1/2019	9:56	8.67	11.87	
5/1/2019	9:57	8.05	12.46	
5/1/2019	9:58	8.37	12.10	
5/1/2019	9:59	8.90	11.57	
5/1/2019	10:00	7.97	12.55	
5/1/2019	10:01	7.90	12.59	
5/1/2019	10:02	7.81	12.68	
5/1/2019	10:03	8.07	12.42	
5/1/2019	10:04	8.07	12.42	
5/1/2019	10:05	8.18	12.30	
5/1/2019	10:06	8.37	12.12	
5/1/2019	10:07	8.48	12.00	
5/1/2019	10:08	7.46	13.04	
5/1/2019	10:09	8.76	11.69	
5/1/2019	10:10	9.03	11.46	
5/1/2019	10:11	9.15	11.32	
5/1/2019	10:12	9.19	11.30	
5/1/2019	10:13	7.95	12.56	
5/1/2019	10:14	8.42	12.04	
5/1/2019	10:15	8.66	11.84	
5/1/2019	10:16	8.49	12.02	
5/1/2019	10:17	7.85	12.64	
5/1/2019	10:18	7.75	12.76	
5/1/2019	10:19	8.33	12.15	
5/1/2019	10:20	8.49	11.99	
5/1/2019	10:21	8.46	12.05	
5/1/2019	10:22	8.48	12.00	
5/1/2019	10:23	7.85	12.65	
5/1/2019	10:24	7.05	13.45	
5/1/2019	10:25	7.11	13.38	
5/1/2019	10:26	7.31	13.16	
5/1/2019	10:27	8.61	11.84	
5/1/2019	10:28	8.78	11.68	
5/1/2019	10:29	9.89	10.58	
5/1/2019	10:30	9.52	10.97	
5/1/2019	10:31	9.49	10.97	
5/1/2019	10:32	10.06	10.43	
5/1/2019	10:33	10.02	10.50	
5/1/2019	10:34	8.79	11.71	
5/1/2019	10:35	8.81	11.68	
5/1/2019	10:36	8.48	12.02	
5/1/2019	10:37	8.23	12.26	
5/1/2019	10:38	8.59	11.91	
5/1/2019	10:39	8.37	12.12	

5/1/2019	10:40	7.87	12.63
5/1/2019	10:41	8.54	11.94
5/1/2019	10:42	7.75	12.74
5/1/2019	10:43	8.07	12.41
5/1/2019	10:44	9.20	11.29
5/1/2019	10:45	9.50	10.98
5/1/2019	10:46	9.44	11.06
5/1/2019	10:47	8.50	12.04
5/1/2019	10:48	7.77	12.75
5/1/2019	10:49	8.27	12.22
5/1/2019	10:50	8.49	11.99
5/1/2019	10:51	8.48	12.02
5/1/2019	10:52	8.78	11.71
5/1/2019	10:53	9.49	11.00
5/1/2019	10:54	8.19	12.34
5/1/2019	10:55	8.37	12.13
5/1/2019	10:56	8.96	11.51
5/1/2019	10:57	8.56	11.96
5/1/2019	10:58	9.22	11.25
5/1/2019	10:59	8.59	11.91
5/1/2019	11:00	8.08	12.45
5/1/2019	11:01	7.76	12.74
5/1/2019	11:02	8.24	12.28
5/1/2019	11:03	7.90	12.59
5/1/2019	11:04	8.22	12.29
5/1/2019	11:05	7.94	12.57
5/1/2019	11:06	7.70	12.79
5/1/2019	11:07	7.44	13.07
5/1/2019	11:08	7.08	13.42
5/1/2019	11:09	7.55	12.92
5/1/2019	11:10	8.45	12.00
5/1/2019	11:11	9.94	10.51
5/1/2019	11:12	10.46	10.06
5/1/2019	11:13	9.23	11.30
5/1/2019	11:14	8.46	12.00
5/1/2019	11:15	8.52	11.98
5/1/2019	11:16	7.82	12.71
5/1/2019	11:17	7.86	12.64
5/1/2019	11:18	7.87	12.62
5/1/2019	11:19	7.59	12.87
5/1/2019	11:20	8.29	12.19
5/1/2019	11:21	8.32	12.17
5/1/2019	11:22	9.08	11.41
5/1/2019	11:23	10.15	10.35
5/1/2019	11:24	10.00	10.53
5/1/2019	11:25	9.25	11.27
5/1/2019	11:26	9.15	11.35
5/1/2019	11:27	9.30	11.22
5/1/2019	11:28	8.97	11.54

5/1/2019	11:29	8.84	11.66
5/1/2019	11:30	8.36	12.18
5/1/2019	11:31	7.74	12.76
5/1/2019	11:32	7.94	12.58
5/1/2019	11:33	8.32	12.20
5/1/2019	11:34	8.12	12.39
5/1/2019	11:35	8.06	12.46
5/1/2019	11:36	8.36	12.13
5/1/2019	11:37	8.53	12.00
5/1/2019	11:38	7.72	12.80
5/1/2019	11:39	7.70	12.78
5/1/2019	11:40	8.47	12.05
5/1/2019	11:41	8.93	11.52
5/1/2019	11:42	9.42	11.04
5/1/2019	11:43	7.84	12.68
5/1/2019	11:44	8.13	12.36
5/1/2019	11:45	8.08	12.41
5/1/2019	11:46	9.22	11.22
5/1/2019	11:47	9.15	11.32
5/1/2019	11:48	8.36	12.13
5/1/2019	11:49	8.33	12.15
5/1/2019	11:50	8.18	12.29
5/1/2019	11:51	8.35	12.11
5/1/2019	11:52	8.62	11.84
5/1/2019	11:53	8.43	12.03
5/1/2019	11:54	8.30	12.16
5/1/2019	11:55	8.65	11.79
5/1/2019	11:56	8.61	11.86
5/1/2019	11:57	8.06	12.40
5/1/2019	11:58	8.67	11.75
5/1/2019	11:59	9.64	10.79
5/1/2019	12:00	9.42	11.05
5/1/2019	12:01	7.86	12.63
5/1/2019	12:02	8.02	12.42
5/1/2019	12:03	7.81	12.63
5/1/2019	12:04	7.92	12.50
5/1/2019	12:05	8.77	11.63
5/1/2019	12:06	9.65	10.79
5/1/2019	12:07	9.66	10.79
5/1/2019	12:08	9.56	10.88
5/1/2019	12:09	9.45	11.00
5/1/2019	12:10	9.88	10.57
5/1/2019	12:11	9.45	11.01
5/1/2019	12:12	8.84	11.61
5/1/2019	12:13	8.06	12.38
5/1/2019	12:14	8.34	12.09
5/1/2019	12:15	8.62	11.84
5/1/2019	12:16	7.57	12.87
5/1/2019	12:17	8.11	12.33

5/1/2019	12:18	8.32	12.13
5/1/2019	12:19	8.59	11.85
5/1/2019	12:20	8.18	12.28
5/1/2019	12:21	7.67	12.80
5/1/2019	12:22	8.39	12.03
5/1/2019	12:23	8.44	11.99
5/1/2019	12:24	8.58	11.89
5/1/2019	12:25	8.21	12.26
5/1/2019	12:26	8.35	12.10
5/1/2019	12:27	8.42	12.03
5/1/2019	12:28	9.31	11.13
5/1/2019	12:29	8.63	11.83
5/1/2019	12:30	8.77	11.66
5/1/2019	12:31	7.89	12.58
5/1/2019	12:32	8.16	12.27
5/1/2019	12:33	8.57	11.88
5/1/2019	12:34	8.27	12.16
5/1/2019	12:35	7.91	12.56
5/1/2019	12:36	7.64	12.82
5/1/2019	12:37	7.37	13.06
5/1/2019	12:38	7.35	13.09
5/1/2019	12:39	7.55	12.85
5/1/2019	12:40	9.02	11.34
5/1/2019	12:41	9.65	10.75
5/1/2019	12:42	9.88	10.52
5/1/2019	12:43	9.77	10.68
5/1/2019	12:44	9.98	10.44
5/1/2019	12:45	9.73	10.74
5/1/2019	12:46	8.89	11.55
5/1/2019	12:47	9.20	11.19
5/1/2019	12:48	8.56	11.90
5/1/2019	12:49	8.47	11.98
5/1/2019	12:50	8.53	11.91
5/1/2019	12:51	7.63	12.82
5/1/2019	12:52	7.40	13.04
5/1/2019	12:53	7.56	12.88
5/1/2019	12:54	8.21	12.17
5/1/2019	12:55	8.78	11.64
5/1/2019	12:56	8.93	11.41
5/1/2019	12:57	8.98	11.36
5/1/2019	12:58	9.44	10.90
5/1/2019	12:59	8.86	11.50
5/1/2019	13:00	7.84	12.51
5/1/2019	13:01	8.30	12.03
5/1/2019	13:02	8.39	11.95
5/1/2019	13:03	8.68	11.62
5/1/2019	13:04	8.59	11.80
5/1/2019	13:05	8.28	12.09
5/1/2019	13:06	7.79	12.59

5/1/2019	13:07	8.23	12.20	
5/1/2019	13:08	8.66	11.74	
5/1/2019	13:09	8.71	11.71	
5/1/2019	13:10	9.50	10.93	
Average		8.53	11.93	
5/1/2019	13:11	9.40	11.02	
5/1/2019	13:12	10.52	10.44	
5/1/2019	13:13	10.53	10.45	O2 CO2 Bias
5/1/2019	13:14	2.89	2.68	
5/1/2019	13:15	0.01	0.08	Zero Bias
5/1/2019	13:16	8.92	8.34	
5/1/2019	13:17	10.62	10.51	Span
5/1/2019	13:18	2.38	2.62	
5/1/2019	13:19	-0.01	0.02	Zero
5/1/2019	13:20	5.68	7.76	
5/1/2019	13:21	8.19	12.26	
5/1/2019	13:22	7.93	12.53	
5/1/2019	13:23	8.38	12.06	
5/1/2019	13:24	8.18	12.28	
5/1/2019	13:25	8.04	12.40	
5/1/2019	13:26	8.14	12.32	
5/1/2019	13:27	7.56	12.93	
5/1/2019	13:28	8.47	11.96	
5/1/2019	13:29	8.87	11.60	
5/1/2019	13:30	8.34	12.13	
5/1/2019	13:31	8.09	12.39	
5/1/2019	13:32	7.51	12.95	
5/1/2019	13:33	8.36	12.05	
5/1/2019	13:34	8.63	11.84	
5/1/2019	13:35	8.32	12.12	
5/1/2019	13:36	8.51	11.92	
5/1/2019	13:37	8.40	12.06	
5/1/2019	13:38	8.69	11.75	
5/1/2019	13:39	8.47	11.94	
5/1/2019	13:40	9.22	11.24	
5/1/2019	13:41	8.01	12.45	
5/1/2019	13:42	8.52	11.90	
5/1/2019	13:43	8.69	11.74	
5/1/2019	13:44	8.85	11.58	
5/1/2019	13:45	8.48	11.97	
5/1/2019	13:46	7.74	12.71	
5/1/2019	13:47	7.30	13.14	
5/1/2019	13:48	6.98	13.48	
5/1/2019	13:49	7.01	13.38	
5/1/2019	13:50	8.01	12.40	
5/1/2019	13:51	8.72	11.70	
5/1/2019	13:52	7.92	12.53	
5/1/2019	13:53	8.23	12.19	

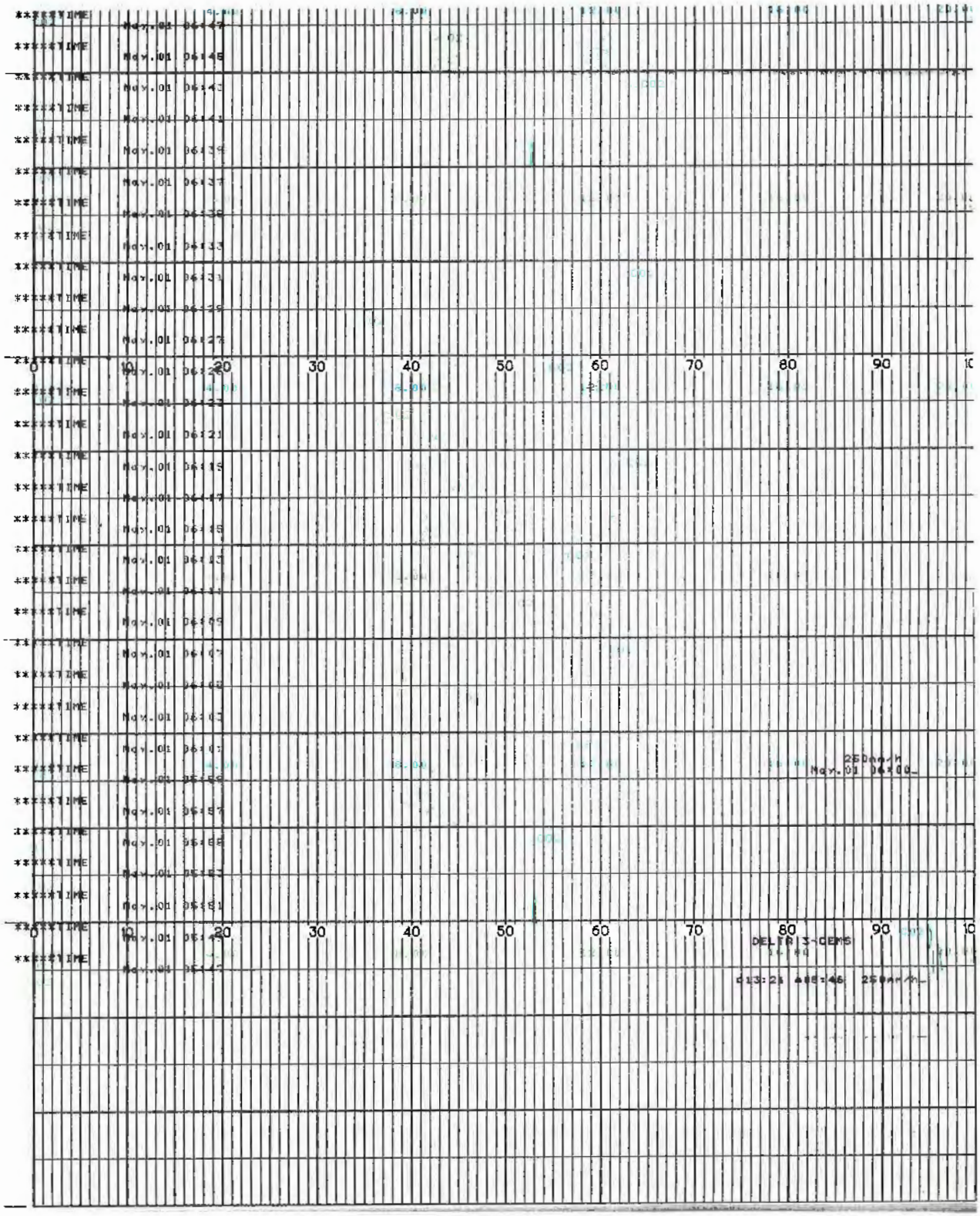
5/1/2019	13:54	9.22	11.15
5/1/2019	13:55	9.97	10.45
5/1/2019	13:56	9.50	10.91
5/1/2019	13:57	9.26	11.16
5/1/2019	13:58	9.37	11.06
5/1/2019	13:59	9.12	11.30
5/1/2019	14:00	8.63	11.83
5/1/2019	14:01	8.29	12.15
5/1/2019	14:02	8.30	12.13
5/1/2019	14:03	8.43	12.03
5/1/2019	14:04	7.64	12.79
5/1/2019	14:05	8.49	11.92
5/1/2019	14:06	9.24	11.17
5/1/2019	14:07	9.16	11.26
5/1/2019	14:08	8.38	12.08
5/1/2019	14:09	8.64	11.80
5/1/2019	14:10	8.95	11.50
5/1/2019	14:11	8.42	12.04
5/1/2019	14:12	7.83	12.66
5/1/2019	14:13	8.04	12.39
5/1/2019	14:14	8.03	12.45
5/1/2019	14:15	7.55	12.91
5/1/2019	14:16	7.75	12.70
5/1/2019	14:17	8.13	12.31
5/1/2019	14:18	8.42	12.03
5/1/2019	14:19	8.20	12.22
5/1/2019	14:20	8.58	11.84
5/1/2019	14:21	9.02	11.40
5/1/2019	14:22	8.67	11.78
5/1/2019	14:23	8.40	12.06
5/1/2019	14:24	7.60	12.87
5/1/2019	14:25	8.01	12.43
5/1/2019	14:26	8.65	11.77
5/1/2019	14:27	8.49	11.92
5/1/2019	14:28	8.13	12.34
5/1/2019	14:29	7.30	13.17
5/1/2019	14:30	7.80	12.62
5/1/2019	14:31	7.82	12.63
5/1/2019	14:32	8.08	12.34
5/1/2019	14:33	9.01	11.41
5/1/2019	14:34	8.50	11.95
5/1/2019	14:35	8.89	11.50
5/1/2019	14:36	9.18	11.23
5/1/2019	14:37	8.94	11.48
5/1/2019	14:38	8.31	12.15
5/1/2019	14:39	8.04	12.40
5/1/2019	14:40	7.94	12.50
5/1/2019	14:41	7.74	12.70
5/1/2019	14:42	7.30	13.15

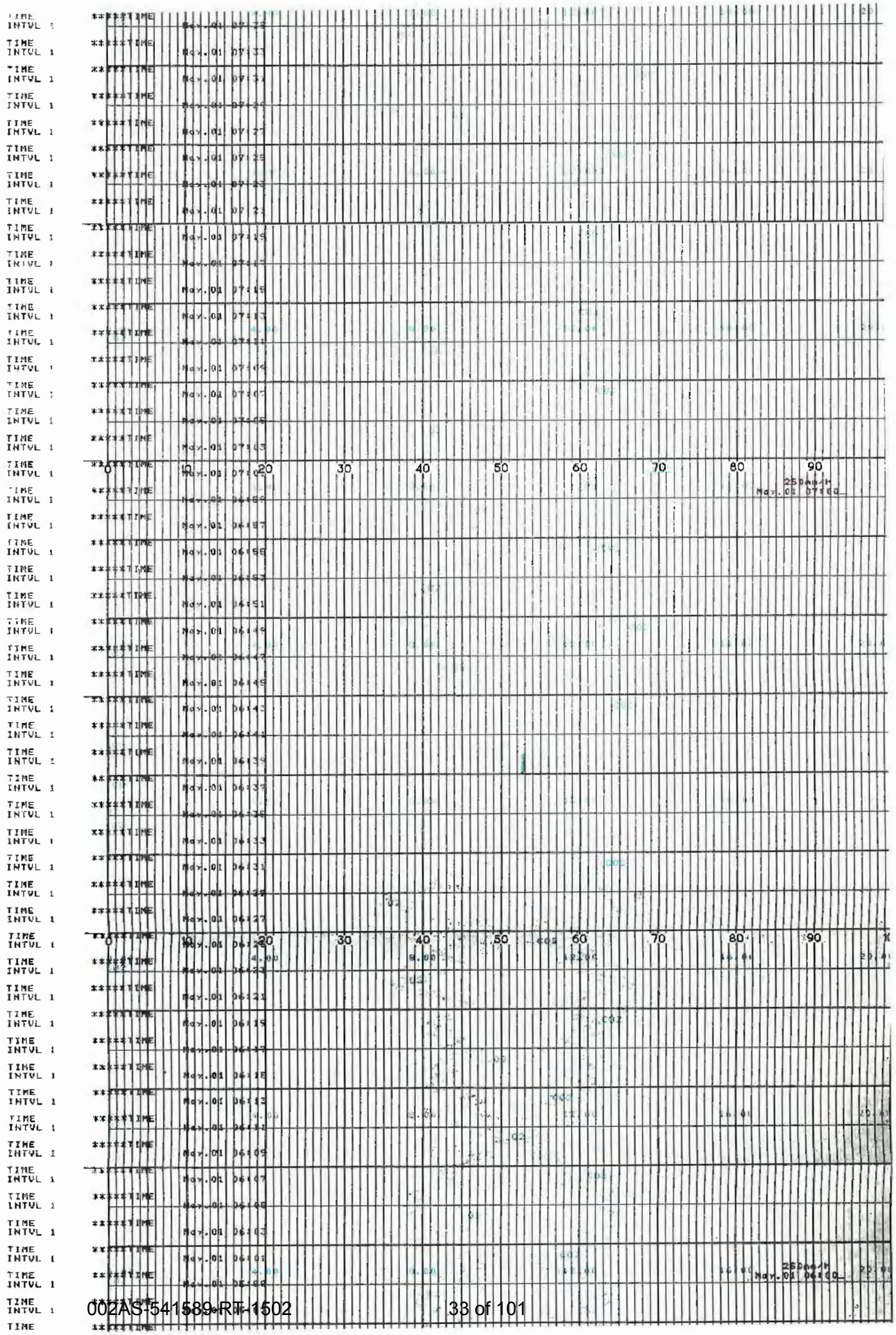
5/1/2019	14:43	7.68	12.73
5/1/2019	14:44	8.63	11.78
5/1/2019	14:45	9.65	10.72
5/1/2019	14:46	11.13	9.32
5/1/2019	14:47	10.75	9.70
5/1/2019	14:48	9.84	10.64
5/1/2019	14:49	8.77	11.65
5/1/2019	14:50	8.86	11.61
5/1/2019	14:51	8.51	11.92
5/1/2019	14:52	8.51	11.96
5/1/2019	14:53	7.67	12.80
5/1/2019	14:54	8.22	12.23
5/1/2019	14:55	7.83	12.65
5/1/2019	14:56	7.75	12.69
5/1/2019	14:57	8.27	12.17
5/1/2019	14:58	8.09	12.37
5/1/2019	14:59	8.21	12.24
5/1/2019	15:00	8.08	12.36
5/1/2019	15:01	8.66	11.76
5/1/2019	15:02	7.69	12.75
5/1/2019	15:03	7.85	12.59
5/1/2019	15:04	8.10	12.32
5/1/2019	15:05	8.94	11.47
5/1/2019	15:06	8.92	11.49
5/1/2019	15:07	9.09	11.36
5/1/2019	15:08	8.49	11.94
5/1/2019	15:09	7.95	12.50
5/1/2019	15:10	7.76	12.72
5/1/2019	15:11	6.82	13.58
5/1/2019	15:12	8.24	12.17
5/1/2019	15:13	9.10	11.30
5/1/2019	15:14	9.67	10.79
5/1/2019	15:15	8.02	12.47
5/1/2019	15:16	8.04	12.37
5/1/2019	15:17	8.83	11.59
5/1/2019	15:18	8.26	12.21
5/1/2019	15:19	8.49	11.94
5/1/2019	15:20	8.84	11.61
5/1/2019	15:21	9.18	11.23
5/1/2019	15:22	8.96	11.52
5/1/2019	15:23	8.37	12.11
5/1/2019	15:24	7.37	13.09
5/1/2019	15:25	8.18	12.23
5/1/2019	15:26	8.57	11.87
5/1/2019	15:27	8.45	11.99
5/1/2019	15:28	8.20	12.25
5/1/2019	15:29	8.29	12.15
5/1/2019	15:30	7.28	13.19
5/1/2019	15:31	7.77	12.65

5/1/2019	15:32	8.58	11.84
5/1/2019	15:33	8.28	12.14
5/1/2019	15:34	8.42	12.03
5/1/2019	15:35	8.39	12.00
5/1/2019	15:36	8.39	12.04
5/1/2019	15:37	8.85	11.56
5/1/2019	15:38	7.67	12.78
5/1/2019	15:39	7.04	13.42
5/1/2019	15:40	7.06	13.39
5/1/2019	15:41	8.42	11.99
5/1/2019	15:42	8.39	12.05
5/1/2019	15:43	8.89	11.47
5/1/2019	15:44	9.29	11.16
5/1/2019	15:45	8.07	12.38
5/1/2019	15:46	7.06	13.41
5/1/2019	15:47	6.53	13.85
5/1/2019	15:48	7.95	12.48
5/1/2019	15:49	8.95	11.43
5/1/2019	15:50	9.90	10.52
5/1/2019	15:51	9.06	11.37
5/1/2019	15:52	8.97	11.46
5/1/2019	15:53	8.87	11.51
5/1/2019	15:54	8.70	11.76
5/1/2019	15:55	8.34	12.11
5/1/2019	15:56	7.71	12.73
5/1/2019	15:57	7.82	12.62
5/1/2019	15:58	7.63	12.80
5/1/2019	15:59	8.14	12.26
5/1/2019	16:00	9.07	11.31
5/1/2019	16:01	8.98	11.43
5/1/2019	16:02	8.34	12.07
5/1/2019	16:03	8.90	11.49
5/1/2019	16:04	9.03	11.38
5/1/2019	16:05	8.48	11.92
5/1/2019	16:06	8.55	11.87
5/1/2019	16:07	8.87	11.49
5/1/2019	16:08	9.53	10.87
5/1/2019	16:09	9.03	11.43
5/1/2019	16:10	7.85	12.61
5/1/2019	16:11	7.19	13.24
5/1/2019	16:12	7.29	13.14
5/1/2019	16:13	8.31	12.08
5/1/2019	16:14	8.62	11.78
5/1/2019	16:15	8.79	11.62
5/1/2019	16:16	8.49	11.93
5/1/2019	16:17	8.70	11.70
5/1/2019	16:18	9.07	11.34
5/1/2019	16:19	8.60	11.84
5/1/2019	16:20	8.28	12.14

5/1/2019	16:21	8.14	12.32	
5/1/2019	16:22	8.16	12.25	
5/1/2019	16:23	7.79	12.66	
5/1/2019	16:24	7.96	12.46	
5/1/2019	16:25	8.24	12.18	
5/1/2019	16:26	7.52	12.93	
5/1/2019	16:27	7.89	12.48	
5/1/2019	16:28	8.52	11.89	
5/1/2019	16:29	8.49	11.91	
5/1/2019	16:30	7.99	12.48	
5/1/2019	16:31	7.75	12.64	
5/1/2019	16:32	7.75	12.66	
5/1/2019	16:33	7.76	12.65	
5/1/2019	16:34	8.28	12.13	
5/1/2019	16:35	8.18	12.23	
5/1/2019	16:36	8.73	11.66	
5/1/2019	16:37	8.24	12.18	
5/1/2019	16:38	8.26	12.15	
5/1/2019	16:39	8.78	11.59	
5/1/2019	16:40	9.23	11.18	
5/1/2019	16:41	8.79	11.64	
5/1/2019	16:42	8.52	11.92	
5/1/2019	16:43	8.09	12.34	
5/1/2019	16:44	8.59	11.80	
5/1/2019	16:45	8.73	11.70	
5/1/2019	16:46	8.01	12.43	
Average		8.38	12.05	
5/1/2019	16:47	3.94	4.95	
5/1/2019	16:48	0.00	0.06	Zero Bias
5/1/2019	16:49	7.99	8.05	
5/1/2019	16:50	10.51	10.43	O2 CO2 Bias
5/1/2019	16:51	1.54	1.73	
5/1/2019	16:52	-0.01	0.02	Zero
5/1/2019	16:53	8.25	7.89	
5/1/2019	16:54	10.60	10.49	Span
5/1/2019	16:55	15.08	14.37	
5/1/2019	16:56	18.94	18.83	High

Appendix A.3
Instrument Strip Charts


TIME INTVL 1
*****TIME
May.01 06:47
May.01 06:45
May.01 06:43
May.01 06:41
May.01 06:39
May.01 06:37
May.01 06:35
May.01 06:33
May.01 06:31
May.01 06:29
May.01 06:27
May.01 06:25
May.01 06:23
May.01 06:21
May.01 06:19
May.01 06:17
May.01 06:15
May.01 06:13
May.01 06:11
May.01 06:09
May.01 06:07
May.01 06:05
May.01 06:03
May.01 06:01
May.01 05:59
May.01 05:57
May.01 05:55
May.01 05:53
May.01 05:51
May.01 05:49
May.01 05:47
0
10
20
30
40
50
60
70
80
90
250mm/h
May.01 06:00
DELTA 3-CEMS
13:21 488:46 250mm/h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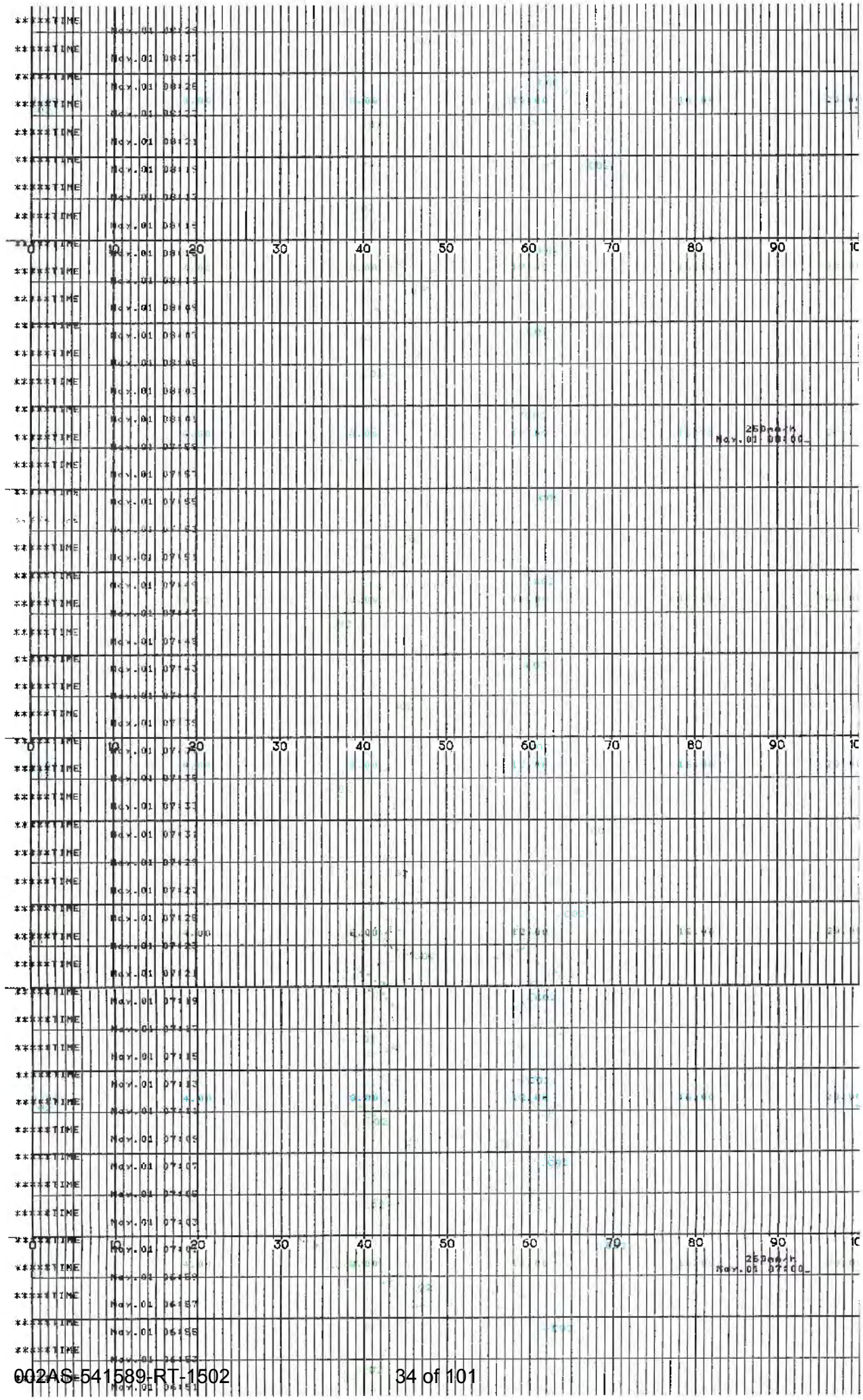
May.01 07:00
May.01 06:00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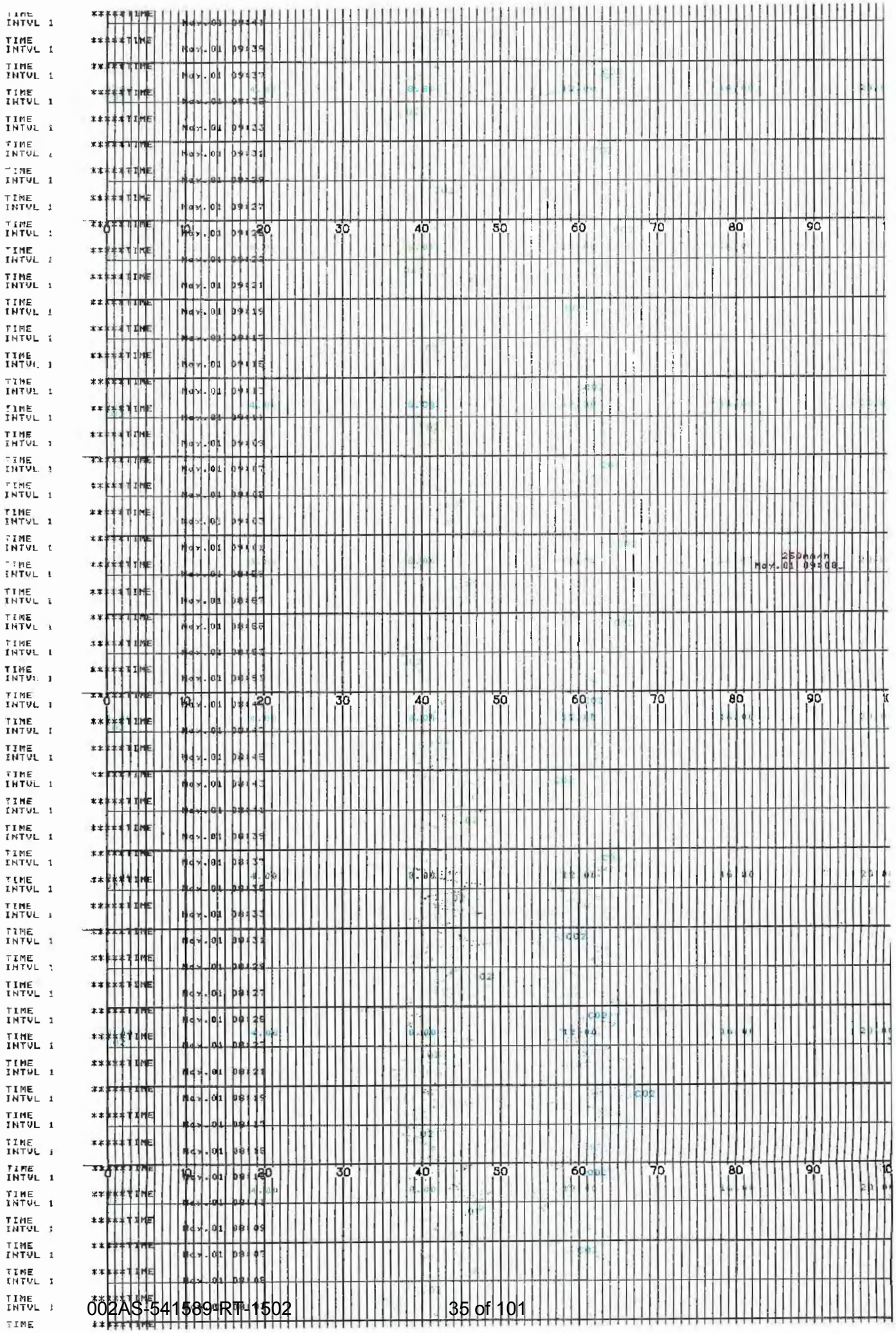
0 10 20 30 40 50 60 70 80 90 10
250mm/h
May.01 08:00
250mm/h
May.01 07:00


TIME INTVL 1 *****TIME May.01 09:41
TIME INTVL 1 *****TIME May.01 09:39
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TIME INTVL 1 *****TIME May.01 09:33
TIME INTVL 1 *****TIME May.01 09:31
TIME INTVL 1 *****TIME May.01 09:29
TIME INTVL 1 *****TIME May.01 09:27
TIME INTVL 1 *****TIME May.01 09:25
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TIME INTVL 1 *****TIME May.01 09:21
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TIME INTVL 1 *****TIME May.01 09:17
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TIME INTVL 1 *****TIME May.01 09:09
TIME INTVL 1 *****TIME May.01 09:07
TIME INTVL 1 *****TIME May.01 09:05
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TIME INTVL 1 *****TIME May.01 08:49
TIME INTVL 1 *****TIME May.01 08:47
TIME INTVL 1 *****TIME May.01 08:45
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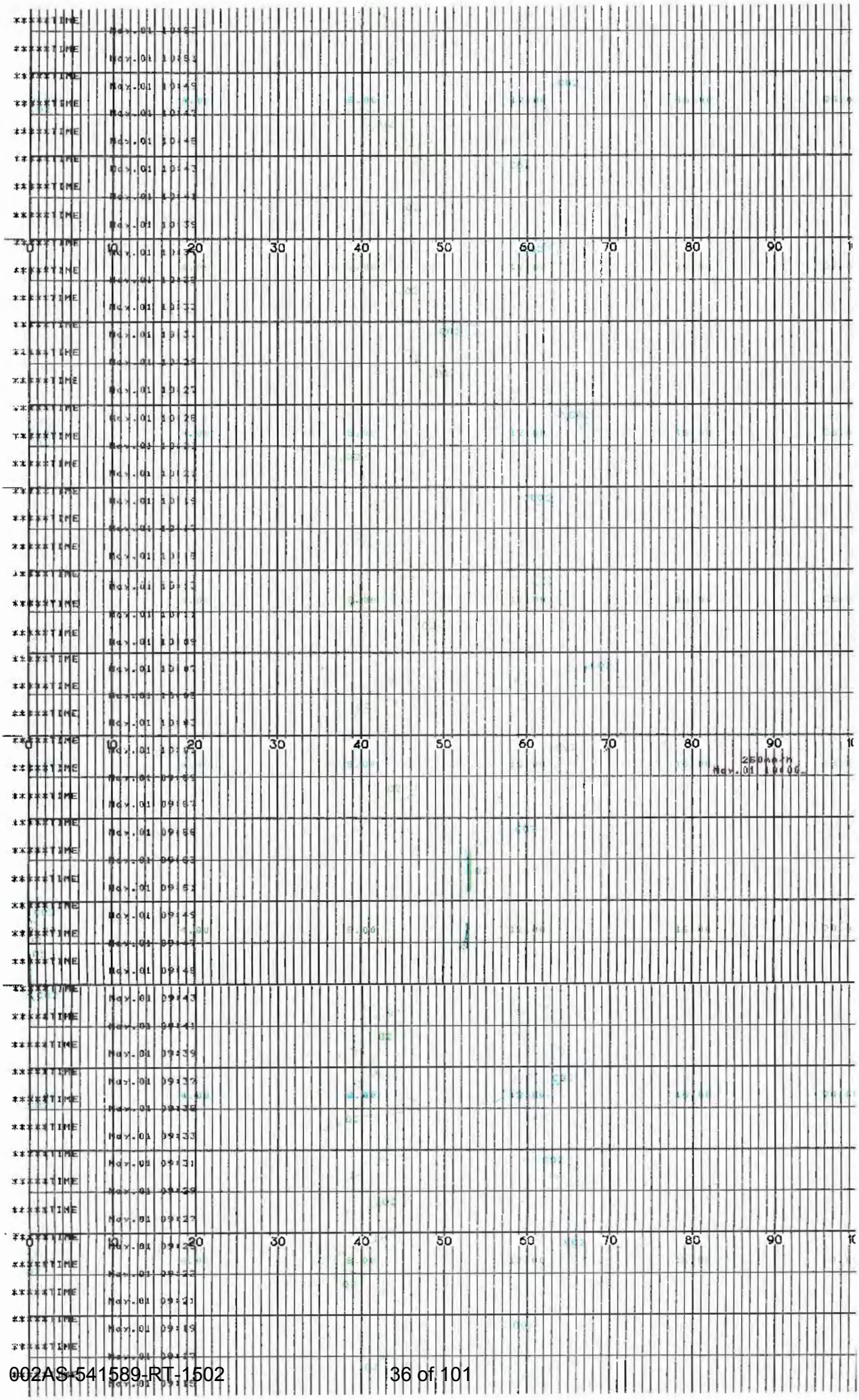
TIME INTVL 1 *****TIME May.01 08:07
TIME INTVL 1 *****TIME May.01 08:05
TIME INTVL 1 *****TIME
TIME *****TIME
0 10 20 30 40 50 60 70 80 90
250mm/h
May.01 09:08


TIME INTVL 1
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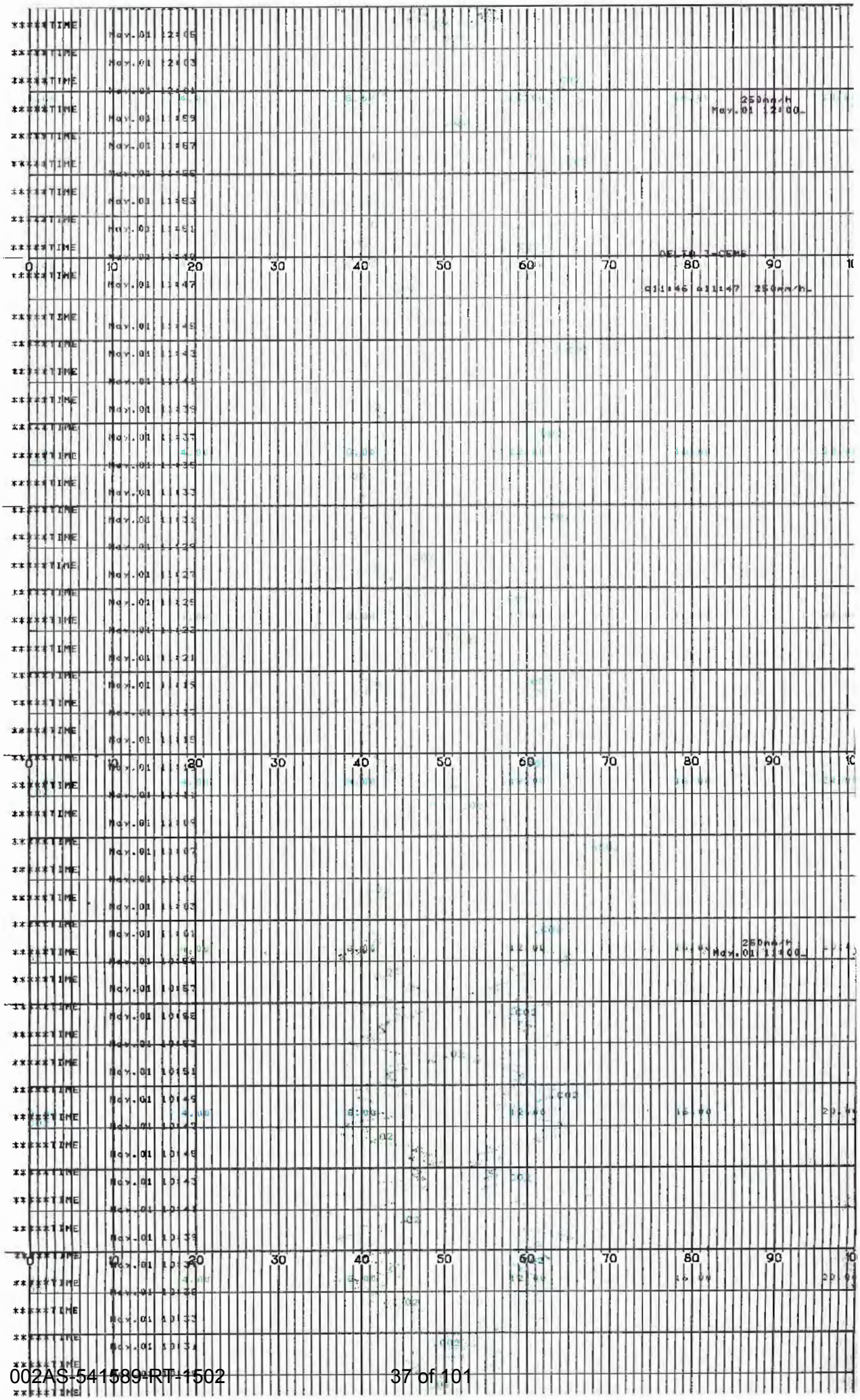
250mm/h
May.01 10:00


TIME INTVL 1 *****TIME May.01 12:05
TIME INTVL 1 *****TIME May.01 12:03
TIME INTVL 1 *****TIME May.01 12:01
TIME INTVL 1 *****TIME May.01 11:59
TIME INTVL 1 *****TIME May.01 11:57
TIME INTVL 1 *****TIME May.01 11:55
TIME INTVL 1 *****TIME May.01 11:53
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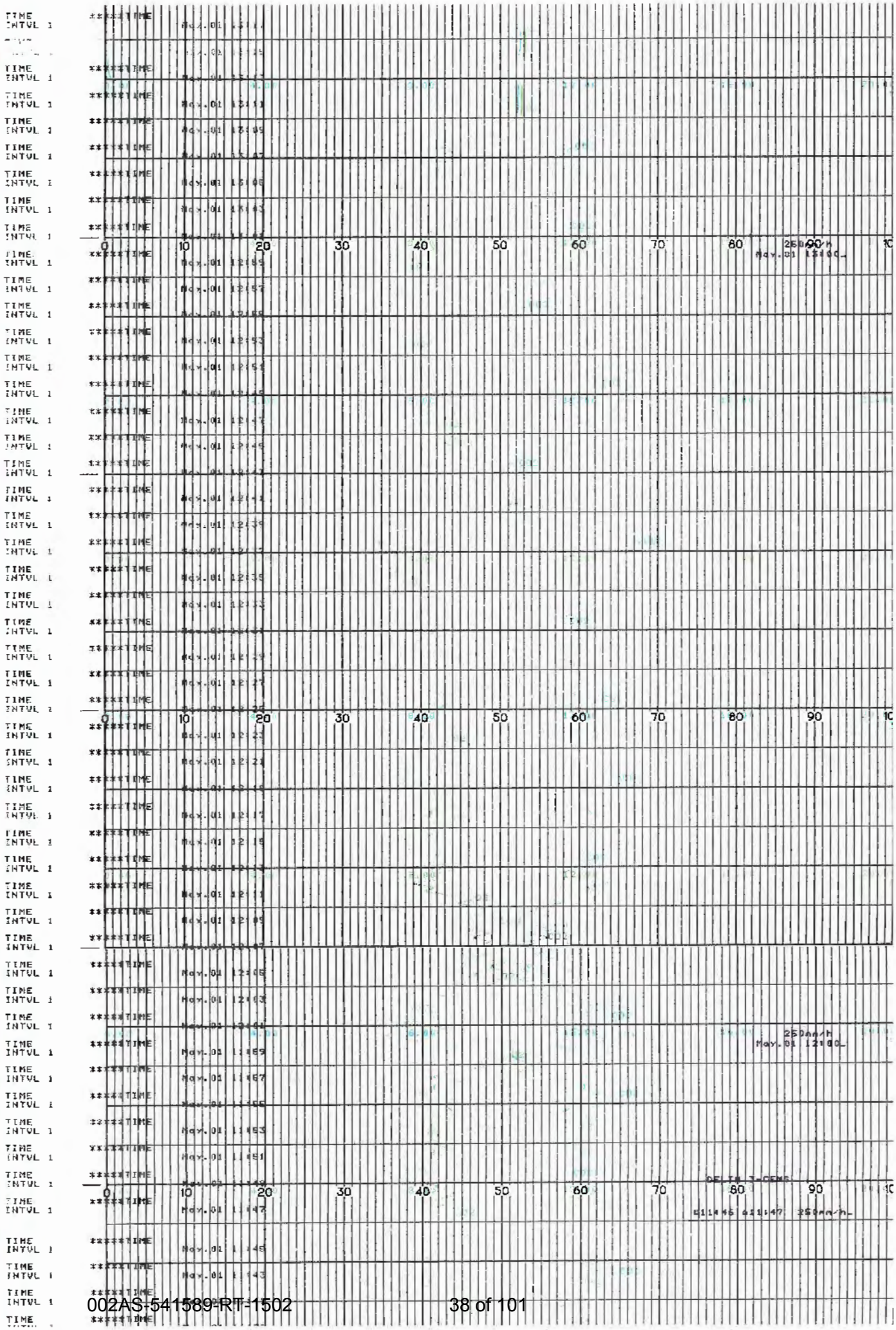
TIME INTVL 1 *****TIME May.01 10:41
TIME INTVL 1 *****TIME May.01 10:39
TIME INTVL 1 *****TIME May.01 10:37
TIME INTVL 1 *****TIME May.01 10:35
TIME INTVL 1 *****TIME May.01 10:33
TIME INTVL 1 *****TIME May.01 10:31
TIME INTVL 1 *****TIME
TIME *****TIME
250mm/h
May.01 12:00
DELTA 3-CEMS
0 10 20 30 40 50 60 70 80 90
a11:46 a11:47 250mm/h
250mm/h
May.01 11:00
0 10 20 30 40 50 60 70 80 90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250mm/h
May.01 12:00
DELTA 3-CEMS
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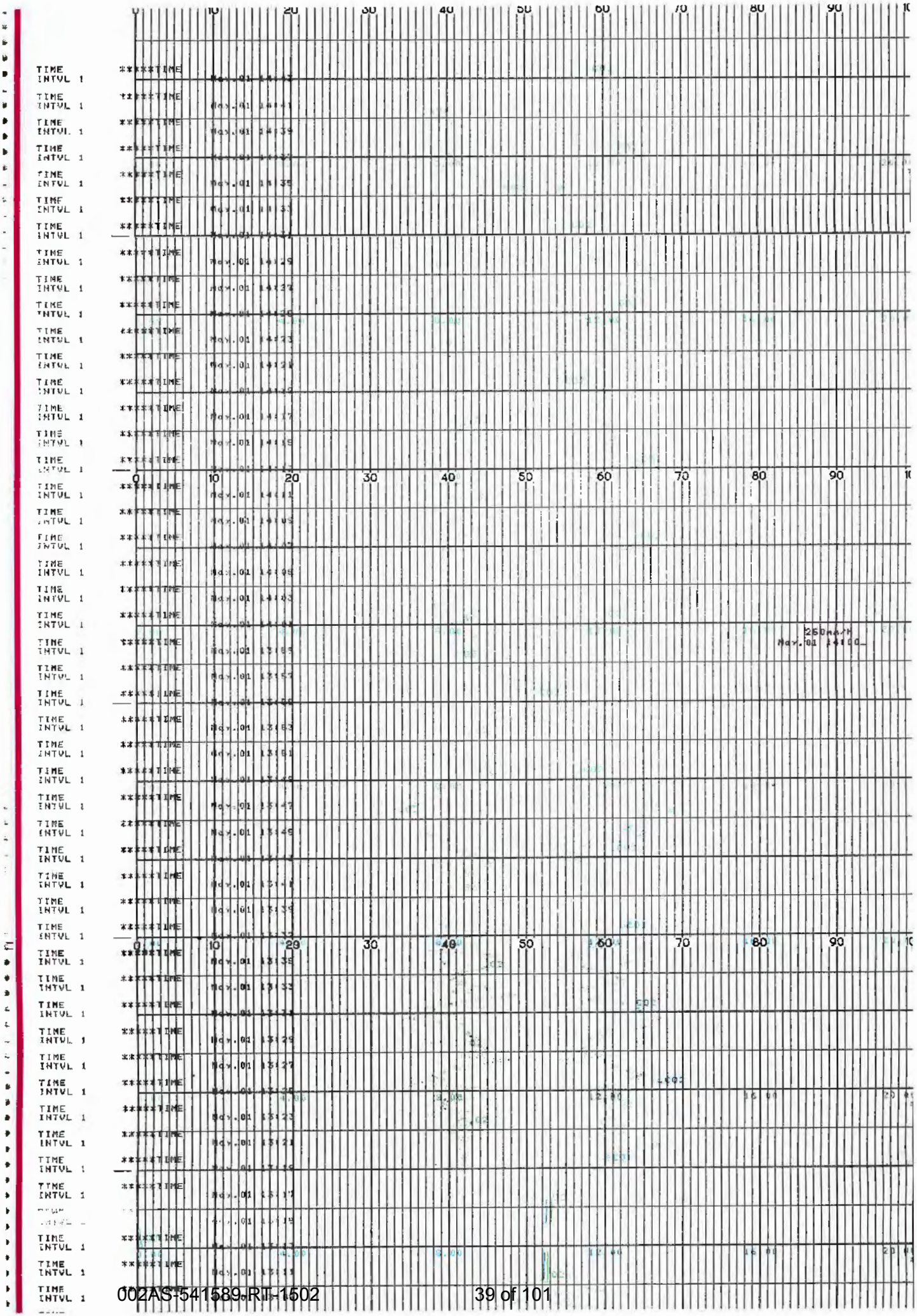
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*****TIME
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Nov.01 14:39
Nov.01 14:35
Nov.01 14:29
Nov.01 14:27
Nov.01 14:23
Nov.01 14:21
Nov.01 14:17
Nov.01 14:15
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Nov.01 14:09
Nov.01 14:03
Nov.01 13:59
Nov.01 13:57
Nov.01 13:53
Nov.01 13:51
Nov.01 13:47
Nov.01 13:45
Nov.01 13:41
Nov.01 13:39
Nov.01 13:35
Nov.01 13:33
Nov.01 13:29
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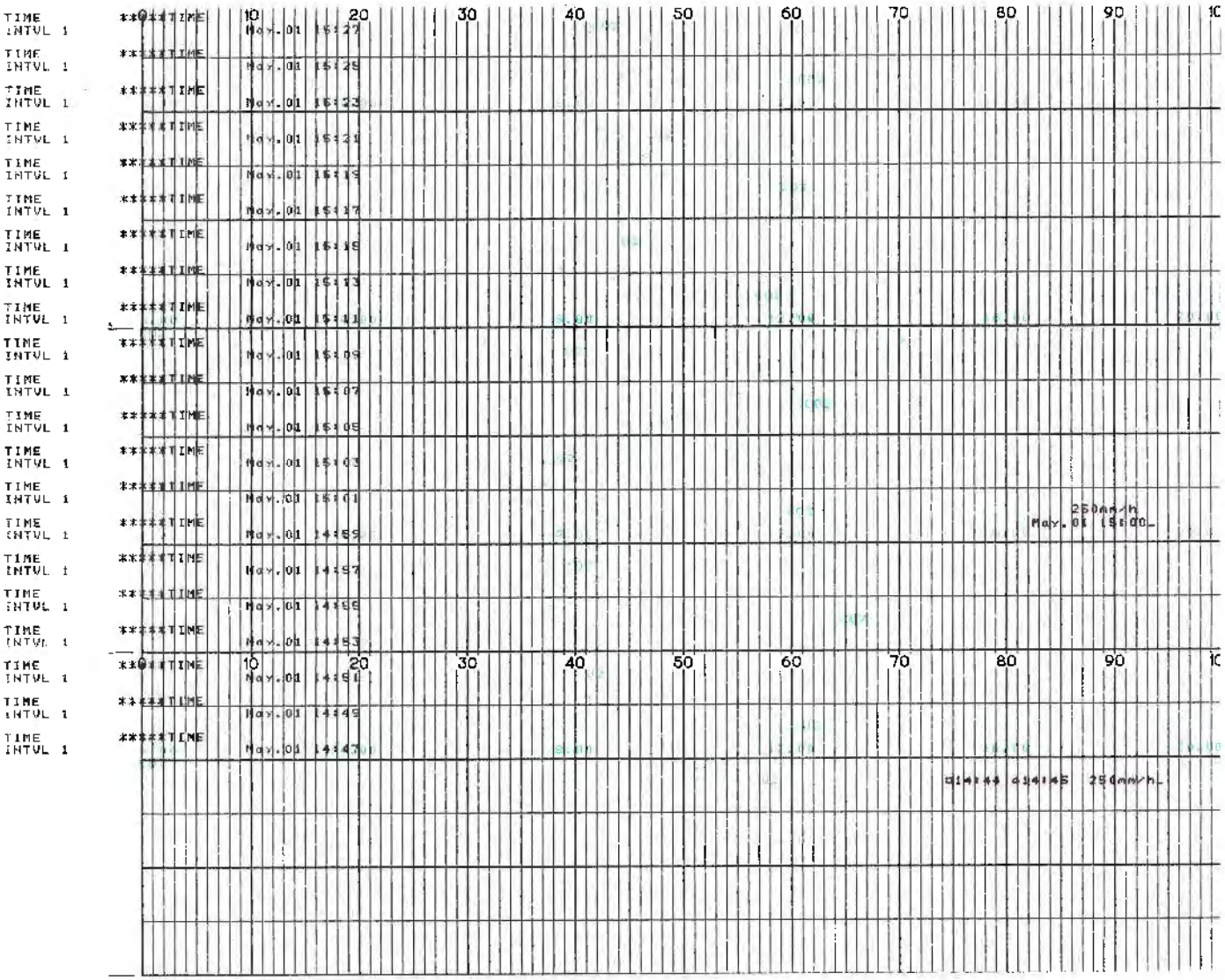
250mm/H
Nov.01 14:00


TIME INTVL 1
0*TIME
10 20 30 40 50 60 70 80 90
May.01 16:27
May.01 16:25
May.01 16:23
May.01 16:21
May.01 16:19
May.01 16:17
May.01 16:15
May.01 16:13
May.01 16:11
May.01 16:09
May.01 16:07
May.01 16:05
May.01 16:03
May.01 16:01
May.01 15:59
May.01 14:57
May.01 14:55
May.01 14:53
May.01 14:51
May.01 14:49
May.01 14:47
250mm/h
May.01 15:00
014:44 014:45 250mm/h

TIME INTVL 1 ******TIME May.01 16:55
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TIME INTVL 1 ******TIME May.01 16:47
TIME INTVL 1 ******TIME May.01 16:45
TIME INTVL 1 ******TIME May.01 16:43
TIME INTVL 1 ******TIME May.01 16:41
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TIME INTVL 1 ******TIME May.01 16:01
TIME INTVL 1 ******TIME May.01 15:59
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TIME INTVL 1 ******TIME May.01 15:55
TIME INTVL 1 ******TIME May.01 15:53
TIME INTVL 1 ******TIME May.01 15:51
TIME INTVL 1 ******TIME May.01 15:49
TIME INTVL 1 ******TIME May.01 15:47
TIME INTVL 1 ******TIME May.01 15:45
TIME INTVL 1 ******TIME May.01 15:43
TIME INTVL 1 ******TIME May.01 15:41
TIME INTVL 1 ******TIME May.01 15:39
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TIME INTVL 1 ******TIME May.01 15:21
TIME INTVL 1 ******TIME May.01 15:19
TIME INTVL 1 ******TIME May.01 15:17

10 20 30 40 50 60 70 80 90

25Dec/H
May.01 16:00

Appendix A.4
PM_{10} Data

MONTROSE AIR QUALITY SERVICES

FLUE GAS VELOCITY DATA AND WORKSHEET

CLIENT: Desert View power
LOCATION: Unit 2 stack Breaching
UNIT: 2
PITOT TUBE ID: 109
PITOT COEFF. Cp: 0.84
TEST NUMBER: Prelim Velocity

TEST DATE: 5/1/2019
PERFORMED BY: Robert Howard
BAR. PRESSURE:
STATIC PRESURE:
TC READOUT ID: 17-WCS

Time	Port	Point	Vel. Head in. H_2O	Temp., °F	Time	Port	Point	Vel. Head in. H_2O	Temp, °F
0602	A	2	.84	327					
0603		1	.99	330					
0605	B	2	1.3	331					
0605		1	.65	335					
0605	C	2	.76	332					
0606		1	.82	329					
0606	D	2	1.1	327					
0607		1	1.2	321					
0607	E	2	1.1	318					
0607		1	1.1	322					
0608	F	2	1.3	320					
0608		1	1.2	319					

Comments:

PM_{10} SAMPLING DATA

CLIENT: Desert View Power
LOCATION: Unit 2 stack Breaching
DATE: ~~4/30/2019~~ 5-1-19 RH
RUN NO: 1-PM10
OPERATOR: Robert Howard
METER BOX NO: 17-WCS
METER ΔH@: 1.534
METER Yd: 0.993
STACK AREA, FT^2: 38.84
TRAVERSE POINTS, MIN/POINT: 15
ΔH= _____

AMBIENT TEMPERATURE: 75°
BAROMETRIC PRESSURE: 30.09
ASSUMED MOISTURE: 13%
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: #109
PROBE LENGTH: 8'
NOZZLE ID NO/ MATERIAL: #3 SS
NOZZLE DIAMETER: 0.163
FILTER NO/TYPE: 45-1414
PRE-TEST LEAK RATE: : 0.005 CFM@ 14 in. Hg.
POST-TEST LEAK RATE: : 0.005 CFM@ 13 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER RH
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	Difference
1	DI-H2O	791.8	602.0	
2	DI-H2O	720.5	716.2	
3	Empty	664.6	663.4	
4	Silca Gel	956.6	938.9	
Total:				

Port	Point	ΔP in. H_2O	Time Start	Time End	Meter Reading Start	Meter Reading End	ΔH in. H_2O	Stack Temp, °F	Meter Temp, °F In	Meter Temp, °F Out	Impinger Exit. Temp, °F	Vacuum in. Hg.	O_2 %	P static in. H_2O
A	2	.85	0632	0645.45	530.100	535.136	0.372	328	59	59	56	1		
	1	1.0	0645.45	0700.30	535.136	540.148		330	RH 59 ~~60~~	59	49	2		
B	2	1.2	0704	0720.15	540.148	546.310		327	61	60	52	2		
	1	.65	0720.15	0732.15	546.310	550.634		325	64	62	49	2		
C	2	.76	0735	0748	550.634	555.362		331	64	63	49	2		
	1	.81	0748	0801.15	555.362	560.130		330	65	64	45	2		
D	2	1.1	0803	0818.30	560.130	565.769		329	66	65	48	2		
	1	1.2	0818.30	0834.45	565.769	571.669		325	68	66	46	2		
E	2	1.1	0837	0852.30	571.669	577.377		326	72	68	52	2		
	1	1.1	0852.30	0908	577.377	583.082		329	79	72	52	2		
F	2	1.3	0910	0927	583.082	589.388		327	79	79	57	2		
	1	1.2	0927	0943.15	589.388	595.333		329	82	78	54	2		
Average:														

Comments: _____

pretest

Client.....	Desertview Power	Test No.....	1-PM10
Unit.....	Unit 2	Date.....	5/1/2019
Location.....	Stack Breaching	Data by.....	Dave Wonderly

Pre-test meter calibration:		Pre-test stack assumptions:	
Meter I.D.	17-WCS	Meter I.D.	17-WCS
Delta H, iwg	0.4000	Stack T, F	330
Meter T, F	61.00	Stack P, iwg	-0.110
Pbar, in Hg	30.09	Meter T, F	68
Sample time, min	10.00	Pbar, in Hg	30.09
Meter vol, ft^3	3.854	O2, % dry	8.0
Meter coefficient (Y)	0.993	CO2, % dry	12.0
Kfactor	0.609	H2O, %	14.0
RESULT: Delta H @	1.509	Delta H @	1.534
Gas Analysis		Dry MW, lb/lb-mole	30.24
fc	0.120	Wet MW, lb/lb-mole	28.53
fo	0.080	Absolute stack P, in Hg	30.079
BWo, unitless	0.140	Viscosity, micropoise	228.6
Wet O2 fraction	0.0688		

Qs,wacfm	0.633		(Qm, dcfm):	0.363
Target delta H for Qs		330	0.372	
if Ts >		345	0.359	
if Ts <		315	0.387	

nozzle selection

Client.....	Desertview Power	Test No.....	1-PM10
Unit.....	Unit 2	Date.....	5/1/2019
Location.....	Stack Breaching	Data by.....	Dave Wonderly
CSR Pitot Coeficient, Cp		0.84	Standard
Method 2 Pitot Coeficient, C'p		0.84	Nozzles
Lowest Delta p		0.65	0.136
Highest delta P from preliminary traverse:		1.30	0.151
average delta P		1.03	0.163
Dn,in	0.163		0.182
Vn,fps	72.8		0.215
Rmin	0.726		0.233
Rmax	0.845		0.263
Vmin	56.61		0.300
Vmax	88.5		0.400
DelP min	0.6752		0.450
DelP max	1.651		0.500

sampling

delP@pt1:		0.85	avg delP:		1.019	Target sample time, min			180	Tref=	68				
B.P.	30.09	K factor (cfm @ delH=1)			0.609	Number of points			12	Yd=	0.9930				
Sample	Dwell Time				Time		Meter Readings		Sample	del H	Stack	Meter		O2	Ps
Pt	Pt. 1	del P	Tn	Actual	START	END	START	END	Volume			In	Out		
6	13.70	0.85		13 : 45	6:32:00	6:45:45	530.100	535.136	5.04	0.37	328	59	59	8.4	-0.37
5		1.00	14.86	14 : 45	6:45:45	7:00:30	535.136	540.148	5.01	0.37	330	61	60	8.4	-0.37
4		1.20	16.28	16 : 15	7:04:00	7:20:15	540.148	546.310	6.16	0.37	327	64	62	8.4	-0.37
3		0.65	11.98	11 : 60	7:20:15	7:32:15	546.310	550.634	4.32	0.37	325	64	62	8.4	-0.37
2		0.76	12.96	12 : 60	7:35:00	7:48:00	550.634	555.362	4.73	0.37	331	64	63	8.4	-0.37
1		0.81	13.37	13 : 15	7:48:00	8:01:15	555.362	560.130	4.77	0.37	330	65	64	8.4	-0.37
6		1.10	15.59	15 : 30	8:03:00	8:18:30	560.130	565.769	5.64	0.37	329	66	65	8.4	-0.37
5		1.20	16.28	16 : 15	8:18:30	8:34:45	565.769	571.669	5.90	0.37	325	68	66	8.4	-0.37
4		1.10	15.59	15 : 30	8:37:00	8:52:30	571.669	577.377	5.71	0.37	326	72	68	8.4	-0.37
3		1.10	15.59	15 : 30	8:52:30	9:08:00	577.377	583.082	5.71	0.37	329	79	72	8.4	-0.37
2		1.30	16.94	16 : 60	9:10:00	9:27:00	583.082	589.388	6.31	0.37	327	79	79	8.4	-0.37
1		1.20	16.28	16 : 15	9:27:00	9:43:15	589.388	595.333	5.94	0.37	329	82	78	8.4	-0.37

MONTROSE AIR QUALITY SERVICES

PM_{10} SAMPLING DATA

CLIENT: Desert View Power
LOCATION: Unit 2 stack Breaching
DATE: 5/1/2019
RUN NO: 2-PM10
OPERATOR: Robert Howard
METER BOX NO: 17-WCS
METER ΔH@: 1.534
METER Yd: 0.993
STACK AREA, FT^2: 38.84
TRAVERSE POINTS, MIN/POINT: 15
ΔH= _____

AMBIENT TEMPERATURE: 80°
BAROMETRIC PRESSURE: 30.09
ASSUMED MOISTURE: 13%
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: #109
PROBE LENGTH: 8'
NOZZLE ID NO/ MATERIAL: #3 SS
NOZZLE DIAMETER: 0.167
FILTER NO/TYPE: 45-1415
PRE-TEST LEAK RATE: : <0.005 CFM@ 14 in. Hg.
POST-TEST LEAK RATE: : <0.005 CFM@ 14 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER RH
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	Difference
1	DI-H2O	949.0	762.7	
2	DI-H2O	740.9	735.8	
3	Empty	606.2	605.3	
4	Silca Gel	964.2	949.8	
Total:				

Port	Point	ΔP in. H_2O	Time Start	Time End	Meter Reading Start	Meter Reading End	ΔH in. H_2O	Stack Temp. °F	Meter Temp. °F In	Meter Temp. °F Out	Impinger Exit. Temp. °F	Vacuum in. Hg.	O_2 %	Pstatic in. H_2O
A	2	.83	1008	1021.30	595.900	601.093	0.39	340	81	80	54	2		-.37
	1	.96	1021.30	1036	601.093	606.644		343	84	82	53	2		
B	2	1.2	1038	1054.15	606.644	612.747		342	85	83	55	2		
	1	.61	1045.15	1106.15	612.747	617.448		342	85	83	54	2		
C	2	.77	1108	1121	617.448	622.476		340	91	86	56	2		
	1	.80	1121	1134.15	622.476	627.565		343	93	88	56	3		
D	2	1.0	1136	1151	627.565	633.509		344	93	90	52	3		
	1	.73	1151	1203.45	633.509	638.507		344	94	92	50	3		
E	2	1.1	1205	1220.45	638.507	644.636		343	95	92	54	3		
	1	1.0	1220.45	1235.45	644.636	650.443		346	97	92	50	3		
F	2	1.2	1238	1254.15	650.443	656.659		346	97	94	55	3		
	1	1.1	1254.15	1310	656.659	662.990		346	100	96	51	3		
Average:														

Comments: _____

Date of last revision 2/14/2017

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pretest

Client.....	Desertview Power	Test No.....	2-PM10
Unit.....	Unit 2	Date.....	5/1/2019
Location.....	Stack Breaching	Data by.....	Dave Wonderly

Pre-test meter calibration:		Pre-test stack assumptions:	
Meter I.D.	17-WCS	Meter I.D.	17-WCS
Delta H, iwg	0.4000	Stack T, F	340
Meter T, F	61.00	Stack P, iwg	-0.370
Pbar, in Hg	30.09	Meter T, F	84
Sample time, min	10.00	Pbar, in Hg	30.09
Meter vol, ft^3	3.854	O2, % dry	8.4
Meter coefficient (Y)	0.993	CO2, % dry	12.3
Kfactor	0.609	H2O, %	13.4
RESULT: Delta H @	1.509	Delta H @	1.534
Gas Analysis		Dry MW, lb/lb-mole	30.30
fc	0.123	Wet MW, lb/lb-mole	28.65
fo	0.084	Absolute stack P, in Hg	30.060
BWo, unitless	0.134	Viscosity, micropoise	231.9
Wet O2 fraction	0.0727		

Qs,wacfm	0.644		(Qm, dcfm):	0.378
Target delta H for Qs		340	0.393	
if Ts >		355	0.378	
if Ts <		325	0.408	

nozzle selection

Client.....	Desertview Power	Test No.....	2-PM10
Unit.....	Unit 2	Date.....	5/1/2019
Location.....	Stack Breaching	Data by.....	Dave Wonderly
CSR Pitot Coeficient, Cp		0.84	Standard
Method 2 Pitot Coeficient, C'p		0.84	Nozzles
Lowest Delta p		0.65	0.136
Highest delta P from preliminary traverse:		1.30	0.151
average delta P		1.02	0.163
Dn,in	0.163		0.182
Vn,fps	74.0		0.215
Rmin	0.727		0.233
Rmax	0.845		0.263
Vmin	57.56		0.300
Vmax	90.0		0.400
DelP min	0.6919		0.450
DelP max	1.692		0.500

sampling

delP@pt1:		0.83	avg delP:		1.012	Target sample time, min			180	Tref=	68				
B.P.	30.09	K factor (cfm @ delH=1)			0.609	Number of points			12	Yd=	0.9930				
Sample	Dwell Time				Time		Meter Readings		Sample	del H	Stack	Meter		O2	Ps
Pt	Pt. 1	del P	Tn	Actual	START	END	START	END	Volume			In	Out		
6	13.58	0.83		13 : 30	10:08:00	10:21:30	595.900	601.093	5.19	0.39	343	84	82	8.6	-0.11
5		0.96	14.61	14 : 30	10:21:30	10:36:00	601.093	606.644	5.55	0.39	342	85	83	8.6	-0.11
4		1.20	16.33	16 : 15	10:38:00	10:54:15	606.644	612.747	6.10	0.39	342	85	83	8.6	-0.11
3		0.66	12.11	12 : 00	10:54:15	11:06:15	612.747	617.448	4.70	0.39	340	91	86	8.6	-0.11
2		0.77	13.08	13 : 0	11:08:00	11:21:00	617.448	622.476	5.03	0.39	343	93	88	8.6	-0.11
1		0.80	13.34	13 : 15	11:21:00	11:34:15	622.476	627.565	5.09	0.39	344	93	92	8.6	-0.11
6		1.00	14.91	14 : 60	11:36:00	11:51:00	627.565	633.509	5.94	0.39	344	94	92	8.6	-0.11
5		0.73	12.74	12 : 45	11:51:00	12:03:45	633.509	638.507	5.00	0.39	343	95	92	8.6	-0.11
4		1.10	15.64	15 : 45	12:05:00	12:20:45	638.507	644.636	6.13	0.39	346	97	94	8.6	-0.11
3		1.00	14.91	14 : 60	12:20:45	12:35:45	644.636	650.443	5.81	0.39	346	97	94	8.6	-0.11
2		1.20	16.33	16 : 15	12:38:00	12:54:15	650.443	656.659	6.22	0.39	346	100	96	8.6	-0.11
1		1.10	15.64	15 : 45	12:54:15	13:10:00	656.659	662.990	6.33	0.39	346	100	96	8.6	-0.11

MONTROSE AIR QUALITY SERVICES

PM10 SAMPLING DATA

CLIENT: Desert View Power
LOCATION: Unit 2 stack Breaching
DATE: 5/1/2019
RUN NO: 3-PM10
OPERATOR: Robert Howard
METER BOX NO: 17-WCS
METER ΔH@: 1.534
METER Yd: 0.993
STACK AREA, FT²: 38.84
TRAVERSE POINTS, MIN/POINT: 15
ΔH= 0.4

AMBIENT TEMPERATURE: 82°
BAROMETRIC PRESSURE: 30.07
ASSUMED MOISTURE: 13%
PITOT TUBE COEFF, Cp: 0.84
PROBE ID NO/MATERIAL: #109
PROBE LENGTH: 8'
NOZZLE ID NO/ MATERIAL: #3 SS
NOZZLE DIAMETER: 0.167
FILTER NO/TYPE: 45-1416
PRE-TEST LEAK RATE: : <0.005 CFM@ 13 in. Hg.
POST-TEST LEAK RATE: : <0.005 CFM@ 14 in. Hg.
PITOT LEAK CHECK - PRE: ✓ POST: ✓
CHAIN OF CUSTODY: SAMPLE CUSTODIAN DW
SAMPLER RH
SAMPLE CUSTODIAN DW

Imp. #	Contents	Post-Test	Pre-Test	Difference
1	DI-H2O	821.4	623.1	
2	DI-H2O	722.6	720.5	
3	Empty	665.8	664.6	
4	Silca Gel	971.4	956.6	
Total:				

Port	Point	ΔP in. H2O	Time Start	Time End	Meter Reading Start	Meter Reading End	ΔH in. H2O	Stack Temp. °F	Meter Temp. °F In	Meter Temp. °F Out	Impinger Exit. Temp. °F	Vacuum in. Hg.	O2 %	P static in. H2O
A	2	.82	1331	1345	663.500	669.011	0.4	346	100	98	58	3		-.37
	1	1.0	1345	1400.30	669.011	675.054		350	101	98	52	3		
B	2	1.3	1402	1419.45	675.054	682.017		351	102	99	56	3		
	1	.68	1419.45	1432.30	682.017	687.008		351	102	100	53	3		
C	2	.74	1434	1447.15	687.008	692.151		349	101	100	56	3		
	1	.85	1447.15	1501.30	692.151	697.731		350	101	99	54	3		
D	2	1.1	1503	1519.15	697.731	704.141		350	99	98	52	3		
	1	1.2	1519.15	1536.15	704.141	710.797		351	98	97	49	3		
E	2	1.2	1538	1555	710.797	717.460		352	97	95	56	3		
	1	1.1	1555	1611.15	717.460	723.793		352	97	95	47	3		
F	2	1.2	1613	1630	723.793	730.417		351	97	95	53	3		
	1	1.1	1630	1646.15	730.417	737.024		352	98	96	47	3		
Average:														

Comments:

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pretest

Client.....	Desertview Power	Test No.....	3-PM10
Unit.....	Unit 2	Date.....	5/1/2019
Location.....	Stack Breaching	Data by.....	Dave Wonderly

Pre-test meter calibration:		Pre-test stack assumptions:	
Meter I.D.	17-WCS	Meter I.D.	17-WCS
Delta H, iwg	0.4000	Stack T, F	344
Meter T, F	61.00	Stack P, iwg	-0.370
Pbar, in Hg	30.09	Meter T, F	94
Sample time, min	10.00	Pbar, in Hg	30.09
Meter vol, ft^3	3.854	O2, % dry	8.4
Meter coefficient (Y)	0.993	CO2, % dry	12.3
Kfactor	0.609	H2O, %	13.4
RESULT: Delta H @	1.509	Delta H @	1.534
Gas Analysis		Dry MW, lb/lb-mole	30.30
fc	0.123	Wet MW, lb/lb-mole	28.65
fo	0.084	Absolute stack P, in Hg	30.060
BWo, unitless	0.134	Viscosity, micropoise	232.8
Wet O2 fraction	0.0727		

Qs,wacfm	0.647		(Qm, dcfm):	0.386
Target delta H for Qs		344	0.401	
if Ts >		359	0.386	
if Ts <		329	0.416	

nozzle selection

Client.....	Desertview Power	Test No.....	3-PM10
Unit.....	Unit 2	Date.....	5/1/2019
Location.....	Stack Breaching	Data by.....	Dave Wonderly
CSR Pitot Coeficient, Cp		0.84	Standard
Method 2 Pitot Coeficient, C'p		0.84	Nozzles
Lowest Delta p		0.66	0.136
Highest delta P from preliminary traverse:		1.20	0.151
average delta P		0.95	0.163
Dn,in	0.163		0.182
Vn,fps	74.4		0.215
Rmin	0.727		0.233
Rmax	0.845		0.263
Vmin	57.88		0.300
Vmax	90.5		0.400
DelP min	0.6964		0.450
DelP max	1.703		0.500

sampling

delP@pt1:		0.82	avg delP:		0.937	Target sample time, min			180	Tref=	68				
B.P.	30.09	K factor (cfm @ delH=1)			0.609	Number of points			12	Yd=	0.9930				
Sample	Dwell Time				Time		Meter Readings		Sample	del H	Stack	Meter		O2	Ps
Pt	Pt. 1	del P	Tn	Actual	START	END	START	END	Volume			In	Out		
6	14.03	0.82		14 : 00	13:31:00	13:45:00	663.500	669.011	5.51	0.40	346	100	98	8.6	-0.37
5		1.00	15.49	15 : 30	13:45:00	14:00:30	669.011	675.054	6.04	0.40	352	101	98	8.6	-0.37
4		1.30	17.66	17 : 45	14:02:00	14:19:45	675.054	682.017	6.96	0.40	351	102	99	8.6	-0.37
3		0.68	12.78	12 : 45	14:19:45	14:32:30	682.017	687.008	4.99	0.40	351	102	100	8.6	-0.37
2		0.74	13.33	13 : 15	14:34:00	14:47:15	687.008	692.151	5.14	0.40	349	101	100	8.6	-0.37
1		0.85	14.28	14 : 15	14:47:15	15:01:30	692.151	697.731	5.58	0.40	350	101	99	8.6	-0.37
6		1.10	16.25	16 : 15	15:03:00	15:19:15	697.731	704.141	6.41	0.40	350	99	98	8.6	-0.37
5		1.20	16.97	16 : 60	15:19:15	15:36:15	704.141	710.797	6.66	0.40	351	98	97	8.6	-0.37
4		1.20	16.97	16 : 60	15:38:00	15:55:00	710.797	717.460	6.66	0.40	352	97	95	8.6	-0.37
3		1.10	16.25	16 : 15	15:55:00	16:11:15	717.460	723.793	6.33	0.40	352	97	95	8.6	-0.37
2		1.20	16.97	16 : 60	16:13:00	16:30:00	723.793	730.417	6.62	0.40	351	97	95	8.6	-0.37
1		1.10	16.25	16 : 15	16:30:00	16:46:15	730.417	737.024	6.61	0.40	352	98	96	8.6	-0.37

Appendix A.5
Opacity Data

3-Min Avg Opacity Limit- 10

Hour	00-03 30-33	03-06 33-36	06-09 36-39	09-12 39-42	12-15 42-45	15-18 45-48	18-21 48-51	21-24 51-54	24-27 54-57	27-30 57-60
5	2.8	2.8	2.8	2.8	2.8	2.9	3.0	3.0	3.0	3.0
	3.0	3.0	3.0	3.1	3.1	3.1	3.0	3.0	3.0	3.1
6	3.1	3.0	3.1	3.0	2.9	2.8	2.8	2.8	2.8	2.8
	2.7	2.7	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.8
7	2.8	2.8	2.7	2.8	2.8	2.8	2.9	2.9	2.9	2.9
	2.9	2.8	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8
8	2.7	2.8	2.7	2.7	2.8	2.7	2.7	2.7	2.7	2.7
	2.7	2.7	2.7	2.7	2.8	2.8	2.7	2.8	2.8	2.8
9			2.9	2.9	3.0	2.9	3.0	3.1	3.0	3.0
	3.1	3.1	3.1	3.1	3.1	3.1	3.0	2.9	2.9	3.0
1-PM10 Average Opacity	2.82									
10	3.0	3.0	3.0	3.1	3.0	3.0	3.1	3.2	3.1	3.0
	3.1	3.1	3.0	2.9	3.0	3.0	3.0	3.0	2.9	2.9
11	2.9	3.0	3.1	3.2	3.2	3.2	3.1	3.1	3.1	3.0
	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
12	3.0	3.0	3.0	3.0	2.9	2.9	2.9	3.0	3.1	3.1
	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3.0	3.1
13	3.1	2.9	2.8	2.7	2.7	2.7	2.8	3.0	3.0	2.9
2-PM10 Average Opacity	3.00									
	2.7	2.6	2.6	2.6	2.7	2.6	2.6	2.6	2.6	2.5
14	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	2.5	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5
15	2.5	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	2.8	2.8	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.9
16	3.0	3.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.7	2.8	2.8
3-PM10 Average opacity	2.71									
Average of the three tests	2.84									
17	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	2.9
18	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8
	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8
19	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7
	2.7	2.7	2.7	2.7	2.8	2.8	2.7	2.7	2.7	2.6
20	2.5	2.6	2.6	2.6	2.7	3.0	3.1	3.1	3.1	3.1
	3.1	3.1	3.0	3.0	2.9	2.8	2.8	2.9	2.9	2.8

Hour	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	24-27	27-30

Appendix A.6
Calibration Data

SPAN GAS RECORD

CLIENT/LOCATION: Desert View Power
Unit 2

DATE: 5/1/2019
BY: DW

	MID SPAN CYLINDER		HIGH SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO	CB10100	99.999		
O_2	ALM-004705	10.65	SA18640	18.99
CO_2	ALM-004705	10.57	SA18640	19.03

PRE-TEST INSTRUMENT CALIBRATION ERROR

	ANALYZER					STATUS
	O_2	CO_2				
Analyzer Range	18.99	19.03				
Zero Gas Value	0.0	0.0				--
Analyzer Reads	0.00	0.02				--
Error (% of scale)	0.0%	0.1%				PASS
High Gas Value	18.99	19.03				--
Analyzer Reads	19.01	19.04				--
Error (% of scale)	0.1%	0.1%				PASS
Mid Gas Value	10.65	10.57				--
Analyzer Reads	10.64	10.59				--
Error (% of scale)	-0.1%	0.1%				PASS
Linearity at Mid Point	-0.1%	0.0%				

POST-TEST INSTRUMENT CALIBRATION ERROR

	ANALYZER					STATUS
	O_2	CO_2				
Analyzer Range	18.99	19.03				
Zero Gas Value	0.0	0.0				--
Analyzer Reads	-0.01	0.02				--
Error (% of scale)	-0.1%	0.1%				PASS
High Gas Value	18.99	19.03				--
Analyzer Reads	18.94	18.83				--
Error (% of scale)	-0.2%	-1.0%				PASS
Mid Gas Value	10.65	10.57				--
Analyzer Reads	10.60	10.49				--
Error (% of scale)	-0.3%	-0.4%				PASS
Linearity at Mid Point	-0.1%	0.1%				

% ERROR CALCULATION:
(AS FOUND - ACTUAL VALUE OF SPAN)/RANGE * 100%
ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIPCHART)

PRAXAIR
Making our planet more productive

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles, CA 90058
Tel: 323-585-2154
Fax: 714-542-6689

Certificate Modification Date: **12/11/2018**

Certification Date: **12/11/2018**
Lot Number: **N70086834401**
Part Number: **NI 5.5CE-AS**

DocNumber: **23830**

Montrose Air Quality Services, LLC 250 LA PATA
631 E. St. Andrew Pl.
Santa Ana, CA 92705
Praxair Order Number: **70813559**

N_2
CB10100
F.D. 12/10/18

CERTIFICATE OF ANALYSIS

Nitrogen, 5.5 Continuous Emission Monitoring Zero

Analytes	Specification	Analytical Results	Analytical Reference	Analytical Uncertainty
Nitrogen	**99.9995 %**	**99.9995 %**	**3**	**------**
Carbon Dioxide	**≤ 1 ppm**	**≤ 0.2 ppm**	**4**	**± 10%**
Carbon Monoxide	**≤ 0.5 ppm**	**≤ 0.1 ppm**	**4**	**± 15%**
Total Hydrocarbons	**≤ 0.1 ppm**	**≤ 0.01 ppm**	**4**	**± 15%**
Oxides of Nitrogen	**≤ 0.1 ppm**	**≤ 0.001 ppm**	**2**	**± 15%**
Oxygen	**≤ 0.5 ppm**	**≤ 0.5 ppm**	**1**	**± 15%**
Sulfur Dioxide	**≤ 0.1 ppm**	**≤ 0.001 ppm**	**5**	**± 15%**
Water	**≤ 2 ppm**	**≤ 0.2 ppm**	**6**	**± 10%**

Cylinder Style: **AS**
Fill Date: **12/10/2018**
Filling Method: **Pressure/Temperature**
Cylinder Pressure @ 70 F: **2000 psig**
Analysis Date: **12/10/2018**
Cylinder Volume: **142 ft3**
Valve Outlet Connection: **CGA 580**
Cylinder Number(s): **CC122662, CB10100, CC28299**
Analyzed Cylinder Number(s): **CC122662**

Analyst: **Jenna Lockman**
Approved Signer: **Ying Yu**

Key to Analytical Techniques:

Reference	Analytical Instrument - Analytical Principle
1	Delta F DF-550 Nanotrace - Electrolytic Cell/Electrochemical
2	Horiba Instruments Inc. APNA-360CE - Chemiluminescence
3	N/A - By Difference of Typical Impurities
4	Peak Performer 1 - Gas Chromatography with FID
5	Thermo 43I-AKSCA S/N 1420962322 - UV Spectrometry
6	Tiger Optics MTO-1000 - Cavity Ring-down Spectroscopy

This analysis of the product described herein was prepared by Praxair Distribution, Inc. using instruments whose calibration is certified using Praxair Distribution, Inc. Reference Materials which are either prepared by weights traceable to the National Institute of Standards and Technology (NIST), Measurement Canada, or by using NIST Standard Reference Materials where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted. Analytical uncertainty is expressed as a Relative % unless otherwise noted.

IMPORTANT
The information contained herein has been prepared at your request by personnel within Praxair Distribution, Inc.. While we believe the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall liability of Praxair Distribution, Inc. arising out of the use of the information contained herein exceed the fee established for providing such information.

PAJ 3-7-19

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22018

DocNumber: 000126579

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

MONTROSE

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70649133
Customer P. O. Number:
Customer Reference Number:

Fill Date: 6/26/2018
Part Number: NI CD10.5O6E-AS
Lot Number: 7008681/903
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

O2 10.65
CO2 10.57
ALM-004705
EXP. 7/3/2026
F22018

Certified Concentration:

		7/3/2026		NIST Traceable
	Cylinder Number:	ALM-004705		Analytical Uncertainty:
10.57	%	CARBON DIOXIDE		± 0.2 %
10.65	%	OXYGEN		± 0.4 %
Balance		NITROGEN		

Certification Information: *Certification Date:* 7/3/2018 *Term:* 96 Months *Expiration Date:* 7/3/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for O2 IR broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard; Z=Zero Gas; C=Gas Candidate)*

1. **Component: CARBON DIOXIDE**

Requested Concentration: 10.5 %
Certified Concentration: 10.57 %
Instrument Used: Horiba VIA 510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 6/22/2018

First Analysis Data:						Date: 7/3/2018
Z:	0	R:	14.01	C:	10.57	Conc: 10.57
R:	14.01	Z:	0	C:	10.56	Conc: 10.56
Z:	0	C:	10.57	R:	14.01	Conc: 10.57
UOM:	%			Mean Test Assay:		10.567 %

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC179324
Ref. Std. Conc.: 14.01%
Ref. Std. Traceable to SRM #: 1675b
SRM Sample #: 5-F-51
SRM Cylinder #: CAL014538

Second Analysis Data:						Date:
Z:	0	R:	0	C:	0	Conc: 0
R:	0	Z:	0	C:	0	Conc: 0
Z:	0	C:	0	R:	0	Conc: 0
UOM:	%			Mean Test Assay:		0 %

2. **Component: OXYGEN**

Requested Concentration: 10.5 %
Certified Concentration: 10.65 %
Instrument Used: PARA 1 OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 7/2/2018

First Analysis Data:						Date: 7/3/2018
Z:	0	R:	9.88	C:	10.65	Conc: 10.65
R:	9.88	Z:	0	C:	10.65	Conc: 10.65
Z:	0	C:	10.64	R:	9.88	Conc: 10.64
UOM:	%			Mean Test Assay:		10.647 %

Reference Standard Type: NTRM
Ref. Std. Cylinder #: DT0010402
Ref. Std. Conc.: 9.88%
Ref. Std. Traceable to SRM #: 170701
SRM Sample #: 17070115
SRM Cylinder #:

Second Analysis Data:						Date:
Z:	0	R:	0	C:	0	Conc: 0
R:	0	Z:	0	C:	0	Conc: 0
Z:	0	C:	0	R:	0	Conc: 0
UOM:	%			Mean Test Assay:		0 %

Analyzed by: Danielle Burns

Certified by: Jose Vasquez

RH 7/11/18

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22018

DocNumber: 000122663

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

MONTROSE

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70550428
Customer P. O. Number:
Customer Reference Number:

Fill Date: 4/2/2018
Part Number: NI CD19O2E-AS
Lot Number: 700086809210
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

O2 18.99
CO2 19.03
SA18640
4/6/26
F22018

Certified Concentration:

Expiration Date:		4/6/2026	NIST Traceable
Cylinder Number:		SA18640	Analytical Uncertainty:
19.03	%	CARBON DIOXIDE	± 0.4 %
18.99	%	OXYGEN	± 0.1 %
	Balance	NITROGEN	

Certification Information: *Certification Date:* 4/5/2018 *Term:* 96 Months *Expiration Date:* 4/6/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for O2 IR broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 19 %
Certified Concentration: 19.03 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 3/22/2018

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC167324
Ref. Std. Conc. 19.92%
Ref. Std. Traceable to SRM #: RGM#CC28
SRM Sample #: N/A
SRM Cylinder #: RGM#CC26033

First Analysis Data:								Date: 4/6/2018
Z:	0	R:	19.92	C:	19.02	Conc:	19.02	
R:	19.92	Z:	0	C:	19.04	Conc:	19.04	
Z:	0	C:	19.03	R:	19.92	Conc:	19.03	
UOM:	%			Mean Test Assay:			19.03 %	

Second Analysis Data:								Date:
Z:	0	R:	0	C:	0	Conc:	0	
R:	0	Z:	0	C:	0	Conc:	0	
Z:	0	C:	0	R:	0	Conc:	0	
UOM:	%			Mean Test Assay:			0 %	

2. Component: OXYGEN

Requested Concentration: 19 %
Certified Concentration: 18.99 %
Instrument Used: PARA 1 OXYMAT SF
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 4/2/2018

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC76311
Ref. Std. Conc 20.88%
Ref. Std. Traceable to SRM #: 26598
SRM Sample #: 71-E-19
SRM Cylinder #: FF22331

First Analysis Data:								Date: 4/5/2018
Z:	0	R:	20.88	C:	18.99	Conc:	18.99	
R:	20.88	Z:	0	C:	18.99	Conc:	18.99	
Z:	0	C:	18.99	R:	20.88	Conc:	18.99	
UOM:	%			Mean Test Assay:			18.99 %	

Second Analysis Data:								Date:
Z:	0	R:	0	C:	0	Conc:	0	
R:	0	Z:	0	C:	0	Conc:	0	
Z:	0	C:	0	R:	0	Conc:	0	
UOM:	%			Mean Test Assay:			0 %	

Analyzed by: Danielle Bums
Danielle Bums

Certified by:
Jose Vasquez

DH
9-21-18

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

Barometric Pressure Determination

Date: 05/01/19

Time: 8:00

Data By: DW

Reference: http://forecast.weather.gov/MapClick.php?CityName=O

Reference Barometer ID	Palm Springs, Jacqueline Cochran Regional Airport (KT
Reference Barometer Location	33.85°N 116.55°W (Elev. 682 ft)
Reference Barometer Other Info.	21 Mar 6:45 am PDT
Reference Barometer Indication, corrected to sea	30.02
Reference Barometer Reference Elevation	**682.00**
Reference Barometer Actual Pressure	29.34
Test Barometer Location/Site	
Location/Site Elevation	**-127**
Location/Site Barometric Pressure	30.15
Sampling Location Height (above/below site elevation	**20**
Sampling Location Barometric Pressure	**30.13**

SEMI-ANNUAL DRY GAS METER/ORIFICE CALIBRATION

Orifice Method - Triplicate Runs/Four Calibration Points
English Meter Box Units, English K' Factor
Filename: C:\Users\Dave Wonderly\Information\Calibrations\Dry Gas Meters\17-wcs\2018\[Semi-Annual Meter Cal 11-2-18 WCS-17.xls
File Modified From: APEX 522 Series Meter box Calibration
Revised: 4/8/2005

Model #: C5000
ID #: 17WCS
Date: 11/2/2018
Bar. Pressure: 30.07 (in. Hg)
Performed By: R. Howard

DRY GAS METER READINGS									CRITICAL ORIFICE READINGS					
					Initial Temps.		Final Temps.					Ambient Temperature		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.11	26.00	868.900	874.273	5.373	67.0	64.0	66.0	66.0	33	0.1551	18.0	60.0	60.0	60.0
0.11	26.00	874.273	879.641	5.368	66.0	66.0	67.0	66.0	33	0.1551	18.0	60.0	60.0	60.0
0.11	26.00	879.641	885.016	5.375	67.0	66.0	67.0	67.0	33	0.1551	18.0	60.0	60.0	60.0
0.49	12.00	890.800	896.111	5.311	67.0	67.0	71.0	68.0	48	0.3345	15.0	60.0	60.0	60.0
0.49	12.00	896.111	901.429	5.318	71.0	68.0	71.0	69.0	48	0.3345	15.0	60.0	64.0	62.0
0.49	12.00	901.429	906.743	5.314	71.0	69.0	71.0	69.0	48	0.3345	15.0	60.0	64.0	62.0
1.60	7.00	907.700	913.107	5.407	71.0	68.0	74.0	67.0	63	0.5915	13.0	61.0	61.0	61.0
1.60	7.00	913.107	918.505	5.398	74.0	67.0	74.0	68.0	63	0.5915	13.0	61.0	61.0	61.0
1.60	7.00	918.505	923.900	5.395	74.0	68.0	75.0	70.0	63	0.5915	13.0	61.0	61.0	61.0
2.90	5.00	925.700	930.799	5.099	76.0	70.0	80.0	73.0	73	0.7678	11.0	61.0	61.0	61.0
2.90	5.00	930.799	935.893	5.094	80.0	73.0	79.0	74.0	73	0.7678	11.0	61.0	61.0	61.0
2.90	5.00	935.893	940.996	5.103	79.0	74.0	76.0	70.0	73	0.7678	11.0	61.0	61.0	61.0

DRY GAS METER		ORIFICE			DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR	Individual Run	Individual Orifice	Orifice Average	Orifice Average
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Y Value (number)	dH@ Value (in H2O)	0.95 < Y < 1.05?	Ymax - Ymin < 0.010?	0.98 < Y/Yd < 1.02?	dH@ - dH@ av < 0.155?
5.422	153.6	5.319	150.6	5.215	0.981	1.494	Pass			
5.412	153.3	5.319	150.6	5.215	0.983	1.491	Pass			
5.414	153.3	5.319	150.6	5.215	0.982	1.490	Pass			
				Average	0.982	1.492		Pass	Pass	Pass
5.339	151.2	5.292	149.9	5.188	0.991	1.425	Pass			
5.331	151.0	5.282	149.6	5.198	0.991	1.428	Pass			
5.325	150.8	5.282	149.6	5.198	0.992	1.427	Pass			
				Average	0.991	1.427		Pass	Pass	Pass
5.433	153.9	5.455	154.5	5.358	1.004	1.491	Pass			
5.416	153.4	5.455	154.5	5.358	1.007	1.491	Pass			
5.403	153.0	5.455	154.5	5.358	1.010	1.487	Pass			
				Average	1.007	1.490		Pass	Pass	Pass
5.094	144.3	5.058	143.2	4.968	0.993	1.592	Pass			
5.072	143.6	5.058	143.2	4.968	0.997	1.586	Pass			
5.098	144.4	5.058	143.2	4.968	0.992	1.590	Pass			
				Average	0.994	1.589		Pass	Pass	Pass

Average Yd: 0.994 dH@: 1.490

Q @ dH = 1: 0.613

SIGNED: Signature on file

Date: 11/2/2018

SEMI-ANNUAL DRY GAS METER/ORIFICE CALIBRATION

Orifice Method - Triplicate Runs/Four Calibration Points
English Meter Box Units, English K' Factor
Filename: M:\Santa Ana\Equipment\Test Equipment\Calibrations\Dry Gas Meters\17-wcs\2019\[Semi-Annual Meter Cal 4-24-19 WCS-1
File Modified From: APEX 522 Series Meter box Calibration
Revised: 4/8/2005

Model #: C5000
ID #: 17WCS
Date: 4/24/2019
Bar. Pressure: 29.99 (in. Hg)
Performed By: R. Howard

DRY GAS METER READINGS									CRITICAL ORIFICE READINGS					
					Initial Temps.		Final Temps.					Ambient Temperature		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.11	26.00	506.000	511.374	5.374	69.0	67.0	71.0	70.0	33	0.1551	19.0	59.0	59.0	59.0
0.11	26.00	511.374	516.743	5.369	71.0	70.0	70.0	68.0	33	0.1551	19.0	59.0	59.0	59.0
0.11	26.00	516.743	522.118	5.375	70.0	68.0	70.0	67.0	33	0.1551	19.0	59.0	59.0	59.0
0.51	12.00	489.400	494.651	5.251	70.0	66.0	70.0	66.0	48	0.3345	15.0	59.0	59.0	59.0
0.51	12.00	494.651	499.896	5.245	70.0	66.0	71.0	66.0	48	0.3345	15.0	59.0	59.0	59.0
0.51	12.00	499.896	505.151	5.255	71.0	66.0	72.0	67.0	48	0.3345	15.0	59.0	59.0	59.0
1.50	7.00	455.700	461.093	5.393	63.0	63.0	64.0	64.0	63	0.5915	12.5	61.0	61.0	61.0
1.50	7.00	461.093	466.486	5.393	64.0	64.0	67.0	64.0	63	0.5915	12.5	61.0	61.0	61.0
1.50	7.00	466.486	471.882	5.396	67.0	64.0	67.0	65.0	63	0.5915	12.5	61.0	61.0	61.0
3.00	5.00	472.500	477.610	5.110	71.0	67.0	71.0	67.0	73	0.7678	12.5	59.0	59.0	59.0
3.00	5.00	477.610	482.716	5.106	71.0	67.0	71.0	68.0	73	0.7678	12.5	59.0	59.0	59.0
3.00	5.00	482.716	487.827	5.111	71.0	68.0	72.0	69.0	73	0.7678	12.5	59.0	59.0	59.0

DRY GAS METER		ORIFICE				DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR				
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)		Y Value (number)	dH@ Value (in H2O)	Individual Run 0.95 < Y < 1.05?	Individual Orifice Ymax - Ymin < 0.010?	Orifice Average 0.98 < Y/Yd < 1.02?	Orifice Average dH@ - dH@ av < 0.155?
5.373	152.2	5.310	150.4	5.210		0.988	1.485	Pass			
5.363	151.9	5.310	150.4	5.210		0.990	1.484	Pass			
5.379	152.3	5.310	150.4	5.210		0.987	1.488	Pass			
					Average	0.989	1.486		Pass	Pass	Pass
5.268	149.2	5.283	149.6	5.183		1.003	1.489	Pass			
5.259	148.9	5.283	149.6	5.183		1.005	1.489	Pass			
5.262	149.0	5.283	149.6	5.183		1.004	1.488	Pass			
					Average	1.004	1.488		Pass	Pass	Pass
5.471	154.9	5.440	154.1	5.358		0.994	1.506	Pass			
5.458	154.6	5.440	154.1	5.358		0.997	1.505	Pass			
5.451	154.4	5.440	154.1	5.358		0.998	1.504	Pass			
					Average	0.996	1.505		Pass	Pass	Pass
5.148	145.8	5.054	143.1	4.958		0.982	1.659	Pass			
5.141	145.6	5.054	143.1	4.958		0.983	1.657	Pass			
5.139	145.5	5.054	143.1	4.958		0.983	1.654	Pass			
					Average	0.983	1.657		Pass	Pass	Pass

Average Yd:	0.993	dH@:	1.534
		Q @ dH = 1:	0.606

SIGNED: Signature on file

Date: 4/24/2019

THERMOCOUPLE CALIBRATION

Thermocouple ID: 109
Date: 12/31/2018
Performed By: JG/RH/DA/JS

Calibrated Digital Temperature Readout ID: PTC-67
T1 Reference Thermometer ID: 242196
T2 Reference Thermometer ID: 242196
T3 Reference Thermometer ID: 242167

T/C I.D. 109	Readout I.D.	T/C - Readout °F Reading 1	Reading 2	Reading 3	Average	Reference Thermometer °F Reading 1	Reading 2	Reading 3	Average	Difference °F	%, (°R)	
T3 (OIL)	PTC-67	359	360	360	360	358	358	358	358	1.7	0.2%	Pass
T2 (Boiling H_2O)	PTC-67	212	212	214	213	212	212	212	212	0.7	0.1%	Pass
T1 (Ice/Water)	PTC-67	31	32	32	32	32	32	32	32	0.3	0.1%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

DIGITAL TEMPERATURE READOUT CALIBRATION

Digital Temperature Readout ID: 17-WCS
Readout Description: Control Box
Date: 12/31/2018
Performed By: JG/DA/RH/JS

Calibrated Thermocouple ID: TC-CAL
T1 Reference Thermometer ID: 242196
T2 Reference Thermometer ID: 242196
T3 Reference Thermometer ID: 242167

T/C I.D. TC-CAL	Readout I.D.	T/C - Readout °F Reading 1	Reading 2	Reading 3	Average	Reference Thermometer °F Reading 1	Reading 2	Reading 3	Average	Difference °F	%, (°R)	
T3 (OIL)	17-WCS	354	354	354	354	358	358	358	358	4.0	0.5%	Pass
T2 (Boiling H_2O)	17-WCS	208	208	208	208	212	212	212	212	4.0	0.6%	Pass
T1 (Ice/Water)	17-WCS	28	28	28	28	32	32	32	32	4.0	0.8%	Pass

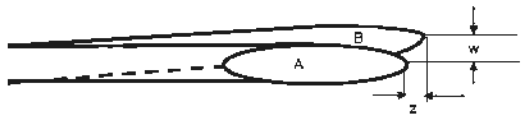
1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

Thermocouple Source Readings

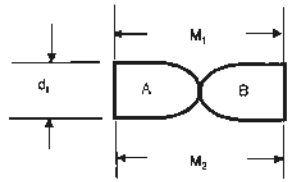
	T/C Source S/N	T/C - Readout °F Reading 1	Reading 2	Reading 3	Average	T/C Source °F Reading 1	Reading 2	Reading 3	Average	Difference °F	%, (°R)	
T4 (~650 F)	S/N 106970	648	648	648	648	650	650	650	650	2.0	0.2%	Pass
T3 (~370 F)	S/N 106970	361	361	361	361	365	365	365	365	4.0	0.5%	Pass
T2 (~212 F)	S/N 106970	209	209	209	209	212	212	212	212	3.0	0.4%	Pass
T1 (~32 F)	S/N 106970	28	28	28	28	32	32	32	32	4.0	0.8%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

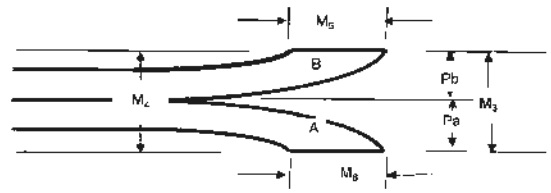
S Type Pitot Tube Dimensional Calibration Record



Side View



End View



Top View

Acceptability Criteria			z < 1/8"	w < 1/32"	Yes	"3/16" < Dt < 3/8"	n/a	n/a	n/a	n/a	n/a	n/a	10 degrees	5 degrees	1.05 Dt < P < 1.5 Dt	
Pitot ID	Date	Calibrated By	Side View, Impact openings Properly aligned, z < 1/8"	Side View, Impact openings Properly aligned, w < 1/32"	Pa = Pb	Tubing Diameter, dt	M1	M2	M3	M4	M5	M6	Average Face Opening Plane Angle, offset from perpendicular to transverse axis	Average Face Opening Plane Frontal Angle from parallel to Longitudinal Axis	Ratio of P/Dt	Status
109	12/31/18	RH	Y	Y	Y	0.375	0.942	0.935	0.947	0.945	0.411	0.414	0.5	0.1	1.3	Pass

Notes: Reference "A Type-S Pitot Tube Calibration Study", Robert F. Vollaro, October 15, 1975
If tube is not visibly deformed it is assumed that Pa = Pb = .5 x avg. of M1 & M2, and that average face opening plane angles represent individual angles to tube axis

APPENDIX B
LABORATORY REPORTS

MONTROSE
AIR QUALITY SERVICES

PARTICLE SIZE, PM_{10}
EPA METHOD 201A

Project # 002AS-541589
Client/Location Desert View
Sample Location Unit 2
Test # 1-PM-10

Water Blank mg/ml NA
Acetone Blank mg/ml 0.0000

Sample Date 5/1/19
Analysis Date 5/8/19
Analyst Initials HS

Item	Number	Final Weight (g)	Tare Weight (g)	Gain Weight (mg)	Blank Correction (mg)	Aliquot Correction (ml/ml)	Net Gain (mg/Sample)
1. >10 microns Acetone Wash	4291	28.4751	28.4750	0.1	0.0	37/37	0.1
2. Filter (<10 microns)	45-1414	0.1054	0.1054	0.0	----------	----------	0.0
3. <10 microns Acetone Wash	4297	29.6772	29.6771	0.0	0.0	21.5/21.5	0.0
Reagent blank Acetone blank	4183	30.0949	30.0949	0.0	0.0	250/250	—

Total Particulate = 0.1 mg
Particulate < 10 µm 0.0 mg

Method of Sample Prep/Notes

MONTROSE AIR QUALITY SERVICES

PARTICLE SIZE, PM_{10}
EPA METHOD 201A

Project # 002AS-541589
Client/Location Desert View
Sample Location Unit 2
Test # 2-PM-10

Water Blank mg/ml NA
Acetone Blank mg/ml 0.0000

Sample Date 5/1/2019
Analysis Date 5/8/2019
Analyst Initials HG

Item	Number	Final Weight (g)	Tare Weight (g)	Gain Weight (mg)	Blank Correction (mg)	Aliquot Correction (ml/ml)	Net Gain (mg/Sample)
1. >10 microns Acetone Wash	4303	29.5668	29.5638	3.0	0.0	23/23	3.0
2. Filter (<10 microns)	45-1415	0.1041	0.1044	0.0	----------	----------	0.0
3. <10 microns Acetone Wash	4304	30.1559	30.1574	0.0	0.0	23/23	0.0

Total Particulate = 3.0 mg
Particulate < 10 µm 0.0 mg

Method of Sample Prep/Notes

MONTROSE AIR QUALITY SERVICES

PARTICLE SIZE, PM_{10}
EPA METHOD 201A

Project # 002AS-541589
Client/Location Desert View
Sample Location Unit 2
Test # 3-PM-10

Water Blank mg/ml NA
Acetone Blank mg/ml 0.0000

Sample Date 5/1/2019
Analysis Date 5/8/2019
Analyst Initials HS

Item	Number	Final Weight (g)	Tare Weight (g)	Gain Weight (mg)	Blank Correction (mg)	Aliquot Correction (ml/ml)	Net Gain (mg/Sample)
1. >10 microns Acetone Wash	4307	29.5356	29.5323	3.3	0.0	44.7 / 44.7	3.3
2. Filter (<10 microns)	45-1416	0.1046	0.1046	0.0	----------	----------	0.0
3. <10 microns Acetone Wash	4302	29.5760	29.5754	0.6	0.0	34.0 / 34.0	0.6

Total Particulate = 3.9 mg
Particulate < 10 µm 0.6 mg

Method of Sample Prep/Notes

CHAIN OF CUSTODY

CLIENT: Desert View Power PROJECT NO: 002AS-541589 TEST DATE(S): May 1, 2019

LOCATION: Unit 2 stack breaching SAMPLER(S): Robert Howard

SAMPLE LOCATION: Stack Breaching PROJECT MANAGER: Dave Wonderly

TEST METHOD(S): EPA 201A DATE DUE:

OUTSIDE LAB REQUIRED?: No COMPLIANCE TEST? Yes

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
5/1/2019	632/943	1-PM-10	Filter # 45-1414	1	RH	
5/1/2019	632/943	1-PM-10	>PM10 Portion	1	RH	
5/1/2019	632/943	1-PM-10	<PM10 Portion	1	RH	
5/1/2019	1008/1310	2-PM-10	Filter # 45-1415	1	RH	
5/1/2019	1008/1310	2-PM-10	>PM10 Portion	1	RH	
5/1/2019	1008/1310	2-PM-10	<PM10 Portion	1	RH	
5/1/2019	1331/1446	3-PM-10	Filter # 45-1416	1	RH	
5/1/2019	1331/1446	3-PM-10	>PM10 Portion	1	RH	
5/1/2019	1331/1446	3-PM-10	<PM10 Portion	1	RH	

RELEASED BY	DATE/TIME	RECEIVED BY	DATE/TIME
Robert Howard / LAB	5-2-19 / 0555	5/6/19 9:00 am	
		Yim. Wei Chu	5/6/19 9:00am

ANALYSIS REQUIRED: PM10 By EPA Method 201A.

APPENDIX C
CALCULATIONS

Appendix C.1
General Emissions Calculations

GENERAL EMISSION CALCULATIONS

I. Stack Gas Velocity

A. Stack gas molecular weight, lb/lb-mole

$$MW_{dry} = 0.44 * \%CO_2 + 0.32 * \%O_2 + 0.28 * \%N_2$$

$$MW_{wet} = MW_{dry} * (1 - B_{wo}) + 18 * B_{wo}$$

B. Absolute stack pressure, iwg

$$Ps = Pbar + \frac{Psg}{13.6}$$

C. Stack gas velocity, ft/sec

$$V_s = 2.9 * C_p * \sqrt{\Delta P} * \sqrt{T_s} * \sqrt{\frac{29.92 * 28.95}{P_s * MW_{wet}}}$$

II. Moisture

A. Sample gas volume, dscf

$$V_{mstd} = 0.03342 * V_m * (P_{bar} + \frac{\Delta H}{13.6}) * \frac{T_{ref}}{T_m} * Y_d$$

B. Water vapor volume, scf

$$V_{wstd} = 0.0472 * V_{lc} * \frac{T_{ref}}{528\ ^oR}$$

C. Moisture content, dimensionless

$$B_{wo} = \frac{V_{wstd}}{(V_{mstd} + V_{wstd})}$$

III. Stack gas volumetric flow rate

A. Actual stack gas volumetric flow rate, wacfm

$$Q = V_s * A_s * 60$$

B. Standard stack gas flow rate, dscfm

$$Q_{sd} = Q * (1 - B_{wo}) * \frac{T_{ref}}{T_s} * \frac{P_s}{29.92}$$

IV. Gaseous Mass Emission Rates, lb/hr

$$M = \frac{ppm * MW_i * Q_{sd} * 60}{SV * 10^6}$$

V. Emission Rates, lb/MMBtu

$$\frac{lb}{MMBtu} = \frac{ppm * MW_i * F}{SV * 10^6} * \frac{20.9}{20.9 - \%O_2}$$

VI. Percent Isokinetic

$$I = \frac{17.32 \text{ x } T_s \text{ } (V_m std)}{(1\text{-Bwo}) \text{ 0 x Vs x Ps x Dn2}} \text{ x } \frac{520°R}{T_{ref}}$$

VII. Particulate emissions

(a) Grain loading, gr/dscf
$C = 0.01543 \text{ } (M_n/V_{m\ std})$

(b) Grain loading at 12% CO_2, gr/dscf
$C_{12\%}\ CO_2 = C \text{ } (12/\%\ CO_2)$

(c) Mass emissions, lb/hr
M = C x Qsd x (60 min/hr)/(7000 gr/lb)

(d) Particulate emission factor

$$lb/10^6\ Btu = C x \frac{1\ lb}{7000\ gr} \text{ x F x } \frac{20.9}{20.9 - \%\ O_2}$$

Nomenclature:

A_s	= stack area, ft^2
B_{wo}	= flue gas moisture content, dimensionless
$C_{12\%CO2}$	= particulate grain loading, gr/dscf corrected to 12% CO_2
C	= particulate grain loading, gr/dscf
C_p	= pitot calibration factor, dimensionless
Dn	= nozzle diameter, in.
F	= fuel F-Factor, dscf/MMBtu @ 0% O_2
H	= orifice differential pressure, iwg
I	= % isokinetics
M_n	= mass of collected particulate, mg
M_i	= mass emission rate of specie i, lb/hr
MW	= molecular weight of flue gas, lb/lb-mole
M_{wi}	= molecular weight of specie i:
	SO_2: 64
	NO_x: 46
	CO: 28
	HC: 16
0	= sample time, min.
ΔP	= average velocity head, iwg = $(\sqrt{\Delta P})^2$
P_{bar}	= barometric pressure, inches Hg
P_s	= stack absolute pressure, inches Hg
P_{sg}	= stack static pressure, iwb
Q	= wet stack flow rate at actual conditions, wacfm
Q_{sd}	= dry standard stack flow rate, dscfm
SV	= specific molar volume of an ideal gas at standard conditions, ft^3/lb-mole
T_m	= meter temperature, °R
T_{ref}	= reference temperature, °R
T_s	= stack temperature, °R
V_s	= stack gas velocity, ft/sec
V_{lc}	= volume of liquid collected in impingers, ml
V_m	= uncorrected dry meter volume, dcf
V_{mstd}	= dry meter volume at standard conditions, dscf
V_{wstd}	= volume of water vapor at standard conditions, scf
Y_d	= meter calibration coefficient

Appendix C.2
Calculation Spreadsheets

Run Summary

Client/Location.....	Desertview Power	Date.....	5/1/2019
Test Number.....	1-PM10	Data By.....	Dave Wonderly
Test Method.....	201A/5	Sample Location....	Stack Breaching
Fuel.....	N. Gas	Ref. Temp (F).....	68
Sample Train.....	17-WCS	Unit.....	Unit 2
Pitot Factor	0.840	Meter Cal Factor....	0.9930
Stack Area (sq ft).....	38.84	Sample Time (Min).	179.00
Bar Press (in Hg).....	30.087	Nozzle Diam (in).....	0.163
Meter Vol (acf).....	65.233	Meter Temp (F).....	67.5
Stack Press (iwg).....	-0.4	Stack Temp (F).....	328.0
Vel Head (iwg).....	1.0122	Stack O2 (%).....	8.40
Liquid Vol (ml).....	213.0	Stack CO2 (%).....	12.28
Meter Press (iwg).....	0.37	Start Time.....	6:32:00
		Stop Time.....	9:43:15

Std Sample Vol (SCF).....	65.249
Moisture Fraction.....	0.134
Stack Gas Mol Wt.....	28.66
Wet O2, %.....	7.3%
Stack Gas Viscosity, micropoise.....	228.3
Stack Gas Velocity (ft/sec).....	68.99
Stack Flow Rate (wacfm).....	160,782
Stack Flow Rate (dscfm).....	93,764
Isokinetic Ratio (%).....	104.16
Qimp (flow rate through nozzle), wacfm.....	0.623
D50 (actual nozzle cut-off diameter), microns.....	10.09
Acceptability criteria (must meet Item 1 and either 2a or 2b)	
1.A. Is D50 < 11.0 um?	YES
1.B. Is D50 > 9.0 um?	YES
2a. Number of points outside delta Pmin to delta Pmax?	1
Acceptable (zero is acceptable)?	NO
2b. Must meet all three cases below	
(1) Isokinetics < 120%?	YES
(2) Isokinetics > 80%?	YES
(3) Only one point outside delta P min and max?	YES
>PM10 Catch, mg.....	0.1
Grain Loading, gr/dscf.....	0.00002
Grain Loading @ 3% O2.....	0.00003
Mass Emissions, lb/hr.....	0.019
<PM10 Filterable Catch, mg.....	0.0
Grain Loading, gr/dscf.....	0.00000
Grain Loading @ 3% O2.....	0.00000
Mass Emissions, lb/hr.....	0.000

Total Particulate.....	0.019
Total Particulate <PM10.....	0.000

Run Summary

Client/Location.....	Desertview Power	Date.....	5/1/2019
Test Number.....	2-PM10	Data By.....	Dave Wonderly
Test Method.....	201A/5	Sample Location....	Stack Breaching
Fuel.....	N. Gas	Ref. Temp (F).....	68
Sample Train.....	17-WCS	Unit.....	Unit 2
Pitot Factor	0.840	Meter Cal Factor....	0.9930
Stack Area (sq ft).....	38.84	Sample Time (Min).	173.00
Bar Press (in Hg).....	30.087	Nozzle Diam (in).....	0.163
Meter Vol (acf).....	67.090	Meter Temp (F).....	91.3
Stack Press (iwg).....	-0.1	Stack Temp (F).....	343.8
Vel Head (iwg).....	0.9374	Stack O2 (%).....	8.62
Liquid Vol (ml).....	207.5	Stack CO2 (%).....	12.04
Meter Press (iwg).....	0.39	Start Time.....	10:08:00
		Stop Time.....	13:10:00

Std Sample Vol (SCF).....	64.213
Moisture Fraction.....	0.132
Stack Gas Mol Wt.....	28.65
Wet O2, %.....	7.5%
Stack Gas Viscosity, micropoise.....	232.5
Stack Gas Velocity (ft/sec).....	67.05
Stack Flow Rate (wacfm).....	156,244
Stack Flow Rate (dscfm).....	89,510
Isokinetic Ratio (%).....	111.10
Qimp (flow rate through nozzle), wacfm.....	0.646
D50 (actual nozzle cut-off diameter), microns.....	10.00
Acceptability criteria (must meet Item 1 and either 2a or 2b)	
1.A. Is D50 < 11.0 um?	YES
1.B. Is D50 > 9.0 um?	YES
2a. Number of points outside delta Pmin to delta Pmax?	1
Acceptable (zero is acceptable)?	NO
2b. Must meet all three cases below	
(1) Isokinetics < 120%?	YES
(2) Isokinetics > 80%?	YES
(3) Only one point outside delta P min and max?	YES
>PM10 Catch, mg.....	3.0
Grain Loading, gr/dscf.....	0.00072
Grain Loading @ 3% O2.....	0.00105
Mass Emissions, lb/hr.....	0.553
<PM10 Filterable Catch, mg.....	0.0
Grain Loading, gr/dscf.....	0.00000
Grain Loading @ 3% O2.....	0.00000
Mass Emissions, lb/hr.....	0.000

Total Particulate.....	0.553
Total Particulate <PM10.....	0.000

Run Summary

Client/Location.....	Desertview Power	Date.....	5/1/2019
Test Number.....	3-PM10	Data By.....	Dave Wonderly
Test Method.....	201A/5	Sample Location....	Stack Breaching
Fuel.....	N. Gas	Ref. Temp (F).....	68
Sample Train.....	17-WCS	Unit.....	Unit 2
Pitot Factor	0.840	Meter Cal Factor....	0.9930
Stack Area (sq ft).....	38.84	Sample Time (Min).	187.25
Bar Press (in Hg).....	30.087	Nozzle Diam (in).....	0.163
Meter Vol (acf).....	73.524	Meter Temp (F).....	98.5
Stack Press (iwg).....	-0.4	Stack Temp (F).....	350.6
Vel Head (iwg).....	1.0143	Stack O2 (%).....	8.48
Liquid Vol (ml).....	216.4	Stack CO2 (%).....	12.22
Meter Press (iwg).....	0.40	Start Time.....	13:31:00
		Stop Time.....	16:46:15

Std Sample Vol (SCF).....	69.475
Moisture Fraction.....	0.128
Stack Gas Mol Wt.....	28.72
Wet O2, %.....	7.4%
Stack Gas Viscosity, micropoise.....	234.6
Stack Gas Velocity (ft/sec).....	69.97
Stack Flow Rate (wacfm).....	163,066
Stack Flow Rate (dscfm).....	93,016
Isokinetic Ratio (%).....	106.88
Qimp (flow rate through nozzle), wacfm.....	0.648
D50 (actual nozzle cut-off diameter), microns.....	10.05
Acceptability criteria (must meet Item 1 and either 2a or 2b)	
1.A. Is D50 < 11.0 um?	YES
1.B. Is D50 > 9.0 um?	YES
2a. Number of points outside delta Pmin to delta Pmax?	1
Acceptable (zero is acceptable)?	NO
2b. Must meet all three cases below	
(1) Isokinetics < 120%?	YES
(2) Isokinetics > 80%?	YES
(3) Only one point outside delta P min and max?	YES
>PM10 Catch, mg.....	3.3
Grain Loading, gr/dscf.....	0.00073
Grain Loading @ 3% O2.....	0.00106
Mass Emissions, lb/hr.....	0.584
<PM10 Filterable Catch, mg.....	0.6
Grain Loading, gr/dscf.....	0.00013
Grain Loading @ 3% O2.....	0.00019
Mass Emissions, lb/hr.....	0.106

Total Particulate.....	0.6906
Total Particulate <PM10.....	0.1062

MOBILE EMISSION LABORATORY
CONTINUOUS GASEOUS MEASUREMENTS SUMMARY

Client:	Desert View Power	Condition:	----
Unit:	Unit 2	Load:	> 90%
Location:	Mecca	Date	5/1/2019

	O2%	CO2%				
Analyzer Range:	18.99	19.03				
Span Value:	10.65	10.57				
	O2%	CO2%				
As Found	10.635	10.588				
Linearity	-0.1%	0.1%			<2%	**Pass**
5/1/2019	O2%	CO2%				
1-PM 10						
Analyzer Range:	18.99	19.03				
Span Value:	10.65	10.57				
Pre test Direct Zero	0.00	0.02				
Pre test Direct Span	10.64	10.59				
System Zero	0.00	0.04				
System Span	10.58	10.53				
Average	8.33	12.22				
System Zero	-0.01	0.04				
System Span	10.56	10.52				
Post test Direct Zero	-0.01	0.02				
Post test Direct Span	10.63	10.56				
Corrected Conc.	8.40	12.28				
System Bias Check						
Zero Pre-test	0.00%	0.20%			< 5%	**PASS**
Zero Post-test	-0.04%	0.19%			< 5%	**PASS**
Span Pre-test	-0.39%	-0.24%			< 5%	**PASS**
Span Post-test	-0.45%	-0.25%			<5%	**PASS**

5/1/2019	O2%	CO2%				
2-PM 10						
Analyzer Range:	18.99	19.03				
Span Value:	10.65	10.57				
Pre test Direct Zero	-0.01	0.02				
Pre test Direct Span	10.63	10.56				
System Zero	-0.01	0.04				
System Span	10.56	10.52				
Raw concentration	8.53	11.93				
System Zero	0.01	0.08				
System Span	10.52	10.44				
Post test Direct Zero	-0.01	0.02				
Post test Direct Span	10.62	10.51				
Corrected Conc.	8.62	12.04				
System Bias Check						
Zero Pre-test	-0.04%	0.19%			< 5%	**PASS**
Zero Post-test	0.03%	0.44%			< 5%	**PASS**
Span Pre-test	-0.45%	-0.25%			< 5%	**PASS**
Span Post-test	-0.66%	-0.67%			<5%	**PASS**

3/10/2015	O2%	CO2%				
3-PM 10						
Analyzer Range:	18.99	19.03				
Span Value:	10.65	10.57				
Pre test Direct Zero	-0.01	0.02				
Pre test Direct Span	10.62	10.51				
System Zero	0.01	0.08				
System Span	10.52	10.44				
Raw concentration	8.38	12.05				
System Zero	0.00	0.06				
System Span	10.51	10.43				
Post test Direct Zero	-0.01	0.02				
Post test Direct Span	10.60	10.49				
Corrected Conc.	8.48	12.22				
System Bias Check						
Zero Pre-test	0.03%	0.44%			< 5%	**PASS**
Zero Post-test	-0.01%	0.29%			< 5%	**PASS**
Span Pre-test	-0.66%	-0.67%			< 5%	**PASS**
Span Post-test	-0.72%	-0.74%			<5%	**PASS**

APPDNEIX D
QUALITY ASSURANCE

Appendix D.1
Quality Assurance Program Summary

QUALITY ASSURANCE PROGRAM SUMMARY

As part of Montrose Air Quality Services, LLC (MAQS) ASTM D7036-04 certification, MAQS is committed to providing emission related data which is complete, precise, accurate, representative, and comparable. MAQS quality assurance program and procedures are designed to ensure that the data meet or exceed the requirements of each test method for each of these items. The quality assurance program consists of the following items:

- Assignment of an Internal QA Officer
- Development and use of an internal QA Manual
- Personnel training
- Equipment maintenance and calibration
- Knowledge of current test methods
- Chain-of-custody
- QA reviews of test programs

Assignment of an Internal QA Officer: MAQS has assigned an internal QA Officer who is responsible for administering all aspects of the QA program.

Internal Quality Assurance Manual: MAQS has prepared a QA Manual according to the requirements of ASTM D7036-04 and guidelines issued by EPA. The manual documents and formalizes all of MAQS QA efforts. The manual is revised upon periodic review and as MAQS adds capabilities. The QA manual provides details on the items provided in this summary.

Personnel Testing and Training: Personnel testing and training is essential to the production of high quality test results. MAQS training programs include:

- A requirement for all technical personnel to read and understand the test methods performed
- A requirement for all technical personnel to read and understand the MAQS QA manual
- In-house testing and training
- Quality Assurance meetings
- Third party testing where available
- Maintenance of training records.

Equipment Maintenance and Calibration: All laboratory and field equipment used as a part of MAQS emission measurement programs is maintained according to manufacturer's recommendations. A summary of the major equipment maintenance schedules is summarized in Table 1. In addition to routine maintenance, calibrations are performed on all sampling equipment according to the procedures outlined in the applicable test method. The calibration intervals and techniques for major equipment components is summarized in Table 2. The calibration technique may vary to meet regulatory agency requirements.

Knowledge of Current Test Methods: MAQS maintains current copies of EPA, ARB, and SCAQMD Source Test Manuals and Rules and Regulations.

Chain-of-Custody: MAQS maintains chain-of-custody documentation on all data sheets and samples. Samples are stored in a locked area accessible only to MAQS source test personnel. Data sheets are kept in the custody of the originator, program manager, or in locked storage until return to MAQS office. Electronic field data is duplicated for backup on secure storage media. The original data sheets are used for report preparation and any additions are initialed and dated.

QA Reviews: Periodic field, laboratory, and report reviews are performed by the in-house QA coordinator. Periodically, test plans are reviewed to ensure proper test methods are selected and reports are reviewed to ensure that the methods were followed and any deviations from the methods are justified and documented.

ASTM D7036-04 Required Information

Uncertainty Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is presented in the report appendices.

Performance Data

Performance data are available for review.

Qualified Personnel

A qualified individual (QI), defined by performance on a third party or internal test on the test methods, will be present on each test event.

Plant Entry and Safety Requirements

Plant Entry

All test personnel are required to check in with the guard at the entrance gate or other designated area. Specific details are provided by the facility and project manager.

Safety Requirements

All personnel shall have the following personal protective equipment (PPE) and wear them where designated:

- Hard Hat
- Safety Glasses
- Steel Toe Boots
- Hearing Protection
- Gloves
- High Temperature Gloves (if required)

The following safety measures will be followed:

- Good housekeeping
- SDS for all on-site hazardous materials
- Confine selves to necessary areas (stack platform, mobile laboratory, CEMS data acquisition system, control room, administrative areas)
- Knowledge of evacuation procedures

Each facility will provide plant specific safety training.

TABLE 1
EQUIPMENT MAINTENANCE SCHEDULE

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pumps	1. Absence of leaks 2. Ability to draw manufacturers required vacuum and flow	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Replace parts 4. Leak check
Flow Meters	1. Free mechanical movement	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero span gas	As recommended by manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	1. Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobil Van Sampling System	1. Absence of leaks	Depends on nature of use	1. Chang filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling lines	1. Sample degradation less than 2%	After each test series	1. Blow dry, inert gas through line until dry

TABLE 2
MAJOR SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS

Sampling Equipment	Calibration Frequency	Calibration Procedure	Acceptable Calibration Criteria
Continuous Analyzers	Before and After Each Test Day	3-point calibration error test	< 2% of analyzer range
Continuous Analyzers	Before and After Each Test Run	2-point sample system bias check	< 5% of analyzer range
Continuous Analyzers	After Each Test Run	2-point analyzer drift determination	< 3% of analyzer range
CEMS System	Beginning of Each Day	leak check	< 1 in. Hg decrease in 5 min. at > 20 in. Hg
Continuous Analyzers	Semi-Annually	3-point linearity	< 1% of analyzer range
NO_x Analyzer	Daily	NO_2 -> NO converter efficiency	> 90%
Differential Pressure Gauges (except for manometers)	Semi-Annually	Correction factor based on 5-point comparison to standard	+/- 5%
Differential Pressure Gauges (except for manometers)	Bi-Monthly	3-point comparison to standard, no correction factor	+/- 5%
Barometer	Semi-Annually	Adjusted to mercury-in-glass or National Weather Service Station	+/- 0.1 inches Hg
Dry Gas Meter	Semi-Annually	Calibration check at 4 flow rates using a NIST traceable standard	+/- 2%
Dry Gas Meter	Bi-Monthly	Calibration check at 2 flow rates using a NIST traceable standard	+/- 2% of semi-annual factor
Dry Gas Meter Orifice	Annually	4-point calibration for $\Delta H@$	--
Temperature Sensors	Semi-Annually	3-point calibration vs. NIST traceable standard	+/- 1.5%

Note: Calibration requirements will be used that meet applicable regulatory agency requirements.

Appendix D.2
CARB, SCAQMD, and STAC Certifications

State of California
Air Resources Board
Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for those test methods listed below:

CARB Source Test Methods:

1, 2, 3, 4, 5, 6, 8, 17, 20

100 (CO, CO_2, NO_x, O_2, SO_2, THC)

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

State of California

Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for those test methods listed below:

U.S. EPA Source Test Methods 201A, 202 and 205
Visible Emissions Evaluation

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

October 30, 2018

Mr. John Peterson
Montrose Air Quality Services, LLC
1631 E. Saint Andrew Place
Santa Ana, CA 92705

Subject: LAP Approval Notice
Reference # 96LA1220

Dear Mr. Peterson:

We have reviewed your renewal letter under the South Coast Air Quality Management District's Laboratory Approval Program (SCAQMD LAP). We are pleased to inform you that your firm is approved for the period beginning October 30, 2018, and ending September 30, 2019 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

SCAQMD Methods 1-4
SCAQMD Methods 10.1 and 100.1
USEPA CTM-030 and ASTM D6522-00
SCAQMD Methods 5.1, 5.2, 5.3, 6.1
SCAQMD Methods 25.1 and 25.3 (Sampling)
SCAQMD Rule 1121/ 1146.2 Protocol
SCAQMD Rule 1420/1420.1/1420.2 – (Lead) Source and Ambient Sampling

Your LAP approval to perform nitrogen oxide emissions compliance testing for SCAQMD Rule 1121/ 1146.2 Protocols includes satellite facilities located at:

McKenna Boiler 1510 North Spring Street Los Angeles, CA 90012	Noritz America Corp. 11160 Grace Avenue Fountain Valley, CA 92708	Ajax Boiler, Inc. 2701 S. Harbor Blvd. Santa Ana, CA 92704

Thank you for participating in the SCAQMD LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

D. Sarkar

Dipankar Sarkar
Program Supervisor
Source Test Engineering

DS:GK/gk

Attachment

181030 LapRenewalRev.doc

Cleaning the air that we breathe...™

MONTROSE AIR QUALITY SERVICES

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 5th day of March 2018.

President and CEO
For the Accreditation Council
Certificate Number 3925.01
Valid to February 29, 2020

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

MONTROSE AIR QUALITY SERVICES

Appendix D.3
Individual QI Certifications

CERTIFICATE OF COMPLETION

Dave Wonderly

This document certifies that this individual has passed a comprehensive examination and is now a Qualified Individual (QI) as defined in Section 8.3 of ASTM D7036-04 for the following method(s):

Source Evaluation Society Group 1: *EPA Manual Gas Volume and Flow Measurements and Isokinetic Particulate Sampling Methods*

Certificate Number: 002-2018-66

Tate Strickler, Accreditation Director

DATE OF ISSUE: 11/29/18

DATE OF EXPIRATION: 11/29/23

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CERTIFICATE OF COMPLETION

Dave Wonderly

This document certifies that this individual has passed a comprehensive examination and is now a Qualified Individual (QI) as defined in Section 8.3 of ASTM D7036-04 for the following method(s):

Source Evaluation Society Group 3: *EPA Gaseous Pollutants Instrumental Methods*

Certificate Number: 002-2018-60

Tate Strickler, Accreditation Director

DATE OF ISSUE: 9/28/18

DATE OF EXPIRATION: 9/28/23

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THIS IS THE LAST PAGE OF THIS DOCUMENT

If you have any questions, please contact one of the following individuals by email or phone.

Name:	Mr. David Wonderly
Title:	Client Project Manager
Region:	Western
E-Mail:	DWonderly@montrose-env.com
Phone:	(714) 279-6777

Name:	Mr. Matt McCune
Title:	Regional Vice President
Region:	Western
E-Mail:	MMccune@montrose-env.com
Phone:	(714) 279-6777