CASCADE
HARDWOOD

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Wess Safford
SWCAA
11815 NE 99th Street, Suite 1294
Vancouver, WA 98682

June 22, 2010

Dear Mr. Safford,

The emission testing requirements for lumber drying has been completed by Oregon State University. I have included a copy of the results for your records.

If you have any questions or comments please feel free to contact me by phone: (360) 748-0178 or email: thompsonjr@chwa.com

Thank You,

Jason Thompson
Safety / Environmental Coordinator

COPY 2

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VOC Emissions From the Drying of Red Alder Lumber

Report to

Cascade Hardwoods

Report by

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Corvallis, OR 97331

June 15, 2010

Table of Contents

Table of Contents ii
List of Figures iii
List of Tables iii

Summary 1
1. Description of source 1
2. Date and time of test 2
3. Results 2
4. Control system and operating conditions 6
   Humidity control 6
   Temperature control 6
5. Production-related parameters 8
   Kiln operation 8
   Wood quantity 9
6. Test methods 10
   Charge Sequence 10
   Sampling Methodologies 10
7. Analytical procedures 12
8. Field data sheets and sample calculations 12
   Field data sheets 12
   Calculations 16
      Humidity 16
      Flows 16
      Moisture content 17
      Hydrocarbon 17
9. Chain of custody information 18
10. Calibration documentation 19
11. Anomalies 21
12. Statement of validity 21

Appendix 1. Detailed sampling procedures 22
   Kiln 22
   Analyzer 23
Appendix 2. Field data sheets 30
Appendix 3. Electronic copy of calculations 108

List of Figures

FIGURE 1. Hydrocarbon concentration and vent rate versus time. 4

FIGURE 2. Cumulative and rate of emissions (as carbon) versus time (top) and cumulative emissions versus wood moisture content (bottom). 5

FIGURE 3. Schematic of kiln and sampling system (top) and photo of kiln loaded for charge 1 (bottom). 7

FIGURE 4. Dry- and wet-bulb temperatures for charge 2. 8

FIGURE 5. Dry- and wet-bulb setpoints provided by the mill. 9

FIGURE 6. Schematic of heated filter box with air dilution system, heated sample line, and analyzer. Sample enters heated box from back of drawing (box is attached to kiln). 11

FIGURE 7. Photo of VOC sampling system showing heated sample box (with white insulation), valves and flow meter for calibration gases (upper left), on/off valve for calibration gas (3 at upper center right), heated sample line to analyzer (green tube, middle left), valve for sample (2 at center left), toggle valve to vacuum pump (near calibration gas valves), and vent/flowmeter valve (4 at upper right) 11

FIGURE 8. Sample of field data sheet for hydrocarbon analyzer. 13

FIGURE 9. Sample of field data sheet for kiln log. 14

FIGURE 10. Sample of field data sheet for flow measurement. 15

List of Tables

TABLE 1. Summary of results. 1

TABLE 2. Summary of results for each sampling interval for charge 2. 3

Summary

Two charges, each containing approximately 72 board feet of 1" random width red alder lumber, were dried from green in a small kiln at Oregon State University. The kiln dry- and wet-bulb temperatures based on a schedule provided by Cascade Hardwoods. The maximum temperature was 170°F (76.7°C). The air velocity was 500 feet per minute (2.5 m/s). The kiln was indirectly heated with steam. The amount of air entering the kiln was regulated to control humidity.

A JUM VE-7 total hydrocarbon analyzer was used to measure organic emissions following EPA Method 25A. The results are shown in Table 1.

TABLE 1. Summary of results.

Charge	Initial MC	Final MC[A]	Time[A]	VOC[B]
	%	%	hr:min	lb/mbf
1	96.3	8	117:42	0.135[C]
2	96.4	8	109:13	0.184

[A] actual times were 120:15 to 7.7% and 112.51 to 7.9%, respectively
[B] as carbon
[C] this value should not be used due to anomalies

1. Description of source

The tested source is a lumber dry kiln. Lumber destined for the mill's kiln was sampled and tested in a small-scale kiln at Oregon State University.

Mill personnel reported that two samples of wood were taken at Cascade Hardwoods. One sample was taken May 20 and a second on May 21, 2010. Each sample was separately wrapped in plastic.

The log source was various lands around SW Washington state with the majority of the sample coming from Lewis county. The logs were stored in the log yard for approximately two weeks prior to sawing. The logs were sawn on days that sampling occurred. The first sample was stored for approximately 15 hours before shipping. The second sample was saw the next day and both samples were shipped.

Enough wood for three charges of lumber was delivered to Oregon State by Cascade Hardwoods on 5-21-10. The wood was wrapped in plastic at the mill to prevent predying and loss of organic compounds during transit. The wood

appeared to be very fresh and still had a white color. Each sample was wrapped separately.

The first charge of lumber was constructed on 5-21-10 by taking half the wood for the charge from each sample so the charge measurement would be an average of the two samples. The remaining wood was re-wrapped and stored in a refrigerator in case it was needed for a second charge. It went into the refrigerator on 5-21-10 and was moved to a freezer on 5-24-10. On 5-27-10 the wood was pulled from the freezer and returned to the refrigerator to thaw.

The second charge was constructed on 5-31-10, again using wood from the two samples equally. The remaining wood was again wrapped and placed in the freezer. The remaining wood was not used for this test.

2. Date and time of test

Charge 1 was dried from May 21, 2010 at 13:23 to May 26, 2010 at 13:44.

Charge 2 was dried from May 31, 2010 at 16:36 to June 5, 2010 at 09:03.

Both charges were dried under the supervision of Mike Milota at Oregon State University. Students were used to monitor the test.

3. Results

See Table 1, page 1, for a summary of the results. Valid results were obtained only in charge 2 (see section 11). Only the charge 2 results are shown in detail here. Details for each sampling interval are tabulated and the hydrocarbon emissions are summarized graphically here. All emission data is presented in detail in electronic form in Appendix 3.

A summary for each sampling interval is in Table 2. An interval is the period between analyzer calibrations, about three to 6 hours of data. The interval time periods shown in the table include the times between sampling and mass calculations are adjusted to account for these. Sampling occurred for approximately 95% of the drying time.

TABLE 2. Summary of results for each sampling interval for charge 2.

Sample Run	Time	Cumulative Dry Gas	Cumulative Water	Average Humidity	Dry Flow Rate @68	THC mass as C	THC dry conc	THC mass as C	Average Wood MC	Average Air MC	Average Anal. MC
	hrs	kg	kg	kg/kg	l/min	g	ppmv	lbs/mbf	%	%	%
1	4.03	55.70	2.69	0.048	191.2	0.07	1.0	0.002	95.8	7.2	7.2
2	3.50	43.79	3.64	0.083	172.9	0.18	5.0	0.005	92.4	11.8	11.8
3	6.10	33.12	5.60	0.169	75.1	0.65	18.1	0.020	88.5	21.4	13.9
4	3.25	19.60	3.32	0.170	83.4	0.26	10.8	0.008	84.0	21.5	13.9
5	3.75	45.33	7.03	0.155	167.1	0.38	6.9	0.011	79.1	20.0	13.0
6	3.45	39.52	6.05	0.153	158.3	0.30	6.2	0.009	72.8	19.8	12.9
7	3.50	38.15	5.80	0.152	150.7	0.30	6.3	0.009	67.1	19.7	12.7
8	3.85	37.29	5.70	0.153	133.9	0.31	6.7	0.009	61.7	19.8	12.8
9	6.15	74.73	11.12	0.149	168.0	0.53	5.8	0.016	54.0	19.3	12.4
10	3.50	38.15	5.57	0.146	150.7	0.28	6.0	0.009	45.7	19.0	12.2
11	3.65	32.99	4.82	0.146	124.9	0.28	6.8	0.008	40.8	19.0	12.3
12	3.15	23.84	3.50	0.147	104.6	0.21	7.1	0.006	36.9	19.1	12.3
13	3.75	30.53	4.47	0.146	112.5	0.26	6.8	0.008	33.2	19.1	12.2
14	3.80	25.20	3.69	0.146	91.7	0.23	7.6	0.007	29.1	19.1	12.3
15	6.10	28.27	4.17	0.147	64.1	0.32	9.1	0.010	25.4	19.2	12.4
16	3.50	13.34	1.97	0.148	52.7	0.17	10.0	0.005	22.6	19.3	12.5
17	3.80	18.81	2.66	0.142	68.4	0.20	8.7	0.006	20.4	18.6	12.0
18	3.09	11.40	1.59	0.139	51.1	0.13	9.1	0.004	18.4	18.3	11.9
19	3.30	10.72	1.51	0.141	44.9	0.13	10.1	0.004	16.9	18.5	11.9
20	4.15	11.05	1.55	0.140	36.8	0.15	10.7	0.004	15.5	18.4	11.9
21	6.25	16.79	2.35	0.140	37.1	0.23	10.9	0.007	13.7	18.4	11.8
22	3.35	7.10	0.99	0.139	29.3	0.10	11.7	0.003	12.1	18.3	11.8
23	3.65	6.29	0.89	0.141	23.8	0.10	12.8	0.003	11.2	18.5	11.9
24	3.65	4.71	0.66	0.140	17.8	0.07	12.8	0.002	10.5	18.4	11.9
25	2.85	4.83	0.67	0.139	23.4	0.07	12.1	0.002	9.9	18.3	11.9
26	3.90	5.19	0.72	0.138	18.4	0.08	12.1	0.002	9.2	18.2	11.8
27	6.20	6.35	0.86	0.136	14.2	0.10	13.2	0.003	8.4	18.0	11.6
Sum	109.21	682.8	93.6			6.1		0.184			
Average				0.140	87.7		9.0				

Figure 1 shows total hydrocarbon concentration (left scale) and dry gas vent rate (right scale) versus time. The vent rate is low for the first few hours as the kiln comes up to temperature and the wet-bulb depression is small. The venting then increases to a maximum during days two and three. The steps in the concentration at approximately 12-hour intervals are due to the changes in the schedule.

The total hydrocarbon concentration is very dependent on the venting early in the schedule with a high vent rate resulting in a lower hydrocarbon concentration and vice versa. When the venting increases at approximately 8 hours, the total hydrocarbon concentration decreases. The steps or saw teeth in the curves correspond to changes in the kiln conditions (Figure 4).

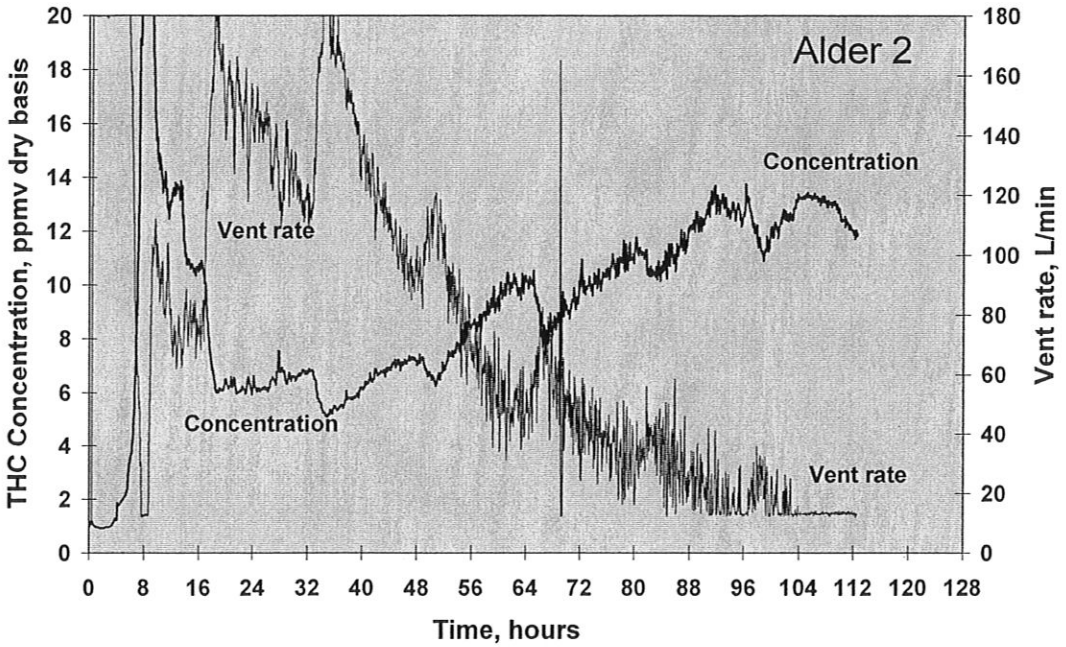


FIGURE 1. Hydrocarbon concentration and vent rate versus time.

Figure 2 shows the cumulative hydrocarbon emissions and the rate of emissions versus time. The cumulative emissions is the emissions up to any point in time in the schedule. The rate of emissions is how much is coming out per unit time. The maximum emission rates occur early in the schedule. The rate of emissions is very low at the end of the schedule. The cumulative emissions versus wood moisture content is also shown.

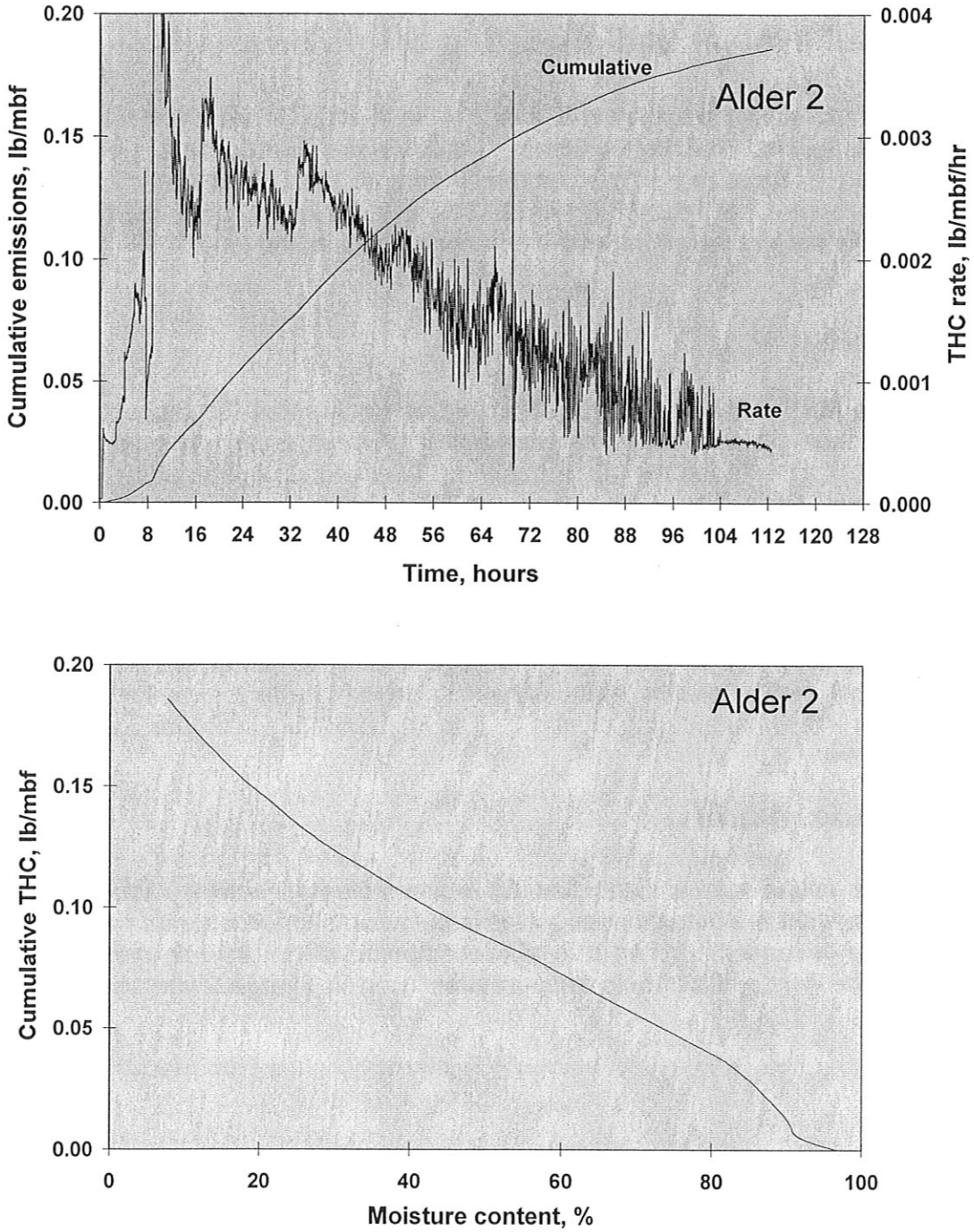


FIGURE 2. Cumulative and rate of emissions (as carbon) versus time (top) and cumulative emissions versus wood moisture content (bottom).

4. Control system and operating conditions

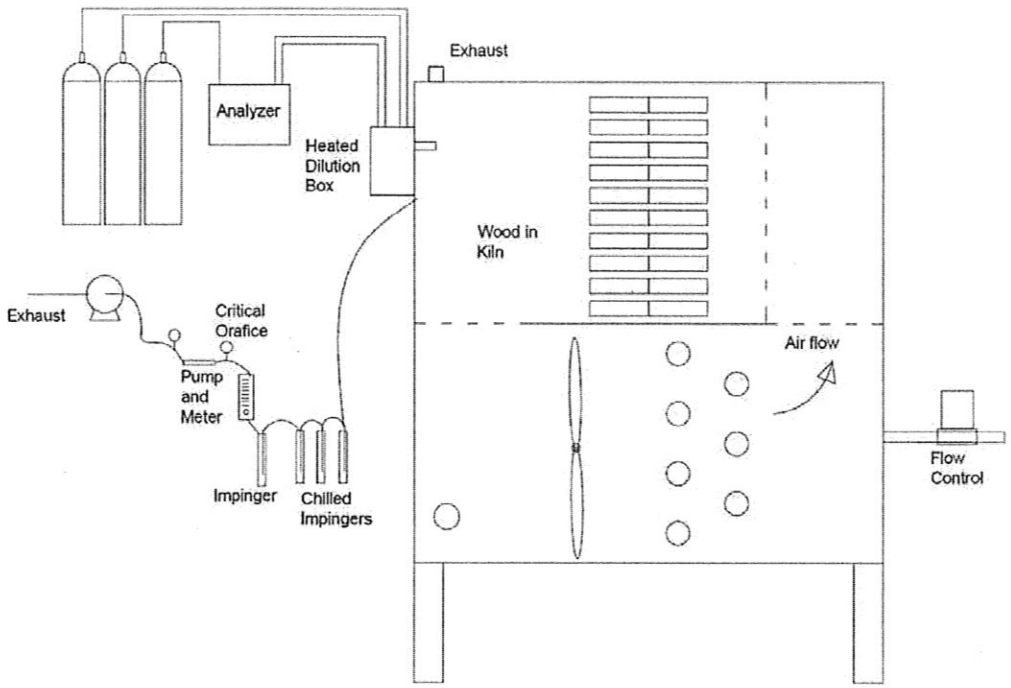
A schematic of the kiln is shown in Figure 3. The kiln box is approximately 4' by 4' by 4'. It is indirectly heated by steam. Four dry-bulb thermocouples and two wet-bulb thermocouples are located on the entering-air side of the load. The dry-bulb thermocouples are spaced in a grid. The two wet-bulb thermocouples are under a single sock at the center of the entering-air side of the load.

Humidity control

A 200 L/min MKS mass flow meter controlled and measured the amount of air entering the kiln. It was factory calibrated and checked using a bubble meter. The amount of air entering the kiln is based on the wet-bulb temperature - if it is above setpoint, the airflow is increased and if it is below setpoint the airflow is decreased. This is analogous to venting for a commercial kiln. A minimum of 12 L/min entered the kiln at all times, more than removed by the analyzer (1.6 L/min). Putting air into the kiln at a rate of 100 L/min causes the pressure in the kiln to be 60 to 130 Pa above ambient, depending on location in the kiln (high-pressure or low-pressure side). Thus, any fugitive leakage should be out of the kiln. Two additional flow meters can be manually set to provide additional airflow. One was used for a few hours during charge 2. The impinger train in Figure 3 was not used in this work.

Temperature control

Temperature in the kiln is controlled by indirect steam heating. When the average of the four dry-bulb thermocouples is below setpoint, the steam pressure in the coil is increased. When it is above setpoint, steam flow to the coil is reduced. The dry- and wet-bulb temperatures used in charge 2 are shown in Figure 4.



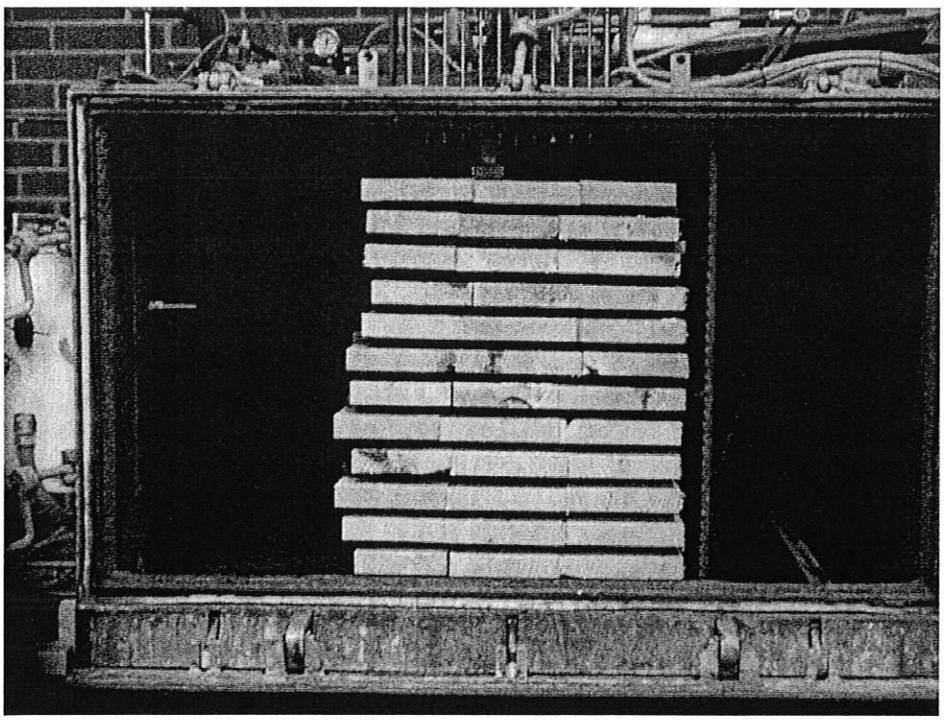


FIGURE 3. Schematic of kiln and sampling system (top) and photo of kiln loaded for charge 1 (bottom).

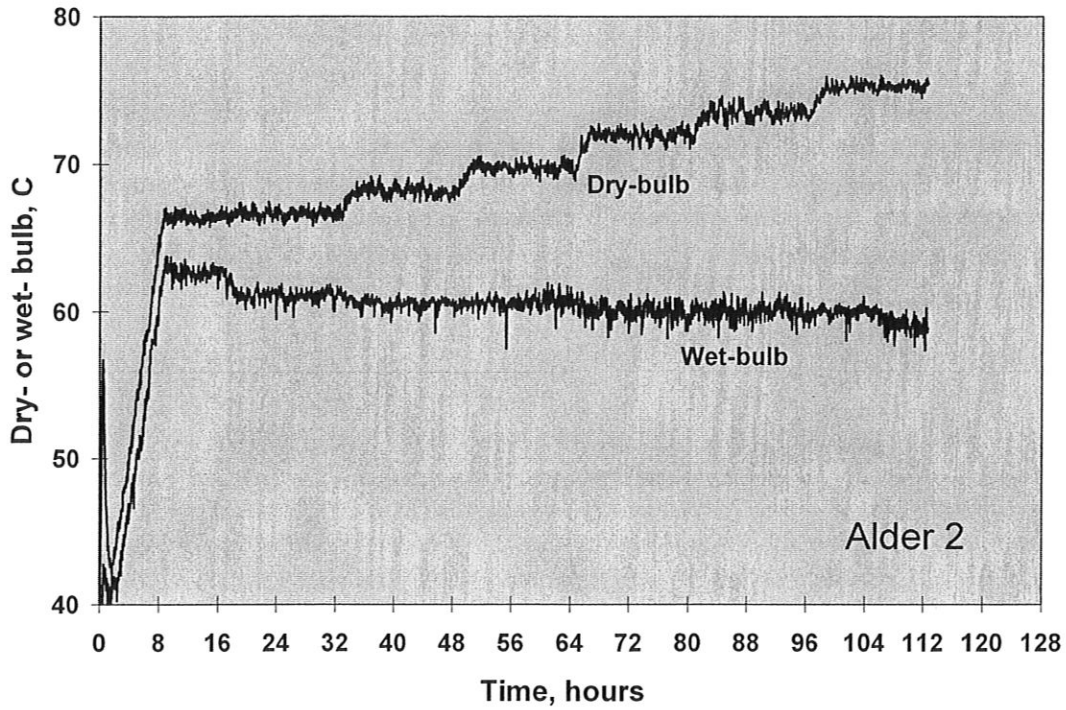


FIGURE 4. Dry- and wet-bulb temperatures for charge 2.

5. Production-related parameters

Kiln operation

The sequence of dry- and wet-bulb temperatures (drying schedule) provided by the mill is shown in Figure 5. The actual operating conditions during the charge 2 measurement period were shown in Figure 3 and agree closely thith those provided by the mill. The wet-bulb sensor leaked during the first part of the first charge. While the temperatures were somewhat followed, the vent rate was very high to remove the excess water during charge 1.

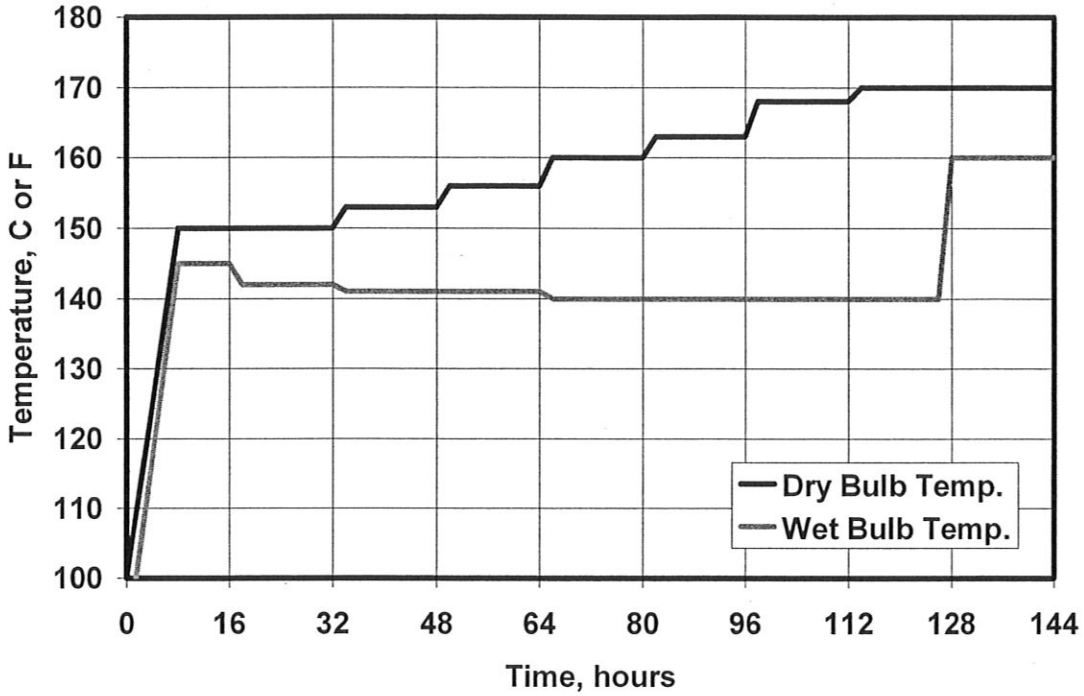


FIGURE 5. Dry- and wet-bulb setpoints provided by the mill.

Wood quantity

The wood quantity was determined by measuring the width and length of each board in the kiln. The nominal board footage was then calculated as

$$Board\ feet = ((length/12) \times (width/12) \times thickness)$$

where all dimensions are in inches and the thickness is a nominal one inch for the lumber in this study.

This quantity was used to express the emissions from the drying cycle on a production basis of lb/mbf (pounds per thousand board feet).

6. Test methods

Charge Sequence

The lumber was unwrapped and 2" were trimmed from each end of each board to give 44" samples. These were then weighed, placed in the kiln and dried. At the end of drying the wood was weighed, oven dried, and reweighed so initial and final moisture contents could be determined by ASTM D4442 (oven-dry method).

Sampling Methodologies

Sampling for total hydrocarbon is done directly from the kiln as shown in Figure 3. The concentration obtained from the hydrocarbon analyzer and the amount of air entering the kiln allow the total hydrocarbon emissions to be calculated.

Figures 6 and 7 show the hydrocarbon sampling system. Unlike stack testing, all necessary equipment is permanently mounted on the kiln and flows are controlled with valves. The sample is withdrawn from the kiln under the assumption that the gas in the kiln is well-mixed and that the composition in the kiln near the exhaust is the same as the composition of the exhaust. The THC sample was drawn from the kiln directly into a heated dilution/filter box mounted on the side of the kiln. The box was heated to 125°C. Heated dilution gas can be added to the hydrocarbon sample gas to lower the gas moisture content to the detector. Dilution air was used when the gas moisture content in the kiln was greater than 15% so that the air moisture content to the detector remained less than 15%. The sample line from the box to the analyzer was heated to 135°C. The 3-way valve at the back of the analyzer was heated to 145°C.

The fuel gas was hydrogen. The span gas was EPA Protocol 601 ppm propane in air, the mid-gas was certified 299 ppm propane. The mid gas was not named because the analyzer was within tolerance without naming. The zero gas was 0.1 ppm air. Detailed sampling procedures are in Appendix 1.

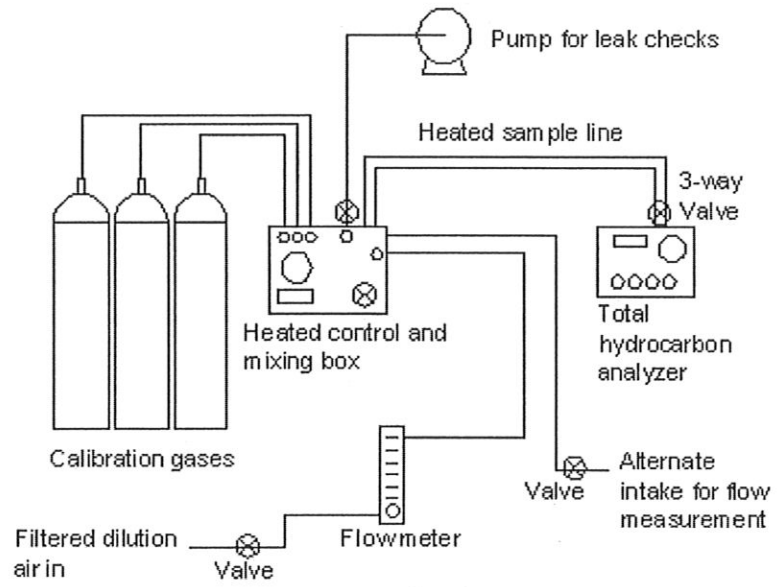


FIGURE 6. Schematic of heated filter box with air dilution system, heated sample line, and analyzer. Sample enters heated box from back of drawing (box is attached to kiln).

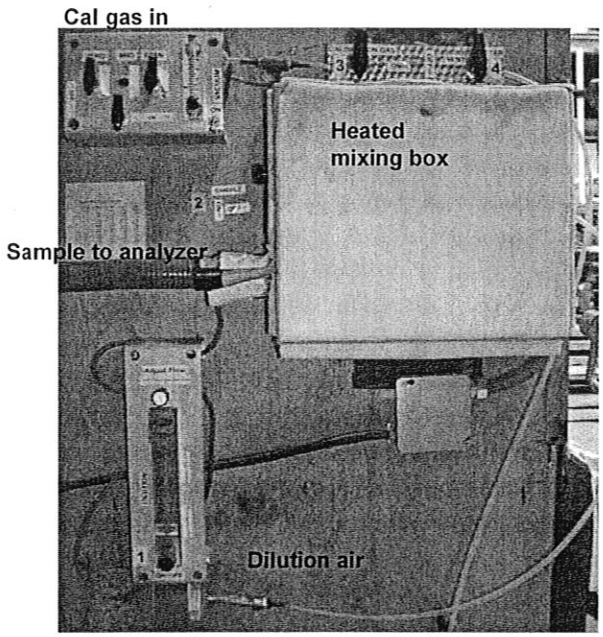


FIGURE 7. Photo of VOC sampling system showing heated sample box (with white insulation), valves and flow meter for calibration gases (upper left), on/off valve for calibration gas (3 at upper center right), heated sample line to analyzer (green tube, middle left), valve for sample (2 at center left), toggle valve to vacuum pump (near calibration gas valves), and vent/flowmeter valve (4 at upper right).

7. Analytical procedures

Leak checks of the VOC sampling train were conducted before and after the charge was dried. A valve was closed at the probe tip and a 3-way valve was closed at the back of the analyzer. All components from just behind the probe tip to the valve at the back of the analyzer were placed under a 18-20 inHg vacuum. Less than one inHg pressure change during two minutes is acceptable and this was met.

Total flow and sample flow to the analyzer were checked using an NIST-traceable flow meter. Total flow is measured with the dilution gas off. Sample flow is measured with dilution gas on. This was done at the beginning and end of each sampling interval. The meter was attached to the system near the probe tip within the heated box. The valves were repositioned so that the sample came from the flow meter (attached to the alternate intake in Figure 6) rather than the kiln. Readings of flow were made with the dilution gas both off and on. The flow readings were verified by observing the analyzer reading for span gas with the dilution gas off and on. The dilution ratio calculated based on the analyzer readings was always within 5% of that determined by the flow meter and usually within 1%.

Calibration of the zero and span of the detector was done at the beginning of each run (about every three to six hours). The calibration gas was introduced by setting the valves so the calibration gas entered the system near the probe tip at ambient pressure. The calibration was checked at the end of each run with no adjustments made to the zero or span during the run. A span drift less than 3% of the span value was acceptable. A zero drift of less than 3% of the span value was acceptable. A total calibration drift less than 5% was acceptable for a sampling run . These were met with the one exception noted in section 11.

8. Field data sheets and sample calculations

Field data sheets

Samples of field data sheets are shown in Figures 8 to 10. All field data sheets are in Appendix 2 of the electronic version of this report.

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2 — Time now: 12:09 am

Run (sample): 9 — Dry-bulb temperature: 67.7

Operator: Reid — Wet-bulb temperature: 61.4

Date: 6/2/10 — Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION [Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	412
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.640 L/min [Valves 1, 2, 3 = off; 4=meter]

Target dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.055 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	DR Span [Span Diluted/Span]	DR Flow [SFR / TFR]	Difference, % 100*(DR Span - DR Flow)/DR Flow
Span Diluted	386	0.642	0.643	.15

START TIME: 12:21 am [1, 2, 5 = on; 3, 4 = off; tank valves off]

ANALYZER RANGE: 1 [60 < computer reading < 750]

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milon — Event (kiln charge): Cascade Hardwoods 2

Time now: 6:05A June — Run (sample): 9

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 6:06

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
Span Diluted	386	383

Sample flow rate (SFR): 1.051 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.631 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.644 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	599	598	582 to 619	412
mid	299	298	290 to 309	none
zero	0	0.	-18 to +18	475

Dilution ratio (DR_{Span}): 0.644 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 6:10

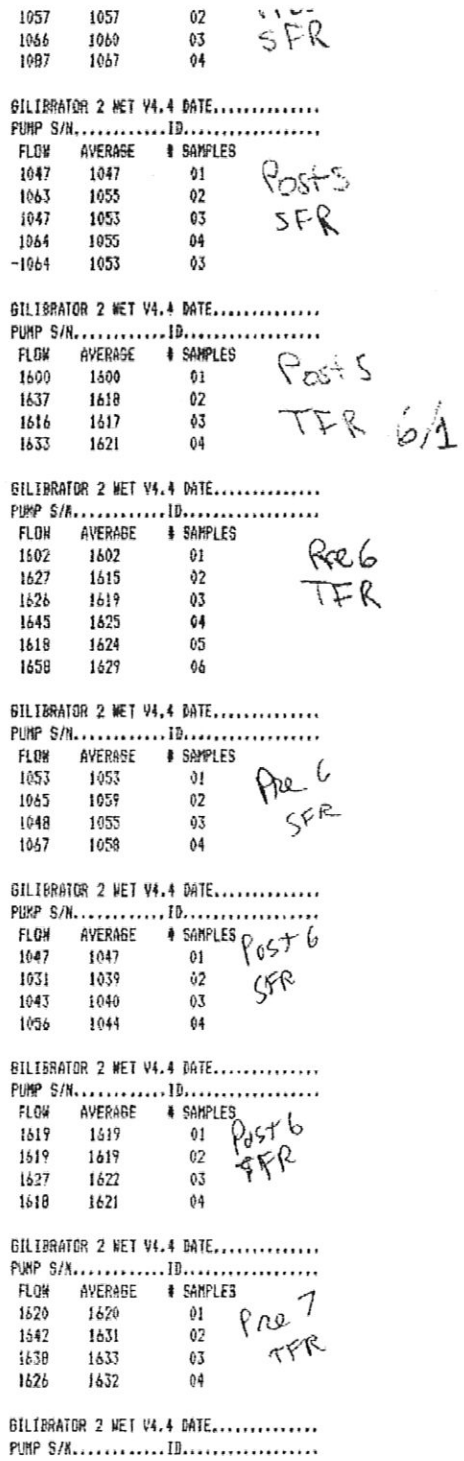
Comments:

FIGURE 8. Sample of field data sheet for hydrocarbon analyzer.

Charge: 2		Date	Time
Cascade Hardwoods	Start	9:20AM June 1	
Page: 2	End	4:46pm June 2	

Clock time	Run time	Run	Temperatures						Flows							Line 1	Line 2	Line 3
			Box	Valve	Dry-bulb	Wet-bulb	Line	Chiller	Flow 1	Flow 2	Flow 3	Dilution	Line 1	Line 2	Line 3	Vac.	Vac.	Vac.
	hrs	#	°C	°C	°C	°C	°C	°C	L/min	L/min	SCFH	SCFM	ml/min	ml/min	ml/min	inHg	inHg	inHg
9:29	16:28	5	126	145	68	62.3	135											
12:58	19:58	5	125	145	66.1	61.3	135											
13:22	20:21	6	126	145	67.8	61.2	135											
16:37	23:32	6	125	145	68.1	61.3	135											
16:43	23:42	7	125	145	65.8	60.8	135											
17:57	24:57	7	125	145	68.0	61.4	135											
19:58	26:15	7	125	145	67.3	61.0	135											
20:23	27:22	8	125	145	66.1	60.8	135											
23:59	30:59	8	125	145	65.6	60.6	135											
00:22	31:21	9	125	145	66.5	61.8	135											
06:05	37:04	9	126	145	69.0	62.4	135											
06:16	37:15	10	126	145	69.9	61.8	135											
09:32	40:31	10	125	145	67.4	60.5	135											
09:46	40:45	11	124	145	69.9	61.8	135											
13:11	44:10	11	125	145	68.3	60.6	135											
13:22	44:21	12	126	145	69.3	60.6	135											
16:47	47:46	12	125	145	67.3	60.3	135											

FIGURE 9. Sample of field data sheet for kiln log.



1057 1057 02
1066 1060 03
1087 1067 04
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1047 1047 01
1063 1055 02
1047 1053 03
1064 1055 04
-1064 1053 03
Post 5 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1600 1600 01
1637 1618 02
1616 1617 03
1633 1621 04
Post 5 TFR 6/1

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1602 1602 01
1627 1615 02
1626 1619 03
1645 1625 04
1618 1624 05
1658 1629 06
Pre 6 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1053 1053 01
1065 1059 02
1048 1055 03
1067 1058 04
Pre 6 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1047 1047 01
1031 1039 02
1043 1040 03
1056 1044 04
Post 6 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1619 1619 01
1619 1619 02
1627 1622 03
1618 1621 04
Post 6 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....
FLOW AVERAGE # SAMPLES
1620 1620 01
1642 1631 02
1638 1633 03
1626 1632 04
Pre 7 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FIGURE 10. Sample of field data sheet for flow measurement.

Calculations

The "FlowCalc" worksheet in the Excel file "Kiln, Cascade #.XLS" in Appendix 3 shows the calculations for each 3-minute interval during the charges. Column A is a reading number. Columns B and C are the clock and charge times, respectively. Columns D and E are the average dry- and wet-bulb temperatures.

Humidity

Column F is the vapor pressure (P_{vp}, Pa) of water at the wet-bulb temperature. The absolute humidity (AbHum, $kg_{water} \cdot kg_{air}^{-1}$) is shown in column G and the molal humidity ($mol_{water} \cdot mol_{air}^{-1}$) in column H. These are calculated based on the dry-bulb temperature (T_d, °C) and wet-bulb temperature (T_w °C),

$$P_{vp} = P_{ambient} * 10^{(16.373 - 2818.6/(Td+273.16) - 1.6908*LOG10(Td+273.16) - 0.0057546*(Td+273.16) + 0.0000040073*(Td+273.16)^2)}$$

$$AbHum = (MW_{air} / MW_{water}) * (1 / (P_{kiln}/P_{vp}-1)) - ((T_d-T_w) * R_{psy}) / \lambda$$

$$MolHum = AbHum * MW_{water} / MW_{air}$$

where MW are molecular weights ($kg \cdot kgmol^{-1}$), R_{psy} is the psychrometric ratio (0.95 $kJ \cdot kg^{-1} \cdot K^{-1}$), and λ is the latent heat ($kJ \cdot kg^{-1}$).

Flows

The volumetric dry gas flow rate (DryGasV, $L \cdot min^{-1}$) in column I is the flowmeter reading adjusted for the meter calibrations and the molar humidity of the entering gas. This is in standard (at 0°C) liters per minute. In column J this has been converted to a mass flow rate (DryGasM, $kg \cdot min^{-1}$) and in column K is the same information is expressed as a molal flow rate (DryGas, $kgmol \cdot min^{-1}$). These values are for the dry gas vented from the kiln.

$$DryGasV = (FlowMeter1 + FlowMeter2 + FlowMeter3) * (1/(1+MolHum_{In}))$$

$$DryGasM = (\ DryGasV\ L \cdot min^{-1}) * 1/(22.4\ m^3 \cdot kgmol^{-1}) * MW_{air} / (1000\ L \cdot m^{-3})$$

$$DryGas\ (kgmol/min) = DryGasM / MW_{air}$$

The water removal rate (WaterVented, $g \cdot min^{-1}$) (column L) is calculated from the humidity (column G) and the gas flow (column J). The total water (column M) is an integration of column L over time.

$$WaterVented = (MolHum - AbHum_{In} * MW_{Water}/MW_{Air}) * (DryGasM * 1000\ g/kg)$$

Moisture content

The moisture content of the wood at each time interval in the event (column N) was determined by reducing the moisture content of the wood from the previous value by accounting for the amount of water leaving the kiln during the interval.

$$MC = MC_{Previous} - 100 * (WaterVented / (1000\ g/kg) / ODWoodWt)$$

This amount is then adjusted by adjusting the wet-bulb temperature to make the ending moisture content match that measure by ASTM D4222.

Hydrocarbon

The original total hydrocarbon analyzer reading is shown in column O. In column P this has been corrected to compensate for the range setting switch on the analyzer. Also in column P, the THA data between sampling runs (rows labeled "test" in column X) has been adjusted to the average of the data during the 12-minute period before and the 12-minute period after the analyzer testing and calibration time.

The dilution THA (column Q) is the corrected THA reading divided by the dilution ratio (from column Y). In column R we have the opportunity to compensate for the effect of moisture on the JUM detector. Column R equals column Q because dilution was used and no compensation was made. Finally in column S, the hydrocarbon concentration is converted to a dry gas basis concentration using the molar humidity (column H).

$$THC_{Dry}, ppm = THC * (1 + MolHum)$$

In column T, the hydrocarbon flow rate (THC_{Vented}, $g_{Carbon} \cdot min^{-1}$) is calculated in a manner analogous to the water flow rate using the dry gas flow rate and the hydrocarbon concentration.

$$THC_{Vented} = DryGas * (THC_{Dry} / 10^6) * MW_{Propane} * (1000\ g \cdot kg^{-1}) * (0.81818\ g_C \cdot g_{Propane}^{-1})$$

Column U is the integral of column T over time, the cumulative hydrocarbon release up to that point in the schedule. Column V is the cumulative unit

emissions, that is, column U divided by the oven-dry weight of the wood in the kiln.

Column X indicates the hydrocarbon sampling run and column Y is the dilution ratio during that run.

The remaining columns are used not used in the hydrocarbon calculations. They are for graphing shown on other worksheets in the workbook.

At the end of the FlowCalc spreadsheet are summaries by run of the flow data for the total hydrocarbon run intervals (interval summary button will reposition spreadsheet).

Moisture content and board weight data are on the "Define" worksheet and the original data are in the files named "Cascade #. Weights.XLS."

9. Chain of custody information

Wood was collected by mill personnel and delivered to Oregon State by Jason Thompson of Cascade Hardwoods. Wood was retained by Oregon State after delivery as documented in section 1.

10. Calibration documentation

SENSIDYNE, INC.

CALIBRATION CERTIFICATE

CELL S/N: 0905001-S DATE: 05 - 05 - 2009

This is to certify that the above referenced Gilibrator Flow Cell was calibrated using film flowmeter MCS-102, which has been calibrated by instruments directly traceable to the National Institute of Standards and Technology. NIST Report 8361604.

Results:

REFERENCE MCS-102 cc/min	S/N 0905001-S cc/min	RELATIVE DIFF. cc/min	PERCENT DIFF.
2002	1997	-5	-0.25
2004	1997	-7	-0.35
2002	1997	-5	-0.25
2004	1997	-7	-0.35
2002	1997	-5	-0.25
2002	1994	-8	-0.4
2002	1996	-6	-0.3
2001	1996	-5	-0.25
2001	1997	-4	-0.2
2002	1996	-6	-0.3
MAX		-8	-0.4
MEAN 2002.2	1996.4		

CALIBRATED BY Slobjana Pavic DATE: 05 - 05 - 2009

CODE 000

Airgas

Airgas Specialty Gases
12722 S. Wentworth Avenue
Chicago, IL 60628
1-773-785-3000
FAX: 1-773-785-1926
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02AI99E15A1472	Reference Number:	54-124099837-2
Cylinder Number:	XC003496B	Cylinder Volume:	146 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jun 26, 2007	Valve Outlet:	590

Expiration Date: Jun 26, 2010

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	600.0 PPM	601.2 PPM	G1	+/- 1% NIST Traceable
Air	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	51919	SG9101963ALB	483.6PPM PROPANE/	Jul 01, 2009

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
VARIAN 3800	FID	Jun 11, 2007

Triad Data Available Upon Request

Notes:

QA Approval

11. Anomalies

Charge 1 data should not be used. A leak occurred from the wet-bulb in charge 1. This was corrected after about 48 hours. Also, the air pressure to the flow meter (to control venting) was not turned up high enough during the first 48 hours. These two problems resulted in the running of a second charge.

The wrong schedule was loaded and the kiln was momentarily at too high a temperature at the start of charge 2. This can be observed in Figure 4. On the first sampling interval in charge 2, the hydrocarbon analyzer span drifted more than 3% and the total calibration drift was 6.5%. The data was used without adjustment because this was during the warmup period of the kiln when emissions are low. This anomaly was attributed to too short a warmup period for the analyzer and did not occur subsequently.

12. Statement of validity

The statements in this report accurately represent the testing that occurred.

Michael R Milota

_____

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Oregon Wood Innovation Center
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136 Richardson Hall
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Corvallis, OR 97331-5751

(541) 737-4210 V
(541) 737-3385 F

Appendix 1. Detailed sampling procedures

Kiln

INSTRUCTIONS FOR CHECKS OF EMISSIONS KILN

Purpose: Ensure kiln is operating correctly

Clock time: Record from computer

Run time: Record from computer. Check the box if the computer screen being refreshed and time is advancing.

Box temperature: Read from metal electrical box under desk, left controller. The top and bottom numbers should be similar on the box should be similar, about 126°C.

Valve temperature: Read from metal electrical box under desk, right controller. The top and bottom numbers should be similar on the box should be similar, about 145°C.

Dry-bulb temperature: Read from computer screen. Compare to graph to be sure it's correct. If it's not within a degree or two of the chart, check again in a few minutes. During startup (the first 3 or so hours), it may not be able to track. If it's too high, the heat valve should be closed, too low and the heat valve should be open. If it does not appear to be working correctly, call Mike.

Wet-bulb temperature: Read from computer screen. Compare to graph to be sure it's correct.

If it is too low, it means that the kiln atmosphere is too dry. Check the flow meters. If Flow1 is about 10 L/min (its lower limit), make sure that Flow2 and Flow3 are turned off

If it's too high, then either the kiln atmosphere is too humid or the sock is not being wetted. If Flow 1 is near 200 L/min (its upper limit) add venting by opening Flow2 and/or Flow 3. The maximum for Flow2 is 50 L/min, if it reads over this value for several readings, reduce it to about 45 L/min. Don't change Flow3 often, rather set it and leave it for several hours if possible. Keep the Flow 3 reading constant by small adjustments. As Flow1 decreases or Flow2 turned down, there is more pressure behind Flow3 and the flow increased. Check for water in the wet-bulb reservoir (push the float down and make sure it's getting water).

Check both Wet-bulb1 and Wet-bulb2 and make sure they are reading about the same. If they differ by more than 2°C, call Mike

If both wet-bulbs are reading the same as the dry-bulb, check the wet-bulb water.

If these procedures do not correct the wet-bulb temperature within 30 minutes, call Mike or Mark.

Line temperature: Read from gray box on wall above analyzer. It should read about 275°F.

Chiller temperature: Read the chiller temperature. It should be about -1°C.

Flow 1: Read from computer. The value of Flow1 changes depending on the wet-bulb. If Flow 1 is 10 L/min and the wet-bulb is too low, there's probably nothing we can do. If it's 200 L/min and the wet-bulb is too high, Flow2 and/or Flow3 can be opened. Flow2 and Flow3 should be adjusted so that Flow1 stays below 175 to 200 L/min.

Flow 2: Read from computer. The value of Flow2 is set by you. It will vary a little - as flow 1 goes down, flow 2 will go up. Do not set it to < 40 L/min if you think Flow1 is going to decrease or it will go off scale and not be read by the computer

Flow 3: Read from meter. The value of Flow3 is set by you. It will vary a little - as flow 1 goes down, flow 2 will go up. Be sure to clearly record this value and when you change it

Dilution flow: Read dilution flow meter. It should read the same setting as the red flag. Do not adjust. If significantly different, investigate.

F/M Flow: Read from rotometer. This should be about 400 to 500 cc/min.

Line vacuum: Read from the vacuum gauge. This should be about 20"Hg.

Analyzer

INSTRUCTIONS FOR FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER

PRE-SAMPLE PROCEDURE

BACKGROUND INFORMATION

Get the dry- and wet-bulb temperatures from the kiln schedule or off the computer. Use the highest expected values for the run.

Read absolute humidity off the psychrometric chart or table.
Calculate or read from tables -
Percent moisture = 100 / [1 + 1 / 1.61*AbHum]
Target Dilution Ratio (TDR) = 15 / Percent Moisture

Event = the name of the drying cycle.
Run = the number of the 3-hour interval.
Operator, that's you.
Date and time are now, as you start the data collection process.

AMBIENT DATA

Read the laboratory temperature from the thermometer.

ANALYZER CALIBRATION (BEFORE SIDE OF SHEET)

Set valves so that 1, 2 = OFF; 3=ON; 4=VENT. This allows gas to flow out of the vents from the calibration tanks and shuts off all other sources. Only calibration gas should go through the detector.

Open the zero gas tank valve
set analyzer to range 3
zero valve on, others off
set flow to 3 L/min using regulator on tank
wait for a stable reading (about 30 to 60 seconds)
use the zero dial (pot) on THA to get a zero reading
read the analyzer
read computer
note pot setting
close valve on zero gas tank

Open span gas tank valve
span valve on, others off
set flow to 3 L/min using regulator on tank
wait for a stable reading (about 30 to 60 seconds)
use the span dial (pot) on THA to get a reading of 601ppm
read the analyzer and record, record 6.01 as 601
read computer (should read about 601)

record pot setting
leave span tank valve open

Open mid gas tank valve
mid valve right on, others off
set flow to 3 L/min using regulator on tank
wait for a stable reading (about 30 to 60 seconds)
read analyzer (do not adjust pot settings), record, for example 299
read computer (should about 299)
check for within tolerance
turn off mid gas tank valve

SET DILUTION FLOW BEFORE RUN (BEFORE SIDE OF SHEET)

Set valves so that 1, 2, 3 = OFF; 4=meter. This allows gas to flow only from the meter to the detector.

Use the Gilibrator to take 4 readings of the total flow rate (TFR). This is the total flow drawn by the analyzer and should be about 1.6 L/min
Make sure the average does not include any "bad" readings
Record the average in L/min; For 1660 record 1.660
Write the Run # and "Pre-TFR" on the Gilibrator printout.

Calculate the next two values -
Target dilution flow rate (TDFR) is the TFR x (1 - DR)
Target sample flow rate (TSFR) is the TFR x DR
Check that the sum of these is the Total Flow Rate

Set dilution flow
Set red pointer to desired dilution flow
Slowly open lower valve on dilution flow meter (1=ON)
Use upper valve on dilution flow meter to adjust flow
Do not adjust this meter after this point
Read the meter that you just set and record the value in SCFH
Calculate and record L/min

Use the Gilibrator to take 4 readings of the sample flow rate (SFR). This is the flow through the analyzer after dilution is set. It will vary, depending on the dilution setting.
Make sure the average does not include any "bad" readings
Record the average, L/min = cc/min / 1000
Write "Pre-SFR" on the Gilibrator printout.

CHECK DILUTION FLOW BEFORE RUN (BEFORE SIDE OF SHEET)

Set valves so that 1, 3 = ON; 2=OFF; 4=VENT. This allows gas to flow out of the vent from the calibration tank and shuts off all other sources. Calibration gas and dilution air will go through the detector.

Open span gas tank valve
span panel valve right (on), others down (off)
set flow to 3 L/min using regulator on tank
set analyzer to range 3
wait for a stable reading (about 30 to 60 seconds) record
turn off all calibration gas tank valves
all calibration gas panel valves off
all tank valves off

Calculate the dilution ratio based on gas flow by dividing the Sample Flow Rate by the Total Flow Rate. DR = Absolute value of [100*(DR Span - DR Flow)/DR Flow]

Calculate the dilution ratio based on span gas by dividing the diluted span by the undiluted span.

If the Dilution ratios do not agree within 5% - DO NOT PROCEED****. Use to calculate the % difference.

**** check calculations, check that values for ppm and flows make sense, remeasure everything. If it still does not agree, call Mike (541)752-0648

START RUN (BOTTOM OF BEFORE SIDE OF SHEET)

Set valve so that 1, 2, 5 = on; 3, 4=off; all calibration tank valves off

Record the start time. Use the computer clock or stopwatch time.

Make sure analyzer is on appropriate range, usually range 3, to keep THC reading on computer between 60 and 600.

Monitor system, as needed. Record system condition at least hourly.

End time should be no more than 3-6 hours from start time.

POST-SAMPLE PROCEDURE

AT END OF RUN (AFTER SIDE OF SHEET)

Record your name as the operator.
Event = the drying cycle. Run = number of the 3-hour interval.
Operator, that's you. Date and time are now, as you start the data collection process.

AMBIENT DATA (AFTER SIDE OF SHEET)

Read the laboratory temperature from the thermometer.

Fill out appropriate information on Pre-sample side of data sheet for next run. This will save time in between runs.

END TIME (AFTER SIDE OF SHEET)

Record computer time.
DO NOT adjust dilution gas or analyzer pots until the instructions tell you to.

CHECK DILUTION FLOW AFTER RUN (AFTER SIDE OF SHEET)

Measure diluted span gas: Set valves so that 1, 3 = on; 2=off; 4=vent. This allows gas to flow out of the vent from the calibration tank and shuts off all other sources. Calibration gas and dilution air will go through the detector.

Open span gas tank valve
Span panel valve ON, others OFF
set flow to 3 L/min using regulator on tank
set analyzer to range 3
wait for a stable reading (about 30 -60 seconds)
record
close panel span valve
leave span tank valve open

Sample flow rate: Set valves so that 1=on; 2, 3 = off; 4=meter. This allows gas to flow only from the meter and the dilution to the detector.

Use the Gilibrator to take 4 readings of the sample flow rate (SFR). This is the flow through the analyzer with dilution on.
Make sure the average does not include any "bad" readings
Record the average in L/min
Write Run # and "Post-SFR" on the Gilibrator printout.

Read dilution flow meter
To calculate the L/min, divide scfh by 2.12
Turn off dilution flow meter using valve 1 (lower dilution valve)

Total flow rate. Set valves so that 1, 2, 3 = off; 4=meter. This allows gas to flow only from the meter to the detector.

Use the Gilibrator to take 4 readings of the total flow rate (TFR). This is the total flow drawn by the analyzer and should be about 1.6 L/min
Make sure the average does not include any "bad" readings
Record the average
Write Run # and "Post-TFR" on the Gilibrator printout.

Calculate the dilution ratio based on gas flow by dividing the Sample Flow Rate by the Total Flow Rate.

CHECK CALIBRATION OF ANALYZER (AFTER SIDE OF SHEET)

Set valves so that 1, 2 = off; 3=on; 4=vent. This allows gas to flow out of the vents from the calibration tanks and shuts off all other sources. Only calibration gas should go through the detector.

Span gas tank valve should be open
span panel valve ON, others down OFF
set flow to 3 L/min using regulator on tank
set analyzer to range 3
wait for a stable reading (about 30 -60 seconds)
read analyzer (do not adjust pot settings), record, for example, 6.05 as 605
read computer (should read about the same)
note pot setting
check for within tolerance - between 582 and 619

Open mid gas tank valve
mid panel valve = ON, others OFF
set flow to 3 L/min using regulator on tank
set analyzer to range 3
wait for a stable reading (about 30 -60 seconds)
read analyzer (do not adjust pot settings), record, for example, 2.97 as 297
read computer (should read same as analyzer)
check for within tolerance

Open the zero gas tank valve
zero panel valve = ON, others OFF
set flow to 3 L/min using regulator on tank

wait for a stable reading (about 30 -60 seconds)
read analyzer (do not adjust pot settings)
read computer
note pot setting

Calculate the dilution ratio based on gas concentration by dividing the Diluted span by the Span

Calculate % difference in the two dilution ratios as 100 * {Absolute Value (DRSpan-DRFlow)} / DRFlow

Record the time now as the end time for check.

Start Pre-Sample procedure for next run.

Appendix 2. Field data sheets

(only field data sheets for charge 2 are included in hard copy)

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 3:03 pm

Run (sample): 1

Dry-bulb temperature: _____

Operator: Milan

Wet-bulb temperature: < 130F

Date: May 31 2010

Target Dilution Ratio (TDR): 1

AMBIENT DATA

Laboratory temperature: 25 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	—	does not apply	480
span	601 (601)	—	does not apply	390
mid	299 (299)	—	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.609 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 0 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.609 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}$/Span]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	—	—	—	—

START TIME: 4:30 p **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Mike Event (kiln charge): Cascade Hardwoods 2

Time now: 8:39p Run (sample): 1

AMBIENT DATA

Laboratory temperature: 24 °C

END TIME: 8:27p

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$		

Sample flow rate (SFR) : 1,630 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 0 scfh \ L/min [L/min = scfh*0.472]

Total flow rate (TFR): \ L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 1 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	562	561	582 to 619	480
mid	280	279	290 to 309	none
zero	0	0	-18 to +18	39

Dilution ratio (DR_{Span}): \ [$Span_{Diluted}$ / Span]

Dilution ratio difference: \ % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 8:31

Comments:

Vac check 19.5" 0.1" loss over 2 MW

Span out of range → drift

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2 — Time now: 8:25

Run (sample): 2 — Dry-bulb temperature: 50

Operator: Miloth — Wet-bulb temperature: 46

Date: 5-31-16 — Target Dilution Ratio (TDR): _____

AMBIENT DATA

Laboratory temperature: 24 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	480
span	601 (601)	601	does not apply	429
mid	299 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.633 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
- dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]
- sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.066 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	390	0.649	0.653	0.6

START TIME: 8:37 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milorg Event (kiln charge): Cascade Hardwoods 2

Time now: 12:00 Run (sample): 2

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 12:02A

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	387	388

Sample flow rate (SFR) : 1.067 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,640 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.651 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	594	594	582 to 619	438
mid	296	296	290 to 309	none
zero	0	0	-18 to +18	480

Dilution ratio (DR_{Span}): 0.652 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 12:06A

Comments:

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 12:00

Run (sample): 3

Dry-bulb temperature: 64

Operator: M. Ilg

Wet-bulb temperature: 59

Date: June 1, 2010

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	601	does not apply	436
mid	300 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,642 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.073 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	390	0.650	0.653	0.45

START TIME: 00:11 June 1 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 2 **[60 < computer reading < 750]**

0.13
See note

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milo TG Event (kiln charge): Cascade Hardwoods 2

Time now: 6:02 A June 1 Run (sample): 3

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 6:05 A

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	393	392

Sample flow rate (SFR) : 1.058 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.634 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.647 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	604	603	582 to 619	436
mid	301	300	290 to 309	none
zero			-18 to +18	475

Dilution ratio (DR_{Span}): 0.651 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.6 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 6:09

Comments:

Vent valve open until 12:13 AM

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 4

Operator: Milota

Date: June 1, 2010

Time now: 6:02A

Dry-bulb temperature: 66

Wet-bulb temperature: 62

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	~~475~~
span	601 (601)	601	does not apply	333
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,640 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1,068 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	391	0.651	0.651	0

START TIME: 6:13 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milo TG Event (kiln charge): Cascade Hardwoods 2

Time now: 9:20 Run (sample): 4

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 9:21

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	396	395

Sample flow rate (SFR) : 1,055 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,625 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0649 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	606	606	582 to 619	333
mid	303	302	290 to 309	none
zero	0	0	-18 to +18	475

Dilution ratio (DR_{Span}): 0.653 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.6 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 9:25

Comments:

346

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 9:20

Run (sample): 5

Dry-bulb temperature: 66

Operator: Milota

Wet-bulb temperature: 62

Date: 6-1-10

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	601	does not apply	328
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.626 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.067 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	391	0.651	0.656	0.75

START TIME: 9:29 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 12:59 Run (sample): 5

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 13:00

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	396	395

Sample flow rate (SFR) : 1.055 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.621 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.651 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	608	607	582 to 619	428
mid	304	301	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.651 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 13:11

Comments:

421

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 13:11

Run (sample): 6

Dry-bulb temperature: 66

Operator: Reid

Wet-bulb temperature: 62

Date: 6/1/10

Target Dilution Ratio (TDR): 965

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	420
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.629 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
- dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]
- sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.058 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	391	0.650	0.649	.15

START TIME: 13:20 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 4:30 p Run (sample): 6

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 4:33 p

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	386	385

Sample flow rate (SFR) : 1,044 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1,2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,621 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0,644 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	598	600	582 to 619	420
mid	298	300	290 to 309	none
zero	0	0,6	-18 to +18	474

Dilution ratio (DR_{Span}): 0,645 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0,15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 4:38 pm

Comments:

490

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 7

Operator: Milota

Date: June 1 2010

Time now: 4:30 p

Dry-bulb temperature: 68

Wet-bulb temperature: 61

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	600	does not apply	424
mid	300 (299)	298	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,632 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1,2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1,058 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	388	0.646	0.648	0.3

START TIME: 4:41 p **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 19:58 Run (sample): 7

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 19:59

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	392	393

Sample flow rate (SFR) : 1.050 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.629 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.644 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	610	608	582 to 619	424
mid	304	302	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.642 [$Span_{Diluted}$ / Span]

Dilution ratio difference: .3 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 20:11

Comments:

560

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 8

Operator: Reid

Date: 6/1/10

Time now: 20:11

Dry-bulb temperature: 66.7

Wet-bulb temperature: 61.1

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	415
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.639 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.049 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}$/Span]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	387	0.643	0.640	0.45

START TIME: 20:22 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 12:00 am Run (sample): 8

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 12:00 am

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	388	387

Sample flow rate (SFR): 1.052 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.634 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.643 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	603	601	582 to 619	415
mid	301	299	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.643 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 12:09 am

Comments:

637

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 9

Operator: Reid

Date: 6/2/10

Time now: 12:09 am

Dry-bulb temperature: 67.7

Wet-bulb temperature: 61.4

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	412
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.640 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.055 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	386	0.642	0.643	.15

START TIME: 12:21 am **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: _____ **[60 < computer reading < 750]**

637

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milan Event (kiln charge): Cascade Hardwoods 2

Time now: 6:05A (June) Run (sample): 9

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 6:06

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	386	383

Sample flow rate (SFR) : 1.051 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.631 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.644 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	599	598	582 to 619	412
mid	299	298	290 to 309	none
zero	0	0.	-18 to +18	475

Dilution ratio (DR_{Span}): 0.644 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0 % [$100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}$]

End time for check: 6:10

Comments:

760

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 10

Operator: Milena

Date: June 2

Time now: 6:05

Dry-bulb temperature: 69

Wet-bulb temperature: 61

Target Dilution Ratio (TDR): 065

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	602	does not apply	4613
mid	300 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.639 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1,2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1,064 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	388	0.646	0.649	0,3

START TIME: 6:14 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 9:32 Run (sample): 10

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 9:33

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	391	390

Sample flow rate (SFR) : 1,041 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,629 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0,639 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	609	607	582 to 619	413
mid	304	303	290 to 309	none
zero	0	0	-18 to +18	475

Dilution ratio (DR_{Span}): 0,642 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0,45 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 9:36

Comments:

830

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 11

Operator: Milota

Date: June 2, 2010

Time now: 9:30

Dry-bulb temperature: 67

Wet-bulb temperature: 61

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	601	does not apply	406
mid	300 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,650 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1,047 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	388	0646	0.635	1.65%

START TIME: 9:40 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 13:11 Run (sample): 11

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 13:11

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	392	392

Sample flow rate (SFR) : 1,043 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,618 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.645 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	610	609	582 to 619	406
mid	305	305	290 to 309	none
zero	0	0	-18 to +18	475

Dilution ratio (DR_{Span}): 0.643 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.3 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 13:14

Comments:

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 12

Operator: Mijoya

Date: June 2 2010

Time now: 13:11

Dry-bulb temperature: 69

Wet-bulb temperature: 60

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	601	does not apply	398
mid	300 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.624 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.045 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	388	0.646	0.643	0.45

START TIME: 13:17 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 4:47 p Run (sample): 12

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 16:47

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	383	382

Sample flow rate (SFR) : 1.045 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.644 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.636 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	596	594	582 to 619	398
mid	297	296	290 to 309	none
zero	0	0	-18 to +18	475

Dilution ratio (DR_{Span}): 0.643 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 1.3 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: ~~4~~ 16:52

Comments:

966

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2 Time now: 4:47P

Run (sample): 13 Dry-bulb temperature: 69

Operator: Milota Wet-bulb temperature: 62

Date: 6-2-10 Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	475
span	601 (601)	601	does not apply	403
mid	300 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,624 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1,046 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	388	0.646	0.644	0.3

START TIME: 14:54 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 19:57 Run (sample): 13

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 19:58

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	379	378

Sample flow rate (SFR) : 1.053 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.630 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.646 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	588	589	582 to 619	403
mid	293	291	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.644 [$Span_{Diluted}$ / Span]

Dilution ratio difference: .3 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 20:06

Comments:

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 14

Operator: Reid

Date: 6/2/10

Time now: 20:06

Dry-bulb temperature: 70.6

Wet-bulb temperature: 60.6

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	414
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.627 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: _____ scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.050 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	387	0.643	0.645	.3

START TIME: 20:15 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 12:01 am Run (sample): 4

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 12:01 am

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	383	381

Sample flow rate (SFR) : 1.058 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1635 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.647 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	593	592	582 to 619	414
mid	296	294	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.645 [$Span_{Diluted}$ / Span]

Dilution ratio difference: .3 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 12:09 am

Comments:

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 15

Operator: Reid

Date: 6/3/10

Time now: 12:10 am

Dry-bulb temperature: 69.0

Wet-bulb temperature: 60.1

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	421
mid	294 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.638 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: _____ scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.055 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	389	0.647	0.644	.4

START TIME: 12:17 am **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 5:59 Run (sample): 15

AMBIENT DATA

Laboratory temperature: 20 °C

END TIME: 6:00

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	387	386

Sample flow rate (SFR) : 1,052 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,623 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.648 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	599	600	582 to 619	474
mid	299	299	290 to 309	none
zero	0	0	-18 to +18	421

Dilution ratio (DR_{Span}): 0.646 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.3 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 6:05

Comments:

1239

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 16

Operator: M. Cota

Date: 6-3-10

Time now: 6:00A

Dry-bulb temperature: 70

Wet-bulb temperature: 60

Target Dilution Ratio (TDR): 0.62

AMBIENT DATA

Laboratory temperature: 20 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	423
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.628 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.054 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	390	0.649	0.647	0.3

START TIME: 6:08 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 09:22 Run (sample): 16

AMBIENT DATA

Laboratory temperature: 20 °C

END TIME: 09:22

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	392	390

Sample flow rate (SFR) : 1.052 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.622 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.648 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	605	604	582 to 619	423
mid	302	300	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.647 [$Span_{Diluted}$ / Span]

Dilution ratio difference: .15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 09:30

Comments:

1309

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 09:30

Run (sample): 17

Dry-bulb temperature: 70

Operator: Reid

Wet-bulb temperature: 60

Date: 6/3/10

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 20 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	419
mid	300 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.636 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.053 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	390	0.649	0.643	.93

START TIME: 09:41 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

if analyzer reads greater than 7.5 on range 1, then set to range 2

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 13:15 Run (sample): 17

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 13:16

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	389	390

Sample flow rate (SFR): 1,049 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,622 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.647 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	602	602	582 to 619	419
mid	300	300	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.646 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 13:20

Comments:

1385

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 13:15

Run (sample): 18

Dry-bulb temperature: 70

Operator: MJDTG

Wet-bulb temperature: 60

Date: June 3, 2010

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	607 (601)	602	does not apply	417
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.665 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.061 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	389	0.647	0.637	1.5

START TIME: 13:23 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Mora Event (kiln charge): Cascade Hardwoods 2

Time now: 4:21 Run (sample): 18

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 4:22 p

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	387	386

Sample flow rate (SFR) : 1,050 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 12 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,626 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.646 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	600	600	582 to 619	417
mid	299	299	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.645 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 16:27

Comments:

1447

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 19

Operator: M. Jotz

Date: June 3 2010

Time now: 4:21 P

Dry-bulb temperature: 72

Wet-bulb temperature: 60

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	616
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.629 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.066 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}$/Span]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	389	0.647	0.654	1.1

START TIME: 4:30 PM **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 20:01 Run (sample): 19

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 20:01

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	389	387

Sample flow rate (SFR) : 1.044 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.619 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.644 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	read Pot settings
span	607	604	582 to 619	416
mid	302	302	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.640 [$Span_{Diluted}$ / Span]

Dilution ratio difference: .62 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 20:07

Comments:

1513

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Time now: 20:08

Run (sample): 20

Dry-bulb temperature: 72.6

Operator: Reid

Wet-bulb temperature: 60.0

Date: 6/3/10

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	410
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.631 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.048 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}$/Span]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	387	0.644	0.642	.3

START TIME: 20:14 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Reid Event (kiln charge): Cascade Hardwoods 2

Time now: 24:01 Run (sample): 20

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 24:01

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	382	382

Sample flow rate (SFR) : 1.039 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.618 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.642 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	read Pot settings
span	596	594	582 to 619	410
mid	297	295	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.641 [$Span_{Diluted}$ / Span]

Dilution ratio difference: .15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 24:07

Comments:

1596

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 21

Operator: Reid

Date: 6/4/10

Time now: 24:08

Dry-bulb temperature: 71.6

Wet-bulb temperature: 60.5

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	415
mid	299 (299)	299	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.617 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.041 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}$/Span]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	386	0.642	0.643	.15

START TIME: 24:15 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

if analyser is > 750 at midnight, go to range 2

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: M. Iota Event (kiln charge): Cascade Hardwoods 2

Time now: 6:06 A Run (sample): 21

June 4, 2010

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 6:06 A

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	387	386

Sample flow rate (SFR) : 1,038 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1,2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,610 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.645 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	(read) Pot settings
span	603	602	582 to 619	415
mid	300	299	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): ~~0.645~~ 0.642 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.45 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 6:12

Comments:

1721

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 22

Operator: Miloth

Date: June 4, 2010

Time now: 6:06A

Dry-bulb temperature: 72

Wet-bulb temperature: 60

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	413
mid	299 (299)	298	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.624 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.040 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	387	0.644	0.648	0.6

START TIME: 06:16 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Mike Event (kiln charge): Cascade Hardwoods 2

Time now: 9:25 A Run (sample): 22

AMBIENT DATA

Laboratory temperature: 20 °C

END TIME: 9:26

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	394	393

Sample flow rate (SFR) : 1.040 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.631 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.638 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	611	609	582 to 619	413
mid	305	304	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.645 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 1.1 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 9:30 A

Comments:

1788

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 23

Operator: Milota

Date: June 4, 2010

Time now: 9:30A

Dry-bulb temperature: 72

Wet-bulb temperature: 60

Target Dilution Ratio (TDR): 0.72

AMBIENT DATA

Laboratory temperature: 20 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	403
mid	299 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,620 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1,2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1,042 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	388	0.646	0.643	0.45

START TIME: 9:33A **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milo TG Event (kiln charge): Cascade Hardwoods 2

Time now: 13:04 Run (sample): 23

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 13:04

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	387	387

Sample flow rate (SFR) : 1,050 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,621 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.648 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	598	597	582 to 619	403
mid	298	298	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.647 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.15 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 13:07

Comments:

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2
Time now: 1304
Run (sample): 24
Dry-bulb temperature: 72
Operator: Milota
Wet-bulb temperature: 60
Date: June 4, 2010
Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	407
mid	299 (299)	298	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.624 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.054 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	389	0.647	0.649	0.3

START TIME: 13:11 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milos Event (kiln charge): Cascade Hardwoods 2

Time now: June 10, 2010 Run (sample): 24

AMBIENT DATA

Laboratory temperature: 22 °C

END TIME: 16:43

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	378	377

Sample flow rate (SFR) : 1.059 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.638 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.647 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Pot settings
span	584	584	582 to 619	407
mid	292	293	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.647 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 16:46

Comments:

1934

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2 — Time now: 4:30p

Run (sample): 25 — Dry-bulb temperature: 72

Operator: Milota — Wet-bulb temperature: 60

Date: June 4, 2010 — Target Dilution Ratio (TDR): 65

AMBIENT DATA

Laboratory temperature: 22 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	~~299~~ 601	does not apply	421
mid	299 (299)	298	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1,638 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.062 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	389	0.648	0.648	0

START TIME: 16:49 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: ADIN B. Event (kiln charge): Cascade Hardwoods 2

Time now: 19:30 Run (sample): 25

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 19:30

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	383	383

Sample flow rate (SFR) : 1.061 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.633 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.650 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	591	591	582 to 619	421
mid	295	295	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.648 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.31 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 19:40

Comments:

1991

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 26

Operator: ADIN B.

Date: 06/04/2010

Time now: 19:40

Dry-bulb temperature: 74.9

Wet-bulb temperature: 59.9

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 24 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	600	does not apply	428
mid	300 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.641 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.058 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	389	0.647	0.645	0.31

START TIME: 19:49 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: ADIN B Event (kiln charge): Cascade Hardwoods 2

Time now: 23:41 Run (sample): 26

AMBIENT DATA

Laboratory temperature: 23 °C

END TIME: 23:41

CHECK DILUTION FLOW AFTER RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	386	386

Sample flow rate (SFR) : 1.058 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.632 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): ~~0.735~~ 0.648 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION

[1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	598	598	582 to 619	428
mid	298	298	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.645 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 0.46 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 23:49

Comments:

2069

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 27

Operator: ADIN B.

Date: JUNE 4, 2010

Time now: 23:50

Dry-bulb temperature: 75

Wet-bulb temperature: 59.3

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 23 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	AVS Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	435
mid	303 (299)	302	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.637 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.056 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	393	0.654	0.645	1.4

START TIME: 23:58 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milota Event (kiln charge): Cascade Hardwoods 2

Time now: 6:03 A Run (sample): 27

AMBIENT DATA

Laboratory temperature: 21 °C

END TIME: 06:07

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	395	394

Sample flow rate (SFR): 1.060 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1.2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1.622 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.635 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Read Pot settings
span	586	585	582 to 619	435
mid	305	304	290 to 309	none
zero	0	0	-18 to +18	474

Dilution ratio (DR_{Span}): 0.674 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 5.7% % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 6:14

Comments:

DR did not agree, ~~can't~~ — I think span gas flow was too low when I checked ~~the~~ span — I redid this & got ~~37~~ 612 ~~so may be this is not reason~~ which gives DR = 0.645 or a 1.5% diff QED

2193

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - BEFORE

BACKGROUND INFORMATION

Event (kiln charge): Cascade Hardwoods 2

Run (sample): 28

Operator: Milo TB

Date: June 5 2010

Time now: 6:03 A

Dry-bulb temperature: 72

Wet-bulb temperature: 68

Target Dilution Ratio (TDR): 0.65

AMBIENT DATA

Laboratory temperature: 21 °C

ANALYZER CALIBRATION

[Valves 1, 2 = off; 3=on; 4=vent]

	Analyzer, ppm	Computer	Within range	Adjust Pot settings
zero	0 (0)	0	does not apply	474
span	601 (601)	601	does not apply	424
mid	299 (299)	300	291 to 309	none

SET DILUTION FLOW BEFORE RUN

Total flow rate (TFR): 1.628 L/min [Valves 1, 2, 3 = off; 4=meter]

Target
dilution flow rate (TDFR) _____ L/min [TFR x (1 - DR)]

sample flow rate (TSFR) _____ L/min [TFR x DR]

Set and read dilution meter: 1.2 scfh [scfh = L/min * 2.12]

Sample flow rate (SFR): 1.066 L/min [1 = on; 2, 3 = off; 4=meter]

CHECK DILUTION FLOW BEFORE RUN

[1, 3=on; 2=off; 4=vent]

	Analyzer	DR_{Span} [$Span_{Diluted}/Span$]	DR_{Flow} [SFR / TFR]	Difference, % $100*(DR_{Span} - DR_{Flow})/DR_{Flow}$
$Span_{Diluted}$	390	0.649	0.654	0.75

START TIME: 6:21 **[1, 2, 5 = on; 3, 4 = off; tank valves off]**

ANALYZER RANGE: 1 **[60 < computer reading < 750]**

FIELD DATA SHEET FOR TOTAL HYDROCARBON ANALYZER - AFTER

Operator: Milta Event (kiln charge): Cascade Hardwoods 2

Time now: 9:05 A Run (sample): 28

AMBIENT DATA

Laboratory temperature:_____ °C

END TIME: 09:05 June 5, 2010 End of Charge

CHECK DILUTION FLOW AFTER RUN [1, 3=on; 2=off; 4=vent]

	Analyzer	Computer
$Span_{Diluted}$	387	—

Sample flow rate (SFR) : 1,056 L/min [1= on, 2, 3 = off, 4=meter]

Read dilution meter: 1,2 scfh _____ L/min [L/min = scfh*0.472]

Total flow rate (TFR): 1,617 L/min [1, 2, 3 = off; 4=meter]
(attach print out with all four sets of data)

Dilution ratio (DR_{Flow}): 0.653 [SFR / TFR]

CHECK OF ANALYZER CALIBRATION [1, 2=off; 3=on, 4=vent]

	Analyzer	Computer	Within range	Rear Pot settings
span	599	—	582 to 619	424
mid	298	—	290 to 309	none
zero	0	—	-18 to +18	474

Dilution ratio (DR_{Span}): 0.646 [$Span_{Diluted}$ / Span]

Dilution ratio difference: 1.1 % [100*(Abs(DR_{Span} - DR_{Flow}))/DR_{Flow}]

End time for check: 9:11 AM

Comments:

End of charge

Vac check 9:12:11 → 9:14:11 20.1" → 19.8" VAC

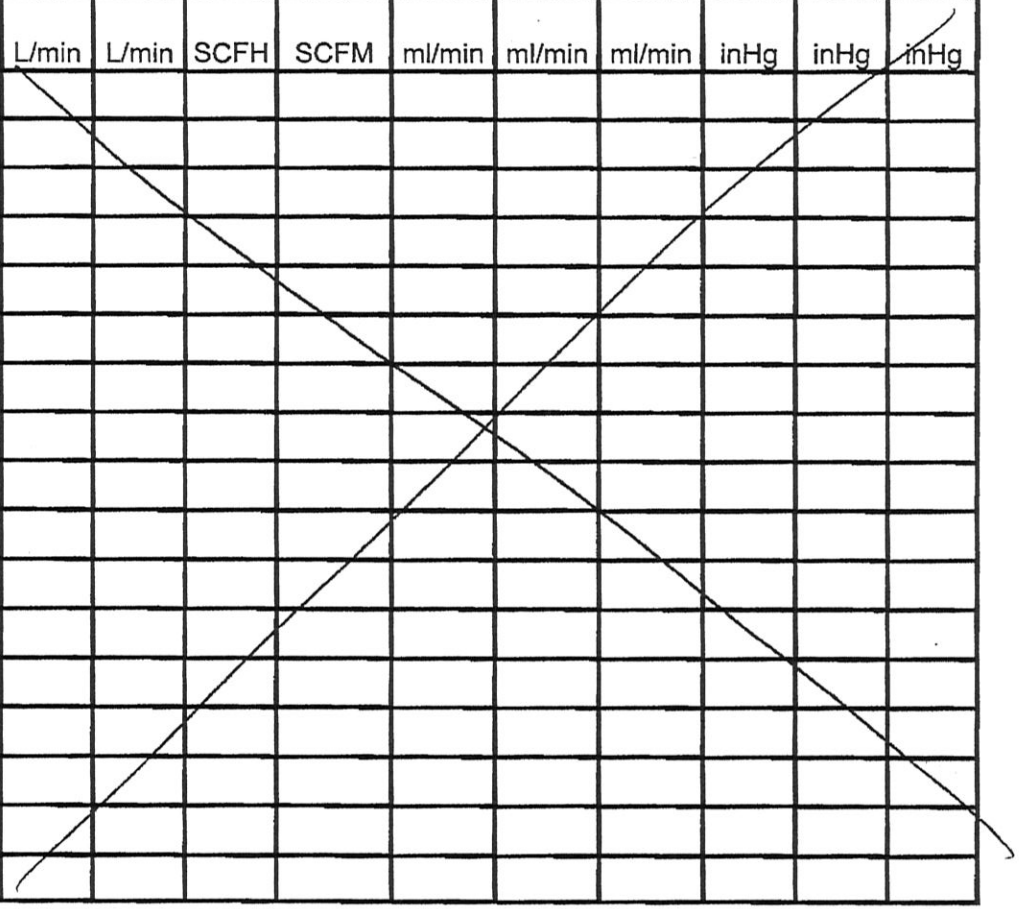
Charge:	2
Cascade Hardwoods	
Page:	1

	Date	Time
Start	5-31-10	4:30P
End		

Clock time	Run time	Run #	Temperatures						Flows							Line 1 Vac.	Line 2 Vac.	Line 3 Vac.
			Box	Valve	Dry-bulb	Wet-bulb	Line	Chiller	Flow 1	Flow 2	Flow 3	Dilution	Line 1	Line 2	Line 3			
	hrs	#	°C	°C	°C	°C	°C	°C	L/min	L/min	SCFH	SCFM	ml/min	ml/min	ml/min	inHg	inHg	inHg
4:23P	—	—	126	145	—	—	135											
4:30P	0	1	125	145	33.0	22.1	135											
4:57P	0:29	1	125	145	64.4	44.8	13											
			too HIGH		↑													
Reset	kiln	program																
6:07P	1:07	1	126	145	42.3	40.9	135											
7:14P	2:14	1	125	145	44.3	42.6	135											
Flow	2 to	35	L/min		Flow	3=0												
8:26	3:25	1	125	145	49.5	46.4	135											
8:37	3:37	2	126	145	50.1	46.9	135											
12:00	6:59	2	125	145	63.7	58.7	135											
Flow	2→20	then	→0															
12:12	07:11	2	126	145	62.9	58.9	135											
6:02A	13:02	3	125	145	66.2	62.5	135											
6:15	13:14	4	126	145	66.7	62.9	135											
7:34	14:33	4	124	145	67.4	62.6	135											
9:20	16 19	4	125	145	66.2	62.7	135											

May 31

June



Charge:	2
Cascade Hardwoods	
Page:	2

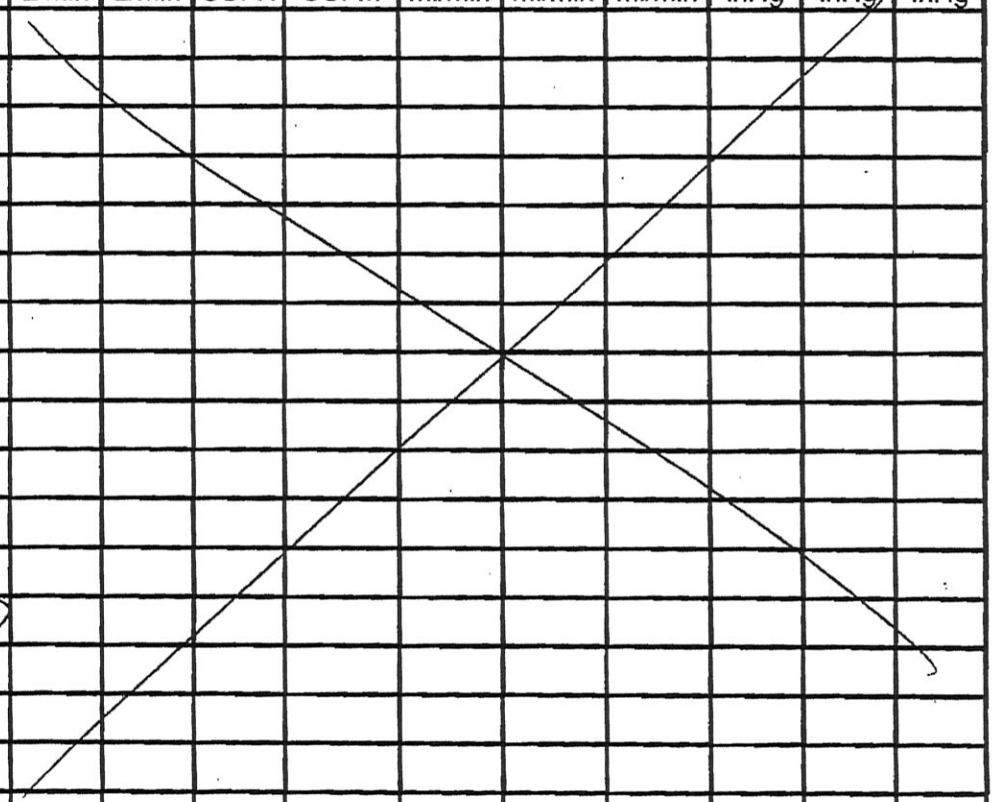
	Date	Time
Start	9:20AM	June 1
End	4:48 pm	June 2

Clock time	Run time	Run	Temperatures						Flows							Line 1	Line 2	Line 3
			Box	Valve	Dry-bulb	Wet-bulb	Line	Chiller	Flow 1	Flow 2	Flow 3	Dilution	Line 1	Line 2	Line 3	Vac.	Vac.	Vac.
	hrs	#	°C	°C	°C	°C	°C	°C	L/min	L/min	SCFH	SCFM	ml/min	ml/min	ml/min	inHg	inHg	inHg
9:29	16:28	5	126	145	65.8	62.3	135											
12:58	19:58	5	125	145	66.1	61.3	135											
13:22	20:21	6	126	145	67.8	61.2	135											
16:33	23:32	6	125	145	68.1	61.3	135											
16:43	23:42	7	125	145	65.8	60.8	135											
17:57	24:57	7	125	145	68.0	61.4	135											
19:58	26:15	7	125	145	67.3	61.0	135											
20:23	27:22	8	125	145	66.1	60.8	135											
23:59	30:59	8	125	145	65.6	60.6	135											
00:22	31:21	9	125	145	66.5	61.8	135											
06:05	37:04	9	126	145	69.0	62.4	135											
06:16	37:15	10	126	145	69.9	62.8	135											
09:32	40:31	10	125	145	67.4	60.5	135											
09:46	40:45	11	124	145	69.9	62.8	135											
13:11	44:10	11	125	145	68.3	60.6	135											
13:22	44:21	12	126	145	69.3	60.6	135											
16:47	47:46	12	125	145	67.3	60.3	135											

Charge:	2
Cascade Hardwoods	
Page:	3

	Date	Time
Start	June 2	5PM
End	June 4	00:15

Clock time	Run time	Run	Temperatures						Flows							Line 1	Line 2	Line 3
			Box	Valve	Dry-bulb	Wet-bulb	Line	Chiller	Flow 1	Flow 2	Flow 3	Dilution	Line 1	Line 2	Line 3	Vac.	Vac.	Vac.
	hrs	#	°C	°C	°C	°C	°C	°C	L/min	L/min	SCFH	SCFM	ml/min	ml/min	ml/min	inHg	inHg	inHg
16:58	47:57	13	126	145	68.4	60.7	135											
19:56	50:56	13	125	145	70.8	60.8	135											
00:01	55:00	14	124	145	69.0	60.6	135											
00:18	55:18	15	125	145	69.0	60.3	135											
05:59	60:59	15	125	145	69.2	60.8	135											
06:11	61:11	16	125	145	69.2	60.2	135											
09:20	64:20	16	124	145	69.7	61.2	135											
09:42	64:42	17	126	145	69.5	60.3	135											
13:15	68:14	17	125	145	[illegible]	59.6	135											
Reset computer at 68.5 hrs																		
13:40	00:01	18	124	145	71.4	59.1	135											
16:21	02:48	18	125	145	71.8	59.6	135											
16:32	02:59	19	125	145	71.3	59.6	135											
20:00	06:27	19	125	145	71.4	59.8	135											
20:15	06:42	20	126	145	71.8	59.8	135											
24:00	10:27	20	125	145	71.7	60.2	135											
24:16	10:43	21	125	145	70.6	59.8	135											



Charge:	2
Cascade Hardwoods	
Page:	4

	Date	Time
Start	June 4	0600
End	June 5	9:30A

Clock time	Run time	Run	Temperatures						Flows							Line 1	Line 2	Line 3
			Box	Valve	Dry-bulb	Wet-bulb	Line	Chiller	Flow 1	Flow 2	Flow 3	Dilution	Line 1	Line 2	Line 3	Vac.	Vac.	Vac.
	hrs	#	°C	°C	°C	°C	°C	°C	L/min	L/min	SCFH	SCFM	ml/min	ml/min	ml/min	inHg	inHg	inHg
06:04	16:31	21	126	145	73.6	59.4	135											
09:25	19:52	21	126	145	73.8	60.3	135											
09:34	20:01	22	125	145	74.7	61.2	135											
13:04	23:31	22	125	145	74.3	60.0	135											
13:17	23:44	23	125	145	73.1	59.8	135											
16:43	27:09	23	125	145	72.9	60.1	135											
19:26	29:53	25	125	145	76.1	60.2	135											
19:55	30:22	26	125	145	74.5	60.4	135											
23:40	34:07	26	125	145	75.2	60.1	135											
00:03	34:29	27	125	145	75.1	60.0	135											
06:03	40:31	27	125	145	75.2	60.0	135											
06:23	40:49	28	125	145	75.2	60	135											
09:05	43:32	28	125	145	76	58	135											
	End of Run																	

May 31 2010
Cascade 2

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1618	1618	01
1577	1598	02
1627	1608	03
1615	1609	04

TFR Pre1

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1642	1642	01
1597	1620	02
1641	1627	03
1642	1630	04

POST1 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1629	1629	01
1613	1621	02
1645	1629	03
1643	1633	04

Pre2 TFR

3RATOR 2 WET V4.4 DATE.....
Pump S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1063	1063	01
1068	1066	02
1065	1065	03
1066	1066	04

Pre 2 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1061	1061	01
1065	1063	02
1074	1067	03
1067	1067	04

Post 2 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1640	1640	01
1637	1638	02
1647	1641	03
1637	1640	04

POST2 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
J	1640	01
1648	1644	02
1640	1642	03
1642	1642	04

Pre 3 TFR

GILIBRATOR 2 WET V4.4 DATE.....

FLOW	AVERAGE	# SAMPLES
1067	1067	01
1079	1073	02
1076	1074	03
1070	1073	04

Pre 3 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1064	1064	01
1048	1056	02
1051	1055	03
1069	1058	04

Post 3 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1632	1632	01
1636	1634	02
1633	1633	03
1636	1634	04

POST 3 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1633	1633	01
1638	1635	02
1639	1636	03
1649	1640	04

Pre 4 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1066	1066	01
1072	1069	02
1065	1068	03
1070	1068	04

Post 4 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1054	1054	01
1055	1055	02
1052	1054	03
1060	1055	04

Post 4 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1623	1623	01
1631	1627	02
1621	1625	03
1626	1625	04

Post 4 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1623	1623	01
1626	1625	02
1627	1626	03
1626	1626	04

Pre 5 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES

1057	1057	02
1066	1060	03
1087	1067	04

SFR

GILIBRATOR 2 WET V4.4 DATE.....
S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1047	1047	01
1063	1055	02
1047	1053	03
1064	1055	04
-1064	1053	03

Post 5
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1600	1600	01
1637	1618	02
1616	1617	03
1633	1621	04

Post 5
TFR 6/1

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1602	1602	01
1627	1615	02
1626	1619	03
1645	1625	04
1618	1624	05
1658	1629	06

Pre 6
TFR

GILIBRATOR 2 WET V4.4 DATE.....
S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1053	1053	01
1065	1059	02
1048	1055	03
1067	1058	04

Pre 6
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1047	1047	01
1031	1039	02
1043	1040	03
1056	1044	04

Post 6
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1619	1619	01
1619	1619	02
1627	1622	03
1618	1621	04

Post 6
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
[illegible]	1620	01
[illegible].2	1631	02
1638	1633	03
1626	1632	04

Pre 7
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

1053	1053	01
1073	1063	02
1058	1061	03
1049	1058	04

Pre 7
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1043	1043	01
1057	1050	02
1043	1048	03
1058	1050	04

Post 7
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1611	1611	01
1645	1628	02
1614	1623	03
1644	1629	04

Post 7
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1619	1619	01
1652	1636	02
1633	1635	03
1651	1639	04

Pre 8
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1039	1039	01
1057	1048	02
1039	1045	03
1060	1049	04

Pre 8
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1050	1050	01
1055	1053	02
1051	1052	03
1053	1052	04

Post 8
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1618	1618	01
1648	1633	02
1624	1630	03
1646	1634	04

Post 8
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1625	1625	01
1653	1639	02
1628	1635	03
1653	1640	04

Pre 9
TFR

6/2
12:23am

PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1053	1053	01
1051	1052	02
1066	1057	03
[illegible]5	1054	04
[illegible]6	1057	03
1047	1054	04
1057	1055	05

Pre 9 STR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1050	1050	01
1050	1050	02
1051	1050	03
1055	1051	04

Pre 9 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1634	1634	01
1629	1632	02
1630	1631	03
1630	1631	04

POST 9 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1635	1635	01
1641	1638	02
[illegible]41	1639	03
[illegible]	1639	04

Pre 10 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1058	1058	01
1084	1071	02
1051	1064	03
1063	1064	04

Pre 10 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1035	1035	01
1037	1036	02
1046	1039	03
1047	1041	04

Post 10 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1625	1625	01
1627	1626	02
1625	1626	03
1638	1629	04

Post 10 TFR

[illegible]BRATOR 2 WET V4.4 DATE.....
[illegible] S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1628	1628	01
1633	1631	02
1706	1656	03
1633	(1650)	04

Pre 11 TFR

June 2, 2010
9:30

~~1050 1430 06~~
~~-1050 1530 05~~

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1048	1048	01
1047	1047	02
1046	1047	03
1047	1047	04

Pre 11 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1039	1039	01
1022	1030	02
1071	1044	03
1040	1043	04

Post 11 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1615	1615	01
1620	1618	02
1621	1619	03
1616	1618	04

Post 11 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1620	1620	01
1627	1624	02
1626	1625	03
1624	1624	04

Pre TFR 12

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1046	1046	01
1039	1043	02
1051	1045	03
1042	1045	04

Pre 12 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1044	1044	01
1045	1045	02
1045	1045	03
1046	1045	04

Post 12 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1624	1624	01
1664	1644	02
1641	1643	03
1648	1644	04

Post 12 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1623	1623	01
1608	1615	02
1633	1621	03

~~Pre & Post~~ 13 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1046	1046	01
[illegible]	1046	02
[illegible]	1046	03
1045	1046	04

Pre 3 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1047	1047	01
1060	1053	02
1047	1051	03
1060	1053	04

Post 3 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1619	1619	01
1637	1628	02
1620	1626	03
1642	1630	04

Post 3 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1612	1612	01
1643	1627	02
1614	1623	03
[illegible]	1627	04

Pre 14 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1044	1044	01
1055	1050	02
1045	1048	03
1056	1050	04

Pre 14 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1054	1054	01
1060	1057	02
1054	1056	03
1063	1058	04

Post 14 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1620	1620	01
1649	1635	02
1625	1631	03
1646	1635	04

Post 14 TFR

GILIBRATOR 2 WET V4.4 DATE.....
[illegible] S/N.....ID.....

[illegible]	AVERAGE	# SAMPLES
1624	1624	01
1650	1637	02
1631	1635	03
1650	1638	04

Pre 15 TFR 6/3 13:20am

PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1047	1047	01
1063	1055	02
1046	1052	03
1063	1055	04

Pre 15 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1043	1043	01
1057	1050	02
1051	1051	03
1055	1052	04

POST 15 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1625	1625	01
1624	1624	02
1623	1624	03
1622	1623	04

POST 15 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1618	1618	01
1636	1627	02
1631	1628	03
1628	1628	04

Pre 16 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1054	1054	01
1053	1054	02
1053	1053	03
1054	1054	04

Pre 16 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1046	1046	01
1055	1051	02
1047	1050	03
1059	1052	04

Post 16 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1610	1610	01
1633	1622	02
1614	1619	03
1630	1622	04

Post 16 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1607	1607	01
1642	1624	02
1618	1622	03
1638	1626	04

Pre 17 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

1049	1049	01
1056	1053	02
1049	1051	03
1057	1053	04

Pre 17 SFR

[illegible]RATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1050	1050	01
1050	1050	02
1048	1050	03
1049	1049	04

Post 17 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1622	1622	01
1623	1622	02
1621	1622	03
1624	1622	04

Post 17 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1626	1626	01
1646	1636	02
1666	1646	03
1724	1665	04

Pre 18 TFR — 1:30 PM July 3, 2016

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
[illegible]	1055	01
1074	1065	02
1062	1064	03
1053	1061	04

Pre 18 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1053	1053	01
1050	1051	02
1049	1051	03
1050	1050	04

Post 18 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1626	1626	01
1627	1627	02
1625	1626	03
1626	1626	04

Post 18 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1624	1624	01
1631	1627	02
[illegible]	1628	03
[illegible]2	1629	04

Pre 19 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1052	1052	01

Pre 19

1053	1055	03
1100	1066	04

Stk

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1042	1042	01
1051	1047	02
1034	1042	03
1050	1044	04

Post 19 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1603	1603	01
1632	1617	02
1615	1617	03
1628	1619	04

Post 19 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1612	1612	01
1646	1629	02
1620	1626	03
1645	1631	04

Pre 20 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1046	1046	01
1054	1050	02
1042	1047	03
1051	1048	04

Pre 20 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1035	1035	01
1046	1040	02
1034	1038	03
1041	1039	04

Post 20 SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1607	1607	01
1626	1616	02
1610	1614	03
1628	1618	04

Post 20 TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1608	1608	01
1631	1619	02
1614	1618	03
1617	1617	04

Pre 21 TFR 6/4/10 12:18 am

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1038	1038	01
1045	1041	02
1034	1039	03

21 Pre SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1033	1033	01
?	1027	02
..30	1038	03
1036	1038	04

21 Post SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1611	1611	01
1596	1603	02
1623	1610	03
1662	1623	04
-1662	1610	03
1609	1610	04
1611	1610	05

21 Post TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1612	1612	01
1633	1623	02
1631	1625	03
1620	1624	04

22 Pre TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1039	1039	01
?	1041	02
1039	1040	03
1040	1040	04

22 Pre SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1040	1040	01
1039	1040	02
1040	1040	03
1041	1040	04

22 Post SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1594	1594	01
1601	1598	02
1700	1632	03
1629	1631	04

22 Post TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1610	1610	01
1626	1618	02
1618	1618	03
?	1618	04
..3	1620	05

23 Pre TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1042	1042	01

23 Pre

1030	1040	03
1049	1042	04

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1045	1045	01
1051	1048	02
1051	1049	03
1055	1050	04

23 Post
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1619	1619	01
1621	1620	02
1618	1620	03
1624	1621	04

23 Post
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1616	1616	01
1626	1621	02
1626	1623	03
1627	1624	04

24 Pre
TFR
13:10
6+10

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1053	1053	01
1058	1055	02
1054	1055	03
1050	1054	04

24 Pre
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1057	1057	01
1064	1061	02
1058	1060	03
1057	1059	04

24 Post
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1632	1632	01
1651	1641	02
1636	1639	03
1633	1638	04

2 Post
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1630	1630	01
1641	1635	02
1640	1637	03
1641	1638	04

25 Pre
TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1059	1059	01
1061	1060	02
1069	1063	03

25 Pre
SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1054	1054	01
	1061	02
	1060	03
1067	1061	04
1631	1175	05
1648	1254	06
1630	1308	07
1652	1351	08
1619	1381	09
1647	1407	10

25 POST SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1622	1622	01
1641	1631	02
1626	1629	03
1645	1633	04

25 POST TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1623	1623	01
1654	1639	02
1634	1637	03
1651	1641	04

26 PRE TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1054	1054	01
1062	1058	02
1053	1056	03
1063	1058	04

26 PRE SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1052	1052	01
1065	1058	02
1054	1057	03
1053	1056	04
1066	1058	05

26 POST SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1618	1618	01
1644	1631	02
1623	1629	03
1642	1632	04

26 POST TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
	1620	01
1650	1635	02
1626	1632	03
1651	1637	04

27 PRE TFR

GILIBRATOR 2 WET V4.4 DATE.....

FLOW	AVERAGE	# SAMPLES
1053	1053	01
1063	1058	02
1052	1056	03
1057	1056	04

27 Pre SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1048	1048	01
1076	1062	02
1055	1060	03
1547	1182	04

27 POST SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1620	1620	01
1625	1622	02
1621	1622	03
1624	1622	04

27 POST TFR June 5 ~ 6AM

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1620	1620	01
1620	1620	02
1640	1627	03
1633	1628	04

28 Pre TFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1053	1053	01
1054	1053	02
1058	1055	03
1100	1066	04

28 Pre SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1050	1050	01
1031	1041	02
1093	1058	03
1050	1056	04

28 Post SFR

GILIBRATOR 2 WET V4.4 DATE.....
PUMP S/N.....ID.....

FLOW	AVERAGE	# SAMPLES
1616	1616	01
1618	1617	02
1617	1617	03
1618	1617	04

28 Post TFR

End June 5 9:30AM

Appendix 3. Electronic copy of calculations

Air Discharge Permit 04-2566R2 - Appendix F
Emission Testing Requirements
Lumber Drying

1. Introduction:

The purpose of this testing is to quantify emissions from lumber drying operations, and demonstrate compliance with the requirements of this Permit and applicable air quality regulations.

2. Testing Requirements:

a. **Testing schedule.** Emission testing of the lumber drying process shall be conducted by the end of February, 2010. Subsequent emission testing shall be conducted on a 5 year cycle, no later than the end of February of the year in which testing is due.

b. **Test plan.** A comprehensive test plan shall be submitted to SWCAA for review and approval at least 10 business days prior to each test. SWCAA personnel shall be informed at least 5 business days prior to testing so that a representative may be present during testing.

c. **Test runs/Reference test methods.** A minimum of 2 samples of each wood species shall be tested for the constituent listed below to ensure the data are representative. Compliance shall be demonstrated by averaging the results of the individual sampling runs. The sampling methods identified below shall be used unless alternate methods are approved in writing by SWCAA in advance of the emission testing.

Constituent	Reference Test Method	Minimum Test Run Duration
Volatile organic compounds	EPA Method 25A	N/A

3. Source Operation:

a. **Source operations.** Source operations during the emission test must be representative of maximum achievable operating conditions.

b. **Record of production parameters.** Production related parameters and equipment operating conditions shall be recorded during emission testing to correlate operating conditions with emissions. Recorded parameters shall, at a minimum, include boiler fuel consumption, process startups and shutdowns, and plant adjustments. All recorded production parameters shall be documented in the test results report.

4. Reporting Requirements:

a. A final emission test report shall be prepared and submitted to SWCAA within 45 calendar days of test completion and, at a minimum, shall contain the following information:

(1) Description of the source including manufacturer, model number and design capacity of the equipment, and the location of the sample ports or test locations,
(2) Time and date of the test and identification and qualifications of the personnel involved,
(3) Summary of results, reported in units and averaging periods consistent with the application emissions standard or unit,
(4) Summary of control system or equipment operating conditions,
(5) Summary of production related parameters,
(6) A description of the test methods or procedures used including all field data, quality assurance/quality control procedures and documentation,
(7) A description of the analytical procedures used including all laboratory data, quality assurance/quality control procedures and documentation,
(8) Copies of field data and example calculations,
(9) Chain of custody information,
(10) Calibration documentation,
(11) Discussion of any abnormalities associated with the results, and
(12) A statement signed by the senior management official of the testing firm certifying the validity of the source test report.

b. VOC emissions shall be reported in pounds per thousand board feet as carbon (lbC/mbf).