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*RESULTS OF THE JUNE 28, 2017
AIR EMISSION COMPLIANCE TESTING
AT THE LOUISIANA PACIFIC SIDING
PLANT IN NEWBERRY, MICHIGAN*

Submitted to:

LOUISIANA-PACIFIC CORPORATION
7299 North C.R. 403
Newberry, Michigan 49868

Attention:

Matt Hieshetter

Reviewed by:



Kathleen Eickstadt
Coordinator
Source Testing

Report Number 17-36094 (RTO)
August 2, 2017
SF/sef

1 INTRODUCTION

On June 28, 2017 Interpoll Laboratories personnel conducted Air Emission compliance testing at the Louisiana Pacific Corporation (LP) OSB Plant located in Newberry, Michigan on the following source:

| <u>Source</u> | <u>Condition(s)</u> | <u>Parameters</u> |
|------------------|----------------------------|---|
| Dryer RTO Outlet | Flue Gas Recirculation Off | PM/PM10, NO _x , CO, VOC's, Opacity |

On-site testing was performed by Trent Johnson, Kevin Chesler and Joey Saba. Coordination between testing activities and plant operation was provided by Matt Hieshetter of Louisiana Pacific Corp. The tests were witnessed by David Patterson and Joseph Scanlon of the Michigan Department of Environmental Quality.

Particulate evaluations were performed in accordance with EPA Methods 1-5, CFR Title 40, Part 60, and Appendix A (revised July 1, 2016). A preliminary determination of the gas linear velocity profile was made at each test location before the first particulate determination to allow selection of the appropriate nozzle diameter for isokinetic sample withdrawal. An Interpoll Labs sampling train, which meets or exceeds specifications in the above-cited reference was used to isokinetically extract particulate samples by means of a heated glass-lined probe. Wet catch samples were collected in the back half of the Method 5 sampling train and analyzed in accordance with EPA Method 202.

Oxygen, carbon dioxide, oxides of nitrogen, carbon monoxide and total hydrocarbon concentrations were determined in accordance with Methods 3A, 7E, 10 and 25A (Ibid). A slipstream of sample gas was withdrawn from the exhaust gas stream using a heated stainless steel probe equipped with a filter to remove interfering particulate material. The particulate-free gas was transported to the analyzers by means of a heat-traced probe and filter assembly. After passing through the filter, the gas passed through a chilled condenser-type moisture removal system. The particulate-free dry gas was then transported to the analyzers with the excess exhausted to the atmosphere through a calibrated orifice, which was used to ensure that the flow from the stack exceeds the requirements of the analyzers.

Total gaseous hydrocarbon concentrations were determined instrumentally using a VIG Model 20/2 heated flame ionization detector (HFID) calibrated against propane in air standards. The THC concentration was continuously monitored by extracting a slipstream of exhaust gas by means of a heated probe and filter holder. A heat-traced Teflon line was used to transport the sample gas from the filter holder outlet to the analyzer inlet.

The analog response of each analyzer was recorded with a computer datalogger. The O₂, CO₂, NO_x, CO and VOC analyzers were calibrated with EPA Protocol 1 standard gases. The instrument was calibrated before and after each run.

Testing on the Dryer RTO Outlet was conducted from two test ports oriented at 90 degrees. These test ports are located approximately 5.7 diameters downstream and 6.6 diameters upstream of the nearest flow disturbances. A 20-point traverse was used to collect representative particulate samples. Each traverse point was sampled for 3 minutes to give a total sampling time of 60 minutes per run.

The results of the test are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the appendices.

2 SUMMARY AND DISCUSSION

The results of the compliance tests are summarized in the following tables. The particulate results have been calculated using the dry plus method 202 condensible wet catch. An overview of all results is presented in the table below:

DRYER RTO OUTLET (Without Flue Gas Re-Circulation)

| <u>PARAMETER</u> | <u>LIMIT</u> | <u>MEASURED</u> |
|--|--------------|-----------------|
| PM/PM-10 (Measured using EPA Methods 5/202) | | |
| <i>DRY + WET CATCH</i>(GR/DSCF) | 0.02 | 0.0015 |
|(LB/HR) | 7.9 | 0.558 |
| Oxides of Nitrogen | | |
| (ppm, d) | N/A | 12.57 |
|(LB/HR) | 14.8 | 3.82 |
| Carbon Monoxide | | |
| (ppm, d) | N/A | 49.98 |
|(LB/HR) | 23.98 | 9.07 |
| VOC's | | |
|(ppm C, w) | N/A | 18.87 |
|(LBC/HR) | 5.12 | 1.93 |
| Visible Emissions | | |
| (%) | N/A | 0.0 |

No difficulties were encountered in the field by Interpoll Labs or in the laboratory evaluation of the samples, which were conducted by Interpoll Labs. On the basis of these facts and a complete review of the data and results, it is our opinion that the results reported herein are accurate and closely reflect the actual values, which existed at the time the test was performed.

Test 1 Summary of the June 28, 2017 Particulate Emission Compliance Test on the RTO Stack (P002)
at the LP facility in Newberry, Michigan.

| Item | | Run 1 | Run 2 | Run 3 | Average |
|---|-----------|-------------|-------------|-------------|----------|
| Date of test | | 06-28-17 | 06-28-17 | 06-28-17 | |
| Time (Start/Finish) | (Hrs) | 0807 / 0909 | 0945 / 1047 | 1125 / 1227 | |
| Volumetric Flow | | | | | |
| Actual | (ACFM) | 75,308 | 77,453 | 76,199 | 76,320 |
| Standard | (SCFM) | 54,228 | 54,972 | 54,689 | 54,630 |
| Dry Standard | (DSCFM) | 42,119 | 42,654 | 42,640 | 42,471 |
| Gas Temperature | (°F) | 250 | 260 | 252 | 254 |
| Moisture Content | (%v/v) | 22.33 | 22.41 | 22.03 | 22.26 |
| Gas Composition (%v/v, dry) | | | | | |
| Carbon Dioxide | | 3.49 | 3.59 | 3.60 | 3.56 |
| Oxygen | | 17.46 | 17.33 | 17.26 | 17.35 |
| Nitrogen | | 79.04 | 79.08 | 79.14 | 79.09 |
| Sample Volume | (dscf) | 38.39 | 38.78 | 38.59 | 38.59 |
| Isokinetic Variation | (%) | 100.3 | 100.1 | 99.6 | 100.0 |
| Particulate Results-EPA Methods 5 & 202 (Dry Impinger Technique) | | | | | |
| <i>Dry Catch Only</i> | | | | | |
| Sample Mass (Nozzle, PW, Filter) | (g) | 0.0012 | 0.0011 | 0.0024 | |
| Concentration - Actual | (GR/ACF) | 0.00027 | 0.00024 | 0.00054 | 0.00035 |
| Concentration - Actual | (MG/ACM) | 0.618 | 0.551 | 1.229 | 0.79940 |
| Concentration - Standard | (GR/DSCF) | 0.00048 | 0.00044 | 0.00096 | 0.00063 |
| Emission Rate | (LB/HR) | 0.174 | 0.160 | 0.351 | 0.228 |
| <i>Organic CPM</i> | | | | | |
| Sample Mass | (g) | 0.0011 | 0.0009 | 0.0011 | |
| Concentration - Actual | (GR/ACF) | 0.00025 | 0.00020 | 0.00025 | 0.000230 |
| Concentration - Standard | (GR/DSCF) | 0.00044 | 0.00036 | 0.00044 | 0.000413 |
| Emission Rate | (LB/HR) | 0.160 | 0.131 | 0.161 | 0.151 |
| <i>Inorganic CPM</i> | | | | | |
| Sample Mass | (g) | 0.0013 | 0.0011 | 0.0013 | |
| Concentration - Actual | (GR/ACF) | 0.00029 | 0.00024 | 0.00029 | 0.000275 |
| Concentration - Standard | (GR/DSCF) | 0.00052 | 0.00044 | 0.00052 | 0.000493 |
| Emission Rate | (LB/HR) | 0.188 | 0.160 | 0.190 | 0.179 |
| <i>Total Particulate (Dry + Organic + Inorganic)</i> | | | | | |
| Sample Mass | (g) | 0.0036 | 0.0031 | 0.0048 | |
| Concentration - Actual | (GR/ACF) | 0.00081 | 0.00068 | 0.00107 | 0.000854 |
| Concentration - Standard | (GR/DSCF) | 0.00145 | 0.00123 | 0.00192 | 0.001533 |
| Emission Rate | (LB/HR) | 0.522 | 0.451 | 0.701 | 0.558 |

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Test 2 Summary of the Results of the June 28, 2017, Oxides of Nitrogen, Carbon Monoxide and VOC Emission Compliance Test on the Dryer System (P002) RTO at the Louisiana Pacific Facility Located in Newberry, Michigan.

| Item | Run 1 | Run 2 | Run 3 | Average |
|---|-------------|-------------|-------------|---------|
| Date of test | 06-28-17 | 06-28-17 | 06-28-17 | |
| Time runs were done (Hrs) | 0807 / 0907 | 0945 / 1045 | 1125 / 1225 | |
| Volumetric Flow | | | | |
| Actual (ACFM) | 75,308 | 77,453 | 76,199 | 76,320 |
| Standard (DSCFM) | 42,119 | 42,654 | 42,640 | 42,471 |
| Gas Temperature (°F) | 250 | 260 | 252 | 254 |
| Moisture Content (%v/v) | 22.33 | 22.41 | 22.03 | 22.26 |
| Gas Composition (%v/v, dry) | | | | |
| Carbon Dioxide | 3.49 | 3.59 | 3.60 | 3.56 |
| Oxygen | 17.46 | 17.33 | 17.26 | 17.35 |
| Nitrogen | 79.04 | 79.08 | 79.14 | 79.09 |
| Analytical Results | | | | |
| Nox (EPA Method 7E) | | | | |
| Concentration - ppm, dry (ppm, d) | 11.851 | 13.398 | 12.462 | 12.57 |
| Emission Rate (LB/HR) | 3.575 | 4.093 | 3.806 | 3.82 |
| CO (EPA Method 10) | | | | |
| Concentration - ppm, dry (ppm, d) | 46.703 | 45.505 | 54.718 | 48.98 |
| Emission Rate (LB/HR) | 8.579 | 8.466 | 10.176 | 9.07 |
| VOC Outlet (EPA Method 25a) | | | | |
| Concentration - ppm, wet (TGNM ppm, w as C) | 17.22 | 17.99 | 21.41 | 18.87 |
| Concentration - ppm, dry (TGNM ppm, d as C) | 22.17 | 23.18 | 27.47 | 24.27 |
| Emission Rate (TGNM LB/HR) | 1.74 | 1.85 | 2.19 | 1.93 |

RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition and moisture is presented first followed by the computer printout of the particulate, oxides of nitrogen, opacity, carbon monoxide, and total hydrocarbons results. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using programs written in using Microsoft Excel spreadsheets specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs. The emission rates have been calculated using the product of the concentration times flow method.

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Test Number 1
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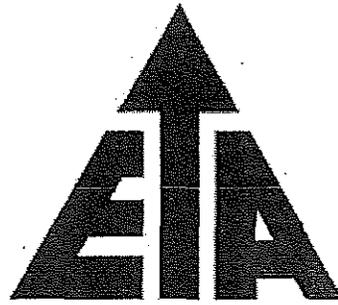
Results of Gas Composition and Moisture Analyses --- Methods 3A and 4 (% v/v)

| Date of Run | | Run 1 | Run 2 | Run 3 |
|---------------------------|-----------|----------|----------|----------|
| | | 06-28-17 | 06-28-17 | 06-28-17 |
| Dry basis | | | | |
| Carbon Dioxide..... | (%) | 3.49 | 3.59 | 3.60 |
| Oxygen..... | (%) | 17.46 | 17.33 | 17.26 |
| Nitrogen..... | (%) | 79.04 | 79.08 | 79.14 |
| Wet basis | | | | |
| Carbon Dioxide..... | (%) | 2.71 | 2.79 | 2.80 |
| Oxygen..... | (%) | 13.56 | 13.45 | 13.46 |
| Nitrogen..... | (%) | 61.39 | 61.36 | 61.71 |
| Water Vapor..... | | 22.33 | 22.41 | 22.03 |
| Dry Molecular Weight..... | (g/gmole) | 29.26 | 29.27 | 29.27 |
| Wet Molecular Weight..... | (g/gmole) | 26.74 | 26.74 | 26.78 |
| Specific Gravity..... | | 0.924 | 0.924 | 0.925 |
| Water Mass Flow..... | (lb/hr) | 33977 | 34547 | 33793 |
| Fo..... | | 0.984 | 0.994 | 1.012 |

Test Number 1
RTO

Results of EPA Method 5/202 Sampling Data

| | | Run 1 | Run 2 | Run 3 |
|----------------------------|-------------|-------------|-------------|-------------|
| Date of Test | | 06-28-17 | 06-28-17 | 06-28-17 |
| Time of Runs | (Hrs) | 0807 / 0909 | 0945 / 1047 | 1125 / 1227 |
| Static Pressure | (In. of WC) | -0.47 | -0.47 | -0.47 |
| Cross Sectional Area | (Sq. ft) | 22.17 | 22.17 | 22.17 |
| Pitot Tube Coefficient | | 0.84 | 0.84 | 0.84 |
| Water in Sample Gas | | | | |
| Impingers | (g) | 222.5 | 226.4 | 224.8 |
| Desiccant | (g) | 11.6 | 11.1 | 6.5 |
| Total | (g) | 234.1 | 237.5 | 231.3 |
| Gas Meter Coefficient | | 1.0027 | 1.0027 | 1.0027 |
| Barometric Pressure | (In. of Hg) | 29.00 | 29.00 | 29.00 |
| Avg. Orifice Pressure Drop | (In. of WC) | 1.42 | 1.46 | 1.44 |
| Avg. Gas Meter Temperature | (°F) | 79.8 | 83.2 | 83.9 |
| Volume Through Gas Meter | | | | |
| Meter Conditions | (CF) | 40.26 | 40.91 | 40.77 |
| Standard Conditions | (DSCF) | 38.39 | 38.78 | 38.59 |
| Total Sampling Time | (Min.) | 60.00 | 60.00 | 60.00 |
| Nozzle Diameter | (In.) | 0.248 | 0.248 | 0.248 |
| Avg. Stack Gas Temperature | (°F) | 250 | 260 | 252 |
| Volumetric Flow Rate | | | | |
| Actual | (ACFM) | 75,308 | 77,453 | 76,199 |
| Dry Standard | (DSCFM) | 42,119 | 42,654 | 42,640 |
| Isokinetic Variation | (%) | 100.3 | 100.1 | 99.6 |



VISIBLE EMISSIONS EVALUATOR

Kevin Chesler

This is to certify that the above named observer has met the specifications of Federal Reference Method 9 and is qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates, Inc. of Raleigh, N.C. This certificate is valid for six months from date of issue.

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Certificate #

CHE101544

Student ID Number

4/5/2017

Date of Certification

Minneapolis, MN

Location

10/5/2017

Certification Expiration Date

Non-ETA

Last Lecture

Marty Hughes

Director of Training