T. R. MILLER MILL COMPANY, INC.

215 DEER STREET
P.O. BOX 708
BREWTON, ALABAMA
36427

SINCE 1872

251-867-4331
IN STATE 800-672-1614
OUT OF STATE 800-633-6740
FAX 251-867-6882

January 9, 2020

CERTIFIED MAIL, RETURN RECEIPT REQUESTED-7019 0700 0000 4668 0389

Mr. Ronald W. Gore, Chief
Air Division
Alabama Department of Environmental Management
P. O. Box 301463
Montgomery, AL 36130-1463

RECEIVED
JAN 14 2020
ADEM AIR DIVISION

Re: T. R. Miller Mill Company, Inc.
Brewton, AL
Revised Application to Construct Continuous Direct-Fired Biomass Pole Kiln (TP-2) and Remove Natural Gas Pole Kiln (TP-1A)
Facility No. 502-S002

Dear Mr. Gore:

Please find enclosed two hard copies and one electronic copy of our revised application for an Air Permit to Construct a new pole kiln. The purpose of this modification is to replace our natural gas pole kiln, which was destroyed in a fire, with a direct-fired biomass continuous pole kiln very similar to our current pole kiln on-site, TP-1.

Based on feedback from your staff, we have rewritten the narrative to better explain the replacement project, revised all forms, updated the emissions calculations, and provided a new Ozone Analysis which includes the most recently available monitoring data from ADEM as well as a MERPs analysis for ozone.

Also, as instructed by ADEM, we have removed the netting calculations associated with the 2018 Lumber Division Project due to ADEM not considering these projects contemporaneous. This results in a large decrease of VOC emissions and small increases of other criteria pollutants. It does not change the PSD applicability of the project, which is still a major modification for VOC only.

This revised application replaces the application dated November 8, 2019 in its entirety, and our new requested construction start date is March 23, 2020, with an anticipated start-up date of mid-September.

Mr. David Brittain of my staff (251-867-4331) is available at any time to answer questions on this project or to assist your staff in whatever manner that can be helpful in processing this application.

Sincerely,

Richard K. Stanley
President and CEO

Enclosure

cc: H. M. Rollins Company, Inc.

File No. 010.020.032

T. R. MILLER MILL COMPANY, INC.
BREWTON, ALABAMA

Application for Modification of the Major Source Operating Permit

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Facility No. 502-S002

RECEIVED
JAN 14 2020
ADEM AIR DIVISION

Prepared By:
H. M. Rollins Company, Inc.
P. O. Box 3471
Gulfport, Mississippi 39505
(228) 832-1738

November 8, 2019
Revised January 7, 2020

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1.0 INTRODUCTION AND FACILITY LOCATION

T. R. Miller Mill Company, Inc. (T. R. Miller), operates a sawmill and wood treating plant at its site in Brewton, Alabama. T. R. Miller has been in operation since 1874, making it one of the oldest mills still in existence, and the mill is a historically significant employer in the City of Brewton. The facility maintains a Title V permit as a "major source" which covers the operations at both the sawmill, designated the Lumber Division, and the treating plant, designated the Pole Division.

2.0 BACKGROUND

The primary product of the Lumber Division is dimensional lumber. Raw timber is brought into the sawmill where it is debarked and rough sawn. The rough sawn lumber is then dried in one of four indirect steam-heated batch lumber dry kilns. The steam for the kilns is provided by two hybrid suspension grate wood-fired boilers on-site. After drying, the lumber is moved to the planer mill to smooth and finish the lumber to a uniform width and thickness.

The primary product of the Pole Division is treated utility poles. Raw timber is debarked and then dried in one of two pole dry kilns. One kiln is a biomass direct-fired continuous kiln, and the other is a natural gas-heated batch kiln. After drying, the poles are pressure treated with either CCA or Pentachlorophenol.

3.0 PROPOSED CHANGES AND PROJECT EMISSIONS

On July 19, 2019, a fire significantly damaged the natural gas pole kiln, TP-1A (Source 004) at the Pole Division of T. R. Miller Mill Company, Inc., in Brewton, Alabama.

Without the ability to repair the kiln due to the extensive damage, it was demolished and removed from the site. In order to maintain production levels, a new kiln must be built, and T. R. Miller has elected to install a direct-fired biomass continuous pole kiln very similar to the current kiln, TP-1.

This project includes removal of one kiln, TP-1A, and the replacement of that kiln with a new kiln designated TP-2. Because this is not a direct in-kind replacement, any potential emissions increases and decreases must be evaluated. This has been performed in the calculations in Exhibit 4 and follows the March 13, 2018 EPA Memorandum from Administrator Pruitt, "Project Emissions Accounting Under the New Source Review Preconstruction Permitting Program," much of which was proposed in the Federal Register in August 2019.

In Step 1, Project Accounting must be performed to determine any emissions changes associated with the project. During Step 1, the potential emissions increases of the new kiln, TP-2, and the past actual emissions of the replaced kiln, TP-1A, are calculated. The past actual emissions are subtracted from the future potential emissions to arrive at the emissions increase for each pollutant. These increases (or decreases) are compared to the PSD thresholds for Significant Emission Rates to determine if any pollutants experience a significant emissions increase. The results of this project accounting show that VOC, as WPP1, has a significant emissions increase of 81.59 TPY when compared to the SER of 40 TPY. Of note is that the SER is not in units of WPP1; however, if evaluating the VOC increase as Carbon, the results are approximately 64 TPY, which is still greater than the VOC SER.

In Step 2, it must be determined if any other creditable emissions changes at the facility have occurred in the past five years, known as the "contemporaneous period." T. R.

Miller initially proposed that an unrelated project that underwent PSD permitting in 2018 at the Lumber Division of T. R. Miller was contemporaneous; however, subsequent direction from ADEM indicated the projects should not be considered contemporaneous. Therefore, there are no applicable creditable emissions changes in Step 2. The only significant net emissions increase in Step 2 remains VOC, with a total potential emissions increase of 81.59 TPY (as WPP1) against the PSD SER of 40 TPY. This project is a major modification for VOC.

There is no debottlenecking associated with this project, and demand growth is not considered for the natural gas pole kiln, TP-1A, as it would not change the result of this project being a major modification for VOC.

4.0 BACT DETERMINATION

The Pole Division project to replace TP-1A with TP-2 is a significant net emissions increase for VOC. A BACT analysis for the continuous pole kiln, TP-2, from this project must be conducted.

A control device review for the proposed pole kiln TP-2 will be conducted for the pollutant volatile organic compounds (VOC), which is the only pollutant with a significant net emissions increase.

4.1 Control Device Review for the Continuous Pole Kiln

A Top-down BACT analysis was performed for the VOC emissions from the proposed pole kiln.

4.1.1 Process Description

The kiln to be constructed is a steel-frame, insulated, metal clad building that is approximately 221 feet long by 36 feet wide and approximately 28 feet tall. There are rails that run through the kiln on each side. There are two openings on each end of the kiln, approximately 12 feet wide by 15 feet high each, where the poles enter and exit. Multiple fans are located inside the kiln, and these fans circulate air within the kiln.

The poles are stacked on kiln trams and pushed into the kilns from both ends creating a counter flow. The direct heat exhaust from the biomass burner dries the poles as they move through the kiln.

4.1.2 Emissions from the Kiln

As calculated in Exhibit 4, the majority of the emissions from the kiln are volatile organic compounds (VOC), which are believed to be primarily alpha and beta pinenes. There is data which indicates that six hazardous air pollutants may be emitted from drying the wood, with the majority being methanol and formaldehyde (EPA PWCP MACT guidance document, "Development of a Provisional Emissions Calculation Tool for Inclusion in the Final PCWP ICR," Sept. 22, 2017). Additional emissions from the kiln due to biomass combustion are also expected but are not part of the BACT analysis because they did not experience significant net emissions increases.

4.1.3 Identification of VOC Control Technologies

Based on general process knowledge, technical literature, equipment vendor information, and the RACT/BACT/LAER Clearinghouse (RBLC) maintained by the U.S. EPA, six control options were identified. These options are:

- Incineration
- Adsorption
- Absorption
- Condensation
- Biological Treatment
- Proper Maintenance and Operation

Each option is discussed below:

- Incineration

This technology may be employed with several different approaches including direct incineration, regenerative thermal oxidation, or catalytic oxidation. These devices use the VOC laden air stream as a fuel source in addition to natural gas. High VOC content streams can see significant destruction efficiencies, as high as 99% depending on the exact characteristics of the incoming air stream and the oxidation technology used.

- Adsorption

Adsorption is another technology that could be used for the control of VOC air emissions. In the adsorption process, organics are collected on the surface of a porous solid such as activated carbon or synthetic resins. As a VOC laden air stream passes through the material, it is adsorbed into the activated carbon or synthetic resin. Over time the adsorbents must be replaced or regenerated when they become saturated with VOC. These systems may produce control efficiencies in the 90% range.

- Absorption

Absorption can be employed to capture VOC into a liquid substrate, most commonly water. This can be accomplished in what is typically referred to as a wet scrubber, and these devices can typically be found controlling emissions from boiler stacks, usually for PM.

- Condensation

Condensation is a simple vapor-liquid equilibrium process whereby the VOC vapors are cooled and converted into a liquid. This technology is difficult to employ on its own and may need a secondary control technology as well.

- Biological Treatment

Typically known as biofiltration, this technology uses micro-organisms to absorb and breakdown the incoming waste stream. This technology is more common in wastewater treatment.

- Proper Operation and Maintenance

This technology employs best operating practices, proper maintenance, and proper drying techniques based on the type of lumber and wood moisture content to effectively reduce VOC emissions. This method has been demonstrated successfully in many other PSD projects in the U.S. and Alabama for dry kilns, and is currently utilized at two existing lumber dry kilns at the T. R. Miller site.

4.1.4 Identification of Technically Infeasible Options

Evaluation of the feasibility of the identified technologies narrows the scope of potential BACT applications considerably.

Beyond the technical aspects of the suitability of the different BACT applications, it must first be determined how to capture the fugitive VOC stream such that it may be routed to a control device. Due to the nature of the kilns, which are open on both ends, creating only dispersed fugitive emissions, there is no known successful attempt to capture these fugitive releases. Irrespective of this issue, an individual analysis of each technology's suitability is below.

- Incineration

Incineration as a VOC control technology is generally done with a regenerative thermal oxidizer, RTO, or in a regenerative catalytic oxidizer, RCO. To achieve a destruction and removal efficiency of greater than 90% in an RTO, a temperature of approximately 1,500°F with a residence time of at least one second is required. With the kiln exit temperature being only 140°F and containing significant moisture, routing this air to a 1500°F RTO would create significant issues inside the device. Additionally, due to the resinous nature of the VOCs released from lumber drying, it would foul the duct work and media in the device over time. Thus, due to the resinous characteristics, the high moisture content, and very low exit temperature of the kiln exhaust, an RTO is infeasible.

In an RCO, the required temperature is typically reduced to 500°F - 800°F. While an RCO may be more suitable for this application since it operates at a much lower temperature, it is still four times higher than a typical kiln exhaust temperature. As in an RTO, the resinous nature of the VOCs released from lumber drying could foul the duct work and media in the device. The catalysts are very susceptible to fowling due to particulates or other air stream contaminants causing frequent catalyst changeouts or an additional control device upstream of the RCO. Due to the resinous nature of the VOCs, the high moisture content and low exit temperature, an RCO is infeasible.

- <u>Adsorption</u>

Using a media such as activated carbon to adsorb the VOC into the activated carbon substrate may be accomplished at a temperature suitable with the kiln exhaust; however, the high moisture content and resinous nature of the VOCs reduces the capacity and efficiency of the carbon causing "blinding" of the carbon and in turn reduced efficiencies and frequent changeouts of the material. For these reasons, this technology is infeasible.

- <u>Absorption</u>

Technology such as a wet scrubber is compatible with the kiln exhaust temperature; however, this technology requires an exhaust stream that is soluble in water but the VOC in the kiln exhaust is relatively insoluble in water. A different scrubbing absorbent could be considered, but these are typically classified as VOC which conflicts with the control purpose.

- <u>Condensation</u>

This technology can not achieve a typical EPA-required removal efficiency of 90% for pinenes, the dominant VOC in the exhaust stream, using standard condensers. A technical analysis shows that a condensing temperature of -35°F would be required, which makes this control technology infeasible, if not impossible due to the freezing of the water vapor in the system.

- Biological Treatment

These systems typically operate at 105°F or less causing incompatibility with the higher temperature VOC stream which would harm the micro-organisms. Additionally, the resinous VOC stream would have a tendency to fowl the biofilter. The cooling of the VOC stream would also create more process wastewater problems similar to the condensation approach.

Irrespective of the infeasibility of capturing the fugitive emissions or the infeasibility of current technologies, a further analysis of control technologies employed at other sites utilizing dry kilns, was performed using the U.S. EPA's RACT/BACT/LAER Clearinghouse (RBLC), and it yielded no facilities that have employed any form of add-on control device on any form of dry kiln. In these cases, the permittee and permitting authority agreed that no add-on controls were feasible and any technology listed was shown as some form of "proper operation and maintenance" or "best operating practices".

4.1.5 Selection of VOC BACT

T. R. Miller has identified six potential control technologies for the control of VOC emissions from lumber kilns. T. R. Miller believes that five of those technologies are technically infeasible, and proposes that the remaining technology, "proper operation and maintenance", be utilized as BACT for this project.

T. R. Miller will implement this BACT for VOC by following a maintenance and operation plan provided by the kiln manufacturer. This BACT is consistent with ADEM permitting actions for continuous drying kilns of similar or greater capacity at other sites in Alabama, including other T. R. Miller kilns, and is the only accepted BACT for kilns listed in the RBLC. It should be noted that the U.S. EPA is currently collecting information as part of the agency's review of the Plywood and Composite Wood Products (PCWP) National Emission Standards for Hazardous Air Pollutants (NESHAP). All dry kilns at major sources are subject to the PCWP MACT, and T. R. Miller has completed EPA's Information Collection Request, which was due from all affected facilities on February 9, 2018. It is expected that the EPA will eventually use this data to make a determination on what, if any, additional requirements may be necessary for dry kilns.

The following is an outline of "proper operation and maintenance" that T. R. Miller will use as its initial plan:

1. Operate kilns in accordance with manufacturer's recommendations.
2. Inspect kiln components on a weekly basis and provide repairs on a timely basis.
3. Ensure that kiln stickers are uniformly placed to the extent practical.

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (AIR DIVISION)

Do not Write in This Space

Facility Number ☐☐☐ - ☐☐☐☐

CONSTRUCTION/OPERATING PERMIT APPLICATION
FACILITY IDENTIFICATION FORM

1. Name of Facility, Firm, or Institution: T. R. Miller Mill Company, Inc.

Facility Physical Location Address

Street & Number: 215 Deer Street

City: Brewton County: Escambia Zip: 36426

Facility Mailing Address (If different from above)

Address or PO Box: P. O. Box 708

City: Brewton State: AL Zip: 36427

Owner's Business Mailing Address

2. Owner: T. R. Miller Mill Company, Inc.

Street & Number: P. O. Box 708 City: Brewton

State: AL Zip: 36427 Telephone: 251-867-4331

Responsible Official's Business Mailing Address

3. Responsible Official: Richard K. Stanley Title: President & CEO

Street & Number: P. O. Box 708

City: Brewton State: AL Zip: 36427

Telephone Number: 251-867-4331 E-mail Address: rks@trmillermill.com

Plant Contact Information

4. Plant Contact: David Brittain Title: Environmental & Safety Manager

Telephone Number: 251-867-4331 E-mail Address: dbrittain@trmillermill.com

5. Location Coordinates:

UTM 494580mE E-W 3442120mN N-S

Latitude/Longitude 31° 06' 21.82" N LAT 87° 03' 56.42" W LONG

6. Permit application is made for:

☐Existing source (initial application)

☐Modification

☒New source (to be constructed)

☐Change of ownership

☐Change of location

☐Other (specify) ____________________

☐Existing source (permit renewal)

If application is being made to construct or modify, please provide the name and address of installer or contractor

Pending contractor selection

Telephone ____________________

Date construction/modification to begin 3/23/20 to be completed 9/14/20

7. Permit application is being made to obtain the following type permit:

☒Air permit

☐Major source operating permit

☐Synthetic minor source operating permit

☐General permit

8. Indicate the number of each of the following forms attached and made a part of this application: (if a form does not apply to your operation indicate "N/A" in the space opposite the form). Multiple forms may be used as required.

N/A	ADEM 104 - INDIRECT HEATING EQUIPMENT
1	ADEM 105 - MANUFACTURING OR PROCESSING OPERATION
N/A	ADEM 106 - REFUSE HANDLING, DISPOSAL, AND INCINERATION
N/A	ADEM 107 - STATIONARY INTERNAL COMBUSTION ENGINES
N/A	ADEM 108 - LOADING, STORAGE & DISPENSING LIQUID & GASEOUS ORGANIC COMPOUNDS
N/A	ADEM 109 - VOLATILE ORGANIC COMPOUND SURFACE COATING EMISSION SOURCES
N/A	ADEM 110 - AIR POLLUTION CONTROL DEVICE
N/A	ADEM 112 - SOLVENT METAL CLEANING
N/A	ADEM 438 - CONTINUOUS EMISSION MONITORS
N/A	ADEM 437 - COMPLIANCE SCHEDULE

9. General nature of business: (describe and list appropriate standard industrial classification (SIC) and North American Industry Classification System (NAICS) (www.naics.com) code(s)):

2491 (321114) Wood Preserving

2421 (321113) Saw Mills and Planing Mills

2499 (321999) Wood Products NEC

10. For those making application for a synthetic minor or major source operating permit, please summarize each pollutant emitted and the emission rate for the pollutant. Indicate those pollutants for which the facility is major.

Regulated pollutant	Potential Emissions* (tons/year)	Major source? yes/no
TP-2 PROJECT: NET EMISSIONS INCREASES		
(see calculations for remaining pollutants)		
	Potential Net Increases	PSD Significant Increase?
VOC as WPP1	81.59	**PSD (40): Yes**
HAP - Formaldehyde	1.21	PSD: NA
HAP - Methanol	3.03	PSD: NA
HAP - Acetaldehyde	0.67	PSD: NA
HAP - Acrolein	0.07	PSD: NA
HAP - Phenol	0.17	PSD: NA
HAP - Propionaldehyde	0.07	PSD: NA
PM	2.63	PSD (25): No
PM-10	2.63	PSD (15): No
PM-2.5	1.31	PSD (10): No
CO	58.13	PSD (100): No
NOx	20.49	PSD (40): No
SO2	14.45	PSD (40): No
Lead	0.005	PSD (0.6): No
CO2e (biomass)	12,837	PSD (75,000): No
HAP – ALL (drying and combustion - see calcs)	7.42	PSD: NA

*Potential emissions are either the maximum allowed by the regulations or by permit, or, if there is no regulatory limit, it is the emissions that occur from continuous operation at maximum capacity.

11. For those applying for a major source operating permit, indicate the compliance status by program for each emission unit or source and the method used to determine compliance. Also cite the specific applicable requirement.

Emission unit or source: Wood-fired Continuous Drying Kiln TP-2
(description)

Emission Point No.	Pollutant[4]	Standard	Program[1]	Method used to determine compliance	Compliance Status	
					IN[2]	OUT[3]
TP-2	PM	E=3.59*P^0.62	SIP	Fuel Usage / Production Records / Eng. Calculations / Emissions Factors	X	
TP-2	"OPACITY"	20% / 40%	SIP	Visual Observations	X	
TP-2	SO_2	4 lb/MMBTU	SIP	Fuel Records / Eng.Calculations / AP-42 Emissions Factors	X	
TP-2	HAP	TBD	40 CFR PART 63 SUBPART DDDD	TBD	X	

[1] PSD, non-attainment NSR, NSPS, NESHAP (40 CFR Part 61), NESHAP (40 CFR Part 63), accidental release (112(r)),SIP regulation, Title IV, Enhanced Monitoring, Title VI, Other (specify)

[2] Attach compliance plan

[3] Attach compliance schedule (ADEM Form-437)

[4] Fugitive emissions must be included as separate entries

12. List all insignificant activities and the basis for listing them as such (i.e., less than the insignificant activity thresholds or on the list of insignificant activities). Attach any documentation needed, such as calculations. No unit subject to an NSPS, NESHAP or MACT standard can be listed as insignificant.

Insignificant Activity	Basis
Space heaters (<500,000 BTU/hr capacity)	Insignificant Activities List
Bark/chip/sawdust conveyors	Insignificant Activities List
Log debarkers	Insignificant Activities List
Wood/lumber chippers	Insignificant Activities List
Sizing saws	Insignificant Activities List
Diesel storage tank emissions	Based on true vapor pressure
Pentachlorophenol concentrate storage tank emissions	Based on true vapor pressure
Penta/Diesel treating solution work tank emissions	Based on true vapor pressure
CCA treatment process emissions	6/4/96 Federal Register p.28201
Green wood chip storage piles	Based on particle size and moisture content
Bark storage piles	Based on particle size and moisture content
Plant upkeep (painting, cleaning, floor finishing, etc.)	Insignificant Activities List
Clerical activites	Insignificant Actitivies List
Automotive fugitve dust	Insignificant Actitivies List
Mobile vehicle internal combustion engine	Insignificant Actitivies List
Greases	Insignificant Actitivies List
Welding	Insignificant Actitivies List

13. List and explain any exemptions from applicable requirements the facility is claiming:

a. None
b.
c.
d.
e.
f.
g.
h.
i.

14. List below other attachments that are a part of this application(all supporting engineering calculations must be appended):

a. ADEM Form 105
b. Engineering Calculations
c. USGS Map of Facility
d. Process Flow Diagram for TP-2
e. Supporting Data for Kiln Emissions
f. Ozone Impact Analysis
g.
h.
i.

I CERTIFY UNDER PENALTY OF LAW THAT, BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE STATEMENTS AND INFORMATION CONTAINED IN THIS APPLICATION ARE TRUE, ACCURATE AND COMPLETE.

I ALSO CERTIFY THAT THE SOURCE WILL CONTINUE TO COMPLY WITH APPLICABLE REQUIREMENTS FOR WHICH IT IS IN COMPLIANCE, AND THAT THE SOURCE WILL, IN A TIMELY MANNER, MEET ALL APPLICABLE REQUIREMENTS THAT WILL BECOME EFFECTIVE DURING THE PERMIT TERM AND SUBMIT A DETAILED SCHEDULE, IF NEEDED FOR MEETING THE REQUIREMENTS.

Richard K. Stanley	President & CEO	1-10-2020
SIGNATURE OF RESPONSIBLE OFFICIAL	TITLE	DATE

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐

Do not write in this space

1. **Name of firm or organization:** T. R. Miller Mill Company, Inc.

2. **Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.**

Operating scenario number 1

The unit is a continuous drying kiln designated as TP-2 which dries wood poles and piling utilizing the direct heat exhaust generated from a wood-fired burner. The kiln is approximately 221 feet in length with 125' center chamber and two 48' end chambers. The poles/piling are continuously fed through both ends of the kiln at an approximate rate of 4-6 ft per hour. This kiln is functionally equivalent to the current TP-1.

3. **Type of unit or process (e.g., calcining kiln, cupola furnace):**

Wood-fired Continuous Drying Kiln TP-2

Make:

Model: Slope grate green wood burner

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: 21,918

Manufactured date: 2020

Proposed installation date: 3/23/20

Original installation date (if existing):

Reconstruction or Modification date (if applicable):

4. **Normal operating schedule:**

Hours per day: 24

Days per week: 7

Weeks per year: 52

Peak production season (if any): N/A

5. **Materials (feed input) used in unit or process (include solid fuel materials used, if any):**

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Wood and Bark (fuel)	2,500 lbs/hr	4,000 lbs/hr	10,950 tons/year
Green Wood Poles and Piling (product)	3.2 MM ft^3/yr	21,918 lbs/hr	96,000 tons/year

6. **Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):** 27 **MMBtu/hr**

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas		Btu/ft³				
L. P. Gas		Btu/ft³				
Wood	4790	Btu/lb	0.05	3.0		
Other (specify)						

7. **Products of process or unit:**

Products	Quantity/year	Units of production
Dry wood poles and piling	3.2	MM ft^3

8. **For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):**

Proper operation and maintenance is required as BACT for VOC from the kiln. An O&M Plan for this kiln will need to be developed to comply with BACT. A VOC BACT limit of 93.05 TPY as WPP1 is selected based on the potential drying capacity of the kiln of 3.2 MM cubic feet per year and NCASI factors for lumber kilns (no data for pole kilns). This should result in conservatively high over estimation of VOC emissions since lumber is dried to a lower moisture content and has a higher surface to volume ratio.

9. Is there any emission control equipment on this emission source?

☐ Yes ☑ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack							
	UTM Coordinates		Height Above Grade (Feet)	Base Elevation (Feet)	Diameter (Feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (°F)
	E-W (km)	N-S (km)						
TP-2 (west door)	TBD	TBD	7.5' (fugitive) at 1/2 door height	85	2 - 12'x15' doors (fugitive)	<5	est 7000 DSCFM	~120
TP-2 (east door)	TBD	TBD	7.5' (fugitive) at 1/2 door height	85	2 - 12'x15' doors (fugitive)	<5	est 7000 DSCFM	~120

* Std temperature is 68°F - Std pressure is 29.92" in Hg.

11. **Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions must be included and calculations must be appended.**

Emission Point	Pollutants	Potential Emissions (lb/hr)	Potential Emissions (Tons/yr)	Potential Emissions Basis of Calculation	Regulatory Emission Limit (lb/hr)	Regulatory Emission Limit (units of standard)
TP-2 (sum of both ends)	PM	0.61	2.69	NCASI	9.9	.2gr/DSCF@50%EA
	PM-10	0.61	2.69	Conservatively assume PM-10 = to PM	N/A	N/A
	Sulfur dioxide	3.30	14.454	Max sulfur content in fuel	100	4.0 lb/MMBTU
	Nitrogen oxides	4.95	21.681	AP-42*1.5	N/A	N/A
	Carbon monoxide	13.50	59.130	AP-42*1.5	N/A	N/A
	VOC as C / VOC as WPP1	16.66 / 21.24	72.96 / 93.05	NCASI / WPP1	N/A	N/A
	Total HAP	1.83	8.03	EPA PCWP MACT ICR & AP-42*1.5	N/A	N/A
	See individual calcs for all					
	remaining pollutants					

12. **Using a flow diagram:**

(1) **Illustrate input of raw materials,**

(2) **Label production processes, process fuel combustion, process equipment and air pollution control equipment,**

(3) **Illustrate locations of air contaminant release so that emission points under item 10 can be identified.**

☑ **(Check box if extra pages are attached)**
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☑ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☐ Yes ☑ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐ Yes ☑ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: J. M. Rollins, P.E., H. M. Rollins Company, Inc.

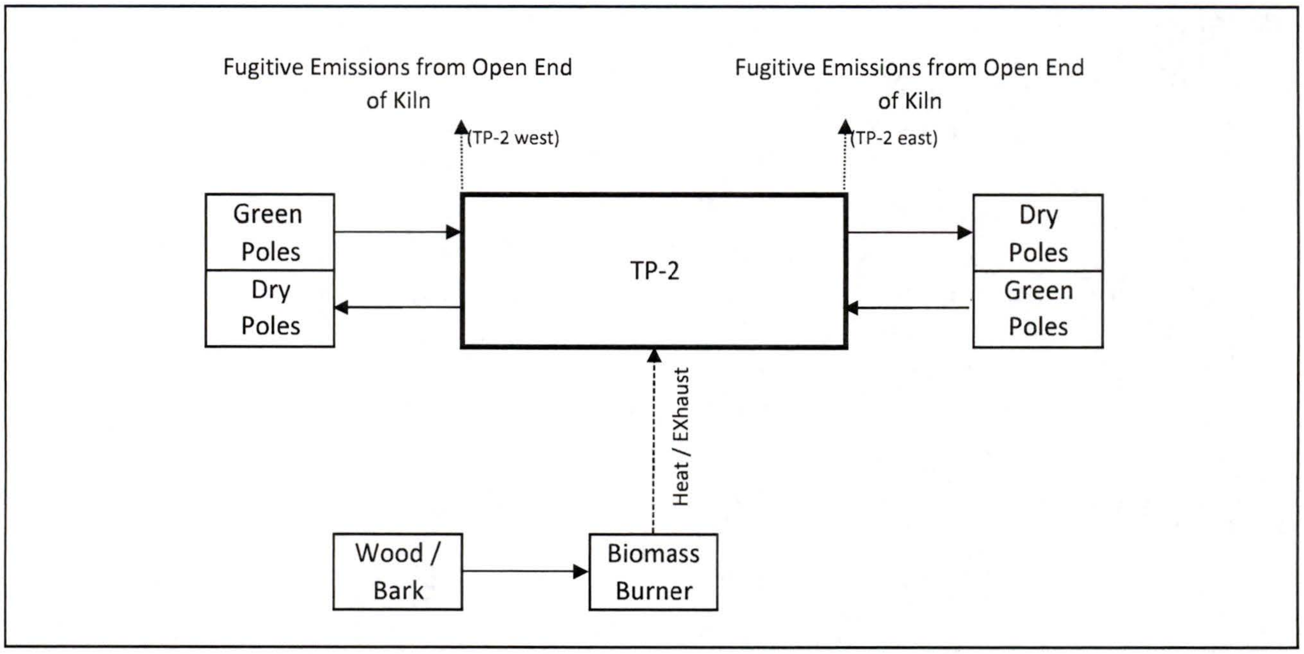
Signature: Date: 1/7/20

T. R. MILLER MILL COMPANY, INC.	U.S.G.S. TOPOGRAPHIC MAP	SCALE:	H.M. ROLLINS CO., INC.
BREWTON, ALABAMA	QUAD: BREWTON SOUTH	1" = 2450'	GULFPORT, MS

FILENAME: TRMiller_USGS_v6

10/8/2019

TP-2 - Process Flow Diagram



Company: T. R. Miller Mill Company, Inc.
Location: Brewton, Alabama

Summary of Emissions - Step 1: Project Emissions Accounting from TP-2 Project

	Pollutant (TPY) - **POTENTIAL** EMISSIONS (NEW SOURCE)														
New Sources	VOC (WPP1)	Formaldehyde (HAP)	Methanol (HAP)	Acetaldehyde (HAP)	Acrolein (HAP)	Phenol (HAP)	Propionaldehyde (HAP)	PM	PM-10	PM-2.5	CO	NOx	SO_2	Lead	CO2e
Pole Division Continuous Direct Fired Kiln 2 (TP-2)	93.05	1.25	3.46	0.77	0.08	0.19	0.08	2.69	2.69	1.34	59.13	21.68	14.45	0.005	13,770

	Pollutant (TPY) - **PAST ACTUAL** EMISSIONS (SHUT DOWN EXISTING SOURCE)														
Shut Down Sources	VOC (WPP1)	Formaldehyde (HAP)	Methanol (HAP)	Acetaldehyde (HAP)	Acrolein (HAP)	Phenol (HAP)	Propionaldehyde (HAP)	PM	PM-10	PM-2.5	CO	NOx	SO_2	Lead	CO2e
Pole Division Batch Natural Gas Kiln (TP-1A)	-11.46	-0.04	-0.43	-0.10	-0.01	-0.02	-0.01	-0.06	-0.06	-0.03	-1.00	-1.19	-0.01	0.000	-933

	Pollutant (TPY)														
TOTAL	VOC	Formaldehyde (HAP)	Methanol (HAP)	Acetaldehyde (HAP)	Acrolein (HAP)	Phenol (HAP)	Propionaldehyde (HAP)	PM	PM-10	PM-2.5	CO	NOx	SO_2	Lead	CO2e
TP-2 Project Potential Emissions	**81.59**	**1.21**	**3.03**	**0.67**	**0.07**	**0.17**	**0.07**	**2.63**	**2.63**	**1.31**	**58.13**	**20.49**	**14.45**	**0.005**	**12,837**
PSD SER	**40**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**25**	**15**	**10**	**100**	**40**	**40**	**0.6**	**75,000**
PSD Significant?	**YES**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Step 1 - Project Emissions Accounting shows that the project is a significant emissions increase for VOC.

Summary of Emissions - Step 2: Determination of Net Emissions Increases

As directed by ADEM, there are no creditable contemporaneous projects in the preceeding 5-year period.
Step 2 - Using the final emissions from Step 1, the TP-2 project is a significant net emissions increase for VOC and is therefore a major modification for VOC.

Company:	T. R. Miller Mill Company, Inc.
Location:	Brewton, Alabama
Source identification:	**Pole Division Direct Fired Kiln TP-1A (including natural gas burner)**
Potential operating hours:	8,760
Source:	004

Source permanently shut down and removed due to fire on 7/19/2019

Estimated Actual Air Emissions From Source

	2015	2016		Average			
Actual Kiln Production (Cu.Ft.)	281,197	515,157	=	398,177	=	4.78	MMBF/yr

Emissions from Drying Poles

Pollutant	Emission Factor		Emissions		EF Source
			lbs/hr	tons/yr	
VOC (as C)	3.8	lb/MBF	2.07	9.08	1
VOC (as Pinenes)	4.294	lb/MBF	2.34	10.26	
VOC (as WPP1)	4.797	lb/MBF	2.62	11.46	
Formaldehyde (HAP)	0.016	lb/MBF	0.009	0.04	2
Methanol (HAP)	0.18	lb/MBF	0.098	0.43	
Acetaldehyde (HAP)	0.04	lb/MBF	0.022	0.10	
Acrolein (HAP)	0.004	lb/MBF	0.002	0.01	
Phenol (HAP)	0.01	lb/MBF	0.005	0.02	
pionaldehyde (HAP)	0.004	lb/MBF	0.002	0.01	
TOTAL HAP ***(incl. gas combustion HAP)***	-	-	*0.14*	*0.61*	
PM	0.022	lb/MBF	0.01	0.05	3
PM-10	0.022	lb/MBF	0.01	0.05	
PM-2.5	0.011	lb/MBF	0.01	0.03	

Emission Factors Notes:

1. VOC: Factor from NCASI Technical Bulletin 845 = 3.8 lb/MBF "as C" for direct fired lumber kilns. Multiply by 1.13 to convert from "as C" to "pinene". To calculate WPP1 (Wood Products Protocol 1) use 3.8 lb/MBF "as C" * 1.225 to convert to "as propane" then add the VOC fractions for Formaldehyde and Methanol. Note the potential for double counting must now be addressed. The Method 25A response factor for Formaldehyde is 0, no other adjustment is needed. The Method 25A response factor for methanol is 65%, this portion of the added Methanol must be subtracted out to prevent double counting. Per the protocol, the Methanol must first be converted to "as propane". This becomes 0.18 *0.4588 * 0.65= 0.05368 methanol to subtract. Final formula result: 3.8 * 1.225 + 0.016 + 0.18 - 0.05368 = 4.797 lb/MBF VOC as WPP1.
2. Formaldehyde, Methanol, Acetaldehyde, Phenol, Propionaldehyde, Acrolein: Factor from EPA PWCP MACT Guidance Document: "Development of a Provisional Emissions Calculations Tool for Inclusion in the Final PCWP ICR", September 22, 2017. SCC 30700844 Direct Fired Lumber Kilns, Softwood Pine Species. NOTE: Formaldehyde factor is taken from steam heated kilns because the factor for direct fired kilns is associated with wood combustion which is not applicable for this kiln.
3. PM: Data based on NCDENR spreadsheet "Wood Kiln Emissions Calculator Revision C July 2007" factor of 0.022 lb/MBF for steam heated batch kilns drying southern yellow pine. Factors for direct wood-fired kilns would not be applicable to natural gas burning kilns. PM-10 will be assumed equal to PM, and PM-2.5 will be assumed equal to 50% of PM-10. See the enclosed document for more information.
4. Calculations of emissions from pole kilns (as opposed to lumber kilns) using these factors will over-estimate emissions because lumber is dried to a lower moisture content and has a higher surface area to volume ratio, however no other data is available so these factors are used with the understanding that the potentials are over-estimated.

Company:	T. R. Miller Mill Company, Inc.
Location:	Brewton, Alabama
Source identification:	**Pole Division Direct Fired Kiln TP-1A (incl. natural gas burner)**

Source permanently shut down and removed due to fire on 7/19/2019

Avg Operating Hours: 2,040

398,177 cu.ft. dried @ 40 scf gas burned/cu.ft. wood dried = 15.93 MMSCF burned

EMISSION FACTORS FROM AP-42, SECTION 1.4 * **1.5** except where noted		
PM/PM-10	0.78	lb/10^{6}scf
PM-2.5	0.645	lb/10^{6}scf
SO_2	0.9	lb/10^{6}scf
NO_x	150	lb/10^{6}scf
VOC	8.25	lb/10^{6}scf
CO	126	lb/10^{6}scf
PM-C	0.48	lb/10^{6}scf
Lead	0.00075	lb/10^{6}scf
Arsenic	3.0E-04	lb/10^{6}scf
Beryllium	1.8E-05	lb/10^{6}scf
Cadmium	1.7E-03	lb/10^{6}scf
Chromium	2.1E-03	lb/10^{6}scf
Nickle	3.2E-03	lb/10^{6}scf
enium	3.6E-05	lb/10^{6}scf

EMISSIONS FROM KILN NATURAL GAS BURNER				
PM/PM-10	0.006	lbs/hr	0.0062	tons/yr
PM-2.5	0.005	lbs/hr	0.0051	tons/yr
SO_2	0.007	lbs/hr	0.0072	tons/yr
NO_x	1.171	lbs/hr	1.1945	tons/yr
VOC	0.064	lbs/hr	0.0657	tons/yr
CO	0.984	lbs/hr	1.0034	tons/yr
PM-C	0.004	lbs/hr	0.0038	tons/yr
Lead	0.000	lbs/hr	0.0000	tons/yr
Arsenic	0.000	lbs/hr	0.0000	tons/yr
Beryllium	0.000	lbs/hr	0.0000	tons/yr
Cadmium	0.000	lbs/hr	0.0000	tons/yr
Chromium	0.000	lbs/hr	0.0000	tons/yr
Nickle	0.000	lbs/hr	0.0000	tons/yr
Selenium	0.000	lbs/hr	0.0000	tons/yr

1. Since AP-42 factors are averages, these emission factors were increased by 50% to more conservatively estimate emissions.
2. Natural Gas combustion factors for PM, PM-10, PM-2.5, and PM-C taken from US EPA spreadsheet "Final table with natural gas adjustment factors Nov 21 2006" and supporting document by Roy Huntley, U.S. EPA. PM/PM-10: 0.52 ; PM-2/5: 0.43 ; PM-C: 0.32. These values are multiplied by 1.5 like the AP-42 values to provide a more conservative estimate.

Emission Factors and Global Warming Potentials (GWP) from 40 CFR 98 (Tables A-1, C-1 and C-2)

Pollutant	Emission Factor, kg/MMBtu	Emission Factor, lb/MMBtu	GWP	CO2e Emission Factor lb/MMBTU	CO2e Emission TPY
	Natural Gas	Natural Gas		Natural Gas	
CO2	53.06	116.997	1	116.997	932
CH4	0.0010	0.0022	25	0.055	0.4
N2O	0.0001	0.00022	298	0.066	0.5
		15.93 MMSCF burned =	15927.08	MMBTU of heat	**933**

Company:	T. R. Miller Mill Company, Inc.
Location:	Brewton, Alabama
Source identification:	**Pole Division Direct Fired Kiln TP-1A (incl. natural gas burner)**

Source permanently shut down and removed due to fire on 7/19/2019

Summary of Actual Emissions

Pollutant	Emissions		Source
	lbs/hr	tons/yr	
VOC (as C)	2.14	9.14	D & C
VOC (as Pinenes)	2.34	10.26	Drying
VOC (as WPP1)	2.62	11.46	Drying
Formaldehyde (HAP)	*0.009*	*0.04*	*Drying*
Methanol (HAP)	*0.098*	*0.43*	*Drying*
Acetaldehyde (HAP)	*0.022*	*0.10*	*Drying*
Acrolein (HAP)	*0.002*	*0.01*	*Drying*
Phenol (HAP)	*0.005*	*0.02*	*Drying*
Propionaldehyde (HAP)	*0.002*	*0.01*	*Drying*
Arsenic (HAP)	*0.000*	*0.00*	*Combustion*
Beryllium (HAP)	*0.000*	*0.00*	*Combustion*
Cadmium (HAP)	*0.000*	*0.00*	*Combustion*
Chromium (HAP)	*0.000*	*0.00*	*Combustion*
Nickle (HAP)	*0.000*	*0.00*	*Combustion*
Selenium (HAP)	*0.000*	*0.00*	*Combustion*
TOTAL HAP	0.14	0.61	-
PM	0.02	0.06	D & C
PM-10	0.02	0.06	D & C
PM-2.5	0.01	0.03	D & C
SO_2	0.01	0.01	Combustion
NO_x	1.17	1.19	Combustion
CO	0.98	1.00	Combustion
PM-C	0.00	0.00	Combustion
Lead	0.00	0.00	Combustion
CO2e		933	Combustion

Company:	T. R. Miller Mill Company, Inc.
Location:	Brewton, Alabama
Source identification:	**Pole Division Continuous Drying Kiln TP-2** **(incl. direct fired burner)**
Potential operating hours:	8,760
Source:	New

Potential Emissions from Drying Poles

Maximum Potential Kiln Production 3,200,000 Cubic Feet = 38.40 MMBF/yr

Emissions from Drying Poles

Pollutant	Emission Factor		Potential Emissions		EF Source
			lbs/hr	tons/yr	
VOC (as C)	3.8	lb/MBF	16.66	72.96	1
VOC (as Pinenes)	4.294	lb/MBF	18.82	82.44	
VOC (as WPP1)	4.846	lb/MBF	21.24	93.05	
Formaldehyde (HAP)	0.065	lb/MBF	0.28	1.25	2
Methanol (HAP)	0.18	lb/MBF	0.79	3.46	
Acetaldehyde (HAP)	0.04	lb/MBF	0.18	0.77	
Acrolein (HAP)	0.004	lb/MBF	0.02	0.08	
Phenol (HAP)	0.01	lb/MBF	0.04	0.19	
pionaldehyde (HAP)	0.004	lb/MBF	0.02	0.08	
TOTAL HAP *(incl. wood combustion HAP)*	-	-	*1.83*	*8.03*	
PM	0.14	lb/MBF	0.61	2.69	3
PM-10	0.14	lb/MBF	0.61	2.69	
PM-2.5	0.07	lb/MBF	0.31	1.34	

93.05 TPY
58.12 lb/MCF
21.24 lb/hr

App A Em Calc
& Draft Perm
17.52
15.76

Emission Factors Notes:

1. VOC: Factor from NCASI Technical Bulletin 845 = 3.8 lb/MBF "as C" for direct fired lumber kilns (no specific data for continuous kilns was found). Multiply by 1.13 to convert from "as C" to "pinene". To calculate WPP1 (Wood Products Protocol 1) use 3.8 lb/MBF "as C" * 1.225 to convert to "as propane" then add the VOC fractions for Formaldehyde and Methanol. Note the potential for double counting must now be addressed. The Method 25A response factor for Formaldehyde is 0, no other adjustment is needed. The Method 25A response factor for methanol is 65%, this portion of the added Methanol must be subtracted out to prevent double counting. Per the protocol, the Methanol must first be converted to "as propane". This becomes 0.18 *0.4588 * 0.65= 0.05368 methanol to subtract. Final formula result: 3.8 * 1.225 + 0.065 + 0.18 - 0.05368 = 4.846 lb/MBF VOC as WPP1.

2. Formaldehyde, Methanol, Acetaldehyde, Phenol, Propionaldehyde, Acrolein: Factor from EPA PWCP MACT Guidance Document: "Development of a Provisional Emissions Calculations Tool for Inclusion in the Final PCWP ICR", September 22, 2017. SCC 30700844 Direct Fired Lumber Kilns, Softwood Pine Species.

3. PM: Data based on NCDENR spreadsheet "Wood Kiln Emissions Calculator Revision C July 2007" factor of 0.14 lb/MBF for direct wood-fired batch kilns (gasifier) drying southern yellow pine. PM-10 will be assumed equal to PM, and PM-2.5 will be assumed equal to 50% of PM-10. See the enclosed document for more information.

4. Calculations of emissions from pole kilns (as opposed to lumber kilns) using these factors will over-estimate emissions because lumber is dried to a lower moisture content and has a higher surface area to volume ratio, however no other data is available so these factors are used with the understanding that the potentials are over-estimated.

Company:	T. R. Miller Mill Company, Inc.
Location:	Brewton, Alabama
Source identification:	**Pole Division Continuous Drying Kiln TP-2 (incl. direct fired burner)**

Potential Emissions from Combusting Wood in Direct Fired Burner

Manufacturer firing capability, MMBtu/hr:	27
Max Potential firing rate, MMBtu/hr (note 1):	15

Potential Emission Factors, pounds per MM Btu of heat input (particulates in lbs/hr)

Criteria Pollutants			**Source of Emission Factors**	**Potential Emissions** Hourly emission rates, **pounds per hour**	**Potential Emissions** Annual emission rates, **tons per year**
Particulate Matter (PM) (filterable)		0.0	Calculated on drying page	0.000	0.000
Particulate Matter <10 microns (PM-10) (filterable)		0.0	Calculated on drying page	0.000	0.000
Particulate Matter <2.5 microns (PM-2.5) (filterable)		0.00	Calculated on drying page	0.000	0.000
Particulate Matter - Condensable		2.55E-02	(AP-42 S 1.6, 9/03= 0.017) * 1.5	0.383	1.675
Nitrogen Oxides (NOx)		0.33	(AP-42 S 1.6, 9/03=0.22) * 1.5	4.950	21.681
Sulfur Dioxide (SO_2)		0.22	Max fuel content	3.300	14.454
Carbon Monoxide (CO)		0.9	(AP-42 S 1.6, 9/03) * 1.5	13.500	59.130
VOC		0.00E+00	Calculated on drying page	0.000	0.000
Lead		7.20E-05	(AP-42 S 1.6, 9/03=4.8e-5) * 1.5	0.001	0.005
Hazardous Air Pollutants (HAP)					
Acrolein	(VOC)	0.00E+00	Calculated on drying page	0.000	0.000
Benzene	(VOC)	6.30E-03	(AP-42 S 1.6, 9/03) * 1.5	0.095	0.414
Formaldehyde	(VOC)	0.00E+00	Calculated on drying page	0.000	0.000
Hydrogen Chloride		2.20E-02	estimate using BMACT limit	0.330	1.445
Styrene	(VOC)	2.85E-03	(AP-42 S 1.6, 9/03) * 1.5	0.043	0.187
Mercury		5.70E-06	estimate using BMACT limit	0.000	0.000
Arsenic		3.30E-05	(AP-42 S 1.6, 9/03) * 1.5	0.000	0.002
Beryllium		1.65E-06	(AP-42 S 1.6, 9/03) * 1.5	0.000	0.000
Cadmium		6.15E-06	(AP-42 S 1.6, 9/03) * 1.5	0.000	0.000
Chromium, total		3.15E-05	(AP-42 S 1.6, 9/03) * 1.5	0.000	0.002
Manganese		2.40E-03	(AP-42 S 1.6, 9/03) * 1.5	0.036	0.158
Nickel		4.95E-05	(AP-42 S 1.6, 9/03) * 1.5	0.001	0.003
Selenium		4.20E-06	(AP-42 S 1.6, 9/03) * 1.5	0.000	0.000

Notes:

1. Emissions testing of a very similar kiln on site [TP-1] has shown: CY 2006 - 10.33 MMBtu/hr, CY 2011 - 8.32 MMBtu/hr, CY 2016 - 9.12 MMBtu/hr. The firing rate must remain relatively constant in order to properly dry the wood - if the firing rate is increased the temperature in the kiln will be too high and will damage the wood. The firing rate will increase some as the ambient temperature drops during the winter months so 15 MMBtu/hr will be used as a conservative maximum firing rate for the dry kiln. This is conservatively high based on the TP-1 test results and this is the same value used to estimate TP-1 emissions.
2. Since AP-42 factors are averages, these emission factors were increased by 50% to more conservatively estimate maximum potential.
3. PM emissions calculated on the drying page.
4. No AP-42 data exists on direct fired burners, so the AP-42 factors for boilers were used.
5. Mercury & HCL estimated based on the Boiler MACT limit for hybrid suspension grate boilers that is used for SB-1 and SB-2 (and TP-1).
6. Total VOC, Total HAP, HAP Acrolein, and HAP Formaldehyde are calculated on the drying page.

Emission Factors and Global Warming Potentials (GWP) from 40 CFR 98 (Tables A-1, C-1 and C-2)

Pollutant	Emission Factor, kg/MMBtu	Emission Factor, lb/MMBtu	GWP	CO2e Emission Factor lb/MMBTU	CO2e Emission TPY
	Wood Residual Fuels	Wood Residual Fuels		Wood Residual Fuels	
CO2	93.8	206.829	1	206.829	13,589
CH4	0.0072	0.016	25	0.397	26
N2O	0.0036	0.008	298	2.366	155
					13,770

Interim VOC Measurement Protocol for the Wood Products Industry – July 2007

1.0 Background and Introduction

On July 12, 2006, Mr. William Wehrum, EPA Acting Assistant Administrator, sent a letter to Mr. Timothy G. Hunt, Senior Director, Air Quality Programs, at the American Forest and Paper Association outlining a path forward for the complex issue of measuring and reporting volatile organic compounds (VOCs) in the forest products industry. In this letter, EPA discussed their desire for the forest products industry to report VOCs as the total mass of the individual organic compounds comprising the VOCs to determine major source applicability of federal programs such as NSR and Title V. EPA recognized, however, that the existing test methods fall short of this goal, and that "*...it is impracticable to identify and quantify every compound...*" EPA recognized that it will take some time to develop practical methods to accurately characterize VOC mass in forest products industry emissions. Therefore, EPA endorsed the use of interim VOC measurement approaches to estimate the total mass of VOC emissions while more appropriate methods and additional information are being developed. EPA stated that a "*...reasonable approximation (of total mass) will be sufficient for assessing the applicability of several regulatory programs.*" VOC measurements for existing SIP, NESHAPS, and NSPS requirements and permit limits should continue to use the specified methods.

This interim protocol establishes calculation procedures and emission measurement methods to approximate VOC emissions for determining applicability with federal programs (particularly for NSR and Title V) and to establish consistency across state programs for the forest products industry. For purposes of this protocol, "reasonable approximation" of total VOC mass means expressing VOC as propane and requiring individual measurements of methanol and formaldehyde at sources for which these compounds are significant, as listed in Appendix 1. Historically, the forest products industry has reported its VOC emissions in terms of the mass of carbon atoms in the VOC compounds because the analytical methods measured the VOCs in those terms. For many facilities, therefore, this interim protocol will substantially increase the reported total mass of VOCs to be used in applicability determinations.

2.0 Interim Protocol Overview

In general, VOC is to be calculated as Total Hydrocarbons (THC) expressed as propane plus methanol and formaldehyde expressed as compound, minus adjustments. In specific cases THC may be expressed as alpha-pinene and measurement of formaldehyde and methanol may be omitted. Further details are provided in subsequent sections of this protocol.

In an effort to reduce confusion, VOC as measured and calculated by this protocol is referred to as "WPP1 VOC" (Wood Products Protocol 1 VOC). It is suggested that the industry and sampling companies use this terminology to identify VOC measured by this protocol as differentiated from VOC measured by other protocols.

3.0 THC Measurement

EPA Method 25A shall be used for THC measurement with the following specifications or modifications:

- The THC portion of the VOCs shall be expressed as propane.
- For some facilities, in states where it is the current practice, it may be appropriate to report the THC portion of the VOCs as terpenes (as alpha-pinene) rather than propane.
- The reporting basis for VOC should be clearly identified.

4.0 Methanol and Formaldehyde Measurement

Methanol and formaldehyde may be measured by any of the approved methods listed in the Plywood and Composite Panel MACT (40 CFR 63 Subpart DDDD).

- Appendix 1 provides a list of sources for which formaldehyde and methanol testing must be conducted concurrently with VOC testing. For sources not listed, formaldehyde and methanol testing are not required and WPP1 VOC is the THC as propane measurement minus adjustments for non-VOCs.
- Separate measurement methods may be used for formaldehyde and methanol.

5.0 Response Factors

For the purposes of this document, response factor is defined as the Flame Ionization Analyzer (FIA) response divided by the actual compound concentration, both expressed on the same basis, and expressed as a percentage. For example, an EPA Protocol 1 methane gas with a tag value of 300 ppmvd is measured by a FIA as 315 ppmvd expressed as carbon (315 ppmvd expressed as methane or 105 ppmvd as expressed as propane). The response factor is 315/300 = 105%.

This protocol provides the following default response factors:

- Formaldehyde RF = 0%
- Methanol RF = 65%
- Alkanes, alkenes, and arenes RF = 100% (includes methane and ethane)
- Acetone RF = 65%

If desired, instrument specific response factors can be developed and used. Response factors must be developed according to procedures provided in Appendix 3.

Some compounds, such as methane, can have response factors exceeding 100%. For sources for which methane emissions are a significant fraction of the FIA measurement, the testing company may determine a response factor for methane. Similarly, if methanol represents a relatively large fraction of WPP1 VOC, response factor determination may be prudent.

6.0 Treatment of Values Below Detection Limits (Non-Detects)

This section applies to individual compounds required for measurement by this protocol (e.g., methanol) as well as compounds that may be measured as an option. Emissions of these individual compounds may be treated as zero if all of the test runs result in a non-detect measurement and the detection limit is less than or equal to one part per million by volume. Otherwise, non-detect sample runs should be treated as one-half of the detection limit. Compounds measured at concentrations between the detection limit and the practical limit of quantitation should be flagged, but used in calculations as a fully detected value.

7.0 WPP1 VOC Adjustments

This protocol allows users to make adjustments for methanol and non-VOC compounds measured by the FIA. Adjustments are discussed in the following sub-sections. Equations and examples are provided in later sections.

7.1 Adjustments for Methanol

The flame ionization analyzer (FIA) used to measure THC partially measures methanol, resulting in partial "double counting" since methanol is also measured individually according to this protocol. To avoid double-counting, a percentage of the methanol measured independently is subtracted from the THC measurement. The percentage subtracted is either 65% (based on the default response factor provided in Section 5) or a percentage based on an instrument specific response factor. Methanol must be converted to the same basis as THC before subtraction, as shown in Equation 1. This approximately corrects double-counting. The 65% response factor (or instrument specific response factor) represents the amount of methanol measured by the FIA divided by the amount present in the gas stream (both on a carbon basis or common basis).

7.2 Exempt VOCs or non-VOCs

This protocol does not require separate or individual measurement of exempt VOCs or non-VOCs but allows measurement and adjustment for non-VOCs, if desired. Any listed non-VOC compound may be measured independently and the value subtracted from the THC measurement, with appropriate adjustments (proper basis and response factor). An equation and example calculations are provided in later sections of this protocol. Methane, ethane, and acetone are the non-VOCs most commonly sampled in the wood products industry. Methane emissions can sometimes be significant from natural gas fired sources such as direct-natural-gas-fired dryers and RTOs. Typically, acetone and ethane emissions are relatively small, but may vary by source. EPA provides a list of non-VOCs in 40 CFR 51.100(s).

8.0 Calculation of Total VOC Emissions

Total VOC emissions may be calculated by using Equation 1 or by using the "VOC Worksheet." A spreadsheet for conducting the calculations is also available at www.ncasi.org.

WPP1 VOC emissions are calculated by subtracting (b) from (a) where (a) equals the sum of THC expressed as propane, methanol expressed as methanol (if applicable), and formaldehyde expressed as formaldehyde (if applicable) and (b) equals the sum of methanol and all measured non-VOC compounds, all expressed as propane with each compound multiplied by the appropriate response factor. Units for the calculations should be mass basis (lb/hr or other mass emission rate unit such as lb/ODT or grams/second). Concentration units (e.g., ppm) cannot be used. If, according to Section 3, VOCs are expressed as terpenes, then the term "alpha-pinene" may be substituted for "propane" in Equation 1.

Equation 1

$$\mathrm{VOC} = \left[\begin{array}{l} \begin{pmatrix} \text{Method 25A VOC} \\ \textit{expressed as propane} \end{pmatrix} \\ \\ +\begin{pmatrix} \text{Methanol} \\ \textit{expressed as methanol} \end{pmatrix} \\ \\ +\begin{pmatrix} \text{Formaldehyde} \\ \textit{expressed as formaldehyde} \end{pmatrix} \end{array} \right] - \begin{pmatrix} \sum_{i=1}^{n} (\mathrm{RF}_i \text{ x } \mathrm{Compound}_i) \\ \textit{expressed as propane} \end{pmatrix}$$

Where: RF_i = response factor of $_i$th compound (expressed as a decimal)

$\mathrm{Compound}_i$ includes methanol and any individually measured, listed, non-VOC compound but does not include formaldehyde.

Units for all expressions are lb/hr or other mass emission rate unit. Units cannot be concentration units.

Methanol and formaldehyde measurements are required only for sources listed in Appendix 1.

Appendix 1

Dryers
Presses
Board Coolers
Blenders
Formers
Pressurized refiners
Fiber washers

(Includes control devices for the above listed process units. For example, a RTO controlling a dryer would be a listed source.)

Appendix 2

VOC Worksheet

	Run 1	Run 2	Run 3
Measurements – VOC, formaldehyde, and methanol			
lb/hr VOC expressed as propane	1a ________	1a ________	1a ________
lb/hr Formaldehyde expressed as formaldehyde	2b ________	2b ________	2b ________
lb/hr Methanol expressed as methanol	3c ________	3c ________	3c ________
(1a + 2b + 3c) lb/hr	4_______	4_______	4_______
Adjustments - methane, ethane, and methanol			
Methanol expressed as methanol, lb/hr	5a ________	5a ________	5a ________
(5a x 0.458 x RF) lb/hr	6_______	6_______	6_______
Methane expressed as methane, lb/hr	7a ________	7a ________	7a ________
(7a x 0.917 x RF) lb/hr	8_______	8_______	8_______
Ethane expressed as ethane, lb/hr	9a ________	9a ________	9a ________
(9a x 0.976 x RF) lb/hr	10______	10______	10______
Non-VOC compounds other than methane and ethane			
Response factor for non-VOC Compound 1	11a ________	11a ________	11a ________
Molecular weight of non-VOC Compound 1	12b ________	12b ________	12b ________
Number of carbon atoms in non-VOC Compound 1	13c ________	13c ________	13c ________
Mass ER non-VOC Compound 1	14d ________	14d ________	14d ________
[(14d x 13c x 11a x 14.667) ÷ (12b)] =	15______	15______	15______
Response factor for non-VOC Compound 2	16a ________	16a ________	16a ________
Molecular weight of non-VOC Compound 2	17b ________	17b ________	17b ________
Number of carbon atoms in non-VOC Compound 2	18c ________	18c ________	18c ________
Mass ER non-VOC Compound 2	19d ________	19d ________	19d ________
[(19d x 18c x 16a x 14.667) ÷ (17b)] =	20______	20______	20______
Final Calculations			
Enter value from line 4	21______	21______	21______
Enter sum of lines 6, 8, 10, 15 and 20	22______	22______	22______
Subtract line 22 from line 21	23______	23______	23______

Sample Calculation
This example follows the VOC worksheet but provides equations and additional detail. Calculations are provided and discussed, corresponding with the line number on the VOC Worksheet.

Example - A sampling company provides the following results from concurrent sampling at a wood products source:

Compound	**Value**	**Units**
VOC as propane (from FIA)	50	lb/hr
Methanol as methanol	10	lb/hr
Formaldehyde as formaldehyde	5	lb/hr
Methane as methane	2	lb/hr
Ethane as ethane	2	lb/hr
Acetone as acetone	2	lb/hr

Acetone, methane, and ethane are listed non-VOCs. The sampling company does not conduct response factor work but uses the default response factors provided in Section 5. Calculate the WPP1 VOC value for this example problem?

Line 4 – This is simply a sum of the mass emission rates of formaldehyde, methanol, and VOCs. 50 lb/hr VOCs as propane + 10 lb/hr methanol as methanol + 5 lb/hr formaldehyde as formaldehyde = 65 lb/hr.

Line 6 – In order for the methanol to be subtracted from the FIA THC measurement, methanol must first be converted to a propane basis. This can be done by using Equation 2 as shown below:

Equation 2

$$\text{Mass}_{\text{VOC expressed as X}} = \text{Mass}_{\text{VOC expressed as Y}} \text{ x} \left(\frac{\text{molecular weight of X}}{\text{molecular weight of Y}}\right) \text{x} \left(\frac{\begin{array}{c}\text{number of carbon atoms}\\ \text{in compound Y}\end{array}}{\begin{array}{c}\text{number of carbon atoms}\\ \text{in compound X}\end{array}}\right)$$

For this example converting 10 lb/hr of methanol, measured as methanol, to a mass rate of methanol expressed as propane yields 4.89 lb/hr of methanol expressed as propane as shown below.

$$\text{methanol}_{\text{expressed as propane}} = 10 \text{ lb/hr methanol}_{\text{expressed as methanol}} \text{ x} \left(\frac{44}{32}\right) \text{x} \left(\frac{1}{3}\right)$$

$$= 4.89 \text{ lb/hr methanol}_{\text{expressed as propane}}$$

This value requires a second adjustment since less than 100% of the methanol responds in a FIA. The response factor set by this protocol is 65%.

0.65 x 4.89 = 2.98 lb/hr methanol expressed as propane

Line 8 – Methane must be converted to a propane basis prior to adjustment. Equation 2 may be used as shown below. A response factor adjustment is not needed for methane.

$$\text{methane}_{\text{expressed as propane}} = 2\ \text{lb/hr methane}_{\text{expressed as methane}}\ \text{x}\left(\frac{44}{16}\right)\text{x}\left(\frac{1}{3}\right)$$

$$= 1.83\ \text{lb/hr methane}_{\text{expressed as propane}}$$

Line 10 – Ethane must be converted to a propane basis prior to adjustment. Equation 2 may be used as shown below. A response factor adjustment is not needed for ethane.

$$\text{ethane}_{\text{expressed as propane}} = 2\ \text{lb/hr ethane}_{\text{expressed as ethane}}\ \text{x}\left(\frac{44}{30}\right)\text{x}\left(\frac{2}{3}\right)$$

$$= 1.95\ \text{lb/hr ethane}_{\text{expressed as propane}}$$

Lines 15 and 20 - For this example, two non-VOC compounds were included – acetone and methyl acetate. The example assumes the sampling company developed response factors of 65% for both compounds. Equation 2 is used, followed by a response factor correction, as shown below.

Line 15 -

$$\text{acetone}_{\text{expressed as propane}} = 2\ \text{lb/hr acetone}_{\text{expressed as acetone}}\ \text{x}\left(\frac{44}{58.1}\right)\text{x}\left(\frac{3}{3}\right)$$

$$= 1.52\ \text{lb/hr acetone}_{\text{expressed as propane}}$$

This value requires a second adjustment since the example response factor for acetone is 65%.

0.65 x 1.52 = 0.98 lb/hr acetone expressed as propane

Line 20 – Not required for this example problem.

Line 21 – This is the sum of VOCs as propane, formaldehyde, and methanol and is copied from Line 4. For this example the value is 65 lb/hr.

Line 22 – The sum of lines 6, 8,10, 15 and 20 is the sum of the adjustments. 2.98 + 1.83 + 1.95 + 0.98 = 7.75 lb/hr of VOCs that may be adjusted or subtracted from the total from Line 4.

Line 23 – The adjustments are subtracted from Line 21 to provide the adjusted Total VOC value. 65 – 7.75 = **57.3 lb/hr of VOCs.**

Example VOC Worksheet

	Run 1	Run 2	Run 3
Measurements – VOC, formaldehyde, and methanol			
lb/hr VOC expressed as propane	1a 50	1a	1a
lb/hr Formaldehyde expressed as formaldehyde	2b 5	2b	2b
lb/hr Methanol expressed as methanol	3c 10	3c	3c
(1a + 2b + 3c) lb/hr	4 65	4	4
Adjustments - methane, ethane, and methanol			
Methanol expressed as methanol, lb/hr	5a 10	5a	5a
(5a x .458 x 0.65) lb/hr	6 2.98	6	6
Methane expressed as methane, lb/hr	7a 2	7a	7a
(7a x 0.917 x 1.0) lb/hr	8 1.83	8	8
Ethane expressed as ethane, lb/hr	9a 2	9a	9a
(9a x 0.976 x 1.0) lb/hr	10 1.95	10	10
Non-VOC compounds other than methane and ethane			
Response factor for non-VOC Compound 1	11a 65%	11a	11a
Molecular weight of non-VOC Compound 1	12b 58.1	12b	12b
Number of carbon atoms in non-VOC Compound 1	13c 3	13c	13c
Mass ER non-VOC Compound 1	14d 2	14d	14d
[(14d x 13c x 11a x 14.667) ÷ (12b)] =	15 0.98	15	15
Response factor for non-VOC Compound 2	16a	16a	16a
Molecular weight of non-VOC Compound 2	17b	17b	17b
Number of carbon atoms in non-VOC Compound 2	18c	18c	18c
Mass ER non-VOC Compound 2	19d	19d	19d
[(19d x 18c x 16a x 14.667) ÷ (17b)] =	20	20	20
Final Calculations			
Enter value from line 4	21 65	21	21
Enter sum of lines 6, 8, 10, 15 and 20	22 7.75	22	22
Subtract line 22 from line 21	23 57.3	23	23

Appendix 3

Procedure for Response Factor Determination for the Interim VOC Measurement Protocol for the Wood Products Industry

Introduction and Definitions -

The Interim VOC Measurement Protocol for the Wood Products Industry (referred to herein as the Protocol) provides the following default response factors (RFs):

- Formaldehyde RF = 0%
- Methanol RF = 65%
- Alkanes, alkenes, and arenes RF = 100% (includes methane and ethane)
- Acetone RF = 65%

These default response factors may be used in Protocol calculations or, if desired, response factors can be determined for methane, ethane, methanol, and acetone by following the measurement procedures established in this Appendix. EPA Protocol 1 gases with air as a diluent must be used for response factor determination for methane and ethane. If methanol and acetone EPA Protocol 1 gases can be obtained with air as a diluent, they may also be used. Otherwise, methanol and acetone standard gases must be prepared in Tedlar or Teflon sampling bags using air as a diluent. Flame ionization analyzers (FIAs) used to determine response factors must be calibrated with propane in an air diluent. If response factors are determined, then the WPP1 VOC testing must be conducted with the same Flame Ionization Analyzer (FIA) calibrated with the same type hydrocarbon gas used during response factor determination and the gas must be in an air diluent. (If response factors are determined, VOC calibration gases with nitrogen diluents cannot be used either during RF determination or during testing.)

Procedures for preparing challenge gases and determining response factors, other than those provided in this Appendix (e.g. permeation tubes or syringe pumps), may be used if approved by the administrator or regulatory authority.

For the purposes of this document:

Response factor is defined as the flame ionization analyzer (FIA) response divided by the "actual compound concentration", both expressed on the same basis, and expressed as a percentage. Examples are provided near the end of this Appendix.

Actual compound concentration is defined as the tag or bottle value of the EPA Protocol 1 gas or as the concentration of gas in a Tedlar or Teflon sampling bag. The concentration in the bag is determined by dividing the mass of compound by the volume of total dry gas in the bag and using appropriate conversion factors. Examples are provided near the end of this Appendix.

Challenge gas is defined as the gas used to determine a response factor. Challenge gases must be purchased or prepared as specified in this Appendix.

Determining Response Factors Using EPA Protocol 1 Gases – Prior to introduction of the Protocol 1 challenge gas, the VOC analyzer (Flame Ionization Analyzer or FIA) must be successfully calibrated according to EPA Method 25A procedures with EPA Protocol 1 gases in an air diluent. Once calibrated, the instrument may be challenged with the challenge gas to determine the response factor of the compound in the gas. The challenge-compound concentration should be near the mid range of the FIA span and may not be less than 30% of span or more than 70% of span. For example, a 150 ppmvd methane gas (expressed as methane or as carbon and equivalent to 50 ppmvd expressed as propane) would be an appropriate challenge gas for use on an instrument calibrated with propane with a 0 to 100 ppmvd span (expressed as propane).

The EPA Protocol 1 challenge gas must be introduced to the analyzer in the same manner as the calibration gases were introduced. The gas must be introduced until the response stabilizes and remains stable for at least a five-minute period. One-minute averages or less must be recorded during the five-minute period. Any single one-minute average within the five-minute period must not differ from the overall five-minute-average by more than 10%. The five-minute average concentration of the challenge gas is used to determine the response factor as defined in the Introduction and Definitions section of this document. Documentation of challenge gas introduction and measurement as well as the FIA calibration must be included in the VOC test report.

Determining Response Factors Using Standard Gases Prepared in Tedlar or Teflon Sampling Bags – Methanol and acetone standard gases may be prepared in Tedlar or Teflon sampling bags using the procedures specified in EPA Method 18. Three or more separate bag samples must be prepared. Air must be used as the diluent gas. The mass of methanol or acetone and the volume of gas in the bag must be measured and recorded in the VOC report. Measurements of the compound mass and gas volume must be made by devices traceable to a primary standard and the sampling company must describe how the volume of gas and the mass of compound was measured or determined. The means of introducing the compound into the bag must also be described in the test report.

If the compound is introduced as an aqueous solution the amount of water introduced may not exceed water vapor saturation in the air at 50°F (a moisture content of about 1.2%). The testing company must report the concentration of compound in the water, the amount of solution introduced into the bag, measures taken to assure that all water was converted into water vapor within the bag, the amount of dry air in the bag, and the moisture content of the final gas in the bag. (Because the bag will contain water vapor, the FIA reading will be on a wet basis. The actual compound concentration should also be calculated on a wet basis or both values should be converted to a dry basis before calculation of the response factor. See "Actual Compound Concentration – Example 2" below.)

Prior to introduction of the Teflon or Tedlar bag challenge gas, the VOC analyzer (Flame Ionization Analyzer or FIA) must be successfully calibrated according to EPA Method 25A procedures with EPA Protocol 1 gases in an air diluent. Propane in nitrogen gases cannot be used. Once calibrated, the instrument may be challenged with the bag challenge gas to determine the response factor of the compound in the gas. The challenge-compound concentration should be near the mid range of the FIA span and may not be less than 30% of span or more than 70% of span (measured on an equivalent basis). For example, a 230 ppmvd methanol gas would be appropriate for use on an instrument calibrated with propane with a 0 to 100 ppmvd span (expressed as propane). (The example assumes a 65% response factor for methanol.)

The Tedlar or Teflon sampling bag challenge gas must be introduced to the analyzer in the same manner as the calibration gases. The gas must be introduced until the response stabilizes. Three or more separate bag samples must be introduced. A single bag sample may not be introduced three times. The results from the three or more samples must be averaged and the average used to determine the response factor as defined in the Introduction and Definitions section of this Appendix. The results from any one of the bag samples may not vary from the average by more than 10%. Documentation must be provided to show that the FIA reading stabilized on each of the three bag samples. Additionally, the VOC test report must contain a discussion of the means by which bag challenge gases and FIA calibration gases were introduced to the FIA. Evidence of a successful FIA calibration must also be provided.

Applicability – The response factors developed via the above described procedures may be used in conjunction with the Interim VOC Measurement Protocol for the Wood Products Industry only for the instrument on which the response factors were determined. The response factors determined via these procedures are not valid for the instrument if (1) adjustments have been made that would affect the fuel or air flow rates to the instrument, (2) the instrument has undergone repair, or (3) adjustments to the instrument other than those required for calibrations have been made. Further, the determined response factors may only be used within 30 days of the date on which they were determined. Response factors may be, but are not required to be, determined in the field during the testing event. Response factors determined in the laboratory may be determined under better controlled conditions but response factors determined in the field may be determined under conditions more representative of the testing.

Response factors determined via these procedures are not applicable to FIAs calibrated with nitrogen diluent gases.

Example Calculations Intended to Illustrate the Definitions of "Response Factor" and "Actual Compound Concentration"

Actual Compound Concentration – Example 1

Fifteen milligrams of methanol is introduced into a Tedlar bag containing 45.0 liters of dry air (corrected to 68°F and one atmosphere). The 15 mg of methanol occupies 0.01 liters at standard conditions. The total Tedlar bag volume is 45.01 liters. The actual compound concentration is

$$\left(\frac{15\text{ mg methanol}}{45.0113\text{ liters}}\right)\text{x}\left(\frac{24.05\text{ liters}}{\text{gram - mole}}\right)\text{x}\left(\frac{\text{gram - mole}}{32.04\text{ grams methanol}}\right)\text{x}\left(\frac{\text{gram}}{1000\text{ mg}}\right)=0.00025=250\text{ ppmvd methanol}$$

Actual Compound Concentration – Example 2

Four milliliters of a 5,000 mg/L solution of methanol in water is introduced into a Tedlar bag containing 50 liters of dry air (corrected to 68°F and one atmosphere). The water and 20 mg of methanol introduced occupy 0.53 and 0.015 liters, respectively. The total Tedlar bag volume is 50.55 liters. The moisture content of the bag is 1.05%. The actual compound concentration is

$$\left(\frac{20\text{ mg methanol}}{50.545\text{ liters}}\right)\text{x}\left(\frac{24.05\text{ liters}}{\text{gram - mole}}\right)\text{x}\left(\frac{\text{gram - mole}}{32.04\text{ grams methanol}}\right)\text{x}\left(\frac{\text{gram}}{1000\text{ mg}}\right)=297\text{ ppmvw methanol}$$

Note that the methanol concentration is expressed on a wet basis.

Response Factor – Example 3

A FIA calibrated with propane in air measures an EPA Protocol 1 methane in air cylinder gas with a tag value of 150 ppmvd, as methane. The FIA measures the gas as 57 ppmvd, expressed as propane, or 171 ppmvd expressed as methane. The response factor is the measured concentration divided by the actual compound concentration or 171/150 = 114%.

Response Factor – Example 4

A FIA calibrated with propane in air measures the Tedlar bag in Example 2 above. The actual compound concentration is 297 ppmvw, expressed as methanol or expressed as carbon. The FIA measures the bag gas as 59 ppmvw, expressed as propane, or 177 ppmvw expressed as carbon. The response factor is the measured compound concentration divided by the actual compound concentration or 177/297 = 59.6%.

PCWP	SCC	SCC Level Four	ICR Process Unit Type	Related AP-42 EF to use in absense of more represetnative data	EF source	EF units	Acetaldehyde	Acrolein	Formaldehyde	Methanol	Phenol	Propion aldehyde
plywood	30700784	Press: Non-Urea Formaldehyde Resin: Hardwood	Hardwood plywood press		No EF for SCC							
plywood	30700785	Press: Urea Formaldehyde Resin: Hardwood	Hardwood plywood press	Hardwood Plywood, press, UF resin	AP-42, Ch 10.5	lb/MSF 3/8			0.0047	0.032	0.011	
plywood	30700791	Hammermill/Chipper: Dry Wood Material	Panel trim chipper	SPW dry trim chipper (chips dry trim from SPW panel saws; process rate = finished board production)	AP-42, Ch 10.5	lb/MSF 3/8				0.0078		
plywood	30700794	Miscellaneous Coating Operations	Miscellaneous coating operation		No EF for SCC							
plywood	30700799	Other Not Classified	Other		No EF for SCC							
lumber	30700841	Lumber Kiln: Indirect-heated: Softwood: Pine Species	Lumber kiln		NCASI 2014	lb/MBF	0.04	0.004	0.016	0.18	0.01	0.004
lumber	30700842	Lumber Kiln: Indirect-heated: Softwood: Non-Pine Species	Lumber kiln		NCASI 2014	lb/MBF	0.04	0.004	0.016	0.18	0.01	0.004
lumber	30700843	Lumber Kiln: Indirect-heated: Hardwood	Lumber kiln		NCASI 2014	lb/MBF	0.04	0.004	0.016	0.18	0.01	0.004
lumber	30700844	Lumber Kiln: Direct-fired: Softwood: Pine Species	Lumber kiln		NCASI 2014	lb/MBF	0.04	0.004	0.065	0.18	0.01	0.004
lumber	30700845	Lumber Kiln: Direct-fired: Softwood: Non-Pine Species	Lumber kiln		NCASI 2014	lb/MBF	0.04	0.004	0.065	0.18	0.01	0.004
lumber	30700846	Lumber Kiln: Direct-fired: Hardwood	Lumber kiln		NCASI 2014	lb/MBF	0.04	0.004	0.065	0.18	0.01	0.004
MDF	30700909	Pressurized Refiner/Primary Tube Dryer: Direct Natural Gas-fired: Blowline Blend: Non-Urea Formaldehyde Resin:	Primary tube dryer	MDF, tube, direct wood-fired, blowline blend, UF, softwood	AP-42, Ch 10.6.3	lb/ODT			0.86			
MDF	30700910	Pressurized Refiner/Primary Tube Dryer: Direct Natural Gas-fired: Blowline Blend: Non-Urea Formaldehyde Resin:	Primary tube dryer	MDF, tube, direct wood-fired, blowline blend, UF, softwood	AP-42, Ch 10.6.3	lb/ODT.			0.86			
MDF	30700911	Pressurized Refiner/Primary Tube Dryer: Direct Natural Gas-fired: Blowline Blend: Non-Urea Formaldehyde Resin: Mixed	Primary tube dryer	MDF, tube, direct wood-fired, blowline blend, UF, softwood	AP-42, Ch 10.6.3	lb/ODT			0.86			
MDF	30700912	Pressurized Refiner/Primary Tube Dryer: Direct Natural Gas-fired: Blowline Blend: Urea Formaldehyde Resin:	Primary tube dryer	MDF, tube, direct wood-fired, blowline blend, UF, softwood	AP-42, Ch 10.6.3	lb/ODT			0.86			

NCDENR - WOOD KILN EMISSIONS CALCULATOR REVISION C -2007

Revised, references
Southern Yellow Pine Emission Factors
MBF is 1000 board feet

	emission factor, pounds per MBF		
	Steam heated	Suspension burner	Gasifier
PM	0.022 (1)	0.40 (2)	0.14 (3)
PM$_{10}$	~	~	~
VOC			
as carbon	3.61 (4)	3.83 (5)	3.83 (5)
as VOC (pinene)	4.09	4.34	4.34
Methanol	0.199 (6)	0.161 (7)	0.161 (7)
Phenol	0.01(8)	0.01 (8)	0.01 (8)
Formaldehyde	0.0183 (9)	0.103 (10)	0.103 (10)
Acetaldehyde (11)	0.052	0.052	0.052
Acrolein (12)	0.0075	0.0075	0.0075

	emission factor, pounds per MBF-hour		
	Steam heated	Suspension burner	Gasifier
Acetaldehyde	0.00377 (13)	0.00377	0.00377
Acrolein	0.00051 (14)	0.00051	0.00051
formaldehyde	0.0014 (15)	0.01185 (16)	0.01185 (16)

For TAPs, the emissions on an hourly basis are given by (Charge in 1000 board feet)* (emission factor) Example: 140,000 BF kiln charge = (140)*(0.00140) = 0.196 lb formaldehyde per hour

Note: for hourly emissions of phenol, use emission factor in lb/MBF.

Note: The full scale direct fired kiln has a blend box that mixes hot air from the sawdust combustion with cooler recycled air from the kiln. Although the small scale kilns reported data under "direct fire" this only means that the temperature profiles of the kilns matched that of a full scale kiln. There was no intermingling of hot combustion gases with cooler recycle air from the small kilns since these kilns are electricaly heated.

REFERENCES

(1)

PRODUCT	FIRING TYPE	MILLS/ UNITS/ RUNS	RATIO OF NON-DETECTS	RANGE	MEDIAN	MEAN	UNITS
Southern Pine Lumber	Steam Heated	3/3/16	0/16 nd	2.0E-03 to 1.7E-01	9.3E-03	2.2E-02	lb/MBF
Southern Pine Lumber	Direct Fired	6/7/24	0/24 nd	2.3E-02 to 1.3E+00	3.2E-01	3.7E-01	lb/MBF

(2) personal Communication, D Word, NCASI, May 31, 2005
Kiln 1K181

Suspension Burner	Run	M 5 lb/MBF	Production	Cycle time, hrs
1K181	1	0.4170	133	20.3
1K181	2	0.3480	133	20.3
1K181	1	0.4800	131	20
1K181	2	0.4100	131	20
1K181	3	0.3600	131	20
		0.40	131.80	20.12

(3) personal Communication, D Word, NCASI, May 31, 2005
Kiln 098 DF

Gasifier	Run	M 5 lb/MBF	Production	Cycle time, hrs
1K098	1	0.2670	130	26.45
1K098	2	0.2010	130	26.45
1K098	3	0.2260	130	26.45
2K098	1	0.1520	128	17.52
2K098	2	0.1810	128	17.52
2K098	3	0.0980	128	17.52
2K098	1	0.0640	104.5	17.25
2K098	2	0.0548	104.5	17.25
2K098	3	0.0466	104.5	17.25
		0.143	120.83	20.41

(4) NCASI Technical Bulletin 845 Table 8.2 Steam heated average of all kilns

(5) NCASI Technical Bulletin 845 Table 8.1 Direct fired (gasifier) full scale kiln only

(6) NCASI Technical Bulletin 845 Table 9.6 Steam heated all kilns

(7) NCASI Technical Bulletin 845 Table 9.4 Direct fired (gasifier) full scale kiln

(8) Table 2A to Appendix B Emission factors for Plywood and Composite Wood Product MACT (Subpart DDDD)

(9) NCASI Technical Bulletin 845 Table 9.5 steam heated full scale kiln and OSU small scale runs. MSU not used. See spreadsheet tab for statistical test

(10) NCASI Technical Bulletin 845 Table 9.3 Direct fired full scale kiln only

(11) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 and BB7 OSU INDF3

(12) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 and BB7 OSU INDF3

(13) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 run # 10 and BB7 OSU INDF3 Run # 2

(14) NCASI Technical Bulletin 845 Appendix BB6 FSK INDF3 run # 10 and BB7 OSU INDF3 Run # 2

(15) NCASI Technical Bulletin 845 Appendix Y7 FSK INDF1 run # 9, BB6 FSK INDF3 run # 10, App Y9 OSU INDF1 run # 4, BB7 OSU INDF3 run # 5

(16) NCASI Technical Bulletin 845 Appendix Y1 FSK DF2 run # 6, Y2 FSK DF5 run # 6

T. R. MILLER MILL CO., INC.
BREWTON, ALABAMA

Ozone Impact Analysis

Prepared By:
H. M. Rollins Company, Inc.
P. O. Box 3471
Gulfport, Mississippi 39505
(228) 832-1738

January 7, 2020

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LIST OF APPENDICES

This project of replacing a natural gas pole kiln with a continuous direct-fired biomass pole kiln at the Pole Division is a major modification for VOC due to a significant net emissions increase of VOC of 81.59 TPY (as WPP1). In Alabama, about 90% of all VOC emissions are from fires or biogenics. Only about 5% of VOC emissions are from industrial processes; therefore, potential changes in these processes have less of an influence on theoretical ozone air quality. This analysis of the potential emissions increase of VOC on the ambient air quality is based on the EPA's April 30, 2019 Memo, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program," the closest representative ozone monitor to the City of Brewton, and the data from EPA's National Emissions Inventory.

There is no ozone monitor in Escambia County; however, ADEM provided data in lieu of pre/post construction modeling. This monitor is located in Dothan, Alabama, and the data from that monitor is shown below. The AQS Design Value Report is also included in Appendix A.

The fourth highest 8-hour ozone concentration for each year is as follows:

2017	**2018**	**2019**	**Average**
55 ppb	61 ppb	57 ppb	58 ppb

It should be noted that the 2019 data from the ozone monitor currently only utilizes the first three quarters, as the fourth quarter will not be finalized until May 1, 2020. Since the peak ozone concentrations are expected during the ozone season of May 1 - September 30, the ozone data presented for 2019 would be expected to be biased high since the months of October through December, when ozone emissions are lower, are not yet included.

The latest Ozone Standard set by EPA in 2015 is 70 ppb, and the ADEM-selected representative monitor 3-year average is approximately 58 ppb, which is significantly below the standard. Considering that as much as 90% of this value could be attributed to natural sources, the data does not suggest that the potential emissions VOC increase for this project could have any discernable impact on the ambient ozone concentrations.

The data from the National Emission's Inventory of 2014, the most recent comprehensive data found, shows that the total VOC emissions in Escambia County were approximately 41,835 tons. The maximum net potential VOC increase from the project is 81.59 tons as WPP1, or 0.2% of the total VOC emissions from the county in 2014. This is a negligible increase and shows this project would have no detrimental impact to Escambia County maintaining an attainment status for ozone. Additionally, this is a very conservative approach because the WPP1 method estimates much higher VOC emissions for the project increases, but the Escambia County data is not in units of WPP1.

IMPACT ANALYSIS OF VISIBILITY, SOILS, AND VEGETATION

The project at T. R. Miller is located on already industrialized portions of the site. No construction is proposed in unutilized areas of the site, and no adverse impact would be expected to soils or vegetation. Visibility will not be impaired as a result of the modifications as shown by the VOC analysis.

IMPACT ANALYSES OF COMMERCIAL, RESIDENTIAL, AND INDUSTRIAL GROWTH

As an already established industry in Brewton for many decades, there are no significant growth impacts associated with this project. As with any construction project, there will be small localized commercial activity associated with the construction, but no long-term changes to the City's commercial, residential, or industrial activities is expected.

SOURCES IMPACTING FEDERAL CLASS I AREAS

This project is not within 100 km of any Class I Area. The two closest areas are the Sipsey Wilderness Area, over 300 km from the site, and the St. Mark's Wilderness Area, approximately 300 km from the site.

Escambia County is an attainment county for the 8-hour ozone standard, and according to the EPA Green Book, all counties in Alabama are attainment for the 8-hour ozone standard (2008). Additionally, 40 CFR Part 81, Subpart C, Section 107, shows all Alabama counties as attainment for the 2015 8-hour ozone standard.

MODELED EMISSION RATES FOR PRECURSORS (MERPs)

As an additional step in the air quality impact analysis, T. R. Miller was directed by ADEM to review EPA's April 30, 2019 Memo, "Guidance on the Development of Modeled Emission Rates for Precursors as a Tier 1 Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program." In that memo, EPA modeled hypothetical sources to determine source level maximum predicted downwind impacts on 8-hr ozone. The memo does not create EPA policy, regulation or action, but the EPA has recommended its use as one compliance demonstration tool to satisfy air quality modeling.

The EPA Memo outlines a three step process for application of the MERPs to individual permit applications.

Step 1: Identify a representative hypothetical source.

Using the data on the EPA SCRAM website, the three closest locations to Brewton, Alabama, were evaluated. These three locations are in Smith County, MS, Atauga County, AL, and Bay County, FL. All have varying terrain heights, urban densities, and meteorology. The EPA's SCRAM site provides several hypothetical emission rates and hypothetical stack heights to calculate the associated MERPs values for these locations. The EPA recommends selecting the hypothetical location that best matches the facility location; however, all three sites will be considered in this exercise as well as all emission rates and stack heights to ensure the most conservative approach. Appendix B in this exhibit shows in tabular format the data for the locations as well as a graphical depiction of their locations relative to Brewton, Alabama.

Step 2: Acquire the source characteristics and associated modeling results for the hypothetical source(s).

Precursors for ozone include both VOC and NO_X; therefore, in addition to the significant net emissions increase of 81.59 TPY of VOC, the NO_X net potential emissions increase of 20.49 TPY will also be included in the analysis even though NO_X did not have a significant net emissions increase. Using the MERPs View Qlik on the EPA website, "Support Center for Regulatory Atmospheric Modeling (SCRAM)," the most conservative MERPs for ozone were determined. Using the three locations from Step 1, 12 different MERPs for VOC and 12 different MERPs for NO_X were considered, the values of which are in Appendix B. The VOC MERPs values ranged from 1,936 TPY - 22,150 TPY, and the NO_X MERPs values ranged from 190 TPY - 659 TPY.

Lowest MERP for VOC:	1,936 TPY - Bay County, FL
Lowest MERP for NO_X:	190 TPY - Smith County, MS

Step 3: Apply the source characteristics and photochemical modeling results from Step 2 to the MERP equation with the appropriate SIL value to assess the project source impacts.

Using the lowest MERP identified above for each pollutant, a Preliminary Impact Determination can be conducted using the following equation:

$$\frac{NO_X\ \textit{Source Increase (tpy)}}{\begin{array}{c}NO_X\ \textit{8-hr daily maximum}\\ \textit{ozone MERP (tpy)}\end{array}} + \frac{\textit{VOC Source Increase (tpy)}}{\begin{array}{c}\textit{VOC 8-hr daily maximum}\\ \textit{ozone MERP (tpy)}\end{array}} < 100\%$$

For this project, the equation calculates as:

$$\frac{20.49}{190} + \frac{81.59}{1936} = 0.1078 + 0.0421 = 0.1499 \times 100 = 15\%$$

The equation results in negligible impacts, as a value less than 100% indicates that the ozone SIL of 1 ppb will not be exceeded. Thus, the project impacts on ozone considering both VOC and NO_X precursor emissions would be expected to be below the EPA recommended 8-hour ozone SIL.

Appendix A

UNITED STATES ENVIRON AL PROTECTION AGENCY

User ID: XDADAMS

DESIGN VALUE REPORT

Report Request ID: 1800117

Report Code: AMP480

Jan. 6, 2020

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	01	069									

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
DESIGN VALUE	44201		
DESIGN VALUE	88101		

SELECTED OPTIONS

Option Type	Option Value
WORKFILE DELIMITER	,
SINGLE EVENT PROCESSING	EXCLUDE REGIONALLY CONCURRED EVENTS
QUARTERLY DATA IN WORKFILE	NO
AGENCY ROLE	PQAO
USER SITE METADATA	STREET ADDRESS
MERGE PDF FILES	YES
USE LINKED SITES	YES

DATE CRITERIA

Start Date	End Date
2019	2019

APPLICABLE STANDARDS

Standard Description
Ozone 8-hour 2015
PM25 24-hour 2012
PM25 Annual 2012

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Jan. 6, 2020

Pollutant: Ozone(44201)
Standard Units: Parts per million(007)
NAAQS Standard: Ozone 8-hour 2015
Statistic: Annual 4th Maximum **Level:** .07

Design Value Year: 2019

REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.

State: Alabama

			2019				2018				2017				3 - Year		
Site ID	**Poc**	**STREET ADDRESS**	**Valid Days**	**Percent Complete**	**4th Max**	**Cert& Eval**	**Valid Days**	**Percent Complete**	**4th Max**	**Cert& Eval**	**Valid Days**	**Percent Complete**	**4th Max**	**Cert& Eval**	**Percent Complete**	**Design Value**	**D. V. Validity**
01-069-0004		161 BUFORD LANE	211	86	.057		233	95	.061	Y	239	98	.055	Y	93	.057	Y

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Jan. 6, 2020

Pollutant: Site-LevelPM2.5 - Local Conditions(88101)
Standard Units: Micrograms/cubic meter (LC)(105)
NAAQS Standard: PM25 24-hour 2012 / PM25 Annual 2012
Statistic: Annual Weighted Mean **Level:** 12
Statistic: Annual 98th Percentile **Level:** 35

Design Value Year: 2019

REPORT EXCLUDES MEASUREMENTS WITH REGIONALLY CONCURRED EVENT FLAGS.

State Name: Alabama

	2019					2018					2017					24-Hour		Annual	
Site ID / STREET ADDRESS	**Cred. Days**	**Comp. Qrtrs**	**98th Perctil**	**Wtd. Mean**	**Cert& Eval**	**Cred. Days**	**Comp. Qrtrs**	**98th Perctil**	**Wtd. Mean**	**Cert& Eval**	**Cred. Days**	**Comp. Qrtrs**	**98th Perctil**	**Wtd. Mean**	**Cert& Eval**	**Design Value**	**Valid Ind.**	**Design Value**	**Valid Ind.**
01-069-0003 126 NORTH ST. ANDREWS STREET (CIVIC CENTER)	87	3	16.9*	8.4*		114	4	16.5	7.7	Y	118	4	18.3	8.6	Y	17	N	8.2	N

Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
PRELIMINARY DESIGN VALUE REPORT

Report Date: Jan. 6, 2020

CERTIFICATION EVALUATION AND CONCURRENCE FLAG MEANINGS

FLAG	MEANING
M	The monitoring organization has revised data from this monitor since the most recent certification letter received from the state.
N	The certifying agency has submitted the certification letter and required summary reports, but the certifying agency and/or EPA has determined that issues regarding the quality of the ambient concentration data cannot be resolved due to data completeness, the lack of performed quality assurance checks or the results of uncertainty statistics shown in the AMP255 report or the certification and quality assurance report.
S	The certifying agency has submitted the certification letter and required summary reports. A value of "S" conveys no Regional assessment regarding data quality per se. This flag will remain until the Region provides an "N" or "Y" concurrence flag.
U	Uncertified. The certifying agency did not submit a required certification letter and summary reports for this monitor even though the due date has passed, or the state's certification letter specifically did not apply the certification to this monitor.
X	Certification is not required by 40 CFR 58.15 and no conditions apply to be the basis for assigning another flag value
Y	The certifying agency has submitted a certification letter, and EPA has no unresolved reservations about data quality (after reviewing the letter, the attached summary reports, the amount of quality assurance data submitted to AQS, the quality statistics, and the highest reported concentrations).

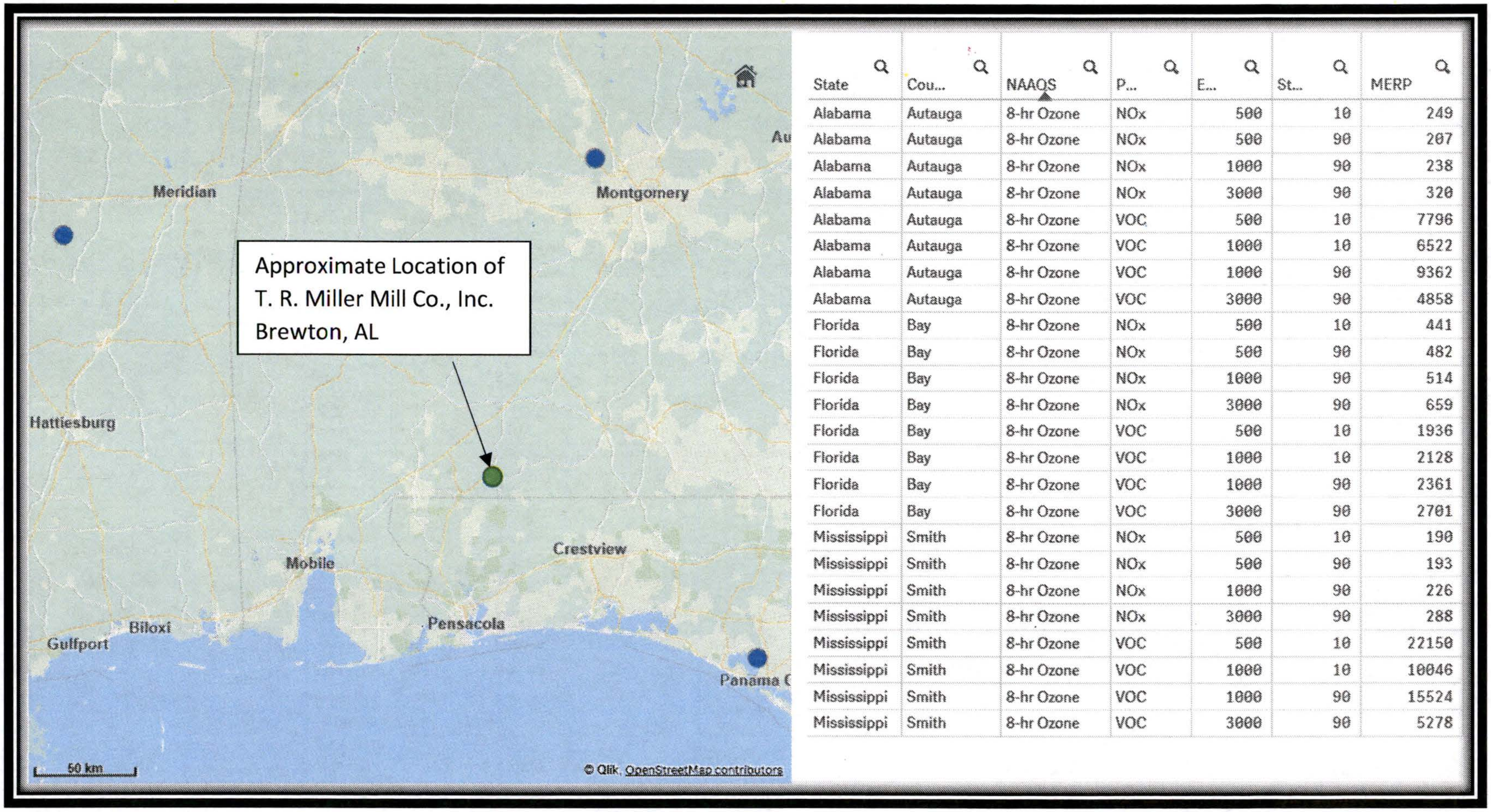
Notes: 1. Computed design values are a snapshot of the data at the time the report was run (may not be all data for year).
2. Some PM2.5 24-hour DVs for incomplete data that are marked invalid here may be marked valid in the Official report due to additional analysis.
3. Annual Values not meeting completeness criteria are marked with an asterisk ('*').

Appendix B

Support Center for Regulatory Atmospheric Modeling (SCRAM)

MERPs View Qlik

Illustrative hypothetical single source modeled impacts for annual maximum daily 8-hr O_3



Approximate Location of
T. R. Miller Mill Co., Inc.
Brewton, AL

State	Cou...	NAAQS	P...	E...	St...	MERP
Alabama	Autauga	8-hr Ozone	NOx	500	10	249
Alabama	Autauga	8-hr Ozone	NOx	500	90	207
Alabama	Autauga	8-hr Ozone	NOx	1000	90	238
Alabama	Autauga	8-hr Ozone	NOx	3000	90	320
Alabama	Autauga	8-hr Ozone	VOC	500	10	7796
Alabama	Autauga	8-hr Ozone	VOC	1000	10	6522
Alabama	Autauga	8-hr Ozone	VOC	1000	90	9362
Alabama	Autauga	8-hr Ozone	VOC	3000	90	4858
Florida	Bay	8-hr Ozone	NOx	500	10	441
Florida	Bay	8-hr Ozone	NOx	500	90	482
Florida	Bay	8-hr Ozone	NOx	1000	90	514
Florida	Bay	8-hr Ozone	NOx	3000	90	659
Florida	Bay	8-hr Ozone	VOC	500	10	1936
Florida	Bay	8-hr Ozone	VOC	1000	10	2128
Florida	Bay	8-hr Ozone	VOC	1000	90	2361
Florida	Bay	8-hr Ozone	VOC	3000	90	2701
Mississippi	Smith	8-hr Ozone	NOx	500	10	190
Mississippi	Smith	8-hr Ozone	NOx	500	90	193
Mississippi	Smith	8-hr Ozone	NOx	1000	90	226
Mississippi	Smith	8-hr Ozone	NOx	3000	90	288
Mississippi	Smith	8-hr Ozone	VOC	500	10	22150
Mississippi	Smith	8-hr Ozone	VOC	1000	10	10046
Mississippi	Smith	8-hr Ozone	VOC	1000	90	15524
Mississippi	Smith	8-hr Ozone	VOC	3000	90	5278

Wood, Anna W

From: Jason M. Rollins <jasonrollins@hmrollins.com>
Sent: Thursday, January 23, 2020 1:27 PM
To: Wood, Anna W
Cc: Daniel J. Gravely; David Brittain; Ricky Stanley; Cole, Lisa B
Subject: TP-2 Application and Particulate issues
Attachments: TRM TP-2 Form 105 rev 2 Signed.pdf

Hi Anna,

This is a follow up to your email to David Brittain and our conversation. I have spoken with Daniel Gravely at T. R. Miller who asked that I provide to you the following information on T. R. Miller's behalf.

Regarding your question on the NCASI vs NCDENR data, the factors are the same because the information from the NCDENR spreadsheet is NCASI data. Essentially the NCDENR created a spreadsheet that compiled all of the NCASI kiln testing data into one place. You can see that in the references of the data in Exhibit 5 of the application (the 3rd document in Exhibit 5 is the NCDENR sheet). So the source of the data is NCASI but the reference document was created by NCDENR. I updated Form 105 to show both NCDENR and NCASI as the source, for clarity.

At your request and to keep the project moving T. R. Miller has elected to just move forward with creating an arbitrary limit for PM to "avoid" the PM PSD SER of 25 TPY even though there is no technical data to suggest that this unit is physically capable of exceeding SER and therefore can't be a major modification for PM. We understand that ADEM has the position that regardless of the unit's potential emissions being far below the SER that the State's process weight equation is being considered the controlling factor in this case. I have revised Form 105 to propose an artificial PM "limit" of 3 lb/hr @ 8760 hours under the Regulatory Emission Limit section. This equates to approximately 13.14 tons of theoretical PM emissions which is about half the PM SER and likely about 5 times higher than the potential emissions from this kiln based on available kiln testing data.

You indicated that you could accept the revised form electronically and I have attached it to this email. If I can be of any assistance in clarifying these changes or providing any further information please let me know.

Thank you for your help on this project.

Jason M. Rollins, P.E.
H. M. Rollins Co., Inc.
Gulfport, MS
228-832-1738

PERMIT APPLICATION
FOR
MANUFACTURING OR PROCESSING OPERATION

☐☐☐ - ☐☐☐☐ - ☐☐☐☐

Do not write in this space

1. **Name of firm or organization:** T. R. Miller Mill Company, Inc.

2. **Briefly describe the operation of this unit or process in your facility: (separate forms are to be submitted for each type of process or for multiple units of one process type. If the unit or process receives input material from, or provides input material to, another operation, please indicate the relationship between the operations.) An application should be completed for each alternative operating scenario.**

Operating scenario number 1

The unit is a continuous drying kiln designated as TP-2 which dries wood poles and piling utilizing the direct heat exhaust generated from a wood-fired burner. The kiln is approximately 221 feet in length with 125' center chamber and two 48' end chambers. The poles/piling are continuously fed through both ends of the kiln at an approximate rate of 4-6 ft per hour. This kiln is functionally equivalent to the current TP-1.

3. **Type of unit or process (e.g., calcining kiln, cupola furnace):**

Wood-fired Continuous Drying Kiln TP-2

Make: ____ **Model:** Slope grate green wood burner

Rated process capacity (manufacturer's or designer's guaranteed maximum) in pounds/hour: 21,918

Manufactured date: 2020 **Proposed installation date:** 3/23/20

Original installation date (if existing): ____

Reconstruction or Modification date (if applicable): ____

4. **Normal operating schedule:**

Hours per day: 24 **Days per week:** 7 **Weeks per year:** 52

Peak production season (if any): N/A

5. **Materials (feed input) used in unit or process (include solid fuel materials used, if any):**

Material	Process Rate Average (lb/hr)	Maximum (lb/hr)	Quantity tons/year
Wood and Bark (fuel)	2,500 lbs/hr	4,000 lbs/hr	10,950 tons/year
Green Wood Poles and Piling (product)	3.2 MM ft^3/yr	21,918 lbs/hr	96,000 tons/year

6. **Total heat input capacity of process heating equipment (exclude fuel used by indirect heating equipment previously described on ADEM Form 104):** 27 **MMBtu/hr**

Fuel	Heat Content	Units	Max. % Sulfur	Max. % Ash	Grade No. [fuel oil only]	Supplier [used oil only]
Coal		Btu/lb				
Fuel Oil		Btu/gal				
Natural Gas		Btu/ft^3				
L. P. Gas		Btu/ft^3				
Wood	4790	Btu/lb	0.05	3.0		
Other (specify)						

7. **Products of process or unit:**

Products	Quantity/year	Units of production
Dry wood poles and piling	3.2	MM ft^3

8. **For each regulated pollutant, describe any limitations on source operation which affects emissions or any work practice standard (attach additional page if necessary):**

Proper operation and maintenance is required as BACT for VOC from the kiln. An O&M Plan for this kiln will need to be developed to comply with BACT. A VOC BACT limit of 93.05 TPY as WPP1 is selected based on the potential drying capacity of the kiln of 3.2 MM cubic feet per year and NCASI factors for lumber kilns (no data for pole kilns). This should result in conservatively high over estimation of VOC emissions since lumber is dried to a lower moisture content and has a higher surface to volume ratio.

9. Is there any emission control equipment on this emission source?

☐ Yes ☑ No (Where a control device exists, ADEM Form 110 must be completed and attached).

10. Air contaminant emission points: (Each point of emission should be listed separately and numbered so that it can be located on the attached flow diagram):

Emission Point	Stack							
	UTM Coordinates		Height Above Grade (Feet)	Base Elevation (Feet)	Diameter (Feet)	Gas Exit Velocity (Feet/Sec)	Volume of Gas Discharged (ACFM)	Exit Temperature (°F)
	E-W (km)	N-S (km)						
TP-2 (west door)	TBD	TBD	7.5' (fugitive) at 1/2 door height	85	2 - 12'x15' doors (fugitive)	<5	est 7000 DSCFM	~120
TP-2 (east door)	TBD	TBD	7.5' (fugitive) at 1/2 door height	85	2 - 12'x15' doors (fugitive)	<5	est 7000 DSCFM	~120

* Std temperature is 68°F - Std pressure is 29.92" in Hg.

11. **Air contaminants emitted: Basis of estimate (material balance, stack test, emission factor, etc.) must be clearly indicated on calculations appended to this form. Fugitive emissions <u>must be included</u> and calculations must be appended.**

Emission Point	Pollutants	Potential Emissions			Regulatory Emission Limit	
		(lb/hr)	(Tons/yr)	Basis of Calculation	(lb/hr)	(units of standard)
TP-2 (sum of both ends)	PM	0.61	2.69	NCDENR (NCASI)	3 lb/hr @ 8,760 hrs	Proposed to avoid process weight eq.
	PM-10	0.61	2.69	Conservatively assume PM-10 = to PM	N/A	N/A
	Sulfur dioxide	3.30	14.454	Max sulfur content in fuel	108	4.0 lb/MMBTU
	Nitrogen oxides	4.95	21.681	AP-42*1.5	N/A	N/A
	Carbon monoxide	13.50	59.130	AP-42*1.5	N/A	N/A
	VOC as C / VOC as WPP1	16.66 / 21.24	72.96 / 93.05	NCASI / WPP1	N/A	N/A
	Total HAP	1.83	8.03	EPA PCWP MACT ICR & AP-42*1.5	N/A	N/A
	See individual calcs for all					
	remaining pollutants					

12. **Using a flow diagram:**

(1) **Illustrate input of raw materials,**

(2) **Label production processes, process fuel combustion, process equipment and air pollution control equipment,**

(3) **Illustrate locations of air contaminant release so that emission points under item 10 can be identified.**

☑ **(Check box if extra pages are attached)**
Process flow diagram

13. Is this unit or process in compliance with all applicable air pollution rules and regulations?

☑ Yes ☐ No

(if "no", a compliance schedule, ADEM Form 437 must be completed and attached.)

14. Does the input material or product from this process or unit contain finely divided materials which could become airborne?

☐ Yes ☑ No

15. If "yes", is this material stored in piles or in some other facility as to make possible the creation of fugitive dust problems?

☐ Yes ☑ No

List storage piles or other facility (if any):

Type of material	Particle size (diameter or screen size)	Pile size or facility (average tons)	Methods utilized to control fugitive emissions (wetted, covered, etc.)

Name of person preparing application: J. M. Rollins, P.E., H. M. Rollins Company, Inc.

Signature: Date: 1/23/20

From: Jason M. Rollins <jasonrollins@hmrollins.com>
Sent: Thursday, February 6, 2020 5:59 PM
To: Wood, Anna W
Subject: Re: Permitting TRMM TP-2

Hi Anna,

I haven't spoken with T. R. Miller so I don't know the answer to your specific question but we could do a quick engineering back-of-the-envelope calculation on the potential drying capacity of the new kiln and not even consider the current production of the debarker associated with the natural gas kiln. At 3.2 MMCUFT potential drying capacity of TP-2 * 60 lbs/cuft divided by 2000 lbs/ton gives us 96,000 tons of wood. An estimate for potential fugitive emissions from the debarker could be made using the old FIRE factor for log debarking of 0.02 lbs PM per ton of logs processed. That equals only 1,920 lbs of potential fugitive PM before we even consider netting out the prior actual debarker throughput associated with the old natural gas kiln. PM-10 and PM-2.5 would be even less than that so I don't think it should have any significant impact on permitting. This also assumes that the debarker has the actual capacity to increase its operating hours to meet those production numbers (and T. R. Miller opted to incur that hourly cost over just buying whitewood instead).

Let me know if you need me to look into this further.

thanks,
Jason

Jason M. Rollins, P.E.
H. M. Rollins Co., Inc.
Gulfport, MS
228-832-1738

From: Wood, Anna W
Sent: Thursday, February 06, 2020 4:36 PM
To: jasonrollins@hmrollins.com
Subject: Permitting TRMM TP-2

Hi Jason,

One more thing on the TP-2 application. With the increased capacity of the replacement kiln, does TRMM expect to see increased production through the debarker?

Thanks,

Anna Watkins Wood
Senior Environmental Scientist
Natural Resources Section

Alabama Department of Environmental Management
P.O. Box 301463
Montgomery, AL 36130-1463
(334) 271-7865

Mission: Assure for all citizens of the State a safe, healthful and productive environment