PRELIMINARY DETERMINATION
Harrigan Lumber Company, Inc.
Facility No. 106-S005

Introduction

On August 20, 2019, ACE Consulting Group submitted, on behalf of Harrigan Lumber Company, Inc. (HLC), a Prevention of Significant Deterioration (PSD) permit application. An addendum to the application was received on September 4, 2019. In the application, HLC proposes to construct a new natural gas-fired continuous dry kiln at their sawmill in Monroeville, Monroe County, Alabama. Once the construction is completed, the facility would have the capability of producing 140 MMBF of kiln dried lumber per year. Air Permit No. X018 would be issued for the proposed continuous kiln pending the resolution of any comments that may be received during the public comment period and EPA review.

Existing Facility Operations

HLC produces dimensional, kiln dried pine lumber and timbers. Logs are debarked, sawn into dimensional lumber or timbers based on a computerized optimizer, and stacked on carts for drying. Bark is conveyed by drag chain to truck trailers and sold for boiler fuel. Trimmings are processed through a wood hog and shaker screen where the green chips are separated and conveyed by belt to a truck load-out and sold to pulp mills.

This facility operates a 147 MBF direct-fired lumber kiln heated by a 32 MMBtu/Hr wood-fired slope grate burner (K-4) and a 82.2 MMBF/yr continuous dry kiln with a 32 MMBtu/hr burner (CDK-1) that burns a mix of green sawdust and dry shavings. Sawdust from the sawmill is pneumatically conveyed via Emission Unit No. 006, Sawdust Transfer and Storage Operations, for use in K-4 through Cyclone 4A (C-4A) to the Green Sawdust Silo 1 or through Cyclone 4B (C-4B) to Green Sawdust Silo 2. Subsequent to drying, lumber and timbers are processed through the planer mill, trimmed, graded and stacked using an automated sorter. The facility operates three cyclones for particulate control from the planer mill operations as part of Emission Unit No. 005. The Planer Cyclone (C-1) controls planer shavings conveyed from the planer mill to the Shavings Silo through Cyclone 2A (C-2A) which feeds the Hammermill, then the dry shavings powder is routed by Cyclone 3 (C-3) to the Powder Silo. The powder is conveyed with Cyclone 5 (C-5) to a blend box for mixing with sawdust from Green Sawdust Silos as fuel for CDK-1. When the Shavings Silo is full or shavings are not needed as fuel for CDK-1, planer shavings are diverted from Cyclone 2A via a y-valve to the Planer Shavings Hopper through Cyclone 2B (C-2B) and loaded into semi-trailers to ship offsite. The mill also has an Emergency Fire Pump Engine as Emission Unit No. 007.

Proposed Project

A batch kiln (K-3) was recently damaged by fire and removed from the facility. The facility proposes to replace the batch kiln with a 110 MMBF/yr continuous dry kiln with a 45 MMBtu/hr natural gas burner (CDK-2). Two kiln condensate evaporators (CE-1 and CE-2) will be utilized to process condensate generated by the continuous kilns. The evaporators will each have a 5.3 MMBtu/hr natural gas burner and the emissions will be exhausted into the kilns. The units will be constructed to allow one evaporator to be in service while the other is down for maintenance as required.

The proposed project would not modify any other sources at the mill. However, as CDK-2 would have a greater drying capacity than Batch Kiln 3, actual production through the planer mill could increase. Although the planer mill would not be modified, actual emissions from Cyclone 1 (C-1) and Cyclone 2B (C-2B) could be affected by increased shavings throughput and sales. Shavings to fuel Batch Kiln 3 routed through Cyclone 2A (C-2A) and 3 (C-3) would no longer be required. Any additional byproducts produced in the planer mill would be sold by routing though Cyclone 2B to trucks for shipping off-site. No other processes would be affected by the proposed modification.

Applicability: Federal Regulations

Title V

HLC is currently a major source for Title V as the emissions of PM, CO, VOC and Methanol are above the applicable thresholds. The new CDK and evaporators would require no monitoring. Within one year of commencing operation of the new kiln, the facility's current Major Source Operating Permit would be modified as a Significant Modification as outlined in ADEM Administrative Code r. 334-3-16-.13(4) to reflect the inclusion of CDK-2 and the evaporators.

MACT

Lumber dry kilns at major sources of HAP are affected sources under the *National Emission Standards for Hazardous Air Pollutants (NESHAP) for Plywood and Composite Wood Products*, 40 CFR Part 63, Subpart DDDD [adopted by reference at ADEM Admin. Code r. 335-3-11-.06(81)], the "PCWP MACT". The PCWP MACT requires facilities which are major sources of HAP and utilize lumber dry kilns to submit an Initial Notification within 120 days after initial startup. No other monitoring or work practice standards are required for dry kilns. The facility stated that the application serves as the initial notification for CDK-2.

National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters (Boiler MACT) regulates HAP emissions from solid, liquid, and gaseous fuel-fired boilers and process heaters at facilities that are a major source of HAP. Since the combustion gases from the proposed natural gas burners would directly contact the process material, the units would not be considered process heaters, and the Boiler MACT would not be applicable.

New Source Pollutant Standards (NSPS)

CDK-2 and the condensate evaporators would not be an affected sources under NSPS.

Prevention of Significant Deterioration (PSD)

Harrigan Lumber is in Monroe County which is currently classified as an attainment area for all criteria pollutants. HLC is not one of the 28 Major Source categories listed in ADEM Admin. Code r. 335-3-14-.04(2)(a)(1); therefore, the major source threshold of concern is 250 TPY for criteria pollutants. This facility is considered an existing major stationary source under PSD regulations because the potential emissions of VOC (328.6 TPY) from the facility exceed 250 TPY.

The proposed project would increase emissions to the level that review as a major modification of the New Source Review (NSR) program through Prevention of Significant Deterioration (PSD) permitting would be required as shown in Table 1.

Table 1 Proposed Project Emission Increases

Pollutant	Total Emission Increase (tpy)	PSD SER Threshold (tpy)	PSD Permitting Triggered?
Particulate Matter (PM)	2.522	25	No
Particulate Matter less than 10 microns (PM_{10})	3.809	15	No
Particulate Matter less than 2.5 microns ($PM_{2.5}$)	3.517	10	No
Volatile Organic Compounds (VOC (WPP1))	263.317	40	Yes
Carbon monoxide (CO)	20.055	100	No
Nitrogen oxide (NO_X)	14.214	40	No
Sulfur dioxide (SO_2)	0.143	40	No
Greenhouse Gases (as CO_2e)	28,684	75,000	No

A major source or major modification (one subject to PSD) must be constructed with Best Available Control Technology (BACT) and must have its effect on soils, vegetation, visibility, and ambient air quality addressed for each applicable pollutant. Applicability is determined by comparing each regulated pollutant's potential emission increase to its significant increase value.

As outlined in ADEM Admin Code r. 335-3-14-.04(1)(e) – (i), this project would be a change to an existing facility involving new emissions units and affecting existing emissions units. Therefore, the "Hybrid Test" would be relevant for calculating the emissions increases associated with this project. The hybrid test allows an actual-to-projected-actual applicability test for existing sources (C-1 and C-2B) and actual-to-potential test for new emissions units (CDK-2, CE-1, and CE-2). The emissions increases from the two tests are summed and compared to the significant emission rate as defined in ADEM Admin Code r. 335-3-14-.04(2)(w) to determine whether a significant emissions increase occurs from the project. The determination of existing versus new units is based on ADEM Admin Code 335-3-14-.04(2)(uu)(3) which indicates that units operating for at least two years are considered existing units. Cyclone 1 has been in operation for many years and Cyclone 2B began operation in June of 2017 (Temporary Authorization to Operate was issued on June 23, 2017).

The facility selected January 2017 – December 2018 as the consecutive 24-month period over the ten years preceding the date a complete permit application is received by the Department in determining the Baseline Actual Emission (BAE) for all NSR pollutants. For unmodified but affected existing sources, the emissions reported through the Department's annual Air Emissions Report for 2017 and 2018 were used. The summary of those sources' baseline data and baseline actual emission is in Table 2. Only particulate matter is emitted from these existing sources.

Table 2 Summary of BAE (tpy)

Baseline Actual Emissions (BAE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Planer Cyclone (C-1)	3.599	3.272	1.963	-	-	-	-	-
Planer Shavings Hopper Cyclone (C-2B)	2.317	2.106	1.264	-	-	-	-	-
Total BAE, tpy	5.916	5.378	3.227	-	-	-	-	-

Projected Actual Emissions is the maximum annual rate in tons per year at which an existing emissions unit is projected to emit a regulated NSR pollutant over any one of the five years following the change. HLC projects the highest annual dry lumber production at the mill after the project would be 140,000 MBF/yr. The summary of all unmodified but affected existing sources' projected actual emissions (PAE) can be found in Table 3 below.

Table 3 Summary of PAE (tpy)

Projected Actual Emissions (PAE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Planer Cyclone (C-1)	5.658	5.143	3.086	-	-	-	-	-
Planer Shavings Hopper Cyclone (C-2B)	3.642	3.311	1.986	-	-	-	-	-
Total PAE, tpy	9.300	8.454	5.072	-	-	-	-	-

Post-change emissions are examined to determine if any such emissions above the baseline are unrelated to the project. The excludable projected actual emissions (EE) are determined if existing sources could-have-accommodated (CHA) operation and the resulting emissions during the baseline period without the CDK-2 project.

An actual production of 10,656.806 MBF was processed through the planer mill in May 2018, which would indicate an achievable annualized production rate of 127,881.672 MBF/yr.

Excludable emissions (EE) are determined from Could Have Accommodated emissions at the achievable production rate of 127,881 MBF/yr less baseline actual emission resulting from actual production rates during the baseline as shown below.

Table 4 Summary of Could Have Accommodated Emissions (tpy)

Could Have Accommodated Emissions (CHA)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Planer Cyclone (C-1)	5.168	4.698	2.819	-	-	-	-	-
Planer Shavings Hopper Cyclone (C-2B)	3.327	3.024	1.814	-	-	-	-	-
Total CHA, tpy	8.495	7.722	4.633	-	-	-	-	-

Table 5 Summary of Excludable Emissions (tpy)

Excludable Emissions (EE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total CHA	8.495	7.722	4.633	-	-	-	-	-
Total BAE	5.916	5.378	3.227	-	-	-	-	-
Total EE (CHA - BAE), tpy	2.579	2.345	1.407	-	-	-	-	-

Table 6 reflects the resulting Adjusted Projected Actual Emissions.

Table 6 Summary of Adjusted Projected Actual Emissions (tpy)

Adjusted Projected Actual Emissions (APAE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total PAE	9.300	8.454	5.072	-	-	-	-	-
Total EE	2.579	2.345	1.407	-	-	-	-	-
Total APAE (PAE - EE), tpy	6.720	6.109	3.666	-	-	-	-	-

The Baseline Actual Emissions are subtracted from the Adjusted Projected Actual Emissions to indicate the Actual-to-Projected Actual Test (ATPA) portion of emission increases for use in the Hybrid Test. Table 7 provides the results of the ATPA for existing sources.

Table 7 Actual-to-Projected-Actual Test Emissions Increase (tpy)

Actual To Projected Actual (ATPA)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total APAE	6.720	6.109	3.666	-	-	-	-	-
Total BAE	5.916	5.378	3.227	-	-	-	-	-
Total ATPA (APAE - BAE), tpy	0.805	0.732	0.439	-	-	-	-	-

The other portion of the Hybrid Test would utilize the Actual-to-Potential Test for new emission units. The actual-to-potential test as defined in ADEM Admin Code 335-3-14-.04(1)(g) is used to determine the project increase for the new sources from the CDK-2 project. New sources are CDK-2, CE-1, and CE-2. The baseline actual emissions (BAE) for new units are equal to zero in accordance with ADEM Admin Code 335-3-14-.04(2)(uu)(3) since this is the initial construction and operation of the unit. The summary of the actual-to-potential test, which is PTE minus BAE (as zero) is shown in Table 8.

Table 8 Actual-to-Potential Test Emissions Increase (tpy)

Actual To Potential (ATP)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
New Sources PAE = PTE	1.717	3.078	3.078	263.317	0.143	20.055	14.214	28,684
New Sources BAE = 0 tpy	0	0	0	0	0	0	0	0
Total ATP (PAE - BAE), tpy	1.717	3.078	3.078	263.317	0.143	20.055	14.214	28,684

The emissions increase from existing units determined by the actual-to-projected-actual applicability test and the increase from new units via the actual-to-potential test are summed. The total project emissions increases are compared to the Significant Emission Rate for each NSR pollutant. As shown in Table 9, the CDK-2 project results in a significant emission increase for VOC only.

Table 9 Summary of Hybrid Total Emissions Increase Test (tpy)

Total Emissions Increase from Project	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total ATPA Increase Existing Sources	0.805	0.732	0.439	-	-	-	-	-
Total ATP Increase New Sources	1.717	3.078	3.078	263.317	0.143	20.055	14.214	28,684
Hybrid Test Total Project Increase (ATPA + ATP), tpy	2.522	3.809	3.517	263.317	0.143	20.055	14.214	28,684
Significant Emission Rate (SER)	25	15	10	40	40	100	40	75,000
% of SER	10%	25%	35%	658%	0%	20%	36%	38%
PSD Review Required?	No	No	No	Yes	No	No	No	No

Sources subject to PSD must satisfy the following requirements before being allowed to initiate construction:

1. Provide opportunity for public participation in the permitting process relative to the air quality impact the source would have if it were built.
2. Obtain a permit which sets forth emission limitations.
3. Demonstrate that the emissions from the source would not cause or contribute to a violation of the PSD increment or the NAAQS.
4. Apply the best available control technology (BACT), which is defined in terms of an emission limitation, based on the maximum degree of reduction of each pollutant which is determined to be technically and economically achievable for that particular source.

5. Analyze the impairment to visibility, soils, and vegetation that might occur as a result of operation of the source.
6. Analyze the air quality impacts projected due to the growth associated with the facility.
7. Conduct any ambient air quality monitoring necessary to determine the effect of the emissions on air quality.

Public Participation

In order to satisfy the public participation requirement, a copy of the preliminary determination (this engineering analysis and the air quality dispersion modeling analysis) and the permit applications will be made available on the Department's website for at least 30 days of public review. After the 30-day public comment period and within 5 days of the PSD permit issuance, the final determination will be made available on the Department's eFile system. The final determination consists of copies of the signed permits, any comments received during the public comment period, and any responses made to those comments.

BACT Determination

During a PSD review, new and modified sources must be assessed for Best Available Control Technology, or BACT, if their potential emissions increase is significant. BACT is an emission limit based on the maximum pollutant reduction achievable considering energy, economic, and environmental impacts. BACT is determined on a unit by unit, pollutant by pollutant basis. The BACT limit can be no less stringent than any applicable New Source Performance Standard (NSPS), National Emission Standard for Hazardous Air Pollutants (NESHAP), or other applicable standard.

For the proposed project, BACT must be determined for VOC emissions from the continuous lumber drying kiln and the condensate evaporator units. HLC utilized the "top-down" approach for the BACT analysis. This approach considers the most stringent control option available and a determination of its technical feasibility for the emission unit in question. If the option is not rejected, the applicant must analyze the option based upon economic, environmental, and energy considerations. Below are the five basic steps of a top-down BACT review procedure as identified by the US EPA in the March 15, 1990, Draft BACT Guidelines:

Step 1. Identify all control technologies
Step 2. Eliminate technically infeasible options
Step 3. Rank remaining control technologies by control effectiveness
Step 4. Evaluate most effective controls and document results
Step 5. Select BACT

Best Available Control Technology (BACT)

BACT is determined on a unit by unit, pollutant by pollutant basis. For the condensate evaporators, a search was completed through August 2019 for Process Key Word "Evaporator" for VOC emissions. Few entries resulted and only one matched the kiln condensate evaporators proposed for Harrigan. The BACT determination for this facility (RBLCID AL-0310) is Proper Kiln Maintenance and Operation. As the burner exhaust from the evaporators will be returned to the kilns, the control of emissions generated from the evaporators are included in the kiln BACT

review. The proposed available control technologies for the kiln at Harrigan Lumber are listed below.

Table 10 Available Control Technologies

Pollutant	Control Technology
VOC	Thermal Oxidation (RTO), Catalytic Oxidation (RCO), Condensation, Wet Scrubbing, Biofiltration, Proper Maintenance and Operation

The facility proposes the following emission levels as BACT:

Table 11 Proposed BACT

Continuous Kilns and Condensate Evaporators	BACT Determination	BACT Emission Limit (Each Unit)	Equivalent Emissions (110 MMBF/yr)
VOC (WPP1)	Proper Maintenance and Operation	4.8 lb/MBF	264 TPY

Continuous Dry Kiln

BACT Determination for VOC

Step 1. Identify all control technologies: Harrigan Lumber Company examined the feasibility of the following control technologies to control VOC emissions: regenerative thermal oxidation (RTO), regenerative catalytic oxidation (RCO), condensation, carbon adsorption, wet scrubbing, biofiltration, and proper kiln maintenance and operation.

Regenerative Thermal Oxidation

According to EPA Air Pollution Control Technology, RTOs use a high-density media, such as a ceramic-packed bed, to preheat an incoming VOC-laden waste gas stream. The preheated gases then pass into a combustion chamber where they are heated by auxiliary fuel (natural gas) combustion to a final oxidation temperature typically between 1400 - 1500°F to achieve maximum VOC destruction. Purified hot gases exit this chamber and are directed to one or more different ceramic-packed beds cooled by an earlier cycle. Heat from the purified gases is absorbed by these beds before the gases are exhausted to atmosphere. The reheated packed bed then begins a new cycle by heating a new incoming waste gas stream. Destruction efficiency of VOC depends upon the design criteria (i.e. chamber temperature, residence time, inlet VOC concentration, compound type, and degree of mixing). Typical VOC destructive efficiencies range from 95% to 99% for RTO systems. Lower control efficiencies are generally associated with lower concentration flows.

Regenerative Catalytic Oxidation

An RCO operates in the same manner as an RTO but uses a catalyst material rather than ceramic material in the packed bed that allows for destruction of VOC at a lower temperature. An RCO uses a precious metal catalyst in the packed bed, allowing

oxidation to occur at approximately 800°F. The lower temperature requirement reduces the amount of natural gas needed to fuel the system and overall size of the incinerator. Destruction efficiencies range from 90 to 99% for RCO systems.

Carbon Adsorption

In adsorption, gaseous pollutants are removed from an air stream by transferring the pollutants to the solid surface of an adsorbent and the cleaned gas passes to the atmosphere. Activated carbon is the most commonly used adsorbent. When the limit to the mass of pollutants that can be collected by an adsorbent is reached, the adsorbent is no longer effective in removing pollutants. To recover the ability to capture gaseous pollutants, adsorbents typically are "regenerated", meaning, the pollutant is desorbed or removed from the adsorbent. This regeneration may occur off-site or on-site. VOC destructive efficiencies range from 90% to 95% for carbon adsorption systems in proper operating capacity.

Condensation

Condensation employs a drop in temperature and/or increase in pressure to cause the VOCs in the emission stream to condense. The cleaned air stream is separated from the condensate containing target pollutants. The removal efficiency of a condenser is dependent on the emission stream characteristics including the nature of the VOC in question (vapor pressure/temperature relationship), VOC concentration, and the type of coolant used. Any component of any vapor mixture can be condensed if brought to a low enough temperature and allowed to come to equilibrium. A condenser cannot lower the inlet concentration to levels below the saturation concentration at the coolant temperature. In many cases, very large temperature drops are required to achieve effective condensation, requiring significant energy investment to accomplish cooling.

Biofiltration

In biofiltration, gases containing biodegradable organic compounds are vented through a biologically active material. The biofilm contains a population of microorganisms on a porous filter material. As gases pass through the biofilter, the organics partition from the gaseous phase to the liquid phase of the biofilm. From the liquid phase, the contaminants are available for the oxidation process through the microorganism on the biofilm. Control efficiencies vary depending on several things to include water solubility of the VOC and can range from 10% - 90%.

Wet Scrubbing

Scrubbing of pollutants from a gas stream often uses packed-bed scrubbers. The packing is held in place by wire mesh retainers and supported by a plate near the bottom of the scrubber. Scrubbing liquid is introduced above the packing and flows down through the bed. The liquid coats the packing and establishes a thin film. The pollutant, VOC, must be soluble in the absorbing liquid and even then, for any given absorbent liquid, only VOC that are soluble can be removed.

Proper Kiln Maintenance and Operation

Proper maintenance and operation of well-designed lumber drying kilns can effectively reduce VOC emissions. Prevention of over drying lumber, which releases additional VOCs to the air, can be minimized. Proper drying through efficient unit operation and kiln temperature management based on lumber moisture content along with routine maintenance based on manufacturer recommendations reduces VOC emissions.

Step 2. Eliminate technically infeasible options:

All add on controls discussed in Step 1 requires collection of the kiln exhaust. The VOC emitted from combustion at the natural gas burner as well as the VOC emitted from lumber drying would exhaust from the ends of the continuous kiln. The exhaust would be vented through the kiln doors and through powered vents at the ends of the kiln. It is assumed that 80% of the kiln emissions would be released through the powered vent stacks with 20% exhausting through the doorway openings. This exhaust would have a relative humidity of 100% and exhausts at approximately 120 – 140°F. The primary constituent of the VOC in the kiln exhaust would be terpenes.

Regenerative Thermal Oxidation

The use of an RTO would be technically infeasible due to the high moisture content and low exit temperature of the kiln exhaust gas stream. No known lumber kilns have successfully utilized this control.

Regenerative Catalytic Oxidation

An RCO can operate at a lower temperature than an RTO, however the temperature of the kiln exhaust would remain below that required for efficient function of an RCO. Catalyst poisoning from the contaminants in the gas stream would also be possible. No such system has been applied to lumber dry kilns. An RCO is therefore technically infeasible for this process.

Carbon Adsorption

The high moisture content of the kiln exhaust indicates carbon adsorption is not practical. The water molecules compete with the hydrocarbon molecules for active adsorption sites reducing the capacity and efficiency of the adsorption system. There are no known lumber dry kilns equipped with a carbon adsorption system and it is deemed technically infeasible.

Condensation

Condensation is effective when the gas stream can be cooled to a temperature where VOC condense as a liquid out of the gas stream. To condense terpenes, the primary constituent of lumber kiln VOC emissions, the temperature would need to be reduced to below 32 °F. At this temperature, freezing of the water vapor would generate ice, causing plugging of the unit. This technology is technically infeasible.

Biofiltration

Temperature is an important variable affecting biofilter operations. The kiln exhaust temperature of approximately 120 – 140°F exceeds that at which microorganisms thrive. The terpenes in the

exhaust stream, being highly viscous, would foul the biofilter. There are no known systems utilizing this application and this option is technically infeasible.

Wet Scrubbing
The terpenes within the kiln exhaust are not highly soluble but are highly viscous. This would lead to plugging the absorption media of a wet scrubber and leaves the process technically infeasible.

Steps 3 and 4. Rank remaining control technologies by control effectiveness, evaluate most effective controls and document results:

Proper Kiln Maintenance and Operation
According to the application, the only economically cost effective control technology for removing VOC emissions from a continuous lumber kiln is the use of "proper maintenance and operating practices". Since this control option is the top remaining BACT control technology, after showing that other "add-on" control systems were not technically or economically feasible, no cost analysis was performed.

Step 5. Select BACT:

HLC proposes the following emission level as BACT for VOC:

Pollutant	BACT Determination	BACT Emission Limit	Equivalent Emissions
VOC	Proper Kiln Maintenance and Operation	4.8 lb/MBF, as WPP1 VOC*	264 TPY

*"WPP1 VOC" is an acronym for Wood Products Protocol 1 VOC. WPP1 VOC refers to VOC emissions expressed in accordance with the document "Interim VOC Measurement Protocol for the Wood Products Industry – July 2007." This EPA document established procedures and emission measurement methods to approximate VOC emissions for determining applicability with Federal programs and to establish consistency across State programs for the forest products industry.

A search of EPA RACT/BACT/LAER Clearinghouse indicated that no facilities are utilizing add-on controls for lumber drying kilns, and the proposed VOC emission limit of 4.8 lb/MBF (as WPP1 VOC) is comparable to other BACT determinations for continuous kilns in the wood products industry. However, none of the BACT limits in the RBLC for continuous kilns have been verified by testing. The Department concurs that proper kiln design, operation, and maintenance, and an emission limit of 4.8 lb/MBF (as WPP1 VOC) represents BACT for the proposed kilns.

HLC identified the average moisture content of the dried lumber at the planer mill as a measurable parameter to be used in minimizing VOC emissions from the kilns. VOC emissions would be minimized by not over-drying the lumber, setting a minimum moisture content parameter of approximately 12%. Due to seasonal variability of the wood moisture content and drying times, HLC has proposed compliance with a rolling 12-month average for comparison to the established moisture content target.

Modeling

As Harrigan Lumber's proposed project is subject to PSD permitting for VOC, as a precursor to ozone, it is necessary to conduct an air quality analysis of the ambient air impacts associated with the project. The analysis should demonstrate that the project emissions will neither cause nor contribute to a violation of the NAAQS or PSD increments.

EPA recommends a two-tiered approach for addressing single source impacts on ozone (O_3). Tier 1 involves use of appropriate and technically credible relationships between emissions and ambient impacts developed from existing modeling studies that are determined sufficient for evaluating the project impacts. Tier 2 involves chemical transport modeling. Tier 1 sufficiently demonstrates there will be no negative impact to the air quality as a result of this project.

Following the steps outlined in US EPA's *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program* dated April 30, 2019, hereafter called "Guidance", the following section documents how the facility satisfies the compliance demonstration requirements for ozone under the PSD program. The steps required by the EPA are:

> Step 1 – Identify representative hypothetical source. Start with lowest, most conservative, illustrative MERPs for selected Climate Zone (Table 4-1 of Guidance copied below).
>
> Step 2 – Acquire source characteristics and associated source impact modeling results. Screen the closest hypothetical sources to the project facility and select the lowest, most conservative, MERPs.
>
> 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.

In the context of the PSD program, precursors to O_3 include volatile organic compounds (VOC) and nitrogen oxides (NO_X) thus contribution of both from the project are evaluated.

Harrigan Lumber's project proposes an increase in emissions of 263.3 tpy of VOC (WPP1) and 14.2 tpy NO_X. Being located in Monroeville, AL, there are no unusual circumstances regarding complex terrain, proximity to very large sources of either NO_X or VOC, or meteorology. Thus, the climate zone is defined as the relevant geographic area such that the lowest MERPs from Guidance's Table 4-1, for the southeast region could be considered representative and chosen for comparison with the project emissions in lieu of selecting a particular hypothetical source from this same climate zone.

No modeling was performed for non-criteria HAP pollutants as the continuous kilns are subject to 40 CFR Part 63 Subpart DDDD, The Plywood and Composite Wood Products MACT. For further discussion of modeling, see the attached memo from the Control Strategies Section of the Planning Branch (Appendix B).

Additional Impacts

Additional impact analyses assess the impacts of air, ground, and water pollution on soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant resulting from the proposed project and from associated growth. The depth of the analysis depends on existing air quality, the quantity of emissions, and the sensitivity of local soils, vegetation, and visibility in the source's impact area.

Soil and Vegetation Impacts

Air contaminants can affect soils through fumigation by gaseous forms, accumulation of compounds transformed from the gaseous state, or by the direct deposition of PM to which certain contaminants are absorbed. The secondary impacts on soils and vegetation from the project have also been considered. The US EPA document *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals* provides methods to evaluate impacts of SO_2, NO_2, CO, and PM_{10} to determine if there is a potential for vegetative stress. As the project does not have a significant emission increase of SO_2, NO_2, CO, and PM_{10}, no adverse impacts on soils and vegetation are anticipated.

Associated Growth

The project will not increase the workforce associated with the current mill; there will be no appreciable long-term growth in the area due to the project.

Visibility Analysis

The pollutants of concern for visibility and deposition are PM, SO_2, and NO_X. Because the project triggers PSD review for VOC only and would not cause a significant increase of PM, SO_2, or NO_X affecting visibility, no adverse impact to visibility is expected.

Applicability: State Regulations

Particulate Matter

Fuel Burning Equipment

The proposed CDK and condensate evaporators would not be subject to ADEM Admin. Code r. 335-3-4-.03(1), because the units would be direct fired, and therefore, not considered “fuel burning equipment”.

Process Industries – General

The proposed units would be subject to the State particulate matter emission standards for process industries as provided in ADEM Admin. Code r. 334-3-4-.04(1).

Visible Emissions

The proposed units would be subject to the State visible emission standards of ADEM Admin. Code r. 335-3-4-.01(1), which states that no air emission source may emit particulate of an opacity greater than 20% (as measured by a six-minute average) more than once during any 60-minute period and at no time shall emit particulate of an opacity greater than 40% (as measured by a six-minute average).

Sulfur Dioxide

The proposed CDK and condensate evaporators would be subject to the State sulfur dioxide emission standard of 4.0 lb/MMBtu of heat input [ADEM Admin. Code r. 335-3-5-.01(1)(b)]. However, the potential emissions using AP-42 emission factors are used in this analysis for applicability purposes under the Title V and PSD regulations.

Emission Testing and Monitoring

I recommend that no emission testing be required for the proposed kiln at this time because it is expected that the kiln would be able to comply with the proposed BACT limitations, testing for continuous kilns is not easily conducted, and there are no emission control devices. I also recommend that no emission testing be required for the proposed condensate evaporators at this time because calculations indicate that they are capable of complying with the proposed BACT limits. If emission problems are observed in the future from these emission sources, testing may be required at that time.

To ensure that the maximum capacity of the proposed kiln is not exceeded, HLC would be required to calculate the kiln production on a monthly and 12-month rolling total basis, to be updated within ten (10) days of the end of each calendar month.

Recordkeeping and Reporting

Recordkeeping

HLC would be required to maintain records of its actions taken to comply with proper maintenance and operating practices. Records of the monthly and 12-month rolling lumber production and average moisture content would be required to be maintained on-site in a permanent form readily available for inspection.

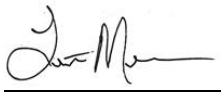
Reporting

HLC would be required to submit Semiannual Monitoring Reports for the proposed unit, which would include a certification that proper maintenance and operating practices were accomplished as required during the reporting period, and if not, describe the date and reason any required action was not accomplished.

Conclusions and Recommendations

This analysis indicates that this facility would meet the requirements of all applicable federal and State rules and regulations. Therefore, I recommend that Harrigan Lumber Company be issued the following Air Permits for the proposed sawmill facility, pending any comments received during the 30-day public comment period and EPA review:

X018 - 110,000 MBF/yr Direct-fired Lumber Dry Kiln (CDK-2), with a 45 MMBtu/hr Natural Gas-Fired Burner and associated 5.3 MMBtu/hr Natural Gas-Fired Kiln Condensate Evaporators (CE-1 and CE-2)



Lester Meredith
Chemical Branch
Air Division

September 5, 2019
Date

Appendix A
Potential Emissions

Baseline Actual Emissions (BAE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Planer Cyclone (C-1)	3.599	3.272	1.963	-	-	-	-	-
Planer Shavings Hopper Cyclone (C-2B)	2.317	2.106	1.264	-	-	-	-	-
Total BAE, tpy	5.916	5.378	3.227	-	-	-	-	-

Projected Actual Emissions (PAE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Planer Cyclone (C-1)	5.658	5.143	3.086	-	-	-	-	-
Planer Shavings Hopper Cyclone (C-2B)	3.642	3.311	1.986	-	-	-	-	-
Total PAE, tpy	9.300	8.454	5.072	-	-	-	-	-

Could Have Accommodated Emissions (CHA)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Planer Cyclone (C-1)	5.168	4.698	2.819	-	-	-	-	-
Planer Shavings Hopper Cyclone (C-2B)	3.327	3.024	1.814	-	-	-	-	-
Total CHA, tpy	8.495	7.722	4.633	-	-	-	-	-

Excludable Emissions (EE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total CHA	8.495	7.722	4.633	-	-	-	-	-
Total BAE	5.916	5.378	3.227	-	-	-	-	-
Total EE (CHA - BAE), tpy	2.579	2.345	1.407	-	-	-	-	-

Adjusted Projected Actual Emissions (APAE)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total PAE	9.300	8.454	5.072	-	-	-	-	-
Total EE	2.579	2.345	1.407	-	-	-	-	-
Total APAE (PAE - EE), tpy	6.720	6.109	3.666	-	-	-	-	-

Actual To Projected Actual (ATPA)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total APAE	6.720	6.109	3.666	-	-	-	-	-
Total BAE	5.916	5.378	3.227	-	-	-	-	-
Total ATPA (APAE - BAE), tpy	0.805	0.732	0.439	-	-	-	-	-

Actual To Potential (ATP)	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
New Sources PAE = PTE	1.717	3.078	3.078	263.317	0.143	20.055	14.214	28,684
New Sources BAE = 0 tpy	0	0	0	0	0	0	0	0
Total ATP (PAE - BAE), tpy	1.717	3.078	3.078	263.317	0.143	20.055	14.214	28,684

Total Emissions Increase from Project	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2	CO	NO_X	CO_2e
Total ATPA Increase Existing Sources	0.805	0.732	0.439	-	-	-	-	-
Total ATP Increase New Sources	1.717	3.078	3.078	263.317	0.143	20.055	14.214	28,684
Hybrid Test Total Project Increase (ATPA + ATP), tpy	2.522	3.809	3.517	263.317	0.143	20.055	14.214	28,684
Significant Emission Rate (SER)	25	15	10	40	40	100	40	75,000
% of SER	10%	25%	35%	658%	0%	20%	36%	38%
PSD Review Required?	No	No	No	Yes	No	No	No	No

Appendix B
Modeling Memo

LANCE R. LEFLEUR
DIRECTOR

KAY IVEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2400 ▪ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ▪ FAX (334) 271-7950

August 20, 2019

MEMORANDUM

TO: Lester Meredith
Natural Resources Section
Chemical Branch
Air Division

FROM: Megan Travis
Meteorological Section
Planning Branch
Air Division

SUBJECT: Modeled Emission Rates for Precursors Analysis for Harrigan Lumber Prevention of Significant Deterioration Permit Application

ADEM has completed its review of the Modeled Emission Rates for Precursors (MERPs) analysis performed by GBMc & Associates on behalf of Harrigan Lumber. The purpose of the analysis was to assess the impacts on air quality from emissions of Volatile Organic Compounds (VOCs) from a proposed kiln construction project located in Monroe County, Alabama.

This MERPs analysis was performed for Ozone. Precursor emission impacts to Ozone were considered and include VOCs and NO_x. If the calculation from the MERPs analysis is less than 100%, it indicates that the air quality threshold will not be exceeded and no further modeling is required. For Ozone, the following total emissions were considered: 263.317 TPY for VOCs and 14.214 TPY for NO_x. GBMc & Associates performed the analysis for both the most conservative source as well as hypothetical Autauga County. The results from the most conservative MERPs analysis are presented in Table 1. Additional details can be found within the application.

TABLE 1
MERPs Analysis Results

Pollutant	Percentage of SIL
Ozone	22%

The MERPs analysis is well below 100%. This indicates that the addition of secondary impacts were protective of the NAAQS and no further analysis is required.

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (FAX)

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (FAX)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (FAX)

Mobile-Coastal
3664 Dauphin Street, Suite B
Mobile, AL 36608
(251) 304-1176
(251) 304-1189 (FAX)

Appendix C
Draft Permits

Alabama Department of Environmental Management

AIR PERMIT

PERMITTEE: HARRIGAN LUMBER CO., INC.

FACILITY NAME: HARRIGAN LUMBER CO., INC.

LOCATION: MONROEVILLE, MONROE COUNTY, ALABAMA

PERMIT NUMBER	DESCRIPTION OF EQUIPMENT, ARTICLE OR DEVICE
106-S005-X018	110,000 MBF/yr Continuous Lumber Dry Kiln (CDK-2), with a 45 MMBtu/hr Natural Gas-Fired Burner and associated 5.3 MMBtu/hr Natural Gas-Fired Kiln Condensate Evaporators (CE-1 and CE-2)

In accordance with and subject to the provisions of the Alabama Air Pollution Control Act of 1971, as amended, Ala. Code §§22-28-1 to 22-28-23 (2006 Rplc. Vol. and 2007 Cum. Supp.) (the "AAPCA") and the Alabama Environmental Management Act, as amended, Ala. Code §§22-22A-1 to 22-22A-15 (2006 Rplc. Vol. and 2007 Cum. Supp.), and rules and regulations adopted there under, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to construct, install and use the equipment, device or other article described above.

ISSUANCE DATE: DRAFT

Alabama Department of Environmental Management

HARRIGAN LUMBER CO., INC.
MONROEVILLE, ALABAMA
(PERMIT NO. 106-S005-X018)
PROVISOS

1. This permit is issued on the basis of Rules and Regulations existing on the date of issuance. In the event additional Rules and Regulations are adopted, it shall be the permit holder's responsibility to comply with such rules.

2. This permit is not transferable. Upon sale or legal transfer, the new owner or operator must apply for a permit within 30 days.

3. A new permit application must be made for new sources, replacements, alterations or design changes which may result in the issuance of, or an increase in the issuance of, air contaminants, or the use of which may eliminate or reduce or control the issuance of air contaminants.

4. The permittee shall keep this permit under file or on display at all times at the site where the facility for which the permit is issued is located and shall make the permit readily available for inspection by any or all persons who may request to see it.

5. Each point of emission, which requires testing, will be provided with sampling ports, ladders, platforms, and other safety equipment to facilitate testing performed in accordance with procedures established by Part 60 of Title 40 of the Code of Federal Regulations, as the same may be amended or revised.

6. All air pollution control equipment shall be operated at all times while this process is operational. In the event of scheduled maintenance, unscheduled maintenance, or a breakdown of the pollution control equipment, the process shall be shutdown as expeditiously as possible (unless this act and subsequent re-start would clearly cause greater emissions than continuing operations of the process for a short period). The Department shall be notified of all such events **that exceed 1 hour** within 24 hours. The notification shall include all pertinent facts, including the duration of the process operating without the control device and the level of excess emissions which have occurred. Records of all such events, regardless of reporting requirements, shall be made and maintained for a period of five years. These records shall be available for inspection.

7. This process, including all air pollution control devices and capture systems for which this permit is issued, shall be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants shall be established.

8. This permit expires and the application is cancelled if construction has not begun within 24 months of the date of issuance of the permit.

9. On completion of construction of the device(s) for which this permit is issued, written notification of the fact is to be submitted to the Chief of the Air Division. The notification shall indicate whether the device(s) was constructed as proposed in the application. The device(s) shall not be operated until authorization to operate is granted by the Chief of the

Air Division. Failure to notify the Chief of the Air Division of completion of construction and/or operation without authorization could result in revocation of this permit.

10. Submittal of other reports regarding monitoring records, fuel analyses, operating rates, and equipment malfunctions may be required as authorized in the Department's air pollution control rules and regulations. The Department may require stack emission testing at any time.

11. Additions and revisions to the conditions of this Permit will be made, if necessary, to ensure that the Department's air pollution control rules and regulations are not violated.

12. Nothing in this permit or conditions thereto shall negate any authority granted to the Air Division pursuant to the Alabama Environmental Management Act or regulations issued thereunder.

13. Unless otherwise stated in this permit or an applicable regulation, the Air Division must be notified in writing at least 10 working days in advance of all emission tests to be conducted and submitted as proof of compliance with the Department's air pollution control rules and regulations.

    To avoid problems concerning testing methods and procedures, the following shall be included with the notification letter:

    (a) The date the test crew is expected to arrive, the date and time anticipated of the start of the first run, how many and which sources are to be tested, and the names of the persons and/or testing company that will conduct the tests.

    (b) A complete description of each sampling train to be used, including type of media used in determining gas stream components, type of probe lining, type of filter media, and probe cleaning method and solvent to be used (if test procedure requires probe cleaning).

    (c) A description of the process(es) to be tested, including the feed rate, any operating parameter used to control or influence the operations, and the rated capacity.

    (d) A sketch or sketches showing sampling point locations and their relative positions to the nearest upstream and downstream gas flow disturbances.

    A pretest meeting may be held at the request of the source owner or the Department. The necessity for such a meeting and the required attendees will be determined on a case-by-case basis.

    All test reports must be submitted to the Air Division within 30 days of the actual completion of the test, unless an extension of time is specifically approved by the Air Division.

14. Any performance tests required shall be conducted and data reduced in accordance with the test methods and procedures contained in each specific permit condition unless the

Director (1) specifies or approves, in specific cases, the use of a reference method with minor changes in methodology, (2) approves the use of an equivalent method, or (3) approves the use of an alternative method, the results of which he has determined to be adequate for indicating whether a specific source is in compliance.

15. This permit is issued with the condition that, should obnoxious odors arising from the plant operations be verified by Air Division inspectors, measures to abate the odorous emissions shall be taken upon a determination by the Alabama Department of Environmental Management that these measures are technically and economically feasible.

16. Precautions shall be taken to prevent fugitive dust emanating from plant roads, grounds, stockpiles, screens, dryers, hoppers, ductwork, etc.

    Plant or haul roads and grounds will be maintained in the following manner so that dust will not become airborne. A minimum of one, or a combination, of the following methods shall be utilized to minimize airborne dust from plant or haul roads and grounds:

    (a) by the application of water any time the surface of the road is sufficiently dry to allow the creation of dust emissions by the act of wind or vehicular traffic;

    (b) by reducing the speed of vehicular traffic to a point below that at which dust emissions are created;

    (c) by paving;

    (d) by the application of binders to the road surface at any time the road surface is found to allow the creation of dust emissions;

    Should one, or a combination, of the above methods fail to adequately reduce airborne dust from plant or haul roads and grounds, alternative methods shall be employed, either exclusively or in combination with one or all of the above control techniques, so that dust will not become airborne. Alternative methods shall be approved by the Department prior to utilization.

17. Precautions shall be taken by the permittee and its personnel to ensure that no person shall ignite, cause to be ignited, permit to be ignited, or maintain any open fire in such a manner as to cause the Department's rules and regulations applicable to open burning to be violated.

18. The Permittee shall not cause or permit the emissions of particulate matter in any 1-hour period from this process to exceed the amount determined by use of the following equation:

$$E=3.59P^{0.62} \quad (P < 30 \text{ tons per hour})$$

OR

$E=17.31P^{0.16}$ ($P \geq 30$ tons per hour)

Where: E=Emissions in pounds per hour
P=Process weight in tons per hour

19. In accordance with ADEM Admin. Code. r. 335-3-4-.01(1), any source of particulate emissions shall not discharge more than one 6-minute average opacity greater than 20% in any 60-minute period. At no time shall any source discharge a 6-minute average opacity of particulate emissions greater than 40%. Opacity shall be determined by 40 CFR Part 60, Appendix A, Method 9.

20. The Permittee shall not use as a defense in an enforcement action that maintaining compliance with conditions of this permit would have required halting or reducing the permitted activity.

21. This permit is valid only for the drying of the types of materials and for the quantities of these materials for which application has been made to the Air Division.

22. This unit is restricted to burn natural gas only, with no permitted back-up fuel.

NESHAP for Plywood and Composite Wood Products, 40 CFR 63, Subpart DDDD

23. This dry kiln is subject to the applicable requirements of the National Emission Standards for Hazardous Air Pollutants for Plywood and Composite Wood Products, 40 CFR Part 63, Subpart DDDD, and to the NESHAP General Provisions, 40 CFR Part 63, Subpart A as provided in 40 CFR §63.2290 and Table 10 of Subpart DDDD.

BACT Requirements

24. The Permittee shall not cause or allow volatile organic compounds (WPP1) to be emitted from the kiln in excess of 4.8 lb/MBF and 264 TPY as determined in accordance with EPA OTM 26, or other test methods approved by the Air Division.

25. The Permittee shall measure and record the moisture content of the lumber as it exits the planer machine. The 12-month rolling average moisture content shall be $\geq$ 12%.

Monitoring, Recordkeeping, and Reporting

26. The Permittee shall maintain records documenting its compliance with its maintenance plan.

27. If the kiln should exceed an applicable limit at any time, the Permittee shall notify the Air Division in writing within two working days of determining that the exceedance occurred.

28. The Permittee shall calculate and record the average monthly and 12-month rolling average lumber moisture content. Within ten (10) days of the end of each calendar month, records of the average lumber moisture content for the last calendar month shall be recorded and the rolling 12-month average updated.

29. The Permittee shall maintain records of total kiln production, including monthly production and 12-month rolling totals. Within ten (10) days of the end of each calendar month, records of the total throughput for the last calendar month shall be recorded and the rolling 12-month total updated.

30. The Permittee shall retain all required records in a permanent form suitable and readily available for inspection for a period of five (5) years from the date of generation of each record.

31. The Permittee shall submit a Semiannual Monitoring Report for the kiln to the Air Division, no later than 60 days after the end of each semiannual reporting period (April 14th to October 13th and October 14th to April 13th). This report shall include a certification that all maintenance activities were accomplished as required during the reporting period, and if not, describe the date and reason any required action was not accomplished.

32. The Permittee shall submit an Annual Compliance Certification to the Air Division no later than 60 days following the anniversary of the issuance of this permit. The compliance certification shall include the following:

    (a) The identification of each term or condition of this permit that is the basis of the certification.

    (b) The compliance status, whether continuous or intermittent.

    (c) The method(s) used for determining the compliance status of the source, currently and over the reporting period.

    (d) Other facts the Department may require to determine the compliance status of the source.

    The compliance certification shall contain certification by a responsible official of truth, accuracy and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

_____

Date