PREVENTION OF SIGNIFICANT DETERIORATION PERMIT APPLICATION

prepared for:

JORDAN FOREST PRODUCTS, LLC

752 Grove Street
Barnesville, Georgia 33024
(678) 359-0526

prepared for submittal to:

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
AIR PROTECTION BRANCH
4224 International Parkway, Suite 120
Atlanta, Georgia 30354

prepared:

APRIL 2016

prepared by:

Conversion Technology, Inc.
2190 N. Norcross Tucker Rd., Suite 202
Norcross, Georgia 30071
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conversiontechnology.com

Environmental and Safety Consulting Engineers

SECTION 1

PERMIT APPLICATION FORMS

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

EXPEDITED PERMITTING PROGRAM – APPLICATION FOR ENTRY TO PROGRAM FOR AIR PERMITS

EPD Use Only

Date Received: ______________________ Application No. ______________________

To be eligible for expedited review, this application form must be accompanied by the complete permit application for the type of air permit being requested.

1. Contact Information

Facility Name: Jordan Forest Products, LLC

AIRS No. (if known): 04-13- 171 - 00005

Contact Person: Larry Spillers Title: Georgia Operations Manager

Telephone No.: 770-358-5931 Alternate Phone No.: 478-955-4055

Email Address: lspillers@jordanforestproducts.com

If EPD is unable to contact me, please contact the alternate contact person:

Contact Person: Wayne Brantly Title: Safety and Environmental Mgr.

Telephone No.: 770-358-5976 Alternate Phone No.: 678-588-6761

Email Address: wbrantly@jordanforestproducts.com

On Page 2 of this form, please check the appropriate box for which type of air permit you are requesting expedited review.

I have read the Expedited Review Program Standard Operating Procedures and accept all of the terms and conditions within. I have participated in the required pre-application meeting with EPD. I understand that it is my responsibility to ensure an application of the highest quality is submitted and to address any requests for additional information by the deadline specified. I understand that submittal of this request form is not a guarantee that expedited review will be granted.

Signature: ______________________________ Date: ______________________

2. **Applying For Which Type Of Permit: (Please Check Appropriate Box)**

Expedited Review Fees for Air Permits	
Permit Type – Please Check One	**Expedited Review Fee***
☐ Generic Permit: Concrete Batch Plant – Minor Source	$1,000
☐ Generic Permit: Concrete Batch Plant – Synthetic Minor Source	$1,500
☐ Generic Permit: Hot Mix Asphalt Plant – Synthetic Minor Source	$2,000
☐ Minor Source Permit (or Amendment)	$3,000
☐ Synthetic Minor Permit (or Amendment)	$4,000
☐ Major Source SIP Permit not subject to PSD or 112(g)	$6,000
☐ Title V 502(b)(10) Permit Amendment	$4,000
☐ Title V Minor Modification with Construction	$4,000
☐ Title V Significant Modification	$6,000
☐ Major Source SIP Permit subject to 112(g) but not subject to PSD	$15,000
☑ PSD Permit (or Amendment) not subject to NAAQS and/or PSD Increment Modeling	$15,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling but not subject to Modeling for $PM_{2.5}$, NO_2, or SO_2	$20,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2	$25,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2 and also impacting a Class I Area	$30,000
☐ Nonattainment NSR Review Permit (or Amendment)	$40,000
* Do not send fee payment with this form. Upon acceptance of application for the expedited permit program, EPD will notify you by phone. Fees must be paid via check to “Georgia Department of Natural Resources” within ten (10) business days of acceptance.	

3. **Comments.**

This section is optional. Applicants may use this field to include specific comments or requests for EPD consideration. For example, the applicant may use this field to request a public hearing or to remind EPD of review time needs and/or expectations that may differ from the time frames in the procedures.

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: ______________________ Application No. ______________________

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: Jordan Forest Products, LLC
AIRS No. (if known): 04-13- 171 – 00005
Facility Location: Street: 752 Grove Street
City: Barnesville Georgia Zip: 30204 County: Lamar

Is this facility a "small business" as defined in the instructions? Yes: ☐ No: ☒

2. Facility Coordinates

Latitude: 33° 04' 49" **NORTH** Longitude: 84° 11' 60" **WEST**

UTM Coordinates: 761379 **EAST** 3663680 **NORTH** **ZONE** 16

3. Facility Owner

Name of Owner: Jordan Lumber and Supply Company
Owner Address Street: PO Box 98
City: Mt. Gilead State: NC Zip: 27306

4. Permitting Contact and Mailing Address

Contact Person: Wayne Brantly Title: Safety and Environmental Manager
Telephone No.: 770-358-5976 Ext. ______ Fax No.: 770-358-5939
Email Address: Wbrantly@jordanforestproducts.com
Mailing Address: Same as: Facility Location: ☒ Owner Address: ☐ Other: ☐
If Other: Street Address: ______________________
City: __________ State: __________ Zip: __________

5. Authorized Official

Name: Larry Spillers Title: Georgia Operations Manager
Address of Official Street: 752 Grove Street
City: Barnesville State: GA Zip: 30204

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: ______________________ Date: ______________________

6. **Reason for Application: (Check all that apply)**

☐ New Facility (to be constructed)

☒ Existing Facility (initial or modification application)

☐ Permit to Construct

☒ Permit to Operate

☐ Change of Location

☐ Permit to Modify Existing Equipment: Affected Permit No.: ______

☐ Revision of Data Submitted in an Earlier Application

Application No.: ______

Date of Original Submittal: ______

7. **Permitting Exemption Activities (for permitted facilities only):**

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

☒ **No** ☐ **Yes, please fill out the SIP Exemption Attachment** (See Instructions for the attachment download)

8. **Has assistance been provided to you for any part of this application?**

☐ **No** ☐ **Yes, SBAP** ☒ **Yes, a consultant has been employed or will be employed.**

If yes, please provide the following information:

Name of Consulting Company: Conversion Technology, Inc.

Name of Contact: Jeff Davis, PE

Telephone No.: 770-263-6330 ext. 116 Fax No.: 770-263-8348

Email Address: jdavis@conversiontechnology.com

Mailing Address: Street: 2190 N. Norcross Tucker Road, Suite 202

City: Norcross State: GA Zip: 30071

Describe the Consultant's Involvement:

Prepared the application.

9. **Submitted Application Forms:** Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
1	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
	2.02 Storage Tank Physical Data
	2.03 Printing Operations
	2.04 Surface Coating Operations
	2.05 Waste Incinerators (solid/liquid waste destruction)
1	2.06 Manufacturing and Operational Data
	3.00 Air Pollution Control Devices (APCD)
	3.01 Scrubbers
	3.02 Baghouses & Other Filter Collectors
	3.03 Electrostatic Precipitators
1	4.00 Emissions Data
	5.00 Monitoring Information
	6.00 Fugitive Emission Sources
1	7.00 Air Modeling Information

10. Construction or Modification Date

Estimated Start Date: ASAP

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☐ No ☐ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)		
Nitrogen oxides (NOx)		
Particulate Matter (PM) (filterable only)		
PM <10 microns (PM10)		
PM <2.5 microns (PM2.5)		
Sulfur dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Greenhouse Gases (GHGs) (in CO2e)		
Total Hazardous Air Pollutants (HAPs)		
Individual HAPs Listed Below:		

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility		After Modification	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	46.89	46.89	46.89	46.89
Nitrogen oxides (NOx)	55.82	55.82	55.82	55.82
Particulate Matter (PM) (filterable only)	25.01	25.01	32.84	32.84
PM <10 microns (PM10)	22.62	22.62	24.26	24.26
PM <2.5 microns (PM2.5)	6.584	6.584	11.42	11.42
Sulfur dioxide (SO_2)	0.3349	0.3349	0.3349	0.3349
Volatile Organic Compounds (VOC)	254.8	254.8	450.0	450.0
Greenhouse Gases (GHGs) (in CO2e)	60,979	60,979	60,979	60,979
Total Hazardous Air Pollutants (HAPs)	19.72	19.72	28.88	28.88
Individual HAPs Listed Below:				
Formaldehyde	1.105	1.105	1.718	1.718
Methanol	15.69	15.69	26.55	26.55
Acetaldehyde	0.3591	0.3591	0.6075	0.6075

14. 4-Digit Facility Identification Code:

SIC Code: 2421 SIC Description: Sawmills and Planing Mills, General

NAICS Code: 321113 NAICS Description: Sawmills

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

This permit application is being submitted to request relaxation of PSD avoidance limits. Jordan is requesting to remove the current limits of 90 MMBF/yr on Kiln No. 4 and 42 MMBF/yr for Kilns No. 1-3 combined. The facility is requesting to set a new facility wide drying limit at 225 MMBF/yr.

16. Additional information provided in attachments as listed below:

Attachment A - PSD Permit Application Binder

Attachment B -

Attachment C -

Attachment D -

Attachment E -

Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

☒ Plot plan/map of facility location or date of previous submittal: See Section 3 of Application Binder

☒ Flow Diagram or date of previous submittal: See Section 3 of Application Binder

18. Other Environmental Permitting Needs:

Will this facility/modification trigger the need for environmental permits/approvals (other than air) such as Hazardous Waste Generation, Solid Waste Handling, Water withdrawal, water discharge, SWPPP, mining, landfill, etc.?

☒ **No** ☐ **Yes, please list below:**

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
500A	Lumber Drying Kiln No. 1	Moore International – K8123	Direct natural gas-fired batch lumber drying kiln
500B	Lumber Drying Kiln No. 2	Moore International – K8123	Direct natural gas-fired batch lumber drying kiln
500C	Lumber Drying Kiln No. 3	Unknown	Direct natural gas-fired batch lumber drying kiln
500D	Lumber Drying Kiln No. 4	USNR – Counter Flow Continuous Drying Kiln	Direct natural gas-fired continuous lumber drying kiln

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FORM 2.01 – BOILERS AND FUEL BURNING EQUIPMENT

Emission Unit ID	Type of Burner	Type of Draft[1]	Design Capacity of Unit (MMBtu/hr Input)	Percent Excess Air	Dates		Date & Description of Last Modification
					Construction	Installation	
500A	Natural Gas	N/A	30	10-20	1982	1982	June 2014 - Converted to natural gas fired
500B	Natural Gas	N/A	30	10-20	1982	1982	January 2013 - Converted to natural gas fired
500C	Natural Gas	N/A	30	10-20	2004	2004	April 2015 - Converted to natural gas fired
500D	Natural Gas	N/A	40	10-20	2015	2015	N/A

[1] This column does not have to be completed for natural gas only fired equipment.

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season									
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30	Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
500A	Natural Gas	257.6	MM scf	41.67	58.33	29,000 scf/hr	29,000 scf/hr	1,020 Btu/scf	1,020 Btu/scf	<1	<1	0	0
500B	Natural Gas	257.6	MM scf	41.67	58.33	29,000 scf/hr	29,000 scf/hr	1,020 Btu/scf	1,020 Btu/scf	<1	<1	0	0
500C	Natural Gas	257.6	MM scf	41.67	58.33	29,000 scf/hr	29,000 scf/hr	1,020 Btu/scf	1,020 Btu/scf	<1	<1	0	0
500D	Natural Gas	343.5	MM scf	41.67	58.33	39,000 scf/hr	39,000 scf/hr	1,020 Btu/scf	1,020 Btu/scf	<1	<1	0	0

Fuel Supplier Information

Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip
Natural Gas	N/A - Supplier did not provide fuel data					

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FORM 2.06 – MANUFACTURING AND OPERATIONAL DATA

Normal Operating Schedule: 24 hours/day 7 days/week 50 weeks/yr

Additional Data Attached? ☒ - No ☐ - Yes, please include the attachment in list on Form 1.00, Item 16.

Seasonal and/or Peak Operating Periods: Kilns operate 24/7 except when down for maintenance or mill closed for extended holidays.

Dates of Annually Occurring Shutdowns: Shutdowns are scheduled around maintenance as needed.

PRODUCTION INPUT FACTORS

Emission Unit ID	Emission Unit Name	Const. Date	Input Raw Material(s)	Annual Input	Hourly Process Input Rate		
					Design	Normal	Maximum
500A	Lumber Drying Kiln No. 1	1982	Green Rough Sawn Lumber	43.3 MMBF/yr	7,420 BF/hr	4,950 BF/hr	7,420 BF/hr
500B	Lumber Drying Kiln No. 2	1982	Green Rough Sawn Lumber	43.3 MMBF/yr	7,420 BF/hr	4,950 BF/hr	7,420 BF/hr
500C	Lumber Drying Kiln No. 3	2004	Green Rough Sawn Lumber	43.3 MMBF/yr	7,990 BF/hr	4,950 BF/hr	7,490 BF/hr
500D	Lumber Drying Kiln No. 4	2016	Green Rough Sawn Lumber	95 MMBF/yr	10,850 BF/hr	10,850 BF/hr	10,850 BF/hr

PRODUCTS OF MANUFACTURING

Emission Unit ID	Description of Product	Production Schedule		Hourly Production Rate (Give units: e.g. lb/hr, ton/hr)			
		Tons/yr	Hr/yr	Design	Normal	Maximum	Units
500A-D	**Dried Rough Sawn Lumber**	**350,000**	**8,600**	**40.7**	**40.7**	**40.7**	**ton/hr**

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
500A*	N/A	501A	CO	2.471	2.471	10.82	10.82	Engineering Estimate
			NOx	2.941	2.941	12.88	12.88	Engineering Estimate
			SO2	0.01765	0.01765	0.07729	0.07729	Engineering Estimate
			PM	0.6925	0.6925	3.033	3.033	Engineering Estimate
			PM10	0.5145	0.5145	2.253	2.253	Engineering Estimate
			PM2.5	0.4897	0.4897	2.145	2.145	Engineering Estimate
			VOC	19.79	19.79	86.67	86.67	Engineering Estimate
			Formaldehyde	0.07591	0.07591	0.3325	0.3325	Engineering Estimate
			Methanol	1.167	1.167	5.113	5.113	Engineering Estimate
			Acetaldehyde	0.02671	0.02671	0.1170	0.1170	Engineering Estimate
			GHG**	1,594	1,594	14,099	14,099	Engineering Estimate
500B*	N/A	501B	CO	2.471	2.471	10.82	10.82	Engineering Estimate
			NOx	2.941	2.941	12.88	12.88	Engineering Estimate
			SO2	0.01765	0.01765	0.07729	0.07729	Engineering Estimate
			PM	0.6925	0.6925	3.033	3.033	Engineering Estimate
			PM10	0.5145	0.5145	2.253	2.253	Engineering Estimate
			PM2.5	0.4897	0.4897	2.145	2.145	Engineering Estimate
			VOC	19.79	19.79	86.67	86.67	Engineering Estimate
			Formaldehyde	0.07591	0.07591	0.3325	0.3325	Engineering Estimate
			Methanol	1.167	1.167	5.113	5.113	Engineering Estimate
			Acetaldehyde	0.02671	0.02671	0.1170	0.1170	Engineering Estimate
			GHG**	1,594	1,594	14,099	14,099	Engineering Estimate

500C*	N/A	501C	CO	2.471	2.471	10.82	10.82	Engineering Estimate
			NOx	2.941	2.941	12.88	12.88	Engineering Estimate
			SO2	0.01765	0.01765	0.07729	0.07729	Engineering Estimate
			PM	0.6925	0.6925	3.033	3.033	Engineering Estimate
			PM10	0.5145	0.5145	2.253	2.253	Engineering Estimate
			PM2.5	0.4897	0.4897	2.145	2.145	Engineering Estimate
			VOC	19.79	19.79	86.67	86.67	Engineering Estimate
			Formaldehyde	0.07591	0.07591	0.3325	0.3325	Engineering Estimate
			Methanol	1.167	1.167	5.113	5.113	Engineering Estimate
			Acetaldehyde	0.02671	0.02671	0.1170	0.1170	Engineering Estimate
			GHG**	1,594	1,594	14,099	14,099	Engineering Estimate
500D	N/A	501D	CO	3.294	3.294	14.43	14.43	Engineering Estimate
			NOx	3.922	3.922	17.18	17.18	Engineering Estimate
			SO2	0.02353	0.02353	0.1031	0.1031	Engineering Estimate
			PM	1.518	1.518	6.650	6.650	Engineering Estimate
			PM10	1.128	1.128	4.940	4.940	Engineering Estimate
			PM2.5	1.074	1.074	4.703	4.703	Engineering Estimate
			VOC	43.38	43.38	190.0	190.0	Engineering Estimate
			Formaldehyde	0.1645	0.1645	0.7206	0.7206	Engineering Estimate
			Methanol	2.559	2.559	11.21	11.21	Engineering Estimate
			Acetaldehyde	0.05856	0.05856	0.2565	0.2565	Engineering Estimate
			GHG**	2,124	2,124	18,684	18,684	Engineering Estimate

*Emissions from the batch kilns (500A, 500B, 500C) are calculated based on the proposed limit of 225 MMBF/yr minus the 95 MMBF/yr capacity of Kiln No. 4 (500D).
**GHG emissions in kg/hr and metric tons/yr

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FORM 7.00 – AIR MODELING INFORMATION: Stack Data

Stack ID	Emission Unit ID(s)	Stack Information			Dimensions of largest Structure Near Stack		Exit Gas Conditions at Maximum Emission Rate			
		Height Above Grade (ft)	Inside Diameter (ft)	Exhaust Direction	Height (ft)	Longest Side (ft)	Velocity (ft/sec)	Temperature (°F)	Flow Rate (acfm)	
									Average	Maximum
501A	500A	27	4.787*	Towards Sky	35	244	25.40	215	28,000	28,000
501B	500B	27	4.787*	Towards Sky	35	244	25.40	215	28,000	28,000
501C	500C	27	4.787*	Towards Sky	35	244	25.85	215	28,500	28,500
501D1	500D	16.5	15.66*	West – horizontal	35	244	0.003281	215	37.91	37.91
501D2	500D	16.5	15.66*	West – horizontal	35	244	0.003281	215	37.91	37.91
501D3	500D	16.5	15.66*	East – horizontal	35	244	0.003281	215	37.91	37.91
501D4	500D	16.5	15.66*	East – horizontal	35	244	0.003281	215	37.91	37.91

* Diameter is equivalent diameter. See Section 7 of Application Binder for more details.

NOTE: If emissions are not vented through a stack, describe point of discharge below and, if necessary, include an attachment. List the attachment in Form 1.00 *General Information*, Item 16.

Facility Name: Jordan Forest Products, LLC **Date of Application:** April 2016

FORM 7.00 AIR MODELING INFORMATION: Chemicals Data

Chemical	Potential Emission Rate (lb/hr)	Toxicity	Reference	MSDS Attached
Lumber Drying Kiln No. 1 (500A – Stack 501A)				
Formaldehyde (50-00-0)	0.1128	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	1.751	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.04007	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐
Lumber Drying Kiln No. 2 (500B – Stack 501B)				
Formaldehyde (50-00-0)	0.1128	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	1.751	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.04007	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐
Lumber Drying Kiln No. 3 (500C – Stack 501C)				
Formaldehyde (50-00-0)	0.1213	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	1.886	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.04315	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐
Lumber Drying Kiln No. 4 Western Door 1 (500D – Stack 501D1)				
Formaldehyde (50-00-0)	0.04113	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	0.6398	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.01464	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐

Lumber Drying Kiln No. 4 Western Door 2 (500D – Stack 501D2)				
Formaldehyde (50-00-0)	0.04113	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	0.6398	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.01464	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐
Lumber Drying Kiln No. 4 Eastern Door 1 (500D – Stack 501D3)				
Formaldehyde (50-00-0)	0.04113	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	0.6398	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.01464	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐
Lumber Drying Kiln No. 4 Eastern Door 2 (500D – Stack 501D4)				
Formaldehyde (50-00-0)	0.04113	1.1 µg/m^3	IRIS Rfc	☐
		245 µg/m^3	29 CFR 1910.1048 (STEL)	☐
Methanol (67-56-1)	0.6398	619 µg/m^3	OSHA Z-1 TWA	☐
		32,800 µg/m^3	ACGIH STEL/CEIL	☐
Acetaldehyde (75-07-0)	0.01464	4.5 µg/m^3	IRIS Rfc	☐
		4,500 µg/m^3	ACGIH STEL/CEIL	☐

SECTION 2

INTRODUCTION

SECTION 2: INTRODUCTION

Jordan Forest Products, LLC (Jordan) operates a dimensional lumber mill in Barnesville, Georgia. The mill consists of a sawmill, lumber drying kilns, a planer mill, and supporting operations. Jordan has recently received a permit to construct a new direct natural gas-fired continuous kiln (Kiln No. 4). The permit to construct this kiln imposes limits on the amount of lumber dried in the kilns such that the modification was not considered a major modification with respect to Prevention of Significant Deterioration (PSD) regulations.

Prior to beginning construction on the continuous kiln, Jordan operated three batch lumber drying kilns. Kilns No. 1 and 2 were limited to 130 MMBF/yr combined, and Kiln No. 3 was limited to 70 MMBF/yr. This effectively made the facility wide lumber drying limit 200 MMBF/yr. In order to avoid PSD review for construction of the continuous kiln, Jordan accepted PSD avoidance limits on its kilns. Kiln No. 4 (the new kiln) was limited to 90 MMBF/yr, and Kilns No. 1-3 (the existing kilns) were limited to 42 MMBF/yr combined.

Jordan now wishes to increase the permitted drying limits for its kilns to a facility wide total of 225 MMBF/yr. Since Jordan is requesting relaxation of PSD avoidance limits that were placed on the kilns in the permit to construct Kiln No. 4, this application will address the PSD requirements that would have been triggered without the PSD avoidance limits. That is, the application and emissions calculations will be done as if Kiln No. 4 was a new unit and the PSD avoidance limits on the kilns had not been put into place.

The net emissions increases for all pollutants were calculated and were below the Significant Emission Rate (SER) threshold for all pollutants except VOC. Net emissions increases are shown in Table 2.1 below.

Table 2.1. Summary of Net Emissions Increases.

Pollutant	Net Emissions Increase (tpy)	PSD Significant Emission Rate Threshold (tpy)	PSD Review Required?
CO	14.43	100	No
NO_x	17.18	40	No
SO_2	0.1031	40	No
PM	8.098	25	No
PM_{10}	8.969	15	No
$PM_{2.5}$	4.687	10	No
VOC	190.0	40	Yes
GHG (CO_2e)*	18,684	75,000	No

*GHG in metric tons.

SECTION 3

PROCESS AND FACILITY DESCRIPTION

SECTION 3: PROCESS AND FACILITY DESCRIPTION

This section provides an overview of the facility's current process as well as a description of the proposed modification. A discussion of the facility's status as it relates to PSD regulations and of the attainment status of the area is also included.

3.1 CURRENT PROCESS DESCRIPTION

Tree-length and precut logs are received and sent to the log processing area where the bark is removed by one of two debarkers. The unusable ends of the log are cut off initially, and then the log is cut to the desired length at the sawmill. The logs are sawed into rough lumber and conveyed to the green sorter. The sorted green lumber is stored on carts and loaded into one of four direct natural gas-fired kilns for drying. The dried lumber from the kilns is sent to the planer mill where rough surfaces are smoothed, and lumber is graded and trimmed. The finished lumber is packaged and then shipped off-site.

3.2 PROPOSED MODIFICATION

Jordan is requesting relaxation of the PSD avoidance limits placed on its lumber drying kilns in Permit No. 2421-171-0005-V-04-1 and proposing a new facility-wide drying limit of 225 MMBF/yr.

3.3 FACILITY DESCRIPTION

Jordan is a PSD major source as the facility has the potential to emit greater than 250 tons per year of VOC. Since Jordan is a PSD major source, the net emissions increases from the proposed project will be evaluated to determine whether the SER threshold is exceeded for any regulated pollutants.

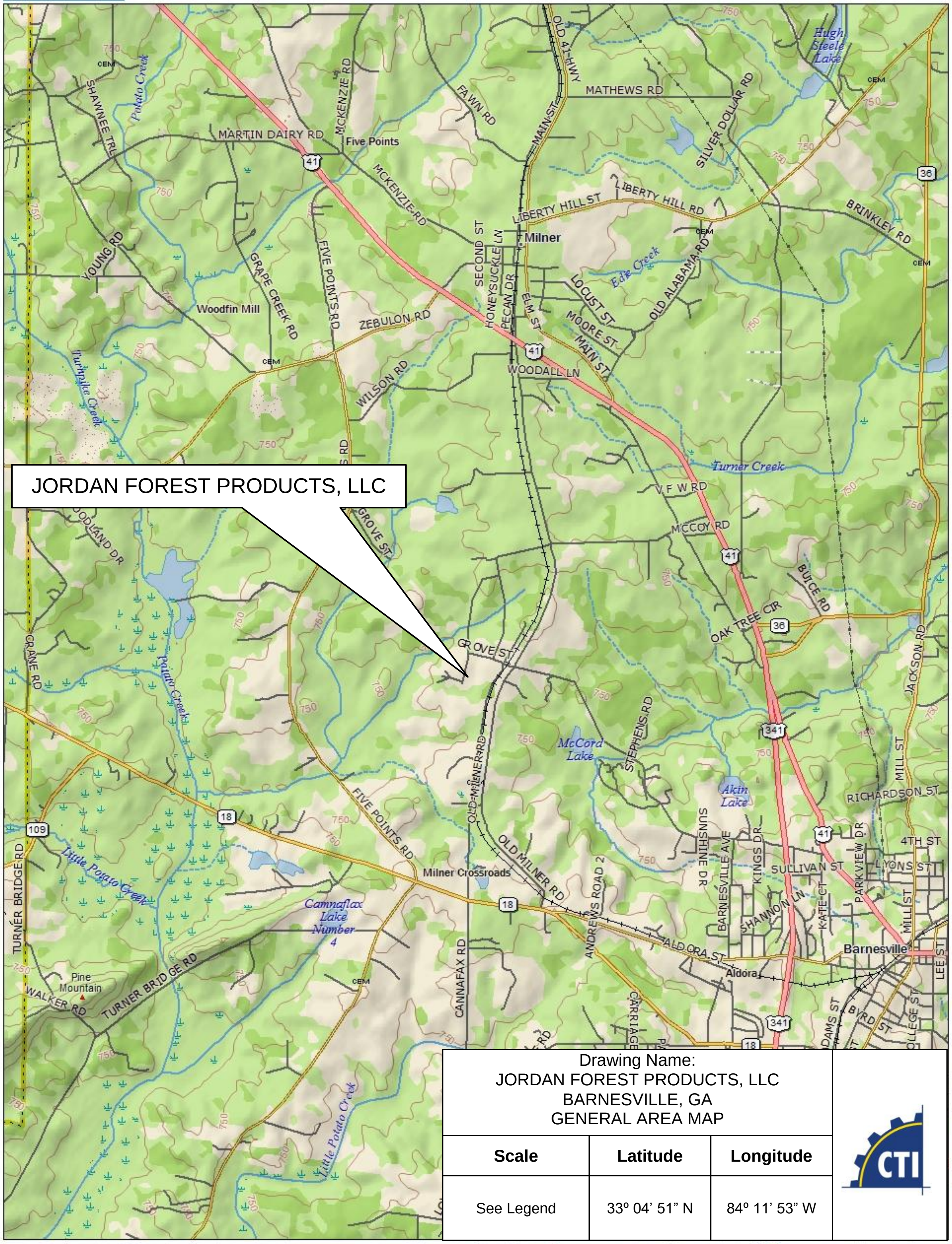
Jordan is located in Lamar County, which has not been designated as a nonattainment area for any regulated pollutants. Therefore, Nonattainment New Source Review is not applicable to the proposed project.

The net emissions increase for each regulated pollutant has been calculated. The net emissions increase of VOC exceeds the SER threshold. Net emissions increases of all other regulated pollutants are below the respective SER thresholds.

GENERAL AREA MAP

DeLORME

Topo North America™ 9



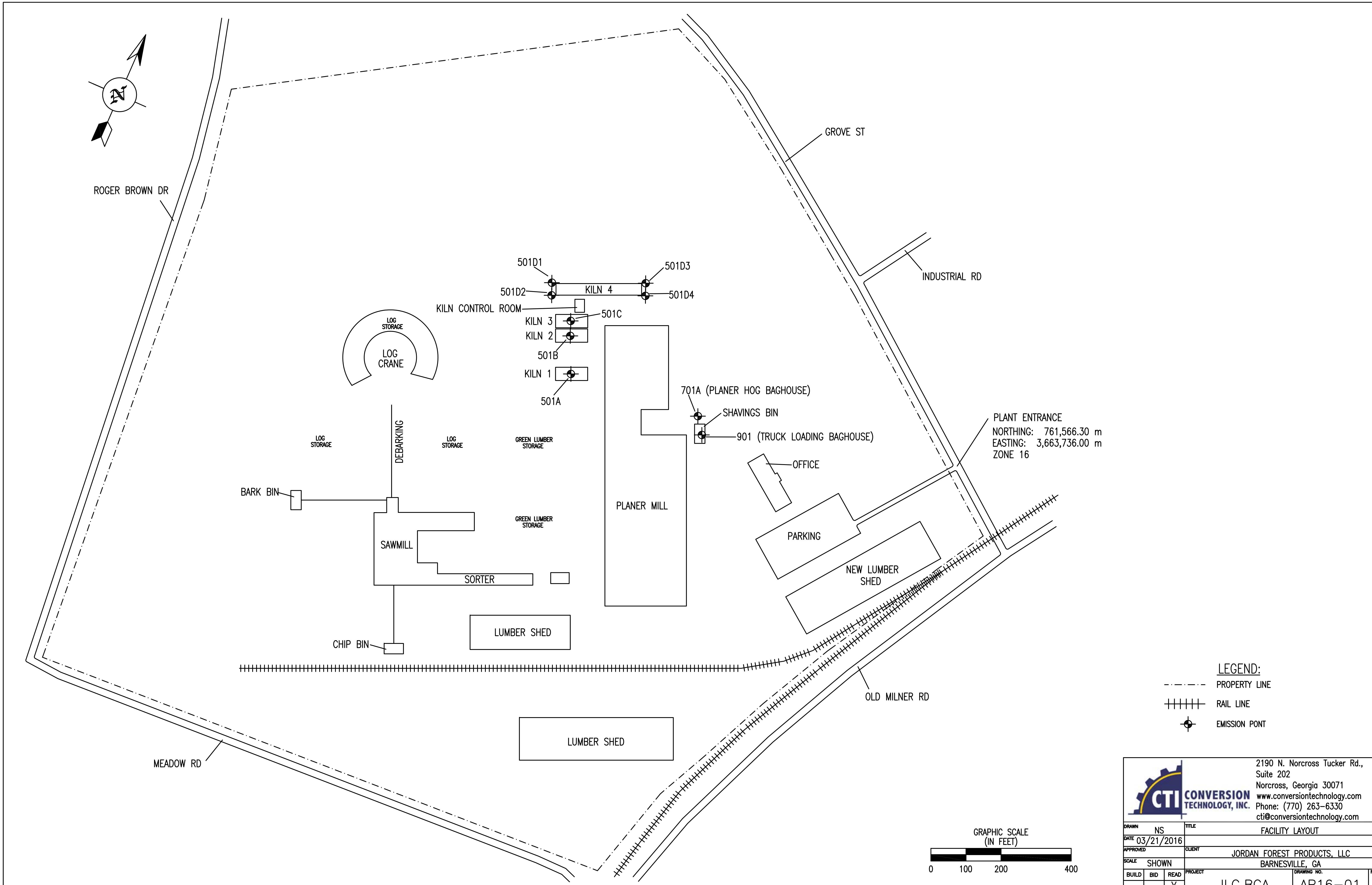
Drawing Name: JORDAN FOREST PRODUCTS, LLC BARNESVILLE, GA GENERAL AREA MAP		
Scale	**Latitude**	**Longitude**
See Legend	33º 04' 51" N	84º 11' 53" W

MN (5.1° W)

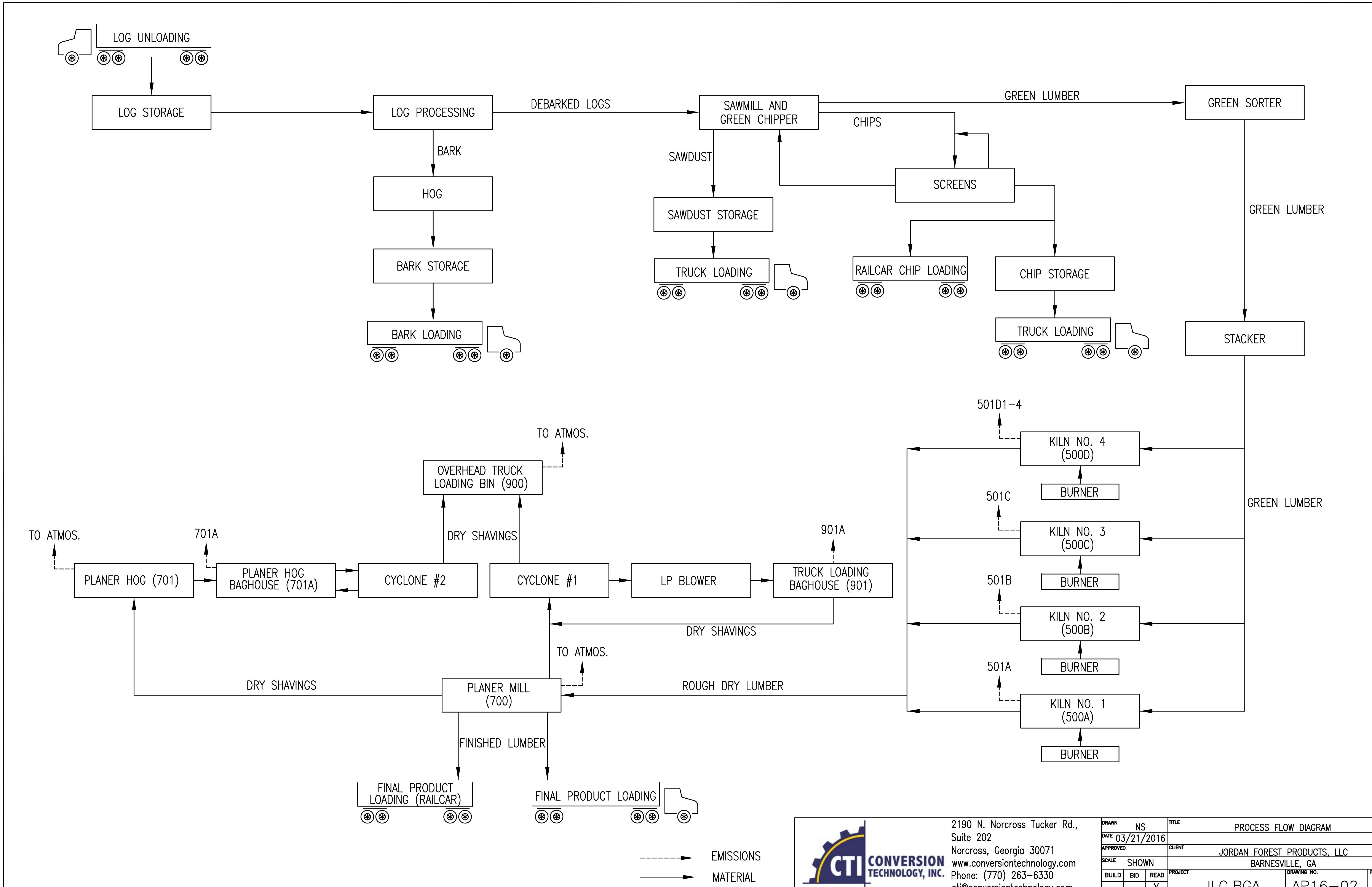
0 ¼ ½ ¾ 1 1¼ mi

Data Zoom 12-0

FACILITY LAYOUT


N
ROGER BROWN DR
GROVE ST
INDUSTRIAL RD
MEADOW RD
OLD MILNER RD
501D1
501D3
501D2
KILN 4
501D4
KILN CONTROL ROOM
KILN 3
501C
KILN 2
501B
KILN 1
501A
LOG STORAGE
LOG CRANE
DEBARKING
LOG STORAGE
LOG STORAGE
GREEN LUMBER STORAGE
GREEN LUMBER STORAGE
701A (PLANER HOG BAGHOUSE)
SHAVINGS BIN
901 (TRUCK LOADING BAGHOUSE)
OFFICE
PLANER MILL
BARK BIN
SAWMILL
SORTER
PARKING
NEW LUMBER SHED
PLANT ENTRANCE
NORTHING: 761,566.30 m
EASTING: 3,663,736.00 m
ZONE 16
LUMBER SHED
CHIP BIN
LUMBER SHED
LEGEND:
PROPERTY LINE
RAIL LINE
EMISSION POINT
GRAPHIC SCALE
(IN FEET)
0
100
200
400
CTI CONVERSION TECHNOLOGY, INC.
2190 N. Norcross Tucker Rd., Suite 202
Norcross, Georgia 30071
www.conversiontechnology.com
Phone: (770) 263-6330
cti@conversiontechnology.com
DRAWN NS
DATE 03/21/2016
APPROVED
SCALE SHOWN
TITLE FACILITY LAYOUT
CLIENT JORDAN FOREST PRODUCTS, LLC
BARNESVILLE, GA
BUILD BID READ
X
PROJECT JLC.BGA
DRAWING NO. AP16-01
REV. 0

PROCESS FLOW DIAGRAM



LOG UNLOADING
LOG STORAGE
LOG PROCESSING
DEBARKED LOGS
SAWMILL AND GREEN CHIPPER
GREEN LUMBER
GREEN SORTER
CHIPS
BARK
HOG
SAWDUST
SCREENS
SAWDUST STORAGE
BARK STORAGE
TRUCK LOADING
RAILCAR CHIP LOADING
CHIP STORAGE
GREEN LUMBER
BARK LOADING
TRUCK LOADING
STACKER
501D1–4
KILN NO. 4 (500D)
TO ATMOS.
OVERHEAD TRUCK LOADING BIN (900)
BURNER
501C
GREEN LUMBER
KILN NO. 3 (500C)
TO ATMOS.
701A
DRY SHAVINGS
901A
BURNER
PLANER HOG (701)
PLANER HOG BAGHOUSE (701A)
CYCLONE #2
CYCLONE #1
LP BLOWER
TRUCK LOADING BAGHOUSE (901)
501B
KILN NO. 2 (500B)
DRY SHAVINGS
TO ATMOS.
BURNER
501A
DRY SHAVINGS
PLANER MILL (700)
ROUGH DRY LUMBER
KILN NO. 1 (500A)
BURNER
FINISHED LUMBER
FINAL PRODUCT LOADING (RAILCAR)
FINAL PRODUCT LOADING
EMISSIONS
MATERIAL
CTI CONVERSION TECHNOLOGY, INC.
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cti@conversiontechnology.com
DRAWN NS
DATE 03/21/2016
APPROVED
SCALE SHOWN
BUILD BID READ X
TITLE PROCESS FLOW DIAGRAM
CLIENT JORDAN FOREST PRODUCTS, LLC
BARNESVILLE, GA
PROJECT JLC.BGA
DRAWING NO. AP16–02
REV. 0

SECTION 4

EMISSION CALCULATIONS

SECTION 4: EMISSION CALCULATIONS

This section provides a discussion of the methodologies used in calculating emissions from the proposed project. Sources for emission factors and assumptions used in the calculations are also discussed. Detailed emission calculations can be found at the end of the section.

4.1 EMISSION FACTORS

4.1.1 NATURAL GAS-FIRED LUMBER DRYING KILNS

Emission factors for the natural gas-fired lumber drying kilns were selected after a review of permits recently issued by EPD for similar projects. The selected lumber drying emission factors are ones that have been previously accepted by EPD and/or specified by EPD in permit narratives. Emission factors for natural gas combustion were based on AP 42 and 40 CFR Part 98 (Mandatory Greenhouse Gas Reporting Rule).

Jordan's lumber drying kilns are unusual in that they rely on natural gas burners to supply heat to the kilns. Most direct-fired kilns are heated by wood combustion, and emission factors for natural gas direct-fired kilns are not widely available. Lumber drying emissions will be based on the best available emission factors for each specific pollutant as described below.

The best available factors for PM, PM_{10}, $PM_{2.5}$, and VOC are based on test data for direct-fired wood combustion kilns. The best available factors for CO, NO_x, and SO_2 are AP 42 emission factors for natural gas combustion. The AP 42 factors for particulates and VOC from natural gas combustion were not used. Since the emission factors selected for particulates and VOC are based on test data from wood combustion direct-fired kilns, particulate and VOC emissions from combustion are already accounted for. The particulate and VOC emission factors for wood combustion are higher than the factors for natural gas combustion, meaning that the particulate and VOC emissions estimates are conservative.

The best available factors for HAP emissions from lumber drying are based on test data for steam-heated kilns. Since HAPs can be formed as byproducts of combustion, test data for HAPs emitted from wood combustion direct-fired kilns are not likely to be representative of Jordan's natural gas direct-fired kilns. Formaldehyde emissions from natural gas combustion are accounted for and are based on an AP 42 emission factor. Formaldehyde emissions from natural gas combustion were calculated due to the impact that the emissions may have on Toxic Air Pollutant modeling. Emissions of any other HAPs from natural gas combustion are negligible.

4.1.2 ASSOCIATED EMISSION UNITS

Emissions of PM from wood debarking, handling, sawing, and planing will increase due to the additional lumber production. There will also be increases in PM emissions from increased truck traffic on plant roads. Emission factors for these activities are primarily from AP-42. Additional information on these emission factors can be found in the detailed emission calculations at the end of this section.

4.2 PROJECT EMISSIONS INCREASES

The net project emissions increases were calculated by summing the emissions from new emission units, existing emissions units, and associated emission units. Table 4.1 shows a summary of the emissions increases attributable to the project.

4.2.1 NEW EMISSION UNITS

The new continuous lumber drying kiln (Kiln No. 4) is considered a new unit. The emissions from the kiln are based on the estimated design throughput capacity of 95 MMBF/yr.

4.2.2 EXISTING EMISSION UNITS

No existing emission units are being modified as a result of this project.

4.2.3 ASSOCIATED EMISSION UNITS

Increased emissions from the sawmill, planer mill, and plant roads are also expected to occur as a result of the increased lumber production. These sources are considered associated units. Previously, some plant roads were unpaved. All plant roads that are traveled by trucks are now paved, and this will be reflected in the road PM emission calculations.

Table 4.1. Summary of Project Emissions Increases

Pollutant	New Units Emissions Increases (tpy)	Existing Units Emissions Increases (tpy)	Associated Units Emissions Increases (tpy)	Total Emissions Increase (tpy)	PSD Significant Emission Rate Threshold (tpy)	PSD Review Required?
CO	14.43	0	0	14.43	100	No
NO_x	17.18	0	0	17.18	40	No
SO_2	0.1031	0	0	0.1031	40	No
PM	6.650	0	1.448	8.098	25	No
PM_{10}	4.940	0	4.029	8.969	15	No
$PM_{2.5}$	4.703	0	-0.01555	4.687	10	No
VOC	190.0	0	0	190.0	40	Yes
GHG (CO_2e)*	18,684	0	0	18,684	75,000	No

*GHG in metric tons.

As shown in the table, the emissions increases of CO, NO_x, SO_2, PM, PM_{10}, $PM_{2.5}$, and GHG are below the SER thresholds. VOC is the only pollutant for which emissions increases exceed the SER thresholds.

4.3 CONTEMPORANEOUS NETTING ANALYSIS

A contemporaneous netting analysis involves a review of modifications completed during the contemporaneous period. The contemporaneous period begins five years prior to the start date of the construction/modification and ends when the constructed/modified unit begins normal operation.

A contemporaneous netting analysis is only conducted for the pollutants for which there is a significant increase in emissions. The only pollutant for which emissions exceed the SER threshold is VOC. There have not been any contemporaneous changes at the facility that resulted in a change in VOC emissions. Therefore, a contemporaneous netting analysis has not been conducted.

4.4 GEORGIA RULE 391-3-1-.02(2)(e)

Georgia Rule 391-3-1-.02(2)(e) establishes particulate matter emission limits based on the process input weight rate of each manufacturing process. The following equations are to be used in establishing the allowable limits:

$E = 4.1 \times P^{0.67}$; for process weight input weight rate less than 30 tons per hour

$E = 55 \times P^{0.11} - 40$; for process input weight rate greater than 30 tons per hour

Where:
E = emission rate in pounds per hour; and
P = process input weight rate in tons per hour

Calculations demonstrating compliance with this rule can be found at the end of this section.

4.5 FACILITY WIDE EMISSIONS SUMMARY

Tables 4.2 summarizes the facility wide emissions after the modification.

Table 4.2. Facility Wide Emissions (After Modification)

Pollutant	Actual Emissions (tpy)	Potential Emissions (tpy)
CO	46.89	46.89
NO_x	55.82	55.82
SO_2	0.3349	0.3349
PM	32.84	32.84
PM_{10}	24.26	24.26
$PM_{2.5}$	11.42	11.42
VOC	450.0	450.0
Formaldehyde	1.790	1.790
Methanol	26.55	26.55
Acetaldehyde	0.6075	0.6075
Total HAPs	28.95	28.95
GHG (CO_2e)*	60,979	60,979

*GHG emissions in metric tons.

DETAILED EMISSION CALCULATIONS

Table 4.3. Lumber Drying Kiln No. 4 (500D) Emissions

Operational Information			
Emission Unit	Kiln Annual Throughput* (MMBF/yr)	Natural Gas Burner Capacity (MMBtu/hr)	Natural Gas Heating Value (Btu/scf)
Kiln No. 4 (500D)	95	40	1,020

*Throughput based on maximum capacity of continuous kiln.

Pollutant	Emission Factor		Reference	Potential Emissions (lb/hr)	Potential Emissions (tpy)
Lumber Drying Emissions					
PM	0.14	lb/MBF	1	1.518	6.650
PM_{10}	0.104	lb/MBF	1	1.128	4.940
$PM_{2.5}$	0.099	lb/MBF	1	1.074	4.703
VOC	4.0	lb/MBF	2	43.38	190.0
Formaldehyde	0.0149	lb/MBF	3	0.1616	0.7078
Methanol	0.236	lb/MBF	3	2.559	11.21
Acetaldehyde	0.0054	lb/MBF	4	0.05856	0.2565
Total HAPs				2.780	12.17
Natural Gas Combustion Emissions					
CO	84	lb/MMscf	5	3.294	14.43
NO_x	100	lb/MMscf	5	3.922	17.18
SO_2	0.6	lb/MMscf	5	0.02353	0.1031
Formaldehyde	0.075	lb/MMscf	5	0.002941	0.01288
Natural Gas Greenhouse Gas Emissions**					
CO_2	53.06	kg/MMBtu	6	2,122	18,592
CH_4	1.00E-03	kg/MMBtu	6	0.04000	0.3504
N_2O	1.00E-04	kg/MMBtu	6	0.004000	0.03504
Total Emissions					
CO				3.294	14.43
NO_x				3.922	17.18
SO_2				0.02353	0.1031
PM				1.518	6.650
PM_{10}				1.128	4.940
$PM_{2.5}$				1.074	4.703
VOC				43.38	190.0
Formaldehyde				0.1645	0.7206
Methanol				2.559	11.21
Acetaldehyde				0.05856	0.2565
Total HAPs				2.782	12.19
GHG (CO_2e)**				2,124	18,684

**GHG emissions in kg/hr and metric tons/yr.

Emission Factor References:

1) EPD accepted emission factor from Title V Application Number 21615 for West Fraser - Augusta Lumber Mill. Based on stack test data for Bibler Brothers Lumber Company (Russelville, AR), NCASI condensible PM ratios, and previous EPD guidance for PM_{10} and $PM_{2.5}$ percentages.
2) VOC emission factor requested by EPD in Jordan's most recent Title V Application (Application Number 40486).
3) Emission factor for steam-heated southern pine drying kilns obtained from Title V Application Number 20518 for Rayonier Wood Products LLC - Baxley Sawmill.
4) Emission factor for steam-heated southern pine drying kilns obtained from Title V Application Number 20695 for Temple Inland - Rome Lumber Mill.
5) AP 42, Chapter 1.4 Natural Gas Combustion, Tables 1.4-1, 1.4-2, and 1.4-3.
6) 40 CFR 98 - Mandatory Greenhouse Gas Reporting Rule Tables C-1 and C-2. CH_4 and N_2O emissions are multiplied by the global warming potentials found in Table A-1 in order to calculate total GHG emissions.

Table 4.4. Previous 10 Years Production Data (Drying Kilns)

Year	Kiln 1 (boardfeet)	Kiln 2 (boardfeet)	Kiln 3 (boardfeet)	Total Produced (boardfeet)	24-Month Average Production (boardfeet)
2006	n/a	n/a	n/a	114,478,000	n/a
2007	n/a	n/a	n/a	53,006,000	83,742,000
2008	35,594,000	35,745,000	31,363,000	102,702,000	77,854,000
2009	28,414,000	31,887,000	13,253,000	73,554,000	88,128,000
2010	32,349,000	36,999,000	35,841,000	105,189,000	89,371,500
2011	25,611,000	25,124,000	26,106,000	76,841,000	91,015,000
2012	32,551,906	26,581,489	34,363,997	93,497,392	85,169,196
2013	27,240,117	44,910,979	29,190,448	101,341,544	97,419,468
2014	39,664,124	50,897,011	32,923,345	123,484,480	112,413,012
2015	44,250,538	47,535,127	36,671,194	128,456,859	125,970,670

Highest 24-month average production.

Table 4.5. Debarking, Sawing, Planing, and Material Handling Emissions

Operational Information		
Previously Permitted Maximum Mill Throughput*	200	MMBF/yr
Mill Throughput During Baseline Period for PM**	125.97	MMBF/yr
New Maximum Mill Throughput***	225	MMBF/yr

*Throughput based on a previously permitted kiln drying limit.

**Highest 24-month average throughput (Jan. 2013 - Dec. 2015).

***Throughput based on requested facility-wide kiln drying limit.

Throughput at Production Rate of 200 MMBF/yr.

Source	Previous Maximum Throughput*	
West Debarker	386,536	tpy
East Debarker	386,536	tpy
Bark to Hog	58,949	tpy
Bark to Storage	58,949	tpy
Bark Truck Loading	221	hr/yr
Dust/Chips to Screen	335,829	tpy
Chips to Bin	325,878	tpy
Green Chip Truck Loading	606	hr/yr
Green Chip Railcar Loading	606	hr/yr
Fines/Chips to Storage	59,007	tpy
Fines to Truck Loading	215	hr/yr
Dry Trim to Hog	39,952	tpy
Dry Dust to Storage	7,359	tpy
Dry Dust to Truck Loading	55	hr/yr

*Throughputs estimated for 2006 Title V Renewal.

Throughput and Baseline Actual PM Emissions at Production Rate of 125.97 MMBF/yr.

Source	Past Actual Throughput		Emission Factor		Reference	Potential Emissions	
						(lb/hr)	(tpy)
West Debarker	243,460	tpy	0.024	lb/ton	1	0.6670	2.922
East Debarker	243,460	tpy	0.024	lb/ton	1	0.6670	2.922
Bark to Hog	37,129	tpy	2.65E-05	lb/ton	2	0.0001123	0.0004920
Bark to Storage	37,129	tpy	2.65E-05	lb/ton	2	0.0001123	0.0004920
Bark Truck Loading	139	hr/yr	1	lb/hr	3	1.000	0.0696
Dust/Chips to Screen	211,522	tpy	2.65E-05	lb/ton	2	0.0006399	0.002803
Chips to Bin	205,254	tpy	2.65E-05	lb/ton	2	0.0006209	0.002720
Green Chip Truck Loading	382	hr/yr	1	lb/hr	3	1.000	0.1908
Green Chip Railcar Loading	382	hr/yr	1	lb/hr	3	1.000	0.1908
Fines/Chips to Storage	37,166	tpy	2.65E-05	lb/ton	2	0.0001124	0.0004924
Fines to Truck Loading	135	hr/yr	1	lb/hr	3	1.000	0.06771
Dry Trim to Hog	25,164	tpy	6.67E-04	lb/ton	2	0.001916	0.008392
Dry Dust to Storage	4,635	tpy	6.67E-04	lb/ton	2	0.0003529	0.001546
Dry Dust to Truck Loading	35	hr/yr	1	lb/hr	3	1.000	0.01732

Totals		(lb/hr)	(tpy)
	PM	6.338	6.396
	PM_{10}*	6.338	6.396
	$PM_{2.5}$**	0.1503	0.004089

*PM_{10} is assumed to be equal to PM.

**$PM_{2.5}$ from green wood is assumed to be zero.
$PM_{2.5}$ from dry wood is assumed to be 15% of PM.

Emission Factor References:

1) Old AP 42 Section 10.3.

2) AP 42 Section 13.2.4, Aggregate Handling and Storage Piles.

3) Historic Engineering Estimation.

Future Throughput and PM Emissions at Production Rate of 225 MMBF/yr.

Source	New Maximum Throughput		Emission Factor		Reference	Potential Emissions (lb/hr)	Potential Emissions (tpy)
West Debarker	434,853	tpy	0.024	lb/ton	1	1.191	5.218
East Debarker	434,853	tpy	0.024	lb/ton	1	1.191	5.218
Bark to Hog	66,318	tpy	2.65E-05	lb/ton	2	0.0002006	0.0008787
Bark to Storage	66,318	tpy	2.65E-05	lb/ton	2	0.0002006	0.0008787
Bark Truck Loading	249	hr/yr	1	lb/hr	3	1.000	0.1243
Dust/Chips to Screen	377,808	tpy	2.65E-05	lb/ton	2	0.001143	0.005006
Chips to Bin	366,613	tpy	2.65E-05	lb/ton	2	0.001109	0.004858
Green Chip Truck Loading	682	hr/yr	1	lb/hr	3	1.000	0.3409
Green Chip Railcar Loading	682	hr/yr	1	lb/hr	3	1.000	0.3409
Fines/Chips to Storage	66,383	tpy	2.65E-05	lb/ton	2	0.0002008	0.000880
Fines to Truck Loading	242	hr/yr	1	lb/hr	3	1.000	0.1209
Dry Trim to Hog	44,946	tpy	6.67E-04	lb/ton	2	0.003422	0.01499
Dry Dust to Storage	8,279	tpy	6.67E-04	lb/ton	2	0.0006304	0.002761
Dry Dust to Truck Loading	62	hr/yr	1	lb/hr	3	1.000	0.03094

Emission Factor References:
1) Old AP 42 Section 10.3.
2) AP 42 Section 13.2.4, Aggregate Handling and Storage Piles.
3) Historic Engineering Estimation.

Totals		(lb/hr)	(tpy)
	PM	7.390	11.42
	PM_{10}*	7.390	11.42
	$PM_{2.5}$**	0.1506	0.007303

*PM_{10} is assumed to be equal to PM.
**$PM_{2.5}$ from green wood is assumed to be zero.
$PM_{2.5}$ from dry wood is assumed to be 15% of PM.

Additional PM Emissions from Production Increase from 125.97 MMBF to 225 MMBF.

Source	Throughput Increase		Emission Factor		Emissions Increase (tpy)
West Debarker	191,393	tpy	0.024	lb/ton	2.297
East Debarker	191,393	tpy	0.024	lb/ton	2.297
Bark to Hog	29,189	tpy	2.65E-05	lb/ton	0.0003867
Bark to Storage	29,189	tpy	2.65E-05	lb/ton	0.0003867
Bark Truck Loading	109	hr/yr	1	lb/hr	0.05471
Dust/Chips to Screen	166,286	tpy	2.65E-05	lb/ton	0.002203
Chips to Bin	161,358	tpy	2.65E-05	lb/ton	0.002138
Green Chip Truck Loading	300	hr/yr	1	lb/hr	0.1500
Green Chip Railcar Loading	300	hr/yr	1	lb/hr	0.1500
Fines/Chips to Storage	29,217	tpy	2.65E-05	lb/ton	0.0003871
Fines to Truck Loading	106	hr/yr	1	lb/hr	0.05323
Dry Trim to Hog	19,782	tpy	6.67E-04	lb/ton	0.006597
Dry Dust to Storage	3,644	tpy	6.67E-04	lb/ton	0.001215
Dry Dust to Truck Loading	27	hr/yr	1	lb/hr	0.01362

Total Emissions Increase		
	PM	5.028
	PM_{10}*	5.028
	$PM_{2.5}$**	0.003214

*PM_{10} is assumed to be equal to PM.
**$PM_{2.5}$ from green wood is assumed to be zero.
$PM_{2.5}$ from dry wood is assume to be 15% of PM.

Table 4.6. Paved and Unpaved Road Fugitve Emissions

Paved Roads Emission Factors

Emission Factor Equation
E = [k (sL)^0.91 x (W)^1.02](1-P/4N)

Equation Inputs			Source
PM Particle Size Multiplier (k)	0.011	lb/VMT	Table 13.2.1-1*
PM_{10} Particle Size Multiplier (k)	0.0022	lb/VMT	Table 13.2.1-1*
$PM_{2.5}$ Particle Size Multiplier (k)	0.00054	lb/VMT	Table 13.2.1-1*
Road Surface Silt Loading (sL)	0.6	g/m2	Table 13.2.1-2*
Days with Rain > 0.01 inches (P)	110	days	Figure 13.2.1-2*
Days per year (N)	365	days	N/A
Average Vehicle Weight (W)	30	tons	Calculated**

*AP 42, Section 13.2.1, Paved Roads.
**Average vehicle weight calculated assuming full weight of 45 tons and empty weight of 15 tons for all trucks

Particulate Emission Factors (Paved Roads)		
PM Emission Factor	0.2052	lb/VMT
PM_{10} Emission Factor	0.04104	lb/VMT
$PM_{2.5}$ Emission Factor	0.01007	lb/VMT

Unpaved Roads Emission Factors

Emission Factor Equation
E = (k (s/12)^a (W/3)^b) x [(365-P)/365)]

Equation Inputs			Source
PM Particle Size Multiplier (k)	4.9	lb/VMT	Table 13.2.2-2*
PM_{10} Particle Size Multiplier (k)	1.5	lb/VMT	Table 13.2.2-2*
$PM_{2.5}$ Particle Size Multiplier (k)	0.15	lb/VMT	Table 13.2.2-2*
PM Empirical Constant (a)	0.7	No units	Table 13.2.2-2*
PM_{10} Empirical Constant (a)	0.9	No units	Table 13.2.2-2*
$PM_{2.5}$ Empirical Constant (a)	0.9	No units	Table 13.2.2-2*
PM Empirical Constant (b)	0.45	No units	Table 13.2.2-2*
PM_{10} Empirical Constant (b)	0.45	No units	Table 13.2.2-2*
$PM_{2.5}$ Empirical Constant (b)	0.45	No units	Table 13.2.2-2*
Surface Material Silt Content (s)	3.9	%	See Note**
Average Vehicle Weight (W)	30	tons	Calculated***
Days with Rain > 0.01 inches (P)	110	days	Figure 13.2.2-1*

*AP 42, Section 13.2.2, Unpaved Roads.
**EPA Surface Material Content by state spreadsheet (http://www3.epa.gov/ttn/chief/ap42/ch13/related/c13s02-2.html)
***Average vehicle weight calculated assuming full weight of 45 tons and empty weight of 15 tons for all trucks

Particulate Emission Factors (Unpaved Roads)		
PM Emission Factor	4.393	lb/VMT
PM_{10} Emission Factor	1.074	lb/VMT
$PM_{2.5}$ Emission Factor	0.1074	lb/VMT

Road Emissions

Truck Travel Distances (at 200 MMBF/yr Production)*			Source
Paved Roads			
All Trucks (Paved Roads)	260	Days/yr of Truck Traffic	Plant Estimate
Log Trucks	100	Trucks/day	Plant Estimate
	5,000	Length of Travel (ft)	Plant Estimate
	24,621	VMT/yr	Calculated
Bark Trucks	8	Trucks/day	Plant Estimate
	8,400	Length of Travel (ft)	Plant Estimate
	3,309	VMT/yr	Calculated
Chip Trucks	28	Trucks/day	Plant Estimate
	10,200	Length of Travel (ft)	Plant Estimate
	14,064	VMT/yr	Calculated
Sawdust Trucks	6	Trucks/day	Plant Estimate
	8,400	Length of Travel (ft)	Plant Estimate
	2,482	VMT/yr	Calculated
Total VMT/yr (Paved Roads)	44,476	VMT/yr	Calculated
Unpaved Roads			
All Trucks (Unpaved Roads)	260	Days/yr of Truck Traffic	Plant Estimate
Lumber Trucks	19	Trucks/day	Plant Estimate
	4,080	Length of Travel (ft)	Plant Estimate
	3,817	VMT/yr	Calculated
Shavings Trucks	8	Trucks/day	Plant Estimate
	2,000	Length of Travel (ft)	Plant Estimate
	787.9	VMT/yr	Calculated
Total VMT/yr (Unpaved Roads)	4,605	VMT/yr	Calculated

*Estimated for 2006 Title V Renewal

Truck Travel Distances (at Past Actual Throughput)*		
Paved Roads		
Log Trucks	15,508	VMT/yr
Bark Trucks	2,084	VMT/yr
Chip Trucks	8,858	VMT/yr
Sawdust Trucks	1,563	VMT/yr
Total VMT/yr (Paved Roads)	28,013	VMT/yr
Unpaved Roads		
Log Trucks	2,404	VMT/yr
Bark Trucks	496.2	VMT/yr
Total VMT/yr (Unpaved Roads)	2,901	VMT/yr

*Calculated based on ratio of past actual production to previous maximum prodution limit.
(125.97 MMBF/yr to 200 MMBF/yr)

Past Actual Road Particulate Emissions		
Paved Roads		
PM	2.874	tpy
PM_{10}	0.5748	tpy
$PM_{2.5}$	0.1411	tpy
Unpaved Roads		
PM	6.371	tpy
PM_{10}	1.558	tpy
$PM_{2.5}$	0.1558	tpy
Totals		
PM	9.245	tpy
PM_{10}	2.133	tpy
$PM_{2.5}$	0.2969	tpy

Truck Travel Distances (at Future Potential Throughput)*		
Paved Roads		
Log Trucks	27,699	VMT/yr
Bark Trucks	3,723	VMT/yr
Chip Trucks	15,822	VMT/yr
Sawdust Trucks	2,792	VMT/yr
Log Trucks	4,294	VMT/yr
Bark Trucks	886.4	VMT/yr
Total VMT/yr	55,216	VMT/yr

*Calculated based on ratio of previous maximum production limit to future production limit.
(200 MMBF/yr to 225 MMBF/yr)
Note: All truck travel roads have been paved.

Future Potential Road Particulate Emissions		
Paved Roads		
PM	5.665	tpy
PM_{10}	1.133	tpy
$PM_{2.5}$	0.2781	tpy

Emissions Increases

Total Road PM Emissions		
Past Actual		
PM	9.245	tpy
PM_{10}	2.133	tpy
$PM_{2.5}$	0.2969	tpy
Future Potential		
PM	5.665	tpy
PM_{10}	1.133	tpy
$PM_{2.5}$	0.2781	tpy
Emissions Increases		
PM	-3.580	tpy
PM_{10}	-1.000	tpy
$PM_{2.5}$	-0.01876	tpy

Table 4.7. Emission Increases From Project

Pollutant	New Units Emissions Increases (tpy)	Existing Units Emissions Increases (tpy)	Associated Units Emissions Increases (tpy)	Total Emissions Increase (tpy)	PSD Significant Emission Rate Threshold (tpy)	PSD Review Required?
CO	14.43	0	0	14.43	100	No
NO_x	17.18	0	0	17.18	40	No
SO_2	0.1031	0	0	0.1031	40	No
PM	6.650	0	1.448	8.098	25	No
PM_{10}	4.940	0	4.029	8.969	15	No
$PM_{2.5}$	4.703	0	-0.01555	4.687	10	No
VOC	190.0	0	0	190.0	40	Yes
GHG (CO_2e)*	18,684	0	0	18,684	75,000	No

*GHG in metric tons

Table 4.8. Project Net Emissions Increases

Pollutant	Net Emissions Increase (tpy)	PSD Significant Emission Rate Threshold (tpy)	PSD Review Required?
CO	14.43	100	No
NO_x	17.18	40	No
SO_2	0.1031	40	No
PM	8.098	25	No
PM_{10}	8.969	15	No
$PM_{2.5}$	4.687	10	No
VOC	190.0	40	Yes
GHG (CO_2e)*	18,684	75,000	No

*GHG in metric tons

Table 4.9. Lumber Drying Kilns No. 1, 2, and 3 (500A, 500B, 500C) Future Emissions

Operational Information			
Emission Unit	Kiln Annual Throughput* (MMBF/yr)	Sum of Natural Gas Burner Capacities** (MMBtu/hr)	Natural Gas Heating Value (Btu/scf)
Kilns No. 1, 2, and 3 (500A, 500B, 500C)	130	90	1,020

*Throughput based on requested facility-wide drying limit minus Kiln No. 4 maximum annual capacity.
**30 MMBtu/hr burner for each kiln.

Pollutant	Emission Factor		Reference	Potential Emissions (lb/hr)	Potential Emissions (tpy)
Lumber Drying Emissions					
PM	0.14	lb/MBF	1	2.078	9.100
PM_{10}	0.104	lb/MBF	1	1.543	6.760
$PM_{2.5}$	0.099	lb/MBF	1	1.469	6.435
VOC	4.0	lb/MBF	2	59.36	260.0
Formaldehyde	0.0149	lb/MBF	3	0.2211	0.9685
Methanol	0.236	lb/MBF	3	3.502	15.34
Acetaldehyde	0.0054	lb/MBF	4	0.08014	0.3510
Total HAPs				3.804	16.66
Natural Gas Combustion Emissions					
CO	84	lb/MMscf	5	7.412	32.46
NO_x	100	lb/MMscf	5	8.824	38.65
SO_2	0.6	lb/MMscf	5	0.05294	0.2319
Formaldehyde	0.075	lb/MMscf	5	0.006618	0.02899
Natural Gas Greenhouse Gas Emissions					
CO_2	53.06	kg/MMBtu	6	4,775	41,833
CH_4	1.00E-03	kg/MMBtu	6	0.09000	0.7884
N_2O	1.00E-04	kg/MMBtu	6	0.009000	0.07884
Total Emissions					
CO				7.412	32.46
NO_x				8.824	38.65
SO_2				0.05294	0.2319
PM				2.078	9.100
PM_{10}				1.543	6.760
$PM_{2.5}$				1.469	6.435
VOC				59.36	260.0
Formaldehyde				0.2277	0.9975
Methanol				3.502	15.34
Acetaldehyde				0.08014	0.3510
Total HAPs				3.810	16.69
GHG (CO_2e)*				4,781	42,296

*GHG emissions in kg/hr and metric tons/yr.

Emission Factor References:

1) EPD accepted emission factor from Title V Application Number 21615 for West Fraser - Augusta Lumber Mill. Based on stack test data for Bibler Brothers Lumber Company (Russelville, AR), NCASI condensible PM ratios, and previous EPD guidance for PM_{10} and $PM_{2.5}$ percentages.
2) VOC emission factor requested by EPD in Jordan's most recent Title V Application (Application Number 40486).
3) Emission factor for steam-heated southern pine drying kilns obtained from Title V Application Number 20518 for Rayonier Wood Products LLC - Baxley Sawmill.
4) Emission factor for steam-heated southern pine drying kilns obtained from Title V Application Number 20695 for Temple Inland - Rome Lumber Mill.
5) AP 42, Chapter 1.4 Natural Gas Combustion, Tables 1.4-1, 1.4-2, and 1.4-3.
6) 40 CFR 98 - Mandatory Greenhouse Gas Reporting Rule Tables C-1 and C-2. CH_4 and N_2O emissions are multiplied by the global warming potentials found in Table A-1 in order to calculate total GHG emissions.

Table 4.10. Facility Wide Emissions (After Modification)

Pollutant	Actual Emissions (tpy)	Potential Emissions (tpy)
CO	46.89	46.89
NO_x	55.82	55.82
SO_2	0.3349	0.3349
PM	32.84	32.84
PM_{10}	24.26	24.26
$PM_{2.5}$	11.42	11.42
VOC	450.0	450.0
Formaldehyde	1.718	1.718
Methanol	26.55	26.55
Acetaldehyde	0.6075	0.6075
Total HAPs	28.88	28.88
GHG (CO_2e)*	60,979	60,979

*GHG in metric tons

Table 4.11. Georgia Rule 391-3-1-.02(2)(e) Compliance Calculations

Lumber Drying Kilns

Emission Unit	Process Input Rate (BF/hr) (1)	Process Input Weight Rate, P (ton/hr) (2)	Allowable PM Emission Rate, E (lb/hr) (3)	Maximum PM Emission Rate (lb/hr) (4)	Complies With Rule?
Lumber Drying Kiln No. 1 (500A)	7,420	18.52	28.98	1.039	Yes
Lumber Drying Kiln No. 2 (500B)	7,420	18.52	28.98	1.039	Yes
Lumber Drying Kiln No. 3 (500C)	7,990	19.94	30.45	1.119	Yes
Lumber Drying Kiln No. 4 (500D)	10,850	27.08	37.38	1.518	Yes

(1) = Maximum hourly input rate = (Maximum annual capacity) / 8,760 hrs/yr

(2) = (1) / (12 BF/ft^3) * (59.9 lb/ft^3) / (2,000 lb/ton)

(Density of green wood is 59.9 lb/ft^3.)

(3) = $4.1 * (2)^{0.67}$ for P less than or equal to 30 tons/hr

(4) = (Maximum annual capacity) * (PM emission factor [0.14 lb/MBF]) / (8,760 hrs/yr)

Other Processes

Emission Unit	Process Input Rate (BF/hr) (1)	Process Input Weight Rate, P (ton/hr) (2)	Allowable PM Emission Rate, E (lb/hr) (3)	Maximum PM Emission Rate (lb/hr) (4)	Complies With Rule?
Planer Mill (700)	25,685	40.45	42.63	0	Yes
Planer Hog (701)	N/A	5.131	12.26	0.003422	Yes
Overhead Truck Loading Bin (900)	N/A	0.9451	3.948	1.000	Yes
West Debarker	N/A	49.64	44.51	1.191	Yes
East Debarker	N/A	49.64	44.51	1.191	Yes

(1) = Maximum hourly input rate = (Requested facility-wide drying limit) / 8,760 hrs/yr

(2) = (1) / (12 BF/ft^3) * (37.8 lb/ft^3) / (2,000 lb/ton) for Planer Mill

(Density of dry wood is 37.8 lb/ft^3.)

(2) = Throughput from emission calculations for units other than Planer Mill.

(3) = $4.1 * (2)^{0.67}$ for P less than or equal to 30 tons/hr

(3) = $55 * (2)^{0.11} - 40$ for P greater than 30 tons/hr

(4) = PM emission rate from calculations

SECTION 5

REGULATORY REVIEW

SECTION 5: REGULATORY REVIEW

This section provides a review of the federal and state air quality regulations applicable to the proposed project. The applicability of PSD regulations, New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), the Title V permit program, and the Georgia Rules for Air Quality Control are discussed.

5.1 FEDERAL REGULATIONS

5.1.1 PSD REGULATIONS

The facility is located in Lamar County. Lamar County has not been designated as a nonattainment area for any regulated pollutants. Therefore, Nonattainment New Source Review is not applicable to this project.

The facility is a major source under PSD regulations since it has the potential to emit over 250 tons per year of VOC. Any modification at a major source must be reviewed to determine if the modification will result in emissions increases above the SER threshold for any regulated pollutant. The net emissions increase analysis presented in Section 4 determined that the proposed modification would result in a VOC emissions increase of greater than 40 tons per year SER threshold. Therefore, the modification is subject to PSD review.

5.1.2 NEW SOURCE PERFORMANCE STANDARDS

NSPS are pollution control standards which have been developed for specific industries or processes. A review of NSPS contained in 40 CFR, Part 60 determined that no NSPS have been promulgated for any of the processes occurring at the facility.

5.1.3 NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS

NESHAPs are air pollution control standards which have been developed to limit emissions of Hazardous Air Pollutants (HAPs). The standards establish emission limits which are typically based on the Maximum Achievable Control Technology (MACT) for the specific process.

The only standard applicable to the facility is 40 CFR, Part 63 Subpart DDDD – National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products. The standard is applicable because Jordan is producer of kiln-dried lumber and is a major source of HAPs. The only requirement of Subpart DDDD applicable to the facility is the initial notification requirement which was previously satisfied by a letter to EPD.

5.1.4 TITLE V PERMIT PROGRAM

The facility is a major source with respect to Title V as its potential emissions for several pollutants are above the Title V major source thresholds. The facility currently operates under Title V Permit Number 2421-171-0005-04-V-0 and Amendment Number 2421-171-0005-V-04-1. The proposed project will require a modification to the Title V Permit. All Title V Permit Application requirements will be satisfied by this application.

5.2 GEORGIA RULES FOR AIR QUALITY CONTROL REGULATIONS

5.2.1 GEORGIA RULE 391-3-1-.02(2)(b) – VISIBLE EMISSIONS

This rule limits the visible emissions of all sources to 40 percent opacity. This rule applies to all sources at the facility unless a more specific visible emissions limit is established elsewhere in the Georgia Rules.

5.2.2 GEORGIA RULE 391-3-1-.02(2)(e) – PARTICULATE EMISSIONS FROM MANUFACTURING PROCESSES

This rule establishes particulate matter emission limits based on the process input weight rate of each process. The following equations are to be used in establishing the allowable limits:

$E = 4.1 \times P^{0.67}$; for process weight input weight rate less than 30 tons per hour

$E = 55 \times P^{0.11} - 40$; for process input weight rate greater than 30 tons per hour

Where:
E = emission rate in pounds per hour; and
P = process input weight rate in tons per hour

Each process at the facility is subject to this rule. Calculations demonstrating compliance with the emission limits are found in Section 4 of this application.

5.2.3 GEORGIA RULE 391-3-1-.02(2)(g) – SULFUR DIOXIDE

This rule requires fuel burning sources with less than 100 MMBtu/hr heat inputs to only burn fuels containing less than 2.5 percent sulfur. The natural gas burners for the four drying kilns are the only fuel burning sources at the facility. Natural gas has a sulfur content much less than 2.5 percent and is inherently compliant with this rule.

5.2.4 GEORGIA RULE 391-1-.02-(2)(n) – FUGITIVE DUST

This rule requires that reasonable precautions be taken to prevent fugitive dust from becoming airborne. The rule also limits the opacity of fugitive dust to less than 20 percent. Jordan will continue to take the reasonable precautions necessary for compliance with this rule.

SECTION 6

BACT ANALYSIS

SECTION 6: BACT ANALYSIS

Under federal and state PSD regulations, any major modification subject to PSD review requires a Best Available Control Technology (BACT) analysis. The BACT analysis is to be conducted for each emission unit or process affected by the project that emits the pollutant for which the SER threshold is exceeded. VOC emissions from the new continuous lumber drying kiln exceed the SER threshold. Therefore, a BACT analysis for VOC emitted from the continuous lumber drying kiln is required.

6.1 BACT ANALYSIS METHODOLOGY

The BACT analysis is performed using the top-down approach presented in EPA's Draft New Source Review Workshop Manual (October 1990). A top-down BACT analysis consists of the following five steps:

- 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
- Step 5: Select BACT

The selected BACT cannot be less stringent than any applicable NSPS or NESHAP. As discussed in Section 4, no NSPS are applicable to the facility. The kiln is subject to 40 CFR, Part 63 Subpart DDDD; however, there are no emission limitations for lumber kilns currently contained in this standard.

6.2 STEP 1: IDENTIFY ALL CONTROL TECHNOLOGIES

Potential control technologies for VOC from lumber drying kilns were identified after a review of the EPA RACT/BACT/LAER Clearinghouse (RBLC) for lumber drying kilns (RBLC Process Code 30.800) permitted in the past ten years. The RBLC for lumber kilns indicates that no add-on controls have been proposed to control VOC from kilns. The only controls that have been proposed for VOC from lumber kilns are proper operation and maintenance procedures. A summary of the results of the RBLC search can be found at the end of this section. Additional control technologies were identified by reviewing technical literature as well as preliminary determinations for recently issued PSD permits for similar sources.

After a review of all available information, the following potential control technologies were identified:

- Carbon Adsorption
- Condensation
- Biofiltration
- Thermal Oxidation
- Wet Scrubbing
- Proper Kiln Operation and Maintenance Practices

6.3 STEP 2: ELIMINATE TECHNICALLY INFEASIBLE OPTIONS

The technical feasibility of each potential control technologies identified in Step 1 will be evaluated. The sections below will include a brief description of each control technology, followed by an evaluation of the technical feasibility of that option.

6.3.1 CARBON ADSORPTION

Carbon adsorption systems use an activated carbon bed to trap VOC. As the exhaust gas stream passes through the activated carbon bed, VOC molecules are attracted to the surface of the activated carbon. The cleaned exhaust gas is then discharged to the atmosphere. When the activated carbon is spent and can no longer effectively adsorb VOC, the carbon is reactivated either by heating with steam or by vacuuming to remove VOC from the surface. Reactivation can occur on-site, or the spent carbon may be returned to the supplier for reactivation.

The kiln exhaust gas stream has a high relative humidity. Carbon adsorption beds are most effective on streams with a low relative humidity. The water present in the exhaust gas would compete with VOC for adsorption onto the activated carbon. In some cases, it has been found that steam in the exhaust gases may cause desorption of previously adsorbed VOC. For these reasons, carbon adsorption is deemed to be technically infeasible for this process.

6.3.2 CONDENSATION

Condensation systems work by converting VOC in the exhaust gas from the vapor phase to the liquid phase. The phase change is usually accomplished by decreasing the temperature of the gas stream, but it can also be accomplished by increasing the pressure of the gas stream enough to cause the vapor to liquefy.

The primary compounds in VOC from lumber drying kilns are terpenes. In order to cause condensation of the terpenes, the gas stream would have to be cooled to below 32 °F. As previously mentioned, the exhaust gas stream from kilns has a high moisture content. Cooling the gas stream to below the freezing point of water would cause ice to form on the condenser, which would render the unit ineffective. For this reason, condensation is deemed to be technically infeasible for this process.

6.3.3 BIOFILTRATION

Biofiltration involves the use of microbes which remove organics from the exhaust gas stream by feeding on the organic material. The exhaust gas stream is directed through the bed media in which the microbes live. Organics are absorbed by moisture in the bed media and come into contact with the microbes. The microbes reduce the concentration of organics by consuming the organic material. The cleaned air is then discharged to the atmosphere.

Most microbes need a temperature range between 60 to 105 °F to survive. The exhaust from lumber drying kilns is typically around 215 °F. Introducing gas streams of this temperature into a biofilter would likely kill the microbes inhabiting the bed media. As previously mentioned, the primary compounds in VOC from lumber drying kilns are terpenes, and most terpenes are not highly soluble in water. Compounds that are not easily soluble in water are not suitable for removal by biofiltration since the compound must be absorbed by moisture in the bed media to come into contact with the microbes. For these reasons, biofiltration is deemed to be technically infeasible for this process.

6.3.4 THERMAL OXIDATION

Thermal oxidation is a process by which combustion converts the VOCs in an exhaust gas stream to water and carbon dioxide. Regenerative thermal oxidizers (RTOs) are the most widely used design. RTOs have a ceramic material in a packed bed which is used to preheat the incoming gas. The preheated gas enters the combustion chamber where it is further heated by natural gas combustion. The combustion chamber is maintained at a temperature of around 1,400 to 1,500 °F for oxidation of VOC.

A regenerative catalytic oxidizer (RCO) operates in the same manner as an RTO, except that it uses a catalyst material in the packed bed instead of a ceramic material. The use of a catalyst allows for oxidation of VOC at a lower temperature of around 800 °F.

As previously mentioned the exhaust gas stream from a lumber kiln has a temperature of around 215 °F and also has a high moisture content. The high moisture content and relatively low exit temperature of the exhaust gas makes an RTO unsuitable. Particulates present in the exhaust gas could also cause fouling of the ceramic material. The fouled ceramic would not provide the necessary preheating needed for the RTO be effective. An RCO would be an ineffective option for the same reasons as an RTO. Particulates in the exhaust gas are an even bigger problem for an RCO. The catalytic material becomes coated with PM, and the coated sections are unable act as a catalyst in the oxidation of VOCs entering the unit. For these reasons, thermal oxidation by an RTO or an RCO is deemed to be technically infeasible for this process.

6.3.5 WET SCRUBBING

Wet scrubbing systems are used to absorb pollutants in the exhaust gas stream into a liquid by passing the stream through a countercurrent flow of a scrubbing liquid. In order for a wet scrubbing system to work, the pollutant being removed must be soluble in the scrubbing liquid. Terpenes, the primary constituent in VOC from lumber kilns, are not very soluble in water. For this reason, wet scrubbing is deemed to be technically feasible for this process.

6.3.6 PROPER KILN OPERATION AND MAINTENANCE PRACTICES

Heating of the lumber inside the kiln causes VOC to be drawn out of the wood and emitted to the atmosphere. Ensuring proper operation of the kiln and performing routine maintenance on the kiln minimizes VOC emissions. Lumber is dried to the target moisture content that will ensure the quality of the lumber. Over-drying of the lumber causes additional VOCs to be drawn from the wood. Proper operating practices can prevent over-drying, therefore minimizing emissions of VOC. Proper kiln operation and maintenance is a technically feasible option.

6.4 STEP 3: RANK REMAINING CONTROL TECHNOLOGIES BY CONTROL EFFECTIVENESS

The only control option that was found to be technically feasible in Step 2 was proper kiln operation and maintenance practices. Since only one control option was found to be technically feasible, ranking of remaining control technologies is not necessary.

6.5 STEP 4: EVALUATE MOST EFFECTIVE CONTROLS

Since the only feasible control option is proper kiln operation and maintenance practices, further evaluation of controls is not necessary.

6.6 STEP 5: SELECT BACT

The selected BACT is proper kiln operation and maintenance practices. This determination is consistent with data obtained from the RBLC. Jordan proposes an emission limit of 4.0 pounds of VOC per thousand boardfeet of lumber dried. Compliance with this emission limit will be demonstrated by implementation of proper operating and maintenance practices for the kiln.

RBLC DATABASE SEARCH RESULTS

RACT/BACT/LAER Clearinghouse Database Report
01/01/2006 - 03/08/2016

FACILITY NAME	COMPANY NAME	STATE	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD DESCRIPTION	EMISSION LIMIT 1	EMISSION LIMIT 1 UNIT	EMISSION LIMIT 1 AVERAGE TIME CONDITION	EMISSION LIMIT 2	EMISSION LIMIT 2 UNIT	EMISSION LIMIT 2 AVGERAGE TIME CONDITION
SKAGIT COUNTY LUMBER MILL	SIERRA PACIFIC INDUSTRIES	WA	1/25/2006	7 DRY KILNS		300	MM BOARD F/YR	COMPUTERIZED STEAM MANAGEMENT SYSTEM	54	T/YR	12 MONTH ROLLING AVERAGE			
ELLIOTT SAWMILLING COMPANY	ELLIOTT SAWMILLING COMPANY	SC	3/6/2006	DIRECT-FIRED LUMBER-DRYING KILN NO. 4	SAWDUST	35	MMBTU/H	WORK PRACTICE STANDARDS	122	T/YR		4.5	LB/MBF	
GILCHRIST FACILITY	INTERFOR PACIFIC, INC.	OR	5/22/2006	LUMBER DRY KILNS		0		PROPER WORK PRACTICES	1.69	LB/MBF				
WRIGHT CITY COMPLEX	WEYERHAEUSER	OK	7/21/2006	LUMBER KILNS					4.8	LB/MBF				
NEW SOUTH LUMBER, INC. - CAMDEN PLANT	NEW SOUTH LUMBER, INC.	SC	11/1/2006	WOOD PRODUCTS INDUSTRIES	VIRGIN WOOD WASTE	0			0					
ALBERTVILLE SAWMILL	BOWATER (ALABAMA) INC. FOREST PRODUCT DIVISION	AL	4/9/2008	TWO 182.14 MBF, STEAM-HEADED LUMBER DRY KILNS (NORTH & SOUTH - K100/K101)		182.14	MBF	OPERATE W/ WET BULB SET POINT DRYING SCHEDULE OF LESS THAN OR EQUAL TO 185F; DAILY AND MONTHLY KILN I/M PROCEDURES	7	LB/MBF	KILN CHARGE CYCLONE (PINENE)			
BIBLER BROTHERS LUMBER COMPANY	BIBLER BROTHERS LUMBER COMPANY	AR	8/25/2008	SN-07G AND SN-13G CONTINOUS OPERATING KILNS	WOOD RESIDUE	25	MMBTU/H		3.8	LB/MBF VOC		46.5	LB VOC/H/KILN	
ELLIOTT SAWMILLING COMPANY	ELLIOTT SAWMILLING COMPANY	SC	4/14/2009	DIRECT FIRED LUMBER DRYING KILN NO.5	SAWDUST	35	MMBTU/H	WORK PRACTICE STANDARDS	119	T/YR		4.5	LB/MBF	
NORTH FLORIDA LUMBER/BRISTOL SAW MILL	NORTH FLORIDA LUMBER	FL	8/4/2009	Wood lumber kiln	steam heated	92000000	board-f lumber/yr	Best operating practices: 1) minimize over-drying lumber; 2) maintain consistent moisture content for processed lumber charge; and 3) dry at the minimum temperature.	116.93	T/YR				
ANTHONY TIMBERLANDS, INC.		AR	9/16/2009	KILN #3 INDIRECT-FIRED	NONE	200	MMBF/YR		3.5	LB/MBF		350	T/YR	
ANTHONY TIMBERLANDS, INC.		AR	9/16/2009	KILN #4 INDIRECT-FIRED	NONE	200	MMBF/YR		3.5	LB/MBF		350	T/YR	
ANTHONY TIMBERLANDS, INC.		AR	9/16/2009	KILN #5 INDIRECT-FIRED	NONE	200	MMBF/YR		3.5	LB/MBF		350	T/YR	
TEMPLE INLAND PINELAND MANUFACTURING COMPLEX	TIN INC	TX	8/12/2011	Dry studmill kilns 1 and 2	wood	156000	boardfeet per charge	good operating practice and maintenance	2.49	LB VOC/1000 BOARDFEE				
JOYCE MILL	WEST FRASER TIMBER COMPANY, LTD	LA	8/16/2011	Lumber kilns		300	million board feet/yr	properly design and operation	930	T/YR				
LUMBER MILL	WEST FRASER, INC.	TX	12/15/2011	Continuous lumber kilns (2)	wood	275	MMBF/YR	proper temperature and process management; drying to appropriate moisture content	3.5	LB/MBF				
SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	SIMPSON LUMBER CO.	GA	4/25/2012	KILN 3	WASTE WOOD	65000000	BF/YR	PROPER MAINTENANCE AND OPERATION	3.83	LB/MBF	DAILY			
SIMPSON LUMBER CO, LLC MELDRIM OPERATIONS	SIMPSON LUMBER CO.	GA	4/25/2012	KILN 4	WASTE WOOD	73000000	BF/YR	PROPER MAINTENANCE AND OPERATION	3.93	LB/MBF	DAILY			
SIMPSON LUMBER COMPANY, LLC	SIMPSON LUMBER COMPANY, LLC	SC	8/29/2012	DIRECT-FIRED LUMBER DRYING KILN NO. 4	DRY WOOD WASTE	34	MMBTU/H	WORK PRACTICE STANDARDS	104	T/YR		3.8	LB/MBF	
NEW SOUTH COMPANIES, INC. - CONWAY PLANT	NEW SOUTH COMPANIES, INC.	SC	9/24/2012	LUMBER KILNS		380.56	MMBD-FT/YR	PROPER MAINTENANCE AND OPERATION	799.18	T/YR		4.2	LB/MBF	AS TOTAL VOC
KLAUSNER HOLDING USA, INC	KLAUSNER HOLDING USA, INC	SC	1/3/2013	LUMBER DRYING KILNS EU007		700	MILLION BOARD FOOT PER YEAR		3.5	LB/MBF				
WEST FRASER, INC. - MAPLESVILE MILL	WEST FRASER, INC.	AL	4/15/2013	Two(2) 100 MMBF/Y Continuous direct fired kiln	Wood Residuals	200	MMBF/YR		3.76	LB/MBF				
WEST FRASER - NEWBERRY LUMBER MILL	WEST FRASER TIMBER CO. LTD	SC	4/30/2013	TWO - 35 MMBTU/H DUAL PATH, DIRECT FIRED, CONTINUOUS LUMBER KILNS, 15 THOUSAND BF/H, EACH	SAWDUST	0		PROPER OPERATION AND GOOD OPERATING PRACTICES	3.76	LB/MBF		376	T/YR	
NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	NEW SOUTH LUMBER COMPANY, INC.	SC	6/18/2013	DKN1	STEAM HEATED	60	MMBF/YR	PROPER OPERATION AND MAINTENANCE	343.98	T/YR				
NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	NEW SOUTH LUMBER COMPANY, INC.	SC	6/18/2013	DKN4	STEAM HEATED	60	MMBF/YR	MAINTENACE AND OPERATING PRACTICES	343.98	T/YR				
NEW SOUTH LUMBER COMPANY, INC. DARLINGTON PLANT	NEW SOUTH LUMBER COMPANY, INC.	SC	6/18/2013	DKN5	WOOD WASTE	75	MMBF/YR	PROPER MAINTENANCE AND OPERATION	141	T/YR				
THE WESTERVELT COMPANY	THE WESTERVELT COMPANY	AL	8/21/2013	Three (3) 93 MMBF/Y Continous, Dual path, indirect fired kilns	Steam (Indirect heat)	0			4.57	LB/MMBF				
DELTIC TIMBER CORPORATION WALDO	DELTIC TIMBER CORPORATION	AR	10/18/2013	KILN NO. 3		0		PROPER KILN OPERATION	27	LB/H				
DELTIC TIMBER CORPORATION WALDO	DELTIC TIMBER CORPORATION	AR	10/18/2013	KILN NO. 4		0			46.2	LB/H				
DELTIC TIMBER CORPORATION WALDO	DELTIC TIMBER CORPORATION	AR	10/18/2013	KILN NO. 5		0			27	LB/H				

FACILITY NAME	COMPANY NAME	STATE	PERMIT ISSUANCE DATE	PROCESS NAME	PRIMARY FUEL	THROUGHPUT	THROUGHPUT UNIT	CONTROL METHOD DESCRIPTION	EMISSION LIMIT 1	EMISSION LIMIT 1 UNIT	EMISSION LIMIT 1 AVERAGE TIME CONDITION	EMISSION LIMIT 2	EMISSION LIMIT 2 UNIT	EMISSION LIMIT 2 AVGERAGE TIME CONDITION
WEST FRASER-OPELIKA LUMBER MILL	WEST FRASER, INC.	AL	11/1/2013	Two(2) 87.5 MMBF/YR Continuous kilns with a 35 MMBtu/hr direct-fired wood burner	Wood Shavings	175	MMBF/YR		3.76	LB/MBF		175	K/12 MONTHS	
PERRY MILL	GILMAN BUILDING PRODUCTS	FL	4/1/2014	Direct-fired lumber drying kiln	Waste wood	90	million board ft/yr	At a minimum, the permittee shall operate the kiln in accordance with the following best operating practices (BMP). a. Minimize over-drying the lumber; b. Maintain consistent moisture content for the processing lumber charge; and c. Dry at the minimum temperature. The permittee shall develop and operate in accordance with a written plan to implement the above BMP and any others required by the kiln manufacturer. Ninety days before the initial startup of the kiln, the permitted shall submit to the Compliance Authority the BMP plan. The Title V air operation permit shall include the submitted BMP plan.	3.5	LB/THOUSAND BOARD FT				
SIMPSON LUMBER COMPANY, LLC	SIMPSON LUMBER COMPANY, LLC	SC	6/20/2014	LUMBER KILNS		166	MMBF/YR	PROPER OPERATION AND MAINTENANCE	156	T/YR		3.76	LB/MBF	
WHITEHOUSE LUMBER MILL	WEST FRASER, INC	FL	9/9/2014	Direct-Fired Continuous Kilns	Wood waste	40	MMBTU/H	Proper Maintenance and Operating Procedures: Minimize over-drying the lumber. Maintain consistent moisture content for the processing lumber charge. Dry the lumber at the minimum temperature. Develop a written Operation and Maintenance (O&M) plan identifying the above practices and the operation and maintenance requirements from the kiln manufacturer. Record and monitor the total monthly amount and 12-month annual total of wood dried in each kiln (board-feet). Record the calculated monthly and 12-month annual total emissions of VOC to demonstrate compliance with the process and emissions limits.	3.76	LB/THOUSAND BOARD FT				
NEW SOUTH COMPANIES, INC. - CONWAY PLANT	NEW SOUTH COMPANIES, INC.	SC	10/15/2014	LUMBER KILNS		295.6	MMBF/YR	PROPER MAINTENANCE AND OPERATION	602	T/YR	(442 T/YR KILNS 1-5, 160 T/YR KILN 6)	4.2	LB/MBF	
MILLPORT WOOD PRODUCTS FACILITY	WEYER HAEUSER NR COMPANY	AL	12/30/2014	Continuous direct-lumber dry kiln	Green sawdust	140000	mbf/yr	Proper maintenance & operating practice requirements. Test method information: Method 18/25.	4.7	LB	MBF AS WPP 1*			
KAPSTONE CHARLESTON KRAFT LLC- SUMMERVILLE	KAPSTONE CHARLESTON KRAFT LLC	SC	1/20/2015	LUMBER KILNS		194.83	MMBF/YR	PROPER MAINTENANCE AND OPERATION	225.6	T/YR		3.76	LB/MBF	
GEORGIA-PACIFIC WOOD PRODUCTS SOUTH LLC (GURDON PLYWOOD AND	GEORGIA-PACIFIC WOOD PRODUCTS SOUTH LLC (GURDON PL	AR	2/6/2015	SN-09 #4 LUMBER KILN	NATURAL GAS	130	MILLION BOARD FEET		3.8	LB/ 1000 BOARD FEET		373.7	T/YR	
RESOLUTE FOREST PRODUCTS - ALABAMA SAWMILL	RESOLUTE FP U.S., INC.	AL	6/24/2015	Continuous Direct-Fired Lumber Dry Kilns with 35 mmbtu/hr Wood Fired Burner	Wood	108.33	mmbf/yr - each		3.76	LB/MBF	ROLLING 12 MONTHS			
EL DORADO SAWMILL	UNION COUNTY LUMBER COMPANY	AR	8/3/2015	LUMBER DRYING KILN SN-01	NATURAL GAS	45	MMBTU/H	PROPER MAINTENANCE AND OPERATION	3.8	LB/MBF				
EL DORADO SAWMILL	UNION COUNTY LUMBER COMPANY	AR	8/3/2015	LUMBER DRYING KILN SN-02	NATURAL GAS	45	MMBTU/H		3.8	LB/MBF				
EL DORADO SAWMILL	UNION COUNTY LUMBER COMPANY	AR	8/3/2015	LUMBER DRYING KILN SN-03	NATURAL GAS	45	MMBTU/H		3.8	LB/MBF				

SECTION 7

TOXIC AIR POLLUTANT MODELING ANALYSIS

SECTION 7: TOXIC AIR POLLUTANT MODELING ANALYSIS

This section provides a discussion of the Toxic Air Pollutant Modeling Analysis which is required for any permit application for a source that emits a Toxic Air Pollutant. Model setup, determination of Acceptable Ambient Concentrations (AACs), and modeling results are discussed.

7.1 REGULATORY APPLICABILITY

The U.S. Environmental Protection Agency (EPA) maintains a Guideline on Air Quality Models, which is published as Appendix W to 40 CFR Part 51 (as revised). The Guideline provides the agency's guidance on regulatory applicability of air quality dispersion models. In general, regulatory modeling applications should be carried out in accordance with a modeling protocol that is reviewed and approved by the appropriate agency prior to conducting the modeling. The modeling protocol should identify the specific model, modeling options and input data to be used for a particular application.

The plume dispersion modeling conducted and described in this Section was conducted as an air toxics only impact analysis. Guidance used as part of this project included the *Guideline For Ambient Impact Assessment Of Toxic Air Pollutant Emissions* – June 21, 1998 published by the Georgia Environmental Protection Division, and the document *Georgia Air Dispersion Modeling Guidance* – December 1, 2006 published by the Georgia Environmental Protection Division. For this evaluation, the AERMOD model was utilized thru usage of Windows based software, BEE-Line Software BEEST Suite Version 11.04, provided by Providence/Oris LLC.

7.2 MODEL SETUP INFORMATION

The AERMOD (version 15181) dispersion model was used to conduct the refined analysis. This analysis was conducted using the following considerations:

a. Meteorological Data – The AERMOD model was executed for five (5) years of meteorological data for Peachtree City-Falcon Field, GA: 2007-2011. Meteorological data was provided by the Georgia EPD via their website epd.georgia.gov/air. Acquisition of the meteorological data from the Georgia EPD precluded the use of the AERMET meteorological processor as part of the enclosed modeling analysis. Surface characteristics of the surface meteorological station and the project vicinity were compared to substantiate the use of the meteorological data provided by the Georgia EPD.

b. Receptor Grid – A refined receptor grid of 100 meters spacing was defined for the model roughly centered around the property line and extending outward from the facility 2 km in all directions.

c. Discrete Receptors – Discrete receptors were input into the model to simulate the property line. Spacing between the points is 50 meters. The model calculates the concentrations for these points and lists these concentrations in a discrete receptor table.

d. Digitized Terrain Data – The National Elevation Dataset (NED) 1/3-arc-second data file was used to extract the receptor and building terrain elevations using AERMAP. Digitized Terrain Data for use with AERMAP was obtained from the USGS Multi-Resolution Land Characteristics Consortium (MRLC) National Land Cover Database web site (mrlc.gov). The NED was processed through the AerMap processor using the standard options and a Base Datum (NADA) of NAD83. The UTM coordinates utilized in the model are based on the WGS84 datum utilized by Google Earth. The NAD83 datum was used in the model as the BEEST software will not export the graphical layout to Google Earth in the WGS84 datum. The NAD83 and WGS84 datums are nearly equivalent for the level of detail required in the dispersion model.

e. Urban/Rural Classification – The procedure to determine whether to use urban or rural dispersion coefficients is found in the EPA's Guideline on Air Quality Models (Revised), dated July 1986, EPA-450/2-78-027R. This document lists two (2) methods that can be used to determine the proper classification. These methods include:

   1. Land Use Procedure – If more than 50% of the land within a 3 kilometer radius of the facility in question is of land use types heavy or medium industrial, commercial, or multi-family residential then the Urban mode should be selected. Otherwise, use the Rural mode.

   2. Population Density Procedure – If the population density within a 3-kilometer radius of the facility is greater than 750 people per square kilometer, then the urban mode should be selected. Otherwise, the Rural mode should be selected.

   Both methods above were evaluated for the area surrounding Jordan Forest Products, LLC (Barnesville, GA). Aerial photographs and USGS Topographic Maps were used to evaluate the area surrounding the facility. This area would be primarily classified as Rural. This was further supported by information obtained from the U.S. Census Bureau. Therefore, the Rural mode was used in evaluation of the AERMOD model.

7.3 MODEL SOURCE SETUP INFORMATION

There are four emission sources of toxic air pollutants at the facility. Those emissions sources are the facility direct fired batch dry kilns (source codes 500A, 500B, and 500C) and the direct fired continuous dry kiln (source code 500D). Based on a review of permits recently issued by EPD for similar projects, the primary toxic pollutant emissions from a direct fired dry kiln source are the toxic pollutants formaldehyde, methanol, and acetaldehyde. Emission rates of formaldehyde, methanol, and acetaldehyde from lumber drying are determined by using emission factors that have been previously accepted by EPD and/or specified by EPD in permit narratives for similar sources. Emission rates of formaldehyde from natural gas combustion were determined based on emission factors found in AP 42. Calculations of modeled emission rates can be found at the end of this section.

The scaled site map was updated with the precise location of the continuous kiln for the facility based on facility site survey maps and on-site measurements. This scaled site map was used for building, emission source, etc. location data for use in the AERMOD model. A copy of the scaled site map for the facility can be found in Section 3 of this application.

Dry kilns are unique emission units due to the variability in operation between the models of dry kiln. The three batch kilns each have 16 vents along the roof of the kiln, with 8 vents on each side of the roof. Due to the nature of the kilns, as they operate with a low pressure and a high pressure side, only one set/side of vents (8 vents) are venting at any one time along the top of the kilns.

For this evaluation, modeling procedures for similar recently permitted facilities were reviewed. For the batch kilns, each kiln is modeled as a single point source at the center of the kiln roof, with an effective diameter equal to the area of eight vents with an effective flow rate equal to the sum of the flow rates from the 8 vents. A flow rate from each vent of between 0.168 CFM/BF and 0.38 CFM/BF was determined based on discussions with kiln manufacturers. The lower of these two values, 0.168 CFM/BF was taken in order to be conservative. Batch Kilns No. 1 and 2 have a maximum batch size of 167,000 BF/batch, while Batch Kiln No. 3 has a maximum batch size of 170,000 BF/batch. This equates to flow rates of approximately 28,000 CFM for Kilns No. 1 and 2 and 28,500 CFM for Kiln No. 3. The vents are square with dimensions of approximately 18” x 18” for each vent. The effective diameter is calculated below.

$$D = \sqrt{\frac{4 \times N \times S}{\pi}}$$

Where: D= equivalent diameter, ft
S = cross section area of stack, ft^2
N = number of vents

$$\mathrm{D} = \sqrt{\frac{(4 \times 8 \times (1.5' \times 1.5'))}{\pi}} = 4.787'$$

For the continuous kiln, all emissions are vented at the kiln doors at the ends of the kiln. The kiln doors are 16’ 6” in height and 11’ 8” in width. There are a total of four doors, with two doors on each end of the kiln. The emissions were simulated as four separate point sources, one for each door of the kiln. The stack diameter is the effective diameter of each door. The exit velocity was set to 0.001 m/s, indicating a horizontal release. The effective diameter of each door is calculated below.

$$\mathrm{D} = \sqrt{\frac{(4 \times (16.5' \times 11.67'))}{\pi}} = 15.66'$$

7.3 MODEL INPUT DATA

The AERMOD plume modeling was performed for formaldehyde, methanol, and acetaldehyde. The stack parameters used by the model are listed in Table 4.1.

Table 7.1. Modeled Stack Parameters

Stack/Vent ID	Model Source ID	Height Above Grade (feet)	Diameter (feet)	Temp. (°F)	Flow Rate (acfm)	UTM Location	
						X (m)	Y (m)
501A – Kiln 1	BK01	27	4.787	215	28,000	761236	3663708
501B – Kiln 2	BK02	27	4.787	215	28,000	761224	3663740
501C – Kiln 3	BK03	27	4.787	215	28,500	761219	3663753
501D1– Kiln 4 Western Door 1	CDK4W1	16.5	15.66	215	37.91	761193	3663773
501D2– Kiln 4 Western Door 2	CDK4W2	16.5	15.66	215	37.91	761195	3663770
501D3– Kiln 4 Eastern Door 1	CDK4E1	16.5	15.66	215	37.91	761264	3663804
501D4 – Kiln 4 Eastern Door 2	CDK4E2	16.5	15.66	215	37.91	761266	3663801

The calculations for emission rates used for modeling are shown at the end of this section. The facility has proposed a facility-wide production limit for the kilns, but the hourly emission rates were calculated based on the maximum capacity of each kiln, ignoring the proposed production limits. This approach provides the maximum hourly emission rate for each source.

7.4 ACCEPTABLE AMBIENT CONCENTRATIONS (AACs)

The *Guideline For Ambient Impact Assessment Of Toxic Air Pollutant Emissions* outlines the method to be used in determining AACs. The GA EPD Air Protection branch also maintains on its website (http://epd.georgia.gov/air) a spreadsheet containing AACs for many Toxic Air Pollutants. The AACs for formaldehyde, methanol, and acetaldehyde were obtained from this spreadsheet. As the AACs were obtained from the EPD database, the AAC calculation procedures provided in the *Guideline For Ambient Impact Assessment Of Toxic Air Pollutant Emissions* were not necessary. Table 7.2 shows the AACs for each averaging period for each modeled pollutant.

Table 7.2. Acceptable Ambient Concentrations (AACs)

Pollutant	Averaging Period	Toxicity Data Source	AAC (µg/m³)
Formaldehyde	Annual	IRIS RfC	1.1
	15-minute	OSHA STEL	245
Methanol	24-hour	OSHA Z-1 TWA	619
	15-minute	ACGIH STEL/CEIL (C)	32,800
Acetaldehyde	Annual	IRIS RfC	4.55
	15-minute	ACGIH STEL/CEIL (C)	4,500

7.5 MODELING RESULTS AND COMPLIANCE EVALUATION

The maximum ground level concentration (MGLC) predicted by the model for each averaging period for each pollutant is compared to the AAC in order to determine compliance with the Toxic Air Pollutant modeling requirements. Table 7.3 shows the MGLC for each averaging period for each modeled pollutant across the five years of data.

Table 7.3. Predicted MGLC

Pollutant	Averaging Period	Year	MGLC (µg/m3)	AAC (µg/m3)
Formaldehyde	Annual	2007	1.446	1.1
	15-minute*	2010	41.89	245
Methanol	24-hour	2007	97.80	619
	15-minute*	2010	649.4	32,800
Acetaldehyde	Annual	2007	0.5142	4.55
	15-minute*	2010	14.91	4,500

*Converted from 1-hour modeled concentration ($C_{15\text{-min}} = C_{1\text{-hour}} \times 1.32$).

All predicted MGLCs were below the associated ACC, with the exception of formaldehyde for the annual averaging period.

7.6 RISK ASSESSMENT

Since the annual formaldehyde MGLC exceeds the ACC, a risk assessment was conducted to ensure that the ACC is not exceeded at any residential areas. The annual formaldehyde results for each year are listed in Table 7.4 below.

Table 7.4. Annual Formaldehyde Concentrations

Year	MGLC (µg/m3)	AAC (µg/m3)
2007	1.446	1.1
2008	1.309	
2009	1.054	
2010	1.364	
2011	1.174	

For every year except 2009, the MGLC exceeds the AAC. All exceedances occur at or near the facility's property line. The locations where the AAC is exceeded off the property occur in industrial or commercial locations, away from residences. To demonstrate this, discrete receptors were placed at the coordinates of three nearby residences located downwind of the facility. The MGLC at these receptors is reported in Table 7.5.

Table 7.5. Residential Discrete Receptor Modeling Results

Coordinates		Year	MGLC (µg/m3)	AAC ($\mu g/m^3$)
X (m)	Y (m)			
761,777	3,663,340	2007	0.7580	1.1
761,892	3,663,362	2007	0.6232	
761,802	3,663,572	2010	0.8426	

The results show that the MGLC does not exceed the AAC at the nearby residential areas. The formaldehyde modeling results for the annual averaging period were also overlaid in Google Earth to provide a visual representation of the modeling results. Images of the modeling results overlaid in Google Earth can be found at the end of this section.

7.7 GOOD ENGINEERING PRACTICE (GEP) STACK HEIGHT ANALYSIS

GEP stack height is calculated using the following equation:

$$H_g = H + 1.5\,L$$

where:

H_g = Good Engineering Practice (GEP) stack height,
H = Height of the structure or nearby structure,
L = Lesser dimension (height or projected width of the structure or nearby building).

The publication *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)* was followed for determining the GEP height for each stack modeled. The structure resulting in the largest GEP height for each stack was identified as the critical building for that stack. The GEP analysis results are presented in Table 7.6.

Table 7.6. GEP Results

Stack/Vent ID	Stack Height (meters)	GEP Height (meters)
501A – Kiln 1	8.23	65
501B – Kiln 2	8.23	65
501C – Kiln 3	8.23	65
501D1 – Kiln 4 Western Door 1	5.03	65
501D1 – Kiln 4 Western Door 2	5.03	65
501D1 – Kiln 4 Eastern Door 1	5.03	65
501D1 – Kiln 4 Eastern Door 2	5.03	65

TOXIC AIR POLLUTANT MODELING EMISSION RATE CALCULATIONS

7.7. Lumber Drying Kiln No. 4 (500D) Toxic Air Pollutants Emissions

Operational Information			
Emission Unit	Kiln Annual Throughput* (MMBF/yr)	Natural Gas Burner Capacity (MMBtu/hr)	Natural Gas Heating Value (Btu/scf)
Kiln No. 4 (500D)	95	40	1,020

*Throughput based on maximum capacity of continuous kiln.

Pollutant	Emission Factor		Reference	Maximum Emission Rate (lb/hr)			
				Western Door 1	Western Door 2	Eastern Door 1	Eastern Door 2
Lumber Drying Emissions							
Formaldehyde	0.0149	lb/MBF	1	0.04040	0.04040	0.04040	0.04040
Methanol	0.236	lb/MBF	1	0.6398	0.6398	0.6398	0.6398
Acetaldehyde	0.0054	lb/MBF	2	0.01464	0.01464	0.01464	0.01464
Natural Gas Combustion Emissions							
Formaldehyde	0.075	lb/MMscf	3	0.0007353	0.0007353	0.0007353	0.0007353
Total Emissions							
Formaldehyde				0.04113	0.04113	0.04113	0.04113
Methanol				0.6398	0.6398	0.6398	0.6398
Acetaldehyde				0.01464	0.01464	0.01464	0.01464

Emission Factor References:

1) Emission factor for steam-heated southern pine drying kilns obtained from
 Title V Application Number 20518 for Rayonier Wood Products LLC - Baxley Sawmill.

2) Emission factor for steam-heated southern pine drying kilns obtained from
 Title V Application Number 20695 for Temple Inland - Rome Lumber Mill.

3) AP 42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3.

Table 7.8. Lumber Drying Kilns No. 1, 2, and 3 (500A, 500B, 500C) Toxic Air Pollutant Emissions

Operational Information			
Emission Unit	Kiln Maximum Annual Throughput Capacity* (MMBF/yr)	Natural Gas Burner Capacity (MMBtu/hr)	Natural Gas Heating Value (Btu/scf)
Kiln No. 1 (500A)	65	30	1,020
Kiln No. 2 (500B)	65	30	1,020
Kiln No. 3 (500C)	70	30	1,020

*Maximum throughput based on maximum design capacity of each kiln.

Kiln No. 1 (500A)

Pollutant	Emission Factor		Reference	Maximum Emission Rate (lb/hr)
Lumber Drying Emissions				
Formaldehyde	0.0149	lb/MBF	1	0.1106
Methanol	0.236	lb/MBF	1	1.751
Acetaldehyde	0.0054	lb/MBF	2	0.04007
Natural Gas Combustion Emissions				
Formaldehyde	0.075	lb/MMscf	3	0.002206
Total Emissions				
Formaldehyde				0.1128
Methanol				1.751
Acetaldehyde				0.04007

Kiln No. 2 (500B)

Pollutant	Emission Factor		Reference	Maximum Emission Rate (lb/hr)
Lumber Drying Emissions				
Formaldehyde	0.0149	lb/MBF	1	0.1106
Methanol	0.236	lb/MBF	1	1.751
Acetaldehyde	0.0054	lb/MBF	2	0.04007
Natural Gas Combustion Emissions				
Formaldehyde	0.075	lb/MMscf	3	0.002206
Total Emissions				
Formaldehyde				0.1128
Methanol				1.751
Acetaldehyde				0.04007

Kiln No. 3 (500C)

Pollutant	Emission Factor		Reference	Maximum Emission Rate (lb/hr)
Lumber Drying Emissions				
Formaldehyde	0.0149	lb/MBF	1	0.1191
Methanol	0.236	lb/MBF	1	1.886
Acetaldehyde	0.0054	lb/MBF	2	0.04315
Natural Gas Combustion Emissions				
Formaldehyde	0.075	lb/MMscf	3	0.002206
Total Emissions				
Formaldehyde				0.1213
Methanol				1.886
Acetaldehyde				0.04315

Emission Factor References:

1) Emission factor for steam-heated southern pine drying kilns obtained from Title V Application Number 20518 for Rayonier Wood Products LLC - Baxley Sawmill.

2) Emission factor for steam-heated southern pine drying kilns obtained from Title V Application Number 20695 for Temple Inland - Rome Lumber Mill.

3) AP 42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3.

Table 7.9. Toxic Air Pollutant Emission Rates

Model Source ID	Emission Source ID	Source Description	Modeled Emission Rate (lb/hr)		
			Formaldehyde	Methanol	Acetaldehyde
BK01	500A	Batch Kiln No. 1	0.1128	1.751	0.04007
BK02	500B	Batch Kiln No. 2	0.1128	1.751	0.04007
BK03	500C	Batch Kiln No. 3	0.1213	1.886	0.04315
CDK4W1	500D	Kiln No. 4 Western Door 1	0.04113	0.6398	0.01464
CDK4W2	500D	Kiln No. 4 Western Door 2	0.04113	0.6398	0.01464
CDK4E1	500D	Kiln No. 4 Eastern Door 1	0.04113	0.6398	0.01464
CDK4E2	500D	Kiln No. 4 Eastern Door 2	0.04113	0.6398	0.01464

Table 7.10. Toxic Air Pollutant Dispersion Modeling Results

Pollutant	Averaging Period	Year	MGLC (µg/m^3)	AAC (µg/m^3)
Formaldehyde	Annual	2007	1.446	1.1
		2008	1.309	
		2009	1.054	
		2010	1.364	
		2011	1.174	
	15-minute*	2007	37.32	245
		2008	39.35	
		2009	39.45	
		2010	41.89	
		2011	40.38	
Methanol	24-hour	2007	97.80	619
		2008	85.22	
		2009	92.29	
		2010	83.43	
		2011	81.37	
	15-minute*	2007	578.6	32,800
		2008	610.0	
		2009	611.4	
		2010	649.4	
		2011	625.7	
Acetaldehyde	Annual	2007	0.5142	4.55
		2008	0.4656	
		2009	0.3748	
		2010	0.4853	
		2011	0.4178	
	15-minute*	2007	13.28	4,500
		2008	14.00	
		2009	14.04	
		2010	14.91	
		2011	14.37	

*Converted from 1-hour modeled concentration ($C_{15\text{-min}} = C_{1\text{-hour}}$ X 1.32)

Maximum Predicted MGLC

Pollutant	Averaging Period	Year	MGLC (µg/m3)	AAC (µg/m^3)
Formaldehyde	Annual	2007	1.446	1.1
	15-minute*	2010	41.89	245
Methanol	24-hour	2007	97.80	619
	15-minute*	2010	649.4	32,800
Acetaldehyde	Annual	2007	0.5142	4.55
	15-minute*	2010	14.91	4,500

*Converted from 1-hour modeled concentration ($C_{15\text{-min}} = C_{1\text{-hour}}$ X 1.32)

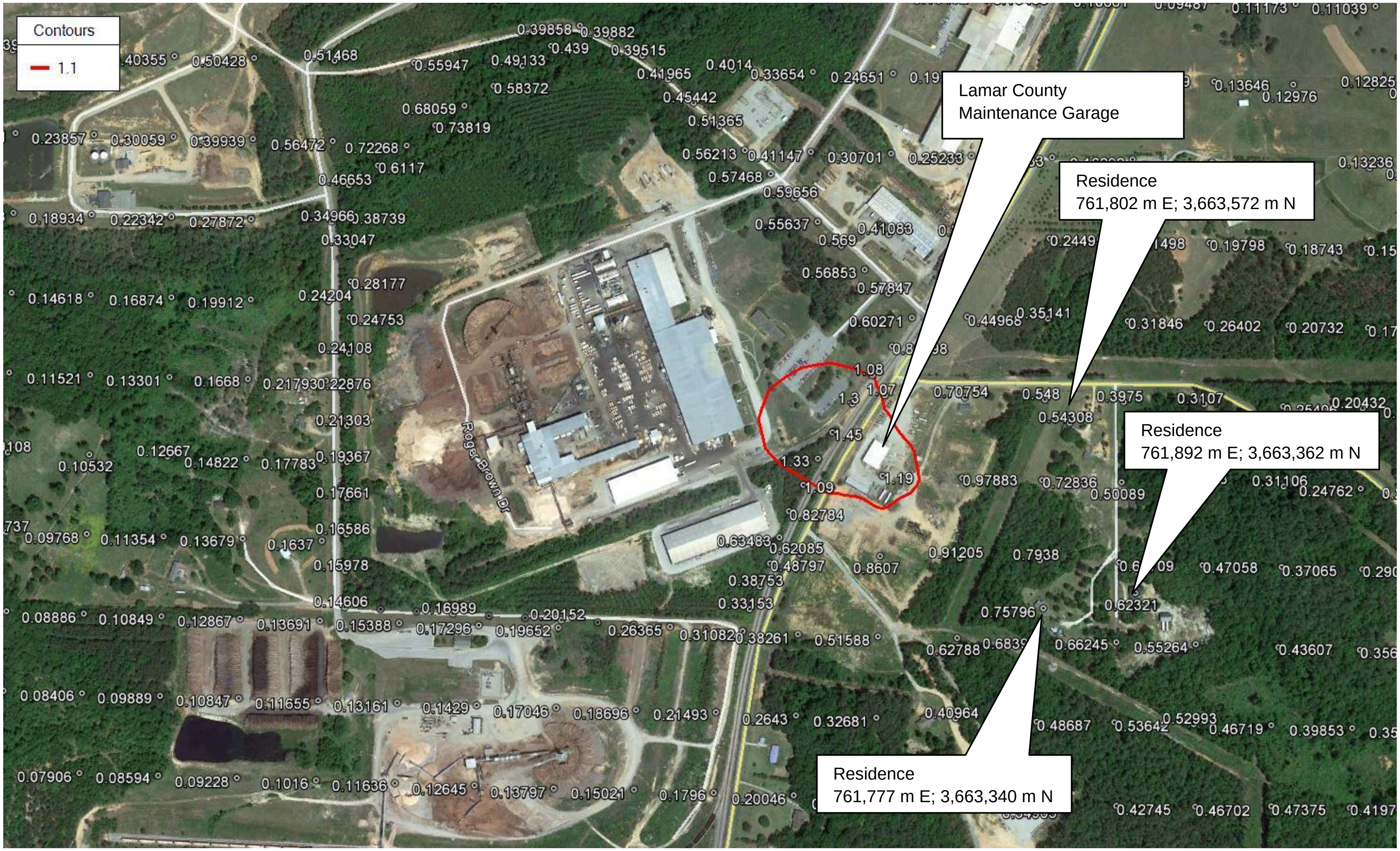
Table 7.11. Annual Formaldehyde Risk Assessment Dispersion Modeling Results

Coordinates		Year	MGLC (µg/m3)	AAC ($\mu g/m^3$)
X (m)	Y (m)			
761,777	3,663,340	2007	0.7580	1.1
		2008	0.6577	
		2009	0.5098	
		2010	0.5606	
		2011	0.4691	
761,892	3,663,362	2007	0.6232	
		2008	0.5893	
		2009	0.4841	
		2010	0.6129	
		2011	0.5030	
761,802	3,663,572	2007	0.5431	
		2008	0.6391	
		2009	0.5532	
		2010	0.8426	
		2011	0.7461	

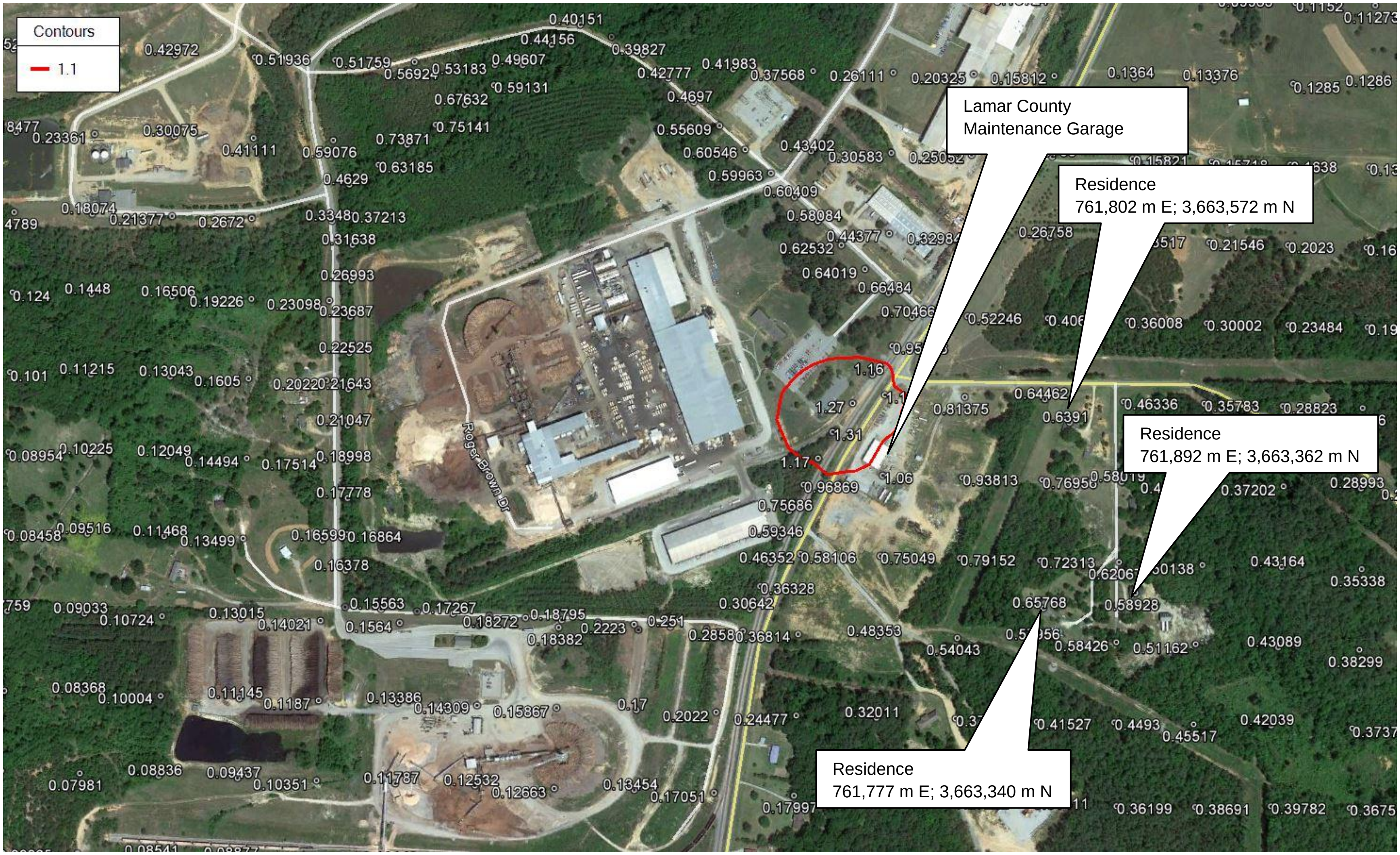
Maximum Predicted MGLC at Residences

Coordinates		Year	MGLC (µg/m3)	AAC ($\mu g/m^3$)
X (m)	Y (m)			
761,777	3,663,340	2007	0.7580	1.1
761,892	3,663,362	2007	0.6232	
761,802	3,663,572	2010	0.8426	

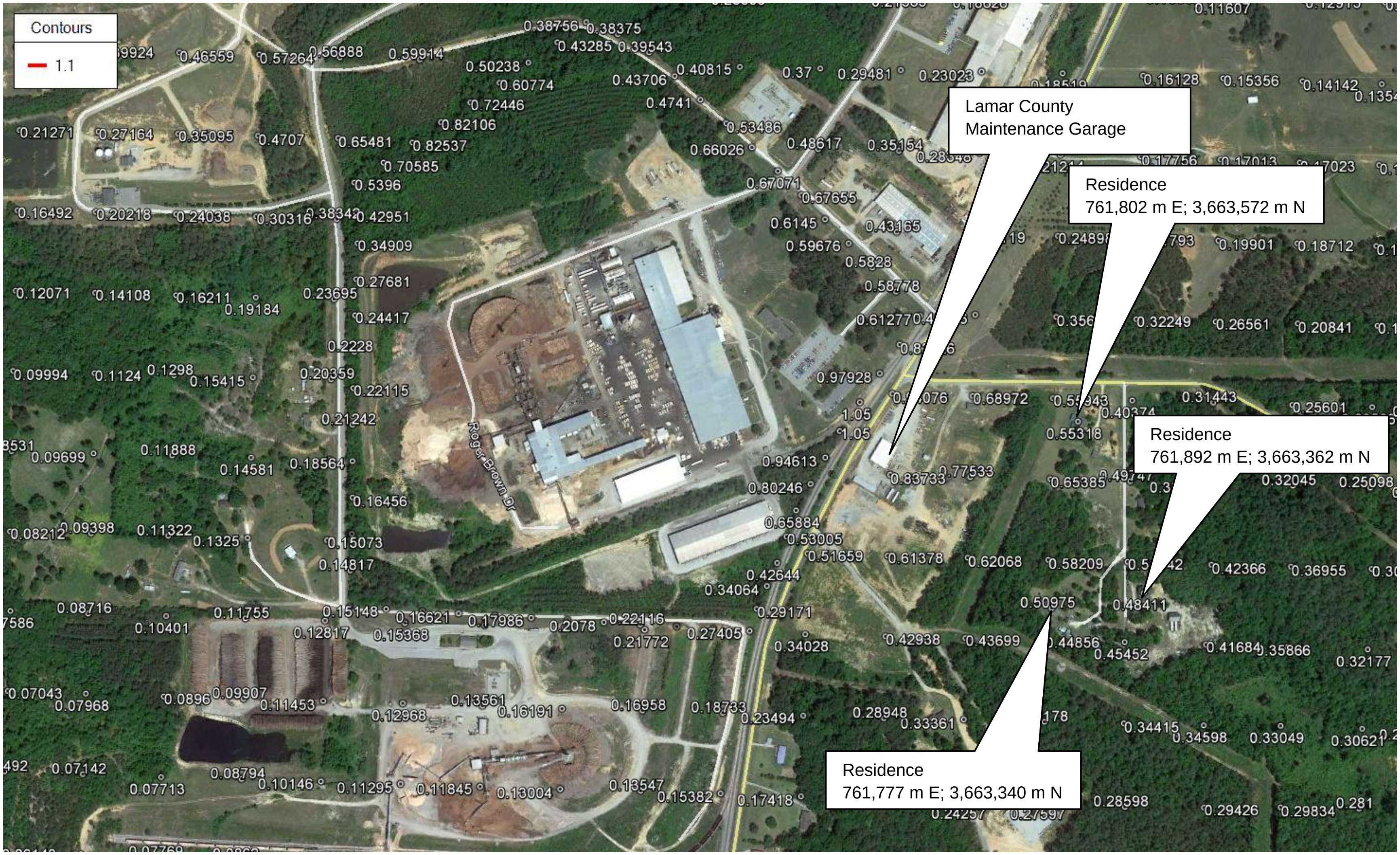
FORMALDEHYDE MODELING RESULTS FOR ANNUAL AVERAGING PERIOD



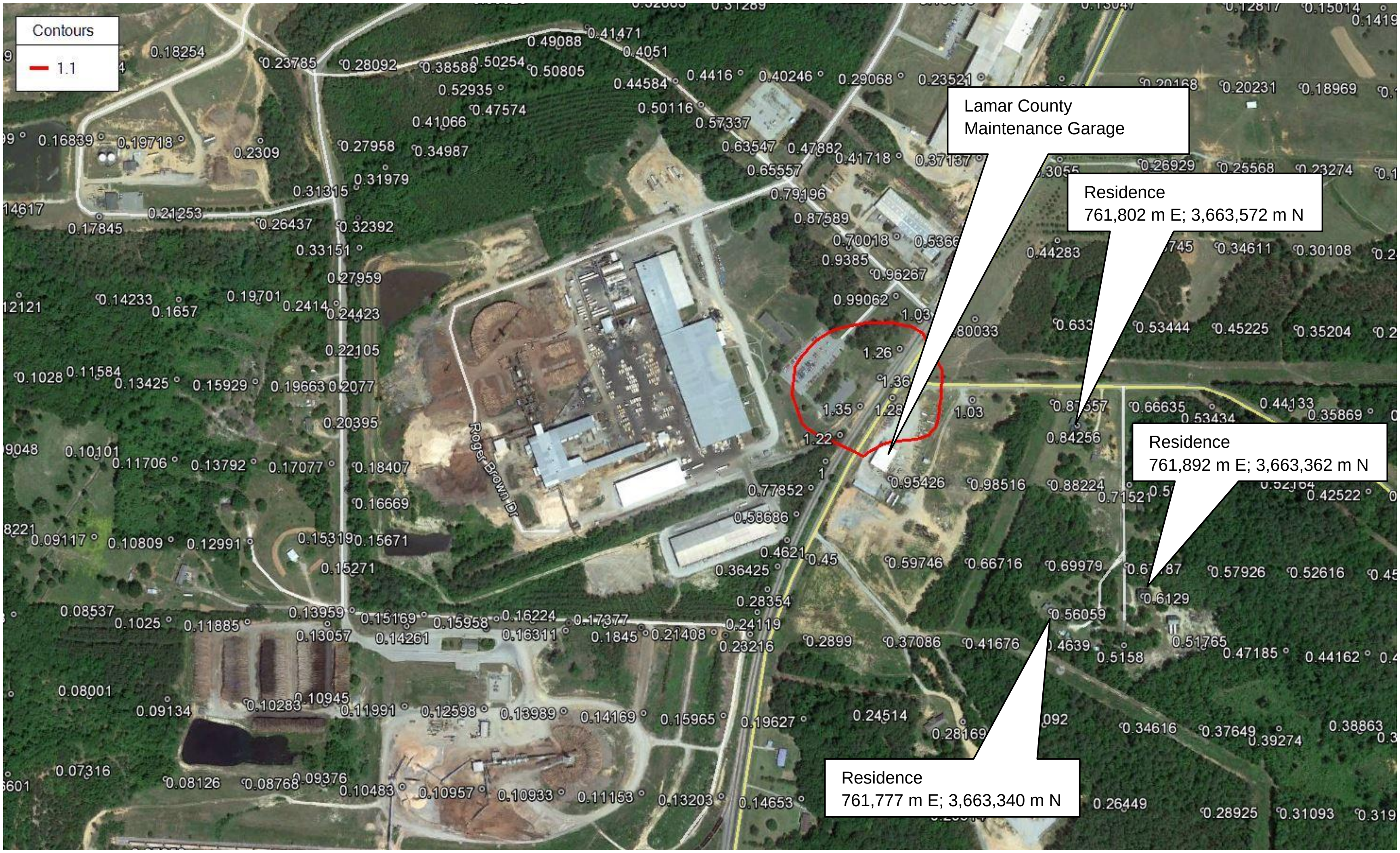
2007 Annual Formaldehyde modeling results.



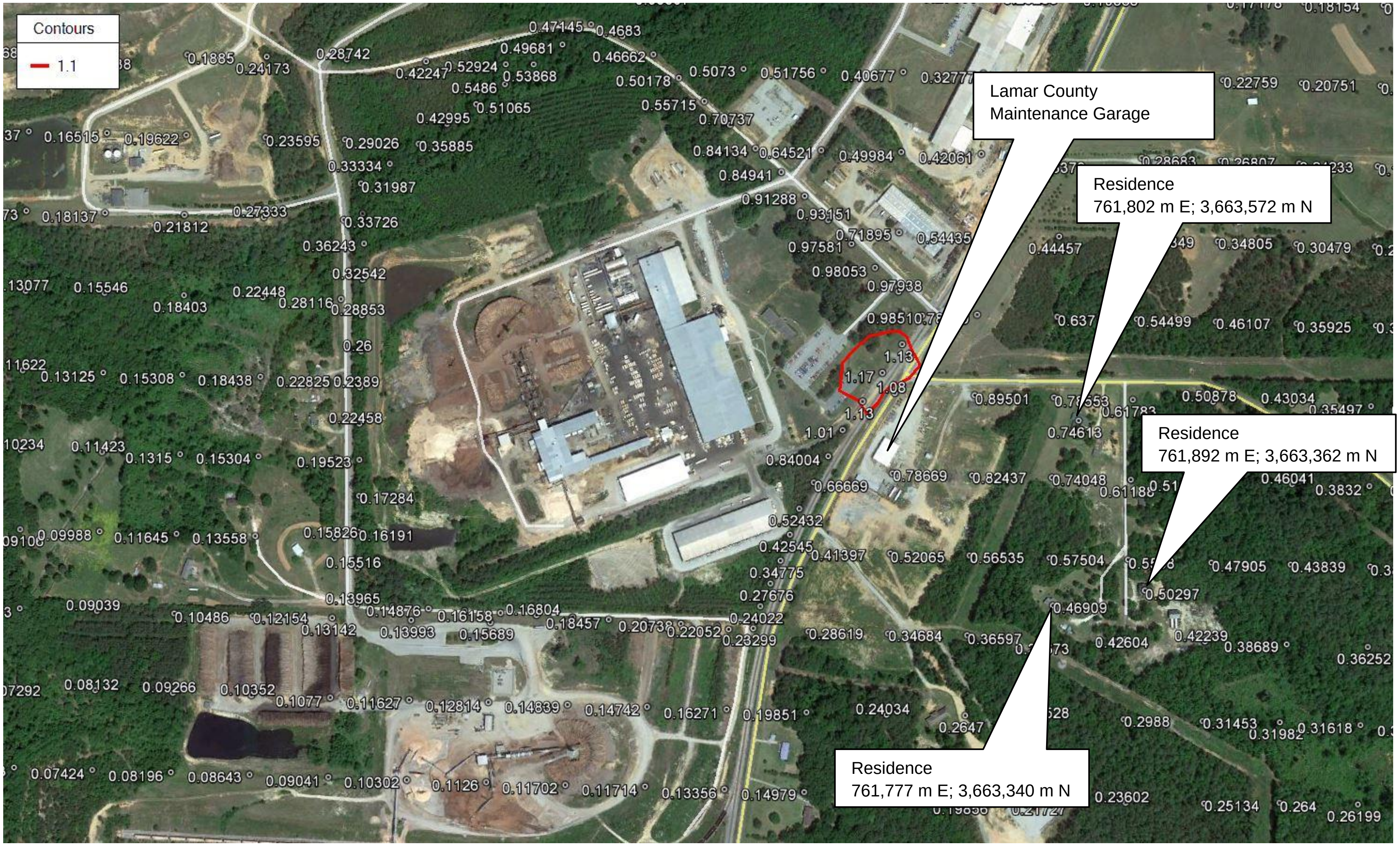
2008 Annual Formaldehyde modeling results.



2009 Annual Formaldehyde modeling results.



2010 Annual Formaldehyde modeling results.



2011 Annual Formaldehyde modeling results.

SECTION 8

ADDITIONAL IMPACTS ANALYSIS

SECTION 8: ADDITIONAL IMPACTS ANALYSIS

8.1 OZONE AMBIENT IMPACT ANALYSIS

Ozone is formed by the interaction of VOC, NO_x, and sunlight. Because the proposed modification will result in a significant increase of VOC, an ozone impact analysis must be conducted to determine the effect of the increased VOC emissions on the ambient ozone concentration in the area surrounding the facility. Since the increase in VOC emissions exceeds 100 tons per year, an evaluation is required to determine if existing ozone monitoring data can be used in the place of pre-construction monitoring data.

The closest ozone monitoring location to the facility is the CASTNET (Clean Air Status and Trends Network) site located in Pike County (Site ID 132319991). The CASTNET site is located approximately 25 km away from the facility and is at an elevation about 20 feet higher than the facility location. Both the CASTNET monitoring site and the facility are located in rural areas. The CASTNET ozone monitor is believed to be representative of the facility due to the close proximity and the similarities of the areas.

Table 7.1 below shows a summary of the ozone monitoring data for the past three years at the CASTNET monitor. The three year average of the annual fourth highest daily maximum 8-hr concentration is the metric used to determine compliance with the ozone standard. Note that data was only available for the years 2012-2014. The monitoring data shows that the area is currently meeting the newly established 8-hr ozone standard of 0.070 ppm.

Table 7.1. Summary of ozone monitoring data at CASTNET monitor.

Year	4^{th} Highest Daily Maximum 8-hr Concentration* (ppm)	3-year average (ppm)
2012	0.077	N/A
2013	0.064	N/A
2014	0.066	0.069

*From 2012-2014 Ambient Air Surveillance Reports (GA EPD).

The proposed modification is expected to have a negligible impact on ambient ozone concentrations. Based on data from the US EPA Air Emission Sources database (http://www3.epa.gov/air/emissions/index.htm), the VOC increase attributable to the project (190.0 tons per year) will be about 2.5% of the annual emissions of VOC in Lamar County. The formation of ozone in the southeastern US is limited by NO_x emissions due to the large quantity of biogenic VOC emissions in this part of the country. The net increase in NO_x emissions for this project is low enough that it is not expected to have a noticeable effect on ozone formation. For these reasons, the proposed modification is not expected to contribute to increased ozone concentrations.

8.2 CLASS I AREA IMPACT ANALYSIS

Certain national park and wilderness areas are designated as Class I areas and are given special protection under PSD regulations. There are five Class I areas located within 300 km of the facility:

- Cohutta Wilderness, 185 km
- Joyce Kilmer-Slickrock Wilderness, 245 km
- Great Smoky Mountains, 270 km
- Shining Rock Wilderness, 275 km
- Okefenokee Swamp, 285 km

A PSD application must demonstrate that PSD increments are not exceeded in nearby Class I areas. The proposed modification triggers PSD review for VOC only. Since there are no PSD increments for VOC, no Class I area analysis is required.

8.3 SOILS AND VEGETATION IMPACT ANALYSIS

The pollutants of concern for adverse impacts on soils and vegetation are SO_2, NO_2, CO, and ozone. The analysis is only conducted for the specific pollutants that are undergoing PSD review. This project is subject to PSD review for VOC only. VOC is a precursor to ozone formation. As discussed in Section 8.1, the increases in VOC are not expected to lead to an increase in ambient ozone concentration. Therefore, no adverse effects on soils and vegetation are anticipated as a result of this project.

8.4 CLASS II AREA VISIBILITY ANALYSIS

The pollutants of concern for impairment of visibility are PM, NO_x, and SO_2. Since VOC is the only pollutant with a significant increase, impairment of visibility is not anticipated as a result of this project.

8.5 GROWTH ANALYSIS

The growth analysis is conducted to estimate increased emissions due to residential, commercial, and industrial growth that will occur as a result of the project. Additional employees may be hired in the future in order to achieve increases in production, but it is believed that any new employees are already part of the existing labor force in the surrounding area. Therefore, no significant residential, commercial, or industrial growth is anticipated as a result of the project.