5. BEST AVAILABLE CONTROL TECHNOLOGY

Pursuant to ORCAA Rule 6.1.4(a)(2) and WAC 173-400-113, all new and modified sources must employ BACT for "all pollutants not previously emitted or whose emissions would increase as a result of the new source or modification." This section includes a BACT analysis for the CDK, haul roads, and material handling. The BACT analyses for PM, SO_2, NO_x, VOC, and CO, as well as tBACT for TAPs for these emission units are presented in the subsequent sections.

5.1 BACT Methodology

In a memorandum dated December 1, 1987, EPA stated its preference for a "top-down" BACT analysis.[4] After determining if any NSPS or NESHAP is applicable, the first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical source or source category. If it can be shown that this level of control is technically, environmentally, or economically infeasible for the unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections. The five basic steps of a top-down BACT review as identified by the EPA are presented below.[5]

5.1.1 Step 1 – Identify All Control Technologies

Available control technologies are identified for each emission unit in question. The following methods are used to identify potential technologies: (1) reviewing entries in the Reasonably Available Control Technology (RACT)/BACT/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) database, (2) surveying regulatory agencies, (3) drawing from similar experience in assessing emissions control strategies, (4) surveying air pollution control equipment vendors, and/or (5) researching available literature.

5.1.2 Step 2 – Eliminate Technically Infeasible Options

After the identification of control options, an analysis is conducted to eliminate technically infeasible options. A control option is eliminated from consideration if there are process specific conditions that prohibit the implementation of the control technology or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits, such as an NSPS or NESHAP.

5.1.3 Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Once technically infeasible options are removed from consideration, the remaining options are ranked based on their control effectiveness. If there is only one remaining option or if all of the remaining technologies could achieve equivalent control efficiencies, ranking based on control efficiency is not required.

5.1.4 Step 4 – Evaluate Most Effective Controls and Document Results

Beginning with the most efficient control option in the ranking, detailed economic, energy, and environmental impact evaluations are performed. If a control option is determined to be economically

[4] U.S. EPA, Office of Air and Radiation. Memorandum from J.C. Potter to the Regional Administrators. Washington, D.C. December 1, 1987.

[5] U.S. EPA. *Draft New Source Review Workshop Manual*, Chapter B. Research Triangle Park, North Carolina. October, 1990.

feasible without adverse energy or environmental impacts, it is not necessary to evaluate the remaining options with lower control efficiencies.

The economic evaluation centers on the cost effectiveness of the control option. Costs of installing and operating control technologies are estimated and annualized following the methodologies outlined in the EPA's OAQPS Control Cost Manual (CCM) and other industry resources.[6]

5.1.5 Step 5 – Select BACT

In the final step, one pollutant-specific control option and/or limit is proposed as BACT for each emission unit under review based on evaluations from the previous step.

Comprehensive "top-down" review is not always necessary for BACT analyses. At a minimum, a complete BACT determination must assess the technical, environmental, and economic feasibility of the most stringent controls available. The BACT analyses in this application follow the framework of the "top-down" approach.

The BACT analyses for the new emission units are presented in the following sections.

5.2 BACT Analysis for New CDK

5.2.1 BACT Analysis for VOC Emissions

VOC is emitted when the carbonaceous matter in the fuel is not converted to CO_2 or CO. Based on the RBLC database results in Table 5-1, as well as existing air permits and applications for direct-fired CDKs, including the West Fraser Augusta Mill's Title V Application No. 21615 approved by the Georgia Environmental Protection Division (EPD), the following control methods were identified for initial review:[7,8]

- Included in RBLC
  - Proper Maintenance and Operating Practices
- Other Controls
  - Adsorption
  - Biofiltration
  - Condensation
  - Thermal Oxidation
  - Wet Scrubber

[6] Office of Air Quality Planning and Standards (OAQPS), *EPA Air Pollution Control Cost Manual,* Sixth Edition, EPA 452-02-001 (http://www.epa.gov/ttn/catc/products.html#cccinfo), Daniel C. Mussatti & William M. Vatavuk, January 2002.

[7] RBLC search conducted on July 3, 2023 for direct-fired continuous dry kilns under process code 30.800 with a permit date between 1/1/2013 and 7/3/2023.

[8] West Fraser – Augusta Mill, *Continuous Kilns Construction Permit Application,* Trinity Consultants, December 2012. (https://epd.georgia.gov/document/document/2450047psdapppdf/download)

Table 5-1. RBLC Results for VOC Emissions from CDKs

Facility Name	State	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
West Fraser-Opelika Lumber Mill	AL	206-5004-X005	Two 87.5 MMBF/yr CDKs with a 35 MMBtu/hr direct-fired wood burner	--	3.76	lb/MBF	175	K/12 months
West Fraser, Inc. – Maplesvile Mill	AL	403-5005-X010	Two 100 MMBF/yr Direct-Fired CDK	--	3.76	lb/MBF	--	--
Millport Wood Products Facility	AL	408-5003-X022	Direct-Fired CDK	Proper Maintenance and Operating Practices	4.7	lb/MBF as WWP1 VOC	--	--
Resolute Forest Products – Alabama Sawmill	AL	309-0072-X002	Direct-Fired CDKs with 35 MMBtu/hr Wood-Fired Burner	--	3.76 [a]	lb/MBF	--	--
Two Rivers Lumber Co.	AL	105-S007-X002	15.4 MBF/hr CDK (DPK-1) w/ 38.8 MMBtu/hr NG Burner	--	3.8	lb/MBF as C	--	--
			15.4 MBF/hr CDK (DPK-2) w/ 38.8 MMBtu/hr NG Burner	--	3.8	lb/MBF as C	--	--
Fulton Sawmill	AL	X007 & X008	11.4 MBF/hr Direct-Fired CDK, 40 MMBtu/hr NG Burner, & 4 MMBtu/hr NG Condensate Evaporator	Proper Kiln Operation and Maintenance Practices	4	lb/MBF	--	--
Millport Wood Products Facility	AL	X023	Three Direct-Fired CDKs Dry Kilns, CDK-4/X023A, CDK-5/X023B, CDK-6/X023C	Operating And Maintenance Practices	4.7	lb/MBF as WWP1 VOC	--	--
Belk Chip-N-Saw Facility	AL	X006, X008, X009	115,000 MBF/yr CDK D (ES-006) with 35 MMBtu/hr Wood-Fired and 7 MMBtu/hr NG-Fired Burners	Operating And Maintenance Practices; Measure Lumber Moisture Content	5.49	lb/MBF as WWP1 VOC	--	--
			115,000 MBF/yr CDK E (ES-009) with 35 MMBtu/hr Wood-Fired and 7 MMBtu/hr NG-Fired Burners		5.49	lb/MBF as WWP1 VOC	--	--
Cottonton Sawmill	AL	211-S005-X007	Direct-fired CDK with 34 MMBtu/hr Wood-Fired Burner	Good Combustion Practices and Proper Maintenance	4.21	lb/MBF as Terpenes	--	--
OLA	AR	0592-AOP-R10	Drying Kiln No. 5 (SN-21)	--	23.5 [b]	lb/hr	3.5 [b]	lb/MBF
Georgia-Pacific Wood Products South	AR	463-AOP-R8	SN-09 #4 Lumber Kiln	--	3.8	lb/MBF	373.7	tpy

Facility Name	State	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
El Dorado Sawmill	AR	2348-AOP-R0	LUMBER DRYING KILN SN-01	Proper Maintenance and Operation	3.8	lb/MBF	--	--
			LUMBER DRYING KILN SN-02	--	3.8	lb/MBF	--	--
			LUMBER DRYING KILN SN-03	--	3.8	lb/MBF	--	--
Deltic Timber Corporation – OLA	AR	0592-AOP-R10	Direct-Fired CDK NO. 5	Proper Drying Schedule, Temperature-Based on Moisture Content, and Manufacturer's Specs	38.2 [c]	lb/hr	--	--
Caddo River	AR	0189-AOP-R6	CDKs	--	53.2	lb/hr	220.4 [a]	tpy
West Fraser, Inc.	AR	1628-AOP-R11	N/A	--	3.8	lb/MMBF	63.6	lb/hr
Anthony Forest Products Company	AR	1681-AOP-R15	Dual Path Kiln #3	--	3.8	lb/MBF	--	--
Caddo River	AR	0189-AOP-R8	Dual Path Kiln # 3	--	3.8	lb/MBF	53.2	lb/hr
Interfor U.S. Inc	AR	1567-AOP-R7	CDK #2 to continuous operation	--	3.8	lb/MBF	--	--
Anthony Timberlands	AR	0456-AOP-R9	CDK	--	36.8	lb/hr	350	tpy
Georgia-Pacific Wood Products South	AR	0463-AOP-R21	SN-09 #4 Lumber Kiln	--	3.8	lb/MBF	460.9	tpy
Anthony Forest Products Company	AR	1681-AOP-R20	Dual Path Kiln #4	--	62	lb/hr	228	tpy
Perry Mill	FL	1230033-012-AC	Direct-fired lumber drying kiln	Best Operating Practices (BMP)	3.5	lb/MBF	--	--
Whitehouse Lumber Mill	FL	0310197-012-AC	Direct-Fired CDKs	Proper Maintenance and Operating Procedures	3.76	lb/MBF	--	--
Graceville Lumber Mill	FL	0630011-016-AC	Direct-fired continuous lumber drying Kiln No. 5	Lumber moisture used as proxy for VOC emissions – product that is over dried likely means more VOC driven off and emitted	3.5	lb/MBF	--	--
Southwest Louisiana Lumber Operations	LA	PSD-LA-770	EP-3K -Wood-Fired Dry Kiln No. 1	Proper kiln design & operation; annual production limit	29.27	lb/hr	2.96	lb/MBF
			EP-4K -Wood-Fired Dry Kiln No. 2		29.27	lb/hr	2.96	lb/MBF
			EP-5K -Wood-Fired Dry Kiln No. 3		29.27	lb/hr	2.96	lb/MBF
			EP-6K -Wood-Fired Dry Kiln No. 4		29.27	lb/hr	2.96	lb/MBF

Facility Name	State	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
Chopin Mill	LA	PSD-LA-784	Lumber Dry Kilns #1&2 (EQT 37&38)	Good operating practices	24.51	lb/hr	53.68	tpy
Joyce Mill	LA	PSD-LA-701(M-2)	GRP0003 Lumber Lilns (AK1)	Properly design and operation	4.2	lb/MBF	300	MMBF/yr
Bogalusa Sawmill	LA	PSD-LA-831	Lumber Kilns (2)	Proper operation and maintenance	--	--	--	--
Holden Wood Products Mill	LA	PSD-LA-834	CDKs A and B (01-19 and 02-19)	Proper Kiln Design and Good Operating Practices	4.33	lb/MBF	--	--
Idabel Sawmill	OK	2015-1163-C(M-1)PSD	Lumber Kiln	--	3.88	lb/MBF	--	--
West Fraser – Newberry Lumber Mill	SC	1780-0007-CG	Two – 35 MMBtu/hr Dual Path, Direct-Fired, CDKs, 15 MBF/hr, Each	Proper Operation and Good Operating Practices	3.76	lb/MBF	376	tpy
New South Lumber Co – Darlington Plant	SC	0820-0045-CJ	DKN5	Proper Maintenance and Operation	141	tpy	--	--
Kapstone Charleston Kraft – Summerville	SC	0900-0017-CE	Lumber Kilns	Proper Maintenance and Operation	225.6	tpy	3.76	lb/MBF
Simpson Lumber Co	SC	1140-0008-CH	Lumber Kilns	Proper Operation and Maintenance	156	tpy	3.76	lb/MBF
New South Companies, Inc. – Conway Plant	SC	1340-0029-CH-R2	Lumber Kilns	Proper Maintenance and Operation	602	tpy	4.2	lb/MBF
New South Lumber Company – Darlington	SC	0820-0045-CK	Two Kilns – KLN5 And KLN6	Proper Operation and Maintenance	--	--	--	--
Camden Plant	SC	1380-0025-CJ	DKN6 – Direct-Fired CDK	--	150.4	tpy	--	--
Georgia Pacific – McCormick Sawmill	SC	1600-0002-CD	Direct-Fired CDK	Good work practices	5.84	lb/MBF as Propane + Methanol + Formaldehyde	--	--
Resolute FP – Catawba Lumber Mill	SC	2440-0216-CA	3 Direct-Fired CDKs (CDK1, CDK2, CDK3)	--	5.82	lb/MBF as Terpene + Methanol + Formaldehyde	--	--
NSLC – Darlington	SC	0820-0045-CL	Lumber Drying Kiln 7	Work practice standards	4.2	lb/MBF as Terpene + Methanol + Formaldehyde	--	--
Canfor Southern Pine – Camden Plant	SC	1380-0025-CL	Lumber Drying Kiln 7	Work practice standards	5.82	lb/MBF	--	--

Facility Name	State	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
						as Terpene + Methanol + Formaldehyde		
Charles Ingram Lumber Company, Inc	SC	1040-0016-CG	Kiln K3	Work Practice Standards	5.824	lb/MBF as Terpene + Methanol + Formaldehyde	--	--
			Kiln K7		5.824	lb/MBF as Terpene + Methanol + Formaldehyde	--	--
Lumber Mill	TX	6729,PSDTX152 AND GHGPSDTX1	Kilns (EPNs CK01 and CK02)	Proper design and operation	3.38	lb/DBF	--	--
Lumber Mill	TX	7286 AND PSDTX892M2	Direct-Fired Wood Drying Kiln No. 3	Proper operation and maintenance of the kiln	4.24	lb/MBF	--	--

a. Rolling 12-months.
b. Average of three 1-hr test runs.
c. Averaged over drying cycle time.

Upon further analysis, all add-on control technologies were deemed to be technically infeasible. As the only technically feasible control method, Weyerhaeuser proposes proper maintenance and operating practices as BACT for VOC emissions from the CDK. In the TSD for the Facility's current TV permit, ORCAA determined BACT for lumber drying operations to be implementation of a steam management system. Since the CDK will be direct-fired, steam is not a practical variable to include. Therefore, Weyerhaeuser will incorporate this requirement by installing a kiln management system and in-kiln moisture management system, both of which provide for optimal drying efficiency and operating practices. Additionally, temperature has a significant impact on drying-based emissions, so Weyerhaeuser will operate the CDK with a maximum drying temperature of 200 °F to limit VOC emissions.

While there are various emission limits presented in the RBLC search results, they are all sourced from facilities in the Southeastern United States (US), which do not process Douglas fir. Since VOC emissions are dependent on wood species, Weyerhaeuser does not deem the RBLC emission limits to be representative of the Raymond Facility's CDK operation, so instead, the Facility proposes a new VOC BACT emission limit that uses the methodology discussed in Section 3.1.2. This limit includes two components: 1.149 lb/MBF for drying-based emissions and 6.19 x 10^{-3} lb/MMBtu for combustion-based emissions.

5.2.2 BACT Analysis for PM Emissions

PM emissions consist of filterable and condensable particulate matter produced by the combustion of wood fuel. Based on the RBLC database results in Table 5-2, as well as existing air permits and applications for direct-fired CDKs, the following control methods were identified for initial review:[9]

- Included in RBLC
  - Proper Maintenance and Operating Practices
- Other Controls
  - Baghouse
  - Cyclone
  - Scrubber
  - Dry Electrostatic Precipitator (Dry ESP)
  - Wet Electrostatic Precipitator (WESP)

[9] RBLC search conducted on July 3, 2023 for direct-fired continuous dry kilns under process code 30.800 with a permit date between 1/1/2013 and 7/3/2023.

Table 5-2. RBLC Results for PM Emissions from CDKs

Facility Name	Permit #	Process Name	Control Method	Pollutant	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
Two Rivers Lumber Co.	105-S007-X002	15.4 MBF/hr CDK (DPK-1) w/ 38.8 MMBtu/hr Natural Gas Burner	--	Total PM (TPM)	1.3	lb/hr	--	--
		15.4 MBF/hr CDK (DPK-2) w/ 38.8 MMBtu/hr Natural Gas Burner			1.3	lb/hr	--	--
Fulton Sawmill	X007 & X008	11.4 MBF/hr Direct-Fired CDK, 40 MMBtu/hr Natural Gas Burner, & 4 MMBtu/hr Natural Gas Condensate Evaporator	--	TPM	--	--	--	--
Anthony Forest Products Company	1681-AOP-R20	Dual Path Kiln #4	--	TPM	2.4	lb/hr	8.6	tpy
				TPM_{10}	2.3	lb/hr	8.5	tpy
		Dual Path Kiln #4 Abort Stack	--	TPM	3.1	lb/hr	0.5	tpy
				TPM_{10}	2.8	lb/hr	0.4	tpy
Resolute FP – Catawba Lumber Mill	2440-0216-CA	3 Direct-Fired CDKs (CDK1, CDK2, CDK3)	--	TPM	0.14 [a]	lb/MBF	--	--
				TPM_{10}	0.104 [a]	lb/MBF	--	--
				$TPM_{2.5}$	0.099 [a]	lb/MBF	--	--

a. Emission limits are for each kiln, on a 3-hour average.

Upon further analysis, all add-on control technologies were deemed to be technically infeasible. As the only technically feasible control method, Weyerhaeuser proposes proper maintenance and operating practices as BACT for PM emissions from the CDK. Following guidance from the RBLC search and Georgia EPD, Weyerhaeuser proposes the following PM BACT emission limits:[10]

- Total PM: 0.140 lb/MBF
- Total PM_{10}: 0.104 lb/MBF
- Total $PM_{2.5}$: 0.099 lb/MBF

5.2.3 BACT Analysis for CO Emissions

CO emissions result primarily from the incomplete combustion of biomass. Based on the RBLC database results in Table 5-3, as well as existing air permits and applications for direct-fired CDKs, the following control methods were identified for initial review:[11]

- Included in RBLC
  - Proper Maintenance and Operating Practices
- Other Controls
  - Thermal Oxidation
  - Catalytic Oxidation

Table 5-3. RBLC Results for CO Emissions from CDKs

Facility Name	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
Resolute Forest Products – Alabama Sawmill	309-0072-X002	Direct-Fired CDKs with 35 MMBtu/hr Wood-Fired Burner	Proper Maintenance and Operating Procedures	0.73 [a]	lb/MBF	--	--
Fulton Sawmill	X007 & X008	11.4 MBF/hr Direct-Fired CDK, 40 MMBtu/hr Natural Gas Burner, & 4 MMBtu/hr Natural Gas Condensate Evaporator	--	--	--	--	--
Anthony Forest Products Company	1681-AOP-R20	Dual Path Kiln #4	--	20.4	lb/hr	89.4	tpy
Resolute FP – Catawba Lumber Mill	2440-0216-CA	3 Direct-Fired CDKs (CDK1, CDK2, CDK3)	--	0.73 [b]	lb/MBF	--	--

a. Rolling 12-months.
b. 3-hour average.

[10] Georgia Environmental Protection Division's (EPD) document entitled "EPD Recommended Emission Factors for Lumber Kiln Permitting in Georgia".

[11] RBLC search conducted on July 3, 2023 for direct-fired continuous dry kilns under process code 30.800 with a permit date between 1/1/2013 and 7/3/2023.

Upon further analysis, all add-on control technologies were deemed to be technically infeasible. As the only technically feasible control method, Weyerhaeuser proposes proper maintenance and operating practices as BACT for CO emissions from the CDK. Following guidance from the RBLC search and Georgia EPD, Weyerhaeuser proposes 0.73 lb/MBF as the CO BACT emission limit.[12]

5.2.4 BACT Analysis for NO_x Emissions

NO_x emissions result primarily from thermal NO_x formation from nitrogen and oxygen in the combustion air. Based on the RBLC database results in Table 5-4, as well as existing air permits and applications in the wood products industry, the following control methods were identified for initial review:[13]

- Included in RBLC
  - N/A
- Other Controls
  - Combustion Modifications
  - Selective Catalytic Reduction (SCR)
  - Selective Non-Catalytic Reduction (SNCR)
  - Water/Steam Injection
  - Proper Maintenance and Operating Practices

Table 5-4. RBLC Results for NO_x Emissions from CDKs

Facility Name	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
Fulton Sawmill	X007 & X008	11.4 MBF/hr Direct-Fired CDK, 40 MMBtu/hr Natural Gas Burner, & 4 MMBtu/hr Natural Gas Condensate Evaporator	--	--	--	--	--
Anthony Forest Products Company	1681-AOP-R20	Dual Path Kiln #4	--	4.6	lb/hr	16.8	tpy

5.2.4.1 Technical Review

Optimal temperature ranges for SCR and SNCR applications are 480°F to 800°F and 1,600°F to 2,100°F, respectively.[14,15] Since the gasifier typically runs at approximately 1,400°F and the secondary burner runs at

[12] Georgia Environmental Protection Division's (EPD) document entitled "EPD Recommended Emission Factors for Lumber Kiln Permitting in Georgia".

[13] RBLC search conducted on July 3, 2023 for direct-fired continuous dry kilns under process code 30.800 with a permit date between 1/1/2013 and 7/3/2023.

[14] EPA, *Air Pollution Control Technology Fact Sheet, Selective Catalytic Reduction (SCR),* EPA-452/F-03-015. (https://www3.epa.gov/ttncatc1/dir1/fscr.pdf).

[15] EPA, *Air Pollution Control Technology Fact Sheet, Selective Non-Catalytic Reduction (SNCR),* EPA-452/F-03-031. (https://www3.epa.gov/ttncatc1/dir1/fsncr.pdf).

around 1,850°F, an SCR is technically infeasible.[16] Additionally, an SNCR typically controls systems with uncontrolled NO_x levels between 200 and 400 ppm.[17] With a combined exhaust flow rate of 50,000 cfm, a vendor-specified exhaust density of 0.0663 lb/ft^3, and hourly NO_x emission rate of 10.33 lb/hr, the concentration of NO_x in the CDK exhaust is approximated to be 52 ppm. Therefore, an SNCR is also technically infeasible for the CDK.

Water/steam injection is not a demonstrated NO_x control method for direct-fired kilns in the wood products industry, so it is technically infeasible.

Combustion modifications, such as staged-air combustion, low NO_x burners (LNB), and flue gas recirculation (FGR), are technically feasible and typically have a control efficiency range between 10-50%.

5.2.4.2 BACT Determination

Per the vendor's guarantee, the green sawdust gasification burners will be designed with a "secondary gas burner system with [three] individual burner chambers," as well as flue gas recirculation, so Weyerhaeuser proposes combustion modifications and proper maintenance and operating practices as BACT for NO_x emissions from the CDK. Following guidance from Georgia EPD, Weyerhaeuser proposes 0.28 lb/MBF as the NO_x BACT emission limit.[18]

5.2.5 BACT Analysis for SO_2 Emissions

Based on the RBLC database results in Table 5-5, as well as existing air permits and applications in the wood products industry, the following control methods were identified for initial review:[19]

- Included in RBLC
  - N/A
- Other Controls
  - Fuel Gas Desulfurization (FGD)
  - Acid Gas Scrubber
  - Alternative Fuels
  - Proper Maintenance and Operating Practices

[16] Girardi, R. and Womac, C. *DIRECT-FIRED GREEN SAWDUST GASIFICATION DRY KILN*, Western Dry Kiln Association. April, 2007. (https://ir.library.oregonstate.edu/downloads/ng451j669).

[17] EPA, *Air Pollution Control Technology Fact Sheet, Selective Non-Catalytic Reduction (SNCR),* EPA-452/F-03-031. (https://www3.epa.gov/ttncatc1/dir1/fsncr.pdf).

[18] Georgia Environmental Protection Division's (EPD) document entitled "EPD Recommended Emission Factors for Lumber Kiln Permitting in Georgia".

[19] RBLC search conducted on July 3, 2023 for direct-fired continuous dry kilns under process code 30.800 with a permit date between 1/1/2013 and 7/3/2023.

Table 5-5. RBLC Results for $_{SO2}$ Emissions from CDKs

Facility Name	Permit #	Process Name	Control Method	Emission Limit 1	Unit 1	Emission Limit 2	Unit 2
Fulton Sawmill	X007 & X008	11.4 MBF/hr Direct-Fired CDK, 40 MMBtu/hr Natural Gas Burner, & 4 MMBtu/hr Natural Gas Condensate Evaporator	--	--	--	--	--
Anthony Forest Products Company	1681-AOP-R20	Dual Path Kiln #4	--	1	lb/hr	4.4	tpy
		Dual Path Kiln #4 Abort Stack	--	0.3	lb/hr	0.1	tpy

FGD and an acid gas scrubber are technically feasible for the system. However, the CDK burner fires green sawdust (i.e., wood) as its primary fuel, which is essentially sulfur free, so low sulfur fuel is technically feasible and already achieved by the process. Therefore, Weyerhaeuser proposes low sulfur fuels and proper maintenance and operating practices as BACT for SO_2 emissions from the CDK. Following guidance from Georgia EPD, Weyerhaeuser proposes 0.025 lb/MMBtu (or 1.25 lb/hr) as the SO_2 BACT emission limit.[20]

5.2.6 tBACT Analysis for Toxic Air Pollutant Emissions

All TAPs emitted are emitted as VOC. Therefore, the BACT determinations listed for VOC emissions also satisfy tBACT requirements for this emission unit.

5.3 BACT Analysis for Paved Roads

5.3.1 BACT Analysis for PM Emissions

PM emissions consist of filterable and condensable particulate matter and are fugitive in nature. Based on the RBLC database results in Table 5-6, as well as existing air permits and applications for direct-fired CDK projects, the following control methods were identified for initial review:[21]

- Included in RBLC
  - Road Watering Plan
  - Good Housekeeping Practices
- Other Controls
  - Road Sweeping
  - Speed Reduction

[20] Georgia Environmental Protection Division's (EPD) document entitled "EPD Recommended Emission Factors for Lumber Kiln Permitting in Georgia".

[21] RBLC search conducted on July 18, 2023 for roads under process code 30.999 with a permit date between 1/1/2012 and 7/18/2023.

Table 5-6. RBLC Results for PM Emissions from Paved Roads

Facility Name	Permit #	Process Name	Control Method	Pollutant	Emission Limit	Unit
El Dorado Sawmill	2348-AOP-R0	Haul Roads SN-09	Road Watering Plan + 0% Off-Site Opacity	TPM	12.7	lb/hr
Resolute FP – Catawba Lumber Mill	2440-0216-CA	Roads	Good Housekeeping Practices	Filterable PM (FPM)	0.13	lb/VMT
				FPM_{10}	0.03	lb/VMT
				$FPM_{2.5}$	0.01	lb/VMT

The Facility currently waters for dust suppression daily and sweeps the roads twice-monthly, which controls 75% of fugitive PM emissions. Since watering and vacuuming provide the most effective control for dust, Weyerhaeuser will continue these practices following the CDK Project. Therefore, Weyerhaeuser proposes bi-weekly watering and vacuuming as BACT for PM emissions from the paved roads. As detailed in the emission calculations, Weyerhaeuser proposed emission factors from AP-42 Section 13.2.1, Paved Roads, using the average silt loading value for corn wet mills along with a control efficiency of 75%, as the most accurate PM BACT emission limits.

5.4 BACT Analysis for Material Handling

5.4.1 BACT Analysis for PM Emissions

PM emissions consist of filterable and condensable particulate matter from the following material transfers inside and outside of the sawmill:

- Fuel silo loading (via cyclone)
- Bark bins loading (via cyclone)
- Chip bins loading of planer shavings (via cyclone)
- Green sawdust sawmill drop point (fugitive)
- Bark bins truck loadout (fugitive)
- Chip bins truck loadout (fugitive)

Based on the RBLC database results in Table 5-7, as well as existing air permits and applications for direct-fired CDK projects, the following control methods were identified for initial review:[22]

- Included in RBLC
  - Building Enclosure
  - Cyclone
  - Proper Maintenance and Operating Practices
- Other Controls
  - Fabric Filtration Systems (baghouse, bin vent filters, etc.)

[22] RBLC search conducted on July 18, 2023 for roads under process code 30.999 with a permit date between 1/1/2012 and 7/18/2023.

Table 5-7. RBLC Results for PM Emissions from Material Handling

Facility Name	Permit #	Process Name	Control Method	Pollutant	Emission Limit	Unit
Two Rivers Lumber Co.	105-S007-X002	Sawmill	--	Fugitive PM	--	--
Talladega Sawmill	309-0075	Sawmill and Green End Operations	--	TPM	--	--
			--	TPM_{10}	--	--
			--	$TPM_{2.5}$	--	--
El Dorado Sawmill	2348-AOP-R0	Sawmill SN-05	Sawmill located inside building	TPM	0.35	lb/ton
		Truck Bin SN-08	Cyclone; Proper Maintenance and Operation	TPM	0.002	gr/dscf
		Material Processing SN-11	Proper Maintenance and Operation	TPM	0.02	lb/ton
Resolute – Catawba Lumber Mill	2440-0216-CA	Material Transfer	Proper Maintenance and Good Operating Practices	FPM	0.0012	lb/ton
				FPM_{10}	0.0005	lb/ton
				$FPM_{2.5}$	0.0001	lb/ton

Loading of green sawdust from the sawmill to the CDK fuel silo and loading of bark from the hog to the bark truck bins will each be controlled by a cyclone with airlocks. Since the Facility will employ the most effective control technology for this transfer, Weyerhaeuser proposes a cyclone as BACT for PM emissions from fuel silo loading and bark bin loading. Following guidance in ORCAA's Annual Emissions Inventories for the Facility, Weyerhaeuser proposes 0.03 gr/dscf as the PM BACT limit for these transfers. Transfer of dry chips from the planer mill to the chip bins will also be controlled by a cyclone with airlocks, but the cyclone exhaust will further be controlled by a baghouse with a 99% control efficiency, due to the low moisture content of this stream. Weyerhaeuser proposes a cyclone and baghouse as BACT for PM emissions from chip bin loading of dry chips. Further, Weyerhaeuser proposes application of a 99% control efficiency onto emissions calculated with ORCAA's 0.03 gr/dscf grain loading rate as the PM BACT limit for this transfer.

For the new green sawdust drop point, the material transfer is located within the building enclosure. Neither a cyclone nor a fabric filtration system is feasible for this drop, so Weyerhaeuser proposes the building enclosure as BACT for PM emissions from the green sawdust sawmill drop point. As shown in the emission calculations, Weyerhaeuser proposes methods from AP-42 Section 13.2.4, Aggregate Handling and Storage Piles, with the minimum wind speed (representing the indoor transfer), as the PM BACT limit for this transfer.

While the bark and chip truck bins will have a cyclone on top of each set of bins, loadout of the materials into trucks will not be controlled by such cyclones. No add-on control technologies already presented are technically feasible for truck bin loadout, besides proper maintenance and operating practices. However, the Facility plans to install steel sidings on two out of four sides of the truck bin drop points, which will reduce fugitive PM emissions by 50%. Therefore, Weyerhaeuser proposes steel sidings as BACT for PM emissions from the bark and chip bins truck loadout. Similar to the green sawdust sawmill drop point, Weyerhaeuser,

proposes methods from AP-42 Section 13.2.4, Aggregate Handling and Storage Piles, but instead with the mean wind speed (representing the outdoor transfer), as the PM BACT limit for the truck loadout transfers.