TECHNICAL SUPPORT DOCUMENT

Air Discharge Permit 24-3624
Air Discharge Permit Application CO-1057

Preliminary Issued February 22, 2024

Pinnacle Renewable Holdings (USA) Inc. (Drax)

SWCAA ID – 2760

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ABBREVIATIONS

List of Acronyms

ADP ..... Air Discharge Permit
AP-42 ..... Compilation of Emission Factors, AP-42, 5th Edition, Volume 1, Stationary Point and Area Sources – published by EPA
ASIL..... Acceptable Source Impact Level
BACT..... Best available control technology
CAM ..... Compliance Assurance Monitoring
CAS#..... Chemical Abstracts Service registry number
CFR..... Code of Federal Regulations
EPA..... U.S. Environmental Protection Agency
EU ..... Emission Unit
MACT..... Maximum Achievable Control Technologies
mfr..... Manufacturer
NESHAP..... National Emission Standards for Hazardous Air Pollutants
NOV..... Notice of Violation/
NSPS..... New Source Performance Standard
PSD..... Prevention of Significant Deterioration
RACT..... Reasonably Available Control Technology
RCW ..... Revised Code of Washington
SCC..... Source Classification Code
SDS ..... Safety Data Sheet
SQER ..... Small Quantity Emission Rate listed in WAC 173-460
Standard..... Standard conditions at a temperature of 68°F (20°C) and a pressure of 29.92 in Hg (760 mm Hg)
SWCAA..... Southwest Clean Air Agency
T-BACT..... Best Available Control Technology for toxic air pollutants
WAC ..... Washington Administrative Code

List of Units and Measures

µg/m³..... Micrograms per cubic meter
µm..... Micrometer (10^{-6} meter)
acfm ..... Actual cubic foot per minute
bhp ..... Brake horsepower
dscfm..... Dry Standard cubic foot per minute
g/dscm..... Grams per dry Standard cubic meter
gpm ..... Gallon per minute
gr/dscf..... Grain per dry standard cubic foot
hp ..... Horsepower
hp-hr .....Horsepower-hour
kW .....Kilowatt
MMBtu .....Million British thermal unit
MMcf.....Million cubic feet
ppm.....Parts per million
ppmv.....Parts per million by volume
ppmvd.....Parts per million by volume, dry
scfm .....Standard cubic foot per minute
tpy.....Tons per year

List of Chemical Symbols, Formulas, and Pollutants

C_3H_8 ..... Propane
CH_4..... Methane
CO..... Carbon monoxide
CO_2..... Carbon dioxide
CO_2e..... Carbon dioxide equivalent
HAP ..... Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act
N_2O ..... Nitrous oxide
NO_2 ..... Nitrogen dioxide
NO_x ..... Nitrogen oxides
O_2 ..... Oxygen
O_3 .....Ozone
PM .....Particulate Matter with an aerodynamic diameter 100 µm or less
PM_{10}.....PM with an aerodynamic diameter 10 µm or less
$PM_{2.5}$ .....PM with an aerodynamic diameter 2.5 µm or less
SO_2.....Sulfur dioxide
SO_x.....Sulfur oxides
TAP.....Toxic air pollutant pursuant to Chapter 173-460 WAC
VOC.....Volatile organic compound

Terms not otherwise defined have the meaning assigned to them in the referenced regulations or the dictionary definition, as appropriate.

1. FACILITY IDENTIFICATION

Applicant Name:	Pinnacle Renewable Holdings (USA) Inc.
Applicant Address:	543 Granville Street, Suite 1100, Vancouver, British Columbia
Facility Name:	Pinnacle Renewable Holdings (USA) Inc.
Facility Address:	125 East Mill Road, Longview, WA 98632
SWCAA Identification:	2760
Contact Person:	Wayne Kooy
Primary Process:	Wood Pellet Manufacturing Facility
SIC/NAICS Code:	2499: Wood Products, Not Elsewhere Classified 321999: All Other Miscellaneous Wood Product Manufacturing
Facility Classification:	Title V (Criteria and HAP)

2. FACILITY DESCRIPTION

Pinnacle Renewable Holdings (USA) Inc. (Drax) plans to operate a newly constructed wood processing facility. The proposed facility will produce wood pellets from wood chips.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit (ADP) application number CO-1057 dated July 27, 2022. Pinnacle Renewable Holdings (USA) Inc. (Drax) submitted ADP application CO-1057 requesting approval to construct and operate a wood pellet processing facility. This facility will consist of the following:

- Two Scalpers, and a Biosizer, which will receive material via an enclosed conveyor
- One Rotary Dryer to be controlled by a Regenerative Thermal Oxidizer (RTO) and a Wet Electrostatic Precipitator (WESP)
- Four Hammermills controlled by a baghouse and a Regenerative Catalytic Oxidizer (RCO)
- Eleven Pelletizers controlled by a baghouse and an RCO
- An emergency generator engine that will provide power in the case of municipal power interruption
- An engine used to power an emergency Fire Suppression Pump

This is the initial permitting action for this facility.

4. PROCESS DESCRIPTION

4.a. Scalper and Biosizer. Material will be transported to the Scalpers and Biosizer via an enclosed conveyor. The Scalper and Biosizer sort the material based on its size. The material is then transported to the Biomass Rotary Dryer.

4.b. Rotary Dryer. One Rotary Dyer with a heat input capacity of 188 MMBtu/hr will be used to dry incoming products. Emissions from the rotary dryer will be controlled by an RTO, two cyclones and a WESP. The dryer drum will have a diameter of 23 feet and will be 110 feet long. Chips will be fed to the dryer from the metering bin through the airlock by a belt conveyor.

4.c. Hammermills. Four Hammermills will be used to process the dried material to its desired size. The Hammermills reduce the size of the material by repeatedly contacting it with small hammers. The emissions from this process will be controlled by a baghouse and an RCO.

4.d. Pelletizers. Eleven Pelletizers will be used to shape the raw material, through a mechanical process into pellets. The pellets will then be fed to four pellet coolers, which will cool them to ambient temperature. The emissions from this process will be controlled by a baghouse and will be routed to the same RCO as the Hammermill emissions.

4.e. Final Product Storage. The final product will be stored in one pellet storage dome. A cascade chute will be used to transport the pellets to vehicles, which will take them offsite to be sold. Aeration fans will be used to maintain low pellet temperature.

4.f. Haul Roads. All planned haul roads will be paved. Haul roads are used to transport raw materials on site and transport the finished product off site.

4.g. Dry Material Receiving. There is one receiving area for dry material. Walking floor trucks deliver dry material to this area, and it is transported to a surge silo or directly to the hammermills.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a. Biomass Rotary Dryer. One Biomass Rotary Dryer will be used to dry raw materials for further processing. The inlet air to the drum is mixed with a recycle stream because temperatures generated in the burner are above the design capacity of the drum. Details of the dryer are as follows.

Maximum Heat Input:	187.7 MMBtu/hr
Max Annual Throughput:	496,040 Oven Dry Tons per Year
Inlet Airflow:	490,158 acfm at 538°C (prior to mixing with recycle)
Outlet Air Flow:	300,912 acfm at 110°C
Flow to Exhaust Stack:	190,467 acfm at 107°C
Recycle Air Flow:	110,445 acfm at 107°C

Wet material feed:	112,800 kg/hr
Induced Draft Fan:	1,200 RPM
Dryer Dimensions:	23′ by 110′ Long
Stack Description:	Height 60′ and 102.8″ diameter

5.b. Electrostatic Precipitator. One WESP will be used to control particulate matter emitted by the Rotary Dryer. A quench duct will be used to control large particulate matter before the gas is introduced to the electrode control system. A negative charge is induced in the particles, and they will then migrate to positively charged electrodes. A solution of water and sodium hydroxide is used to clean the electrodes, in order to prevent particle buildup. Solids that are built up in the system will be removed in one of two ways. A decanter centrifuge will be used to remove some solids. A blowdown stream will also be removed from the water tank in order to remove solids. Details for the WESP are as follows:

Number of Tubes:	936
Number of Fields:	4
Design Pressure:	+-25″ w.c.
Recycle Tank Size:	20,000 gallons
Recycle Pump Capacity:	2,500 gpm
Centrifuge Flow Rate:	50 gpm
Blow Down Rate:	~2 gpm
NaOH Pump:	2 to 3 gpm
De-Foaming Agent Pump:	2 to 3 gpm
Inlet Power Supply:	105KVA
Output Rating:	70 kv
Vendor guarantee:	95% removal

5.c. Hammermill Baghouse. One fabric filter baghouse is used to filter particulate matter from the four hammermills. Filter bags are cleaned while in use with a reverse airjet cleaning system. Fine particulate collected in the baghouse is augured back into the plant′s material stream. The discharge of the baghouse is routed to the RCO. Details for the baghouse are as follows:

Make:	Allied/ Air-Cure
Model:	544RF12W
Number of Bags:	544
Filter Type:	polypropylene felt bags
Filtration Area:	8,105 ft² filtration area
Fan Motor:	200 HP and 1,800 RPM
Rated Air Flow:	40,000 acfm
Vendor Guarantee:	0.005 gr/dscf
Stack Diameter:	N/A
Stack Height:	N/A
Cleaning Method:	Reverse airjet

5.d. Pelletizer Baghouse. One fabric filter baghouse is used to filter particulate matter from the eleven pelletizers. Filter bags are cleaned while in use with a reverse airjet cleaning system. Fine particulate collected in the baghouse are augured back into the plant′s material stream. The discharge of the baghouse is routed to the RCO. Details for the baghouse are as follows:

Make:	Allied Air-Cure
Model:	544RF12W
Number of Bags:	824
Bag Size:	12′ long
Filter Type:	polyester with micro denier scrim felt
Filtration Area:	12.277 ft², (estimated based on air to cloth ratio)
Fan Motor:	200 HP and 1,800 RPM
Rate Airflow:	76,000 acfm
Vendor guarantee:	0.005 gr/dscf
Stack Diameter:	N/A
Stack Height:	N/A
Cleaning Method:	Reverse airjet

5.e. Regenerative Thermal Oxidizer (RTO). VOC emissions from the rotary dryer are controlled by an RTO, after passing through the WESP and one of two cyclones. Details for the oxidizer are as follows:

Auxiliary Heat Input Rate:	8.8 MMBtu/hr
Number of Chambers:	4
Combustion Chamber Size:	11′ by 34′ long by 8′ tall
Heat Recovery Media:	See Below
Saddle Lexco (ft^3):	1,320
Flexoramic (ft^3):	2,640
Monolith LA32 (ft^3):	2,640
Monolith NT40 (ft^3):	2,640
Stack Height:	60′
Stack Diameter:	102.8″
ID Fan:	900 RPM
Exhaust Flow:	170,000 acfm

5.f. Regenerative Catalytic Oxidizer (RCO). VOC emissions from the pelletizer and Hammermills are controlled by an RCO after passing through fabric filter baghouses. The RCO exhausts 60 feet above ground level. Details for the oxidizer are as follows:

Auxiliary Heat Input Rate:	2.2 MMBtu/hr
Number of Chambers:	4
Combustion Chamber Size:	11′ by 26′ long by 8′ tall
Heat Recovery Media:	See Below, all values are from a similar project and may be different for the unit used.
Saddle Lantec (ft^3):	1,000

Flexoramic (ft^3):	2,000
Monolith LA32 (ft^3):	2,000
Monolith NT40 (ft^3):	2,000
Stack Height:	60′
Stack Diameter:	74.8″
ID Fan:	900 RPM
Exhaust Flow:	120,000 acfm

5.g. Emergency Generator Engine. An emergency generator engine is to provide power in the event of an interruption of municipal power. Details for the engine are as follows:

Make:	Caterpillar
Model:	C15
Horsepower:	838 HP
Exhaust Flow:	3,606 acfm
Exhaust Temp:	988°F
Fuel Consumption:	36.2 gallons per hour
Stack Height:	6′
Stack Diameter:	8.04″
Rated Output:	500 KW
EPA Certification:	Tier 2

5.h. Fire Pump Engine. A fire pump engine is used to provide power for emergency fire suppression. Details for the engine are as follows:

Make:	John Deere
Model:	JU6H-UFADP8
Horsepower:	380 HP
Exhaust Flow:	1,189 acfm
Exhaust Temp:	986°F
Fuel Consumption:	11.2 gallons per hour
Stack Height:	11′ 4″
Stack Diameter:	5″
EPA Certification:	Tier 3

5.i. Negligible Emission. Equipment determined to have minimal emission are listed below along with a description of why emissions were determined to be minimal:

- Material will be transported to the Biosizer and Scalper via an enclosed conveyor. Shavings/Hog Fuel will also be transported via an enclosed conveyor.
- A cascade chute will be used to transport material from the storage silo to transport off site.

5.j. Equipment/Activity Summary.

ID No.	Equipment/Activity	Control Equipment/Measure
1	Biosizer/Scalpers	Enclosed Conveyor

ID No.	Equipment/Activity	Control Equipment/Measure
2	Biomass Rotary Dryer	Regenerative Thermal Oxidizer (RTO) Wet Electrostatic Precipitator (WESP) For RTO - Low Sulfur Fuel (Nat Gas)
3	Shaving Receiving	Walking Floor Trucks, Covered Conveyors
4	Hammermill No. 1	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
5	Hammermill No. 2	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
6	Hammermill No. 3	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
7	Hammermill No. 4	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
8	Pelletizer No. 1	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
9	Pelletizer No. 2	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
10	Pelletizer No. 3	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
11	Pelletizer No. 4	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
12	Pelletizer No. 5	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
13	Pelletizer No. 6	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
14	Pelletizer No. 7	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
15	Pelletizer No. 8	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)

ID No.	Equipment/Activity	Control Equipment/Measure
16	Pelletizer No. 9	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
17	Pelletizer No. 10	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
18	Pelletizer No. 11	Regenerative Catalytic Oxidizer (RCO) Fabric Filtration For RCO - Low Sulfur Fuel (Nat Gas)
19	Pellet Storage Silo	Enclosure
20	Loadout System	Cascade Chute
21	Wet Material Stockpile	High moisture content (approximately 50%)
22	Emergency Generator Engine	Low Sulfur Fuel (≤ 0.0015% by wt), Limited Operation (≤ 100 hr/yr) Maintenance and Testing EPA Tier 2 Certification Diesel Particulate Filtration
23	Fire Pump Engine	Low Sulfur Fuel (≤ 0.0015% by wt), Limited Operation (≤ 100 hr/yr) Maintenance and Testing EPA Tier 3 Certification Diesel Particulate Filtration
24	Haul Roads	Fugitive Control and Monitoring, Watering, Street Sweeping

6. EMISSIONS DETERMINATION

Unless otherwise specified by SWCAA, actual emissions must be determined using the specified input parameter listed for each emission unit and the following hierarchy of methodologies:

(a) Continuous emissions monitoring system (CEMS) data;
(b) Source emissions test data (EPA reference method). When source emissions test data conflicts with CEMS data for the time period of a source test, source test data must be used;
(c) Source emissions test data (other test method); and
(d) Emission factors or methodology provided in this TSD.

Nothing precludes the use, including the exclusive use of any credible evidence or information relevant to identifying or quantifying emissions if methods identified above, in the ADP, or elsewhere in this TSD have not provided adequate quantification of actual emissions.

6.a. Biomass Rotary Dryer. Potential emissions for the biomass rotary dryer are calculated based on a maximum production value of 471,789 Oven Dry Tons (ODT) per year and a maximum heat input rate of 188 MMBtu/hr, and 8,760 hours of operation. $PM/PM_{10}/PM_{2.5}$, CO, NOx, and VOC emissions are calculated using emission guarantees from TSI Engineers. SO_2 emissions are calculated using EPA approved emission factors. Annual emissions will be calculated based on source testing data or CEMs data. Since the exhaust is commingled most of the emissions associated with natural gas combustion are captured as part of this calculation. Benzene, formaldehyde, and sulfur dioxide emissions are calculated separately.

Biomass Rotary Dryer						
Throughput	471,789	ODT/yr				
Hours per year =	8,760	Hours				
Maximum Heat Input =	187.7	MMBtu/hr				
	Emission Factors		Total	EF Source		
Pollutant	lb/hr	lb/MMBtu	tpy	tpy		
NO_X	52.00	0.22	227.76	Vendor Guarantee		
CO	42.00	0.60	183.96	Vendor Guarantee		
SO_2	4.690	0.025	20.54	AP-42 1.6-2		
PM	5.00	0.58	21.90	Vendor Guarantee		
PM_{10}	5.00	0.52	21.90	Vendor Guarantee		
$PM_{2.5}$	5.00	0.45	21.90	Vendor Guarantee		
VOC	15	0.017	65.70	Vendor Guarantee		
				CO_2e	CO_2e	Emission Factor
Greenhouse Gases	kg/MMBtu	GWP		lb/MMBtu	tpy	Source
CO_2	93.8	1		206.79	170,010	40 CFR 98
CH_4	0.0072	25		0.397	1,636	40 CFR 98
N_2O	0.0036	298		2.365	9,752	40 CFR 98
Total GHG - CO_2e				209.556	181,399	

6.b. Regenerative Thermal Oxidizer. A thermal oxidizer will be used to control emissions from the biomass rotary dryer. The thermal oxidizer burns natural gas in order to drive the reaction that reduces concentrations of HAPs/TAPs, VOCs and CO. Most of the emission produced by burning natural gas will be captured via direct measurement. There are a few additional compounds produced by burning natural gas that are summarized below.

Dryer RTO Emissions - Natural Gas Emissions

Heat Rate =	8.800	MMBtu/hr
Natural Gas Heat Value =	1,020	Btu/scf for AP-42 emission factors
Natural Gas Heat Value =	1,026	Btu/scf for 40 CFR 98 GHG emission factors
Fuel Consumption =	75.576	MMscf/yr

Pollutant	ppmvd @ 3% O_2	Emission Factor lb/MMBtu	Emission Factor lb/MMscf	lb/hr	tpy	Emission Factor Source
NO_X	80.7	See Biomass Rotary Dryer				N/A
CO	111.4	See Biomass Rotary Dryer				N/A
VOC		See Biomass Rotary Dryer				N/A
SO_X as SO_2		0.00059	0.6	0.0052	0.0227	AP-42 Sec. 1.4 (7/98)
PM		See Biomass Rotary Dryer				N/A
PM_{10}		See Biomass Rotary Dryer				N/A
$PM_{2.5}$		See Biomass Rotary Dryer				N/A
Benzene		2.06E-06	0.0021	1.8E-05	7.9E-05	AP-42 Sec. 1.4 (7/98)
Formaldehyde		7.35E-05	0.075	6.5E-04	2.8E-03	AP-42 Sec. 1.4 (7/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	tpy, CO_2e	Emission Factor Source
CO_2	53.06	1	116.98	120,019	4,508.8	40 CFR 98
CH_4	0.001	25	0.055	56.55	2.1	40 CFR 98
N_2O	0.0001	298	0.066	67.41	2.5	40 CFR 98

6.c. Regenerative Catalytic Oxidizer. A catalytic oxidizer will be used to control emissions emitted by the pelletizers and hammermills. The catalytic oxidizer burns natural gas to drive the reaction that reduces concentrations of HAPs/TAPs, VOCs and CO. Most of the emission produced by burning natural gas will be captured via direct measurement. There are a couple additional compounds produced by burning natural gas that are summarized below. NOx and CO will be calculated using source test data, however for the purposes of calculating initial potential to emit AP-42 emission factors are used to estimate NOx emissions. Additionally, emissions that will not be captured using source test data are summarized below.

Pelletizer and hammermills RCO Emissions - Natural Gas Emissions

Heat Rate =	2.200	MMBtu/hr
Natural Gas Heat Value =	1,020	Btu/scf for AP-42 emission factors
Natural Gas Heat Value =	1,026	Btu/scf for 40 CFR 98 GHG emission factors
Fuel Consumption =	18.894	MMscf/yr

Pollutant	ppmvd @ 3% O_2	Emission Factor lb/MMBtu	Emission Factor lb/MMscf	lb/hr	tpy	Emission Factor Source
NO_X	80.7	0.0980	99.93	0.22	0.94	AP-42 Sec. 1.4 (7/98)
CO			See Section 6.f			N/A
VOC			See section 6.f			N/A
SO_X as SO_2		0.00059	0.6	0.0013	0.0057	AP-42 Sec. 1.4 (7/98)
PM			See section 6.f			N/A
PM_{10}			See section 6.f			N/A
$PM_{2.5}$			See section 6.f			N/A
Benzene		2.06E-06	0.0021	4.5E-06	2.0E-05	AP-42 Sec. 1.4 (7/98)
Formaldehyde		7.35E-05	0.075	1.6E-04	7.1E-04	AP-42 Sec. 1.4 (7/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	tpy, CO_2e	Emission Factor Source
CO_2	53.06	1	116.98	120,019	1,127.2	40 CFR 98
CH_4	0.001	25	0.055	56.55	0.5	40 CFR 98
N_2O	0.0001	298	0.066	67.41	0.6	40 CFR 98

6.d. Emergency Engine – Caterpillar. Estimated emissions from emergency engine operation are calculated based on 200 annual hours of operation (100 hours maintenance use, 100 hours emergency use), use of ultra-low sulfur diesel (<0.0015% sulfur by weight), and applicable emission factors. Diesel particulate filters will be installed and provide 90% control of particulate matter.

Generator Engine	Caterpillar Emergency					
Hours of Operation =	200	hours				
Power Output =	838	horsepower				
Diesel Density =	7.206	pounds per gallon				
Fuel Sulfur Content =	0.0015	% by weight				
Fuel Consumption Rate =	36.20	gallons per hour (based on 8,000 Btu/hp-hr)				
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)				
nnual Fuel Consumption =	7,240	gallons				
	Emission	Emission				
	Factor	Factor	Emissions	Emission Factor		
Pollutant	g/hp-hr	lb/hr	tpy	Source		
NO_X	3.5200	6.50	0.65	SCAQMD		
CO	0.7700	1.42	0.14	SCAQMD		
VOC	0.0700	0.13	0.01	SCAQMD		
SO_X as SO_2		0.0078	0.0008	Mass Balance		
$PM/PM_{10}/PM_{2.5}$	0.05000	0.0092	0.0009	SCAQMD		
			CO_2e	CO_2e		
Greenhouse Gases	kg/MMBtu	GWP	lb/MMBtu	lb/gallon	tpy, CO_2e	
CO_2	73.96	1	163.05	23	81	40 CFR 98
CH_4	0.003	25	0.165	0.023	0.08	40 CFR 98
N_2O	0.0006	298	0.394	0.054	0.20	40 CFR 98
Total GHG - CO_2e	73.9636		163.613	23	82	

6.e. Emergency Engine – Fire Pump Engine. Estimated emissions from fire pump engine operation are calculated based on 200 annual hours of operation (100 hours maintenance use, 100 hours emergency use), use of ultra-low sulfur diesel (<0.0015% sulfur by weight), and applicable emission factors. Diesel particulate filters will be installed and provide 90% control of particulate matter.

Generator Engine	Fire Pump Engine					
Hours of Operation =	200	hours				
Power Output =	380	horsepower				
Diesel Density =	7.206	pounds per gallon				
Fuel Sulfur Content =	0.0015	% by weight				
Fuel Consumption Rate =	11.20	gallons per hour (based on 8,000 Btu/hp-hr)				
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)				
nnual Fuel Consumption =	2,240	gallons				
	Emission	Emission				
	Factor	Factor	Emissions	Emission Factor		
Pollutant	g/hp-hr	lb/hr	tpy	Source		
NO_X	2.7000	2.26	0.23	John Deere		
CO	0.9000	0.75	0.08	John Deere		
VOC	0.1000	0.08	0.01	John Deere		
SO_X as SO_2		0.0024	0.0002	Mass Balance		
$PM/PM_{10}/PM_{2.5}$	0.10000	0.0084	0.0008	John Deere		
			CO_2e	CO_2e		
Greenhouse Gases	kg/MMBtu	GWP	lb/MMBtu	lb/gallon	tpy, CO_2e	
CO_2	73.96	1	163.05	23	25	40 CFR 98
CH_4	0.003	25	0.165	0.023	0.03	40 CFR 98
N_2O	0.0006	298	0.394	0.054	0.06	40 CFR 98
Total GHG - CO_2e	73.9636		163.613	23	25	

6.f. Pelletizer and Hammermills. Potential emissions of CO, VOCs and HAPs/TAPs from the Pelletizer and Hammermills are estimated based on the results of engineering testing completed at other Drax facilities in Aliceville, AL and Gloster, MS with an additional safety factor added to account for varying process conditions. VOCs and HAP/TAPs will be measured at the outlet of the RCO and there will be one combined emission limit for the pelletizers and hammermills. Potential particulate matter emissions are calculated assuming 8,760 hours of operation, Drax's estimated flow rates and the emission limit of 0.005 gr/dscf.

Pelletizer Emissions		
Grain Loading =	0.005	Gr/dscf
Gas Flow =	68,905	Scfm
Hours per year =	8,760	hr/yr
Pollutant	lb/hr	tpy
$PM/PM_{10}/PM_{2.5}$	2.95	12.93
Hammermill Emissions		
Grain Loading =	0.005	Gr/dscf
Gas Flow =	40,074	Scfm
Hours per year =	8,760	hr/yr
Pollutant	lb/hr	tpy
$PM/PM_{10}/PM_{2.5}$	1.72	7.52
Combined RCO emissions		
Hours per year =	8,760	hr/yr
Annual Throughput =	496,040	ODT/yr
CO Emission Factor =	0.216	lb/odt
Pollutant	lb/hr	TPY
VOC	15	65.7
CO	N/A	53.60

6.g. Material Handling Emissions. Emissions from material handling are calculated using emission factors from AP-42 section 13.2.4 for aggregate handling (11/06) and the total annual throughput.

$$E\ (lb/ton) = k^{1}(0.032)\ \frac{\left(\frac{U^{2}}{5}\right)^{1.3}}{\left(\frac{M^{3}}{2}\right)^{1.4}}$$

[1]k = PM size multiplier
[2]U = average wind speed in Longview from 2007 to 2015 (2.54 m/s)
[3]M = estimated moisture

K_{pm} = 0.74	K_{pm10} = 0.35	$K_{pm2.5}$ = 0.053
$M_{incoming}$= 50%	$M_{drychips}$= 8%	$M_{finishedproduct}$= 5%

Miscellaneous Fugitive Emissions Sources							
	Potential Annual Throughput	Emission Factor			Potential Emissions		
Emission Unit	ODT/yr	PM lb/ton	PM_{10} lb/ton	$PM_{2.5}$ lb/ton	PM tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Shaving Receiving	24,251	1.41E-04	6.67E-05	1.01E-05	1.71E-03	8.08E-04	1.22E-04
Biosizer/Scalper	471,789	1.08E-05	5.13E-06	7.76E-07	2.56E-03	1.21E-03	1.83E-04
Ship Loadout System	496,040	2.72E-04	1.29E-04	1.95E-05	6.75E-02	3.19E-02	4.84E-03
Wet Material Stockpile	943,578	1.08E-05	5.13E-06	7.76E-07	5.11E-03	2.42E-03	3.66E-04

6.h. Haul Roads. Emissions from paved haul roads are calculated according to AP-42 section 13.2.1 (1/2011). The following formula is used to calculate emissions:

$$E\ (lb/VMT) = K^{1}(sL^{2})^{0.91}(W^{3})^{1.02}\left(1 - \frac{p^{4}}{4N}\right)^{1.02}$$

[1]k = PM size multiplier
[2]sL = Silt loading (1.1g/m²)
[3]W = Average weight (tons) vehicle
4P = Average number of days of precipitation per year (185.4), N = 365 days

K_{pm} = 0.011	K_{pm10} = 0.0022	$K_{pm2.5}$ = 0.00054

Haul Road Emissions				
Average Truck Weight =	16.5	tons		
Average Round Trip Distance =	0.62	miles		
Amount of Material per Load =	5.5	tons		
Total Miles Traveled =	105,288	miles		
	EF		Emissions	
Pollutant	lb/VMT		tpy	
PM	0.21		**11.26**	
PM_{10}	0.04		**2.25**	
$PM_{2.5}$	0.01		**0.55**	

6.i. Wind Erosion Emissions. Particulate matter emissions due to wind erosion are calculated using emission factors calculated according to equation 2-12 in the EPA document ″Fugitive Dust Background Document and Technical Information Document for Best Control Measures″ dated 1992. The following formula is used to calculate emissions:

$$\text{E (lb/acre-day)} = 1.7\left(\frac{S^1}{1.5}\right)\left(\frac{365-p^2}{235}\right)\left(\frac{f^3}{15}\right)$$

[1] = Silt content =1
[2]p = Number of days of precipitation 185.4
[3]f = percentage of time that the unobstructed wind speed exceeds 5.4 m/s

Size multipliers used for the material handling section were used to calculate relative emissions for $PM_{10}/PM_{2.5}$.

Wet Material Stockpile				
Total Size of Wet Material Stockpiles =	1.97	Acres		
	EF	Emissions	Emissions	
Pollutant	lb/acre-day	lb/hr	tpy	
PM	0.81	0.07	**0.29**	
PM_{10}	0.81	0.03	**0.14**	
$PM_{2.5}$	0.81	0.005	**0.02**	

6.j. Pellet Storage Potential Emissions. Particulate matter emissions from pellet storage are calculated using an exhaust flow rate from the pellet storage ventilation system and the grain loading rate, both of which were provided by the vendor. Emission factors for total VOC were calculated using a factor found in ″VOC emissions from multiple wood types and concentrations in indoor air″ published in 2015 in Energy Fuels. The emission factor was listed on a daily basis, and it was assumed that pellets can be stored in the silo for up to 30 days. CO emissions were calculated using a factor found in ″Analysis on Storage Off-Gas Emissions from Woody, Herbaceous, and Torrefied Biomass″ published 2015 in Energies.

Pellet Storage Potential Emissions - PM					
	Potential Operation	Exhaust Flow Rate	Grain Loading	Total Emission	
Emission Unit	hr/year	scfm	gr/dscf	lb/hr	tpy
Pellet Storage Dome	8,760	59963	0.002	1.03	4.50

e Potential Emissions - CO and VOC		Emission Factor		Potential Emissions	
	Annual Throughput	CO	VOC	CO	VOC
Emission Unit	ODT/yr	lb/ton	lb/ton	tpy	tpy
Pellet Storage Dome	496,040	0.0212	0.00384	5.26	0.95

6.k. Air Toxics Summary. Potential air toxics emissions emitted by the Dryer were calculated using emission factors from AP-42 sections 1.6-3 and 1.6-4. Air toxics emissions from the hammermills and pelletizers were calculated using source testing data from 2018 and 2021 for similar equipment. Potential maximum emissions were calculated assuming 496,040 tons/year of annual raw material throughput. Potential toxic air pollutant emissions were estimated as follows:

Pollutant	CAS	HAP/TAP	Estimated Emissions (tpy)
Acenaphthene	83-32-9	Y/N	$3.74x10^{-5}$
Acenaphthylene	208-96-8	Y/N	$2.06x10^{-4}$
Acetaldehyde	75-07-0	Y/Y	3.04
Acrolein	107-02-8	Y/Y	1.24
Anthracene	120-12-7	Y/N	$1.23x10^{-4}$
Benz[a]anthracene	56-55-3	Y/Y	$2.67x10^{-6}$
Benzene	71-43-2	Y/Y	0.173
Benzo(a)pyrene	50-32-8	Y/Y	$1.07x10^{-4}$
Benzo(b)fluorathene	205-99-2	Y/Y	$4.11x10^{-6}$
Benzo(g,h,i)perylene	191-24-2	Y/Y	$3.82x10^{-6}$
Benzo(k)fluoranthene	207-08-9	Y/Y	$1.48x10^{-6}$
Chrysene	218-01-9	Y/Y	$1.56x10^{-6}$
Dibenzo(a,h)anthracene	53-70-3	Y/Y	$3.74x10^{-7}$
Fluoranthene	206-44-0	Y/N	$6.58x10^{-5}$
Fluorene	86-73-7	Y/N	$1.40x10^{-4}$
Formaldehyde	50-00-0	Y/Y	6.22
Hydrochloric acid	7647-01-0	Y/Y	0.841
Indeno(1,2,3-c,d)pyrene	193-39-5	Y/Y	$3.58x10^{-6}$
Methanol	67-56-1	Y/Y	20.8
Naphthalene	91-20-3	Y/Y	$3.99x10^{-3}$
Octachlorodibenzo-p-dioxins (2,3,7,8 TCDD Eqv.)	3268-87-9	Y/N	$2.71x10^{-6}$

Pollutant	CAS	HAP/TAP	Estimated Emissions (tpy)
Pentachlorodibenzo-p-dioxins (2,3,7,8 TCDD Eqv.)	40321-76-4	Y/N	$6.17x10^{-8}$
Phenanthrene	85-01-8	Y/Y	$2.88x10^{-4}$
Phenol	108-95-2	Y/Y	10.3
Propionaldehyde	123-38-6	Y/Y	1.55
Pyrene	129-00-0	Y/Y	$1.52x10^{-4}$
Arsenic	7440-38-2	Y/Y	$9.04x10^{-4}$
Beryllium	7440-41-7	Y/Y	$4.52x10^{-5}$
Cadmium	7440-43-9	Y/Y	$1.69x10^{-4}$
Chromium VI	18540-29-9	Y/Y	$1.44x10^{-4}$
Chromium (II and III)	16065-83-1	Y/Y	$8.63x10^{-4}$
Copper	7440-02-0	N/Y	$2.01x10^{-3}$
Manganese	7439-96-5	Y/Y	$6.58x10^{-2}$
Mercury*	7439-97-6	Y/Y	$2.88x10^{-3}$
Nickel	7440-02-0	Y/Y	$1.36x10^{-3}$
Selenium	7782-49-2	Y/Y	$1.15x10^{-4}$
Zinc	7440-66-6	N/N	$1.73x10^{-2}$
Total Dioxins/Furans (2,3,7,8 TCDD Eqv.)	136677-09-3	Y/Y	$1.63x10^{-8}$
TAP Total Polycyclic Aromatic Hydrocarbons (TAP - PAH)	130498-29-2	Y/Y	$6.17x10^{-8}$

6.l. Emissions Summary

Air Pollutant	**Potential to Emit (tpy)**
NO_x	229.58
CO	243.03
VOC	132.37
SO_2	20.57
PM	58.50
PM_{10}	49.29
$PM_{2.5}$	47.44
CO_2/CO_2e	187,148
HAPs	44.02
TAPs	44.02

7. REGULATIONS AND EMISSION STANDARDS

Regulations have been established for the control of emissions of air pollutants to the ambient air. Regulations applicable to the proposed facility that have been used to evaluate the acceptability of the proposed facility and establish emission limits and control requirements include, but are not limited to, the following regulations, codes, or requirements. These items establish maximum emissions limits that could be allowed and are not to be exceeded for new or existing facilities. More stringent limits are established in this Permit consistent with implementation of Best Available Control Technology (BACT):

7.a. 40 CFR 60.7 ″Notification and Recordkeeping″ requires that notification must be submitted to SWCAA, the delegated authority, for date construction commenced, anticipated initial startup, and initial startup.

7.b. 40 CFR 60.8 ″Performance Tests″ requires that emission tests be conducted according to test methods approved in advance by the permitting authority and a copy of the results be submitted to the permitting authority.

7.c. 40 CFR 60 Subpart IIII [§60.4200 *et seq*] ″Standards of Performance for Stationary Compression Ignition Internal Combustion Engines″ applies to each compression ignition (CI) internal combustion engine (ICE) that commences construction after July 11, 2005 and is manufactured after April 1, 2006, or that is modified or reconstructed after July 11, 2005.

The fire pump and emergency generator engines are a CI ICE configuration and will have a manufacture date after April 1, 2006; therefore, this regulation is applicable to the engines.

7.d. 40 CFR 63.7 ″Performance testing requirements″ requires that emission tests be conducted according to test methods approved in advance by the permitting authority and a copy of the results be submitted to the permitting authority.

7.e. 40 CFR 63.9 ″Notification Requirements″ requires that the delegated authority be notified when any unit subject to 40 CFR 63 begins initial startup.

7.f. 40 CFR 63 Subpart ZZZZ [§63.6580 *et seq*] ″National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines″ establishes national emission limitations and operating limitations for HAP emitted from stationary reciprocating internal combustion engines located at major and area sources of HAP emissions. The Emergency Generator Engine will be located at an area source of HAP and used in emergency situations; therefore, this regulation applies to the new engine.

7.g. 40 CFR 63 DDDD ″National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products″. This subpart established national compliance options, operating requirements, and work practice requirements for hazardous air pollutants (HAP) emitted from plywood and composite wood products (PCWP) manufacturing facilities.

This subpart established requirements to demonstrate initial and continuous compliance with the compliance options, operating requirements, and work practice requirements.

Wood pellets do not meet the definition of a composite wood product. The pieces of wood are not bonded together to be used for an extended period of time and resin is not used.

7.h. 40 CFR 64 ″Compliance Assurance Monitoring″ requires the owner or operator of selected pollutant specific emission units at a major stationary source to develop and implement a monitoring plan that provides a reasonable assurance of compliance with applicable emission limitations or standards. This regulation will be applicable to the biomass rotary dryer, hammermills, and pelletizers at this facility, following the issuance of the Title V permit.

7.i. 40 CFR 70 ″State Operating Permit Programs″ requires facilities with site emissions of any regulated air pollutant greater than 100 tpy, any single hazardous air pollutant greater than 10 tpy, or any aggregate combination of hazardous air pollutants greater than 25 tpy to obtain a Title V permit. Potential emissions of NOx, CO, and VOCs are all greater than 100 tons per year. Additionally, potential emissions of HAP are greater than 25 tons per year. Drax Group will be required to submit a title V application within 12 months of commencement of operation.

7.j. Revised Code of Washington (RCW) 70A.15.2040 empowers any activated air pollution control authority to prepare and develop a comprehensive plan or plans for the prevention, abatement and control of air pollution within its jurisdiction. An air pollution control authority may issue such orders as may be necessary to effectuate the purposes of the Washington Clean Air Act (RCW 70A.15) and enforce the same by all appropriate administrative and judicial proceedings subject to the rights of appeal as provided in Chapter 62, Laws of 1970 ex. sess. This law applies to the facility.

7.k. RCW 70A.15.2210 provides for the inclusion of conditions of operation as are reasonably necessary to assure the maintenance of compliance with the applicable ordinances, resolutions, rules and regulations when issuing an ADP for installation and establishment of an air contaminant source. This law applies to the facility.

7.l. WAC 173-401 ″Operating Permit Regulation″ requires all major sources and other sources as defined in WAC 173-401-300 to obtain an operating permit.

7.m. WAC 173-460 ″Controls for New Sources of Toxic Air Pollutants″ requires BACT for toxic air pollutants (T-BACT), identification and quantification of emissions of toxic air pollutants and demonstration of protection of human health and safety.

The facility emits TAPs; therefore, this regulation applies to the facility.

7.n. WAC 173-476 ″Ambient Air Quality Standards″ establishes ambient air quality standards for PM_{10}, $PM_{2.5}$, lead, SO_2, NO_x, ozone, and CO in the ambient air, which must not be exceeded. The facility emits PM_{10}, $PM_{2.5}$, SO_x, NO_x, and CO; therefore, certain sections of

this regulation apply. The facility does not emit lead; therefore, the lead regulation section does not apply.

7.o. SWCAA 400-040 "General Standards for Maximum Emissions" requires all new and existing sources and emission units to meet certain performance standards with respect to Reasonably Available Control Technology (RACT), visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, SO_2, concealment and masking, and fugitive dust. This regulation applies to the facility.

7.p. SWCAA 400-040(1) "Visible Emissions" requires that emissions of an air contaminant from any emissions unit must not exceed twenty percent opacity for more than three minutes in any one hour at the emission point, or within a reasonable distance of the emission point. This regulation applies to the facility.

7.q. SWCAA 400-040(2) "Fallout" requires that emissions of PM from any source must not be deposited beyond the property under direct control of the owner(s) or operator(s) of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited. This regulation applies to the facility.

7.r. SWCAA 400-040(3) "Fugitive Emissions" requires that reasonable precautions be taken to prevent the fugitive release of air contaminants to the atmosphere. This regulation applies to the facility.

7.s. SWCAA 400-040(4) "Odors" requires any source which generates odors that may unreasonably interfere with any other property owner's use and enjoyment of their property to use recognized good practice and procedures to reduce these odors to a reasonable minimum. This source must be managed properly to maintain compliance with this regulation. This regulation applies to the facility.

7.t. SWCAA 400-040(6) "Sulfur Dioxide" requires that no person is allowed to emit a gas containing in excess of 1,000 ppmd of SO_2, corrected to 7% O_2 or 12% CO_2 as required by the applicable emission standard for combustion sources.

The facility emits SO_2; therefore, this regulation applies to the facility.

7.u. SWCAA 400-040(8) "Fugitive Dust Sources" requires that reasonable precautions be taken to prevent fugitive dust from becoming airborne, and minimize emissions. This regulation applies to the facility.

7.v. SWCAA 400-050 "Emission Standards for Combustion and Incineration Units" requires that all provisions of SWCAA 400-040 be met and that no person is allowed to cause or permit the emission of PM from any combustion or incineration unit in excess of 0.23 g/Nm^3_{dry} (0.1 gr/dscf) of exhaust gas at standard conditions.

The facility has combustion units; therefore, this regulation applies to the facility.

7.w. SWCAA 400-060 ″Emission Standards for General Process Units″ requires that all new and existing general process units do not emit PM in excess of 0.23 g/Nm^3_{dry} (0.1 gr/dscf) of exhaust gas. The facility has general process units; therefore, this regulation applies to the facility.

7.x. SWCAA 400-109 ″Air Discharge Permit Applications″ requires that an ADP application be submitted for all new installations, modifications, changes, or alterations to process and emission control equipment consistent with the definition of ″new source″. Sources wishing to modify existing permit terms may submit an ADP application to request such changes. An ADP must be issued, or written confirmation of exempt status must be received, before beginning any actual construction, or implementing any other modification, change, or alteration of existing equipment, processes, or permits. This regulation applies to the facility.

7.y. SWCAA 400-110 ″New Source Review″ requires that SWCAA issue an ADP in response to an ADP application prior to establishment of the new source, emission unit, or modification. The new units meet the definition of a new source; therefore, this regulation applies to the facility.

7.z. SWCAA 400-113 ″Requirements for New Sources in Attainment or Nonclassifiable Areas″ requires that no approval to construct or alter an air contaminant source will be granted unless it is evidenced that:

(1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
(2) BACT will be employed for all air contaminants to be emitted by the proposed equipment;
(3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
(4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

The facility is located in an area that is in attainment for (PM, NO_x, CO, SO_2, O_3); therefore, this regulation applies to the facility.

8. RACT/BACT/BART/LAER/PSD/CAM DETERMINATIONS

The proposed equipment and control systems incorporate BACT for the types and amounts of air contaminants emitted by the processes as described below:

8.a. BACT Determination – Biomass Rotary Dryer. The use of the following control measures has been determined to meet the requirements of BACT for the Biomass Rotary Dryer:

NO_x. Proper burner design and combustion practices have been determined to meet the requirements of BACT. Selective non-catalytic reduction (SNCR) systems are not considered feasible as the exhaust gases from the furnace come directly into contact with

the finished product, which will therefore become contaminated with residual ammonia from the SNCR system.

CO/VOC. An RTO will be used primarily to control VOC emissions and will also provide some control for CO emissions. A biofiltration system has not yet been used in practice at a wood pellet manufacturing facility. Catalyst based systems were ruled out due to the fact that they are prone to corrosion due to high operating temperatures and entrained salts.

PM. A WESP will be used to control particulate matter. Baghouses and cyclones were deemed infeasible due to the condensation of resinous compounds on the filter material and cyclone. This condensation prevents air from passing through the filter and reducing efficiency. A scrubber was deemed to be inadequate due to the high inlet loading.

8.b. BACT Determination – Hammermills and Pelletizers. The use of the following control measures has been determined to meet the requirements of BACT for the hammermills and pelletizers.

NO_x. Source testing data from the Aliceville, AL facility that is similar in design to the Longview facility shows that NOx generation is minimal.

CO/VOC. An RCO will be used primarily to control VOC emissions and will also provide some control for CO emissions. This option provides the highest level of control (greater than 95%), therefore other options were not considered.

PM. A fabric filter baghouse has been determined to meet the criteria of BACT for the hammermills and pelletizers, as it provides the highest level of control for this particular application.

8.c. BACT Determination – Fugitive Emissions. Process enclosures are used for the pellet storage domes. Drax has stated that PM emissions for wet materials, formed pellets, and larger raw materials are minimal and therefore additional controls are not necessary for areas that process those types of material.

Additional controls include a Truck Traffic Fugitive Control Plan, which includes watering, sweeping, and speed limits.

8.d BACT Determination – Emergency Engine and Fire Pump Engine. The use of modern diesel-fired engine design meeting EPA Tier Emission Standards, the use of ultra-low sulfur diesel fuel (≤15 ppmw), limitation of visible emissions to 5% opacity or less, and limitation of engine operation to less than 100 hr/yr for maintenance checks and readiness testing has been determined to meet the requirements of BACT for the types and quantities of air contaminants emitted from these engines. Diesel exhaust filters are also installed to control diesel particulate matter.

8.e. Prevention of Significant Deterioration (PSD) Applicability Determination. This permitting action will not result in a potential increase in emissions equal to or greater than the PSD thresholds. Therefore, PSD review is not applicable to this action.

8.f. Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is generally applicable to any emission unit with the potential to emit (pre-controlled) 100 tpy or more of any criteria air pollutant for which an emission standard (limit) applies and that utilizes a control device to maintain compliance with the emission standard.

The dryer, hammermills and pelletizers will meet these criteria because all three could have the potential to emit more than 100 tons of VOC and PM (pre-controlled).

9. AMBIENT IMPACT ANALYSIS

9.a. Criteria Air Pollutant Review. Emissions of NO_x, CO, PM, VOC (as a precursor to O_3), and SO_2 were estimated. Trinity Consultant ran a model using estimated emissions and determined that the emissions would not cause the National Ambient Air Quality Standards (NAAQS) to be exceeded. Those results are summarized as follows:

Pollutant	Averaging period	Modeled Concentration	Background Concentration	Total Concentration	NAAQS
PM_{10}	24-hr	25.2	53.1	78	150
$PM_{2.5}$	24-hr	8.3	19.1	27.4	35
	Annual	1.3	6.2	7	9
SO_2	1-hr	16	14.2	31	196
NOx	1-hr	100	20.6	120	188
	Annual	3.8	67.9	72	100
CO	1-hr	1,816	1,371	3,187	40,000
	8-hr	812	956	1,768	10,000

All concentrations are expressed in units of $\mu g/m^3$

Since this analysis was completed additional sources of carbon monoxide emission were identified (RCO exhaust and pellet storage) and the PTE for carbon monoxide is now 243 tons per year. The original PTE for carbon monoxide was 222.5 tons per year. The modeled concentration would still be below the NAAQS, even if the modeled concentration was increased by 10%.

9.b. TAP Small Quantity Review. Drax estimated the following TAP emissions and compared the modeled impact to the Acceptable Source Impact Level (ASIL) in WAC 173-460. TAP emissions exceeded the Small Quantity Emission Rate (SQER), or there is no SQER for 21 pollutants, emitted by this facility.

9.c. TAP Ambient Impact Analysis – Emissions were modeled using AERMOD Version 21112. The results of the model indicate that the project will not cause an incremental

increase in ambient concentrations greater than the applicable ASIL identified in WAC 173-460.

TAP/HAP	CAS Number	Modeled Concentration (ug/m^3)	ASIL (ug/m^3)	Averaging Period
Acetaldehyde	75-07-0	$5.52x10^{-2}$	$3.7x10^{-1}$	Annual
Acrolein	107-02-8	$3.1x10^{-1}$	$3.5x10^{-1}$	24-hr
Benzene	71-43-2	$3.49x10^{-3}$	$1.20x10^{-1}$	Annual
Benzo(a)pyrene	50-32-8	$2.16x10^{-6}$	$1.00x10^{-3}$	Annual
Formaldehyde[1]	50-00-0	$1.1x10^{-1}$	$1.7x10^{-1}$	Annual
Arsenic	7440-38-2	$1.83x10^{-5}$	$2.30x10^{-4}$	Annual
Beryllium	7440-41-7	$9.13x10^{-7}$	$4.20x10^{-4}$	Annual
Cadmium	7440-43-9	$3.41x10^{-6}$	$5.60x10^{-4}$	Annual
Chromium (III)	16065-83-1	$1.21x10^{-3}$	$1.0x10^{-1}$	24-hr
Chromium (VI)	18540-29-9	$2.91x10^{-6}$	$4.00x10^{-6}$	Annual
Diesel Engine Particulate	200	$3.08x10^{-3}$	$3.3x10^{-3}$	Annual
Hydrochloric Acid	7647-01-0	$2.2x10^{-1}$	9.0	24-hr
Nickel	7440-02-0	$2.74x10^{-5}$	$3.80x10^{-3}$	Annual
Total Dioxins/Furans	136677-09-3	$1.26x10^{-9}$	$3.00x10^{-8}$	Annual
TAP-PAH	130498-29-2	$2.36x10^{-6}$	$4.80x10^{-4}$	Annual
Manganese	7439-96-5	$9.19x10^{-2}$	$4.00x10^{-1}$	24-hr
Methanol	67-56-1	3.29	$8.7x10^{2}$	24-hr
Mercury	7439-97-6	$2.01x10^{-4}$	$3x10^{-2}$	24-hr
Naphthalene	91-20-3	$8.07x10^{-5}$	$3x10^{-2}$	Annual
Pentachlorodibenzo-p-dioxins	40321-76-4-200	$1.24x10^{-9}$	$2.6x10^{-8}$	Annual
Propionaldehyde	123-38-6	$2.6\ x10^{-1}$	8	24-hr

[1] *Exceeded the ASIL established in 1998, however the 2019 ASIL was used, as directed by the Washington Department of Ecology.*

Conclusions

9.d. Construction and operation of the wood pellet processing facility, as proposed in ADP application CO-1057, will not cause the ambient air quality requirements of 40 CFR 50 ″National Primary and Secondary Ambient Air Quality Standards″ to be violated.

9.e. Construction and operation of the wood pellet processing facility, as proposed in ADP application CO-1057, will not cause the requirements of WAC 173-460 ″Controls for New Sources of Toxic Air Pollutants″ or WAC 173-476 ″Ambient Air Quality Standards″ to be violated.

9.f. Construction and operation of the wood pellet processing facility, as proposed in ADP application CO-1057, will not violate emission standards for sources as established under SWCAA General Regulations Sections 400-040 ″General Standards for Maximum Emissions,″ 400-050 ″Emission Standards for Combustion and Incineration Units,″ and 400-060 ″Emission Standards for General Process Units.″

10. DISCUSSION OF APPROVAL CONDITIONS

SWCAA has made a determination to issue ADP 24-3624 in response to ADP application CO-1057. ADP 24-3624 contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

10.a. Supersession of Previous Permits. This is the initial permitting action for the facility.

10.b. Emission Limits. Facility-wide emission limits are based on the sum of the emission limits for approved equipment calculated in Section 6 of this TSD.

Short term emission limits were established for the Biomass Rotary Dyer, the Pelletizers, and the Hammermills. Emission limits were determined based on source test data from a similar facility in Gloster, Mississippi. Emission limits were similar to the data measured at the facility. A safety factor was applied in some cases to account for varying processes and feedstocks.

A preliminary determination was made on November 30, 2023, by the Olympic Region Clean Air Agency (ORCAA) to issue a permit to a wood pellet manufacturing facility which is owned by Pacific Northwest Regional Energy which proposed VOC short term VOC emission limits of 8.92 lbs/hr for the RTO and 8.6 lbs/hr for the RCO. The proposed facility is similar in design to the facility proposed by Drax. Drax provided data that suggested that these emission limits may be difficult to achieve in practice. SWCAA requested data from ORCAA supporting these emission limits. SWCAA was told that these emission limits were established based on a vendor guarantee. Drax proposed higher emission limits based on a combination of test data and a safety factor to account for varying process conditions. SWCAA established emission limits that consider the vendor guarantee provided for the ORCAA permit and test data provided by Drax for similar facilities. SWCAA has approved emission limits that are slightly higher than what had been approved by ORCAA, however a stipulation is included in the ADP that requires Drax to demonstrate 95% control efficiency for both the RTO and the RCO. In most cases, this will require Drax to limit emissions to levels significantly lower than the hourly emission limit.

All process transfer operations are limited to 0% opacity because SWCAA was notified that all material transfer will occur using covered conveyors.

10.c. Operational Limits and Requirements.

Emergency Generator. Approval conditions are based on limited service for actual power interruptions and maintenance. Compliance with these requirements will be demonstrated based on manufacturer′s emission factors and annual operation as recorded and reported by the source. BACT requirements for this unit include the use of low sulfur diesel (sulfur content not to exceed 0.0015% by weight). Visible emission limits have been established consistent with proper operation of the diesel engine. Due to the technical limitations of the engine, the limit of 5% opacity does not apply during periods of start-up and shutdown. Diesel particulate filters have been installed to limit emissions of diesel particulate matter.

Regenerative Thermal Oxidizer and Regenerative Catalytic Oxidizer. Minimum operating temperatures have been established for both the RTO and RCO. Initial temperatures were determined based on guidance from the manufacturer. In the future, the compliance temperature will be determined based on the source test. Compliance temperatures are an average of the temperatures in the combustion and recovery chambers. Each of the oxidizers will be required to meet hourly emission limits and demonstrate 95% destruction efficiency for total VOC.

The outlet of the RTO will be limited to 10% opacity. This limit was determined to meet the criteria of BACT based on data collected at Sierra Pacific, another facility with a wood burning furnace, that is also located in SWCAA′s jurisdiction.

Wet Electrostatic Precipitator (WESP). Minimum power output has been established for the WESP in addition to the requirement that all electric fields are always operational, and a pH requirement for the water used to flush the WESP.

Hammermill and Pelletizer Baghouses. Baghouse leak detectors are required to be installed at the hammermill and pelletizer and to always be in operation.

Pellet Storage Dome. An annual CO emission limit was established for the pellet storage dome. The emission limit was established assuming 8,760 hours of operation and an emission factor specified in section 6.j.

10.d. Monitoring and Recordkeeping Requirements. ADP 24-3624 establishes monitoring and recordkeeping requirements sufficient to document compliance with applicable emission limits, ensure proper operation of approved equipment and provide for compliance with generally applicable requirements.

10.e. Reporting Requirements. ADP 24-3624 establishes general reporting requirements for annual air emissions, upset conditions and excess emissions. Specific reporting requirements are established for hours of operation, fuel consumption, and material throughput. Reports are to be submitted on an annual basis.

11. START-UP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

11.a. Start-up and Shutdown Provisions. Pursuant to SWCAA 400-081 ″Start-up and Shutdown″, technology-based emission standards and control technology determinations must take into consideration the physical and operational ability of a source to comply with the applicable standards during start-up or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during start-up or shutdown, SWCAA will include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during start-up or shutdown.

Startup and Shutdown. Carbon monoxide levels may be elevated during furnace startup periods since the initial flame temperatures are lower than they are during normal operation. During startup periods data collected by the CEMS is not required to be used to calculate the 24-hour average used for compliance. Startup is considered complete when heat from the furnace is used to dry wood, or 16 hours after the furnace begins to burn fuel.

Emergency Generator. Visible emissions from the diesel engine driven generator and fire pump engine are limited to 5% opacity or less during normal operation. However, the engine is not capable of reliably limiting visible emissions to less than 5% opacity until the engine achieves normal operating temperature. Therefore, the 5% opacity limit does not apply to the generator and fire pump exhaust during start-up periods.

11.b. Alternate Operating Scenarios. SWCAA conducted a review of alternate operating scenarios applicable to equipment affected by this permitting action. The permittee did not propose or identify any applicable alternate operating scenarios. Therefore, none were included in the approval conditions.

11.c. Pollution Prevention Measures. SWCAA conducted a review of possible pollution prevention measures for the facility. No pollution prevention measures were identified by either the permittee or SWCAA separately or in addition to those measures required under BACT considerations. Therefore, none were included in the approval conditions.

12. EMISSION MONITORING AND TESTING

12.a. Emission Testing Requirements – Regenerative Catalytic Oxidizer. Permit requirements for the catalytic oxidizer require emission testing every 24 months for the purpose of assuring compliance with applicable emission limits. Emission testing must be conducted in accordance with ADP 24-3624, Appendix A.

12.b. Emission Testing Requirements – Regenerative Thermal Oxidizer. Permit requirements for the thermal oxidizer require emission testing every 24 months for the purpose of assuring compliance with applicable emission limits. Emission testing must be conducted in accordance with ADP 24-3624, Appendix B. Permit requirements require the installation and maintenance of a Continuous Monitoring System (CMS) to measure emissions of O_2, CO and NOx and measure flow rate. The CEMS must meet applicable audit requirements

from 40 CFR 60, Appendices B and F. These requirements are summarized in ADP 24-3624, Appendix C.

13. FACILITY HISTORY

13.a. General History. The facility has not been permitted in the past.

14. PUBLIC INVOLVEMENT OPPORTUNITY

14.a. Public Notice for ADP Application CO-1057. Public notice for ADP application CO-1057 was published on the SWCAA website for a minimum of fifteen (15) days beginning on July 29, 2022.

14.b. Public/Applicant Comment for ADP Application CO-1057. A thirty (30) day public comment period will be provided for this permitting action pursuant to SWCAA 400-171(3).

14.c. State Environmental Policy Act. Cowlitz County issued a SEPA determination of Non Significance (Associated Permit #0000097-003) for this project December 5, 2022.