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# **NEW SOURCE**

## **FINAL DETERMINATION**

### **to APPROVE:**

**Wood Pellet Manufacturing  
Facility**

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**Pacific Northwest Renewable Energy,  
LLC**

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**23NOC1606**

**May 7, 2024**

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## NOTICE OF CONSTRUCTION FINAL DETERMINATION TO APPROVE

Olympic Region Clean Air Agency

<b>Issued to:</b>	<b>Pacific Northwest Renewable Energy, LLC</b>	<b>County:</b>	<b>Grays Harbor</b>
<b>Location:</b>	<b>411 Moon Island Road Hoquiam</b>	<b>Source:</b>	<b>926</b>
<b>Application #:</b>	<b>23NOC1606</b>	<b>RC:</b>	<b>OP1</b>
<b>Prepared on:</b>	<b>May 7, 2024</b>	<b>File:</b>	<b>432</b>

### 1. Summary

Pacific Northwest Renewable Energy (PNWRE) seeks approval from Olympic Region Clean Air Agency (ORCAA) to construct a new wood pellet manufacturing facility at 411 Moon Island Road in Hoquiam, Washington. The proposed facility would emit air pollution from combustion of woody biomass and wood processing activities and, therefore, triggers approval by ORCAA through an air permit application prior to commencement of construction. PNWRE submitted an air permit application to ORCAA, which was determined complete on September 11, 2023. ORCAA staff reviewed PNWRE's application and concluded that the proposed facility meets criteria for approval in Washington and, therefore, may be conditionally approved. Recommended conditions of approval are detailed in Section 17 of this [Final Determination](#).

### 2. Regulatory Background

Pursuant to the Washington Clean Air Act under chapter 70A.15 of the Revised Code of Washington, ORCAA's Rule 6.1 and the Washington State Implementation Plan under 40 CFR part 52.2470(c)<sup>1</sup> require New Source Review (NSR) for new stationary sources of air pollution (referred to as new sources) in ORCAA's jurisdiction. NSR is also required prior to installing, replacing, or substantially altering any air pollution control technology. NSR generally refers to the process of evaluating air quality impacts and the likelihood of compliance with applicable air regulations and standards. NSR and approval of an air permit by ORCAA is required prior to commencing construction or modification of any new source or prior to installing, replacing, or substantially altering air pollution control technology. The goal of NSR is to assure compliance

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<sup>1</sup> A State Implementation Plan (SIP) is a collection of regulations and documents used by a state, territory, or local air district to implement, maintain, and enforce the National Ambient Air Quality Standards, or NAAQS, and to fulfill other requirements of the federal Clean Air Act. The Clean Air Act requires the EPA to review and approve all SIPs. ORCAA's SIP was last approved by EPA in 1995.

with applicable air regulations and standards, including equipment performance standards and ambient air quality standards.

NSR is initiated by a project proponent submitting an air permit application referred to as a Notice of Construction (NOC) application<sup>2</sup>, which provides ORCAA information on the proposed project of sufficient detail to characterize air impacts. NOC applications are posted on ORCAA's website and may undergo a public notice and comment period if requested by the public or if emissions increases trigger an automatic public notice. Approval of a NOC in an attainment or unclassifiable area<sup>3</sup> is contingent on verifying a proposed project meets the following criteria from ORCAA's Rule 6.1 and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6:

1. **Performance Standards** – The new stationary source will likely comply with applicable air-performance standards such as federal new source performance standards (NSPS), national emission standards for hazardous air pollutants (NESHAPs), or any performance standards adopted under chapter 70A.15 RCW;
2. **BACT** – The new stationary source will employ “Best Available Control Technology” (BACT) to control all air pollutants emitted;
3. **RACT** – Replaced or substantially altered air pollution control technology meets the standard of “Reasonably Available Control Technology” (RACT) as defined in ORCAA Rule 1.4;
4. **Ambient Air Quality** – Emissions from the new stationary source will not cause or contribute to a violation of any ambient air quality standard;
5. **Federal Air Permitting Requirements** – The new stationary source secures all applicable federal air permits that may apply; and,
6. **Air Toxics** – If there are increases in toxic air pollutant (TAP) emissions, the requirements of Washington's Controls for New Sources of Toxic Air Pollutants under Chapter 173-460 WAC are met.

In this case, PNWRE is proposing to construct a new “greenfield” wood pellet manufacturing facility in Hoquiam, Washington. The proposed facility would rely on combustion of woody biomass as the primary source of heat, which results in air pollutant emissions. It would also include wood processing activities that generate dust. At the production rates proposed by PNWRE, air emission rates from both activities are significant and trigger the requirement to secure ORCAA's approval through a NOC application prior to commencement of construction.

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<sup>2</sup> There are two categories of NOC applications: Notice of Construction (NOC) and Notice of Construction Revision (NOR). NOCs are required for new or modified sources, new control technology, replacing an existing stationary source or control technology, and substantially altering control technology. NORs are required when an owner or operator requests a revision to an existing air permit issued by ORCAA.

<sup>3</sup> Unclassified area or “attainment area” means an area that has not otherwise been designated by EPA as nonattainment with ambient air quality standards for a particular regulated pollutant. Attainment area means any geographic area in which levels of a given criteria air pollutant (e.g., ozone, carbon monoxide, PM<sub>10</sub>, PM<sub>2.5</sub>, and nitrogen dioxide) meet the health-based National Ambient Air Quality Standards (NAAQS) for that pollutant. An area may be an attainment area for one pollutant and a nonattainment area for others.

### 3. Application Processing

- Application received: July 20, 2023
- SEPA lead agency: City of Hoquiam
- SEPA determination: Determination of Non-Significance, #SEPA 2023-02, July 24<sup>th</sup>, 2023
- 1<sup>st</sup> Application addendum received: 8/11/2023 (requested 8/4/2023)
- 2<sup>nd</sup> Application addendum received: 9/6/2023 (requested 8/25/2023)
- Application declared complete: 9/11/2023
- Notification that natural gas will not be used as startup fuel: 9/27/2023
- 3<sup>rd</sup> Application addendum received: 10/25/2023 (requested 10/3/2023)
- ORCAA Preliminary Determination issued and posted to website: 12/8/2023
- Public Hearing at Hoquiam City Hall: 6:30 p.m. on 1/16/2024
- End of 30-day Public Comment Period: 4:30 p.m. on 1/18/2024

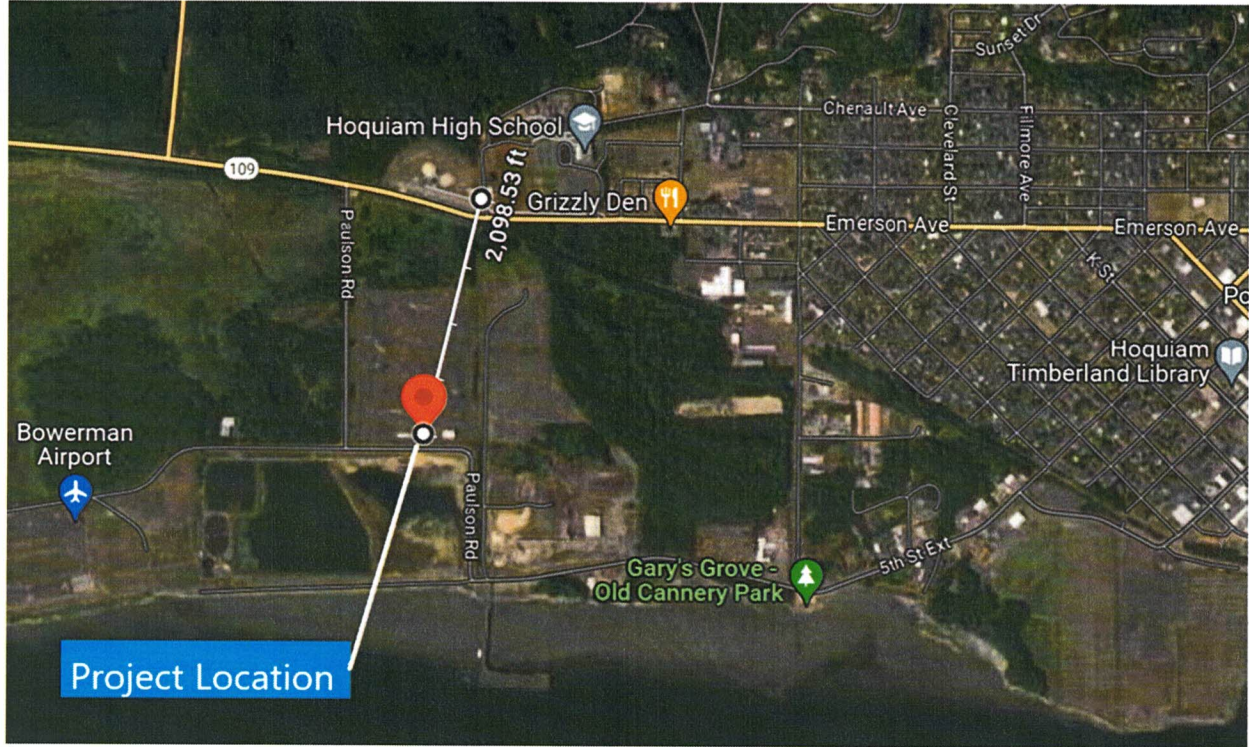
### 4. Description of Proposed Facility

PNWRE's NOC application thoroughly describes the proposed wood pellet manufacturing facility including equipment, operations, emissions units and air impacts. The following is a brief description of the facility and is intended as an overview.

#### 4.1 Proposed Location

The proposed wood pellet manufacturing facility will be located on an approximately 60-acre parcel in the city of Hoquiam, Washington. The facility is designed to produce, store, and export up to 440,800 short tons per year (TPY) of wood pellets and is intended to operate at least 8,000 hours per year. The proposed location is adjacent to the Willis Enterprises Moon Island Chip Mill (Willis Enterprises) and near Terminal 3 at the Port of Grays Harbor.

Figure 1: Proposed Location



\* Imagery ©2018 Google, Maps data ©2018 Google

\*\* Annotated by ORCAA

#### 4.2 Ambient Air Quality

ORCAA works cooperatively with the Washington State Department of Ecology (Ecology) and the regional United States Environmental Protection Agency (EPA) to measure criteria ambient air pollutants, meteorological parameters, and other air-related data. ORCAA is also a member of the Washington Air Monitoring Work Group, which makes recommendations to Washington Air Quality Managers Group regarding air monitoring programs, including ambient air monitoring site locations. ORCAA currently operates and maintains air monitoring equipment for measurement of three of the six criteria pollutants in various locations in its jurisdiction: particulate matter (PM<sub>2.5</sub>), ozone (O<sub>3</sub>), and carbon monoxide (CO).

ORCAA does not maintain any permanent monitors in Hoquiam but does operate a PM<sub>2.5</sub> monitor in nearby Aberdeen, WA. A temporary federal reference method (FRM) PM<sub>2.5</sub> monitor was installed at Harbor High School in Aberdeen between August 18, 2002, and December 29, 2003. No violations of the daily or annual PM<sub>2.5</sub> NAAQS were recorded during this time. As a permanent FRM was not installed in Aberdeen, the region is officially considered “unclassified” with regards to PM<sub>2.5</sub> attainment status. A nephelometer has been used to monitor PM<sub>2.5</sub> at Harbor High School in Aberdeen for the past 20 years. Nephelometer based PM<sub>2.5</sub> was verified by the previously mentioned FRM data during the period when both monitors were collocated in Aberdeen.

Because of the absence of FRM monitoring, Grays Harbor County is officially considered “unclassified” with respect to the National Ambient Air Quality Standards (NAAQS). However,

based on the number and size of air pollution sources and other monitoring data, ambient air quality in Hoquiam and Aberdeen is assumed to be generally good. Areas that are unclassified with respect to the NAAQS are regulated the same way as areas officially classified as “attainment.”

#### **4.3 Facility Overview**

The facility is designed with three truck tippers; a chips cleaning line; two wet hammer mills; one hog fuel furnace and dryer; four dry hammer mills; 12 pellet mills; five wood pellet storage silos; and a covered conveyor system to deliver wood pellets to the existing Willis Enterprises conveyance system and ship loadout facility. Air pollution control systems are proposed for all point sources of air emissions. Descriptions of stationary sources of air emissions and air pollution controls proposed are summarized in the following table. The proposed emergency generator, Source ID GEN-01, will be less than 500 horsepower and therefore is categorically exempt from New Source Review per ORCAA Rule 6.1(c)(28)(ii). It is included in the table below for informational purposes only.



**Table 1: Emissions Sources**

Emission Source ID <sup>c</sup>	Emission Source	Exhaust Rate (cfm)	Fugitive or Point? <sup>a,b</sup>	Air Pollution Controls
TD-01	Truck Dumper – White Wood	N/A	Fugitive	Dust Control Plan: <ul style="list-style-type: none"> <li>• 10 miles per hour (mph) speed limit for all mobile vehicles</li> <li>• Applying water where needed via water truck or other means</li> <li>• Using a vacuum truck as needed</li> </ul>
TD-02	Truck Dumper – Chips			
TD-03	Truck Dumper – Hog Fuel			
SP-01	Storage Pile – White Wood			
SP-02	Storage Pile – Chips			
SP-03	Storage Pile – Hog Fuel			
VEH-01	Vehicle Traffic – Trucks			
VEH-02	Vehicle Traffic – Front End Loaders			
EP-01.1	Chip Cleaning Line	36,334	Point & Fugitive	Cyclo-filter capable of 10 mg/Nm3 (.0044 gr/scf)
EP-01.2	White Wood Disc Screening	N/A	Fugitive	None
EP-01.3	Hog Fuel Feed	N/A	Fugitive	None
EP-02	Drying Line (furnace, drum dryer)	103,229	Point	Cyclones (2 units in parallel) WESP <sup>c</sup> RTO <sup>c</sup>
EP-03	Dry Product Intermediate Storage 1	852	Point	Passive Filters
EP-04	Dry Product Intermediate Storage 2	852	Point	Passive Filters
EP-05	Wet Hammer Mill 1	99,795	Point	Cyclo-filters (4 units serving DHM) Cyclo-Filters (2 units, one serving each pellet cooler) Cyclo-filter capable of 10 mg/Nm3 (.0044 gr/scf) (Serving each wet hammer mill) RCO <sup>c</sup> (Serving exhaust from all)
EP-06	Wet Hammer Mill 2		Point	
EP-07	Dry Hammer Mills (DHM, 4 units)		Point	
EP-08	Pelletizers (12 units) Pellet Coolers (2 units)		Point	
EP-09	Milled Dry Product Intermediate Storage	852	Point	Silo vent filters
EP-10	Pellet Storage Silo #1	15,635	Point	Storage silo venting to maintain low pellet temperatures – equipped with silo vent filters
EP-11	Pellet Storage Silo #2	15,635	Point	
EP-12	Pellet Storage Silo #3	15,635	Point	
EP-13	Pellet Storage Silo #4	15,635	Point	
EP-14	Pellet Storage Silo #5	15,635	Point	
EP-15	Truck Loadout	N/A	Fugitive	Silo Filter and shrouded dump chute
GEN-01	Emergency Generator (<500 HP) <sup>d</sup>	N/A	Point	Tier 4

**Table Notes:**

<sup>a</sup> Fugitive, refers to fugitive sources of emissions and means air pollution emitted to that is not captured and is not emitted through a stack or vent. Examples of fugitive emissions include, but are not limited to, road dust from vehicle traffic, wind-blown dust from piles of materials, and volatiles that escape capture or containment systems like emission from leaks.

<sup>b</sup> Point, refers to point sources of emissions and means air pollution that is captured and emitted to the ambient air through a stack or vent.

<sup>c</sup> Table acronyms: TD = Truck Dumpers; SP = Storage Piles; VEH = Vehicle Traffic; EP = Emission Point; LO = Load Out; RTO = Regenerative Thermal Oxidizer; RCO =Regenerative Catalytic Oxidizer, WESP = Wet Electrostatic Precipitator

<sup>d</sup> Categorically exempt from New Source Review per ORCAA Rule 6.1(c)(28)(ii)

**4.4 Raw Materials Processing**

Raw materials for pellet production and fuel for the furnace will be delivered to the facility via truck and include:

- Forest Residuals consisting of chipped woody biomass from logging operations (referred to as “ground chips”).
- Mill residuals consisting of sawdust and shavings (referred to as “white wood”).
- Biomass fuel (“referred to as hog fuel”), which is an unrefined mix of coarse chips of bark and wood fiber used for fuel.

Trucks delivering raw materials will be emptied via gravity in dedicated truck tippers. The proposed facility includes 3 truck tippers. The biomass will empty into the yard where front-end loaders will move the material to outdoor storage piles. Approximately 1.7 acres will be dedicated to outdoor storage of fuel and raw material for wood pellet manufacturing. Front-end loaders will transfer raw materials and biomass fuel to dedicated walking-floor bins. A radial stacker/reclaimer system may be installed, which would eliminate fugitive dust and mobile source emissions from front-end loaders.

To minimize dust emissions from vehicle traffic in the yard, PNWRE proposes to implement a dust control plan. The plan will include a 10 miles per hour (mph) posted speed limit for all vehicles and heavy equipment, regularly applying water on road surfaces via water trucks or other means, and using a vacuum truck as needed. The walking floor bins are designed to move the materials to the next phase in their processing. The facility is designed with 3 walking floor bins, each dedicated to a specific raw material stream. From this point onward, all raw material handling processes are fully enclosed.

The walking floor bin for ground chips empties to the chip cleaning line. The chip cleaning line uses a series of scalper rolls to remove dirt, sand and other impurities from the ground chips. The chip cleaning line will also classify the chips by size. The smallest sizes, or fines, will be routed to the dryer feeding system, while the intermediate fraction will be sent to the wet hammer mills for size reduction. Overs are reclaimed and recycled. The chip cleaning line will be enclosed and equipped with a dust capture system that will exhaust through a cyclo-filter dust control unit. Cyclo-filter units are essentially cyclone separator units equipped with an integral fabric filter baghouse to remove particulate from the exhaust. PNWRE’s application states that the cyclo-filters proposed for the facility will be capable of controlling particulate emissions down to 0.0044 grains per standard cubic foot of air (gr/scf).

The white wood walking floor bin will discharge to a disc screen that separates larger pieces for further sizing in the wet hammer mills. PNWRE expects the white wood material stream to be relatively free of dust and contaminants. No dust control system is proposed for the disc screen. The screened white wood will be sent to the dryer via conveyor while overs will be sent to wet hammer mills for further size reduction. The white wood disc screening unit is considered a point source of fugitive particulate emissions.

Hog fuel will be off-loaded in its own dedicated truck tipper and then transported via front end loader to a hog fuel pile, which will be uncovered and in the open. Front end loaders will also be used to move the hog fuel from the pile onto the hog fuel walking floor bin. Traffic-generated dust from front end loaders was accounted for in the review of air quality impacts. The hog fuel walking floor will transport hog fuel to the furnace fuel feed conveyor that empties to the furnace fuel metering bin.

#### **4.5 Wet Hammer Mills**

The proposed facility includes two wet hammer mills operating in parallel. They are referred to as “wet hammer mills” because they process materials upstream of the dryer. The purpose of the wet hammer mills is to reduce the size of the chips so the material can be more easily dried and milled into pellets. The wet hammer mills will be enclosed and airborne dust emissions will be captured by a pneumatic system and routed to dedicated cyclo-filters for particulate emissions control. The cyclo-filters serving the wet hammer mills will be capable of controlling particulate emissions down to 0.0044 grains per standard cubic foot of air (gr/scf). On March 12, 2024, PNWRE submitted additional information proposing to route the exhaust to the regenerative catalytic oxidizer (RCO). Changes compared to the Preliminary Determination are summarized in Section 16.

#### **4.6 Drying Line**

The drying line includes the biomass furnace, drum dryer, and emissions control system. The furnace will combust hog fuel to provide heat for the dryer and will have a maximum heat input capacity of 164.81 million British thermal units per hour (MMBtu/hr), which is roughly 25.57 short tons per hour of hog fuel as received. Hog fuel will consist of ground forest slash from logging and forest management operations and hog fuel from local mill operations.

Wet raw materials will be staged in a metering bin before being fed to the drum dryer inlet. Hot flue gas from the furnace will be routed through the drum dryer to dry, by direct contact, the raw material from approximately 45 percent moisture to a target 10 percent final moisture. Dried material will then be conveyed pneumatically from the drum dryer discharge through a pair of high-efficiency cyclones operating in parallel that will separate the dried wood material from the moisture-rich exhaust gas stream. The dried material will then be conveyed pneumatically to a dry-product intermediate-storage silo.

The emissions control system for the drying line will consist of dual cyclones followed by a Wet Electrostatic Precipitator (WESP), and finally a Regenerative Thermal Oxidizer (RTO). The purpose of the dual cyclones is simply to separate the dried material stream from the wet exhaust. The WESP is a high efficiency particulate removal device and expected to remove upwards of 98% of the particulate matter (PM) from the exhaust gas stream. The RTO is a secondary combustion unit used to destroy organic gases through oxidation.

#### **4.7 Furnace**

The proposed biomass furnace is designed with four primary combustion zones to enable combustion of high moisture content fuel. Zone 1 is designed to dry out the fuel, with combustion occurring in the following zones. PNWRE claims this design accommodates the moisture in the biomass fuel, making a fuel pile cover unnecessary. The combustion chamber will have four zones of overlapping, moving grates. The primary combustion air enters the fuel bed from the under-fire air zone through slots between the grate bars. The combustion chamber is refractory lined. The chamber is designed with the top as a secondary combustion chamber. The furnace will also have a second, secondary combustion chamber to enable final combustion of remaining combustible gases from the furnace.

The furnace will exhaust to the drum dryer and is designed to provide process heat at 752° F. After passing through the drum dryer, exhaust gases will pass through the pollution control system consisting of dual cyclones, a wet Electrostatic Precipitator (ESP), and finally, a Regenerative Thermal Oxidizer (RTO). Therefore, during normal operations, emissions from the furnace will ultimately exhaust through the RTO stack.

Ash will drop through the grates to four separate ash hoppers in the primary combustion chamber and a single ash hopper in the secondary combustion chamber. Ash hoppers will drop to a “submerged” ash conveyor that provides an air lock from the furnace. The ash conveyor drag chain will move ash to an enclosed ash storage bin.

#### ***4.8 Dryer Line Operating Scenarios***

##### ***4.8.1 Normal, Steady-State Operation***

During normal steady-state operation at design capacity of the facility, the drying line will exhaust through the WESP and RTO, and the pellet lines will exhaust through baghouses or cyclo-filters and the Regenerative Catalytic Oxidizer (RCO). Operating the drying line at design capacity (164.81 MMBtu/hr) will require roughly 23.2 metric tons per hour (mt/h) of hog fuel as received and produce dried material for roughly 51.1 mt/hr of pellet product.

The dryer system will have two emergency bypass stacks: One for the furnace and a separate stack for the dryer. When used, exhaust and emissions from these stacks bypass the air pollution control system (WESP + RTO) and are emitted directly to the atmosphere at approximately 50 feet above grade. The purpose of the bypass stacks is to provide for safe operation and temperature control during start-ups, shutdowns and unplanned malfunction and emergency events. Temperature control enables more gradual heating and cooling of the furnace refractory during these events, which is essential for assuring the integrity and long life of the refractory as well as other furnace and dryer components. Also, ability to control temperature provides a means to maintain refractory heat during minor malfunction events, thereby avoiding the need for a cold start.

##### ***4.8.2 Planned Startups***

Planned startups are referred to as “cold startups” because they are initiated when the dryer system (furnace + drum dryer) has been shut down and has cooled to a temperature that requires gradual heating to safely bring the system up to operating temperatures. This is necessary to avoid thermally shocking and damaging the dryer system. The furnace bypass stack is open when combustion in the furnace is initiated, thereby bypassing both the drum dryer and the air pollution control system. PNWRE stated in an email correspondence to ORCAA that exhaust bypassing the air pollution control system during a cold startup will last only approximately 30 minutes during a normal cold startup, and that they anticipate no more than ten cold startups per year. Based on these constraints, and a reduced initial heat rate to the furnace of approximately 15% of the maximum furnace heat input rate (~25 MMBtu/hr), emissions rates were determined by PNWRE to be less than those during normal, steady state operations. ORCAA staff evaluated PNWRE’s emissions calculations and concurs with this assessment. However, to assure startup emissions do not exceed these bounds in the future,

ORCAA imposed startup constraints consistent with the cold startup descriptions provided by PNWRE.

ORCAA's understanding is that cold startup of the furnace will be initiated using approximately 25 pounds of dry wood, which will be augmented with approximately 15 gallons of diesel. The diesel is used as an accelerant. The clean/dry wood is placed on a bed of dry wood chips on the furnace grate, and is ignited using the diesel to help accelerate the combustion. The fire is manually ignited and allowed to burn while exhausting from the emergency bypass stack. During this time, the flue gas connection to the dryer is closed and the dryer ID fan runs at minimum speed with the drum turning and empty without material. After approximately 30 minutes, normal biomass fuel input to the furnace is initiated, the emergency stack of the furnace is closed, and the flue gas connection to the dryer is opened. By this time, the dryer system's air pollution controls (WESP and RTO) will be fully operational. Therefore, uncontrolled emissions through the bypass stack are only expected to last for 30 minutes during a normal cold startup. However, optimal combustion of the fuel is not achieved until the primary and secondary air in the furnace are fully functioning. Once a temperature of approximately 300° C (570° F) is reached, primary and secondary combustion air fans start operation at a low rate and then are gradually increased. From this point in the cold startup sequence, temperatures within the combustion chamber are increased in steps of approximately 120° F per hour until the normal fuel input rate is reached. The air ratio between primary and secondary combustion air are then adjusted until the working/operating temperature is achieved. PNWRE expects approximately 14 hours from cold start-up to achieving normal operating temperatures. However, bypass of the air pollution control system is only expected to last 30 minutes during the entire 14-hour cold startup period.

PNWRE does not expect the total duration of cold startup bypass (exhaust bypassing the air pollution control systems during cold startups) to exceed 5 hours per year (10 startups @ 30 minutes per). Use of diesel during startups is expected to be less than 15 gallons per startup, and no more than 150 gallons per year. A propane torch may also be used to ignite the biomass during startups. Air emissions rates from combustion of wood and diesel during startups were quantified by PNWRE's environmental consultant and found to be less than emissions rates during normal, steady state operations. Emissions from the bypass stack during a cold startup are likely to exhibit opacity and, therefore, BACT opacity limits imposed on the dryer system exempt emissions from the bypass stacks during cold startups. However, ORCAA's general opacity standard of 20% (ORCAA Rule 8.2) applies at all times including startup and shutdown as does the State's general opacity standard of 20% (WAC 173-400-040).

#### **4.8.3 Planned Shutdowns**

Planned shutdown from full production mode to a cold system takes about 14 hours. PNWRE stated in an email correspondence that air pollution control systems will be fully operational during a planned shutdown. Shutdowns are initiated by stopping fuel flow to the furnace fuel hopper. Actual fuel feed to the furnace stops after fuel hopper is emptied. Simultaneously with stopping fuel feed to the furnace, material input to the dryer system is ramped down until material infeed is completely stopped. It takes less than 30 minutes to empty the entire drum of material. The dryer system temperature will be controlled by a substitute cooling load (water injection into the drum). Until the fuel on the furnace grate is completely combusted, the

furnace and dryer will exhaust through the air pollution control system consisting of the WESP and RTO. Only after fuel is completely combusted on the grate, primary and secondary combustion fans will be stopped and the flue gas connection to the dryer closed. As the combustion chamber cools down, hot gases will be exhausted through the emergency bypass stack of the furnace.

Cool down of the furnace is conducted at a rate of approx. 120° F per hour. Simultaneously, the dryer system ID fan will continue to run until the dryer system is cooled down. At this stage of the shutdown sequence, because neither fuel is being combusted nor material is being dried, hot gases from both the furnace and dryer will be emitted through the emergency bypass stacks for these units until they are sufficiently cooled. Therefore, during a planned shut-down, air pollution control systems for the drying system will be fully operational for the duration of time air pollution is being generated. Likewise, the RCO will be fully operational while air emissions are being generated by the hammer mills and pellet coolers during a planned shutdown. ORCAA's understanding is that PNWRE anticipates only two shutdowns of the furnace each year but assumed 10 for the air impacts analysis.

#### ***4.8.4 Malfunctions and Emergencies***

The furnace automatically aborts to the furnace bypass stack in the event of a malfunction or emergency situation like loss of power or failure of a critical piece of equipment. Likewise, the dryer system automatically aborts to the dryer bypass stack due to similar events. Aborts and exhausting through either or both of the bypass stacks may be triggered by failsafe interlocks associated with the furnace, dryer, emissions control systems, or utility supply systems. Typically interlocks divert flue gas to both bypass stacks in the event of loss of utilities (electricity, water, compressed air or fuel), when monitoring conditions exceed safe operating ranges (temperature, pressure, flowrate) or in the event of a spark detection within the wood drying system and flue gas treatment areas. Whenever there is an abort, the furnace automatically switches to idle mode and emissions are exhausted through the bypass stack. Simultaneously, fuel feed to the furnace is reduced to the idle mode heat rate. During malfunctions and emergencies, air emissions from the drying system may emit uncontrolled through the bypass stacks. However, other than during planned startups and shutdowns of the drying system, exhaust through either of the bypass stacks is presumed to be in excess of the pollutant mass rate limits established in the air permit.

#### ***4.8.5 Feedstock Interruptions***

Idle-mode may also be triggered by a reduction or interruption of feedstock material to the dryer. During these occurrences, idle-mode is triggered as a means to reduce the heat rate to the dryer in order to avoid excessive dryer temperatures and damage to the drying system. Also, in addition to preventing damage to the drying system, idle-mode avoids completely shutting down the furnace when feedstock input to the dryer is interrupted. Idle mode is initiated by reducing or stopping fuel feed into the furnace. The dryer system temperatures are reduced by substitute load (assumed water injection). Until feedstock input is resumed, the system continues to operate at a reduced heat rate. PNWRE stated in a communication with ORCAA that the furnace, dryer, dry hammer mills and pellet coolers will all be exhausted through their respective air pollution control systems when there are feedstock interruptions.

#### **4.9 Pellet Mill**

Dried material is then transferred by conveyor to into a dry-product intermediate-storage silo. The purpose of the intermediate-storage silo is to allow the dried material moisture content to homogenize; This helps provide a consistent raw material moisture content for the pelletizing process. The residency time of the dried materials in the intermediate-storage silo is approximately 2 hours and 50 minutes. The intermediate storage silo is passively vented through fabric filters.

A chain conveyor will be used to transfer dried material from the bottom of the intermediate-storage silo to four dry hammer mills operating in parallel. The dry hammer mills then mill the dried material into the desired size and consistency for pelletizing. Each dry hammer mill will exhaust through a cyclo-filter for recovering product and controlling particulate emissions. Exhaust streams from each dry hammer mill cyclo-filter will then be combined with exhaust streams from the pelletizing line and passed through a RCO for destruction of Volatile Organic Compounds (VOC) before emitting to the atmosphere. The RCO functions like an RTO to destroy VOC; however, the RCO uses a catalyst material rather than a ceramic material to achieve oxidation, and therefore can achieve efficient VOC destruction at lower temperatures.

Dried, milled material from the dry hammer mills and associated cyclo-filters will empty onto a chain conveyor which then conveys the milled product to a dry product intermediate-storage silo. The purpose of the dry intermediate-storage silo is to provide additional retention time for achieving homogenous moisture content, which is a key factor for achieving the desired quality in the final product. The intermediate-storage silo will be passively vented through a particulate filter.

A chain conveyor will then transport the dried, milled material from the outlet of the intermediate-storage silo to the pellet mill hoppers, which independently feed the pellet mills. PNWRE proposes two pellet lines consisting of six pellet mills each, for a total of 12 pellet mills. In each pellet mill, rollers push the material through the holes of a die plate. Knives on the exterior of the die plate cut the wood pellets from the plate once the pellets achieve the required length. The temperature of a freshly produced pellet is around 200 degrees Fahrenheit (°F). Therefore, the two pellet lines will discharge into pellet coolers where the material will flow countercurrent to a stream of ambient air. The airflow reduces the temperature of the wood pellets at the point of pellet discharge. Each pellet cooler will be equipped with either a baghouse or cyclo-filter to remove dust from the exhaust stream before it goes to the RCO. The exhaust streams from the two pellet cooler baghouses will then be combined with the exhaust streams from the dry hammer mills and passed through the RCO for control of VOC before being emitted to the atmosphere.

#### **4.10 Pellet Silos and Loadout**

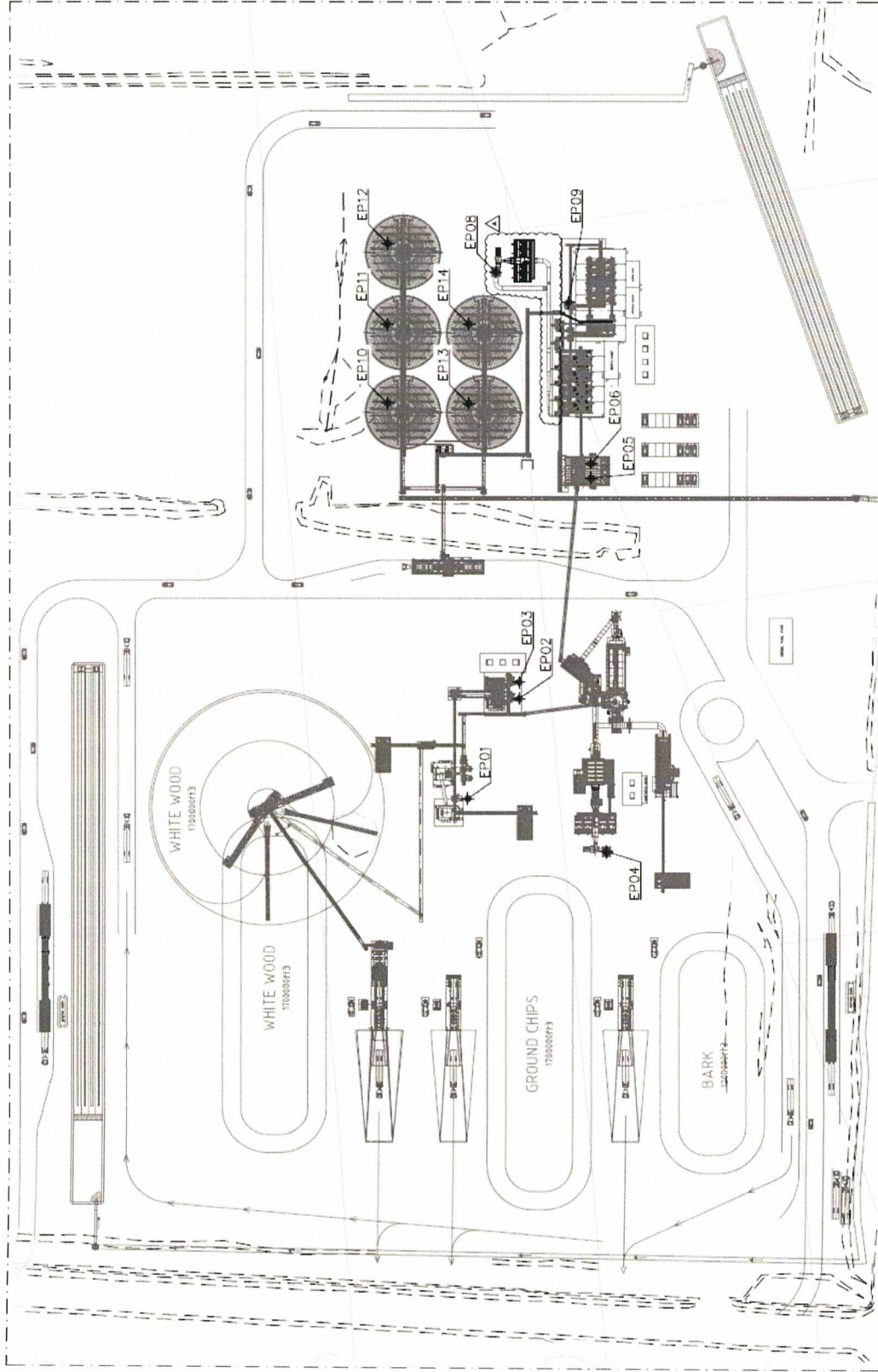
Cooled pellets will be conveyed from the pellet coolers to one of five pellet silos. The total combined capacity of the pellet silos is approximately 60,000 short tons. The silos will utilize aeration fans and venting to maintain low pellet temperature for final shipment. An automated enclosed conveyor will draw pellets from the silos evenly according to loading schedules and transport them via enclosed conveyor to the neighboring Willis Enterprises' existing conveyors and marine vessel loadout facilities. Willis Enterprises operates under an RC2-class ORCAA

registration (source number 2112, file number 647). The existing conveyors and vessel loadout facilities owned by Willis Enterprises are under a separate air permit and already registered with ORCAA.

PNWRE will also have the ability to deliver pellets via a truck unloading system; however, this system would be used only in special circumstances. PNWRE proposes no more than 10 loaded trucks per day and 32,000 tons per year of truck loadout utilization.



Figure 2: General Facility Layout



\* Figure from page 3 of PNWRE NOC application

## 5. Air Pollutant Emissions

Air pollutant emissions evaluated through this permitting action included Criteria Air Pollutants, Hazardous Air Pollutants (HAP), Toxic Air Pollutants (TAP) and Greenhouse Gases (GHG). Criteria Air Pollutants are air pollutants that have established National Ambient Air Quality Standards (NAAQS). EPA established and periodically reevaluates and updates NAAQS for six of the most common air pollutants— carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide— these are known as “criteria” air pollutants (or simply “criteria pollutants”). Based on ambient monitoring throughout the nation, areas are ranked in terms of whether or not the NAAQS are maintained. It is important to note that ground-level ozone is not an air pollutant directly emitted, but is created via photo-chemical reactions in the atmosphere involving volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>). Therefore, ozone is not included in any of the tables below because it is not directly emitted. However, ground-level ozone precursors (NO<sub>x</sub> and VOC) are quantified and included in the tables below.

HAP are those pollutants that are known or suspected by the EPA to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. There are 188 air pollutants that are regulated as HAP under the Clean Air Act. Facilities that have the potential to emit 10 tons or more per year of any single HAP or 25 tons per year or more of any combination of HAPs are regulated as “Major Sources” of HAP and subject to the Title V Air Operating Permit program. It is important to note that HAPs emitted as solids are a subset of and reflected in the PM, PM<sub>10</sub> and PM<sub>2.5</sub> emissions rates shown in the tables below. Likewise, HAP emitted as volatile gases are reflected in the in the VOC emissions rates shown below.

TAP, also known “air toxics,” are specific air pollutants regulated by Washington because they are known or suspected by the Department of Ecology to cause cancer or other serious health effects. Washington State regulates TAP through a State-wide regulation titled CONTROLS FOR NEW SOURCES OF TOXIC AIR POLLUTANTS, which is under Chapter 173-460 of the Washington Administrative Code (Washington Air Toxics Regulation). It is important to note that the list of TAP regulated by Washington contains more than 350 chemical compounds and substances. Most but not all of the federally listed HAPs are also listed and regulated as TAPs in Washington. However, there are 40 HAPs that are not listed as TAP. Emissions of individual TAPs were provided in PNWRE’s application. Section 12 addresses compliance with the Washington Air Toxics Regulation.

A comprehensive Potential to Emit analysis for the proposed facility was provided in PNWRE’s NOC application. The emissions inventory accounts for both point sources of emissions (stacks and equipment) and area sources of emissions (material piles, material handling, haul roads). All foreseeable operating scenarios were accounted for such as startup, shutdown, and “idle mode,” as well as normal, steady-state operation. Emissions estimates for normal operations were calculated based on fuel and production rates at maximum capacity for each operating scenario and assuming no down time.

### **5.1 Emissions During Normal Operations**

ORCAA staff reviewed PNWRE's emissions calculations including verifying emissions factors, conversions, assumptions and equations used to calculate emissions from individual point and area sources. ORCAA staff concluded that PNWRE's emission estimates reflect maximum potential to emit of the facility and are appropriate for making regulatory determinations and estimating ambient air quality impacts. Therefore, the emissions rates and facility-wide emissions provided in PNWRE's NOC application were used in confirming applicability of relevant air regulations, evaluating projected air impacts, and establishing emissions limits. Revisions or additions to emissions estimates in response to comments made during the public comment period are incorporated into this Final Determination as necessary, and summarized in Section 16.

Table 2 provides a Potential to Emit (PTE) summary for the proposed facility in terms of tons of pollutants emitted annually. PTE represents the highest amount an air pollutant could be emitted at the maximum design rates of each emissions source and assuming continuous operation. PTE estimates were used in determining applicability of relevant performance standards and air regulatory programs such as the Title V Air Operating Permits (Title V) and Prevention of Significant Determination (PSD) permitting programs. To ensure long term protection of air quality, PTE estimates were converted to annual emissions limits and included in the proposed conditions of approval detailed in section 17.

Table 3 provides a summary of emissions rates for criteria pollutant emissions and Greenhouse Gases (GHG) in terms of pounds per hour for each source. It is important to note that Hazardous Air Pollutants (HAP) and Toxic Air Pollutants (TAP) emissions rates are shown for normal, steady-state operations, and for potential alternative operating scenarios. Emission rates for normal, steady-state operations reflect the maximum hourly PTE with air emissions control systems fully functioning. To ensure that the performance of air pollution control systems do not degrade over time, emission rates for normal operations were converted to commensurate emission limits as appropriate, and included in the recommended conditions of approval detailed in section 17.

### **5.2 Startup Emissions Rates**

Startup of the drying system will require exhausting emissions uncontrolled from the furnace bypass stack. PNWRE stated in their application that two cold start-ups are anticipated per year. However, the air quality analysis provided in the application conservatively assumes 10, 30-minute startups per year. The objective for startups is to gradually bring the furnace up to normal operating temperatures using clean startup fuels.

PNWRE stated in their application that startup of the furnace will be initiated using approximately 25 pounds of dry wood, which will be augmented with approximately 15 gallons of diesel and ignited using propane torches. The diesel is used as an accelerant. The clean/dry wood is placed on a bed of dry wood chips on the furnace grate, soaked with diesel and ignited using propane to help accelerate the combustion. The fire is manually ignited using propane torches and allowed to burn while exhausting from the emergency bypass stack. During this time, the flue gas connection to the dryer is closed and the dryer ID fan runs at minimum rpm with the drum turning and empty without material.

**Table 2. Facility-Wide Potential Annual Emissions (tons per year (tpy))**

Pollutant	Class	Point-Sources (tpy)	Area-Sources (tpy)	Facility-Wide Total (tpy)	Title V Major?	PSD Major?
PM	Criteria <sup>a</sup>	108	32	140	N/A	No
PM <sub>10</sub>	Criteria <sup>a</sup>	88	10	98	No	No
PM <sub>2.5</sub>	Criteria <sup>a</sup>	71	1	72	No	No
NO <sub>x</sub>	Criteria <sup>a</sup>	230	Not emitted	230	Yes	No
CO	Criteria <sup>a</sup>	186	Not emitted	186	Yes	No
VOC <sup>d</sup>	Criteria <sup>a</sup>	68	Not emitted	68	No	No
SO <sub>2</sub>	Criteria <sup>a</sup>	18	Not emitted	18	No	No
Lead	Criteria <sup>a</sup>	< 0.1 lbs/yr	Not emitted	< 0.1 lbs/yr	No	No
CO <sub>2</sub> e	GHG <sup>e</sup>	163,592	Not emitted	163,592	N/A	No
Total HAP	Total HAP <sup>b</sup>	1.60	Not emitted	1.60	No	N/A
Formaldehyde (Highest individual HAP/TAP)	HAP <sup>b</sup> TAP <sup>c</sup>	0.34	Not emitted	0.34	No	N/A

Table Notes:

<sup>a</sup> EPA has established national ambient air quality standards (NAAQS) for six of the most common air pollutants—carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide—known as “criteria” air pollutants (or simply “criteria pollutants”).

<sup>b</sup> HAP means Hazardous Air Pollutant. Hazardous Air Pollutants are those known to cause cancer and other serious health impacts and are regulated under the federal Clean Air Act. HAPs that are solids when emitted are reflected in the PM, PM<sub>10</sub> and PM<sub>2.5</sub> annual emissions. HAP emitted as volatile organic compounds are reflected in the in the VOC annual emissions.

<sup>c</sup> TAP means any toxic air pollutant regulated in Washington and listed in WAC 173-460-150.

<sup>d</sup> VOC is regulated as a Criteria Air Pollutant because it is a precursor to Ground Level Ozone (O<sub>3</sub>)

<sup>e</sup> GHG means Green House Gas. GHG are shown in terms of Carbon Dioxide Equivalents.

<sup>f</sup> Table acronyms: CO = carbon monoxide; CO<sub>2</sub>e = carbon dioxide equivalent; HAP = hazardous air pollutant; N/A = not applicable; NO<sub>x</sub> = nitrogen oxides; PM = particulate matter; PM<sub>2.5</sub> = particulate matter 2.5 microns or less in diameter; PM<sub>10</sub> = particulate matter 10 microns or less in diameter; PSD = Prevention of Significant Deterioration; PTE = potential to emit; SO<sub>2</sub> = sulfur dioxide; TPY = tons per year; VOC = volatile organic compound

**Table 3. PTE Hourly Emissions Rates, Normal Operation (pounds per hour (lb/hr))**

Sources	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	CO <sub>2e</sub>
Truck Dumpers (fugitive <sup>a</sup> ): TD-01 (White Wood) TD-02 (Chips) TD-03 (Bark)	0.26	0.12	0.02					
Storage Piles (fugitive <sup>a</sup> ): SP-01 (White Wood) SP-02 (Chips) SP-03 (Bark)	0.44	0.22	0.11					
Vehicle Dust (fugitive <sup>a</sup> ): VEH-01 (Truck Traffic) VEH-02 (Loaders)	9.24	2.75	0.28					
Chip Cleaning Line: EP-01.1 (Cyclo-filter: point <sup>b</sup> ) EP-01.2 (White Wood Disc Screening: fugitive <sup>a</sup> ) EP-01.3 (Hog Fuel Feed: fugitive <sup>a</sup> )	6.81	1.70	0.29					
Drying Line (RTO <sup>c</sup> exhaust - point <sup>b</sup> ) EP-02	7.73	7.73	7.73	52.00	42.00	6.58	4.12	36,729
Dry Product Intermediate Storage (point <sup>b</sup> ): EP-03 (Silo 1 Vent) EP-04 (Silo 2 Vent)	0.03	0.03	0.03					
Wet Hammer Mills and Pellet Mill (RCO <sup>c</sup> exhaust - point <sup>b</sup> ): EP-05 (Wet Hammer Mill 1) EP-06 (Wet Hammer Mill 2) EP-07 (Dry Hammer Mills; 4 units) EP-08 (Pelletizers; 12 units. Pellet Coolers; 2 units)	5.95	2.86	2.06	0.41	0.18	8.98	0.00	529
Milled, Dry Product Intermediate Storage (point <sup>b</sup> ): EP-09 (Silo Vent)	0.02	0.02	0.02					
Pellet Storage Silos (point <sup>b</sup> ): EP-10 (Silo 1 Vent) EP-11 (Silo 2 Vent) EP-12 (Silo 3 Vent) EP-13 (Silo 4 Vent) EP-14 (Silo 5 Vent)	4.39	2.68	1.01		0.18	0.06		
Truck Loadout (fugitive <sup>a</sup> ) EP-15 (Truck Loading)	0.01	0.00	0.00					
Emergency Generator (point <sup>b</sup> ): GEN-01 (Generator Stack)	0.17	0.17	0.17	2.05	2.87	1.26	1.03	575

Table Notes:

<sup>a</sup> Fugitive, refers to fugitive sources of emissions and means air pollution emitted to that is not captured and is not emitted through a stack or vent. Examples of fugitive emissions include, but are not limited to, road dust from vehicle traffic, wind-blown dust from piles of materials, and volatiles that escape capture or containment systems like emission from leaks.

<sup>b</sup> Point, refers to point sources of emissions and means air pollution that is captured and emitted to the ambient air through a stack or vent.

<sup>c</sup> Table acronyms: TD = Truck Dumpers; SP = Storage Piles; VEH = Vehicle Traffic; EP = Emission Point; LO = Load Out; RTO = Regenerative Thermal Oxidizer; RCO =Regenerative Catalytic Oxidizer

<sup>d</sup> Pollutant acronyms: CO = carbon monoxide; CO<sub>2e</sub> = carbon dioxide equivalent; NO<sub>x</sub> = nitrogen oxides; PM = particulate matter; PM<sub>2.5</sub> = particulate matter 2.5 microns or less in diameter; PM<sub>10</sub> = particulate matter 10 microns or less in diameter; VOC = volatile organic compound;

After approximately 30 minutes, normal biomass fuel input to the furnace is initiated, the emergency stack of the furnace is closed, and the flue gas connection to the dryer is opened. By this time, the dryer system air pollution controls (WESP and RTO) will be fully operational. Therefore, uncontrolled emissions through the bypass stack are only expected to last for 30 minutes during a normal cold startup. Startup continues from this point forward in the startup sequence with air pollution controls functional. However, optimal combustion of the fuel is not achieved until the primary and secondary air are fully functioning.

Once a temperature of approx. 300° C (570° F) is reached, primary and secondary combustion air fans start operation at a low rate and then are gradually increased. From this point in the cold startup sequence, temperatures within the combustion chamber are increased in steps of approximately 120° F per hour until the normal fuel input rate is reached. The air ratio between primary and secondary combustion air are then adjusted until the working/operating temperature is achieved. From cold start-up to operating temperature, PNWRE expects a cold startup to take about 14 hours.

Startup emission rate estimates are shown in Table 4 and were based on emissions factors from EPA’s latest edition of Compilation of Air Pollutant Emissions Factors (AP-42). Startup emission rates from wood combustion were based on EPA AP-42 Chapter 1.10 Residential Wood Stoves utilizing emission factors for conventional stoves. Conventional stoves are enclosed wood-burning heaters that operate without catalytic combustors and have no emission reduction technology or design features. This scenario is similar to the piles of burning wood pieces within the enclosed furnace. Startup emission rates from diesel fuel used as an accelerant were based on EPA AP-42 Chapter 1.3 using emission factors for distillate oil-fired boilers and assuming ultra-low sulfur diesel.

**Table 4. Uncontrolled Startup Emissions Rates (pounds per hour (lb/hr))**

Sources	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	CO <sub>2e</sub>
Drying Line (Furnace & Dryer) <sup>a</sup> EP-02	0.84	0.84	0.84	0.67	5.92	1.34	0.03	784

Table Notes:

<sup>a</sup> Includes uncontrolled emissions from combustion of dry wood and diesel for the initial 30-minutes during a cold startup. EP = Emission Point.

<sup>b</sup> PM = particulate matter; PM<sub>2.5</sub> = particulate matter 2.5 microns or less in diameter; PM<sub>10</sub> = particulate matter 10 microns or less in diameter; NO<sub>x</sub> = Nitrogen Oxides; CO = Carbon Monoxide; VOC = Volatile Organic Compounds; SO<sub>2</sub> = Sulfur Dioxide; CO<sub>2e</sub> = Carbon dioxide equivalent

### 5.3 Shutdown Emission Rates

Shut down from full production mode to a cold system takes about 14 hours. PNWRE stated in their application that air pollution control systems will be fully operational during a planned shutdown while fuel is still being combusted on the furnace grates. Shutdowns are initiated by stopping fuel flow to the furnace fuel hopper. Actual fuel feed to the furnace stops after fuel hopper is emptied. Simultaneously with stopping fuel feed to the furnace, material input to the

dryer system is ramped down until material infeed is completely stopped. It takes less than 30 minutes to empty the entire drum of material. The dryer system temperature will be controlled by a substitute cooling load (water injection into the drum). Until the fuel on the furnace grate is completely combusted, the furnace and dryer will exhaust through the air pollution control system consisting of the cyclones, WESP and RTO. Only after fuel is completely combusted on the grate, primary and secondary combustion fans will be stopped and the flue gas connection to the dryer closed. As the combustion chamber cools down, hot gases will be exhausted through the emergency bypass stack of the furnace.

Cool down of the furnace is conducted at a rate of approx. 120° F per hour. Simultaneously, the dryer system ID fan will continue to run until the dryer system is cooled down. At this stage of the shutdown sequence, because neither fuel is being combusted nor material is being dried, hot gases from both the furnace and dryer will be emitted through the emergency bypass stacks for these units until they are sufficiently cooled. Therefore, during a planned shut-down, air pollution control systems will be fully operational for the duration of time air pollution is being generated. Likewise, the RCO will be fully operational while air emissions are being generated by the hammer mills and pellet coolers during a planned shutdown.

## **6. Administrative Requirements for NOC Applications**

NOC applications are subject to filing fees according to ORCAA Rule 3.3(b) and may incur additional NOC processing fees at an hourly rate according to ORCAA Rule 3.3(c). Applicable NOC filing fees for PNWRE's NOC application were paid prior to ORCAA commencing processing of the application. Additional NOC processing fees may apply and will be determined and assessed prior to issuing a Final Determination and the Approval Order (a.k.a.: Air Permit).

NOC applications are subject to a 15-day public notice and an opportunity to request a 30-day public comment period. Public notice of PNWRE's NOC application was posted on ORCAA's website on July 25, 2023. The time period for filing comments on the application and requests for a public comment period expired on August 9, 2023.

There were no requests for a public comment hearing during the application noticing period. However, the NOC application is subject to a mandatory public comment period per ORCAA Rule 6.1.3(b) as the proposed facility would cause a significant net increase in emissions of several air contaminants. Per ORCAA regulations, a public hearing may be scheduled if requested during the public comment period. However, anticipating a high level of public interest on the case, PNWRE proactively requested ORCAA to schedule a Public Hearing. On December 8, 2023, ORCAA opened the 30-day public comment period and notice of public hearing. The information was posted to ORCAA's website on December 8, 2023 and notice was given in The Daily World (local newspaper in Aberdeen) on December 9, 2023. Additionally, copies of ORCAA's Preliminary Determination and the NOC application were made available to view at the Hoquiam Timberland Library. The notice included the time, date, and location of the public hearing. A copy of the notice is retained on file.

On January 16, 2024, ORCAA conducted a public hearing at the Hoquiam City Hall to collect testimony from the public. The public comment period closed at 4:30 p.m. on January 18, 2024. In addition to the comments received during the public hearing, ORCAA accepted emailed

comments that were sent to Lauren Whybrew, ORCAA Engineer II, during the public comment period. All comments received responses and are retained on file. ORCAA's response to comments has been distributed to all members of the public who submitted an emailed comment, attended the public hearing, or provided written or oral testimony at the public hearing in Hoquiam.

## 7. SEPA Review

The State Environmental Policy Act (SEPA) under Chapter 197-11 WAC is intended to provide information to agencies, applicants, and the public to encourage the development of environmentally sound proposals. The goal of SEPA is to assure that significant impacts are mitigated.

The City of Hoquiam served as the Lead Agency for this project and issued a Determination of Non-Significance (DNS) on July 25, 2023. The DNS lists an Air Permit issued by ORCAA as one of the permits required. Other permits listed in the DNS include:

- Department of Ecology – National Pollutant Discharge Elimination System Construction Stormwater Permit and Industrial Stormwater Permit
- FAA – Clearance Letter
- City of Hoquiam Building Permit
- City of Hoquiam Critical Areas Review
- Port of Grays Harbor – Approval of Operation Agreement and Lease Agreement

## 8. Criteria for Approval

ORCAA's Rule 6.1 and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6, establish the following general criteria for approving new stationary sources and modifications to existing stationary sources of air pollution in ORCAA's region:

1. **Performance Standards** - Any new stationary source or modification will likely comply with applicable air-performance standards such as the federal new source performance standards (NSPS), national emission standards for hazardous air pollutants (NESHAPs), and any performance standards adopted under chapter 70A.15 RCW;
2. **BACT** - The new or modified stationary source is controlled to a level that meets the standard of "Best Available Control Technology" (BACT);
3. **Ambient Air Quality** – Any increase in air emissions will not cause or contribute to violation of any ambient air quality standard;
4. **Federal Air Permitting Requirements** – All applicable federal air permits, if required, are secured;
5. **Washington Air Toxics Regulations** - If there are increases in toxic air pollutant (TAP) emissions, the requirements of Washington's Controls for New Sources of Toxic Air Pollutants under Chapter 173-460 WAC are met; and,
6. **Public Outreach** – Public notice and comment requirements in ORCAA's regulations and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6 are met.

The following sections provide more detail on each criterion.



## 9. Applicable Performance Standards (Summary)

ORCAA's Rule 6.1.4(a)(1) and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6, require a finding that any new or modified stationary source will likely comply with applicable state, federal and local performance standards for air emissions including emission standards adopted under chapter 70A.15 RCW, emissions standard of ORCAA, and federal emission standards including New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and National Emission Standards for Hazardous Air Pollutants for Source Categories (MACT standards). The performance standards in Table 5 were determined applicable to the new wood pellet manufacturing facility. The performance standards in Table 6 were determined relevant to the proposed wood pellet manufacturing facility, but inapplicable. A comprehensive list of applicable performance standards that apply to all stationary sources of air pollution to be located at the facility, as well as general air regulations and standards that apply, are included in the Appendix.

**Table 5: General Requirements, Prohibitions, and Performance Standards**

Title Citation	Brief Description (Consult rule/regulation for specific requirements)	discussion/determination
Air Operating Permit Program  Chapter 173-401 WAC; ORCAA Rule 5.1	All sources subject to this regulation must have a permit to operate that assures compliance by the source with all applicable requirements. While chapter 173-401 WAC does not impose substantive new requirements, it does require that fees be imposed on sources and that certain procedural measures be adopted especially with respect to compliance.	The facility is projected to emit greater than 100 tons per year of NO <sub>x</sub> and CO, which makes the facility a “major source” and subject to the Title V Air Operating Permit program.
Operating Permit Fees  ORCAA Rule 3.2	Requires all facilities subject to the Air Operating Program to pay an annual fee to cover ORCAA’s costs of administering the program.	The facility is projected to emit greater than 100 tons per year of NO <sub>x</sub> and CO, which makes the facility a “major source” and subject to the Title V Air Operating Permit program.
Interference or Obstruction  ORCAA Rule 7.1	Prohibits willfully interfering with or obstructing the Executive Director or any Agency employee in performing any lawful duty.	Applies generally to all air pollution sources
False or Misleading Statements  ORCAA Rule 7.2	Prohibits any person from willfully making a false or misleading statement to the Board or its representative as to any matter within the jurisdiction of the Board.	Applies generally to all air pollution sources
Unlawful Reproduction or Alteration of Documents  ORCAA Rule 7.3	Prohibits reproducing or altering, or causing to be reproduced or altered, any order, registration certificate or other paper issued by the Agency if the purpose of such reproduction or alteration is to evade or violate any provision of these Regulations or any other law.	Applies generally to all air pollution sources
Display of Orders and Certificates  ORCAA Rule 7.4	Any order or registration certificate required to be obtained by these Regulations shall be available on the premises designated on the order or certificate. In the event that the Agency requires order or registration certificate to be displayed, it shall be posted. No person shall mutilate, obstruct, or remove any order or registration certificate unless authorized to do so by the Board or the Executive Director.	Applies generally to all air pollution sources
RACT Requirement  WAC 173-400-040(1)(c) ORCAA Rule 8.3	All emissions units are required to use reasonably available control technology (RACT).	Applies generally to all air pollution sources
Visible Emissions  WAC 173-400-040(2) ORCAA Rule 8.2(a)	Prohibits emissions with opacity of greater than 20% for more than three (3) minutes in any one hour.	Applies generally to all air pollution sources
Sulfur Dioxide  WAC 173-400-040(7)	No person shall cause or allow the emission from any emissions unit in excess of one thousand ppm of sulfur dioxide on a dry basis, corrected to seven percent oxygen for combustion sources, and based	Applies generally to all air pollution sources

Title Citation	Brief Description (Consult rule/regulation for specific requirements)	discussion/determination
	on the average of any period of sixty consecutive minutes.	
Control Equipment Maintenance and Repair ORCAA Rule 8.8	ORCAA Rule 8.8 requires that all air contaminant sources keep any process and/or air pollution control equipment in good operating condition and repair.	Applies generally to all air pollution sources
Fallout WAC 173-400-040(3) ORCAA Rule 8.3(e)	Prohibits particulate emissions from any source to be deposited, beyond the property under direct control of the owner or operator of the source, in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material was deposited.	Applies generally to all air pollution sources
Fugitive Emissions WAC 173-400-040(4)(a) ORCAA Rule 8.3(c)	The owner or operator of any emissions unit engaging in materials handling, construction, demolition, or other operation which is a source of fugitive emission shall take reasonable precautions to prevent the release of air contaminants from the operation.	Applies generally to all air pollution sources
Odor WAC 173-400-040(5) ORCAA Rule 8.5	ORCAA Rule 8.5 contains general requirements for controlling odors and a general prohibition of odors that unreasonably interfere with the use or enjoyment of a person's property.	Applies generally to all air pollution sources
Emissions Detrimental to Persons or Property WAC 173-400-040(6) ORCAA Rule 7.6	Prohibits causing or allowing the emission of any air contaminant from any source if it is detrimental to the health, safety, or welfare of any person, or causes damage to property or business.	Applies generally to all air pollution sources
Concealment and Masking WAC 173-400-040(8) ORCAA Rule 7.5	Prohibits installation or use of any device or means to conceal or mask emissions of an air contaminant, which causes detriment to health, safety, or welfare of any person, or causes damage to property or business.	Applies generally to all air pollution sources
Fugitive Dust WAC 173-400-040(9)	The owner or operator of a source or activity that generates fugitive dust must take reasonable precautions to prevent that fugitive dust from becoming airborne and must maintain and operate the source to minimize emissions.	Applies generally to all air pollution sources
Excess Emissions Provisions WAC 173-400-107; WAC 173-400-108 ORCAA 8.7	Requires excess emissions be reported to the Agency as soon as possible and within 24 hours and establishes criteria qualifying excess emissions as unavoidable.	Applies generally to all air pollution sources
Record Keeping and Reporting. ORCAA Rule 8.11	Requires the following: 1. Maintenance of records on the nature and amounts of emissions and other related information as deemed necessary by ORCAA; 2. Reporting of emissions to ORCAA upon request.	Applies generally to all air pollution sources
Emission Standards for Combustion and Incineration units	Prohibits emissions from any combustion unit in excess of 0.1 grain/dscf. EPA test methods from 40 CFR Part 60 Appendix A shall be used should demonstration of compliance be required.	The furnace, RTO and RCO are combustion units and subject to the limit of these rules.

Title Citation	Brief Description (Consult rule/regulation for specific requirements)	discussion/determination
WAC 173-400-050(1) ORCAA Rule 8.3(a)	Measured concentrations for combustion and incineration units shall be adjusted for volumes corrected to seven percent oxygen, except when the permitting authority determines that an alternate oxygen correction factor is more representative of normal operations.	
Emission standards for general process units.  WAC 173-400-060 ORCAA Rule 8.3(a)	Prohibits emissions from any process unit in excess of 0.1 grain/dscf. EPA test methods from 40 CFR Appendix A shall be used should demonstration of compliance be required.	The performance standards of these rules apply to all baghouses, cyclo-filters and other general process units proposed for the facility.
Washington State Reporting of Emissions of Greenhouse Gases  Chapter 173-441 WAC	This rule establishes mandatory greenhouse gas (GHG) reporting requirements for owners and operators of certain facilities that directly emit GHG as well as for certain suppliers and electric power entities. For suppliers, the GHGs reported are the quantity that would be emitted from the complete combustion or oxidation of the products supplied.	Based on PNWRE's GHG potential to emit estimates and a strong likelihood that the facility will operate continuously, actual emissions will likely exceed the 10,000 metric tons CO <sub>2</sub> e or more per calendar year threshold. Therefore, reporting GHG per Chapter 173-441 WAC will likely be required.
Standards of Performance for Stationary Compression Ignition Internal Combustion Engines  40 CFR 60 Subpart IIII	This New Source Performance Standard (NSPS) applies to manufacturers, owners, and operations of certain stationary compression-ignition (CI) internal combustion engines (ICEs).	PNWRE is proposing to operate a CI ICE emergency generator. Therefore, NSPS IIII is applicable to the CI ICE at the facility. PNWRE proposes to operate the CI ICE as an emergency engine as defined in this regulation and comply with the applicable performance standards.
National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines  40 CFR Part 63, Subpart ZZZZ	Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions.	The proposed facility will include one diesel-fired emergency generator that meets the applicability criteria of this regulation.

**Table 6: Inapplicable Requirements, Prohibitions, and Performance Standards**

Regulation Title Citation	Applicability Criteria	Basis
Registration ORCAA Regulation 4	Requires facilities that are minor sources of emissions to register annually with ORCAA and pay annual registration fees.	PNWRE will be a major source of air pollution and subject to the Title V Air Operating Permit (AOP) program
Annual Registration Fees ORCAA Rule 3.1	Requires payment of annual registration fees to ORCAA based in part on air pollutants emitted during the previous year.	PNWRE will be a major source of air pollution and subject to the Title V Air Operating Permit (AOP) program
Initial Notification ORCAA Rule 4.3(a)&(b); 4.3(f)	Requires facilities subject to registration to register by submitting an initial notification with the information in ORCAA Rule 4.3(b) within 30 days from: 1) Commencement of operation of any new or recommissioned stationary source; 2) Change in ownership of existing registered stationary source. The notification must be signed by the owner or operator or by the agent appointed by the owner.	PNWRE will be a major source of air pollution and subject to the Title V Air Operating Permit (AOP) program
Administrative Change Notification ORCAA Rule 4.3(e); 4.3(f)	Requires facilities to notify ORCAA of any changes to administrative information within 30 days from the change taking place including, but not limited to, contact names, address, phone numbers, and permanent shut down or decommissioning of a stationary source. The notification must be signed by the owner or operator or by the agent appointed by the owner.	PNWRE will be a major source of air pollution and subject to the Title V Air Operating Permit (AOP) program
Annual and/or Periodic Reports ORCAA Rule 4.3(c)&(d); 4.3(f)	Requires stationary sources to submit reports with information directly related to the registration program when requested by the Agency within 30 days of receipt of the request. The submittal must be signed by the owner or operator or by the agent appointed by the owner.	PNWRE will be a major source of air pollution and subject to the Title V Air Operating Permit (AOP) program
Emission Standards for Combustion and Incineration units – Incinerators WAC 173-400-050(2)	For any incinerator, no person shall cause or allow emissions in excess of one hundred ppm of total carbonyls as measured by Source Test Method 14 procedures in Source Test Manual - Procedures for Compliance Testing, state of Washington, department of ecology, as of September 20, 2004, on file at ecology. "Incinerator" means a furnace used primarily for the thermal destruction of waste.	The biomass combusted in the furnace is a fuel and not regulated as a waste. Therefore, this rule does not apply.
Commercial and industrial solid waste incineration units WAC 173-400-050(4)	This rule applies to commercial and industrial solid waste incineration units constructed on or before November 30, 1999. A commercial and industrial solid waste incineration unit that commenced construction on or before November 30, 1999, that meets the applicability requirements in 40 C.F.R. 62.14510, must comply with the requirements in 40 C.F.R. Part 62, Subpart GGG (in effect on the date in WAC 173-400-025).	PNWRE's biomass furnace is not regulated as an incinerator because the biomass fuel is not classified as a solid waste. Therefore, this rule does not apply.

<p>Other waste wood burners WAC 173-400-070(5)</p>	<p>This rule applies to waste wood burners and incorporates by reference federal standards for Commercial and Industrial Solid Waste Incineration units (CISWI) under 40 CFR Part 60 Subpart CCCC and 40 CFR Part 62 Subpart III. For purposes of this rule, "Waste wood" means, "... wood pieces or particles generated as a by-product or waste from the manufacturing of wood products..."</p>	<p>This rule does not apply because the biomass combusted in the proposed furnace does is not "waste wood," but will be purchased and combusted as a fuel to produce heat for a manufacturing process.</p>
<p>Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units 40 CFR 60 Subpart Db</p>	<p>The affected facility to which this subpart applies is each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr).</p>	<p>Although the heat rate of the furnace exceeds 100 MMBtu/hr, by definition, the furnace is not a steam generating unit. Therefore, the performance standards under this subpart do not apply.</p>
<p>Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units 40 CFR Part 60 Subpart Dc</p>	<p>The affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h).</p>	<p>The heat rate of the furnace exceeds 100 MMBtu/hr and is, therefore, outside the applicability slot of this performance standard. Also, by definition, the furnace is not a steam generating unit. Therefore, the performance standards under this subpart do not apply.</p>
<p>Standards of Performance for Commercial and Industrial Solid Waste Incineration Units 40 CFR Part 60 Subpart CCCC</p>	<p>This subpart establishes new source performance standards for commercial and industrial solid waste incineration units (CISWIs) and air curtain incinerators (ACIs). Commercial and industrial solid waste incineration unit (CISWI) means any distinct operating unit of any commercial or industrial facility that combusts, or has combusted in the preceding 6 months, any solid waste as that term is defined in 40 CFR part 241.</p>	<p>Per §241.2, traditional fuels that have not been discarded are not solid wastes, including cellulosic biomass (virgin wood). The traditional fuels definition further states that clean cellulosic biomass, defined in §241.2 to include forest-derived biomass such as bark and hogged fuel, is a fuel product. Therefore, the proposed fuel for the furnace is not solid waste and the furnace is not a CISWI.</p>
<p>National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products 40 CFR Part 63 Subpart DDDD</p>	<p>This subpart establishes national compliance options, operating requirements, and work practice requirements for hazardous air pollutants (HAP) emitted from plywood and composite wood products (PCWP) manufacturing facilities. Plywood and composite wood products (PCWP) manufacturing facility means a facility that manufactures plywood and/or composite wood products by bonding wood material (fibers, particles, strands, veneers, etc.) or agricultural fiber, generally with resin under heat and pressure, to form a panel, engineered wood product, or other product defined in § 63.2292.</p>	<p>The PNWRE facility will be an area source of HAP emissions. Therefore, 40 CFR Part 63 Subpart DDDD does not apply.</p>

<p>National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters</p> <p>40 CFR Part 63 Subpart DDDDD</p>	<p>This subpart establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAP.</p>	<p>The PNWRE facility will be an area source of HAP emissions. Therefore, the proposed facility is not subject to 40 CFR Part 63 Subpart DDDDD.</p>
<p>National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources</p> <p>40 CFR Part 63, Subpart JJJJJ</p>	<p>This subpart applies to industrial, commercial, or institutional boilers that are located at, or part of, an area source of hazardous air pollutants (HAP). A “boiler” is defined an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water.</p>	<p>The PNWRE facility will be an “Area Source” of HAP emissions. However, the facility does not include any boilers. Therefore, the performance standards under 40 CFR Part 63 Subpart JJJJJ do not apply.</p>
<p>National Emission Standards for Hazardous Air Pollutants for Wood Preserving Area Sources</p> <p>40 CFR Part 63 Subpart QQQQQ</p>	<p>This subpart applies to wood preserving operations that are Area Sources of HAP emissions. Wood preserving is defined as means the pressure or thermal impregnation of chemicals into wood to provide effective long-term resistance to attack by fungi, bacteria, insects, and marine borers.</p>	<p>The PNWRE facility will not use any wood preservatives in the production of wood pellets. Therefore, the standards in Subpart QQQQQ do not apply.</p>
<p>Federal- MANDATORY GREENHOUSE GAS REPORTING</p> <p>40 CFR Part 98</p>	<p>This part establishes mandatory greenhouse gas (GHG) reporting requirements for owners and operators of certain facilities that directly emit GHG as well as for certain suppliers.</p>	<p>PNWRE will not emit GHG above the threshold requiring federal reporting. This determination relies on “netting out” biogenic CO<sub>2</sub>e emissions from combustion of biomass.</p>

## 10. Best Available Control Technology (BACT)

ORCAA Rule 6.1.4(a)(2) and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6, require the finding that a new source or modification to an existing source of air pollution in an attainment or unclassifiable area will employ best available control technology for all pollutants (BACT) not previously emitted or whose emissions would increase as a result of the new source or modification.

New sources of air pollution and modifications to existing sources of air pollution are required to use BACT to control all pollutants not previously emitted, or those for which emissions would increase as a result of the new source or modification. BACT is defined in WAC 173-400-030 as, *“an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under chapter 70A.15 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant.”*

PNWRE’s original NOC application and subsequent application addendums describe air pollution control technology proposed for all point, area, and fugitive sources of air emissions, and the expected level of control. The emissions levels and control efficiencies proposed meet ORCAA’s presumed BACT control levels. These BACT levels may be assured through commensurate emissions limits established in the air permit issued by ORCAA, which is staff’s recommendation. Air pollution control technologies and measures proposed and corresponding controlled emissions levels are described in the following table.

**Table 7: BACT Summary**

Emission Source ID <sup>a</sup>	Emission Source	Air Pollution Control Technology & Methods	BACT Emissions Level <sup>b</sup>
TD-01	Truck Dumper – White Wood	Dust Control Plan: <ul style="list-style-type: none"> <li>• 10 miles per hour (mph) speed limit for all mobile vehicles</li> <li>• Applying water where needed</li> <li>• Using a vacuum truck as needed</li> </ul>	General Opacity Standards
TD-02	Truck Dumper – Chips		
TD-03	Truck Dumper – Hog Fuel		
SP-01	Storage Pile – White Wood		
SP-02	Storage Pile – Chips		
SP-03	Storage Pile – Hog Fuel		
VEH-01	Vehicle Traffic – Trucks		
VEH-02	Vehicle Traffic – Front End Loaders		
EP-01.1	Chip Cleaning Line	Cyclo-filter	0.0044 gr/scf 0% opacity
EP-01.2	White Wood Disc Screening	Clean/wet feedstock	General Opacity Standards
EP-01.3	Hog Fuel Feed	Clean/wet feedstock	General Opacity Standards
EP-02	Drying Line (furnace, drum dryer)	Cyclones (2 units in parallel) WESP <sup>a</sup> RTO <sup>a</sup> Low-NOx burners (furnace)	PM <sub>10</sub> : 8.0 lbs/hr (filterable + condensable) NOx: 53 lbs/hr CO: 42 lbs/hr VOC: 7 lbs/hr HCl: 0.028 lbs/hr Hg: 0.0006 lbs/hr 5% opacity
EP-03	Dry Product Intermediate Storage 1	Silo Filters	0% opacity 98+ % filter efficiency
EP-04	Dry Product Intermediate Storage 2		
EP-05	Wet Hammer Mill 1	Baghouse or Cyclo-filter (for each DHM) Baghouse or Cyclo-filter (per each pellet cooler) Cyclo-filter (for each wet hammer mill) RCO <sup>a</sup> (serving exhaust from all)	PM <sub>10</sub> : 3.0 lbs/hr (filterable + condensable) VOC: 9.0 lbs/hr 5% opacity
EP-06	Wet Hammer Mill 2		
EP-07	Dry Hammer Mills (DHM, 4 units)		
EP-08	Pelletizers (12 units) Pellet Coolers (2 units)		
EP-09	Milled Dry Product Intermediate Storage	Silo Filter	0% opacity 98+ % filter efficiency
EP-10	Pellet Storage Silo #1	Silo Filters	0% opacity 98+ % filter efficiency
EP-11	Pellet Storage Silo #2		
EP-12	Pellet Storage Silo #3		
EP-13	Pellet Storage Silo #4		
EP-14	Pellet Storage Silo #5		
EP-15	Truck Loadout	Silo Filter and shrouded dump	5% opacity 98+ % filter efficiency

Table Notes:



<sup>a</sup> Table acronyms: TD = Truck Dumpers; SP = Storage Piles; VEH = Vehicle Traffic; EP = Emission Point; LO = Load Out; RTO = Regenerative Thermal Oxidizer; RCO =Regenerative Catalytic Oxidizer, WESP = Wet Electrostatic Precipitator

<sup>b</sup> Pollutant acronyms: CO = carbon monoxide; NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> = particulate matter 10 microns or less in diameter; VOC = volatile organic compound; HCl = Hydrogen Chloride; Hg = Mercury

## 11. Ambient Impact Analysis (Criteria Pollutants)

ORCAA’s Rule 6.1.4(a)(3) and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6, require emissions from any new stationary source or modification not delay the attainment date of an area not in attainment, nor cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS).

PNWRE provided an Ambient Air Quality Analysis (AAQA) in their NOC application, which compares estimated maximum ground-level concentrations of regulated pollutants to the NAAQS for each regulated pollutant. PNWRE’s NOC application includes a comprehensive description of the air dispersion modeling analysis performed. PNWRE relied on the AERMOD air dispersion model (Version 22112) to estimate ground-level concentrations. Ambient impacts were estimated based continuous operation and maximum Potential to Emit (PTE) for all pollutants evaluated. ORCAA staff reviewed PNWRE’s AAQA, the emissions and other model input parameters, modeling methods, meteorological data, and background ambient air quality data used. Staff concluded that PNWRE’s AAQA conservatively estimates ground-level impacts, and that results from the analysis are appropriate for comparing with the NAAQS. Results from PNWRE’s analysis shown in the table below sufficiently demonstrates that emissions from the new facility will not cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS), which meets this approval criteria.

**Table 8: Impacts Compared to NAAQS**

Pollutant	Averaging Period	Modeled	Background	Total Impact	NAAQS	Exceeds NAAQS? (Yes/No)
PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour	79.8	42.1	122	150	No
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	24-hour	11.6	12.5	24.1	35	No
	Annual	3.86	5.1	8.96	9	No
NO <sub>2</sub> (ppb)	1-hour	68.6	15.1	83.7	100	No
	Annual	0.818	2.6	3.42	53	No
CO (ppm)	1-hour	0.381	1.04	1.42	35	No
	8-hour	0.0809	0.69	0.771	9	No
SO <sub>2</sub>	Not modeled – Emissions less than significant emissions rates					
Lead	Not modeled – Emissions less than significant emissions rates					

Table Notes:

<sup>a</sup> Pollutant acronyms: PM<sub>10</sub> = particulate matter 10 microns or less in diameter; PM<sub>2.5</sub> = particulate matter 2.5 microns or less in diameter; NO<sub>2</sub> = nitrogen dioxide; CO = carbon monoxide; SO<sub>2</sub> = sulfur dioxide

## 12. Ambient Impact Analysis (Toxic Air Pollutants)

Washington’s regulation titled Controls for New Sources of Toxic Air Pollutants (Air Toxics Rule) under Chapter 173-460 of the Washington Administrative Code applies to new stationary sources of Toxic Air Pollutants (TAP), including modifications to existing emissions units that increase TAP. The purpose of the Air Toxics Rule is to, “... maintain such levels of air quality as

will protect human health and safety.” The TAPs covered under the Air Toxics Rule include carcinogens and non-carcinogens

The Air Toxics Rule has two independent requirements for new sources and modifications that increase TAP emissions above de-minimis levels:

- 1) **tBACT:** The new or modified emission units must use Best Available Control Technology to control TAP emissions (WAC 173-460-040(3)(a)).
- 2) **Ambient Impact:** The NOC application must demonstrate that any increase in TAP from the new or modified emission units are sufficiently low to protect human health and safety from potential carcinogenic and/or other toxic effects (WAC 173-460-070).

### **12.1 tBACT**

The tBACT requirement applies to any new or modified emission units that triggers the Air Toxics Rule (results in a TAP increase above de-minimis levels), regardless of facility-wide or “net” TAP emissions. The term tBACT means Best Available Control Technology, as that term is defined in WAC 173-400-030, but applied to control of TAP (see BACT definition in Section 10).

Staff’s conclusion is that the BACT emissions levels described above for particulate and VOC emissions meets the tBACT requirement for TAP emitted as particulate and TAP emitted as VOC, respectively. These tBACT levels may be assured through the VOC and PM<sub>10</sub> emissions limits established in the air permit issued by ORCAA, which is staff’s recommendation.

### **12.2 Ambient Impact Review**

The Air Toxics Rule provides a multi-tiered, screening approach under WAC 173-460-080 to assess health impacts and demonstrate compliance with the ambient impact requirement under WAC 173-460-070, which is that TAP increases must be sufficiently low to protect human health and safety from potential carcinogenic and/or other toxic effects.

The “First Tier Review” (Tier 1 Review) is a two-step process. First, the emissions increase of each TAP is compared to its unique Small Quantity Emission Rate (SQER). SQERs are listed for each TAP under WAC 173-460-150. An SQER is the level of emissions of a TAP below which dispersion modeling is not required to demonstrate compliance with the ambient impact requirement. TAP emissions increases used in this first step must be based on the maximum potential to emit considering control or reduction in emissions achievable using the air pollution control technology or methods proposed to meet the tBACT requirement. Any TAP with an increase below its SQER can be presumed to be in compliance with the ambient impact requirement. If this is the outcome, further analysis is not required for that TAP. However, TAPs with emissions increases above their SQER must undergo the second step of the Tier 1 Review.

The second step of the Tier 1 Review requires evaluating TAP impacts against Acceptable Source Impact Levels (ASIL) and is referred to as an ASIL Analysis. An ASIL is the adopted health-based concentration for a TAP below which can be presumed as meeting the ambient impact requirement of WAC 173-460-070. ASILs are provided for each TAP under WAC 173-460-150. An ASIL analysis typically involves using an ambient air dispersion model to estimate ambient concentrations resulting from TAP emissions increases and considering air dispersion and local meteorological characteristics of the source. If the modeled impact of the increase in emissions

of a TAP does not exceed its corresponding ASIL, the ambient impact requirement of WAC 173-460-070 may be considered met and the First Tier Review is completed for that TAP.

Emissions rates used to support an ASIL Analysis must be based on the maximum potential to emit considering control or reduction in emissions achievable using the air pollution control technology or methods proposed to meet the tBACT requirement. In addition, the Air Toxics Rule allows TAP reductions from existing emission units not subject to review to be subtracted or “netted out” from TAP increases, provided the reductions are included in the approval order as enforceable voluntary emission limits and meet all the requirements of WAC 173-460-071. These requirements include:

- (1) The voluntary emissions reductions must be enforceable through a regulatory order issued by the air permitting agency.
- (2) The approval order enforcing the voluntary emissions reductions must include monitoring, recordkeeping, and reporting requirements sufficient to ensure the reductions are maintained.
- (3) The agency’s preliminary determination to approve the voluntary emissions reductions are subject to a 30-day public notice and comment period and opportunity for a public hearing.

For pollutants with ambient concentrations found to be greater than their ASIL, a “Second Tier Review” (Tier 2 Review) by the Washington Department of Ecology (Ecology) is required. An application for a Tier 2 Review by Ecology is referred to a Tier 2 petition. Tier 2 petitions must include a Health Impacts Assessment (HRA) and estimated ambient TAP impacts based on refined air dispersion modeling. Ecology will not act on a Tier 2 petition unless a written preliminary determination on the NOC application for the new or modified TAP source and a draft approval order have been completed by the local agency with jurisdiction. Ecology’s review and approval of a Tier 2 petition is contingent on a finding that TAP impacts meet the ambient impact requirement of WAC 173-460-070 that increases in TAP emissions are sufficiently low to protect human health and safety from potential carcinogenic and/or other toxic effects. If Ecology recommends denial of a Tier 2 petition, the permitting authority may not approve the project. The applicant then has the option of submitting a petition for a “Third Tier Review” (Tier 3 Review) by Ecology and a request for a risk management decision.

PNWRE conducted a Tier 1 Review of TAP according to the methods prescribed in Washington’s Air Toxics Rule. The Tier 1 review was based continuous operation and maximum PTE for all TAP emitted. On March 12, 2024, PNWRE provided additional information regarding VOC emission rates from the wet (green) hammer mills and proposed to route the wet hammer mills’ exhaust to the RCO. ORCAA staff used source test data from a wet hammer mill (Enviva Wiggins, Oct. 2013) to estimate the TAP emissions rates from the wet hammer mills, based on the VOC emission rate provided by PNWRE. TAP emissions from the wet hammer mills included methanol, acetaldehyde, acrolein, formaldehyde, and propionaldehyde emissions. PTE for most of the TAP expected to be emitted are below their respective SQER level and, therefore, do not require modeling for demonstrating compliance with the ambient impact requirement. This still held true after incorporating the estimated TAP emission rates from the wet hammer mills. Several TAP were found to be emitted above their respective SQER level. For these TAP, PNWRE applied the same modeling methodology as described above to estimate ground level impacts. Staff reviewed this analysis including PTE emission rate estimates, model input parameters,

modeling methods, and meteorological data. Three TAPs emitted from the wet hammer mills required modeling, so ORCAA staff added the maximum impact for these TAPs to the previously modeled impact. This was accomplished by scaling the PTE for each of these TAPs emitted by the 1 g/s modeled result from the RCO and adding it to the modeled impact originally provided by PNWRE for all other emission points. This approach is overly conservative as it does not spatially and temporally resolve where and when the maximum impact occurs. Attachment 4 includes information supporting the TAP PTE from the wet hammer mills. Staff concluded that PNWRE’s ASIL analysis, with the amendment from ORCAA staff to account for TAPs from the wet hammer mills, conservatively estimates ground-level TAP impacts and that results from the analysis are appropriate for comparing with ASILs for each TAP evaluated. Results demonstrate that TAP emissions from the new facility will be sufficiently low to protect human health and safety from potential carcinogenic and/or other toxic effects, which meets this approval criteria.

**Table 9: ASIL Analysis**

TAP Name	Averaging Period	ASIL (µg/m³)	Projected Impact (µg/m³)	Pass Tier 1 (Yes/No)
12-Dimethylbenz(a)anthracene	year	8.50E-06	1.42E-08	Yes
Acetaldehyde	year	3.70E-01	1.07E-02	Yes
Acrolein	24-hr	3.50E-01	7.73E-02	Yes
Benzene	year	1.30E-01	1.03E-02	Yes
Formaldehyde	year	1.70E-01	1.46E-02	Yes
Arsenic	year	3.00E-04	6.21E-06	Yes
Beryllium	year	4.20E-04	3.12E-07	Yes
Cadmium	year	2.40E-04	1.89E-06	Yes
Chromium hexavalent	year	4.00E-06	9.68E-07	Yes
Manganese	24-hr	3.00E-01	1.14E-02	Yes
Mercury	24-hr	3.00E-02	5.03E-04	Yes
Nickel	year	3.80E-03	1.05E-05	Yes

### 13. Requirements for Major Stationary Sources and Major Modifications to Major Stationary Sources

Projects that are major stationary sources and major modifications to major stationary sources as defined in 40 CFR 52.21(b) may be subject to permitting requirements under WAC 173-400-700 through 173-400-860.

Based on the facility’s PTE, the pellet manufacturing facility proposed by PNWRE is not a “Major Stationary Source” as defined in 40 CFR 52.21(b) and not subject to the permitting program required by WAC 173-400-700 through WAC 173-400-860. Therefore, these permitting requirements do not apply. This conclusion will be assured through annual limits.

During the 30-day public comment period, ORCAA received several comments asserting that PNWRE must be classified as a “fuel conversion plant” for PSD applicability purposes. The Washington Department of Ecology (Ecology) is the delegated PSD authority in the state of Washington. ORCAA sought Ecology’s opinion on whether the pellet manufacturing facility proposed in Hoquiam should be considered a “fuel conversion plant” for PSD applicability

purposes. Ecology responded with a letter dated February 21, 2024 clarifying the key characteristics of a “fuel conversion plant” based on a review of EPA memos. Based on this letter, ORCAA reaffirms that PNWRE should not be classified as a Fuel Conversion Plant under PSD regulations as the proposed plant will not have any of the key characteristics identified in Ecology’s letter (e.g., conversion is irreversible, change in the state of a fuel, involves a fossil fuel).

#### **14. Title V Air Operating Permit (AOP) Implications**

The State of Washington program pursuant to Title V of the federal Clean Air Act is governed under Chapter 173-401 WAC, the Washington Air Operating Permit Program. Chapter 173-401 WAC requires existing major stationary sources to operate in compliance with an approved Air Operating Permit (AOP). Major stationary sources are those stationary sources with a potential to emit which is greater than 100 tons per year of any criteria pollutant, greater than 10 tons per year of any hazardous air pollutants (HAP), or greater than 25 tons per year of any combination of HAP.

Based on the facility’s PTE, the pellet manufacturing facility proposed by PNWRE is a “Major Stationary Source” as defined in Chapter 173-401 WAC. Specifically, the facility will be a major source of both NO<sub>x</sub> and CO. Therefore, the facility will be subject to Title V of the federal Clean Air Act and will be required to submit a Title V Air Operating Permit (AOP) application within twelve months after commencing operation.

#### **15. Environmental Justice Considerations**

EPA defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The purpose of an EJ review in conjunction with an air permitting action is to ensure no group of people bear a disproportionate share of the negative environmental consequences as the result of the permitting action. Further, ORCAA strives to engage the affected community effectively and meaningfully regarding the permitting action, and to ensure compliance with obligations pursuant to Title VI of the Civil Rights Act.

With respect to factoring EJ into air permitting decisions, EPA Region 10 expects air agencies to:

- Identify overburdened communities;
- Engage with communities;
- Evaluate cumulative impacts; and,
- Use available authority to minimize emissions.

However, EPA Region 10 does not expect air agencies to use the Clean Air Act’s authorities to address existing disproportional impacts to communities when implementing New Source Review in areas that are “attainment/unclassifiable” with respect to meeting the NAAQS.

The following subsections describe how these expectations from EPA Region 10 were met.

##### **15.1 Identify Overburdened Communities**

The initial step in an EJ review is to identify any affected populations or communities of concern and to identify whether they are disproportionately impacted.

ORCAA used EPA's environmental justice screening and mapping tool, EJScreen, to answer this first part of this question. An EJScreen Community Report was generated for Grays Harbor County. The Community Report estimates a minority population of 31%, with approximately 8% of the total population speaking Spanish and 1% speaking another non-English language at home. All demographic indicators were below the 80<sup>th</sup> percentile for the nation. Likewise, the Community Report indicates that Grays Harbor County is below the 80<sup>th</sup> percentile for all environmental indicators. Environmental indicators above the 80<sup>th</sup> percentile is an indication that a community is already disproportionately impacted. Therefore, ORCAA staff's conclusion is that the project impact area does not include any preexisting, overburdened communities. A copy of the Community Report with more detailed information will be filed as part of the supporting documentation for the project.

Pre-existing air quality impacts were evaluated based on ambient air quality monitoring data and designation of the area with respect to maintaining compliance with the NAAQS. If air quality in a geographic area meets or is cleaner than a national standard based on ambient air monitoring data, it is called an attainment area and designated "attainment/unclassifiable." Areas may also be presumed "attainment/unclassifiable" based on population density and air pollutant emissions being below certain thresholds. For this case, the project impact area and Grays Harbor County as a whole is designated "attainment/unclassifiable." Therefore, there are no preexisting nonattainment issues identified within the County. Furthermore, the ambient air quality analysis provided in PNWRE's application demonstrates that air emissions will not cause or contribute to any exceedance of a NAAQS. Therefore, ORCAA staff's conclusion is that there are no indications of any existing disproportional impacts to communities of concern within the project impact area.

### **15.2 Engage with Communities**

A public hearing was conducted on ORCAA's Preliminary Determination to approve PNWRE's application to construct the new pellet mill. ORCAA's current public noticing and outreach policies and procedures were sufficient to effectively provide notice for the public hearing and meaningfully engage with the community surrounding the proposed project site and included:

- Issuing a press release of the Public Notice.
- Posting the Public Notice, application, and ORCAA's Preliminary Determination on ORCAA's website.
- Posting Hard Copies –Hard copies of the Public Notice and ORCAA's Preliminary Determination were posted at the nearest library, Hoquiam Timberland Library located at 420, 7<sup>th</sup> St. in Hoquiam.
- Publishing the Public Notice in The Daily World (local newspaper) on December 9, 2023.
- Emailing the Public Notice to environmental agencies, local tribal nations, organizations and advocacy groups, and persons and entities who have expressed interest in the project.

After the public hearing and considering all comments submitted on the case, ORCAA prepared a written responsiveness summary (response to comments). The responsiveness summary

includes a description of ORCAA’s Final Determination as well as responses to questions and comments received during the comment period and public hearing. ORCAA’s responsiveness summary will be posted on ORCAA’s website and forwarded to all persons and entities who submitted comments during the comment period and public hearing.

### **15.3 Evaluate Cumulative Impacts**

The air permitting action for this case did not trigger a cumulative impacts analysis under either the Clean Air Act or the Washington Clean Air Act. However, with respect to air impacts alone, results from the Ambient Air Quality Analysis included in PNWRE’s application do reflect background ambient concentrations for each criteria air pollutant evaluated. Also, the modeling protocol specified that air emissions from existing and planned facilities within the project impact area should be included in the analysis. However, because of the proposed location of new pellet mill, it was determined by PNWRE’s environmental consultant that impacts of emissions from existing sources of air pollution are already reflected in the background concentrations used. Therefore, emissions from nearby sources of air pollution were not explicitly modeled. PNWRE’s environmental consultant also determined that planned sources in the Grays Harbor area are not likely to cause significant impacts within the project impact area. Therefore, the air analysis can be considered a cumulative analysis with respect to the NAAQS.

### **15.4 Use Available Authority to Minimize Emissions**

As described elsewhere in this report, ORCAA applied existing New Source Review authorities provided under the Clean Air Act and the Washington Clean Air Act to minimize emissions from the proposed new pellet mill. Principally among these authorities is the requirement to use BACT for controlling emissions. The BACT requirement was applied and corresponding BACT emissions limits are included in the air permit.

## **16. Differences Between Preliminary and Final Determination**

In addition to minor formatting changes and corrections of typographical errors, the following changes were made between the Preliminary Determination dated November 30, 2023 and the Final Determination:

- Sections 3, 5.1, 6, and 15.2 were updated to include information regarding the public comment period and public hearing.
- Table 1, Table 7, and section 4.5 was updated to include PNWRE’s proposal to route the wet (green) hammer mills to the RCO to control VOCs and HAPs. These units were previously proposed to be uncontrolled for these pollutants. The wet hammer mills were redesignated from EP-02 and EP-03 to EP-05 and EP-06 in Table 1 and Table 7. As a result, the drying line was redesignated from EP-04 to EP-02, and the dry product intermediate storage silos were redesignated from EP-05 and EP-06 to EP-03 and EP-04.
- Table 2 and Table 3 was updated to include VOC and HAP emissions from the wet hammer mills, and VOC and CO emission from the five wood pellet storage silos. Section 12.2 and Table 9 were updated to include the TAP emissions from the wet hammer mills.
- Added footnotes to Table 1, Table 4, Table 7 and Table 8 for clarity.
- Edited ID #s in Table 3 and Table 4 to clarify and better align with the nomenclature used throughout the other tables in the Final Determination.

- Table 7: Added low-NOx burners to the BACT Summary for EP-02 (drying line) for clarity.
- Table 8: Revised the PM<sub>2.5</sub> annual NAAQS to reflect the most current standard.
- Section 13 includes additional clarification regarding PNWRE's classification of "Fuel Conversion Plant" under PSD regulations.
- Table in Condition #2 was updated to change the wet hammer mills from EP-02 and EP-03 to EP-05 and EP-06, and require the wet (green) hammer mills to be routed to the RCO. Drying line was redesignated from EP-04 to EP-02 and dry product intermediate storage silos were redesignated from EP-05 and EP-06 to EP-03 and EP-04 as a result.
- Condition #6 was updated to include PNWRE's proposal to route the wet (green) hammer mills to the RCO to control VOC and HAP. These units were previously proposed to be uncontrolled for these pollutants.
- Condition #7 was updated: The VOC limit was changed from "VOC as propane" to VOC per EPA's Wood Products Protocol 1 (WPP1), and emission limits were revised to account for the VOC emissions from the wet (green) hammer mills.
- Condition #8 was updated to support the initial testing requirements for HAP added to Condition #12.
- Condition #12 was updated and reorganized; added initial testing requirements for acetaldehyde, acrolein, propionaldehyde and phenol for the RTO and RCO exhaust. Additionally, the deadline to submit performance test results was changed from 60 days to 45 days to resolve a discrepancy with Condition #16.
- Condition #13(a) added "to prevent fugitive dust emissions" for clarity.
- Condition #16 includes reporting requirement for any exceedances of facility-wide emission limits. The requirement to submit test results was removed from Condition #16, as it is redundant and already established in Condition #12.
- Attachment 2 was added that includes a list of abbreviations, acronyms, and units of measurement commonly used in NOC permits.
- Attachment 3 was added to support the CO and VOC silo emissions from the five pellet storage silos. Attachment 4 was added to support the TAP PTE for the wet hammer mills and the changes made to section 12.2.

## 17. Recommended Conditions of Approval

The following conditions of approval were determined necessary for assuring compliance with applicable air regulations and standards and protecting air quality. Recommended conditions of approval will become effective once the Approval Order is issued:

1. **Approved Equipment.** The new wood pellet manufacturing facility as described in Notice of Construction application No. 23NOC1606, application addendums, and the associated Final Determination is approved for construction and operation subject to conditions in this Order of Approval.  
[Regulatory Basis: ORCAA Rule 6.1(a); ORCAA Rule 6.1.2(l); 40 CFR Part 52.2470(c), Table 6]
2. **Preapproval Required.** Prior approval by ORCAA may be required for the following as specified in ORCAA Rule 6.1:
  - a) Construction, installation, or establishment of any stationary source;
  - b) Modification to any existing stationary source;



- c) Replacement or substantial alteration of emission control technology installed on an existing stationary source; or,
- d) Deviations from the approved plans, drawings, data, and specifications of the stationary sources listed in the following table:

Source ID	Approved Stationary Sources	Approved Control Technologies and Measures
TD-01	Truck Dumper – White Wood (75' Back-On Truck Dump Platform)	Dust control plan
TD-02	Truck Dumper – Chips (75' Back-On Truck Dump Platform)	Dust control plan
TD-03	Truck Dumper – Hog Fuel (75' Back-On Truck Dump Platform)	Dust control plan
SP-01	Storage Pile – White Wood	Dust control plan
SP-02	Storage Pile – Chips	Dust control plan
SP-03	Storage Pile – Hog Fuel	Dust control plan
VEH-01	Vehicle Traffic – Trucks	Dust control plan
VEH-02	Vehicle Traffic – Front End Loaders	Dust control plan
EP-01.1	Chip Cleaning Line	Cyclo-filter
EP-01.2	White Wood Disc Screening	None
EP-01.3	Hog Fuel Feed	None
EP-02	Drying Line Emissions Units (EU):  EU 02.1 – Furnace: <ul style="list-style-type: none"> <li>Fuel – Biomass</li> <li>Start-up Fuel – Biomass + Diesel</li> <li>4 reciprocating grate zones</li> <li>Heat rate 165 MMBtu/hr total</li> <li>Under-fire and overfire air + secondary combustion zone</li> </ul> EU 02.2 – Drum dryer: <ul style="list-style-type: none"> <li>Ø 20' by 90' long</li> <li>Feedstock input – 85.5 ton/h @ 45% mc)</li> <li>Operating temperature around 750°F</li> <li>Operating airflow around 124,031 ACFM</li> </ul>	Cyclones (2 units in parallel)  Wet Electrostatic Precipitator: <ul style="list-style-type: none"> <li>Output Rating: 70 kilovolt, 1500 milliamp.</li> <li>Input: 105 KVA, 460 V / 3-phase / 60 Hz.</li> <li>3 Fields and 621 Ø10" tubes</li> </ul> Regenerative Thermal Oxidizer: <ul style="list-style-type: none"> <li>4 chambers</li> <li>20.2 MMBtu/hr gas consumption</li> </ul>
EP-03	Dry Product Intermediate Storage Silo 1: <ul style="list-style-type: none"> <li>Volume (gross) 45,732 ft<sup>3</sup></li> </ul>	Silo vent filters
EP-04	Dry Product Intermediate Storage Silo 2: <ul style="list-style-type: none"> <li>Volume (gross) 45,732 ft<sup>3</sup></li> </ul>	Silo vent filters
EP-05	Wet Hammer Mill 1	Baghouses or Cyclo-filters (4 units, one for each DHM): <ul style="list-style-type: none"> <li>Each exhausting to RCO</li> </ul> Baghouses or Cyclo-filters (2 units, one per each pellet cooler): <ul style="list-style-type: none"> <li>Each exhausting to RCO</li> </ul> Baghouses or Cyclo-filters (2 units, one per each wet hammer mill): <ul style="list-style-type: none"> <li>Each exhausting to RCO</li> </ul> Regenerative Catalytic Oxidizer (RCO): <ul style="list-style-type: none"> <li>Controls exhaust from DHMs, Pelletizers, Pellet Coolers, and wet hammer mills</li> <li>Design Airflow = 29,500 ACFM from DHM + 76,000 ACFM from pelleting line + 20,440 ACFM from wet hammer mills</li> <li>5.8 MMBtu/hr design natural gas consumption</li> </ul>
EP-06	Wet Hammer Mill 2	
EP-07	Dry Hammer Mills (DHM, 4 units): <ul style="list-style-type: none"> <li>15.5 ton/h design capacity each</li> <li>900 HP each</li> </ul>	
EP-08	Pellet Mill Emissions Units (EU)  EU 08.1 – Pelletizers (12 units): <ul style="list-style-type: none"> <li>500 HP each</li> <li>5.5 ton/h</li> </ul> EU 08.2 – Pellet Coolers (2 units)	

Source ID	Approved Stationary Sources	Approved Control Technologies and Measures
EP-09	Milled Dry Product Intermediate Storage Silo • Volume (gross) 45,732 ft <sup>3</sup>	Silo vent filters
EP-10	Pellet Storage Silo #1	Silo vent filters
EP-11	Pellet Storage Silo #2	
EP-12	Pellet Storage Silo #3	
EP-13	Pellet Storage Silo #4	
EP-14	Pellet Storage Silo #5	
EP-15	Truck Loadout	Silo Filter and shrouded dump chute

[Regulatory Basis: ORCAA Rule 6.1(a); ORCAA Rule 6.1.2(l); WAC 173-400-110(2); WAC 173-400-111(10)]

3. **Cyclo-filters and Baghouses.** In addition to applicable general emissions limits and standards, the following limits and standards apply to all cyclo-filters and baghouses emitting directly to the ambient air:
- Cyclo-filters and baghouses must be operating whenever the pellet plant is operating.
  - All cyclo-filters and baghouses must be equipped with a working manometer to read pressure drop across the filters.
  - Visible emissions must not exceed 0% opacity as measured in accordance with EPA 40 CFR Part 60 Appendix A Method 9.
  - Total filterable emissions must not exceed 0.004 grains per standard cubic feet, 1-hour average, measured in accordance with EPA Method 5 in Appendix A to 40 CFR Part 60, or an alternative method approved by ORCAA.
  - Baghouses and Cyclo-filters must exhaust through a vertical stack that provides suitable conditions for stack testing per Method 5.

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

4. **Silo Vents.** In addition to applicable general emissions limits and standards, the following limits and standards apply to all silo vents:
- Silo vents must be equipped with suitable filters capable of at least 98% filtration efficiency for the size range of particles emitted.
  - Filter efficiency must be confirmed and documented by appropriate certification and/or guarantees provided by the filter manufacturer.
  - Visible emissions from any silo vent must not exceed 0% opacity as measured in accordance with EPA 40 CFR Part 60 Appendix A Method 9.

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

5. **Drying Line.** In addition to applicable general emissions limits and standards, the following limits and standards apply to emissions from the drying line (furnace and drum dryer):
- Emissions from the RTO stack must not exceed the following limits:

Pollutant	Limit	Reference Test Methods
PM <sub>10</sub> (filterable + condensable)	12.7 lbs/hr, 1-hr average	EPA Methods 1-4, 5, 201, or 201A, plus EPA Reference Method 202 from 40 CFR Part 60 Appendix A-1, or equivalent methods agreed to in advance by ORCAA. Use of EPA Reference Method 5 assumes all filterable particulate is PM <sub>10</sub> .
NO <sub>x</sub>	53 lbs/hr, 1-hr average	EPA Methods 1-4, and 20 from 40 CFR Part 60 Appendix A, or an equivalent method agreed to in advance by ORCAA.
CO	42 lbs/hr, 1-hr average	EPA Methods 1-4, and 10 from 40 CFR Part 60 Appendix, or an equivalent method agreed to in advance by ORCAA.

Pollutant	Limit	Reference Test Methods
VOC (Per EPA's Wood Products Protocol 1)	8.92 lbs/hr, 1-hr average	EPA Method 1-4, and 25A from 40 CFR Part 60 Appendix A, or equivalent method agreed to in advance by ORCAA. Concurrent testing for both methanol and formaldehyde. VOC must be determined using EPA Method OTM-26 (see condition 8). Formaldehyde and methanol testing methods (or equivalent methods agreed to in advance by ORCAA): <ul style="list-style-type: none"> <li>Methanol: EPA Method 308 or 320 from 40 CFR Part 63 Appendix A or NCASI method CI/WP-98.01</li> <li>Formaldehyde: EPA Method 316 or 320 from 40 CFR Part 63 Appendix A or NCASI Method CI/WP-98.01</li> </ul>
HCl	0.028 lbs/hr, 1-hr average	EPA Methods 1-4, and 26 or 26A (M26 or M26A) from 40 CFR part 60, appendix A-8.
Hg	0.0006 lbs/hr, 1-hr average	EPA Methods 1-4, and 29, 30A, or 30B from 40 CFR Part 60, appendix A-8. For Method 29, collect a minimum of 4 dscm per run; for Method 30A or Method 30B, collect a minimum sample as specified in the method; for ASTM D6784 collect a minimum of 4 dscm.
Opacity	5%, 6-minute average	EPA Method 9 from 40 CFR Part 60 Appendix A.

- b) At all times, except during startup as allowed by condition 9, emissions from the furnace and dryer must exhaust through the air pollution control system consisting of the pair of cyclones, Wet Electrostatic Precipitator (WESP) and Regenerative Thermal Oxidizer (RTO).
- c) The WESP must be equipped with a means to continuously monitor and record VDC and mADC of each WESP field.
- d) The cake produced by the WESP decanter centrifuge must be properly disposed of and must not be recycled back into the furnace fuel feed system or in the pellet feedstock.
- e) All combustion chambers of the RTO must be equipped with thermocouples to continuously measure and record combustion chamber temperature.
- f) Except as provided by conditions 9 and 10, emissions exhausting through either the furnace or dryer bypass stacks are presumed to be in violation of the limits and standards of this condition.

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

6. **Wet Hammer Mill and Pellet Mill.** In addition to applicable general emissions limits and standards, the following limits and standards apply to emissions from the wet hammer mills, dry hammer mills, pelletizers and pellet coolers:

- a) At all times, exhaust from the wet and dry hammer mills must exhaust through their respective baghouses and the Regenerative Catalytic Oxidizer (RCO).
- b) At all times, emissions from the pellet coolers must exhaust through their respective baghouses and the RCO.
- c) All baghouses must be equipped with a working manometer to read pressure drop across the filters.
- d) All combustion chambers of the RCO must be equipped with thermocouples to continuously measure and record combustion chamber temperature directly after the catalyst bed.
- e) Emissions from the RCO stack must not exceed the following limits:

Pollutant	Limit	Reference Test Methods
PM <sub>10</sub> (filterable + condensable)	3.0 lbs/hr, 1-hr average	EPA Methods 1-4, 5, 201, or 201A, plus EPA Reference Method 202 from 40 CFR Part 60 Appendix A-1, or equivalent methods agreed to in advance by ORCAA. Use of EPA Reference Method 5 assumes all filterable particulate is PM <sub>10</sub> .
VOC (Per EPA's Wood Products Protocol 1)	9.0 lbs/hr, 1-hr average	EPA Method 1-4, and 25A from 40 CFR Part 60 Appendix A, or equivalent method agreed to in advance by ORCAA. Concurrent testing for both methanol and formaldehyde. VOC must be determined using EPA Method OTM-26 (see condition 8). Formaldehyde and methanol testing methods (or equivalent methods agreed to in advance by ORCAA): <ul style="list-style-type: none"> <li>Methanol: EPA Method 308 or 320 from 40 CFR Part 63 Appendix A or NCASI method CI/WP-98.01</li> <li>Formaldehyde: EPA Method 316 or 320 from 40 CFR Part 63 Appendix A or NCASI Method CI/WP-98.01</li> </ul>
Opacity	5%, 6-minute average	EPA Method 9 from 40 CFR Part 60 Appendix A.

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

**7. Facility-wide Annual Emissions Limits.** Facility-wide annual emissions must not exceed the following limits in terms of tons per consecutive 12-month period:

Pollutant	Facility-Wide Limit	Compliance Determination Methods
PM <sub>10</sub> (filterable + condensable)	98 tons/12-month period	Compliance determined by calculating tons of each pollutant based on ORCAA-approved emissions factors and the actual fuels combusted, tons of pellets produced, and operating schedule over the previous 12-month period according to condition 8.
NOx	230 tons/12-month period	
CO	186 tons/12-month period	
VOC (Per EPA's Wood Products Protocol 1)	68 tons/12-month period	

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

**8. Monitoring Facility-Wide Emissions.** Compliance with facility-wide annual emissions must be determined monthly by calculating facility-wide total tons of each pollutant for the previous 12-consecutive month period as follows:

- a) For the drying line (furnace and dryer):
  - i) PM<sub>10</sub> and VOC emissions must be calculated based on emission factors in terms of pounds per oven dried ton of pellets (lb/ODT) determined through source testing, times the actual tons of pellets produced, or an alternative method of calculation approved by ORCAA. Emissions factors must be updated with each required source test.
  - ii) VOC emissions must be determined using EPA's Interim VOC Measurement Protocol for the Wood Products Industry – July 2007 (otherwise known as Other Test Method 26 or OTM-26) and must include quantification of the individual contributions of methanol and formaldehyde based on the most recent source test results. VOC emissions calculated using this method are referred to as "WPP1 VOC".
  - iii) NOx and CO emissions must be determined using data from the NOx and CO continuous emission rate monitoring systems (CERMS) required by condition 11.

- iv) Emissions from the dryer line during any period when pellets are not produced such as, but not limited to, startup, shutdown, and idle mode, must be included in the facility-wide total emissions.
  - b) For the RCO exhaust (pellet mill and wet hammer mills):
    - i) Emissions of NO<sub>x</sub>, CO, PM<sub>10</sub>, and VOC must be calculated based on emission factors in terms of pounds per oven dried ton of pellets produced (lb/ODT) determined through source testing, times the actual tons of pellets produced, or an alternative method of calculation approved by ORCAA. Emissions factors must be updated with each required source test.
    - ii) VOC emissions must be determined using EPA's Interim VOC Measurement Protocol for the Wood Products Industry – July 2007 (otherwise known as Other Test Method 26 or OTM-26) and must include quantification of the individual contributions of methanol and formaldehyde based on the most recent source test results. VOC emissions calculated using this method are referred to as "WPP1 VOC".
    - iii) Emissions from the dryer line and pellet mill during any periods when pellets are not produced such as, but not limited to, startup, shutdown, and idle mode, must be included in the facility-wide total emissions.
  - c) PM<sub>10</sub> emissions from process units (baghouses, cyclo-filters, silo vents) must be calculated based on 0.004 grains per standard cubic feet, and each unit's exhaust rate and the hours they operated, or an alternative method of calculation approved by ORCAA.
  - d) PM<sub>10</sub> emissions from road dust created by traffic (front end loaders and trucks) must be calculated based on equations from AP-42 Section 13.2.2 and vehicle miles traveled at the facility by front end loaders and haul truck, or an alternative method of calculation approved by ORCAA.
  - e) PM<sub>10</sub> emissions from process fugitive sources (truck dumpers, storage piles, chip screening) must be calculated based on equations from Particulate Matter Potential to Emit Emissions Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country (EPA Region 10, May 8, 2014) and actual production over the 12-month period, or an alternative method of calculation approved by ORCAA.
- [Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

9. **Furnace/Dryer Startups.** In addition to applicable general emissions limits and standards, the following requirements apply to operation of the furnace and drum dryer during startups:
- a) Cold startup must be initiated using clean, dry fuels including dry wood and ultra-low sulfur diesel.
  - b) Furnace exhaust during a startup may bypass the drying line air pollution control system through the furnace bypass stack provided:
    - i) Bypass of the air pollution control system (cyclones, WESP, RTO) does not exceed 30 minutes during any single startup;
    - ii) The number of startups that bypass the air pollution control systems and exhaust through the furnace bypass stack does not exceed 10 startups per each 12-month period;

- iii) Operation of the air pollution control system including the WESP and RTO are initiated so that these units are fully functional and ready to accept emissions from the furnace and dryer as soon as possible after a startup is initiated;
  - iv) Exhausting through the air pollution control system is initiated as soon as possible after a startup is initiated.
- c) A sufficient amount of clean dry fuel must be maintained at all times to minimize emissions during startups.

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-400-081; WAC 173-460-040(3)]

10. **Furnace/Dryer Planned Shutdowns.** In addition to applicable general emissions limits and standards, the following requirements apply to operation of the furnace and drum dryer during planned shutdowns:

- a) The air pollution control system must be fully functioning during a planned shutdown;
- b) Exhaust of hot gases through the furnace bypass stack during a planned shutdown may commence once there is no combustion occurring on the furnace grates;
- c) Exhaust of hot gases through the dryer bypass stack during a planned shutdown may commence once there is no combustion on the furnace grates and no material remaining in the drum dryer.

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-400-113(2); WAC 173-460-040(3)]

11. **Dryer Line Emissions Monitoring.** Ongoing compliance with the drying line NO<sub>x</sub> and CO limits in condition 5a must be continuously monitored using continuous emission rate monitoring systems (CERMS) for measuring NO<sub>x</sub> and CO pollutant mass rates in lb/hr.

- a) The NO<sub>x</sub> and CO CERMS must meet applicable requirements from 40 CFR Part 60, Appendix B.
- b) The NO<sub>x</sub> and CO CERMS must meet applicable procedures and requirements from 40 CFR Part 60, Appendix F, including requirements and schedules for Relative Accuracy Test Audits (RATA).

[Regulatory Basis: ORCAA Rule 6.1.4(a)(2)]

12. **Performance Testing.** The following requirements apply to all performance testing. For purposes of this condition, performance testing includes the RATA of the NO<sub>x</sub> and CO CERMS.

a) **Performance Testing Schedule.**

- i) The following performance tests must be completed within 180-days of commencing operation of the facility to demonstrate compliance with emissions limits and determine emissions factors:
  - (1) Emissions from the RTO stack must be tested for each pollutant in Condition 5a.
  - (2) Emissions from the RCO stack must be tested for each pollutant in Condition 6e.
  - (3) Acetaldehyde, acrolein, propionaldehyde and phenol emissions from the RTO stack and the RCO stack must be tested according to EPA Method 320 from 40 CFR Part 63 Appendix A, or an alternative method approved by ORCAA.
- ii) Following the initial performance tests required in (i), the following performance tests must be completed every five years or whenever required by ORCAA:
  - (1) Emissions from the RTO stack must be tested for each pollutant in Condition 5a.

- (2) Emissions from the RCO stack must be tested for each pollutant in Condition 6e.
- b) **Performance Testing Requirements.**
- i) Performance testing must be conducted during operating conditions with highest emissions unless otherwise approved by ORCAA.
  - ii) Compliance with each emissions limit must be determined from the average of three separate 1-hour test runs unless otherwise approved by ORCAA.
  - iii) RATA of the NO<sub>x</sub> and CO CERMS must be conducted:
    - (1) According to the requirements from 40 CFR Part 60, Appendix F; and
    - (2) Concurrently with RTO performance testing.
  - iv) Testing for formaldehyde and methanol must be conducted concurrently with VOC testing.
  - v) Testing for NO<sub>x</sub> and CO must be conducted concurrently.
- c) **Notifications, Plans, and Reports.**
- i) Performance testing must be conducted consistent with an ORCAA approved test plan.
  - ii) A test plan must be submitted to ORCAA for approval at least 45 days prior to conducting a required performance test.
  - iii) The test plan must describe:
    - (1) Air emissions test methods;
    - (2) Target operating conditions for testing;
    - (3) Performance indicators that will be monitored during the testing; and,
    - (4) Methods for calculating emissions factors.
  - iv) A test report must be submitted to ORCAA within 45 days of conducting any performance test.
  - v) The test report must include for each test run:
    - (1) The concentrations and pollutant mass rates in pounds per hour for each pollutant measured;
    - (2) Emissions factors in terms of pounds of pollutant per oven dry ton of pellets produced;
    - (3) The rate of pellet production;
    - (4) Key operating indicators of the source and pollution control technology.
- [Regulatory Basis: ORCAA Rule 6.1.4(a)(2); WAC 173-40-113(2); WAC 173-460-040(3)(a); ORCAA Rule 6.1.2(l); WAC 173-400-111(10)]

13. **Operation and Maintenance Plan.** The owner or operator must devise and implement an operation and maintenance plan (O&M Plan) to minimize emissions from all sources and modes of operation at the facility. The O&M Plan must be submitted to ORCAA for approval within the first six months from commencement of operation of the facility. The O&M Plan must include, but is not limited to, the following elements:
- a) Dust prevention plan describing company policies to prevent fugitive dust emissions including, at a minimum, vehicle speed limits, application of dust suppressants to haul roads, minimizing material drop heights, surveying the facility for fugitive dust; procedures for minimizing for fugitives during truck loading; and minimizing visible dust during feedstock and fuel dumps;

- b) Cyclo-filter maintenance plan that describes how acceptable operating pressure drop ranges will be determined and applied, how and when cyclo-filters will be inspected, and how filters will be maintained;
  - c) WESP maintenance plan that describes how acceptable performance indicators will be determined, how quality of flush water will be maintained, how centrifuge cake will be disposed of, and detailed startup and shutdown procedures;
  - d) RTO maintenance plan that describes how RTO performance will be monitored, when thermocouples will be changed out, and detailed startup and shutdown procedures;
  - e) RCO maintenance plan that describes how RCO performance will be monitored, how performance of the catalyst will be monitored and maintained, and detailed startup and shutdown procedures;
  - f) Detailed startup and shutdown procedures for the furnace and dryer;
  - g) How proper combustion in the furnace will be monitored and maintained;
  - h) Plan describing the means and methods for monitoring time emissions bypass air pollution control systems for both the dryer line and pellet mill.
- [Regulatory Basis: ORCAA Rule 6.1.4(a)(2)]

14. **Emissions Inventory.** On an annual basis, the owner or operator must complete and submit to ORCAA an annual emissions inventory (inventory) of all regulated pollutants from all emissions units. Actual emissions must be based on actual operating data and ORCAA approved emission factors. The inventory must be accompanied by all associated calculations and data and must be certified by a Responsible Official as defined under WAC 173-401-200(27) as being true and accurate.

[Regulatory Basis: ORCAA Rule 8.11]

15. **Required Records.** The following records must be kept and made available when requested:

- a) The O&M plan required by condition 13;
- b) Manufacturer specifications for all cyclo-filters and baghouses as built identifying design air flow rates, pressure drops, and filtering efficiencies;
- c) Manufacturer specified or certified filtering efficiency for all silo vent filters;
- d) The number of truck dumps per day;
- e) Tons of pellets produced per day;
- f) Combustion chamber temperatures of the RTO and RCO;
- g) WESP KVA and MA of each of the three WESP fields;
- h) Number of occurrences, duration for each occurrence, and reason for emitting through either the furnace or drum dryer bypass stacks;
- i) The amount of diesel and clean, dry wood used during each cold startup;
- j) Daily record of the operating pressure drop across each baghouse and cyclo-filter;
- k) Monthly record of emissions calculations to demonstrate compliance with the emissions limits in condition 7; and,
- l) NOx and CO CERMS certification and quality assurance records.

[Regulatory Basis: ORCAA Rule 8.11]

16. **Required Notifications, Reports and Applications.** The following notifications, reports, and applications must be submitted to ORCAA by the deadline specified:



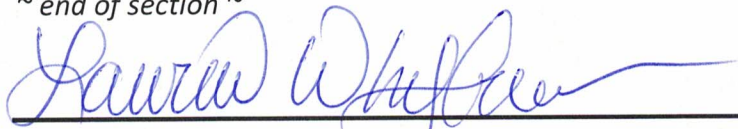
- a) Any updates or revisions to the O&M plan required by condition 13 must be submitted to ORCAA for approval prior to implementing them;
- b) Notification by phone or email message of any complaint as soon as possible but in no case later than 24 hours of receiving the complaint;
- c) Title V Air Operating Permit (AOP) application within 12 months from commencing operation of the facility;
- d) Notification by phone or email of any emissions through the furnace or drum dryer bypass stacks as soon as possible but in no case later than 24 hours from initiation of the event;
- e) Notification of any excess emissions determined through the NOx or CO CERMS as soon as possible but in no case later than 24 hours from the beginning of each event; and,
- f) Notification of any exceedances with respect to all facility-wide emission limits as soon as possible, but no later than 30 days after the end of the month during which the exceedance was discovered.

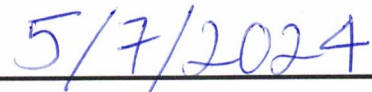
[Regulatory Basis: WAC 173-401-500; ORCAA Rule 8.11; ORCAA Rule 8.7; ORCAA Rule 5.1]

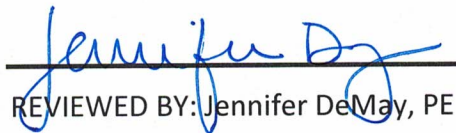
### 18. Final Determination to Approve

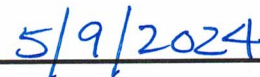
This Final Determination documents ORCAA staff’s determinations with respect to the applicable criteria of approval in ORCAA Rule 6.1 and the Washington State Implementation Plan under 40 CFR part 52.2470(c), Table 6. ORCAA staff recommends approval of PNWRE’s proposal to construct a new wood pellet manufacturing facility, provided the conditions identified in Section 17 of this Final Determination are implemented through an enforceable Order of Approval (AKA: Air Permit). Emissions calculations, modeling summary and other data supporting this Final Determination are provided in the permit application.

~ end of section ~

  
 PREPARED BY: Lauren Whybrew, Engineer II

  
 Date

  
 REVIEWED BY: Jennifer DeMay, PE

  
 Date

## Attachment 1: Applicable General Performance Standards that apply to Pacific Northwest Renewable Energy (PNWRE) in Hoquiam, Washington

Title Citation	Brief Description (Consult rule/regulation for specific requirements)	Applies to
False or Misleading Statements ORCAA Rule 7.2	Prohibits any person from willfully making a false or misleading statement to the Board or its representative as to any matter within the jurisdiction of the Board.	Applies generally to all air pollution sources
Unlawful Reproduction or Alteration of Documents ORCAA Rule 7.3	Prohibits reproducing or altering, or causing to be reproduced or altered, any order, registration certificate or other paper issued by the Agency if the purpose of such reproduction or alteration is to evade or violate any provision of these Regulations or any other law.	Applies generally to all air pollution sources
Display of Orders and Certificates ORCAA Rule 7.4	Any order or registration certificate required to be obtained by these Regulations shall be available on the premises designated on the order or certificate. In the event that the Agency requires order or registration certificate to be displayed, it shall be posted. No person shall mutilate, obstruct, or remove any order or registration certificate unless authorized to do so by the Board or the Executive Director.	The Approval Order issued in conjunction with this NOC approval must be retained on site.
General Requirements WAC 173-400-040(1)(c) ORCAA Rule 8.3	All emissions units are required to use reasonably available control technology (RACT).	Applies generally to all air pollution sources.
Visible Emissions WAC 173-400-040(2) ORCAA Rule 8.2(a)	Prohibits emissions with opacity of greater than 20% for more than three (3) minutes in any one hour.	Applies generally to all air pollution sources
Sulfur Dioxide WAC 173-400-040(7)	No person shall cause or allow the emission from any emissions unit in excess of one thousand ppm of sulfur dioxide on a dry basis, corrected to seven percent oxygen for combustion sources, and based on the average of any period of sixty consecutive minutes.	Applies generally to facilities that emit Sulfur Dioxide.
Control Equipment Maintenance and Repair ORCAA Rule 8.8	ORCAA Rule 8.8 requires that all air contaminant sources keep any process and/or air pollution control equipment in good operating condition and repair.	Applies generally to all air pollution control devices.
Fallout WAC 173-400-040(3) ORCAA Rule 8.3(e)	Prohibits particulate emissions from any source to be deposited, beyond the property under direct control of the owner or operator of the source, in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material was deposited.	Applies generally to all air pollution sources.
Fugitive Emissions WAC 173-400-040(4)(a)	The owner or operator of any emissions unit engaging in materials handling, construction, demolition, or other operation which is a source of fugitive emission shall take reasonable precautions to prevent the release of air contaminants from the operation.	Applies generally to any activity that results in fugitive emissions.

Title Citation	Brief Description (Consult rule/regulation for specific requirements)	Applies to
ORCAA Rule 8.3(c)		
Odor WAC 173-400-040(5) ORCAA Rule 8.5	ORCAA Rule 8.5 contains general requirements for controlling odors and a general prohibition of odors that unreasonably interfere with the use or enjoyment of a person's property.	Applies generally to all air pollution sources.
Emissions Detrimental to Persons or Property WAC 173-400-040(6) ORCAA Rule 7.6	Prohibits causing or allowing the emission of any air contaminant from any source if it is detrimental to the health, safety, or welfare of any person, or causes damage to property or business.	Applies generally to all air pollution sources
Concealment and Masking WAC 173-400-040(8) ORCAA Rule 7.5	Prohibits installation or use of any device or means to conceal or mask emissions of an air contaminant, which causes detriment to health, safety, or welfare of any person, or causes damage to property or business.	Applies generally to all air pollution sources
Fugitive Dust WAC 173-400-040(9)	The owner or operator of a source or activity that generates fugitive dust must take reasonable precautions to prevent that fugitive dust from becoming airborne and must maintain and operate the source to minimize emissions.	Applies to any activity that results in fugitive dust.
Particulate Standards for Process units ORCAA Rule 8.3(a) WAC 173-400-060	Prohibits emissions from any process unit in excess of 0.1 grain/dscf. EPA test methods from 40 CFR Appendix A shall be used should demonstration of compliance be required.	Applies to generally to all stationary process units that exhaust to the atmosphere.
Particulate Standards for Combustion Units ORCAA Rule 8.3(a) WAC 173-400-050(1)	Prohibits emissions from any combustion unit in excess of 0.1 grain/dscf. EPA test methods from 40 CFR Part 60 Appendix A shall be used should demonstration of compliance be required.	Applies generally to all stationary combustion units that exhaust to the atmosphere.
Excess Emissions Provisions WAC 173-400-107; WAC 173-400-108 ORCAA 8.7	Requires excess emissions be reported to the Agency as soon as possible and within 24 hours and establishes criteria qualifying excess emissions as unavoidable.	Applies generally to all air pollution sources
Record Keeping and Reporting. ORCAA Rule 8.11	Requires the following: 1. Maintenance of records on the nature and amounts of emissions and other related information as deemed necessary by ORCAA; 2. Reporting of emissions to ORCAA upon request.	Required of all facilities registered with ORCAA.

## Attachment 2: List of Abbreviations and Acronyms

AOP	Air Operating Permit
AP-42	Compilation of Emission Factors, AP-42, Fifth Edition, Volume I, Stationary Point and Area Sources – Published by EPA
ASIL	Acceptable Source Impact Level pursuant to Chapter 173-460 WAC
BACT	Best Available Control Technology
FCAA	Federal Clean Air Act
CAM	Compliance assurance monitoring (40 CFR 64)
CFR	Code of Federal Regulations
CO	Carbon monoxide
EPA	United States Environmental Protection Agency
HAP	Hazardous air pollutant listed pursuant to Section 112 FCAA
MACT	Maximum Achievable Control Technology
NESHAP	National Emission Standards for Hazardous Air Pollutants
NAAQS	National Ambient Air Quality Standard
NO <sub>x</sub>	Nitrogen oxides
NOC	Notice of Construction
NSPS	New Source Performance Standards
NSR	New Source Review
ORCAA	Olympic Region Clean Air Agency
PM	Total particulate matter
PM <sub>10</sub>	Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers
PM <sub>2.5</sub>	Particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
RCW	Revised Code of Washington
SO <sub>2</sub>	Sulfur Dioxide
SQER	Small Quantity Emission Rate listed in Chapter 173-460 WAC
TAP	Toxic Air Pollutant pursuant to Chapter 173-460 WAC
tBACT	Best Available Control Technology for toxic air pollutants
VOC	Volatile Organic Compound
WAC	Washington Administrative Code

## Units of Measurement

'	minute (measurement of angle)
"	second (measurement of angle)
°	degree
acfm	actual cubic feet per minute
atm	atmosphere
BHP	Brake horsepower
Btu	British thermal units
cfm	cubic feet per minute
dscfm	dry standard cubic feet per minute
°F	degree Fahrenheit
ft	feet
g	grams
g/s	grams per second
gal	gallon
gr	grain
hr	hour
hp	horsepower
in	inches
K	degree Kelvin
kg	kilograms
km	kilometers
kW	kilowatt
L	liter
lb	pounds
m	meters
M	thousand
min	minute
Mbf	thousand board feet
MMbf	million board feet
MM	million
µg	micrograms
MMBtu	million British thermal units
mmHg	millimeters of mercury
mph	miles per hour
MW	megawatts
ppm	parts per million
ppmvd	parts per million, dry volume
ppb	parts per billion
psi	pounds per square inch
s	second
scfm	standard cubic feet per minute
tpy	tons per year

### Attachment 3: CO and VOC PTE for Five Pellet Storage Silos

				Total Pellet Throughput	440800 tons/yr
<b>Five Pellet Storage Silos</b>					
<b>Pollutant</b>	<b>CO</b>	<b>VOC</b>	<b>Units</b>		
<b>Emission Factor</b>	0.0036	0.0013	lb/ton		
	1595.70	560.86	lbs/year		
<b>PTE</b>	0.18	0.06	lbs/hour		
	0.80	0.28	Tons per Year		
<b>softwood VOC Emission Factor (Soto-Garcia, L. et al., 2015)</b>					
	0.064 mg/(kg-day)	*60,000 tons storage capacity total across the five silos, 50.3 dry ton/hr = storing them for about 9 days.			
	0.000128 lb/(ton-day)				
	0.0013 lb/ton				
<b>softwood CO Emission Factor (Tumuluru, J. et al., 2015)</b>					
	1.81 mg/kg				
	0.0036 lb/ton				

References

Soto-Garcia, L., Ashley, W. J., Bregg, S., Walier, D., LeBouf, R., Hopke, P. K., & Rossner, A. (2015). VOCs Emissions from Multiple Wood Pellet Types and Concentrations in Indoor Air. *Energy & Fuels*, 29(10), 6485–6493. <https://doi.org/10.1021/acs.energyfuels.5b01398>

Tumuluru, J., Lim, C., Bi, X., Kuang, X., Melin, S., Yazdanpanah, F., & Sokhansanj, S. (2015). Analysis on storage off-gas emissions from woody, herbaceous, and torrefied biomass. *Energies*, 8(3), 1745–1759. <https://doi.org/10.3390/en8031745>

# Attachment 4: Wet Hammer Mill TAP PTE

## VOC emissions from Wet (Green) Hammermills (WHM)

Value	Units	Notes
96	mg VOC/m <sup>3</sup> S	Vendor supplied (both GHM)
34,729	m <sup>3</sup> /hr	Flowrate of GHM, to the RTO (vendor supplied)
7.35	lb VOC/hr	Before Regenerative Catalytic Oxidation (RCO) control
0.37	lb VOC/hr	accounting for 95% RCO control
1.61	TPY	additional VOC from GHM from RCO exhaust

Pollutant	Potential to Emit From WHM			Facilitywide Totals		
	lb/hr	lb/day	TPY	Prev. Facilitywide total (lbs/yr)	New Facilitywide Total w/ WHM (TPY)	New Facilitywide Total w/ WHM (TPY)
Methanol	0.0224	0.536	186	0.0979	474	670
Acetaldehyde	0.0112	0.269	98.1	0.0490	329	427
Acrolein	0.0225	0.539	197	0.0985	105	302
Formaldehyde	0.00657	0.160	58.4	0.0292	627	685
Proprionaldehyde	0.00162	0.0390	14.2	0.00711	71.6	86
Total	N/A	N/A	N/A	0.288	2634	3197

Pollutant	Potential to Emit (see Avg. Period at right)		WAC 173-460-150		Modeled Impacts	
	Total Facilitywide	Increase from WHM	Total Facilitywide w/ WHM	Was it modeled originally?	Original Facilitywide Result (ug/m <sup>3</sup> )	New Result (add WHM) ASIL?
Methanol	1.30	0.536	1.84	No	0.00858	0.0107
Acetaldehyde	0.329	0.27	0.60	Yes	0.0409	0.0775
Acrolein	0.322	0.539	0.862	Yes	0.0133	0.0346
Formaldehyde	0.627	0.160	0.787	Yes	N/A - still below SOER	0.370
Proprionaldehyde	0.196	0.0390	0.235	No	N/A - still below SOER	0.550

**Model Results (lbs./day) - for 1 g/s - High 1st High**

RTO 24-HR	6.89011	ug/m <sup>3</sup>
RCO 24-HR	12.85289	ug/m <sup>3</sup>
Emerg. Gen.	164.01279	ug/m <sup>3</sup>
ALL	171.46792	ug/m <sup>3</sup>

**Model Results (lbs./year) - for 1 g/s**

RTO	0.26641	ug/m <sup>3</sup>
RCO	1.52287	ug/m <sup>3</sup>
Emerg. Gen.	15.27243	ug/m <sup>3</sup>
ALL	16.57905	ug/m <sup>3</sup>

**BECAUSE 1 g/s WAS USED FOR RELEASE POINTS IN THEIR MODEL:**  
 Impact (ug/m<sup>3</sup>) = [PTE (lbs/day or lbs/hr)\*1 hr/7.957 lbs]\*[avg. time, either day/24 hr or year/8760 hr]\* Model Result (daily or annual)

**AERMOD Inputs**  
 Source Group EG Emergency Engine Release Point  
 Source Group EP04 RTO Release Point  
 Source Group EP08 RCO Release Point

## Source Testing Results from other facilities' Other Wet (Green) Hammermills

Envia Armory Green Hammermills (Oct. 2013)		Envia Wiggins Green Hammermills (Oct. 2013)	
12.71 Tons of VOC	1.47 lbs/hr (as C1)	21.1 Tons of VOC	4.3 lbs/hr (as C1)
1.37 Tons of Methanol	0.16 lbs/hr	0.27 Tons of methanol	0.058 lbs/hr
		0.61 Acetaldehyde	0.131 lbs/hr
		1.24 Acrolein	0.263 lbs/hr
		0.37 Formaldehyde	0.078 lbs/hr

\*Note: Acrolein, acrolein, formaldehyde, phenol and proprionaldehyde were below MCL

\*Note: Phenol was below MCL and 2 out of 3 runs for Proprionaldehyde were below MCL

**Lauren Whybrev:**  
 Conservatively added max impact (for the increased RCO (GHM)) to the prev. source ALL group (i.e., facilitywide) modeled impact, even though the max impacts don't necessarily occur at same receptor and time. Overestimates impacts, but for purposes of determining whether it is below ASIL, it is overly conservative and therefore sufficient.

**Information provided by PNWRE that ORCAA Staff used to estimate PTE:**

PNWRE proposes to route the emissions to the RCO. Green hammermill VOC emissions calculations are below.

96 mg/Nm<sup>3</sup> x 34,729 Nm<sup>3</sup>/h = 3.34 kg/h = 7.35 lb/h