

# **Oregon Woody Biomass Utilization Environmental Permitting Guidance Document**

**Prepared by:**

**Oregon Biomass Utilization Working Group**

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## Using this Document

The purpose of this document is to explain the permits and regulations which Oregon requires before construction and/or operation can begin on a woody biomass facility / mobile unit, and which will need to be maintained while the facility / unit is in operation. This document is written for use by an individual or company. It is the responsibility of the owner of the technology to ensure that they meet all permitting requirements. Advice and regulations in this guidance may be updated over time. The Biomass Utilization Working Group will attempt to update the guidance; however, there is no guarantee that the guidance provided in this document is up to date.

While this guide tries to be comprehensive, this is no guarantee that every regulatory requirement and every situation is covered in this document. Changes to regulations after the date of this document may not be incorporated; however, the BUWG will do its best to update this guidance as requirements change. Although this guidance document can help you to understand Oregon's laws and regulations, it is no substitute for discussion between you and agency staff members. Talk with the applicable state and local agencies regarding your specific situation and the permitting requirements that may apply.

The [Executive Summary](#) provides an overview of each section of the document and the information you can expect to find. You can use section links (if using an electronic version) in the [Executive Summary](#) or use the Table of Contents to quickly find the information you need.

## Contents

1. Executive Summary	6
2. Background	8
3. Business Costs	9
3.1. Business Licensing	9
3.2. Environmental Permits	9
3.3. Transportation/Fuel	9
3.4. Insurance	9
3.5. Safety	9
3.6. Raw Material	10
3.7. Consumables & Overhead	10
3.8. Equipment	10
3.9. Payroll	10
4. Why Require Permits?	11
4.1. Air Emissions	11
4.2. Water Quality Concerns	11
4.2.1. Process Water Management	11
4.2.2. Stormwater Management	12
4.3. Land Quality Concerns	12
4.3.1. Solid Waste Management	12
4.3.2. Hazardous Waste	12
4.3.3. Spills	12
5. Biomass Source	14
5.1. Logging Slash in Forests	14
5.2. Urban Forest Abatements	14
5.3. Woody Debris from Mill Residues	14
5.4. Woody Debris from Agricultural Operations	14
6. Utilization Technology	16
6.1. Air Curtain Incinerator	16
6.1.1. Auxiliary equipment to an ACI	17
6.1.2. Environmental concerns and how they are addressed	17
6.1.3. Air emissions	18
6.1.4. Water	20
6.1.5. Land Quality	21
6.2. Grinding / Masticating / Chipping	21
6.3. Gasification/Pyrolysis/Torrefaction	22

6.4.	Pelletization	24
6.5.	Burners and Heaters	25
6.6.	Electrical Generation	26
6.7.	Conversion to biofuels, renewable natural gas, and hydrogen	26
6.8.	Auxiliary Equipment	27
6.8.1.	Diesel Engines	27
6.8.2.	Trucks	27
6.8.3.	Water tender	28
6.8.4.	Loader	30
7.	Operation Type and Location	31
7.1.	Portable Source	31
7.1.1.	Environmental concerns specific to portable sources	31
7.2.	Stationary Source	31
7.2.1.	Environmental concerns specific to stationary sources	31
7.2.2.	Biomass Utilization Campus	32
7.2.3.	Existing mill retrofit	32
8.	Regulating Agencies	33
8.1.	Local Governments	33
8.1.1.	Local Land Use	33
8.1.2.	Local Energy Facility	33
8.1.3.	Local Fire Authority	33
8.1.4.	Other Local Regulations	33
8.2.	Oregon Department of Environmental Quality	33
8.2.1.	Air Quality Program	33
8.2.2.	Air Quality Permit Types	35
8.2.3.	Cleaner Air Oregon	36
8.2.4.	Lane Regional Air Protection Agency	37
8.2.5.	Solid Waste Program	37
8.2.6.	Water Quality Program	40
8.2.7.	DEQ Hazardous Waste	41
8.3.	Oregon Emergency Response System	43
8.3.1.	What to Do When You've Had a Spill	43
8.4.	Oregon Department of Forestry	44
8.4.1.	Oregon Forest Practices Act	45
8.5.	United States Forest Service	45
8.6.	Applicable Tribal Regulations	46
8.7.	Cultural Resources	47

## Oregon Woody Biomass Utilization Environmental Permitting Guide

8.8.	Oregon Department of Energy	47
8.8.1.	Energy Facility Siting Council	47
8.9.	Other Regulatory Agencies	48
8.9.1.	Oregon Water Resources Department	48
8.9.2.	Oregon OSHA	49
8.9.3.	Oregon Department of Transportation	49
8.9.4.	Oregon Department of Land Conservation and Development	49
9.	Appendices	50
9.1.	Appendix B - Contact Information	50
9.2.	Appendix A – Acronyms and Definitions	52
	Acronyms	52
	Definitions	53
	References	61

# 1. Executive Summary

This permitting guidance is meant for assisting small businesses interested in entering the biomass utilization space in Oregon. It offers insights into various aspects of the industry, including regulatory requirements, environmental considerations, and technology options. By addressing key topics such as business costs, permitting, biomass sourcing, utilization technology, operational considerations, and regulatory agencies, this guide serves as a valuable resource for both newcomers and established companies in the biomass utilization sector.

The biomass utilization industry plays a crucial role in managing forest residues, urban forest abatements, mill residues, and agricultural operations' woody debris. It is often not economical to harvest solely for biomass. However, low-value biomass from forestry operations can be redirected to biomass operations and creating a beneficial product instead of simply burning the material. This guide explores the background and significance of biomass utilization, highlighting its role in sustainable resource management and environmental stewardship.

## [Business Costs](#)

Understanding the costs associated with biomass utilization is essential for effective planning and operation. This section delves into various cost factors, including business licensing, environmental permits, transportation and fuel expenses, insurance, safety measures, raw materials, consumables, overhead costs, equipment, and payroll considerations.

## [Why Require Permits?](#)

To operate within the biomass utilization industry, businesses often need to obtain permits. This section explains the necessity of permits and provides an overview of environmental concerns such as air emissions, water quality management (including process water and stormwater), and land quality management (including solid waste, hazardous waste, and spill prevention).

## [Biomass Source](#)

Different sources of biomass serve as the foundation for various utilization processes. Explore the key biomass sources, including logging slash in forests, urban forest abatements, woody debris from mill residues, and woody debris from agricultural operations, to understand their availability and suitability for biomass utilization.

## [Utilization Technology](#)

Diverse technologies are available for biomass utilization, each with its own advantages and environmental considerations. This section provides an overview of various technologies, such as air curtain incineration, grinding/masticating/chipping, gasification/pyrolysis/torrefaction, pelletization, burners and heaters, direct combustion to electricity, and conversion to biofuels, renewable natural gas, and hydrogen.

## [Auxiliary Equipment](#)

Complementary equipment is essential for efficient biomass utilization. Explore the auxiliary equipment required for different utilization technologies, including diesel engines, trucks, water tenders, and loaders.

## [Operation Type and Location](#)

Businesses engaged in biomass utilization can operate in various modes and locations, each with specific environmental concerns. Learn about portable and stationary sources, biomass utilization campuses, and retrofitting existing mills to determine the best operational approach for your business.

## [Regulating Agencies](#)

Navigating the regulatory landscape is crucial for compliance and successful operations. Discover the roles of different regulating agencies, including local governments, DEQ, Oregon Department of Forestry, United States Forest Service, tribal regulations, Oregon Department of Energy, and other relevant agencies. This section also discusses what to do if your business experiences a spill, including reporting requirements under the Oregon Emergency Response System.

### Appendices

Additional resources are in the appendices, including definitions and acronyms ([Appendix B](#) - Contact Information)

### **Department of Environmental Quality**

You will need to contact DEQ with questions on environmental regulations. Who you contact will vary depending on the location where you plan to use the source (DEQ splits the state into three regions) and the environmental media you are concerned with (air quality, land quality, water quality).

**For Air Quality**, this information is provided on the following website:

<https://www.oregon.gov/deq/aq/aqPermits/Pages/Contacts.aspx>

**For Water Quality**, this information is provided on the following website:

<https://www.oregon.gov/deq/wq/wqpermits/Pages/FAQ.aspx>

For questions on **hazardous waste** requirements see this website: <https://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/Technical-Assistance.aspx>

For questions on **solid waste** requirements, see this website:

<https://www.oregon.gov/deq/mm/swpermits/Pages/default.aspx>

For questions on potential spills, contact the Emergency Response Program:

<https://www.oregon.gov/deq/Hazards-and-Cleanup/er/Pages/default.aspx>

### **Oregon Department of Forestry**

If you should have questions regarding the preparation of a written plan, please contact one of the Department of Forestry offices listed below. Local forest practices foresters are available to assist you in understanding the requirements of the Oregon Forest Practices Act.

Northwest Oregon Area			
Astoria District Route 1, Box 950 Astoria, OR 97103 541-325-5451	Cascade District - Molalla Unit 14995 S. Hwy 211 Molalla, OR 97038 503-829-2216	Cascade District – Sweet Home Unit 4690 Highway 20 Sweet Home, OR 97386 541-367-6108	Columbia Unit 405 E Street Columbia City, OR 97018 503-397-2636
Philomath 24533 Alsea Highway Philomath, OR 97370 541-929-3266	Tillamook District 4907 E 3rd Street Tillamook, OR 97141 503-842-2545	Dallas Unit 825 Oak Villa Road Dallas, OR 97338 503-623-8146	Cascade District - Santiam Unit 22965 North Fork Road SE Lyons, OR 97358 503-859-2151
Toledo Unit 763 NW Forestry Road Toledo, OR 97391	Forest Grove 801 Gales Creek Road Forest Grove, OR 97116		

<b>Northwest Oregon Area</b>			
Astoria District Route 1, Box 950 Astoria, OR 97103 541-325-5451	Cascade District - Molalla Unit 14995 S. Hwy 211 Molalla, OR 97038 503-829-2216	Cascade District – Sweet Home Unit 4690 Highway 20 Sweet Home, OR 97386 541-367-6108	Columbia Unit 405 E Street Columbia City, OR 97018 503-397-2636
541-336-2273	503-357-2191		

<b>Southern Oregon Area</b>			
Veneta PO Box 157 Veneta, OR 97487 541-935-2283	Florence Unit PO Box 461 Florence, OR 97439 541-997-8713	Central Point 5286 Table Rock Road Central Point, OR 97502 541-664-3328	Coos Bay 63612 5th Road Coos Bay, OR 97420 541-267-4136
Springfield 3150 Main Street Springfield, OR 97478 (541) 726-3588	Brookings 415 Redwood St. Brookings, OR 97415 541-469-5040	Grants Pass Unit 5375 Monument Drive Grants Pass, OR 97526 541-474-3152	Roseburg 1758 Ne Airport Road Roseburg, OR 97470 541-672-6507

<b>Eastern Oregon Area</b>			
John Day Unit PO Box 546 John Day, OR 97845 541-575-1139	Pendleton Unit 1055 Airport Road Pendleton, OR 97801 541-276-3491	Klamath-Lake District 3200 Delap Road Klamath Falls, OR 97601 541-883-5681	Prineville 3501 E 3rd Street Prineville, OR 97754 541-447-5658
LaGrande 611 20th Street La Grande, OR 97850 541-963-3168	The Dalles Unit 3701 West 13th Street The Dalles, OR 97058 541-296-4626	Lakeview Unit 2290 North 4th Street Lakeview, OR 97630 541-947-3311	Wallowa Unit Route 1 Box 80 Wallowa, OR 97885 541-886-2881



Appendix A – Acronyms and Definitions) and contact information for regulatory agencies and key stakeholders  
([References](#))

BUPG Section	Title/Resource	URL
<b>2 - Background</b>	Biomass Energy and Biofuels from Oregon's Forests	<a href="https://oregonforests.org/sites/default/files/2017-08/Biomass_Full_Report_0.pdf">https://oregonforests.org/sites/default/files/2017-08/Biomass_Full_Report_0.pdf</a>
<b>6.1 - Air Curtain Incinerator</b>	The Use of Air Curtain Destructors for Fuel Reduction and Disposal	<a href="https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html">https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html</a>
<b>6.1 - Air Curtain Incinerator</b>	Figure 1: Air Curtain Incinerator Diagram	<a href="https://www.oregon.gov/deq/aq/cao/Pages/Air-Curtain-Incinerators.aspx">https://www.oregon.gov/deq/aq/cao/Pages/Air-Curtain-Incinerators.aspx</a>
<b>6.1.2 - Environmental concerns and how they are addressed</b>	USDA Soil and Water Management Research - Biochar	<a href="https://www.ars.usda.gov/midwest-area/stpaul/swmr/people/kurt-spokas/biochar/">https://www.ars.usda.gov/midwest-area/stpaul/swmr/people/kurt-spokas/biochar/</a>
<b>6.1.2 - Environmental concerns and how they are addressed</b>	Figure 2: Air Curtain Incinerator Inputs and Outputs	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.1.3 - Air emissions</b>	Table 2: Air Curtain Incinerator Permit Conditions	<a href="https://www.oregon.gov/deq/FilterPermitsDocs/AQGP-031.pdf">https://www.oregon.gov/deq/FilterPermitsDocs/AQGP-031.pdf</a>
<b>6.2 - Grinding / Masticating / Chipping</b>	Figure 3: Grinding, Chipping, and Masticating Inputs and Outputs	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.3 - Gasification/Pyrolysis/Torrefaction</b>	Figure 4: General Process Flow for Gasification, Pyrolysis, and Torrefaction	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.4 - Pelletization</b>	Figure 5: General Process Flow for Pelletization Plants	<a href="https://extension.psu.edu/manufacturing-fuel-pellets-from-biomass">https://extension.psu.edu/manufacturing-fuel-pellets-from-biomass</a>
<b>6.5 - Burners and Heaters</b>	Table 3: Heating Value for Common Biomass Materials	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.7 - Conversion to biofuels, renewable natural gas, and hydrogen</b>	General Resource for this section from the Office of Energy Efficiency & Renewable Energy	<a href="https://www.energy.gov/eere/bioenergy/biofuel-basics#:~:text=During%20pyrolysis%2C%20biomass%20is%20heated,%E2%80%9Cbio%2Dcrude%E2%80%9D%20oil">https://www.energy.gov/eere/bioenergy/biofuel-basics#:~:text=During%20pyrolysis%2C%20biomass%20is%20heated,%E2%80%9Cbio%2Dcrude%E2%80%9D%20oil</a>
<b>6.7 - Conversion to biofuels, renewable natural gas, and hydrogen</b>	General Resource for this section from the Office of Energy Efficiency & Renewable Energy	<a href="https://www.energy.gov/eere/bioenergy/conversion-technologies">https://www.energy.gov/eere/bioenergy/conversion-technologies</a>
<b>6.8.1 - Diesel Engines</b>	Table 4: Exhaust Emission Standards	<a href="https://www.ecfr.gov/current/title-40/chapter-I/subchapter-U/part-1039/subpart-B/section-1039.101">https://www.ecfr.gov/current/title-40/chapter-I/subchapter-U/part-1039/subpart-B/section-1039.101</a>
<b>6.8.3 – Water tender</b>	USFS Research – Mobile Biochar Production by Flame Carbonization: Reducing Wildfire Risk and Improving Forest Resilience	<a href="https://research.fs.usda.gov/treesearch/67944">https://research.fs.usda.gov/treesearch/67944</a>
<b>6.8.3 - Figure 6: USFS Industrial Fire Precaution Levels</b>	ODF Industrial Fire Precaution Guidelines	<a href="https://www.oregon.gov/odf/fire/documents/industrial-fire-precaution-levels.pdf">https://www.oregon.gov/odf/fire/documents/industrial-fire-precaution-levels.pdf</a>
<b>6.8.3 - Water tender</b>	Figure 6: USFS Industrial Fire Precaution Levels	<a href="https://www.fs.usda.gov/detail/rogue-siskiyou/fire/?cid=fseprd545253#:~:text=There">https://www.fs.usda.gov/detail/rogue-siskiyou/fire/?cid=fseprd545253#:~:text=There</a>

		% 20are% 20four% 20Industrial% 20Fire,to% 20the% 20closed% 20fire% 20season
<b>8.2.1 - Air Quality Program</b>	Figure 8: Oregon's Class I Areas and the Columbia River Gorge Scenic Area	GIS Layers available at: <a href="https://www.oregon.gov/deq/FilterDocs/AQMaintenanceAreas.zip">https://www.oregon.gov/deq/FilterDocs/AQMaintenanceAreas.zip</a>
<b>8.2.1 - Air Quality Program</b>	Oregon Maintenance Area Maps	<a href="https://www.Oregon.gov/deq/aq/Pages/Maintenance-Areas.aspx">https://www.Oregon.gov/deq/aq/Pages/Maintenance-Areas.aspx</a>
<b>8.2.1 - Air Quality Program</b>	Figure 9: Oregon's NAAQS Maintenance and Non-attainment Areas	GIS Layers available at: <a href="https://www.oregon.gov/deq/FilterDocs/AQMaintenanceAreas.zip">https://www.oregon.gov/deq/FilterDocs/AQMaintenanceAreas.zip</a>
<b>8.5 - United States Forest Service</b>	Figure 12: Oregon Class I Areas	<a href="https://www.oregon.gov/deq/aq/Documents/OverviewRegionalHaze.pdf">https://www.oregon.gov/deq/aq/Documents/OverviewRegionalHaze.pdf</a>

). These resources will aid in your biomass utilization endeavors by providing clarity and access to important contacts.

This guide equips you with the knowledge and tools needed to navigate the complex landscape of biomass utilization, ensuring that your business can thrive while adhering to environmental regulations and industry best practices.

## 2. Background

The Pacific Northwest region has seen higher average temperatures, changes to precipitation patterns, and reduced snowpack in recent decades. These climate changes have altered forest conditions and made them more prone to wildfires that are increasingly outside their historical range of frequency and severity. In addition to changes in climate, a history of fire suppression and harvesting practices has created a legacy of forest structure conditions that are more homogenous in size and age classes, making them more susceptible to fire, insect, and disease.

Management practices such as forest thinning and prescribed burning can increase forest resiliency against fire and disease. Thinning treatments remove smaller diameter trees, often with physical characteristics that make it harder to recoup the costs associated with removing them from the woods. A commonly used way to deal with logging residuals is to leave them in the forest in piles and burn them.

According to the 2019 Governor's Council on Wildfire Response (Mitigation Committee), the State of Oregon should evaluate economic opportunities and feasibility for policy changes that could incentivize the private business sector investment in woody biomass power plants, biofuels, or commercial production.

The [Biomass Energy and Biofuels from Oregon's Forests](#) report explains that concerns over environmental impacts of forest biomass harvesting and processing appear to be one factor limiting development of a woody biomass energy industry in Oregon. Additionally, a lack of coordinated policy development may inadvertently limit the establishment and use of non-burn fuel treatments specifically on biomass, biofuels and other wood residue utilization (now referred to as "biomass utilization").

As a leader in environmental protection, the Oregon Department of Environmental Quality established a team of specialists to examine biomass utilization as an alternative to outdoor open burning to reduce emission from fire-fuels treatments while still addressing hazardous fuels reduction goals. As part of these efforts, DEQ launched the Biomass Utilization Working Group (BUWG) which brings together representation from other State and regulatory agencies, neighboring states, and biomass stakeholders. The BUWG held monthly meetings between April and December of 2021. During this time, the BUWG identified strategic areas that required additional, focused, work and established subcommittees to complete this work. One of these committees was charged with developing this guidance document.

## **3. Business Costs**

Often new business owners do not fully anticipate the costs associated with starting the business. Below are some key sources of costs that anyone starting a business utilizing forest residuals should consider. One of the fastest ways for a new business to fail (often causing the owner/founder to suffer a serious financial setback) is to be undercapitalized due to failure to anticipate certain business expenses.

Certain business costs are discussed in greater detail throughout this guide. Users of this guide should keep in mind their specific operation and factors that should be considered during business planning that are outside the scope of this guide.

### **3.1. Business Licensing**

Many localities require a business license and/or incorporation to do business. For example, most banks require a business to have an active registry with the Oregon Secretary of State's office to open an account. Check with the Oregon Secretary of State's office for statewide requirements and local government entities for any local requirements. Registration with the IRS to acquire a tax ID number may also be required to set up business accounts.

### **3.2. Environmental Permits**

In Oregon, many types of business activity involving forest residues/debris require an environmental permit, either related to air, land, or water quality. These permits can be expensive and include annual renewal fees along with the application fees. This document will help you determine the type(s) of permit you may need. You can get help from the Oregon Department of Environmental Quality, or relevant permitting agency, once you have an idea of what permit(s) you may need.

### **3.3. Transportation/Fuel**

In many cases, when recovering forest residuals, transportation costs will be one of the largest expenses. Numerous factors enter into this calculation, with the largest cost likely to be fuel. Other costs will include maintenance on vehicles and equipment, mileage taxes, over-sized transportation permits (from ODOT), and insurance. Maintenance costs are often much higher than for other activities due to the challenging environment where equipment and vehicles must operate. When trucking things like bio-oil you will likely need a driver with a Hazmat certification.

### **3.4. Insurance**

Insurance is another expense that is often unanticipated. Most entities require some form of liability insurance for operations on their property and many require "errors and omissions" insurance. Vehicles and other equipment need to be insured. One issue many people are unaware of is that insurance policies on your personal vehicle (i.e., not owned by your business) will not cover accidents when those vehicles are used for business purposes. An example would be having an accident while picking up parts for the business. Often a low-cost addition can be added to a personal policy to cover this sort of risk. Business Interruption insurance may be a wise investment for certain types of businesses. Worker's Compensation insurance will be required if you have employees. Speaking with an insurance agent when putting your business plan and budget together will help plan for insurance expenses.

### **3.5. Safety**

OR-OSHA Division 7 rules apply to work in forestry operations. There are many rules regarding safe work practices, safety training, equipment guarding, record keeping, and personal protective equipment. OR-OSHA's Technical Section can be very helpful in interpreting safety regulations. Even if you don't have employees (i.e., owner operated business), safe work practices can prevent tragedies in a hazardous

occupation. Money invested in safety is generally considered to have a positive (though often unquantifiable) return.

### **3.6. Raw Material**

Often, published costs for forest residuals/debris lag behind real costs. Multiple businesses may plan on utilizing forest residuals/debris from the same region, creating more demand for a finite supply and driving the price up. This unanticipated increase can be the difference between success and failure.

### **3.7. Consumables & Overhead**

Fuel, engine fluids, spare parts, and even cleaning compounds can add up in a hurry. Have a realistic amount budgeted to pay for these materials. Overhead should be included in operating budgets as well. Overhead could include expenses already covered here, such as insurance, but would also include any office or land leases.

### **3.8. Equipment**

Equipment costs will be a major part of any budget for forest residual/debris business. Newer equipment costs will be higher initially but will likely have lower maintenance costs. Remember that maintenance costs for vehicles and equipment used for forest residual/debris recovery will generally be higher due to the challenging operating environment.

### **3.9. Payroll**

If you have employees, you will have wages and benefit costs to consider. Many jobs, such as a masticator operator, require a high degree of skill and therefore can command a higher wage/benefits package than a job hand piling slash. Doing market research can provide you with a realistic expectation of the current wages for the positions you will need to hire. If you are the owner/operator and the business will be your sole source of income, it is important to determine how much you will pay yourself.

## 4. Why Require Permits?

Environmental permits include enforceable conditions that the owner or operator of a facility must comply with. Some permit conditions are general to all types of units, and some permit conditions are specific to the source. The permit establishes limits on the types and amounts of pollution, or management activities, allowed; operating requirements; and monitoring and reporting requirements.

Permits are meant to protect the public and the environment through placing limits on the releases that are allowed by the permit holder, whether those limits are placed on air emissions, releases of stormwater or process water, or the disposal of hazardous or solid waste. Environmental permits allow Oregon to maintain compliance with federal and state regulatory requirements and protect our resources.

### 4.1. Air Emissions

Typically, all woody biomass operations have the same or similar source material, meaning potential air emissions are also similar. Compared to traditional outdoor burning of wood waste, many of these technologies will emit lower levels of air pollutants because they burn more efficiently, may have emissions control/reduction systems, and produce significantly less smoke than traditional outdoor burning.

Toxic air pollutants come from the wood itself and from the combustion of fuel used to power the facility. Some of the most concerning pollutants are metals like manganese. Manganese is naturally occurring in soil and is taken into the tree through the roots. The metals can be released into the air when the wood is burned. Another element of concern is arsenic.

Actual emissions may still vary depending on temperature, controls, type of wood, and other factors. The most common air emissions from woody biomass utilization are:

- Dust
- Particulate Matter (PM)
- Odors
- Sulfur Dioxide (SO<sub>2</sub>)
- Nitrogen Oxides (NO<sub>x</sub>)
- Carbon Monoxide (CO)
- Volatile Organic Compounds (VOCs) including benzene and formaldehyde
- Greenhouse gasses (GHG) typically from fuel combustion

### 4.2. Water Quality Concerns

#### 4.2.1. Process Water Management

Process wastewater can be generated during biomass utilization through dust control at a fixed facility (either temporary or permanent), spraying log decks for cooling (requires a [400-J permit](#)), or cooling a utilization system including using water to cool ash or biochar from an ACI (most/all of the water may evaporate). Management of the process water can include the following:

- Collect for offsite disposal: This may include eventual discharge into the sewer or directly at the wastewater treatment facility, depending on availability/approvals. Contact the local government responsible for wastewater management to determine availability.
- Discharge to waters of the state: This will require a [100-J permit](#) through DEQ's Water Quality Program. This is a permit for industrial sources that discharge no more than 0.5 million gallons per day (MGD) of non-contact cooling water, defrost water, heat pump transfer water, and cooling tower blowdown. Also included are cooling and sump water discharges from hydroelectric facilities.
- Onsite treatment is an option, including lagoons and bioswales. A general stormwater permit will typically be required for a fixed facility. Permitting will depend on how water is handled post-

treatment. Most process water will either evaporate or be discharged to waters of the state. Any sediment that is generated will need to be collected and disposed of as solid waste.

- Land application: Land application of industrial water is subject to issuance of a permit or approval by DEQ, land application of industrial process water, reclaimed water and biosolids is an allowed use on EFU zoned land. Information on reuse of industrial water is available from [DEQs Water Reuse program](#).

#### **4.2.2. Stormwater Management**

National Pollutant Discharge Elimination System (NPDES) permits are required for [stormwater discharges](#) to surface waters from construction and industrial activities, and for municipalities if stormwater from rain or snow melt leaves your site through a "point source" and reaches surface waters either directly or through storm drainage. A point source is a natural or human-made conveyance of water through such things as pipes, culverts, ditches, catch basins, or any other type of channel.

Potential contaminants of concern in process water and stormwater managed as part of a woody biomass utilization project include:

- Biochemical Oxygen Demand (BOD)
- Total Suspended Solids (TSS)
- pH (ash can cause a very high pH)
- Color
- High Concentrations of Nutrients (leads to algal growth)
- Oil and Grease
- Tannins and lignins (may not be tested directly, BOD/COD/color observation)
- Metal Concentrations (most importantly copper, lead, and zinc)
- Temperature
- Chemical Oxygen Demand (COD)
- Process Specific Parameters (such as iron concentration for boiler operations)

### **4.3. Land Quality Concerns**

#### **4.3.1. Solid Waste Management**

Oregon DEQ is switching focus from solid waste management to materials management. This shift means instead of focusing solely on properly disposing of material, the focus is on producing less solid waste in the first place. This is done through a hierarchy of actions that includes reduce, reuse, recycle, compost, energy recovery, and finally, landfill. Solid waste generated or used by projects would be required to be managed in accordance with Oregon's Solid Waste regulations. Solid Waste Program [Section 8.2.5](#) contains more information on DEQs solid waste program.

#### **4.3.2. Hazardous Waste**

While unlikely for smaller biomass utilization operations, there is the potential to be classified as a generator of hazardous waste. If you suspect your business may generate hazardous waste at levels that would require registration with DEQ, you should review the information on [DEQs Hazardous Waste website](#) and reach out to program staff for technical assistance. More information on determining your status as a hazardous waste generator can be found in [section 8.2.7](#).

#### **4.3.3. Spills**

Facilities need to be prepared to manage potential spills. Material of concern that would be most common include oil, hydraulic fluid, and gasoline or diesel. DEQ has a guide for the steps to take to [report a spill](#). Any amount of oil spilled that impacts waters of the state (waters of the state includes roadside ditches) must be reported as well as oil spilled on land in excess of 42 gallons. The reportable quantities of spills

for other hazardous materials are listed in [CFR 40 Part 117](#). More information on spills and spill reporting is available in [section 8.3](#).



## 5. Biomass Source

This guidance document focuses on woody biomass from forest or agricultural operations. While it covers a variety of biomass utilization projects, the main audience is small operators that may not have access to consultants to navigate the required environmental permits. This guide does not focus on diversion of woody debris to composting facilities and will not discuss the permitting considerations for those operations.

Below are a variety of sources of woody biomass that might be used in biomass utilization.

### 5.1. Logging Slash in Forests

Logging slash is debris accumulated by forest vegetation management for the purpose of wildfire risk reductions, roadside clearing, habitat enhancement, or restoration of habitat or silvicultural manipulations. Coarse and fine woody debris is also generated during forest management operations or through wind, snow or other natural forest disturbances. Woody debris that by nature is combustible which is accrued from a property used for forest management purposes, land use intended to grow and harvest timber, or other property that ODF has approved to be part of the smoke management plan.

From a land use perspective, disposal of slash in conjunction with a forest operation permitted under the [Oregon Forest Practices Act](#) is an allowed use in forest zones and mixed farm-forest zones.

Forest land can be controlled by a private entity, the State of Oregon, the Bureau of Land Management, a Federally Recognized Tribe, or the United States Forest Service. See [section 8.4](#) through [section 8.6](#) for more information on conducting operations on these types of properties or obtaining forest slash from these properties for offsite use.

### 5.2. Urban Forest Abatements

Woody debris is generated in urban environments through landscaping debris, land clearing and right-of-way (ROW) abatements, and clean construction and demolition waste that includes pallet waste.

### 5.3. Woody Debris from Mill Residues

Woody residues from processing wood products fall under this category. While woody debris from mill residues is not the focus of this permitting guidance, if it is clean, untreated wood, it may be allowable to use it in the same utilization technologies as other sources of biomass. Certain exemptions to woody debris from forest management practices and solid waste regulations would likely not apply.

### 5.4. Woody Debris from Agricultural Operations

Woody debris generated by an agricultural operation that uses or intends to use land primarily for the purpose of obtaining profit by raising, harvesting, and selling crops or animals. The following woody debris falls under agricultural woody debris:

- Woody debris from operating an orchard which includes nut trees, fruit trees, seed trees, agriculture tree crops, and nursery stock trees that include ornamental, street or park trees;
- Woody debris from establishing or managing trees intended to mitigate the effects of agricultural practices on the environment or fish and wildlife resources such as trees that are established for windbreaks, riparian filters, or shade strips immediately adjacent to active farm lands;
- Vineyard clippings\*;
- Hemp/Marijuana branches or main stock. Does not include hemp extract operations and associated waste\*;
- Wood chips that are used on a farm for animal bedding material\*.

\*These wastes do not fit the definition of “woody biomass” in the solid waste rules (OAR 340-093-0030) and are therefore considered solid waste. A solid waste permit may be required if any of these materials are used in a treatment unit or facility. These materials would not require a solid waste permit if used for energy recovery under an air quality permit.

Anyone who does not make a primary living from an agricultural operation has not accumulated woody debris from an agricultural operation. This material above would not be considered agriculture woody debris and would not qualify for any programs or exemptions specific to agriculture woody debris.

## 6. Utilization Technology

This section details several types of equipment that can process woody biomass, the inputs to this equipment, the outputs, and the likely environmental permit requirements. Some technology is stationary, such as conversion technologies, while others, like chipping or masticating, are portable units. Each has their own set of considerations, including how the biomass will be transported to the site or how the technology will be transported to the biomass.

Biomass uses that are *not* detailed in this guide include:

- Composting
- Prescribed burning
- Slash pile fires

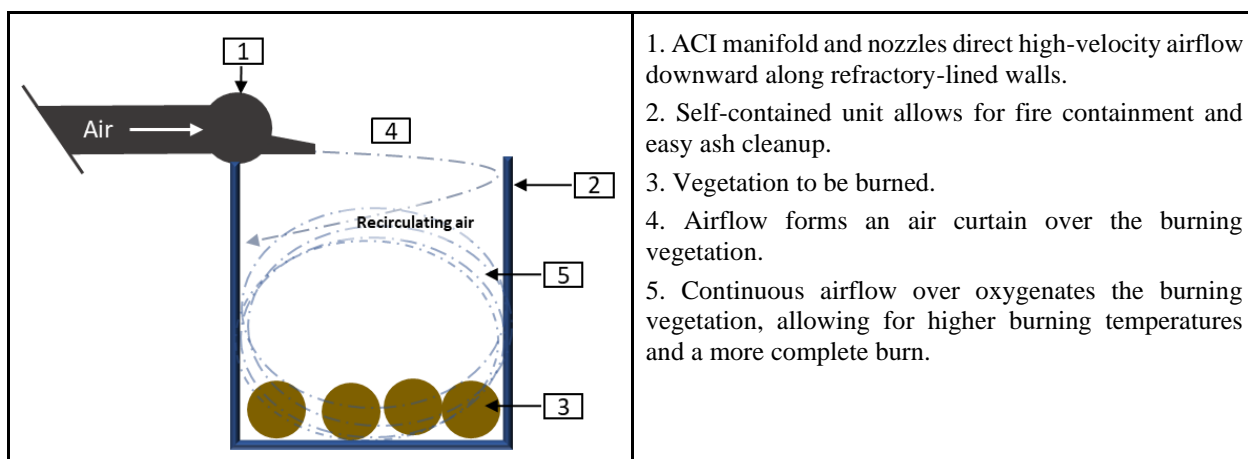
Each technology below should have one or more of these regulatory requirements listed and explained how they pertain to the technology:

- Air Quality
- Water Quality
- Land Quality / Solid Waste
- Transportation
- Energy

### 6.1. Air Curtain Incinerator

This section outlines the inputs, outputs, and permitting requirements for air curtain incinerators (ACI). There are several sizes and types of ACI, with a similar permitting process for each. At the time of this guidance the CharBoss, BurnBoss, and Carbonator 6050 are the primary ACIs on the market. One of the main differences is between ACI that are portable and those that are stationary; portable ACI are required to notify DEQ each time they move to a new location to operate.

An ACI is a type of incinerator. Clean wood waste is loaded into the firebox, and a fire starter such as diesel fuel is used to ignite the wood waste. An engine that is incorporated into the ACI runs a blower that is used to forcefully project a curtain of air across the open chamber in which combustion occurs. This air curtain is projected across the firebox at an angle which generates a cyclonic flow within the firebox. This accelerates the combustion process and promotes uniform combustion throughout the firebox. The emissions are also reduced because the smoke particles are trapped below the air curtain and re-burned. ACIs are different from conventional combustion devices which typically have enclosed fireboxes and controlled air technology such as mass burn, modular, and fluidized bed combustors.



**Figure 1: Air Curtain Incinerator Diagram**

ACIs can be used for both wildfire cleanup and fire prevention efforts and can be portable or stationary. The US Forest Service has studied using ACIs and found them to be a useful alternative to traditional fuel reduction and disposal methods: <https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html>

ACIs produce less harmful smoke and particulate matter than traditional open burning. [Table 1](#), below, provides a typical list of authorized and prohibited materials for use in ACIs. Operating permits for the ACI may further limit types of wastes allowed.

**Table 1: List of Authorized and Prohibited Materials for use in ACIs**

Type of Waste	Description of Waste and Authorized Materials	Prohibited Materials
Wood Waste	<ul style="list-style-type: none"> <li>• Untreated wood and untreated wood products</li> <li>• Trees from orchards (fruit or nut) and from Christmas tree farms are authorized wood waste materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Treated wood</li> <li>• Treated wood products</li> </ul>
Clean Lumber	<ul style="list-style-type: none"> <li>• Wood or wood products that have been cut or shaped, and include wet, air-dried and kiln- dried wood products.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction, renovation, or demolition wastes.</li> </ul>
Yard Waste	<ul style="list-style-type: none"> <li>• Yard waste from residential, commercial/retail, institutional, or industrial sources</li> <li>• Yard waste incidental to land clearing</li> <li>• Shrubs and bushes from clearing forest service land</li> <li>• Yard waste that is not agricultural but is from clearing agricultural lands</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural waste</li> </ul>

Soil must be removed from the material prior to burning in an ACI.

#### **6.1.1. Auxiliary equipment to an ACI**

See [section 6.8](#) for information on auxiliary equipment that may be necessary to operate an ACI.

- Water tender for quenching the fire.
- Equipment to move the ACI.
- Loader to bring material to the ACI and to load material into the ACI.

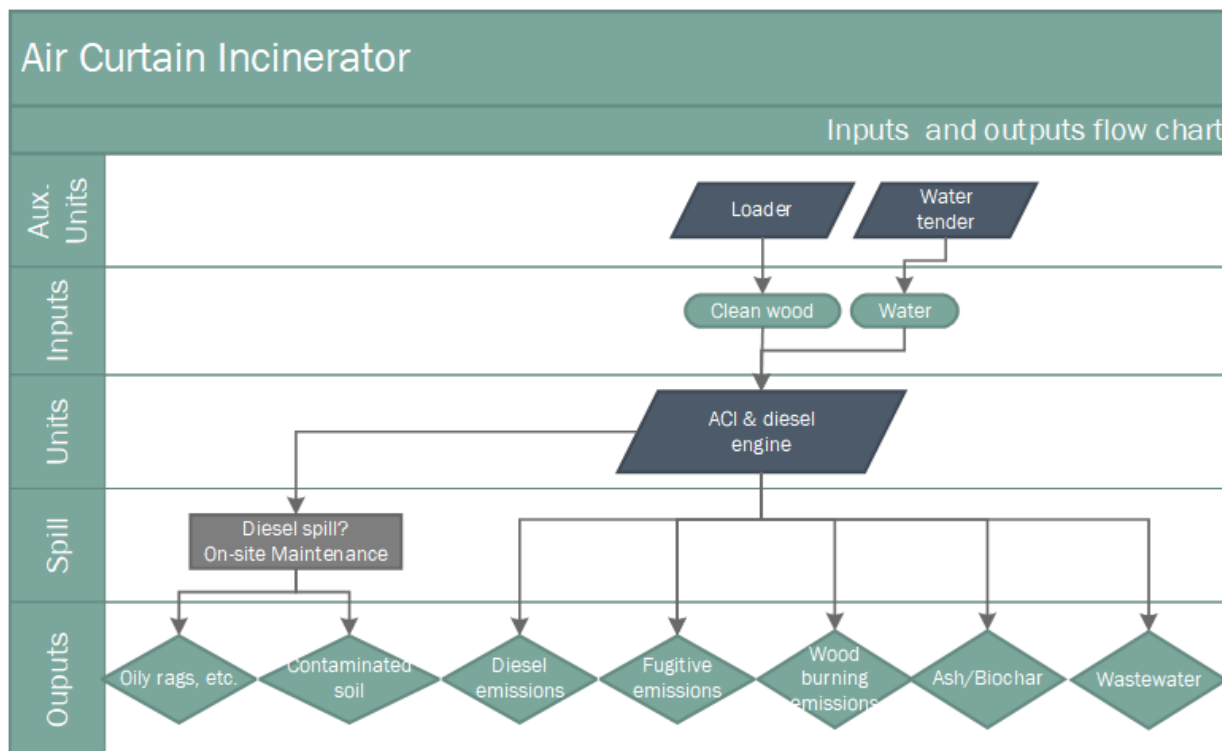
#### **6.1.2. Environmental concerns and how they are addressed**

Depending on how the ACI is set up and run, it can produce either ash or [biochar](#) as an end product. To create biochar, the charcoal is separated from the burning biomass and quenched with water. The water

typically evaporates. If ash is generated, it may be classified as a solid waste and have to be disposed of as such. See [section 8.2.5](#) for information on characterizing and disposing of solid waste.

Fugitive emissions are generated from moving the materials to be burned and removing ash/biochar from the ACI. Users of an ACI may be required to develop a fugitive emission control plan to prevent fugitive emissions from leaving the property boundary.

[Figure 2](#) shows the typical inputs, processes, and outputs of an ACI.



**Figure 2: Air Curtain Incinerator Inputs and Outputs**

### 6.1.3. Air emissions

Sources of emissions from ACIs include:

- The ACI itself
- Handling of the resultant ash or biochar
- The blower diesel engine. See [section 6.8](#) on auxiliary units
- Moving equipment on unpaved roads. See [section 6.8](#) on auxiliary units
- Loader to place the wood into the ACI

Compared to traditional outdoor burning of wood waste, air curtain incinerators emit lower levels of air pollutants including PM<sub>2.5</sub> and NO<sub>x</sub>. ACIs burn more efficiently and produce significantly less smoke than traditional outdoor burning.

ACIs are sources of PM, SO<sub>2</sub>, CO, NO<sub>x</sub>, VOC, GHG and toxic air contaminant emissions. Toxic air contaminant emissions from ACIs come from the wood itself so can vary depending on the type of wood burned and the soils in the area. The most concerning pollutants are metals like manganese. Manganese is naturally occurring in soil and is taken into the tree through the roots. The metals can be released into the air when the wood is burned. Potential nuisances originating from ACIs could include fugitive dust associated with material handling and smoke. In 2023, DEQ, ODF, the Department of Agriculture, and

Clean Water Services conducted ACI testing to more accurately quantify emissions associated with ACIs. The final results of the test are available on [DEQ's website](#).

### Air permit requirements

In 2024, EPA will be removing the requirement for Other Solid Waste Incinerators (OSWIs) that burn 100% clean wood waste to be permitted under the Title V program. When that change is finalized, information in this section will be updated.

Oregon DEQ issues a general Title V permit for ACIs. Permit information and applications can be found on [DEQ's Air Quality Permits](#) website. Owners can apply for a general permit (GP-031) until they are ready to operate the ACI, then must obtain a General Title V permit within 12 months of starting to operate the ACI. If the owner knows they will begin operating the ACI immediately, they may opt to apply directly for the General Title V permit.

Permits restrict the amount of throughput and emissions and contain some geographically specific restrictions that should be reviewed prior to operating. Some restrictions include minimum distances for operation near a Class I area to reduce visibility impacts on those areas. This permit will include limitations on the amount of wood that is burned based on the distance to potential exposure source (see [Table 2](#)).

The owner and/or operator of the ACI will need to conduct various testing while using the ACI to confirm that the unit is meeting all the requirements. Some of this testing includes:

- [EPA Test Method 9](#) to determine compliance with the opacity limitations (the unit isn't too smokey)
- [EPA Test Method 22](#) to determine fugitive emissions are not visible at the closest publicly accessible area or road within 200 feet downwind from the ACI.

The owner and/or operator will also be required to keep records of certain activities and submit a report every year to DEQ with these records. Records include locations the ACI was used, the nearest exposure location, type and quantity of fire starter, type and quantity of material burned, type and quantity of fuel used in the engine, and amount of ash or biochar made and how it was used or disposed.

**Table 2: Air Curtain Incinerator Permit Conditions**

ACI Size Category	Maximum Capacity (tons/hour)	Daily Capacity (tons/day)	Minimum Distance to Closest Exposure Location (meters)
Micro	<=1	12	90
Small	>1 but <=5	60	375
Medium	>5 but <=10	120	700
Large	>10 but <=13	156	1,000
35 ton/day limit	NA	35	225

Current as of 2023.

These websites provide additional information on air quality regulations for ACIs:

- <https://www.oregon.gov/deq/aq/cao/Pages/Air-Curtain-Incinerators.aspx>
- <https://www.oregon.gov/deq/aq/aqPermits/Pages/ACDP-General.aspx>

### Air permit fees

Since ACIs are currently subject to federal Title V permit requirements, fees associated with maintaining the air permit are determined in conjunction with the EPA. Permits can be obtained one of two ways.

If you have purchased an ACI but are not planning to start up immediately, the permit process can be started by obtaining a General ACI permit. Initial fees for the general permit include the following:

- Initial permitting fees for the general permit include an assignment fee, annual fee, registration fee, Cleaner Air Oregon fee totaling just over \$3,500 (as of 2023).
- Annual fees which include a base fee and an additional fee based on tons of pollutants emitted.

Once the unit is operating, a Title V permit must be submitted to DEQ and approved within 12 months. Ample time should be given to allow for application review. Fees for this permit are based on anticipated emissions, and coordination with the DEQ permit writer may be necessary. There may be specific activity fees based on permit requirements. If a diesel-powered engine is used to power the ACI blower, a permit attachment may be required along with the associated fee. The base fee is \$8,700, the emission fee is \$66 per ton of regulated pollutant, and the base emission fee is \$3,000 as of 2023.

#### **6.1.4. Water**

**Sources of process water or requirements for onsite water are:**

- A certain amount of water is required to be onsite by the forest service to deal with potential fire. See [section 6.8](#) for auxiliary equipment that may be needed for operation of an ACI.
- Water used to quench the ash and biochar in the ACI will likely all evaporate.

#### **Permit requirements**

Discharges to waters of the state will require an NPDES permit. If there are no discharges to waters of the state, then likely no permit would be needed. The following best management practices are recommended to preserve water quality while using an ACI:

- Unpermitted discharges to bodies of water could result in fines. To prevent this, stay far enough from a water body so no contaminants can get in there. This can vary depending on slope and is site specific. Ideally, units should be operated at least 25 to 50 feet away from a water body.
- Clean up any spill immediately, don't let it get into the water. Have booms or pads on hand to contain and clean up spills.
- Be careful when quenching the ash or biochar so the quenching water does not enter waters of the state.

Best practices for water used to quench burning charcoal is to collect the residual water. Most of the water will actually evaporate. The unit should not be placed near a waterway to avoid the risk of overspray.

Depending on the specific type of ACI employed, effective ash segregation methods can be implemented to minimize ash dispersion into water sources. The Carbonator 6050 captures both charcoal and ash when water is applied to quench the burning charcoal. The resultant charcoal ash slurry is directed to the ground for collection. The BurnBoss requires minimal water usage, thus mitigating runoff concerns. Measurable pH effects are anticipated during the initial year following the deposition of char/ash resulting from combustion.

For operations involving the CharBoss, the equipment's design facilitates the separation of a significant portion of ash from charcoal. As the charcoal descends onto the extraction belt and enters the water, ash formation concludes. Loose ash descending from the burn chamber traverses the woven steel extraction belt, accumulating beneath the CharBoss for easy retrieval. Similar to the BurnBoss, relocating the CharBoss ensures the extinguishment of remaining ash, significantly reducing the risk of ash loss to surface water flow.

During operation of ACIs, flowing and pooled water is black in color. Once the water has been allowed to settle, usually by the following day before start up, solids of charcoal and ash will have precipitated into a

sludge and the water will be visibly clear. Clear water can be drawn off the top and sludge collected for disposal as a solid waste.

Toxicity of process water may be more of an issue with a fixed site. [Section 4.2](#) discusses water treatment considerations in more detail. Mobile ACIs are in a given location for a shorter duration, making it unlikely that toxicity levels for most measured, regulated contaminants will be detectable. However, if the feedstock contains metals at toxic levels, they are likely to be present in the charcoal and ash. To date, characterization of biochar has little mention of metals, with the same assumed for process water.

Provided the woody biomass has been combusted correctly, it is unlikely that a measurable amount of nutrients will be present in process water or biochar for algal growth. Appropriately charred wood will typically tie up nutrients in the water column, likely making ambient nutrients in the water column less available for algal growth.

Effective wastewater management is crucial to prevent wastewater from entering any waters of the State of Oregon. Wastewater must be tepid, within the range of 60 to 100 degrees Fahrenheit, to prevent temperature violations. Activities such as fueling or maintenance pose a risk of oil and grease spills, emphasizing the need to minimize these incidents by adhering to equipment-specific operations and maintenance instructions. When dealing with feedstocks, particularly from biochar or wastewater, the potential for tannins and lignins entering waters should be considered. In the event of process water spills, the assessment of surrogate measurements such as Biochemical Oxygen Demand, Chemical Oxygen Demand, or total color becomes essential to determine the presence of tannins or lignins in the waters of the state.

#### **6.1.5. Land Quality**

If material besides woody biomass is added to the ACI, a solid waste permit will be required as discussed in [section 8.2.5](#). This guidance document does not address utilization of any material other than woody biomass. If only woody biomass is used, then likely no permit would be needed. The following best management practices are recommended to protect land quality while using an ACI:

- Remove all waste material from equipment maintenance, etc. Properly characterize and dispose of the waste materials.
- Biochar and ash are allowed to be used productively onsite. Simply leaving a pile of ash onsite where it will not be used would be considered solid waste disposal and would result in violations and potentially in fines.

### **6.2. Grinding / Masticating / Chipping**

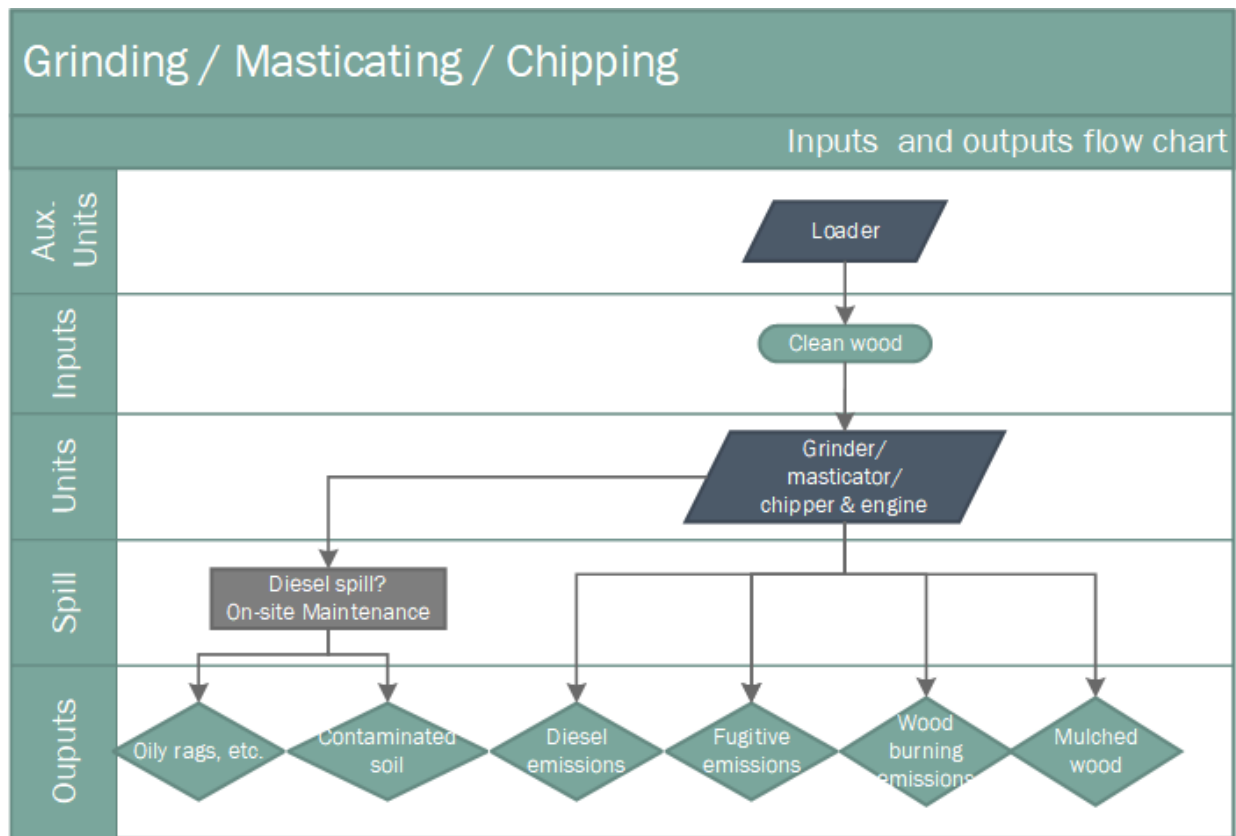
Grinding of forest residues consists primarily of having the residual material piled at a landing then having a grinder (tub or horizontal) brought in to reduce the size of the residual down to a size of material known as “hog fuel”. The grinder is towed to the site while the loader is hauled on a flatbed trailer known as “low boy”. Hog fuel is small enough to be hauled in a box trailer, conveyed, and moved with a front-end loader. Residual material from nearby piles is also moved near enough to the grinder (using the loader) for it to reach it with its grapple. The ground up material or “hog fuel” is fed by a belt loader into a box trailer commonly referred to as a “chip trailer” that is towed by a standard heavy haul truck. The hog fuel is then hauled to the end use location.

Mastication is performed by a piece of equipment known as a “masticator”. A masticator is a large grinder head mounted on a skid steer that can enter areas with standing or piled biomass to grind it in place, leaving behind the ground biomass as a mulch to improve the soil. The skid steer is towed to the site on a trailer using a large pickup style truck. Most masticators are not large enough to require special permits from ODOT to transport them from site to site.

Forest debris is not suitable for making chips for paper pulping operations as it is impractical to remove the bark before chipping. Only bark free chips are suitable for paper pulping. In the Northwest, chipping



operations for paper pulping are usually at fixed locations such as sawmills where wood residuals from trees that have been debarked before processing are generated. In the Southeast, where whole tree chipping is sometimes practiced, the trees are debarked before chipping.



**Figure 3: Grinding, Chipping, and Masticating Inputs and Outputs**

## Air Quality

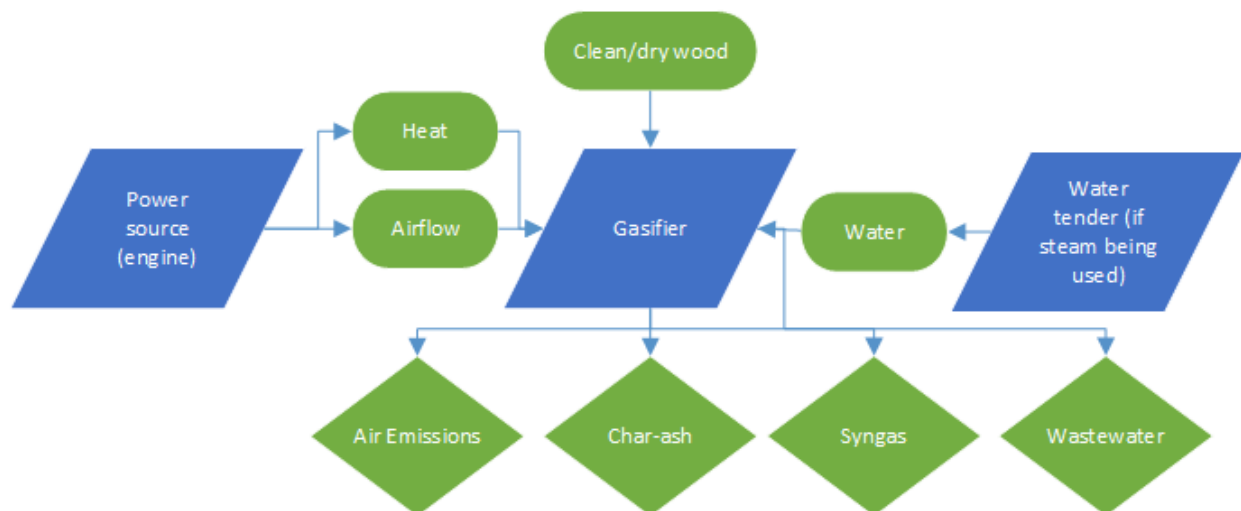
Equipment and activities that may require an air quality permit from DEQ include, but are not limited to, generators, internal combustion engines, boilers, sawing, truck loadout, material transfer cyclones, and source piles for chips, sawdust, and planer shavings. Information on permit requirements is available at [DEQ's air quality permitting website](#).

Permits may include a requirement to calculate emissions from fugitive dust. Emission factors for fugitive dust can be found in [EPA AP-42 Chapter 13](#) and on DEQ air quality permitting website.

## Transportation

There may be ODOT requirements for over-dimension equipment depending on size. See [section 8.9.3](#) for links to information on permit requirements for transporting over-dimension equipment.

## 6.3. Gasification/Pyrolysis/Torrefaction



**Figure 4: General Process Flow for Gasification, Pyrolysis, and Torrefaction**

Biomass gasification uses a controlled process involving heat, pressure, and steam, with a small amount of oxygen to convert biomass to fuel gas, also known as syngas, without combustion.

Systems that convert biomass fuels into combustible gasses for use in a boiler are subject to the same standards as direct-fired industrial boilers. Gasifiers will need emissions control equipment similar to a direct-fired boiler of the same size.

Gasifiers firing internal combustion engines to generate power need a system to clean dust from the hot gas before it enters the engine manifold. Dry filters often recycle cleaning media into the fuel. Wet scrubbing systems produce dirty water that must meet appropriate discharge standards.

Pyrolysis is the gasification of biomass in the absence of oxygen. In general, biomass does not gasify as easily as coal, and it produces other hydrocarbon compounds in the gas mixture exiting the gasifier; this is especially true when no oxygen is used. As a result, an extra step is typically taken to reform these hydrocarbons using a catalyst to yield a clean syngas.

Woody biomass torrefaction is a thermochemical process of heating biomass in a low-oxygen environment. Torrefaction reduces the moisture content of wood and turns it into a brittle, charcoal like material called biochar.

Bio-char is an intermediate product between wood and charcoal and has most of the advantages of both products. The thermo-chemical process of torrefaction can reduce the mass of wood by 20-30% while maintaining much of its energy value, resulting in a higher-valued product that can be transported more economically than traditional wood chips.

These systems can be mobile or stationary, depending on the size. The outputs from the system will vary depending on the process and what type of emission control technology is installed. Typical combustion emissions from these processes include carbon dioxide, carbon monoxide, methane, and nitrogen oxide. Ash and tar are also common byproducts that must be addressed.

Process water may contain tars such as phenols. Cooling water if cooling the output (syngas). Cooling water may be treated prior to discharge or treated with antifoulant (there will be limits on the discharge).

## Water

If the technology is stationary, a permit for stormwater discharges will likely be required. Refer to [section 4.2.2](#) for information on stormwater permits.

## Air

Emissions from these units may include NO<sub>x</sub>, PM and HAP emissions from fuel, and fugitive emissions from facility roads and movement of material at the facility. Standard or Title V permits are typically required for these types of facilities. More information on air quality permitting can be found in [section 8.2.1](#).

### 6.4. Pelletization

Pelletization is the compression of woody biomass into pellets. Biomass is chipped and shredded into smaller parts and dried, then pressed to make pellets. The high pressure is enough to bind the wood together; a process known as extrusion. After extrusion, the pellets must be cooled and packaged.

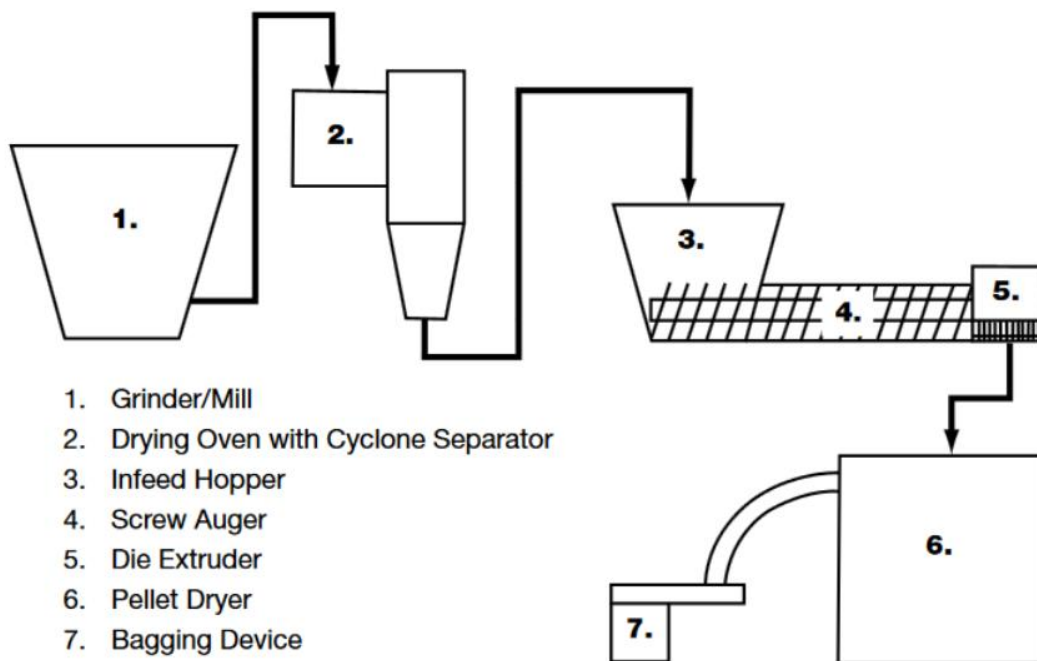
Wet wood is sometimes converted to clean, dry, or densified fuel. Wood fuel processing includes storage and handling. It may include drying and densification. Plants have been built to separate fuel chips from pulp fiber, and to produce densified fuel which is sold to public institutions and industry.

## Water

A permit for stormwater discharges will likely be required. Refer to [section 4.2.2](#) for information on stormwater permits.

## Air

Fuel processors must file a “Notice of Construction” application with the DEQ. Environmental permit requirements depend on the use of drying facilities, the size of the operation, and the use of combustion equipment. Most facilities will require a Standard or Title V air quality permit.



**Figure 5: General Process Flow for Pelletization Plants**

The main input to a pelletization process is biomass. Different types of biomass provide different energy outputs, with logging leftovers being on the higher end of the energy scale, at around 9,000 btu/lb. Most pellet mills require biomass that is no more than 3 millimeters, or 1/8 inch. To get larger material to this size, it is run through a chipper then a hammer mill. The moisture content for feedstock should be around

15 percent. During extrusion, a roller compresses the biomass against a heated die with small holes that the biomass is squeezed through. As the pellets pass through the die, a blade cuts them to predetermined lengths. Pellets come out of this process at around 150 degrees Celsius and must be cooled and dried, which is typically done through blowing air through the pellets while they are stored in a metal bin.

Pellet facilities require about 50 and 100 kilowatts of power for every ton per hour of production. If electricity is not available, gasoline or diesel-powered equipment may be necessary, and associated air quality permits required. Other portions of operations that may trigger air quality permits are the drying process which may result in water vapor, methanol, acetone, and other hazardous air pollutants, and any engines that operate in the plant. There may also be hazardous waste generated during maintenance activities. For information on identifying hazardous waste concerns, see [section 8.2.7](#).

## 6.5. Burners and Heaters

Wood-fired burners and boilers must control emissions from fuel storage and smoke stacks. Plant size measured by fuel input is one guide to permit requirements. Plants that change to a new fuel must obtain a new DEQ air quality permit.

The following types of boilers are required to obtain a general Air Contaminant Discharge Permit, general permit 11:

- Single oil-fired boilers with a heat energy input capacity greater than 10 MM BTU/hr.
- Single natural gas, propane, or butane-fired boilers with a heat energy input capacity greater than 30 MM BTU/hr or more.
- An on-site aggregate of oil-fired boilers totaling more than 10 MM BTU/hr but less than 250 MM BTU/hr heat energy input capacity.
- An on-site aggregate of natural gas, propane, or butane-fired boilers equal to or greater than 30 MM BTU/hr but less than 250 MM BTU/hr heat energy input capacity.

Specific permit application forms and permit conditions can be found under the GP-11 permit on DEQ's Air Quality Permits website: <https://www.oregon.gov/deq/aq/aqPermits/Pages/ACDP-General.aspx>. A basic permit is also available for natural gas and propane fire boilers with 10 MMBTU/hr or more but less than 30 MM BTU/hr heat energy input and constructed after June 9, 1989.

**Table 3: Heating Value for Common Biomass Materials**

Product	Heating Value (btu/dry lb)
Bark	8,513 - 9,301
Chips	8,455 - 9,066
Hog Fuel from Chip Yard	8,737
Hogged Lumber and Pole Ends	8,804
Mill Residues	8,676
Sawdust	8,656 - 8,979
Tree Trimmings	8,876

Urban Wood	7,751 - 8,931
Yard Material	7,780 - 8,871

When a new facility is being planned, extensive calculations and field monitoring may be needed to predict the environmental impacts of the proposed plant. DEQ helps estimate these impacts.

Areas where federal air standards are being met (attainment areas) have fewer standards for wood-fired boilers than areas where federal standards are not being met (non-attainment areas). Large wood-fired boilers are often proposed for sites classed as non-attainment areas. They must guarantee certain emission levels before an ACDP will be issued.

Some small furnaces need special equipment just to control total suspended particulate emissions (TSP). Large plants must also control other categories of pollutants like carbon monoxide (CO) and nitrogen oxides (NO<sub>x</sub>). Plants near Air Quality Maintenance Areas (AQMA) must control volatile organic compounds (VOC) because they contribute to the formation of ozone.

## **6.6. Electrical Generation**

Sales contracts for electric power or for gas need to be reviewed by the Oregon Department of Energy. Power plants larger than 25 MW need to apply to the Energy Facility Siting Council.

Most biomass power projects proposed for Oregon are less than 25 MW, but sales contracts still must be reviewed by the Council.

These large-scale biomass utilization projects will require coordination with numerous agencies across the state, and potentially federal agencies. Guidance for these projects is beyond the scope of this document.

## **6.7. Conversion to biofuels, renewable natural gas, and hydrogen**

There are multiple technologies covered in this section. Pyrolysis of wood yields biochar, pyrolysis oil, and syngas with the percentage of each determined by operating parameters, particularly temperature. This process can be performed with mobile or stationary pyrolysis units. Given the auxiliary equipment required to recover the syngas (compressors, separation equipment, and storage capacity), it is unlikely with current technology that production of syngas (which contains hydrogen, renewable natural gas (methane), as well as carbon monoxide and carbon dioxide) would be practical in the field. Pyrolysis oil and biochar on the other hand could be generated and recovered in the field using mobile units but the moisture in the wood is an issue in recovering pyrolysis oil in the field as it adds water to the oil when it is condensed. At a stationary facility this problem could be mitigated by drying the wood to about 7% moisture before the pyrolysis process. Regardless of the source, the pyrolysis oil must then be refined by hydrodeoxygenation and hydrocracking it in a process using hydrogen called “hydrotreating” which also dehydrates the pyrolysis oil (removes the water), in order to be able to use it as a substitute for fossil fuels. Again, this form of treatment is unlikely to be practical in the field.

Another technology for converting wood to biofuels is hydrothermal liquefaction. This process converts nearly any organic material into a material known as biocrude which can then be utilized at a refinery to replace fossil crude oil. This technology is evolving but basically uses supercritical water to dissolve and convert the biomass into usable liquid biocrude. Given the extremely high temperature and pressure required it is unlikely that this technology would be practical in the field.

Another new technology uses a catalytic thermo-mechanical process to convert any cellulosic biomass (including wood) into five and six carbon sugars and pure lignin. The sugars can then be converted into

ethanol using traditional fermentation processes and the lignin into biodegradable plastics. The equipment required for this process makes it unlikely that this would be practical in the field.

These large-scale biomass utilization projects will require coordination with numerous agencies across the state, and potentially federal agencies. Guidance for these projects is beyond the scope of this document.

## 6.8. Auxiliary Equipment

With many of the technologies discussed below, potential pollution emissions/discharges and permitting requirements are triggered by use of auxiliary equipment to run the technology. This can include diesel engines of loaders, engines to power the main unit, and vehicles to move all the aforementioned equipment.

The emissions from this auxiliary equipment add to the total allowable emissions and may limit the quantity of wood that can be processed over a specific amount of time in order to meet air quality standards.

### 6.8.1. Diesel Engines

Diesel engines, either separate units or as part of loading equipment are very common auxiliary pieces of equipment for portable woody biomass units.

#### Air Quality Requirements

Diesel engines must meet Tier 4 emissions standards and associated low sulfur fuel requirements. These standards limit the amount of nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), non-methane hydrocarbons (NMHC), and carbon monoxide that can be emitted in engine exhaust, based on engine size (see [Table 4](#) from §1039.101).

Additionally, the opacity (how much the exhaust blocks light) of the engine exhaust has limitations:

- 20% during acceleration mode;
- 15% during lugging mode; and
- 50% during the peaks in either the acceleration or lugging modes.

Because the emission control devices necessary to meet Tier 4 standards can be damaged by sulfur, EPA has also adopted requirements to decrease sulfur levels by more than 99 percent for in-use diesel fuel. The resulting Ultra Low Sulfur Diesel Fuel has a maximum sulfur concentration of 15 parts per million.

**Table 4: Exhaust Emission Standards**

Table 1 of §1039.101—Tier 4 Exhaust Emission Standards After the 2014 Model Year, g/kW-hr<sup>a</sup>

Maximum Engine Power	Application	PM	NO <sub>x</sub>	NMHC	NO <sub>x</sub> +NMHC	CO
kW < 19	All	0.40 <sup>b</sup>	-	-	7.5	6.6 <sup>c</sup>
19 ≤ kW < 56	All	0.03	-	-	4.7	5.0 <sup>d</sup>
56 ≤ kW < 130	All	0.02	0.40	0.19	-	5.0
130 ≤ kW ≤ 560	All	0.02	0.40	0.19	-	3.5
kW > 560	Generator sets	0.03	0.67	0.19	-	3.5
kW > 560	All except generator sets	0.04	3.5	0.19	-	3.5

<sup>a</sup>Note that some of these standards also apply for 2014 and earlier model years. This table presents the full set of emission standards that apply after all the transition and phase-in provisions of §1039.102 expire.

<sup>b</sup>See paragraph (c) of this section for provisions related to an optional PM standard for certain engines below 8 kW.

<sup>c</sup>The CO standard is 8.0 g/kW-hr for engines below 8 kW.

<sup>d</sup>The CO standard is 5.5 g/kW-hr for engines below 37 kW.

### 6.8.2. Trucks

Trucks may be necessary to move mobile sources, such as ACIs, from site to site. They may also be used for transportation within a facility. Depending on the size of equipment being moved, an oversize permit may be required from ODOT, as outlined in [section 8.9.3](#). There also may be concerns with fugitive dust if there are unpaved roads in the facility. While fugitive dust, in and of itself, does not create the need for a permit, air quality permits contain requirements to control fugitive dust emissions.

### **6.8.3. *Water tender***

Forest use permits typically require a water tender capable of putting out incidental fires. In their 2024 research paper on [Mobile Biochar Production by Flame Carbonization: Reducing Wildfire Risk and Improving Forest Resilience](#), the USFS outlines the amount of water required per eight-hour shift for three types of ACI. The requirements, found in Table 6 of the USFS research paper, are 500 gallons per shift for a BurnBoss, 300 gallons per shift for a CharBoss, and 3,000 gallons per shift for a Tigercat 6050.

The US Forest Service has four levels of industrial fire precautions for [USFS operations in Oregon](#). Restrictions are based on wildfire risk and apply to permitted, commercial, and industrial operations on federal lands, including personal firewood cutting. Restrictions should be checked for the specific forest you will be working in. [ODF industrial fire precaution guidelines](#) are similar to the [USFS and BLM guidelines](#).






**Forest Service**  
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## What are Industrial Fire Precaution Levels?

**Industrial Fire Precaution Levels** are stages of restrictions that apply to permitted, commercial, and industrial operations on federal lands, including personal firewood cutting. These restrictions are put in place in order to reduce the risk of a wildfire igniting.

There are **four Industrial Fire Precaution Levels (IFPL)** that begin with Level One at the start of the closed fire season, and can go as high as Level Four, if conditions warrant. The IFPL levels restrict certain operations as the fire danger increases. There are no precautions prior to the closed fire season. Each IFPL level adds to the restrictions applicable to all lower levels.

1

**IFPL 1**  
 IFPL 1 marks the start of Closed Season, and fire precaution requirements are in effect.
 

- A Fire Watch is required at this and all higher levels unless otherwise waived.
- Fire Watch = 1 hour minimum

2

**IFPL 2 (aka Partial Hoot Owl)**  
 The following may operate only between the hours of 8 p.m. and 1 p.m. local time. (No operation between 1 p.m. and 8 p.m.):
 

- Power saws (except at loading sites)
- Cable yarding
- Blasting/Welding or cutting metal

3

**IFPL 3 (aka Partial Shutdown)**  
 The following are prohibited except as indicated:
 

- Cable yarding – except gravity operated systems employing non-motorized carriages operating between 8 p.m. and 1 p.m. when all blocks and moving lines are suspended 10 feet above the ground except the line between the carriage and the chokers.
- Power saws – except power saws may be used at loading sites and on tractor/skidder operations between the hours of 8 p.m. and 1 p.m. local time.

 In addition, the following are permitted to operate between the hours of 8 p.m. and 1 p.m. local time (no operation between 1 p.m. and 8 p.m.):
 

- Tractor, skidder, feller-buncher, forwarder or shovel logging operations where tractors, skidders, or other equipment with a blade capable of constructing fireline are immediately available to quickly reach and effectively attack a fire start.
- Mechanized loading or hauling of any product or material for blasting;
- Welding or cutting of metal;
- Any other spark emitting operation not specifically mentioned.

4

**IFPL 4: General Shutdown**  
**ALL OPERATIONS ARE PROHIBITED.**

- No waivers will be issued.
- Landowners are permitted entry into their lands.

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Figure 6: USFS Industrial Fire Precaution Levels



#### **6.8.4. Loader**

A loader will be necessary for loading clean wood into the utilization technology. Similar to trucks, an oversize permit from ODOT may be required to move the loader between sites as outlined in [section 8.9.3](#).

## 7. Operation Type and Location

Operations can be portable or stationary and in a variety of locations from the forest, to more urban, commercial, or industrially zoned environments. Types of portable and stationary facilities, and considerations for each, are described in more detail in this section.

### 7.1. Portable Source

Portable sources are defined in OAR 340-200-122 as:

“Portable” means designed and capable of being carried or moved from one location to another. Indicia of portability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

When an air quality permit is required for a portable source, the potential locations of operation must be determined. If the source will operate in Lane County, permitting must be obtained through the Lane Regional Air Protection Agency. For all other areas of the state, air quality permits must be obtained through DEQ. Other permits that may be required could include water quality/discharge permits, ODOT oversize permits, and water rights permits.

Typical portable sources include ACIs, pyrolysis units, chipper/masticator, and trucking operations.

#### 7.1.1. *Environmental concerns specific to portable sources*

Since portable sources do not have one specific location, permits for these types of units will have to incorporate location specific concerns throughout the state. For example, the air permit will likely include varying requirements if the portable unit is used in an air quality management area or near a class I area.

Air quality risk assessments for portable sources may result in a limit on the annual and daily throughput based on the distance from the portable source to the nearest potential exposure location. Due to no set location, the risk assessment will likely be based on residential risk values to be conservative. The risk assessment may include a range of distances from the nearest exposure location and the subsequent throughput limit.

Owners and operators of portable units will likely be required to maintain a record of (and submit an annual report containing) all locations of operation. The annual report requirements will vary depending on the specific technology. Owners and operators of portable sources are also required to report the relocation to DEQ prior to each relocation using a Relocation Notice, which can be found online at: <https://www.oregon.gov/deq/FilterPermitsDocs/RelocationNotice.pdf>

Transportation of portable units into forested areas may cause fugitive dust, which may be addressed in the permit or may require coordination with ODF, USFS, or BLM to reduce impacts.

### 7.2. Stationary Source

#### 7.2.1. *Environmental concerns specific to stationary sources*

A stationary source is defined in OAR 340-200-172 as:

“Stationary source” means any building, structure, facility, or installation at a source that emits or may emit any regulated pollutant. Stationary source includes portable sources that are required to have permits under OAR chapter 340, division 216.

**Water Discharge Permits** are required if a person wants to conduct an activity that will or could discharge, or change discharge limits established in an existing permit, industrial or commercial wastes into waters of the State. DEQ issues two types of water discharge permits, Federal National Pollutant Discharge Elimination System (NPDES) permits for discharging to surface waters, and State Water Pollution Control Facilities (WPCF) permits to protect groundwater. Additional information on these permits can be found in [section 8.2.6](#).

**Stormwater permits** include the 1200 series permits, which can be found on [DEQ's Water Quality Permits](#) webpage.

Some specific examples of stationary sources that may have specific permitting requirements are discussed below.

### ***7.2.2. Biomass Utilization Campus***

A biomass utilization campus (BUC) is a permanent or semi-permanent facility that processes logging byproducts and non-timber woody material. This includes tree tops, slash and small or damaged wood. A BUC typically accepts materials from a variety of sources, as long as it meets the material quality requirements (non-treated woody material). A BUC may house a variety of businesses that process this material in different ways and multiple products.

For Air Quality permitting, the co-location of numerous potential air pollution sources may mean that each individual source has a lower throughput than it would if it was located on its own. This is to make sure the local air quality is not significantly degraded by having all the sources potentially emitting at the same time.

A stormwater permit would be required both during and after construction as outlined in [section 8.2.6](#). The requirement to obtain a water discharge permit would depend on the processes present at the site, the amount of water used, and the desired means of disposal of water.

If solid waste is brought into the site, such as in cases where woody biomass is not the only material being processed, a solid waste permit would be required as outlined in [section 8.2.5](#).

Processes and materials used at the site need to be evaluated to determine if a hazardous waste generator ID is required. The use of solvents and chemicals could cause the site to be classified as a hazardous waste generator. DEQ offers free technical assistance to determine generator status. This process is included in [section 8.2.7](#).

### ***7.2.3. Existing mill retrofit***

Existing wood mills present a unique opportunity to use processes and equipment that are already in place.

#### **Example of an existing mill retrofit**

From USFS Wood Innovations Program:

Iron Triangle has developed a post and pole plant in Seneca, OR and a firewood processing plant in John Day, OR to utilize the vast quantity of non-saw biomass generated from the accelerated restoration projects on the Malheur National Forest with the Malheur Forest-wide Stewardship 10-year contract a primary part.

The 10-year contract was awarded to Iron Triangle to remove over 750,000 tons of non-saw biomass with a continual supply of material for the post and pole and firewood plants. Along with the production of post and poles and firewood, there is a large amount of residual product which is well suited for burning in "wood gasification furnaces" to provide heat for the post and pole and firewood plants.

The project proposes to install three separate furnaces and the associated heat exchange units to convert the large amount of residual biomass to usable heat for each facility.

The objectives of the program are to:

1. Utilize as much of the non-saw biomass removed from the forest as possible for posts, poles, and firewood and wood generated energy as possible to minimize the need to chip and sell low value chips to the pulp market.
2. Provide economically generated heat for our processing and maintenance facilities in Seneca and John Day.

***Figure 7: Example of an Existing Mill Retrofit***

## **8. Regulating Agencies**

### **8.1. Local Governments**

Local governments play an important role in permitting biomass utilization technologies. This guidance does not include detailed information on local government permitting. However, a brief overview of some of the permits that may be required is provided below. Please reach out to the local governments with jurisdiction over the area where the biomass utilization will occur to confirm their requirements.

#### ***8.1.1. Local Land Use***

Activities that impact land use must be consistent with local comprehensive plans. A Land Use Compatibility Statement (LUCS) is a form that the local government uses to verify to the State that the proposed use is consistent with the local development code.

When facilities are located in resource zones (Forest, Exclusive Farm Use, Mixed Farm-Forest), the land use requirements are generally standardized statewide. When located in industrial or commercial zones or in urban areas, requirements will vary from jurisdiction to jurisdiction. Additionally, local jurisdictions may apply an overlay zone over an established zoning district to establish additional or stricter standards and criteria for the covered properties.

#### ***8.1.2. Local Energy Facility***

Facilities that are smaller than the jurisdictional threshold for the Energy Facility Siting Council are reviewed by the local jurisdiction as a power generating/commercial utility facility. Coordination for the siting and permitting requirements of smaller facilities should be coordinated through the local jurisdiction.

#### ***8.1.3. Local Fire Authority***

Fire agencies may have authority over aspects of building permit approvals related to fire safety, as well as fire safety inspections once the facility is operational. Inspections during construction will likely be coordinated through the local building department, but communication with the fire authority to communicate any potential hazards that will be present on the site is advised. Cities, counties, and local fire districts also have their own restrictions on burning. [Remember to always contact your local fire department](#) before you burn.

#### ***8.1.4. Other Local Regulations***

Local governments may have their own registration or permitting requirements for activities discussed in this guidance. Any person or company using this guidance document is encouraged to reach out to local governments to determine if there are any additional requirements.

Additional potential local permits include (but are not limited to):

- Building Permits
- Fire, Life and Safety Plans review
- Boiler or Pressure Vessel permit
- Publicly owned treatment works (POTW) for wastewater discharge
- Road and traffic impacts

### **8.2. Oregon Department of Environmental Quality**

#### ***8.2.1. Air Quality Program***

Any business or industry (e.g. source) that emits or has the potential to emit pollutants into the air may be required to obtain an air permit from DEQ. DEQ issues permits for new sources, existing sources, and

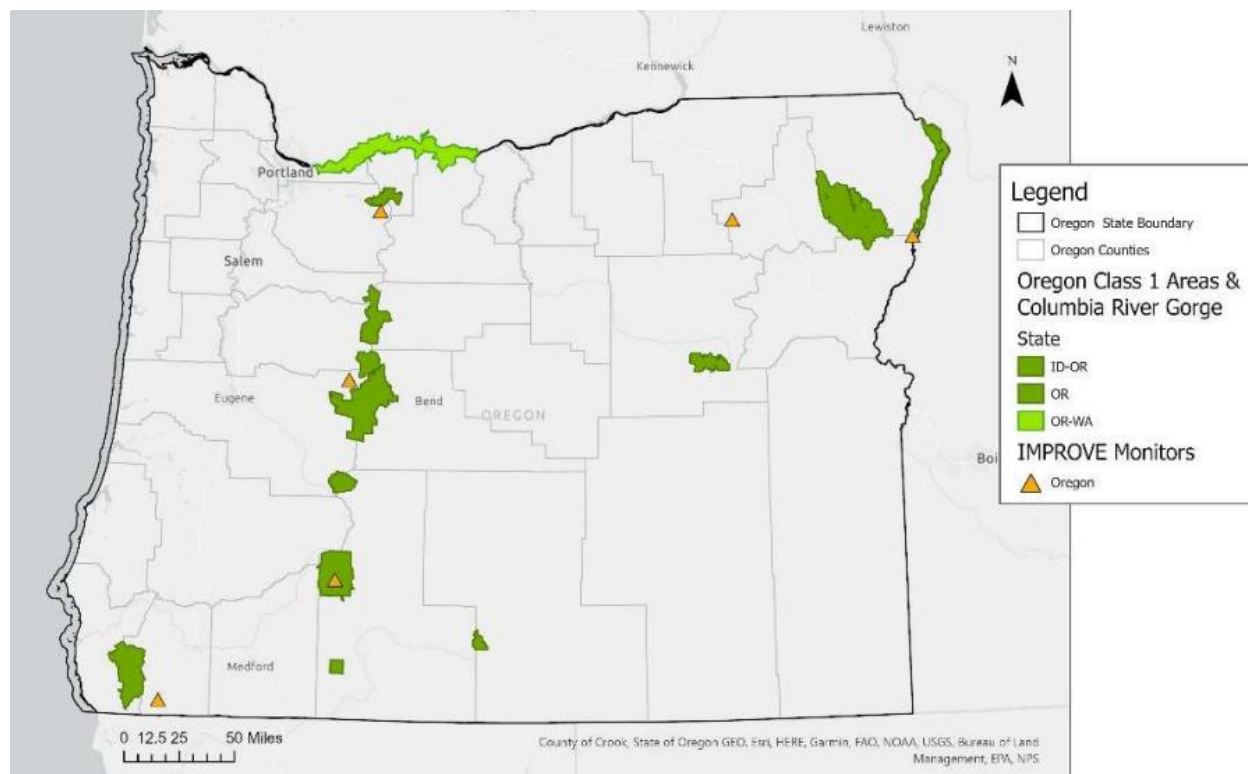
sources that are undergoing a modification to industrial processes. If the business resides in Lane County, contact the [Lane Regional Air Protection Agency](#) for assistance on air permitting questions.

### Areas with Unique Air Quality Needs

Air quality is both a local and a wide-spread concern. DEQ's role is in regulating emissions that can deteriorate air quality. The regulations and requirements of a certain emission point can vary depending on the local, regional, and state-wide conditions. Some of these conditions are described below.

### Class I Areas - Prevention of Significant Deterioration

The Clean Air Act gives special air quality and visibility protection to national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres that were in existence when it was amended in 1977. These are "Class I" areas. Class I allows very little deterioration of air quality.



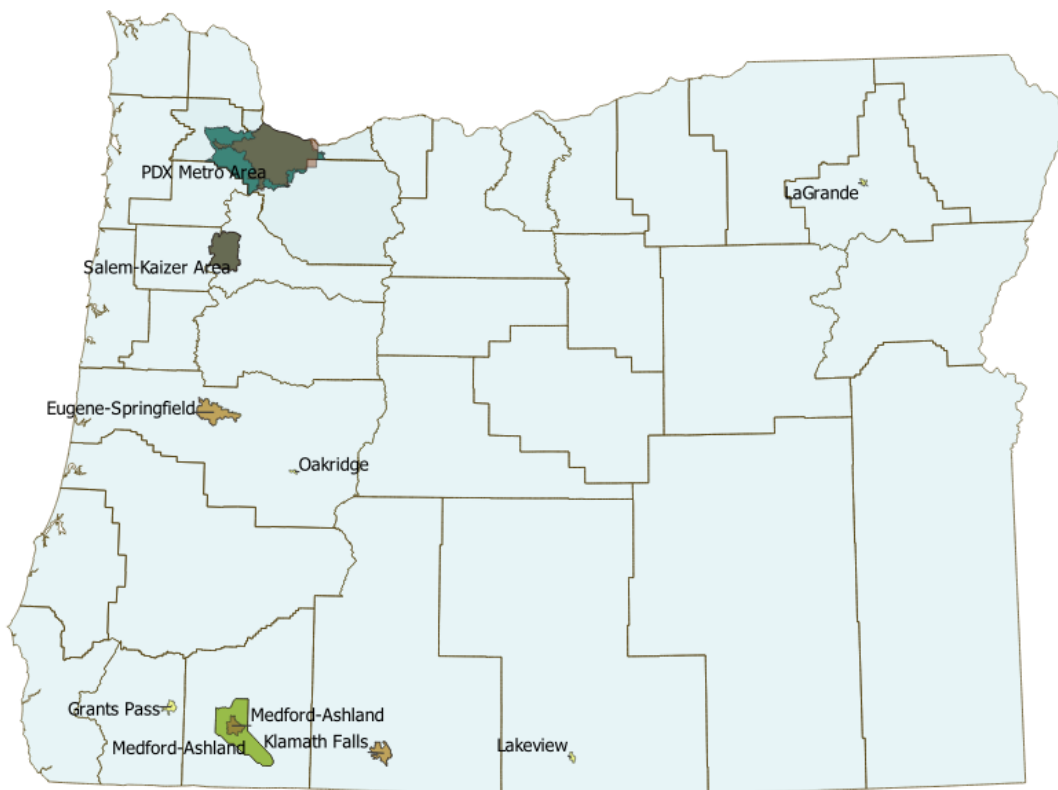
**Figure 8: Oregon's Class I Areas and the Columbia River Gorge National Scenic Area**

### Nonattainment or Maintenance Areas

EPA sets National Ambient Air Quality Standards (NAAQS) for Carbon Monoxide, Lead, Particulate Matter, Ozone, Nitrogen Dioxide, and Sulfur Dioxide. These pollutants are common in outdoor air, considered harmful to public health and the environment, and come from numerous and diverse sources.

Federal law requires that all states attain the NAAQS. Areas that exceed one or more NAAQS are nonattainment areas and must develop plans to attain the NAAQS. Maintenance areas are those geographic areas that had a history of nonattainment but are now consistently meeting the NAAQS.

Additional requirements may be applicable if the utilization technology operates in a maintenance or nonattainment area. The boundaries for these areas are defined in OAR chapter 340 division 204 and maps are available on DEQ's website: <https://www.Oregon.gov/deq/aq/Pages/Maintenance-Areas.aspx>.



**Figure 9: Oregon's NAAQS Maintenance and Non-attainment Areas**

### 8.2.2. Air Quality Permit Types

DEQ's air permits vary in complexity. The most basic type of permit is a Basic Air Contaminant Discharge Permit, followed by a General ACDP, Simple ACDP, Standard ACDP, and then Title V permits. Any facility may elect to obtain a higher-level permit than is required, this can help clarify requirements for sources that are subject to multiple rules or have a variety of equipment subject to regulation. Potential permit requirements for specific utilization technologies are detailed in [section 6](#).

- A **Short-Term Activity ACDP** is a letter permit that authorizes the activity and includes any conditions placed upon the method or methods of operation of the activity. DEQ may issue a Short-Term Activity ACDP for unexpected or emergency activities, operations, or emissions. A Short-Term Activity ACDP automatically terminates 60 days from the date of issuance and may not be renewed.
- A **Basic ACDP** is a permit that authorizes the operation of specific sources and activities. A Basic ACDP is the minimum permit required for these sources and activities, but the applicant may obtain a Simple or Standard ACDP in place of the Basic ACDP. A Basic ACDP contains only the most significant and relevant rules applicable to the source and it does not contain Plant Site Emission Limits. A Basic ACDP may be issued for a period not to exceed ten years.
- A **General ACDP** is a permit that authorizes operation of specific sources and activities. General ACDPs are issued by order for a period of up to ten years and then individual sources are assigned to the General ACDP if they meet the qualifications. One significant qualification is that the actual emissions from the source must be less than the Generic PSELs contained in the General ACDP.

(Generic PSELs are shown in the glossary of terms section of this document.) Any source that does not meet the qualifications would have to obtain either a Simple or Standard ACDP.

- A **Simple ACDP** authorizes operation of the sources and activities listed below. A Simple ACDP is required for these sources and activities, unless there is a General ACDP available for the source and the source meets the General ACDP qualifications. In addition, the applicant may request a Standard ACDP in place of the Simple ACDP if the annual emissions are greater than the Generic PSEL or the applicant wants to maintain a netting basis. A Simple ACDP contains all relevant applicable requirements, Generic PSELs, and testing, monitoring, recordkeeping and reporting requirements sufficient to determine compliance with the emissions limits and standards. The Simple ACDP is issued for a period of up to 5 years.
- A **Construction ACDP** is a permit for approval of Type 3 construction or modification changes specified in OAR 340-210-0220. The Construction ACDP includes requirements for the construction or modification of stationary sources or air pollution control equipment at sources that are required to obtain a Standard ACDP or Oregon Title V Operating Permit. The Construction ACDP does not provide authorization to operate the new construction or modification. A new or modified Standard ACDP or Oregon Title V Operating Permit is required before operation of the new construction or modification. The Construction ACDP is optional for ACDP sources but is required for any source that has an Oregon Title V Operating Permit.
- A **Title V Operating Permit** is a comprehensive operating permit program for major industrial sources of air pollution, required by Title V of the Clean Air Act. A major source of air emissions has the potential to emit 100 tons of any criteria pollutant. Or, for emitters of hazardous air pollutants, a major source has the potential to emit 10 tons of any single hazardous air pollutant or 25 tons of any combination of hazardous air pollutants. A major source can choose to limit its potential to emit through federally enforceable physical or operational restrictions on the facility and can remain in the ACDP program as what is known as a synthetic minor source.

### 8.2.3. *Cleaner Air Oregon*

All applicants for a new Simple or Standard Air Contaminant Discharge Permit must also submit a toxic air contaminant emissions inventory. This inventory will determine if the source is subject to Cleaner Air Oregon. Applicants for Basic and General Air Contaminant Discharge Permits will be notified by DEQ if they are subject to Cleaner Air Oregon. More details about Cleaner Air Oregon are included below.

To complete the toxic air contamination emissions inventory, facilities first estimate the types and amounts of toxic air pollutants emitted. Next, facilities determine the risk from those toxic air pollutants to adults and children living, working, or going to school nearby. This is done through dispersion modeling that estimates how much of a given pollutant a person nearby may breathe in based on distance, time and amount.

DEQ compares the dispersion modeling estimates of risk with Oregon's established health standards. If the facility's risk is higher, DEQ requires the facility to lower their emissions.

#### **New Source Review**

Additional reviews are required if an owner/operator is proposing to construct a major source or to undertake a major modification as defined in OAR 340-200-0020.

- If the construction/modification takes place in a nonattainment area or maintenance area, then the New Source Review (NSR) rules in OAR 340-224-0050 or 340-224-0060 are applicable.
- If the construction/modification takes place in an attainment area, then the Prevention of Significant Deterioration (PSD) rules in OAR 340-224-0070 are applicable.

New Source Review permits are complicated and may take up to a year to process. It is important that the correct information be provided in a timely manner. It is highly recommended that the applicant contacts DEQ to discuss the permit process as early as possible.

#### **8.2.4. Lane Regional Air Protection Agency**

LRAPA is the local air quality protection agency for southern Willamette Valley with a jurisdiction covering Lane County, Oregon. Its member jurisdictions include Lane County and the cities of Eugene, Springfield, Cottage Grove, and Oakridge. LRAPA may apply any approved LRAPA rule in lieu of a state rule(s) provided that the LRAPA rule is at least as strict as the state rule(s).

#### **8.2.5. Solid Waste Program**

DEQ issues solid waste disposal site permits that authorize certain solid waste management activities. The material being managed must be defined as a solid waste to require a solid waste permit. If a facility manages woody biomass, DEQ will determine whether such woody biomass is a solid waste and, if so, whether and how the facility is regulated under solid waste statutes and rules.

To apply these regulations to a facility managing woody biomass, DEQ first determines whether the woody biomass meets the definition of “solid waste,” i.e., is it useless or discarded by the generator. This is a case-specific, fact-based determination. If the woody biomass is not a solid waste, DEQ lacks authority under solid waste laws to regulate the facility’s management of that woody biomass.

If the woody biomass is a solid waste, DEQ next determines whether the facility managing that waste is excluded from solid waste permit requirements, and if not, the type of permit required. DEQ may also assess the facility’s potential for a beneficial use determination in lieu of a permit.

Whether or not the facility requires a permit, DEQ also determines whether rules requiring certain management practices for both permitted and unpermitted facilities apply. To ensure these regulations are consistently applied, DEQ staff will consult within their own and other regions and with their managers regarding relevant factors, information needed, and prior precedent. Staff will ensure the information supporting their determinations is properly documented.

The following are the solid waste authorizations that may apply to a facility managing woody biomass solid waste:

- Solid Waste Disposal Site Permit – Composting, conversion technology, and landfill are examples of permit types that may apply to management of woody biomass.
- Solid Waste Letter Authorization (SWLA) – Letter authorizations are permits issued for short term, low-volume, low-risk disposal operations of up to six months if the proposed or existing disposal site is not likely to create a public nuisance, health hazard, or environmental problem.
- Beneficial Use Determination (BUD) – DEQ may approve a beneficial use determination for the productive use of woody biomass as an alternative to issuing a disposal permit. The proposed use must meet performance criteria to demonstrate the use is productive and will not cause an adverse impact to public health, safety, welfare or the environment. DEQ does not regulate the material managed under a BUD as a solid waste as long as it is used in accordance with the BUD. BUDs may be case-specific or categorical.

An example of a woody biomass project that might be eligible for an SWLA is a short-term pilot project testing the effectiveness of a mobile torrefaction unit in a low fire risk area.

Whether or not a facility requires a permit, it may be subject to certain solid waste management practices that apply to both permitted and non-permitted facilities relating to:

- Storage and Collection
- Transportation
- Environmental performance standards for composting facilities



- Environmental performance standards for conversion technology facilities

### **Making a Solid Waste Determination**

Examining whether a material such as woody biomass (or residuals after woody biomass operations) is a solid waste requires an analysis of the specific circumstances. Woody biomass is not categorically considered a solid waste. To be a solid waste, woody biomass must meet the definition of a solid waste and must not be excluded from that definition or from the application of that definition in ORS 459.007.

The definition of “solid waste” describes a comprehensive range of materials that are considered solid waste if they are “useless or discarded.” Whether or when a material becomes a solid waste is a fact-based determination and not subject to a bright line standard. Whether woody biomass is a solid waste will be clear in many cases. For other cases, staff will have to identify and consider multiple factors when evaluating whether it is useless or discarded by the generator. Additional information may be needed for that evaluation.

- DEQ generally considers a material to be “discarded” if it is discarded, thrown away or abandoned by the generator. A material that is discarded becomes part of a waste stream and is a solid waste, even if it is also useful, recyclable or reclaimable.
- DEQ generally considers a material to be “useless” when it cannot be productively used for any purpose, or if it was made for a particular purpose, when it cannot be used for the original purpose for which it was made, and is fit, if for anything, only for remanufacturing into something else or for some other use that differs substantially from the original use. If a material must be reclaimed, processed, transformed, mixed, purified or otherwise altered to be useful, it will generally be considered a waste until actually converted into a bona fide product.

The following are some of the factors that have been relevant in determining whether woody biomass being used in a manufacturing process is a solid waste or a bona fide commodity or product. Each of these factors, if applicable, may indicate that a material is not a solid waste, and their absence may indicate it is a solid waste, though all relevant information should be considered in making that determination:

- The woody biomass is productively used “as-is” or with minimal processing.
- The woody biomass was intentionally produced for use as a commodity in trade.
- The woody biomass was manufactured or processed to specifications required.
- A legitimate market exists for the woody biomass.
- The woody biomass was purchased for fair market value.
- The woody biomass is stored and managed in a manner that preserves its value as a commodity or product.
- The woody biomass is not speculatively accumulated.
- The woody biomass is not mixed with solid waste.
- The woody biomass does not contain contaminants not normally associated with woody biomass or that make it unsuitable for its intended use.
- A legitimate market exists for the product made from woody biomass.

Two exclusions to the definition of solid waste may be applicable to the management of woody biomass [OAR 340-093-030(91)(b) and (c)]:

- Woody biomass used for productive purposes in agricultural operations in accordance with OAR 340-093-030(91)(b).

Woody biomass applied productively as a soil amendment at agronomic rate on agricultural lands is an example of woody biomass used for productive purposes in agricultural operations.

- Woody biomass combusted as a fuel by a facility that has obtained an air quality permit.

Burning saw dust wood pellets and hog fuel are examples of combustion (substances reacting with oxygen and transferring energy as heat and light). By definition, conversion technologies such as gasification, pyrolysis or torrefaction are not considered combustion, OAR 340-093-0030(28), and are not excluded under this provision.

<p><b>Solid Waste Determination, Scenario 1:</b>  Company A harvests trees from its property and leaves woody biomass on the forest floor. Company B operates an industrial facility that processes woody biomass into a product. Company B purchases woody biomass that meets specifications required for its operations from A for fair market value. Company B accepts only material that is screened to meet its specifications and is scheduled for use in its production process. Company B stores the material in a manner retaining its value and for a limited time before processing it into a saleable product. Company B has a market for that product.</p> <p>Company B accepts only woody biomass screened to meet required specifications; it was not intentionally produced for use as a commodity but is purchased at fair market value for use in the production process; it is stored to retain its value; and the product has a legitimate market.</p> <p>If managed as described, <b>the woody biomass is not useless or discarded, and is not a solid waste.</b></p>	<p><b>Solid Waste Determination, Scenario 2:</b>  Company A delivers woody biomass to Company B free of charge. Company B plans to sort and grind the woody biomass and use it to produce innovative widgets that B hopes will attract a new market. After encountering several production problems, Company B manages to produce some widgets, but is unable to attract buyers. Woody biomass is stored in piles exposed to rain and weather, degrading its value for making widgets. Unsold widgets are stored outside under cover.</p> <p>In this case, since the woody biomass is not being stored like a product, it may be considered “useless or discarded” by the generator and may be deemed a solid waste. Company B did not purchase the woody biomass for fair market value, and it was not intentionally produced as a commodity or processed to specifications for Company B, although Company B’s processing might be considered minimal. The woody biomass is not stored or managed as a valuable commodity. The market for the widgets produced is not well-established and may not be legitimate. If the unsold widgets are speculatively accumulated or degrade in storage, they may also be considered solid wastes.</p> <p>In this scenario, several factors support the conclusion <b>the woody biomass is solid waste.</b></p>
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**Figure 10: Example of Making a Solid Waste Determination**

### Exclusion from permit requirements

If a material or product has been determined to be a solid waste, DEQ must then determine whether regulation under a solid waste permit is required. The owner or operator of a facility used to manage woody biomass determined to be solid waste is required to obtain a disposal site permit from DEQ unless their facility is excluded from permit requirements by statute or rule. The following are examples of the types of facilities excluded from permit requirements (under the conditions specified), that may be relevant to facilities managing woody biomass:

- Facilities excluded under OAR 340-093-0050(3), including certain material recovery and recycling facilities, facilities operating under a water quality permit issued under ORS 468B.050, facilities combusting wood or tire chips for energy recovery, facilities processing wood for energy recovery, and land disposal sites accepting only clean fill;
- Composting facilities excluded under OAR 340-096-0060(3); and
- Conversion technology facilities excluded under OAR 340-096-0160(4).

### **8.2.6. Water Quality Program**

#### **Regulatory Authority**

The Oregon Department of Environmental Quality's Water Quality Program's mission is to protect, restore and improve Oregon's water quality. Protecting Oregon's rivers, lakes, streams, and groundwater keeps these waters safe for a multitude of beneficial uses, such as drinking water, fish and other aquatic organisms, recreation, the ability to consume fish safely and irrigation. DEQ accomplishes water quality protection, restoration, and improvement by:

- Developing and implementing water quality standards and clean water plans
- Regulating wastewater treatment systems and industrial and stormwater discharges
- Collecting and evaluating water quality data
- Providing grants and technical assistance to reduce and prevent nonpoint sources of pollution
- Protecting drinking water sources
- Providing below market rate loans to communities to build and upgrade treatment facilities and fund other water quality improvement projects
- Coordinating with other state and federal agencies on actions that may affect Oregon waters

The Water Quality Program issues permits that regulate pollution from point sources discharging to Oregon's surface water and groundwater through its water quality permitting program. The term "point source" generally refers to wastewater or stormwater discharged into water or onto land through a pipe or a discernible channel. DEQ issues two types of permits:

1. Federal National Pollutant Discharge Elimination System (NPDES) permits when discharging to surface water. Under Oregon Revised Statutes, Oregon issues NPDES permits to regulate pollutant discharges to surface "waters of the state" which are more broadly defined than the federal definition of "waters of the United States."
2. State Water Pollution Control Facilities (WPCF) permits to protect groundwater.

Water Discharge requirements are provided in [OAR chapter 340, division 045](#). Water Discharge Permits are required if a person wants to conduct an activity that will or could discharge, or change discharge limits established in an existing permit, industrial or commercial wastes into waters of the State.

Water Discharge Permits that might apply to a woody biomass operation include:

- 400J NPDES Log Ponds, Industrial Wastewater: Wet storage facilities (log ponds) that do not receive domestic sewage or process wastewater and that discharge to surface waters; non-discharging evaporative pond; facilities that use cold deck sprinkling or have log yard runoff where sprinkling occurs.
- 1200C NPDES Construction Stormwater: The 1200-C Construction Stormwater General Permit authorizes discharges in Oregon excluding tribal trust and reservation lands.
- 1700A - NPDES Wash Water, Industrial Wastewater: Vehicle, equipment, building, and pavement washing activities that discharge wash water to surface waters or storm sewers. This permit covers discharges from fixed washing operations and mobile washing operations.
- 1700B - WPCF Wash Water, Industrial Wastewater: This permit covers vehicle, equipment, building, and pavement cleaning activities that discharge wash water by means of evaporation, seepage and/or irrigation. This permit covers discharges from fixed washing operations and mobile washing operations.
- Permit coverage is required under the General Permit if the following activities have the potential to discharge to surface waters or to a conveyance system that leads to surface waters of the state in Oregon and do not have coverage under another NPDES permit:
- Any construction activity and materials or equipment staging and stockpiling that will disturb one or more acres of land; or

- Any construction activity and materials or equipment staging and stockpiling that will disturb less than one acre of land but is part of a common plan of development or sale that will ultimately disturb one or more acres of land; or
- Any construction activity that results in the disturbance of less than one acre of land that is a necessary and required component (e.g. utilities, structure, or infrastructure) of a final project that will ultimately disturb one or more acres of land; or
- Any construction activity that may discharge stormwater to surface waters of the state that may be a significant contributor of pollutants to waters of the state or may cause an exceedance of a water quality standard.

### **8.2.7. DEQ Hazardous Waste**

Federal and state of Oregon hazardous waste regulations ensure that the generation, transport, treatment, storage and disposal of hazardous wastes are conducted in a way that protects human health and the environment.

Woody biomass operations need to be able to properly identify if any of the wastes the facility generates, treats, or sends off site for recycling, energy recovery or disposal are hazardous wastes. For a complete description of waste determination requirements, consult Oregon Administrative Rule 340-101 and the Code of Federal Regulations Title 40, Part 261.

Some potential wastes that might be generated during biomass utilization include:

- Ash
- Solvents (from cleaning equipment)
- Grease (from equipment maintenance)
- Rags (from equipment maintenance)

As a waste generator, you must:

- Determine if your waste is hazardous, then
- Ensure your waste is managed properly

Waste management companies may perform or offer to help you, the generator, with your hazardous waste determination, but generators are ultimately responsible for any mismanagement of their hazardous waste. Failure to do an adequate hazardous waste determination is the top violation cited by DEQ hazardous waste inspectors and can lead to mismanagement of your waste, often leading to environmental and human health damage.

The DEQ Hazardous Waste program offers technical assistance to determine how hazardous waste regulations apply to your business. On-site visits can be scheduled to:

- Identify where you may save money through reduced disposal costs and less regulation by the hazardous waste program
- Explain hazardous waste regulations that apply to your business
- Help determine what areas need improvement
- Request feedback on any changes you make as a result of the visit

These site visits are conducted to help businesses comply with hazardous waste regulations. They are not inspections and are meant to provide guidance only. A list of hazardous waste offices and inspectors and a technical assistance brochure are available on DEQ's Hazardous Waste website:

<https://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/Technical-Assistance.aspx>.

### **Hazardous Waste Management in Biomass Utilization**

The first step in determining which regulations apply is to make a “hazardous waste determination” for each waste stream. Each waste stream would have to be characterized to see if it exhibited a hazardous waste characteristic (flammability, corrosivity, reactivity, or toxicity) or contained a listed waste(s) above the threshold concentrations. The easiest way to control this is not to allow the activities that could generate waste streams to occur in the field.

Possible waste streams may include:

- cleaning solvents,
- vehicle fluids (from oil or coolant changes or leaks),
- waste from equipment maintenance and repairs (such as oil filters, welding rod stubs, grease rags, paint waste, or aerosol cans),
- waste pesticides (including herbicides)
- ash from biomass combustion. Ash from woody biomass combustion should contain only clean non-treated wood and therefore it is unlikely to be a hazardous waste. However, the following is a partial list of potential contamination sources for woody biomass:
  - Pesticides in agricultural woody biomass
  - Various contaminants in urban woody biomass
  - If the utilization site accepts biomass from a number of sources, it is possible sources will send treated wood
  - Elevated levels of arsenic in woody biomass due to high background arsenic concentrations in soil
  - Fire retardants sprayed onto woody biomass

Best practices may include requiring all equipment maintenance and repairs are performed on the Plant site where there are established procedures and appropriate equipment and only allowing trained personnel to authorize work to be done off-site and then only with special procedures in place to handle any waste. The following example explains why this is important.

*Figure 7: Summary of Hazardous Waste Management*

### **Hazardous Waste Determination Example**

Let us say a contractor using a piece of equipment finds out that a delegation is coming to see his operation and take pictures the following week. He wants to make a good impression and decides to shut down and clean and paint his equipment. He has a drum of solvent that he uses to clean the grease off so that the paint will stick. He then uses aerosol cans of paint to paint his equipment. In this case, he has generated multiple waste streams.

- Grease and dirt material including:
  - Grease and dirt cleaned off of the equipment
  - Rags or brushes that cannot be reused
  - Solvents used to clean the equipment
  - Grease from the equipment
- Aerosol cans

The grease and dirt waste stream is from cleaning off the equipment. He cannot simply dump this on the ground as this would be an illegal disposal of solid and possibly hazardous waste. He must collect it for a hazardous waste determination. The same applies to any rags or brushes from the cleaning operation that he cannot reuse. He can use “process knowledge” to make the determination if he has the necessary information.

The Safety Data Sheets (SDSs) for the solvent and grease will tell if they contain any ingredients that could make the waste stream a hazardous waste. If the information is inconclusive regarding the potential presence of listed hazardous waste the next step would be to determine if it has a hazardous characteristic. This means determining if the material is flammable, corrosive, reactive, or toxic.

- Corrosivity would not apply as it is defined by pH (above 12 or below 2.5) which only applies to aqueous solutions not solvents.
- Flammability only applies to material that will pass through a paint filter so the rags and brushes would not be considered hazardous by characteristic of flammability but the captured solvent and grease (that passes through a paint filter) would have to be tested for flash point (less than 140 degrees Fahrenheit is hazardous waste by characteristic of flammability).

- The operator could use “process knowledge” to say that the materials would not react to air, water, or heat so the material would not be hazardous waste by the characteristic of reactivity.
- A TCLP (Toxic Characteristic Leaching Procedure) test would need to be performed by a laboratory to determine if metal, volatiles, or semi-volatiles could be leached from either of the waste streams (including the rags and brushes) in excess of the determination threshold. If the threshold is not exceeded the waste would not be a hazardous waste by characteristic of toxicity.

In Oregon, waste aerosol cans that have not been punctured are considered hazardous waste by the characteristic of reactivity since they will explode if heated. Special puncturing systems exist that will puncture an aerosol can and drain its contents into a drum. If the contents of the **punctured** aerosol cans (paint) were not hazardous they could now be disposed of as solid waste by throwing them into the trash.

If they did contain hazardous waste, they would have to be triple rinsed with a solvent that would clean the can (i.e. not water for oil-based paint) and the contents collected (this would then be a new waste stream). The contents captured from puncturing and rinsing the cans must now have their own hazardous waste determination. If the operator decides to keep the drum (that contains hazardous waste) until it is full before disposing of it, then special storage regulations apply. If he decides to haul it to town to send it off, then special rules apply for transporting it. In either case it must be disposed of at a licensed Transportation, Storage, and Disposal Facility (commonly referred to as a “TSDF”).

Another consideration would be for spent solvent spilling onto the soil. In this case the solvent would be useless and effectively discarded so it would be a solid waste. The soil would have to be immediately cleaned up due to emergency response requirements regarding spills of hazardous materials (these are not necessarily hazardous wastes since the definitions are different). Anytime a hazardous waste is mixed with something the entire mixture becomes hazardous waste therefore any contaminated soil would have to be evaluated as to whether or not it was hazardous waste. Let’s assume the solvent was methyl ethyl ketone (MEK), a commonly used solvent. Since MEK is a listed waste on both the F list (mostly spent solvents) and the U list (virgin materials) the soil becomes hazardous waste. It also would need to have a TCLP test performed and would be hazardous waste if the leached MEK concentration was found to be above the threshold value.

A second example would be accidentally spilling gasoline onto the ground. In this case the gasoline would not be a waste until mixed with the soil as the discharge was unintentional since the gasoline was neither useless nor deliberately discarded. Once mixed with the soil it would be rendered useless. Once again immediate excavation of contaminated soil would be required because of emergency response rules for hazardous materials (gasoline would be considered hazardous) and the soil would need a hazardous waste characterization performed. Since the procedure for determining ignitability requires that material being tested to pass through a paint filter the soil obviously would not be a hazardous waste by characteristic of ignitability. While gasoline is not a listed waste itself it generally contains benzene which is on the list of TCLP chemicals. If the leachate had a concentration of benzene above 0.5 ppm, then it would be hazardous by characteristic of toxicity. If the result was lower the soil would be non-hazardous petroleum contaminated soil. It could likely be bioremediated and placed back in the excavation.

Waste characterization is complex and if performed incorrectly can potentially cause environmental damage and/or human health effects not to mention potential fines and cleanup costs (also potentially prison time if violations were knowing and intentional). This is why it is recommended to perform all maintenance and cleaning operations at a location where any waste generated can be controlled rather than in the field, and to seek professional assistance from the DEQ if the need arises.

**Figure 11: Example of Making a Hazardous Waste Determination**

## 8.3. Oregon Emergency Response System

### 8.3.1. What to Do When You’ve Had a Spill

You are responsible for the immediate cleanup of your spill, regardless of the quantity involved. The responsibility lies with the person who spills the product, as well as the person owning or having authority over the oil or hazardous material.

Call 911 for medical emergency and public safety assistance from the local fire, police and medical services. immediately.

Immediately report the spill or threatened spill to the Oregon Emergency Response System, 1-800- 452-0311, when the spill or threat of a spill includes:

- Any amount of oil to waters of the state;
- Oil spills on land in excess of 42 gallons;



- Hazardous materials and reportable quantities that are equal to the Code of Federal Regulations, 40 CFR Part 302.

When you report the spill to OERS, you will need to provide basic spill information:

- Contact names and phone numbers
- Type of oil or hazardous material
- Estimated quantity
- Location descriptions (land or water)

Some oil or hazardous material spills will require a separate notification to the National Response Center, 1-800-424-8802. Visit EPA's Emergency Response website for information necessary to determine if you need to report to the federal system.

Other actions to take:

- Move away or upwind from the spill if you detect an odor and are unsure if it is safe.
- Avoid contact with liquids or fumes.
- Keep non-emergency people out of the area.
- Control and contain the spill.
- Clean up what you can immediately.
- Remove cleanup materials to an approved facility (such as a solid or hazardous waste landfill or recycling facility.) Save your receipts for documentation.
- Continue with long-term cleanup measures.
- File a completed Spill Release Report Form with DEQ

You may need to hire a qualified contractor or properly trained and equipped personnel to respond immediately to the spill. If you fail to clean up your spill, DEQ may clean it up for you and, as allowed by law, fine you up to three times the cost of the cleanup, in addition to the actual cost of the cleanup (Oregon Administrative Rules 340-142).

DEQ is responsible for ensuring that the cleanup is completed in a way that protects human health and the environment. Oregon law also requires DEQ to recover its costs in carrying out this responsibility. Depending on the type and quantity of material spilled, and the potential threat to people or the environment, DEQ may choose to oversee the cleanup. This oversight may take the form of DEQ staff at the scene, phone contact, document review or a combination of these actions. You are responsible for these oversight costs and will normally be billed within 45 days.

Regional Emergency Response coordinators are listed in Appendix C. You may also visit the DEQ Emergency Response webpage: <https://www.oregon.gov/deq/Hazards-and-Cleanup/er/Pages/default.aspx>

## **8.4. Oregon Department of Forestry**

**You must obtain a "Permit to Use Fire or Power-driven Machinery"** (also called a PDM permit) from ODF prior to starting any operation that uses motorized equipment or tools. Information on filing an E-notification for work on non-federal lands can be found at:

<https://www.oregon.gov/odf/Working/Pages/ENotification.aspx>

Firefighting equipment required on an active operation can vary with size of operation and time of year – check with ODF for specific details. Basic requirements include:

- a water source, pump, hose and nozzle with specific capacity
- specific firefighting capability of heavy equipment and crew
- specific hand tools, extinguishers, and exhaust spark arrestors
- an on-site firewatch person after daily shutdown, who is ready to take action to report and begin to suppress a fire

During legally declared fire season, forest operations are subject to different levels of fire prevention restrictions, which can change daily depending on the local wildfire potential within each regulated use area. Landowners and operators engaged in active forest projects must daily check the local closedown level — known as “industrial fire precaution level” or “IFPL” — to be sure the proper fire prevention restrictions are followed each day.

### **Forest Practices Act**

The Forest Practices Act (FPA), ORS 527.610 - 527.992 and associated rules apply to activities that are part of the commercial growing and harvesting of forest trees. A large portion of the FPA rules are aimed at the protection of water sources. Regulations require landowners to leave forested buffers and other vegetation along streams, wetlands, and lakes to protect water quality and fish and wildlife habitat. Most forest practices fall into one of the following general categories:

- Road construction and maintenance
- Harvesting
- Site preparation by treating slash
- Reforestation
- Use of pesticides or fertilizers

Before conducting an operation or forest practice, landowners and operators need to inform the Oregon Department of Forestry of their planned operation by completing a Notification of Operation.

- Notifications must be submitted at least 15 days prior to the start of the operation
- Failure to file is a violation under the Forest Practices Act and Rules
- A Notification of Operation can be filed electronically via E-Notification

The forest practice rules allow slash treatment and burning for site preparation as long as soil, air, and water are protected. Following a harvest, slash (or tree tops, limbs, and defective wood) is often left on site and may require treatment to make the site ready for successful reforestation (site preparation), to reduce wildfire hazards, or both. Piling, burning, and chipping are examples of slash treatments and may be done in combination with site preparation or separately.

#### **8.4.1. Oregon Forest Practices Act**

The Oregon Forest Practices Act (FPA) sets standards for all commercial activities involving the establishment, management, or harvesting of trees on Oregon’s forestlands.

Oregon law gives the Board of Forestry primary responsibility to interpret the FPA and set rules for forest practices. ODF is responsible for enforcing those requirements by:

- Reviewing pre-operations plans
- Overseeing operations
- Ensuring reforestation
- Investigating complaints
- Enforcing corrective actions when violations occur

ODF works with landowners and operators to help them comply with the requirements of the FPA.

### **8.5. United States Forest Service**

The Wilderness Act of 1964 prohibits certain activities within Wilderness Areas so as to maintain the purpose for which these lands are set aside. Specifically, the Wilderness Act states the following:

*Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety*



*of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.*

Therefore, some, if not all, of these biomass utilization technologies are not allowed in Wilderness Areas. The air contaminant discharge permits for mobile units will contain a condition that allows operation of the unit within certain distances of Class I areas based on the size of the unit. These distances are based on modeling analysis to ensure that potential impact from operations of the unit is limited to less than 1 ug/m<sup>3</sup> (24-hour average) for the regulated pollutants listed in OAR 340-200-0020(161)(b) through (v). [OAR 340-200-0020(161)(w)]

Unless specified differently, these areas were established by [Public Law 88-577](#). These areas are:

- Mt. Hood Wilderness
- Eagle Cap Wilderness
- Hells Canyon Wilderness, as established by Public Law 94-199
- Mt. Jefferson Wilderness, as established by Public Law 90-548
- Mt. Washington Wilderness
- Three Sisters Wilderness
- Strawberry Mountain Wilderness
- Diamond Peak Wilderness
- Crater Lake National Park, as established by Public Law 32-202
- Kalmiopsis Wilderness
- Mountain Lake Wilderness
- Gearhart Mountain Wilderness

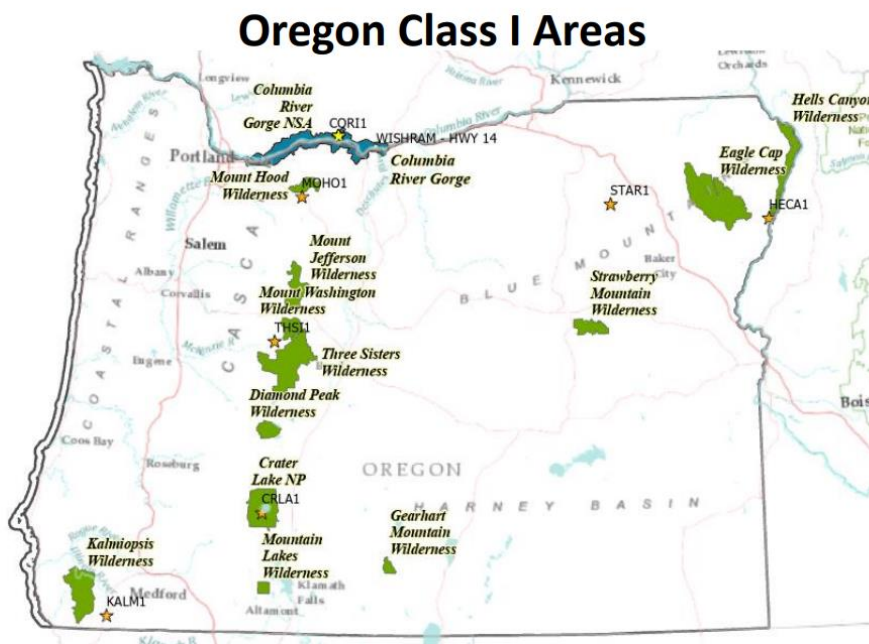


Figure 12: Oregon Class I Areas

## 8.6. Applicable Tribal Regulations

For individuals or organizations planning projects on Tribal lands, it's essential to become familiar with the specific regulations and guidelines outlined by the Tribe and to coordinate early in the planning process.

Federally recognized Tribes are Sovereign Nations as codified in Federal Law. There are currently nine Federally recognized Tribes in Oregon:

- Burns Paiute Tribe
- Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians
- Confederated Tribes of Grand Ronde
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Warm Springs
- Cow Creek Band of Umpqua Tribe of Indians
- Coquille Indian Tribe
- Klamath Tribes

Each Tribe will have its own laws, regulations, resolutions and permitting processes. The [Legislative Commission on Indian Services](#) is a resource for project planning with a Tribal Nation. The Commission serves as an access point for information related to state programs and Indian communities.

Sites may have cultural or archaeological significance; taking steps to ensure that projects do not disturb artifacts or culturally important areas is not only a legal requirement but also a respectful practice. Protecting cultural resources through the completion of a cultural resource review is another required step that must be considered.

## **8.7. Cultural Resources**

Cultural resources are a non-renewable resource and provide an important link to Oregon's heritage and history. Prior to initiating a project, it must be determined if there is a risk it will impact properties of historic significance. These properties may include prehistoric or historic districts, sites, buildings, structures, objects, artifacts, records, material remains, and traditional, religious, spiritual, storied, or legendary places. The cost of hiring a cultural resource management firm to complete reviews and reports falls on the company or individual undertaking the project.

If a cultural resource will be disturbed, damaged, or destroyed, a permit must be obtained through a state, federal, or federally recognized tribal government, as appropriate. The State of Oregon's Historic Preservation Office provides online guidance on permitted activities and steps to obtain a permit: <https://www.oregon.gov/oprd/OH/Pages/projectreview.aspx>

## **8.8. Oregon Department of Energy**

### ***8.8.1. Energy Facility Siting Council***

Biomass utilization technologies that result in energy production may need review by the Energy Facility Siting Council (EFSC). The EFSC is made of volunteer members who are appointed by the Governor and confirmed by the Oregon Senate. Oregon Department of Energy employees serve as staff members for the council, handling the ongoing work related to the regulation of energy facilities. Staff are energy experts who research issues involved with locating, building and operating large energy facilities. They make recommendations to the council based on their research and analysis. Rules related to siting of facilities are contained in OAR 345-022 and ORS 215.

The Energy Facility Siting Council is responsible for overseeing the development of large electric generating facilities, high voltage transmission lines, gas pipelines, radioactive waste disposal sites, and other projects. State-level oversight of energy facilities helps ensure that Oregon has an adequate energy supply while protecting Oregon's environment and public safety.

A proposed energy facility must undergo a thorough review and meet the council's [siting standards](#) to receive a site certificate. Standards cover issues such as land use, environmental impacts, noise concerns,

and cultural and archeological artifacts. If the council approves a site certificate, the developer is authorized to construct and operate the facility. After issuing a site certificate, the council has ongoing regulatory authority over the construction and operation of the facility.

The following types of energy facilities must have a site certificate from the Council before construction *[truncated to only potential biomass facilities]*:

- Electric power plants that burn biomass if the nominal electric generating capacity of the turbines that produce electricity is 25 megawatts or more.
- Plants that convert biomass to gas, liquid or solid fuel products, or combination of such products, if any one of such products is intended to be used as fuel and if any one of such products is capable of being burned to produce the equivalent of 6 billion Btu of heat per day.

Facilities that operate at below the thresholds listed above would be subject to county or city jurisdictions. ODOE has resources available online for permitting under the state jurisdiction.

- Siting Standards: <https://www.oregon.gov/energy/facilities-safety/facilities/Pages/Siting-Standards.aspx>
- Rules and Statutes: <https://www.oregon.gov/energy/facilities-safety/facilities/Pages/Rules-and-Statutes.aspx>
- Siting of Energy Facilities in Oregon Process Flowchart: <https://www.oregon.gov/energy/facilities-safety/facilities/Documents/Fact-Sheets/EFSC-Process-Flowchart.pdf>
- A Public Guide to Energy Facility Siting in Oregon; <https://www.oregon.gov/energy/facilities-safety/facilities/Documents/Fact-Sheets/EFSC-Public-Guide.pdf>
- Energy Siting Fact Sheets: <https://www.oregon.gov/energy/facilities-safety/facilities/Pages/Fact-Sheets.aspx>

## 8.9. Other Regulatory Agencies

Other potential bodies not included in this guide that likely will have some oversight of the operations include:

1. Oregon Water Resources Department
2. Oregon OSHA
3. Oregon Department of Transportation
4. Oregon Department of Land Conservation and Development

Please reach out to these agencies directly. Some publicly available information is provided below.

### 8.9.1. *Oregon Water Resources Department*

Under Oregon law, all water belongs to the public. With some exceptions, cities, irrigators, businesses, and other water users must obtain a permit or license from the Water Resources Department to use water from any source - whether it is underground, or from lakes or streams. Generally speaking, landowners with water flowing past, through, or under their property do not automatically have the right to use that water without authorization from the Department.

Four fundamental provisions

1. Beneficial purpose without waste: Surface or groundwater may be legally diverted for use only if it is used for a beneficial purpose without waste.
2. Priority: The water right priority date determines who gets water in a time of shortage. The more senior the water right, the longer water may be available in a time of shortage.

3. Appurtenancy: Generally, a water right is attached to the land described in the right, as long as the water is used. If the land is sold, the water right typically goes with the land to the new owner.
4. Must be used: Once established, a water right must be used as provided in the right at least once every five years. With some exceptions established in law, after five consecutive years of non-use, the right is considered forfeited and is subject to cancellation.

Forest management slash burning is a water use that does not require water right application, permit or certificate. However, the user shall submit notice of the proposed use, including the identification of the proposed water source, to the Water Resources Department and to the State Department of Fish and Wildlife at the time notice is provided to the Oregon Department of Forestry and comply with any restrictions imposed by the department pertaining to sources of water that may not be used in conjunction with the proposed activity.

Water Rights in Oregon: <https://www.oregon.gov/owrd/WRDPublications1/aquabook2023Edit.pdf>

### **8.9.2. Oregon OSHA**

Oregon Occupational Safety and Health Division (Oregon OSHA) is committed to advance & improve workplace safety & health for all workers in Oregon.

OSHA rules are provided in OAR 437 Divisions 1 through 5 and 7. Specific divisions that are more likely to be involved in biomass utilization work include: Division 1 (General administrative), Division 2 (General occupational safety and health), Division 3 (Construction), Division 4 (Agriculture), and Division 7 (Forest Activities).

Oregon OSHA rules and laws: <https://osha.oregon.gov/rules/Pages/default.aspx>

### **8.9.3. Oregon Department of Transportation**

ODOT's hazard tree removal objectives are outlined in the [ODOT Integrated Vegetation Management Statewide Plan \(IVM\)](#). Section 3.2.6 of the IVM Plan discusses tree management and refers to activity 133 in the ODOT Maintenance Guide. As part of hazard tree maintenance, ODOT arborists identify and document hazard trees based on tree health. Plans are developed for corridors with known hazard trees and ODF and ODFW are coordinated with to obtain the necessary clearances and waivers. Timber sale contracts may be drafted based on appraised value. There is the opportunity for hazard trees to be routed to biomass utilization projects to address the slash and debris resulting from removal.

ODOT requires an [over-dimension permit](#), regulated under [OAR 734-082](#), for truck and trailer combinations that exceed regulatory limits. The legal width is 8 feet 6 inches, the length is 14 feet, and the legal weight is 80,000 pounds gross weight. Over-dimension permits require specific routes and must be registered in advance of the planned haul. If you think you may need an over-dimension permit, you should research the requirements and timelines for permitting in advance to avoid project delays.

### **8.9.4. Oregon Department of Land Conservation and Development**

The Oregon Department of Land Conservation and Development (DLCD) works alongside local governments and state and federal agencies to address land use needs both locally and across the state. DLCD manages urban growth and protects farm and forest lands, coastal areas, and natural resource areas to provide communities that are safe and livable and meet the vision of the community. DLCD statewide planning goals guide planning of both the built and natural environment across five focus areas; ensuring equitable planning and engagement, investing in robust operations, building community resilience, promoting healthy and equitable communities, and conserving farmlands, forest lands, coastal areas, and natural areas.

## 9. Appendices

### 9.1. Appendix B - Contact Information

#### Department of Environmental Quality

You will need to contact DEQ with questions on environmental regulations. Who you contact will vary depending on the location where you plan to use the source (DEQ splits the state into three regions) and the environmental media you are concerned with (air quality, land quality, water quality).

**For Air Quality**, this information is provided on the following website:

<https://www.oregon.gov/deq/aq/aqPermits/Pages/Contacts.aspx>

**For Water Quality**, this information is provided on the following website:

<https://www.oregon.gov/deq/wq/wqpermits/Pages/FAQ.aspx>

For questions on **hazardous waste** requirements see this website: <https://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/Technical-Assistance.aspx>

For questions on **solid waste** requirements, see this website:

<https://www.oregon.gov/deq/mm/swpermits/Pages/default.aspx>

For questions on potential spills, contact the Emergency Response Program:

<https://www.oregon.gov/deq/Hazards-and-Cleanup/er/Pages/default.aspx>

#### Oregon Department of Forestry

If you should have questions regarding the preparation of a written plan, please contact one of the Department of Forestry offices listed below. Local forest practices foresters are available to assist you in understanding the requirements of the Oregon Forest Practices Act.

Northwest Oregon Area			
Astoria District Route 1, Box 950 Astoria, OR 97103 541-325-5451	Cascade District - Molalla Unit 14995 S. Hwy 211 Molalla, OR 97038 503-829-2216	Cascade District – Sweet Home Unit 4690 Highway 20 Sweet Home, OR 97386 541-367-6108	Columbia Unit 405 E Street Columbia City, OR 97018 503-397-2636
Philomath 24533 Alsea Highway Philomath, OR 97370 541-929-3266	Tillamook District 4907 E 3rd Street Tillamook, OR 97141 503-842-2545	Dallas Unit 825 Oak Villa Road Dallas, OR 97338 503-623-8146	Cascade District - Santiam Unit 22965 North Fork Road SE Lyons, OR 97358 503-859-2151
Toledo Unit 763 NW Forestry Road Toledo, OR 97391 541-336-2273	Forest Grove 801 Gales Creek Road Forest Grove, OR 97116 503-357-2191		

<b>Southern Oregon Area</b>			
Veneta PO Box 157 Veneta, OR 97487 541-935-2283	Florence Unit PO Box 461 Florence, OR 97439 541-997-8713	Central Point 5286 Table Rock Road Central Point, OR 97502 541-664-3328	Coos Bay 63612 5th Road Coos Bay, OR 97420 541-267-4136
Springfield 3150 Main Street Springfield, OR 97478 (541) 726-3588	Brookings 415 Redwood St. Brookings, OR 97415 541-469-5040	Grants Pass Unit 5375 Monument Drive Grants Pass, OR 97526 541-474-3152	Roseburg 1758 Ne Airport Road Roseburg, OR 97470 541-672-6507

<b>Eastern Oregon Area</b>			
John Day Unit PO Box 546 John Day, OR 97845 541-575-1139	Pendleton Unit 1055 Airport Road Pendleton, OR 97801 541-276-3491	Klamath-Lake District 3200 Delap Road Klamath Falls, OR 97601 541-883-5681	Prineville 3501 E 3rd Street Prineville, OR 97754 541-447-5658
LaGrande 611 20th Street La Grande, OR 97850 541-963-3168	The Dalles Unit 3701 West 13th Street The Dalles, OR 97058 541-296-4626	Lakeview Unit 2290 North 4th Street Lakeview, OR 97630 541-947-3311	Wallowa Unit Route 1 Box 80 Wallowa, OR 97885 541-886-2881

## 9.2. Appendix A – Acronyms and Definitions

The following are definitions and acronyms used in this guidance document. Users of this document must be aware that there may be multiple definitions for the same word, depending on which regulations are being applied. Where it is not clear which definition applies, this guidance tries to cite the appropriate definition. The following is a list of acronyms, definitions, and resources used in this guidance; these lists may not be comprehensive.

### Acronyms

Term	Acronym
Air Contaminant Discharge Permit	ACDP
Air Quality Maintenance Area	AQMA
Beneficial Use Determination	BUD
Biochemical Oxygen Demand	BOD
Biomass Utilization Campus	BUC
Biomass Utilization Working Group	BUWG
Carbon Monoxide	CO
Chemical Oxygen Demand	COD
Exclusive Farm Use	EFU
Forest Practices Act	FPA
Globally Harmonized System	GHS
Greenhouse Gasses	GHG
Land Use Compatibility Statement	LUCS
Megawatt	MW
Million British Thermal Units per Hour	MM BTU/hr
Million gallons per day	MGD
National Ambient Air Quality Standard	NAAQS
National Pollutant Discharge Elimination System	NPDES
Nitrogen Oxides	NO <sub>x</sub>
Oregon Department of Environmental Quality	DEQ
Oregon Department of Transportation	ODOT
Oregon Emergency Response System	OERS
Oregon Occupational Safety and Health Division	OR-OSHA
Particulate Matter	PM
Right-of-Way	ROW
Solid Waste Letter Authorization	SWLA
Sulfur Dioxide	SO <sub>2</sub>
Total Suspended Solids	TSS
Volatile Organic Compounds	VOCs



## Definitions

Term	Citation	Definition
Agricultural Waste	<a href="#">OAR 340-264-0030(4)</a>	Agricultural waste means any waste material generated or used by an agricultural operation, excluding those materials described in OAR 340-264-0060(3). 340-264-00060(3) states: No person may cause or allow to be initiated or maintained any open burning of any wet garbage, plastic, asbestos, wire insulation, automobile part, asphalt, petroleum product, petroleum treated material, rubber product, animal remains, or animal or vegetable matter resulting from the handling, preparation, cooking, or service of food or of any other material which normally emits dense smoke or noxious odors.
Air Contaminant Discharge Permit (ACDP)	<a href="#">OAR 340-200-0020(9)</a>	Air Contaminant Discharge Permit or "ACDP" means written authorization issued, renewed, amended, or revised by DEQ, under OAR chapter 340, division 216.
Air Curtain Incinerator	<a href="#">40 CFR §60.51b</a>	Air curtain incinerator means an incinerator that operates by forcefully projecting a curtain of air across an open chamber or pit in which burning occurs. Incinerators of this type can be constructed above or below ground and with or without refractory walls and floor.
Attainment Area	<a href="#">40 CFR §51.491</a> <a href="#">OAR 340-200-0020(14)</a>	CFR: Attainment area means any area of the country designated or redesignated by the EPA at 40 CFR part 81 in accordance with section 107(d) as having attained the relevant NAAQS for a given criteria pollutant. An area can be an attainment area for some pollutants and a nonattainment area for other pollutants.  OAR: Attainment area or “unclassified 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 areas or unclassified areas may also be referred to as sustainment or maintenance areas as designated in OAR chapter 340, division 204. Any particular location may be part of an attainment area or unclassified area for one regulated pollutant while also being in a different type of designated area for another regulated pollutant.



Beneficial Use Determination (BUD)	<a href="#">OAR 340-093-0030(13) &amp; (14)</a>	<p>(13) “Beneficial Use” means the productive use of solid waste in a manner that will not create an adverse impact to public health, safety, welfare, or the environment.</p> <p>(14) “Beneficial Use Determination” means the approval of a beneficial use of a solid waste pursuant to OAR 340-093-0260 through 340-093-0290 either as a standing beneficial use or as a case-specific authorization.</p>
Biochar	<a href="#">USDA Northwest Climate Hub</a>	Biochar is a stable solid, rich in carbon that is made from organic waste material or biomass that is partially combusted in the presence of limited oxygen. The qualities that make up biochar vary depending upon the material that it comes from (feedstocks; i.e., timber slash, corn stalks, manure, etc.) and the temperature at which combustion occurs.
Class I Area	<a href="#">OAR 629-048-0005(5)</a>	"Class I Area" means national parks and certain wilderness areas designated by Congress in 1977 as federal Class I Areas that are subject to visibility protection under the Environmental Protection Agency's Regional Haze Rule and the federal Clean Air Act. Class I Areas in Oregon include: Crater Lake National Park, Diamond Peak Wilderness, Eagle Cap Wilderness, Gearhart Mountain Wilderness, Hells Canyon Wilderness, Kalmiopsis Wilderness, Mountain Lakes Wilderness, Mount Hood Wilderness, Mount Jefferson Wilderness, Mount Washington Wilderness, Strawberry Mountain Wilderness and Three Sisters Wilderness.
Composting	<a href="#">ORS 459.005(6)</a>	"Compost" means the controlled biological decomposition of organic material or the product resulting from such a process.
Energy Facility	<a href="#">OAR 345-001-0010(12)</a>	<p>(a) An energy facility as defined in ORS 469.300;</p> <p>(b) A small generating plant for which an applicant must have a site certificate according to OAR 345-001-0210; and</p> <p>(c) A facility for which a developer or governing body has elected to defer regulatory authority to the Council under ORS 469.320(8).</p> <p>Note that facilities that are smaller than the jurisdictional threshold for the Energy Facility Siting Council are reviewed by the local jurisdiction as a power generating/commercial utility facility.</p>

Energy Facility	<a href="#">ORS 469.300(11)</a>	<p>Any of the following [abridged to include only woody biomass facilities or auxiliary facilities]:</p> <p>(A) An electric power generating plant with a nominal electric generating capacity of 25 megawatts or more, including but not limited to:</p> <ul style="list-style-type: none"> <li>(i) Thermal power;</li> <li>(ii) Combustion turbine power plant; or (iii)</li> </ul> <p>(C) A high voltage transmission line of more than 10 miles in length with a capacity of 230,000 volts or more to be constructed in more than one city or county in this state, but excluding:</p> <ul style="list-style-type: none"> <li>(i) Lines proposed for construction entirely within 500 feet of an existing corridor occupied by high voltage transmission lines with a capacity of 230,000 volts or more;</li> <li>(ii) Lines of 57,000 volts or more that are rebuilt and upgraded to 230,000 volts along the same right of way; and</li> <li>(iii) Associated transmission lines.</li> </ul> <p>(G) A plant which converts biomass to a gas, liquid or solid product, or combination of such products, intended to be used as a fuel and if any one of such products is capable of being burned to produce the equivalent of six billion Btu of heat a day.</p> <p>(I) A surface facility related to an underground gas storage reservoir that, at design injection or withdrawal rates, will receive or deliver more than 50 million cubic feet of natural or synthetic gas per day, or require more than 4,000 horsepower of natural gas compression to operate, but excluding:</p> <ul style="list-style-type: none"> <li>(i) The underground storage reservoir;</li> <li>(ii) The injection, withdrawal or monitoring wells and individual wellhead equipment; and</li> <li>(iii) An underground gas storage reservoir into which gas is injected solely for testing or reservoir maintenance purposes or to facilitate the secondary recovery of oil or other hydrocarbons.</li> </ul>
EPA AP-42	<a href="#">Compilation of Air Pollutant Emissions Factors from Stationary Sources (AP-42)</a>	<p>Emission factors in AP-42 are representative values that attempt to relate the quantity of a pollutant released to the atmosphere from a given source/activity. In most cases, the factors are averages of all available data of acceptable quality and are generally assumed to be representative of long-term averages for all facilities in a source category. Emission factors represent an average of a range of emission rates; therefore, approximately half of the subject sources will have emission rates greater than the emission factor and the other half will have emission rates less than the emission factor. (Synthesized from AP-42 Introduction.)</p>

EPA Test Method 22	<a href="#">EPA Air Emissions Measurement Center</a>	Method 22 is the visual observation of visible, fugitive emissions that escape during material transfer, from buildings that contain the process, or directly from process equipment. No certification is required to conduct a Method 22 observation but understanding of the effects of background contrast, ambient lighting, and your position during the observation in respect to lighting, wind, and the source are important. Emissions are recorded using two stopwatches, one to track the total time observations are being collected and one to track any time periods during the observation that emissions are observed. Recording and calculating emissions should be done in accordance with the rule that applies to the source. (Synthesized from EPA Method 22 Guide.)
EPA Test Method 9	<a href="#">EPA Air Emissions Measurement Center</a>	Method 9 is a visual observation of the opacity of an emissions plume by a certified observer. Certifications are valid for 6 months and allow the candidate to conduct observations on black plumes and white plumes. Observations and conditions during observations should be recorded according to EPA requirements. (Synthesized from EPA Method 9 Guide.)
Forest Practices Act	<a href="#">ORS 527.610</a>	The Oregon Forest Practices Act (FPA) sets standards for all commercial activities involving the establishment, management, or harvesting of trees on Oregon's non-federal forestlands. ODF is responsible for administering and enforcing the FPA and the forest practice rules. ODF works with landowners and operators to help them comply with the requirements of the FPA.
Fugitive Emissions	<a href="#">OAR 340-208-0210</a>	Fugitive emissions are visible emissions that leave the property of a source for a period or periods totaling more than 18 seconds in a six-minute period.
Hazardous Waste	<a href="#">40 CFR § 261.3</a>	<p>A solid waste is a hazardous waste if it is not excluded from regulation as a hazardous waste and it meets any of the following criteria:</p> <ul style="list-style-type: none"> <li>It exhibits any of the characteristics of hazardous waste including ignitability, corrosivity, reactivity or toxicity (from subpart C of the part).</li> <li>It is a listed waste in subpart D of the part and has not been excluded in subpart D.</li> <li>It is a mixture of solid waste and one or more hazardous wastes listed in subpart D.</li> <li>Used oil containing more than 1000 ppm total halogens.</li> </ul> <p>See the part for more detailed information on specific materials categorized as hazardous waste.</p>

Hog Fuel	<a href="#">40 CFR § 63.7575</a>	Included under the definition of biomass or bio-based solid fuel. Any biomass-based solid fuel that is not a solid waste. This includes, but is not limited to, wood residue; wood products (e.g., trees, tree stumps, tree limbs, bark, lumber, sawdust, sander dust, chips, scraps, slabs, millings, and shavings); animal manure, including litter and other bedding materials; vegetative agricultural and silvicultural materials, such as logging residues (slash), nut and grain hulls and chaff (e.g., almond, walnut, peanut, rice, and wheat), bagasse, orchard pruning's, corn stalks, coffee bean hulls and grounds. This definition of biomass is not intended to suggest that these materials are or are not solid waste.
Industrial Fire Precaution Levels	<a href="#">ODF IFPL Restrictions</a>	Stages of restrictions that apply to permitted, commercial, and industrial operations on forest lands, including personal firewood cutting. These restrictions are in place to reduce the risk of wildfire.
Lignins	<a href="#">National Library of Medicine</a>	The most abundant natural aromatic organic polymer found in all vascular plants. Lignin together with cellulose and hemicellulose are the major cell wall components of the fibers of all wood and grass species. Lignin is composed of coniferyl, p-coumaryl, and sinapyl alcohols in varying ratios in different plant species.
Logging slash	<a href="#">OAR 330-170-0020(110)</a> <a href="#">OAR 340-264-0030(28)</a>	(11) "Slash" means material from trees and woody plants, including limbs, tops, needles, leaves and other woody parts, grown in a forest, woodland, farm, rangeland or wildland-urban interface environment and collected at the harvest site.  (28) "Slash" means forest debris or woody vegetation to be burned that is related to the management of forest land used for growing and harvesting timber.
National Pollutant Discharge Elimination System (NPDES)	<a href="#">NPDES Program</a>	As authorized by the CWA, the NPDES permit program protects the nation's waters by controlling the discharge of pollutants into waters of the United States. Such discharges are illegal unless authorized by an NPDES permit. The NPDES permit program requires all point source discharges of pollutants (other than dredged or fill material regulated under Section 404 of the CWA) to waters of the United States to have a permit, the term of which may not exceed five years. The term "NPDES-regulated facilities," as used in this rule, refers broadly to entities regulated under the Clean Water Act, including permittees under CWA section 402 along with the biosolids program, indirect dischargers, and non-discharging entities with permits.

Non-attainment Area	<a href="#">40 CFR §51.491</a> <a href="#">OAR 340-200-0020(97)</a>	<p>CFR: Nonattainment area means any area of the country designated by the EPA at 40 CFR part 81 in accordance with section 107(d) of the Act as nonattainment for one or more criteria pollutants. An area could be a nonattainment area for some pollutants and an attainment area for other pollutants.</p> <p>OAR: Nonattainment area means a geographical area of the state, as designated by the EQC or the EPA, that exceeds any state or federal primary or secondary ambient air quality standard. Nonattainment areas are designated by the EQC according to division 204.</p>
Opacity	<a href="#">40 CFR § 63.2</a>	Opacity means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background. For continuous opacity monitoring systems, opacity means the fraction of incident light that is attenuated by an optical medium.
Portable Source	<a href="#">OAR 340-200-122</a>	Designed and capable of being carried or moved from one location to another. Indicia of portability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.
Process Water / Process Wastewater	<a href="#">40 CFR § 122.2</a>	Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.
Silviculture	<a href="#">USFS Forest Management</a>	Silviculture is the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society such as wildlife habitat, timber, water resources, restoration, and recreation on a sustainable basis.
Slash	<a href="#">OAR 340-264-0030(28)</a>	"Slash" means forest debris or woody vegetation to be burned that is related to the management of forest land used for growing and harvesting timber.
Small Generating Plant	<a href="#">OAR 345-001-0210</a>	<p>One or more electric power generating devices that:</p> <p>(A) Have a combined nominal electric generating capacity of more than 3 megawatts and a combined average electric generating capacity of less than 35 megawatts;</p> <p>(B) Are connected to a common switching station or are constructed maintained or operated as a contiguous group of devices; and</p> <p>(C) Are owned by a single person or entity or subsidiaries of a single entity;</p>

Smoke Management Plan	<a href="#">ORS 477.013</a> <a href="#">OAR 629-048</a>	For the purpose of maintaining air quality, the State Forester and the Department of Environmental Quality shall approve a plan for the purpose of managing smoke in areas they shall designate. The plan shall delineate regulated areas to which this section applies. The plan shall also include but not be limited to considerations of weather, volume of material to be burned, distance of the burning from designated areas, burning techniques and provisions for cessation of further burning under adverse air quality conditions. All burning permitted within the regulated areas shall be according to the plan. The plan shall be developed by the State Forestry Department in cooperation with federal and state agencies, landowners and organizations that will be affected by the plan. The approved plan shall be filed with the Secretary of State and may thereafter be amended in the same manner as its formation.
Solid Waste	<a href="#">ORS 459-005(25)</a>	All useless or discarded putrescible and nonputrescible materials, including but not limited to garbage, rubbish, refuse, ashes, paper and cardboard, sewage sludge, septic tank and cesspool pumpings or other sludge, useless or discarded commercial, industrial, demolition and construction materials, discarded or abandoned vehicles or parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semisolid materials, dead animals and infectious waste as defined in ORS 459.386. Solid waste does not include: (a) Hazardous waste as defined in ORS 466.005. (b) Materials used for fertilizer or for other productive purposes or which are salvageable as such materials are used on land in agricultural operations and the growing or harvesting of crops and the raising of animals. (c) Woody biomass that is combusted as a fuel by a facility that has obtained a permit described in ORS 468A.040.
Solid Waste Authorization Letter (SWLA)	<a href="#">OAR 340-093-0050(5)</a>	Oregon Administrative Rule (OAR) 340-93-0050(5) authorizes the Oregon Department of Environmental Quality to issue a short-term Solid Waste Letter Authorization, if DEQ determines that a proposed or existing disposal site is not likely to create a public nuisance, health hazard, air or water pollution or other environmental problem. They may be issued for a period not to exceed six months.
Stationary Source	<a href="#">OAR 340-200-172</a>	Any building, structure, facility, or installation at a source that emits or may emit any regulated pollutant.
Tannins	<a href="#">USFS Ethnobotany</a>	Tannins are complex chemical substances derived from phenolic acids (sometimes called tannic acid). They are classified as phenolic compounds, which are found in many species of plants, from all climates and all parts of the globe. Tannins are found commonly in the bark of trees, wood, leaves, buds, stems, fruits, seeds, roots, and plant galls. In all of these plant structures, tannins help to protect the individual plant species. Tannins that become stored in the bark of trees protect the tree from being infected by bacteria or fungi.
Title V Permit	<a href="#">OAR 340-200-0010(105)</a>	Oregon Title V Operating Permit program source or "Title V source" means any source subject to the permitting requirements, OAR chapter 340, division 218.

Visible Emissions	<a href="#">40 CFR § 49.123</a>	Visible emissions mean air pollutants in sufficient amount to be observable to the human eye.
Wastes	<a href="#">OAR 340-045(31)</a>	Sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive, or other substances, that will or may cause or tend to cause pollution of any waters of the state.
Waters of the State	<a href="#">ORS 468B.005(10)</a>	“Water” or “the waters of the state” include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.
Woody Biomass	<a href="#">ORS 526.005(10)(a) 459.005(31) [woody biomass is not solid waste if the facility has an air permit]</a>	Material from trees and woody plants, including limbs, tops, needles, leaves and other woody parts, grown in a forest, woodland, farm, rangeland or wildland-urban interface environment that is the by-product of forest management, ecosystem restoration or hazardous fuel reduction treatment. Woody biomass does not mean: <ul style="list-style-type: none"> <li>● Wood pieces that have been treated with creosote, pentachlorophenol, copper chrome arsenic or other chemical preservatives;</li> <li>● Wood that must be retained under state or federal regulations;</li> <li>● Wood required for large woody debris recruitment; or</li> <li>● Municipal solid waste.</li> </ul>

## References

BUPG Section	Title/Resource	URL
<b>2 - Background</b>	Biomass Energy and Biofuels from Oregon's Forests	<a href="https://oregonforests.org/sites/default/files/2017-08/Biomass_Full_Report_0.pdf">https://oregonforests.org/sites/default/files/2017-08/Biomass_Full_Report_0.pdf</a>
<b>6.1 - Air Curtain Incinerator</b>	The Use of Air Curtain Destructors for Fuel Reduction and Disposal	<a href="https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html">https://www.fs.usda.gov/t-d/pubs/html/05511303/05511303.html</a>
<b>6.1 - Air Curtain Incinerator</b>	Figure 1: Air Curtain Incinerator Diagram	<a href="https://www.oregon.gov/deq/aq/cao/Pages/Air-Curtain-Incinerators.aspx">https://www.oregon.gov/deq/aq/cao/Pages/Air-Curtain-Incinerators.aspx</a>
<b>6.1.2 - Environmental concerns and how they are addressed</b>	USDA Soil and Water Management Research - Biochar	<a href="https://www.ars.usda.gov/midwest-area/stpaul/swmr/people/kurt-spokas/biochar/">https://www.ars.usda.gov/midwest-area/stpaul/swmr/people/kurt-spokas/biochar/</a>
<b>6.1.2 - Environmental concerns and how they are addressed</b>	Figure 2: Air Curtain Incinerator Inputs and Outputs	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.1.3 - Air emissions</b>	Table 2: Air Curtain Incinerator Permit Conditions	<a href="https://www.oregon.gov/deq/FilterPermitsDocs/AQGP-031.pdf">https://www.oregon.gov/deq/FilterPermitsDocs/AQGP-031.pdf</a>
<b>6.2 - Grinding / Masticating / Chipping</b>	Figure 3: Grinding, Chipping, and Masticating Inputs and Outputs	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.3 - Gasification/Pyrolysis/Torrefaction</b>	Figure 4: General Process Flow for Gasification, Pyrolysis, and Torrefaction	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.4 - Pelletization</b>	Figure 5: General Process Flow for Pelletization Plants	<a href="https://extension.psu.edu/manufacturing-fuel-pellets-from-biomass">https://extension.psu.edu/manufacturing-fuel-pellets-from-biomass</a>
<b>6.5 - Burners and Heaters</b>	Table 3: Heating Value for Common Biomass Materials	Developed by the Biomass Utilization Working Group, Permitting Guide Subgroup
<b>6.7 - Conversion to biofuels, renewable natural gas, and hydrogen</b>	General Resource for this section from the Office of Energy Efficiency & Renewable Energy	<a href="https://www.energy.gov/eere/bioenergy/biofuel-basics#:~:text=During%20pyrolysis%2C%20biomass%20is%20heated,%E2%80%9Cbio%2Dcrude%E2%80%9D%20oil">https://www.energy.gov/eere/bioenergy/biofuel-basics#:~:text=During%20pyrolysis%2C%20biomass%20is%20heated,%E2%80%9Cbio%2Dcrude%E2%80%9D%20oil</a>
<b>6.7 - Conversion to biofuels, renewable natural gas, and hydrogen</b>	General Resource for this section from the Office of Energy Efficiency & Renewable Energy	<a href="https://www.energy.gov/eere/bioenergy/conversion-technologies">https://www.energy.gov/eere/bioenergy/conversion-technologies</a>
<b>6.8.1 - Diesel Engines</b>	Table 4: Exhaust Emission Standards	<a href="https://www.ecfr.gov/current/title-40/chapter-I/subchapter-U/part-1039/subpart-B/section-1039.101">https://www.ecfr.gov/current/title-40/chapter-I/subchapter-U/part-1039/subpart-B/section-1039.101</a>
<b>6.8.3 – Water tender</b>	USFS Research – Mobile Biochar Production by Flame Carbonization: Reducing Wildfire Risk and Improving Forest Resilience	<a href="https://research.fs.usda.gov/treesearch/67944">https://research.fs.usda.gov/treesearch/67944</a>
<b>6.8.3 - Figure 6: USFS Industrial Fire Precaution Levels</b>	ODF Industrial Fire Precaution Guidelines	<a href="https://www.oregon.gov/odf/fire/documents/industrial-fire-precaution-levels.pdf">https://www.oregon.gov/odf/fire/documents/industrial-fire-precaution-levels.pdf</a>
<b>6.8.3 - Water tender</b>	Figure 6: USFS Industrial Fire Precaution Levels	<a href="https://www.fs.usda.gov/detail/rogue-siskiyou/fire/?cid=fseprd545253#:~:text=There">https://www.fs.usda.gov/detail/rogue-siskiyou/fire/?cid=fseprd545253#:~:text=There</a>



		<a href="#">%20are%20four%20Industrial%20Fire,to%20the%20closed%20fire%20season</a>
<b>8.2.1 - Air Quality Program</b>	Figure 8: Oregon's Class I Areas and the Columbia River Gorge Scenic Area	<a href="#">GIS Layers available at: https://www.oregon.gov/deq/FilterDocs/AQMaintenanceAreas.zip</a>
<b>8.2.1 - Air Quality Program</b>	Oregon Maintenance Area Maps	<a href="#">https://www.Oregon.gov/deq/aq/Pages/Maintenance-Areas.aspx</a>
<b>8.2.1 - Air Quality Program</b>	Figure 9: Oregon's NAAQS Maintenance and Non-attainment Areas	<a href="#">GIS Layers available at: https://www.oregon.gov/deq/FilterDocs/AQMaintenanceAreas.zip</a>
<b>8.5 - United States Forest Service</b>	Figure 12: Oregon Class I Areas	<a href="#">https://www.oregon.gov/deq/aq/Documents/OverviewRegionalHaze.pdf</a>