United States Environmental Protection Agency
Region 10, Office of Air, Waste and Toxics
AWT-150
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

Permit Number: R10T5-WA-03-01M4
Issued: May 6, 2016
Effective: May 6, 2016
Expiration: June 9, 2008
Replaces: R10T5-WA-03-01M3
AFS Plant I.D. Number: 16-061-00002

Statement of Basis

Title V Air Quality Operating Permit
Modification No. 4

Permit Writer: Dan Meyer

Omak Forest Products, LLC

Colville Reservation
Omak, Washington

Purpose of Permit and Statement of Basis

Title 40 Code of Federal Regulations Part 71 establishes a comprehensive air quality operating permit program under the authority of Title V of the 1990 amendments to the federal Clean Air Act. The air quality operating permit is an enforceable compilation of all of the applicable air pollution requirements that apply to an existing affected air emissions source. The permit is developed via a public process, may contain additional new requirements to improve monitoring of existing requirements, and contains procedural and prohibitory requirements related to the permit program itself. The permit is valid for five years and may be renewed.

This document, the statement of basis, summarizes the legal and factual basis for the permit conditions in the revised air quality operating permit to be issued to Omak Forest Products, LLC (referred to herein as OFP, facility, source, or permittee). Unlike the air quality operating permit, this document is not legally enforceable. The permittee is obligated to follow the terms of the permit. Any errors or omissions in the summaries provided here do not excuse the permittee from the requirements of the permit.

Scope of Application

Pursuant to the requirements of 40 CFR § 71.11(b), this statement of basis (SB) serves to describe the bases for changes to certain permit conditions from the prior Title V permit to operate issued on February 18, 2016 to Omak Forest Products, LLC (OFP).[1] The bases for unchanged permit conditions remain as documented in the February 18, 2016 SB. Today's permitting action was initiated in response to a request received November 4, 2015 to modify the Title V permit. The request is part of a broader Title V renewal application submitted by the former operator and permittee Omak Wood Products, LLC (OWP).[2] The EPA is not acting upon the broader Title V permit renewal application at this time, but intends to do so in the near future.

This statement of basis addresses changes to the permit proposed and explained by the permittee in the following excerpts from the November 4, 2015 Title V renewal application:

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Request: Revise conditions III.A.1.b and c as follows:

Condition III.A.1.b (first sentence) currently reads: "All veneer dryer emissions shall be vented to one or both boilers' combustion chambers at all times that veneer dryers operate." Revise this sentence to read:

> "Vent all emissions from the veneer dryer heated sections to the Boiler 1 combustion chamber at all times the veneer dryers operate."

Condition III.A.1.c currently reads: "The boilers shall be operated at all times that veneer dryer emissions are vented to the boilers' combustion chambers. An electrical interlock (veneer dryer lockout) must be installed and maintained such that the veneer dryers cannot be operated unless at least one boiler is operating." Revise the condition to read:

> "Operate Boiler 1 at all times veneer dryer heated section emissions are vented to the boiler combustion chamber. Install and maintain an electrical interlock (veneer dryer lockout) such that the veneer dryers cannot operate unless Boiler 1 is operating."

These revisions are necessary to clarify the veneer dryer venting requirement and to reflect the removal of Boiler 2 from the permit. The OWP veneer dryer control system was designed and built to control emissions from the veneer dryer heated sections. Each dryer has three heated sections followed by one cooling section. After the drying stage, veneer passes through a dead air space and enters the cooling section, where ambient air is circulated to reduce the veneer temperature. Circulation air from the cooling section is vented to atmosphere through three stacks. Veneer passes through the cooling section in approximately 30 seconds and then exits the dryer for sorting.

[1] The February 18, 2016 permit issuance was the reissuance of the existing part 71 permit for the facility to OFP, the new operator of the facility. The June 2003 permit issued to Colville Indian Plywood and Veneer underwent a significant permit modification on May 24, 2005, and was first transferred to Omak Wood Products, Inc., as the new operator of the facility on July 2, 2013, and then most recently to OFP as the current operator of the facility in the February 18, 2016 permit action.

[2] The November 4, 2015 Title V renewal application replaced the previous December 6, 2007 Title V renewal application submitted by former operator and permittee Colville Indian Plywood and Veneer.

The cooling section does not actually dry the veneer. Circulating ambient air in the cooling section allows personnel to safely handle the veneer and prevents the plywood resin from setting too quickly on the layup line. OWP believes that the only reasonable reading of condition III.A.1.b is to require venting of the veneer dryer heated sections, and therefore seeks to have the condition make this clear. Venting cooling section emissions would be impractical and unwarranted for the reasons summarized below.

Technical infeasibility: Venting exhaust from the veneer dryer heated sections is possible because the gases are hot, allowing them to be conveyed via a 1,000-foot pipe to the boiler without condensing water and organic vapors. Introducing ambient air from the cooling sections to the veneer dryer control system would result in heated section gases (water vapor and organics) condensing and collecting inside the pipe, which eventually would clog and/or collapse the pipe. Also, the additional ambient air conveyed to the boiler combustion chamber would significantly reduce boiler operating efficiency and create unsafe operating conditions. OWP is not aware of any other plywood mill in the country that vents cooling section circulation air to a boiler or emission control device.

Low emissions: EPA and industry studies indicate that VOC emissions from veneer dryer cooling sections are negligible compared to VOC emissions from the heated sections. National Council for Air and Stream Improvement (NCASI) collected emission data from several veneer dryers (heating and cooling sections) indicate that over 95 percent of total VOC emissions from a veneer dryer derive from the heating sections.[1]

Plywood MACT requirements: Although OWP is not classified as a major source of Hazardous Air Pollutants (HAPs), EPA's Plywood MACT rule for major sources is relevant to this issue because it reflects EPA's approach to controlling emissions from plywood mills. EPA's National Emission Standard for Plywood and Composite Wood Products (40 C.F.R. § 63, Subpart DDDD, also referred to as "Plywood MACT" or "PCWP MACT") requires control of only the heated sections of softwood veneer dryers and specifically excludes cooling section emissions from both emission limits and control requirements.[2]

[1] NCASI Technical Bulletin 768, Volatile Organic Compound Emissions from Wood Products Manufacturing Facilities, Part I – Plywood, January 1999.
[2] Examples in 40 C.F.R. § 63.2241(c), 63.2265, Table 1A, Table 1B, and Table 6.

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Request: Delete condition III.A.1.f , which imposes an hourly production-based limit.

Condition III.A.1.f limits each veneer dryer to 16,320 sf/hour, 3/8" basis. As discussed in Proposed Revision 3, the facility no longer requires limits to keep its potential to emit below the PSD major source threshold. The 16,320 sf/hour production-based limit is not correlated to, nor necessary to ensure, emissions compliance.

OWP will continue to track monthly veneer dryer throughput for calculating monthly HAP emissions from the facility, but the hourly veneer dryer throughput limit in condition III.A.1.f is no longer necessary and should be removed. Removing the limit also addresses the fact that it is an invalid gauge of emissions due the fact that it counts redried and regraded plywood as production even though those activities have low to no emissions.

Application Review – Maintaining the Veneer Dryers' Synthetic Minor Limits

On June 10, 2003, EPA issued the mill its initial Title V permit. The permit contained synthetic minor limits on emissions to enable construction of two veneer dryers replacing existing veneer dryers at the facility without issuance of a PSD permit. At the time the part 71 permit was issued in 2003, there was no mechanism other than a Part 71 permit for a source in Indian Country to apply for and obtain synthetic minor source limits to avoid the applicability of major source programs. EPA issued that initial Title V permit and created veneer dryer synthetic minor emission limits so that the dryers' combined potential to emit would be less than PSD review thresholds. That initial Title V permit created daily and 12-month rolling PM, PM_{10} and VOC limits on veneer dryer emissions.[3] EPA also created requirements, including the ones in Conditions III.A.1.b, c and f, to help ensure the mill's compliance with the daily and 12-month rolling emission limits. For a thorough discussion of this topic, see section 5.1.5 of the June 10, 2003 SB.

Condition III.A.1.b requires the mill to vent all veneer dryer emissions to one of two on-site boilers. Given that the permit condition refers to "all" veneer dryer emissions and the specific reference to emissions from the "cooling section" in the table in Section 4.2 of the June 10, 2003 SB, EPA believes that "veneer dryer emissions" under the permit includes those resulting from drying the veneer, cooling the veneer and leaks from door seals. The permittee requests EPA to revise Condition III.A.1.b such that only emissions resulting from veneer drying (generated within the heating section and not associated with leaks) be required to be vented to an on-site boiler's combustion chamber. Closely related Condition III.A.1.c requires that the mill operate a boiler at all times veneer dryer emissions are vented to it, and requires installation of equipment preventing operation of veneer dryers unless a boiler is operating. The permittee requests that Condition III.A.1.c be revised to reflect that the mill is required to operate the boiler at all times emissions resulting from veneer drying (generated within the heating section and not associated with leaks) are vented to it. And finally, Condition III.A.1.f prohibits the mill from operating either veneer dryer such that hourly veneer dryer production for each exceeds 16,320 square feet (3/8-inch basis) per hour. The permittee requests this operating restriction be discontinued.

It is possible to accommodate the permittee's request for operational flexibility while maintaining the veneer dryers' synthetic minor emission limits. This is accomplished by revising the compliance demonstration for the 12-month rolling emission limits in a number of ways, beginning with the accounting of veneer dryer emissions resulting from cooling the veneer and door seal leaks. The appendix to this SB details the estimation of these test-derived wood-species-specific emission factors for veneer cooling and door seal leaks. Uncontrolled emissions from these components of the veneer dryer are accounted for by specifying these factors in the permit and requiring associated emissions be calculated monthly based upon wood-species-specific veneer dryer throughput. See proposed Condition III.C for the accounting of veneer dryer emissions attributable to cooling veneer, and see Condition III.D for the emissions contribution of door seal leaks. See appendix to the proposed permit for a listing of the emission factors.

In addition to improving accounting of uncontrolled emissions, the compliance demonstration is also being updated to improve the accounting of veneer drying emissions (generated within the heating section and not associated with leaks) vented to boiler RSB-1.[4] The accounting of these controlled emissions is being improved based upon (a) boiler RSB-1's recently confirmed ability to reduce veneer drying emissions by at least 93.4 percent[5], and (b) wood-species-specific testing of uncontrolled emissions performed both at the mill and at a similar source. The appendix to this SB details the estimation of these

[3] The Title V permit was later modified in May 2005, in part, to discontinue the veneer dryer PSD-avoidance daily emission limits.

[4] The proposed permit no longer authorizes the mill to vent veneer drying emissions to boiler RSB-2.

[5] September 18, 2014 Avogadro Group, LLC emissions testing report documenting boiler RSB-1 PM_{10} emissions while combusting veneer dryer heating section emissions. April 7, 2015 email from Environ's Kyle Heitkamp to EPA's Dan Meyer.

species-specific emission factors. The emissions are accounted for by specifying the factors in the permit and requiring associated emissions be calculated monthly based upon wood-species-specific veneer dryer throughput. See proposed Condition III.B for the accounting of veneer drying emissions. See appendix to the proposed permit for a listing of the emission factors.

The representativeness of the "controlled" veneer drying emission factors is dependent upon the mill continuing to operate boiler RSB-1 and its associated multiclone MC-1 and wet scrubber WS-1 in much the same way as was operated during the July 2014 emissions test. Conditions III.1.g through j of the existing permit prescribe how RSB-1 and WS-1 are to be operated with respect to the following performance indicators: exhaust opacity (downstream of wet scrubber), exhaust oxygen content, exhaust temperature and pressure drop across the wet scrubber. Requiring the mill to operate RSB-1, MC-1 and WS-1 in much the same was as was observed during the July 2014 emissions test furthers the representativeness of the "controlled" emission factor. This helps to ensure that the mill will continue to comply with the overarching 12-month rolling veneer dryer emission limits. Thus, EPA is proposing to revise Conditions III.1.g through j to reflect more recent performance observations, and EPA is proposing to add multiclone pressure drop as a performance indicator.

With the improvements to the permit as described in the analysis above, all veneer dryer emissions are included in determining compliance with the 12-month rolling veneer dryer PM, PM_{10} and VOC numerical synthetic minor emission limits established in 2003. EPA anticipates that the mill will be able to continue to comply with the limits as evidenced by the following presentation extracted from the appendix to this SB:

Omak Forest Products Veneer Dryers Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing the Following Representative Mix of Wood Species with Uncontrolled Leaks, Uncontrolled Cooling Section & 93.4% Reduction of Heating Section Emissions Across Boiler/Multiclone/Wet Scrubber, (tons per year)

Non-Resinous Softwood (%):	10
Resinous Softwood, Non-Pine (%):	80
Resinous Softwood, Pine (%):	10

Pollutant	Emission Generating Activity[1]			Total	12-Month Rolling Limits
	Heating Section	Cooling Section	Leaks		
PM	0.5	0.3	0.6	1.3	3.8
PM_{10}	0.8	0.4	1.0	2.3	14.5
WPP1 VOC	4.1	3.9	0.4	8.4	19.9

[1] The entire veneer dryer is considered a single emission unit. Its component emissions have been presented separately to aid in understanding.

Given the assumptions in the above somewhat realistic operating scenario (it is not realistic that a veneer dryer operates each hour of the year), the veneer dryers' combined hourly production rate would need to more than double from 32.64 msf/hr (3/8" basis) to more than 65 msf/hr (3/8" basis) before emissions would begin to approach the 12-month rolling emission limits.[6] Regardless of whether it is remotely possible for the mill to double the veneer dryers' production, the proposed permit is designed to ensure that the mill continues to comply with the veneer dryers' 12-month rolling numerical synthetic minor emission limits established in 2003.

EPA is removing sections III.A.2 (Testing Requirements) and III.A.4 (Reporting Requirements) of the

[6] 1.3 tpy PM less than one-half of 3.8 tpy limit, 2.3 tpy PM_{10} less than one-half of 14.5 tpy limit, and 8.4 tpy VOC less than one-half 19.9 tpy limit.

permit related to the veneer dryer synthetic minor limits. All conditions within those sections of the existing permit have been fulfilled and are no longer applicable.

Public Participation

The proposed changes to the permit do not qualify as an administrative amendment (criteria at 40 CFR § 71.7(d)) or as a minor modification (criteria at 40 CFR § 71.7(e)). The EPA is therefore processing the proposed changes using the significant permit modification procedures specified at 40 CFR § 71.7(e)(3), thus ensuring public participation in decisionmaking.

As required in 40 CFR §§ 71.11(a)(5) and 71.8, all draft operating permits must be publicly noticed and made available for public comment. The public notice of permit actions and public comment period is described in 40 CFR § 71.11(d). There is a 30 day public comment period for actions pertaining to a draft permit. For this permit action, the requirements of 40 CFR §§ 71.11(a)(5) and 71.8 were satisfied as follows:

1. Publishing the public notice for this draft permit in a daily or weekly newspaper of general circulation in the area affected by this source. In this case, hardcopy publication was provided in the weekly Omak-Okanogan Chronicle on April 6, 2016, and in the weekly Tribal Tribune a day later on April 7.

2. Providing a copy of the public notice to: the permit applicant, the affected states, the air pollution control agencies of affected states, the Tribal, city and county executives, any comprehensive land use planning agency, any state or federal land manager whose lands may be affected by emissions from the source, the local emergency planning authorities which have jurisdiction over the area where the source is located and all persons who submitted a written request to be included on Region 10's mailing list for Title V permitting actions;

3. Making available from April 6, 2016 through May 5, 2016, on the Region 10 public notice website [http://yosemite.epa.gov/R10/homepage.nsf/Information/R10PN/] during the public comment period, a copy of the public notice and the draft permit and statement of basis prepared by Region 10;

4. Making available from April 6, 2016 through May 5, 2016, at the locations listed below, a copy of the public notice, draft permit, the statement of basis, the application, and relevant supporting materials:

Omak Public Library 30 Ash Street South Omak, Washington (509) 826-1820	Colville Tribes Library 12 Lake Street Nespelem, Washington (509) 634-2791	U.S. EPA, Region 10 Public Library 1200 Sixth Avenue Seattle, Washington (206) 553-1289

The public comment period for this permit ran from April 6, 2016 to May 5, 2016 during which time EPA received no comments. EPA received no request for public hearing, and therefore none was held. As required in 40 CFR 71.11(i), EPA will notify the applicant of the final permit decision.

Appendix

EPA Estimation of Omak Forest Products, LLC PM, PM_{10} and VOC Air Pollutant Emission Factors and Annual Emissions for Veneer Dryers

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Omak, Washington

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Omak Forest Products Veneer Dryers Non-HAP PTE (Processing Resinous Softwood Pine - Worst Case) w/o PSD Avoidance Limits, (tons per year)

Pollutant	Emission Generating Activity[1]			Total	PSD SER
	Heating Section	Cooling Section	Leaks		
PM	7.9	0.1	0.7	8.7	25
PM_{10}	26.2	0.2	2.5	28.8	15
WPP1 VOC	261.9	1.6	0.6	264.0	40

The above table illustrates that the 2003 project would have been a major modification for PM_{10} and VOC without the PSD avoidance limits appearing in the Title V permit.

Omak Forest Products Veneer Dryers Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Non-Resinous Softwood (e.g. white fir) with Uncontrolled Leaks, Uncontrolled Cooling Section & 93.4% Reduction of Heating Section Emissions Across Boiler/Multiclone/Wet Scrubber, (tons per year)

Pollutant	Emission Generating Activity[1]			Total	12-Month Rolling Limits
	Heating Section	Cooling Section	Leaks		
PM	0.4	0.9	0.3	1.6	3.8
PM_{10}	0.8	1.5	0.4	2.7	14.5
WPP1 VOC	2.4	4.2	0.4	7.0	19.9

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Omak Forest Products Veneer Dryers Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Non-Pine (e.g. douglas fir) with Uncontrolled Leaks, Uncontrolled Cooling Section & 93.4% Reduction of Heating Section Emissions Across Boiler/Multiclone/Wet Scrubber, (tons per year)

Pollutant	Emission Generating Activity[1]			Total	12-Month Rolling Limits
	Heating Section	Cooling Section	Leaks		
PM	0.5	0.2	0.6	1.3	3.8
PM_{10}	0.7	0.3	0.9	2.0	14.5
WPP1 VOC	2.7	4.1	0.4	7.1	19.9

Omak Forest Products Veneer Dryers Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Pine (e.g. ponderosa pine) with Uncontrolled Leaks, Uncontrolled Cooling Section & 93.4% Reduction of Heating Section Emissions Across Boiler/Multiclone/Wet Scrubber, (tons per year)

Pollutant	Emission Generating Activity[1]			Total	12-Month Rolling Limits
	Heating Section	Cooling Section	Leaks		
PM	0.5	0.1	0.7	1.3	3.8
PM_{10}	1.7	0.2	2.5	4.4	14.5
WPP1 VOC	17.3	1.6	0.6	19.4	19.9

Omak Forest Products Veneer Dryers Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing the Following Representative Mix of Wood Species with Uncontrolled Leaks, Uncontrolled Cooling Section & 93.4% Reduction of Heating Section Emissions Across Boiler/Multiclone/Wet Scrubber, (tons per year)

Non-Resinous Softwood (%): 10
Resinous Softwood, Non-Pine (%): 80
Resinous Softwood, Pine (%): 10

Pollutant	Emission Generating Activity[1]			Total	12-Month Rolling Limits
	Heating Section	Cooling Section	Leaks		
PM	0.5	0.3	0.6	1.3	3.8
PM_{10}	0.8	0.4	1.0	2.3	14.5
WPP1 VOC	4.1	3.9	0.4	8.4	19.9

[1] The entire veneer dryer is considered a single emission unit. Its component emissions have been presented separately to aid in understanding.

Appendix: PM, PM10 and VOC Emission Factors and Annual Emissions for Veneer Dryers

Omak Forest Products PM, PM_{10} and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat with 93.4% Emissions Reduction from Heating Section via Boiler/Multiclone/Wet Scrubber

Dryer Activity[1]	PM lb/msf 3/8"	PM_{10} lb/msf 3/8"	WPP1 VOC lb/msf 3/8"
Species: Non-Resinous Softwood (e.g. white fir, western hemlock and western red cedar)			
Heating	3.07E-03	5.27E-03	1.66E-02
Cooling	6.12E-03	1.05E-02	2.95E-02
Leaking	1.83E-03	3.14E-03	2.60E-03
Species: Resinous Softwood Non-Pine Family (e.g. douglas fir, engelman spruce and larch)			
Heating	3.34E-03	5.13E-03	1.87E-02
Cooling	1.58E-03	2.43E-03	2.86E-02
Leaking	4.20E-03	6.46E-03	2.60E-03
Species: Resinous Softwood Pine Family (e.g. lodgepole pine, ponderosa pine and western white pine)			
Heating	3.63E-03	1.21E-02	1.21E-01
Cooling	3.55E-04	1.18E-03	1.12E-02
Leaking	5.18E-03	1.72E-02	3.90E-03

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Dryer Activity	PM lb/msf 3/8"	PM_{10} lb/msf 3/8"	WPP1 VOC lb/msf 3/8"
Heating	3.63E-03	1.21E-02	1.21E-01
Cooling	6.12E-03	1.05E-02	2.95E-02
Leaking	5.18E-03	1.72E-02	3.90E-03

[1] The entire veneer dryer is considered a single emission unit. Its component emissions have been presented separately to aid in understanding.

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Heating Section Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Non-Resinous Softwood (e.g. white fir) with 93.4% Emissions Reduction Across Boiler/Multiclone/Wet Scrubber

Emission Unit: **Veneer Dryers No. 1 and No. 2 Heating Sections (VDHS-1&2)**
Description: Heating section from two softwood veneer dryers; VDHS-1 and 2.
Control Device: Boiler RSB-1 equipped with multiclone MC-1 and wet scrubber WS-1
Wood Species: Non-resinous softwood (e.g. white fir, western hemlock and western red cedar)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year
RSB-1 Control Efficiency: 93.4 percent

Non-Hazardous Air Pollutants	Uncontrolled EF (lb/msf 3/8")	Uncontrolled Annual Emissions (lb/msf 3/8")	Controlled EF (lb/msf 3/8")	Controlled Annual Emissions (tpy)	EF Reference
PM	4.65E-02	6.6	3.07E-03	0.4	1 - measurement of Omak Forest Products (OFP) VDHS emissions in duct upstream of control device while processing "white wood" as defined by CIPV to include, "lodgepole pine, spruce, and a mix of subalpine fir and other true firs." Pine and spruce are not non-resinous softwood while subalpine and other true firs are. Assume that white fir (a true fir) was being processed during test based upon test result's RM25A measurements as compared to results of higher-emitting resinuous species. The degree of uncertainty surrounding this assumption is unknown.
PM_{10}	7.99E-02	11.4	5.27E-03	0.8	1 - measurement of OFP VDHS emissions in duct upstream of control device while processing "white wood" as defined by CIPV to include, "lodgepole pine, spruce, and a mix of subalpine fir and other true firs." Pine and spruce are not non-resinous softwood while subalpine and other true firs are. Assume that white fir (a true fir) was being processed during test based upon test result's RM25A measurements as compared to results of higher-emitting resinuous species. The degree of uncertainty surrounding this assumption is unknown.
WPP1 VOC	2.51E-01	35.9	1.66E-02	2.4	1 - measurement of OFP VDHS emissions in duct upstream of control device while processing "white wood" as defined by CIPV to include, "lodgepole pine, spruce, and a mix of subalpine fir and other true firs." Pine and spruce are not non-resinous softwood while subalpine and other true firs are. Assume that white fir (a true fir) was being processed during test based upon test result's RM25A measurements as compared to results of higher-emitting resinuous species. The degree of uncertainty surrounding this assumption is unknown.

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1	February 2008 emissions testing of OFP VDHS exhaust upstream of control device while processing "white wood." See May 12, 2015, April 7, 2015 and May 7, 2014 email from Environ's Kyle Heitkamp to EPA Region 10's Dan Meyer. See also April 25, 2014 letter from OFP's David Niessner to EPA Region 10's Don Dossett. OFP WPP1 VOC calculations adjusted to account for contribution of acetaldehyde.

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Cooling Section Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Non Resinous Softwood (e.g. white fir)

Emission Unit: **Veneer Dryers No. 1 and No. 2 Cooling Sections (VDCS-1&2)**
Description: Cooling section from two softwood veneer dryers; VDCS-1 and 2.
Control Device: None
Wood Species: Non-resinous softwood (e.g. white fir, western hemlock and western red cedar)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year

Non-Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
PM	6.12E-03	0.9	1 & 2 - EF estimate for processing "white wood."[1]
PM_{10}	1.05E-02	1.5	1 & 2 - EF estimate for processing "white wood."[1]
WPP1 VOC	2.95E-02	4.2	2 - measurement of emissions from similar source processing white fir.

EF Reference	Description
R10T5-WA-03-01M4	February 2008 emissions testing of Omak Forest Products (OFP) VDHS exhaust upstream of control device while processing "white wood." See May 12, 2015, April 7, 2015 and May 7, 2014 email from Environ's Kyle Heitkamp to EPA Region 10's Dan Meyer. See also April 25, 2014 letter from OFP's David Niessner to EPA Region 10's Don Dossett.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

[1] EPA Region 10 is not aware of any emissions testing to measure PM or PM_{10} emissions resulting from veneer dryer cooling section. EPA Region 10 has estimated what these emissions might be based upon (1) measurement of PM and PM_{10} emissions generated by OFP veneer dryer heating section while processing "white wood" assumed white fir, (2) measurement of WPP1 VOC emissions generated by veneer dryer heating section and veneer dryer cooling section at similar source to OFP while processing white fir, and (3) assumption that PM/PM_{10} emissions across the two emission generating activities (veneer dryer heating section and veneer dryer cooling section) are proportional to WPP1 VOC emissions. The degree of uncertainty surrounding this assumption is unknown.

VDCS-1&2 PM EF estimation: VDCS-1&2 PM EF = (VDHS-1&2 PM EF) X (VDCS-1&2 WPP1 VOC EF) / (VDHS-1&2 WPP1 VOC EF)
Average VDCS-1&2 WPP1 VOC EF (NCASI TB No. 768 - white fir measurement): 2.95E-02
Average VDHS-1&2 WPP1 VOC EF (NCASI No. 768 - white fir measurement): 2.24E-01
VDCS-1&2 PM EF (calculated): 6.12E-03
VDHS-1&2 PM EF (2008 OFP - "white wood" assumed white fir measurement): 4.65E-02

VDCS-1&2 PM_{10} EF estimation: VDCS-1&2 PM_{10} EF = (VDHS-1&2 PM_{10} EF) X (VDCS-1&2 WPP1 VOC EF) / (VDHS-1&2 WPP1 VOC EF)
Average VDCS-1&2 WPP1 VOC EF (NCASI TB No. 768 - white fir measurement): 2.95E-02
Average VDHS-1&2 WPP1 VOC EF (NCASI No. 768 - white fir measurement): 2.24E-01
VDCS-1&2 PM_{10} EF (calculated): 1.05E-02
VDHS-1&2 PM_{10} EF (2008 OFP - "white wood" assumed white fir measurement): 7.99E-02

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Leak Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Non-Resinous Softwood (e.g. white fir)

Emission Unit: **Veneer Dryers No. 1 and No. 2 Leaks (VDL-1&2)**
Description: Leaks from two softwood veneer dryers; VDL-1 and 2.
Control Device: None
Wood Species: Non-resinous softwood (e.g. white fir, western hemlock and western red cedar)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year

Non-Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
PM	1.83E-03	0.3	1 & 2 - EF estimate for processing white fir.[1]
PM_{10}	3.14E-03	0.4	1 & 2 - EF estimate for processing white fir.[1]
VOC (only methanol measured)	2.60E-03	0.4	2 - EF estimate based upon measurement of HAP emissions from similar source processing ponderosa pine and douglas fir (douglas fir contribution backed out). No RM25A testing performed. Methanol only one of 20 HAP detected. EF underestimates VOC emissions given that measurement of VOC (e.g. terpenes) outside of 20 HAP not performed. White fir (a less-VOC-emitting wood species) EF assumed equal to douglas fir EF. The degree of uncertainty surrounding this assumption is unknown.

Hazardous Air Pollutants	EF (lb/msf 3/8")	PTE (tpy)	EF Reference
Methanol	2.60E-03	0.4	2 - EF estimate based upon measurement of HAP emissions from similar source processing ponderosa pine and douglas fir (douglas fir contribution backed out). No RM25A testing performed. Methanol only one of 20 HAP detected. EF underestimates VOC emissions given that measurement of VOC (e.g. terpenes) outside of 20 HAP not performed. White fir (a less-VOC-emitting wood species) EF assumed equal to douglas fir EF. The degree of uncertainty surrounding this assumption is unknown.

EF Reference	Description
1	February 2008 emissions testing of Omak Forest Products (OFP) VDHS exhaust upstream of control device while processing "white wood." See May 12, 2015, April 7, 2015 and May 7, 2014 email from Environ's Kyle Heitkamp to EPA Region 10's Dan Meyer. See also April 25, 2014 letter from OFP's David Niessner to EPA Region 10's Don Dossett.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

[1] EPA Region 10 is not aware of any emissions testing to measure PM or PM_{10} emissions resulting from veneer dryer leaks. EPA Region 10 has estimated what these emissions might be based upon (1) measurement of PM and PM_{10} emissions generated by OFP veneer dryer heating section while processing "white wood" assumed white fir, (2) measurement of methanol emissions generated by veneer dryer heating section and veneer dryer leaks at similar source to OFP while processing douglas fir - assumed to generate same emissions as white fir (for veneer dryer leaks, douglas fir contribution backed out due to co-processing of ponderosa pine and douglas fir), and (3) assumption that PM/PM_{10} emissions across the two emission generating activities (veneer dryer heating section and veneer dryer leaks) are proportional to methanol emissions. The degree of uncertainty surrounding assumptions is unknown.

VDL-1&2 PM EF estimation: VDL-1&2 PM EF = (VDHS-1&2 PM EF) X (VDL-1&2 Methanol EF) / (VDHS-1&2 Methanol EF)
Average VDL-1&2 Methanol EF (NCASI TB No. 768 - "backed out" douglas fir measurement): 2.40E-03 — VDL-1&2 PM EF (calculated): 1.83E-03
Average VDHS-1&2 Methanol EF (NCASI TB No. 768 - white fir measurement): 6.10E-02 — VDHS-1&2 PM EF (2014 OFP - "white wood" assumed white fir measurement): 4.65E-02

VDL-1&2 PM_{10} EF estimation: VDL-1&2 PM_{10} EF = (VDHS-1&2 PM_{10} EF) X (VDL-1&2 Methanol EF) / (VDHS-1&2 Methanol EF)
Average VDL-1&2 Methanol EF (NCASI TB No. 768 - "backed out" douglas fir measurement): 2.40E-03 — VDL-1&2 PM_{10} EF (calculated): 3.14E-03
Average VDHS-1&2 Methanol EF (NCASI TB No. 768 - white fir measurement): 6.10E-02 — VDHS-1&2 PM_{10} EF (2014 OFP - "white wood" assumed white fir measurement): 7.99E-02

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Heating Section Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Non-Pine (e.g. douglas fir) with 93.4% Emissions Reduction Across Boiler/Multiclone/Wet Scrubber

Emission Unit: **Veneer Dryers No. 1 and No. 2 Heating Sections (VDHS-1&2)**
Description: Heating section from two softwood veneer dryers; VDHS-1 and 2.
Control Device: Boiler RSB-1 equipped with multiclone MC-1 and wet scrubber WS-1
Wood Species: Resinous softwood non-pine (e.g. douglas fir, engelman spruce and larch)

Assumed Combined Operating Rate:	32.64	msf/hr
Operation:	8760	hours per year
RSB-1 Control Efficiency:	93.4	percent

Non-Hazardous Air Pollutants	Uncontrolled EF (lb/msf 3/8")	Uncontrolled Annual Emissions (lb/msf 3/8")	Controlled EF (lb/msf 3/8")	Controlled Annual Emissions (tpy)	EF Reference
PM	5.06E-02	7.2	3.34E-03	0.5	1 - measurement of Omak Forest Products (OFP) VDHS emissions in duct upstream of control device while processing "red wood" as defined by CIPV to include, "douglas fir and western larch." Both of these species are resinous softwood, non-pine.
PM_{10}	7.78E-02	11.1	5.13E-03	0.7	1 - measurement of OFP VDHS emissions in duct upstream of control device while processing "red wood" as defined by CIPV to include, "douglas fir and western larch." Both of these species are resinous softwood, non-pine.
WPP1 VOC	2.84E-01	40.6	1.87E-02	2.7	1 - measurement of OFP VDHS emissions in duct upstream of control device while processing "red wood" as defined by CIPV to include, "douglas fir and western larch." Both of these species are resinous softwood, non-pine.

R10T5-WA-03-01M4	Description
1	February 2008 emissions testing of OFP VDHS exhaust upstream of control device while processing "red wood." See May 12, 2015, April 7, 2015 and May 7, 2014 email from Environ's Kyle Heitkamp to EPA Region 10's Dan Meyer. See also April 25, 2014 letter from OFP's David Niessner to EPA Region 10's Don Dossett. OFP calculations adjusted to account for contribution of acetaldehyde to WPP1 VOC.

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Cooling Section Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Non-Pine (e.g. douglas fir)

Emission Unit: **Veneer Dryers No. 1 and No. 2 Cooling Sections (VDCS-1&2)**
Description: Cooling section from two softwood veneer dryers; VDCS-1 and 2.
Control Device: None
Wood Species: Resinous softwood non-pine (e.g. douglas fir, engelman spruce and larch)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year

Non-Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
PM	1.58E-03	0.2	1 & 2 - EF estimate for processing "red wood."[1]
PM_{10}	2.43E-03	0.3	1 & 2 - EF estimate for processing "red wood."[1]
WPP1 VOC	2.86E-02	4.1	2 - measurement of emissions from similar source processing douglas fir.

EF Reference	Description
R10T5-WA-03-01M4	February 2008 emissions testing of Omak Forest Products (OFP) VDHS exhaust upstream of control device while processing "red wood." See May 12, 2015, April 7, 2015 and May 7, 2014 email from Environ's Kyle Heitkamp to EPA Region 10's Dan Meyer. See also April 25, 2014 letter from OFP's David Niessner to EPA Region 10's Don Dossett.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

[1] EPA Region 10 is not aware of any emissions testing to measure PM or PM_{10} emissions resulting from veneer dryer cooling section. EPA Region 10 has estimated what these emissions might be based upon (1) measurement of PM and PM_{10} emissions generated by OFP veneer dryer heating section while processing "red wood", (2) measurement of WPP1 VOC emissions generated by veneer dryer heating section and veneer dryer cooling section at similar source to OFP while processing douglas fir, and (3) assumption that PM/PM_{10} emissions across the two emission generating activities (veneer dryer heating section and veneer dryer cooling section) are proportional to WPP1 VOC emissions. The degree of uncertainty surrounding this assumption is unknown.

VDCS-1&2 PM EF estimation: VDCS-1&2 PM EF = (VDHS-1&2 PM EF) X (VDCS-1&2 WPP1 VOC EF) / (VDHS-1&2 WPP1 VOC EF)
Average VDCS-1&2 WPP1 VOC EF (NCASI TB No. 768 - douglas fir measurement): 1.96E-02
Average VDHS-1&2 WPP1 VOC EF (NCASI No. 768 - douglas fir measurement): 6.27E-01
VDCS-1&2 PM EF (calculated): 1.58E-03
VDHS-1&2 PM EF (2008 OFP - "red wood" measurement): 5.06E-02

VDCS-1&2 PM_{10} EF estimation: VDCS-1&2 PM_{10} EF = (VDHS-1&2 PM_{10} EF) X (VDCS-1&2 WPP1 VOC EF) / (VDHS-1&2 WPP1 VOC EF)
Average VDCS-1&2 WPP1 VOC EF (NCASI TB No. 768 - douglas fir measurement): 1.96E-02
Average VDHS-1&2 WPP1 VOC EF (NCASI No. 768 - douglas fir measurement): 6.27E-01
VDCS-1&2 PM_{10} EF (calculated): 2.43E-03
VDHS-1&2 PM_{10} EF (2008 OFP - "red wood" measurement): 7.78E-02

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Leak Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Non-Pine (e.g. douglas fir)

Emission Unit: **Veneer Dryers No. 1 and No. 2 Leaks (VDL-1&2)**
Description: Leaks from two softwood veneer dryers; VDL-1 and 2.
Control Device: None
Wood Species: Resinous softwood non-pine (e.g. douglas fir, engelman spruce and larch)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year

Non-Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
PM	4.20E-03	0.6	1 & 2 - EF estimate for processing douglas fir.[1]
PM_{10}	6.46E-03	0.9	1 & 2 - EF estimate for processing douglas fir.[1]
VOC	2.60E-03	0.4	2 - EF estimate based upon measurement of HAP emissions from similar source processing ponderosa pine and douglas fir (douglas fir contribution backed out). No RM25A testing performed. Methanol only one of 20 HAP detected. EF underestimates VOC emissions given that measurement of VOC (e.g. terpenes) outside of 20 HAP not performed.

Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
Methanol	2.60E-03	0.4	2 - EF estimate based upon measurement of HAP emissions from similar source processing ponderosa pine and douglas fir (douglas fir contribution backed out). No RM25A testing performed. Methanol only one of 20 HAP detected. EF underestimates VOC emissions given that measurement of VOC (e.g. terpenes) outside of 20 HAP not performed.

EF Reference	Description
1	February 2008 emissions testing of Omak Forest Products (OFP) VDHS exhaust upstream of control device while processing "red wood." See May 12, 2015, April 7, 2015 and May 7, 2014 email from Environ's Kyle Heitkamp to EPA Region 10's Dan Meyer. See also April 25, 2014 letter from OFP's David Niessner to EPA Region 10's Don Dossett.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

[1] EPA Region 10 is not aware of any emissions testing to measure PM or PM_{10} emissions resulting from veneer dryer leaks. EPA Region 10 has estimated what these emissions might be based upon (1) measurement of PM and PM_{10} emissions generated by OFP veneer dryer heating section while processing douglas fir, (2) measurement of methanol emissions generated by veneer dryer heating section and veneer dryer leaks at similar source to OFP while processing douglas fir (for veneer dryer leaks, douglas fir contribution backed out due to co-processing of ponderosa pine and douglas fir), and (3) assumption that PM/PM_{10} emissions across the two emission generating activities (veneer dryer heating section and veneer dryer leaks) are proportional to methanol emissions. The degree of uncertainty surrounding this assumption is unknown.

VDL-1&2 PM EF estimation: VDL-1&2 PM EF = (VDHS-1&2 PM EF) X (VDL-1&2 Methanol EF) / (VDHS-1&2 Methanol EF)
Average VDL-1&2 Methanol EF (NCASI TB No. 768 - "backed out" douglas fir measurement): 2.40E-03
Average VDHS-1&2 Methanol EF (NCASI TB No. 768 - douglas fir measurement): 2.89E-02
VDL-1&2 PM EF (calculated): 4.20E-03
VDHS-1&2 PM EF (2014 OFP - "red wood" measurement): 5.06E-02

VDL-1&2 PM_{10} EF estimation: VDL-1&2 PM_{10} EF = (VDHS-1&2 PM_{10} EF) X (VDL-1&2 Methanol EF) / (VDHS-1&2 Methanol EF)
Average VDL-1&2 Methanol EF (NCASI TB No. 768 - "backed out" douglas fir measurement): 2.40E-03
Average VDHS-1&2 Methanol EF (NCASI TB No. 768 - douglas fir measurement): 2.89E-02
VDL-1&2 PM_{10} EF (calculated): 6.46E-03
VDHS-1&2 PM_{10} EF (2014 OFP - "red wood" measurement): 7.78E-02

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Heating Section Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Pine (e.g. ponderosa pine) with 93.4% Emissions Reduction Across Boiler/Multiclone/Wet Scrubber

Emission Unit: **Veneer Dryers No. 1 and No. 2 Heating Sections (VDHS-1&2)**
Description: Heating section from two softwood veneer dryers; VDHS-1 and 2.
Control Device: Boiler RSB-1 equipped with multiclone MC-1 and wet scrubber WS-1
Wood Species: Resinous softwood pine (e.g. lodgepole pine, ponderosa pine and western white pine)

Assumed Combined Operating Rate:	32.64	msf/hr
Operation:	8760	hours per year
RSB-1 Control Efficiency:	93.4	percent

Non-Hazardous Air Pollutants	Uncontrolled EF (lb/msf 3/8")	Uncontrolled Annual Emissions (lb/msf 3/8")	Controlled EF (lb/msf 3/8")	Controlled Annual Emissions (tpy)	EF Reference
PM	5.50E-02	7.9	3.63E-03	0.5	1 - measurement of Omak Forest Products (OFP) VDHS emissions in duct upstream of control device while processing ponderosa pine.
PM_{10}	1.83E-01	26.2	1.21E-02	1.7	1 - measurement of OFP VDHS emissions in duct upstream of control device while processing ponderosa pine.
WPP1 VOC	1.83E+00	261.9	1.21E-01	17.3	2 - measurement of emissions from similar source processing ponderosa pine.

R10T5-WA-03-01M4	Description
1	September 18, 2014 Avogadro Group emissions test report, page 18 of 20.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Cooling Section Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Pine (e.g. ponderosa pine)

Emission Unit: **Veneer Dryers No. 1 and No. 2 Cooling Sections (VDCS-1&2)**
Description: Cooling section from two softwood veneer dryers; VDCS-1 and 2.
Control Device: None
Wood Species: Resinous softwood pine (e.g. lodgepole pine, ponderosa pine and western white pine)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year

Non-Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
PM	3.55E-04	0.1	1 & 2 - EF estimate for processing ponderosa pine.[1]
PM_{10}	1.18E-03	0.2	1 & 2 - EF estimate for processing ponderosa pine.[1]
WPP1 VOC	1.12E-02	1.6	2 - measurement of emissions from similar source processing ponderosa pine and douglas fir (ponderosa pine contribution backed out).

EF Reference	Description
R10T5-WA-03-01M4	July 2014 emissions testing of Omak Forest Products (OFP) VDHS exhaust upstream of control device while processing ponderosa pine.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

[1] EPA Region 10 is not aware of any emissions testing to measure PM or PM_{10} emissions resulting from veneer dryer cooling section. EPA Region 10 has estimated what these emissions might be based upon (1) measurement of PM and PM_{10} emissions generated by OFP veneer dryer heating section while processing ponderosa pine, (2) measurement of WPP1 VOC emissions generated by veneer dryer heating section and veneer dryer cooling section at similar source to OFP while processing ponderosa pine (for veneer dryer cooling section, ponderosa pine contribution backed out due to co-processing of ponderosa pine and douglas fir), and (3) assumption that PM/PM_{10} emissions across the two emission generating activities (veneer dryer heating section and veneer dryer cooling section) are proportional to WPP1 VOC emissions. The degree of uncertainty surrounding this assumption is unknown.

VDCS-1&2 PM EF estimation: VDCS-1&2 PM EF = (VDHS-1&2 PM EF) X (VDCS-1&2 WPP1 VOC EF) / (VDHS-1&2 WPP1 VOC EF)
Average VDCS-1&2 WPP1 VOC EF (NCASI TB No. 768 - "backed out" ponderosa pine measurement): 1.12E-02
Average VDHS-1&2 WPP1 VOC EF (NCASI No. 768 - ponderosa pine measurement): 1.73E+00
VDCS-1&2 PM EF (calculated): 3.55E-04
VDHS-1&2 PM EF (2014 OFP - ponderosa pine measurement): 5.50E-02

VDCS-1&2 PM_{10} EF estimation: VDCS-1&2 PM_{10} EF = (VDHS-1&2 PM_{10} EF) X (VDCS-1&2 WPP1 VOC EF) / (VDHS-1&2 WPP1 VOC EF)
Average VDCS-1&2 WPP1 VOC EF (NCASI TB No. 768 - "backed out" ponderosa pine measurement): 1.12E-02
Average VDHS-1&2 WPP1 VOC EF (NCASI No. 768 - ponderosa pine measurement): 1.73E+00
VDCS-1&2 PM_{10} EF (calculated): 1.18E-03
VDHS-1&2 PM_{10} EF (2014 OFP - ponderosa pine measurement): 1.83E-01

Appendix: PM, PM_{10} and VOC Emission Factors and Annual Emissions for Veneer Dryers

Veneer Dryer Leak Air Pollutant Emission Factors and Annual Emissions (assuming 8760 hr/yr operation at 32.64 msf 3/8"/hr) Processing Resinous Softwood Pine (e.g. ponderosa pine)

Emission Unit: **Veneer Dryers No. 1 and No. 2 Leaks (VDL-1&2)**
Description: Leaks from two softwood veneer dryers; VDL-1 and 2.
Control Device: None
Wood Species: Resinous softwood pine (e.g. lodgepole pine, ponderosa pine and western white pine)
Assumed Combined Operating Rate: 32.64 msf/hr
Operation: 8760 hours per year

Non-Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
PM	5.18E-03	0.7	1 & 2 - EF estimate for processing ponderosa pine.[1]
PM_{10}	1.72E-02	2.5	1 & 2 - EF estimate for processing ponderosa pine.[1]
VOC	3.90E-03	0.6	2 - EF estimate based upon measurement of HAP emissions from similar source processing ponderosa pine and douglas fir (ponderosa pine contribution backed out). No RM25A testing performed. Methanol only one of 20 HAP detected. EF underestimates VOC emissions given that measurement of VOC (e.g. terpenes) outside of 20 HAP not performed.

Hazardous Air Pollutants	EF (lb/msf 3/8")	Annual Emissions (tpy)	EF Reference
Methanol	3.90E-03	0.6	2 - measurement of emissions from similar source processing ponderosa pine and douglas fir (ponderosa pine contribution backed out).

EF Reference	Description
1	July 2014 emissions testing of Omak Forest Products (OFP) VDHS exhaust upstream of control device while drying ponderosa pine.
2	EPA Region 10 HAP and VOC Emission Factors for Veneer Dryer Employing Indirect Steam Heat without Air Pollution Controls, February 2016. See http://www.epa.gov/sites/production/files/2016-03/documents/veneer-dryer-hap-voc-emissionfactors.pdf

[1] EPA Region 10 is not aware of any emissions testing to measure PM or PM_{10} emissions resulting from veneer dryer leaks. EPA Region 10 has estimated what these emissions might be based upon (1) measurement of PM and PM_{10} emissions generated by OFP veneer dryer heating section while processing ponderosa pine, (2) measurement of methanol emissions generated by veneer dryer heating section and veneer dryer leaks at similar source to OFP while processing ponderosa pine (for veneer dryer leaks, ponderosa pine contribution backed out due to co-processing of ponderosa pine and douglas fir), and (3) assumption that PM/PM_{10} emissions across the two emission generating activities (veneer dryer heating section and veneer dryer leaks) are proportional to methanol emissions. The degree of uncertainty surrounding this assumption is unknown.

VDL-1&2 PM EF estimation: VDL-1&2 PM EF = (VDHS-1&2 PM EF) X (VDL-1&2 Methanol EF) / (VDHS-1&2 Methanol EF)
Average VDL-1&2 Methanol EF (NCASI TB No. 768 - "backed out" ponderosa pine measurement): 3.70E-03
Average VDHS-1&2 Methanol EF (NCASI No. 768 - ponderosa pine measurement): 3.93E-02
VDL-1&2 PM EF (calculated): 5.18E-03
VDHS-1&2 PM EF (2014 OWP - ponderosa pine measurement): 5.50E-02

VDL-1&2 PM_{10} EF estimation: VDL-1&2 PM_{10} EF = (VDHS-1&2 PM_{10} EF) X (VDL-1&2 Methanol EF) / (VDHS-1&2 Methanol EF)
Average VDL-1&2 Methanol EF (NCASI TB No. 768 - "backed out" ponderosa pine measurement): 3.70E-03
Average VDHS-1&2 Methanol EF (NCASI No. 768 - ponderosa pine measurement): 3.93E-02
VDL-1&2 PM_{10} EF (calculated): 1.72E-02
VDHS-1&2 PM_{10} EF (2014 OWP - ponderosa pine measurement): 1.83E-01