# Appendix A

## Potential Emissions Inventory

Last Revised: July 31, 2020

Statement of Basis

Title V Operating Permit

R10T5120100

Yakama Forest Products
White Swan, Washington

# Appendix A: Potential Emissions Inventory

**Summary of Facility Non-HAP Potential to Emit**

**Non-Fugitive Emissions[1], (tons per year)**

| | Boilers | Kilns | Cyclones | Bins | MNFA | MFA | PT | Tanks | |
|---|---|---|---|---|---|---|---|---|---|
| | Boilers #1-4 | Kilns #1-11 | Cyclones #1-4 | Bins #1-7 | Miscellaneous Non-Fugitive Activities | Miscellaneous Fugitive Activities | Plant Traffic | Tanks | **Non-Fugitive Subtotal** |
| Carbon Monoxide (CO) | 41.6 | | | | | | | | 42 |
| Lead (Pb) | 0.0 | | | | | | | | 0 |
| Nitrogen Oxides ($NO_X$) | 72.1 | | | | | | | | 72 |
| Particulate (PM)[2] | 1.1 | 5.1 | 16.3 | 0.09 | 26.1 | | | | 49 |
| Inhalable Coarse Particulate ($PM_{10}$) | 3.9 | 5.1 | 13.9 | 0.04 | 13.1 | | | | 36 |
| Fine Particulate ($PM_{2.5}$) | 3.9 | 5.1 | 8.2 | 0.01 | 6.5 | | | | 24 |
| Sulfur Dioxide ($SO_2$) | 8.3 | | | | | | | | 8 |
| Volatile Organic Compounds (VOC) | 5.5 | 257.2 | 14.0 | | | | | 0.0 | 277 |
| Greenhouse Gas ($CO_2e$) | 69,320 | | | | | | | | 69,320 |

**Fugitive Emissions, (tons per year)**

| | Boilers | Kilns | Cyclones | Bins | MNFA | MFA | PT | Tanks | |
|---|---|---|---|---|---|---|---|---|---|
| | Boilers #1-4 | Kilns #1-11 | Cyclones #1-4 | Bins #1-7 | Miscellaneous Non-Fugitive Activities | Miscellaneous Fugitive Activities | Plant Traffic | Tanks | **Fugitive Subtotal** |
| Carbon Monoxide (CO) | | | | | | | | | 0 |
| Lead (Pb) | | | | | | | | | 0 |
| Nitrogen Oxides ($NO_X$) | | | | | | | | | 0 |
| Particulate (PM)[2] | | | | 0.13 | | 22.8 | 165.9 | | 189 |
| Respirable Particulate ($PM_{10}$) | | | | 0.06 | | 11.4 | 40.1 | | 52 |
| Fine Particulate ($PM_{2.5}$) | | | | 0.01 | | 5.7 | 6.5 | | 12 |
| Sulfur Dioxide ($SO_2$) | | | | | | | | | 0 |
| Volatile Organic Compounds (VOC) | | | | | | | | 0.4 | 0 |
| Greenhouse Gas ($CO_2e$) | | | | | | | | | 0 |

**Total Non-Fugitive and Fugitive Emissions, (tons per year)**

| | Boilers | Kilns | Cyclones | Bins | MNFA | MFA | PT | Tanks | |
|---|---|---|---|---|---|---|---|---|---|
| | Boilers #1-4 | Kilns #1-11 | Cyclones #1-4 | Bins #1-7 | Miscellaneous Non-Fugitive Activities | Miscellaneous Fugitive Activities | Plant Traffic | Tanks | **Plantwide PTE** |
| Carbon Monoxide (CO) | 41.6 | | | | | | | | 42 |
| Lead (Pb) | 0.00 | | | | | | | | 0 |
| Nitrogen Oxides ($NO_X$) | 72.1 | | | | | | | | 72 |
| Particulate (PM)[2] | 1.1 | 5.1 | 16.3 | 0.2 | 26 | 22.8 | 165.9 | | 238 |
| Respirable Particulate ($PM_{10}$) | 3.9 | 5.1 | 13.9 | 0.1 | 13 | 11.4 | 40.1 | | 88 |
| Fine Particulate ($PM_{2.5}$) | 3.9 | 5.1 | 8.2 | 0.0 | 7 | 5.7 | 6.5 | | 36 |
| Sulfur Dioxide ($SO_2$) | 8.3 | | | | | | | | 8 |
| Volatile Organic Compounds (VOC)[3] | 5.5 | 257.2 | 14.0 | | | | | 0.4 | 277 |
| Greenhouse Gas ($CO_2e$) | 69,320 | | | | | | | | 69,320 |

Notes:

[1] Only non-fugitive emissions are considered for this facility in determining Title V applicability given that it is a sawmill and not one of the 27 listed source categories required to consider fugitive emissions. See definition of "major source" at 40 CFR § 71.2.

[2] PM is not a pollutant considered in determining whether a source is subject to the requirement to obtain a Title V permit; however, PM emissions are considered in determining whether a facility/project is a major PSD source/modification and whether a source is subject to compliance assurance monitoring.

[3] Additional sources of VOC likely exist in the mill, for which emission factors have not yet been identified.

# Appendix A: Potential Emissions Inventory

**Summary of Facility HAP Potential to Emit**

**Total Non-Fugitive and Fugitive Emissions, (tons per year)**

| Hazardous Air Pollutants (HAP) | Boilers #1-4 | Kilns #1-11 | Cyclones #1-4 | Single HAP Plantwide Totals |
|---|---|---|---|---|
| **Trace Metal Compounds** | | | | |
| Arsenic Compounds | 9.95E-05 | | | 9.9E-05 |
| Beryllium Compounds | 5.97E-06 | | | 6.0E-06 |
| Cadmium Compounds | 5.47E-04 | | | 5.5E-04 |
| Chromium Compounds (including hexavalent) | 6.96E-04 | | | 7.0E-04 |
| Cobalt Compounds | 4.18E-05 | | | 4.2E-05 |
| Manganese Compounds | 1.89E-04 | | | 1.9E-04 |
| Mercury Compounds | 1.29E-04 | | | 1.3E-04 |
| Nickel Compounds | 1.04E-03 | | | 1.0E-03 |
| Selenium Compounds | 1.19E-05 | | | 1.2E-05 |
| **Organic Compounds** | | | | |
| Acetaldehyde | | 5.65E+00 | | 5.6E+00 |
| Acrolein | | 0.00E+00 | | 0.0E+00 |
| Acenaphthene* | 8.95E-07 | | | 9.0E-07 |
| Acenaphthylene* | 8.95E-07 | | | 9.0E-07 |
| Anthracene* | 1.29E-06 | | | 1.3E-06 |
| Benz(a)anthracene* | 8.95E-07 | | | 9.0E-07 |
| Benzene | 1.04E-03 | | | 1.0E-03 |
| Benzo(a)pyrene* | 5.97E-07 | | | 6.0E-07 |
| Benzo(b)fluoranthene* | 8.95E-07 | | | 9.0E-07 |
| Benzo(g,h,i)perylene* | 5.97E-07 | | | 6.0E-07 |
| Benzo(k)fluoranthene* | 8.95E-07 | | | 9.0E-07 |
| Chrysene* | 8.95E-07 | | | 9.0E-07 |
| Dibenzo(a,h)anthracene* | 5.97E-07 | | | 6.0E-07 |
| Dichlorobenzene | 5.97E-04 | | | 6.0E-04 |
| 7,12-Dimethylbenz(a)anthracene* | 7.96E-06 | | | 8.0E-06 |
| Fluoranthene* | 1.49E-06 | | | 1.5E-06 |
| Fluorene* | 1.39E-06 | | | 1.4E-06 |
| Formaldehyde | 3.73E-02 | 1.10E+00 | | 1.1E+00 |
| Hexane | 8.95E-01 | | | 9.0E-01 |
| Indeno(1,2,3-cd)pyrene* | 8.95E-07 | | | 9.0E-07 |
| Methanol | | 3.93E+01 | 5.22E-02 | 3.9E+01 |
| 2-Methylnaphthalene* | 1.19E-05 | | | 1.2E-05 |
| 3-Methylchloroanthracene* | 8.95E-07 | | | 9.0E-07 |
| Naphthalene* | 3.03E-04 | | | 3.0E-04 |
| Phenanathrene* | 8.46E-06 | | | 8.5E-06 |
| Polycyclic Organic Matter (POM) | 3.47E-04 | | | 3.5E-04 |
| Proprionaldehyde | | 0.00E+00 | | 0.0E+00 |
| Pyrene* | 2.49E-06 | | | 2.5E-06 |
| Toluene | 1.69E-03 | | | 1.7E-03 |
| TOTAL** | 0.9 | 46.0 | 0.1 | 47.0 |

| | | |
|---|---|---|
| Predicted Highest Plantwide Single HAP | 39.3 | tons per year, methanol |
| Predicted Plantwide HAP Total | 47.0 | tons per year |

* These HAPs are subject to the 10 tons/year major source threshold individually, but are also considered POM that are then, in aggregate, also subject to the 10 tons/year major source threshold.

** Because all of the emitted pollutants that are POMs have already been accounted for individually, the POM calculated PTE has not been included in the totals to avoid double-counting. Other sources of HAPs likely exist in the mill, for which emission factors have not yet been identified. When emission factors become available, additional sources will be added.

# Appendix A: Potential Emissions Inventory

**Non-HAP Potential to Emit**

Emission Unit: **Boilers #1-4**

Description: Two Superior brand boilers are located in the SLM, and two Superior brand are located in the LLM.
SLM: Model # 6-5-3000, Serial # 13796, 24.92 mmBTU/hr; and Model # 7-4-2500, Serial # 14159, 24.92 mmBTU/hr
LLM: both Model # 6-5-5000, Serial # 14921 and 14922, both 33 mmBtu/hr

Maximum Steam Production: SLM: 20,700 and 21,562 lb/hr = 42,736 pph total
LLM: 26,368 lb/hr each = 52,736 pph total
LLM boiler steam flow estimated based on original design heat-input-to-steam-output ratio = 33 mmBtu x (33,000 pph / 41.3 mmBtu) = 26,368 pph steam

Control Device: None

Fuel: Propane (assume SLM boilers are converted to propane from oil)

Startup: SLM: 1998 and 2001; and LLM: 2002

Design Maximum Heat Input Capacity: 115.84 MMBtu/hr (total for all four)
1.27 mgal/hr (assuming 91.5 mmBtu/mgal from AP-42, Section 1.5.3.1)

Operation: 8,760 hours per year

**NON-FUGITIVE EMISSIONS**

| Criteria Pollutant Emissions | EF (lb/mgal) | PTE (tpy) | EF References and Notes |
|---|---|---|---|
| Carbon Monoxide (CO) | 7.5 | 41.6 | AP-42, Table 1.5-1 |
| Lead (Pb) | 0 | 0.0 | No lead emissions are expected from propane combustion. |
| Nitrogen Oxides ($NO_X$) | 13 | 72.1 | AP-42, Table 1.5-1 |
| Particulate (PM) | 0.2 | 1.1 | AP-42, Table 1.5-1 (filterable only) |
| Inhalable Coarse Particulate ($PM_{10}$) | 0.7 | 3.9 | AP-42, Table 1.5-1 (assumed to be similar to natural gas where all PM is <1 micron diameter - see AP-42, Table 1.4-2) |
| Fine Particulate ($PM_{2.5}$) | 0.7 | 3.9 | AP-42, Table 1.5-1 (assumed to be similar to natural gas where all PM is <1 micron diameter - see AP-42, Table 1.4-2) |
| Sulfur Dioxide ($SO_2$) | 1.5 | 8.3 | AP-42, Table 1.5-1: EF = 0.10S, where S is the sulfur content expressed in grains per 100 cf gas vapor. For PTE purposes, the sulfur content is assumed to be 15 grains/100 cf gas vapor based on the Gas Processors Association liquefied petroleum gas standard of 185 ppmw at standard conditions: 185 ppmw x 44 (MW of propane) x 0.001845 = 15. The actual S content is often much lower to meet corrosion specifications. |
| Volatile Organic Compounds (VOC) | 1.0 | 5.5 | AP-42, Table 1.5-1 (TOC): assume TOC adequately represents VOC for propane combustion |

**NON-FUGITIVE EMISSIONS**

| Greenhouse Gas Emissions ($CO_2$ Equivalent) | EF (lb/mgal) | PTE (tpy) | EF Reference and Notes |
|---|---|---|---|
| Carbon Dioxide ($CO_2$) | 12,500 | 69,314 | AP-42, Table 1.5-1 |
| Methane ($CH_4$) | 0.2 | 1.1 | AP-42, Table 1.5-1 |
| Nitrous Oxide ($N_2O$) | 0.9 | 5.0 | AP-42, Table 1.5-1 |
| TOTAL | | 69,320 | |

# Appendix A: Potential Emissions Inventory

## Non-HAP Potential to Emit

Emission Unit: **Kilns #1-11**
Description: Lumber drying; the permits limits pine drying to less than 200ºF
Control Device: None
Work Practice Requirements: None
Fuel: None - indirect steam provided by propane fired boilers
Predominant Species Dried: Douglas Fir, Ponderosa Pine, Western True Fir
Installed: SLM: #1-3 1997, #4 2001; LLM: #5-9 2002, #10-11 2005
Annual Capacity: See table below; values are in mbf/yr and represent the maximum amount that can be dried if only that species is dried all year. Values were calculated by YFP using the mill economic maximation model without any limit on hours of operation and were provided to Region 10 on July 23, 2015. The LLM is constrained by steam generation capacity; the SLM is constrained by kiln capacity.

| Mill, Kilns | Western True Fir | Douglas Fir | Ponderosa Pine |
|---|---|---|---|
| SLM, #1-4 | 88,815 | 80,618 | 61,879 |
| LLM, #5-11 | 116,527 | 116,393 | 77,184 |
| Total | 205,342 | 197,011 | 139,063 |

**NON-FUGITIVE EMISSIONS**

| Pollutant Emissions | EF (lb/mbf) | PTE (tpy) | EF Notes |
|---|---|---|---|
| Carbon Monoxide (CO) | 0 | 0.0 | No CO emissions are expected. |
| Lead (Pb) | 0 | 0.0 | No lead emissions are expected. |
| Nitrogen Oxides ($NO_X$) | 0 | 0.0 | No $NO_x$ emissions are expected. |
| Particulate (PM) | 0.05 | 5.1 | Reference 1 - Because the facility has the ability to dry both resinous and non-resinous softwood species, to be conservative the higher of the two EF and capacities (non-resinous, Western True Fir) were selected to determine PTE. Western True Fir is assumed to be the same as White Fir. |
| Respirable Particulate ($PM_{10}$) | 0.05 | 5.1 | Reference 1 - Because the facility has the ability to dry both resinous and non-resinous softwood species, to be conservative the higher of the two EF and capacities (non-resinous, Western True Fir) were selected to determine PTE. Western True Fir is assumed to be the same as White Fir. |
| Fine Particulate ($PM_{2.5}$) | 0.05 | 5.1 | Reference 1 - Because the facility has the ability to dry both resinous and non-resinous softwood species, to be conservative the higher of the two EF and capacities (non-resinous, Western True Fir) were selected to determine PTE. Western True Fir is assumed to be the same as White Fir. |
| Sulfur Dioxide ($SO_2$) | 0 | 0.0 | No $SO_2$ emissions are expected. |
| Volatile Organic Compounds (VOC) | 3.69891 | 257.2 | Reference 2 - Because kiln capacity and emission factors vary with species dried, PTE is based upon the highest emitting combination that is selected considering Western True Fir, Douglas Fir and Ponderosa Pine dried at temperatures of 240ºF, the highest emissions for that temperature is Ponderosad Pine and selected to determine PTE. |

**NON-FUGITIVE EMISSIONS**

| Greenhouse Gas Emissions ($CO_2$ Equivalent) | EF (lb/mbf) | PTE (tpy) | EF Reference |
|---|---|---|---|
| Carbon Dioxide ($CO_2$) | 0 | 0.0 | No carbon dioxide is emitted from the kilns |
| Methane ($CH_4$) | 0 | 0.0 | No methane is emitted from the kilns |
| Nitrous Oxide ($N_2O$) | 0 | 0.0 | No nitrous oxide is emitted from the kilns |
| TOTAL | | 0 | |

EF References

| | |
|---|---|
| 1 | EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country, May 8, 2014. See online at: http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/tvop/. |
| 2 | EPA Region 10 HAP and VOC Emission Factors for Lumber Drying, November 2019. See online at: https://www.epa.gov/sites/production/files/2020-03/documents/epa-region-10-hap-voc-ldk-ef.pdf. VOCs for Pine are calculated at 240ºF. |

# Appendix A: Potential Emissions Inventory

## Non-HAP Potential to Emit

Emission Unit: **Cyclones**

Description: Cyclone C-1 is in the SLM; cyclones C-2, C-3 and C-4 are in the LLM. Cyclone C-1 separates shavings from a pnuematic handling system into Bin SH-1. Cyclone C-2 separates sawdust from a pnuematic handling system onto the hog fuel conveyor belt. Cyclone C-3 separates green chips from a pnuematic handling system into Bin GC-2. Cyclone C-4 separates shavings from a pnuematic handling system into Bin SH-2.

Control Device: none

Capacity: See table below; values were calculated by YFP using the mill economic maximation model without any limit on hours of operation and were provided to Region 10 on July 23, 2015. Material is assumed to be Ponderosa Pine.

| Bin | Mill | Material | | bdt/yr |
|---|---|---|---|---|
| | | | | Pine |
| Cyclone C-1 | SLM | SH | Shavings | 5,731 |
| Cyclone C-2 | LLM | SD | Sanderdust | 13,178 |
| Cyclone C-3 | LLM | GC | Green Chips | 30,986 |
| Cyclone C-4 | LLM | SH | Shavings | 15,344 |

**NON-FUGITIVE EMISSIONS**

| Emissions Generating Activity | Annual Capacity (bdt/yr) | EF | | | | PTE | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PM | $PM_{10}$ | $PM_{2.5}$ | VOC | PM | $PM_{10}$ | $PM_{2.5}$ | VOC |
| | | (lb/bdt) | | | | (tpy) | | | |
| Cyclone C-1 | 5,731 | 0.5 | 0.425 | 0.25 | 0.4283 | 1.43 | 1.22 | 0.72 | 1.23 |
| Cyclone C-2 | 13,178 | 0.5 | 0.425 | 0.25 | 0.4283 | 3.29 | 2.80 | 1.65 | 2.82 |
| Cyclone C-3 | 30,986 | 0.5 | 0.425 | 0.25 | 0.4283 | 7.75 | 6.58 | 3.87 | 6.64 |
| Cyclone C-4 | 15,344 | 0.5 | 0.425 | 0.25 | 0.4283 | 3.84 | 3.26 | 1.92 | 3.29 |
| | | | | | TOTAL | 16.3 | 13.9 | 8.2 | 14.0 |

EF References and Notes

| | |
|---|---|
| PM, $PM_{10}$ and $PM_{2.5}$ | EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country, May 8, 2014. See online at: http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/tvop/. Assume all are medium efficiency. Emissions caused by bin filling below each cyclone is assumed to vent back up through each cyclone. |
| VOC | NCASI Technical Bulletin No. 723, "Laboratory and Limited Field Measurements of VOC Emissions from Wood Residuals," September 1996. To convert emission factor from units of carbon to units of propane, multiply by propane mass conversation factor of 1.2238. The EF for Ponderosa Pine chip handling will be used for all material handling because ponderosa pine generally emits more VOC than Douglas Fir (the other species tested) and chips generally emit less VOC than sawdust and shavings (the Ponderosa Pine chip EF is higher than the Douglas Fir sawdust and shavings EFs). For ponderosa pine chips, 0.35 (lb carbon)/bdt X 1.2238 = 0.4283 (lb VOC as propane)/bdt. The actual Ponderosa Pine sawdust and shavings emission factors are likely higher than chip-derived EF based upon comparative emissions testing data for douglas fir. |

# Appendix A: Potential Emissions Inventory

## Non-HAP Potential to Emit

Emission Unit: **Bins**

Description: Bins are used to store byproducts before shipping in trucks. Bin names ending with a "1" are located in the SLM; bin names ending with a "2" are located in the LLM. Bins SH-1, GC-2 and SH-2 are filled via a cyclone; all other bins are filled via a conveyor. All bins unload to trucks.

Control Device: none

Capacity: See table below; values were calculated by YFP using the mill economic maximation model without any limit on hours of operation and were provided to Region 10 on July 23, 2015. Highest value is used for

| Mill | Material | | bdt/yr | | | |
|---|---|---|---|---|---|---|
| | | | Grand Fir | Douglas Fir | Pine | Highest |
| SLM | HF | hog fuel | 25,577 | 24,264 | 15521 | 25,577 |
| SLM | SD | sawdust | 11,633 | 8,957 | 10890 | 11,633 |
| SLM | GC | green chips | 70,102 | 52,268 | 62171 | 70,102 |
| SLM | DC | dry chips | 5,086 | 4,626 | 3550 | 5,086 |
| SLM | SH | shavings | 8,226 | 7,467 | 5731 | 8,226 |
| LLM | HF | hog fuel | 21,826 | 30,070 | 11,131 | 30,070 |
| LLM | SD | sawdust | 6,684 | 7,987 | 13,178 | 13,178 |
| LLM | GC | green chips | 39,186 | 38,033 | 30,986 | 39,186 |
| LLM | DC | dry chips | 6,674 | 6,409 | 4,430 | 6,674 |
| LLM | SH | shavings | 11,653 | 11,369 | 15344 | 15,344 |

**NON-FUGITIVE EMISSIONS**

| Emissions Generating Activity | Annual Capacity (bdt/yr) | Control Efficiency % | EF | | | PTE | | |
|---|---|---|---|---|---|---|---|---|
| | | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| | | | (lb/bdt) | | | (tpy) | | |
| Bin HF-1 filling | 25,577 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Bin SD-1 filling | 11,633 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Bin GC-1 filling | 70,102 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Bin DC-1 filling | 5,086 | 0 | 0.0015 | 0.0007 | 0.0001 | 0.019 | 0.009 | 0.001 |
| Bin HF-2 filling | 30,070 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Bin SD-2 filling | 13,178 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Bin DC-2 filling | 6,674 | 0 | 0.0015 | 0.0007 | 0.0001 | 0.019 | 0.009 | 0.001 |
| | | | | | | 0.086 | 0.040 | 0.006 |

**FUGITIVE EMISSIONS**

| Emissions Generating Activity | Annual Capacity (bdt/yr) | Control Efficiency % | EF | | | PTE | | |
|---|---|---|---|---|---|---|---|---|
| | | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| | | | (lb/bdt) | | | (tpy) | | |
| Truck loading from Bin HF-1 | 25,577 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Truck loading from Bin SD-1 | 11,633 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Truck loading from Bin GC-1 | 70,102 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Truck loading from Bin DC-1 | 5,086 | 0 | 0.0015 | 0.0007 | 0.0001 | 0.019 | 0.009 | 0.001 |
| Truck loading from Bin SH-1 | 8,226 | 0 | 0.0015 | 0.0007 | 0.0001 | 0.019 | 0.009 | 0.001 |
| Truck loading from Bin HF-2 | 30,070 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Truck loading from Bin SD-2 | 13,178 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Truck loading from Bin GC-2 | 39,186 | 0 | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| Truck loading from Bin DC-2 | 6,674 | 0 | 0.0015 | 0.0007 | 0.0001 | 0.019 | 0.009 | 0.001 |
| Truck loading from Bin SH-2 | 15,344 | 0 | 0.0015 | 0.0007 | 0.0001 | 0.019 | 0.009 | 0.001 |
| | | | | | | 0.134 | 0.063 | 0.009 |

EF References and Notes

| | |
|---|---|
| PM, $PM_{10}$ and $PM_{2.5}$ EF Basis | EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country, May 8, 2014. See online at: http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/tvop/. Emission caused by filling bins that are fed by a cyclone are accounted for with the cyclone emission estimates, not here, because those emission are assumedto vent back up through each cyclone feeding the bin. Emission caused by filling bins using a conveyor belt are accounted for here and assumed to be non-fugitive because they can be readily enclosed and captured. Emission caused by loading trucks from the bins are accounted for here and assumed to be fugitive because it is not as practical to enclose and capture truck loading emissions. |

# Appendix A: Potential Emissions Inventory

## Non-HAP Potential to Emit

Emission Unit: **MNFA**

Description: Miscellaneous Non-Fugitive Activities. Activities occurring inside a building that generate wood residue and dust that is emitted from the buildings thru various building vents. Sawing is the only activity

Controls: 80% Assume 80% reduction in dust emitted due to being inside building

Capacity: See the table below; mbf/yr values are from maximum drying capacity assumptions explained on the kiln emission estimating sheet; tons log/yr values are calculated using the following equation and assumptions:

tons/yr logs = mbf/yr lumber x (1000 bf/mbf) x (1 cf/6.33 bf lumber) x (46 lb/cf logs) x (1 ton/2000 lb)

SLM = 88,815 mbf/yr = 322,709 ton/yr logs

LLM = 116,527 mbf/yr = 423,400 ton/yr logs

**NON-FUGITIVE EMISSIONS**

| | | | EF | | | PTE | | |
|---|---|---|---|---|---|---|---|---|
| | | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| Emissions Generating Activity | Annual Capacity | | (lb/ton log or lb/mbf lumber) | | | (tpy) | | |
| SLM Material Sawing (inside building) | 322,709 | ton/yr logs | 0.35 | 0.175 | 0.0875 | 11 | 6 | 3 |
| LLM Material Sawing (inside building) | 423,400 | ton/yr logs | 0.35 | 0.175 | 0.0875 | 15 | 7 | 4 |
| | | | | | TOTAL | 26 | 13 | 7 |

EF References and Notes:

| | |
|---|---|
| PM, $PM_{10}$ and $PM_{2.5}$ EF Basis: | EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country, May 8, 2014. See online at: http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/tvop/. |

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**Non-HAP Potential to Emit**

Emission Unit: **MFA**

Description: Miscellaneous Fugitive Activities. Activities occurring outside a building or storage structure that generate fugitive dust. Sawing, debarking, hogging, material conveyance and wind erosion are addressed.

Control Device: none

Capacity: See the table below; hog-related capacities are from the material handling capacities calculated on the bin emission estimating sheet; acreage estimates are from YFP website documentation about the plant size; logs processing capacities are calculated using the mbf/yr lumber capacities from the kiln emission estimating sheet and the following equation from the referenced document below:

Logs (tons/yr) = mbf/yr lumber x (1000 bf/mbf) x (1 cf/6.33 bf lumber) x (46 lb/cf logs) x (1 ton/2000 lb)

| | | | | | |
|---|---|---|---|---|---|
| SLM = | 88,815 | mbf/yr | = | 322,709 | ton/yr logs |
| LLM = | 116,527 | mbf/yr | = | 423,400 | ton/yr logs |

**FUGITIVE EMISSIONS**

| Emissions Generating Activity | Annual Capacity | | EF | | | PTE | | |
|---|---|---|---|---|---|---|---|---|
| | | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ |
| | | | (lb/bdt, lb/tons log; lb/acre) | | | (tpy) | | |
| SLM Log cross cut saws | 322,709 | ton/yr logs | 0.035 | 0.0175 | 0.00875 | 5.647 | 2.824 | 1.412 |
| SLM Log debarking | 322,709 | ton/yr logs | 0.024 | 0.012 | 0.006 | 3.873 | 1.936 | 0.968 |
| SLM Conveyance to hog | 25,577 | bdt/yr | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| SLM Hog | 25,577 | bdt/yr | 0.024 | 0.012 | 0.006 | 0.307 | 0.153 | 0.077 |
| SLM Hog conveyance | 25,577 | bdt/yr | 0.00075 | 0.00035 | 0.00005 | 0.010 | 0.004 | 0.001 |
| SLM Log Yards No.'s 1, 2 and 3 (Wind Erosion) | 90.0 | acre-yr | 0.38 | 0.19 | 0.095 | 0.017 | 0.009 | 0.004 |
| LLM Log cross cut saws | 423,400 | ton/yr logs | 0.035 | 0.0175 | 0.00875 | 7.409 | 3.705 | 1.852 |
| LLM Log debarking | 423,400 | ton/yr logs | 0.024 | 0.012 | 0.006 | 5.081 | 2.540 | 1.270 |
| LLM Conveyance to hog | 30,070 | bdt/yr | 0.00075 | 0.00035 | 0.00005 | 0.011 | 0.005 | 0.001 |
| LLM Hog | 30,070 | bdt/yr | 0.024 | 0.012 | 0.006 | 0.361 | 0.180 | 0.090 |
| LLM Hog conveyance | 30,070 | bdt/yr | 0.00075 | 0.00035 | 0.00005 | 0.011 | 0.005 | 0.001 |
| LLM Log Yards No.'s 1, 2 and 3 (Wind Erosion) | 90.0 | acre-yr | 0.38 | 0.19 | 0.095 | 0.017 | 0.009 | 0.004 |
| | | | | | TOTAL | 22.8 | 11.4 | 5.7 |

EF References and Notes:

| | |
|---|---|
| PM, $PM_{10}$ and $PM_{2.5}$ EF Basis: | EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country, May 8, 2014. See online at: http://yosemite.epa.gov/R10/AIRPAGE.NSF/Permits/tvop/. Assume hog emissions are similar to debarking. |

# Appendix A: Potential Emissions Inventory

**Non-HAP Potential to Emit**

Emission Unit: **PT**
Description: Plant Traffic. Fugitive emissions including employyee vehicles, forklifts, log trucks and byproduct trucks on paved and unpaved roads
Controls: Watering, but is not included because it is not required

**FUGITIVE EMISSIONS**

| Vehicle Type (# of vehicles) | Location | Loaded Weight (lbs) | Empty Weight (lbs) | Average Weight (lbs) | Paved Road Emission Factors (lb/VMT) | | | Unpaved Road Emission Factors (lb/VMT) | | | Travel % Paved | Travel % Unpaved | VMT per Year (miles) | VMT Paved Roads (miles) | VMT Unpaved Roads (miles) | Emissions (tpy) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PM | $PM_{10}$ | $PM_{2.5}$ | PM | $PM_{10}$ | $PM_{2.5}$ | | | | | | PM | $PM_{10}$ | $PM_{2.5}$ |
| Employee Vehicles | Plantwide | 5000 | 5000 | 5000 | 0.173 | 0.035 | 0.008 | 3.517 | 1.002 | 0.100 | 100 | 0.000 | 4,636 | 4,636 | 0 | 0.4 | 0.1 | 0.0 |
| Product Loadout | Plantwide | 60000 | 60000 | 60000 | 2.183 | 0.4366 | 0.107 | 10.759 | 3.067 | 0.307 | 100 | 0.000 | 3,709 | 3,709 | 0 | 4.0 | 0.8 | 0.2 |
| H-360 HD forklift | SM-3 | 41200 | 20600 | 30900 | 1.109 | 0.222 | 0.054 | 7.981 | 2.275 | 0.228 | 100 | 0.000 | 6,480 | 6,480 | 0 | 3.6 | 0.7 | 0.2 |
| H-360 HD forklift | PM-3 | 41200 | 20600 | 30900 | 1.109 | 0.222 | 0.054 | 7.981 | 2.275 | 0.228 | 100 | 0.000 | 4,320 | 4,320 | 0 | 2.4 | 0.5 | 0.1 |
| H-360 HD forklift | PM/KILN-3 | 41200 | 20600 | 30900 | 1.109 | 0.222 | 0.054 | 7.981 | 2.275 | 0.228 | 100 | 0.000 | 5,760 | 5,760 | 0 | 3.2 | 0.6 | 0.2 |
| H-360 HD forklift | KILN | 41200 | 20600 | 30900 | 1.109 | 0.222 | 0.054 | 7.981 | 2.275 | 0.228 | 100 | 0.000 | 5,760 | 5,760 | 0 | 3.2 | 0.6 | 0.2 |
| H-280 forklift | SM-2 | 34800 | 17400 | 26100 | 0.934 | 0.187 | 0.046 | 7.397 | 2.109 | 0.211 | 100 | 0.000 | 3,240 | 3,240 | 0 | 1.5 | 0.3 | 0.1 |
| H-280 forklift | PM-2 | 34800 | 17400 | 26100 | 0.934 | 0.187 | 0.046 | 7.397 | 2.109 | 0.211 | 100 | 0.000 | 3,240 | 3,240 | 0 | 1.5 | 0.3 | 0.1 |
| H-190 HD forklift (x 3) | SHIPPING-3 | 26300 | 13150 | 19725 | 0.702 | 0.140 | 0.034 | 6.522 | 1.859 | 0.186 | 100 | 0.000 | 12,960 | 12,960 | 0 | 4.5 | 0.9 | 0.2 |
| H-190 HD forklift (x 2) | PM-3 | 26300 | 13150 | 19725 | 0.702 | 0.140 | 0.034 | 6.522 | 1.859 | 0.186 | 100 | 0.000 | 7,920 | 7,920 | 0 | 2.8 | 0.6 | 0.1 |
| H-190 forklift | PM-2 | 26300 | 13150 | 19725 | 0.702 | 0.140 | 0.034 | 6.522 | 1.859 | 0.186 | 100 | 0.000 | 2,430 | 2,430 | 0 | 0.9 | 0.2 | 0.0 |
| H-190 forklift | PM-SHIP-2 | 26300 | 13150 | 19725 | 0.702 | 0.140 | 0.034 | 6.522 | 1.859 | 0.186 | 100 | 0.000 | 2,700 | 2,700 | 0 | 0.9 | 0.2 | 0.0 |
| H-190 forklift | SHIPPING-2 | 26300 | 13150 | 19725 | 0.702 | 0.140 | 0.034 | 6.522 | 1.859 | 0.186 | 100 | 0 | 2,970 | 2,970 | 0 | 1.0 | 0.2 | 0.1 |
| H-155 Forklift | SM-2 | 13500 | 6750 | 10125 | 0.356 | 0.071 | 0.017 | 4.831 | 1.377 | 0.138 | 100 | 0 | 360 | 360 | 0 | 0.1 | 0.0 | 0.0 |
| LULL forklift | SM-2 | 9000 | 4500 | 6750 | 0.235 | 0.047 | 0.012 | 4.025 | 1.147 | 0.115 | 90 | 10 | 180 | 162 | 18 | 0.1 | 0.0 | 0.0 |
| TRACTOR forklift | SM-2 | 7500 | 3750 | 5625 | 0.195 | 0.039 | 0.010 | 3.708 | 1.057 | 0.106 | 90 | 10 | 270 | 243 | 27 | 0.1 | 0.0 | 0.0 |
| CAT 950 (x 3) | MERCH | 42520 | 21260 | 31890 | 1.146 | 0.229 | 0.056 | 8.095 | 2.308 | 0.231 | 99 | 1 | 14,580 | 14,434 | 86 | 8.6 | 1.8 | 0.4 |
| JD-200 | MERCH | 50000 | 25000 | 37500 | 1.352 | 0.270 | 0.066 | 8.708 | 2.482 | 0.248 | 99 | 1 | 810 | 802 | 8 | 0.6 | 0.1 | 0.0 |
| LETRO (x 2) | P-2 | 90000 | 45000 | 67500 | 2.462 | 0.492 | 0.121 | 11.344 | 3.234 | 0.323 | 1 | 99 | 4,860 | 49 | 4,811 | 27.4 | 7.8 | 0.8 |
| LETRO (x 2) | P-3 | 140000 | 70000 | 105000 | 3.863 | 0.773 | 0.190 | 13.840 | 3.945 | 0.394 | 99 | 1 | 16,200 | 16,038 | 162 | 32.1 | 6.5 | 1.6 |
| JD-744 (x 2) | P-2 | 51920 | 25960 | 38940 | 1.405 | 0.281 | 0.069 | 8.857 | 2.525 | 0.252 | 1 | 99 | 4,050 | 41 | 4,010 | 17.8 | 5.1 | 0.5 |
| CAT 966 | P-2 | 51980 | 25990 | 38985 | 1.406 | 0.281 | 0.069 | 8.861 | 2.526 | 0.253 | 1 | 99 | 2,025 | 20 | 2,005 | 8.9 | 2.5 | 0.3 |
| CAT 966 (x 2) | P-3 | 52720 | 26360 | 39540 | 1.427 | 0.285 | 0.070 | 8.918 | 2.542 | 0.254 | 99 | 1 | 9,450 | 9,356 | 95 | 7.1 | 1.5 | 0.3 |
| HITACHI (x 2) | P-2 | 81000 | 40500 | 60750 | 2.211 | 0.442 | 0.109 | 10.819 | 3.084 | 0.308 | 99 | 1 | 1,350 | 1,337 | 14 | 1.6 | 0.3 | 0.1 |
| MADILL (x 2) | P-3 | 99800 | 49900 | 74850 | 2.735 | 0.547 | 0.134 | 11.885 | 3.388 | 0.339 | 99 | 1 | 1,350 | 1,337 | 14 | 1.9 | 0.4 | 0.1 |
| WATER 1 | P-2&3 | 49860 | 24930 | 37395 | 1.348 | 0.270 | 0.066 | 8.697 | 2.479 | 0.248 | 50 | 50 | 3,900 | 1,950 | 1,950 | 9.8 | 2.7 | 0.3 |
| WATER 2 | P-2&3 | 52180 | 26090 | 39135 | 1.412 | 0.282 | 0.069 | 8.877 | 2.530 | 0.253 | 50 | 50 | 3,900 | 1,950 | 1,950 | 10.0 | 2.7 | 0.3 |
| WATER 3 | P-2&3 | 51920 | 25960 | 38940 | 1.405 | 0.281 | 0.069 | 8.857 | 2.525 | 0.252 | 50 | 50 | 3,900 | 1,950 | 1,950 | 10.0 | 2.7 | 0.3 |
| | | | | | | | | | | | | | | | TOTAL | 165.9 | 40.1 | 6.5 |

EF References and Notes:

| | |
|---|---|
| Emission, tpy = | EF (lb/VMT) x VMT x (ton/2000 lb) for both paved and unpaved roads |
| VMT = | vehicle miles traveled. Values are from YFP's 2010 Non-Title V application. VMT are multiplied by the number vehicles of the same type in the same location. |
| Paved Road EF = | k x $(sL)^{0.91}$ x $(W)^{1.02}$, lb/VMT, from AP-42 (01/11), Chapter 13.2.1, Equation 1 |
| sL= | 7.4 road surface silt loading in units of grams per square meter. Value is taken from application. |
| W = | average weight of vehicles traveling the road in units of tons. Vehicle weights are from application. |
| k = | particle size multiplier for particle size range in units of lb/VMT. See AP-42 Table 13.2.1-1 as follows: |
| | PM: 0.011 lb/VMT $PM_{10}$: 0.0022 lb/VMT $PM_{2.5}$: 0.00054 lb/VMT |
| | |
| Unpaved Road EF = | k $(s/12)^a$ x $(W/3)^b$, lb/VMT, from AP-42 (11/06) Chapter 13.2.2, Equation 1a. |
| s = | 8.4 surface material silt content in units of percent (%). Value is from application. |
| W = | average weight of vehicles traveling the road in units of tons. Vehicle weights are from application. |
| k, a and b = | empirical constants. See AP-42 Table 13.2.2-2 as follows: |

| | k (lb/VMT) | a | b |
|---|---|---|---|
| PM | 4.9 | 0.7 | 0.45 |
| $PM_{10}$ | 1.5 | 0.9 | 0.45 |
| $PM_{2.5}$ | 0.15 | 0.9 | 0.45 |

# Appendix A: Potential Emissions Inventory

**Non-HAP Potential to Emit**

Emission Unit: **Tanks**

Description: Various sized storage tanks that store different types of fuel located throughout the facilty. Capacities are listed in gallons.

Controls: none

Maximum Potential Fule Usage (gal/yr):

| | |
|---|---|
| LLM Propane Storage Tank 1 | 3,159,344 |
| LLM Propane Storage Tank 2 | 3,159,344 |
| LLM Diesel Storage Tank 1 | 276,722 |
| LLM Diesel Storage Tank 2 | 276,722 |
| SLM Heating Oil Storage Tank[6] | 12,000 |
| SLM Kerosene Storage Tank | 200 |
| SLM Forklift Diesel Storage Tank | 61,494 |
| SLM Truck Diesel Storage Tank | 309,195 |
| SLM Gasoline Storage Tank | 51,309 |

**FUGITIVE EMISSIONS**

| Emissions Generating Activity | Capacity (gal) | VOC | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Valve EF (lb/hr/source) | Valve PTE (tpy/source) | Relief Valve EF (lb/hr/source) | Relief Valve PTE (tpy/source) | Open-ended Line EF (lb/hr/source) | Open-ended Line PTE (tpy/source) | Flange EF (lb/hr/source) | Flange PTE (tpy/source) | PTE Total (tpy) |
| LLM Propane Storage Tank 1[1] | 30,000 | 0.00254 | 0.0111252 | 0.0417 | 0.182646 | 0.000771 | 0.00337698 | 0.000376 | 0.0016469 | 0.19879506 |
| LLM Propane Storage Tank 2[1] | 30,000 | 0.00254 | 0.0111252 | 0.0417 | 0.182646 | 0.000771 | 0.00337698 | 0.000376 | 0.0016469 | 0.19879506 |
| | | | | | | | | | TOTAL | 0.39759012 |

**NON-FUGITIVE EMISSIONS**

| Emissions Generating Activity[5] | Capacity (gal) | VOC | | | | |
|---|---|---|---|---|---|---|
| | | Breathing Loss EF (lbs/gal) | Breathing Loss PTE (tpy) | Working Loss EF (lbs/gal) | Workng Loss PTE (tpy) | Breathing Loss + Working Loss PTE Total (tpy) |
| LLM Diesel Storage Tank 1[2] | 10,000 | 0.0004 | 0.002 | 0.00002 | 0.00276722 | 0.00476722 |
| LLM Diesel Storage Tank 2[2] | 6,000 | 0.0004 | 0.0012 | 0.00002 | 0.00276722 | 0.00396722 |
| SLM Heating Oil Storage Tank[2] | 1,000 | 0.0004 | 0.0002 | 0.00002 | 0.00012 | 0.00032 |
| SLM Kerosene Storage Tank[3] | 200 | 0.0036 | 0.00036 | 0.0011 | 0.00011 | 0.00047 |
| SLM Forklift Diesel Storage Tank[2] | 1,000 | 0.0004 | 0.0002 | 0.00002 | 0.00061494 | 0.00081494 |
| SLM Truck Diesel Storage Tank[2] | 12,000 | 0.0004 | 0.0024 | 0.00002 | 0.00309195 | 0.00549195 |
| SLM Gasoline Storage Tank[4] | 500 | 0.00305 | 0.0007625 | 0.001 | 0.0256545 | 0.026417 |
| | | | | | TOTAL | 0.00873444 |

EF References and Notes:

| | | |
|---|---|---|
| 1 | AP-42 Chapter 1.5 Liquified Petroleum Gas Combustion | EF for Propane emissions found in Background Document on Table 4-3 at: https://www3.epa.gov/ttn/chief/ap42/ch01/bgdocs/b01s05.pdf |
| 2 | WebFIRE EF for Distillate Fuel | Breathing Loss EF: https://cfpub.epa.gov/webfire/index.cfm?action=fire.showfactor&factorid=22460 |
| | | Working Loss EF: https://cfpub.epa.gov/webfire/index.cfm?action=fire.showfactor&factorid=22462 |
| 3 | WebFIRE for Petroleum Liquids | Breathing Loss EF: https://cfpub.epa.gov/webfire/index.cfm?action=fire.showfactor&factorid=22485 |
| | | Working Loss EF: https://cfpub.epa.gov/webfire/index.cfm?action=fire.showfactor&factorid=22499 |
| 4 | WebFIRE for Gasoline | Breathing Loss EF: https://cfpub.epa.gov/webfire/index.cfm?action=fire.showfactor&factorid=22485 |
| | | Working Loss EF: https://cfpub.epa.gov/webfire/index.cfm?action=fire.showfactor&factorid=22488 |
| 5 | These sources have been designated 'Insignificant Emission Units' as their potential to emit regulated air pollutants, excluding HAPs, do not exceed 2 tpy. | |
| 6 | Per YFP's Title V renewal application, the SLM heating oil storage tank is currently being used to store waste oil which is then transported offsite. | |

# Appendix A: Potential Emissions Inventory

**HAP Potential to Emit**

Emission Unit: **Boilers #1-4**

Description: Two Superior brand boilers are located in the SLM, and two Superior brand are located in the LLM.
SLM: Model # 6-5-3000, Serial # 13796, 24.92 mmBTU/hr; and Model # 7-4-2500, Serial # 14159, 24.92 mmBTU/hr
LLM: both Model # 6-5-5000, Serial # 14921 and 14922, both 33 mmBtu/hr

Maximum Steam Production: SLM: 20,700 and 21,562 lb/hr = 42,262 pph total
LLM: 26,368 lb/hr each = 52,736 pph total
LLM boiler steam flow estimated based on original design heat-input-to-steam-output ratio = 33 mmBtu x (33,000 pph / 41. mmBtu) = 26,368 pph steam

Control Device: None

Fuel: Propane (assume SLM boilers are converted to propane from oil)

Startup: SLM: 1998 and 2001; and LLM: 2002

Design Maximum Heat Input Capacity: 115.84 MMBtu/hr (total for all four)
1.27 mgal/hr (assuming 91.5 mmBtu/mgal)

Operation: 8,760 hours per year

**NON-FUGITIVE EMISSIONS**

| Hazardous Air Pollutants | EF (lb/mmscf) | PTE (tpy) |
|---|---|---|
| **Trace Metal Compounds** | | |
| Arsenic Compounds | 2.00E-04 | 9.95E-05 |
| Beryllium Compounds | 1.20E-05 | 5.97E-06 |
| Cadmium Compounds | 1.10E-03 | 5.47E-04 |
| Chromium Compounds (including hexavalent) | 1.40E-03 | 6.96E-04 |
| Cobalt Compounds | 8.40E-05 | 4.18E-05 |
| Manganese Compounds | 3.80E-04 | 1.89E-04 |
| Mercury Compounds | 2.60E-04 | 1.29E-04 |
| Nickel Compounds | 2.10E-03 | 1.04E-03 |
| Selenium Compounds | 2.40E-05 | 1.19E-05 |
| **Organic Compounds** | | |
| Acenaphthene* | 1.80E-06 | 8.95E-07 |
| Acenaphthylene* | 1.80E-06 | 8.95E-07 |
| Anthracene* | 2.60E-06 | 1.29E-06 |
| Benz(a)anthracene* | 1.80E-06 | 8.95E-07 |
| Benzene | 2.10E-03 | 1.04E-03 |
| Benzo(a)pyrene* | 1.20E-06 | 5.97E-07 |
| Benzo(b)fluoranthene* | 1.80E-06 | 8.95E-07 |
| Benzo(g,h,i)perylene* | 1.20E-06 | 5.97E-07 |
| Benzo(k)fluoranthene* | 1.80E-06 | 8.95E-07 |
| Chrysene* | 1.80E-06 | 8.95E-07 |
| Dibenzo(a,h)anthracene* | 1.20E-06 | 5.97E-07 |
| Dichlorobenzene | 1.20E-03 | 5.97E-04 |
| 7,12-Dimethylbenz(a)anthracene* | 1.60E-05 | 7.96E-06 |
| Fluoranthene* | 3.00E-06 | 1.49E-06 |
| Fluorene* | 2.80E-06 | 1.39E-06 |
| Formaldehyde | 7.50E-02 | 3.73E-02 |
| Hexane | 1.80E+00 | 8.95E-01 |
| Indeno(1,2,3-cd)pyrene* | 1.80E-06 | 8.95E-07 |
| 2-Methylnaphthalene* | 2.40E-05 | 1.19E-05 |
| 3-Methylchloroanthracene* | 1.80E-06 | 8.95E-07 |
| Naphthalene* | 6.10E-04 | 3.03E-04 |
| Phenanathrene* | 1.70E-05 | 8.46E-06 |
| Polycyclic Organic Matter (POM) | 6.98E-04 | 3.47E-04 |
| Pyrene* | 5.00E-06 | 2.49E-06 |
| Toluene | 3.40E-03 | 1.69E-03 |
| TOTAL** | 1.89E+00 | 9.39E-01 |

* These HAPs are subject to the 10 tpy major source threshold individually, but are also considered POM that are then, in aggregate, also subject to the 10 tpy major source threshold.

** Because all of the emitted pollutants that are POMs have already been accounted for individually, the POM EF and calculated PTE has not been included in the totals to avoid double-counting.

EF References and Notes:

| | |
|---|---|
| HAP | AP-42 Tables 1.4-3 and 1.4-4. Assumes HAP EFs for natural gas combustion conservatively represent HAP emissions from propane combustion, because there are no EF available for propane combustion. Because the boiler is not subject to any limits in NESHAP DDDDD, PTE has been based on AP-42 emission factors for all HAPs. Included in each PTE calculation is the conversion of the natural gas EF in lb/mmscf to lb/mgal propane (as explained in AP-42, Table 1.5-1, Footnote a) by multiplying by the heat content of propane (91.5 mmBtu/mgal) and dividing by the heat content of methane (1020 mmBtu/1 mmscf). |

# Appendix A: Potential Emissions Inventory

## HAP Potential to Emit

Emission Unit: **Kilns #1-11**
Description: Lumber drying in both the small log mill and large log mill
Control Device: None
Work Practice Requirements: None
Fuel: None - indirect steam provided by propane fired boilers
Predominant Species Dried: Douglas Fir, Ponderosa Pine, Western True Fir
Installed: SLM: #1-3 1997, #4 2001; LLM: #5-9 2002, #10-11 2005
Annual Capacity: See table below; values are in mbf/yr and represent the maximum amount that can be dried if only that species is dried all year. Values were calculated by YFP using the mill economic maximation model without any limit on hours of operation and were provided to Region 10 on July 23, 2015. The LLM is constrained by steam generation capacity; the SLM is constrained by kiln capacity.

| Mill, Kilns | Western True Fir | Douglas Fir | Ponderosa Pine |
|---|---|---|---|
| SLM, #1-4 | 88,815 | 80,618 | 61,879 |
| LLM, #5-11 | 116,527 | 116,393 | 77,184 |
| Total | 205,342 | 197,011 | 139,063 |

**NON-FUGITIVE EMISSIONS**

| Hazardous Air Pollutants | Western True Fir | | Douglas Fir | | Ponderosa Pine | |
|---|---|---|---|---|---|---|
| | EF (lb/mbf) | PTE (tpy) | EF (lb/mbf) | PTE (tpy) | EF (lb/mbf) | PTE (tpy) |
| Acetaldehyde | 0.0550 | 5.6 | 0.0275 | 2.7 | 0.0340 | 2.4 |
| Acrolein | No Data | 0.0 | 0.0005 | 0.0 | 0.0026 | 0.2 |
| Formaldehyde | 0.0108 | 1.1 | 0.0029 | 0.3 | 0.0073 | 0.5 |
| Methanol | 0.3824 | 39.3 | 0.1127 | 11.1 | 0.1390 | 9.7 |
| Propionaldehyde | No Data | 0.0 | 0.0003 | 0.0 | 0.0010 | 0.1 |
| TOTAL | | 46.0 | | 14.2 | | 12.8 |

Highest total HAPs from one species: 46 tpy, when drying Western True Fir at temperatures at 240ºF
Highest HAP from any species: 39 tpy, when drying Western True Fir at temperatures at 240ºF (methanol)

EF References and Notes:

| | |
|---|---|
| HAP | EPA Region 10 HAP and VOC Emission Factors for Lumber Drying, November 2019. See online at: https://www.epa.gov/sites/production/files/2020-03/documents/epa-region-10-hap-voc-ldk-ef.pdf. Because the facility has the ability to dry resinous and non-resinous softwood species, the Grand Fir total HAPs and methanol represent the highest potential emissions at a maximum drying temperature of 240ºF. Western True Firs include Grand Firs. |

# Appendix A: Potential Emissions Inventory

## HAP Potential to Emit

Emission Unit: **Cyclones**

Description: Cyclone C-1 is in the SLM; cyclones C-2, C-3 and C-4 are in the LLM. Cyclone C-1 separates shavings from a pnuematic handling system into Bin SH-1. Cyclone C-2 separates sawdust from a pnuematic handling system onto the hog fuel conveyor belt. Cyclone C-3 separates green chips from a pnuematic handling system into Bin GC-2. Cyclone C-4 separates shavings from a pnuematic handling system into Bin SH-2.

Control Device: none

Capacity: See table below; values were calculated by YFP using the mill economic maximation model without any limit on hours of operation and were provided to Region 10 on July 23, 2015. Assume all the material is Ponderosa Pine.

| Bin | Mill | Material | | bdt/yr Pine |
|---|---|---|---|---|
| Cyclone C-1 | SLM | SH | Shavings | 5,731 |
| Cyclone C-2 | LLM | SD | Sanderdust | 13,178 |
| Cyclone C-3 | LLM | GC | Green Chips | 30,986 |
| Cyclone C-4 | LLM | SH | Shavings | 15,344 |

**NON-FUGITIVE EMISSIONS**

| Emissions Generating Activity | Annual Capacity (bdt/yr) | EF Methanol (lb/bdt) | PTE Methanol (tpy) |
|---|---|---|---|
| Cyclone C-1 | 5,731 | 0.0016 | 0.00 |
| Cyclone C-2 | 13,178 | 0.0016 | 0.011 |
| Cyclone C-3 | 30,986 | 0.0016 | 0.02 |
| Cyclone C-4 | 15,344 | 0.0016 | 0.01 |
| | | | 0.05 |

EF References and Notes

| | |
|---|---|
| HAP (Methanol) | NCASI Technical Bulletin No. 773 entitled, "Volatile Organic Compound Emissions from Wood Products Manufacturing Facilities, Part VI - Hardboard and Fiberboard," January 1999. See Table B46 of the document for emission unit 072-IIC1. Emission factor is representative of emissions exhausted from a cyclone receiving green hardwood chips via pneumatic system. Higher of two values employed in this PTE inventory. Of the 19 HAP's sampled for, only methanol was detected. Assume softwood green chip methanol EF is approximately equal to that for hardwood, and assume green chip EF is approximately equal to that for shavings and sanderdust. The actual sanderdust and shavings EF's are likely higher than chip-derived EF based upon comparative emissions testing data for douglas fir presented in NCASI Technical Bulletin No. 723 entitled, "Laboratory and Limited Field Measurements of VOC Emissions from Wood Residuals," September 1996." |

# Appendix A: Potential Emissions Inventory

Abbreviations used in Appendic A of the Statement of Basis

| | |
|---|---|
| bdt | bone dry tons |
| bf | board feet of lumber |
| Btu | British thermal units |
| cf | cubic feet |
| $CH_4$ | methane |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| DC | dry chips |
| dscf | dry standard cubic feet |
| EF | emission factor |
| EU | emission unit |
| ºF | degrees Fahrenheit |
| gal | gallon(s) |
| GC | green chips |
| GHG | greenhouse gases |
| gr | grains |
| HAP | hazardous air pollutant(s) |
| HF | hog fuel |
| hpy | hours per year |
| hr | hour |
| kPa | kilopascals |
| lb | pound (lbs = pounds) |
| lbm | pound-mole |
| LLM | large log mill |
| m | thousand |
| mm | million |
| $N_2O$ | nitrous oxide |
| $NO_x$ | nitrogen oxides |
| PM | particulate matter |
| $PM_{10}$ | particulate matter less than 10 microns in aerodynamic diameter |
| $PM_{2.5}$ | particulate matter less than 2.5 microns in aerodynamic diameter |
| pph | pounds per hour |
| ppmdv | parts per million on a dry volume basis |
| ppmw | parts per million on a weight basis |
| psi | pounds per square inch |
| S | sulfur |
| scf | standard cubic feet |
| SD | sander dust |
| SH | shavings |
| SLM | small log mill |
| $SO_2$ | sulfur dioxide |
| tpy | tons per year |
| VMT | vehicle miles traveled |
| VOC | volatile organic compounds |
| WPP1 | Wood Products Protocol 1 |