TECHNICAL SUPPORT DOCUMENT

Air Discharge Permit 22-3511
Air Discharge Permit Application L-724

Issued: June 28, 2022

Hampton Lumber Mills - WA, Inc. Morton Facility

SWCAA ID – 349

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ABBREVIATIONS

List of Acronyms

ADP.....Air Discharge Permit

AP-42 .....Compilation of Emission Factors, AP-42, 5th Edition, Volume 1, Stationary Point and Area Sources – published by EPA

ASIL.....Acceptable Source Impact Level

BACT.....Best available control technology

BART .....Best Available Retrofit Technology

CAM .....Compliance Assurance Monitoring

CEMS.....Continuous Emissions Monitoring System

CAS#.....Chemical Abstracts Service registry number

CFR.....Code of Federal Regulations

EPA.....U.S. Environmental Protection Agency

EU .....Emission Unit

LAER.....Lowest achievable emission rate

MACT.....Maximum Achievable Control Technologies

mfr.....Manufacturer

NESHAP.....National Emission Standards for Hazardous Air Pollutants

NOV.....Notice of Violation/

NSPS.....New Source Performance Standard

PSD .....Prevention of Significant Deterioration

RACT.....Reasonably Available Control Technology

RCW .....Revised Code of Washington

SCC.....Source Classification Code

SDS .....Safety Data Sheet

SQER .....Small Quantity Emission Rate listed in WAC 173-460

Standard .....Standard conditions at a temperature of 68°F (20°C) and a pressure of 29.92 in Hg (760 mm Hg)

SWCAA .....Southwest Clean Air Agency

T-BACT.....Best Available Control Technology for toxic air pollutants

WAC .....Washington Administrative Code

List of Units and Measures

µg/m³.....Micrograms per cubic meter

µm .....Micrometer (10^{-6} meter)

acfm.....Actual cubic foot per minute

bdt. .....Bone dry tons

bhp.....Brake horsepower

Btu.....British thermal unit

dscfm.....Dry Standard cubic foot per minute

g/dscm.....Grams per dry Standard cubic meter

gpm .....Gallon per minute

gr/dscf .....Grain per dry standard cubic foot

hp.....Horsepower

hp-hr.....Horsepower-hour

kW.....Kilowatt

lb/hr.....Pound per hour

MMBtu.....Million British thermal unit

MMcf .....Million cubic feet

ppm .....Parts per million

ppmv .....Parts per million by volume

ppmvd .....Parts per million by volume, dry

ppmw.....Parts per million by weight

psig.....Pounds per square inch, gauge

rpm .....Revolution per minute
scfm.....Standard cubic foot per minute
tph .....Ton per hour
tpy .....Tons per year

List of Chemical Symbols, Formulas, and Pollutants

C_3H_8 .....Propane
CH_4.....Methane
CO .....Carbon monoxide
CO_2.....Carbon dioxide
CO_2e.....Carbon dioxide equivalent
H_2S .....Hydrogen sulfide
HAP.....Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act
HCl.....Hydrochloric acid
Hg.....Mercury
N_2O .....Nitrous oxide
NH_3 .....Ammonia
NO_2 .....Nitrogen dioxide
NO_x .....Nitrogen oxides
O_2 .....Oxygen
O_3 .....Ozone
PM.....Particulate Matter with an aerodynamic diameter 100 µm or less
PM_{10} .....PM with an aerodynamic diameter 10 µm or less
$PM_{2.5}$ .....PM with an aerodynamic diameter 2.5 µm or less
SO_2 .....Sulfur dioxide
SO_x .....Sulfur oxides
TAP .....Toxic air pollutant pursuant to Chapter 173-460 WAC
TGOC.....Total Gaseous Organic Carbon
TOC.....Total Organic Carbon
TSP.....Total Suspended Particulate
VOC .....Volatile organic compound

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

1. FACILITY IDENTIFICATION

Applicant Name:	Hampton Lumber Mills
Applicant Address:	PO Box 189, Randle, Washington 98377
Facility Name:	Hampton Lumber Mills - WA, Inc. Morton Facility
Facility Address:	302 State Route 7, Morton, Washington 98356
SWCAA Identification:	349
Contact Person:	Tim Johnson
Primary Process:	Dimensional dried lumber
SIC/NAICS Code:	2421: Sawmills and Planing Mills
Facility Classification:	Title V (HAP, CO, NO_X, VOC, and PM_{10})

2. FACILITY DESCRIPTION

Hampton Lumber Mills has a sawmill located at 302 State Route 7 in Morton, Lewis County, Washington. Hampton Lumber Mills – WA, Inc. Morton Facility (Hampton Lumber Morton) is a manufacturer of finished lumber products. The products manufactured by Hampton Lumber Morton are primarily used in the construction industry. Dimensional lumber produced at the Morton facility is shipped both kiln-dried and green. The sawmill equipment includes an ABCO Industries, Inc. hog fuel boiler, dry kilns, pneumatic conveyors, plant vehicle traffic and debarking and saw equipment. The facility has the potential to emit more than 100 tons per year (tpy) of carbon monoxide (CO), nitrogen oxides (NO_X), volatile organic compounds (VOCs), and particulate matter smaller than 10 microns (PM_{10}); therefore, it is a major source and is subject to the Air Operating Permit Program.

Hampton Drying Company is a support facility for Hampton Lumber Morton. Combined, the two facilities emit more than 10 tpy each of acetaldehyde and methanol, therefore establishing the facility has a hazardous air pollutant (HAP) major.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit (ADP) application number L-724 dated March 7, 2022. Hampton Lumber Morton submitted ADP application L-724 requesting the following:

- Installation of a TDS Technologies anti-stain system. The system will be located in the mill at the sorter infeed. They will apply the anti-stain to green and dry wood.

ADP 22-3511 will supersede ADP 17-3237 in its entirety.

4. PROCESS DESCRIPTION

4.a. Green timber is brought into the facility, debarked, and cut into specified sizes (dimensional lumber) by wood working equipment. A Western Pneumatics Model 542 baghouse, which is vented to the atmosphere, controls emissions from the sawmill and the planer mill.

4.b. The ABCO Industries, Inc. hog fuel boiler provides the steam for the dry kilns. Wood waste from sawmill operations is used to fire the ABCO Industries boiler. Emissions from the boiler are controlled via a multiclone and wet venturi scrubber in series, which are exhausted to the atmosphere.

4.c. Green lumber is stacked on carts and dried in one of the six dry kilns, which are exhausted to the atmosphere. Some of the green wood will have anti-stain applied to it and will not be dried. After drying, lumber is removed from the kilns and sent to the planer mill.

4.d. Particulate matter collected by the planer baghouse is mechanically conveyed to exterior storage bins. Bark and other streams of wood byproduct material are mechanically conveyed to a hog unit and stored in an exterior bin. Other streams of unusable wood are mechanically conveyed to multiple chippers. Wood chips are mechanically conveyed to exterior storage bins prior to shipment off site.

4.e. Some of the dried wood will have anti-stain applied to it. The dried and planed wood is then stored and shipped off site for sale.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a. Log Yard. The log yard consists of all outdoor areas of the facility used for the handling and storage of raw logs. Raw logs are received by trucks and stacked until needed for the sawmill. Access roads to the log yard are paved, and the yard area itself is pavement and packed dirt. Haul road and fugitive dust emissions are controlled by low pressure water spray. Water is applied with a water truck as necessary to minimize emissions.

5.b. Hog. One hog stationed outside of the sawmill is used to process green bark and wood chunks from the merchandizer. It is designed to process 20 tons of material per hour but will typically only handle 15 tons per hour.

5.c. Sawmill. The sawmill consists of an enclosed building and associated equipment used to produce green lumber. The sawmill is arranged in a linear configuration. Raw logs are debarked and cut to length with bucksaws. Processed logs are then cut down to standard dimensional lumber sizes through multiple stages of trimming, edging, and resawing. Green sawdust from sawing operations is collected by drag chains and pneumatically conveyed to exterior storage bins. Selected pieces of equipment are directly connected to cyclone and baghouse combinations configured in series. Finished lumber is color coded and/or marked prior to shipment off site.

Particulate matter collected by the cyclone is reduced in size by the fractionating system and is then conveyed to storage bins. Bark and other streams of byproduct material are conveyed to a hog unit and stored in an exterior bin. Streams of unusable wood are conveyed to multiple chippers. Wood chips are conveyed to exterior storage bins prior to shipment off site. Hog fuel produced on-site is sent to the ABCO Industries boiler.

The following relevant equipment is associated with the sawmill:

- Log sawing equipment: One debarker, two bucksaws, one fuel hog, five chippers, various conveyors, chop saws, trim saws, edgers, and one planer.
- One Western Pneumatics 8-foot semi-long cone standard cyclone designed for 14,000 actual cubic feet per minute (acfm) and one Western Pneumatics Model 542 baghouse, rated at 42,750 acfm with an air to cloth ratio of approximately 6:1, are used to control sawmill and planer equipment emissions. The baghouse contains 7,095 cubic feet (ft^2) of 16-oz polypropylene bags.

5.d. Chip Bunkers. Four transfer bunkers with 30-unit capacity. These bunkers are used to store/transfer wood chips.

5.e. Sawdust Bunker. One transfer bunker with 30-unit capacity. This bunker is used to store/transfer sawdust and is equipped with wind shrouds.

5.f. Hog Fuel/Bark Bunker. One transfer bunker with 30-unit capacity. This bunker is used to store/transfer bark and hog fuel.

5.g. Shavings Bunker. One transfer bunker with 30-unit capacity. This bunker is used to store/transfer shavings and is equipped with wind shrouds.

5.h. Hog Fuel Boiler. The ABCO Industries, Inc. hog fuel boiler was installed in 1978 and is a hybrid suspension grate design. The boiler is used to generate steam for the lumber dry kilns on-site and is fired solely on wood byproducts from facility operations with the potential to buy additional hog fuel from other facilities on an as-needed basis. Most of the boiler's fuel is hog fuel; however, chips, planer shavings, sawdust, and scrap wood are all fired in the boiler depending on required fuel characteristics. Exhaust from the boiler's furnace passes through a multiclone and wet venturi scrubber configured in series. Process water for the wet venturi scrubber is conditioned in a settling pond located adjacent to the boiler building. Wood ash is conveyed by drag chain to an exterior storage bunker.

The following relevant equipment is associated with the hog fuel boiler:

- ABCO Industries, Inc. hog fuel boiler, model number 120x22HRT, serial number 77101, rated at 40,400 pounds of steam per hour (lb-steam/hr) and 59.6 million British thermal units (MMBtu) per hour with an airflow of 22,400 dry standard cubic feet per minute (dscfm). An air-to-air heat exchanger on the exhaust delivers preheated combustion air to the boiler. The unit has an oxygen trim system.
- One multiclone/wet venturi scrubber system: Exhaust from the boiler is sent through a multiclone (installed in 2013) with a 92% efficiency to remove larger particulate matter (PM). The multiclone is followed by a Branch Environmental Corp. Wet Scrubber System with a variable throat. The scrubber operating flow rate is 215 gallons per minute (gpm) and pressure drop across the system is 19 inches of water column (inch w.c.). According to the manufacturer, the flow rate can range from 150 GPM to 258 GPM, and the pressure can range from 15 inches w.c. to 22 inches w.c. and still meet the capture efficiency. It has AIROL Chevron Mist eliminators. It is guaranteed to remove 99.5% of PM_{10}.
- A settling pond for scrubber water with a capacity of 3,960 ft^2.
- The scrubber stack is 20 feet tall with a diameter of 3.44 feet.

5.i. Dry Kilns. There are six dry kilns used to dry green lumber from the sawmill. The kilns are powered exclusively with steam from the facility's hog fuel boiler. Rough sawn lumber is stacked on carts and rolled into the kilns. After drying, lumber is removed from the kilns and sent to the planer.

The following relevant equipment is associated with the dry kilns:

- Five American Wood Dryers, Inc. model 1156, measuring 34 feet wide by 24.5 feet high by 88 feet long. They have a capacity of 140,000 board feet (BF) each and have a drying time of approximately 62 hours per cycle depending on wood species and season. The temperature is controlled using wet bulb and dry bulb thermometers and is maintained at approximately 200 ºF. The units have heat exchangers installed that save between 25-30% of the energy used.
- One Coe Manufacturing 68' double track dry kiln, shop #59824, measuring 34 feet wide by 68 feet long and is constructed of 2-inch-thick aluminum. It has a capacity of 141,000 BF and has a drying time of approximately 62 hours per cycle depending on wood species and season. The temperature is controlled using wet bulb and dry bulb thermometers and is maintained at approximately 200 ºF. The unit has an Ultra Vent heat exchanger, model 6, which saves between 20-30% of the energy used.

5.j. Anti-Stain Treatment (*new*). TDS Technologies, Inc., model Chem Room Z1T0083, sap stain spray system, with an airflow of 3,000 acfm and a TDS Technologies mist eliminator. Emissions from the spray enclosure are collected and vented to the mist eliminator. The mist eliminator consists of internal PVC baffles that collect the anti-stain droplets and route them back into circulation. The mist eliminator is estimated to eliminate 94% of all spray particles 12 microns or larger. The system is located at the sorter infeed. It has a 12-inche diameter stack that exhausts 4 feet above building roof.

5.k. Office Power Emergency Generator. One Generac 45 kilowatt (kW), 60.3 brake horsepower (bhp), generator model 93A05070-S, serial number 2011085 emergency electrical generator which is propane-fired. It consumes 4.14-7.96 gal/hr and was manufactured in 1993. It is used to provide emergency electrical power to the office during power outages.

5.l. Fire Pump Engine. One Caterpillar diesel-fired pump engine, 225 hp, model 3208, serial number 03Z04523. It consumes 12.1 gallons per hour (gal/hr) and was manufactured in August 1985. It is used to provide emergency electrical power to the main sprinkler house that provides emergency fire protection in the event of a power outage.

Other Equipment

One (1) debarker	Five (5) chippers (four (4) in sawmill, one (1) in planer mill)
Two (2) bucksaws	Various chop saws, trim saws
One (1) fuel hog	Various edgers
One (1) sorter	One (1) planer
One (1) water truck	Five (5) lumber stackers (two (2) in sawmill, three (3) in planer mill)

5.m. Equipment/Activity Summary.

ID No.	Equipment/Activity	Control Equipment/Measure
1	Log yard	Water truck – low pressure water spray

ID No.	Equipment/Activity	Control Equipment/Measure
2	Hog	None
3	Sawmill/planer	Building enclosures, Western Pneumatics model 542 baghouse
4	Four Chip bunkers	None
5	Sawdust bunker	Wind shrouds
6	Shavings bunker	Wind shrouds
7	Hog fuel/bark bunker	None
8	ABCO Industries, Inc. hog fuel boiler	One multiclone followed by a Branch Environmental wet venturi scrubber
9	Six Dry kilns	Process temperature limit
10	Anti-stain system	Mist eliminator
11	Office emergency propane engine	Low sulfur fuel, limited hours
12	Fire pump diesel engine	Low sulfur fuel, limited hours

6. EMISSIONS DETERMINATION

Emissions to the ambient atmosphere from the existing sawmill equipment, as proposed in ADP application L-724, consist of carbon monoxide (CO), oxides of nitrogen (NO_X), volatile organic compounds (VOC), sulfur dioxide (SO_2), particulate matter (PM), toxic air pollutants (TAPs), and hazardous air pollutants (HAPs).

Unless otherwise specified by SWCAA, actual emissions must be determined using the specified input parameter listed for each emission unit and the following hierarchy of methodologies:
(a) Continuous emissions monitoring system (CEMS) data;
(b) Source emissions test data (EPA reference method). When source emissions test data conflicts with CEMS data for the time period of a source test, source test data must be used;
(c) Source emissions test data (other test method); and
(d) Emission factors or methodology provided in this TSD

6.a. Haul Roads. Emissions from unpaved haul roads are calculated using AP-42 Section 13.2.2 (11/06) and assuming an average silt content of 4.8%, an average round trip distance of 0.5 miles, and the average truck weight of 20 tons. The total vehicle miles traveled (VMT) is calculated to be 22,000 miles per year (mile/yr). The use of wet suppression is expected to provide an overall control efficiency of 80% for haul road emissions.

$$E = k\left(\frac{s}{12}\right)^{a}\left(\frac{w}{3}\right)^{b}(100\% - CE)$$

Where:

E = Emission factor, in lb/VMT, for PM, PM_{10}, or $PM_{2.5}$;
k = Emission constants for PM (k=4.9), PM_{10} (k=1.5), or $PM_{2.5}$ (k=0.23);
a = Emission constants for PM (a=0.7), PM_{10} (a=0.9), or $PM_{2.5}$ (a=0.9);
b = Emission constants for PM (b=0.45), PM_{10} (b=0.45), or $PM_{2.5}$ (b=0.45);

s = Road surface silt content, in percent;
w = Average truck weight, in tons; and
CE = Control efficiency, in percent.

Activity	Mileage (miles/yr)	Pollutant	Emission Factor - Uncontrolled (lb/mile)	Control Efficiency	Emissions (tpy)
Haul Road	22,000	PM	6.06	80%	13.33
		PM_{10}	1.54	80%	3.40
		$PM_{2.5}$	0.24	80%	0.52

6.b. Hog. Emissions from the hogging of wood material/logs/bark based on 42,000 tons of wood material//bark per year, an emission factor from EPA-454/R-95-012 "FIRE Version 5.0" of 0.35 pounds of PM per ton of wood material//bark, and a 90% control factor due to the green state of the wood are calculated to be 0.74 tons of PM per year.

6.c. Sawmill Baghouse. Emissions from the Western Pneumatics model 542 baghouse are based on 56,000 acfm, 8,760 hours per year of operation, and 0.005 grains per dry standard cubic feet (gr/dscf).

Particulate matter smaller than 2.5 microns ($PM_{2.5}$) emissions are assumed to be 23% of PM emissions (EPA PM Calculator Version 2.0 - SCC 30700899). Emission evaluations should be based on the most recent emission test and actual hours of operation.

Pollutant	Emissions
PM/PM_{10}	10.51 tpy
$PM_{2.5}$	2.42 tpy

6.d. Wood Waste Bunkers. Emissions from wood waste storage and transfer consist primarily of fugitive PM emitted during truck loading. Potential emissions from the existing bunkers (shavings, sawdust, chip, hog/bark) are calculated from material throughput reported by the facility for those process units.

Emission factors for PM and PM_{10} are based on information from EPA AP-42 Table 10.4-2 (7/79). The original factors provided in Table 10.4-2 have been modified subsequent to engineering review by SWCAA. The modifications are due to variations in material and emission controls. The resulting emission factors applicable to this facility are provided below. An additional emission reduction of 10% has been applied to the base emission factors for sawdust and shavings transfer due to the use of two-sided shrouding. $PM_{2.5}$ emissions are estimated to be 23% of PM emissions (EPA PM Calculator Version 2.0 - SCC 30700899).

Material	Throughput	Pollutant	Emission Factor	Emissions
Shavings	31,100 Bdt	PM	0.59 lb/ton	9.17 tpy
		PM_{10}	0.35 lb/ton	5.44 tpy
		$PM_{2.5}$	23% PM	2.11 tpy
Green Sawdust	33,400 Bdt	PM	0.27 lb/ton	4.51 tpy
		PM_{10}	0.16 lb/ton	2.67 tpy
		$PM_{2.5}$	23% PM	1.04 tpy
Chip	85,800 Bdt	PM	0.20 lb/ton	8.58 tpy
		PM_{10}	0.12 lb/ton	5.15 tpy
		$PM_{2.5}$	23% PM	1.97 tpy
Green Hog/Bark	68,400 Bdt	PM	0.15 lb/ton	5.13 tpy
		PM_{10}	0.09 lb/ton	3.08 tpy
		$PM_{2.5}$	23% PM	1.18 tpy
Total		PM		27.39 tpy
		PM_{10}		16.34 tpy
		$PM_{2.5}$		6.30 tpy

6.e. Hog Fuel Boiler. The PM, NO_x, and CO emission factors are based on the October 26, 2001, and October 27, 2003, source tests. The SO_2 and VOC emission factors are based on U.S. EPA AP-42 Section 1.6 Wood Waste Combustion in Boilers (2/98). The calculations are based on 8,760 hr/yr. The boiler is rated at 40,400 lb-steam/hr with a heat input of 59.6 MMBtu/hr. The exhaust airflow is approximately 22,400 dscf/min. A maximum of 34,200 tpy of hog fuel can be burned in this unit. All emitted PM is assumed to be PM_{10}.

Pollutant	Emission Concentration
NO_x	175 ppmv @ 7% O_2
CO	300 ppmv @ 7% O_2

Pollutant	Emission Factor	Emissions
NO_x	0.69 lb/1,000 lb steam	122.10 tpy
CO	0.72 lb/1,000 lb steam	127.41 tpy
VOC	0.017 lb/MMBtu	4.44 tpy
$PM/PM_{10}/PM_{2.5}$	0.050 gr/dscf (filterable)	42.05 tpy
SO_2	0.075 lb/ton of wood	1.28 tpy

Actual annual emissions are calculated as follows:

(1) NO_x and CO emissions are based on the most recent emission test and annual pounds of steam produced.
(2) PM emissions are based on the most recent grain loading emission test as measured, measured air flow, and annual hours of operation.
(3) SO_2 emissions are based on the above emission factor and tons of wood combusted.
(4) VOC emissions are based on the above emission factor, 59.6 MMBtu/hr heat input, and annual hours of operation.

The annual limits include start-up and shutdown emissions. During start-up the CO and NO_X concentrations can spike, exceeding the short-term limits. Since no actual start-up and shutdown emission data is available for this unit, factors from facilities with continuous emission monitors

(CEMs) will be used. SWCAA assumes that due to the age and design of the equipment, the start-up emissions will be approximately 10% higher. CO and NO_X start-up and shutdown emissions will be based on 1.70 lb/MMBtu and 0.20 lb/MMBtu, respectively. During start-up, the average firing rate is calculated to be 33 MMBtu/hr. Hampton Lumber estimates approximately 100 hours of start-up situations, which equates to approximately 10 start-ups a year. The start-up emissions are accounted for in the annual (tpy) limit. These concentrations are not meant to be short term limits and SWCAA is not requiring testing during a start-up period.

Pollutant	100 hr/yr @ 33 MMBtu/hr	8,660 hr/yr @ 59.6 MMBtu/hr	Total
NO_X	0.33 tpy	121.29 tpy	121.62 tpy
CO	2.81 tpy	126.45 tpy	129.26 tpy

The following table contains HAP and TAP estimates using emission factors from EPA AP-42 Tables 1.6-3 and 1.6-4 (9/03). There is no control attributed to emissions from the wet scrubber.

HAP and TAP Emissions from EPA AP-42 Tables 1.6-3 and 1.6-4 (9/03)

Pollutant	CAS	SQER (lb/yr)	Estimation Factor Rating	Emission Factor (lb/MMBtu)	Emissions (lb/yr)
Arsenic*	7440-38-2	--	A	2.2 E-05	11.49
Beryllium*	7440-41-7	--	B	1.1 E-06	0.57
Cadmium*	7440-43-9	--	A	4.1 E-06	2.14
Chromium*	7440-47-3	--	A	2.1 E-05	10.96
Copper	7440-50-8	175	A	4.9 E-05	25.58
Iron	1309-37-1	1,750	A	9.9 E-04	516.88
Manganese*	7439-96-5	175	A	1.6 E-03	835.35
Mercury*	7439-97-6	175	A	3.5 E-06	1.83
Nickel*	7440-49-2	0.5	A	3.3 E-05	17.23
Selenium*	7782-49-2	175	A	2.8 E-06	1.46
Zinc	7646-85-7	175	A	4.2 E-04	219.28
Acetaldehyde*	75-07-0	50	A	8.3 E-04	433.34
Benzene*	71-43-2	20	A	4.2 E-03	2,192.80
Benzo(a)pyrene*	56-55-3	--	A	2.6 E-06	1.36
Formaldehyde*	50-00-0	20	A	4.4 E-03	2,297.22
Naphthalene*	91-20-3	22,750	A	9.7 E-05	50.64

* HAPs

6.f. Lumber Drying. Emissions from lumber drying operations are estimated based on applicable emission factors and the maximum rated lumber throughput for each wood type (a total of 275 MMbf/yr for Douglas fir and 170 MMbf/yr for hemlock and other high HAP woods). The average final moisture content is 16% and the facility typically dries at 180 ºF, but wants to maintain the ability to operate the kilns at 200 ºF. Actual wood species vary, though the facility expects to dry solely Douglas fir in the foreseeable future.

Emissions from lumber drying include PM (presumably condensable PM), VOCs, methanol, formaldehyde, acetaldehyde, propionaldehyde, acrolein, ethanol, and acetic acid. SWCAA has developed individual emission factors for PM, VOCs, methanol, formaldehyde, acetaldehyde, propionaldehyde, and acrolein from test data available to SWCAA at the time of permitting. Test data and literature (e.g. articles by Dr. Mike Milota – Oregon State University) indicate that emissions of VOCs, methanol, and formaldehyde have a strong dependence on the maximum drying temperature; therefore SWCAA has developed a temperature dependent emission factor for each of these pollutants based on a least squares fit of the available data from numerous tests for various facilities. SWCAA is not aware of any full speciation profiles of the VOC emissions from dry kilning lumber from which to develop an accurate scaling factor for the EPA Method 25A results. SWCAA has used the following assumptions to calculate VOC emissions based on the EPA Method 25A test data and the available speciated HAP data:

Assumptions

Component	Response Factor	Molecular Weight	Notes
Methanol	0.69	32.04	CH_4O
Formaldehyde	0	30.04	CH_2O
Acetaldehyde	1.0	44.05	C_2H_4O
Propionaldehyde	2.0	58.08	C_3H_6O
Acrolein	1.95	56.06	C_3H_40
Monoterpenes	10	136.23	$C_{10}H_{16}$

where response factor = (ppm as CH_4 indicated by M25A)/(ppm compound)

Assume all unknown VOCs are monoterpenes ($C_{10}H_{16}$), Mwt. = 136.23

For example, to correct the Method 25A data for the known methanol emissions, SWCAA assumed that the methanol response factor is 0.69, meaning that for every 1 ppm of methanol measured, the Method 25A analyzer read 0.69 ppm as methane (CH_4). Using this assumption, the portion of the Method 25A reading resulting from methanol in the exhaust stream can be estimated and subtracted from the Method 25A result. After doing this for all known species, we are left with a Method 25A result that is due to compounds <u>other than</u> the known compounds. For this analysis, SWCAA has assumed that the remaining VOCs are represented by monoterpenes ($C_{10}H_{16}$). To scale the remaining VOC emissions expressed as propane (C_3H_8) to monoterpenes ($C_{10}H_{16}$) the following equation would be used:

$$\frac{\text{lb as } C_{10}H_{16}}{\text{MMbf}} = \left(\frac{\text{lb as } C_3H_8}{\text{MMbf}}\right)\left(\frac{\text{Mwt C in } C_3H_8}{\text{Mwt } C_3H_8}\right)\left(\frac{\text{Mwt } C_{10}H_{16}}{\text{Mwt C in } C_{10}H_{16}}\right) = \left(\frac{\text{lb as } C_3H_8}{\text{MMbf}}\right)\left(\frac{36}{44}\right)\left(\frac{136.23}{120}\right)$$

This could result in a significant underestimation of VOC emissions if it turns out that the bulk of the remaining VOC emissions are alcohols or aldehydes since both have low response factors and higher ratios of molecular weight to the number of carbon atoms in the molecule.

For this analysis the following temperature dependent Method 25A relationships were used:

<u>Wood Species</u>	<u>VOCs as C_3H_8</u>
Western hemlock	1.75*(T) – 121
Douglas fir	19.2*(T) – 2,845

where: T is temperature in degrees Fahrenheit

Emissions of acetaldehyde, propionaldehyde, and acrolein did not appear to be strongly temperature dependent; therefore, the emission factor for these pollutants is a simple average of the available test data. No test data is yet available to estimate emissions of ethanol and acetic acid.

Source tests conducted by Horizon Engineering using the "H. Dettinger" method were not used to calculate emission factors because this method does not control humidity in the kiln, and therefore does not accurately represent a drying cycle. Generally, this resulted in shorter drying times. Some portion of the VOC emissions is believed to be related to thermal decomposition products that would be related to the kiln temperature and the overall time the wood is held at specific temperatures; therefore, the H. Dettinger method is likely to underestimate VOC emissions.

The facility wants the flexibility to dry Douglas fir and hemlock interchangeably. The maximum throughput of Douglas fir at the current drying schedule is 275 MMbf/yr, and the previously established maximum throughput for hemlock was 170 MMbf/yr. Because the VOC emissions for Douglas fir are higher and the HAP emissions for hemlock are higher, the VOC emission limit will be based on 275 MMbf/yr Douglas fir and the HAP limit will be based on 170 MMbf/yr hemlock.

The following emission factors are listed for 200°F. The facility can use other emission factors for other temperatures and wood species found in the SWCAA Default August 2009 document with approval from SWCAA.

Hemlock Drying

Throughput = 170,000,000 Board Feet
Maximum Kiln Temperature = 200 º F

		Emission Factors			
Pollutant	Equation	lb/MMBf	lb/yr	tpy	Emission Factor Source
PM		50.5	8,585.00	4.29	Nov. 1998 by Horizon Engineering at OSU
PM_{10}		50.5	8,585.00	4.29	Nov. 1998 by Horizon Engineering at OSU
$PM_{2.5}$		50.5	8,585.00	4.29	Nov. 1998 by Horizon Engineering at OSU
VOC	See discussion	371	63,070.00	31.54	SWCAA Default August 2009
Methanol	2.83*(T) - 457	109.0	18,530.00	9.27	SWCAA Default August 2009
Formaldehyde	0.064*(T) - 10.8	2.00	340.00	0.17	SWCAA Default August 2009
Acetaldehyde		113	19,210.00	9.61	SWCAA Default August 2009
Propionaldehyde		1.2	204.00	0.10	SWCAA Default August 2009
Acrolein		1.75	297.50	0.15	SWCAA Default August 2009
Total TAPs			38,581.50	19.29	
Total HAPs			38,581.50	19.29	

(T) is in units of degrees Fahrenheit in the equations presented in the table above.

Douglas Fir Drying

Throughput = 275,000,000 Board Feet
Maximum Kiln Temperature = 200 º F

		Emission Factors			
Pollutant	Equation	lb/MMBf	lb/yr	tpy	Emission Factor Source
PM		21	5,775.00	2.89	Nov. 1998 by Horizon Engineering at OSU
PM_{10}		21	5,775.00	2.89	Nov. 1998 by Horizon Engineering at OSU
$PM_{2.5}$		21	5,775.00	2.89	Nov. 1998 by Horizon Engineering at OSU
VOC	See discussion	1008	277,200.00	138.60	SWCAA Default August 2009
Methanol	1.45*(T) - 223	67	18,425.00	9.21	SWCAA Default August 2009
Formaldehyde	0.0495*(T) - 7.6	2.3	632.50	0.32	SWCAA Default August 2009
Acetaldehyde		49	13,475.00	6.74	SWCAA Default August 2009
Propionaldehyde		0.53	145.75	0.07	SWCAA Default August 2009
Acrolein		0.73	200.75	0.10	SWCAA Default August 2009
Total TAPs			32,879.00	16.44	
Total HAPs			32,879.00	16.44	

(T) is in units of degrees Fahrenheit in the equations presented in the table above.

The emission factors established for spruce and Engelmann spruce/lodgepole pine (ESLP) are based on a single source test at 180 °F provided by Hampton Lumber Morton. The factors for white fir and ponderosa pine have been scaled to 200 °F. For those species that do not have information on PM emissions, hemlock emission factors should be used. These emission factors are here for future emission inventory determinations not potential to emit establishment since the throughput on these different wood species will be much smaller than the dominate species of Douglas fir and hemlock.

Other Wood Species' Emission Factors					
	VOC (lb/MMBf)	PM (lb/MMBf)	Methanol (Lb/MMBf)	Formaldehyde (lb/MMBf)	Reference
White fir	633	50.5	221	7.1	SWCAA Default
Sitka spruce	290				HLM, OSU, 11/03
Ponderosa pine	2,596		89	3	HLM, OSU, 7/07; HEFLD, Milota, 7/06
ESLP	400		29	0.9	HLM, OSU, 2/07

HLM, OSU, 11/03 - Hampton Lumber Mills test performed by Oregon State University on November, 2003.
HLM, OSU, 7/07 – Hampton Lumber Mills test performed by Oregon State University on July 2007.
HEFLD, Milota, 7/06 – Hazardous air pollutant emissions from lumber drying, Dr. Michael Milota, July 2006.
HLM, OSU, 2/07 – Hampton Lumber Mills test performed by Oregon State University on February 2007.

6.g. Anti-Stain Treatment. Emissions from anti-stain treatment come from the usage of Kop-Coat WORKHORSE® II, Anti-foam, and Iron FixT® 1002. According to the safety data sheet (SDS) and Kop-Coat, WORKHORSE contains trace amounts of 1,4-dioxane and ethylene oxide at under 0.0001%, which are not added to the product but are contained in trace amounts in one raw material. The other

two products contain no HAPs or TAPs. Emissions shall be based on annual throughput and SDS information.

	Used (gal/yr)	VOC (lb/gal)	VOC (tpy)
Iron FixT		0	
Anti-foam		0	
Workhorse II	3,000	0.004	0.006
VOC (total)			0.006

6.h. Emergency Office Power Generator Engine. Emissions from propane engine operation are calculated based on 200 hr/yr of operation, assumed propane characteristics of 91,600 Btu/gal, 4.2 lb/gal, and a maximum of 123 ppmw sulfur (40 CFR § 79.55, TABLE F94-6), a maximum engine rating of 60.3 hp, and factors from EPA AP-42 3.2. EPA AP-42 3.2 factors for natural gas are used because natural gas and propane are similar fuels and no other factors for propane combustion in an engine are available.

Office Power Propane Back-up Generator

Hours of Operation =	200	hours
Power Output =	60.3	bhp
Fuel Consumption Rate =	8.0	gallons per hour
Propane Heat Content =	91,500	Btu/gal for AP-42 emission factors
Propane Heat Content =	92,000	Btu/gal for 40 CFR 98 GHG emission factors
Propane Sulfur Content =	123	ppmw
Propane Density =	4.24	lbs/gallon
Fuel Consumption =	1,592	gallons per year

Pollutant	Emission Factor lb/MMBtu	Emissions lb/1,000 gal	lb/hr	tpy	Emission Factor Source
NO_X	4.08	373.3	2.97	0.30	AP-42 Sec 3.2 (7/00) - 4 stroke LB
CO	0.317	29.0	0.23	0.023	AP-42 Sec 3.2 (7/00) - 4 stroke LB
VOC	0.118	10.8	0.09	8.59E-03	AP-42 Sec 3.2 (7/00) - 4 stroke LB
SO_X as SO_2	0.01140	1.04	0.008	8.30E-04	AP-42 Sec 3.2 (7/00)
PM	0.00999	0.91	7.3E-03	7.27E-04	AP-42 Sec 3.2 (7/00)
PM_{10}	0.00999	0.91	7.3E-03	7.27E-04	AP-42 Sec 3.2 (7/00)
$PM_{2.5}$	0.00999	0.91	7.3E-03	7.27E-04	AP-42 Sec 3.2 (7/00)
Acetaldehyde	0.00836	7.6E-01	6.1E-03	6.1E-04	AP-42 Sec 3.2 (7/00)
Acrolein	0.00514	4.7E-01	3.7E-03	3.7E-04	AP-42 Sec 3.2 (7/00)
Benzene	0.00044	4.0E-02	3.2E-04	3.2E-05	AP-42 Sec 3.2 (7/00)
Ethylbenzene	0.0000397	3.6E-03	2.9E-05	2.9E-06	AP-42 Sec 3.2 (7/00)
Methanol	0.0025	2.3E-01	1.8E-03	1.8E-04	AP-42 Sec 3.2 (7/00)
Toluene	0.00041	3.7E-02	3.0E-04	3.0E-05	AP-42 Sec 3.2 (7/00)
Xylene	0.00018	1.7E-02	1.3E-04	1.3E-05	AP-42 Sec 3.2 (7/00)
			TAP/HAP Total =	1.2E-03	

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	Emission Factor Source
CO_2	61.71	1	136.047	12.516	9.963	40 CFR 98
CH_4	0.003	25	0.165	0.015	0.012	40 CFR 98
N_2O	0.0006	298	0.394	0.036	0.029	40 CFR 98
Total GHG - CO_2e			136.607	12.568	10.004	

Emissions must be calculated using the emission factors identified above unless new emission factors are provided by the manufacturer or developed through source testing.

6.i. Fire Pump Diesel Engine. Emissions from diesel engine operation are calculated based on 200 hr/yr of operation, a maximum fuel sulfur content of 0.0015% sulfur by weight, a maximum engine rating of 225 hp, and applicable emission factors. Emission factors for all pollutants except SO_2 are taken from EPA AP-42, Table 3.4-1 (10/96). The emission factor for SO_2 is derived by mass balance assuming all fuel sulfur is converted to SO_2. All PM emissions are assumed to be $PM_{2.5}$.

Fire Pump Diesel Engine

Hours of Operation =	200	hours
Power Output =	225.0	horsepower
Diesel Density =	7.206	pounds per gallon
Fuel Sulfur Content =	0.0015	% by weight
Fuel Consumption Rate =	12.1	gal/hr (estimated based on7,000 Btu/hp-hr)
Fuel Heat Content =	0.138	MMBtu/gal (for use with GHG factors from 40 CFR 98)

Pollutant	Emission Factor lb/hp-hr	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	0.031	6.98	0.70	AP-42 Table 3.3-1 (10/96)
CO	0.00668	1.50	0.15	AP-42 Table 3.3-1 (10/96)
VOC	0.002514	0.57	0.057	AP-42 Table 3.3-1 (10/96)
SO_X as SO_2		0.0026	2.62E-04	Mass Balance
PM	0.0022	0.50	0.050	AP-42 Table 3.3-1 (10/96)
PM_{10}	0.0022	0.50	0.050	AP-42 Table 3.3-1 (10/96)
$PM_{2.5}$	0.0022	0.50	0.050	AP-42 Table 3.3-1 (10/96)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/gallon	tpy, CO_2e	
CO_2	73.96	1	163.05	23	27	40 CFR 98
CH_4	0.003	25	0.165	0.023	0.03	40 CFR 98
N_2O	0.0006	298	0.394	0.054	0.07	40 CFR 98
Total GHG - CO_2e	73.9636		163.613	23	27	

Emissions must be calculated using the emission factors identified above unless new emission factors are provided by the manufacturer or developed through source testing.

6.j. Emissions Summary

Air Pollutant	Potential to Emit (tpy)	Project Impact (tpy)
NO_x	122.62	
CO	129.26	
VOC	174.65	0.006
SO_2	1.28	
PM	97.04	
PM_{10}	75.32	
$PM_{2.5}$	54.32	

Facilitywide TAP/HAP Emissions

Toxic Compound	CAS #	Total Annual Emissions (lb/yr)	Small Quantity Emission Rate (lb/yr)	Acceptable Source Impact Level ($\mu g/m^3$)	TAP Class	EPA Classified HAP (Yes/No)
Acetaldehyde	75-07-0	18,633	50	0.45	A	Yes
Acrolein	107-02-8	280	175	0.02	B	Yes
Arsenic	7440-38-2	11.49	--	0.00023	A	Yes
Beryllium	7440-41-7	0.57	--	0.00042	A	Yes
Benzene	71-43-2	2,192.80	20	0.12	A	Yes
Cadmium	7440-43-9	2.14	--	0.00056	A	Yes
Chromium, total	7440-47-3	10.96	175	0.00083	A	Yes
Copper	7440-50-8	25.58	175	0.67	B	No
Formaldehyde	50-00-0	2,938	20	0.077	A	Yes
Manganese	7439-96-5	835.35	175	3.3	B	Yes
Mercury	7439-97-6	1.83	175	0.33	B	Yes
Methanol	67-56-1	18,540	43,748	870	B	Yes
Naphthalene	91-20-3	50.64	22,750	170	B	Yes
Nickel	7440-02-2	17.23	0.5	0.0021	A	Yes
Propionaldehyde	123-38-6	220	--		B	Yes
Selenium	7782-49-2	1.46	175	0.67	B	Yes

7. REGULATIONS AND EMISSION STANDARDS

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

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

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

7.c. 40 CFR 60 Subpart Dc "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to any steam generating unit with a heat input greater than or equal to 10 MMBtu/hr, but less than or equal to 100 MMBtu/hr constructed, modified, or reconstructed after June 9, 1989. The ABCO hog fuel boiler is rated at 59.6 MMBtu/hr but was constructed in 1978 so this standard does not apply to this unit.

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

7.e. 40 CFR 63.9 "Notification Requirements" requires that the delegated authority be notified when any unit subject to 40 CFR 64 begins initial startup.

7.f. 40 CFR 63.2230 et seq. (Subpart DDDD) "National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products" applies to each Plywood and Composite Wood Products manufacturing facility that is located at a major source of HAP emissions. Hampton Lumber Morton is not a major source of HAP emissions on its own, however Hampton Drying Company is a support facility for Hampton Lumber Morton. Combined, the two facilities emit over 10 tpy of a single HAP and over 25 tpy of all HAPs combined, and are therefore subject to this regulation. The facility is only required to comply with the initial notification requirement and that initial notification was submitted July 15, 2009, based upon evidence that the combined facilities were major sources for HAP emissions.

7.g. 40 CFR 63.6580 et seq. (Subpart ZZZZ)) "National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines" establishes national emission limitations and operating limitations for HAP emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This regulation is applicable to the two facility engines.

7.h. 40 CFR 63.7480 et seq. (Subpart DDDDD) "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters" applies to each industrial, commercial, or institutional boiler or process heater that is located at, or is part of, a major source of HAP emissions. Hampton Lumber Morton is not a major source of HAP emissions on its own, however Hampton Drying Company is a support facility for Hampton Lumber Morton. Combined, the two facilities emit over 10 tpy of a single HAP and over 25 tpy of all HAPs combined, and are therefore subject to this regulation.

7.i. 40 CFR 64 "Compliance Assurance Monitoring" requires the owner or operator of selected pollutant specific emission units at a major stationary source to develop and implement a monitoring plan that provides a reasonable assurance of compliance with applicable emission limitations or standards. This regulation is applicable to the hog fuel boiler.

7.j. 40 CFR 70 "State Operating Permit Programs" requires facilities with site emissions of any single criteria pollutant greater than 100 tpy, any single HAP greater than 10 ton/yr, and/or any aggregate combination of HAPs greater than 25 tpy to obtain a Title V permit. The hog fuel boiler at this facility has the potential to emit greater than 100 tons per year of VOCs, CO and NO_X; therefore, this facility is subject to the Air Operating Permit program.

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

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

7.m. Washington Administrative Code (WAC) 173-401 "Operating Permit Regulation" requires all major sources and other sources as defined in WAC 173-401-300 to obtain an operating permit. This regulation is applicable because this source has the potential to exceed the Title V thresholds and has obtained an operating permit.

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

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

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

7.q. SWCAA 400-040(1) "Visible Emissions" requires that emissions of an air contaminant from any emissions unit must not exceed 20% for more than three minutes in any one hour at the emission point, or within a reasonable distance of the emission point. A visible emission standard for hog fuel boilers during start-up and shutdown, as well as soot blowing and grate cleaning is established.

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

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

7.t. SWCAA 400-040(4) "Odors" requires any source which generates odors that may unreasonably interfere with any other property owner's use and enjoyment of their property to use recognized good practice and procedures to reduce these odors to a reasonable minimum. This source must be managed properly to maintain compliance with this regulation.

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

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

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

7.x. SWCAA 400-060 "Emission Standards for General Process Units" requires that all new and existing general process units do not emit PM in excess of 0.23 g/Nm^3_{dry} (0.1 gr/dscf) of exhaust gas.

7.y. SWCAA 400-070(2) "Hog fuel boilers" requires hog fuel boilers to meet all provisions of SWCAA 400-040 and SWCAA 400-050(1). All hog fuel boilers are also required to utilize Reasonably Available Control Technology (RACT) and be operated and maintained to minimize emissions.

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

7.aa. SWCAA 400-110 "New Source Review" requires that SWCAA issue an ADP in response to an ADP application prior to establishment of the new source, emission unit, or modification.

7.bb. SWCAA 400-113 "Requirements for New Sources in Attainment or Nonclassifiable Areas" requires that no approval to construct or alter an air contaminant source will be granted unless it is evidenced that:
(1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
(2) BACT will be employed for all air contaminants to be emitted by the proposed equipment;
(3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
(4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

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

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

New BACT Determination(s)

8.a. BACT Determination – Anti-stain System. The use of mist eliminators for a sap stain/anti-stain spray system meets the requirements of Best Available Control Technology (BACT) for the types and quantities of VOCs and TAPs from the new TDS Technologies, Inc. anti-stain spray system.

Previous BACT Determination(s)

8.b. BACT Determination. All equipment at the facility has previously been through New Source Review and determined to meet the requirements of BACT at the time of installation or were installed prior to the establishment of BACT requirements.

8.c. BACT and RACT Determination – Boiler. The use of a multiclone and a wet venturi scrubber in series has been determined by SWCAA to meet RACT for PM from the hog fuel boiler. The use of proper combustion controls has been determined to meet BACT and RACT for other boiler pollutants.

When replacing the wet venturi scrubber with a wet venturi scrubber Hampton Lumber considered an electrostatic precipitator (ESP) and baghouse. The baghouse was eliminated as an option as retrofitting this control onto a 1978 hybrid suspension grate boiler could potentially create explosion hazards.

Hampton Lumber received vendor quotes for an ESP and a wet venturi scrubber. PPC Industries proposed an ESP that would a meet 94.5% PM_{10} removal efficiency without any control for condensables. By contrast, the wet venturi scrubber meets 99.5% PM_{10} removal efficiency with the potential to capture condensables.

8.d. BACT Determination - Planer mill. The use of a cyclone and baghouse in series on the planer and trimmer operations has been determined by SWCAA to meet BACT for the collection of PM from these operations.

8.e. BACT Determination - Dry kilns. A review of the RACT/BACT/LAER Clearinghouse (RBLC) showed no add-on controls established for dry kiln emissions. The use of process temperature limits had been determined to meet the requirements of BACT for the dry kilns installed at this facility.

8.f. BACT Determination – Bin unloading. The use of load out bunker enclosures for the shavings and sawdust loadout bunkers had been determined by SWCAA to meet BACT for the collection of PM from these operations.

8.g. BACT Determination – Office emergency engine (propane-fired). Limited hours of operation (100 hr/yr) and the use of propane, a low-sulfur fuel (15 grains per 100 cubic feet (gr/100 ft^3) or approximately 180 per million by weight (ppmw)), has been determined to meet the requirements of BACT for the propane-fired emergency generator engine.

8.h. BACT Determination – Fire pump engine (diesel-fired). Limited hours of operation (100 hr/yr) and the use of low-sulfur (≤500 ppmw) diesel fuel was previously determined to meet the requirements of BACT for the diesel-fired fire pump engine.

8.i. Prevention of Significant Deterioration (PSD) Applicability. This permitting action will not result in a potential increase in actual emissions equal to or greater than the PSD thresholds. The facility does not fall into the collection of twenty-six source categories that are triggered by the 100 tpy threshold, nor are they subject to any NSPS or NESHAP promulgated prior to 1980. They are in the 250 tpy category and do not have greater than 250 tons of any criteria pollutant potential to emit. Therefore, PSD review is not applicable to this action.

8.j. Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is generally applicable to any emission unit with the potential to emit (pre-controlled) 100 tpy or more of any criteria air pollutant for which an emission standard (limit) applies and that utilizes a control device to maintain compliance with the emission standard. The emission unit affected by this permitting action (anti-stain application) does not emit over 100 tpy for any criteria pollutant. Therefore, the requirements of the CAM program are not applicable to the proposed project.

Hog Fuel Boiler. The facility has the potential to emit over 100 tpy of CO, NO_X, and PM_{10} from the hog fuel boiler. CO and NO_X have no controls; therefore, the CAM program is not application to those emissions. PM_{10} is controlled by the wet venturi scrubber; therefore, the CAM program is applicable to the hog fuel boiler and wet venturi scrubber for PM_{10}. However, 40 CFR 64.2(b)(1)(i) exempts these emission limitations from the requirements of Part 64 because the facility is subject to a post-1990 NESHAP (Boiler MACT)… [that establishes PM limits and monitoring.] It is expected that the standards in the Boiler MACT will provide a reasonable assurance of compliance. Also, this permitting action does not address the hog fuel boiler and only addresses the addition of the new anti-stain system.

9. AMBIENT IMPACT ANALYSIS

9.a. Criteria Air Pollutant Review. Emissions of NO_x, CO, PM, VOC (as a precursor to O_3), and SO_2 are emitted at levels where no adverse ambient air quality impact is anticipated.

9.b. TAP Small Quantity Review. Hampton Lumber Morton estimated the following TAP emissions established in ADP 15-3151 and compared the modeled impact to the ASIL in WAC 173-460 [effective August 21, 1998]. The installation of the anti-stain process will not increase any TAP beyond the SQER.

Toxic Compound	CAS #	Total Annual Emissions (lb/yr)	Small Quantity Emission Rate (lb/yr)	Acceptable Source Impact Level ($\mu g/m^3$)	TAP Class	EPA Classified HAP (Yes/No)
Acetaldehyde	75-07-0	18,633	50	0.45	A	Yes
Acrolein	107-02-8	280	175	0.02	B	Yes
Arsenic	7440-38-2	11.49	--	0.00023	A	Yes
Beryllium	7440-41-7	0.57	--	0.00042	A	Yes
Benzene	71-43-2	2,192.80	20	0.12	A	Yes
Cadmium	7440-43-9	2.14	--	0.00056	A	Yes
Chromium, total	7440-47-3	10.96	175	0.00083	A	Yes
Copper	7440-50-8	25.58	175	0.67	B	No
Formaldehyde	50-00-0	2,938	20	0.077	A	Yes
Manganese	7439-96-5	835.35	175	3.3	B	Yes
Mercury	7439-97-6	1.83	175	0.33	B	Yes
Methanol	67-56-1	18,540	43,748	870	B	Yes
Naphthalene	91-20-3	50.64	22,750	170	B	Yes
Nickel	7440-02-2	17.23	0.5	0.0021	A	Yes
Propionaldehyde	123-38-6		--		B	Yes
Selenium	7782-49-2	1.46	175	0.67	B	Yes

Conclusions

9.c. Installation of the anti-stain process, as proposed in ADP application L-724, will not cause the ambient air quality requirements of 40 CFR 50 "National Primary and Secondary Ambient Air Quality Standards" to be violated.

9.d. Installation of the anti-stain process, as proposed in ADP application L-724, will not cause the requirements of WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" or WAC 173-476 "Ambient Air Quality Standards" to be violated.

9.e. The anti-stain process as proposed in ADP application L-724, will not violate emission standards for sources as established under SWCAA General Regulations Sections 400-040 "General Standards for Maximum Emissions," 400-050 "Emission Standards for Combustion and Incineration Units," and 400-060 "Emission Standards for General Process Units."

10. DISCUSSION OF APPROVAL CONDITIONS

SWCAA has made a determination to issue ADP 22-3511 in response to ADP application L-724. ADP 22-3511 contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

10.a. Supersession of Previous Permits. ADP 22-3511 supersedes ADP 17-3237 in its entirety. Compliance will be determined under this ADP, not previously superseded ADPs. Existing approval conditions for units not affected by this project have been carried forward unchanged.

10.b. General Basis. Permit requirements for equipment affected by this permitting action incorporate the operating schemes proposed by the applicant in ADP application L-724 and previous applications. Unless otherwise requested by the applicant, emission limits for approved equipment are based on the potential emission calculations in Section 6 of this Technical Support Document. BACT is implemented as proposed for each emission unit from pervious permitting actions, except for the hog fuel boiler, wherein RACT is implemented.

10.c. Monitoring and Recordkeeping Requirements. ADP 22-3511 establishes monitoring and recordkeeping requirements sufficient to document compliance with applicable emission limits, ensure proper operation of approved equipment and provide for compliance with generally applicable requirements. In specific, Hampton Lumber Morton is required to record boiler operation, bin unloading throughput, dry kiln parameters, baghouse operation, upset conditions, and excess emissions.

10.d. Reporting Requirements. ADP 22-3511 establishes general reporting requirements for annual air emissions, upset conditions and excess emissions. Specific reporting requirements are established for material throughput and hours of operation.

10.e. Dry Kilns. Permit requirements for the lumber dry kilns incorporate the operating scheme proposed by the permittee at the time of installation. Visible emissions are limited to 5% opacity consistent with proper operation. Restrictions have been imposed on dry kiln set point temperatures, and monitoring of the average actual dry kiln temperature has been required. Monitoring the set point temperature is meant to be reflective of the actual dry kiln temperature. SWCAA acknowledges that at times the actual temperature may exceed the set point temperature for a short period of time and that this is natural for the normal operation of the equipment. Emission limits for lumber drying are based on emission test data, maximum average temperature, and the maximum lumber capacity of the kilns.

The facility is permitted to dry a variety of woods. Emission factors established by SWCAA from data from a variety of sources have shown that dry kiln emissions vary greatly by wood species. Establishment of factors is not intended to limit the types of wood dried at the facility.

10.f. Hog Fuel Boiler. The boiler is designed for and approved to fire on wood products only. Exhaust gases must be discharged through the multiclone and wet venturi scrubber at all times during operation. Visible emissions are limited to 15% opacity. The facility is required to perform an emission test every two years. Annual air emissions are calculated using the most recent source test and annual production.

Branch Environmental Corp. could not offer specific parametric limits concerning scrubber water circulation flow rate and scrubber pressure, nor could the company offer a guarantee for exhaust grain loading of PM. According to Branch Environmental, the scrubber flow rate for the ABCO hog fuel boiler control can range from 150 GPM to 258 GPM, and the pressure can range from 15" w.c. to 22" w.c. and still meet the capture efficiency of 99.5% for PM_{10} and larger. SWCAA has established limits within this range to assure proper operation of the scrubber for this hog fuel boiler; however, SWCAA understands the unit might operate better under alternate parameters.

Hampton Lumber Morton performed an engineering evaluation that showed the established parametric limits to be able to assure compliance with the PM limit.

The scrubber pressure, water flow rate, steam flow rate and oxygen are required to be recorded daily to being recorded as a 30-day rolling average. Continuous monitoring data is recorded every 15 minutes from valid data points collected during operation of the boiler in order to generate the 30-day rolling average as required by 40 CFR Part 63 (Subpart DDDDD) "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters", subparts 63.7525 and 63.7535.

10.g. Fire Pump Engine. Permit requirements incorporate the use of these units as an emergency power source only. BACT requirements for this unit include operational limitations (≤ 100 hr/yr testing and maintenance) and the use of ultra-low sulfur diesel (≤ 0.0015% S by weight). Annual operation is to be monitored with an integral hourmeter. The permit allows the use of "#2 diesel or better." For this unit, "or better" includes road-grade diesel fuel with lower sulfur content, biodiesel, and mixtures of biodiesel and road-grade diesel that meet the definition of "diesel" and contain no more than 0.0015% sulfur by weight. A visible emission limit or 5% opacity has been established consistent with proper operation of the diesel engine. Due to the technical limitations of the engine, the opacity limit does not apply during periods of start-up and shutdown.

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

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

Hog fuel boiler.

Boiler start-up, as defined by 40 CFR Subpart DDDDD "National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters", is as follows:
(1) Either the first-ever firing of fuel in a boiler or process heater for the purpose of supplying useful thermal energy for heating and/or producing electricity, or for any other purpose, or the firing of fuel in a boiler after a shutdown event for any purpose. Start-up ends when any of the useful thermal energy from the boiler or process heater is supplied for heating, and/or producing electricity, or for any other purpose, or
(2) The period in which operation of a boiler or process heater is initiated for any purpose. Start-up begins with either the first-ever firing of fuel in a boiler or process heater for the purpose of supplying useful thermal energy (such as steam or heat) for heating, cooling or process purposes, or producing electricity or the firing of fuel in a boiler or process heater for any purpose after a shutdown event. Start-up ends four hours after when the boiler or process heater supplies useful thermal energy (such as heat or steam) for heating, cooling, or process purposes, or generates electricity, whichever is earlier.

Shutdown, as defined by 40 CFR Subpart DDDDD "National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters", means the period in which cessation of operation of a boiler or process heater is initiated for any purpose. Shutdown begins when the boiler or process heater no longer supplies useful thermal energy (such as heat or steam) for heating, cooling, or process purposes and/or generates electricity or when no fuel is being fed to the boiler or process heater, whichever is earlier. Shutdown ends when the boiler or process heater no longer supplies useful thermal energy (such as steam or heat) for heating, cooling, or process purposes and/or generates electricity, and no fuel is being combusted in the boiler or process heater.

In accordance with SWCAA 400-040(1), visible emissions from the hog fuel boiler are limited to 40% opacity during periods of soot blowing and/or grate cleaning. These periods are limited to not more than 15 consecutive minutes in any eight-hour period.

During periods of start-up, shutdown, and grate cleaning, NO_X, CO and PM_{10} emissions from the hog fuel boiler may exceed the operational limit of 175 ppm, 300 ppm and 0.050 gr/dscf, respectively, corrected to 7% O_2. Start-up and shutdown periods are limited to a six-hour period. The emissions from start-up and shutdown are included in annual facility totals.

If refractory work has been performed on the boiler, the boiler start-up period is extended to include curing the new refractory. The curing process takes an extended period of time and generates an elevated moisture content in the firebox. Therefore, the length of the start-up period must be significantly extended to allow completion of the curing process. Start-up periods that occur after refractory work shall not exceed a maximum length of 36 hours.

Fire pump diesel engine. Visible emissions from the diesel-fired fire pump engine are limited to 5% opacity or less during normal operation. However, the engine might not be capable of reliably limiting visible emissions to less than 5% opacity until the engine achieve normal operating temperature. Therefore, the general limitation from SWCAA 400 of 20% opacity applies during start-up.

To SWCAA's knowledge, all other equipment at this facility can comply with all applicable standards during start-up and shutdown.

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

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

12. EMISSION MONITORING AND TESTING

12.a. Emission Testing Requirements – Western Pneumatics Baghouse. The Western Pneumatics baghouse emission test shall be performed by the end of March 2015 and every five years thereafter, no later than the end of March. This is consistent with similar testing requirements for other large baghouses at similar facilities in SWCAA's jurisdiction. All emission monitoring shall be conducted in accordance with the provisions of ADP 17-3237, Appendix C.

12.b. Emission Testing Requirements - Dry Kilns. A lumber drying emission test shall be performed by the end of February 2007 and every five years thereafter, no later than the end of February. If there is no test company capable of performing this test, SWCAA must be notified of the Permittee's attempt to locate a capable test facility. If no test firm can be located, the test is excused until the next five-year interval. Emission testing shall be conducted in accordance with ADP 17-3237, Appendix B. Constituents to be measured include wood weight, wood moisture content, kiln temperature, and speciated VOCs including HAPs and TAPs.

12.c. Emission Testing Requirements - Hog Fuel Boiler. The ABCO Industries, Inc. hog fuel boiler emission test shall be performed by the end of October 2005, and every two years thereafter, no later than the end of October. Emission testing shall be conducted in accordance with ADP 17-3237, Appendix A. Constituents to be measured include flow rate, gas velocity, temperature, oxygen, carbon dioxide, moisture, nitrogen oxides, carbon monoxide, volatile organic compounds, sulfur dioxide, particulate matter, and opacity. The outlet of the wet venturi scrubber shall be measured for all constituents.

12.d. Emission Monitoring Requirements - Hog Fuel Boiler. Approval conditions for the ABCO Industries, Inc. hog fuel boiler require emission tuning in all years an emission test in not performed, for the purpose of monitoring future performance and assuring compliance with facilitywide emission limits. All emission monitoring shall be conducted in accordance with the provisions of ADP 17-3237, Appendix D or 40 CFR 63 Subpart DDDDD: Major Boiler MACT.

13. FACILITY HISTORY

13.a. General History. Hampton Lumber Mills purchased Cowlitz Stud Company on June 1, 1999.

13.b. Previous Permitting Actions. SWCAA has previously issued the following Permits for Hampton Lumber Mill's facility in Morton. Permits in italics have been superseded.

Date	Application Number	Approval ADP	Purpose
May 3, 1973	N/A	Letter	Installation of a Carter-Day fabric filter.
January 13, 1978	L-91	78-300	Installation of the ABCO Industries, Inc. hog fuel boiler and associated pollution control equipment consisting of a multiclone and Zurn Air Systems wet venturi scrubber. This Permit was superseded by 04-2534.
August 29, 1978	N/A	78-381	Consent Order - discontinue the use of existing incineration equipment. Closed.
January 16, 1989	L-179	88-1032	Installation of an H & R Mechanical Systems Posi-Con model 7210 baghouse. This Permit was superseded by 04-2534.
January 8, 1996	L-342	95-1817	Installation of two additional American Wood Dryers, Inc. model 1156 lumber dry kilns. This Permit was superseded by 04-2534.
November 11, 1996	L-289	96-1951	Installation and operation of new debarking and saw equipment. This Permit was superseded by 04-2534.
September 5, 1997	L-384	97-2034	Establish federally enforceable emission limits for the existing ABCO Industries, Inc. boiler. This Permit was superseded by 04-2534.
March 27, 2001	L-478	01-2339	Installation of a new Coe Manufacturing dry kiln. This Permit was superseded by 04-2534.
March 2, 2001	N/A	01-2341	Consent Order - improve performance of the ABCO Industries, Inc. hog fuel boiler. Closed.
June 9, 2004	L-439	04-2534	Modification of existing approval conditions including emissions monitoring provisions for a hog fuel boiler, dry kilns, and sawmill. This Permit was superseded by 04-2534R1.
November 22, 2004	L-546	04-2534R1	Replacement of the Carothers Company model 386 baghouse and the H & R Mechanical Systems Posi-Con model 7210 baghouse with a new Western Pneumatics model 542 baghouse. This Permit was superseded by 04-2534R2.
June 18, 2008	N/A	08-2800	Consent Order for compliance with boiler emission limits. Closed.
August 3, 2010	L-643	04-2534R2	Approved the increase in bin unloading throughput and dry kiln throughput. This permit superseded ADP 04-2534R1.
August 27, 2015	L-682	15-3151	Approval to replace the existing wet scrubber with a new wet scrubber. This permit superseded ADP 04-2534R2.

August 15, 2017	L-690	17-3237	Approval to modify existing monitoring requirements. This Permit superseded ADP 15-3151.

13.c. Compliance Issues. There are no outstanding compliance issues addressed in this Permit.

14. PUBLIC INVOLVEMENT OPPORTUNITY

14.a. Public Notice for ADP Application L-724. Public notice for ADP application L-724 was published on the SWCAA website for a minimum of fifteen (15) days beginning on March 9, 2022.

14.b. Public/Applicant Comment for ADP Application L-724. A (30) day public comment period was provided for this permitting action pursuant to SWCAA 400-171(3). No comments were received during the public comment period.

14.c. State Environmental Policy Act. After review of the SEPA Checklist for this project, SWCAA has determined that the project does not have a probable significant impact on the environment and has issued Determination of Non-Significance 22-007. An Environmental Impact Statement is not required under RCW 43.21C.030(2)(c).