MAUL FOSTER ALONGI

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September 26, 2025

Heather Kuoppamaski, P.E.
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232

Re: CAO Permitting Response to Information Request Dated July 31, 2025

Dear Heather:

Maul Foster and Alongi, Inc (MFA) is submitting this revised Cleaner Air Oregon (CAO) air toxics emissions inventory (ATEI) on behalf of Freres Lumber Company, Inc. (Freres) for their Lyons, Oregon facility (the facility). The revised ATEI is in response to the letter provided to Freres on July 31, 2025 (response letter) by the Oregon Department of Environmental Quality (DEQ). In the response letter, the DEQ requested that Freres make several edits and updates to the ATEI based on additional information, where needed, and provide clarifying information pertaining to several toxic emission units (TEUs) at the facility. The response letter required that an updated ATEI be submitted to the DEQ by September 29, 2025. Therefore, this revised ATEI represents a timely submittal of the requested materials.

The revised ATEI includes the requested changes and revisions from the response letter, where applicable. In some cases, the response letter requested comments and/or clarifications from Freres. The remainder of this cover letter includes these responses. The revised process flow diagram is provided as Attachment A, and the revised emissions support document (ESD) is provided as Attachment B.

While preparing the revised ATEI, it was identified that there are no cooling zones associated with the dryer. TAC emissions from cooling zones were mistakenly included with the original ATEI. Accordingly, the dryer cooling zone TEUs have been removed from the revised ATEI and process flow diagram, and will not be included with any associated materials moving forward.

1.a.) A list of the onsite "Distillate oil, kerosene, gasoline, natural gas or propane burning equipment"; include throughput, fuel storage, and Btu/hour ratings to confirm the equipment meets the requirements to be exempted using OAR 340-245-0060(3)(b)(B).

A list of all equipment meeting this definition, excluding the primary natural gas heaters used for the dryers, is provided in Table 1, below. As shown in Table 1, the individual heat rating of the two natural gas burners is less than the threshold of 2 million British-thermal units per hour (MMBtu/hr) as defined by Oregon Administrative Rule (OAR) 340-245-0060(3)(b)(B)(ii). The facility does not use equipment that burns distillate oil, kerosene, or gasoline fuel.

Table 1 – Onsite Fuel Burning Equipment

Fuel Burning Equipment	Maximum Rating (MMBtu/hr)
Cat Shop Natural Gas Heater	0.230
Cat Shop Bay Floor Natural Gas Heater	0.206

1.b.) b. Manufacturer data for the propane boiler (BLR2) to justify using emission factors for 10- 100 MMBtu/hr.

Due to the age of the propane boiler (installed in 1969), manufacturer information is limited. Photographs taken of the name plant are provided in Table 1 of the ESD. As shown in Table 1 of the ESD, the name identifies that the propane boiler has an hourly fuel consumption rate of 139.5 gallons per hour. Multiplying this hourly fuel rate by the high heat content of propane at 0.091 MMBtu per gallon[1] results in a maximum hourly heat rating of 12.7 MMBtu/hr, which would qualify for the emission factors for 10-100 MMBtu/hr propane combustion units.

Note that this value differs from what was used to estimate daily propane consumption from the propane boiler in the original submittal. MFA believes the 20.922 MMBtu/hr rating is reflective of the maximum input heat rating when using residential oil number 6 fuel. As a result, MFA has revised the maximum daily usage to reflect the 139.5 gallons per hour fuel consumption throughout the emissions calculations.

1.d.) For the Wood fuel boiler TEU (BLR3) provide the following information:

i. Manufacturer information on the ESP;
ii. Information on ash handling operations at the facility.
iii. The following regarding startup and shutdown procedures for this TEU, including:
    1. Startup and shutdown plan;
    2. Fuel used during startup and shutdown;
    3. Any emission controls used during startup and shutdown; and
    4. The number of startups and shutdowns per year.

An equipment specifications sheet of the electrostatic precipitator (ESP) provided by the manufacturer is shown in Attachment C.

Ash handling operations are characterized by the following: Ash from the wood fired boiler is picked up via a grate conveyor and delivered to a trammel screen which separates the residual boiler products based on size. The trammel screen and all conveyors are fully enclosed. Larger products (diameter > ¼") are delivered to a water bath conveyor that separates wood from rock/metal and are then manually transports the wood to the boiler fuel storage pile. The smaller boiler residuals are conveyed to a storage silo where they are stored prior to being further screened by size (approximately 1 millimeter [mm]). Screening occurs below the storage silo in a fully enclosed system. Boiler residuals that are larger than the 1 mm threshold are then stored onsite until they are shipped to customers. The fine boiler ash (< 1 mm) is kept in a storage pile until it is shipped to either a landfill or customer. The boiler ash storage pile is stored in a 3-sided enclosure and kept moist to minimize fugitive loss.

The startup and shutdown plan for the wood fired boiler (BLR3) is provided in Attachment D. BLR3 does not use alternate fuel during startup and shutdown periods. As identified in the Attachment D, BLR3 does not start using the ESP until the exhaust temperature reaches a set point of 250 degrees Fahrenheit (°F). At this temperature, the ESP becomes fully charged. Freres is proposing to assume a maximum of four hours per startup event of multi-clone control only emissions from BLR3 on a short-term (i.e., 24-hour) basis. For annual emissions, Freres is proposing to assuming a maximum of 30 startup periods per year. For BLR3 startup, only 20 percent of the hourly fuel rate is used for the four-hour period prior to the ESP becoming fully charged. As a result, daily and annual emissions during BLR3 startup have been estimated using this reduced hourly fuel rate. The reduced fuel rate calculations are provided in Attachment B.

[1] 40 CFR Part 98, Table C-1 High Heat Values for Various Types of Fuel. Representative of propane fuel.

During shutdown periods, the ESP is considered offline when the exhaust temperature drops below 250 °F. It is important to note that wood combustion in BLR3 ceases prior to the exhaust temperature reaching this threshold. As a result, MFA believes that shutdown periods should not be evaluated as the fully charged ESP is operational during these shutdown periods when wood combustion is occurring.

1.e.) For the Natural Gas Combustion in Dryer Auxiliary Burners TEU (DRY_NG):

i. Manufacturer documentation showing the natural gas dryer is <10 MMBtu/hr; and

ii. Verification that the natural gas dryer does not have a selective non-catalytic reduction (SNCR) system or a selective catalytic reduction (SCR) system.

The auxiliary dryer is comprised of eight natural gas burners, each with a maximum heat rating of either 6.0 or 8.5 MMBtu/hr. The aggregate rating for the auxiliary dryer burners is 58.0 MMBtu/hr. Information on the auxiliary dryer burners was submitted to the DEQ on March 7, 2022, in application number 33756 R-01. Specification sheets for the auxiliary dryer burners are provided in Attachment E.

None of the eight auxiliary dryer burners use SNCR or SCR technologies for emissions control.

1.e.) For the Propane Emergency Generator TEU (EGEN): Manufacturer information for the generators to confirm "2-stroke lean burn" is representative. The Title V Operating Permit Review Report states the emergency generator used by the facility is a rich burn engine.

Emission factors for 2-stroke lean burn engines were mistakenly used for the propane emergency generator. They have since been updated to reflect rich burn engines.

1.g.) For the Emergency Diesel Generator Fire Pump TEU (FIRE):

i. Manufacturer documentation that these engines do not have NOx controls;

A specification sheet for the emergency diesel generator fire pump is provided in Attachment F. As shown in Attachment F, the exhaust emissions are rated for EPA Tier 3 standards and do not use selective catalytic reduction or similar technologies for the control of nitrogen dioxide emissions.

1.h.) For the Cooling Tower TEU (CT):

i. Additional manufacturer information to support the following:

1. Water circulation rate used; and

2. If the unit has a drift loss eliminator.

The operations and maintenance manual for the cooling tower is provided in Attachment G. As shown in Attachment G, the cooling tower utilizes a PVC cellular drift eliminator to achieve a drift loss of 0.005 percent. The water circulation rate in the ESD has been updated to align with what is shown in Attachment G.

1.i.) For the Fugitive Welding TEU (WELD): Electrode types used for each welding process, if available.

The electrode types for each welding product are shown below in Table 2.

Table 2 – Welding Electrode Types

Electrode Type	Product(s)
Gas Metal Arc Welding (GMAW)	Stoody S965
	Weldcote ER70S
	Lincoln 28676
	Weldcote 308L
Submerged Arc Welding (SMAW)	Eutectic 7018RS
	Lincoln 7018
Flux Core Arc Welding (FCAW)	ESAB 710X
Tungsten Inert Gas (TIG)	Unibraze E120S

2.c.) Provide additional clarification on the activity levels for the steam tunnels (TEU ID TUNNEL) and the veneer dryer heated and cooling zones (TEU IDs DRY_NG, DRY_HEAT, and DRY_COOL). The Process Flow Diagram shows all materials from the steam tunnels going to the veneer dryer heated and cooling zones. However, the activity levels in Tab 2 of the AQ520 form show 480,000 Msf-3/8" veneer in the Steam Tunnels with only 200,000 Msf-3/8" veneer in each of DRY_HEAT and DRY_COOL

As described in section 5 of the Review Report to the Title V permit 22-6002-TV-01 (existing permit), after the softened logs leave the steam tunnels, they are peeled on one of two lathes. From there, the green veneer is sorted by grade and either dried via the veneer dryers (DRY_HEAT1 or DRY_HEAT2), transported to a separate facility in Mill City, or sold offsite. The potential to emit (PTE) activity level of green veneer going to the dryers is 200,000 thousand square feet (on a 3/8-inch basis) per year (Msf-3/8"/yr). The remainder of the green veneer is transported to the Mill City facility or sold offsite. The process flow diagram in Attachment A has been updated to reflect this process. As previously identified, the cooling zone TEUs have been removed from the revised ATEI.

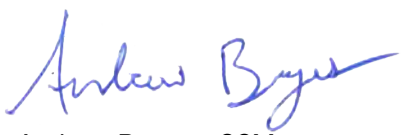
4.1.b/2.c) Provide additional information from the manufacturer on nickel concentrations in the welding rod for Stoody S965 and Eutectic 7018RS products. Nickel is mentioned in Section 15 "EPCRA/SARA Title III 313 Toxic Chemicals" of each SDS.

Freres requested additional clarification on nickel content from both the supplier and the product manufacturer. The manufacturer identified that these products should not include any form of nickel or nickel compounds. The safety data sheets, which were provided in the original submittal, are the only documents the manufacturer is able to provide at this time.

MFA looks forward continuing to work with the DEQ to get the facility through the CAO permitting program. Should you have any questions, comments, or concerns regarding the information provided in this submittal, please don't hesitate to contact Andrew Rogers at (503) 407-6406 or arogers@maulfoster.com

Sincerely,

Maul Foster & Alongi, Inc.



Andrew Rogers, CCM
Project Meteorologist

Attachments

References

Limitations

A—Emissions Support Document

B—Process Flow Diagram

C—ESP Procedure Manual

D—Boiler 3 Startup/Shutdown Procedure Manual

E— Burner Specification Sheets

F— Diesel Generator Spec Sheet

G— Cooling Tower Specification Sheet

cc:

Mike Flewelling, Freres

Kyle Freres, Freres

Limitations

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

Attachment A

Emissions Support Document

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Table 1
Production Input and Assumptions
Freres Lumber Company, Inc.—Lyons, Oregon

Parameter	Production or Process Rate				
	Daily		Annual		
FACILITY-WIDE					
Hours of Operation	24.0	(hrs/day) [1]	8,760	(hrs/yr)	[1]
BOILER 2					
Propane Consumption	3.35	(Mgal/day) [a]	180	(Mgal/yr)	[3]
BOILER 3					
Normal Operations					
Wood Fuel Heat Input	3,960	(MMBtu/day) [a]	1,419,000	(MMBtu/yr)	[3]
SU Operations					
Hours of Operation	4.00	(hrs/day) [b]	120	(hrs/yr)	[b]
Wood Fuel Heat Input	132	(MMBtu/day) [c]	3,960	(MMBtu/yr)	[d]
LOG CONDITIONING					
Steam Tunnels Green Veneer Production	2,880	(Msf-3/8"/day) [a]	480,000	(Msf-3/8"/yr)	[3]
Tunnel 1 Green Veneer Production	1,440	(Msf-3/8"/day) [e]	240,000	(Msf-3/8"/yr)	[e]
Tunnel 2 Green Veneer Production	1,440	(Msf-3/8"/day) [e]	240,000	(Msf-3/8"/yr)	[e]
VENEER DRYERS					
Total Dryer Production	840	(Msf-3/8"/day) [a]	200,000	(Msf-3/8"/yr)	[3]
Dryer Auxiliary Burner Natural Gas Fuel Usage	1.36	(MMscf/day) [f]	497	(MMscf/yr)	[g]
GASOLINE DISPENSING FACILITY					
Gasoline Throughput	246	(gal/day) [h]	85,000	(gal/yr)	[3]
PRODUCT USAGE					
Krylon Machine Green	2.50	(gal/day) [4]	750	(gal/yr)	[4]
Krylon True Blue	2.50	(gal/day) [4]	750	(gal/yr)	[4]
Krylon Gloss Red	2.50	(gal/day) [4]	750	(gal/yr)	[4]
Krylon White	2.50	(gal/day) [4]	750	(gal/yr)	[4]
Krylon Yellow	1.00	(gal/day) [4]	250	(gal/yr)	[4]
Sherwin Williams Yellow	1.00	(gal/day) [4]	250	(gal/yr)	[4]
WVCO DIC-231 Disappearing Ink	0.50	(gal/day) [4]	100	(gal/yr)	[4]
WVCO Red Striping Ink	0.50	(gal/day) [4]	100	(gal/yr)	[4]
WVCO Green Striping Ink	0.50	(gal/day) [4]	100	(gal/yr)	[4]
WVCO Purple Striping Ink	0.50	(gal/day) [4]	100	(gal/yr)	[4]
Weld-On Plumbing Purple Primer	0.020	(gal/day) [4]	5.00	(gal/yr)	[4]
740 Zinc-Rich Galvanizing Compound Aerosol	0.020	(gal/day) [4]	5.00	(gal/yr)	[4]
FIRE PUMP DIESEL ENGINE					
Hours of Operation	3.00	(hrs/day) [10]	100.0	(hrs/yr)	[11]
Fuel Usage	31.5	(gal/day) [i]	1,050	(gal/yr)	[i]
PROPANE EMERGENCY ENGINE					
Hours of Operation	3.00	(hrs/day) [10]	100.0	(hrs/yr)	[11]
Fuel Usage	18.6	(gal/day) [j]	620	(gal/yr)	[j]
SULFURIC ACID TANK (EXEMPT TEU)					
Maximum Usage	3.00	(gal/day) [14]	1,100	(gal/yr)	[14]

Notes

BDT = bone dry tons; Mgal = thousand gallons; MMBtu = million British thermal units; MMscf = million standard cubic feet; SU = startup.
Msf-3/8" = thousand square feet on three-eighths inch basis.

(a) Daily throughput ("unit"/day) = (maximum hourly throughput ["unit"/hr]) x (daily operating hours hr/day)

Boiler 2 maximum capacity hourly consumption (Mgal/hr) = 0.1395 (2)
Boiler 3 maximum capacity hourly throughput (MMMBtu/hr) = 165 (4)
Maximum permitted hourly veneer production (Msf-3/8"/hr) = 120 (6)
Maximum hourly dryer production (Msf-3/8"/hr) = 35.0 (4)

(b) Boiler 3 hours of operation (SU) (hrs/yr) = (hours of multi-clone only operation per SU event [hrs/event]) x (PTE number of SU events per day or year)

Hours of multi-clone only operation per SU (hrs/event) = 4.00 (5)
PTE Number of SU events per day = 1.00 (4)

(c) Boiler 3 daily thoughput (SU) (MMBtu/day) = (maximum hourly throughput [MMBtu/hr]) x (percentage of hourly throughput during SU [%] / 100) x (hours of multi-clone only operation per SU event [hrs/event])

Boiler 3 maximum capacity hourly throughput (MMMBtu/hr) = 165 (4)
Percentage of hourly throughput during SU (%) = 20.0 (7)

(d) Annual throughput for SU (MMBtu/yr) = (boiler 3 daily throughput [SU] [MMBtu/day]) x (PTE number of SU days per year)

PTE Number of SU days per year = 30.00 (4)

(e) Vat 1/2 green dryer production (Msf-3/8"/[day or year]) = (total steam green veneer production [Msf-3/8" {day or year}]) x (percent appropriated to each vat [%] / 100)

Percent appropriated to each vat (%) = 50.0 (4)

(f) Daily dryer auxiliary burner natural gas usage (MMscf/day) = (burner total heat input capacity [MMBtu/hr]) / (natural gas high heat value [MMBtu/MMscf]) x (daily hours of operation [hrs/day])

Dryer burner total heat input capacity (MMBtu/hr) = 58.0 (8)
Natural gas high heat value (MMBtu/MMscf) = 1,026 (9)

(g) Annual dryer auxiliary burner natural gas fuel usage (MMscf/yr) = (daily dryer natural gas fuel usage [MMscf/day]) x (365 days/yr)

(h) Daily throughput ("unit"/day) = (annual throughput ["unit"/yr]) / (345 operating days/yr)

(i) Fuel consumption (gal/day or gal/yr) = (maximum hourly fuel rate [gal/hr]) x (hours of operation [hrs/day or hrs/yr])

Maximum hourly fuel rate (gal/hr) = 10.5 (12)

(j) Fuel consumption (gal/day or gal/yr) = (engine size [hp]) x ((brake specific fuel consumption [btu/hp-hr]) / (1,000,000 Btu/MMBtu) / (fuel heat content [MMBtu/gal])) x (hours of operation [hrs/day or hrs/yr])

Brake specific fuel consumption (Btu/hp-hr) = 7,000 (13)
Propane fuel heat content (MMBtu/gal) = 0.091 (9)
Engine size (hp-hrl) = 80.5 (4)

References

(1) Assumes continuous facility operation.
(2) Maximum hourly fuel consumption as found on the boiler 2 nameplate. Nameplate prepared by the Cleaver Brooks Company (dated 11/17/69).
(3) Information provided by Freres Lumber Company, Inc. See Review Report to Title V Permit no. 22-6002-TV-01, issued July 10, 2020.
(4) Information provided by Freres Lumber Company, Inc.
(5) Information provided by Freres Lumber Company, Inc. Maximum length of time that occurs during a cold SU event when the ESP is not charged.
(6) See Condition 29.b to Title V Permit no. 22-6002-TV-01, issued July 10, 2020.
(7) Information provided by Freres Lumber Company, Inc. Assumes a maximum of 20% fuel rate used during SU operations.
(8) Information provided by Freres Lumber Company, Inc. See Review Report to Title V Permit no. 22-6002-TV-01 Modification No. 1, issued June 23, 2022.
(9) High heat values from 40 CFR Part 98, Table C-1 High Heat Values for Various Types of Fuel.
(10) Representative of a maximum of 3 hours a day for readiness testing and maintanence operation.
(11) Representative of 100 hours a year for readiness testing and maintanence operation.
(12) Information from Cummins specification sheet for Fire Pump Drive Engine model number CFP7E-F30. Representative of 2,100 RPM.
(13) AP-42 Chapter 3.3, Table 3.3-1, "Emissions Factors for Uncontrolled Gasoline and Diesel Industrial Engines".
(14) Information provided by Freres Lumber Company, Inc. Representative of maximum daily and annual throughputs.

Table 2
Welding Usages
Freres Lumber Company, Inc.—Lyons, Oregon

Description	Product Type ID	Welding Category	PTE Maximum Quantity Used [1]	
			Daily (lb/day)	Annual (lb/yr)
Plant 1				
965AP-G	Stoody S965	GMAW	0.64	186
Stoody 965-O				
Dual Shield 710X .045 X 33LB ESAB	ESAB 710X	FCAW	0.22	66.0
7018RS x 3/32 44LB PKG Eutectic	Eutectic 7018RS	SMAW	0.86	232
7018RS x 1/8 44LB PKG Eutectic				
7018RS x 5/32 44LB PKG Eutectic				
ED028281 Excalibur 7018 1/8 50 Lincoln	Lincoln 7018	SMAW	0.52	150
Plant 2				
Dual Shield 710X .045 X 33LB ESAB	ESAB 710X	FCAW	0.22	66.0
ER70S-6 035 33LB Carbon Steel Weldcote	Weldcote ER70S	GMAW	0.16	40.0
ER70S-6 045 33LB Carbon Steel Weldcote				
7018RS x 3/32 44LB PKG Eutectic	Eutectic 7018RS	SMAW	0.30	86.0
7018RS x 1/8 44LB PKG Eutectic				
7018RS x 5/32 44LB PKG Eutectic				
ED028281 Excalibur 7018 1/8 50 Lincoln	Lincoln 7018	SMAW	0.52	150
Plant 4				
Dual Shield 710X .045 X 33LB ESAB	ESAB 710X	FCAW	0.22	66.0
7018RS x 3/32 44LB PKG Eutectic	Eutectic 7018RS	SMAW	0.30	86.0
7018RS x 1/8 44LB PKG Eutectic				
7018RS x 5/32 44LB PKG Eutectic				
ED028281 Excalibur 7018 1/8 50 Lincoln	Lincoln 28281	SMAW	0.52	150
Cat Shop				
Dual Shield 710X .045 X 33LB ESAB	ESAB 710X	FCAW	0.57	165
ER70S-6 035 33LB Carbon Steel Weldcote	Weldcote ER70S	GMAW	0.40	100.0
ER70S-6 045 33LB Carbon Steel Weldcote				
7018RS x 3/32 44LB PKG Eutectic	Eutectic 7018RS	SMAW	0.60	150
7018RS x 1/8 44LB PKG Eutectic				
7018RS x 5/32 44LB PKG Eutectic				
ED028281 Excalibur 7018 1/8 50 Lincoln	Lincoln 7018	SMAW	0.20	50.0
ED028676 L56 035 12.5 Spool Lincoln	Lincoln 28676	GMAW	0.13	37.5
*E120S1 .035 X 1# Spool Unibraze	Unibraze E120S	TIG	0.080	20.0
Fab Shop				
Dual Shield 710X-M .045 X 33LB ESAB	ESAB 710X	FCAW	1.40	363
Dual Shield 710X-M .052 X 33LB ESAB				
ER70S-6 035 33LB Carbon Steel Weldcote	Weldcote ER70S	GMAW	0.58	165
ER70S-6 045 33LB Carbon Steel Weldcote				
7018RS x 3/32 44LB PKG Eutectic	Eutectic 7018RS	SMAW	0.60	176
7018RS x 1/8 44LB PKG Eutectic				
7018RS x 5/32 44LB PKG Eutectic				
ED028281 Excalibur 7018 1/8 50 Lincoln	Lincoln 7018	SMAW	0.12	30.0
308L Stainless .035 x 25SP Weldcote	Weldcote 308L	GMAW	0.20	50.0

References

(1) Information provided by Freres Lumber Company, Inc.

Table 3
Boiler 2 Propane Combustion TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor [1] (lb/Mgal)	Emission Estimates	
					Daily [a] (lb/day)	Annual [b] (lb/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS						
Acetaldehyde	75-07-0	Yes	Yes	2.8E-04	9.4E-04	0.050
Acrolein	107-02-8	Yes	Yes	2.4E-04	8.0E-04	0.043
Ammonia	7664-41-7	No	Yes	0.30	1.01	54.0
Benzene	71-43-2	Yes	Yes	5.1E-04	1.7E-03	0.092
Ethylbenzene	100-41-4	Yes	Yes	6.1E-04	2.0E-03	0.11
Formaldehyde	50-00-0	Yes	Yes	1.1E-03	3.7E-03	0.20
Hexane	110-54-3	Yes	Yes	4.1E-04	1.4E-03	0.074
Toluene	108-88-3	Yes	Yes	2.4E-03	7.9E-03	0.42
Xylene (mixture)	1330-20-7	Yes	Yes	1.8E-03	5.9E-03	0.32
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)						
Benzo[a]pyrene	50-32-8	Yes	Yes	1.0E-05	3.4E-05	1.8E-03
Naphthalene	91-20-3	Yes	Yes	3.0E-05	1.0E-04	5.4E-03
Total HAP Emission Estimates					**0.024**	**1.31**
Total TAC Emission Estimates					**1.03**	**55.3**

Notes

HAP = hazardous air pollutant; Mgal = thousand gallons; RBC = risk based concentration.

(a) Daily emission estimate (lb/day) = (emissions factor [lb/Mgal]) x (daily propane fuel usage [Mgal/day])

Daily propane fuel usage (Mgal/day) = 3.35 (2)

(b) Annual emission estimate (tons/yr) = (emission factor [lb/Mgal) x (annual propane fuel usage [Mgal/yr]) / (2,000 [lb/ton])

Annual propane fuel usage (Mgal/yr) = 180 (2)

References

(1) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B, Table B-3 "Default Emission Factors for LPG, Butane, or Propane Combustion" for external combustion equipment.

(2) See Table 1, Production Input and Assumptions.

Table 4
Boiler 3 Wood Combustion TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS or DEQ ID	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor (lb/MMBtu)		SU Emission Estimates (Multi-Clone Only)		Emission Estimates (ESP)		Total Emissions Estimates	
				Multi-Clone Only	ESP	Daily [a] (lb/day)	Annual [b] (lb/yr)	Daily [a] (lb/day)	Annual [b] (lb/yr)	Daily [a] (lb/day)	Annual [b] (lb/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS											
1,1,1-Trichloroethane (Methyl chloroform)	71-55-6	Yes	Yes	5.8E-05 [2]	5.8E-05 [2]	7.6E-03	0.23	0.23	82.0	0.24	82.2
1,2-Dichloropropane (Propylene dichloride)	78-87-5	Yes	Yes	1.7E-05 [2]	1.7E-05 [2]	2.2E-03	0.067	0.067	23.8	0.069	23.9
Acetaldehyde	75-07-0	Yes	Yes	2.8E-04 [2]	2.8E-04 [2]	0.037	1.12	1.12	402	1.16	403
Acetone	67-64-1	No	Yes	5.3E-04 [2]	5.3E-04 [2]	0.070	2.09	2.09	751	2.16	753
Acetophenone	98-86-2	Yes	No	1.8E-06 [2]	1.8E-06 [2]	2.4E-04	7.3E-03	7.3E-03	2.61	7.5E-03	2.62
Acrolein	107-02-8	Yes	Yes	2.6E-04 [2]	2.6E-04 [2]	0.034	1.03	1.03	369	1.06	370
Benzene	71-43-2	Yes	Yes	9.8E-04 [2]	9.8E-04 [2]	0.13	3.88	3.88	1,391	4.01	1,395
Bromomethane (Methyl bromide)	74-83-9	Yes	Yes	1.1E-05 [2]	1.1E-05 [2]	1.5E-03	0.045	0.045	16.0	0.046	16.1
Carbon tetrachloride	56-23-5	Yes	Yes	9.9E-06 [2]	9.9E-06 [2]	1.3E-03	0.039	0.039	14.0	0.040	14.0
Chlorine	7782-50-5	Yes	Yes	7.9E-04 [3]	7.9E-04 [3]	0.10	3.13	3.13	1,121	3.23	1,124
Chlorobenzene	108-90-7	Yes	Yes	1.7E-05 [2]	1.7E-05 [2]	2.2E-03	0.066	0.066	23.6	0.068	23.6
Chloroform	67-66-3	Yes	Yes	2.0E-05 [2]	2.0E-05 [2]	2.7E-03	0.080	0.080	28.5	0.082	28.6
Chloromethane (Methyl chloride)	74-87-3	Yes	Yes	4.4E-05 [2]	4.4E-05 [2]	5.7E-03	0.17	0.17	61.7	0.18	61.9
Crotonaldehyde	4170-30-3	No	No	4.5E-05 [2]	4.5E-05 [2]	5.9E-03	0.18	0.18	63.6	0.18	63.7
Dibutyl phthalate	84-74-2	Yes	No	3.3E-05 [2]	3.3E-05 [2]	4.4E-03	0.13	0.13	47.3	0.14	47.4
Diethyl phthalate	84-66-2	No	No	4.4E-05 [2]	4.4E-05 [2]	5.8E-03	0.17	0.17	61.9	0.18	62.0
Ethylbenzene	100-41-4	Yes	Yes	1.2E-05 [2]	1.2E-05 [2]	1.6E-03	0.048	0.048	17.3	0.050	17.4
Formaldehyde	50-00-0	Yes	Yes	1.1E-03 [2]	1.1E-03 [2]	0.14	4.16	4.16	1,490	4.30	1,494
Hexane	110-54-3	Yes	Yes	2.9E-04 [2]	2.9E-04 [2]	0.038	1.14	1.14	409	1.18	410
Hydrochloric Acid	7647-01-0	Yes	Yes	4.4E-03 [2]	4.4E-03 [2]	0.58	17.3	17.3	6,187	17.8	6,204
Hydrogen Fluoride	7664-39-3	Yes	Yes	9.1E-05 [2]	9.1E-05 [2]	0.012	0.36	0.36	128	0.37	129
Isopropyl alcohol	67-63-0	No	Yes	4.5E-03 [2]	4.5E-03 [2]	0.60	17.9	17.9	6,414	18.5	6,432
Methanol	67-56-1	Yes	Yes	7.3E-04 [2]	7.3E-04 [2]	0.097	2.90	2.90	1,039	3.00	1,042
Methyl ethyl ketone (2-Butanone)	78-93-3	No	Yes	7.0E-06 [2]	7.0E-06 [2]	9.2E-04	0.028	0.028	9.89	0.029	9.92
Methyl isobutyl ketone (MIBK, Hexone)	108-10-1	Yes	Yes	4.5E-04 [2]	4.5E-04 [2]	0.059	1.76	1.76	631	1.82	633
Methylene chloride (Dichloromethane)	75-09-2	Yes	Yes	4.0E-04 [2]	4.0E-04 [2]	0.053	1.58	1.58	565	1.63	566
Phenol	108-95-2	Yes	Yes	1.6E-04 [2]	1.6E-04 [2]	0.021	0.63	0.63	227	0.65	228
Propionaldehyde	123-38-6	Yes	Yes	3.1E-04 [2]	3.1E-04 [2]	0.041	1.23	1.23	441	1.27	443
Styrene	100-42-5	Yes	Yes	4.7E-04 [2]	4.7E-04 [2]	0.062	1.86	1.86	666	1.92	667
Toluene	108-88-3	Yes	Yes	1.1E-05 [2]	1.1E-05 [2]	1.5E-03	0.045	0.045	16.2	0.047	16.2
Xylene (mixture)	1330-20-7	Yes	Yes	5.2E-06 [2]	5.2E-06 [2]	6.9E-04	0.021	0.021	7.41	0.021	7.43
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)											
Acenaphthene	83-32-9	Yes	No	8.5E-07 [2]	8.5E-07 [2]	1.1E-04	3.4E-03	3.4E-03	1.21	3.5E-03	1.21
Acenaphthylene	208-96-8	Yes	No	4.7E-06 [2]	4.7E-06 [2]	6.2E-04	0.019	0.019	6.66	0.019	6.67
Anthracene	120-12-7	Yes	No	2.7E-06 [2]	2.7E-06 [2]	3.5E-04	0.011	0.011	3.80	0.011	3.81
Benz[a]anthracene	56-55-3	Yes	Yes	8.1E-08 [2]	8.1E-08 [2]	1.1E-05	3.2E-04	3.2E-04	0.12	3.3E-04	0.12
Benzo[a]pyrene	50-32-8	Yes	Yes	2.2E-06 [2]	2.2E-06 [2]	2.9E-04	8.8E-03	8.8E-03	3.15	9.1E-03	3.16
Benzo[b]fluoranthene	205-99-2	Yes	Yes	1.4E-07 [2]	1.4E-07 [2]	1.9E-05	5.6E-04	5.6E-04	0.20	5.8E-04	0.20
Benzo[e]pyrene	192-97-2	Yes	No	2.1E-07 [2]	2.1E-07 [2]	2.8E-05	8.4E-04	8.4E-04	0.30	8.6E-04	0.30
Benzo[g,h,i]perylene	191-24-2	Yes	Yes	1.5E-07 [2]	1.5E-07 [2]	2.0E-05	6.0E-04	6.0E-04	0.21	6.2E-04	0.21
Benzo[j]fluoranthene	205-82-3	Yes	Yes	1.6E-07 [2]	1.6E-07 [2]	2.1E-05	6.2E-04	6.2E-04	0.22	6.4E-04	0.22
Benzo[k]fluoranthene	207-08-9	Yes	Yes	5.2E-08 [2]	5.2E-08 [2]	6.8E-06	2.1E-04	2.1E-04	0.074	2.1E-04	0.074
Chrysene	218-01-9	Yes	Yes	7.9E-08 [2]	7.9E-08 [2]	1.0E-05	3.1E-04	3.1E-04	0.11	3.2E-04	0.11
Fluoranthene	206-44-0	Yes	Yes	1.7E-06 [2]	1.7E-06 [2]	2.2E-04	6.6E-03	6.6E-03	2.37	6.8E-03	2.38
Fluorene	86-73-7	Yes	No	3.0E-06 [2]	3.0E-06 [2]	4.0E-04	0.012	0.012	4.27	0.012	4.28
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	Yes	1.0E-07 [2]	1.0E-07 [2]	1.3E-05	4.0E-04	4.0E-04	0.14	4.2E-04	0.15
2-Methyl naphthalene	91-57-6	Yes	No	1.4E-06 [2]	1.4E-06 [2]	1.8E-04	5.5E-03	5.5E-03	1.99	5.7E-03	1.99
Naphthalene	91-20-3	Yes	Yes	1.0E-04 [2]	1.0E-04 [2]	0.013	0.39	0.39	141	0.41	142
Perylene	198-55-0	Yes	No	3.2E-08 [2]	3.2E-08 [2]	4.2E-06	1.3E-04	1.3E-04	0.045	1.3E-04	0.046
Phenanthrene	85-01-8	Yes	No	6.5E-06 [2]	6.5E-06 [2]	8.5E-04	0.026	0.026	9.17	0.026	9.19
Pyrene	129-00-0	Yes	No	3.5E-06 [2]	3.5E-06 [2]	4.7E-04	0.014	0.014	5.02	0.014	5.04
DIOXINS AND FURANS											
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	Yes	Yes	9.5E-13 [2]	9.5E-13 [2]	1.3E-10	3.8E-09	3.8E-09	1.4E-06	3.9E-09	1.4E-06
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	No	Yes	1.3E-12 [2]	1.3E-12 [2]	1.8E-10	5.3E-09	5.3E-09	1.9E-06	5.4E-09	1.9E-06
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	No	Yes	8.7E-13 [2]	8.7E-13 [2]	1.1E-10	3.4E-09	3.4E-09	1.2E-06	3.6E-09	1.2E-06
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	No	Yes	2.1E-12 [2]	2.1E-12 [2]	2.8E-10	8.3E-09	8.3E-09	3.0E-06	8.6E-09	3.0E-06
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	No	Yes	2.2E-12 [2]	2.2E-12 [2]	2.9E-10	8.8E-09	8.8E-09	3.1E-06	9.0E-09	3.1E-06
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	No	Yes	9.8E-12 [2]	9.8E-12 [2]	1.3E-09	3.9E-08	3.9E-08	1.4E-05	4.0E-08	1.4E-05
Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	No	Yes	2.5E-11 [2]	2.5E-11 [2]	3.2E-09	9.7E-08	9.7E-08	3.5E-05	1.0E-07	3.5E-05
2,3,7,8-Tetrachlorodibenzofuran (TcDF)	51207-31-9	No	Yes	8.0E-12 [2]	8.0E-12 [2]	1.1E-09	3.2E-08	3.2E-08	1.1E-05	3.3E-08	1.1E-05
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	No	Yes	4.0E-12 [2]	4.0E-12 [2]	5.3E-10	1.6E-08	1.6E-08	5.7E-06	1.6E-08	5.7E-06
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	No	Yes	6.1E-12 [2]	6.1E-12 [2]	8.0E-10	2.4E-08	2.4E-08	8.6E-06	2.5E-08	8.7E-06

Table 4 (Cont.)
Boiler 3 Wood Combustion TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS or DEQ ID	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor (lb/MMBtu)		SU Emission Estimates (Multi-Clone Only)		Emission Estimates (ESP)		Total Emissions Estimates	
				Multi-Clone Only	ESP	Daily [a] (lb/day)	Annual [b] (lb/yr)	Daily [a] (lb/day)	Annual [b] (lb/yr)	Daily [a] (lb/day)	Annual [b] (lb/yr)
DIOXINS AND FURANS (Cont.)											
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	No	Yes	3.6E-12 [2]	3.6E-12 [2]	4.7E-10	1.4E-08	1.4E-08	5.1E-06	1.5E-08	5.1E-06
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	No	Yes	3.2E-12 [2]	3.2E-12 [2]	4.2E-10	1.3E-08	1.3E-08	4.5E-06	1.3E-08	4.5E-06
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	No	Yes	6.7E-13 [2]	6.7E-13 [2]	8.8E-11	2.6E-09	2.6E-09	9.5E-07	2.7E-09	9.5E-07
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	No	Yes	2.7E-12 [2]	2.7E-12 [2]	3.5E-10	1.1E-08	1.1E-08	3.8E-06	1.1E-08	3.8E-06
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	No	Yes	5.7E-12 [2]	5.7E-12 [2]	7.5E-10	2.3E-08	2.3E-08	8.1E-06	2.3E-08	8.1E-06
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	No	Yes	8.0E-13 [2]	8.0E-13 [2]	1.1E-10	3.2E-09	3.2E-09	1.1E-06	3.3E-09	1.1E-06
Octachlorodibenzofuran (OCDF)	39001-02-0	No	Yes	5.0E-12 [2]	5.0E-12 [2]	6.6E-10	2.0E-08	2.0E-08	7.1E-06	2.0E-08	7.1E-06
TRACE METALS											
Antimony and compounds	7440-36-0	Yes	Yes	3.1E-06 [4]	3.1E-07 [5]	4.1E-04	0.012	1.2E-03	0.43	1.6E-03	0.45
Arsenic and compounds	7440-38-2	Yes	Yes	8.6E-06 [4]	1.9E-06 [5]	1.1E-03	0.034	7.5E-03	2.68	8.6E-03	2.72
Barium and compounds	7440-39-3	No	No	4.8E-03 [4]	2.1E-04 [5]	0.64	19.1	0.83	297	1.47	316
Beryllium and compounds	7440-41-7	Yes	Yes	1.4E-07 [4]	2.9E-08 [5]	1.8E-05	5.3E-04	1.1E-04	0.040	1.3E-04	0.041
Cadmium and compounds	7440-43-9	Yes	Yes	5.0E-06 [4]	3.2E-07 [5]	6.6E-04	0.020	1.3E-03	0.46	1.9E-03	0.48
Chromium VI	18540-29-9	Yes	Yes	7.0E-06 [4]	2.7E-07 [5]	9.2E-04	0.028	1.1E-03	0.39	2.0E-03	0.41
Cobalt and compounds	7440-48-4	Yes	Yes	1.7E-06 [4]	5.0E-07 [5]	2.2E-04	6.6E-03	2.0E-03	0.71	2.2E-03	0.71
Copper and compounds	7440-50-8	No	Yes	8.3E-05 [4]	3.8E-06 [5]	0.011	0.33	0.015	5.38	0.026	5.70
Lead and compounds	7439-92-1	Yes	Yes	3.1E-05 [4]	5.2E-06 [5]	4.1E-03	0.12	0.021	7.39	0.025	7.52
Manganese and compounds	7439-96-5	Yes	Yes	1.9E-03 [4]	9.6E-05 [5]	0.24	7.33	0.38	136	0.62	143
Mercury and compounds	7439-97-6	Yes	Yes	1.8E-06 [4]	1.1E-06 [5]	2.3E-04	7.0E-03	4.2E-03	1.50	4.4E-03	1.51
Molybdenum trioxide	1313-27-5	No	No	3.2E-06 [5]	3.1E-06 [5]	4.2E-04	0.012	0.012	4.41	0.013	4.42
Nickel and compounds	365	Yes	Yes	1.3E-05 [4]	2.8E-06 [5]	1.7E-03	0.052	0.011	3.97	0.013	4.03
Phosphorus and compounds	504	Yes	No	5.5E-03 [2]	3.1E-04 [5]	0.72	21.6	1.23	440	1.95	461
Selenium and compounds	7782-49-2	Yes	Yes	7.3E-07 [4]	1.6E-06 [5]	9.6E-05	2.9E-03	6.4E-03	2.30	6.5E-03	2.30
Silver and compounds	7440-22-4	No	No	9.4E-04 [4]	9.9E-07 [5]	0.12	3.71	3.9E-03	1.40	0.13	5.11
Thallium and compounds	7440-28-0	No	No	1.9E-06 [6]	1.9E-06 [6]	2.4E-04	7.3E-03	7.3E-03	2.63	7.6E-03	2.63
Vanadium (fume or dust)	7440-62-2	No	Yes	9.8E-07 [7]	5.9E-07 [5]	1.3E-04	3.9E-03	2.4E-03	0.84	2.5E-03	0.85
Zinc and compounds	7440-66-6	No	No	5.7E-04 [4]	5.8E-05 [5]	0.075	2.25	0.23	81.7	0.30	84.0
POLYCHLORINATED BIPHENYLS (PCBs)											
Polychlorinated Biphenyls	1336-36-3	Yes	Yes	7.9E-09 [8]	7.9E-09 [8]	1.0E-06	3.1E-05	3.1E-05	0.011	3.2E-05	0.011
1-Methylphenanthrene	832-69-9	No	No	2.6E-07 [2]	2.6E-07 [2]	3.4E-05	1.0E-03	1.0E-03	0.37	1.1E-03	0.37
3-Methylcholanthrene	56-49-5	Yes	No	8.7E-09 [2]	8.7E-09 [2]	1.1E-06	3.4E-05	3.4E-05	0.012	3.6E-05	0.012
7,12-Dimethylbenz[a]anthracene	57-97-6	Yes	No	4.6E-09 [2]	4.6E-09 [2]	6.0E-07	1.8E-05	1.8E-05	6.5E-03	1.9E-05	6.5E-03
2,4-Dinitrotoluene	121-14-2	Yes	Yes	9.4E-07 [2]	9.4E-07 [2]	1.2E-04	3.7E-03	3.7E-03	1.34	3.9E-03	1.34
4,6-Dinitro-o-cresol (and salts)	534-52-1	Yes	No	2.1E-06 [9]	2.1E-06 [9]	2.8E-04	8.3E-03	8.3E-03	2.98	8.6E-03	2.99
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	Yes	Yes	4.7E-08 [2]	4.7E-08 [2]	6.1E-06	1.8E-04	1.8E-04	0.066	1.9E-04	0.066
Butyl benzyl phthalate	85-68-7	No	No	2.7E-05 [2]	2.7E-05 [2]	3.5E-03	0.11	0.11	38.0	0.11	38.1
Hydrogen cyanide	74-90-8	No	Yes	2.1E-05 [2]	2.1E-05 [2]	2.7E-03	0.081	0.081	29.1	0.084	29.2
Phthalates	518	No	No	1.1E-07 [2]	1.1E-07 [2]	1.5E-05	4.4E-04	4.4E-04	0.16	4.5E-04	0.16
Ethylene dichloride (EDC, 1,2-dichloroethane)	107-06-2	Yes	Yes	2.9E-05 [2]	2.9E-05 [2]	3.9E-03	0.12	0.12	41.4	0.12	41.6
Isopropylbenzene (Cumene)	98-82-8	Yes	Yes	1.8E-05 [2]	1.8E-05 [2]	2.3E-03	0.070	0.070	25.1	0.072	25.2
p-Dichlorobenzene (1,4-Dichlorobenzene)	106-46-7	Yes	Yes	2.8E-04 [2]	2.8E-04 [2]	0.037	1.10	1.10	396	1.14	397
Vinyl Chloride	75-01-4	Yes	Yes	1.8E-05 [2]	1.8E-05 [2]	2.4E-03	0.073	0.073	26.1	0.075	26.2
Trichloroethene (TCE, Trichloroethylene)	79-01-6	Yes	Yes	2.0E-05 [2]	2.0E-05 [2]	2.6E-03	0.079	0.079	28.2	0.081	28.3
4-nitrophenol	100-02-7	Yes	No	1.1E-07 [2]	1.1E-07 [2]	1.5E-05	4.5E-04	4.5E-04	0.16	4.7E-04	0.16
2-Chlorophenol	95-57-8	No	No	2.4E-08 [2]	2.4E-08 [2]	3.1E-06	9.3E-05	9.3E-05	0.033	9.6E-05	0.033
2,4-Dinitrophenol	51-28-5	Yes	No	1.8E-07 [2]	1.8E-07 [2]	2.4E-05	7.1E-04	7.1E-04	0.26	7.4E-04	0.26
Trichlorofluoromethane (Freon 11)	75-69-4	No	No	1.4E-05 [2]	1.4E-05 [2]	1.8E-03	0.055	0.055	19.7	0.057	19.8
2,4,6-Trichlorophenol	88-06-2	Yes	Yes	2.0E-07 [2]	2.0E-07 [2]	2.6E-05	7.9E-04	7.9E-04	0.28	8.2E-04	0.28
Pentachlorophenol	87-86-5	Yes	Yes	2.1E-07 [2]	2.1E-07 [2]	2.8E-05	8.5E-04	8.5E-04	0.30	8.8E-04	0.30
Tetrachloroethene (Perchloroethylene)	127-18-4	Yes	Yes	2.5E-05 [2]	2.5E-05 [2]	3.2E-03	0.097	0.097	34.9	0.10	35.0
Total HAP Emission Estimates						**2.47**	**74.2**	**46.7**	**16,738**	**49.2**	**16,813**
Total TAC Emission Estimates						**4.01**	**120**	**68.4**	**24,519**	**72.4**	**24,639**

Notes

HAP = hazardous air pollutant; MMBtu = million British thermal units; RBC = risk based concentration; TAC = toxic air contaminant; SU = startup.

(a) Daily emissions estimate (lb/day) = (emission factor [lb/MMBtu]) x (daily fuel heat input [MMBtu/day])

Boiler SU daily fuel heat input (Multi-clone Only) (MMBtu/day) = 132 (1)

Boiler daily fuel heat input (ESP) (MMBtu/day) = 3,960 (1)

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMBtu]) x (annual boiler fuel heat input [MMBtu/yr]) x (ton/2,000 lb)

Annual boiler SU fuel heat input (Multi-Clone Only) (MMBtu/yr) = 3,960 (1)

Annual boiler fuel heat input (ESP) (MMBtu/yr) = 1,419,000 (1)

References

(1) See Table 1, Production Input and Assumptions.

(2) DEQ-approved list of TAC emission factors for wood combustion. See NCASI Technical Bulletin 1050 (September 2018). Emission factor for wood-fired boiler.

(3) DEQ-approved list of TAC emission factors for wood combustion. See AP-42 Chapter 1 (March 2022), Table 1.6-3.

(4) DEQ-approved list of TAC emission factors for wood combustion. See NCASI Technical Bulletin 1050 (September 2018). Emission factor for wood-fired boiler with mechanical collector control.

(5) DEQ-approved list of TAC emission factors for wood combustion. See NCASI Technical Bulletin 1050 (September 2018). Emission factor for wood-fired boiler with ESP or fabric filter control.

(6) DEQ-approved list of TAC emission factors for wood combustion. See NCASI Technical Bulletin 1050 (September 2018). Emission factor for wood-fired boiler with wet scrubber control.

(7) DEQ-approved list of TAC emission factors for wood combustion. See AP-42 Chapter 1 (March 2022), Table 1.6-4.

(8) DEQ-approved list of TAC emission factors for wood combustion. See NCASI Technical Bulletin 1050 (September 2018). Equal to sum of speciated PCB compounds.

(9) DEQ-approved list of TAC emission factors for wood combustion. See NCASI Technical Bulletin 1051 (March 2019).

Table 5
Steam Tunnels TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor [1] (lb/Msf-3/8")	Emission Estimates	
					Daily [a] (lb/day)	Annual [b] (lb/yr)
Steam Tunnel 1						
Acetaldehyde	75-07-0	Yes	Yes	4.7E-03	6.77	1,128
Acetone	67-64-1	No	Yes	3.0E-03	4.32	720
Methanol	67-56-1	Yes	Yes	7.3E-03	10.5	1,752
Steam Tunnel 2						
Acetaldehyde	75-07-0	Yes	Yes	4.7E-03	6.77	1,128
Acetone	67-64-1	No	Yes	3.0E-03	4.32	720
Methanol	67-56-1	Yes	Yes	7.3E-03	10.5	1,752
Total Steam Tunnels						
Acetaldehyde	75-07-0	Yes	Yes	--	13.5	2,256
Acetone	67-64-1	No	Yes	--	8.64	1,440
Methanol	67-56-1	Yes	Yes	--	21.0	3,504
Total HAP Emission Estimates					**34.6**	**5,760**
Total TAC Emission Estimates					**43.2**	**7,200**

Notes

HAP = hazardous air pollutant; Msf-3/8" = million standard cubic feet on 3/8" basis. RBC = risk based concentration; TAC = toxic air contaminant.

(a) Daily emission estimate (lb/day) = (emission factor [lb/Msf-3/8"]) x (daily throughput [Msf-3/8"/day])

Daily throughput steam tunnel 1(Msf-3/8"/hr) = 1,440 (2)

Daily throughput steam tunnel 2 (Msf-3/8"/hr) = 1,440 (2)

(b) Annual emission estimate (tons/yr) = (emission factor [lb/Msf-3/8"]) x (annual throughput [Msf-3/8"/yr]) / (2,000 [lb/ton])

Annual throughput steam tunnel 1(Msf-3/8"/yr) = 240,000 (2)

Annual throughput steam tunnel 2 (Msf-3/8"/yr) = 240,000 (2)

References

(1) AP-42 Table 10.5-7 "Emission Factors for Plywood Miscellaneous Sources." Emission factors for softwood plywood log steaming vats.

(2) See Table 1, Production Input and Assumptions.

Table 6
Veneer Dryer Natural Gas Combustion TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor (lb/MMscf)	Emission Estimates			
					Boiler 3 Stack		Fugitives	
					Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS								
Acetaldehyde	75-07-0	Yes	Yes	4.3E-03 (2)	5.8E-04 (a)	0.21 (b)	1.2E-04 (c)	0.043 (d)
Acrolein	107-02-8	Yes	Yes	2.7E-03 (2)	3.7E-04 (a)	0.13 (b)	7.3E-05 (c)	0.027 (d)
Ammonia	7664-41-7	No	Yes	3.20 (2)	0.44 (a)	159 (b)	0.087 (c)	31.8 (d)
Benzene	71-43-2	Yes	Yes	8.0E-03 (2)	1.1E-03 (a)	0.40 (b)	2.2E-04 (c)	0.080 (d)
Ethylbenzene	100-41-4	Yes	Yes	9.5E-03 (2)	1.3E-03 (a)	0.47 (b)	2.6E-04 (c)	0.094 (d)
Formaldehyde	50-00-0	Yes	Yes	0.017 (2)	2.3E-03 (a)	0.84 (b)	4.6E-04 (c)	0.17 (d)
Hexane	110-54-3	Yes	Yes	6.3E-03 (2)	8.6E-04 (a)	0.31 (b)	1.7E-04 (c)	0.063 (d)
Toluene	108-88-3	Yes	Yes	0.037 (2)	5.0E-03 (a)	1.82 (b)	1.0E-03 (c)	0.36 (d)
Xylene (mixture)	1330-20-7	Yes	Yes	0.027 (2)	3.7E-03 (a)	1.35 (b)	7.4E-04 (c)	0.27 (d)
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)								
PAHs (excluding Naphthalene)	401	Yes	Yes	1.0E-04 (2)	1.4E-05 (a)	5.0E-03 (b)	2.7E-06 (c)	9.9E-04 (d)
Benzo(a)pyrene	50-32-8	Yes	Yes	1.2E-06 (3)	1.6E-07 (a)	6.0E-05 (b)	3.3E-08 (c)	1.2E-05 (d)
Naphthalene	91-20-3	Yes	Yes	3.0E-04 (2)	4.1E-05 (a)	0.015 (b)	8.2E-06 (c)	3.0E-03 (d)
TRACE METALS								
Arsenic	7440-38-2	Yes	Yes	2.0E-04 (4)	2.7E-04 (e)	0.099 (f)	5.4E-06 (c)	2.0E-03 (d)
Barium	7440-39-3	No	No	4.4E-03 (4)	6.0E-03 (e)	2.19 (f)	1.2E-04 (c)	0.044 (d)
Beryllium	7440-41-7	Yes	Yes	1.2E-05 (4)	1.6E-05 (e)	6.0E-03 (f)	3.3E-07 (c)	1.2E-04 (d)
Cadmium	7440-43-9	Yes	Yes	1.1E-03 (4)	1.5E-03 (e)	0.55 (f)	3.0E-05 (c)	0.011 (d)
Chromium VI	18540-29-9	Yes	Yes	1.4E-03 (4)	1.9E-03 (e)	0.70 (f)	3.8E-05 (c)	0.014 (d)
Cobalt	7440-48-4	Yes	Yes	8.4E-05 (4)	1.1E-04 (e)	0.042 (f)	2.3E-06 (c)	8.3E-04 (d)
Copper	7440-50-8	No	Yes	8.5E-04 (4)	1.2E-03 (e)	0.42 (f)	2.3E-05 (c)	8.4E-03 (d)
Lead	7439-92-1	Yes	Yes	5.0E-04 (4)	6.8E-04 (e)	0.25 (f)	1.4E-05 (c)	5.0E-03 (d)
Manganese	7439-96-5	Yes	Yes	3.8E-04 (4)	5.2E-04 (e)	0.19 (f)	1.0E-05 (c)	3.8E-03 (d)
Mercury	7439-97-6	Yes	Yes	2.6E-04 (4)	3.5E-04 (e)	0.13 (f)	7.1E-06 (c)	2.6E-03 (d)
Molybdenum trioxide	1313-27-5	No	No	1.7E-03 (4)	2.2E-03 (e)	0.82 (f)	4.5E-05 (c)	0.016 (d)
Nickel	365	Yes	Yes	2.1E-03 (4)	2.9E-03 (e)	1.04 (f)	5.7E-05 (c)	0.021 (d)
Selenium	7782-49-2	Yes	Yes	2.4E-05 (4)	3.3E-05 (e)	0.012 (f)	6.5E-07 (c)	2.4E-04 (d)
Vanadium (fume or dust)	7440-62-2	No	Yes	2.3E-03 (4)	3.1E-03 (e)	1.14 (f)	6.3E-05 (c)	0.023 (d)
Zinc	7440-66-6	No	No	0.029 (4)	0.039 (e)	14.4 (f)	7.9E-04 (c)	0.29 (d)
Total HAP Emission Estimates					**0.023**	**8.58**	**3.2E-03**	**1.17**
Total TAC Emission Estimates					**0.51**	**187**	**0.091**	**33.4**

Notes

HAP = hazardous air pollutant; MMscf = million standard cubic feet; RBC = risk based concentration; TAC = toxic air contaminant.

(a) Daily emission estimate (lb/day) = (emission factor [lb/MMscf]) x (daily natural gas fuel usage [MMscf/day]) x (1 - [Boiler 3 control efficiency {%}]/100)

Daily natural gas fuel usage (MMscf/day) = 1.36 (1)

Boiler control efficiency (%) = 90.0 (5)

(b) Annual emission estimate (lb/yr) = (emission factor [lb/MMscf]) x (annual natural gas fuel usage [MMscf/yr]) x (1 - [Boiler 3 control efficiency {%}]/100)

Annual natural gas fuel usage (MMscf/yr) = 497 (1)

Boiler control efficiency (%) = 90.0 (5)

(c) Daily fugitive emission estimate (lb/day) = (emission factor [lb/MMscf]) x (daily natural gas fuel usage [MMscf/day]) x (estimated percent fugitives [%] / 100)

Daily natural gas fuel usage (MMscf/day) = 1.36 (1)

Estimated percent fugitives (%) = 2.00 (6)

(d) Annual fugitive emission estimate (lb/yr) = (emission factor [lb/MMscf]) x (annual natural gas fuel usage [MMscf/yr]) x (estimated percent fugitives [%] / 100)

Annual natural gas fuel usage (MMscf/yr) = 497 (1)

Estimated percent fugitives (%) = 2.00 (6)

(e) Daily emission estimate (lb/day) = (emission factor [lb/MMscf]) x (daily natural gas fuel usage [MMscf/day])

(f) Annual emission estimate (lb/yr) = (emission factor [lb/MMscf]) x (annual natural gas fuel usage [MMscf/yr])

References

(1) See Table 1, Production Input and Assumptions.

(2) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B, Table B-1 "Default Emission Factors for Natural Gas Combustion" for external combustion equipment less than 10 MMBtu/hr. Ammonia emission factor representative of units without SCR or SNCR control.

(3) AP-42 Chapter 1.4 (July 1998), Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion."

(4) AP-42 Chapter 1.4 (July 1998), Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion."

(5) Title V Operating Permit no. 22-6002-TV-01, Review Report. Assumes 90% destruction in boiler combustion zone.

(6) Title V Operating Permit no. 22-6002-TV-01, Review Report. Assumes 2 percent of uncontrolled natural gas combustion emissions are fugitives.

Table 7
Veneer Dryer Heated Zones TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor [1] (lb/Msf-3/8")	Emission Estimates	
					Daily [a] (lb/day)	Annual [b] (lb/yr)
Acetaldehyde	75-07-0	Yes	Yes	0.017	1.43	340
Acetone	67-64-1	No	Yes	0.013	1.09	260
Acrolein	107-02-8	Yes	Yes	1.3E-03	0.11	26.0
Benzene	71-43-2	Yes	Yes	5.9E-04	0.050	11.8
Formaldehyde	50-00-0	Yes	Yes	0.014	1.18	280
Methanol	67-56-1	Yes	Yes	0.039	3.28	780
Methyl Isobutyl Ketone	108-10-1	Yes	Yes	1.5E-03	0.13	30.0
Phenol	108-95-2	Yes	Yes	3.4E-03	0.29	68.0
Propionaldehyde	123-38-6	Yes	Yes	2.4E-03	0.20	48.0
Toluene	108-88-3	Yes	Yes	1.1E-03	0.092	22.0
Xylene (mixture)	1330-20-7	Yes	Yes	7.5E-04	0.063	15.0
Total HAP Emissions Estimate					**6.65**	**1,584**
Total TAC Emission Estimates					**7.90**	**1,881**

Notes

HAP = hazardous air pollutant; Msf-3/8" = million standard cubic feet on 3/8" basis. RBC = risk based concentration; TAC = toxic air contaminant.

(a) Daily emission estimate (lb/day) = (emission factor [lb/Msf-3/8"]) x (daily throughput [Msf-3/8"/day]) x (1 - [boiler control efficiency {%} / 100])

Daily throughput (Msf-3/8"/day) =	840	(2)
Boiler control efficiency (%) =	90.0	(3)

(b) Annual emission estimate (tons/yr) = (emission factor [lb/Msf-3/8"]) x (annual throughput [Msf-3/8"/yr]) x (1 - [boiler control efficiency {%} / 100]) / (2,000 [lb/ton])

Annual throughput (Msf-3/8"/yr) =	200,000	(2)
Boiler control efficiency (%) =	90.0	(3)

References

(1) AP-42 Table 10.5-3 "Emission Factors for Plywood Veneer Dryers." Emission factors for uncontrolled, indirect heated softwood veneer dryer heated zones.

(2) See Table 1, Production Input and Assumptions.

(3) Title V Operating Permit no. 22-6002-TV-01, Review Report. Assumes 90% destruction in boiler combustion zone.

Table 9
Veneer Dryer Fugitives TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factors (lb/Msf-3/8")		Emission Estimates	
				Uncontrolled [1]	Fugitive [a]	Daily [b] (lb/day)	Annual [c] (lb/yr)
Acetaldehyde	75-07-0	Yes	Yes	0.017	3.4E-04	0.29	68.0
Acetone	67-64-1	No	Yes	0.013	2.6E-04	0.22	52.0
Acrolein	107-02-8	Yes	Yes	1.3E-03	2.6E-05	0.022	5.20
Benzene	71-43-2	Yes	Yes	5.9E-04	1.2E-05	9.9E-03	2.36
Formaldehyde	50-00-0	Yes	Yes	0.014	2.8E-04	0.24	56.0
Methanol	67-56-1	Yes	Yes	0.039	7.8E-04	0.66	156
Methyl Isobutyl Ketone	108-10-1	Yes	Yes	1.5E-03	3.0E-05	0.025	6.00
Phenol	108-95-2	Yes	Yes	3.4E-03	6.8E-05	0.057	13.6
Propionaldehyde	123-38-6	Yes	Yes	2.4E-03	4.8E-05	0.040	9.60
Toluene	108-88-3	Yes	Yes	1.1E-03	2.2E-05	0.018	4.40
Xylene (mixture)	1330-20-7	Yes	Yes	7.5E-04	1.5E-05	0.013	3.00
Total HAP Emissions Estimate						**1.36**	**324**
Total TAC Emission Estimates						**1.58**	**376**

Notes

HAP = hazardous air pollutant; Msf-3/8" = million standard cubic feet on 3/8" basis. RBC = risk based concentration; TAC = toxic air contaminant.

(a) Fugitive emission factor (lb/Msf-3/8") = (uncontrolled emission factor (lb/Msf-3/8") x (estimated percent fugitives [%] / 100)

Estimated percent fugitives (%) = 2.00 (2)

(b) Daily emission estimate (lb/day) = (emission factor [lb/Msf-3/8"]) x (daily throughput [Msf-3/8"/day])

Daily throughput (Msf-3/8"/day) = 840 (3)

(c) Annual emission estimate (ton/yr) = (fugitive emission factor [lb/Msf-3/8"]) x (annual throughput [Msf-3/8"/yr]) / (2,000 [lb/ton])

Annual throughput (Msf-3/8"/yr) = 200,000 (3)

References

(1) AP-42 Table 10.5-3 "Emission Factors for Plywood Veneer Dryers." Emission factors for uncontrolled, indirect heated softwood veneer dryer heated zones.

(2) Title V Operating Permit no. 22-6002-TV-01, Review Report. Assumes 2 percent of uncontrolled dryer emissions are fugitives.

(3) See Table 1, Production Input and Assumptions.

Table 10
Gasoline Dispensing Facility TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	TAC Vapor Weight Fraction [1] (lb/lb)	Emission Factor [a] (lb/Mgal)	Emission Estimates	
						Daily [b] (lb/day)	Annual [c] (lb/yr)
1,2,3-Trimethylbenzene	526-73-8	No	Yes	7.1E-05	8.9E-04	2.2E-04	0.076
1,2,4-Trimethylbenzene	95-63-6	No	Yes	4.0E-04	5.0E-03	1.2E-03	0.43
1,3,5-Trimethylbenzene	108-67-8	No	Yes	1.6E-04	2.0E-03	4.8E-04	0.17
2,2,4-Trimethylpentane	540-84-1	Yes	No	0.015	0.19	0.048	16.5
2-Methyl naphthalene	91-57-6	Yes	No	1.8E-06	2.3E-05	5.7E-06	2.0E-03
Benzene	71-43-2	Yes	Yes	5.5E-03	0.069	0.017	5.88
Cyclohexane	110-82-7	No	Yes	4.5E-03	0.057	0.014	4.85
Ethyl benzene	100-41-4	Yes	Yes	1.4E-03	0.018	4.4E-03	1.51
Hexane	110-54-3	Yes	Yes	0.022	0.27	0.067	23.2
Isoprene	78-79-5	No	No	2.7E-04	3.4E-03	8.3E-04	0.29
Isopropylbenzene (cumene)	98-82-8	Yes	Yes	4.3E-05	5.4E-04	1.3E-04	0.046
m-Xylene	108-38-3	Yes	Yes	2.7E-03	0.034	8.3E-03	2.86
Naphthalene	91-20-3	Yes	Yes	6.0E-06	7.5E-05	1.8E-05	6.4E-03
o-Xylene	95-47-6	Yes	Yes	1.3E-03	0.016	3.9E-03	1.34
p-Xylene	106-42-3	Yes	Yes	1.2E-03	0.015	3.6E-03	1.25
Toluene	108-88-3	Yes	Yes	0.013	0.17	0.042	14.4
Total HAP Emission Estimates						**0.19**	**67.0**
Total TAC Emission Estimates						**0.21**	**72.8**

Notes

HAP = hazardous air pollutant; Mgal = thousand gallons; RBC = risk based concentration; TAC = toxic air contaminant.

(a) Emission factor (lb/Mgal) = (TAC vapor weight fraction [lb/lb]) x (total VOC emission factor [lb/Mgal])

Total VOC emission factor (lb/Mgal) = 12.59 (2)

(b) Daily emission estimate (lb/day) = (emission factor [lb/Mgal]) x (daily throughput [gal/day]) / (1,000 gal/Mgal])

Daily throughput (gal/day) = 246 (3)

(c) Annual emission estimate (tons/yr) = (emission factor [lb/Mgal) x (annual throughput [gal/yr]) / (1,000 gal/Mgal]) / (2,000 [lb/ton])

Annual throughput (gal/yr) = 85,000 (3)

References

(1) TAC weight fractions provided by the DEQ. See California Resources Board Speciation. Representative of the highest weight fraction for each TAC from from Profile 691 ("Headspace vapors E10 summer gasoline fuel") and Profile 695 ("Headspace vapors E10 winter gasoline fuel").

(2) Oregon Department of Environmental Quality, General Permit AQGP-022 for Gasoline Dispensing Facilities dated April 16, 2020.

(3) See Table 1, Production Input and Assumptions.

Table 11
Cooling Tower TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Pollutant	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Concentration (ppm)	Emission Estimates	
					Daily (lb/day)	Annual (lb/yr)
Drift Loss	--				10,665 (a)	3,892,692 (b)
Sulfuric Acid	7664-93-9	No	Yes	1.95 (1)	0.021 (c)	7.59 (d)

Notes

gpm = gallons per minute; ppm = parts per million.

(a) Daily drift loss (lb/day) = (total water circulation rate [gpm]) x (density of water [lb/gal]) x (drift loss percent of circulating water [%] / 100) x (60 min/hr) x (daily hours of operation [hrs/day])

Water circulation rate (gpm) =	17,750	(1)
Density of water (lb/gal) =	8.35	
Daily hours of operation (hrs/day) =	24.0	(2)
Drift loss percent of circulating water (%) =	5.0E-03	(1)

(b) Annual drift loss (lb/yr) = (daily drift loss [lb/day]) x (annual days of operation [days/yr])

Annual days of operation (days/yr) =	365	(2)

(c) Daily emissions estimate (lb/day) = (daily drift loss [lb/day]) x (TAC concentration [ppm] / 1,000,000); see Reference (3).

(d) Annual emissions estimate (lb/yr) = (annual drift loss [lb/yr]) x (TAC concentration [ppm] / 1,000,000); see Reference (3).

References

(1) See Section 1 of the cooling tower operation and maintenance manual from Midwest Towers No. 06N1211.

(2) See Table 1, Production Input and Assumptions.

(3) Assumes the composition of the drift loss is same as the cooling tower makeup water.

Table 12
Propane Emergency Engine TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor [1] (lb/Mgal)	Emission Estimates	
					Max. Daily [a] (lb/day)	Annual [b] (lb/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS						
1,1,2,2-Tetrachloroethane	79-34-5	Yes	Yes	2.3E-03	4.3E-05	1.4E-03
1,1,2-Trichloroethane (vinyl trichloride)	79-00-5	Yes	Yes	1.4E-03	2.6E-05	8.6E-04
1,2-Dichloropropane (propylene dichloride)	78-87-5	Yes	Yes	1.2E-03	2.2E-05	7.3E-04
1,3-Butadiene	106-99-0	Yes	Yes	0.060	1.1E-03	0.037
1,3-Dichloropropene	542-75-6	Yes	Yes	1.2E-03	2.1E-05	7.1E-04
Acetaldehyde	75-07-0	Yes	Yes	0.25	4.7E-03	0.16
Acrolein	107-02-8	Yes	Yes	0.24	4.4E-03	0.15
Ammonia	7664-41-7	No	Yes	0.30	5.6E-03	0.19
Benzene	71-43-2	Yes	Yes	0.14	2.7E-03	0.089
Carbon tetrachloride	56-23-5	Yes	Yes	1.6E-03	3.0E-05	9.9E-04
Chloroform	67-66-3	Yes	Yes	1.2E-03	2.3E-05	7.7E-04
Dichloromethane (methylene chloride)	75-09-2	Yes	Yes	3.7E-03	6.9E-05	2.3E-03
Ethyl benzene	100-41-4	Yes	Yes	2.2E-03	4.2E-05	1.4E-03
Ethylene dibromide (EDB, 1,2-dibromoethane)	106-93-4	Yes	Yes	1.9E-03	3.6E-05	1.2E-03
Ethylene dichloride (EDC, 1,2-dichloroethane)	107-06-2	Yes	Yes	1.0E-03	1.9E-05	6.3E-04
Formaldehyde	50-00-0	Yes	Yes	1.86	0.035	1.15
Methanol	67-56-1	Yes	Yes	0.28	5.2E-03	0.17
Styrene	100-42-5	Yes	Yes	1.1E-03	2.0E-05	6.7E-04
Toluene	108-88-3	Yes	Yes	0.051	9.4E-04	0.031
Vinyl chloride	75-01-4	Yes	Yes	6.5E-04	1.2E-05	4.0E-04
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	Yes	Yes	0.018	3.3E-04	0.011
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)						
Naphthalene	91-20-3	Yes	Yes	8.8E-03	1.6E-04	5.4E-03
Total HAP Emission Estimates					**0.054**	**1.81**
Total TAC Emission Estimates					**0.060**	**2.00**

Notes

HAP = hazardous air pollutant; hp = horsepower; Mgal = thousand gallons; PTE = potential to emit; RBC = risk based concentration; TAC = toxic air contaminant.

(a) Maximum daily emissions estimate (lb/day) = (emission factor [lb/Mgal]) x (maximum daily fuel consumption rate [gal/day]) / (1,000 gal/Mgal)

Maximum daily propane consumption (gal/day) = 18.6 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb/Mgal]) x (annual fuel consumption rate [Mgal/yr]) / (1,000 gal/Mgal)

Annual propane consumption (gal/yr) = 620 (2)

References

(1) Emission factors obtained from DEQ's Combustion Emission Factor Search Tool. See South Coast Air Quality Monitoring District AB2588. Assumes 4-Stroke Rich Burn as representative.

(2) See Table 1, Production Input and Assumptions.

Table 13
Fire Pump Diesel Emergency Engine TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Toxic Air Contaminant	CAS	HAP? (Yes/No)	RBC? (Yes/No)	Emission Factor [1] (lb/Mgal)	Emission Estimates	
					Max. Daily [a] (lb/day)	Annual [b] (lb/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS						
1,3-Butadiene	106-99-0	Yes	Yes	0.22	6.8E-03	0.23
Acetaldehyde	75-07-0	Yes	Yes	0.78	0.025	0.82
Acrolein	107-02-8	Yes	Yes	0.034	1.1E-03	0.036
Ammonia	7664-41-7	No	Yes	0.80	0.025	0.84
Benzene	71-43-2	Yes	Yes	0.19	5.9E-03	0.20
Chlorobenzene	108-90-7	Yes	Yes	2.0E-04	6.3E-06	2.1E-04
Ethylbenzene	100-41-4	Yes	Yes	0.011	3.4E-04	0.011
Formaldehyde	50-00-0	Yes	Yes	1.73	0.054	1.81
Hexane	110-54-3	Yes	Yes	0.027	8.5E-04	0.028
Hydrochloric acid	7647-01-0	Yes	Yes	0.19	5.9E-03	0.20
Propylene	115-07-1	No	Yes	0.47	0.015	0.49
Toluene	108-88-3	Yes	Yes	0.11	3.3E-03	0.11
Xylene (mixture)	1330-20-7	Yes	Yes	0.042	1.3E-03	0.045
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)						
PAHs	401	Yes	Yes	0.036	1.1E-03	0.038
Benzo[a]pyrene	50-32-8	Yes	Yes	3.5E-05	1.1E-06	3.7E-05
Naphthalene	91-20-3	Yes	Yes	0.020	6.2E-04	0.021
TRACE METALS						
Antimony	7440-36-0	Yes	Yes	3.2E-04	1.0E-05	3.3E-04
Arsenic	7440-38-2	Yes	Yes	1.6E-03	5.0E-05	1.7E-03
Barium	7440-39-3	No	No	3.7E-04	1.2E-05	3.9E-04
Beryllium	7440-41-7	Yes	Yes	4.8E-06	1.5E-07	5.0E-06
Cadmium	7440-43-9	Yes	Yes	1.5E-03	4.7E-05	1.6E-03
Chromium VI	18540-29-9	Yes	Yes	1.0E-04	3.2E-06	1.1E-04
Cobalt	7440-48-4	Yes	Yes	1.6E-05	5.0E-07	1.7E-05
Copper	7440-50-8	No	Yes	4.1E-03	1.3E-04	4.3E-03
Lead	7439-92-1	Yes	Yes	8.3E-03	2.6E-04	8.7E-03
Manganese	7439-96-5	Yes	Yes	3.1E-03	9.8E-05	3.3E-03
Mercury	7439-97-6	Yes	Yes	2.0E-03	6.3E-05	2.1E-03
Nickel	365	Yes	Yes	3.9E-03	1.2E-04	4.1E-03
Phosphorus	504	Yes	No	8.4E-03	2.6E-04	8.8E-03
Selenium	7782-49-2	Yes	Yes	2.2E-03	6.9E-05	2.3E-03
Silver	7440-22-4	No	No	4.8E-05	1.5E-06	5.0E-05
Thallium	7440-28-0	No	No	2.4E-04	7.6E-06	2.5E-04
Zinc	7440-66-6	No	No	5.2E-03	1.6E-04	5.5E-03
DIESEL PARTICULATE MATTER (DPM)						
Total DPM	200	No	Yes	33.5	1.06	35.2
Total HAP Emission Estimates					**0.11**	**3.58**
Total TAC Emission Estimates					**1.20**	**40.1**

Notes

HAP = hazardous air pollutant; hp = horsepower; Mgal = thousand gallons; PTE = potential to emit; RBC = risk based concentration; TAC = toxic air contaminant.

(a) Maximum daily emissions estimate (lb/day) = (emission factor [lb/Mgal]) x (maximum daily fuel consumption rate [gal/day]) / (1,000 gal/Mgal)

Maximum daily diesel consumption (gal/day) = 31.5 (2)

(b) Annual emissions estimate (lb/yr) = (emission factor [lb/Mgal]) x (annual fuel consumption rate [gal/yr]) / (1,000 gal/Mgal)

Annual diesel consumption (gal/yr) = 1,050 (2)

References

(1) Emission factor obtained from DEQ's Combustion Emission Factor Search Tool. See South Coast Air Quality Monitoring District AB2588. Assumes pre-2006 Tier 0 and Tier 1 Diesel ICE due to fire pump engine being less than 750 hp.

(2) See Table 1, Production Input and Assumptions.

Table 14
Welding TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Product Type ID	Welding Category	Wire Usage [1]		TAC	CAS or DEQ ID	Regulatory Category			Weight Percent (%)	PTE Emission Estimates	
		Maximum Daily (lb/day)	Annual (lb/yr)			TAC	HAP	RBC		Maximum Daily (lb/day)	Annual (lb/yr)
Plant 1 Welding Shop											
Stoody S965	GMAW	0.64	186	Manganese	7439-96-5	Yes	Yes	Yes	1.75 [2]	6.1E-05 [a]	0.018 [a]
				Total Chromium	7440-47-3	Yes	Yes	No	5.00 [2]	1.7E-04 [a]	0.051 [a]
				Chromium VI	18540-29-9	Yes	Yes	Yes	--	8.7E-06 [b]	2.5E-03 [b]
				Fluorides	239	Yes	No	Yes	1.00 [2]	3.5E-05 [a]	0.010 [a]
				Molybdenum	7439-98-7	No	No	No	0.55 [2]	1.9E-05 [a]	5.6E-03 [a]
				Molybdenum trioxide	1313-27-5	Yes	No	No	--	2.9E-05 [c]	8.4E-03 [c]
ESAB 710X	FCAW	0.22	66.0	Manganese	7439-96-5	Yes	Yes	Yes	1.30 [2]	1.6E-05 [a]	4.9E-03 [a]
				Phosphorus	504	Yes	Yes	No	0.012 [2]	1.5E-07 [a]	4.5E-05 [a]
Eutectic 7018RS	SMAW	0.86	232	Manganese	7439-96-5	Yes	Yes	Yes	1.00 [2]	4.9E-05 [a]	0.013 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	3.00 [2]	1.5E-04 [a]	0.040 [a]
				Fluorides	239	Yes	No	Yes	10.00 [2]	4.9E-04 [a]	0.13 [a]
Lincoln 7018	SMAW	0.52	150	Aluminum Oxide	1344-28-1	Yes	No	No	0.55 [2]	1.6E-05 [a]	4.7E-03 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	3.00 [2]	8.9E-05 [a]	0.026 [a]
				Fluorides	239	Yes	No	Yes	7.50 [2]	2.2E-04 [a]	0.064 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	1.10 [3]	3.3E-05 [a]	9.5E-03 [a]
Plant 2 Welding Shop											
ESAB 710X	FCAW	0.22	66.0	Manganese	7439-96-5	Yes	Yes	Yes	1.30 [2]	1.6E-05 [a]	4.9E-03 [a]
				Phosphorus	504	Yes	Yes	No	0.012 [2]	1.5E-07 [a]	4.5E-05 [a]
Weldcote ER70S	GMAW	0.16	40.0	Aluminum and compounds	7429-90-5	Yes	No	Yes	0.075 [2]	6.6E-07 [a]	1.6E-04 [a]
				Copper and compounds	7440-50-8	Yes	No	Yes	0.40 [2]	3.5E-06 [a]	8.7E-04 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	1.25 [2]	1.1E-05 [a]	2.7E-03 [a]
Eutectic 7018RS	SMAW	0.30	86.0	Manganese	7439-96-5	Yes	Yes	Yes	1.00 [2]	1.7E-05 [a]	4.9E-03 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	3.00 [2]	5.2E-05 [a]	0.015 [a]
				Fluorides	239	Yes	No	Yes	10.00 [2]	1.7E-04 [a]	0.049 [a]
Lincoln 7018	SMAW	0.52	150	Aluminum Oxide	1344-28-1	Yes	No	No	0.55 [2]	1.6E-05 [a]	4.7E-03 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	3.00 [2]	8.9E-05 [a]	0.026 [a]
				Fluorides	239	Yes	No	Yes	7.50 [2]	2.2E-04 [a]	0.064 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	1.10 [3]	3.3E-05 [a]	9.5E-03 [a]
Plant 4 Welding Shop											
ESAB 710X	FCAW	0.22	66.0	Manganese	7439-96-5	Yes	Yes	Yes	1.30 [2]	1.6E-05 [a]	4.9E-03 [a]
				Phosphorus	504	Yes	Yes	No	0.012 [2]	1.5E-07 [a]	4.5E-05 [a]
Eutectic 7018RS	SMAW	0.30	86.0	Manganese	7439-96-5	Yes	Yes	Yes	1.00 [2]	1.7E-05 [a]	4.9E-03 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	3.00 [2]	5.2E-05 [a]	0.015 [a]
				Fluorides	239	Yes	No	Yes	10.00 [2]	1.7E-04 [a]	0.049 [a]
Lincoln 28676	GMAW	0.52	150	Manganese	7439-96-5	Yes	Yes	Yes	3.00 [2]	8.5E-05 [a]	0.025 [a]
Cat Shop Welding											
ESAB 710X	FCAW	0.57	165	Manganese	7439-96-5	Yes	Yes	Yes	1.30 [2]	4.2E-05 [a]	0.012 [a]
				Phosphorus	504	Yes	Yes	No	0.012 [2]	3.9E-07 [a]	1.1E-04 [a]
Weldcote ER70S	GMAW	0.40	100	Aluminum and compounds	7429-90-5	Yes	No	Yes	0.075 [2]	1.6E-06 [a]	4.1E-04 [a]
				Copper and compounds	7440-50-8	Yes	No	Yes	0.40 [2]	8.7E-06 [a]	2.2E-03 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	1.25 [2]	2.7E-05 [a]	6.8E-03 [a]
Eutectic 7018RS	SMAW	0.60	150	Manganese	7439-96-5	Yes	Yes	Yes	1.00 [2]	3.4E-05 [a]	8.6E-03 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	3.00 [2]	1.0E-04 [a]	0.026 [a]
				Fluorides	239	Yes	No	Yes	10.00 [2]	3.4E-04 [a]	0.086 [a]
Lincoln 7018	SMAW	0.20	50.0	Aluminum Oxide	1344-28-1	Yes	No	No	0.55 [2]	6.3E-06 [a]	1.6E-03 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	3.00 [2]	3.4E-05 [a]	8.6E-03 [a]
				Fluorides	239	Yes	No	Yes	7.50 [2]	8.6E-05 [a]	0.021 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	1.10 [3]	1.3E-05 [a]	3.2E-03 [a]
Lincoln 28676	GMAW	0.13	37.5	Manganese	7439-96-5	Yes	Yes	Yes	3.00 [2]	2.1E-05 [a]	6.1E-03 [a]
Unibraze E120S	MIG/TIG	0.080	20.0	Manganese	7439-96-5	Yes	Yes	Yes	1.25 [2]	5.5E-06 [a]	1.4E-03 [a]
				Nickel	365	Yes	Yes	Yes	1.98 [2]	8.6E-06 [a]	2.2E-03 [a]
				Total Chromium	7440-47-3	Yes	Yes	No	5.25 [2]	2.3E-05 [a]	5.7E-03 [a]
				Chromium VI	18540-29-9	Yes	Yes	Yes	--	1.1E-06 [b]	2.9E-04 [b]
				Copper and compounds	7440-50-8	Yes	No	Yes	0.38 [2]	1.6E-06 [a]	4.1E-04 [a]
				Vanadium Pentoxide	1314-62-1	Yes	No	Yes	0.14 [2]	6.1E-07 [a]	1.5E-04 [a]
				Molybdenum	7439-98-7	No	No	No	0.60 [2]	2.6E-06 [a]	6.6E-04 [a]
				Molybdenum trioxide	1313-27-5	Yes	No	No	--	3.9E-06 [c]	9.8E-04 [c]
Fab Shop Welding											
ESAB 710X	FCAW	1.40	363	Manganese	7439-96-5	Yes	Yes	Yes	1.30 [2]	1.0E-04 [a]	0.027 [a]
				Phosphorus	504	Yes	Yes	No	0.012 [2]	9.6E-07 [a]	2.5E-04 [a]
Weldcote ER70S	GMAW	0.58	165	Aluminum and compounds	7429-90-5	Yes	No	Yes	0.075 [2]	2.4E-06 [a]	6.8E-04 [a]
				Copper and compounds	7440-50-8	Yes	No	Yes	0.40 [2]	1.3E-05 [a]	3.6E-03 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	1.25 [2]	4.0E-05 [a]	0.011 [a]
Eutectic 7018RS	SMAW	0.60	176	Manganese	7439-96-5	Yes	Yes	Yes	1.00 [2]	3.4E-05 [a]	0.010 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	3.00 [2]	1.0E-04 [a]	0.030 [a]
				Fluorides	239	Yes	No	Yes	10.00 [2]	3.4E-04 [a]	0.10 [a]

Table 14 (Cont.)
Welding TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Product Type ID	Welding Category	Wire Usage [1]		TAC	CAS or DEQ ID	Regulatory Category			Weight Percent (%)	PTE Emission Estimates	
		Maximum Daily (lb/day)	Annual (lb/yr)			TAC	HAP	RBC		Maximum Daily (lb/day)	Annual (lb/yr)
Fab Shop Welding											
Lincoln 7018	SMAW	0.12	30.0	Aluminum Oxide	1344-28-1	Yes	No	No	0.55 [2]	3.8E-06 [a]	9.5E-04 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	3.00 [2]	2.1E-05 [a]	5.2E-03 [a]
				Fluorides	239	Yes	No	Yes	7.50 [2]	5.2E-05 [a]	0.013 [a]
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes	1.10 [3]	7.6E-06 [a]	1.9E-03 [a]
Weldcote 308L	GMAW	0.20	50.0	Total Chromium	7440-47-3	Yes	Yes	No	18.30 [2]	2.0E-04 [a]	0.050 [a]
				Chromium VI	18540-29-9	Yes	Yes	Yes	--	1.0E-05 [b]	2.5E-03 [b]
				Copper and compounds	7440-50-8	Yes	No	Yes	2.38 [2]	2.6E-05 [a]	6.5E-03 [a]
				Manganese	7439-96-5	Yes	Yes	Yes	7.00 [2]	7.6E-05 [a]	0.019 [a]
				Molybdenum	7439-98-7	No	No	No	2.83 [2]	3.1E-05 [a]	7.7E-03 [a]
				Molybdenum trioxide	1313-27-5	Yes	No	No	--	4.6E-05 [c]	0.012 [c]
				Nickel	365	Yes	Yes	Yes	18.25 [2]	2.0E-04 [a]	0.050 [a]
TOTAL WELDING SUMMARY											
Total Emission Estimates				Manganese	7439-96-5	Yes	Yes	Yes	--	9.1E-04	0.25
				Total Chromium	7440-47-3	Yes	Yes	No		4.0E-04	0.11
				Chromium VI	18540-29-9	Yes	Yes	Yes		2.0E-05	5.3E-03
				Molybdenum trioxide	1313-27-5	Yes	No	No		7.9E-05	0.021
				Phosphorus	504	Yes	Yes	No		1.8E-06	5.0E-04
				Aluminum Oxide	1344-28-1	Yes	No	No		4.3E-05	0.012
				Fluorides	239	Yes	No	Yes		2.1E-03	0.59
				Silica, crystalline (respirable)	7631-86-9	Yes	No	Yes		5.4E-04	0.15
				Aluminum and compounds	7429-90-5	Yes	No	Yes		4.7E-06	1.2E-03
				Copper and compounds	7440-50-8	Yes	No	Yes		5.3E-05	0.014
				Vanadium Pentoxide	1314-62-1	Yes	No	Yes		6.1E-07	1.5E-04
				Nickel	365	Yes	Yes	Yes		2.1E-04	0.052
				Total HAP						**1.5E-03**	**0.42**
				Total TAC						**4.4E-03**	**1.20**

Notes

FCAW = Flux Cored Arc Welding; GMAW = Gas Metal Arc Welding; HAP = hazardous air pollutant; lb/lb-mol = pound per pound-mole; MW = molecular weight; RBC = risk-based concentration; SMAW = Shielded Metal Arc Welding; TAC = toxic air contaminant.

(a) Emissions estimate (lb/unit) = (fume generation rate—GMAW/TIG [lb fume/lb wire]) x (fume correction factor—GMAW/TIG) x (weight percentage [%]/100) x (usage [lb/unit])

Fume generation rate—GMAW/TIG (lb fume/lb wire) = 0.010 (4)

Fume correction factor—GMAW/TIG = 0.5464 (4)

Fume generation rate—SMAW/FCAW (lb fume/lb wire) = 0.020 (5)

Fume correction factor—SMAW/FCAW = 0.2865 (5)

(b) Chromium VI weight percent (%) = (total chromium emissions estimate [lb/unit]) x (total chromium to chromium VI conversion rate)

Total chromium to chromium VI conversion rate—GMAW/TIG = 0.05 (6)

(c) Molybdenum trioxide weight percent (%) = (molybdenum weight percent [%]) x (molybdeum trioxide MW [lb/lb-mol]) / (molybdeum MW [lb/lb-mol]); See reference (7).

Molybdenum trioxide MW (lb/lb-mol) = 144

Molybdenum MW (lb/lb-mol) = 96.0

References

(1) See Table 2, Welding Usages.

(2) Information from product safety data sheets. Value represents the average of weight percent range presented, if applicable.

(3) Information from product safety data sheets. Includes weight percent of quartz (CAS 14808-60-7). Value represents the average of weight percent range presented, if applicable.

(4) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the National Steel Shipbuilding Company (NASSCO) research. Assumes GMAW fume generation rate and correction factor.

(5) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998 (revised July 11, 2022). Based on American Welding Society information and the NASSCO research. Assumes SMAW fume generation rate and correction factor.

(6) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the National Steel Shipbuilding Company (NASSCO) research. Hexavalent chromium accounts for 5 percent of total chromium emissions for GMAW welding. It is assumed that TIG welding is similar to GMAW per ARB-Richard Bode.

(7) Conservatively assume 100 percent of molybdenum will be emitted in the trioxide form.

Table 15
Material Balance TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Product	PTE Product Usage [1]		Product Density [2] (lb/gal)	TAC	CAS	HAP? (Yes/No)	RBC? (Yes/No)	TAC Weight Percent [2] (%)	Emission Estimates	
	Daily (gal/day)	Annual (gal/yr)							Daily [a] (lb/day)	Annual [b] (lb/yr)
Plants 1, 2, 4										
Krylon Machine Green	2.50	750	6.31	Acetone	67-64-1	No	Yes	31.0	4.89	1,467
				Toluene	108-88-3	Yes	Yes	23.0	3.63	1,088
Krylon True Blue	2.50	750	5.81	Acetone	67-64-1	No	Yes	31.0	4.50	1,351
				Toluene	108-88-3	Yes	Yes	14.0	2.03	610
Krylon Gloss Red	2.50	750	5.83	1,2,4-Trimethylbenzene	95-63-6	No	Yes	2.00	0.29	87.5
				Acetone	67-64-1	No	Yes	28.0	4.08	1,224
				Toluene	108-88-3	Yes	Yes	13.0	1.89	568
Krylon White	2.50	750	6.76	Acetone	67-64-1	No	Yes	25.0	4.23	1,268
				Barium and Compounds	7440-39-3	No	No	2.00	0.34	101
Krylon Yellow	1.00	250	6.01	Acetone	67-64-1	No	Yes	37.5	2.25	563
				Toluene	108-88-3	Yes	Yes	5.00	0.30	75.1
Sherwin Williams Yellow	1.00	250	8.35	1,2,3-Trimethylbenzene	526-73-8	No	Yes	0.50	0.042	10.4
				1,2,4-Trimethylbenzene	95-63-6	No	Yes	0.65	0.054	13.6
				1,3,5-Trimethylbenzene	108-67-8	No	Yes	0.65	0.054	13.6
				Trimethylbenzene	25551-13-7	No	No	1.50	0.13	31.3
				Cumene	98-82-8	Yes	Yes	0.50	0.042	10.4
				Ethylbenzene	100-41-4	Yes	Yes	0.50	0.042	10.4
				Toluene	108-88-3	Yes	Yes	0.60	0.050	12.5
				Xylene (mixture)	1330-20-7	Yes	Yes	1.35	0.11	28.2
Plant 4										
WVCO DIC-231 Disappearing Ink	0.50	100	8.76	Sodium Hydroxide	1310-73-2	No	Yes	2.50	0.11	21.9
WVCO Red Striping Ink	0.50	100	8.26	Isopropyl Alcohol	67-63-0	No	Yes	1.50	0.062	12.4
WVCO Green Striping Ink	0.50	100	8.35	Isopropyl Alcohol	67-63-0	No	Yes	1.50	0.063	12.5
				Dipropylene glycol monomethyl ether	34590-94-8	No	No	2.50	0.10	20.9
WVCO Purple Striping Ink	0.50	100	8.43	Isopropyl Alcohol	67-63-0	No	Yes	1.50	0.063	12.6
				Dipropylene glycol monomethyl ether	34590-94-8	No	No	2.50	0.11	21.1
Welding Shops										
Weld-On Plumbing Purple Primer	2.00E-02	5.00	7.15	Methyl Ethyl Ketone	78-93-3	No	Yes	37.5	0.067	13.4
				Acetone	67-64-1	No	Yes	17.5	0.025	6.26
740 Zinc-Rich Galvanizing Compound Aerosol	2.00E-02	5.00	8.93	Methyl Ethyl Ketone	78-93-3	No	Yes	5.00	8.9E-03	2.23
				Xylene (mixture)	1330-20-7	Yes	Yes	0.50	8.9E-04	0.22
				1,2,4-Trimethylbenzene	95-63-6	No	Yes	0.50	8.9E-04	0.22
				1,3,5-Trimethylbenzene	108-67-8	No	Yes	0.15	2.7E-04	0.067
				Ethylbenzene	100-41-4	Yes	Yes	0.15	2.7E-04	0.067
Total Emissions Estimate				**Acetone**	**67-64-1**	**No**	**Yes**	**--**	**20.0**	**5,879**
				Toluene	**108-88-3**	**Yes**	**Yes**	**--**	**7.91**	**2,355**
				1,2,4-Trimethylbenzene	**95-63-6**	**No**	**Yes**	**--**	**0.35**	**101**
				1,2,3-Trimethylbenzene	**526-73-8**	**No**	**Yes**	**--**	**0.042**	**10.4**
				1,3,5-Trimethylbenzene	**108-67-8**	**No**	**Yes**	**--**	**0.055**	**13.6**
				Trimethylbenzene	**25551-13-7**	**No**	**No**	**--**	**0.13**	**31.3**
				Cumene	**98-82-8**	**Yes**	**Yes**	**--**	**0.042**	**10.4**
				Barium and Compounds	**7440-39-3**	**No**	**No**	**--**	**0.34**	**101**
				Ethylbenzene	**100-41-4**	**Yes**	**Yes**	**--**	**0.042**	**10.5**
				Xylene (mixture)	**1330-20-7**	**Yes**	**Yes**	**--**	**0.11**	**28.4**
				Sodium Hydroxide	**1310-73-2**	**No**	**Yes**	**--**	**0.11**	**21.9**
				Isopropyl Alcohol	**67-63-0**	**No**	**Yes**	**--**	**0.19**	**37.6**
				Methyl Ethyl Ketone	**78-93-3**	**No**	**Yes**	**--**	**0.076**	**15.6**
				Dipropylene glycol monomethyl ether	**34590-94-8**	**No**	**No**	**--**	**0.21**	**41.9**

Notes

HAP = hazardous air pollutant; RBC = risk based concentration; TAC = toxic air contaminant.

(a) Daily emission estimate (lb/day) = (daily product usage [gal/day]) x (product density [lb/gal]) x (weight percent [%] /100)

(b) Annual emission estimate (lb/yr) = (annual product usage [gal/yr]) x (product density [lb/gal]) x (weight percent [%] /100)

References

(1) See Table 1, Production Input and Assumptions.

(2) Information provided by Freres Lumber Company, Inc based on manufacturer safety data sheet.

Table 16
Summary of Non-Exempt HAP/TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Pollutant	CAS	HAP? (Yes/No)	RBC? (Yes/No)	TAC Emissions Estimate																												Total Facility Emissions Estimate (lb/yr)	
				Significant TEUs [1]																						Gas Combustion Exempt TEUs [2]									
				Boiler 3 ESP (Normal)		Boiler 3 Multi-Clone (SU)		Steam Tunnels 1		Steam Tunnels 2		Veneer Dryer Heated Zones		Veneer Dryer Fugitives		Gasoline Dispensing Facility		Welding		Fire Pump		Cooling Towers		Material Balance		Boiler 2 Propane		Veneer Dryer Natural Gas		Veneer Dryer Natural Gas Fugitives		Propane Emergency Engine			
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS																																	
1,1,1-Trichloroethane (Methyl chloroform)	71-55-6	Yes	Yes	0.23	82.0	7.6E-03	0.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.24	82.2
1,1,2,2-Tetrachloroethane	79-34-5	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.3E-05	1.4E-03	4.3E-05	1.4E-03
1,1,2-Trichloroethane (vinyl trichloride)	79-00-5	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.6E-05	8.6E-04	2.6E-05	8.6E-04
1,2,5-Trimethylbenzene	108-67-8	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	4.8E-04	0.17	--	--	--	--	--	--	0.055	13.6	--	--	--	--	--	--	--	--	0.055	13.8
1,2,4-Trimethylbenzene	95-63-6	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	1.2E-03	0.43	--	--	--	--	--	--	0.35	101	--	--	--	--	--	--	--	--	0.35	102
1,2,3-Trimethylbenzene	526-73-8	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	2.2E-04	0.076	--	--	--	--	--	--	0.042	10.4	--	--	--	--	--	--	--	--	0.042	10.5
1,2-Dichloropropane (Propylene dichloride)	78-87-5	Yes	Yes	0.067	23.8	2.2E-03	0.067	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2E-05	7.3E-04	0.069	23.9
1,3-Butadiene	106-99-0	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.8E-03	0.23	--	--	--	--	--	--	--	--	1.1E-03	0.037	8.0E-03	0.27
1,3-Dichloropropene	542-75-6	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.1E-05	7.1E-04	2.1E-05	7.1E-04
2,2,4-Trimethylpentane	540-84-1	Yes	No	--	--	--	--	--	--	--	--	--	--	--	--	0.048	16.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.048	16.5
Acetaldehyde	75-07-0	Yes	Yes	1.12	402	0.037	1.12	6.77	1,128	6.77	1,128	1.43	340	0.29	68.0	--	--	--	--	0.025	0.82	--	--	--	--	9.4E-04	0.050	5.8E-04	0.21	1.2E-04	0.043	4.7E-03	0.16	16.4	3,068
Acetone	67-64-1	No	Yes	2.09	751	0.070	2.09	4.32	720	4.32	720	1.09	260	0.22	52.0	--	--	--	--	--	--	--	--	20.0	5,879	--	--	--	--	--	--	--	--	32.1	8,384
Acetophenone	98-86-2	Yes	No	7.3E-03	2.61	2.4E-04	7.3E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.5E-03	2.62
Acrolein	107-02-8	Yes	Yes	1.03	369	0.034	1.03	--	--	--	--	0.11	26.0	0.022	5.20	--	--	--	--	1.1E-03	0.036	--	--	--	--	8.0E-04	0.043	3.7E-04	0.13	7.3E-05	0.027	4.4E-03	0.15	1.20	402
Ammonia	7664-41-7	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.025	0.84	--	--	--	--	1.01	54.0	0.44	159	0.087	31.8	5.6E-03	0.19	1.56	246
Benzene	71-43-2	Yes	Yes	3.88	1,391	0.13	3.88	--	--	--	--	0.050	11.8	9.9E-03	2.36	0.017	5.88	--	--	5.9E-03	0.20	--	--	--	--	1.7E-03	0.092	1.1E-03	0.40	2.2E-04	0.080	2.7E-03	0.089	4.10	1,415
Bromomethane (Methyl bromide)	74-83-9	Yes	Yes	0.045	16.0	1.5E-03	0.045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.046	16.1
Carbon tetrachloride	56-23-5	Yes	Yes	0.039	14.0	1.3E-03	0.039	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0E-05	9.9E-04	0.040	14.0
Chlorine	7782-50-5	Yes	Yes	3.13	1,121	0.10	3.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.23	1,124
Chlorobenzene	108-90-7	Yes	Yes	0.066	23.6	2.2E-03	0.066	--	--	--	--	--	--	--	--	--	--	--	--	6.3E-06	2.1E-04	--	--	--	--	--	--	--	--	--	--	--	--	0.068	23.6
Chloroform	67-66-3	Yes	Yes	0.080	28.5	2.7E-03	0.080	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3E-05	7.7E-04	0.082	28.6
Chloromethane (Methyl chloride)	74-87-3	Yes	Yes	0.17	61.7	5.7E-03	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	61.9
Crotonaldehyde	4170-30-3	No	No	0.18	63.6	5.9E-03	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	63.7
Diethylphthalate	84-66-2	No	No	0.17	61.9	5.8E-03	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	62.0
Cyclohexane	110-82-7	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	0.014	4.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.014	4.85
Dibutyl phthalate	84-74-2	Yes	No	0.13	47.3	4.4E-03	0.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14	47.4
Ethylbenzene	100-41-4	Yes	Yes	0.048	17.3	1.6E-03	0.048	--	--	--	--	--	--	--	--	4.4E-03	1.51	--	--	3.4E-04	0.011	--	--	0.042	10.5	2.0E-03	0.11	1.3E-03	0.47	2.6E-04	0.094	4.2E-05	1.4E-03	0.10	30.1
Dipropylene glycol monomethyl ether	34590-94-8	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.21	41.9	--	--	--	--	--	--	--	--	0.21	41.9
Ethylene dibromide (EDB, 1,2-dibromoethane)	106-93-4	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.6E-05	1.2E-03	3.6E-05	1.2E-03
Fluorides	239	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.1E-03	0.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.1E-03	0.59
Formaldehyde	50-00-0	Yes	Yes	4.16	1,490	0.14	4.16	--	--	--	--	1.18	280	0.24	56.0	--	--	--	--	0.054	1.81	--	--	--	--	3.7E-03	0.20	2.3E-03	0.84	4.6E-04	0.17	0.035	1.15	5.80	1,834
Hexane	110-54-3	Yes	Yes	1.14	409	0.038	1.14	--	--	--	--	--	--	--	--	0.067	23.2	--	--	8.5E-04	0.028	--	--	--	--	1.4E-03	0.074	8.6E-04	0.31	1.7E-04	0.063	--	--	1.25	434
Hydrochloric Acid	7647-01-0	Yes	Yes	17.3	6,187	0.58	17.3	--	--	--	--	--	--	--	--	--	--	--	--	5.9E-03	0.20	--	--	--	--	--	--	--	--	--	--	--	--	17.8	6,204
Hydrogen Fluoride	7664-39-3	Yes	Yes	0.36	128	0.012	0.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37	129
Isopropyl alcohol	67-63-0	No	Yes	17.9	6,414	0.60	17.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19	37.6	--	--	--	--	--	--	--	--	18.7	6,469
Isoprene	78-79-5	No	No	--	--	--	--	--	--	--	--	--	--	--	--	8.3E-04	0.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.3E-04	0.29
Methanol	67-56-1	Yes	Yes	2.90	1,039	0.097	2.90	10.5	1,752	10.5	1,752	3.28	780	0.66	156	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.2E-03	0.17	28.0	5,482
2-Butanone (Methyl ethyl ketone)	78-93-3	No	Yes	0.028	9.89	9.2E-04	0.028	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.076	15.6	--	--	--	--	--	--	--	--	0.10	25.6
Dichloromethane (Methylene chloride)	75-09-2	Yes	Yes	1.58	565	0.053	1.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9E-05	2.3E-03	1.63	566
Methyl Isobutyl Ketone	108-10-1	Yes	Yes	1.76	631	0.059	1.76	--	--	--	--	0.13	30.0	0.025	6.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.97	669
Phenol	108-95-2	Yes	Yes	0.63	227	0.021	0.63	--	--	--	--	0.29	68.0	0.057	13.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	309
Propionaldehyde	123-38-6	Yes	Yes	1.23	441	0.041	1.23	--	--	--	--	0.20	48.0	0.040	9.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.51	500
Propylene	115-07-1	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015	0.49	--	--	--	--	--	--	--	--	--	--	--	--	0.015	0.49
Silicon dioxide (amorphous)	7631-86-9	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.4E-04	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.4E-04	0.15
Sodium Hydroxide	1310-73-2	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11	21.9	--	--	--	--	--	--	--	--	0.11	21.9
Styrene	100-42-5	Yes	Yes	1.86	666	0.062	1.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.0E-05	6.7E-04	1.92	667
Sulfuric Acid	7664-93-9	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.021	7.59	--	--	--	--	--	--	--	--	--	--	0.021	7.59
Toluene	108-88-3	Yes	Yes	0.045	16.2	1.5E-03	0.045	--	--	--	--	0.092	22.0	0.018	4.40	0.042	14.4	--	--	3.3E-03	0.11	--	--	7.91	2,355	7.9E-03	0.42	5.0E-03	1.82	1.0E-03	0.36	9.4E-04	0.031	8.12	2,414
Trimethylbenzene	25551-13-7	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13	31.3	--	--	--	--	--	--	--	--	0.13	31.3
Vanadium Pentoxide	1314-62-1	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.1E-07	1.5E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.1E-07	1.5E-04
m-Xylene	108-38-3	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	8.3E-03	2.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.3E-03	2.86
o-Xylene	95-47-6	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	3.9E-03	1.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.9E-03	1.34
p-Xylene	106-42-3	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	3.6E-03	1.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.6E-03	1.25
Xylene (mixture)	1330-20-7	Yes	Yes	0.021	7.41	6.9E-04	0.021	--	--	--	--	0.063	15.0	0.013	3.00	--	--	--	--	1.3E-03	0.045	--	--	0.11	28.4	5.9E-03	0.32	3.7E-03	1.35	7.4E-04	0.27	3.3E-04	0.011	0.22	55.8
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)																																	
PAHs (excluding Naphthalene)	401	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1E-03	0.038	--	--	--	--	--	--	1.4E-05	5.0E-03	2.7E-06	9.9E-04	--	--	1.2E-03	0.044
Acenaphthene	83-32-9	Yes	No	3.4E-03	1.21	1.1E-04	3.4E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.5E-03	1.21
Acenaphthylene	208-96-8	Yes	No	0.019	6.66	6.2E-04	0.019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.019	6.67
Anthracene	120-12-7	Yes	No	0.011	3.80	3.5E-04	0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.011	3.81
Benz[a]anthracene	56-55-3	Yes	Yes	3.2E-04	0.12	1.1E-05	3.2E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3E-04	0.12
Benzo[a]pyrene	50-32-8	Yes	Yes	8.8E-03	3.15	2.9E-04	8.8E-03	--	--	--	--	--	--	--	--	--	--	--	--	1.1E-06	3.7E-05	--	--	--	--	3.4E-05	1.8E-03	1.6E-07	6.0E-05	3.3E-08	1.2E-05	--	--	9.1E-03	3.16
Benzo[b]fluoranthene	205-99-2	Yes	Yes	5.6E-04	0.20	1.9E-05	5.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.8E-04	0.20
Benzo[e]pyrene	192-97-2	Yes	No	8.4E-04	0.30	2.8E-05	8.4E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.6E-04	0.30
Benzo[g,h,i]perylene	191-24-2	Yes	Yes	6.0E-04	0.21	2.0E-05	6.0E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.2E-04	0.21
Benzo[j]fluoranthene	205-82-3	Yes	Yes	6.2E-04	0.22	2.1E-05	6.2E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.4E-04	0.22
Benzo[k]fluoranthene	207-08-9	Yes	Yes	2.1E-04	0.074	6.8E-06	2.1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.1E-04	0.074
Chrysene	218-01-9	Yes	Yes	3.1E-04	0.11	1.0E-05	3.1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.2E-04	0.11
Fluoranthene	206-44-0	Yes	Yes	6.6E-03	2.37	2.2E-04	6.6E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.8E-03	2.38
Fluorene	86-73-7	Yes	No	0.012	4.27	4.0E-04	0.012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.012	4.28
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	Yes	4.0E-04	0.14	1.3E-05	4.0E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.2E-04	0.15
2-Methyl naphthalene	91-57-6	Yes	No	5.5E-03	1.99	1.8E-04	5.5E-03	--	--	--	--	--	--	--	--	5.7E-06	2.0E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.7E-03	1.99
Naphthalene	91-20-3	Yes	Yes	0.39	141	0.013	0.39	--	--	--	--	--	--	--	--	1.8E-05	6.4E-03	--	--	6.2E-04	0.021	--	--	--	--	1.0E-04	5.4E-03	4.1E-05	0.015	8.2E-06	3.0E-03	1.6E-04	5.4E-03	0.41	142
Perylene	198-55-0	Yes	No	1.3E-04	0.045	4.2E-06	1.3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3E-04	0.046
Phenanthrene	85-01-8	Yes	No	0.026	9.17	8.5E-04	0.026	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.026	9.19
Pyrene	129-00-0	Yes	No	0.014	5.02	4.7E-04	0.014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.014	5.04

Table 16 (Cont.)
Summary of Non-Exempt HAP/TAC Emission Estimates
Freres Lumber Company, Inc.—Lyons, Oregon

Pollutant	CAS	HAP? (Yes/No)	RBC? (Yes/No)	TAC Emissions Estimate																										Total Facility Emissions Estimate (lb/yr)	
				Significant TEUs (1)																				Gas Combustion Exempt TEUs (2)									
				Boiler 3 ESP Control (Normal)		Boiler 3 Multi-Clone (SU)		Steam Tunnels 1		Steam Tunnels 2		Veneer Dryer Heated Zones		Veneer Dryer Fugitives		Gasoline Dispensing Facility		Welding		Fire Pump		Cooling Towers		Material Balance		Boiler 2 Propane		Veneer Dryer Natural Gas		Veneer Dryer Natural Gas Fugitives		Propane Emergency Engine			
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
DIOXINS AND FURANS																															
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	Yes	Yes	3.8E-09	1.4E-06	1.3E-10	3.8E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.9E-09	1.4E-06
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	No	Yes	5.3E-09	1.9E-06	1.8E-10	5.3E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.4E-09	1.9E-06
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	No	Yes	3.4E-09	1.2E-06	1.1E-10	3.4E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.6E-09	1.2E-06
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	No	Yes	8.3E-09	3.0E-06	2.8E-10	8.3E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.6E-09	3.0E-06
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	No	Yes	8.8E-09	3.1E-06	2.9E-10	8.8E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.0E-09	3.1E-06
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	No	Yes	3.9E-08	1.4E-05	1.3E-09	3.9E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.0E-08	1.4E-05
Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	No	Yes	9.7E-08	3.5E-05	3.2E-09	9.7E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0E-07	3.5E-05
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	No	Yes	3.2E-08	1.1E-05	1.1E-09	3.2E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3E-08	1.1E-05
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	No	Yes	1.6E-08	5.7E-06	5.3E-10	1.6E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.6E-08	5.7E-06
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	No	Yes	2.4E-08	8.6E-06	8.0E-10	2.4E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.5E-08	8.7E-06
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	No	Yes	1.4E-08	5.1E-06	4.7E-10	1.4E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-08	5.1E-06
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	No	Yes	1.3E-08	4.5E-06	4.2E-10	1.3E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3E-08	4.5E-06
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	No	Yes	2.6E-09	9.5E-07	8.8E-11	2.6E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.7E-09	9.5E-07
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	No	Yes	1.1E-08	3.8E-06	3.5E-10	1.1E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1E-08	3.8E-06
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	No	Yes	2.3E-08	8.1E-06	7.5E-10	2.3E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3E-08	8.1E-06
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	No	Yes	3.2E-09	1.1E-06	1.1E-10	3.2E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3E-09	1.1E-06
Octachlorodibenzofuran (OCDF)	39001-02-0	No	Yes	2.0E-08	7.1E-06	6.6E-10	2.0E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.0E-08	7.1E-06
TRACE METALS																															
Aluminum and compounds	7429-90-5	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.7E-06	1.2E-03	--	--	--	--	--	--	--	--	--	--	--	--	4.7E-06	1.2E-03
Aluminum Oxide	1344-28-1	No	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.3E-05	0.012	--	--	--	--	--	--	--	--	--	--	--	--	4.3E-05	0.012
Antimony	7440-36-0	Yes	Yes	1.2E-03	0.43	4.1E-04	0.012	--	--	--	--	--	--	--	--	--	--	--	--	1.0E-05	3.3E-04	--	--	--	--	--	--	--	--	--	--	1.6E-03	0.45
Arsenic	7440-38-2	Yes	Yes	7.5E-03	2.68	1.1E-03	0.034	--	--	--	--	--	--	--	--	--	--	--	--	5.0E-05	1.7E-03	--	--	--	--	--	--	2.7E-04	0.099	5.4E-06	2.0E-03	--	--	8.9E-03	2.82
Barium	7440-39-3	No	No	0.83	297	0.64	19.1	--	--	--	--	--	--	--	--	--	--	--	--	1.2E-05	3.9E-04	--	--	0.34	101	--	--	6.0E-03	2.19	1.2E-04	0.044	--	--	1.81	419
Beryllium	7440-41-7	Yes	Yes	1.1E-04	0.040	1.8E-05	5.3E-04	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-07	5.0E-06	--	--	--	--	--	--	1.6E-05	6.0E-03	3.3E-07	1.2E-04	--	--	1.5E-04	0.047
Cadmium	7440-43-9	Yes	Yes	1.3E-03	0.46	6.6E-04	0.020	--	--	--	--	--	--	--	--	--	--	--	--	4.7E-05	1.6E-03	--	--	--	--	--	--	1.5E-03	0.55	3.0E-05	0.011	--	--	3.5E-03	1.04
Total Chromium	7440-47-3	Yes	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.0E-04	0.11	--	--	--	--	--	--	--	--	--	--	--	--	4.0E-04	0.11
Chromium VI	18540-29-9	Yes	Yes	1.1E-03	0.39	9.2E-04	0.028	--	--	--	--	--	--	--	--	--	--	2.0E-05	5.3E-03	3.2E-06	1.1E-04	--	--	--	--	--	--	1.9E-03	0.70	3.8E-05	0.014	--	--	4.0E-03	1.13
Cobalt	7440-48-4	Yes	Yes	2.0E-03	0.71	2.2E-04	6.6E-03	--	--	--	--	--	--	--	--	--	--	--	--	5.0E-07	1.7E-05	--	--	--	--	--	--	1.1E-04	0.042	2.3E-06	8.3E-04	--	--	2.3E-03	0.75
Copper	7440-50-8	No	Yes	0.015	5.38	0.011	0.33	--	--	--	--	--	--	--	--	--	--	5.3E-05	0.014	1.3E-04	4.3E-03	--	--	--	--	--	--	1.2E-03	0.42	2.3E-05	8.4E-03	--	--	0.027	6.15
Lead	7439-92-1	Yes	Yes	0.021	7.39	4.1E-03	0.12	--	--	--	--	--	--	--	--	--	--	--	--	2.6E-04	8.7E-03	--	--	--	--	--	--	6.8E-04	0.25	1.4E-05	5.0E-03	--	--	0.026	7.78
Manganese	7439-96-5	Yes	Yes	0.38	136	0.24	7.33	--	--	--	--	--	--	--	--	--	--	9.1E-04	0.25	9.8E-05	3.3E-03	--	--	--	--	--	--	5.2E-04	0.19	1.0E-05	3.8E-03	--	--	0.62	144
Mercury	7439-97-6	Yes	Yes	4.2E-03	1.50	2.3E-04	7.0E-03	--	--	--	--	--	--	--	--	--	--	--	--	6.3E-05	2.1E-03	--	--	--	--	--	--	3.5E-04	0.13	7.1E-06	2.6E-03	--	--	4.9E-03	1.65
Molybdenum trioxide	1313-27-5	No	No	0.012	4.41	4.2E-04	0.012	--	--	--	--	--	--	--	--	--	--	7.9E-05	0.021	--	--	--	--	--	--	--	--	2.2E-03	0.82	4.5E-05	0.016	--	--	0.015	5.28
Nickel	365	Yes	Yes	0.011	3.97	1.7E-03	0.052	--	--	--	--	--	--	--	--	--	--	2.1E-04	0.052	1.2E-04	4.1E-03	--	--	--	--	--	--	2.9E-03	1.04	5.7E-05	0.021	--	--	0.016	5.15
Phosphorus	504	Yes	No	1.23	440	0.72	21.6	--	--	--	--	--	--	--	--	--	--	1.8E-06	5.0E-04	2.6E-04	8.8E-03	--	--	--	--	--	--	--	--	--	--	1.95	461
Selenium	7782-49-2	Yes	Yes	6.4E-03	2.30	9.6E-05	2.9E-03	--	--	--	--	--	--	--	--	--	--	--	--	6.9E-05	2.3E-03	--	--	--	--	--	--	3.3E-05	0.012	6.5E-07	2.4E-04	--	--	6.6E-03	2.32
Silver	7440-22-4	No	No	3.9E-03	1.40	0.12	3.71	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-06	5.0E-05	--	--	--	--	--	--	--	--	--	--	0.13	5.11
Thallium and compounds	7440-28-0	No	No	7.3E-03	2.63	2.4E-04	7.3E-03	--	--	--	--	--	--	--	--	--	--	--	--	7.6E-06	2.5E-04	--	--	--	--	--	--	--	--	--	--	7.6E-03	2.63
Vanadium (fume or dust)	7440-62-2	No	Yes	2.4E-03	0.84	1.3E-04	3.9E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1E-03	1.14	6.3E-05	0.023	--	--	5.7E-03	2.01
Zinc	7440-66-6	No	No	0.23	81.7	0.075	2.25	--	--	--	--	--	--	--	--	--	--	--	--	1.6E-04	5.5E-03	--	--	--	--	--	--	0.039	14.4	7.9E-04	0.29	--	--	0.34	98.7
POLYCHLORINATED BIPHENYLS (PCBs)																															
Polychlorinated Biphenyls	1336-36-3	Yes	Yes	3.1E-05	0.011	1.0E-06	3.1E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.2E-05	0.011
1-Methylphenanthrene	832-69-9	No	No	1.0E-03	0.37	3.4E-05	1.0E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1E-03	0.37
3-Methylcholanthrene	56-49-5	Yes	No	3.4E-05	0.012	1.1E-06	3.4E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.6E-05	0.012
7,12-Dimethylbenz[a]anthracene	57-97-6	Yes	No	1.8E-05	6.5E-03	6.0E-07	1.8E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-05	6.5E-03
2,4-Dinitrotoluene	121-14-2	Yes	Yes	3.7E-03	1.34	1.2E-04	3.7E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.9E-03	1.34
4,6-Dinitro-o-cresol (and salts)	534-52-1	Yes	No	8.3E-03	2.98	2.8E-04	8.3E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.6E-03	2.99
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	Yes	Yes	1.8E-04	0.066	6.1E-06	1.8E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-04	0.066
Butyl benzyl phthalate	85-68-7	No	No	0.11	38.0	3.5E-03	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11	38.1
Hydrogen cyanide	74-90-8	No	Yes	0.081	29.1	2.7E-03	0.081	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.084	29.2
Phthalates	518	No	No	4.4E-04	0.16	1.5E-05	4.4E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.5E-04	0.16
Ethylene dichloride (EDC, 1,2-dichloroethane)	107-06-2	Yes	Yes	0.12	41.4	3.9E-03	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-05	6.3E-04	0.12	41.6
Isopropylbenzene (Cumene)	98-82-8	Yes	Yes	0.070	25.1	2.3E-03	0.070	--	--	--	--	--	--	1.3E-04	0.046	--	--	--	--	--	--	--	--	0.042	10.4	--	--	--	--	--	--	0.11	35.7
p-Dichlorobenzene (1,4-Dichlorobenzene)	106-46-7	Yes	Yes	1.10	396	0.037	1.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.14	397
Vinyl Chloride	75-01-4	Yes	Yes	0.073	26.1	2.4E-03	0.073	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2E-05	4.0E-04	0.075	26.2
Trichloroethene (TCE, Trichloroethylene)	79-01-6	Yes	Yes	0.079	28.2	2.6E-03	0.079	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.081	28.3
4-nitrophenol	100-02-7	Yes	No	4.5E-04	0.16	1.5E-05	4.5E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.7E-04	0.16
2-Chlorophenol	95-57-8	No	No	9.3E-05	0.033	3.1E-06	9.3E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.6E-05	0.033
2,4-Dinitrophenol	51-28-5	Yes	No	7.1E-04	0.26	2.4E-05	7.1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4E-04	0.26
Trichlorofluoromethane (Freon 11)	75-69-4	No	No	0.055	19.7	1.8E-03	0.055	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.057	19.8
2,4,6-Trichlorophenol	88-06-2	Yes	Yes	7.9E-04	0.28	2.6E-05	7.9E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.2E-04	0.28
Pentachlorophenol	87-86-5	Yes	Yes	8.5E-04	0.30	2.8E-05	8.5E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.8E-04	0.30
Tetrachloroethene (Perchloroethylene)	127-18-4	Yes	Yes	0.097	34.9	3.2E-03	0.097	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	35.0
DIESEL PARTICULATE MATTER (DPM)	--																																
Total DPM	200	No	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.06	35.2	--	--	--	--	--	--	--	--	--	--	1.06	35.2
Total TAC Emissions Estimate				**68.4**	**24,519**	**4.01**	**120**	**21.6**	**3,600**	**21.6**	**3,600**	**7.90**	**1,881**	**1.58**	**376**	**0.21**	**72.8**	**4.4E-03**	**1.20**	**1.20**	**40.1**	**0.021**	**7.59**	**29.6**	**8,658**	**1.03**	**55.3**	**0.51**	**187**	**0.091**	**33.4**	**0.060**	**2.00**	**158**	**43,153**
Total HAP Emissions Estimate				**46.7**	**16,738**	**2.47**	**74.2**	**17.3**	**2,880**	**17.3**	**2,880**	**6.81**	**1,621**	**1.36**	**324**	**0.19**	**67.0**	**1.5E-03**	**0.42**	**0.11**	**3.58**	**0**	**0**	**8.10**	**2,404**	**0.024**	**1.31**	**0.023**	**8.58**	**3.2E-03**	**1.17**	**0.054**	**1.81**	**100**	**27,005**
Single Highest HAP (Hydrochloric Acid) Emissions Estimate																																	**6,204**

Notes

HAP = hazardous air pollutant; RBC = risk based concentration; TAC = toxic air contaminant; SU = startup.

References

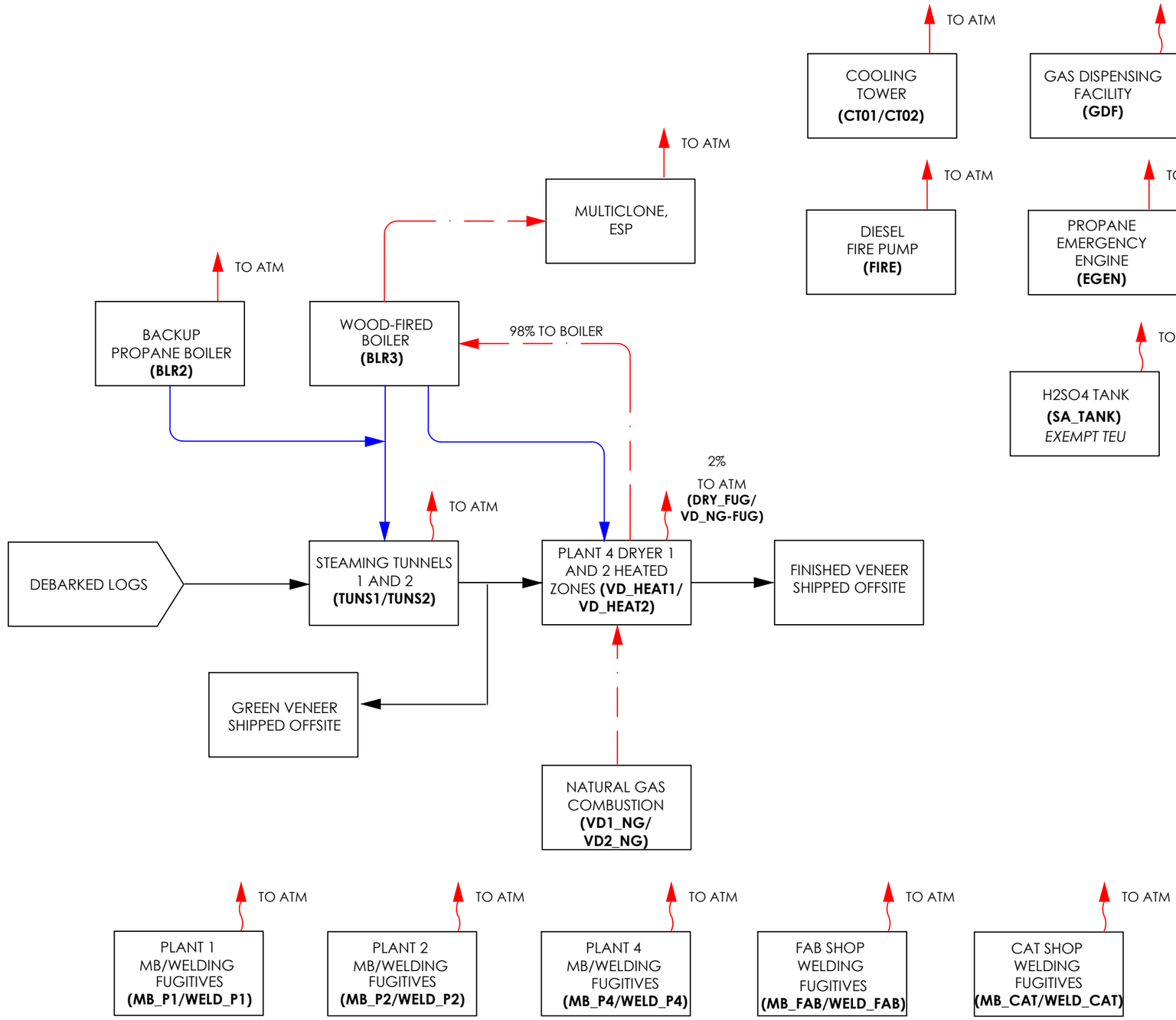
(1) Significant TEUs as defined in Oregon Administrative Rule 340-245-0020(52).

(2) Gas combustion exempt TEUs as defined in Oregon Administrative Rule 340-245-0050(5).

Attachment B

Process Flow Diagram

MAUL FOSTER ALONGI



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MAUL FOSTER ALONGI
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LEGEND

- EXHAUST
- PRODUCT
- STEAM
- POINT SOURCE
- FUGITIVE SOURCE

Figure 1 - Process Flow Diagram

Freres Lumber Company
Lyons, Oregon

Attachment C

ESP Procedure Manual

MAUL FOSTER ALONGI

Equipment specifications

Freres Lumber Company
Lyons, OR
Contract #B-2603

Operating conditions: Gas from 100,000PPH Boiler with Veneer Dryer Exhaust

Gas volume (ACFM)	96,719
Gas temperature (F)	397° F
Inlet grain loading (GR/DSCF @ 12% CO_2)	0.10
Outlet grain loading	0.025 lb/MM Btu Input
Outlet grain loading (lb/hr)	3.69
Estimated efficiency (%)	90
Pressure drop (Inches H_20)	1.0
Gas velocity (FPS)	2.53
Treatment time (seconds)	7.97
Aspect ratio (length/height)	0.92
SCA (FT^2 collecting surface per 1000 ACFM)	266

Construction

Number of fields	2
Number of bus sections	4
Number of electrodes	406
Type of rapper	Electromagnetic gravity impulse
Number of collecting plate rappers	12
Number of discharge electrode rappers	8
Number of distribution rappers	1
Number of plates	60
Total active collecting surface (FT^2)	25,706
Number of access hatches	13
Number of safety key interlocks	1 Lot

Auxiliaries

Number of hopper heaters	2
Number of hopper vibrators	--
Number of purge air fans	1
Number of purge air heaters	1

Electrical

High voltage transformer/rectifier with current limiting reactor, disconnect, and ground switch

Number of systems	2
Rectifier type	Full wave silicon diode w/integral current limit reactor
Input voltage (volts AC, single phase)	480V
Input current (amps AC)	213amp
Output voltage (volts DC)	60,000V
Output current (mA DC)	1000 mA/T-R

T/R high voltage control panel

Number of panels	1
Type of voltage control	Solid state SCR

Rapper control panel

Number of panels	1
Type of control	Wellons rapper control

Power requirements	Operating KW	Connected KVA
Transformer/rectifiers (213A, 400V per T/R)	51.8	170.4
Rappers (120 Volt)	1.0	3.0
Purge air fans (5 HP fan - 3 phase)	3.8	5.6
Purge air heaters (480V, 1 phase)	18	24.0
Hopper heaters (480V, 1 phase)	--	20.0
Screw Conveyor (3x5HP, 480 Volt, 3 Phase)	8.4	16.9
Rotary Ash Discharge Valves(2 @ 1hp-3 phase)	1.5	2.3
Total	**84.5**	**242.2**

Attachment D

Boiler 3 Startup/Shutdown Procedure Manual

MAUL FOSTER ALONGI

VELLONS

SEQUENCE FOR START-UP OF CELL FURNACE

1. Thoroughly inspect the furnace, boiler, air/gas ducting, and precipitator to ensure all hatches and doors are properly secured.

2. To turn on and operate the computerized boiler control system, see the User's Manual.

3. Turn "ON" all rotary valves and ash augers in the ash handling system. Visually check to ensure proper operation.

4. Turn on the air supply to the pneumatic controls, if required.

5. On multi-cell furnaces, switch each cells controller to manual and adjust the firing rate to minimum (zero output).

6. Turn "OFF" the "EXCESS OXYGEN" controller.

7. Switch the "INDUCED DRAFT" controller to manual and adjust the draft to minimum (zero output).

8. Adjust the "EXHAUST PRESSURE" controller so the process signal coincides with the set point, then switch the station to Automatic.

9. Fill boiler to proper water level. Turn the "gratewater pump" selector to "On". Check the gratewater sight glass to be sure water is circulating through the water-cooled grates.

10. With dry wood and kindling, build a fire in the cell large enough to cover the grates. Close the cell door.

11. Start the "I.D. FAN". "OPEN" the combustion air by-pass damper at the air preheater. Visually check to insure damper is open and ID fan is running.

12. Adjust the "INDUCED DRAFT" controller so the process signal coincides with the set point, then switch the station to automatic.

13. Start the "MASTER CONTROL". The automatic master control will become, and remain, engaged as long as the correct boiler water level is maintained and the I.D. fan continues to run.

14. When fire is burning well, turn the "COMBUSTION AIR FAN" selector to "AUTOMATIC" to start the fan.

15. Turn "METERING BIN/AUGER" selectors to "AUTOMATIC". Turn all fuel conveyor selectors to "AUTOMATIC".

16. The metering bin/auger, operating at minimum RPM, will start delivery of fuel to the cell. The fuel conveyors will start on demand. Visually insure operation.

17. 17. When the boiler starts producing steam, causing the boiler water level to drop, turn the "FEEDWATER PUMP" selector to "ON". Visually insure operation.

Note: a) On high pressure boiler plants, the pump runs continuously and the boiler drum level is maintained by a modulating feedwater flow valve.

If there is a condensate return pump, it should be turned on at this time.

18. Manually control the fuel feed rate until the cell refractory is hot and the cell is able to sustain the fire at the maximum fuel feed rate. Important - See the following:

    a) Table B in "Preparing Boiler for Service" for allowable boiler heat up times.

    b) "Boiler Start-Up Instructions" for the proper procedure to place the boiler on line.

19. On multi-cell furnaces, switch each cells controller to automatic when the process signal coincides with the set point.

20. The furnace system is now under "AUTOMATIC CONTROL".

21. Test the boiler low water level switches for proper operation.

22. Turn "ON" the electrostatic precipitator.
    Note: See "PRECIPITATOR START-UP AND OPERATING PROCEDURES."

23. Start the furnace/boiler system's automatic cell cleaning cycle.

24. When the stack temperature reaches 350°F, close the combustion air bypass damper at air preheater.

    Note: The bypass damper may be left slightly open to obtain a higher gas temperature into the precipitator.

25. After the furnace system and boiler demand have stabilized, the excess oxygen controller may be turned "ON".

CAUTION: The furnace shall never be operated in the manual/hand/maintenance mode unless operator is in constant attendance.

WELLONS

SEQUENCE FOR SHUTDOWN OF BOILER PLANT

1. On single cell systems, switch the "Firing Rate" operator's station to manual and adjust the output to zero. On multi-cell systems, switch each of the "Cell Control" operator's stations to manual and adjust the output to zero (minimum firing rate).
2. Turn the cell feed auger, metering bin/auger and all fuel system conveyors to "OFF". (See Note #b.)
3. Allow the fire to burn down.
4. Turn the F.D. fan to "OFF".
5. Allow the I.D. fan to run until the boiler exhaust gas temperature is below 200°F.
6. "Stop" the I.D. fan.
7. Turn the boiler feedwater, gratewater and condensate pumps to "Off". Turn rotary valve to "OFF".
8. Turn off the air supply to the pneumatic controls.
9. Push the electrical panel "Power" push/pull button to "OFF".
10. Turn the main and control circuit breakers to "OFF".
11. Leave ash handling system (rotary valve, conveyor, etc.) until all ash has been cleared from the system.

IMPORTANT NOTE

If the boiler is to be out of service for a prolonged period of time:

a) See the boiler manufacturer's instruction for proper boiler storage preparation.

b) Plan ahead to have no more than a cone full of fuel remaining in the storage bin and empty the fuel conveyors and metering bin/auger.

Attachment E

Burner Specification Sheets

MAUL FOSTER ALONGI

Burner Setup Sheet

Burner Fuel and Heat Input

Burner	**Eclipse WX0600**		**Customer:**	Freres
Burner Gross HHV Input	6	**MMBTU / hr**	**Job Title:**	
Turndown Required	10	**(X : 1)**	**Date :**	
Fuel	Natural gas		**SO#**	
Specific gravity	0.6			
Heating value	1000	**BTU / ft^3**		
Natural Gas Pressure @ High Fire	18	**"wc**		
Gas Flow	6000	**SCFH**		
Combustion Air			**Air Corrections**	
STP Air Pressure @ High	18	**"wc**	0	**Altitude (ft)**
Adjusted Air Pressure	18.0	**"wc**	0.075	**Density (lbs/ ft^3)**
Catalog Excess Air % @ Input and Pressure	70%	**%**	1.000	**Specific Gravity**
Air Flow	102000	**SCFH**	70	**Air Temperature (deg F)**
Enter catalog data for capacity with matching fuel / air pressures at maximum firing rate			1.00	**Air Pressure Correction Factor**
* **Yellow** cells are required inputs * **Green** cells are variable outputs			1.00	**Air Temp Correction Factor**

Firing Rate Pecent	**Differential Gas Pressure** (in wc)	**Differential Air Pressure** (in wc)	**Gas Flow** (SFCH)	**Air Flow** (SCFH)	**Trim From Constant Excess Air**	**Custom Percent Excess Air**
100%	18.00	18.00	6000	102000	☐ Customize ?	0.0%
92%	15.18	15.18	5509	93655	☐ Customize ?	0.0%
84%	12.59	12.59	5018	85309	☐ Customize ?	0.0%
75%	10.25	10.25	4527	76964	☐ Customize ?	0.0%
67%	8.15	8.15	4036	68618	☐ Customize ?	0.0%
59%	6.29	6.29	3545	60273	☐ Customize ?	0.0%
51%	4.67	4.67	3055	51927	☐ Customize ?	0.0%
43%	3.29	3.29	2564	43582	☐ Customize ?	0.0%
35%	2.15	1.79	2073	32127	☑ Customize ?	55.0%
26%	1.25	1.11	1582	25309	☑ Customize ?	60.0%
18%	0.60	0.63	1091	19091	☑ Customize ?	75.0%
10.0%	0.18	0.39	600	15000	☑ Customize ?	150.0%

Burner Setup Sheet

Burner Fuel and Heat Input

Burner	Eclipse WX0850		Customer:	Freres
Burner Gross HHV Input	8.5	MMBTU / hr	Job Title:	
Turndown Required	10	(X : 1)	Date :	
Fuel	Natural gas		SO#	
Specific gravity	0.6			
Heating value	1000	BTU / ft^3		
Natural Gas Pressure @ High Fire	17.5	"wc		
Gas Flow	8500	SCFH		
Combustion Air			Air Corrections	
STP Air Pressure @ High	17.5	"wc	0	Altitude (ft)
Adjusted Air Pressure	17.5	"wc	0.075	Density (lbs/ ft^3)
Catalog Excess Air % @ Input and Pressure	70%	%	1.000	Specific Gravity
Air Flow	144500	SCFH	70	Air Temperature (deg F)
Enter catalog data for capacity with matching fuel / air pressures at maximum firing rate			1.00	Air Pressure Correction Factor
* Yellow cells are required inputs * Green cells are variable outputs			1.00	Air Temp Correction Factor

Firing Rate Pecent	Differential Gas Pressure (in wc)	Differential Air Pressure (in wc)	Gas Flow (SFCH)	Air Flow (SCFH)	Trim From Constant Excess Air	Custom Percent Excess Air
100%	17.50	17.50	8500	144500	☐ Customize ?	0.0%
92%	14.75	14.75	7805	132677	☐ Customize ?	0.0%
84%	12.24	12.24	7109	120855	☐ Customize ?	0.0%
75%	9.96	9.96	6414	109032	☐ Customize ?	0.0%
67%	7.92	7.92	5718	97209	☐ Customize ?	0.0%
59%	6.11	6.11	5023	85386	☐ Customize ?	0.0%
51%	4.54	4.54	4327	73564	☐ Customize ?	0.0%
43%	3.19	3.19	3632	61741	☐ Customize ?	0.0%
35%	2.09	1.74	2936	45514	☑ Customize ?	55.0%
26%	1.22	1.08	2241	35855	☑ Customize ?	60.0%
18%	0.58	0.61	1545	27045	☑ Customize ?	75.0%
10.0%	0.18	0.38	850	21250	☑ Customize ?	150.0%

Attachment F

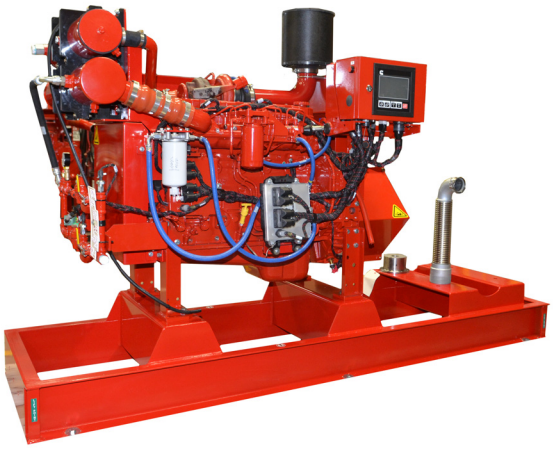
Diesel Generator Specification Sheet

MAUL FOSTER ALONGI

Specification sheet

Fire pump drive engine

CFP7E-F30
CFP7EVS-F30



Description

Engine series - Cummins QSB 6.7 Series
Exhaust emissions - EPA Tier 3

When performance matters, we take notice. Our engines are an assurance of safety specifically designed to fit your needs. The Cummins CFP7E fire pump drive engine features a cast-iron parent bore block structurally designed to reduce noise and increase durability.

Features

Variable Speed Pressure Limiting Control (VSPLC) - Cummins' VSPLC-equipped fire pump drive engines are capable of maintaining a constant pump discharge pressure by controlling the engine speed down to 1200 RPM, while still maintaining T3 emissions certification. VSPLC fire pump drive engines provide design flexibility in the fire pump system for high-rise applications; compensate for varying discharge pressure; allow the system architect to apply a larger pump and/or a pump with a steeper curve; and significantly reduce water consumption during the weekly test.

Certified power - The CFP7E-F30 complies with NFPA 20 and is UL 1247 Listed and FM 1333 Approved. The CFP7EVS-F30 complies with NFPA 20 and is FM 1333 Approved.

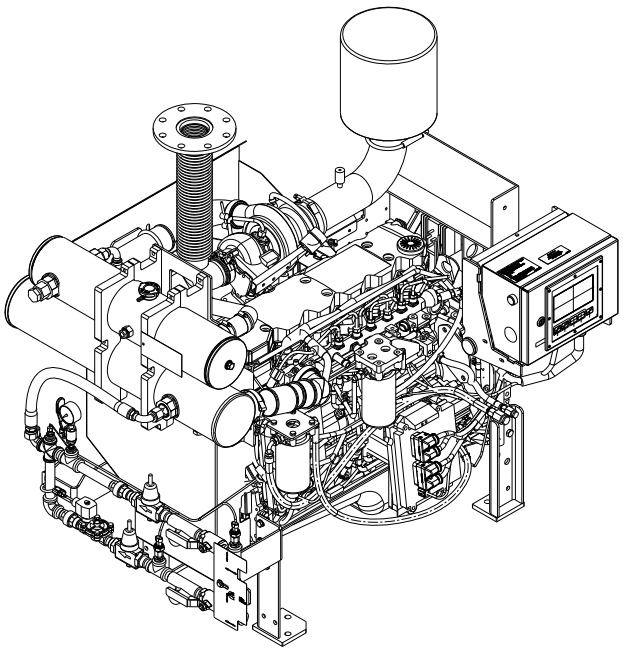
Control system - The industry-leading, state-of-the-art Fire Pump Digital Panel (FPDP) provides total fire pump drive engine system integration and intuitive operation, including:

- Color touchscreen;
- Dual microprocessors for critical signal redundancy;
- Standard J1939 parameter and Cummins fault code display;
- Engine idling;
- Electronic Control Module (ECM) self-diagnosis; and
- Optional Modbus field server remote messaging capability.

Warranty and service - Our models are backed by a comprehensive warranty and worldwide distributor network.

Ratings in HP (kW) and certifications

Operating speed (RPM)	1470		1760		1900		2100		2350		2600	
CFP7E-F30 NFPA, UL & FM	177	(132)	205	(153)	190	(142)	200	(149)	201	(150)	204	(152)
CFP7EVS-F30 NFPA & FM	177	(132)	205	(153)	190	(142)	200	(149)	201	(150)	204	(152)



General engine data	
Engine type	4 Cycle; In-Line, 6 Cylinder
Aspiration	Turbocharged and Charge-Air Cooled
Bore and stroke	4.21 x 4.88 in. (107 x 124 mm)
Displacement	409 in^3 (6.7 L)
Rotation	Counterclockwise from flywheel end
Compression ratio	17.2:1
Valves per cylinder	Intake - 2 Exhaust - 2
Fuel system	Bosch Electronic Common Rail
Maximum allowable bending moment @ rear face of block	1000 lb.-ft. (1356 N-m)
Estimated wet weight*	TBD

* Weight includes engine, cooling loop, heat exchanger, dual Electronic Control Modules (ECMs), Fire Pump Digital Panel (FPDP), standard air cleaner, standard exhaust flex, and all fluids.

Equipment	Standard	Optional
Air cleaner	Disposable; treated for high humidity, indoor service	Heavy-duty, two-stage with replaceable elements
Alternator	12V-DC, 95 amps; includes belt guard	24V-DC, 45 amps with belt guard
Cooling loop (maximum pressure of 300 PSI)	3/4" diameter for fresh water; includes alarm sensors and FM-approval	Cu Ni construction available for sea water applications; approved loops up to 1 1/4"
Cooling system	Tube and shell type, 60 PSI with NPTF connections	Radiator[1]; sea water tube and shell
Engine heater	120V-AC, 1500 watts	240V-AC, 1500 watts
Exhaust protection	Metal guards on manifolds and turbocharger	N/A
Exhaust flex connection	Steel, flanged	Stainless steel flex, NPT
Flywheel power take-off	Flywheel	Driveshaft system, stub shaft
Fuel connections	Fire-resistant flexible supply and return lines	N/A
Fuel filter	Primary and secondary	N/A
Governor, speed	Constant speed, adjustable	VSPLC[2]
Fire pump digital panel (FPDP)	7" color touchscreen; enclosure rated as Type 2/Type 4X; Imperial and metric values	Optional 316SS construction; custom gauges with digital panel expansion module (DPEM)
Lube oil cooler	Engine-water-cooled, plate type	N/A
Lube oil filter	Full-flow with by-pass valve	N/A
Lube oil pump	Gear-driven	N/A
Manual start controls	On FPDP and/or contactors	N/A
Overspeed controls	Electronic with reset and test on FPDP	N/A
Starter	12V-DC	24V-DC

[1] Not UL Listed and not FM Approved.

[2] FM Approved, but not UL Listed.

Air induction system

Maximum temperature rise between ambient air and engine air inlet	30.6 °F (17 °C)
Maximum inlet restriction with dirty filter	25 in. H_2O (635 mm H_2O)
Recommended air cleaner element - (standard)	Cummins FIltration AH1196
Recommended air cleaner element - (heavy duty)	Optional: primary element AF26124; secondary element AF26125

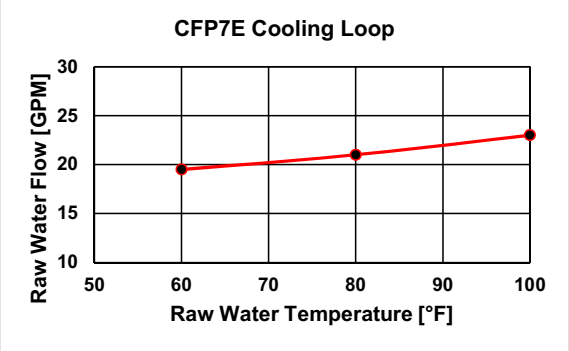
Lubrication system

Oil pressure range at rated	40-70 PSI (276-483 kPa)
Oil capacity of pan (high - low)	15-13 qt. (14.2 - 12.3 L)
Total system capacity	4 gal. (15.1 L)
Recommended lube oil filter	Cummins Filtration LF3970

Cooling system*

Raw water working pressure range at heat exchanger	60 PSI (413 kPa) MAX
Recommended minimum water supply pipe size to heat exchanger	.75 in. (19.05 mm)
Recommended minimum water discharge pipe size from heat exchanger	1.00 in. (25.40 mm)
Coolant water capacity (engine only)	3.75 gal. (14.2 L)
Standard thermostat - type	Modulating
Standard thermostat - range	180-199 °F (82-93 °C)
Normal Operating Temperature	180-212 °F (82-100 °C)
Minimum raw water flow: - with water temperatures to 60 °F (16 °C)	19.5 GPM (1.23 L/sec)
- with water temperatures to 80 °F (27 °C)	21 GPM (1.32 L/sec)
- with water temperatures to 100 °F (38 °C)	23 GPM (1.45 L/sec)

* A jacket water heater is mandatory on this engine. The recommended heater wattage is 1500 down to 40 °F (4 °C)



Exhaust system

Maximum allowable back pressure by complete exhaust system	40.8 in. H_2O (10.2 kPa)
Exhaust pipe size normally acceptable	4 in. (102 mm)

Noise emissions - The noise emission values are estimated sound pressure levels at 3.3 ft. (1 m).

Top	92.5 dBa
Right side	94.3 dBa
Left side	93.8 dBa
Front	92.1 dBa
Exhaust	114.2 dBa

Fuel supply/drain system

Operating speed in RPM	1470		1760		1900		2100		2350		2600	
Fuel rate - gal/hr (L/hr)	9.1	(34.6)	10.6	(40.1)	9.8	(37.3)	10.5	(40.7)	10.8	(40.7)	11.5	(43.5)

Fuel type	No. 2 diesel only
Minimum supply line size	0.5 in. (12.70 mm)
Minimum drain line size	0.375 in. (9.53 mm)
Maximum fuel height above C/L fuel pump	360 in. (9.1 m)
Recommended fuel filter - primary	Cummins Filtration FF5612
Recommended fuel filter - secondary	Cummins Filtration FS1212
Maximum restriction @ lift pump-inlet - with clean filter	5.0 in. Hg (127 mm Hg)
Maximum restriction @ lift pump-inlet - with dirty filter	10.0 in. Hg (254 mm Hg)
Maximum return line restriction - without check valves	5.9 in. Hg (150 mm Hg)
Minimum fuel tank vent capability	7.1 ft^3/hr (0.21 m^3/hr)
Maximum fuel temperature @ lift pump inlet	158 °F (70 °C)

Starting and electrical system

Minimum recommended battery capacity - cold soak at 0 °F (-18 °C) or above	12V	24V
Engine only - cold cranking amperes	1400 CCA*	900 CCA*
Engine only - reserve capacity	430 minutes*	430 minutes*
*Based on FM requirement for a minimum of 900 CCA and 430 reserve capacity minutes		

Battery cable size - minimum of 2/0 AWG and maximum cable length not to exceed 6 ft. (1.5 m)	12V	24V
Maximum resistance of starting circuit	0.001 Ohms	0.002 Ohms
Typical cranking speed	120 RPM	120 RPM
Alternator (standard), internally regulated	95 amps	70 amps

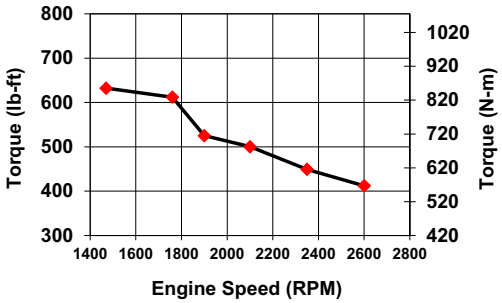
Operating conditions

Operating speed in RPM	1470		1760		1900		2100		2350		2600	
Output - BHP (kW)	177	(132)	205	(153)	190	(142)	200	(149)	201	(150)	204	(152)
Ventilation air required - CFM (litre/sec)	403	(190)	480	(227)	502	(237)	567	(268)	627	(296)	689.7	(326)
Exhaust gas flow - CFM (litre/sec)	1026	(484)	1174	(554)	1180	(557)	1305	(616)	1468	(693)	1615	(762)
Exhaust gas temperature - °F (°C)	959.2	(515)	959.2	(515)	959.2	(515)	959.2	(515)	959.2	(515)	959.2	(515)
Heat rejection to coolant - BTU/min. (kW)	3622	(64)	3978	(70)	3757	(66)	4043	(71)	4533	(80)	4986	(88)
Heat rejection to ambient - BTU/min. (kW)	994.8	(17)	1059	(19)	1151	(20)	1243	(22)	1218	(21)	1194	(21)

Engine performance curve for CFP7E-F30 and CFP7EVS-F30

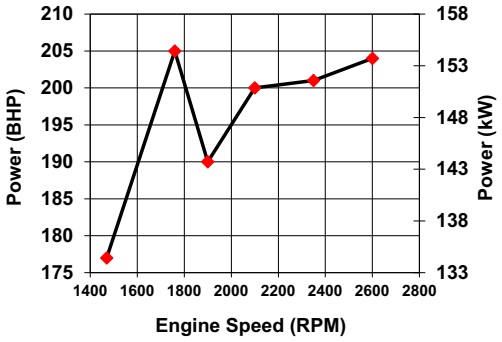
Torque Output

RPM	lb-ft	N-m
1470	632	857
1760	612	830
1900	525	712
2100	500	678
2350	449	609
2600	412	559



Horsepower Output

RPM	BHP	kW
1470	177	132
1760	205	153
1900	190	142
2100	200	149
2350	201	150
2600	204	152



All data is based on the engine operating with a fuel system, water pump, lubricating oil pump, air cleaner, and alternator. The fan, optional equipment, and driven components are not included. Data is based on operation at SAE standard J1349 conditions of 300 ft. (91.4 m) altitude, 29.61 in. (752 mm) Hg dry barometer, and 77 °F (25 °C) intake air temperature, using No.2 diesel fuel only.

Altitude above which output should be limited*:	300 ft. (91.4 m)
Correction factor per 1000 ft. (305 m) above altitude limit:	3%
Temperature above which output should be limited:	77 °F (25 °C)
Correction factor per 10 °F (11 °C) above temperature limit:	1% (2%)

* Above 5,000 feet, contact Cummins for derate information.

US EPA NSPS Tier 3 Emissions Compliance

Fuel Percentage of Sulfur	D2 Cycle Exhaust Emissions*									
	Grams per BHP - HR					Grams per kW - HR				
	NMHC	NO_x	NMHC + NO_x	CO	PM	NMHC	NO_x	NMHC + NO_x	CO	PM
15 PPM Diesel Fuel	0.062	2.475	2.537	1.193	0.111	0.083	3.319	3.402	1.600	0.149
300-4000 PPM Diesel Fuel	0.075	2.685	2.759	1.193	0.127	0.1	3.600	3.700	1.600	0.170

*The emissions values above are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

Refer to the engine data tag for the EPA Standard Engine Family.

No special options are needed to meet current regulation emissions for all fifty states.
Tests conducted using alternate test methods, instrumentation, fuel, or reference conditions can yield different results.

Diesel Fuel Specifications:

- Cetane Number: 40-48
- Reference: ASTM D975 No. 2-D

Reference Conditions:

- Air Inlet Temperature: 25 °C (77 °F)
- Fuel Inlet Temperature: 40 °C (104 °F)
- Barometric Pressure: 100 kPa (29.53 in Hg)
- Humidity: 107 g H_2O/kg (75 grains H_2O/lb) of dry air; required for NO_x correction
- Intake Restriction set to a maximum allowable limit for clean filter
- Exhaust Back Pressure set to maximum allowable limit

Fire pump digital panel (FPDP)

The Cummins FPDP is an integrated microprocessor-based control system that provides full digital technology with enhanced accuracy and built-in redundancy.

Reliable design - Designed and tested with isolated mounting to minimize vibration for longer life and durability, the Cummins FPDP proves reliable in harsh environments.

Advanced control methodology - The Cummins FPDP allows for Input/Output (I/O) expansion and remote monitoring capabilities, as well as automatic Electronic Control Module (ECM) switching for electronic engines.

Certified quality - The Cummins FPDP is UL 1247 Listed and FM 1333 Approved.

Operator panel features

Operator/display panel

- 7” TFT LCD (thin-film-transistor liquid-crystal display) - color, 24-bit, 800x480 (WVGA).
- Auto, manual, start, stop, and fault reset.
- Assembly enclosure that meets NEMA Type 2 and Type 4X design requirements and is water, corrosion, fire, and impact-resistant.

Electronic engine communications - SAE J1939 protocol.

- Comprehensive full-authority engine (FAE) data: oil pressure and temperature; coolant temperature; and intake manifold pressure and temperature.
- Cummins fault code display.
- Sensor failure indication.
- Optional RS-485 serial - Modbus RTU/Modbus TCP/IP.

Variable speed pressure limiting control (VSPLC) capabilities

- VSPLC status indication.
- Pump discharge pressure display.
- Ability to run the engine at fixed speed from the FPDP at start-up for commissioning.

Other control features

- Digital Panel Expansion Module (DPEM) for additional analog/digital inputs and configurable dry relay contact output.
- Ability to idle at start-up for commissioning of electronic engines.
- Idle cool down for electronic engines.

Functional

- Configurable display units for temperature in degrees Fahrenheit or Celsius and pressure in PSI or kPa.
- Manual ECM selector switch on electronic engines.
- Ability to crank the fire pump drive engine from Battery A, Battery B, or both.
- Fixed engine speed adjustments in +/- 10 RPM increments.
- Overspeed shutdown.

Environmental

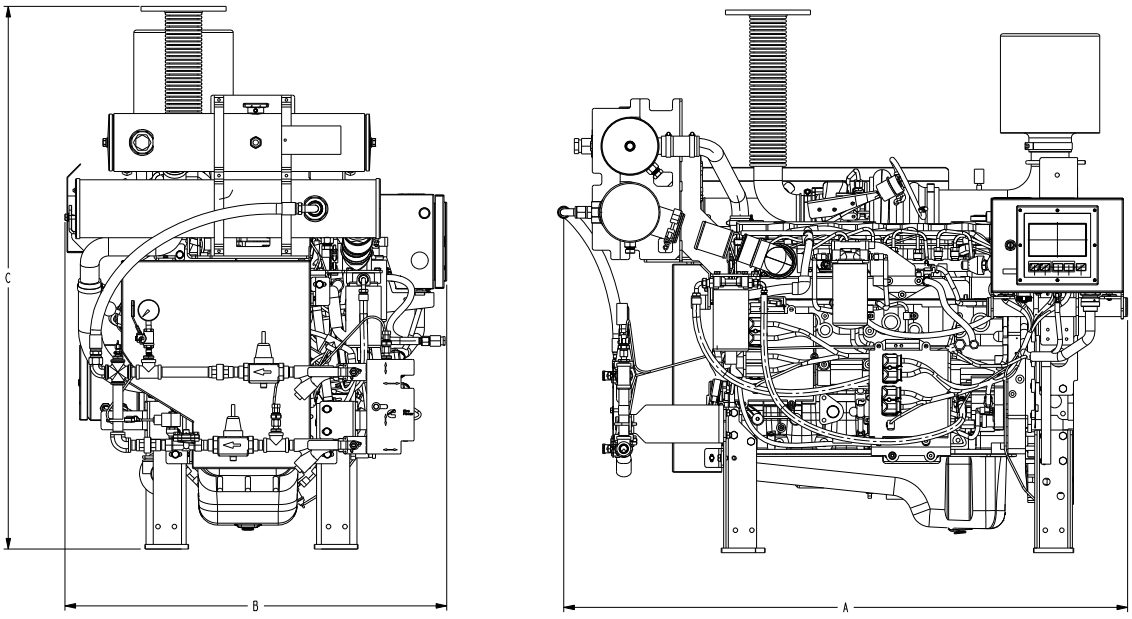
- Operating temperature: minus 4 to 140 °F (minus 20 to 60 °C).
- Storage temperature: minus 22 to 176 °F (minus 30 to 80 °C).
- Meets CISPR 11 Class B radiated emissions.

Electrical

- 8-30 VDC operating voltage.
- Reverse polarity protected.
- Spring cage terminal block interface.
- Built-in dual micro controllers for increased reliability.

Mechanical

- 1 3/8” pre-cut customer conduit knockout for easy field installation.
- Simplified internal design for efficiency and ease of customer connections.
- 16GA ASTM A366 material - 316 stainless steel optional.
- RAL3001 red powder coat finish.



This outline drawing is for reference only.
Do not use for installation design.

	Dim "A" in. (mm)	Dim "B" in. (mm)	Dim "C" in. (mm)
CFP7E	60 (1524)	40 (1016)	57 (1448)

NOTE: Consult drawings or contact the factory for additional information.

NOTE: Specifications are subject to change without notice. Codes or standards compliance may not be available with all model configurations - consult factory for availability.
For more information, contact firepumpsales@cummins.com.

FM APPROVED

c UL us LISTED

ISO 9001
BUREAU VERITAS Certification
UKAS MANAGEMENT SYSTEMS
008

This product has been manufactured under the controls established by a Bureau Veritas Certification approved management system that conforms with ISO 9001:2015.

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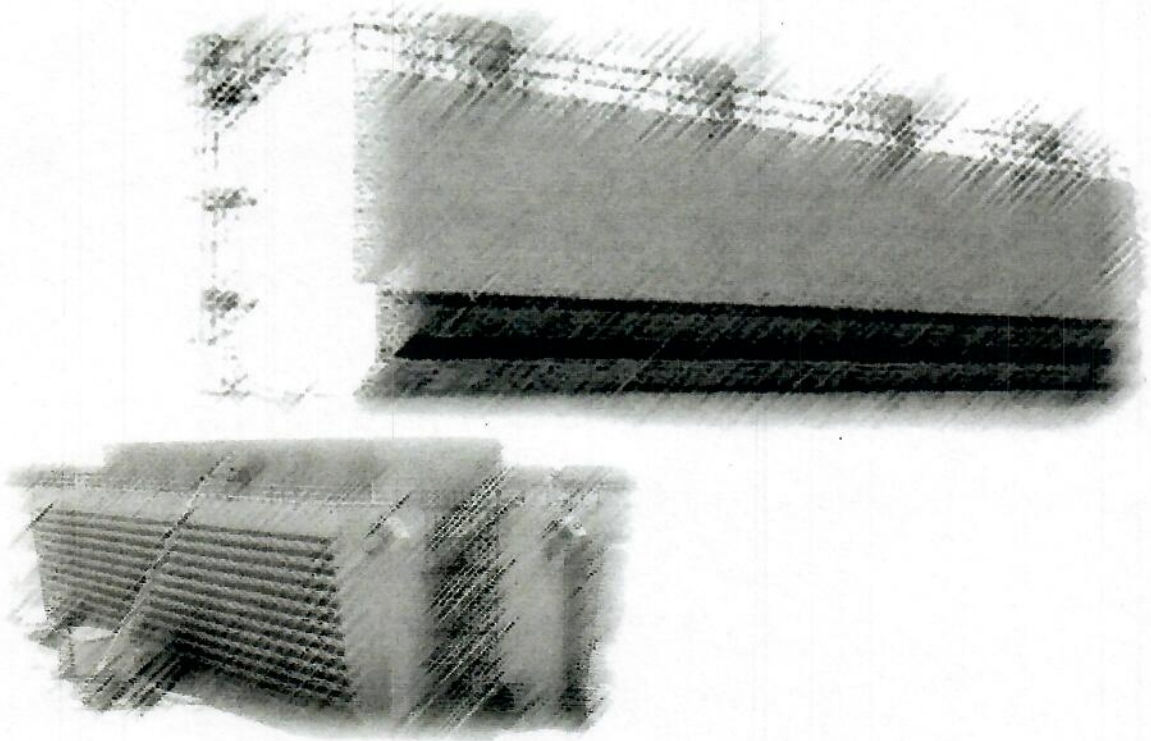
Attachment G

Cooling Tower Spec Sheet

MAUL FOSTER ALONGI

COOLING TOWER OPERATION & MAINTENANCE MANUAL



Evergreen Bio Power LLC
Lyons, OR

MIDWEST TOWERS, INC.
In partnership with:
Wellons, Inc.

Midwest Towers No.: 06N1211

Midwest TOWERS, INC.

Hwy. 19 East, PO Box 1465
Chickasha, OK 73023
405 224 4622
www.midwesttowers.com

BTU/HR = RANGE x GPM x 500

SECTION 1: COUNTERFLOW TOWER DESIGN

COOLING TOWER SPECIFICATIONS

COOLING TOWER DATA SHEET

Cooling Tower	
Type:	Induced draft
Air Flow:	Counterflow
Model No.:	CLT3636-2405-2
Drawing No.:	
No. Cells:	2
Position:	In line
Operating Conditions	
Water Flow (gpm):	17,750
Inlet Water Temp. (°F):	87 } RANGE
Exit Water Temp. (°F):	77 }
Wet Bulb Temp. (°F):	67
Relative Humidity (%):	60
Heat Load (MMBtu/hr.)	88.75
Evaporation Loss (%):	0.84
Elevation (ft.):	680
Dimensions	
Each Cell (LxW):	36' x 36'
Overall Dims (LxW):	72' x 36'
Fan Stack Height (ft.):	10
Ht. BWall to Fandk (ft.)	26-0 3/8"
Air Inlet on all 4 sides	10 feet high
Distribution System	
Type:	Low pressure
Material:	FRP & PVC
Inlet Water Flange:	24" FRP w 125# Drill
Inlet Water Height:	18' – 3 3/8"
Tower Pump Head:	Approx 24'
Fill	
Type:	Cellular
Material:	PVC
Fill Volume:	12,960 (ft3)
Water Loading:	6.85 (gpm/ft2)
Air Inlet on all 4 sides	10 feet high
Drift Eliminators	
Type:	Cellular
Material:	PVC
Drift Loss (%):	0.005
Structure Materials	
Casing:	FRP GP
Fan Stack:	FRP GP
Structure:	Douglas Fir
Stairway:	Douglas Fir
Access Ladder/Landing	FRP

Fans	
Number of Fans:	2
Manufacturer:	Hudson Products Co.
Type:	Axial Flow
Model No.:	APT-24K-6
Diameter:	24 ft
Number of Blades:	6
Blade Material:	FRP
Hub Material:	Galvanized Steel
Rotation (rpm):	162 (nom)
Fan Tip Speed:	12,000 ft./min (nom)
Fan Rated HP	100
Static Efficiency (%):	70 (approx)
Air Flow (cfm):	653,715
Static Pressure (w.c.)	0.549"
Motors	
Number:	2
Manufacturer:	Toshiba Prem Eff
Type:	TEFC
Frame Size:	405T
Rated Horsepower:	100
Service Factor:	1.15
Rotation (rpm):	1800 (nom)
Voltage (volts):	460
Frequency (Hz):	60
Phase:	3
Gear Reducers	
Number:	2
Manufacturer:	Amarillo Gear Co
Type:	Right angle
Model No.	1110
Reduction Ratio:	11.0:1
Service Factor:	2.0
Gear Type:	Spiral Bevel
Lubrication:	Oil
Coupling	
Number:	2
Manufacturer:	Amarillo Gear Co.
Model No.:	CF67 600L
Service Factor:	3.0
Sleeve Material:	Composite
Flexible Material:	Carbonfiber/Epoxy
Accessories	
Vibration Switch:	Murphy VS2 or Equal
Oil Fill / Drain Line:	HDG