OLYMPIC REGION CLEAN AIR AGENCY

2940 Limited Lane NW - Olympia, Washington 98502 - 360-539-7610 – Fax 360-491-6308

FORM 1- NOTICE OF CONSTRUCTION

TO CONSTRUCT - INSTALL - ESTABLISH OR MODIFY AN AIR CONTAMINANT SOURCE

Form 1 Instructions:

1. Please complete all the fields below. **This NOC application is considered incomplete until signed.**
2. If the application contains any confidential business information, please complete a Request of Confidentiality of Records (www orcaa org/forms).
3. Duty to Correction Application: An applicant has the duty to supplement or correct an application. Any applicant who fails to submit any relevant facts or who has submitted incorrect information in a permit application must, upon becoming aware of such failure or incorrect submittal, promptly submit supplementary factors or corrected information.

Business Name: Murphy Company	**For ORCAA use only**
Mailing Address: 2350 Prairie Road, Eugene, Oregon 97402	File No: 177 County No: 27 Source No: 58 Application No: 213M01496
Physical Address of Project or New Source: 505 Elma McCleary Road, Elma, Washington 98541-9439	Date Received: Received APR 14 2021 ORCAA
Billing Address: 2350 Prairie Road, Eugene, Oregon 97402	

Project or Equipment to be installed/established:

ORCAA request to change permit type to Synthetic Minor

Anticipated startup date: Currently operating Is facility currently registered with ORCAA? Yes ☑ No ☐

This project must meet the requirements of the State Environmental Policy Act (SEPA) before ORCAA can issue final approval. Indicate the SEPA compliance option:

- ☐ SEPA was satisfied by _____ (government agency) on ___/___/___ (date) - Include a copy of the SEPA determination
- ☐ SEPA threshold determination by _____ (government agency) is pending - Include a copy of the environmental checklist
- ☐ ORCAA is the only government agency requiring a permit - Include ORCAA Environmental Checklist
- ☑ This project is exempt from SEPA per WAC 197-11-800 (19) (WAC citation).

Name of Owner of Business: John Murphy		Agency Use Only
Title: President		
Email: John.Murphy@murphyplywood.com	Phone: (541) 461-4545	
Authorized Representative for Application (if different than owner):		
Title:		
Email:	Phone:	
I hereby certify that the information contained in this application is, to the best of my knowledge, complete and correct.		
Signature of Owner or Authorized Representative: (sign in Blue Ink)		
	Date: 4/8/21	

IMPORTANT: Do not send via email or other electronic means. ORCAA must receive Original, hardcopy, signed application and payment prior to processing application.

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FORM 1D- Contact Information

Business Name Murphy Company	FOR ORCAA USE
	FILE # 177
Physical Site Address (Street address, city, state, zip)	CTY # 27
505 Elma McCleary Road, Elma, WA 98541-9439	SRC # 58
	Date Received
Previous Business Name (if applicable)	Received APR 14 2021 ORCAA

Contact Information

Inspection Contact	
Name Ben Krauss	Title Mill Manager
Phone (360) 482-2521	Email Ben.Krauss@murphyveneer.com
Billing Contact	
Name John Murphy	Title President
Phone (541) 461-4545	Email John.Murphy@murphyplywood.com
Emission Inventory Contact	
Name Steven LaFranchi	Title Consultant
Phone (541) 683-4997	Email gabbro@comcast.net
Complaint Contact	
Name Ben Krauss	Title Mill Manager
Phone (360) 482-2521	Email Ben.Krauss@murphyveneer.com
Permit Contact	
Name John Murphy	Title President
Phone (541) 461-4545	Email John.Murphy@murphyplywood.com

The **inspection contact** is the on-site person responsible for the everyday operation of the site and is available for inspections.
The **billing contact** is the person invoices are sent.
The **emission inventory contact** is the person requests for emissions information and material use information are sent.
The **complaint contact** is the person who receives and responds to complaints received on-site and who is contacted regarding complaints ORCAA receives.
The **permit contact** is the person responsible for filling out permit applications and receiving approval from ORCAA.

Environmental Science Associates, Inc. *1450 Flintridge Avenue Eugene, Oregon 97401 Phone (541) 683-4997*
FAX (541) 683-5360

April 9, 2021

Lauren Whybrew
Engineer I
ORCAA
2940 Limited Lane NW
Olympia, WA 98502

RE: information Response to ORCAA letter of January 28, 2021. Subject: Action Required of Murphy Company.

Ms. Lauren Whybrew,

Murphy Company requested ***ESA*** respond to the ORCAA letter dated January 28th, 2021 and supply emission information requested in the letter.

To begin, ***ESA*** would like to reiterate, the Murphy Company Elma mill does not have operational capacity with the present COE M62 veneer dryer and mill configuration to emit any pollutant above major source criteria.

This fact has been true the entire time Murphy Company has owned and operated the Elma mill. Actual emissions based on Murphy Company's historic production and equipment operation have never exceeded major source criteria.

The attached spreadsheet provides data on PTE for the mill using various operating scenarios. This was done to demonstrate no operating scenario, even those that are impracticable and are not achievable would exceed PTE above major source.

The greatest amount of pollutant emitted at the mill is volatile organic compounds (VOC). VOC emissions are significant because the veneer dryer has no installed pollution control equipment. Even a scenario of 100% heart production for 8760 hours, the mill has a PTE of less than 70 tons per year VOC. This scenario is not practicable and no mill in the United States operates in a similar manner.

For example, annual green veneer production in the COE M62 dryer has not exceeded 72,000 Msf 3/8" basis during the entire time Murphy Company has owned the mill. The PTE in the supplied spreadsheet, where dryer throughput is 100% heart yields an

annual production of 103,368 Msf 3/8". This production level cannot be achieved for the following reasons.

The PTE production is based on 8760 hours of operation per year. Standard operation of the veneer dryer requires an 8-hour shutdown per week for maintenance of the dryer. In addition, the dryer loses production during periods of shift-change and operational changes such as preparing for change from heart to sap. Historic records demonstrate the dryer in down during these periods on average 175 hours per year.

Green veneer production is also limited by the hours required to complete redry processing. Redry consists of green veneer that has passed through the veneer dryer once yet still contains moisture above the target for dried veneer. Most veneer is typically dried to 3-5% moisture to prevent blows and optimize glue adhesion. In general, approximately 10% of green veneer dried requires another pass through the veneer dryer. This reflects attempts to avoid over drying the green veneer and scorching or hard casing the veneer which again can adversely impact the glue bond when producing plywood or laminated veneer lumber.

Redry has nearly achieved the correct moisture content therefore when run through the dryer a second time is not dried at the same high-temperatures as green veneer. Veneer redry is performed in the COE M62 at temperatures of approximately 180 degrees F. Green veneer dryer temperatures average between 300-310 degrees F for Douglas-fir heart and 370-380 degrees F for Douglas-fir sap.

The higher temperatures for drying sap are necessary to remove the excess water versus heart. Average moisture of heart is 37% while sap is 70%. This explains why sap throughput is substantially less and dryer temperatures higher than typical for heart. More heat and time are required to dry sap veneer. This explains the lower veneer dryer production rates for sap vs. heart.

To demonstrate VOC off-gassing occurs rapidly during the first pass of green veneer through the dryer, the recent source test is illustrative. Heart VOC emissions decreased from the infeed, near Stack 1 to Stack 4 nearest the outfeed, from 0.278, 0.425, 0.218 and 0.131 lb/M 3/8" basis. Heart VOC emissions were highest in zone 2 (Stack 2) after the veneer had heated up in the first zone and the removal of moisture allowed the temperature of the veneer to increase, driving off VOCs.

Sap VOC emissions likewise decreased from infeed and Stack 1, to Stack 4, nearest the outfeed, from 0.492, 0.483, 0.306 and finally 0.030 lb/M 3/8" basis.

Because redry veneer has already passed through the dryer once at temperatures above vapor pressure of the primary low temp volatile organic constituents, beta pinene and alpha pinene (0-212 F), the second, low temperature <180 degrees F, redry pass emits negligible VOCs.

Although the annual hours used to calculate PTE were 8760, the actual maximum hours per year the mill runs green veneer in the COE M62 is 8760 Hrs. less 416 Hrs. (8 Hr. veneer dryer maintenance shutdowns weekly) less 800 Hrs. (average redry hours per year) and 175 Hrs. of average downtime annually. This leaves operational hours for drying green veneer of 7,369 hours annually.

This explanation helps demonstrate the PTE numbers are exaggerated above actual plant capability by approximately 9 tons per year (100% Heart @ 8760 Hrs. vs. actual mill design operation of 7369 Hs).

During the period Murphy Company has owned the Elma mill, no resinous softwoods (i.e., pine) have been dried. The emission factor used by ORCAA is based on AP42 with data representative of resinous pine emissions and not non-resinous west coast Douglas-fir.

Murphy Company purchased the Elma mill to provide high-quality Douglas-fir veneer for use in their laminated veneer lumber mill and high-quality structural panels. Pine is not utilized for this purpose. Across all Murphy Company mills encompassing some ten veneer dryers, less than 6000 Msf 3/8" of pine are dried out of a volume exceeding 690,000 Msf 3/8" or less than 8/10's of 1 percent.

Utilizing any production scenario possible, 100% sap, 100% heart, and utilizing 8760 operating hours scenario (an impossible metric) the mill could not exceed an annual emission rate of 100 tons for VOC.

The ORCAA determination Murphy Company has actual emissions of regulated pollutants above major source thresholds is not feasible under operating scenarios the mill can achieve with the current operational design. Without changing plant equipment this mill cannot exceed 100 tons of VOC on an annual basis. Even completing the exercise of running 100% pine using actual operational design demonstrates the mill PTE is below major source at approximately 90 Tons/Yr VOC.

Again, Murphy Company has never run pine at this mill and has no intention of doing so. But again, the calculations demonstrate the mill would not be a major source using AP42 factors.

On March 15, 2021 you sent an email pdf attachment depicting PM PTE emissions of 126.2 tons per year. The calculations are erroneous based a couple of factors.

1. The veneer dryer capacity is not 109,500 Msf 3/8' per year. At best the mill average maximum hourly rate is 11,800 Msf 3/8" (average calculated over many years) times 8760 Hrs. (impossible) yields and annual production of 103,368 Msf 3/8". This production rate is not possible due to the weekly maintenance, redry,

and proportion of sap/heart in the green veneer feedstock.

The PM emission rate using the 103,368 Msf 3/8" would produce annual PM emissions from the veneer dryer of 19.5 tons. Using actual, achievable annual production rates, maximum yearly PM for the dryer would not exceed 29.5 tons/yr.

2. There is only one cyclone operating at the mill. The fishtail cyclone processes approximately 40 BDT of green wood sawdust per year. The airflow rate is 2,600 ACFM not 26,422 ACFM. Using a medium efficiency rate for the cyclone of 0.5 lb/BDT (Oregon AQP-010) the emissions of PM total 0.01 tons/yr. The mill cuts 30 units per day, a cut takes 3 minutes, and the blower operates for 3.5 minutes per fishtail unit. This means the fishtail saw runs at most runs 38,325 minutes per year (638.75 hours). These variables indicate the grain loading would be below 0.001 gr/dscf.

WAC 173-401-200 (19) (a) and (b) EPA defines a major source as a facility that has the potential to emit 100 tons/yr or more of any criteria pollutant or 10 tons/yr or more of any single HAP or 25 tons/yr or more of combined HAPs. This facility is not a major source of emissions based on these criteria. The support for this determination can be found within the attached emission calculations spreadsheets.

In addition, mill PTE under actual physical and operational design is well below major source criteria. According to WAC 173-401-200 (24), ***"Potential to emit" means the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design."***

The operational design of this veneer dryer, including mandatory maintenance, operational shutdowns and redry hours preclude the veneer dryer emissions contributing sufficient VOC for the mill to attain major source criteria.

EPA defines a synthetic minor as a source that otherwise has the potential to emit regulated NSR pollutants in amounts that are at or above the thresholds for major sources in 40 CFR 49.167, 40 CFR 52.21 or 40 CFR 71.2, as applicable, but has taken a restriction so that its PTE is less than such amounts for major sources. Such restrictions must be enforceable as a practical matter (as defined in 40 CFR 49.152).

And a "Synthetic minor Hazardous Air Pollutant (HAP) source" means a source that otherwise has the potential to emit HAPs in amounts that are at or above those for major sources of HAP in 40 CFR 63.2, but that have taken a restriction so that its PTE is less than such amounts for major sources. Such restrictions must be enforceable as a practical matter.

A source that has potential to emit at the major source levels but accepts a PSEL below major source levels is called a synthetic minor (SM). This source does not have the potential to emit at major source levels; therefore, does not qualify as a synthetic minor candidate. The basis for this determination can be found within the attached emissions.

None of the PTE operating scenarios demonstrate the Murphy Company mill achieves the necessary threshold limits to qualify for a Synthetic Minor category permit as no operational restriction is required to remain below major source thresholds with the current mill configuration.

Murphy Company is providing the requested information in the ORCAA letter dated January 28th, 2021 with the intent of continuing clarification and dialogue on this matter. Murphy Company does not believe the mill qualifies as a major source or for a "synthetic minor regulatory order" as the mill has not in the past, nor can the mill exceed major source criteria in the future with the current mill configuration.

Murphy Company respectfully requests ORCAA provide information demonstrating how the Murphy Elma mill as designed is currently a major source. If a Synthetic Minor Order (SMO) under WAC 173-400-091 is demonstrated as necessary, Murphy Company would certainly request a voluntarily limit on production or operation such that emissions remain below major source criteria.

We look forward to hearing from you on this matter at your earliest convenience to reach consensus and resolution.

Sincerely,

Steven LaFranchi
Environmental Science Associates, Inc.

Cc: John Murphy

Facility: Murphy Company - Elma

PLANT SITE EMISSION DETAIL SHEET
POTENTIAL TO EMIT

Emission Source Operating Parameters - Mix Heart/Sap 8760 Hrs	Pollutant	Emission Factor		Reference	Emissions tons/year
COE M62 Jet Veneer Dryer Annual Hours of Operation 8760					
Heart Production (Max Avg. 11,800 ft^2/Hr)					
53,808 Msf 3/8"	$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	13.4
Douglas fir	CO	0.64	Msf 3/8"	AP-42	17.2
61 % Heart Production 4560 Hrs/Year	NOx	0.12	Msf 3/8"	AP-42	3.2
	VOC (Heated Section)	1.05	Msf 3/8"	2020 Source Test	28.2
	VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	1.2
	VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.1
	Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	1.1
	Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	1.8
	Acetaldehyde	0.062	Msf 3/8"	AP-42 (H&C)	1.7
	Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.2
Sap Production (Max Avg 8,150 ft^2/Hr)					
	$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	8.5
34,230 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	11.0
Douglas fir	NOx	0.12	Msf 3/8"	AP-42	2.1
39% Sap Production 4200 Hrs/Year	VOC (Heated Section)	1.31	Msf 3/8"	2020 Source Test	22.4
	VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	0.8
	VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.0
	Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	0.7
Total Production 88,126.038 Msf 3/8"	Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	1.1
	Acetaldehyde	0.0654	Msf 3/8"	AP-42 (H&C)	1.1
	Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.2
Cleaver-Brooks Natural Gas Boiler					
	$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMcf	AP-42	1.0
250 $MMft^3$/yr	SO_2	0.6	lb/MMcf	AP-42	0.1
	NO_x	100	lb/MMcf	AP-42	12.5
	CO	84	lb/MMcf	AP-42	10.5
	VOC	5.5	lb/MMcf	AP-42	0.7
Log Conditioning					
	Alpha-pinene	0.056	Msf 3/8"	AP-42 Table 10.5-7	7.98
	Beta-pinene	0.0064	Msf 3/8"	AP-42 Table 10.5-7	0.91
285,000 MSF 3/8"	Methanol	0.0073	Msf 3/8"	AP-42 Table 10.5-7	1.04
	Acetaldehyde	0.0047	Msf 3/8"	AP-42 Table 10.5-7	0.67
				Total VOC (VOC+M+A)	10.60
Fish Tail Cyclone					
	PM	0.5	lbv/BDT	Oregon DEQ AQGP-010	0.01
40 BDT/year	PM_{10}	0.43	lbv/BDT	Oregon DEQ AQGP-010	0.01
	$PM_{2.5}$	0.25	lbv/BDT	Oregon DEQ AQGP-010	0.01
Chip/Bark Bins:					
50,000 BDT/year					
	PM	0.06	lb/BDT	EPA	1.6
	PM_{10}	0.03	lb/BDT	EPA	0.7
	$PM_{2.5}$	0.01	lb/BDT	Engineering estimate	0.3
Debarker					
	PM	0.02	lbs/tons logs	EPA 454-R-R-95-012 (1995)	1.1
	PM_{10}	0.011	lbs/tons logs	EPA 454-R-R-95-012 (1995)	0.6
114,000 Tons	$PM_{2.5}$	0.00165	lbs/tons logs	Engineering factor 15% of PM_{10}	0.1

70 million board feet logs =5,833,333 ft3
5,833,333 x 39 lb/ft3 = 227,500,000 lbs
227,500,000/2000 = 113,750 tons

Total Emissions:	Tons/Yr
PM	32.0
PM_{10}	26.1
$PM_{2.5}$	21.2
VOC	64.0
NOx	17.8
CO	38.7
SO_2	0.1

HAP Emissions	Tons/Yr
Methanol	2.9
Formaldehyde	2.9
Acetaldehyde	3.5
Acrolein	0.4
Total HAP	9.7

Facility: Murphy Company - Elma

PLANT SITE EMISSION DETAIL SHEET
POTENTIAL TO EMIT

Emission Source Operating Parameters - 100% Heart 8760 Hrs		Pollutant	Emission Factor		Reference	Emissions tons/year
COE M62 Jet Veneer Dryer Annual Hours of Operation 8760						
Heart Production (Max Avg. 11,800 ft^2/Hr)						
		$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	25.8
	103,368 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	33.1
Douglas fir		NOx	0.12	Msf 3/8"	AP-42	6.2
100% Heart Production 8760 Hrs/Yr		VOC (Heated Section)	1.05	Msf 3/8"	2020 Source Test	54.3
		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	2.3
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.1
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	2.2
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	3.5
		Acetaldehyde	0.062	Msf 3/8"	AP-42 (H&C)	3.2
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.5
Douglas fir						
Sap Production (Max Avg 8,150 ft^2/Hr)		$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	0.0
	0 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	0.0
		NOx	0.12	Msf 3/8"	AP-42	0.0
		VOC (Heated Section)	1.31	Msf 3/8"	2020 Source Test	0.0
Total Production 100% Heart - 103,368 Msf 3/8"		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	0.0
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.0
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	0.0
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	0.0
		Acetaldehyde	0.0654	Msf 3/8"	AP-42 (H&C)	0.0
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.0
Cleaver-Brooks Natural Gas Boiler		$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMcf	AP-42	1.0
	250 $MMft^3$/yr	SO_2	0.6	lb/MMcf	AP-42	0.1
		NO_x	100	lb/MMcf	AP-42	12.5
		CO	84	lb/MMcf	AP-42	10.5
		VOC	5.5	lb/MMcf	AP-42	0.7
Log Conditioning		Alpha-pinene	0.056	Msf 3/8"	AP-42 Table 10.5-7	7.98
		Beta-pinene	0.0064	Msf 3/8"	AP-42 Table 10.5-7	0.91
	285,000 MSF 3/8"	Methanol	0.0073	Msf 3/8"	AP-42 Table 10.5-7	1.04
		Acetaldehyde	0.0047	Msf 3/8"	AP-42 Table 10.5-7	0.67
					Total VOC (VOC+M+A)	10.60
Fish Tail Cyclone		PM	0.5	lbv/BDT	Oregon DEQ AQGP-010	0.01
	40 BDT/year	PM_{10}	0.43	lbv/BDT	Oregon DEQ AQGP-010	0.01
		$PM_{2.5}$	0.25	lbv/BDT	Oregon DEQ AQGP-010	0.01
Chip/Bark Bins						
	50,000 BDT/year	PM	0.06	lb/BDT	EPA	1.6
		PM_{10}	0.03	lb/BDT	EPA	0.7
		$PM_{2.5}$	0.01	lb/BDT	Engineering estimate	0.3
Debarker		PM	0.02	lbs/tons logs	EPA 454-R-R-95-012 (1995)	1.1
		PM_{10}	0.011	lbs/tons logs	EPA 454-R-R-95-012 (1995)	0.6
	114,000 Tons	$PM_{2.5}$	0.00165	lbs/tons logs	Engineering factor 15% of PM_{10}	0.1

Total Emissions:	Tons/Yr
PM	35.8
PM_{10}	29.9
$PM_{2.5}$	24.6
VOC	68.0
NOx	18.7
CO	43.6
SO_2	0.1

HAP Emissions	Tons/Yr
Methanol	3.2
Formaldehyde	3.5
Acetaldehyde	3.9
Acrolein	0.5
Total HAP	11.0

Facility: Murphy Company - Elma

PLANT SITE EMISSION DETAIL SHEET
POTENTIAL TO EMIT

Emission Source Operating Parameters - 100% Sap 8760 Hrs		Pollutant	Emission Factor		Reference	Emissions tons/year
COE M62 Jet Veneer Dryer Annual Hours of Operation 8760						
Heart Production (Max Avg. 11,800 ft^2/Hr)						
	Msf 3/8"	$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	0.0
		CO	0.64	Msf 3/8"	AP-42	0.0
		NOx	0.12	Msf 3/8"	AP-42	0.0
		VOC (Heated Section)	1.05	Msf 3/8"	2020 Source Test	0.0
		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	0.0
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.0
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	0.0
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	0.0
		Acetaldehyde	0.062	Msf 3/8"	AP-42 (H&C)	0.0
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.0
Sap Production (Max Avg 8,150 ft^2/Hr)						
		$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	17.8
	71,394 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	22.8
		NOx	0.12	Msf 3/8"	AP-42	4.3
Total Production 100% Sap 71,394 Msf 3/8"		VOC (Heated Section)	1.31	Msf 3/8"	2020 Source Test	46.8
		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	1.6
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.1
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	1.5
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	2.4
		Acetaldehyde	0.0654	Msf 3/8"	AP-42 (H&C)	2.3
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.3
Cleaver-Brooks Natural Gas Boiler						
		$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMcf	AP-42	1.0
	250 $MMft^3$/yr	SO_2	0.6	lb/MMcf	AP-42	0.1
		NO_x	100	lb/MMcf	AP-42	12.5
		CO	84	lb/MMcf	AP-42	10.5
		VOC	5.5	lb/MMcf	AP-42	0.7
Log Conditioning						
		Alpha-pinene	0.056	Msf 3/8"	AP-42 Table 10.5-7	7.98
		Beta-pinene	0.0064	Msf 3/8"	AP-42 Table 10.5-7	0.91
	285,000 MSF 3/8"	Methanol	0.0073	Msf 3/8"	AP-42 Table 10.5-7	1.04
		Acetaldehyde	0.0047	Msf 3/8"	AP-42 Table 10.5-7	0.67
					Total VOC (VOC+M+A)	10.60
Fish Tail Cyclone						
		PM	0.5	lbv/BDT	Oregon DEQ AQGP-010	0.01
	40 BDT/year	PM_{10}	0.43	lbv/BDT	Oregon DEQ AQGP-010	0.01
		$PM_{2.5}$	0.25	lbv/BDT	Oregon DEQ AQGP-010	0.01
Chip/Bark Bins						
	50,000 BDT/year					
		PM	0.06	lb/BDT	EPA	1.6
		PM_{10}	0.03	lb/BDT	EPA	0.7
		$PM_{2.5}$	0.01	lb/BDT	Engineering estimate	0.3
Debarker						
		PM	0.02	lbs/tons logs	EPA 454-R-R-95-012 (1995)	1.1
		PM_{10}	0.011	lbs/tons logs	EPA 454-R-R-95-012 (1995)	0.6
	114,000 Tons	$PM_{2.5}$	0.00165	lbs/tons logs	Engineering factor 15% of PM_{10}	0.1

Total Emissions:	Tons/Yr
PM	27.8
PM_{10}	21.9
$PM_{2.5}$	17.4
VOC	59.7
NOx	16.8
CO	33.3
SO_2	0.1

HAP Emissions	Tons/Yr
Methanol	2.5
Formaldehyde	2.4
Acetaldehyde	3.0
Acrolein	0.3
Total HAP	8.2

Facility: Murphy Company - Elma

PLANT SITE EMISSION DETAIL SHEET
POTENTIAL TO EMIT

Emission Source Operating Parameters		Pollutant	Emission Factor		Reference	Emissions tons/year
COE M62 Jet Veneer Dryer Annual Hours of Operation 7369 (Doesn't Include 800 Hrs Redry) 416 Hrs Maintenance & 175 Hrs downtime Heart Production (Max Avg. 11,800 ft^2/Hr)						
	44,103 Msf 3/8"	$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	11.0
Douglas fir		CO	0.64	Msf 3/8"	AP-42	14.1
Heart Production 3835 Hrs/Yr		NOx	0.12	Msf 3/8"	AP-42	2.6
Heart Production 61%		VOC (Heated Section)	1.05	Msf 3/8"	2020 Source Test	23.2
		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	1.0
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.1
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	0.9
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	1.5
		Acetaldehyde	0.062	Msf 3/8"	AP-42 (H&C)	1.4
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.2
Sap Production (Max Avg 8,150 ft^2/Hr)						
		$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	7.2
	28,802 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	9.2
		NOx	0.12	Msf 3/8"	AP-42	1.7
		VOC (Heated Section)	1.31	Msf 3/8"	2020 Source Test	18.9
		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	0.6
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.0
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	0.6
Total Production Actual Design Operation		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	1.0
Heart + Sap = 72,905.1 Msf 3/8"		Acetaldehyde	0.0654	Msf 3/8"	AP-42 (H&C)	0.9
Redry = 8,400 Msf 3/8"		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.1
Cleaver-Brooks Natural Gas Boiler						
		$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMcf	AP-42	1.0
	250 $MMft^3$/yr	SO_2	0.6	lb/MMcf	AP-42	0.1
		NO_x	100	lb/MMcf	AP-42	12.5
		CO	84	lb/MMcf	AP-42	10.5
		VOC	5.5	lb/MMcf	AP-42	0.7
Log Conditioning		Alpha-pinene	0.056	Msf 3/8"	AP-42 Table 10.5-7	7.98
		Beta-pinene	0.0064	Msf 3/8"	AP-42 Table 10.5-7	0.91
	285,000 MSF 3/8"	Methanol	0.0073	Msf 3/8"	AP-42 Table 10.5-7	1.04
		Acetaldehyde	0.0047	Msf 3/8"	AP-42 Table 10.5-7	0.67
					Total VOC (VOC+M+A)	0.00
						10.60
Fish Tail Cyclone						
		PM	0.5	lbv/BDT	Oregon DEQ AQGP-010	0.01
	40 BDT/year	PM_{10}	0.43	lbv/BDT	Oregon DEQ AQGP-010	0.01
		$PM_{2.5}$	0.25	lbv/BDT	Oregon DEQ AQGP-010	0.01
Chip/Bark Bins						
	50,000 BDT/year					
		PM	0.06	lb/BDT	EPA	1.6
		PM_{10}	0.03	lb/BDT	EPA	0.7
		$PM_{2.5}$	0.01	lb/BDT	Engineering estimate	0.3
Debarker		PM	0.02	lbs/tons logs	EPA 454-R-R-95-012 (1995)	1.1
		PM_{10}	0.011	lbs/tons logs	EPA 454-R-R-95-012 (1995)	0.6
	114,000 Tons	$PM_{2.5}$	0.00165	lbs/tons logs	Engineering factor 15% of PM_{10}	0.1
COE M62 Jet Veneer Dryer Redry Production (Avg. 10,500 ft^2/Hr) 800 Hours Annual		$PM/PM_{10}/PM_{2.5}$	0.124	Msf 3/8"	Engineering estimate	0.5
	8,400 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	2.7
		NOx	0.12	Msf 3/8"	AP-42	0.5
		VOC (Heated Section)	0.03	Msf 3/8"	Engineering estimate	0.1
		VOC (Cooling Section)	0.011	Msf 3/8"	Engineering estimate	0.0
		VOC (Fugitives)	0.0007	Msf 3/8"	Engineering estimate	0.0
		Methanol	0.0104	Msf 3/8"	Engineering estimate	0.0
		Formaldehyde	0.0167	Msf 3/8"	Engineering estimate	0.1
		Acetaldehyde	0.0155	Msf 3/8"	Engineering estimate	0.1
		Acrolein	0.0023	Msf 3/8"	Engineering estimate	0.0

Total Emissions:	Tons/Yr
PM	28.7
PM_{10}	25.0
$PM_{2.5}$	18.3
VOC	55.2
NOx	17.4
CO	36.5
SO_2	0.1

HAP Emissions	Tons/Yr
Methanol	2.6
Formaldehyde	2.5
Acetaldehyde	3.0
Acrolein	0.3
Total HAP	8.5

Facility: Murphy Company - Elma

PLANT SITE EMISSION DETAIL SHEET
POTENTIAL TO EMIT

Emission Source Operating Parameters		Pollutant	Emission Factor		Reference	Emissions tons/year
COE M62 Jet Veneer Dryer						
Annual Hours of Operation 7369 (Doesn't Include 800 Hrs Redry)						
416 Hrs Maintenance & 175 Hrs downtime						
Heart Production (Max Avg. 11,800 ft^2/Hr)						
	Msf 3/8"	$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	0.0
		CO	0.64	Msf 3/8"	AP-42	0.0
		NOx	0.12	Msf 3/8"	AP-42	0.0
		VOC (Heated Section)	1.05	Msf 3/8"	2020 Source Test	0.0
		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	0.0
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.0
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	0.0
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	0.0
		Acetaldehyde	0.062	Msf 3/8"	AP-42 (H&C)	0.0
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.0
Pine Production (Max Avg 8,150 ft^2/Hr)						
		$PM/PM_{10}/PM_{2.5}$	0.499	Msf 3/8"	AP-42	15.0
	60,057 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	19.2
		NOx	0.12	Msf 3/8"	AP-42	3.6
100% Pine Production 60,057.35 Msf 3/8"		VOC (Heated Section)	2.5	Msf 3/8"	2020 Source Test	75.1
Redry = 8,400 Msf 3/8"		VOC (Cooling Section)	0.044	Msf 3/8"	EPA R10	1.3
		VOC (Fugitives)	0.0026	Msf 3/8"	EPA R10	0.1
		Methanol	0.0417	Msf 3/8"	AP-42 (H&C)	1.3
		Formaldehyde	0.0669	Msf 3/8"	AP-42 (H&C)	2.0
		Acetaldehyde	0.0654	Msf 3/8"	AP-42 (H&C)	2.0
		Acrolein	0.009	Msf 3/8"	AP-42 (H&C)	0.3
Cleaver-Brooks Natural Gas Boiler						
		$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMcf	AP-42	1.0
	250 $MMft^3$/yr	SO_2	0.6	lb/MMcf	AP-42	0.1
		NO_x	100	lb/MMcf	AP-42	12.5
		CO	84	lb/MMcf	AP-42	10.5
		VOC	5.5	lb/MMcf	AP-42	0.7
Log Conditioning		Alpha-pinene	0.056	Msf 3/8"	AP-42 Table 10.5-7	7.98
		Beta-pinene	0.0064	Msf 3/8"	AP-42 Table 10.5-7	0.91
	285,000 MSF 3/8"	Methanol	0.0073	Msf 3/8"	AP-42 Table 10.5-7	1.04
		Acetaldehyde	0.0047	Msf 3/8"	AP-42 Table 10.5-7	0.67
					Total VOC (VOC+M+A)	10.60
Fish Tail Cyclone						
		PM	0.5	lbv/BDT	Oregon DEQ AQGP-010	0.01
	40 BDT/year	PM_{10}	0.43	lbv/BDT	Oregon DEQ AQGP-010	0.01
		$PM_{2.5}$	0.25	lbv/BDT	Oregon DEQ AQGP-010	0.01
Chip/Bark Bins						
	50,000 BDT/year					
		PM	0.06	lb/BDT	EPA	1.6
		PM_{10}	0.03	lb/BDT	EPA	0.7
		$PM_{2.5}$	0.01	lb/BDT	Engineering estimate	0.3
Debarker		PM	0.02	lbs/tons logs	EPA 454-R-R-95-012 (1995)	1.1
		PM_{10}	0.011	lbs/tons logs	EPA 454-R-R-95-012 (1995)	0.6
	114,000 Tons	$PM_{2.5}$	0.00165	lbs/tons logs	Engineering factor 15% of PM_{10}	0.1
COE M62 Jet Veneer Dryer						
Redry Production (Avg. 10,500 ft^2/Hr)						
800 Hours Annual						
		$PM/PM_{10}/PM_{2.5}$	0.101	Msf 3/8"	Engineering estimate	0.4
	8,400 Msf 3/8"	CO	0.64	Msf 3/8"	AP-42	1.3
		NOx	0.12	Msf 3/8"	AP-42	0.3
		VOC (Heated Section)	0.51	Msf 3/8"	Engineering estimate	2.1
		VOC (Cooling Section)	0.018	Msf 3/8"	Engineering estimate	0.1
		VOC (Fugitives)	0.0060	Msf 3/8"	Engineering estimate	0.0
		Methanol	0.0104	Msf 3/8"	Engineering estimate	0.0
		Formaldehyde	0.0167	Msf 3/8"	Engineering estimate	0.1
		Acetaldehyde	0.0155	Msf 3/8"	Engineering estimate	0.1
		Acrolein	0.0023	Msf 3/8"	Engineering estimate	0.0

Total Emissions:	Tons/Yr
PM	25.4
PM_{10}	19.5
$PM_{2.5}$	15.3
VOC	90.0
NOx	16.4
CO	31.1
SO_2	0.1

HAP Emissions	Tons/Yr
Methanol	2.3
Formaldehyde	2.1
Acetaldehyde	2.7
Acrolein	0.3
Total HAP	7.4

VEHICLE DATA - PAVED ROAD			Enter Schedule and Round Trip Miles				VMT/yr
Enter Vehicle Name	Class	Enter Vehicle Wt. Tons Avg of Loaded + Unloaded	Number of Trips per Day	Enter Number of Days per Week	Enter Number of Weeks per Year	Enter Miles Round Trip (Paved)	VMT/Yr
Log Trucks	Truck	28.8	50	5	51	0.3	3825
Chip Trucks	Truck	34.8	20	5	51	0.3	1530
Bark Trucks	Truck	25.3	14	5	51	0.3	1071
Core Trucks	Truck	43.1	7	5	51	0.3	536
Veneer Trucks	Truck	28.3	16	5	51	0.2	816
Veneer Trucks Maxis	Truck	35.1	35	5	51	0.2	1785
Fork Lifts	Fork Lift	14.3	159	5	51	0.1	4055
950 Loader	Heavy Equipment	20.2	461	5	51	0.1	11756
Shovel log loader	Heavy Equipment	65.3	1.7	5	51	0.01	4
Bobcat	Utility	3.0	27	5	51	0.1	689
Total (W) Mean Vehicle Wt. Tons		29.8				Total VMT/Yr	26065

VEHICLE DATA - UNPAVED ROAD			Enter Schedule and Round Trip Miles				VMT/yr
Enter Vehicle Name	Class	Enter Vehicle Wt. Tons Avg of Loaded + Unloaded	Number of Trips per Day	Enter Number of Days per Week	Enter Number of Weeks per Year	Enter Miles Round Trip (Paved)	VMT/Yr
988 Loader	Heavy Equipment	74.2	59	5	51	0.3	4514
Total (W) Mean Vehicle Wt. Tons		74.2				Total VMT/Yr	4514

Vehicle Emissions - Paved Road

Pollutant	Silt Loading %	Particle Size Multiplier	Constant	Constant	Paving Controls	Emission Factor Uncontrolled	# Days >0.01 inch Precipitation	% Control	Emission Factor Control	Actual Emissions T/Yr
	sL	k	a	b	P	P	P		lb/VMT	
PM	8.4	4.9	0.7	0.45	90%	1.07	182	75%	0.1	1.8
PM_{10}	8.4	1.5	0.9	0.45	90%	0.3	182	75%	0.04	0.5
$PM_{2.5}$	8.4	0.15	0.9	0.45	90%	0.03	182	75%	0.00	0.05

Vehicle Emissions - Unpaved Roads Logyard

Pollutant	Silt Loading %	Particle Size Multiplier	Constant	Constant	Paving Controls	Emission Factor Uncontrolled	# Days >0.01 inch Precipitation	% Control	Emission Factor Control	Actual Emissions T/Yr
	sL	k	a	b	P	P	P		lb/VMT	
PM	8.4	4.9	0.7	0.45	NA	16.17	182	75%	2.0	4.6
PM_{10}	8.4	1.5	0.9	0.45	NA	4.61	182	75%	0.58	1.3
$PM_{2.5}$	8.4	0.15	0.9	0.45	NA	0.05	182	75%	0.01	0.03

Unpaved Road Emissions AP42 13.2.2 (11/2006)

Emission Factor lb/VMT Equation:

E uncontrolled = [k (sL/12) ^a x (W/3) ^b] (1 – P/4N)

E = particulate emission factor (having units matching the units of k)

k = particle size multiplier for particle size range and units of interest (Table 13.2.1-1)

sL = road surface silt loading (grams per square meter) (g/m^2)

W = average weight (tons) of the vehicles traveling the road

where k , sL, W, a nd S are as defined in Equation 1 and Eext = annual or other long-term average emission factor in the same units as k,

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period

N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly

Changes to methodology include using unpaved emission factor equation with a 90% control efficiency for paving.

Additional control efficiency applied for water application, vacuum sweeping and broom sweeping.

Fishtail sawdust weight calc.

Fishtail Dimensions		
Height	28	inches
Width	50	inches
length	102	inches
Cubic area	142800	inches cubed
Fishtail Weight average	3585	lbs
Kerf dimensions		
Height	28	inches
Width	50	inches
Saw kerf	0.5	inches
Cubic area	700	inches cubed
Kerf% of Fishtail	0.004901961	
Avg. kerf weight green	17.57	lbs
Moisture	43.90%	
Bone dry ton	2000	lbs
Avg. kerf weight dry	9.86	lbs

Fishtail Prod.		
Fishtail Prod.	30	units per day
Operating days	255	days
Kerf weight dry	75419.44	lbs per year
Kerf weight dry	**37.7**	**Bone dry tons per year**