Appendix C
Emission Calculations

Table C-1 - Facility-Wide Potential Emissions

Emissions ID	Emissions Source	Fugitive or Point?	PM Filterable	PM_{10} Total[1]	$PM_{2.5}$ Total[1]	NO_x	CO	VOC	SO_2	CO_2e
TD-01	Truck Dumper - White Wood	Fugitive	0.41	0.19	0.03	-	-	-	-	-
TD-02	Truck Dumper - Chips	Fugitive	0.46	0.22	0.03	-	-	-	-	-
TD-03	Truck Dumper - Bark	Fugitive	0.27	0.13	0.02	-	-	-	-	-
SP-01	Storage Pile - White Wood	Fugitive	0.65	0.32	0.16	-	-	-	-	-
SP-02	Storage Pile - Chips	Fugitive	0.65	0.32	0.16	-	-	-	-	-
SP-03	Storage Pile - Bark	Fugitive	0.65	0.32	0.16	-	-	-	-	-
VEH-01	Vehicle Traffic - Trucks	Fugitive	10.70	3.18	0.32	-	-	-	-	-
VEH-02	Vehicle Traffic - Front End Loader	Fugitive	17.69	5.29	0.53	-	-	-	-	-
EP-01	Chips Cleaning Line Cyclone	Point	29.81	7.45	1.27	-	-	-	-	-
EP-02	Wet Hammer Mill Cyclone 1	Point	8.38	2.10	0.36	-	-	-	-	-
EP-03	Wet Hammer Mill Cyclone 2	Point	8.38	2.10	0.36	-	-	-	-	-
EP-04	Drying Line (cyclones, WESP, RTO)	Point	33.88	55.81	55.81	227.76	183.96	28.80	18.05	161244
EP-05	Dry Product Intermediate Storage 1	Point	0.07	0.07	0.07	-	-	-	-	-
EP-06	Dry Product Intermediate Storage 2	Point	0.07	0.07	0.07	-	-	-	-	-
EP-08	Dry Hammer Mill and Pellet Cooler (RCO)	Point	8.19	8.30	8.30	1.82	0.77	37.67	0.01	2319
EP-09	Milled Dry Product Intermediate Storage	Point	0.07	0.07	0.07	-	-	-	-	-
EP-10	Pellet Storage Silo 1	Point	3.85	2.35	0.89	-	-	-	-	-
EP-11	Pellet Storage Silo 2	Point	3.85	2.35	0.89	-	-	-	-	-
EP-12	Pellet Storage Silo 3	Point	3.85	2.35	0.89	-	-	-	-	-
EP-13	Pellet Storage Silo 4	Point	3.85	2.35	0.89	-	-	-	-	-
EP-14	Pellet Storage Silo 5	Point	3.85	2.35	0.89	-	-	-	-	-
EP-15	Product Loadout (truck)	Fugitive	0.02	0.01	0.00	-	-	-	-	-
GEN-01	Emergency Generator	Point	0.01	0.01	0.01	0.17	0.14	0.06	0.05	29
	Point Source Total Emissions:		**108**	**88**	**71**	**230**	**185**	**67**	**18**	**163592**
	Title V Threshold (Point Sourced Only):		--	100	100	100	100	100	100	--
	Title V Threshold Exceeded? (Yes/No):		--	No	No	Yes	Yes	No	No	--
	PSD New Major Source Threshold (Point Sources Only):		--	250	250	250	250	250	250	100000
	PSD New Major Source Threshold Exceeded? (Yes/No):		--	No	No	No	No	No	No	No[2]
	Facility-wide Total Emissions:		140	98	72	230	185	67	18	163592

Notes:

1 PM_{10} and $PM_{2.5}$ Total includes condensable PM

"-" Indicates that pollutant is not emitted from this source

2 CO_2e cannot trigger PSD unless already triggered by another pollutant

Table C-2 - Facility HAP/TAP Emissions

				Dry Hammermills and Pelletizers				Dryer				RTO (Natural gas combustion)				RCO (Natural gas combustion)				Emergency Backup Generator				Totals				WAC TAP Review							
CAS	Pollutant Name	HAP?	TAP?	ton/yr	lb/yr	lb/hr	lb/24hr	ton/yr	lb/yr	lb/hr	lb/24hr	ton/yr	lb/yr	lb/hr	lb/24hr	ton/yr	lb/yr	lb/hr	lb/24hr	ton/yr	lb/yr	lb/hr	lb/24hr	ton/yr	lb/yr	lb/hr	lb/24hr	de minimis level lb/avg per	averaging period	TAP lb/avg per	De Minimis Check?	SQER lb/avg per	SQER Check?	ASIL µg/m^3	Modeling Result µg/m^3
56-49-5	3-Methylcholanthrene	No	Yes	0	0	0	0	0	0	0	0	6.18E-08	0.000124	1.41E-08	3.39E-07	3.48E-08	6.96E-05	7.94E-09	1.91E-07	0	0	0	0	9.66E-08	1.93E-04	2.21E-08	5.29E-07	0.00078	year	0.00019324	de minimis	0.016	< SQER	----	----
106-99-0	1,3-Butadiene	Yes	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000978	1.955	0.01955	0.01955	9.78E-04	1.96E+00	1.96E-02	1.96E-02	0.27	year	1.955	Exceeds	5.4	< SQER	----	----
57-97-6	7,12-Dimethylbenz(a)anthracene	No	Yes	0	0	0	0	0	0	0	0	5.5E-07	0.001099	1.25E-07	3.01E-06	3.09E-07	0.000618	7.06E-08	1.69E-06	0	0	0	0	8.59E-07	1.72E-03	1.96E-07	4.71E-06	0.000069	year	1.72E-03	Exceeds	1.40E-03	Exceeds	8.50E-06	1.42E-08
71-55-6	1,1,1-Trichloroethane	Yes	Yes	0	0	0	0	0.000134	0.268582	3.07E-05	0.000736	0	0	0	0	0	0	0	0	0	0	0	0	1.34E-04	2.69E-01	3.07E-05	7.36E-04	19	24-hr	0.00073584	de minimis	370	< SQER	----	----
95-63-6	1,2,4-Trimethyl benzene	No	Yes	0	0	0	0	0.001007	2.014362	0.00023	0.005519	0	0	0	0	0	0	0	0	0	0	0	0	1.01E-03	2.01E+00	2.30E-04	5.52E-03	0.22	24-hr	0.0055188	de minimis	4.4	< SQER	----	----
75-07-0	Acetaldehyde	Yes	Yes	0	0	0	0	0.145482	290.9634	0.033215	0.79716	0	0	0	0	0	0	0	0	0.019175	38.35	0.3835	0.3835	1.65E-01	3.29E+02	4.17E-01	1.18E+00	3	year	3.29E+02	Exceeds	6.00E+01	Exceeds	3.70E-01	8.58E-03
98-86-2	Acetophenone	Yes	No	0	0	0	0	0.000716	1.432435	0.000164	0.003924	0	0	0	0	0	0	0	0	0	0	0	0	7.16E-04	1.43E+00	1.64E-04	3.92E-03	N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	----
107-02-8	Acrolein	Yes	Yes	0	0	0	0	0.050359	100.7181	0.011498	0.27594	0	0	0	0	0	0	0	0	0.002313	4.625	0.04625	0.04625	5.27E-02	1.05E+02	5.77E-02	3.22E-01	0.0013	24-hr	3.22E-01	Exceeds	2.60E-02	Exceeds	3.50E-01	4.09E-02
56-55-3	Benz(a)anthracene	Yes	Yes	0	0	0	0	0	0	0	0	6.18E-08	0.000124	1.41E-08	3.39E-07	3.48E-08	6.96E-05	7.94E-09	1.91E-07	0.000042	0.084	0.00084	0.00084	4.21E-05	8.42E-02	8.40E-04	8.41E-04	0.045	year	8.42E-02	Exceeds	8.90E-01	< SQER	----	----
71-43-2	Benzene	Yes	Yes	0	0	0	0	0.011079	22.15798	0.002529	0.060707	7.21E-05	0.144282	1.65E-05	0.000395	4.06E-05	0.081159	9.26E-06	0.000222	0.023325	46.65	0.4665	0.4665	3.45E-02	6.90E+01	4.69E-01	5.28E-01	1	year	6.90E+01	Exceeds	2.10E+01	Exceeds	1.30E-01	1.03E-02
50-32-8	Benzo(a)pyrene	Yes	Yes	0	0	0	0	0	0	0	0	4.12E-08	8.24E-05	9.41E-09	2.26E-07	2.32E-08	4.64E-05	5.29E-09	1.27E-07	4.7E-06	0.0094	0.000094	0.000094	4.76E-06	9.53E-03	9.40E-05	9.44E-05	0.0082	year	9.53E-03	Exceeds	1.60E-01	< SQER	----	----
205-99-2	Benzo(b)fluoranthene	Yes	Yes	0	0	0	0	0	0	0	0	6.18E-08	0.000124	1.41E-08	3.39E-07	3.48E-08	6.96E-05	7.94E-09	1.91E-07	2.48E-06	0.004955	4.96E-05	4.96E-05	2.57E-06	5.15E-03	4.96E-05	5.01E-05	0.045	year	0.00514824	de minimis	0.89	< SQER	----	----
207-08-9	Benzo(k)fluoranthene	Yes	Yes	0	0	0	0	0	0	0	0	6.18E-08	0.000124	1.41E-08	3.39E-07	3.48E-08	6.96E-05	7.94E-09	1.91E-07	3.88E-06	0.00775	7.75E-05	7.75E-05	3.97E-06	7.94E-03	7.75E-05	7.80E-05	0.045	year	0.00794324	de minimis	0.89	< SQER	----	----
92-52-4	Biphenyl	Yes	No	0	0	0	0	0.000436	0.87289	9.96E-05	0.002391	0	0	0	0	0	0	0	0	0	0	0	0	4.36E-04	8.73E-01	9.96E-05	2.39E-03	N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	----
117-81-7	Bis-(2-ethylhexyl phthalate)	Yes	Yes	0	0	0	0	0.003581	7.162176	0.000818	0.019622	0	0	0	0	0	0	0	0	0	0	0	0	3.58E-03	7.16E+00	8.18E-04	1.96E-02	3.4	year	7.16E+00	Exceeds	6.80E+01	< SQER	----	----
74-83-9	Bromomethane	Yes	Yes	0	0	0	0	0.000313	0.62669	7.15E-05	0.001717	0	0	0	0	0	0	0	0	0	0	0	0	3.13E-04	6.27E-01	7.15E-05	1.72E-03	0.019	24-hr	0.00171696	de minimis	0.37	< SQER	----	----
75-15-0	Carbon disulfide	Yes	Yes	0	0	0	0	0.000201	0.402872	4.6E-05	0.001104	0	0	0	0	0	0	0	0	0	0	0	0	2.01E-04	4.03E-01	4.60E-05	1.10E-03	3	24-hr	0.00110376	de minimis	59	< SQER	----	----
56-23-5	Carbon tetrachloride	Yes	Yes	0	0	0	0	0.000134	0.268582	3.07E-05	0.000736	0	0	0	0	0	0	0	0	0	0	0	0	1.34E-04	2.69E-01	3.07E-05	7.36E-04	1.4	year	0.2685816	de minimis	27	< SQER	----	----
74-87-3	Chloromethane	Yes	Yes	0	0	0	0	0.001231	2.461998	0.000281	0.006745	0	0	0	0	0	0	0	0	0	0	0	0	1.23E-03	2.46E+00	2.81E-04	6.75E-03	0.33	24-hr	0.0067452	de minimis	6.7	< SQER	----	----
218-01-9	Chrysene	No	Yes	0	0	0	0	0	0	0	0	6.18E-08	0.000124	1.41E-08	3.39E-07	3.48E-08	6.96E-05	7.94E-09	1.91E-07	8.83E-06	0.01765	0.000177	0.000177	8.92E-06	1.78E-02	1.77E-04	1.77E-04	0.45	year	0.01784324	de minimis	8.9	< SQER	----	----
98-82-8	Cumene	Yes	Yes	0	0	0	0	0.000772	1.544344	0.000176	0.004231	0	0	0	0	0	0	0	0	0	0	0	0	7.72E-04	1.54E+00	1.76E-04	4.23E-03	1.5	24-hr	0.00423108	de minimis	30	< SQER	----	----
84-74-2	Di-N-butyl phthalate	Yes	No	0	0	0	0	0.000257	0.514781	5.88E-05	0.00141	0	0	0	0	0	0	0	0	0	0	0	0	2.57E-04	5.15E-01	5.88E-05	1.41E-03	N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	----
53-70-3	Dibenzo(a,h)anthracene	Yes	Yes	0	0	0	0	0	0	0	0	4.12E-08	8.24E-05	9.41E-09	2.26E-07	2.32E-08	4.64E-05	5.29E-09	1.27E-07	1.46E-05	0.02915	0.000292	0.000292	1.46E-05	2.93E-02	2.92E-04	2.92E-04	0.0041	year	2.93E-02	Exceeds	8.20E-02	< SQER	----	----
100-41-4	Ethyl benzene	Yes	Yes	0	0	0	0	4.25E-05	0.085051	9.71E-06	0.000233	0	0	0	0	0	0	0	0	0	0	0	0	4.25E-05	8.51E-02	9.71E-06	2.33E-04	3.2	year	0.08505084	de minimis	65	< SQER	----	----
50-00-0	Formaldehyde	Yes	Yes	0	0	0	0	0.279773	559.545	0.063875	1.533	0.002576	5.152941	0.000588	0.014118	0.001449	2.898529	0.000331	0.007941	0.0295	59	0.59	0.59	3.13E-01	6.27E+02	6.55E-01	2.15E+00	1.4	year	6.27E+02	Exceeds	2.70E+01	Exceeds	1.70E-01	1.33E-02
110-54-3	Hexane	Yes	Yes	0	0	0	0	0.000291	0.581927	6.64E-05	0.001594	0.061835	123.6706	0.014118	0.338824	0.034782	69.56471	0.007941	0.190588	0	0	0	0	9.69E-02	1.94E+02	2.21E-02	5.31E-01	2.6	24-hr	0.53100608	de minimis	52	< SQER	----	----
123-31-9	Hydroquinone	Yes	No	0	0	0	0	0.000671	1.342908	0.000153	0.003679	0	0	0	0	0	0	0	0	0	0	0	0	6.71E-04	1.34E+00	1.53E-04	3.68E-03	N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	----
193-39-5	Indeno(1,2,3,c,d)pyrene	Yes	Yes	0	0	0	0	0	0	0	0	6.18E-08	0.000124	1.41E-08	3.39E-07	3.48E-08	6.96E-05	7.94E-09	1.91E-07	9.38E-06	0.01875	0.000188	0.000188	9.47E-06	1.89E-02	1.88E-04	1.88E-04	0.045	year	0.01894324	de minimis	0.89	< SQER	----	----
1330-20-7	m,p-Xylene	Yes	Yes	0	0	0	0	0.006155	12.30999	0.001405	0.033726	0	0	0	0	0	0	0	0	0.007125	14.25	0.1425	0.1425	1.33E-02	2.66E+01	1.44E-01	1.76E-01	0.82	24-hr	1.76E-01	de minimis	1.60E+01	< SQER	----	----
67-56-1	Methanol	Yes	Yes	0.080446	160.892	0.018367	0.4408	0.156673	313.3452	0.03577	0.85848	0	0	0	0	0	0	0	0	0	0	0	0	2.37E-01	4.74E+02	5.41E-02	1.30E+00	74	24-hr	1.29928	de minimis	1500	< SQER	----	----
78-93-3	Methyl ethyl ketone	No	Yes	0	0	0	0	0.054835	109.6708	0.01252	0.300468	0	0	0	0	0	0	0	0	0	0	0	0	5.48E-02	1.10E+02	1.25E-02	3.00E-01	19	24-hr	0.300468	de minimis	370	< SQER	----	----
108-10-1	Methyl isobutyl ketone	Yes	Yes	0	0	0	0	0.026858	53.71632	0.006132	0.147168	0	0	0	0	0	0	0	0	0	0	0	0	2.69E-02	5.37E+01	6.13E-03	1.47E-01	11	24-hr	0.147168	de minimis	220	< SQER	----	----
75-09-2	Methylene chloride	Yes	Yes	0	0	0	0	0.00705	14.10053	0.00161	0.038632	0	0	0	0	0	0	0	0	0	0	0	0	7.05E-03	1.41E+01	1.61E-03	3.86E-02	490	year	14.100534	de minimis	9800	< SQER	----	----
110-54-3	n-Hexane	Yes	Yes	0	0	0	0	0.000291	0.581927	6.64E-05	0.001594	0.061835	123.6706	0.014118	0.338824	0.034782	69.56471	0.007941	0.190588	0	0	0	0	9.69E-02	1.94E+02	2.21E-02	5.31E-01	2.6	24-hr	0.53100608	de minimis	52	< SQER	----	----
91-20-3	Naphthalene	Yes	Yes	0	0	0	0	0	0	0	0	2.1E-05	0.041911	4.78E-06	0.000115	1.18E-05	0.023575	2.69E-06	6.46E-05	0.002313	4.625	0.04625	0.04625	2.35E-03	4.69E+00	4.63E-02	4.64E-02	0.24	year	4.69E+00	Exceeds	4.80E+00	< SQER	----	----
95-47-6	o-Xylene	Yes	Yes	0	0	0	0	0.000157	0.313345	3.58E-05	0.000858	0	0	0	0	0	0	0	0	0	0	0	0	1.57E-04	3.13E-01	3.58E-05	8.58E-04	0.82	24-hr	0.00085848	de minimis	16	< SQER	----	----
108-95-2	Phenol	Yes	Yes	0.04959	99.18	0.011322	0.271726	0.07386	147.7199	0.016863	0.404712	0	0	0	0	0	0	0	0	0	0	0	0	1.23E-01	2.47E+02	2.82E-02	6.76E-01	0.74	24-hr	0.67643803	de minimis	15	< SQER	----	----
115-07-1	Propylene	No	Yes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0645	129	1.29	1.29	6.45E-02	1.29E+02	1.29E+00	1.29E+00	11	24-hr	1.29	de minimis	220	< SQER	----	----
123-38-6	Propionaldehyde	Yes	Yes	0	0	0	0	0.035811	71.62176	0.008176	0.196224	0	0	0	0	0	0	0	0	0	0	0	0	3.58E-02	7.16E+01	8.18E-03	1.96E-01	0.03	24-hr	1.96E-01	Exceeds	5.90E-01	< SQER	----	----
100-42-5	Styrene	Yes	Yes	0	0	0	0	0.001343	2.685816	0.000307	0.007358	0	0	0	0	0	0	0	0	0	0	0	0	1.34E-03	2.69E+00	3.07E-04	7.36E-03	3.2	24-hr	0.0073584	de minimis	65	< SQER	----	----
108-88-3	Toluene	Yes	Yes	0	0	0	0	0.023501	47.00178	0.005366	0.128772	0.000117	0.2336	2.67E-05	0.00064	6.57E-05	0.1314	0.000015	0.00036	0.010225	20.45	0.2045	0.2045	3.39E-02	6.78E+01	2.10E-01	3.34E-01	19	24-hr	0.334272	de minimis	370	< SQER	----	----
7440-36-0	Antimony	Yes	No	0	0	0	0	0.000285	0.570276	6.51E-05	0.001562	0	0	0	0	0	0	0	0	0	0	0	0	2.85E-04	5.70E-01	6.51E-05	1.56E-03	N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	----
7440-38-2	Arsenic	Yes	Yes	0	0	0	0	0.000794	1.588109	0.000181	0.004351	6.87E-06	0.013741	1.57E-06	3.76E-05	3.86E-06	0.007729	8.82E-07	2.12E-05	0	0	0	0	8.05E-04	1.61E+00	1.84E-04	4.41E-03	2.50E-03	year	1.61E+00	Exceeds	4.90E-02	Exceeds	3.00E-04	6.21E-06
7440-41-7	Beryllium	Yes	Yes	0	0	0	0	3.97E-05	0.079405	9.06E-06	0.000218	4.12E-07	0.000824	9.41E-08	2.26E-06	2.32E-07	0.000464	5.29E-08	1.27E-06	0	0	0	0	4.03E-05	8.07E-02	9.21E-06	2.21E-04	3.40E-03	year	8.07E-02	Exceeds	6.80E-02	Exceeds	4.20E-04	3.12E-07
7440-43-9	Cadmium	Yes	Yes	0	0	0	0	0.000148	0.295966	3.38E-05	0.000811	3.78E-05	0.075576	8.63E-06	0.000207	2.13E-05	0.042512	4.85E-06	0.000116	0	0	0	0	2.07E-04	4.14E-01	4.73E-05	1.13E-03	1.90E-03	year	4.14E-01	Exceeds	3.90E-02	Exceeds	2.40E-04	1.89E-06
CRVICOMP	Chromium, hexavalent	Yes	Yes	0	0	0	0	0.000126	0.252654	2.88E-05	0.000692	0	0	0	0	0	0	0	0	0	0	0	0	1.26E-04	2.53E-01	2.88E-05	6.92E-04	3.30E-05	year	2.53E-01	Exceeds	6.50E-04	Exceeds	4.00E-06	9.68E-07
7440-47-3	Chromium, total	Yes	Yes	0	0	0	0	0.000758	1.515922	0.000173	0.004153	4.81E-05	0.096188	1.1E-05	0.000264	2.71E-05	0.054106	6.18E-06	0.000148	0	0	0	0	8.33E-04	1.67E+00	1.90E-04	4.56E-03	3.70E-04	24-hr	4.56E-03	Exceeds	7.40E-03	< SQER	----	----
7440-48-4	Cobalt	Yes	Yes	0	0	0	0	0.000235	0.469214	5.36E-05	0.001286	2.89E-06	0.005771	6.59E-07	1.58E-05	1.62E-06	0.003246	3.71E-07	8.89E-06	0	0	0	0	2.39E-04	4.78E-01	5.46E-05	1.31E-03	0.00037	24-hr	1.31E-03	Exceeds	7.40E-03	< SQER	----	----
7439-92-1	Lead	Yes	Yes	0	0	0	0	0.001732	3.464965	0.000396	0.009493	1.72E-05	0.034353	3.92E-06	9.41E-05	9.66E-06	0.019324	2.21E-06	5.29E-05	0	0	0	0	1.76E-03	3.52E+00	4.02E-04	9.64E-03	1.00E+01	year	3.51864191	de minimis	1.40E+01	< SQER	----	----
7439-96-5	Manganese	Yes	Yes	0	0	0	0	0.057749	115.4988	0.013185	0.316435	1.31E-05	0.026108	2.98E-06	7.15E-05	7.34E-06	0.014686	1.68E-06	4.02E-05	0	0	0	0	5.78E-02	1.16E+02	1.32E-02	3.17E-01	1.10E-03	24-hr	3.17E-01	Exceeds	2.20E-02	Exceeds	3.00E-01	1.14E-02
7439-97-6	Mercury	Yes	Yes	0	0	0	0	0.002527	5.053075	0.000577	0.013844	8.93E-06	0.017864	2.04E-06	4.89E-05	5.02E-06	0.010048	1.15E-06	2.75E-05	0	0	0	0	2.54E-03	5.08E+00	5.80E-04	1.39E-02	0.00011	24-hr	1.39E-02	Exceeds	2.20E-03	Exceeds	3.00E-02	5.03E-04
7440-02-0	Nickel	Yes	Yes	0	0	0	0	0.001191	2.382164	0.000272	0.006526	7.21E-05	0.144282	1.65E-05	0.000395	4.06E-05	0.081159	9.26E-06	0.000222	0	0	0	0	1.30E-03	2.61E+00	2.98E-04	7.14E-03	3.10E-02	year	2.61E+00	Exceeds	6.20E-01	Exceeds	3.80E-03	1.05E-05
7723-14-0	Phosphorus	Yes	Yes	0	0	0	0	0.000975	1.949043	0.000222	0.00534	0	0	0	0	0	0	0	0	0	0	0	0	9.75E-04	1.95E+00	2.22E-04	5.34E-03	0.074	24-hr	0.00533984	de minimis	1.5	< SQER	----	----
7782-49-2	Selenium	Yes	Yes	0	0	0	0	0.000101	0.202123	2.31E-05	0.000554	8.24E-07	0.001649	1.88E-07	4.52E-06	4.64E-07	0.000928	1.06E-07	2.54E-06	0	0	0	0	1.02E-04	2.05E-01	2.34E-05	5.61E-04	7.40E-02	24-hr	0.00056082	de minimis	1.5	< SQER	----	----
7440-62-2	Vanadium	No	Yes	0	0	0	0	3.54E-05	0.070743	8.08E-06	0.000194	7.9E-05	0.158024	1.8E-05	0.000433	4.44E-05	0.088888	1.01E-05	0.000244	0	0	0	0	1.59E-04	3.18E-01	3.63E-05	8.70E-04	0.00037	24-hr	8.70E-04	Exceeds	7.40E-03	< SQER	----	----

Note:
"#N/A" indicates that the pollutant is not a TAP and therefore there are no related TAP review elements.
If column "SQER Check?" says "Exceeds", then modeling was performed to check predicted concentration against the ASIL.

Summary

Total Facility HAP Emissions (TPY):	1.32
Maximum individual HAP (TPY):	0.31 Formaldehyde

Table C-3 - Raw Material Received - Handling

Emission Point ID	Point or Fugitive	Emission Source	Throughput [1] (short tons/year)	Annual Hours of Operation (hours/year)	Pollutant	Emission factor [2] (lb/BDton)	Number of "Drops" [3]	Potential Emissions (lb/hr)	Potential Emissions (ton/year)
TD1	Fugitive	Truck Dumper - White Wood [4]	367333	8760	Filterable PM	0.00075	3	0.09	0.41
					Filterable PM_{10}	0.00035		0.04	0.19
					Filterable $PM_{2.5}$	0.00005		0.01	0.03
TD2	Fugitive	Truck Dumper - Chips	411413	8760	Filterable PM	0.00075	3	0.11	0.46
					Filterable PM_{10}	0.00035		0.05	0.22
					Filterable $PM_{2.5}$	0.00005		0.01	0.03
TD3	Fugitive	Truck Dumper - Bark (Hog Fuel)	242440	8760	Filterable PM	0.00075	3	0.06	0.27
					Filterable PM_{10}	0.00035		0.03	0.13
					Filterable $PM_{2.5}$	0.00005		0.00	0.02

1. Wet material based on mass balance flowchart provided by client.
2. PM emission factors from USEPA Memo "Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country," May 8, 2014. While the emission factors are in units of pounds per bone dry ton of material, the calculation conservatively uses the heavier estimate of "wet" material throughput to represent material flow through this process.
3. Emissions are generated from each "drop" of material from one surface to another. This includes each mechanical conveyance drop between point of generation and storage bin. In this instance, there is (1) drop from truck dumper to ground, (2) front end loader drop to storage pile, and (3) front end loader drop to walking floor bin.
4. As an alternating stockpiling scenario for white wood, PNWRE is considering using a radial stacker rather than using a front end loader for moving and stacking the white wood. Using a radial stacker would represent the same number of drop points as the front end loader method (truck unload to conveyor pickup, drop from conveyor to storage pile, conveyor drop to walking floor bin) while eliminating any associated front end loader traffic emissions for that material.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
AIR, WASTE, AND TOXICS

MAY 08 2014

MEMORANDUM

SUBJECT: Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country

FROM: Dan Meyer, Environmental Engineer
Air Permits & Diesel Unit

THRU: Donald A. Dossett, P.E., Manager
Air Permits & Diesel Unit

TO: Permit File

EPA Region 10 has compiled the attached list of particulate matter (PM – CAA § 111 pollutant, PM_{10} and $PM_{2.5}$ – criteria pollutants) emission factors ("EFs") for use in determining the potential emissions, more commonly referred to as potential to emit ("PTE"), for activities at sawmills, excluding boilers, located in Pacific Northwest Indian Country.[1] The EFs are presented in units appropriate for the particular activity. PTE generally represents the maximum capacity of a source to emit a pollutant under its physical and operational design taking into consideration restrictions that are federally enforceable. While PM, PM_{10} and $PM_{2.5}$ PTE are all used to determine applicability of the Compliance Assurance Monitoring program and Prevention of Significant Deterioration construction permit program, only PM_{10} and $PM_{2.5}$ are employed to determine applicability of the Title V operating permit program.[2]

The Federal Air Rules for Reservations ("FARR") limit particulate matter emissions from applicable activities at sawmills. The rules and the rationale for not employing them to determine PTE are as follows: (a) 20 percent opacity limit (40 CFR § 49.124) – lack of a correlation between opacity and particulate matter emissions, (b) requirements for limiting fugitive emissions (40 CFR § 49.126) – lack of a correlation between compliance with requirements and particulate matter emissions, (c) non-combustion stack 0.1 grain per dry standard cubic foot PM emission limit (40 CFR § 49.125) – resultant PTE would be unrealistically high as we assume that an unreasonable amount of wood residue is exhausted to atmosphere rather than recovered for sale or combustion in on-site boiler.

There are no other federal regulations beyond the FARR that limit particulate matter emissions from activities addressed by this memorandum. Under the circumstances, it is appropriate to employ the EFs presented in the attachment to estimate PTE, unless a more representative (e.g. site-specific) EF is available.

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[1] Activities include log bucking and debarking, sawing, lumber drying, mechanical and pneumatic conveyance of wood residue, wind erosion of wood residue piles and traffic along paved and unpaved roads.
[2] October 16, 1995 EPA memorandum entitled, "Definition of Regulated Pollutant for Particulate Matter for Purposes of Title V"

EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country, May 2014

EF Reference No.	Emissions Generating Activity[1]	PM[2] EF	PM_{10} % of PM	PM_{10} EF	$PM_{2.5}$ % of PM	$PM_{2.5}$ EF	Units
1, 2, 3, 4	Log Bucking[3]	0.035	50	0.0175	25	0.00875	lb/ton log
1, 2, 3, 5	Log Debarking[3]	0.024	50	0.012	25	0.006	lb/ton log
1, 2, 3, 6	Sawing[3]	0.350	50	0.175	25	0.0875	lb/ton log
1, 3, 7	Lumber Drying - Resinous Softwood Species[4]	0.02	100	0.02	100	0.02	lb/mbf
1, 3, 7	Lumber Drying - Non-Resinous Softwood Species[5]	0.05	100	0.05	100	0.05	lb/mbf
1, 2, 3, 8	"Drop" of "wet" material[5] from one surface to another including, but not limited to, (a) each mechanical conveyance drop between point of generation and storage bin (but not including bin unless open to atmosphere) (b) loadout from storage bin into a truck bed or railcar and (c) drop onto a pile. Apply EF to each "drop."	0.00075	N/A	0.00035	N/A	0.00005	lb/bdt material
1, 2, 3, 8	"Drop" of "dry" material[5] from one surface to another including, but not limited to, (a) each mechanical conveyance drop between point of generation and storage bin (but not including bin unless open to atmosphere) (b) loadout from storage bin into a truck bed or railcar and (c) drop onto a pile. Apply EF to each "drop."	0.0015	N/A	0.0007	N/A	0.0001	lb/bdt material
1, 3, 9	Pneumatically convey material[6] through medium efficiency cyclone to bin	0.5	85	0.425	50	0.25	lb/bdt material
1, 3, 9	Pneumatically convey material[6] through high efficiency cyclone to bin	0.2	95	0.19	80	0.16	lb/bdt material
1, 3, 9	Pneumatically convey material[6] through cyclone to bin. Exhaust routed through baghouse.	0.001	99.5	0.000995	99	0.00099	lb/bdt material
1, 3, 9	Pneumatically convey material[6] into target box	0.1	85	0.085	50	0.05	lb/bdt material
1, 2, 10	Wind Erosion of Pile	0.38	50	0.19	25	0.095	ton/acre-yr
1, 2, 11	Paved Roads	Emission factors based upon site-specific parameters.					lb/VMT
1, 2, 12	Unpaved Roads	Emission factors based upon site-specific parameters.					lb/VMT

Acronyms

bdt: bone dry ton

mbf: 1000 board foot lumber

VMT: vehicle mile traveled

[1] If any activity occurs within a building, reduce the PM, PM_{10} and $PM_{2.5}$ emission factor ("EF") by 100 percent (engineering judgement) as emissions struggle to escape through doorways and other openings. If an activity's by-products are evacuated pneumatically to a target box, cyclone or bag filter system, then only the associated downstream conveyance emissions are counted.

[2] PM refers to the CAA § 111 pollutant generally measured using EPA Reference Method 5 to determine the filterable fraction of particulate matter. "Particulate matter" is a term used to define an air pollutant that consists of a mixture of solid particles and liquid droplets found in the ambient air. PM does not include a condensable fraction.

[3] EF for log bucking, debarking and sawing are expressed in units of "lb/ton log" in the table above. The EF can be expressed in units of "lb/mbf" lumber as follows:

$$\text{lb/mbf} = (\text{lb PM/ton log}) \times (\text{ton/2000 lb}) \times (\text{LD lb/ft}^3) \times (\text{LRF bf lumber/ft}^3 \text{ log}) \times (1000 \text{ bf/mbf})$$

where "LD" stands for log density and "LRF" stands for log recovery factor

• LD values are species-specific and are provided by The Engineering ToolBox and are listed at http://www.engineeringtoolbox.com/weigt-wood-d_821.html

• LRF value of 6.33 bf/ft^3 log is specific to softwood species of the Pacific Coast East. See Section 2 of Appendix D to Forest Products Measurements and Conversion Factors with Special Emphasis on the U.S. Pacific Northwest. College of Forest Resources, University of Washington. 1994. See http://www.ruraltech.org/projects/conversions/briggs_conversions/briggs_append2/appendix02_combined.pdf

[4] Douglas Fir, Engelmann Spruce, Larch, Lodgepole Pine, Ponderosa Pine and Western White Pine

[5] White Fir, Western Hemlock and Western Red Cedar

[6] The "material" in this entry refers to bark, hogged fuel, green chips, dry chips, green sawdust, dry sawdust, shavings and any other woody by-product of lumber production.

<table>
<tr><th>No.</th><th>EF Reference</th></tr>
<tr><td>1</td><td>Although this activity may be subject to the FARR visible emissions limit of 20% opacity (40 CFR § 124(d)), the limit was not further considered in deriving an emission factor due to the lack of a correlation between opacity and particulate matter emissions.</td></tr>
<tr><td>2</td><td>Although this activity may be subject to the FARR requirements for limiting fugitive particulate matter emissions (40 CFR §126), those requirements were not further considered in deriving an emission factor due to lack of a correlation between compliance with requirements and particulate matter emissions.</td></tr>
<tr><td>3</td><td>Although this activity may be subject to the FARR stack PM emission limit of 0.1 gr/dscf (40 CFR § 125(d)(3)), that limit was not further considered in deriving an emission factor because the resultant PTE would be unrealistically high.</td></tr>
<tr><td>4</td><td>For PM, PM_{10}, and $PM_{2.5}$ EF, apply engineering judgement to estimate that log bucking emissions are one-tenth sawing emissions. EPA has stated that log bucking is normally a negligible source of fugitive PM emissions. See page 2-125 of Assessment of Fugitive Particulate Emission Factor for Industrial Processes, EPA-450/3-78-107, September 1978. The document can be downloaded from internet at http://nepis.epa.gov/Simple.html by entering EPA publication number. For sawing emissions details, see Reference No. 3 below.</td></tr>
<tr><td>5</td><td>• For PM EF, see Table 2-47 of Assessment of Fugitive Particulate Emission Factor for Industrial Processes, EPA-450/3-78-107, September 1978. See also Table 2-59 of Technical Guidance for Controls of Industrial Process Fugitive Particulate Emissions, EPA-450/3-77-010, March 1977. Both documents can be downloaded from internet at http://nepis.epa.gov/Simple.html by entering EPA publication number. EPA revoked the PM EF from WebFIRE on January 1, 2002. See detailed search results for SCC 3-07-008-01 (include revoked factors) at http://cfpub.epa.gov/webfire/index.cfm?action=fire.detailedSearch
• For PM_{10} and $PM_{2.5}$ EF, apply engineering judgement to estimate that (a) PM_{10} emissions are one-half PM emissions and (b) $PM_{2.5}$ emissions are one-half PM_{10} emissions.</td></tr>
<tr><td>6</td><td>• Sawing consists of the following cummulative activities: breaking the log into cants and flitches with a smooth edge, breaking cant further down into multiple flitches and/or boards, taking the flitch and trim off all irregular edges to leave four-sided lumber and trimming to square the ends.
• For PM EF, see Table 2-47 of Assessment of Fugitive Particulate Emission Factor for Industrial Processes, EPA-450/3-78-107, September 1978. See also Table 2-59 of Technical Guidance for Controls of Industrial Process Fugitive Particulate Emissions, EPA-450/3-77-010, March 1977. Both documents can be downloaded from internet at http://nepis.epa.gov/Simple.html by entering EPA publication number. EPA revoked the PM EF from WebFIRE on January 1, 2002. See detailed search results for SCC 3-07-008-01 (include revoked factors) at http://cfpub.epa.gov/webfire/index.cfm?action=fire.detailedSearch
• For PM_{10} and $PM_{2.5}$ EF, apply engineering judgement to estimate that (a) PM_{10} emissions are one-half PM emissions and (b) $PM_{2.5}$ emissions are one-half PM_{10} emissions.</td></tr>
<tr><td>7</td><td>• For PM EF, see ODEQ ACDP Application Guidance AQ-EF02 (4/25/00). Douglas fir is a resinous softwood species and western hemlock is a non-resinous softwood species.
• For PM_{10} and $PM_{2.5}$ EF, apply engineering judgement to estimate that all PM emitted is organic aerosols and fully PM_{10} and $PM_{2.5}$ emissions.</td></tr>
<tr><td>8</td><td>• See Section 13.2.4 of EPA's AP-42, November 2006 at http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf. Apply Equation 1 on page 13.2.4-4 to estimate emissions resulting from material drops as follows: E [lb PM/ton] = (k) X (0.0032) X $(U/5)^{1.3}$ / $(M/2)^{1.4}$

Wet Material Drop
<table>
<tr><th>Particulate</th><th>k</th><th>0.0032</th><th>$(U/5)^{1.3}$</th><th>$(M/2)^{1.4}$</th><th>lb PM / ton</th></tr>
<tr><td>PM</td><td>0.74</td><td rowspan="3">0.0032</td><td rowspan="3">6.6693</td><td rowspan="3">21.0552</td><td>0.00075</td></tr>
<tr><td>PM_{10}</td><td>0.35</td><td>0.00035</td></tr>
<tr><td>$PM_{2.5}$</td><td>0.053</td><td>0.00005</td></tr>
</table>
The following conservative assumptions were made in applying Equation 1:
Mean wind speed (U) = 15 miles per hour
$(U/5)^{1.3}$ = 6.66930
Material moisture content (M) = 34 percent. Value based upon observations
$(M/2)^{1.4}$ = 21.05520

Note: • Mean wind speed of 15 mph is a reasonable upper bounder estimate.
• Moisture content of 34 percent for "wet" material is based upon observation that average moisture content (dry basis) of green douglas fir lumber (common to the Pacific Northwest) is 51 percent as recorded prior to lab scale kiln VOC emissions testing conducting by Oregon State University's Mike Milota and organized in Microsoft Excel workbook entitled, "EPA Region 10 HAP and VOC Emission Factors for Lumber Drying, December 2012." 51 percent moisture content (dry basis) is equivalent to 34 percent moisture content (wet basis) as illustrated below:
MCD = MCW / (1-MCW); where
MCD: moisture content dry basis
MCW: moisture content wet basis

0.51 = MCW / (1 - MCW)
0.51 - (0.51)(MCW) = MCW
(1.51)(MCW) = 0.51
MCW = 0.34, or 34 percent</td></tr>
</table>

Dry Material Drop

Particulate	k × 0.0032 × $(U/5)^{1.3}$ / $(M/2)^{1.4}$ = lb PM / ton				
PM	0.74	0.0032	6.6693	10.5552	0.0015
PM_{10}	0.35				0.0007
$PM_{2.5}$	0.053				0.0001

The following conservative assumptions were made in applying Equation 1:

Mean wind speed (U) = 15 miles per hour

$(U/5)^{1.3}$ = 6.6693

Material moisture content (M) = 13 percent

$(M/2)^{1.4}$ = 10.5552

Note:
- Mean wind speed of 15 mph is a reasonable upper bounder estimate.
- Moisture content of 13 percent for "dry" material is based upon observation that typical moisture content (dry basis) of kiln-dried lumber is 15 percent as recorded during lab scale kiln emissions testing conducting by Oregon State University's Mike Milota and organized in Microsoft Excel workbook entitled, "EPA Region 10 HAP and VOC Emission Factors for Lumber Drying, December 2012." 15 percent moisture content (dry basis) is equivalent to 13 percent moisture content (wet basis) as illustrated below:

MCD = MCW / (1-MCW); where

MCD: moisture content dry basis

MCW: moisture content wet basis

0.15 = MCW / (1 - MCW)

0.15 - (0.15)(MCW) = MCW

(1.15)(MCW) = 0.15

MCW = 0.13, or 13 percent

9	• For PM EF, see Oregon Department of Environmental Quality (ODEQ) Wood Products Emission Factors, AQ-EF02 Revised 08/01/11. http://www.deq.state.or.us/aq/permit/acdp/docs/AQ-EF02.pdf • For PM_{10} and $PM_{2.5}$ EF, see ODEQ Wood Products Emission Factors - $PM_{10}/PM_{2.5}$ Fractions, AQ-EF03 Revised 08/01/11. http://www.deq.state.or.us/aq/permit/acdp/docs/AQ-EF03.pdf
10	• For PM EF, see last row of Table 11.9-4 on page 11.9-11 of Section 11.9 of EPA's AP-42, July 1998 at http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf. • For PM_{10} and $PM_{2.5}$ EF, apply engineering judgement to estimate that (a) PM_{10} emissions are one-half PM emissions and (b) $PM_{2.5}$ emissions are one-half PM_{10} emissions.
11	See Equation 1 on page 13.2.1-4 of Chapter 13.2.1 of AP-42, January 2011 at http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf
12	See Equation 1a on page 13.2.2-4 of Chapter 13.2.2 of AP-42, November 2006 at http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf

Table C-4 - Raw Material Received - Storage Piles

Emission Point ID	Point or Fugitive	Emission Source	Throughput [1] (short tons/year)	Size of Storage Pile [2] (acre)	PM Emission Factor [3] (ton/acre-year)	PM10 Emission Factor [3] (ton/acre-year)	PM2.5 Emission Factor [3] (ton/acre-year)	PM (ton/year)	PM_{10} (ton/year)	$PM_{2.5}$ (ton/year)
SP-01	Fugitive	White Wood	367333	1.7	0.38	0.19	0.095	0.65	0.32	0.16
SP-02	Fugitive	Chips	411413	1.7	0.38	0.19	0.095	0.65	0.32	0.16
SP-03	Fugitive	Bark (Hog Fuel)	242440	1.7	0.38	0.19	0.095	0.65	0.32	0.16

1. Throughput rates based on client-provided mass balance.
2. Assumed individual storage pile size of 1.7 acres based on client information.
3. PM emission factors from USEPA Memo "Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country," May 8, 2014.

Table C-5 - Vehicle Traffic - Haul Trucks (VEH-01)

Emission Factors

Equation 1a from AP-42 Section 13.2.2

$$E = k \times \left(\frac{s}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b}$$

Equation 2 from AP-42 Section 13.2.2

$$E_{ext} = E \times [(365 - P)/365]$$

kPM30	4.9	lb/VMT	*from AP-42 Table 13.2.2-2, assumed equivalent to total suspended particulate*
kPM10	1.5	lb/VMT	*from AP-42 Table 13.2.2-2*
kPM2.5	0.15	lb/VMT	*from AP-42 Table 13.2.2-2*
s	8.4	%	*from AP-42 Table 13.2.2-1, mean for Lumber sawmills*
WE	11.3		*estimate from client info*
WF	44.0		*client info for GVWR with possum belly trailers*
a	0.9		*for PM10 & PM2.5, from AP-42 Table 13.2.2-2*
a	0.7		*for PM30, from AP-42 Table 13.2.2-2*
b	0.45		*from AP-42 Table 13.2.2-2*
P	180	days	*number of days with ≥0.01 inch of precipitation, AP-42 Figure 13.2.2-1*
	85%	CE	*Control efficiency applied from control measures: 10 mph speed limit, regular wet suppression, pickup broom truck. Source: WRAP Fugitive Dust Handbook (2006), Executive Summary Table, Page 3.* R110344-02 (wrapair.org)

Emission Factor E without natural mitigation

EPM_empty	6.94	lb/VMT
EPM10_empty	1.98	lb/VMT
EPM2.5_empty	0.20	lb/VMT
EPM_full	11.90	lb/VMT
EPM10_full	3.64	lb/VMT
EPM2.5_full	0.36	lb/VMT

Emission Factor E_{ext} with natural mitigation

EextPM_empty	3.52	lb/VMT
EextPM10_empty	1.00	lb/VMT
EextPM2.5_empty	0.10	lb/VMT
EextPM_full	6.03	lb/VMT
EextPM10_full	1.85	lb/VMT
EextPM2.5_full	0.18	lb/VMT

Emission Estimates

Annual Emissions

Delivery/Export Area	Annual Loads	Onsite Trip Length* Entering (m)	Onsite Trip Length* Exiting (m)	Onsite Trip Length Entering (mi)	Onsite Trip Length Exiting (mi)	PM Emissions Entering (tpy)	PM Emissions Exiting (tpy)	PM10 Emissions Entering (tpy)	PM10 Emissions Exiting (tpy)	PM2.5 Emissions Entering (tpy)	PM2.5 Emissions Exiting (tpy)
White Wood Storage	16688	656.2	793.9	0.408	0.493	3.079	2.173	0.942	0.619	0.094	0.062
Ground Chips Storage	9242	618	833	0.384	0.518	1.606	1.262	0.492	0.360	0.049	0.036
Bark Storage	7364	545.3	916.6	0.339	0.570	1.129	1.107	0.346	0.316	0.035	0.032
Product Loadout	980	273.3	489.3	0.339	0.570	0.088	0.252	0.025	0.077	0.002	0.008

**Source length generated in Lake's AERMOD View TM*

Product Loadout annual loads estimated based on 32,000 tons of pellets and average SGT/load values

Max Daily Emissions (based on 5 day a week)

Delivery/Export Area	Max Daily Loads	Onsite Trip Length* Entering (m)	Onsite Trip Length* Exiting (m)	Onsite Trip Length Entering (mi)	Onsite Trip Length Exiting (mi)	PM Emissions Entering (ppd)	PM Emissions Exiting (ppd)	PM10 Emissions Entering (ppd)	PM10 Emissions Exiting (ppd)	PM2.5 Emissions Entering (ppd)	PM2.5 Emissions Exiting (ppd)
White Wood Storage	64	656.2	793.9	0.408	0.493	23.61	16.66	7.23	4.75	0.72	0.48
Ground Chips Storage	36	618	833	0.384	0.518	12.51	9.84	3.83	2.80	0.38	0.28
Bark Storage	28	545.3	916.6	0.339	0.570	8.59	8.42	2.63	2.40	0.26	0.24
Product Loadout	10	273.3	489.3	0.339	0.570	3.07	3.01	0.94	0.86	0.09	0.09

**Source length generated in Lake's AERMOD View TM*

Product Loadout daily loads estimated based on 10 trucks per day proposed limitation and average SGT/load values

Emissions Totals With Natural Mitigation and Wet Suppression

Pollutant	Annual (tpy)	Max Daily (ppd)
PM	10.70	85.70
PM10	3.18	25.43
PM2.5	0.32	2.54

Truck Traffic Flow and Traffic (7 Days Per week)

Combined Feedstock	Annual SGT	SGT/ Load	Annual Loads	Loads per Week	Loads per Day	Ave Loads Per Hour	OP Hours	Load Every # Minute	Combined Feedstock	Figure Names Match
Slash	305,000	33	9242	178	36	3	12	20.0	Slash	Ground Chips
Mill Resid	534,000	32	16688	321	**46**	3	18	23.6	Mill Residuals	White wood
Hog Fuel	243,000	33	7364	142	**20**	1	18	53.4	Hog Fuel	Bark
Total	1,082,000		25930	499	102	7		9.0	Combined	

Truck Traffic Flow and Traffic (5 Days Per Week)

Combined Feedstock	Annual SGT	SGT/ Load	Annual Loads	Loads per Week	Loads per Day	Ave Loads Per Hour	OP Hours	Load Every # Minute	Combined Feedstock	Figure Names Match
Slash	305,000	33	9242	178	36	3	12	20.0	Slash	Ground Chips
Mill Resid	534,000	32	16688	321	**64**	4	18	16.8	Mill Residuals	White wood
Hog Fuel	243,000	33	7364	142	**28**	2	18	38.1	Hog Fuel	Bark
Total	1,082,000		25930	499	128	8		7.4	Combined	

Table C-6 - Vehicle Traffic - Front End Loader (VEH-02)
Assumptions: Client indicates FEL with 10-12 yd^3 capacity so CAT 950M data used as representative
950M Wheel Loader | Cat | Caterpillar

Emission Factors

Equation 1a from AP-42 Section 13.2.2

$$E = k \times \left(\frac{s}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b}$$

Equation 2 from AP-42 Section 13.2.2

$$E_{ext} = E \times [(365 - P)/365]$$

kPM30	4.9	lb/VMT	*from AP-42 Table 13.2.2-2, assumed equivalent to total suspended particulate*
kPM10	1.5	lb/VMT	*from AP-42 Table 13.2.2-2*
kPM2.5	0.15	lb/VMT	*from AP-42 Table 13.2.2-2*
s	8.4	%	*from AP-42 Table 13.2.2-1, mean for Lumber sawmills*
WE	26	tons	*Front End Loader Empty Bucket Weight*
WF	29	tons	*Front End Loader Full Bucket Weight*
a	0.9		*for PM10 & PM2.5, from AP-42 Table 13.2.2-2*
a	0.7		*for PM30, from AP-42 Table 13.2.2-2*
b	0.45		*from AP-42 Table 13.2.2-2*
P	180	days	*number of days with ≥0.01 inch of precipitation, AP-42 Figure 13.2.2-1*
	85%	CE	*Control efficiency applied from control measures: 10 mph speed limit, regular wet suppression, pickup broom truck. Source: WRAP Fugitive Dust Handbook (2006), Executive Summary Table, Page 3.*
	10	yd^3	*estimated FEL bucket capacity*
	3	tons	*estimated weight per bucket load*

Emission Factor E without natural mitigation

EPM_empty	10.12	lb/VMT
EPM10_empty	2.88	lb/VMT
EPM2.5_empty	0.29	lb/VMT
EPM_full	9.89	lb/VMT
EPM10_full	3.03	lb/VMT
EPM2.5_full	0.30	lb/VMT

Emission Factor E_{ext} with natural mitigation

EextPM_empty	5.13	lb/VMT
EextPM10_empty	1.46	lb/VMT
EextPM2.5_empty	0.15	lb/VMT
EextPM_full	5.01	lb/VMT
EextPM10_full	1.53	lb/VMT
EextPM2.5_full	0.15	lb/VMT

Emission Estimates

Annual Emissions

		Onsite Trip Length*		Onsite Trip Length		PM Emissions		PM10 Emissions		PM2.5 Emissions	
Delivery Area	Annual Loads	Full (m)	Empty (m)	Full (mi)	Empty (mi)	Full (tpy)	Empty (tpy)	Full (tpy)	Empty (tpy)	Full (tpy)	Empty (tpy)
White Wood Storage	178000	148	86	0.092	0.053	6.161	3.660	1.886	1.043	0.189	0.104
Ground Chips Storage	101667	130	64	0.081	0.039	3.079	1.544	0.943	0.440	0.094	0.044
Bark Storage	81000	124	46	0.077	0.029	2.353	0.897	0.720	0.256	0.072	0.026

**Source length estimated from facility diagram*

Max Daily Emissions (based on 5 day a week)

		Onsite Trip Length*		Onsite Trip Length		PM Emissions		PM10 Emissions		PM2.5 Emissions	
Delivery Area	Max Daily Loads	Full (m)	Empty (m)	Full (mi)	Empty (mi)	Full (ppd)	Empty (ppd)	Full (ppd)	Empty (ppd)	Full (ppd)	Empty (ppd)
White Wood Storage	685	148	86	0.092	0.053	47.39	28.15	14.51	8.03	1.45	0.80
Ground Chips Storage	391	130	64	0.081	0.039	23.68	11.88	7.25	3.38	0.73	0.34
Bark Storage	312	124	46	0.077	0.029	18.10	6.90	5.54	1.97	0.55	0.20

**Source length estimated from facility diagram*

Emissions Totals With Natural Mitigation and Wet Suppression

Pollutant	Annual (tpy)	Max Daily (ppd)
PM	17.69	136.10
PM10	5.29	40.68
PM2.5	0.53	4.07

FEL Traffic Flow and Traffic (7 Days Per week)

Combined Feedstock	Annual SGT	SGT/ Load	Annual Loads	Loads per Week	Loads per Day	Ave Loads Per Hour	OP Hours	Load Every # Minute	Combined Feedstock	Figure Names Match
Slash	305,000	3	101667	1955	279	23	12	2.6	Slash	Ground Chips
Mill Resid	534,000	3	178000	3423	489	27	18	2.2	Mill Residuals	White wood
Hog Fuel	243,000	3	81000	1558	223	12	18	4.9	Hog Fuel	Bark
Total	1,082,000		360667	6936	991	63		10	Combined	

FEL Traffic Flow and Traffic (5 Days Per Week)

Combined Feedstock	Annual SGT	SGT/ Load	Annual Loads	Loads per Week	Loads per Day	Ave Loads Per Hour	OP Hours	Load Every # Minute	Combined Feedstock	Figure Names Match
Slash	305,000	3	101667	1955	391	33	12	1.8	Slash	Ground Chips
Mill Resid	534,000	3	178000	3423	685	38	18	1.6	Mill Residuals	White wood
Hog Fuel	243,000	3	81000	1558	312	17	18	3.5	Hog Fuel	Bark
Total	1,082,000		360667	6936	1387	88		7	Combined	

Input Material Densities	kg/m^3	ton/yd^3
White Wood	350	0.294
Ground Chips	350	0.294
Bark	305	0.256

1 kg --> 0.0011 ston
1 m^3 --> 1.308 yd^3
Densities provided by client/vendor

Table C-7 - Vendor Rates and Calculated Particle Size Distribution for Filterable Particulate Matter

Emission Point ID	Point or Fugitive	Emission Source	Control Device	Potential Operation (hours/year)	Flow rate[1] Nm^3/h	Flow rate[1] (cfm)	Grain Loading[1] mg/Nm^3	Grain Loading[1] (gr/cf)	PM[1] (ton/year)	PM_{10} (ton/year)	$PM_{2.5}$ (ton/year)
EP-01	Point	Chip Cleaning Line	Cyclone[2]	8760	61740	36334	50	0.022	29.81	7.45	1.27
EP-02	Point	Wet Hammer Mill 1	Cyclone[2]	8760	17364	10219	50	0.022	8.38	2.10	0.36
EP-03	Point	Wet Hammer Mill 2	Cyclone[2]	8760	17364	10219	50	0.022	8.38	2.10	0.36
EP-04	Point	Drying Line	Cyclone, WESP, RTO[3]	8760	175410	103229	20	0.009	33.88	33.88	33.88
EP-05	Point	Dry Product Intermediate Storage 1	Filter[3]	8760	1447	852	5	0.002	0.07	0.07	0.07
EP-06	Point	Dry Product Intermediate Storage 2	Filter[3]	8760	1447	852	5	0.002	0.07	0.07	0.07
EP-08	Point	Dry Hammer Mills & Pellet Coolers	Cyclone, Filter, RCO[3]	8760	169576	99795	5	0.002	8.19	8.19	8.19
EP-09	Point	Milled Dry Product Intermediate Storage	Filter[3]	8760	1447	852	5	0.002	0.07	0.07	0.07
EP-10	Point	Pellet Storage Silo 1	Extractor[4]	8760	26567	15635	15	0.007	3.85	2.35	0.89
EP-11	Point	Pellet Storage Silo 2	Extractor[4]	8760	26567	15635	15	0.007	3.85	2.35	0.89
EP-12	Point	Pellet Storage Silo 3	Extractor[4]	8760	26567	15635	15	0.007	3.85	2.35	0.89
EP-13	Point	Pellet Storage Silo 4	Extractor[4]	8760	26567	15635	15	0.007	3.85	2.35	0.89
EP-14	Point	Pellet Storage Silo 5	Extractor[4]	8760	26567	15635	15	0.007	3.85	2.35	0.89

1. Flow rates, grain loading factors, and PM emission rates provided by vendor in metric units, which have been converted to Imperial units.
2. For units with cyclone control only, size speciation based on EPA AP42 Chapter 9.9, Table 9.9.1-1 footnote for Grain Cleaning/Internal Vibrating with cyclone control, where PM_{10} = 25% of PM and $PM_{2.5}$ = 17% PM_{10}.
3. Assumption of PM = PM_{10} = $PM_{2.5}$ for filterable emissions.
4. Pellet Storage Silos utilize aeration fans and venting to maintain low pellet temperature. PM_{10} and $PM_{2.5}$ speciation estimated based on EPA AP42 Appendix B.2, Table B.2.2, Category 7 for Grain Processing as the pellets experience some forced air flow. Category 7 Cumulative Particle Size Table indicates PM_{10} = 61% of PM and $PM_{2.5}$ = 23% of PM.

Conversions

m3=	1	-->	35.31	cf
mg=	1	-->	0.01543236	grain
mg/Nm3=	1	-->	0.000437054	gr/cf
m3/hr=	1	-->	0.5885	cfm
gr=	1	-->	0.00014286	lb

Table C-8a - Drying Line Emissions (EP-04)

Parameter	Value	Units	Notes
Max Annual Throughput	440800	ODT/yr	Dried product, maximum plant capacity
Max Hourly Throughput	51.1	ODT/hr	Dryer Design Rating
Furnace Burner Capacity	164.81	MMBtu/hr	Burner Design Rating
RTO Burner capacity	8	MMBtu/hr	Burner Design Rating
RTO Burner capacity	7.84E-03	MMcf/hr	Conversion from MMBtu/hr, 1020 Btu/scf NG heat content
Max Annual Operation	8760	hr/year	Unrestricted operation

Vendor Design Rates for WESP/RTO Stack Emissions

Pollutant	Emission factor	Units	Potential Annual Emissions (TPY)
PM filterable	7.735	lb/hr	33.9
PM10 filterable	7.735	lb/hr	33.9
PM2.5 filterable	7.735	lb/hr	33.9
NOx	52	lb/hr	227.8
CO	42	lb/hr	184.0
VOC	6.575	lb/hr	28.8

Notes:
Emission rates are based on vendor data

Estimated Maximum Rates from Furnace and Dryer for Other Pollutants for WESP/RTO Stack

Pollutant	Emission factor	Units	Potential Annual Emissions (TPY)
PM condensable	0.098	lb/ODT	21.9
Methane (CH4)	0.013	lb/ODT	2.9
SO2	0.025	lb/MMBtu	18.0
CO2	720	lb/ODT	161149

Notes:
PM condensable emission factor is from AP 42, Table 10.6.1-1, Rotary dryer, direct wood-fired, softwood, WESP/RTO, 3/02
Methane emission factor is from AP 42, Table 10.6.2-3, Rotary dryer, direct wood-fired, softwood, 6/02, with 95% control applied
SO2 emission factor is from AP 42, Table 1.6-2, Bark/Bark and Wet wood - No Control, 9/03
CO2 emission factor is from AP 42, Table 10.6.1-2, Rotary dryer, direct wood-fired, softwood, RTO, 3/02

Estimated RTO Combustion Emissions Not Already Accounted for Above

Pollutant	Emission factor	Units	Potential Annual Emissions (TPY)
SO2	0.6	lb/MMcf	0.0
Nitrous Oxide (N2O)	2.2	lb/MMcf	0.1

Notes:
RTO natural gas combustion emissions are from AP 42, Table 1.4-2, 7/98

Greenhouse Gas Emission Summary for WESP/RTO Stack

Pollutant	TPY	GWP	CO2e
Methane (CH4)	2.9	25	73
Nitrous Oxide (N2O)	0.1	298	23
CO2	161149	1	161149
Total CO2e			161244

Notes:
Global Warming Potential (GWP) from 40 CFR 98, Subpart A, Table A-1
CO2e = emission rate multiplied by its GWP

Table C-8b - Furnace Hog-fuel Combustion Organics and Metals (EP-04)

51.1 =dryer output flowrate ODT/hr

164.81 =furnace capacity MMBtu/hr

ODT/hr	hours/yr	CAS	Pollutant Name	Emission Factor	Units	Rating	HAP?	TAP?	Control Efficiency WESP control 95%	Control Efficiency RTO control 95%	ton/yr	lb/yr	lb/hr	lb/24hr
51.1	8760	71-55-6	1,1,1-Trichloroethane	0.000012	lb/ODT	D	Yes	Yes		Yes	1.34E-04	2.69E-01	3.07E-05	7.36E-04
51.1	8760	95-63-6	1,2,4-Trimethyl benzene	0.00009	lb/ODT	D	No	Yes		Yes	1.01E-03	2.01E+00	2.30E-04	5.52E-03
51.1	8760	5779-94-2	2,5-Dimethyl benzaldehyde	0.000033	lb/ODT	E	No	No		Yes	3.69E-04	7.39E-01	8.43E-05	2.02E-03
51.1	8760	13466-78-9	3-Carene	0.076	lb/ODT	D	No	No		Yes	8.51E-01	1.70E+03	1.94E-01	4.66E+00
51.1	8760	75-07-0	Acetaldehyde *	0.013	lb/ODT	D	Yes	Yes		Yes	1.45E-01	2.91E+02	3.32E-02	7.97E-01
51.1	8760	67-64-1	Acetone	0.084	lb/ODT	D	No	No		Yes	9.40E-01	1.88E+03	2.15E-01	5.15E+00
51.1	8760	98-86-2	Acetophenone	0.000064	lb/ODT	D	Yes	No		Yes	7.16E-04	1.43E+00	1.64E-04	3.92E-03
51.1	8760	107-02-8	Acrolein *	0.0045	lb/ODT	D	Yes	Yes		Yes	5.04E-02	1.01E+02	1.15E-02	2.76E-01
51.1	8760	80-56-8	Alpha-pinene	0.39	lb/ODT	D	No	No		Yes	4.36E+00	8.73E+03	9.96E-01	2.39E+01
51.1	8760	100-52-7	Benzaldehyde	0.0026	lb/ODT	E	No	No		Yes	2.91E-02	5.82E+01	6.64E-03	1.59E-01
51.1	8760	71-43-2	Benzene *	0.00099	lb/ODT	D	Yes	Yes		Yes	1.11E-02	2.22E+01	2.53E-03	6.07E-02
51.1	8760	127-91-3	Beta-pinene	0.12	lb/ODT	D	No	No		Yes	1.34E+00	2.69E+03	3.07E-01	7.36E+00
51.1	8760	92-52-4	Biphenyl *	0.000039	lb/ODT	D	Yes	No		Yes	4.36E-04	8.73E-01	9.96E-05	2.39E-03
51.1	8760	117-81-7	Bis-(2-ethylhexyl phthalate)	0.00032	lb/ODT	D	Yes	Yes		Yes	3.58E-03	7.16E+00	8.18E-04	1.96E-02
51.1	8760	74-83-9	Bromomethane *	0.000028	lb/ODT	D	Yes	Yes		Yes	3.13E-04	6.27E-01	7.15E-05	1.72E-03
51.1	8760	123-72-8	Butylaldehyde	0.0031	lb/ODT	E	No	No		Yes	3.47E-02	6.94E+01	7.92E-03	1.90E-01
51.1	8760	85-68-7	Butylbenzyl phthalate	0.000014	lb/ODT	E	No	No		Yes	1.57E-04	3.13E-01	3.58E-05	8.58E-04
51.1	8760	75-15-0	Carbon disulfide *	0.000018	lb/ODT	D	Yes	Yes		Yes	2.01E-04	4.03E-01	4.60E-05	1.10E-03
51.1	8760	56-23-5	Carbon tetrachloride *	0.000012	lb/ODT	D	Yes	Yes		Yes	1.34E-04	2.69E-01	3.07E-05	7.36E-04
51.1	8760	74-87-3	Chloromethane *	0.00011	lb/ODT	D	Yes	Yes		Yes	1.23E-03	2.46E+00	2.81E-04	6.75E-03
51.1	8760	98-82-8	Cumene *	0.000069	lb/ODT	D	Yes	Yes		Yes	7.72E-04	1.54E+00	1.76E-04	4.23E-03
51.1	8760	84-74-2	Di-N-butyl phthalate	0.000023	lb/ODT	D	Yes	No		Yes	2.57E-04	5.15E-01	5.88E-05	1.41E-03
51.1	8760	75-18-3	Dimethyl sulfide	0.000014	lb/ODT	E	No	No		Yes	1.57E-04	3.13E-01	3.58E-05	8.58E-04
51.1	8760	74-84-0	Ethane	0.015	lb/ODT	D	No	No		Yes	1.68E-01	3.36E+02	3.83E-02	9.20E-01
51.1	8760	100-41-4	Ethyl benzene *	0.0000038	lb/ODT	E	Yes	Yes		Yes	4.25E-05	8.51E-02	9.71E-06	2.33E-04
51.1	8760	50-00-0	Formaldehyde *	0.025	lb/ODT	C	Yes	Yes		Yes	2.80E-01	5.60E+02	6.39E-02	1.53E+00
51.1	8760	66-25-1	Hexaldehyde	0.016	lb/ODT	E	No	No		Yes	1.79E-01	3.58E+02	4.09E-02	9.81E-01
51.1	8760	123-31-9	Hydroquinone	0.00006	lb/ODT	E	Yes	No		Yes	6.71E-04	1.34E+00	1.53E-04	3.68E-03
51.1	8760	590-86-3	Isovaleraldehyde	0.00052	lb/ODT	E	No	No		Yes	5.82E-03	1.16E+01	1.33E-03	3.19E-02
51.1	8760	138-86-3	Limonene	0.034	lb/ODT	D	No	No		Yes	3.80E-01	7.61E+02	8.69E-02	2.08E+00
51.1	8760	1330-20-7	m,p-Xylene	0.00055	lb/ODT	D	Yes	Yes		Yes	6.15E-03	1.23E+01	1.41E-03	3.37E-02
51.1	8760	620-23-5	m-Tolualdehyde	0.00045	lb/ODT	E	No	No		Yes	5.04E-03	1.01E+01	1.15E-03	2.76E-02
51.1	8760	64-82-8	Methane	0.26	lb/ODT	D	No	No		Yes	2.91E+00	5.82E+03	6.64E-01	1.59E+01
51.1	8760	67-56-1	Methanol *	0.014	lb/ODT	D	Yes	Yes		Yes	1.57E-01	3.13E+02	3.58E-02	8.58E-01
51.1	8760	78-93-3	Methyl ethyl ketone *	0.0049	lb/ODT	D	No	Yes		Yes	5.48E-02	1.10E+02	1.25E-02	3.00E-01
51.1	8760	108-10-1	Methyl isobutyl ketone *	0.0024	lb/ODT	D	Yes	Yes		Yes	2.69E-02	5.37E+01	6.13E-03	1.47E-01
51.1	8760	75-09-2	Methylene chloride *	0.00063	lb/ODT	D	Yes	Yes		Yes	7.05E-03	1.41E+01	1.61E-03	3.86E-02
51.1	8760	110-54-3	n-Hexane*	0.000026	lb/ODT	E	Yes	Yes		Yes	2.91E-04	5.82E-01	6.64E-05	1.59E-03
51.1	8760	95-47-6	o-Xylene *	0.000014	lb/ODT	D	Yes	Yes		Yes	1.57E-04	3.13E-01	3.58E-05	8.58E-04
51.1	8760	108-95-2	Phenol *	0.0066	lb/ODT	D	Yes	Yes		Yes	7.39E-02	1.48E+02	1.69E-02	4.05E-01
51.1	8760	123-38-6	Propionaldehyde *	0.0032	lb/ODT	D	Yes	Yes		Yes	3.58E-02	7.16E+01	8.18E-03	1.96E-01
51.1	8760	100-42-5	Styrene *	0.00012	lb/ODT	E	Yes	Yes		Yes	1.34E-03	2.69E+00	3.07E-04	7.36E-03
51.1	8760	108-88-3	Toluene *	0.0021	lb/ODT	D	Yes	Yes		Yes	2.35E-02	4.70E+01	5.37E-03	1.29E-01
51.1	8760	110-62-3	Valeraldehyde	0.0016	lb/ODT	E	No	No		Yes	1.79E-02	3.58E+01	4.09E-03	9.81E-02
164.81	8760	7440-36-0	Antimony	7.90E-06	lb/MMBtu	C	Yes	No	Yes		2.85E-04	5.70E-01	6.51E-05	1.56E-03
164.81	8760	7440-38-2	Arsenic	2.20E-05	lb/MMBtu	A	Yes	No	Yes		7.94E-04	1.59E+00	1.81E-04	4.35E-03
164.81	8760	7440-39-3	Barium	1.70E-04	lb/MMBtu	C	No	No	Yes		6.14E-03	1.23E+01	1.40E-03	3.36E-02
164.81	8760	7440-41-7	Beryllium	1.10E-06	lb/MMBtu	B	Yes	No	Yes		3.97E-05	7.94E-02	9.06E-06	2.18E-04
164.81	8760	7440-43-9	Cadmium	4.10E-06	lb/MMBtu	A	Yes	No	Yes		1.48E-04	2.96E-01	3.38E-05	8.11E-04
164.81	8760	7440-47-3	Chromium, total	2.10E-05	lb/MMBtu	A	Yes	No	Yes		7.58E-04	1.52E+00	1.73E-04	4.15E-03
164.81	8760	CRVICOMP	Chromium, hexavalent	3.50E-06	lb/MMBtu	C	Yes	No	Yes		1.26E-04	2.53E-01	2.88E-05	6.92E-04
164.81	8760	7440-48-4	Cobalt	6.50E-06	lb/MMBtu	C	Yes	Yes	Yes		2.35E-04	4.69E-01	5.36E-05	1.29E-03
164.81	8760	7440-50-8	Copper	4.90E-05	lb/MMBtu	A	No	No	Yes		1.77E-03	3.54E+00	4.04E-04	9.69E-03
164.81	8760	7439-89-6	Iron	9.90E-04	lb/MMBtu	C	No	No	Yes		3.57E-02	7.15E+01	8.16E-03	1.96E-01
164.81	8760	7439-92-1	Lead	4.80E-05	lb/MMBtu	A	Yes	No	Yes		1.73E-03	3.46E+00	3.96E-04	9.49E-03
164.81	8760	7439-96-5	Manganese	1.60E-03	lb/MMBtu	A	Yes	No	Yes		5.77E-02	1.15E+02	1.32E-02	3.16E-01
164.81	8760	7439-97-6	Mercury	3.50E-06	lb/MMBtu	A	Yes	Yes	No		2.53E-03	5.05E+00	5.77E-04	1.38E-02
164.81	8760	7439-98-7	Molybdenum	2.10E-06	lb/MMBtu	D	No	No	Yes		7.58E-05	1.52E-01	1.73E-05	4.15E-04
164.81	8760	7440-02-0	Nickel	3.30E-05	lb/MMBtu	A	Yes	No	Yes		1.19E-03	2.38E+00	2.72E-04	6.53E-03
164.81	8760	7723-14-0	Phosphorus	2.70E-05	lb/MMBtu	D	Yes	Yes	Yes		9.75E-04	1.95E+00	2.22E-04	5.34E-03
164.81	8760	7440-09-7	Potassium	3.90E-02	lb/MMBtu	D	No	No	Yes		1.41E+00	2.82E+03	3.21E-01	7.71E+00
164.81	8760	7782-49-2	Selenium	2.80E-06	lb/MMBtu	A	Yes	No	Yes		1.01E-04	2.02E-01	2.31E-05	5.54E-04
164.81	8760	7440-22-4	Silver	1.70E-03	lb/MMBtu	D	No	No	Yes		6.14E-02	1.23E+02	1.40E-02	3.36E-01
164.81	8760	7440-23-5	Sodium	3.60E-04	lb/MMBtu	D	No	No	Yes		1.30E-02	2.60E+01	2.97E-03	7.12E-02
164.81	8760	7440-24-6	Strontium	1.00E-05	lb/MMBtu	D	No	No	Yes		3.61E-04	7.22E-01	8.24E-05	1.98E-03
164.81	8760	7440-31-5	Tin	2.30E-05	lb/MMBtu	D	No	No	Yes		8.30E-04	1.66E+00	1.90E-04	4.55E-03
164.81	8760	7440-32-6	Titanium	2.00E-05	lb/MMBtu	D	No	No	Yes		7.22E-04	1.44E+00	1.65E-04	3.96E-03
164.81	8760	7440-62-2	Vanadium	9.80E-07	lb/MMBtu	D	No	Yes	Yes		3.54E-05	7.07E-02	8.08E-06	1.94E-04
164.81	8760	7440-65-5	Yttrium	3.00E-07	lb/MMBtu	D	No	No	Yes		1.08E-05	2.17E-02	2.47E-06	5.93E-05
164.81	8760	7440-66-6	Zinc	4.20E-04	lb/MMBtu	A	No	No	Yes		1.52E-02	3.03E+01	3.46E-03	8.31E-02

1. Organic HAP emission factors from USEPA AP-42 10.6.2, Tables 10.6.2-3 Rotary dryer, direct wood-fired, softwood
2. Metal HAP emission factors from USEPA AP-42 1.6.2, Tables 1.6.2-4.
3. Dryer hog-fuel burner is rated at 164.81 MMBtu/hr HHV
4. 95% control/destruction efficiency for WESP/RTO based on vendor data.
   Metals assumed controlled as PM by WESP (except mercury), organics controlled by RTO

Table C-8c - Dryer RTO Natural Gas Combustion Organics and Metals (EP-04)

8 =RTO MMBtu/hr

1020 Btu/Scf natural gas heating value

EF based on MDL

MMBtu/hr	hours/yr	CAS	Pollutant Name	Emission Factor	Units	Rating	HAP?	TAP?	ton/yr	lb/yr	lb/hr	lb/24hr
8	8760	91-57-6	2-Methylnaphthalene	0.000024	lb/MMscf	D	No	No	0.00	0.001648941	1.8824E-07	4.5176E-06
8	8760	56-49-5	3-Methylcholanthrene	1.80E-06	lb/MMscf	E	No	Yes	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	57-97-6	7,12-Dimethylbenz(a)anthracene	1.60E-05	lb/MMscf	E	No	Yes	0.00	0.001099294	1.2549E-07	3.0118E-06
8	8760	83-32-9	Acenaphthene	1.80E-06	lb/MMscf	E	No	No	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	208-96-8	Acenaphthylene	1.80E-06	lb/MMscf	E	No	No	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	120-12-7	Anthracene	2.40E-06	lb/MMscf	E	No	No	0.00	0.000164894	1.8824E-08	4.5176E-07
8	8760	56-55-3	Benz(a)anthracene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	71-43-2	Benzene	0.0021	lb/MMscf	B	Yes	Yes	0.00	0.144282353	1.6471E-05	0.00039529
8	8760	50-32-8	Benzo(a)pyrene	1.20E-06	lb/MMscf	E	Yes	Yes	0.00	8.24471E-05	9.4118E-09	2.2588E-07
8	8760	205-99-2	Benzo(b)fluoranthene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	191-24-2	Benzo(g,h,i)perylene	1.20E-06	lb/MMscf	E	No	No	0.00	8.24471E-05	9.4118E-09	2.2588E-07
8	8760	207-08-9	Benzo(k)fluoranthene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	106-97-8	Butane	2.1	lb/MMscf	E	No	No	0.07	144.2823529	0.01647059	0.39529412
8	8760	218-01-9	Chrysene	1.80E-06	lb/MMscf	E	No	Yes	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	53-70-3	Dibenzo(a,h)anthracene	1.20E-06	lb/MMscf	E	Yes	Yes	0.00	8.24471E-05	9.4118E-09	2.2588E-07
8	8760	25321-22-6	Dichlorobenzene	0.0012	lb/MMscf	E	No	No	0.00	0.082447059	9.4118E-06	0.00022588
8	8760	74-84-0	Ethane	3.1	lb/MMscf	E	No	No	0.11	212.9882353	0.02431373	0.58352941
8	8760	206-44-0	Fluoranthene	0.000003	lb/MMscf	E	No	No	0.00	0.000206118	2.3529E-08	5.6471E-07
8	8760	86-73-7	Fluorene	0.0000028	lb/MMscf	E	No	No	0.00	0.000192376	2.1961E-08	5.2706E-07
8	8760	50-00-0	Formaldehyde	0.075	lb/MMscf	B	Yes	Yes	0.00	5.152941176	0.00058824	0.01411765
8	8760	110-54-3	Hexane	1.8	lb/MMscf	E	Yes	Yes	0.06	123.6705882	0.01411765	0.33882353
8	8760	193-39-5	Indeno(1,2,3,c,d)pyrene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	0.000123671	1.4118E-08	3.3882E-07
8	8760	91-20-3	Naphthalene	0.00061	lb/MMscf	E	Yes	Yes	0.00	0.041910588	4.7843E-06	0.00011482
8	8760	109-66-0	Pentane	2.6	lb/MMscf	E	No	No	0.09	178.6352941	0.02039216	0.48941176
8	8760	85-01-8	Phenanathrene	0.000017	lb/MMscf	D	No	No	0.00	0.001168	1.3333E-07	0.0000032
8	8760	74-98-6	Propane	1.6	lb/MMscf	E	No	No	0.05	109.9294118	0.01254902	0.30117647
8	8760	129-00-0	Pyrene	0.000005	lb/MMscf	E	No	No	0.00	0.000343529	3.9216E-08	9.4118E-07
8	8760	108-88-3	Toluene	0.0034	lb/MMscf	C	Yes	Yes	0.00	0.2336	2.6667E-05	0.00064
8	8760	7440-38-2	Arsenic	0.0002	lb/MMscf	E	Yes	No	0.00	0.013741176	1.5686E-06	3.7647E-05
8	8760	7440-39-3	Barium	0.0044	lb/MMscf	D	No	No	0.00	0.302305882	3.451E-05	0.00082824
8	8760	7440-41-7	Beryllium	1.20E-05	lb/MMscf	E	Yes	No	0.00	0.000824471	9.4118E-08	2.2588E-06
8	8760	7440-43-9	Cadmium	0.0011	lb/MMscf	D	Yes	No	0.00	0.075576471	8.6275E-06	0.00020706
8	8760	7440-47-3	Chromium, total	0.0014	lb/MMscf	D	Yes	No	0.00	0.096188235	1.098E-05	0.00026353
8	8760	7440-48-4	Cobalt	0.000084	lb/MMscf	D	Yes	Yes	0.00	0.005771294	6.5882E-07	1.5812E-05
8	8760	7440-50-8	Copper	0.00085	lb/MMscf	C	No	No	0.00	0.0584	6.6667E-06	0.00016
8	8760	7439-92-1	Lead	0.0005	lb/MMscf	D	Yes	No	0.00	0.034352941	3.9216E-06	9.4118E-05
8	8760	7439-96-5	Manganese	0.00038	lb/MMscf	D	Yes	No	0.00	0.026108235	2.9804E-06	7.1529E-05
8	8760	7439-97-6	Mercury	0.00026	lb/MMscf	D	Yes	Yes	0.00	0.017863529	2.0392E-06	4.8941E-05
8	8760	7439-98-7	Molybdenum	0.0011	lb/MMscf	D	No	No	0.00	0.075576471	8.6275E-06	0.00020706
8	8760	7440-02-0	Nickel	0.0021	lb/MMscf	C	Yes	No	0.00	0.144282353	1.6471E-05	0.00039529
8	8760	7782-49-2	Selenium	2.40E-05	lb/MMscf	E	Yes	No	0.00	0.001648941	1.8824E-07	4.5176E-06
8	8760	7440-62-2	Vanadium	0.0023	lb/MMscf	D	No	Yes	0.00	0.158023529	1.8039E-05	0.00043294
8	8760	7440-66-6	Zinc	0.029	lb/MMscf	E	No	No	0.00	1.992470588	0.00022745	0.00545882

POM

1. HAP emission factors from USEPA AP-42 1.4, Tables 1.4.1-4. 1.4_natural_gas_combustion.pdf (epa.gov)
2. **Blue Cell**: CAS not identified as HAP; however, AP-42 footnote assigns as a HAP as Polycyclic Organic Matter (POM).
3. RTO burner capacity of 8 MMBtu/hr
4. Natural gas heating value 1020 Btu/scf

Table C-9a - Dry Hammermill and Pellet Cooler Combined/RCO Stack Emissions (EP-08)

Parameter	Value	Units	Notes
RCO Burner capacity	4.5	MMBtu/hr	Burner Design Rating
RCO Burner capacity	4.41E-03	MMcf/hr	Conversion from MMBtu/hr, 1020 Btu/scf NG heat content
Max Annual Operation	8760	hr/year	Unrestricted operation

Vendor Design Rates for RCO Stack Emissions

Pollutant	Emission factor	Units	Potential Annual Emissions (TPY)
PM filterable	1.87	lb/hr	8.19
PM10 filterable	1.87	lb/hr	8.19
PM2.5 filterable	1.87	lb/hr	8.19
VOC	8.6	lb/hr	37.67

Estimated RCO Combustion Emissions Not Already Accounted for Above

Pollutant	Emission factor	Units	Potential Annual Emissions (TPY)
PM condensable	5.7	lb/MMcf	0.11
NOx	94	lb/MMcf	1.82
CO	40	lb/MMcf	0.77
SO2	0.6	lb/MMcf	0.01
CO2	120000	lb/MMcf	2319
Methane (CH4)	2.3	lb/MMcf	0.04
Nitrous Oxide (N2O)	2.2	lb/MMcf	0.04

Notes:
PM condensable, NOx, CO, SO2, and CO2 emissions are from combustion of natural gas in RCO.
Combustion emission factors are from AP 42, Table 1.4-1, No SCC - Uncontrolled, 7/98, and Table 1.4-2

Greenhouse Gas Emission Summary for RCO Stack

Pollutant	TPY	GWP	CO2e
Methane (CH4)	0.0	25	1
Nitrous Oxide (N2O)	0.0	298	13
CO2	2319	1	2319
Total CO2e			2333

Notes:
Global Warming Potential (GWP) from 40 CFR 98, Subpart A, Table A-1
CO2e = emission rate multiplied by its GWP

Table C-9b - Dry Hammermill and Pelletizing organics

50.3196347 =process capacity ODT/hr

Control Efficiency 95%

ODT/hr	hours/yr	CAS	Pollutant Name	Emission Factor	Units	Rating	HAP?	TAP?	RCO control	ton/yr	lb/yr	lb/hr	lb/24hr
50.3196347	8760	67-64-1	Acetone	6.40E-03	lb/ODT	D	No	No	Yes	7.05E-02	1.41E+02	1.61E-02	3.86E-01
50.3196347	8760	80-56-8	Alpha-pinene	4.90E-01	lb/ODT	D	No	No	Yes	5.40E+00	1.08E+04	1.23E+00	2.96E+01
50.3196347	8760	127-91-3	Beta-pinene	1.50E-01	lb/ODT	D	No	No	Yes	1.65E+00	3.31E+03	3.77E-01	9.06E+00
50.3196347	8760	67-56-1	Methanol	7.30E-03	lb/ODT	D	Yes	Yes	Yes	8.04E-02	1.61E+02	1.84E-02	4.41E-01
50.3196347	8760	108-95-2	Phenol	4.50E-03	lb/ODT	E	Yes	Yes	Yes	4.96E-02	9.92E+01	1.13E-02	2.72E-01

1. Organics emission factors from USEPA AP-42 10.6.2, Table 10.6.2-7 for Hammermills. 95% control efficiency provided by RCO.
2. Process is rated at 440800 ODT/yr (50.32 ODT/hr at 8760 hours per year)

Table C-9c - Dry Hammermill and Pelletizer RCO Natural Gas Combustion Organics and Metals (EP-08)

4.5 =RCO MMBtu/hr

1020 Btu/Scf natural gas heating value

EF based on MDL

MMBtu/hr	hours/yr	CAS	Pollutant Name	Emission Factor	Units	Rating	HAP?	TAP?	ton/yr	lb/yr	lb/hr	lb/24hr
4.5	8760	91-57-6	2-Methylnaphthalene	0.000024	lb/MMscf	D	No	No	0.00	0.000927529	1.0588E-07	2.5412E-06
4.5	8760	56-49-5	3-Methylcholanthrene	1.80E-06	lb/MMscf	E	No	Yes	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	57-97-6	7,12-Dimethylbenz(a)anthracene	1.60E-05	lb/MMscf	E	No	Yes	0.00	0.000618353	7.0588E-08	1.6941E-06
4.5	8760	83-32-9	Acenaphthene	1.80E-06	lb/MMscf	E	No	No	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	208-96-8	Acenaphthylene	1.80E-06	lb/MMscf	E	No	No	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	120-12-7	Anthracene	2.40E-06	lb/MMscf	E	No	No	0.00	9.27529E-05	1.0588E-08	2.5412E-07
4.5	8760	56-55-3	Benz(a)anthracene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	71-43-2	Benzene	0.0021	lb/MMscf	B	Yes	Yes	0.00	0.081158824	9.2647E-06	0.00022235
4.5	8760	50-32-8	Benzo(a)pyrene	1.20E-06	lb/MMscf	E	Yes	Yes	0.00	4.63765E-05	5.2941E-09	1.2706E-07
4.5	8760	205-99-2	Benzo(b)fluoranthene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	191-24-2	Benzo(g,h,i)perylene	1.20E-06	lb/MMscf	E	No	No	0.00	4.63765E-05	5.2941E-09	1.2706E-07
4.5	8760	207-08-9	Benzo(k)fluoranthene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	106-97-8	Butane	2.1	lb/MMscf	E	No	No	0.04	81.15882353	0.00926471	0.22235294
4.5	8760	218-01-9	Chrysene	1.80E-06	lb/MMscf	E	No	Yes	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	53-70-3	Dibenzo(a,h)anthracene	1.20E-06	lb/MMscf	E	Yes	Yes	0.00	4.63765E-05	5.2941E-09	1.2706E-07
4.5	8760	25321-22-6	Dichlorobenzene	0.0012	lb/MMscf	E	No	No	0.00	0.046376471	5.2941E-06	0.00012706
4.5	8760	74-84-0	Ethane	3.1	lb/MMscf	E	No	No	0.06	119.8058824	0.01367647	0.32823529
4.5	8760	206-44-0	Fluoranthene	0.000003	lb/MMscf	E	No	No	0.00	0.000115941	1.3235E-08	3.1765E-07
4.5	8760	86-73-7	Fluorene	0.0000028	lb/MMscf	E	No	No	0.00	0.000108212	1.2353E-08	2.9647E-07
4.5	8760	50-00-0	Formaldehyde	0.075	lb/MMscf	B	Yes	Yes	0.00	2.898529412	0.00033088	0.00794118
4.5	8760	110-54-3	Hexane	1.8	lb/MMscf	E	Yes	Yes	0.03	69.56470588	0.00794118	0.19058824
4.5	8760	193-39-5	Indeno(1,2,3,c,d)pyrene	1.80E-06	lb/MMscf	E	Yes	Yes	0.00	6.95647E-05	7.9412E-09	1.9059E-07
4.5	8760	91-20-3	Naphthalene	0.00061	lb/MMscf	E	Yes	Yes	0.00	0.023574706	2.6912E-06	6.4588E-05
4.5	8760	109-66-0	Pentane	2.6	lb/MMscf	E	No	No	0.05	100.4823529	0.01147059	0.27529412
4.5	8760	85-01-8	Phenanathrene	0.000017	lb/MMscf	D	No	No	0.00	0.000657	7.5E-08	0.0000018
4.5	8760	74-98-6	Propane	1.6	lb/MMscf	E	No	No	0.03	61.83529412	0.00705882	0.16941176
4.5	8760	129-00-0	Pyrene	0.000005	lb/MMscf	E	No	No	0.00	0.000193235	2.2059E-08	5.2941E-07
4.5	8760	108-88-3	Toluene	0.0034	lb/MMscf	C	Yes	Yes	0.00	0.1314	0.000015	0.00036
4.5	8760	7440-38-2	Arsenic	0.0002	lb/MMscf	E	Yes	No	0.00	0.007729412	8.8235E-07	2.1176E-05
4.5	8760	7440-39-3	Barium	0.0044	lb/MMscf	D	No	No	0.00	0.170047059	1.9412E-05	0.00046588
4.5	8760	7440-41-7	Beryllium	1.20E-05	lb/MMscf	E	Yes	No	0.00	0.000463765	5.2941E-08	1.2706E-06
4.5	8760	7440-43-9	Cadmium	0.0011	lb/MMscf	D	Yes	Yes	0.00	0.042511765	4.8529E-06	0.00011647
4.5	8760	7440-47-3	Chromium, total	0.0014	lb/MMscf	D	Yes	No	0.00	0.054105882	6.1765E-06	0.00014824
4.5	8760	7440-48-4	Cobalt	0.000084	lb/MMscf	D	Yes	Yes	0.00	0.003246353	3.7059E-07	8.8941E-06
4.5	8760	7440-50-8	Copper	0.00085	lb/MMscf	C	No	No	0.00	0.03285	0.00000375	0.00009
4.5	8760	7439-92-1	Lead	0.0005	lb/MMscf	D	Yes	Yes	0.00	0.019323529	2.2059E-06	5.2941E-05
4.5	8760	7439-96-5	Manganese	0.00038	lb/MMscf	D	Yes	No	0.00	0.014685882	1.6765E-06	4.0235E-05
4.5	8760	7439-97-6	Mercury	0.00026	lb/MMscf	D	Yes	Yes	0.00	0.010048235	1.1471E-06	2.7529E-05
4.5	8760	7439-98-7	Molybdenum	0.0011	lb/MMscf	D	No	No	0.00	0.042511765	4.8529E-06	0.00011647
4.5	8760	7440-02-0	Nickel	0.0021	lb/MMscf	C	Yes	No	0.00	0.081158824	9.2647E-06	0.00022235
4.5	8760	7782-49-2	Selenium	2.40E-05	lb/MMscf	E	Yes	No	0.00	0.000927529	1.0588E-07	2.5412E-06
4.5	8760	7440-62-2	Vanadium	0.0023	lb/MMscf	D	No	Yes	0.00	0.088888235	1.0147E-05	0.00024353
4.5	8760	7440-66-6	Zinc	0.029	lb/MMscf	E	No	No	0.00	1.120764706	0.00012794	0.00307059

POM

1. HAP emission factors from USEPA AP-42 1.4, Tables 1.4.1-4. 1.4_natural_gas_combustion.pdf (epa.gov)
2. **Blue Cell**: CAS not identified as HAP; however, AP-42 footnote assigns as a HAP as Polycyclic Organic Matter (POM).
3. RCO burner capacity of 1.8 MMBtu/hr
4. Natural gas heating value 1020 Btu/scf

Table C-10 - Product Loadout - Truck Loadout (EP-15)

Emission Point ID	Point or Fugitive	Emission Source	Throughput [1] (short tons/year)	Throughput [1] (short tons/day)	Pollutant[2]	Emission factor (lb/ton)	Number of "Drops" [3]	Potential Emissions (lb/day)	Potential Emissions (ton/year)
EP-15	Fugitive	Truck Loadout	32000	330	Filterable PM[3]	0.0015	1	0.50	0.02
					Filterable PM_{10}[3]	0.0007		0.23	0.01
					Filterable $PM_{2.5}$[3]	0.0001		0.03	0.00

1. PNWRE proposes no more than 32,000 tons per year for use of the truck loadout capability for annual emissions and and no more than 10 trucks per day (330 tons of product per day, assuming no more than 33 tons of product per loaded truck) for daily emissions.
2. PM emission factors for truck loadout from US EPA Memo "Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country," May 8, 2014.
3. Emissions are generated from each "drop" of material from one surface to another. All conveyor transitions are enclosed; therefore, not counted as emissions points. There is one drop from loadout spout to truck.

Table C-12a - Emergency Generator (GEN-01)

Parameter	Value	Units	Notes
Engine size	500	hp	Assumed size for 300 kW generator
Max Annual Non-Emergency Operation	100	hours	Limited by 40 CFR 60, Subpart IIII

Estimated Maximum Rates from Emergency Generator

Pollutant	Emission Factor	Units	Potential Annual Emissions (TPY)
$PM/PM_{10}/PM_{2.5}$	3.31E-04	lbs/hp-hr	0.01
NO_x	6.61E-03	lbs/hp-hr	0.17
CO	5.73E-03	lbs/hp-hr	0.14
VOC	2.51E-03	lbs/hp-hr	0.06
SO_2	2.05E-03	lbs/hp-hr	0.05
CO_2	1.15E+00	lbs/hp-hr	28.75

Notes:

Emission factors for PM, NOx, and CO are based on EPA Tier 3 emission standards

All PM assumed to be less than 2.5 micron diameter; therefore, PM=PM10=PM2.5

Emission factors for VOC, SO2 and CO2 are based on EPA AP-42, Section 3.3, Table 3.3-1, 10/96

Table C-11b - Emergency Generator Organics (GEN-01)
500 =engine hp

hp	hours/yr	CAS	Pollutant Name	Emission Factor [1]	Units	Rating	HAP?	TAP?	ton/yr	lb/yr	lb/hr	lb/24hr [2]
500	100	71-43-2	Benzene	0.000933	lb/hp-hr	E	Yes	Yes	0.02	4.67E+01	4.67E-01	4.67E-01
500	100	108-88-3	Toluene	4.09E-04	lb/hp-hr	E	Yes	Yes	0.01	2.05E+01	2.05E-01	2.05E-01
500	100	1330-20-7	Xylenes	2.85E-04	lb/hp-hr	E	Yes	Yes	0.01	1.43E+01	1.43E-01	1.43E-01
500	100	115-07-1	Propylene	2.58E-03	lb/hp-hr	E	No	Yes	0.06	1.29E+02	1.29E+00	1.29E+00
500	100	106-99-0	1,3-Butadiene	3.91E-05	lb/hp-hr	E	Yes	Yes	0.00	1.96E+00	1.96E-02	1.96E-02
500	100	50-00-0	Formaldehyde	1.18E-03	lb/hp-hr	E	Yes	Yes	0.03	5.90E+01	5.90E-01	5.90E-01
500	100	75-07-0	Acetaldehyde	7.67E-04	lb/hp-hr	E	Yes	Yes	0.02	3.84E+01	3.84E-01	3.84E-01
500	100	107-02-8	Acrolein	0.0000925	lb/hp-hr	E	Yes	Yes	0.00	4.63E+00	4.63E-02	4.63E-02
500	100	91-20-3	Naphthalene	9.25E-05	lb/hp-hr	E	Yes	Yes	0.00	4.63E+00	4.63E-02	4.63E-02
500	100	208-96-8	Acenaphthylene	5.06E-06	lb/hp-hr	E	No	No	0.00	2.53E-01	2.53E-03	2.53E-03
500	100	83-32-9	Acenaphthene	1.42E-06	lb/hp-hr	E	No	No	0.00	7.10E-02	7.10E-04	7.10E-04
500	100	86-73-7	Fluorene	2.92E-05	lb/hp-hr	E	No	No	0.00	1.46E+00	1.46E-02	1.46E-02
500	100	85-01-8	Phenanthrene	0.0000294	lb/hp-hr	E	No	No	0.00	1.47E+00	1.47E-02	1.47E-02
500	100	120-12-7	Anthracene	1.87E-06	lb/hp-hr	E	No	No	0.00	9.35E-02	9.35E-04	9.35E-04
500	100	206-44-0	Fluoranthene	7.61E-06	lb/hp-hr	E	No	No	0.00	3.81E-01	3.81E-03	3.81E-03
500	100	129-00-0	Pyrene	0.00000478	lb/hp-hr	E	No	No	0.00	2.39E-01	2.39E-03	2.39E-03
500	100	56-55-3	Benz(a)anthracene	0.00000168	lb/hp-hr	E	Yes	Yes	0.00	8.40E-02	8.40E-04	8.40E-04
500	100	218-01-9	Chrysene	0.000000353	lb/hp-hr	E	No	Yes	0.00	1.77E-02	1.77E-04	1.77E-04
500	100	205-99-2	Benzo(b)fluoranthene	9.91E-08	lb/hp-hr	E	Yes	Yes	0.00	4.96E-03	4.96E-05	4.96E-05
500	100	207-08-9	Benzo(k)fluoranthene	0.000000155	lb/hp-hr	E	Yes	Yes	0.00	7.75E-03	7.75E-05	7.75E-05
500	100	50-32-8	Benzo(a)pyrene	0.000000188	lb/hp-hr	E	Yes	Yes	0.00	9.40E-03	9.40E-05	9.40E-05
500	100	193-39-5	Indeno(1,2,3-cd)pyrene	3.75E-07	lb/hp-hr	E	Yes	Yes	0.00	1.88E-02	1.88E-04	1.88E-04
500	100	53-70-3	Dibenz(a,h)anthracene	0.000000583	lb/hp-hr	E	Yes	Yes	0.00	2.92E-02	2.92E-04	2.92E-04
500	100	191-24-2	Benzo(g,h,l)perylene	0.000000489	lb/hp-hr	E	No	No	0.00	2.45E-02	2.45E-04	2.45E-04
500	100	PAH	Total Polycyclic Aromatic Hydrocarbons (PAH)	0.000168	lb/hp-hr	E	No	No	0.00	8.40E+00	8.40E-02	8.40E-02

1. HAP emission factors from USEPA AP-42 3.3, Table 3.3-2.
2. Because an emergency generator is an intermittent source and would only operate for short periods of time for maintenance checks and readiness testing, the 24-hour rates are assumed to be equal to the hourly rates.