

Test Summary for EPA Method 23 Determination of PAHs

Company: ORRCO  
 Location: Klamath Falls, OR,  
 Source: Auxiliary Boiler  
 Date: Aug. 25&26, 2020

iii.	PAH (Polynuclear Aromatic Hydrocarbons)	PAH ng/m3	PAH ng/sec	PAH lbs/1000 gal.	PAH TEQ ng/m3	PAH TEQ ng/sec	PAH TEQ lbs/1000 gal.
1	Acenaphthene	1.387	0.439	2.33E-07	1.387	0.439	2.33E-07
2	Acenaphthylene	1.046	0.332	1.76E-07	1.046	0.332	1.76E-07
3	Anthracene	<1.451	<0.460	<2.43E-07	<1.451	<0.460	<2.43E-07
5	Benzo(a)anthracene	0.558	0.177	9.36E-08	0.112	0.035	1.87E-08
6	Benzo(a)pyrene	1.427	0.457	2.40E-07	1.427	0.457	2.40E-07
7	Benzo(b)fluoranthene	3.916	1.234	6.55E-07	3.133	0.987	5.24E-07
9	Benzo(e)pyrene	7.521	2.399	1.26E-06	7.521	2.399	1.26E-06
10	Benzo(g,h,i)perylene	34.154	10.958	5.75E-06	0.307	0.099	5.17E-08
11	Benzo(k)fluoranthene	1.502	0.473	2.51E-07	0.045	0.014	7.53E-09
12	Chrysene	2.627	0.830	4.40E-07	0.263	0.083	4.40E-08
13	Dibenz(a,h)anthracene	<0.508	<0.161	<8.52E-08	<5.079	<1.612	<8.52E-07
14	Fluoranthene	16.631	5.270	2.79E-06	1.330	0.422	2.23E-07
15	Fluorene	2.273	0.721	3.81E-07	2.273	0.721	3.81E-07
16	Indeno(1,2,3-cd)pyrene	4.977	1.593	8.37E-07	0.348	0.111	5.86E-08
17	2-Methyl naphthalene	20.620	6.546	3.46E-06	20.620	6.546	3.46E-06
18	Perylene	<0.391	<0.124	<6.55E-08	<0.391	<0.124	<6.55E-08
19	Phenanthrene	23.939	7.597	4.02E-06	23.939	7.597	4.02E-06
20	Pyrene	13.042	4.142	2.19E-06	13.465	4.274	2.19E-06
		<137.969	<43.913	<2.32E-05	<80.253	<25.481	<1.40E-05
			<b>*Total PAH</b>			<b>*Total PAH TEQ</b>	

PAH	PAH ng/m3	PAH ng/sec	PAH lbs/1000 gal.	PAH TEQ ng/m3	PAH TEQ ng/sec	PAH lbs/1000 gal.
Naphthalene	47.387	15.041	7.95E-06	47.387	15.041	7.95E-06

**DATA REPORTING:** Analytes which were below analytical detection limits are flagged as a less than value, "<".

Results are calculated according to ODEQ guidance, which requires that individual PAH analytes that are below method detection limits be considered present at the analyte detection limit for reporting purposes.

\* Total PAH values are the sum of the three test run averages.

EPA Method 23 Determination of PAHs

Company: ORRCO  
 Location: Klamath Falls, OR.  
 Source: Auxiliary Boiler  
 Date: Aug. 25, 2020

Test Run: #1

Start: 10:32  
 Finish: 13:43

Sample Volume Collected: 3.332 dscm  
 Exhaust Flow Rate: 19.010 dscmm  
 Fuel Firing Rate: 0.0150 1000 gal/hr

iii.	PAH (Polynuclear Aromatic Hydrocarbons)	Sample Concentration (ng/sample)	MDL (ng/sample)	PAH ng/m <sup>3</sup>	PAH ng/sec	PAH lbs/1000 gal.	Toxic Eq. Factors (TEFs)	PAH TEQ ng/m <sup>3</sup>	PAH TEQ ng/sec	PAH TEQ lbs/1000 gal.
1	Acenaphthene	5.42		1.627	0.515	2.74E-07	1	1.627	0.515	2.74E-07
2	Acenaphthylene	3.4		1.020	0.323	1.72E-07	1	1.020	0.323	1.72E-07
3	Anthracene	ND	5.2	<1.561	<0.494	<2.63E-07	1	<1.561	<0.494	<2.62E-07
5	Benzo(a)anthracene	ND	2.0	<0.600	<0.190	<1.01E-07	0.2	<0.120	<0.038	<2.02E-08
6	Benzo(a)pyrene	2.65		0.795	0.252	1.34E-07	1	0.795	0.252	1.34E-07
7	Benzo(b)fluoranthene	6.02		1.807	0.572	3.04E-07	0.8	1.445	0.458	2.43E-07
9	Benzo(e)pyrene	12.9		3.871	1.227	6.51E-07	1	3.871	1.227	6.51E-07
10	Benzo(g,h,i)perylene	48.9		14.675	4.649	2.47E-06	0.009	0.132	0.042	2.22E-08
11	Benzo(k)fluoranthene	2.36		0.708	0.224	1.19E-07	0.03	0.021	0.007	3.57E-09
12	Chrysene	6.84		2.053	0.650	3.45E-07	0.1	0.205	0.065	3.45E-08
13	Dibenz(a,h)anthracene	ND	1.82	<0.546	<0.173	<9.19E-08	10	<5.462	<1.730	<9.19E-07
14	Fluoranthene	37.2		11.164	3.537	1.88E-06	0.08	0.893	0.283	1.50E-07
15	Fluorene	9.24		2.773	0.879	4.66E-07	1	2.773	0.879	4.66E-07
16	Indeno(1,2,3-cd)pyrene	6.38		1.915	0.607	3.22E-07	0.07	0.134	0.042	2.25E-08
17	2-Methyl naphthalene	80.5		24.158	7.654	4.06E-06	1	24.158	7.654	4.06E-06
18	Perylene	ND	1.4	<0.420	<0.133	<7.07E-08	1	<0.420	<0.133	<7.07E-08
19	Phenanthrene	77.6		23.288	7.378	3.92E-06	1	23.288	7.378	3.92E-06
20	Pyrene	42.5		12.754	4.041	2.15E-06	1	12.754	4.041	2.15E-06
				Total PAH:	<105.736	<1.78E-05	Total PAH TEQ:		<25.562	<1.36E-05
21	PAH (Polynuclear Aromatic Hydrocarbons)	Sample Concentration (ng/sample)		PAH ng/m <sup>3</sup>	PAH ng/sec	PAH lbs/1000 gal.	Toxic Eq. Factors (TEFs)	PAH TEQ ng/m <sup>3</sup>	PAH TEQ ng/sec	PAH TEQ lbs/1000 gal.
	Naphthalene	192		57.620	18.256	9.69E-06	1	57.620	18.256	9.69E-06

**DATA REPORTING:** Analytes which were below analytical detection limits are flagged as a less than value, "<".  
 Results are calculated according to ODEQ guidance, which requires that individual  
 PAH analytes that are below method detection limits be considered present at the analyte  
 detection limit for reporting purposes.

EPA Method 23 Determination of PAHs

Company: ORRCO  
 Location: Klamath Falls, OR.  
 Source: Auxiliary Boiler  
 Date: Aug. 25, 2020

Test Run: #2

Start: 16:00  
 Finish: 19:32

Sample Volume Collected: 3.784 dscm  
 Exhaust Flow Rate: 19.373 dscm/hr  
 Fuel Firing Rate: 0.0152 1000 gal/hr

iii.	PAH (Polynuclear Aromatic Hydrocarbons)		Sample Concentration (ng/sample)	MDL (ng/sample)	PAH			Toxic Eq. Factors (TEFs)	PAH TEQ		
	Hydrocarbons	Aromatic			ng/m3	ng/sec	lbs/1000 gal.		ng/m3	ng/sec	lbs/1000 gal.
1	Acenaphthene		3.69		0.975	0.315	1.64E-07	1	0.975	0.315	1.64E-07
2	Acenaphthylene		4.41		1.166	0.376	1.96E-07	1	1.166	0.376	1.96E-07
3	Anthracene		ND	5.2	<1.374	<0.444	<2.32E-07	1	<1.374	<0.444	<2.32E-07
5	Benzo(a)anthracene		ND	2.0	<0.529	<0.171	<8.91E-08	0.2	<0.106	<0.034	<1.78E-08
6	Benzo(a)pyrene		10.6		2.801	0.905	4.72E-07	1	2.801	0.905	4.72E-07
7	Benzo(b)fluoranthene		8.21		2.170	0.701	3.66E-07	0.8	1.736	0.560	2.93E-07
9	Benzo(e)pyrene		47.4		12.527	4.045	2.11E-06	1	12.527	4.045	2.11E-06
10	Benzo(g,h,i)perylene		288		76.115	24.576	1.28E-05	0.009	0.685	0.221	1.15E-07
11	Benzo(k)fluoranthene		2.71		0.716	0.231	1.21E-07	0.03	0.021	0.007	3.62E-09
12	Chrysene		6.06		1.602	0.517	2.70E-07	0.1	0.160	0.052	2.70E-08
13	Dibenz(a,h)anthracene		ND	1.82	<0.481	<0.155	<8.11E-08	10	<4.810	<1.553	<8.11E-07
14	Fluoranthene		61.3		16.201	5.231	2.73E-06	0.08	1.296	0.418	2.19E-07
15	Fluorene		7.32		1.935	0.625	3.26E-07	1	1.935	0.625	3.26E-07
16	Indeno(1,2,3-cd)pyrene		38.0		10.043	3.243	1.69E-06	0.07	0.703	0.227	1.19E-07
17	2-Methyl naphthalene		73.1		19.319	6.238	3.26E-06	1	19.319	6.238	3.26E-06
18	Perylene		ND	1.4	<0.370	<0.119	<6.24E-08	1	<0.370	<0.119	<6.24E-08
19	Phenanthrene		89.3		23.601	7.620	3.98E-06	1	23.601	7.620	3.98E-06
20	Pyrene		51.9		13.717	4.429	2.31E-06	1	13.717	4.429	2.31E-06
Total PAH:					<185.64	<59.94	<3.13E-05	Total PAH TEQ:	<87.30	<28.19	<1.47E-05
21	Naphthalene		162		42.815	13.824	7.22E-06	1	42.815	13.824	7.22E-06

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EPA Method 23 Determination of PAHs

Company: ORRCO  
 Location: Klamath Falls, OR,  
 Source: Auxiliary Boiler  
 Date: Aug. 26, 2020

Test Run: #3

Start: 10:13  
 Finish: 13:45

Company: ORRCO

Sample Volume Collected: 3.667 dscm  
 Exhaust Flow Rate: 18.754 dscmm  
 Fuel Firing Rate: 0.0149 1000 gal/hr

PAH (Polynuclear Aromatic Hydrocarbons)	Sample Concentration (ng/sample)	RL (ng/sample)	PAH ng/m3	PAH ng/sec	PAH lbs/1000 gal.	Toxic Eq. Factors (TEFs)	PAH TEQ ng/m3	PAH TEQ ng/sec	PAH TEQ lbs/1000 gal.
iii.	5.72		1.560	0.488	2.60E-07	1	1.560	0.488	2.60E-07
1 Acenaphthene	3.49		0.952	0.298	1.58E-07	1	0.952	0.298	1.58E-07
2 Acenaphthylene	ND	5.2	<1.418	<0.443	<2.36E-07	1	<1.418	<0.443	<2.36E-07
3 Anthracene	ND	2.0	<0.545	<0.170	<9.08E-08	0.2	<0.109	<0.034	<1.82E-08
5 Benzo(a)anthracene	2.51		0.685	0.214	1.14E-07	1	0.685	0.214	1.14E-07
6 Benzo(b)fluoranthene	28.5		7.773	2.429	1.29E-06	0.8	6.218	1.944	1.04E-06
7 Benzo(e)pyrene	22.6		6.164	1.927	1.03E-06	1	6.164	1.927	1.03E-06
9 Benzo(g,h,i)perylene	42.8		11.673	3.648	1.94E-06	0.009	0.105	0.033	1.75E-08
10 Benzo(k)fluoranthene	11.3		3.082	0.963	5.13E-07	0.03	0.092	0.029	1.54E-08
12 Chrysene	15.5		4.227	1.321	7.04E-07	0.1	0.423	0.132	7.04E-08
13 Dibenzo(a,h)anthracene	ND	1.82	<0.496	<0.155	<8.26E-08	10	<4.964	<1.551	<8.26E-07
14 Fluoranthene	82.6		22.527	7.041	3.75E-06	0.08	1.802	0.563	3.00E-07
15 Fluorene	7.74		2.111	0.660	3.51E-07	1	2.111	0.660	3.51E-07
16 Indeno(1,2,3-cd)pyrene	10.9		2.973	0.929	4.95E-07	0.07	0.208	0.065	3.46E-08
17 2-Methyl naphthalene	67.4		18.382	5.745	3.06E-06	1	18.382	5.745	3.06E-06
18 Perylene	ND	1.4	<0.382	<0.119	<6.36E-08	1	<0.382	<0.119	<6.36E-08
19 Phenanthrene	91.4		24.927	7.791	4.15E-06	1	24.927	7.791	4.15E-06
20 Pyrene	46.4		12.655	3.955	2.11E-06	1	13.925	4.352	2.11E-06
		Total PAH:	<122.53	<38.298	<2.04E-05	Total PAH TEQ:	<84.43	<26.388	<1.38E-05
PAH (Polynuclear Aromatic Hydrocarbons)	Sample Concentration (ng/sample)		PAH ng/m3	PAH ng/sec	PAH lbs/1000 gal.	Toxic Eq. Factors (TEFs)	PAH TEQ ng/m3	PAH TEQ ng/sec	PAH TEQ lbs/1000 gal.
21 Naphthalene	153		41.728	13.042	6.95E-06	1	41.728	13.042	6.95E-06

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