APPENDIX F

Bush Community Emission Factors

- **F-1 Aircraft Emission Factors**
- **F-2 Nonroad Emission Factors**
- **F-3 Area Source Emission Factors**

APPENDIX F-1

Aircraft Emission Factors

Appendix F-1

Aircraft Emission Factors for Bush Communities

Hydrocarbon emissions were estimated for general aviation aircraft, both turbine and piston powered, and for turbine helicopters. Although piston powered helicopters exist, the majority of in-use helicopters are believed to be turbine powered. Most of the toxic pollutant emissions were calculated by applying toxic profiles to HC emissions, with the exception of lead emissions. Lead emissions were estimated from the piston aircraft using the lead to SO_X emissions ratio of 6.08. The estimated toxic emission factors are summarized in Table F-1 below based on landing and take-off (LTO) cycles.

Table F-1

Toxic Emissions for General Aviation Aircraft and Helicopters

No.	Section 112 Hazardous Air Pollutants Chemical Name	General Aviation (g/LTO)		Helicopter (g/LTO)
		Turbine	Piston	Turbine
9	1,3-Butadiene	24.18	2.70	53.19
35	Acetaldehyde	66.54	1.71	146.35
39	Acrolein	31.73	0.17	69.79
48	Benzene (including benzene from gasoline)	27.57	11.17	60.64
99	Ethyl benzene	2.31	4.05	5.08
109	Formaldehyde	217.80	7.42	479.04
118	Hexane	0.00	1.93	0.00
124	Lead Compounds	0.00	7.35	0.00
162	Polycylic Organic Matter	0.04	0.01	0.09
164	Propionaldehyde	13.86	0.17	30.49
172	Styrene	5.70	0.94	12.53
176	Toluene	7.55	28.68	16.60
185	Xylenes (isomers and mixture)	6.78	16.16	14.91

For general aviation aircraft, three common airframe models were chosen each for piston and turbine engines. The models chosen are: Piper Navajo, Cessna 150, and Cherokee Six for piston aircraft; and PA-42 Cheyenne, DHC 6/300, and Cessna T337 for turbine aircraft. Emission factors from the FAA EDMS model resulted in average HC emissions of about 265 g/LTO for piston general aviation aircraft and about 1398 g/LTO for turbine general aviation aircraft. Toxic fractions were then applied.

Because emission factors for helicopters were only available for military models, the most common turbine engine was identified and used in estimating the typical HC

emissions from helicopters. The engine was identified as model T58-GE-5, and typically 2 engines are used per helicopter. Using the emission factors and time-in-mode values from AP-42, the HC emissions estimate found for helicopters was about 3000 g/LTO. Using this, the toxics emissions were then estimated.

APPENDIX F-2

Nonroad Emission Factors

Appendix F-2

NONROAD Emission Factors for Rural Alaskan Communities

The emission factors shown in Tables F-2-1 through F-2-4 were generated using output from EPA's NONROAD Emissions model. For simplicity, the output a Fairbanks modeling run was used to generate the emission factors. However, Slight differences in the calculated emission factors from the Fairbanks, Juneau, and Anchorage areas exist due to temperature adjustments made within the model.

The standard NONROAD model output includes estimated VOC emissions, hours of equipment activity and estimated fuel use for each equipment category and technology type. These values were used to generate VOC emission factors on a gram-per-hour basis and on a gram-per gallon basis as follows:

$$\frac{\text{tons VOC}}{\text{season}} \times \frac{\text{908,000 grams}}{\text{ton}} \div \frac{\text{hours of equip. activity}}{\text{season}} = \frac{\text{grams VOC}}{\text{hour}}$$

$$\frac{\text{tons VOC}}{\text{season}} \times \frac{\text{908,000 grams}}{\text{ton}} \div \frac{\text{gallons of fuel used}}{\text{season}} = \frac{\text{grams VOC}}{\text{gallon}}$$

Once VOC estimates were obtained, HAP emission rates were determined by applying the applicable toxic fraction to the VOC emission rate:

$$\frac{\text{grams VOC}}{\text{hour}} \times \frac{\text{grams toxics}}{\text{grams VOC}} = \frac{\text{grams toxics}}{\text{hour}}$$

$$\frac{\text{grams VOC}}{\text{gallon}} \times \frac{\text{grams toxics}}{\text{grams VOC}} = \frac{\text{grams toxics}}{\text{gallon}}$$

A total of four sets of HAP emission factors were prepared for this effort:

1. Winter - Toxic/hour
2. Winter - Toxic/gallon
3. Summer - Toxic/hour
4. Summer - Toxic/gallon

Table F-2-1
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese
AC\Refrigeration	Dsl	16.59	19.16	1.34E-03	1.34E-03
AC\Refrigeration	4-St	126.53	1.19	7.12E-05	1.42E-04
Aerial Lifts	4-St	203.59	1.97	1.18E-04	2.37E-04
Aerial Lifts	Dsl	48.10	39.20	2.74E-03	2.74E-03
Agricultural Tractors	Dsl	68.88	39.04	2.73E-03	2.73E-03
Air Compressors	4-St	137.18	1.18	7.10E-05	1.42E-04
Air Compressors	Dsl	45.32	36.61	2.56E-03	2.56E-03
Airport Support Equipment	Dsl	113.22	80.30	5.62E-03	5.62E-03
Airport Support Equipment	4-St	161.66	1.90	1.14E-04	2.28E-04
All Terrain Vehicles\Motorcycles	2-St	960.78	22.81	1.37E-03	2.74E-03
All Terrain Vehicles\Motorcycles	4-St	44.75	0.38	2.27E-05	4.54E-05
Balers	4-St	325.28	2.24	1.34E-04	2.69E-04
Bore/Drill Rigs	Dsl	130.39	106.33	7.44E-03	7.44E-03
Bore/Drill Rigs	4-St	94.84	0.74	4.45E-05	8.91E-05
Cement & Mortar Mixers	4-St	134.83	1.12	6.70E-05	1.34E-04
Cement & Mortar Mixers	Dsl	10.92	15.61	1.09E-03	1.09E-03
Combines	Dsl	96.37	100.25	7.02E-03	7.02E-03
Concrete/Industrial Saws	2-St	510.05	30.34	1.82E-03	3.64E-03
Concrete/Industrial Saws	4-St	129.63	1.29	7.77E-05	1.55E-04
Concrete/Industrial Saws	Dsl	42.38	40.73	2.85E-03	2.85E-03
Cranes	Dsl	69.00	53.35	3.73E-03	3.73E-03
Cranes	4-St	237.46	2.41	1.45E-04	2.89E-04
Crawler Tractor/Dozers	Dsl	65.58	59.50	4.16E-03	4.16E-03
Crushing/Proc. Equipment	Dsl	82.99	59.14	4.14E-03	4.14E-03
Crushing/Proc. Equipment	4-St	134.68	1.17	7.04E-05	1.41E-04
Dumpers/Tenders	4-St	95.46	0.70	4.22E-05	8.45E-05
Dumpers/Tenders	Dsl	25.33	21.77	1.52E-03	1.52E-03
Excavators	Dsl	136.03	80.19	5.61E-03	5.61E-03
Forklifts	4-St	87.18	1.85	1.11E-04	2.22E-04

Table F-2-1
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese
Forklifts	Dsl	44.83	38.94	2.73E-03	2.73E-03
Gas Compressors	4-St	311.37	7.47	4.48E-04	8.96E-04
Generator Sets	4-St	157.87	1.05	6.28E-05	1.26E-04
Generator Sets	Dsl	54.23	41.61	2.91E-03	2.91E-03
Generator Sets	2-St	241.04	9.89	5.94E-04	1.19E-03
Graders	Dsl	59.52	51.62	3.61E-03	3.61E-03
Inboard	Dsl	108.14	55.49	3.88E-03	3.88E-03
Inboard/Sterndrive	4-St	322.62	3.78	2.27E-04	4.54E-04
Irrigation Sets	Dsl	74.52	52.04	3.64E-03	3.64E-03
Off-Highway Tractors	Dsl	191.41	140.30	9.82E-03	9.82E-03
Off-highway Trucks	Dsl	237.25	178.36	1.25E-02	1.25E-02
Other Agricultural Equipment	Dsl	93.02	57.09	4.00E-03	4.00E-03
Other Agricultural Equipment	4-St	96.98	0.71	4.23E-05	8.47E-05
Other Construction Equipment	Dsl	59.96	57.60	4.03E-03	4.03E-03
Other Construction Equipment	4-St	574.56	5.86	3.52E-04	7.03E-04
Other General Industrial Eqp	4-St	107.80	0.78	4.70E-05	9.41E-05
Other General Industrial Eqp	Dsl	32.94	28.33	1.98E-03	1.98E-03
Other Material Handling Eqp	Dsl	115.12	85.17	5.96E-03	5.96E-03
Other Material Handling Eqp	4-St	160.54	1.37	8.19E-05	1.64E-04
Other Underground Mining Equipment	Dsl	171.36	102.84	7.20E-03	7.20E-03
Outboard	2-St	1,288.74	75.08	4.50E-03	9.01E-03
Outboard	Dsl	16.56	16.60	1.16E-03	1.16E-03
Pavers	Dsl	46.06	43.12	3.02E-03	3.02E-03
Pavers	4-St	148.67	1.43	8.57E-05	1.71E-04
Paving Equipment	4-St	126.26	0.94	5.66E-05	1.13E-04
Paving Equipment	Dsl	44.06	45.18	3.16E-03	3.16E-03
Paving Equipment	2-St	234.60	9.72	5.83E-04	1.17E-03
Plate Compactors	4-St	96.58	0.70	4.22E-05	8.43E-05
Plate Compactors	2-St	197.92	8.20	4.92E-04	9.84E-04

Table F-2-1
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese
Plate Compactors	Dsl	12.39	17.88	1.25E-03	1.25E-03
Pressure Washers	4-St	161.45	1.19	7.13E-05	1.43E-04
Pressure Washers	Dsl	25.31	26.06	1.82E-03	1.82E-03
Pumps	2-St	253.87	10.04	6.03E-04	1.21E-03
Pumps	4-St	127.90	0.98	5.89E-05	1.18E-04
Pumps	Dsl	42.56	34.64	2.42E-03	2.42E-03
Railway Maintenance	Dsl	81.61	53.92	3.77E-03	3.77E-03
Railway Maintenance	4-St	77.54	0.62	3.71E-05	7.41E-05
Rollers	Dsl	40.05	40.71	2.85E-03	2.85E-03
Rollers	4-St	137.46	1.37	8.24E-05	1.65E-04
Rough Terrain Forklift	Dsl	102.98	74.61	5.22E-03	5.22E-03
Rough Terrain Forklift	4-St	395.29	4.03	2.42E-04	4.84E-04
Rubber Tire Loaders	Dsl	142.88	97.85	6.85E-03	6.85E-03
Rubber Tire Loaders	4-St	475.71	4.85	2.91E-04	5.82E-04
Rubber Tire Tractor/Dozers	Dsl	105.44	84.84	5.94E-03	5.94E-03
Scrapers	Dsl	114.83	96.80	6.78E-03	6.78E-03
Signal Boards/Light Plants	Dsl	21.43	20.18	1.41E-03	1.41E-03
Signal Boards/Light Plants	4-St	116.12	0.90	5.42E-05	1.08E-04
Skid Steer Loaders	Dsl	71.36	48.21	3.37E-03	3.37E-03
Skid Steer Loaders	4-St	233.23	2.16	1.30E-04	2.60E-04
Snowblowers (res)	2-St	333.38	11.94	7.16E-04	1.43E-03
Snowblowers (res)	4-St	37.82	0.33	1.98E-05	3.95E-05
Snowmobiles	2-St	2,075.68	49.27	2.96E-03	5.91E-03
Snowmobiles	4-St	194.06	1.58	9.50E-05	1.90E-04
Specialty Vehicle Carts	4-St	259.93	1.76	1.05E-04	2.11E-04
Specialty Vehicle Carts	2-St	75.88	0.76	4.58E-05	9.17E-05
Specialty Vehicle Carts	Dsl	198.28	128.32	8.98E-03	8.98E-03
Sprayers	4-St	169.24	1.43	8.59E-05	1.72E-04
Sprayers	2-St	260.28	9.88	5.93E-04	1.19E-03

Table F-2-1
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese
Sprayers	Dsl	153.13	77.66	5.44E-03	5.44E-03
Surfacing Equipment	4-St	87.36	0.75	4.51E-05	9.03E-05
Surfacing Equipment	Dsl	138.39	140.84	9.86E-03	9.86E-03
Swathers	4-St	589.47	4.06	2.44E-04	4.87E-04
Swathers	Dsl	40.35	47.80	3.35E-03	3.35E-03
Sweepers/Scrubbers	Dsl	91.87	59.26	4.15E-03	4.15E-03
Sweepers/Scrubbers	4-St	218.50	2.14	1.28E-04	2.57E-04
Sweepers/Scrubbers	2-St	213.86	8.86	5.32E-04	1.06E-03
Tampers/Rammers	2-St	296.90	18.21	1.09E-03	2.19E-03
Tampers/Rammers	4-St	75.57	0.59	3.52E-05	7.05E-05
Terminal Tractors	Dsl	56.06	53.52	3.75E-03	3.75E-03
Tillers > 6 HP	4-St	120.48	0.57	3.41E-05	6.83E-05
Tractors/Loaders/Backhoes	Dsl	84.91	59.56	4.17E-03	4.17E-03
Tractors/Loaders/Backhoes	4-St	130.30	1.29	7.75E-05	1.55E-04
Trenchers	Dsl	52.27	46.39	3.25E-03	3.25E-03
Trenchers	4-St	151.50	1.34	8.03E-05	1.61E-04
Welders	4-St	179.29	1.75	1.05E-04	2.09E-04
Welders	Dsl	47.71	34.82	2.44E-03	2.44E-03

Table F-2-2
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
AC\Refrigeration	Dsl	108.31	27.50	1.93E-03	1.93E-03	5.50E-04
AC\Refrigeration	4-St	23.82	1.02	6.09E-05	1.22E-04	1.02E-05
Aerial Lifts	4-St	140.41	1.36	8.17E-05	1.63E-04	1.36E-05
Aerial Lifts	Dsl	35.03	28.55	2.00E-03	2.00E-03	5.71E-04
Agricultural Tractors	Dsl	16.11	9.13	6.39E-04	6.39E-04	1.83E-04
Air Compressors	4-St	153.85	1.33	7.96E-05	1.59E-04	1.33E-05
Air Compressors	Dsl	19.83	16.02	1.12E-03	1.12E-03	3.20E-04
Airport Support Equipment	Dsl	190.85	17.77	1.24E-03	1.24E-03	3.55E-04
Airport Support Equipment	4-St	25.06	2.24	1.35E-04	2.69E-04	2.24E-05
All Terrain Vehicles\Motorcycles	2-St	469.54	11.15	6.69E-04	1.34E-03	1.11E-04
All Terrain Vehicles\Motorcycles	4-St	82.56	0.70	4.19E-05	8.38E-05	6.98E-06
Balers	4-St	113.50	0.78	4.69E-05	9.38E-05	7.82E-06
Bore/Drill Rigs	Dsl	225.10	13.15	9.20E-04	9.20E-04	2.63E-04
Bore/Drill Rigs	4-St	16.12	1.76	1.06E-04	2.11E-04	1.76E-05
Cement & Mortar Mixers	4-St	203.78	1.69	1.01E-04	2.02E-04	1.69E-05
Cement & Mortar Mixers	Dsl	30.44	43.52	3.05E-03	3.05E-03	8.70E-04
Combines	Dsl	15.32	15.94	1.12E-03	1.12E-03	3.19E-04
Concrete/Industrial Saws	2-St	1,108.78	65.96	3.96E-03	7.91E-03	6.60E-04
Concrete/Industrial Saws	4-St	109.10	1.09	6.54E-05	1.31E-04	1.09E-05
Concrete/Industrial Saws	Dsl	18.33	17.62	1.23E-03	1.23E-03	3.52E-04
Cranes	Dsl	136.31	11.76	8.23E-04	8.23E-04	2.35E-04
Cranes	4-St	15.21	1.38	8.30E-05	1.66E-04	1.38E-05
Crawler Tractor/Dozers	Dsl	11.58	10.51	7.35E-04	7.35E-04	2.10E-04
Crushing/Proc. Equipment	Dsl	130.55	12.05	8.44E-04	8.44E-04	2.41E-04
Crushing/Proc. Equipment	4-St	16.92	1.14	6.82E-05	1.36E-04	1.14E-05
Dumpers/Tenders	4-St	167.43	1.23	7.41E-05	1.48E-04	1.23E-05
Dumpers/Tenders	Dsl	61.50	52.84	3.70E-03	3.70E-03	1.06E-03
Excavators	Dsl	20.23	11.93	8.35E-04	8.35E-04	2.39E-04
Forklifts	4-St	723.18	15.35	9.21E-04	1.84E-03	1.54E-04

Table F-2-2
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
Forklifts	Dsl	27.08	23.53	1.65E-03	1.65E-03	4.71E-04
Gas Compressors*	4-St					
Generator Sets	4-St	1,130.11	0.95	5.72E-05	1.14E-04	9.53E-06
Generator Sets	Dsl	143.91	17.27	1.21E-03	1.21E-03	3.45E-04
Generator Sets	2-St	22.52	46.39	2.78E-03	5.57E-03	4.64E-04
Graders	Dsl	10.38	9.00	6.30E-04	6.30E-04	1.80E-04
Inboard	Dsl	23.71	12.16	8.52E-04	8.52E-04	2.43E-04
Inboard/Sterndrive	4-St	79.21	0.93	5.57E-05	1.11E-04	9.29E-06
Irrigation Sets	Dsl	19.22	13.42	9.40E-04	9.40E-04	2.68E-04
Off-Highway Tractors	Dsl	15.22	11.15	7.81E-04	7.81E-04	2.23E-04
Off-highway Trucks	Dsl	11.06	8.32	5.82E-04	5.82E-04	1.66E-04
Other Agricultural Equipment	Dsl	132.52	13.79	9.65E-04	9.65E-04	2.76E-04
Other Agricultural Equipment	4-St	22.46	0.96	5.78E-05	1.16E-04	9.64E-06
Other Construction Equipment	Dsl	143.68	13.20	9.24E-04	9.24E-04	2.64E-04
Other Construction Equipment	4-St	13.74	1.47	8.79E-05	1.76E-04	1.47E-05
Other General Industrial Eqp	4-St	217.16	1.58	9.48E-05	1.90E-04	1.58E-05
Other General Industrial Eqp	Dsl	15.25	13.12	9.18E-04	9.18E-04	2.62E-04
Other Material Handling Eqp	Dsl	117.22	23.54	1.65E-03	1.65E-03	4.71E-04
Other Material Handling Eqp	4-St	31.82	1.00	5.98E-05	1.20E-04	9.97E-06
Other Underground Mining Equipment	Dsl	31.27	18.76	1.31E-03	1.31E-03	3.75E-04
Outboard	2-St	626.35	36.49	2.19E-03	4.38E-03	3.65E-04
Outboard	Dsl	32.61	32.69	2.29E-03	2.29E-03	6.54E-04
Pavers	Dsl	121.17	13.33	9.33E-04	9.33E-04	2.67E-04
Pavers	4-St	14.24	1.16	6.98E-05	1.40E-04	1.16E-05
Paving Equipment	4-St	1,136.62	1.18	7.08E-05	1.42E-04	1.18E-05
Paving Equipment	Dsl	157.78	14.90	1.04E-03	1.04E-03	2.98E-04
Paving Equipment	2-St	14.52	47.10	2.83E-03	5.65E-03	4.71E-04
Plate Compactors	4-St	1,137.09	1.56	9.39E-05	1.88E-04	1.56E-05
Plate Compactors	2-St	215.03	47.10	2.83E-03	5.65E-03	4.71E-04

Table F-2-2
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
Plate Compactors	Dsl	54.59	78.76	5.51E-03	5.51E-03	1.58E-03
Pressure Washers	4-St	176.12	1.30	7.78E-05	1.56E-04	1.30E-05
Pressure Washers	Dsl	23.99	24.70	1.73E-03	1.73E-03	4.94E-04
Pumps	2-St	1,169.20	46.26	2.78E-03	5.55E-03	4.63E-04
Pumps	4-St	176.50	1.35	8.12E-05	1.62E-04	1.35E-05
Pumps	Dsl	22.29	18.15	1.27E-03	1.27E-03	3.63E-04
Railway Maintenance	Dsl	135.41	17.03	1.19E-03	1.19E-03	3.41E-04
Railway Maintenance	4-St	25.78	1.08	6.47E-05	1.29E-04	1.08E-05
Rollers	Dsl	112.43	14.42	1.01E-03	1.01E-03	2.88E-04
Rollers	4-St	14.18	1.12	6.74E-05	1.35E-04	1.12E-05
Rough Terrain Forklift	Dsl	143.82	21.13	1.48E-03	1.48E-03	4.23E-04
Rough Terrain Forklift	4-St	29.17	1.47	8.80E-05	1.76E-04	1.47E-05
Rubber Tire Loaders	Dsl	143.94	14.29	1.00E-03	1.00E-03	2.86E-04
Rubber Tire Loaders	4-St	20.87	1.47	8.81E-05	1.76E-04	1.47E-05
Rubber Tire Tractor/Dozers	Dsl	10.18	8.19	5.73E-04	5.73E-04	1.64E-04
Scrapers	Dsl	9.51	8.02	5.61E-04	5.61E-04	1.60E-04
Signal Boards/Light Plants	Dsl	170.66	27.43	1.92E-03	1.92E-03	5.49E-04
Signal Boards/Light Plants	4-St	29.14	1.33	7.96E-05	1.59E-04	1.33E-05
Skid Steer Loaders	Dsl	132.10	26.55	1.86E-03	1.86E-03	5.31E-04
Skid Steer Loaders	4-St	39.30	1.23	7.35E-05	1.47E-04	1.23E-05
Snowblowers (res)	2-St	1,133.40	40.58	2.43E-03	4.87E-03	4.06E-04
Snowblowers (res)	4-St	91.07	0.79	4.76E-05	9.52E-05	7.93E-06
Snowmobiles	2-St	434.81	11.15	6.69E-04	1.34E-03	1.11E-04
Snowmobiles	4-St	67.08	0.70	4.19E-05	8.39E-05	6.99E-06
Specialty Vehicle Carts	4-St	100.02	1.05	6.33E-05	1.27E-04	1.05E-05
Specialty Vehicle Carts	2-St	156.20	1.01	6.04E-05	1.21E-04	1.01E-05
Specialty Vehicle Carts	Dsl	30.14	19.51	1.37E-03	1.37E-03	3.90E-04
Sprayers	4-St	1,195.39	1.87	1.12E-04	2.24E-04	1.87E-05
Sprayers	2-St	220.83	45.40	2.72E-03	5.45E-03	4.54E-04

Table F-2-2
Wintertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
Sprayers	Dsl	33.72	17.10	1.20E-03	1.20E-03	3.42E-04
Surfacing Equipment	4-St	135.86	1.17	7.02E-05	1.40E-04	1.17E-05
Surfacing Equipment	Dsl	15.58	15.85	1.11E-03	1.11E-03	3.17E-04
Swathers	4-St	105.97	0.73	4.38E-05	8.76E-05	7.30E-06
Swathers	Dsl	15.52	18.39	1.29E-03	1.29E-03	3.68E-04
Sweepers/Scrubbers	Dsl	1,230.16	18.01	1.26E-03	1.26E-03	3.60E-04
Sweepers/Scrubbers	4-St	138.55	1.36	8.13E-05	1.63E-04	1.36E-05
Sweepers/Scrubbers	2-St	27.93	50.97	3.06E-03	6.12E-03	5.10E-04
Tampers/Rammers	2-St	1,018.94	62.50	3.75E-03	7.50E-03	6.25E-04
Tampers/Rammers	4-St	126.71	0.99	5.91E-05	1.18E-04	9.85E-06
Terminal Tractors	Dsl	9.32	8.90	6.23E-04	6.23E-04	1.78E-04
Tillers > 6 HP	4-St	150.48	0.71	4.26E-05	8.53E-05	7.11E-06
Tractors/Loaders/Backhoes	Dsl	103.29	19.50	1.36E-03	1.36E-03	3.90E-04
Tractors/Loaders/Backhoes	4-St	27.80	1.02	6.14E-05	1.23E-04	1.02E-05
Trenchers	Dsl	143.68	17.53	1.23E-03	1.23E-03	3.51E-04
Trenchers	4-St	19.75	1.27	7.62E-05	1.52E-04	1.27E-05
Welders	4-St	115.31	1.12	6.73E-05	1.35E-04	1.12E-05
Welders	Dsl	25.37	18.52	1.30E-03	1.30E-03	3.70E-04

Table F-2-3
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese	Mercury
AC\Refrigeration	Dsl	16.64	19.10	1.34E-03	1.34E-03	3.82E-04
AC\Refrigeration	4-St	120.02	1.19	7.12E-05	1.42E-04	1.19E-05
Aerial Lifts	4-St	215.51	1.98	1.19E-04	2.38E-04	1.98E-05
Aerial Lifts	Dsl	48.56	39.40	2.76E-03	2.76E-03	7.88E-04
Agricultural Tractors	Dsl	70.28	39.57	2.77E-03	2.77E-03	7.91E-04
Air Compressors	4-St	124.54	1.14	6.81E-05	1.36E-04	1.14E-05
Air Compressors	Dsl	45.08	36.65	2.57E-03	2.57E-03	7.33E-04
Airport Support Equipment	Dsl	116.98	82.09	5.75E-03	5.75E-03	1.64E-03
Airport Support Equipment	4-St	142.07	1.80	1.08E-04	2.16E-04	1.80E-05
All Terrain Vehicles\Motorcycles	2-St	1,254.53	22.84	1.37E-03	2.74E-03	2.28E-04
All Terrain Vehicles\Motorcycles	4-St	122.74	0.38	2.28E-05	4.56E-05	3.80E-06
Balers	4-St	482.12	2.24	1.35E-04	2.69E-04	2.24E-05
Bore/Drill Rigs	Dsl	130.22	107.45	7.52E-03	7.52E-03	2.15E-03
Bore/Drill Rigs	4-St	96.27	0.78	4.70E-05	9.40E-05	7.83E-06
Cement & Mortar Mixers	4-St	139.89	1.19	7.16E-05	1.43E-04	1.19E-05
Cement & Mortar Mixers	Dsl	10.92	15.61	1.09E-03	1.09E-03	3.12E-04
Chain Saws < 6 HP (res)	2-St	359.34	12.77	7.66E-04	1.53E-03	1.28E-04
Combines	Dsl	96.86	100.93	7.07E-03	7.07E-03	2.02E-03
Concrete/Industrial Saws	2-St	478.95	28.40	1.70E-03	3.41E-03	2.84E-04
Concrete/Industrial Saws	4-St	112.40	1.21	7.28E-05	1.46E-04	1.21E-05
Concrete/Industrial Saws	Dsl	43.63	41.34	2.89E-03	2.89E-03	8.27E-04
Cranes	Dsl	68.17	53.60	3.75E-03	3.75E-03	1.07E-03
Cranes	4-St	244.66	2.42	1.45E-04	2.90E-04	2.42E-05
Crawler Tractor/Dozers	Dsl	67.18	60.62	4.24E-03	4.24E-03	1.21E-03
Crushing/Proc. Equipment	Dsl	82.25	59.41	4.16E-03	4.16E-03	1.19E-03
Crushing/Proc. Equipment	4-St	122.45	1.15	6.88E-05	1.38E-04	1.15E-05
Dumpers/Tenders	4-St	98.89	0.72	4.34E-05	8.68E-05	7.23E-06
Dumpers/Tenders	Dsl	25.34	21.77	1.52E-03	1.52E-03	4.35E-04
Excavators	Dsl	142.25	83.03	5.81E-03	5.81E-03	1.66E-03

Table F-2-3
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese	Mercury
Forklifts	4-St	86.57	1.84	1.11E-04	2.21E-04	1.84E-05
Forklifts	Dsl	46.75	39.73	2.78E-03	2.78E-03	7.95E-04
Gas Compressors	4-St	272.14	6.53	3.92E-04	7.83E-04	6.53E-05
Generator Sets	4-St	167.25	1.04	6.24E-05	1.25E-04	1.04E-05
Generator Sets	Dsl	54.32	41.70	2.92E-03	2.92E-03	8.34E-04
Generator Sets	2-St	245.01	9.89	5.94E-04	1.19E-03	9.89E-05
Graders	Dsl	61.00	52.55	3.68E-03	3.68E-03	1.05E-03
Inboard	Dsl	108.15	55.49	3.88E-03	3.88E-03	1.11E-03
Inboard/Sterndrive	4-St	928.00	3.79	2.27E-04	4.55E-04	3.79E-05
Irrigation Sets	Dsl	73.89	52.14	3.65E-03	3.65E-03	1.04E-03
Lawn & Garden Tractors (res)	4-St	107.51	0.76	4.54E-05	9.08E-05	7.57E-06
Lawn mowers (res)	4-St	74.37	0.49	2.92E-05	5.84E-05	4.87E-06
Leafblowers/Vacuums (res)	2-St	313.53	11.08	6.65E-04	1.33E-03	1.11E-04
Leafblowers/Vacuums (res)	4-St	155.04	0.59	3.55E-05	7.09E-05	5.91E-06
Off-Highway Tractors	Dsl	198.77	144.80	1.01E-02	1.01E-02	2.90E-03
Off-highway Trucks	Dsl	242.38	181.65	1.27E-02	1.27E-02	3.63E-03
Other Agricultural Equipment	Dsl	94.16	57.70	4.04E-03	4.04E-03	1.15E-03
Other Agricultural Equipment	4-St	99.39	0.71	4.26E-05	8.52E-05	7.10E-06
Other Construction Equipment	Dsl	61.05	58.55	4.10E-03	4.10E-03	1.17E-03
Other Construction Equipment	4-St	589.88	5.87	3.52E-04	7.05E-04	5.87E-05
Other General Industrial Eqp	4-St	81.91	0.67	4.00E-05	7.99E-05	6.66E-06
Other General Industrial Eqp	Dsl	33.79	28.88	2.02E-03	2.02E-03	5.78E-04
Other Lawn & Garden Eqp. (res)	4-St	129.36	1.67	1.00E-04	2.01E-04	1.67E-05
Other Material Handling Eqp	Dsl	116.96	86.58	6.06E-03	6.06E-03	1.73E-03
Other Material Handling Eqp	4-St	157.28	1.38	8.26E-05	1.65E-04	1.38E-05
Other Underground Mining Equipment	Dsl	171.62	102.88	7.20E-03	7.20E-03	2.06E-03
Outboard	2-St	1,608.86	75.10	4.51E-03	9.01E-03	7.51E-04
Outboard	Dsl	16.65	16.62	1.16E-03	1.16E-03	3.32E-04
Pavers	Dsl	47.54	43.96	3.08E-03	3.08E-03	8.79E-04

Table F-2-3
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese	Mercury
Pavers	4-St	140.83	1.41	8.48E-05	1.70E-04	1.41E-05
Paving Equipment	4-St	124.26	0.97	5.79E-05	1.16E-04	9.65E-06
Paving Equipment	Dsl	44.81	45.87	3.21E-03	3.21E-03	9.17E-04
Paving Equipment	2-St	237.83	9.79	5.88E-04	1.18E-03	9.79E-05
Personal Water Craft	2-St	3,120.40	123.31	7.40E-03	1.48E-02	1.23E-03
Plate Compactors	4-St	95.42	0.74	4.47E-05	8.94E-05	7.45E-06
Plate Compactors	2-St	198.89	8.17	4.90E-04	9.80E-04	8.17E-05
Plate Compactors	Dsl	12.40	17.88	1.25E-03	1.25E-03	3.58E-04
Pressure Washers	4-St	161.53	1.23	7.39E-05	1.48E-04	1.23E-05
Pressure Washers	Dsl	25.34	26.11	1.83E-03	1.83E-03	5.22E-04
Pumps	2-St	250.13	9.84	5.90E-04	1.18E-03	9.84E-05
Pumps	4-St	126.39	1.00	6.02E-05	1.20E-04	1.00E-05
Pumps	Dsl	42.60	34.74	2.43E-03	2.43E-03	6.95E-04
Railway Maintenance	Dsl	83.91	55.12	3.86E-03	3.86E-03	1.10E-03
Railway Maintenance	4-St	77.34	0.62	3.73E-05	7.47E-05	6.22E-06
Rear Engine Riding Mowers (res)	4-St	62.98	0.47	2.84E-05	5.69E-05	4.74E-06
Rollers	Dsl	40.91	41.26	2.89E-03	2.89E-03	8.25E-04
Rollers	4-St	126.91	1.34	8.07E-05	1.61E-04	1.34E-05
Rotary Tillers < 6 HP (res)	4-St	107.04	0.32	1.90E-05	3.80E-05	3.16E-06
Rotary Tillers < 6 HP (res)	2-St	241.64	8.03	4.82E-04	9.64E-04	8.03E-05
Rough Terrain Forklift	Dsl	105.92	75.80	5.31E-03	5.31E-03	1.52E-03
Rough Terrain Forklift	4-St	401.10	4.04	2.43E-04	4.85E-04	4.04E-05
Rubber Tire Loaders	Dsl	147.98	100.11	7.01E-03	7.01E-03	2.00E-03
Rubber Tire Loaders	4-St	473.67	4.88	2.93E-04	5.86E-04	4.88E-05
Rubber Tire Tractor/Dozers	Dsl	107.94	86.59	6.06E-03	6.06E-03	1.73E-03
Scrapers	Dsl	118.16	99.50	6.97E-03	6.97E-03	1.99E-03
Signal Boards/Light Plants	Dsl	21.50	20.18	1.41E-03	1.41E-03	4.04E-04
Signal Boards/Light Plants	4-St	99.79	0.85	5.10E-05	1.02E-04	8.50E-06
Skid Steer Loaders	Dsl	73.98	49.17	3.44E-03	3.44E-03	9.83E-04

Table F-2-3
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/hour of equipment use)

Equipment	Tech	grams VOC/ hr Equip. use	grams PM/ hr Equip. use	Chromium	Manganese	Mercury
Skid Steer Loaders	4-St	240.60	2.18	1.31E-04	2.61E-04	2.18E-05
Snowblowers (res)*	4-St					
Snowblowers (res)*	2-St					
Snowmobiles*	2-St					
Snowmobiles*	4-St					
Specialty Vehicle Carts	4-St	286.22	1.77	1.06E-04	2.13E-04	1.77E-05
Specialty Vehicle Carts	2-St	95.14	0.77	4.63E-05	9.26E-05	7.72E-06
Specialty Vehicle Carts	Dsl	201.75	130.73	9.15E-03	9.15E-03	2.61E-03
Sprayers	4-St	170.56	1.50	9.01E-05	1.80E-04	1.50E-05
Sprayers	2-St	265.85	9.89	5.93E-04	1.19E-03	9.89E-05
Sprayers	Dsl	154.06	78.07	5.47E-03	5.47E-03	1.56E-03
Surfacing Equipment	4-St	77.62	0.73	4.35E-05	8.71E-05	7.26E-06
Surfacing Equipment	Dsl	140.08	142.62	9.98E-03	9.98E-03	2.85E-03
Swathers	4-St	844.14	4.06	2.43E-04	4.87E-04	4.06E-05
Swathers	Dsl	40.47	48.00	3.36E-03	3.36E-03	9.60E-04
Sweepers/Scrubbers	Dsl	97.06	61.19	4.28E-03	4.28E-03	1.22E-03
Sweepers/Scrubbers	4-St	207.67	2.11	1.26E-04	2.53E-04	2.11E-05
Sweepers/Scrubbers	2-St	198.77	8.22	4.93E-04	9.86E-04	8.22E-05
Tampers/Rammers	2-St	305.81	18.48	1.11E-03	2.22E-03	1.85E-04
Tampers/Rammers	4-St	76.84	0.59	3.55E-05	7.10E-05	5.92E-06
Terminal Tractors	Dsl	58.02	54.86	3.84E-03	3.84E-03	1.10E-03
Tillers > 6 HP	4-St	132.18	0.57	3.41E-05	6.83E-05	5.69E-06
Tractors/Loaders/Backhoes	Dsl	87.83	61.09	4.28E-03	4.28E-03	1.22E-03
Tractors/Loaders/Backhoes	4-St	119.16	1.28	7.68E-05	1.54E-04	1.28E-05

Table F-2-4
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
AC\Refrigeration	Dsl	24.09	27.65	1.94E-03	1.94E-03	5.53E-04
AC\Refrigeration	4-St	102.56	1.01	6.08E-05	1.22E-04	1.01E-05
Aerial Lifts	4-St	148.49	1.37	8.19E-05	1.64E-04	1.37E-05
Aerial Lifts	Dsl	35.41	28.73	2.01E-03	2.01E-03	5.75E-04
Agricultural Tractors	Dsl	16.44	9.26	6.48E-04	6.48E-04	1.85E-04
Air Compressors	4-St	139.65	1.27	7.64E-05	1.53E-04	1.27E-05
Air Compressors	Dsl	19.91	16.18	1.13E-03	1.13E-03	3.24E-04
Airport Support Equipment	Dsl	25.80	18.10	1.27E-03	1.27E-03	3.62E-04
Airport Support Equipment	4-St	186.32	2.36	1.42E-04	2.83E-04	2.36E-05
All Terrain Vehicles\Motorcycles	2-St	613.10	11.16	6.70E-04	1.34E-03	1.12E-04
All Terrain Vehicles\Motorcycles	4-St	226.43	0.70	4.20E-05	8.41E-05	7.01E-06
Balers	4-St	168.23	0.78	4.70E-05	9.39E-05	7.83E-06
Bore/Drill Rigs	Dsl	16.20	13.37	9.36E-04	9.36E-04	2.67E-04
Bore/Drill Rigs	4-St	227.86	1.85	1.11E-04	2.22E-04	1.85E-05
Cement & Mortar Mixers	4-St	210.08	1.79	1.08E-04	2.15E-04	1.79E-05
Cement & Mortar Mixers	Dsl	30.45	43.53	3.05E-03	3.05E-03	8.71E-04
Chain Saws < 6 HP (res)	2-St	1,205.90	42.87	2.57E-03	5.14E-03	4.29E-04
Combines	Dsl	15.40	16.05	1.12E-03	1.12E-03	3.21E-04
Concrete/Industrial Saws	2-St	1,041.19	61.74	3.70E-03	7.41E-03	6.17E-04
Concrete/Industrial Saws	4-St	94.59	1.02	6.13E-05	1.23E-04	1.02E-05
Concrete/Industrial Saws	Dsl	18.89	17.89	1.25E-03	1.25E-03	3.58E-04
Cranes	Dsl	15.16	11.92	8.35E-04	8.35E-04	2.38E-04
Cranes	4-St	140.43	1.39	8.33E-05	1.67E-04	1.39E-05
Crawler Tractor/Dozers	Dsl	11.87	10.71	7.50E-04	7.50E-04	2.14E-04
Crushing/Proc. Equipment	Dsl	17.00	12.28	8.60E-04	8.60E-04	2.46E-04
Crushing/Proc. Equipment	4-St	118.61	1.11	6.66E-05	1.33E-04	1.11E-05
Dumpers/Tenders	4-St	172.86	1.26	7.59E-05	1.52E-04	1.26E-05
Dumpers/Tenders	Dsl	61.52	52.86	3.70E-03	3.70E-03	1.06E-03
Excavators	Dsl	21.11	12.32	8.63E-04	8.63E-04	2.46E-04

Table F-2-4
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
Forklifts	4-St	718.13	15.30	9.18E-04	1.84E-03	1.53E-04
Forklifts	Dsl	28.10	23.89	1.67E-03	1.67E-03	4.78E-04
Gas Compressors*	4-St					
Generator Sets	4-St	151.82	0.94	5.66E-05	1.13E-04	9.44E-06
Generator Sets	Dsl	22.68	17.41	1.22E-03	1.22E-03	3.48E-04
Generator Sets	2-St	1,146.74	46.31	2.78E-03	5.56E-03	4.63E-04
Graders	Dsl	10.64	9.17	6.42E-04	6.42E-04	1.83E-04
Inboard	Dsl	23.71	12.16	8.52E-04	8.52E-04	2.43E-04
Inboard/Sterndrive	4-St	227.84	0.93	5.58E-05	1.12E-04	9.30E-06
Irrigation Sets	Dsl	19.23	13.57	9.50E-04	9.50E-04	2.71E-04
Lawn & Garden Tractors (res)	4-St	115.77	0.82	4.89E-05	9.78E-05	8.15E-06
Lawn mowers (res)	4-St	311.47	2.04	1.22E-04	2.45E-04	2.04E-05
Leafblowers/Vacuums (res)	2-St	1,213.02	42.86	2.57E-03	5.14E-03	4.29E-04
Leafblowers/Vacuums (res)	4-St	278.84	1.06	6.38E-05	1.28E-04	1.06E-05
Off-Highway Tractors	Dsl	15.79	11.51	8.05E-04	8.05E-04	2.30E-04
Off-highway Trucks	Dsl	11.30	8.47	5.93E-04	5.93E-04	1.69E-04
Other Agricultural Equipment	Dsl	22.74	13.94	9.76E-04	9.76E-04	2.79E-04
Other Agricultural Equipment	4-St	135.44	0.97	5.80E-05	1.16E-04	9.67E-06
Other Construction Equipment	Dsl	13.99	13.42	9.39E-04	9.39E-04	2.68E-04
Other Construction Equipment	4-St	147.51	1.47	8.81E-05	1.76E-04	1.47E-05
Other General Industrial Eqp	4-St	164.99	1.34	8.05E-05	1.61E-04	1.34E-05
Other General Industrial Eqp	Dsl	15.65	13.37	9.36E-04	9.36E-04	2.67E-04
Other Lawn & Garden Eqp. (res)	4-St	258.63	3.35	2.01E-04	4.02E-04	3.35E-05
Other Material Handling Eqp	Dsl	32.30	23.91	1.67E-03	1.67E-03	4.78E-04
Other Material Handling Eqp	4-St	114.46	1.00	6.01E-05	1.20E-04	1.00E-05
Other Underground Mining Equipment	Dsl	31.31	18.77	1.31E-03	1.31E-03	3.75E-04
Outboard	2-St	781.84	36.49	2.19E-03	4.38E-03	3.65E-04
Outboard	Dsl	32.78	32.73	2.29E-03	2.29E-03	6.55E-04
Pavers	Dsl	14.71	13.60	9.52E-04	9.52E-04	2.72E-04

Table F-2-4
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
Pavers	4-St	114.71	1.15	6.91E-05	1.38E-04	1.15E-05
Paving Equipment	4-St	154.78	1.20	7.22E-05	1.44E-04	1.20E-05
Paving Equipment	Dsl	14.78	15.13	1.06E-03	1.06E-03	3.03E-04
Paving Equipment	2-St	1,152.29	47.45	2.85E-03	5.69E-03	4.74E-04
Personal Water Craft	2-St	923.51	36.50	2.19E-03	4.38E-03	3.65E-04
Plate Compactors	4-St	211.49	1.65	9.90E-05	1.98E-04	1.65E-05
Plate Compactors	2-St	1,142.17	46.91	2.81E-03	5.63E-03	4.69E-04
Plate Compactors	Dsl	54.63	78.78	5.51E-03	5.51E-03	1.58E-03
Pressure Washers	4-St	175.41	1.34	8.03E-05	1.61E-04	1.34E-05
Pressure Washers	Dsl	24.07	24.80	1.74E-03	1.74E-03	4.96E-04
Pumps	2-St	1,151.98	45.32	2.72E-03	5.44E-03	4.53E-04
Pumps	4-St	174.24	1.38	8.30E-05	1.66E-04	1.38E-05
Pumps	Dsl	22.47	18.32	1.28E-03	1.28E-03	3.66E-04
Railway Maintenance	Dsl	26.47	17.38	1.22E-03	1.22E-03	3.48E-04
Railway Maintenance	4-St	134.69	1.08	6.50E-05	1.30E-04	1.08E-05
Rear Engine Riding Mowers (res)	4-St	107.67	0.81	4.86E-05	9.72E-05	8.10E-06
Rollers	Dsl	14.50	14.62	1.02E-03	1.02E-03	2.92E-04
Rollers	4-St	103.77	1.10	6.60E-05	1.32E-04	1.10E-05
Rotary Tillers < 6 HP (res)	4-St	308.55	0.91	5.47E-05	1.09E-04	9.12E-06
Rotary Tillers < 6 HP (res)	2-St	1,262.98	41.97	2.52E-03	5.04E-03	4.20E-04
Rough Terrain Forklift	Dsl	29.90	21.40	1.50E-03	1.50E-03	4.28E-04
Rough Terrain Forklift	4-St	145.94	1.47	8.83E-05	1.77E-04	1.47E-05
Rubber Tire Loaders	Dsl	21.53	14.57	1.02E-03	1.02E-03	2.91E-04
Rubber Tire Loaders	4-St	143.32	1.48	8.87E-05	1.77E-04	1.48E-05
Rubber Tire Tractor/Dozers	Dsl	10.42	8.36	5.85E-04	5.85E-04	1.67E-04
Scrapers	Dsl	9.79	8.25	5.77E-04	5.77E-04	1.65E-04
Signal Boards/Light Plants	Dsl	29.33	27.52	1.93E-03	1.93E-03	5.50E-04
Signal Boards/Light Plants	4-St	146.60	1.25	7.49E-05	1.50E-04	1.25E-05
Skid Steer Loaders	Dsl	40.62	27.00	1.89E-03	1.89E-03	5.40E-04

Table F-2-4
Summertime Emission Factors for Rural Alaskan Communities
Based on EPA NONROAD Model Output for Fairbanks, AK
(grams toxics/gallon of fuel use)

Equipment	Tech	gramsVOC/ gal fuel	grams PM/ gal fuel	Chromium	Manganese	Mercury
Skid Steer Loaders	4-St	136.05	1.23	7.39E-05	1.48E-04	1.23E-05
Snowblowers (res)**	4-St					
Snowblowers (res)**	2-St					
Snowmobiles**	2-St					
Snowmobiles**	4-St					
Specialty Vehicle Carts	4-St	171.76	1.06	6.38E-05	1.28E-04	1.06E-05
Specialty Vehicle Carts	2-St	125.41	1.02	6.10E-05	1.22E-04	1.02E-05
Specialty Vehicle Carts	Dsl	30.64	19.86	1.39E-03	1.39E-03	3.97E-04
Sprayers	4-St	221.45	1.95	1.17E-04	2.34E-04	1.95E-05
Sprayers	2-St	1,216.29	45.25	2.72E-03	5.43E-03	4.53E-04
Sprayers	Dsl	33.93	17.20	1.20E-03	1.20E-03	3.44E-04
Surfacing Equipment	4-St	120.65	1.13	6.77E-05	1.35E-04	1.13E-05
Surfacing Equipment	Dsl	15.77	16.06	1.12E-03	1.12E-03	3.21E-04
Swathers	4-St	151.76	0.73	4.38E-05	8.75E-05	7.29E-06
Swathers	Dsl	15.57	18.47	1.29E-03	1.29E-03	3.69E-04
Sweepers/Scrubbers	Dsl	29.44	18.56	1.30E-03	1.30E-03	3.71E-04
Sweepers/Scrubbers	4-St	131.67	1.33	8.01E-05	1.60E-04	1.33E-05
Sweepers/Scrubbers	2-St	1,143.36	47.27	2.84E-03	5.67E-03	4.73E-04
Tampers/Rammers	2-St	1,048.81	63.38	3.80E-03	7.61E-03	6.34E-04
Tampers/Rammers	4-St	128.40	0.99	5.93E-05	1.19E-04	9.89E-06
Terminal Tractors	Dsl	9.65	9.13	6.39E-04	6.39E-04	1.83E-04
Tillers > 6 HP	4-St	164.94	0.71	4.26E-05	8.52E-05	7.10E-06
Tractors/Loaders/Backhoes	Dsl	28.70	19.96	1.40E-03	1.40E-03	3.99E-04
Tractors/Loaders/Backhoes	4-St	94.40	1.01	6.08E-05	1.22E-04	1.01E-05

APPENDIX F-3

Area Source Emission Factors

Appendix F-3

Area Source Emission Factors for Bush Communities

Area source emission factors are included in this section for all area source categories addressed in this inventory (see list below). A discussion of calculation methodologies is provided in Appendix D-1.

Airline Support

			Starved Air Incinerators			NG-Fired Boilers/Heaters			
			Activity Data Input:		**tons**	**Activity Data Input:**		**MMscf**	
	Section 112 Hazardous Air Pollutants		**Source Category Emission Calculations**			**Source Category Emission Calculations**			**Total - All Categories**
No.	**CAS No.**	**Chemical Name**	**Emission Factor**		**Estimated Emissions**	**Emission Factor**		**Estimated Emissions**	**Estimated Emissions**
12	106467	1,4-Dichlorobenzene(p)				1.20E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	2.94E-06	lb/ton	0.00E+00 tons				0.00E+00 tons
45	N/A	Antimony Compounds				2.04E-04 lb/MMscf		0.00E+00 tons	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	6.69E-04	lb/ton	0.00E+00 tons				0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)				2.10E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
52	N/A	Beryllium Compounds				1.20E-05 lb/MMscf		0.00E+00 tons	0.00E+00 tons
58	N/A	Cadmium Compouns	2.41E-03	lb/ton	0.00E+00 tons	1.10E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
75	N/A	Chromium Chompounds	3.31E-03	lb/ton	0.00E+00 tons	1.40E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
76	N/A	Cobalt Compounds				8.40E-05 lb/MMscf		0.00E+00 tons	0.00E+00 tons
109	5000	Formaldehyde				7.50E-02 lb/MMscf		0.00E+00 tons	0.00E+00 tons
118	110543	Hexane				1.80E+00 lb/MMscf		0.00E+00 tons	0.00E+00 tons
120	7647010	Hydrochloric acid	2.15E+00	lb/ton	0.00E+00 tons				0.00E+00 tons
124	N/A	Lead Compounds				5.00E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
127	N/A	Manganese Compounds				3.80E-04 lb/MMscf		0.00E+00 tons	0.00E+00 tons
128	N/A	Mercury Compounds	5.60E-03	lb/ton	0.00E+00 tons	2.60E-04 lb/MMscf		0.00E+00 tons	0.00E+00 tons
145	91203	Naphthalene				6.10E-04 lb/MMscf		0.00E+00 tons	0.00E+00 tons
146	N/A	Nickel Compounds	5.52E-03	lb/ton	0.00E+00 tons	2.10E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
162	N/A	Polycylic Organic Matter				8.82E-05 lb/MMscf		0.00E+00 tons	0.00E+00 tons
171	N/A	Selenium Compounds				2.40E-05 lb/MMscf		0.00E+00 tons	0.00E+00 tons
176	108883	Toluene				3.40E-03 lb/MMscf		0.00E+00 tons	0.00E+00 tons
			Total HAP Emissions		**0.000 tons**	**Total HAP Emissions**		**0.000 tons**	**TOTAL** **0.000 tons**

Notes/Comments:
1. Reference: AP-42, Tables 2.1-9.

Notes/Comments:
1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4.

Asphalt Paving

			NG-Fired Batch Asphalt Plant		Oil-Fired Drum Asphalt Plant		
			Activity Data Input:	**tons**	**Activity Data Input:**	**tons**	
Section 112 Hazardous Air Pollutants			**Source Category Emission Calculations**		**Source Category Emission Calculations**		**Total - All Categories**
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**	**Emission Factor**	**Estimated Emissions**	**Estimated Emissions**
35	75070	Acetaldehyde	0.00064 lb/ton	0.00E+00 tons	0.0013 lb/ton	0.00E+00 tons	0.00E+00 tons
39	107028	Acrolein			0.000026 lb/ton	0.00E+00 tons	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	0.00035 lb/ton	0.00E+00 tons	0.00041 lb/ton	0.00E+00 tons	0.00E+00 tons
99	100414	Ethyl benzene	0.0033 lb/ton	0.00E+00 tons	0.00038 lb/ton	0.00E+00 tons	0.00E+00 tons
109	5000	Formaldehyde	0.00086 lb/ton	0.00E+00 tons	0.0024 lb/ton	0.00E+00 tons	0.00E+00 tons
133	78933	Methyl ethyl ketone (2-Butanone)			0.00002 lb/ton	0.00E+00 tons	0.00E+00 tons
164	123386	Propionaldehyde			0.00013 lb/ton	0.00E+00 tons	0.00E+00 tons
169	106514	Quinone	0.00027 lb/ton	0.00E+00 tons	0.00016 lb/ton	0.00E+00 tons	0.00E+00 tons
176	108883	Toluene	0.0018 lb/ton	0.00E+00 tons	0.00075 lb/ton	0.00E+00 tons	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	0.0043 lb/ton	0.00E+00 tons	0.00016 lb/ton	0.00E+00 tons	0.00E+00 tons
			Total HAP Emissions	**0.000 tons**	**Total HAP Emissions**	**0.000 tons**	**TOTAL** **0.000 tons**

Notes/Comments:
1. Reference: AP-42, Tables 11.1-9 and 11.1-12.

Notes/Comments:
1. Reference: AP-42, Tables 11.1-10 and 11.1-13.

Consumer Products

			Personal Care Products		Household Products		Automotive Aftermarket Products		Adhesives & Sealants		FIFRA-Regulated Products		Coatings & Related Products		Miscellaneous		
			Activity Data: Capita		Activity Data: Capita		Activity Data: Capita		Activity Data: Capita		Activity Data: Capita		Activity Data: Capita		Activity Data: Capita		
	Section 112 Hazardous Air Pollutants		Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Emissions
10	542756	1,3-Dichloropropene									1.60E-01 lb/yr/cap	0.00E+00 tons					0.00E+00 tons
12	106467	1,4-Dichlorobenzene(p)			4.79E-02 lb/yr/cap	0.00E+00 tons					3.52E-02 lb/yr/cap	0.00E+00 tons					0.00E+00 tons
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)							1.09E-05 lb/yr/cap	0.00E+00 tons							0.00E+00 tons
25	79469	2-Nitropropane							2.12E-06 lb/yr/cap	0.00E+00 tons							0.00E+00 tons
36	60355	Acetamide	1.38E-07 lb/yr/cap	0.00E+00 tons													0.00E+00 tons
38	98862	Acetophenone											8.53E-06 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
41	79107	Acrylic Acid							3.94E-09 lb/yr/cap	0.00E+00 tons							0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)					4.72E-06 lb/yr/cap	0.00E+00 tons									0.00E+00 tons
63	56235	Carbon tetrachloride											4.10E-10 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
70	108907	Chlorobenzene									7.16E-02 lb/yr/cap	0.00E+00 tons	1.51E-05 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
72	67663	Chloroform					3.60E-05 lb/yr/cap	0.00E+00 tons					9.55E-04 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
86	132649	Dibenzofurans							8.07E-06 lb/yr/cap	0.00E+00 tons							0.00E+00 tons
94	68122	Dimethyl formamide	2.71E-05 lb/yr/cap	0.00E+00 tons			2.78E-08 lb/yr/cap	0.00E+00 tons	2.29E-07 lb/yr/cap	0.00E+00 tons					7.43E-06 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
99	100414	Ethyl benzene			2.56E-06 lb/yr/cap	0.00E+00 tons	7.51E-05 lb/yr/cap	0.00E+00 tons	1.36E-05 lb/yr/cap	0.00E+00 tons	1.30E-03 lb/yr/cap	0.00E+00 tons	6.86E-04 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
103	107062	Ethylene dichloride (1,2-Dichloroethane)	4.62E-06 lb/yr/cap	0.00E+00 tons	3.52E-08 lb/yr/cap	0.00E+00 tons											0.00E+00 tons
106	75218	Ethylene oxide									1.51E-02 lb/yr/cap	0.00E+00 tons					0.00E+00 tons
109	5000	Formaldehyde			6.74E-06 lb/yr/cap	0.00E+00 tons			2.51E-05 lb/yr/cap	0.00E+00 tons	3.81E-04 lb/yr/cap	0.00E+00 tons	8.55E-04 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
110	N/A	Glycol ethers	1.52E-05 lb/yr/cap	0.00E+00 tons	5.31E-03 lb/yr/cap	0.00E+00 tons	2.69E-02 lb/yr/cap	0.00E+00 tons	1.28E-04 lb/yr/cap	0.00E+00 tons	5.65E-03 lb/yr/cap	0.00E+00 tons	2.24E-03 lb/yr/cap	0.00E+00 tons	2.42E-04 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
118	110543	Hexane			2.09E-03 lb/yr/cap	0.00E+00 tons	3.53E-03 lb/yr/cap	0.00E+00 tons	7.83E-02 lb/yr/cap	0.00E+00 tons			2.39E-03 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
120	7647010	Hydrochloric acid			1.75E-06 lb/yr/cap	0.00E+00 tons											0.00E+00 tons
121	7664393	Hydrogen fluoride (Hydrofluoric acid)			8.75E-08 lb/yr/cap	0.00E+00 tons	1.41E-05 lb/yr/cap	0.00E+00 tons									0.00E+00 tons
123	78591	Isophorone									9.47E-04 lb/yr/cap	0.00E+00 tons					0.00E+00 tons
129	67561	Methanol	5.67E-07 lb/yr/cap	0.00E+00 tons	6.66E-04 lb/yr/cap	0.00E+00 tons	6.61E-01 lb/yr/cap	0.00E+00 tons	6.82E-04 lb/yr/cap	0.00E+00 tons	9.48E-04 lb/yr/cap	0.00E+00 tons	1.60E-02 lb/yr/cap	0.00E+00 tons	1.84E-02 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
131	74839	Methyl bromide(Bromomethane)									2.22E-01 lb/yr/cap	0.00E+00 tons					0.00E+00 tons
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	7.45E-04 lb/yr/cap	0.00E+00 tons	2.85E-02 lb/yr/cap	0.00E+00 tons	7.63E-02 lb/yr/cap	0.00E+00 tons	2.14E-01 lb/yr/cap	0.00E+00 tons	5.99E-02 lb/yr/cap	0.00E+00 tons	7.69E-03 lb/yr/cap	0.00E+00 tons	2.46E-04 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
133	78933	Methyl ethyl ketone (2-Butanone)	1.75E-05 lb/yr/cap	0.00E+00 tons	4.49E-04 lb/yr/cap	0.00E+00 tons	3.04E-03 lb/yr/cap	0.00E+00 tons	3.91E-02 lb/yr/cap	0.00E+00 tons	2.01E-05 lb/yr/cap	0.00E+00 tons	7.94E-03 lb/yr/cap	0.00E+00 tons	1.01E-05 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
136	108101	Methyl isobutyl ketone (Hexone)			1.08E-04 lb/yr/cap	0.00E+00 tons	8.73E-04 lb/yr/cap	0.00E+00 tons	1.24E-03 lb/yr/cap	0.00E+00 tons	9.01E-05 lb/yr/cap	0.00E+00 tons	5.26E-03 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
139	1634044	Methyl tert butyl ether					2.36E-05 lb/yr/cap	0.00E+00 tons									0.00E+00 tons
141	75092	Methylene chloride(Dichloromethane)			2.39E-03 lb/yr/cap	0.00E+00 tons	4.83E-03 lb/yr/cap	0.00E+00 tons	8.78E-03 lb/yr/cap	0.00E+00 tons	6.81E-04 lb/yr/cap	0.00E+00 tons	1.97E-02 lb/yr/cap	0.00E+00 tons	2.38E-05 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
145	91203	Naphthalene			5.52E-07 lb/yr/cap	0.00E+00 tons	2.26E-06 lb/yr/cap	0.00E+00 tons	1.07E-04 lb/yr/cap	0.00E+00 tons	4.60E-02 lb/yr/cap	0.00E+00 tons	5.75E-06 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
174	127184	Tetrachloroethylene (Perchloroethylene)			2.96E-03 lb/yr/cap	0.00E+00 tons	2.35E-02 lb/yr/cap	0.00E+00 tons	6.75E-04 lb/yr/cap	0.00E+00 tons	1.92E-04 lb/yr/cap	0.00E+00 tons	1.48E-04 lb/yr/cap	0.00E+00 tons	7.53E-04 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
176	108883	Toluene	3.41E-03 lb/yr/cap	0.00E+00 tons	5.82E-04 lb/yr/cap	0.00E+00 tons	2.49E-02 lb/yr/cap	0.00E+00 tons	8.43E-02 lb/yr/cap	0.00E+00 tons			3.16E-01 lb/yr/cap	0.00E+00 tons	2.46E-06 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
178	79016	Trichloroethylene			4.34E-05 lb/yr/cap	0.00E+00 tons	2.67E-04 lb/yr/cap	0.00E+00 tons	3.88E-05 lb/yr/cap	0.00E+00 tons			1.37E-04 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
179	121448	Triethylamine									3.13E-04 lb/yr/cap	0.00E+00 tons	5.26E-04 lb/yr/cap	0.00E+00 tons			0.00E+00 tons
181	108054	Vinyl acetate							4.94E-08 lb/yr/cap	0.00E+00 tons							0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)			3.28E-03 lb/yr/cap	0.00E+00 tons	1.20E-02 lb/yr/cap	0.00E+00 tons	9.76E-03 lb/yr/cap	0.00E+00 tons	1.37E-01 lb/yr/cap	0.00E+00 tons	4.05E-02 lb/yr/cap	0.00E+00 tons	4.31E-04 lb/yr/cap	0.00E+00 tons	0.00E+00 tons
			Total HAPs	**0.00E+00 tons**	**Total HAPs**	**0.00E+00 tons**	**Total HAPs**	**0.00E+00 tons**	**Total HAPs**	**0.00E+00 tons**	**Total HAPs**	**0.00E+00 tons**	**Total HAPs**	**0.00E+00 tons**	**Total HAPs**	**0.00E+00 tons**	**0.00E+00 tons**

Notes/Comments:
1. Reference: EIIP Volume III, Area Sources Preferred and Alternative Methods.

Diesel-fired Boilers and Heaters

Diesel-Fired Boilers / Heaters

Activity Data Input: gallons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		
No.	**CAS No.**	**Chemical Name**	**Emission Factor**		**Estimated Emissions**
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2	$lb/10^{12}$ Btu	0.000E+00 tons
52	N/A	Beryllium Compounds	2.5	$lb/10^{12}$ Btu	0.000E+00 tons
58	N/A	Cadmium Compouns	11	$lb/10^{12}$ Btu	0.000E+00 tons
75	N/A	Chromium Chompounds	67	$lb/10^{12}$ Btu	0.000E+00 tons
109	5000	Formaldehyde	1.214	lb/Mgal	0.000E+00 tons
118	110543	Hexane	0.269	lb/Mgal	0.000E+00 tons
124	N/A	Lead Compounds	8.9	$lb/10^{12}$ Btu	0.000E+00 tons
127	N/A	Manganese Compounds	14	$lb/10^{12}$ Btu	0.000E+00 tons
128	N/A	Mercury Compounds	3.0	$lb/10^{12}$ Btu	0.000E+00 tons
146	N/A	Nickel Compounds	18	$lb/10^{12}$ Btu	0.000E+00 tons
		Total HAP Emissions			**0.000E+00 tpy**

Notes/Comments:

1. Reference: AP-42, Tables 1.3-2 (assume residential furnace factor), 1.3-9, and Speci
2. Assume diesel fuel heat content of 137,000 Btu/gal.

Diesel-fired Engines (>600 hp)

Diesel-fired Engines (>600 hp)
Activity Data Input: **gallons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
35	75070	Acetaldehyde	2.52E-05 lb/MMBtu	0.00E+00 tons
39	107028	Acrolein	7.88E-06 lb/MMBtu	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	7.76E-04 lb/MMBtu	0.00E+00 tons
109	5000	Formaldehyde	7.89E-05 lb/MMBtu	0.00E+00 tons
145	91203	Naphthalene	1.30E-04 lb/MMBtu	0.00E+00 tons
162	N/A	Polycylic Organic Matter	2.12E-04 lb/MMBtu	0.00E+00 tons
176	108883	Toluene	2.81E-04 lb/MMBtu	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	1.93E-04 lb/MMBtu	0.00E+00 tons
			Total HAP Emissions	**0.000 tons**

Notes/Comments:
1. Reference: AP-42, Table 3.4-3 (diesel engines).
2. Assume diesel fuel heat content of 137,000 Btu/gal.

Diesel-fired Engines (< 600 hp)

Diesel-Fired Engines (<600 hp)

Activity Data Input: gallons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
35	75070	Acetaldehyde	7.67E-04 lb/MMBtu	0.00E+00 tons
39	107028	Acrolein	9.25E-05 lb/MMBtu	0.00E+00 tons
48	71432	Benzene(including benzene from gasoline)	9.33E-04 lb/MMBtu	0.00E+00 tons
109	5000	Formaldehyde	1.18E-03 lb/MMBtu	0.00E+00 tons
145	91203	Naphthalene	8.48E-05 lb/MMBtu	0.00E+00 tons
176	108883	Toluene	4.09E-04 lb/MMBtu	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	2.85E-04 lb/MMBtu	0.00E+00 tons
186	95476	Xylenes (isomers and mixture)	0.00E+00 lb/MMBtu	0.00E+00 tons
187	108383	Xylenes (isomers and mixture)	0.00E+00 lb/MMBtu	0.00E+00 tons
188	106423	Xylenes (isomers and mixture)	0.00E+00 lb/MMBtu	0.00E+00 tons

Total HAP Emissions 0.000E+00 tons

Notes/Comments:

1. Reference: AP-42, Table 3.3-2.
2. Assume diesel fuel heat content of 137,000 Btu/gal.

Diesel-fired Turbines for Electricity Generation

Diesel-Fired Turbines for Electricity Generation
Activity Data Input: gallons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
45	N/A	Antimony Compounds	2.20E-05 lb/MMBtu	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	4.90E-06 lb/MMBtu	0.00E+00 tons
52	N/A	Beryllium Compounds	3.30E-07 lb/MMBtu	0.00E+00 tons
58	N/A	Cadmium Compouns	4.20E-06 lb/MMBtu	0.00E+00 tons
75	N/A	Chromium Chompounds	4.70E-05 lb/MMBtu	0.00E+00 tons
76	N/A	Cobalt Compounds	9.10E-06 lb/MMBtu	0.00E+00 tons
124	N/A	Lead Compounds	5.80E-05 lb/MMBtu	0.00E+00 tons
127	N/A	Manganese Compounds	3.40E-04 lb/MMBtu	0.00E+00 tons
128	N/A	Mercury Compounds	8.40E-06 lb/MMBtu	0.00E+00 tons
146	N/A	Nickel Compounds	1.20E-03 lb/MMBtu	0.00E+00 tons
158	7723140	Phosphorus	3.00E-04 lb/MMBtu	0.00E+00 tons
171	N/A	Selenium Compounds	5.30E-06 lb/MMBtu	0.00E+00 tons
			Total HAP Emissions	**0.000E+00 tons**

Notes/Comments:
1. Reference: AP-42, Table 3.1-4.
2. Assume diesel fuel heat content of 137,000 Btu/gal.

Dry Cleaners

Activity Data Input: **Capita**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
174	127184	Tetrachloroethylene (Perchloroethylene)	1.3 lb/yr/capita	0.0 tons
			Total HAP Emissions	**0.0 tons**

Notes/Comments:
1. Reference: AP-42, Table 4.1-2.

Gasoline Service Station(s)

Gasoline Service Station(s)
Activity Data Input: Gallons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
48	71432	Benzene (including benzene from gasoline)	0.92 %	0.000 tons
99	100414	Ethyl benzene	0.09 %	0.000 tons
118	110543	Hexane	1.68 %	0.000 tons
176	108883	Toluene	1.07 %	0.000 tons
185	1330207	Xylenes (isomers and mixture)	0.47 %	0.000 tons
186	95476	Xylenes (isomers and mixture)	0.13 %	0.000 tons
			Total HAP Emissions	**0.000 tons**

Notes/Comments:

1. Reference: AP-42, Section 5.2.
2. Assumptions:

EFvoc total = (EFvoc fill + EFvoc b&e + EFvoc vd + EFvoc s)

EFvoc fill =	0.3	lb/kgal	VOC emission factor associated with filling USTs (Balanced submerged filling, Stage I controls)
EFvoc b&e =	1.0	lb/kgal	VOC emission factor associated with breathing and emptying losses from USTs
EFvoc vd =	1.1	lb/kgal	VOC emission factor associated with vapor displacement from automobile tanks during refilling (St
EFvoc s =	0.7	lb/kgal	VOC emission factor associated with spillage during automobile refilling
	3.1	lb/kgal	

3. Speciate was used to obtain the refined emission factors (Profile Number 7000).

NG-Fired Asphalt Plants

NG-Fired Batch Asphalt Plant

Activity Data Input: **tons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
35	75070	Acetaldehyde	6.40E-04 lb/ton	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	6.60E-07 lb/ton	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	3.50E-04 lb/ton	0.00E+00 tons
52	N/A	Beryllium Compounds	2.20E-07 lb/ton	0.00E+00 tons
58	N/A	Cadmium Compouns	8.40E-07 lb/ton	0.00E+00 tons
75	N/A	Chromium Chompounds	8.90E-07 lb/ton	0.00E+00 tons
99	100414	Ethyl benzene	3.30E-03 lb/ton	0.00E+00 tons
109	5000	Formaldehyde	8.60E-04 lb/ton	0.00E+00 tons
124	N/A	Lead Compounds	7.40E-07 lb/ton	0.00E+00 tons
127	N/A	Manganese Compounds	9.90E-06 lb/ton	0.00E+00 tons
128	N/A	Mercury Compounds	4.50E-07 lb/ton	0.00E+00 tons
146	N/A	Nickel Compounds	4.20E-06 lb/ton	0.00E+00 tons
162	N/A	Polycylic Organic Matter	1.27E-04 lb/ton	0.00E+00 tons
169	106514	Quinone	2.70E-04 lb/ton	0.00E+00 tons
176	108883	Toluene	1.80E-03 lb/ton	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	4.30E-03 lb/ton	0.00E+00 tons

Total HAP Emissions **0.000 tons**

Notes/Comments:

1. Reference: AP-42, Tables 11.1-9 and 11.1-12.

NG-fired Boilers and Heaters

Natural Gas-Fired Boilers/Heaters

Activity Data Input: MMscf

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
12	106467	1,4-Dichlorobenzene(p)	1.20E-03 lb/MMscf	0.00E+00 tons
45	N/A	Antimony Compounds	2.04E-04 lb/MMscf	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	2.10E-03 lb/MMscf	0.00E+00 tons
52	N/A	Beryllium Compounds	1.20E-05 lb/MMscf	0.00E+00 tons
58	N/A	Cadmium Compouns	1.10E-03 lb/MMscf	0.00E+00 tons
75	N/A	Chromium Chompounds	1.40E-03 lb/MMscf	0.00E+00 tons
76	N/A	Cobalt Compounds	8.40E-05 lb/MMscf	0.00E+00 tons
109	5000	Formaldehyde	7.50E-02 lb/MMscf	0.00E+00 tons
118	110543	Hexane	1.80E+00 lb/MMscf	0.00E+00 tons
124	N/A	Lead Compounds	5.00E-03 lb/MMscf	0.00E+00 tons
127	N/A	Manganese Compounds	3.80E-04 lb/MMscf	0.00E+00 tons
128	N/A	Mercury Compounds	2.60E-04 lb/MMscf	0.00E+00 tons
145	91203	Naphthalene	6.10E-04 lb/MMscf	0.00E+00 tons
146	N/A	Nickel Compounds	2.10E-03 lb/MMscf	0.00E+00 tons
162	N/A	Polycylic Organic Matter	8.82E-05 lb/MMscf	0.00E+00 tons
171	N/A	Selenium Compounds	2.40E-05 lb/MMscf	0.00E+00 tons
176	108883	Toluene	3.40E-03 lb/MMscf	0.00E+00 tons
			Total HAP Emissions	**0.000 tons**

Notes/Comments:

1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4.

NG-Fired Turbines

NG-Fired Turbines

Activity Data Input: **MMscf**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations			
No.	**CAS No.**	**Chemical Name**	**Emission Factor**		**Estimated Emissions**	
35	75070	Acetaldehyde	4.00E-05	lb/MMBtu	0.00E+00	tons
39	107028	Acrolein	6.40E-06	lb/MMBtu	0.00E+00	tons
48	71432	Benzene (including benzene from gasoline)	1.20E-05	lb/MMBtu	0.00E+00	tons
99	100414	Ethyl benzene	3.20E-05	lb/MMBtu	0.00E+00	tons
109	5000	Formaldehyde	7.10E-04	lb/MMBtu	0.00E+00	tons
145	91203	Naphthalene	1.30E-06	lb/MMBtu	0.00E+00	tons
162	N/A	Polycylic Organic Matter	2.20E-06	lb/MMBtu	0.00E+00	tons
176	108883	Toluene	1.30E-04	lb/MMBtu	0.00E+00	tons
185	1330207	Xylenes (isomers and mixture)	6.40E-05	lb/MMBtu	0.00E+00	tons

Total HAP Emissions **0.000** **tons**

Notes/Comments:
1. Reference: AP-42, Table 3.1-3.
2. Assume NG heating value of 1,020 Btu/scf.

Oil-Fired Asphalt Plants

Oil-Fired Drum Asphalt Plant with Fabric Filter

Activity Data Input: **tons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
35	75070	Acetaldehyde	1.30E-03 lb/ton	0.00E+00 tons
39	107028	Acrolein	2.60E-05 lb/ton	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	1.10E-06 lb/ton	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	4.10E-04 lb/ton	0.00E+00 tons
58	N/A	Cadmium Compouns	4.40E-07 lb/ton	0.00E+00 tons
75	N/A	Chromium Chompounds	1.20E-05 lb/ton	0.00E+00 tons
99	100414	Ethyl benzene	3.80E-04 lb/ton	0.00E+00 tons
109	5000	Formaldehyde	2.40E-03 lb/ton	0.00E+00 tons
124	N/A	Lead Compounds	3.30E-06 lb/ton	0.00E+00 tons
127	N/A	Manganese Compounds	1.10E-05 lb/ton	0.00E+00 tons
128	N/A	Mercury Compounds	7.30E-09 lb/ton	0.00E+00 tons
133	78933	Methyl ethyl ketone (2-Butanone)	2.00E-05 lb/ton	0.00E+00 tons
146	N/A	Nickel Compounds	1.50E-05 lb/ton	0.00E+00 tons
162	N/A	Polycylic Organic Matter	5.81E-04 lb/ton	0.00E+00 tons
164	123386	Propionaldehyde	1.30E-04 lb/ton	0.00E+00 tons
169	106514	Quinone	1.60E-04 lb/ton	0.00E+00 tons
176	108883	Toluene	7.50E-04 lb/ton	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	1.60E-04 lb/ton	0.00E+00 tons

Total HAP Emissions **0.000 tons**

Notes/Comments:
1. Reference: AP-42, Tables 11.1-10 and 11.1-13.
2. Assume unit contains a baghouse.

Open Burning of Diesel

Open Burning (Diesel)

Activity Data Input: **gallons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10^{12} Btu	0.000E+00 tons
52	N/A	Beryllium Compounds	2.5 lb/10^{12} Btu	0.000E+00 tons
58	N/A	Cadmium Compouns	11 lb/10^{12} Btu	0.000E+00 tons
75	N/A	Chromium Chompounds	67 lb/10^{12} Btu	0.000E+00 tons
109	5000	Formaldehyde	1.214 lb/Mgal	0.000E+00 tons
118	110543	Hexane	0.269 lb/Mgal	0.000E+00 tons
124	N/A	Lead Compounds	8.9 lb/10^{12} Btu	0.000E+00 tons
127	N/A	Manganese Compounds	14 lb/10^{12} Btu	0.000E+00 tons
128	N/A	Mercury Compounds	3.0 lb/10^{12} Btu	0.000E+00 tons
146	N/A	Nickel Compounds	18 lb/10^{12} Btu	0.000E+00 tons
			Total HAP Emissions	**0.00E+00 tons**

Notes/Comments:

1. Reference: AP-42, Tables 1.3-2 (assume residential furnace factor), 1.3-9, and Speciate.
2. Assume diesel fuel heat content of 137,000 Btu/gal.

Residential and Commercial Natural Gas Combustion

Activity Data Input: **MMscf**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Calculated Emissions**
12	106467	1,4-Dichlorobenzene(p)	1.20E-03 lb/MMscf	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	2.00E-04 lb/MMscf	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	2.10E-03 lb/MMscf	0.00E+00 tons
52	N/A	Beryllium Compounds	1.20E-05 lb/MMscf	0.00E+00 tons
58	N/A	Cadmium Compouns	1.10E-03 lb/MMscf	0.00E+00 tons
75	N/A	Chromium Chompounds	1.40E-03 lb/MMscf	0.00E+00 tons
76	N/A	Cobalt Compounds	8.40E-05 lb/MMscf	0.00E+00 tons
109	5000	Formaldehyde	7.50E-02 lb/MMscf	0.00E+00 tons
118	110543	Hexane	1.80E+00 lb/MMscf	0.00E+00 tons
127	N/A	Manganese Compounds	3.80E-04 lb/MMscf	0.00E+00 tons
128	N/A	Mercury Compounds	2.60E-04 lb/MMscf	0.00E+00 tons
145	91203	Naphthalene	6.10E-04 lb/MMscf	0.00E+00 tons
146	N/A	Nickel Compounds	2.10E-03 lb/MMscf	0.00E+00 tons
171	N/A	Selenium Compounds	2.40E-05 lb/MMscf	0.00E+00 tons
176	108883	Toluene	3.40E-03 lb/MMscf	0.00E+00 tons

Total HAP Emissions **0.00 tons**

Notes/Comments:
1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4.

Residential Fireplaces

Activity Data Input: **tons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
162	N/A	Polycylic Organic Matter	1.60E-02 lb/ton	0.00E+00 tons

Total HAP Emissions **0.000 tons**

Notes/Comments:
1. Reference: AP-42, Table 1.9-1.

Residential and Commercial Fuel Oil Combustion

Residential Oil Combustion

Activity Data Input: **gallons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10^{12} Btu	0.000E+00 tons
52	N/A	Beryllium Compounds	2.5 lb/10^{12} Btu	0.000E+00 tons
58	N/A	Cadmium Compouns	11 lb/10^{12} Btu	0.000E+00 tons
75	N/A	Chromium Chompounds	67 lb/10^{12} Btu	0.000E+00 tons
109	5000	Formaldehyde	1.214 lb/Mgal	0.000E+00 tons
118	110543	Hexane	0.269 lb/Mgal	0.000E+00 tons
124	N/A	Lead Compounds	8.9 lb/10^{12} Btu	0.000E+00 tons
127	N/A	Manganese Compounds	14 lb/10^{12} Btu	0.000E+00 tons
128	N/A	Mercury Compounds	3.0 lb/10^{12} Btu	0.000E+00 tons
146	N/A	Nickel Compounds	18 lb/10^{12} Btu	0.000E+00 tons
			Total HAP Emissions	**0.000E+00 tons**

Notes/Comments:

1. Reference: AP-42, Tables 1.3-2 (assume residential furnace factor), 1.3-9, and Speciate.
2. Assume diesel fuel heat content of 137,000 Btu/gal.

Residual Oil-fired Boilers

Residual Oil-fired Boilers
Activity Data Input: gallons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
45	N/A	Antimony Compounds	5.25E-03 lb/Mgal	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	1.32E-03 lb/Mgal	0.00E+00 tons
48	71432	Benzene (including benzene from gasoline)	2.14E-04 lb/Mgal	0.00E+00 tons
52	N/A	Beryllium Compounds	2.78E-05 lb/Mgal	0.00E+00 tons
58	N/A	Cadmium Compouns	3.98E-04 lb/Mgal	0.00E+00 tons
75	N/A	Chromium Chompounds	8.45E-04 lb/Mgal	0.00E+00 tons
76	N/A	Cobalt Compounds	6.02E-03 lb/Mgal	0.00E+00 tons
99	100414	Ethyl benzene	6.36E-05 lb/Mgal	0.00E+00 tons
109	5000	Formaldehyde	3.30E-02 lb/Mgal	0.00E+00 tons
124	N/A	Lead Compounds	1.51E-03 lb/Mgal	0.00E+00 tons
127	N/A	Manganese Compounds	3.00E-03 lb/Mgal	0.00E+00 tons
128	N/A	Mercury Compounds	1.13E-04 lb/Mgal	0.00E+00 tons
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	2.36E-04 lb/Mgal	0.00E+00 tons
145	91203	Naphthalene	1.13E-03 lb/Mgal	0.00E+00 tons
146	N/A	Nickel Compounds	8.45E-02 lb/Mgal	0.00E+00 tons
162	N/A	Polycylic Organic Matter	1.30E-03 lb/Mgal	0.00E+00 tons
171	N/A	Selenium Compounds	6.83E-04 lb/Mgal	0.00E+00 tons
176	108883	Toluene	6.20E-03 lb/Mgal	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	1.09E-04 lb/Mgal	0.00E+00 tons

Total HAP Emissions 0.000 tons

Notes/Comments:
1. Reference: AP-42, Tables 1.3-8 and 1.3-10 (residual boilers).

Sewage Sludge Incinerators

Sewage Sludge Incinerators
Activity Data Input: tons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
5	96128	1,2-Dibromo-3-chloropropane	8.20E-04 lb/ton	0.00E+00 tons
7	106887	1,2-Epoxybutane	1.60E-03 lb/ton	0.00E+00 tons
35	75070	Acetaldehyde	5.00E-02 lb/ton	0.00E+00 tons
40	79061	Acrylamide	5.00E-02 lb/ton	0.00E+00 tons
45	N/A	Antimony Compounds	3.00E-04 lb/ton	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	3.70E-02 lb/ton	0.00E+00 tons
51	100447	Benzyl chloride	1.90E-03 lb/ton	0.00E+00 tons
52	N/A	Beryllium Compounds	2.90E-02 lb/ton	0.00E+00 tons
58	N/A	Cadmium Compouns	1.80E-03 lb/ton	0.00E+00 tons
61	63252	Carbaryl	2.00E-05 lb/ton	0.00E+00 tons
69	79118	Chloroacetic acid	1.50E-03 lb/ton	0.00E+00 tons
70	108907	Chlorobenzene	6.00E-05 lb/ton	0.00E+00 tons
83	N/A	Cyanide Compounds	1.00E-01 lb/ton	0.00E+00 tons
84	3547044	DDE	7.60E-06 lb/ton	0.00E+00 tons
110	N/A	Glycol ethers	1.90E-02 lb/ton	0.00E+00 tons
128	N/A	Mercury Compounds	1.60E-02 lb/ton	0.00E+00 tons
131	74839	Methyl bromide(Bromomethane)	1.20E-04 lb/ton	0.00E+00 tons
139	1634044	Methyl tert butyl ether	8.00E-04 lb/ton	0.00E+00 tons
140	74873	Methylchloride (chloromethane)	1.20E-02 lb/ton	0.00E+00 tons
142	101688	Methylene diphenyl diisocyante (MDI)	1.80E-02 lb/ton	0.00E+00 tons
143	N/A	Mineral fibers	1.70E-06 lb/ton	0.00E+00 tons
151	90040	o-Anisidine	1.20E-02 lb/ton	0.00E+00 tons
154	82688	Pentachloromitrobenzene(Quintobenzene)	4.40E-02 lb/ton	0.00E+00 tons
162	N/A	Polycylic Organic Matter	3.00E-04 lb/ton	0.00E+00 tons
174	127184	Tetrachloroethylene (Perchloroethylene)	1.50E-02 lb/ton	0.00E+00 tons
177	8001352	Toxaphene(chlorinated camphene)	8.00E-04 lb/ton	0.00E+00 tons
182	593602	Vinyl bromide	1.30E-02 lb/ton	0.00E+00 tons
183	75014	Vinyl chloride	1.90E-03 lb/ton	0.00E+00 tons
184	75354	Vinylidene chloride(1,1-Dichloroethylene)	1.90E-03 lb/ton	0.00E+00 tons
185	1330207	Xylenes (isomers and mixture)	1.90E-03 lb/ton	0.00E+00 tons
186	95476	Xylenes (isomers and mixture)	1.90E-03 lb/ton	0.00E+00 tons
187	108383	Xylenes (isomers and mixture)	3.00E-03 lb/ton	0.00E+00 tons
188	106423	Xylenes (isomers and mixture)	9.40E-03 lb/ton	0.00E+00 tons

Total HAP Emissions 0.000 tons

Notes/Comments:
1. Reference: AP-42, Tables 2.2-1, 2.2-3, 2.2-4 & 2.2-5.

Starved-Air Incinerators

Starved-air Incinerators

Activity Data Input: **tons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	2.94E-06 lb/ton	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	6.69E-04 lb/ton	0.00E+00 tons
58	N/A	Cadmium Compouns	2.41E-03 lb/ton	0.00E+00 tons
75	N/A	Chromium Chompounds	3.31E-03 lb/ton	0.00E+00 tons
120	7647010	Hydrochloric acid	2.15E+00 lb/ton	0.00E+00 tons
128	N/A	Mercury Compounds	5.60E-03 lb/ton	0.00E+00 tons
146	N/A	Nickel Compounds	5.52E-03 lb/ton	0.00E+00 tons
		Total HAP Emissions		**0.000E+00 tons**

Notes/Comments:

1. Reference: AP-42, Tables 2.1-9.

Structual Fires

Activity Data Input: **total fires**

Section 112 Hazardous Air Pollutants

No.	CAS No.	Chemical Name
39	107028	Acrolein
83	N/A	Cyanide Compounds
109	5000	Formaldehyde
120	7647010	Hydrochloric acid

Source Category Emission Calculations

Emission Factor		Estimated Emissions	
2.55E-05	lb/dscf	0.00E+00	tons
2.05E-04	lb/dscf	0.00E+00	tons
5.91E-06	lb/dscf	0.00E+00	tons
8.73E-05	lb/dscf	0.00E+00	tons

Total HAP Emissions **0.000 tons**

Notes/Comments:
1. Emission factors apply to sum of residential and nonresidential fires.
2. Reference: Development of Area Source Hazardous Air Pollutant Inventories, Vol 1: Air Toxic Emission Inventory.
3. Reference: EIIP Volume III, Area Sources Preferred and Alternative Methods.

F-Factor (Ref. 2)	9,570	**dscf/MMBtu**
HHV Factor (Ref. 3)	9,044	**Btu/lb**
Fuel Loading Factor (Ref. 3)	1.15	**tons of material buned/fire**

Sample calculation for volume of gas generated per amount burned:
Volume Gas Generated (dscf) / Material Burned (ton)
= F-Factor (dscf/MMBtu) * HHV (Btu/lb) * (1/2000) * (1/1e6)
= 173,102 dscf / ton burned

Sample calculation for emission rate of acrolein produced per amount burned:
Weight of Gas Generated (lb) / Material Burned (ton)
= Emission Factor (lb/dscf) * Volume Gas Generated Per Amount Burned (dscf/ton)
= 4.41 lb Acrolein / ton burned

Sample calculation for emission estimates:
= Number of Fires * Fuel Loading Factor (tons of material burned/fire) * Emission Rate of Acrolein (lb/ton burned)
= 0.00E+00 tons

Surface Coating

			Architectural Coatings Water-based		Architectural Coatings Oil-based		Product Coatings		Special Purpose Coatings		
			Activity Data: gallons		Activity Data: gallons		Activity Data: gallons		Activity Data: gallons		
	Section 112 Hazardous Air Pollutants		Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categorie
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Estimated Emissior
48	71432	Benzene (including benzene from gasoline)	0.36 %	0.000 tons							0.000 tons
99	100414	Ethyl benzene			0.54 %	0.000 tons					0.000 tons
101	75003	Ethyl chloride (Chloroethane)	0.62 %	0.000 tons							0.000 tons
104	107211	Ethylene glycol	0.58 %	0.000 tons							0.000 tons
133	78933	Methyl ethyl ketone (2-Butanone)			0.54 %	0.000 tons	8.1 %	0.000 tons	8.1 %	0.000 tons	0.000 tons
136	108101	Methyl isobutyl ketone (Hexone)			0.36 %	0.000 tons	5.9 %	0.000 tons	5.9 %	0.000 tons	0.000 tons
140	74873	Methylchloride (Chloromethane)	0.55 %	0.000 tons							0.000 tons
141	75092	Methylene chloride(Dichloromethane)	5.52 %	0.000 tons							0.000 tons
176	108883	Toluene			37.87 %	0.000 tons	14.7 %	0.000 tons	14.7 %	0.000 tons	0.000 tons
181	108054	Vinyl acetate	0.12 %	0.000 tons							0.000 tons
185	1330207	Xylenes (isomers and mixture)			3.7 %	0.000 tons	15.8 %	0.000 tons	15.8 %	0.000 tons	0.000 tons
186	95476	Xylenes (isomers and mixture)			4.47 %	0.000 tons					0.000 tons
			Total HAPs	**0.000 tons**	**Total HAPs**	**0.000 tons**	**Total HAPs**	**0.000 tons**	**Total HAPs**	**0.000 tons**	**0.000 tons**

Notes/Comments:
1. Reference: AP-42, Section 4.2.
2. SPECIATE, Surface Coating Operations, Coating Application, Water-based Paint.

Notes/Comments:
1. Reference: AP-42, Section 4.2.
2. SPECIATE, Surface Coating Operations, Solvent-based Paint.

Notes/Comments:
1. Reference: AP-42, Section 4.2.
2. SPECIATE, Surface Coating Operations, Industrial.

Notes/Comments:
1. Reference: AP-42, Section 4.2.
2. SPECIATE, Surface Coating Operations, Industrial.

Notes on architectural paint calculations:
1. Solvent is assumed to be 60% (by volume) of the paint/coatings.
2. Solvent densities are assumed to be 7.36 lb/gallon.
3. Architectural paints are assumed to be 70% water-based (low-solvent) and 30% solvent-based.
4. Water-based paints are assumed to emit 25% of the VOCs in solvent-based paints.
5. Reference: AP-42 Section 4.2.2.1.2, Tables 4.2.2.1-2 and 4.2.2.1-3

Notes on product coatings and special purpose calculations:
1. Product coatings are assumed to be 30% water-based (low-solvent) and 70% solvent-based.
2. Water-based paints are assumed to emit 25% of the VOCs in solvent-based paints.

Used Oil Combustion

Activity Data Input: **gallons**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	**CAS No.**	**Chemical Name**	**Emission Factor**	**Estimated Emissions**
12	106467	1,4-Dichlorobenzene(p)	8.30E-07 lb/kgal	0.00E+00 tons
46	N/A	Arsenic Compounds (inorganic including arsine)	2.50E-03 lb/kgal	0.00E+00 tons
52	N/A	Beryllium Compounds	1.80E-03 lb/kgal	0.00E+00 tons
58	N/A	Cadmium Compouns	2.90E-04 lb/kgal	0.00E+00 tons
75	N/A	Chromium Chompounds	1.90E-01 lb/kgal	0.00E+00 tons
76	N/A	Cobalt Compounds	7.60E-03 lb/kgal	0.00E+00 tons
145	91203	Naphthalene	1.20E-02 lb/kgal	0.00E+00 tons
			Total HAP Emissions	**0.000E+00 tons**

Notes/Comments:

1. Reference: AP-42, Section 1.11, including 1996 revisions.

Wildfires

Wildfires

Activity Data Input: **acres**

Section 112 Hazardous Air Pollutants

No.	CAS No.	Chemical Name
9	106990	1,3-Butadiene

Source Category Emission Calculations

Emission Factor	Estimated Emissions
0.520 lb/lb VOC	0.000 tons

Total HAP Emissions **0.000 tons**

Notes/Comments:
1. Reference: AP-42, Tables 13.1-1 and 13.1-2 and Speciate

AP-42 Table 13.1-1. Fuel Consumed in Wildfires.

Coastal	=	135	Mg/hectare
	=	60	ton/acre
Interior	=	25	Mg/hectare
	=	11	ton/acre

AP-42 Table 13.1-2. Emission Factors. Use Region 10 data.

Particulate	=	17	lb/ton
VOCs	=	24	lb/ton

Speciate. Miscellaneous Burning - Forest Fires.

1,3-Butadiene	=	0.52	percent of TOCs