

1999 Air Toxics Emission Inventory – Final Report

for

**Anchorage, Fairbanks,
and Juneau, Alaska**

prepared for the

**Alaska Department of Environmental
Conservation**

June 2001

Final Report

1999 Air Toxics Emission Inventory
Contract #18-4014-00

for

Anchorage, Fairbanks, and Juneau
Alaska

prepared for the

Alaska Dept. of Environmental Conservation

prepared by

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1.0 Introduction

1.1 Purpose and Need

The Alaska Department of Environmental Conservation (ADEC) recently initiated a study of hazardous air pollutant (HAP) emissions in Alaska as one of the first steps in development of an Alaska air toxics program. HAPs, sometimes called air toxics or toxic air pollutants, are potentially harmful substances in the air that come from anthropogenic (vehicles, industrial facilities) or natural sources (radon gas, volcanic ash). Inhaling toxic air pollutants can increase the chance that a person will experience health problems.

In the Clean Air Act Amendments of 1990, Congress identified 188 HAPs,¹ which are to be managed in two phases. The first phase is the development of technology-based emission standards for stationary sources of HAPs with standards applicable to large (called "major") sources and smaller (called "area") sources. The second phase is to develop an as-yet undefined regulatory program to address risks identified through a series of studies of HAP emissions from all sources. In support of program development, the U.S. Environmental Protection Agency (EPA) initiated a National Toxics Inventory (NTI) in 1993. Emission inventories like the NTI provide important information to help identify risks, prioritize regulatory initiatives, and monitor progress toward achieving program goals. While the primary intent of the ADEC HAP inventory is to provide a basis for air toxics management in Alaska, the emissions data will also be submitted to EPA for use in the NTI.

1.2 Inventory Goals

In assessing the risks of air toxics, regulatory agencies generally rely on three types of information:

1. What HAPs are being released, and how toxic are they? For instance, can they cause immediate death, serious health effects such as cancer or birth defects, or other serious illnesses?
2. How much of each HAP is released into the air?
3. Where is each HAP released, and how many people or sensitive plant and animal populations are exposed to them?

¹ The Clean Air Act Amendments of 1990 actually identified 190 HAPs. Hydrogen sulfide was included on the original list due to a clerical error and was subsequently removed by Congress in 1991. Caprolactam was delisted by the U.S. Environmental Protection Agency in 1996.

What HAPs are being released in Alaska? The first goal of the study is to identify which of the 188 Congressionally-designated HAPs are released into the air in Alaska. (Toxicity is usually reviewed as part of a risk assessment, not part of an emission inventory.) HAPs are released from a wide variety of activities. Many of those activities have been studied to quantify emissions per unit of activity, and HAP emission factors have been published. Therefore, significant pollutant-emitting activities in Alaska must be identified, and then a search of accepted EPA data sources must be conducted to determine which HAPs are released by the particular activity and at what rate.

How much of each HAP is being released into the air? In determining how much of each HAP is released into the air, it is convenient to divide pollutant-emitting activities into traditional source categories of mobile and stationary sources. The NTI reports data for two mobile and two stationary categories:

- On-road mobile sources
- Off-road mobile sources
- Area sources (small stationary)
- Point sources (large or major stationary)

Other reasons for basing the emission inventory on these source categories are that many of the emission estimating models have been developed based on these categories, locating where the emissions are released is generally based on source category, and regulatory programs are typically designed to target one of these categories. The time period for determining how much of each HAP is released into the air was designated as calendar year 1999 with subdivisions for summer (April through September) and winter (January through March; October through December). Calendar year 1999 was chosen to coincide with the every-third year cycle of the NTI (1993, 1996, 1999,...); a division between winter and summer has been targeted to see if there are significant seasonal differences in emissions and ultimately air quality risks.

As a practical matter, a comprehensive inventory of Alaska air toxics is not feasible at this time due to budget and schedule constraints. Thus, the ADEC decided to develop a less extensive inventory targeted at the largest source concentrations. National inventory data indicate that gross HAP emissions are larger in urban areas than rural. As a result, the ADEC determined that one of the priorities for this initial study is to inventory the largest urban areas in Alaska, including:

- Municipality of Anchorage (MOA)
- Fairbanks North Star Borough (FNSB)

- A smaller Alaska community (later determined to be the City and Borough of Juneau (CBJ))²

See Figures 1-1, 1-2, and 1-3 for general maps of each of these areas.

An inventory for a smaller community is desirable because Alaska has numerous towns that do not have the same emission characteristics as either the large urban areas or the more remote bush communities. Juneau was chosen as the smaller community because it is typical of many of the coastal towns that are not connected to the road network, and a significant amount of information already exists about Juneau emissions. Bush communities would be addressed by identifying the types of pollutant-emitting activities in these areas and gathering available emission factors (Appendix F). In this way emission estimates for a bush village could be developed as activity data become available.

Where are the HAPs being released? In characterizing risks from air toxics the concentration in the ambient air must be modeled. However, modeling cannot be completed without first identifying the locations of the sources emitting HAPs. Thus, the emissions from each of the four source categories needed to be "gridded" (located) for Anchorage. Fairbanks and Juneau gridding would be deferred due to budget constraints.

1.3 Quality Assurance

For data to be accepted as part of the NTI, it would need to be reviewed through a formal quality assurance (QA) procedure. Thus, an Inventory Preparation Plan (IPP) was developed and followed during preparation of the inventory (see Appendix A). Additionally, a QA reviewer from ADEC staff unaffiliated with preparation of the inventory was assigned to the project to provide an independent review of methods and implementation

² When referring to Anchorage, Fairbanks, or Juneau throughout the text and supporting documentation, we mean the entire MOA, FNSB, or CBJ, respectively.

Figure 1-1

Municipality of Anchorage Map

(use map from Interim Report)

Figure 1-2

Fairbanks North Star Borough Map

(use map from Interim Report)

Figure 1-3

City and Borough of Juneau Map

(use map from Interim Report)

2.0 Methodology

An overview of the emission inventory methodology as it was applied to each of the four source categories is provided in this section. A more detailed description is provided in the IPP (Appendix A), and further details on the emission calculations are provided in the source category appendices (Appendices B – F).

2.1 General Approach

HAP-Emitting Activities. To determine HAP emissions in each of the areas of interest, the first task is to identify activities that emit HAPs. For instance, combustion of wood, whether in stoves, fireplaces, wildfires, or prescribed burns, is known to emit certain HAPs. Thus, for each source category – on-road mobile, off-road mobile, area, point – a method was developed to identify the types of activities that occur in Alaska in each study area.

HAP Emission Basis. A calculation of HAP emissions may generally be determined based on the intensity of a HAP-emitting activity as follows:

$$\text{Emissions of a HAP} = (\text{emission per unit of activity}) \times (\text{amount of activity in 1999})^3$$

The "emission per unit of activity" is commonly referred to as an "emission factor." Ideally all HAP-emitting activities have been studied in detail with emissions factors quantified, published in scientific literature, and endorsed in regulatory guidance documents. In reality, however, many activities have not been studied in sufficient detail to develop widely-accepted emission factors. Therefore, for each HAP-emitting activity in Alaska, a search for emission factors needed to be conducted to determine if emissions could be estimated. The search for each of the source categories generally focused on EPA published databases although supplemental data sources were used when appropriate.

1999 Activity Levels. The amount of activity occurring in each of the study areas in 1999, divided into winter and summer if possible, needed to be gathered for each HAP-emitting activity. Given the budget and schedule constraints of the project, a set of priorities was established for each of the source categories, and a search for the best-available data sources for the priority activities.

³ The general emission estimation equation usually includes an additional factor for control efficiency. However, there are no identified HAP emission controls in the study areas so this factor is omitted.

Gridding. Once emissions are estimated, the geographic distribution needs to be established to prepare any modeling studies that may follow. The location of point and some area sources can be identified accurately, but other source categories either are mobile or else too numerous to pinpoint. As a result, emissions are assigned to grid cells that range in size from 1 km x 1 km to 10 km x 10 km. The grid cell is the smallest unit of geographic distribution, and the emissions are assumed to be evenly distributed throughout the cell. Gridding under this contract is limited to Anchorage.

A summary gridding report is provided in Appendix G.

2.2 On-Road Mobile Sources

HAP-Emitting Activities. Virtually all on-road mobile sources emit HAPs from the combustion of fuel. For purposes of estimating emissions, the EPA has classified the following categories of vehicles:

- Light-duty gasoline vehicles
- Light-duty gasoline trucks less than 6,000 lbs gross vehicle weight (GVW)
- Light-duty gasoline trucks 6,000 – 8,500 lbs GVW
- Heavy-duty gasoline trucks 8,500+ lbs GVW
- Light-duty diesel vehicles
- Light-duty diesel trucks less than 8,500 lbs GVW
- Heavy-duty diesel trucks 8,500+ lbs GVW
- Motorcycles

Emissions are estimated to the extent feasible for each of these categories of on-road mobile sources for each of the study areas.

HAP Emission Basis. HAP emissions from on-road mobile sources are estimated from two models. The first model is MOBTOX5b, which includes emission factors for the following pollutants:

- 1, 3-Butadiene
- Acetaldehyde
- Benzene
- Total organic gas (TOG)

TOG is not a HAP, but it may be speciated into numerous HAPs based on EPA speciation profiles. The second model is EPA's PART5, which can be used to estimate emissions of particulate matter (PM) from diesel vehicles. EPA speciation profiles for PM

can then be used to develop emissions of HAPs such as polycyclic organic matter (POM).

The MOBTOX5b model requires numerous input parameters for each type of vehicle. The primary indicator of activity is vehicle-miles traveled (VMT), although many other parameters affect emissions including vehicle age, operating mode, ambient temperatures, and gasoline formulation.

1999 Activity Levels. Travel data for Anchorage was obtained from the Transportation Planning Division of the Municipality of Anchorage. Travel data for Fairbanks was obtained from the Northern Regional Office of the Alaska Department of Transportation and Public Facilities (ADOT). No formal estimate of travel activity was available for Juneau. Data on traffic counts, roadway mileage and speed collected in Juneau was provided by ADOT. Sierra translated that information into estimates of travel activity for 1999. The results were reviewed and approved by ADEC staff. Information sources for each of the primary input parameters is documented in Appendix B.

Gridding. For on-road mobile sources, travel activity data in Anchorage had previously been organized into grid cells by the Municipality for the development of a carbon monoxide emissions inventory. That data was used to allocate toxic emission estimates into each of the 700+ grid cells for the community.

2.3 Off-Road Mobile Sources

HAP-Emitting Activities. There are a wide variety of off-road mobile source activities in Alaska, which emit HAPs from fuel combustion. Generally off-road mobile sources are analyzed as one of four classes of sources:

- Aircraft
- Trains
- Commercial marine vessels (CMV)
- Other nonroad engines

Large international airports operate in Anchorage and Fairbanks, and a regional hub airport is located in Juneau. There is also a busy small plane airport (Merrill Field) and floatplane/skiplane base (Lakes Hood and Spenard) in Anchorage, with several smaller airstrips in each of the communities. Additionally, Elmendorf Air Force Base (AFB) is located within the MOA and Eielson AFB is located within the FNSB. Both of these bases have significant aircraft operations throughout the year. Fort Richardson in the MOA and Fort Wainwright in the FNSB have lesser amounts of aircraft activity.

Railroad yards are located in Anchorage and Fairbanks with year-round activity, and the associated HAP emissions from locomotives. Juneau does not have a railroad.

CMV traffic is summer-peaking in Juneau due to significant cruise ship tourism activity and year-round ferry traffic. The Port of Anchorage does not have significant cruise ship activity, but does have steady year-round cargo and bulk fuel shipping operations. Fairbanks is inland with insignificant CMV traffic on the Chena and Tanana Rivers.

EPA's draft NONROAD emission estimating model identifies about 80 basic and 260 specific types of off-road sources (see Appendix C) for construction, maintenance, and recreational purposes in the following categories:

- Recreational vehicles (e.g., snowmachines, all-terrain vehicles)
- Recreational marine vessels (power boats)
- Residential and commercial yard equipment (lawnmowers, snowblowers)
- Logging equipment (chainsaws)
- Agricultural equipment (tractors)
- Construction equipment (graders, backhoes)
- Industrial equipment (forklifts, sweepers, mining apparatus)

HAP Emission Basis. Since virtually all off-road mobile source emissions result from fuel combustion, HAP emissions are generally based on a speciation of TOG and PM emissions. Thus, the primary task for each of the off-road mobile source categories is to determine the best method for estimating TOG and PM emissions.

For aircraft operations, the Federal Aviation Administration (FAA) in cooperation with the U.S. Air Force developed a model for estimating emissions from civilian and military airports. The model, Emissions and Dispersion Modeling System (EDMS), estimates emissions of pollutants including total hydrocarbons and PM from aviation sources, particularly aircraft, auxiliary power units on aircraft, and ground support equipment (GSE). EDMS can also be used to estimate emissions from non-aviation sources at airports including powerplants, fuel storage tanks, and vehicles. EDMS methodologies for estimating emissions are based on:

- FAA Aircraft Engine Emission Database
- MOBILE5a (EPA)
- PART5 (EPA)
- TANKS (EPA)
- WIND (EPA)

Thus, some of the same models used to estimate emissions for other source categories (onroad mobile, area, point) are also built into EDMS for airport emissions. Key indicators of airport activity are landings and takeoffs (LTO), fleet mix, cycle times for LTOs, and GSE activity. Once emissions are estimated from EDMS, speciation profiles for hydrocarbons and PM may be applied to determine individual HAP emissions.

Railroad emissions are developed from fuel combustion from locomotives. Speciation of hydrocarbon and PM emissions into HAP compounds is based on EPA toxic fractions.

HAP emission factors from commercial marine vessels are not readily available. A study of CMV fuel use was conducted for EPA, which developed curves for distillate fuel use for various ship sizes and operating scenarios. Using the assumption that marine engines have similar emission characteristics to stationary diesel engines, emissions can be estimated from information about ship size and number of port calls. There are a few ships operating in the study area that burn residual fuel in boilers for steam turbines. Fuel use and emissions for these marine boilers was assumed to be similar to stationary boilers, so that emissions may be calculated from the size of the ship powerplant along with the number of port calls. A typical ship powerplant size was estimated for cruise ships based on industry estimates and for ferries based on publicly-available information. Information on the powerplants for the primary cargo ships using the Port of Anchorage were obtained from the ship operators.

For the remainder of the off-road mobile sources, the NONROAD model provides an estimate of either total hydrocarbons or TOG and PM based on equipment population and end-use characteristics for a given locality. Emissions from nonroad engines are difficult to estimate as a whole because of the wide variety of engine models and applications, and the shortage of emission studies available. However, NONROAD provides estimated emissions for various equipment sizes, ages, and fuel types (gasoline, diesel, compressed natural gas, liquefied petroleum gas).

1999 Activity Levels. Total commercial domestic LTOs and fleet mix for Anchorage International Airport (AIA), Fairbanks International Airport (FIA), and the Juneau Airport for 1999 were obtained from the FAA. Supplemental information such as international LTOs, small commercial activity (including helicopters in Juneau), and LTOs for Lakes Hood and Spenard were obtained from the respective airport staffs. LTO data for Merrill Field were obtained from MOA reports. Estimates of military aircraft LTOs and fleet mix for Elmendorf and Eielson were obtained from publicly-available base planning documents. Fort Wainwright data were obtained from sources at the Post; aircraft activity at Fort Richardson is not available, but is believed to be insignificant compared to the previously-cited airports.

Railroad activity data were provided by the Alaska Railroad Corporation for Anchorage and Fairbanks. Information was provided for both mainline and yard activity levels.

For Juneau, the 1999 cruise ship and ferry schedules are in the public domain, and total emissions were estimated based on typical ship size. Port of Anchorage emission estimates are based on information provided by the two largest cargo ship operators on the total number of port calls for their respective vessels, and tanker and barge traffic are from actual data for 1995.

Gridding. Emissions of aircraft activity will be allocated to the grid cells where the airports are located. Railroad emissions will be assigned proportionally to the cell where the railroad yards are located and to the main rail lines through Anchorage. Similarly, vessel emissions will be gridded to the cells at the Port of Anchorage, and to the shipping lanes located within MOA.

Nonroad emissions will be gridded based on knowledge about where the activity is located. For instance, snowmachine emissions will be assigned to areas where activity is known to occur. Chainsaw emissions will be allocated to areas with larger lots and less dense populations. Emissions from garden equipment and snowblowers will be weighted more heavily toward areas with single-family homes. Other nonroad emissions will be assigned similarly.

2.4 Area Sources

HAP-Emitting Activities. Area sources are generally stationary sources that are too small and diffuse to be inventoried as individual sources. EPA maintains a lengthy list of source categories in AP-42 for estimating emissions. This list was screened to identify the types of activities believed to exist in Alaska, then prioritized based on knowledge about the relative size of the source category emissions. The results of this screening analysis are provided in Table 2-1 (see Appendix D for the complete screening

Table 2-1

**Results of Screening of AP-42 Area Source Categories
Based on Expected Significance of Source Category**

Source Category	Likely Significance	
	High	Medium
External Combustion Sources		
Bituminous And Subbituminous Coal Combustion	X	
Fuel Oil Combustion	X	
Natural Gas Combustion	X	
Residential Fireplaces	X	
Residential Wood Stoves	X	
Waste Oil Combustion		X
Solid Waste Disposal		
Refuse Combustion	X	
Sewage Sludge Incineration	X	
Medical Waste Incineration	X	
Open Burning		X
Stationary Internal Combustion Sources		
Stationary Gas Turbines For Electricity Generation	X	
Gasoline And Diesel Industrial Engines		X
Large Stationary Diesel And All Stationary Dual-fuel Engines		X
Evaporation Loss Sources		
Dry Cleaning		X
Nonindustrial Surface Coating		X
General Industrial Surface Coating		X
Asphalt Paving Operations		X
Commercial/Consumer Solvent Use		X
Petroleum Industry		
Petroleum Refining	X	
Transportation And Marketing Of Petroleum Liquids	X	
Liquid Storage Tanks		
Organic Liquid Storage Tanks		X
Mineral Products Industry		
Hot Mix Asphalt Plants		X
Asphalt Roofing		X
Sand And Gravel Processing		X
Miscellaneous Sources		
Wildfires And Prescribed Burning		X
Fugitive Dust Sources		X
Paved Roads		X
Unpaved Roads		X
Heavy Construction Operations		X

Note: See Appendix D-1 for complete screening analysis.

analysis). The most effort was directed toward estimating emissions for the high priority categories. The medium priority categories were also addressed to the extent feasible. Area sources that may exist within the study area but are likely to have a low significance were not addressed unless the activity data was already available. Two additional source categories from the NTI were added to the inventory – structural fires and consumer products.

The Clean Air Act defines area sources also to include facilities that may be large enough to be inventoried separately, but nevertheless do not emit enough HAPs to be classified as a "major" source. A search through ADEC permit files for major facilities for purposes of calculating point source emissions also yielded the smaller permitted facilities that are not major for HAPs. As shown in Table 2-2, a total of 130 facilities were identified in the study areas as potentially having air quality permits or applications. Of the 130 facilities, four facility operators had previously classified their facility's as major sources of HAPs; the remainder of the facilities were assumed to be area sources. Appendix D provides documentation on whether there is sufficient information to use the facility's emission inventory to determine HAP emissions or whether it must be grouped with other area sources. In some cases facilities with permits are in categories where there are numerous portable sources (e.g., asphalt plants, dirt burners). These facilities were addressed as top-down area sources to account for area-wide emissions rather than attempting to determine when the particular source was operating within one of the study areas.

Table 2-2

Classification of Potentially Permitted Facilities

	Anchorage	Fairbanks	Juneau
Major HAP sources	1	2	1
Area sources with facility-specific emissions	19	10	6
Area sources without facility-specific emissions	56	19	16
Total facilities in study areas	76	31	23

HAP Emission Basis. Emissions for small, diffuse area sources are estimated using a top-down methodology based on area-wide information. Often demographic statistics provide the most basic screening level emission estimates. For instance, dry cleaner emissions have been correlated to total population in the study area. Emission estimates can be improved if they can be calculated from study-area specific activity data, so whenever area source activity data were available they were used. For example, HAPs from commercial and residential natural gas heating in Anchorage are estimated from

historical data on total natural gas consumed in the commercial and residential sectors. Similarly, gasoline station and vehicle fleet refueling emissions in Anchorage are estimated from the total fuel dispensed in the MOA. Asphalt paving emissions are derived from the actual area paved. HAP emission factors for most of these source categories are published by EPA in documents and databases such as AP-42, FIRE, and SPECIATE.

For facilities that are area sources, facility-specific calculations were prepared where feasible. An ADEC file search was conducted for the facility permits and applications to determine whether the operator had already identified HAPs emitted and calculated emission rates. Even if the operator had not calculated HAPs, the emissions could be calculated from EPA HAP emission factors if facility source inventories were sufficiently documented in the permit or application. Some classes of facilities (for instance, dry cleaners and asphalt plants) generally did not have sufficient detail in permits and applications to calculate emissions. These facilities were addressed as a group source along with the remainder of the small, diffuse area sources.

1999 Activity Levels. Data for top-down area source categories was gathered from the best available source. Examples: Dry cleaner emissions were based on 1999 U.S. Census data for Anchorage. For natural gas heating, the most recent year of publicly-available consumption data by end-use sector is for 1990. Therefore, 1990 data was the base year natural gas data for the residential and commercial heating sectors adjusted for 1999 consumption based on the change in the number of households and population. Gasoline refueling in Anchorage was based on required data reports from fuel distributors as part of the nonattainment area management plan. Paving emissions were based on actual paving contracts for 1999 issued by the Department of Transportation and the local road maintenance agency, if available. See Appendix D for a complete listing of activity level data sources.

For facilities, activity data were gathered from 1999 facility operating reports (FOR), if available. If 1999 FORs were not available for a facility, a file search was conducted for the most recent year of operating data, and that year was assumed to be representative of 1999. Documentation of the actual year of operating data is provided in Appendix D.

Gridding. Top-down area source emissions will be gridded based on the key indicator of category emissions. For instance, architectural surface coatings are based on population so emissions will be distributed to Anchorage consistent with population densities. Surface coatings for traffic markings will be gridded based on VMTs similar to the on-road mobile source category. To the extent feasible, dispersed sources that are not too numerous will be identified by street address of the location. An example would be dry cleaners: dry cleaners in Anchorage can most likely be located and emissions allocated to each of the specific locations.

Facility area sources will be located based on the street address of the facility, and emissions will be assigned to the specific location.

2.5 Point Sources

HAP-Emitting Activities. Point sources are by definition major sources of HAPs. These sources are assumed to be already identified based on reporting obligations under the Clean Air Act for Title V purposes. Thus, a search through ADEC Title V permit application files was conducted, which yielded a total of four facilities in Anchorage, Fairbanks, and Juneau. The operators of the following facilities reported their determination that they are major sources of HAPs:

- ENTECH (Anchorage)
- Fort Wainwright (Fairbanks)
- University of Alaska, Fairbanks
- USA Waste Incinerator (Juneau)

HAP Emission Basis. For each of the four HAP-major facilities, the expected emissions of HAPs was provided in permit documentation. The HAPs emitted and rate of emissions were gathered from those permit files.

1999 Activity Levels. Activity data were for the year inventoried by the operator for the facility permit application, and that year was assumed to be representative of 1999. Documentation of the actual year of operating data is provided in Appendix E.

Gridding. Facility area sources will be located based on the street address of the facility, and emissions will be assigned to the specific location.

2.6 Bush Communities

HAP Emission Basis. Emission factors for bush or other remote Alaska communities are provided in Appendix F. These factors have been compiled from similar activities in Anchorage, Fairbanks, and Juneau.

Activity Levels. If activity levels for 1999 or any other time period are compiled, they may be used along with the emission factors in Appendix F to estimate HAP emissions for the activity of interest.

3.0 Summary of Results

A summary of the emission results for the on-road mobile, off-road mobile, area, and point sources are provided by study area in the tables that follow:

- Table 3-1 – Top 10 HAPs from all Sources in 1999
- Table 3-2 – Top 10 Source Types for Total HAPs in 1999
- Table 3-3 – Municipality of Anchorage
- Table 3-4 – Fairbanks North Star Borough
- Table 3-5 – City and Borough of Juneau

Detailed documentation of the emission calculations is provided in Appendices B through E.

Table 3-1

**Top 10 Hazardous Air Pollutants Emitted from All Sources in 1999
Anchorage, Fairbanks, and Juneau**

Section 112 Hazardous Air Pollutants				Estimated Emissions - Tons per Year					
				Total HAPs Emitted in Study Area	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources	
Rank	No.	CAS No.	Chemical Name						
Municipality of Anchorage									
1	176	108883	Toluene	629	27%	146.6	103.3	378.7	----
2	185	1330207	Xylenes (isomers and mixture)	391	17%	82.5	99.19	209.2	----
3	48	71432	Benzene (including benzene from gasoline)	186	8.0%	119.4	59.05	7.187	----
4	109	5000	Formaldehyde	172	7.4%	19.5	148.0	4.519	----
5	174	127184	Tetrachloroethylene (Perchloroethylene)	172	7.4%	----	----	172.0	----
6	133	78933	Methyl ethyl ketone (2-Butanone)	94	4.0%	----	----	94.03	----
7	129	67561	Methanol	90	3.9%	----	----	89.97	----
8	118	110543	Hexane	86	3.7%	18.39	16.30	51.37	----
9	35	75070	Acetaldehyde	66	2.8%	11.28	54.61	0.460	----
10	136	108101	Methyl isobutyl ketone (Hexone)	65	2.8%	----	----	64.52	----
Fairbanks North Star Borough									
1	176	108883	Toluene	259	22%	65.8	52.89	137.6	2.340
2	185	1330207	Xylenes (isomers and mixture)	162	14%	37.13	50.15	73.31	1.100
3	120	7647010	Hydrochloric acid	161	14%	----	----	1.104	160.0
4	48	71432	Benzene (including benzene from gasoline)	107	9.3%	49.62	26.53	31.02	0.250
5	109	5000	Formaldehyde	104	9.0%	10.18	59.95	33.37	0.420
6	174	127184	Tetrachloroethylene (Perchloroethylene)	55	4.8%	----	----	55.12	0.090
7	133	78933	Methyl ethyl ketone (2-Butanone)	35	3.0%	----	----	34.46	0.390
8	118	110543	Hexane	33	2.9%	7.46	11.22	13.71	0.710
9	129	67561	Methanol	29	2.5%	----	----	28.95	0.010
10	35	75070	Acetaldehyde	26	2.3%	3.61	22.12	0.227	----
City and Borough of Juneau									
1	176	108883	Toluene	284	32%	31.51	208.6	43.53	----
2	185	1330207	Xylenes (isomers and mixture)	264	29%	17.78	221.8	24.21	----
3	48	71432	Benzene (including benzene from gasoline)	77	8.6%	15.68	60.99	0.369	----
4	99	100414	Ethyl benzene	55	6.2%	4.56	50.58	0.315	----
5	109	5000	Formaldehyde	46	5.1%	4.98	28.82	11.99	----
6	118	110543	Hexane	38	4.3%	3.02	31.46	4.009	----
7	120	7647010	Hydrochloric acid	29	3.2%	----	----	0.474	28.21
8	174	127184	Tetrachloroethylene (Perchloroethylene)	20	2.3%	----	----	20.26	----
9	35	75070	Acetaldehyde	14	1.5%	1.73	11.80	0.030	----
10	133	78933	Methyl ethyl ketone (2-Butanone)	11	1.2%	----	----	10.92	----

Table 3-2

**Top 10 Source Types for Total Hazardous Air Pollutants in 1999
Anchorage, Fairbanks, and Juneau**

Rank	Source Type	Source Category	Estimated Emissions - Tons Per Year			
			Total HAPs Emitted in Study Area		Highest Emitted HAP in Source Type	
Municipality of Anchorage						
1	Surface Coating	Area Sources	682	29%	Toluene	46%
2	Consumer Products	Area Sources	331	14%	Methanol	27%
3	Light Duty Gasoline Vehicles	On-Road Mobile Sources	270	12%	Toluene	35%
4	Aircraft	Off-Road Mobile Sources	220	9.4%	Formaldehyde	45%
5	Dry Cleaners	Area Sources	168	7.2%	Tetrachloroethylene	100%
6	Light Duty Gas Trucks (< 6000 lb)	On-Road Mobile Sources	112	4.8%	Toluene	35%
7	Entech	Point Sources	50	2.1%	Hydrochloric Acid	99%
8	Area Source Facilities	Area Sources	36	1.5%	Hexane	26%
9	Light Duty Gas Trucks (6-8500 lb)	On-Road Mobile Sources	32	1.4%	Toluene	35%
10	Residential Heating - NG	Area Sources	27	1.2%	Hexane	95%
Fairbanks North Star Borough						
1	Surface Coating	Area Sources	223	19%	Toluene	46%
2	Snowmobiles (2-st.)	Off-Road Mobile Sources	176	15%	Xylenes	37%
3	Fort Wainwright	Point Sources	145	13%	Hydrochloric Acid	82%
4	Consumer Products	Area Sources	107	9.3%	Methanol	27%
5	Light Duty Gasoline Vehicles	On-Road Mobile Sources	89	7.7%	Toluene	36%
6	Light Duty Gas Trucks (< 6000 lb)	On-Road Mobile Sources	70	6.1%	Toluene	37%
7	Residential Woodstoves	Area Sources	59	5.1%	Benzene	46%
8	Dry Cleaners	Area Sources	54	4.7%	Tetrachloroethylene	100%
9	U.A. Fairbanks	Point Sources	47	4.1%	Hydrochloric Acid	88%
10	Outboard (2-st.)	Off-Road Mobile Sources	45	3.9%	Xylenes	37%
City and Borough of Juneau						
1	Outboard (2-st.)	Off-Road Mobile Sources	255	28%	Xylenes	38%
2	Logging Equip. Chain Saws > 6 HP	Off-Road Mobile Sources	147	16%	Xylenes	39%
3	Personal Water Craft (2-st.)	Off-Road Mobile Sources	135	15%	Xylenes	38%
4	Surface Coating	Area Sources	80	8.9%	Toluene	46%
5	Light Duty Gasoline Vehicles	On-Road Mobile Sources	43	4.7%	Toluene	40%
6	Consumer Products	Area Sources	39	4.3%	Methanol	27%
7	U.S. Waste Services	Point Sources	28	3.1%	Hydrochloric Acid	99%
8	Dry Cleaners	Area Sources	20	2.2%	Tetrachloroethylene	100%
9	Light Duty Gas Trucks (< 6000 lb)	On-Road Mobile Sources	20	2.2%	Toluene	40%
10	Inboard/sterndrive	Off-Road Mobile Sources	15	1.7%	Toluene	31%

Table 3-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Anchorage TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
1	79345	1,1,2,2-Tetrachloroethane	0.010	-----	-----	0.010	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	0.003	-----	-----	0.003	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	0.005	-----	-----	0.005	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	22.32	4.776	14.62	2.925	-----
10	542756	1,3-Dichloropropene	20.62	-----	-----	20.62	-----
11	1120714	1,3-Propane sultone	0.000	-----	-----	0.000	-----
12	106467	1,4-Dichlorobenzene(p)	10.74	-----	-----	10.74	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.001	-----	-----	0.001	-----
14	540841	2,2,4-Trimethylpentane	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000	0.000	-----	0.000	-----
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----
21	584849	2,4-Tolluene diisocyanate	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	0.000	-----	-----	0.000	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	66.35	11.28	54.61	0.460	-----
36	60355	Acetamide	0.000	-----	-----	0.000	-----
37	75058	Acetonitrile	0.041	-----	-----	0.041	-----
38	98862	Acetophenone	0.001	-----	-----	0.001	-----
39	107028	Acrolein	20.68	1.140	18.47	1.068	-----
40	79061	Acrylamide	0.160	-----	-----	0.160	-----
41	79107	Acrylic Acid	0.000	-----	-----	0.000	-----
42	107131	Acrylonitrile	0.010	-----	-----	0.010	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.031	-----	-----	0.012	0.019
46	N/A	Arsenic Compounds (inorganic including arsine)	0.134	0.000	0.000	0.133	0.000
47	1332214	Asbestos	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	185.7	119.4	59.05	7.187	-----
49	92875	Benzidine	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	0.007	-----	-----	0.007	-----

Table 3-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Anchorage TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
52	N/A	Beryllium Compounds	0.109	----	----	0.104	0.005
53	57578	beta-Propiolactone	----	----	----	----	----
54	92524	Biphenyl	----	----	----	----	----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	----	----	----	----	----
56	542881	Bis(chloromethyl)ether	----	----	----	----	----
57	75252	Bromoform	0.000	----	----	0.000	----
58	N/A	Cadmium Compounds	0.053	----	----	0.045	0.008
59	156627	Calcium cyanamide	----	----	----	----	----
60	133062	Captan	----	----	----	----	----
61	63252	Carbaryl	0.000	----	----	0.000	----
62	75150	Carbon disulfide	----	----	----	----	----
63	56235	Carbon tetrachloride	0.001	----	----	0.001	----
64	463581	Carbonyl sulfide	0.004	----	----	0.004	----
65	120809	Catechol	----	----	----	----	----
66	133904	Chloramben	----	----	----	----	----
67	57749	Chlordane	----	----	----	----	----
68	7782505	Chlorine	0.154	----	----	0.001	0.153
69	79118	Chloroacetic acid	0.005	----	----	0.005	----
70	108907	Chlorobenzene	9.235	----	----	9.235	----
71	510156	Chlorobenzilate	----	----	----	----	----
72	67663	Chloroform	0.128	----	----	0.128	----
73	107302	Chloromethyl methyl ether	----	----	----	----	----
74	126998	Chloroprene	0.062	----	----	0.062	----
75	N/A	Chromium Compounds	0.103	0.006	0.016	0.079	0.001
76	N/A	Cobalt Compounds	0.012	----	----	0.012	----
77	N/A	Coke Oven Emissions	----	----	----	----	----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----
79	95487	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----
80	108394	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----
81	106445	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----
82	98828	Cumene	0.010	----	----	0.010	----
83	N/A	Cyanide Compounds	8.604	----	----	8.604	----
84	3547044	DDE	0.000	----	----	0.000	----
85	334883	Diazomethane	----	----	----	----	----
86	132649	Dibenzofurans	0.001	----	----	0.001	----
87	84742	Dibutylphthalate	----	----	----	----	----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	----	----	----	----	----
89	62737	Dichlorvos	----	----	----	----	----
90	111422	Diethanolamine	----	----	----	----	----
91	64675	Diethyl sulfate	----	----	----	----	----
92	60117	Dimethyl aminoazobenzene	----	----	----	----	----
93	79447	Dimethyl caramoyl chloride	----	----	----	----	----
94	68122	Dimethyl formamide	0.032	----	----	0.032	----
95	131113	Dimethyl phthalate	----	----	----	----	----
96	77781	Dimethyl sulfate	----	----	----	----	----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	0.002	----	----	0.002	----
98	140885	Ethyl acrylate	----	----	----	----	----
99	100414	Ethyl benzene	50.08	21.60	25.15	3.333	----
100	51796	Ethyl carbamate (Urethane)	----	----	----	----	----
101	75003	Ethyl chloride (Chloroethane)	1.525	----	----	1.525	----
102	1006934	Ethylene dibromide (Dibromoethane)	----	----	----	----	----

Table 3-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Anchorage TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.001	----	----	0.001	----
104	107211	Ethylene glycol	1.427	----	----	1.427	----
105	151564	Ethylene imine (Axiridine)	----	----	----	----	----
106	75218	Ethylene oxide	1.946	----	----	1.946	----
107	96457	Ethylene thiourea	----	----	----	----	----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	----	----	----	----	----
109	5000	Formaldehyde	172.1	19.54	148.0	4.519	----
110	N/A	Glycol ethers	5.219	----	----	5.219	----
111	76448	Heptachlor	----	----	----	----	----
112	118741	Hexachlorobenzene	----	----	----	----	----
113	87683	Hexachlorobutadiene	----	----	----	----	----
114	77474	Hexachlorocyclopentadiene	----	----	----	----	----
115	67721	Hexachloroethane	----	----	----	----	----
116	822060	Hexamethylene-1,6 diisocyanate	0.059	----	----	0.059	----
117	680319	Hexamethylphosphoramide	----	----	----	----	----
118	110543	Hexane	86.06	18.39	16.30	51.37	----
119	302012	Hydrazine	----	----	----	----	----
120	7647010	Hydrochloric acid	53.95	----	----	5.052	48.90
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.411	----	----	0.193	0.218
122	123319	Hydroquinone	0.021	----	----	0.021	----
123	78591	Isophorone	0.122	----	----	0.122	----
124	N/A	Lead Compounds	15.086	0.011	14.95	0.020	0.106
125	58899	Lindane (all isomers)	----	----	----	----	----
126	108316	Maleic anhydride	----	----	----	----	----
127	N/A	Manganese Compounds	0.065	0.002	0.018	0.043	0.001
128	N/A	Mercury Compounds	0.229	0.000	0.004	0.068	0.156
129	67561	Methanol	89.97	----	----	89.968	----
130	72435	Methoxychlor	----	----	----	----	----
131	74839	Methyl bromide(Bromomethane)	28.62	----	----	28.617	----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	50.21	----	----	50.207	----
133	78933	Methyl ethyl ketone (2-Butanone)	94.03	----	----	94.032	----
134	60344	Methyl hydrazine	----	----	----	----	----
135	74884	Methyl iodide (Iodomethane)	----	----	----	----	----
136	108101	Methyl isobutyl ketone (Hexone)	64.52	----	----	64.521	----
137	624839	Methyl isocyanate	----	----	----	----	----
138	80626	Methyl methacrylate	----	----	----	----	----
139	1634044	Methyl tert butyl ether	0.042	----	----	0.042	----
140	74873	Methylchloride (Chloromethane)	1.391	----	----	1.391	----
141	75092	Methylene chloride(Dichloromethane)	22.02	----	----	22.015	----
142	101688	Methylene diphenyl diisocyanate (MDI)	0.058	----	----	0.058	----
143	N/A	Mineral fibers	0.000	----	----	0.000	----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	0.004	----	----	0.004	----
145	91203	Naphthalene	6.324	----	----	6.324	----
146	N/A	Nickel Compounds	0.073	0.005	0.008	0.060	0.001
147	98953	Nitrobenzene	----	----	----	----	----
148	62759	N-Nitrosodimethylamine	----	----	----	----	----
149	59892	N-Nitrosomorpholine	----	----	----	----	----
150	684935	N-Nitroso-N-methylurea	----	----	----	----	----
151	90040	o-Anisidine	0.038	----	----	0.038	----
152	95534	o-Toluidine	----	----	----	----	----
153	56382	Parathion	----	----	----	----	----

Table 3-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Anchorage TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
154	82688	Pentachloromicrobenzene (Quintobenzene)	0.141	-----	-----	0.141	-----
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----
156	108952	Phenol	0.000	-----	-----	0.000	-----
157	75445	Phosgene	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.001	-----	-----	0.001	-----
159	7803512	Phospine	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	1.366	0.021	0.087	1.258	0.000
163	106503	p-Phenylemediamine	3.710	-----	-----	3.710	-----
164	123386	Propionaldehyde	11.77	1.731	9.957	0.081	-----
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	0.013	-----	-----	0.013	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----
169	106514	Quinone	0.019	-----	-----	0.019	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.001	-----	-----	0.001	-----
172	100425	Styrene	8.488	4.437	4.051	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	172.0	-----	-----	172.0	-----
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----
176	108883	Toluene	628.7	146.6	103.3	378.7	-----
177	8001352	Toxaphene (chlorinated camphene)	0.003	-----	-----	0.003	-----
178	79016	Trichloroethylene	0.252	-----	-----	0.252	-----
179	121448	Triethylamine	0.108	-----	-----	0.108	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	0.295	-----	-----	0.295	-----
182	593602	Vinyl bromide	0.042	-----	-----	0.042	-----
183	75014	Vinyl chloride	0.016	-----	-----	0.016	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	0.016	-----	-----	0.016	-----
185	1330207	Xylenes (isomers and mixture)	391.0	82.5	99.2	209.2	-----
186	95476	Xylenes (isomers and mixture)	19.73	-----	-----	19.73	-----
187	108383	Xylenes (isomers and mixture)	0.010	-----	-----	0.010	-----
188	106423	Xylenes (isomers and mixture)	0.030	-----	-----	0.030	-----
Total HAP Emissions (Tons per Year)			2,329	432	568	1,280	50

Table 3-4

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Fairbanks TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
1	79345	1,1,2,2-Tetrachloroethane	0.030	-----	-----	-----	0.030
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----	-----	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	-----	-----	-----	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	12.828	2.617	5.940	4.271	-----
10	542756	1,3-Dichloropropene	6.640	-----	-----	6.640	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	3.449	-----	-----	3.449	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000	-----	-----	0.000	-----
14	540841	2,24-Trimethylpentane	0.612	-----	-----	0.612	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000	0.000	-----	0.000	-----
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----
21	584849	2,4-Tolluene diisocyanate	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	0.000	-----	-----	0.000	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	25.953	3.606	22.12	0.227	-----
36	60355	Acetamide	0.000	-----	-----	0.000	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----
38	98862	Acetophenone	0.000	-----	-----	0.000	-----
39	107028	Acrolein	8.748	0.578	7.627	0.543	-----
40	79061	Acrylamide	-----	-----	-----	-----	-----
41	79107	Acrylic Acid	0.000	-----	-----	0.000	-----
42	107131	Acrylonitrile	0.050	-----	-----	-----	0.050
43	107051	Allyl chloride	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.032	-----	-----	0.032	-----
46	N/A	Arsenic Compounds (inorganic including arsine)	1.258	0.000	0.000	0.028	1.230
47	1332214	Asbestos	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	107.42	49.62	26.53	31.02	0.250
49	92875	Benzidine	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	-----	-----	-----	-----	-----

Table 3-4

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Fairbanks TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
52	N/A	Beryllium Compounds	0.010	-----	-----	0.010	-----
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----
58	N/A	Cadmium Compounds	0.150	-----	-----	0.050	0.100
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----
61	63252	Carbaryl	-----	-----	-----	-----	-----
62	75150	Carbon disulfide	0.010	-----	-----	-----	0.010
63	56235	Carbon tetrachloride	0.010	-----	-----	0.000	0.010
64	463581	Carbonyl sulfide	0.010	-----	-----	-----	0.010
65	120809	Catechol	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----
69	79118	Chloroacetic acid	-----	-----	-----	-----	-----
70	108907	Chlorobenzene	3.322	-----	-----	2.972	0.350
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----
72	67663	Chloroform	0.051	-----	-----	0.041	0.010
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.383	0.003	0.007	0.363	0.010
76	N/A	Cobalt Compounds	0.024	-----	-----	0.014	0.010
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----
82	98828	Cumene	0.600	-----	-----	0.220	0.380
83	N/A	Cyanide Compounds	1.449	-----	-----	1.449	-----
84	3547044	DDE	-----	-----	-----	-----	-----
85	334883	Diazomethane	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	0.000	-----	-----	0.000	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	0.001	-----	-----	0.001	-----
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	24.29	9.639	12.58	1.551	0.520
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	0.509	-----	-----	0.499	0.010
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----

Table 3-4

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Fairbanks TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.010	-----	-----	0.000	0.010
104	107211	Ethylene glycol	0.467	-----	-----	0.467	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	0.627	-----	-----	0.627	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	0.030	-----	-----	-----	0.030
109	5000	Formaldehyde	103.92	10.18	59.95	33.37	0.420
110	N/A	Glycol ethers	1.680	-----	-----	1.680	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	0.010	-----	-----	-----	0.010
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----
118	110543	Hexane	33.09	7.457	11.22	13.71	0.710
119	302012	Hydrazine	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	161.1	-----	-----	1.104	160.0
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	19.99	-----	-----	0.001	19.99
122	123319	Hydroquinone	-----	-----	-----	-----	-----
123	78591	Isophorone	0.039	-----	-----	0.039	-----
124	N/A	Lead Compounds	3.208	0.006	2.284	0.118	0.800
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.791	0.001	0.008	0.782	-----
128	N/A	Mercury Compounds	0.038	0.000	0.002	0.026	0.010
129	67561	Methanol	28.96	-----	-----	28.95	0.010
130	72435	Methoxychlor	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	9.213	-----	-----	9.213	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	16.09	-----	-----	16.08	0.010
133	78933	Methyl ethyl ketone (2-Butanone)	34.85	-----	-----	34.46	0.390
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	20.94	-----	-----	20.88	0.060
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	0.001	-----	-----	0.001	-----
140	74873	Methylchloride (Chloromethane)	0.443	-----	-----	0.443	-----
141	75092	Methylene chloride(Dichloromethane)	8.573	-----	-----	8.403	0.170
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----	-----	-----	-----
143	N/A	Mineral fibers	-----	-----	-----	-----	-----
144	121697	N,N-Diethyl anniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----
145	91203	Naphthalene	6.117	-----	-----	5.977	0.140
146	N/A	Nickel Compounds	1.803	0.002	0.004	1.797	-----
147	98953	Nitrobenzene	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----
151	90040	o-Anisidine	-----	-----	-----	-----	-----
152	95534	o-Toluidine	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----

Table 3-4

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Fairbanks TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
154	82688	Pentachloromitrobenzene (Quintobenzene)	-----	-----	-----	-----	-----
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----
156	108952	Phenol	0.380	-----	-----	0.000	0.380
157	75445	Phosgene	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.431	-----	-----	0.431	-----
159	7803512	Phospine	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	10.33	0.010	0.035	10.283	-----
163	106503	p-Phenylemediamine	-----	-----	-----	-----	-----
164	123386	Propionaldehyde	4.975	0.909	4.065	0.001	-----
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	0.010	-----	-----	-----	0.010
167	75569	Propylene oxide	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----
169	106514	Quinone	0.004	-----	-----	0.004	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.008	-----	-----	0.008	-----
172	100425	Styrene	4.150	2.079	1.701	-----	0.370
173	96093	Styrene oxide	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	55.21	-----	-----	55.12	0.090
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----
176	108883	Toluene	258.6	65.80	52.89	137.6	2.340
177	8001352	Toxaphene (chlorinated camphene)	-----	-----	-----	-----	-----
178	79016	Trichloroethylene	0.070	-----	-----	0.020	0.050
179	121448	Triethylamine	0.035	-----	-----	0.035	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	0.097	-----	-----	0.097	-----
182	593602	Vinyl bromide	-----	-----	-----	-----	-----
183	75014	Vinyl chloride	0.060	-----	-----	-----	0.060
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----	-----	-----	-----
185	1330207	Xylenes (isomers and mixture)	161.7	37.13	50.15	73.31	1.100
186	95476	Xylenes (isomers and mixture)	6.167	-----	-----	6.167	-----
187	108383	Xylenes (isomers and mixture)	0.000	-----	-----	0.0001	-----
188	106423	Xylenes (isomers and mixture)	0.000	-----	-----	0.0001	-----
Total HAP Emissions (Tons per Year)			1,152	190	257	515	190

Table 3-5

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Juneau TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	0.000	-----	-----	0.000	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	0.001	-----	-----	0.001	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	8.023	1.502	6.520	-----	-----
10	542756	1,3-Dichloropropene	2.440	-----	-----	2.440	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	1.267	-----	-----	1.267	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000	-----	-----	0.000	-----
14	540841	2,24-Trimethylpentane	0.095	-----	-----	0.095	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000	0.000	-----	0.000	0.000
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----
21	584849	2,4-Tolluene diisocyanate	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	0.000	-----	-----	0.000	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	13.559	1.731	11.80	0.030	-----
36	60355	Acetamide	0.000	-----	-----	0.000	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----
38	98862	Acetophenone	0.000	-----	-----	0.000	-----
39	107028	Acrolein	3.755	0.292	3.338	0.125	-----
40	79061	Acrylamide	0.023	-----	-----	0.023	-----
41	79107	Acrylic Acid	0.000	-----	-----	0.000	-----
42	107131	Acrylonitrile	-----	-----	-----	-----	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.000	-----	-----	0.000	-----
46	N/A	Arsenic Compounds (inorganic including arsine)	0.032	0.000	-----	0.023	0.009
47	1332214	Asbestos	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	77.04	15.68	60.99	0.369	-----
49	92875	Benzidine	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	0.001	-----	-----	0.001	-----

Table 3-5

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Juneau TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
52	N/A	Beryllium Compounds	0.017	-----	-----	0.017	-----
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----
58	N/A	Cadmium Compounds	0.047	-----	-----	0.016	0.032
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----
61	63252	Carbaryl	0.000	-----	-----	0.000	-----
62	75150	Carbon disulfide	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	0.000	-----	-----	0.000	-----
64	463581	Carbonyl sulfide	-----	-----	-----	-----	-----
65	120809	Catechol	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----
69	79118	Chloroacetic acid	0.001	-----	-----	0.001	-----
70	108907	Chlorobenzene	1.092	-----	-----	1.092	-----
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----
72	67663	Chloroform	0.015	-----	-----	0.015	-----
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.150	0.001	0.009	0.097	0.043
76	N/A	Cobalt Compounds	0.000	-----	-----	0.000	-----
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----
78	1319773	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----
79	95487	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----
80	108394	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----
81	106445	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----
82	98828	Cumene	-----	-----	-----	-----	-----
83	N/A	Cyanide Compounds	1.046	-----	-----	1.046	-----
84	3547044	DDE	0.000	-----	-----	0.000	-----
85	334883	Diazomethane	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	0.000	-----	-----	0.000	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----
93	79447	Dimethyl carboxyl chloride	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	0.001	-----	-----	0.001	-----
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	55.45	4.556	50.58	0.315	-----
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	0.179	-----	-----	0.179	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----

Table 3-5

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Juneau TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.000	-----	-----	0.000	-----
104	107211	Ethylene glycol	0.167	-----	-----	0.167	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	0.230	-----	-----	0.230	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----
109	5000	Formaldehyde	45.66	4.978	28.82	11.86	-----
110	N/A	Glycol ethers	0.626	-----	-----	0.626	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----
118	110543	Hexane	38.45	3.016	31.46	3.980	-----
119	302012	Hydrazine	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	28.68	-----	-----	0.474	28.208
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.000	-----	-----	0.000	-----
122	123319	Hydroquinone	-----	-----	-----	-----	-----
123	78591	Isophorone	0.014	-----	-----	0.014	-----
124	N/A	Lead Compounds	4.104	0.002	4.089	0.012	-----
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.039	0.000	0.015	0.023	-----
128	N/A	Mercury Compounds	0.087	0.000	0.002	0.012	0.073
129	67561	Methanol	10.64	-----	-----	10.640	-----
130	72435	Methoxychlor	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	3.386	-----	-----	3.386	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	5.908	-----	-----	5.908	-----
133	78933	Methyl ethyl ketone (2-Butanone)	10.922	-----	-----	10.922	-----
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	7.475	-----	-----	7.475	-----
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	0.001	-----	-----	0.001	-----
140	74873	Methylchloride (Chloromethane)	0.164	-----	-----	0.164	-----
141	75092	Methylene chloride(Dichloromethane)	2.145	-----	-----	2.145	-----
142	101688	Methylene diphenyl diisocyanate (MDI)	0.008	-----	-----	0.008	-----
143	N/A	Mineral fibers	0.000	-----	-----	0.000	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----
145	91203	Naphthalene	0.732	-----	-----	0.732	-----
146	N/A	Nickel Compounds	0.116	0.001	0.009	0.034	0.072
147	98953	Nitrobenzene	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----
151	90040	o-Anisidine	0.006	-----	-----	0.006	-----
152	95534	o-Toluidine	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----

Table 3-5

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Estimated Emissions - Tons per Year				
			Juneau TOTAL	On-Road Mobile Sources	Off-Road Mobile Sources	Area Sources	Point Sources
No.	CAS No.	Chemical Name					
154	82688	Pentachloromitrobenzene (Quintobenzene)	0.020	-----	-----	0.020	-----
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----
156	108952	Phenol	-----	-----	-----	-----	-----
157	75445	Phosgene	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.002	-----	-----	0.002	-----
159	7803512	Phospine	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	0.116	0.005	0.042	0.070	-----
163	106503	p-Phenylemediamine	-----	-----	-----	-----	-----
164	123386	Propionaldehyde	2.350	0.294	2.056	0.000	-----
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----	-----	-----	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----
169	106514	Quinone	0.002	-----	-----	0.002	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.000	-----	-----	0.000	-----
172	100425	Styrene	4.168	0.971	3.197	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	20.26	-----	-----	20.26	-----
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----
176	108883	Toluene	283.6	31.51	208.6	43.53	-----
177	8001352	Toxaphene (chlorinated camphene)	0.000	-----	-----	0.000	-----
178	79016	Trichloroethylene	0.007	-----	-----	0.007	-----
179	121448	Triethylamine	0.013	-----	-----	0.013	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	0.035	-----	-----	0.035	-----
182	593602	Vinyl bromide	0.006	-----	-----	0.006	-----
183	75014	Vinyl chloride	0.001	-----	-----	0.001	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	0.001	-----	-----	0.001	-----
185	1330207	Xylenes (isomers and mixture)	263.8	17.78	221.8	24.21	-----
186	95476	Xylenes (isomers and mixture)	2.212	-----	-----	2.212	-----
187	108383	Xylenes (isomers and mixture)	0.005	-----	-----	0.005	-----
188	106423	Xylenes (isomers and mixture)	0.008	-----	-----	0.008	-----
Total HAP Emissions (Tons per Year)			900	82	633	156	28

APPENDIX A

Inventory Preparation Plan

Alaska Air Toxics Emission Inventory Preparation Plan

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June 2000

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Alaska Air Toxics Emission Inventory Preparation Plan

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1. INTRODUCTION

This inventory preparation plan (IPP) has been compiled in accordance with EPA requirements and is designed to serve as both a work plan that documents analysis objectives and a quality assurance plan that identifies review responsibilities. The goal of the effort is to develop toxic emission inventories for a representative set of Alaskan communities. These inventories will be prepared for the 1999 calendar year, with separate estimates for summer versus winter seasons. To maximize representation, this effort will collect information on the two largest population centers, Anchorage and Fairbanks, and a marine community, Juneau. The result will be source-specific gridded toxic emission inventories for each community. In addition, a list of sources, activity levels, and related emission factors will be prepared for a “typical” rural Alaskan community. The results will be used to assess where potential “hot spots” may exist and provide a framework for additional investigations of toxic emission distributions across the state.

Inventories will be prepared for the areas within each of the following jurisdictions:

- Municipality of Anchorage (MOA);
- North Star Borough (FNSB); and
- City and Borough of Juneau (CBJ).

The remainder of this plan is organized as follows: Section 2 describes the methodology to be employed in estimating on-road mobile source emissions. Section 3 provides a similar description for off-road mobile sources. A description of the approach to be used in estimating area sources is presented in Section 4. Section 5 provides a review of the point source methodology. Section 6 presents a detailed discussion of the planned approach to gridding the inventories. The quality assurance plan is presented in Section 7.

2. ON-ROAD MOBILE SOURCES

An on-road motor vehicle inventory is typically generated by simply multiplying motor vehicle activity (i.e., vehicle miles traveled, or VMT) by an emission factor (in grams per mile). In general, the activity data are based on travel forecasts prepared by local Metropolitan Planning Organizations (MPOs), while the emission factors are obtained by running EPA=s MOBILE model. Because this study requires development of toxics emissions inventories, EPA=s current emission factor model, MOBILE5b, will not be used. Instead, a toxics version of the model recently developed under contract to the U.S. Environmental Protection Agency (EPA) will serve as the basis of the emission factor estimates. Separate estimates will be prepared for each of the following vehicle categories:

- Light-duty gasoline vehicles (LDGV);
- Light-duty gasoline trucks (LDGT1), less than 6,000 lbs gross vehicle weight (GVW);
- Light-duty gasoline trucks (LDGT2), 6,000 – 8,500 lbs GVW;
- Heavy-duty gasoline vehicles (HDGV), 8,500+ lbs GVW;
- Light-duty Diesel vehicles (LDDV);
- Light-duty Diesel trucks (LDDT); less than 8,500 lbs GVW;
- Heavy-duty Diesel Vehicles (HDDV), 8,500 lbs GVW; and
- Motorcycles (MCY).

The specific elements of this task are described below.

Collection of Travel Data - The first step will be to establish contacts at the MPOs in Anchorage, Fairbanks, and Juneau to obtain the latest travel forecast for the 1999 calendar year. Because the inventories are ultimately going to be gridded, the travel information will be obtained in the most disaggregated form possible, including the coordinates of the link end points if those data are available. In addition, differences between summer and winter activity levels will be obtained to the extent that those data exist. If the travel data do not distinguish between summer and winter activity patterns, an estimate of those differences will be made based on monthly fuel sales or other measure of motor vehicle activity.

Both MOA and FNSB are in the process of developing CO emission inventories for the 2000 State Implementation Plan submittal. At a minimum, those efforts will quantify emissions by source category for the base year and 2000 (i.e., the year in which an attainment demonstration is required). Using the data included in both the base year and attainment year inventories, it will be possible to interpolate estimates of fuel sales, population, VMT, etc. for 1999. Separate requests for travel and related data will be

submitted to ADOT&PF for Juneau. A screening-level approach will be used to collect relevant data for the selected rural community.

Model Selection - It is anticipated that the MOBTOX5b model would be used to generate toxics emission factors for this effort. The MOBTOX5b model was recently developed under contract to EPA,* and was used to generate toxics emissions estimates to support the Tier 2 rulemaking as well as potential toxics regulatory actions required under Section 202(l) of the 1990 Clean Air Act Amendments. In addition, it was used to prepare on-road motor vehicle emission factors for the 1996 National Toxics Inventory.

Although MOBTOX5b was based on the MOBILE5b model, a number of modifications were made to ensure the toxics estimates reflected the latest information on motor vehicle emissions. As much as possible, those revisions were designed to mimic the changes that are currently being incorporated into MOBILE6. In particular:

- Base emission rates were modified to reflect the lower deterioration rates anticipated for newer technology vehicles;
- Off-cycle effects were incorporated into the model to account for aggressive driving behavior not captured in MOBILE5b;
- Revised fuel effects were incorporated to better reflect the impact of gasoline sulfur levels; and
- Fleet characteristics (i.e., age distributions, mileage accumulation rates, and the mix between cars and light trucks) were modified to reflect more recent data on the make-up and usage of the in-use fleet.

The MOBTOX5b model calculates emissions of benzene, acetaldehyde, formaldehyde, 1,3-butadiene, and MTBE. In addition, total organic gas (TOG) emissions are calculated by the model. This is important because calculation of emission rates for other compounds on the list of Hazardous Air Pollutants (e.g., acrolein) will be based on applying a toxics fraction to the TOG estimate. Those toxics fractions will likely be based on EPA or CARB published speciation profiles, although other sources of information will also be investigated.

A revised version of EPA's PART5 model will also be used to prepare estimates of Diesel particulate matter (PM). The revised version of this model, which includes more recent emission factor estimates for light-duty Diesel vehicles, was also developed under contract to EPA. It is anticipated that the Diesel PM estimates would be used as the basis of the polycyclic organic matter estimates prepared for this inventory.

* "Analysis of the Impacts of Control Programs on Motor Vehicle Toxics Emissions and Exposure in Urban Areas and Nationwide," Prepared by Sierra Research for the U.S. Environmental Protection Agency, Report No. SR99-11-02, November 30, 1999.

Input File Preparation - Separate MOBILE input files would be prepared for each of the study areas and for each season under consideration. The standard MOBILE model inputs would be included in this effort, including vehicle age distribution, mileage accumulation rates, ambient temperatures, operating mode fractions, I/M program specifications, etc. In addition, the MOBTOX5b model requires the following files to be developed for each model run:

- “Toxic-TOG curves,” which reflect the exhaust emissions impacts of specific fuel formulations (e.g., sulfur, RVP, aromatics content, benzene content, oxygenate type and content, etc.);
- Evaporative fractions, which reflect the fraction of toxic compounds (e.g., benzene, MTBE) in evaporative emissions; and
- Off-cycle correction factors, which account for aggressive driving behavior.

Finally, alternative base emission rate equations would be incorporated into this analysis consistent with those developed by EPA for the Tier 2 rulemaking.

It should be noted that the development of the Toxic-TOG curves required by the MOBTOX5b model is not a simple process, requiring output from EPA’s Complex model to be merged with data on emission control system configuration by model year within a FORTRAN routine.

Because fuel specifications can have a substantial impact on emissions of air toxics from motor vehicles, it is important to ensure that the fuel specifications used in this analysis match those of each study area for summer and winter conditions. Although fuel specification data are available for Fairbanks through the American Automobile Manufacturers Association’s (AAMA’s) annual fuel surveys,* similar data are not readily available for Anchorage and Juneau (nor for rural areas of Alaska). As a result, some effort will be devoted to obtaining appropriate fuel data for use in this study (e.g., through oil industry contacts). If data are not forthcoming through those sources, gasoline sampling and analysis will be considered.

Inventory Preparation - Once the input files are generated for each study area and season, the MOBTOX5b model will be run. The resulting emission factors will then be combined with the link-specific travel forecasts to arrive at a toxics emission inventory for each area and season. It is anticipated that much of this effort would be directed at developing a computer program (likely written in FORTRAN) to automate this process as much as possible. Automating this process may require more “up-front” effort, but in the long run will result in less effort devoted to QC. In addition, if mid-course corrections or adjustments to model inputs are necessary, those can be made with the knowledge that recalculating the inventory is not a limiting factor. The output format would be developed

* With the disbanding of AAMA, these surveys are now sponsored by the Alliance of Automobile Manufacturers.

in consultation with ADEC to ensure that the results could be used directly in any potential submittal to EPA and in the development of the gridded inventory.

3. OFF-ROAD MOBILE SOURCES

In general, off-road mobile sources include aircraft, trains, ships, and a variety of equipment types employed in construction, maintenance, and recreation. EPA has developed a model entitled “NONROAD” to estimate emissions for the latter category of equipment types. The FAA has prepared a model to address aircraft emissions, and EPA has defined emission factors for quantifying emissions from trains and ships. Regardless of the source category, inventories are generally developed using the following approach:

$$\text{Emissions (tons per day)} = \text{Population} * \text{Annual Usage} * \text{Seasonal Use Factor} \\ * \text{Emission Factor} * \text{Load Factor}$$

The three elements on the first line of the above equation generally reflect overall source activity, while the two elements on the second line reflect an emission rate. The specific approach proposed to develop the off-road mobile source inventory for this study is summarized below.

Nonroad Equipment

Activity Levels - The first step in this effort will be to identify the different types of equipment used in the communities selected for analysis as well as in rural areas of Alaska. As a starting point for this analysis, EPA’s NONROAD model will be reviewed for both equipment types and activity levels specific to Alaska. That model has been formatted such that off-road equipment populations and usage (i.e., hours per year) are estimated for each county in the U.S. However, estimates from this model must be reviewed carefully for reasonableness. That is because the NONROAD model uses a “top-down” approach in which state-level equipment populations are allocated to counties on the basis of activity indicators that are specific to certain equipment types. For example, if the activity indicator is based on the number of businesses within a particular SIC code and those businesses are based primarily in Anchorage and Fairbanks, the model can over-allocate the equipment to those communities and ignore usage that occurs outside those areas. To illustrate this point, a run of the NONROAD model identified the following 15 sources as accounting for 77 percent of the CO emitted on a typical winter day during 1999 in Fairbanks.

- Air Compressors;
- All Terrain Vehicles\Motorcycles;
- Concrete\Industrial Saws;
- Gas Compressors;
- Generator Sets;
- Lawn & Garden Tractors;

- Lawn Mowers;
- Other Underground Mining Equipment;
- Paving Equipment;
- Pressure Washers;
- Pumps;
- Snow blowers;
- Snowmobiles;
- Tractors/Loaders/Backhoes; and
- Welders.

The largest source, with over 24% of the CO emitted for nonroad vehicles, was all-terrain vehicles\motorcycles. Snow machines were ranked second with 14% of the CO emissions. Clearly, these findings warrant some investigation, as it is unlikely that all-terrain vehicles\motorcycle activity levels are the dominant source of nonroad CO during the winter. This points out that it is important to properly quantify seasonal equipment usage when generating the activity estimates. For example, all-terrain vehicles\motorcycles are likely to be used primarily during the summer and snow blowers during the winter. Large construction equipment (e.g., road graders) operation is likely to be much greater in the summer than in the winter.

As noted in the RFP, development of snow machine activity deserves special attention because it is expected that snow machine use will be a primary emission source in the winter. In previous efforts to prepare CO emission inventories for Anchorage and Fairbanks, snow machine usage was identified as a primary emission source. Recent surveys of snow machine registration and activity levels will be obtained from the Alaska Department of Transportation and Public Facilities (ADOT&PF). To the extent possible, recent data gathered for the development of the serious area CO inventories will be used to support the development of the toxics emissions inventories.

Emission Models - It is expected that the primary emission model that will be used to generate hydrocarbon (or TOG) emission factors for off-road mobile sources is EPA's NONROAD model. Although that model combines equipment activity and emissions to generate county-level inventories, it is unlikely that it will be used in this mode. Depending on the results of the review conducted above, separate estimates of population and usage may be necessary. If that were the case, then the emission factors (and load factors) from the NONROAD model would be used in this effort. A preliminary review of the model indicates that the emission factors within that model are the most current available.

Because the NONROAD model does not provide emission estimates for commercial marine vessels, locomotives, and aircraft, it will be necessary to separately estimate emission factors (and activity) from these sources. The approach used to generate these estimates will follow EPA guidelines spelled out in AP-42 or other appropriate information source.

The emission rates of air toxics will be estimated by applying a speciation profile to the hydrocarbon emission factors. A review of EPA and CARB documents related to off-road equipment air toxics will be necessary to determine the appropriate toxics fractions

for each non-road source. For example, EPA's 1991 Nonroad Engine and Vehicle Emission Study included estimates of benzene, 1,3-butadiene, aldehydes (as a general class), and nitrosamines, and testing conducted by Southwest Research Institute in 1991 on small utility engines used in lawn and garden equipment included detailed estimates of aldehydes and ketones (including formaldehyde, acetaldehyde, acrolein, and propionaldehyde) that could be used to develop appropriate profiles for use in this inventory.

Aircraft

Contacts have been established with the airports in Anchorage, Fairbanks and Juneau and requests for data on landings and take offs (LTOs) have been requested for calendar year 1999. That data will be input into the Federal Aviation Administration's (FAA's) Emissions Dispersion Modeling System (EDMS) to prepare emission estimates for both aircraft and airport ground support equipment for the commercial airports and military bases. A separate methodology that relies on average aircraft emissions and LTOs will be used to compute emissions for general aviation fields. A similar methodology is planned for computing estimates of HC from aircraft operations in each of the communities. An approach to speciation similar to the one outlined above for the nonroad equipment will be followed.

The FAA collects data on flight operations at each of the major U.S. airfields for U.S. flag aircraft that have a minimum of 60 seats. A summary of specific LTOs by aircraft body (e.g., 727-200, etc.) is collected for each commercial airport and published annually for the preceding year (e.g., 1998 data are published in 1999, etc.). Additional data are required to document LTOs for foreign flag carriers and for smaller aircraft. Contacts have been established with the towers at each of the airports in each community to collect these data for 1999. The published FAA data will be obtained for each of the airports and contacts will be established at the towers to obtain the remaining data on LTOs required to prepare emission inventory estimates.

Anchorage - Contacts have been established with personnel at the following airports:

- Anchorage International Airport including Lake Hood,
- Merrill Field,
- Elmendorf Air Force Base, and
- Fort Richardson.

Fairbanks - Contacts have been established with personnel at the following airports:

- Fairbanks International Airport,
- Eielson Air Force Base,
- Metro Field, and
- Fort Wainwright Army Air Field.

Juneau - Contacts have been established with personnel at Juneau International Airport.

Rail

Contacts have been established with Alaska Railroad (ARR) for information on fuel consumption in terminal operations and line haul activity with the boundaries of Anchorage and Fairbanks (there is no rail activity in Juneau). Emission estimates will be calculated by multiplying the fuel consumption information by updated emission factors for railway locomotive operation.* An approach to speciation similar to the one outlined above for the nonroad equipment will be followed.

Vessels

There is no significant vessel activity in Fairbanks. For Anchorage, contacts have been established with the Port of Anchorage to obtain data on daily activity levels and related fuel consumption levels in 1999. Similar requests have been made to fuel suppliers and related contacts (e.g., agencies responsible for tracking cruise ships, etc.) in Juneau. Emissions will be computed by multiplying fuel consumption estimates by emission factors recently developed by EPA for marine vessels. An approach to speciation similar to the one outlined above for the nonroad equipment will be followed.

Inventory Development

Once the activity levels and emission factors are determined for each source, development of the inventory is a simple matter of multiplying one by the other. Source specific speciation profiles will then be applied to the HC emission estimates. Of greater difficulty will be spatially allocating the emission inventory of each equipment type to develop a gridded inventory. It is likely that some sources, such as snowblowers, would be allocated to grid cell on the basis of residential population, while others, such as snow machines, would be allocated based on the location of trails. Spatial allocation of equipment usage will be kept in mind during the review of activity levels outlined above, since it will be an integral component of the gridded inventory development. A more detailed discussion of these issues is presented in Section 6.

* "Feasibility and Cost-Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm, and Other Mobile Off-Highway Equipment," prepared by Radian Corporation, for U.S. EPA, February 1988.

4. AREA SOURCES

While some small, dispersed sources like dry cleaning shops, plating shops, and gasoline-dispensing facilities have emissions through stacks or vents, they are often considered area sources for inventory and/or regulatory purposes. Typically, area sources include all stationary sources that are not major sources of hazardous air pollutants (HAPs) as defined in the Clean Air Act (greater than 10 tons per year [tpy] of an individual HAP or 25 tpy of total HAPs). For purposes of this inventory, however, it is not important whether a facility is a major source of HAPs, and therefore it is convenient to include all facilities with air quality permits or with operating permit applications as stationary sources (it is easy to reclassify permitted, non-major HAP sources as area sources if federal protocols require it). Therefore, it is suggested that area sources be defined for this inventory as stationary, unpermitted emission sources.

Significant area sources are likely to include commercial, institutional, and residential heating, and residential wood combustion. As a result, typical summer and winter consumption rates will be obtained for the following fuel types:

- X natural gas (Anchorage only);
- X fuel oil;
- X coal (Fairbanks only);
- X propane; and
- X wood.

Relevant AP-42 emission factors will be screened to identify other significant area HAP sources. In most cases these sources may be small, but numerous. Examples include open burning, prescribed burning, forest fires, and structural fires.

For those sources where ADEC does not have preexisting inventory data, these sources may be evaluated using population-based or similar factors to calculate the emissions. In this case, effort would be spent evaluating activity level and emissions using rates per capita, per household, per registered motor vehicle, or other units. Where locations are known, this information will be tracked. Otherwise, population densities, zoning information, or other methods to locate area sources will be applied. The four military bases (Elmendorf and Eielson AFBs; Forts Richardson and Wainwright) within the study area will receive special attention due to the likely significance in the total emissions. Where activity levels or emission factors are not available, emissions of volatile organic compounds (VOCs) or PM from the area source category will be used and HAPs emissions will be apportioned using speciation data. For example, if overall emissions from dry cleaning are known, perchloroethylene emissions could be estimated using the industry averages of perchloroethylene dry cleaning and petroleum-based solvent dry cleaning.

To the extent that emissions are seasonal, the HAPs emissions will be apportioned for winter and summer. Examples where activity levels are expected to vary seasonally include residential wood combustion, residential/commercial/institution heating, and architectural coatings. The seasonal activity levels will be based on past inventories, air quality plans, fuel sales, or other appropriate information.

5. POINT SOURCES

Data will be obtained from ADEC on permitted facilities, or facilities with operating permit applications, located in Anchorage, Fairbanks, and Juneau. All facilities required to have air quality construction or operating permits will be inventoried using ADEC's point source methodology even though some of them may be classified as area sources. To the extent it is available, facility information should include the type of source (e.g., power plants, refineries, incinerators, tank farms, etc.), physical location (e.g., Universal Transverse Mercator coordinates), and process or operational data (e.g., throughput, fuel combustion rates, hours of operation, etc.). Each facility will be gridded as a single source (i.e., the emissions from individual sources within a facility will be aggregated). If coordinates are not available from ADEC, coordinates will be based on street addresses.

Appropriate emission factors will be obtained for HAPs emitted by each facility. To the extent feasible, emission factors will be obtained from EPA and the California Air Resources Board (CARB) sources, including:

- EPA's *Compilation of Air Pollutant Emission Factors*;
- EPA's *Locating and Estimating* series for toxic air pollutants;
- Background documentation for development of National Emission Standards for Hazardous Air Pollutants;
- EPA's Factor Information Retrieval (FIRE) database;
- EPA's SPECIATE database; and
- California Air Toxics Emission Factor database.

Emission factors from these sources are typically expressed in units of mass HAP emitted per unit of activity, where such units may be fuel consumption, power rating, throughput, material consumption, or other units. If source-specific factors for HAPs are not available, VOC or PM emission will be used together with speciation data (e.g., mass of HAP per mass of VOC) from EPA or CARB documents.

Activity levels for 1999 should be readily available from facility operating reports. Effort will be devoted to the collection of available reports for 1999 in each inventory area. Some facilities file reports quarterly and therefore seasonal data can be easily obtained. For facilities that file semi-annually, winter and summer emission allocations will be based on knowledge of the facility operation or information available from ADEC.

A separate methodology will be developed for rural areas. It will provide a range of emission factors for a representative set of source types and provide an approach for collecting activity information. Contacts will be established with one or more rural areas to identify the source types to be addressed.

6. GRIDDING

Source-specific toxic inventory emissions will be spatially gridded into a uniform, rectangular grid system. The size and areal extent of the grid cells will be defined in consultation with ADEC. (Typical cell sizes range from 1 km to 10 km, depending on the resultant use of the inventory.) Separate spatial gridding methodologies will be applied for on-road mobile, off-road mobile, area, and point sources as described below. These methods would rely on FORTRAN software developed by Sierra for spatially allocating emission sources. An alternative approach would be to use ArcView mapping software. The two approaches will be investigated and a joint decision will be made with ADEC to select the optimal methodology.

On-Road Mobile Sources - For Anchorage, Fairbanks, and possibly Juneau (depending on the level of detail in the available data), on-road toxic mobile source emissions will be spatially allocated into grid cells based on roadway link-level emission estimates developed under Task 2.

For communities in which link-level travel activity data are not available (i.e., rural communities), a spatial allocation scheme using GIS-based demographic survey or other surrogates (see “Area Sources” below) will be developed if sufficient data are available to support the calculations and only after consultation with ADEC.

Off-Road Mobile Sources - The primary sources of off-road mobile source toxic emissions are expected to include aircraft, marine vessels, and, in wintertime, snow machines. Discussions will be held with responsible agencies and contacts in each community to identify those specific sub-areas (and resulting grid cells) in which emissions from each of these types of source categories occur. For example, snowmobile usage will be allocated into grid cells corresponding to areas within the community in which they are heavily used. Similarly, marine vessel emissions will be allocated into shipping lane-based grid cells.

Area Sources - Stationary area source emissions will be spatially allocated to appropriate grid cells based upon available category-specific geographic usage patterns obtained from recently completed GIS-based demographic survey data. The availability of these GIS-based usage data will be determined from discussions with community planning departments. For those local areas for which such data exist, they will be used to allocate regionally developed area source emissions into specific grid cells based upon surveyed usage patterns. These spatial allocations will be performed on a category-specific basis using appropriate metrics as available in the demographic data. For example, households per square mile is a better spatial usage indicator of residential fuel combustion than population per square mile. For communities or area source categories for which appropriate spatial usage data are not available, emissions will be allocated uniformly into grid cells across the inventory domain. These latter instances will be clearly documented.

Point Sources - Of the four major source categories, point sources are the easiest to grid. By definition, point sources represent emissions from a single location. Thus, the emissions for each toxic point source will simply be allocated into the appropriate grid cell based on the coordinates of each separate point source.

This approach assumes that vertical gridding of the toxic inventory will not be required. Vertically gridded inventories are typically used only for photochemical and transport grid modeling of broad urbanized areas. In Alaska, the only non-ground-level emission sources are expected to be combustion stacks (e.g., from power plants) and aircraft. Thus, emissions from these categories will simply be gridded into a single vertical depth, which will be established in consultation with the Project Manager.

Finally, separate gridded inventories will be developed for both winter and summer for source categories that exhibit significant differences in spatial patterns between seasons. Snow machines are the most obvious example, but other categories will be evaluated for large seasonal differences in spatial patterns.

7. QUALITY ASSURANCE PLAN

Quality Assurance/Quality Control (QA/QC) procedures described in this plan were developed to ensure data accuracy, completeness, representativeness, and comparability. These procedures will be implemented throughout the planning, data collection, emission estimation, and reporting phases of the inventory development program. ADEC staff will take the lead in tracking the implementation of these procedures.

QC procedures that will be implemented during the inventory development process include the following:

- Data Collection - As described in the previous sections, data collection will be patterned after existing CO emission inventory development efforts that are governed by EPA-approved procedures.
- Data Documentation - All activities will be documented in notebooks with indices to facilitate the retrieval of recorded information. A notebook will be assigned to each team member and it will be used only to record information relative to the development of the inventory. To facilitate review, all entries will be made in a computer file (using Microsoft WORD) and uploaded to Q/A personnel for review. Records of contacts (e.g., agency, group, company, phone number, etc.) will be documented.
- Emission Calculation - The procedures to be followed in developing on-road, non-road mobile, area, and point source emission estimates were detailed in Sections 2 through 5. All changes to these procedures will be documented and submitted to ADEC for review and comment.
- Reporting - Prior to finalizing the report, all of the actions taken in response to the recommendations for corrective action will be evaluated to determine whether the report accurately reflects the corrections made.

QA activities are not directly involved in the development of the inventory and would normally include assessments of the effectiveness and appropriateness of the systems established by management to control data quality. This includes the management and supervision of the work. Specific steps involve Q/A training and a series of independent audits to assess the effectiveness of the QC system and management of inventory development activities. With the exception of the latter step (i.e., management, which will be addressed during the course of the effort), these activities are literally beyond the budget and scope of this project. More importantly, it is premature to initiate these efforts, because the inventories developed under this project will be the first for Alaska.

For that reason, all efforts will be focused on QC procedures to ensure that the results of this initial effort will be based on the best data possible. It would be prudent, however, to implement QA procedures in subsequent air toxic emission inventory development efforts.

APPENDIX B

On-Road Mobile Sources

Appendix B

Estimation of Air Toxics from On-Road Motor Vehicles

The U.S. Environmental Protection Agency (EPA) recently developed county-level estimates of air toxics from on-road motor vehicles as part of the federal rulemaking on hazardous air pollutants (HAPs) from motor vehicles.* However, the base-year inventories prepared for that effort were for 1996, and because these estimates were prepared for each county in the U.S., the use of locally derived data was limited. As a result, the EPA estimates could not be used for the 1999 calendar year inventories required for this study, and independent estimates were prepared.

The general approach used to develop HAP inventories for this project followed the methodology developed by EPA and its contractors to generate the nationwide inventories used to support the federal rulemaking on motor vehicle air toxics. As explained below, this method relied on the use of the MOBTOX5b model coupled with fleet characteristics, fuel parameters, and vehicle miles traveled specific to each of the three areas analyzed in this effort (i.e., Anchorage, Fairbanks, and Juneau).

MOBTOX5b

The MOBTOX5b model was developed by Sierra Research under contract to EPA.** This model is similar to MOBILE5b in function and design. However, it was extensively modified to incorporate the following features:

- The base emission rates were modified to incorporate new data on in-use vehicle emissions performance and generally reflect changes that were made to EPA's MOBILE6 model;
- The emissions impacts of off-cycle operation (i.e., aggressive driving behavior and air conditioning usage) were incorporated,***

* "Control of Emissions of Hazardous Air Pollutants from Mobile Sources," U.S. Environmental Protection Agency, Federal Register, Vol. 66, No. 61, March 29, 2001.

** "Analysis of the Impacts of Control Programs on Motor Vehicle Toxics Emissions and Exposure in Urban Areas and Nationwide," Prepared by Sierra Research for the U.S. Environmental Protection Agency, Report No. SR99-11-02, November 30, 1999.

*** Note that chase car data collected by Sierra Research in Anchorage and Fairbanks during the winter indicate that road and weather conditions limit aggressive driving. As a result, the wintertime estimates prepared for this study do not include an emissions impact from aggressive driving behavior.

- Specific accounting for the emissions impacts of gasoline sulfur level was incorporated; and
- A subroutine was added to estimate emissions of benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and MTBE; the model also calculates total organic gas (TOG) emissions.

In addition to the standard inputs required for a MOBILE5b run (e.g., temperature, speed, fuel volatility, etc.) MOBTOX5b requires a number of additional input files that are read by the model. These input files, which are generated outside the model, are a function of local fuel specifications and are used by the model to generate the toxics estimates. Thus, it was necessary to compile data on local fuel parameters (e.g., benzene content, aromatic content, etc.) for each of the areas evaluated in this study.

Once the MOBTOX5b input parameters were compiled and the model was run, the resulting emission factors were combined with local estimates of vehicle miles traveled (VMT) to generate an inventory for each area. Because ambient temperatures and fuel parameters change across seasons, separate inventories were prepared for the winter, spring, summer, and fall.

Finally, MOBTOX5b does not calculate emissions from all HAPs that are of interest with respect to on-road motor vehicles. Thus, the methodology used to generate the 1996 base year National Toxics Inventory (NTI)* was used for the compounds not calculated by MOBTOX5b. That method applies a toxics fraction (i.e., mg/mi toxic per mg/mi TOG) to the TOG emission rate calculated by the model. For some metal compounds, toxic fractions were reported as a fraction of PM₁₀ emissions. For those compounds, the PART5 model was used to generate PM₁₀ emission rates, and the toxics fractions contained in the documentation for the 1996 NTI were used to generate the HAP estimates. A summary of the compounds evaluated in this study is contained in Table B-1.

Specific inputs used in the modeling performed for this study are summarized below.

Fuel Specification Data - As described above, fuel specification data for each community were required to develop inputs for the MOBTOX5b model. For Anchorage, fuel surveys were conducted by ADEC and the results of those surveys were provided to Sierra. The estimates for Fairbanks made use of survey data collected by the Alliance of Automobile

* "Documentation for the 1996 Base Year National Toxics Inventory for Onroad Sources," Prepared by Eastern Research Group, Inc., February 9, 2000.

Manufacturers (AAM).** Finally, the AAM fuel survey results for Seattle were assumed to best characterize the fuel parameters in Juneau. This assumption was necessary because fuel data collected from Juneau were not available for this study. Table B-2 details the gasoline specifications used in this analysis.

Table B-1 List of Mobile Source Air Toxics Evaluated in this Study		
Acetaldehyde	Ethylbenzene	Nickel Compounds
Acrolein	Formaldehyde	POM as 7 PAH
Arsenic Compounds	n-Hexane	POM as 16 PAH
Benzene	Lead Compounds	Propionaldehyde
1,3-Butadiene	Manganese Compounds	Styrene
Chromium Compounds	Mercury Compounds	Toluene
Dioxin/Furans	MTBE	Xylene

Table B-2 Summary of Fuel Parameters Used to Generate Toxics Estimates						
Fuel Parameter	Anchorage		Fairbanks		Juneau (Seattle)	
	Summer	Winter	Summer	Winter	Summer	Winter
RVP, psi	12.5	14.7	12.5	14.7	8.4	13.9
Oxygenate	n/a	Ethanol	n/a	n/a	n/a	n/a
Sulfur ppm	156	148	156	164	186	378
E200 %	49.8	56.1	49.8	51.5	46.1	48.8
E300 %	91.4	93.6	91.4	92.9	85.8	83.4
Aromatics %	39.4	36.0	37.1	36.5	31.0	30.3
Olefins %	0.3	0.3	0.7	0.6	4.3	8.7
Benzene %	4.20	3.80	3.86	3.44	1.94	1.84
Ethanol %	0.00	9.46	0.00	0.00	0.00	0.00

Temperature Data - Temperature data for each of the communities were also required to develop input files for the MOBTOX5b model. Temperature data were compiled from www.weatherbase.com, which is a website specializing in historical weather information.

** Fairbanks is one of the communities historically included in the annual AAM fuel surveys.

Tables B-3, B-4, and B-5 summarize the average seasonal temperatures for the three communities included in this analysis.

Table B-3 Anchorage Temperature Data (°F)			
Season	Average Temperature	Average High Temperature	Average Low Temperature
Winter	16.3	23.0	9.7
Spring	36.0	43.7	28.0
Summer	57.0	63.3	49.0
Fall	35.0	41.3	28.0

Table B-4 Fairbanks Temperature Data (°F)			
Season	Average Temperature	Average High Temperature	Average Low Temperature
Winter	-5.3	2.7	-15.7
Spring	30.3	42.0	18.7
Summer	59.7	69.3	49.0
Fall	24.7	32.3	16.0

Table B-5 Juneau Temperature Data (°F)			
Season	Average Temperature	Average High Temperature	Average Low Temperature
Winter	26.7	31.7	21.0
Spring	40.0	47.0	32.3
Summer	55.0	62.7	46.7
Fall	41.7	46.7	36.0

Other MOBILE5b/MOBTOX5b Inputs - In addition to temperature and fuel parameters, there are a number of other inputs that can be specified by the user to tailor a standard MOBILE run for a local area. In this analysis, the following user-inputs were included in the MOBTOX5b runs. For the most part, these inputs were provided by ADEC and reflect the most current inputs used in ADEC's MOBILE5b modeling efforts.

- Speed – The VMT data (summarized below) were provided as a function of vehicle speed; those speeds were then used as inputs to the MOBTOX5b model.
- Registration Distributions – Locally derived data on vehicle registration distributions were used.
- I/M Program – The runs performed for Anchorage and Fairbanks included the impacts of the I/M programs in those communities.
- VMT Mix – Alternative VMT mix estimates (i.e., VMT fraction by vehicle class) were used in this analysis.
- Mileage Accumulation Rates – Locality-specific mileage accumulation rates were used in this analysis.

The winter MOBTOX5b input files developed for Anchorage, Fairbanks, and Juneau are included in Attachments B-1 to B-3 of Appendix B as sample input files.

VMT Data - VMT estimates for the communities of Anchorage and Fairbanks were provided to Sierra by ADEC. For the city of Juneau, VMT estimates had to be developed by extrapolating average daily travel data on monitored roadways to the rest of the network. The results of the Juneau analysis were reviewed by ADEC for reasonableness. A summary of the VMT estimates used to generate the on-road motor vehicle toxics inventories is given in Tables B-6, B-7, and B-8 for Anchorage, Fairbanks, and Juneau, respectively.

Toxics Results

Tables B-9, B-10, and B-11 summarize the on-road motor vehicle toxic inventories developed for Anchorage, Fairbanks, and Juneau, respectively. As noted above, the estimates were prepared for calendar year 1999, and results are presented separately for winter, spring, summer, and fall. Detailed results by vehicle class are provided in Attachment B-4.

Table B-6	
Anchorage Average Daily Vehicle Miles Traveled (VMT) for 1999	
Speed (mph)	VMT (miles)
10.0	89
18.5	114,584
21.8	692,319
27.5	1,034,080
32.0	702,046
37.0	191,219
41.5	49,346
48.5	215,201
52.2	230,740
55.6	18,355

Table B-7	
Fairbanks Average Daily Vehicle Miles Traveled (VMT) for 1999	
Speed (mph)	VMT (miles)
25.0	17,572
25.1	96,030
27.8	32,926
30.1	207,987
32.0	154,972
33.8	115,578
36.0	10,383
37.8	58,204
46.4	235,506
49.1	198,668
49.9	28,417
55.0	520,905

Speed (mph)	VMT (miles)
20.1	94,432
35.5	114,762
39.0	106,126
51.0	240,816

Pollutant	Seasonal Emissions (lbs./day)				Annual Emissions (tons/year)
	Winter	Spring	Summer	Fall	
Benzene	657.7	728.3	721.4	510.3	119.4
Acetaldehyde	99.3	37.1	30.8	79.9	11.3
Formaldehyde	131.7	101.2	84.5	110.9	19.5
1,3-Butadiene	32.2	26.5	20.1	25.9	4.8
Acrolein	7.3	6.4	5.2	6.1	1.1
Ethylbenzene	127.5	115.0	132.3	98.6	21.6
n-Hexane	64.6	76.1	211.5	50.8	18.4
Propionaldehyde	10.6	9.5	8.5	9.4	1.7
Styrene	30.1	25.6	18.2	23.4	4.4
Toluene	895.2	794.9	832.5	690.7	146.6
Xylene	506.0	448.6	463.5	390.8	82.5
Arsenic Compounds	1.36E-03	1.36E-03	1.36E-03	1.36E-03	2.49E-04
Chromium Compounds	3.48E-02	3.48E-02	3.48E-02	3.48E-02	6.35E-03
Manganese Compounds	1.37E-02	1.37E-02	1.37E-02	1.37E-02	2.50E-03
Mercury Compounds	6.80E-04	6.80E-04	6.80E-04	6.80E-04	1.24E-04
Nickel Compounds	2.59E-02	2.59E-02	2.59E-02	2.59E-02	4.72E-03
Dioxins/Furans	4.13E-07	4.13E-07	4.13E-07	4.13E-07	7.54E-08
Lead Compounds	6.24E-02	6.24E-02	6.24E-02	6.24E-02	1.14E-02
POM as 7-PAH	6.56E-02	5.65E-02	4.23E-02	5.25E-02	9.90E-03
POM as 16-PAH	1.33E-01	1.16E-01	9.13E-02	1.10E-01	2.06E-02

Table B-10					
Summary of Fairbanks On-Road Motor Vehicle Air Toxics Emissions					
Pollutant	Seasonal Emissions (lbs./day)				Annual Emissions (tons/year)
	Winter	Spring	Summer	Fall	
Benzene	298.2	292.2	258.5	238.6	49.6
Acetaldehyde	23.0	20.7	16.1	19.2	3.6
Formaldehyde	66.1	57.5	44.7	54.8	10.2
1,3-Butadiene	18.5	14.3	9.8	14.7	2.6
Acrolein	3.7	3.4	2.5	3.1	0.6
Ethylbenzene	58.8	52.0	53.2	47.4	9.6
n-Hexane	30.2	26.9	81.7	24.6	7.5
Propionaldehyde	5.6	5.2	4.3	4.8	0.9
Styrene	14.0	12.4	7.8	11.3	2.1
Toluene	411.5	363.7	335.9	331.1	65.8
Xylene	232.9	205.9	187.6	187.5	37.1
Arsenic Compounds	9.95E-04	9.95E-04	9.95E-04	9.95E-04	1.82E-04
Chromium Compounds	1.71E-02	1.71E-02	1.71E-02	1.71E-02	3.13E-03
Manganese Compounds	7.14E-03	7.14E-03	7.14E-03	7.14E-03	1.30E-03
Mercury Compounds	4.88E-04	4.88E-04	4.88E-04	4.88E-04	8.90E-05
Nickel Compounds	1.29E-02	1.29E-02	1.29E-02	1.29E-02	2.35E-03
Dioxins/Furans	3.08E-07	3.08E-07	3.08E-07	3.08E-07	5.63E-08
Lead Compounds	3.06E-02	3.06E-02	3.06E-02	3.06E-02	5.59E-03
POM as 7-PAH	3.15E-02	2.83E-02	1.93E-02	2.60E-02	4.79E-03
POM as 16-PAH	6.63E-02	6.00E-02	4.37E-02	5.55E-02	1.03E-02

Table B-11
Summary of Juneau On-Road Motor Vehicle Air Toxics Emissions

Pollutant	Seasonal Emissions (lbs./day)				Annual Emissions (tons/year)
	Winter	Spring	Summer	Fall	
Benzene	109.7	79.1	66.3	88.6	15.7
Acetaldehyde	11.5	9.0	7.8	9.7	1.7
Formaldehyde	32.7	26.0	22.7	27.8	5.0
1,3-Butadiene	10.8	7.4	6.1	8.6	1.5
Acrolein	2.0	1.5	1.3	1.6	0.3
Ethylbenzene	31.2	22.7	19.8	26.1	4.6
n-Hexane	15.6	15.3	17.3	17.9	3.0
Propionaldehyde	1.9	1.5	1.3	1.7	0.3
Styrene	7.1	4.8	3.9	5.5	1.0
Toluene	219.5	156.9	133.8	180.5	31.5
Xylene	124.0	88.5	75.3	101.8	17.8
Arsenic Compounds	3.36E-05	3.39E-05	3.39E-05	3.36E-05	6.16E-06
Chromium Compounds	5.85E-03	5.85E-03	5.85E-03	5.85E-03	1.07E-03
Manganese Compounds	2.40E-03	2.40E-03	2.40E-03	2.40E-03	4.38E-04
Mercury Compounds	4.49E-05	4.49E-05	4.49E-05	4.49E-05	8.20E-06
Nickel Compounds	4.56E-03	4.57E-03	4.57E-03	4.56E-03	8.33E-04
Dioxins/Furans	5.59E-08	5.69E-08	5.69E-08	5.59E-08	1.03E-08
Lead Compounds	1.13E-02	1.13E-02	1.13E-02	1.13E-02	2.06E-03
POM as 7-PAH	1.57E-02	1.11E-02	9.20E-03	1.25E-02	2.21E-03
POM as 16-PAH	3.13E-02	2.30E-02	1.95E-02	2.56E-02	4.54E-03

Uncertainties and Recommended Improvements

The emissions modeling performed for this study was based on EPA's MOBTOX5b model. Although a significant amount of effort went into updating that model to incorporate the changes planned for MOBILE6, it is not clear that those updates are consistent with the final version of the MOBILE6 model. Thus, it is recommended that the inventories prepared for this effort be re-evaluated once MOBILE6 is finalized. EPA has indicated that it will include toxics estimates in MOBILE6.2, which is anticipated to be released near the end of 2001 or beginning of 2002.

Attachment B-1

Winter MOBTX5b Input File for Anchorage

MOBTOX5b Input File
Anchorage – Winter I/M

```

1 PROMPT - vertical flag input, no prompting
Anchorage - 1999 MOBTOX5b - Winter With IM
1 TAMFLG - default tampering rates
1 SPDFLG - one speed per scenario for all IV
3 VMFLAG - user supplied single VMT mix for all scenarios
4 MYMFRG - user supplied mileage accumulation rates and registration
distributions
2 NEWFLG - default exhaust emission rates
3 IMFLAG - I/M program (see I/M characteristics record below)
1 ALHFLG - no additional correction factor inputs
2 ATPFLG - anti-tampering program (see ATP characteristics record below)
5 RLFLAG - zero out refueling emissions
1 LOCFLG - read local area parameters as 2nd req'd scenario record (i.e., for
each scenario)
2 TEMFLG - user inputs specific ambient temperature
3 OUTFMT - MOBILE4 112 column numerical output format + BMY
1 PRTFLG - print exhaust CO emission factors only
1 IDLFLG - print idle emissions results
7 1 NMHFLG - print NMHC
2 HCFLAG - print HC components
.681.191.051.006.008.030.033.000 VMT MIX RECORD
(VMFLAG=3)
.15920 .15058 .14229 .13436 .12676 .11951 .11260 .10603 .09981 .09393 LDGV
.08839 .08320 .07834 .07384 .06967 .06585 .06237 .05923 .05644 .05399
.05189 .05012 .04870 .04762 .04689
.17133 .16070 .15057 .14095 .13183 .12322 .11510 .10750 .10039 .09379 LDGT1
.08770 .08210 .07701 .07243 .06835 .06477 .06169 .05912 .05706 .05549
.05443 .05388 .05350 .05325 .05310
.17133 .16070 .15057 .14095 .13183 .12322 .11510 .10750 .10039 .09379 LDGT2
.08770 .08210 .07701 .07243 .06835 .06477 .06169 .05912 .05706 .05549
.05443 .05388 .05350 .05325 .05310
.17251 .16185 .15185 .14246 .13365 .12539 .11764 .11037 .10355 .09715 HDGV
.09114 .08551 .08022 .07526 .07061 .06625 .06215 .05831 .05471 .05132
.04815 .04517 .04238 .03976 .03730
.17825 .16478 .15233 .14081 .13017 .12033 .11124 .10283 .09506 .08788 LDDV
.08123 .07509 .06942 .06417 .05932 .05484 .05069 .04686 .04332 .04005
.03702 .03422 .03163 .02924 .02703
.21004 .19125 .17415 .15858 .14440 .13149 .11973 .10902 .09927 .09040 LDDT
.08231 .07495 .06825 .06215 .05659 .05153 .04692 .04272 .03890 .03543
.03226 .02937 .02675 .02435 .02218
.35129 .33070 .31217 .29553 .28059 .26735 .25644 .24516 .23604 .22813 HDDV
.22030 .21492 .20911 .20377 .19897 .19430 .19210 .18841 .18547 .18084
.17203 .16336 .15516 .14737 .14000
.04786 .04475 .04164 .03853 .03543 .03232 .02921 .02611 .02300 .01989
.01678 .01368 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000
.00000 .00000 .00000 .00000 .00000 MC
.050 .070 .078 .061 .056 .084 .070 .074 .057 .062 LDGV Reg
dist
.069 .056 .044 .035 .033 .037 .022 .009 .009 .004
.004 .004 .004 .003 .005
.045 .063 .062 .076 .062 .060 .087 .046 .050 .063 LDGT1 Reg
dist
.074 .059 .038 .029 .032 .023 .031 .020 .015 .012
.006 .008 .004 .008 .027
.045 .063 .062 .076 .062 .060 .087 .046 .050 .063 LDGT2 Reg
dist
.074 .059 .038 .029 .032 .023 .031 .020 .015 .012
.006 .008 .004 .008 .027

```

.123	.214	.131	.098	.060	.031	.042	.027	.022	.023	HDGV Reg
dist										
.026	.014	.017	.014	.006	.015	.013	.017	.012	.005	
.011	.006	.016	.003	.052						
.050	.070	.078	.061	.056	.084	.070	.074	.057	.062	LDDV Reg
dist										
.069	.056	.044	.035	.033	.037	.022	.009	.009	.004	
.004	.004	.004	.003	.005						
.045	.063	.062	.076	.062	.060	.087	.046	.050	.063	LDDT Reg
dist										
.074	.059	.038	.029	.032	.023	.031	.020	.015	.012	
.006	.008	.004	.008	.027						
.030	.073	.062	.031	.049	.049	.030	.044	.034	.031	HDDV Reg
dist										
.047	.048	.045	.027	.031	.047	.035	.029	.024	.031	
.024	.031	.025	.016	.110						
.144	.168	.135	.109	.088	.070	.056	.045	.036	.029	
.023	.097	.000	.000	.000	.000	.000	.000	.000	.000	
.000	.000	.000	.000	.000	MC					
0107		ZM	DR1	DR2	Flex	Pt	File:	NTR_IM_B.BER		
1	1	1	65	67	7.488	0.186			LDGV	
1	1	1	68	69	4.576	0.258				
1	1	1	70	71	3.099	0.382				
1	1	1	72	74	3.491	0.165				
1	1	1	75	75	1.068	0.282				
1	1	1	76	77	1.071	0.283				
1	1	1	78	79	1.074	0.284				
1	1	1	80	80	0.371	0.211				
1	1	1	81	81	0.464	0.120	0.005	14.63		
1	1	1	82	82	0.460	0.119	0.006	14.63		
1	1	1	83	83	0.336	0.064				
1	1	1	84	84	0.346	0.061				
1	1	1	85	85	0.350	0.057				
1	1	1	86	86	0.358	0.046				
1	1	1	87	87	0.360	0.045				
1	1	1	88	88	0.228	0.036				
1	1	1	89	89	0.231	0.037				
1	1	1	90	90	0.228	0.036				
1	1	1	91	91	0.224	0.035				
1	1	1	92	92	0.226	0.035				
1	1	1	93	93	0.224	0.035				
1	1	1	94	94	0.197	0.031				
1	1	1	95	95	0.169	0.028				
1	1	1	96	00	0.156	0.026	0.024	9.05		
1	1	1	01	50	0.064	0.014	0.016	14.64		
1	2	1	65	67	7.488	0.186			LDGT1	
1	2	1	68	69	4.576	0.258				
1	2	1	70	71	3.099	0.382				
1	2	1	72	74	3.470	0.176				
1	2	1	75	75	1.802	0.270				
1	2	1	76	76	1.813	0.272				
1	2	1	77	78	1.807	0.271				
1	2	1	79	80	0.876	0.282				
1	2	1	81	81	1.406	0.086				
1	2	1	82	82	1.406	0.086				
1	2	1	83	83	1.423	0.087				
1	2	1	84	84	0.495	0.061				
1	2	1	85	85	0.485	0.061				
1	2	1	86	86	0.456	0.062				
1	2	1	87	87	0.446	0.066				
1	2	1	88	88	0.334	0.049				
1	2	1	89	89	0.333	0.047				
1	2	1	90	90	0.319	0.045				

1 2 1 91 91	0.293	0.044		
1 2 1 92 92	0.313	0.042		
1 2 1 93 93	0.312	0.042		
1 2 1 94 94	0.264	0.037		
1 2 1 95 95	0.216	0.033		
1 2 1 96 00	0.192	0.031	0.027	11.84
1 2 1 01 50	0.073	0.015	0.017	17.20
1 3 1 65 69	9.885	0.186		LDGT2
1 3 1 70 73	6.486	0.258		
1 3 1 74 78	6.486	0.176		
1 3 1 79 80	0.887	0.286		
1 3 1 81 81	1.404	0.086		
1 3 1 82 82	1.404	0.086		
1 3 1 83 83	1.427	0.088		
1 3 1 84 84	0.501	0.061		
1 3 1 85 85	0.502	0.063		
1 3 1 86 86	0.487	0.067		
1 3 1 87 87	0.470	0.069		
1 3 1 88 88	0.349	0.051		
1 3 1 89 89	0.344	0.048		
1 3 1 90 90	0.336	0.048		
1 3 1 91 91	0.293	0.044		
1 3 1 92 95	0.313	0.042		
1 3 1 96 96	0.264	0.038		
1 3 1 97 00	0.216	0.034	0.029	13.93
1 3 1 01 50	0.214	0.034	0.028	13.93
1 4 1 80 80	4.285	0.203		HDGV
1 4 1 81 83	4.289	0.201		
1 4 1 84 84	4.366	0.205		
1 4 1 85 85	3.148	0.065		
1 4 1 86 86	2.791	0.065		
1 4 1 87 87	1.347	0.126		
1 4 1 88 89	1.194	0.036		
1 4 1 90 90	0.879	0.042		
1 4 1 91 97	0.851	0.039		
1 4 1 98 50	0.863	0.039		
1 5 1 65 74	1.406	0.089		LDDV
1 5 1 75 79	0.454	0.078		
1 5 1 80 93	0.310	0.033		
1 5 1 94 94	0.261	0.028		
1 5 1 95 95	0.213	0.023		
1 5 1 96 96	0.189	0.020		
1 5 1 97 97	0.189	0.020		
1 5 1 98 98	0.189	0.020		
1 5 1 99 99	0.189	0.020		
1 5 1 00 00	0.189	0.020		
1 5 1 01 50	0.057	0.006		
1 6 1 65 80	0.916	0.089		LDDT
1 6 1 81 95	0.458	0.044		
1 6 1 96 96	0.369	0.036		
1 6 1 97 97	0.281	0.027		
1 6 1 98 98	0.281	0.027		
1 6 1 99 99	0.281	0.027		
1 6 1 00 00	0.281	0.027		
1 6 1 01 50	0.281	0.027		
1 7 1 88 88	0.879	0.000		HDDV
1 7 1 89 89	0.886	0.000		
1 7 1 90 90	0.746	0.000		
1 7 1 91 91	0.652	0.000		
1 7 1 92 92	0.653	0.000		
1 7 1 93 93	0.632	0.000		
1 7 1 94 94	0.362	0.000		
1 7 1 95 95	0.359	0.000		

1 7 1 96 50 0.357 0.000	
85 23 75 80 00 00 090 222 2221 2111	I/M CHARACTERISTICS RECORD
(IMFLAG=2)	
85 23 75 20 00 00 090 222 1112 2111	
0.85 0.85 0.00 0.70 0.00	Alt Effectiveness
85 68 20 2222 22 090. 22112221	ATP CHARACTERISTICS RECORD
(ATPFLG=2)	
TX EVP FRACTIONS : An99wb.evp	
TX EXH EMISSIONS : An99wb_b.exh	
OFFCYCLE FACTORS : no_off.off	
1 99 10.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 18.5 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 21.8 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 27.5 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 32.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 37.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 41.5 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 48.5 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 52.2 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 55.6 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 14.7 14.7 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	

Attachment B-2

Winter MOBTOX5b Input File for Fairbanks

MOBTOX5b Input File
Fairbanks Winter I/M

```

1  PROMPT - vertical flag input, no prompting
Fairbanks - 1999 MOBTOX5b - Winter With IM
1  TAMFLG - default tampering rates
1  SPDFLG - one speed per scenario for all IV
3  VMFLAG - user supplied single VMT mix for all scenarios
4  MYMRFG - user supplied mileage accumulation rates and registration
distributions
2  NEWFLG - user-input exhaust emission rates
3  IMFLAG - I/M program (see I/M characteristics record below)
1  ALHFLG - no additional correction factor inputs
2  ATPFLG - anti-tampering program (see ATP characteristics record below)
5  RLFLAG - zero out refueling emissions
1  LOCFLG - read in local area parameters as 2nd req'd scenario record (i.e.,
for each scenario)
2  TEMFLG - user inputs specific ambient temperature
3  OUTFMT - MOBILE4 112 column numerical output format
1  PRNFLG - print exhaust TOG emission factors only
1  IDLFLG - do not print idle emissions results
7 1  NMHFLG - print NMHC
2  HCFLAG - print HC components
.561.255.071.006.009.046.052.000                                VMT MIX RECORD
(VMFLAG=3)
.16549 .15702 .14895 .14128 .13401 .12714 .12066 .11459 .10892 .10364 LDGV
.09876 .09428 .09020 .08652 .08324 .08036 .07788 .07580 .07411 .07283
.07194 .07145 .07136 .07130 .07127
.18615 .17538 .16517 .15551 .14640 .13784 .12984 .12239 .11549 .10915 LDGT1
.10336 .09812 .09344 .08931 .08573 .08270 .08023 .07831 .07695 .07613
.07587 .07567 .07552 .07540 .07532
.18615 .17538 .16517 .15551 .14640 .13784 .12984 .12239 .11549 .10915 LDGT2
.10336 .09812 .09344 .08931 .08573 .08270 .08023 .07831 .07695 .07613
.07587 .07567 .07552 .07540 .07532
.17251 .16185 .15185 .14246 .13365 .12539 .11764 .11037 .10355 .09715 HDGV
.09114 .08551 .08022 .07526 .07061 .06625 .06215 .05831 .05471 .05132
.04815 .04517 .04238 .03976 .03730
.17825 .16478 .15233 .14081 .13017 .12033 .11124 .10283 .09506 .08788 LDGV
.08123 .07509 .06942 .06417 .05932 .05484 .05069 .04686 .04332 .04005
.03702 .03422 .03163 .02924 .02703
.21004 .19125 .17415 .15858 .14440 .13149 .11973 .10902 .09927 .09040 LDDT
.08231 .07495 .06825 .06215 .05659 .05153 .04692 .04272 .03890 .03543
.03226 .02937 .02675 .02435 .02218
.35129 .33070 .31217 .29553 .28059 .26735 .25644 .24516 .23604 .22813 HDDV
.22030 .21492 .20911 .20377 .19897 .19430 .19210 .18841 .18547 .18084
.17203 .16336 .15516 .14737 .14000
.04786 .04475 .04164 .03853 .03543 .03232 .02921 .02611 .02300 .01989
.01678 .01368 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000
.00000 .00000 .00000 .00000 .00000                                MC
.055 .073 .087 .084 .066 .087 .068 .078 .058 .062                                LDGV Reg
dist
.061 .045 .032 .030 .026 .026 .018 .013 .004 .004
.002 .004 .002 .002 .013
.050 .066 .064 .069 .064 .071 .092 .054 .049 .063                                LDGT1 Reg
dist
.055 .050 .042 .029 .027 .033 .019 .015 .008 .015
.007 .009 .007 .009 .033
.050 .066 .064 .069 .064 .071 .092 .054 .049 .063                                LDGT2 Reg
dist
.055 .050 .042 .029 .027 .033 .019 .015 .008 .015
.007 .009 .007 .009 .033

```


.187	.194	.118	.045	.024	.038	.019	.026	.012	.014		HDGV Reg
dist											
.017	.009	.012	.014	.012	.024	.017	.019	.017	.007		
.014	.007	.017	.005	.135							
.055	.073	.087	.084	.066	.087	.068	.078	.058	.062		LDDV Reg
dist											
.061	.045	.032	.030	.026	.026	.018	.013	.004	.004		
.002	.004	.002	.002	.013							
.050	.066	.064	.069	.064	.071	.092	.054	.049	.063		LDDT Reg
dist											
.055	.050	.042	.029	.027	.033	.019	.015	.008	.015		
.007	.009	.007	.009	.033							
.028	.058	.044	.041	.089	.031	.043	.026	.036	.035		HDDV Reg
dist											
.040	.034	.020	.021	.022	.037	.029	.022	.032	.040		
.037	.023	.025	.014	.174							
.144	.168	.135	.109	.088	.070	.056	.045	.036	.029		
.023	.097	.000	.000	.000	.000	.000	.000	.000	.000		
.000	.000	.000	.000	.000							
MC											
0107		ZM	DR1	DR2	Flex	Pt	File:	NTR_IM_B.BER			
1	1	1	65	67	7.488	0.186					LDGV
1	1	1	68	69	4.576	0.258					
1	1	1	70	71	3.099	0.382					
1	1	1	72	74	3.491	0.165					
1	1	1	75	75	1.068	0.282					
1	1	1	76	77	1.071	0.283					
1	1	1	78	79	1.074	0.284					
1	1	1	80	80	0.371	0.211					
1	1	1	81	81	0.464	0.120	0.005	14.63			
1	1	1	82	82	0.460	0.119	0.006	14.63			
1	1	1	83	83	0.336	0.064					
1	1	1	84	84	0.346	0.061					
1	1	1	85	85	0.350	0.057					
1	1	1	86	86	0.358	0.046					
1	1	1	87	87	0.360	0.045					
1	1	1	88	88	0.228	0.036					
1	1	1	89	89	0.231	0.037					
1	1	1	90	90	0.228	0.036					
1	1	1	91	91	0.224	0.035					
1	1	1	92	92	0.226	0.035					
1	1	1	93	93	0.224	0.035					
1	1	1	94	94	0.197	0.031					
1	1	1	95	95	0.169	0.028					
1	1	1	96	00	0.156	0.026	0.024	9.05			
1	1	1	01	50	0.064	0.014	0.016	14.64			
1	2	1	65	67	7.488	0.186					LDGT1
1	2	1	68	69	4.576	0.258					
1	2	1	70	71	3.099	0.382					
1	2	1	72	74	3.470	0.176					
1	2	1	75	75	1.802	0.270					
1	2	1	76	76	1.813	0.272					
1	2	1	77	78	1.807	0.271					
1	2	1	79	80	0.876	0.282					
1	2	1	81	81	1.406	0.086					
1	2	1	82	82	1.406	0.086					
1	2	1	83	83	1.423	0.087					
1	2	1	84	84	0.495	0.061					
1	2	1	85	85	0.485	0.061					
1	2	1	86	86	0.456	0.062					
1	2	1	87	87	0.446	0.066					
1	2	1	88	88	0.334	0.049					
1	2	1	89	89	0.333	0.047					
1	2	1	90	90	0.319	0.045					

1 2 1 91 91	0.293	0.044		
1 2 1 92 92	0.313	0.042		
1 2 1 93 93	0.312	0.042		
1 2 1 94 94	0.264	0.037		
1 2 1 95 95	0.216	0.033		
1 2 1 96 00	0.192	0.031	0.027	11.84
1 2 1 01 50	0.073	0.015	0.017	17.20
1 3 1 65 69	9.885	0.186		LDGT2
1 3 1 70 73	6.486	0.258		
1 3 1 74 78	6.486	0.176		
1 3 1 79 80	0.887	0.286		
1 3 1 81 81	1.404	0.086		
1 3 1 82 82	1.404	0.086		
1 3 1 83 83	1.427	0.088		
1 3 1 84 84	0.501	0.061		
1 3 1 85 85	0.502	0.063		
1 3 1 86 86	0.487	0.067		
1 3 1 87 87	0.470	0.069		
1 3 1 88 88	0.349	0.051		
1 3 1 89 89	0.344	0.048		
1 3 1 90 90	0.336	0.048		
1 3 1 91 91	0.293	0.044		
1 3 1 92 95	0.313	0.042		
1 3 1 96 96	0.264	0.038		
1 3 1 97 00	0.216	0.034	0.029	13.93
1 3 1 01 50	0.214	0.034	0.028	13.93
1 4 1 80 80	4.285	0.203		HDGV
1 4 1 81 83	4.289	0.201		
1 4 1 84 84	4.366	0.205		
1 4 1 85 85	3.148	0.065		
1 4 1 86 86	2.791	0.065		
1 4 1 87 87	1.347	0.126		
1 4 1 88 89	1.194	0.036		
1 4 1 90 90	0.879	0.042		
1 4 1 91 97	0.851	0.039		
1 4 1 98 50	0.863	0.039		
1 5 1 65 74	1.406	0.089		LDDV
1 5 1 75 79	0.454	0.078		
1 5 1 80 93	0.310	0.033		
1 5 1 94 94	0.261	0.028		
1 5 1 95 95	0.213	0.023		
1 5 1 96 96	0.189	0.020		
1 5 1 97 97	0.189	0.020		
1 5 1 98 98	0.189	0.020		
1 5 1 99 99	0.189	0.020		
1 5 1 00 00	0.189	0.020		
1 5 1 01 50	0.057	0.006		
1 6 1 65 80	0.916	0.089		LDDT
1 6 1 81 95	0.458	0.044		
1 6 1 96 96	0.369	0.036		
1 6 1 97 97	0.281	0.027		
1 6 1 98 98	0.281	0.027		
1 6 1 99 99	0.281	0.027		
1 6 1 00 00	0.281	0.027		
1 6 1 01 50	0.281	0.027		
1 7 1 88 88	0.879	0.000		HDDV
1 7 1 89 89	0.886	0.000		
1 7 1 90 90	0.746	0.000		
1 7 1 91 91	0.652	0.000		
1 7 1 92 92	0.653	0.000		
1 7 1 93 93	0.632	0.000		
1 7 1 94 94	0.362	0.000		
1 7 1 95 95	0.359	0.000		

1 7 1 96 50 0.357 0.000	
85 23 75 80 00 00 093 222 2221 2111	I/M CHARACTERISTICS RECORD
(IMFLAG=2)	
85 23 75 20 00 00 093 222 1112 2111	I/M CHARACTERISTICS RECORD
(IMFLAG=2)	
0.85 0.85 0.00 0.70 0.00	Alt Effectiveness
85 75 20 2222 22 093. 22112221	ATP CHARACTERISTICS RECORD
(ATPFLG=2)	
TX EVP FRACTIONS : Fb99wb.evp	
TX EXH EMISSIONS : Fb99wb_b.exh	
OFFCYCLE FACTORS : no_off.off	
1 99 25.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 25.1 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 27.8 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 30.1 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 32.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 33.8 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 36.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 37.8 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 46.4 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 49.1 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 49.9 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	
1 99 55.0 20. 20.6 27.3 20.6 1	1ST REQUIRED SCENARIO
RECORD	
1999 C 10. 30. 9.0 9.0 20 1 1 1	LAP CHARACTERISTICS RECORD
(LOCFLG=1)	

Attachment B-3

Winter MOBTOX5b Input File for Juneau

MOBTOX5b Input File
Juneau – Winter Non-I/M

```

1   PROMPT - vertical flag input, no prompting
Juneau - 1999 MOBTOX5b - Winter No IM
1   TAMFLG - default tampering rates
1   SPDFLG - one speed per scenario for all IV
1   VMFLAG - Use MOBILE5 VMT mix
3   MYMRFG - Input registration distributions by age
2   NEWFLG - user-input exhaust emission rates
1   IMFLAG - I/M program (see I/M characteristics record below)
1   ALHFLG - no additional correction factor inputs
1   ATPFLG - anti-tampering program (see ATP characteristics record below)
5   RLFLAG - zero out refueling emissions
1   LOCFLG - read local area parameters as 2nd req'd scenario record (i.e.,
for ea. scenario)
2   TEMFLG - user inputs specific ambient temperature
3   OUTFMT - MOBILE4 112 column numerical output format
1   PRTFLG - print exhaust TOG emission factors only
1   IDLFLG - do not print idle emissions results
7 1  NMHFLG - print NMHC
2   HCFLAG - print HC components
.035 .058 .054 .051 .045 .062 .060 .059 .058 .067          LDGV Reg Dist
.068 .064 .052 .046 .043 .041 .036 .021 .014 .009
.007 .008 .006 .004 .034
.023 .049 .048 .056 .049 .065 .059 .049 .048 .052          LDGT1 Reg Dist
.060 .057 .040 .033 .040 .042 .042 .032 .026 .020
.015 .018 .014 .011 .054
.024 .048 .036 .051 .046 .055 .075 .052 .045 .049          LDGT2 Reg Dist
.062 .051 .034 .031 .044 .054 .042 .039 .020 .030
.016 .019 .018 .013 .044
.076 .097 .049 .090 .063 .090 .069 .021 .028 .035          HDGV Reg Dist
.021 .021 .021 .021 .028 .007 .056 .014 .049 .021
.014 .028 .007 .000 .076
.035 .058 .054 .051 .045 .062 .060 .059 .058 .067          LDDV Reg Dist
.068 .064 .052 .046 .043 .041 .036 .021 .014 .009
.007 .008 .006 .004 .034
.023 .049 .048 .056 .049 .065 .059 .049 .048 .052          LDDT Reg Dist
.060 .057 .040 .033 .040 .042 .042 .032 .026 .020
.015 .018 .014 .011 .054
.018 .030 .018 .028 .028 .028 .022 .022 .030 .030          HDDV Reg Dist
.042 .046 .036 .042 .028 .052 .052 .022 .026 .042
.052 .048 .034 .006 .218
.044 .087 .055 .047 .054 .054 .038 .040 .034 .020
.014 .570 .000 .000 .000 .000 .000 .000 .000 .000          MC Reg Dist
.000 .000 .000 .000 .000
0106          ZM      DR1      DR2 Flex Pt  File: NTR_NO_B.BER
1 1 1 65 67  7.488  0.186          LDGV
1 1 1 68 69  4.576  0.258
1 1 1 70 71  3.099  0.382
1 1 1 72 74  3.491  0.165
1 1 1 75 75  1.068  0.282
1 1 1 76 77  1.071  0.283
1 1 1 78 79  1.074  0.284
1 1 1 80 80  0.371  0.211
1 1 1 81 81  0.401  0.223  0.005  14.63
1 1 1 82 82  0.400  0.221  0.005  14.63
1 1 1 83 83  0.232  0.116
1 1 1 84 84  0.257  0.110
1 1 1 85 85  0.278  0.102
1 1 1 86 86  0.334  0.082
1 1 1 87 87  0.338  0.080

```

1	1	1	88	88	0.223	0.057				
1	1	1	89	89	0.222	0.058				
1	1	1	90	90	0.219	0.056				
1	1	1	91	91	0.216	0.055				
1	1	1	92	92	0.214	0.055				
1	1	1	93	93	0.213	0.055				
1	1	1	94	94	0.190	0.042				
1	1	1	95	95	0.167	0.028				
1	1	1	96	00	0.156	0.022	0.047	3.13		
1	1	1	01	50	0.064	0.010	0.038	3.72		
1	2	1	65	67	7.488	0.186			LDGT1	
1	2	1	68	69	4.576	0.258				
1	2	1	70	71	3.099	0.382				
1	2	1	72	74	3.470	0.176				
1	2	1	75	75	1.802	0.270				
1	2	1	76	76	1.813	0.272				
1	2	1	77	78	1.807	0.271				
1	2	1	79	80	0.876	0.282				
1	2	1	81	81	1.319	0.183				
1	2	1	82	82	1.319	0.183				
1	2	1	83	83	1.335	0.185				
1	2	1	84	84	0.446	0.109				
1	2	1	85	85	0.434	0.109				
1	2	1	86	86	0.401	0.111				
1	2	1	87	87	0.384	0.117				
1	2	1	88	88	0.331	0.077				
1	2	1	89	89	0.331	0.073				
1	2	1	90	90	0.320	0.071				
1	2	1	91	91	0.296	0.068				
1	2	1	92	92	0.314	0.066				
1	2	1	93	93	0.313	0.065				
1	2	1	94	94	0.264	0.052				
1	2	1	95	95	0.216	0.040				
1	2	1	96	00	0.192	0.033	0.052	3.38		
1	2	1	01	50	0.073	0.018	0.040	4.59		
1	3	1	65	69	9.885	0.186			LDGT2	
1	3	1	70	73	6.486	0.258				
1	3	1	74	78	6.486	0.176				
1	3	1	79	80	0.887	0.286				
1	3	1	81	81	1.317	0.182				
1	3	1	82	82	1.317	0.182				
1	3	1	83	83	1.339	0.186				
1	3	1	84	84	0.452	0.110				
1	3	1	85	85	0.450	0.113				
1	3	1	86	86	0.428	0.119				
1	3	1	87	87	0.405	0.123				
1	3	1	88	88	0.346	0.080				
1	3	1	89	89	0.342	0.076				
1	3	1	90	90	0.337	0.075				
1	3	1	91	91	0.296	0.068				
1	3	1	92	92	0.314	0.066				
1	3	1	93	93	0.313	0.065				
1	3	1	94	94	0.313	0.065				
1	3	1	95	95	0.313	0.065				
1	3	1	96	96	0.265	0.052				
1	3	1	97	00	0.216	0.040	0.055	3.38		
1	3	1	01	50	0.214	0.039	0.054	3.38		
1	4	1	80	80	4.285	0.203			HDGV	
1	4	1	81	83	4.289	0.201				
1	4	1	84	84	4.366	0.205				
1	4	1	85	85	3.148	0.065				
1	4	1	86	86	2.791	0.065				
1	4	1	87	87	1.347	0.126				

1 4 1 88 89	1.194	0.036	
1 4 1 90 90	0.879	0.042	
1 4 1 91 97	0.851	0.039	
1 4 1 98 50	0.863	0.039	
1 5 1 65 74	1.406	0.089	LDDV
1 5 1 75 79	0.454	0.078	
1 5 1 80 93	0.310	0.033	
1 5 1 94 94	0.261	0.028	
1 5 1 95 95	0.213	0.023	
1 5 1 96 96	0.189	0.020	
1 5 1 97 97	0.189	0.020	
1 5 1 98 98	0.189	0.020	
1 5 1 99 99	0.189	0.020	
1 5 1 00 00	0.189	0.020	
1 5 1 01 50	0.057	0.006	
1 6 1 65 80	0.916	0.089	LDDT
1 6 1 81 95	0.458	0.044	
1 6 1 96 96	0.369	0.036	
1 6 1 97 50	0.281	0.027	
1 7 1 88 88	0.879	0.000	HDDV
1 7 1 89 89	0.886	0.000	
1 7 1 90 90	0.746	0.000	
1 7 1 91 91	0.652	0.000	
1 7 1 92 92	0.653	0.000	
1 7 1 93 93	0.632	0.000	
1 7 1 94 94	0.362	0.000	
1 7 1 95 95	0.359	0.000	
1 7 1 96 50	0.357	0.000	
TX EVP FRACTIONS : SE99wb.evp			
TX EXH EMISSIONS : SE99wb_b.exh			
OFFCYCLE FACTORS : ntrno96b.off			
1 99 20.1 26.7 20.6 27.3 20.6 1			1ST REQUIRED SCENARIO
RECORD			
1999	C 21.0 31.7 13.7 13.7 20 1 1 1		LAP CHARACTERISTICS RECORD
(LOCFLG=1)			
1 99 35.5 26.7 20.6 27.3 20.6 1			1ST REQUIRED SCENARIO
RECORD			
1999	C 21.0 31.7 13.7 13.7 20 1 1 1		LAP CHARACTERISTICS RECORD
(LOCFLG=1)			
1 99 39.0 26.7 20.6 27.3 20.6 1			1ST REQUIRED SCENARIO
RECORD			
1999	C 21.0 31.7 13.7 13.7 20 1 1 1		LAP CHARACTERISTICS RECORD
(LOCFLG=1)			
1 99 51.0 26.7 20.6 27.3 20.6 1			1ST REQUIRED SCENARIO
RECORD			
1999	C 21.0 31.7 13.7 13.7 20 1 1 1		LAP CHARACTERISTICS RECORD
(LOCFLG=1)			

Attachment B-4

Detailed 1999 Emission Results for On-Road Mobile Sources

Vehicle classes used in the following tables are consistent with standard EPA classification. The classes are defined as:

- Light-duty gasoline vehicles (LDGV)
- Light-duty gasoline trucks (LDGT1), less than 6,000 lbs gross vehicle weight (GVW)
- Light-duty gasoline trucks (LDGT2), 6,000 – 8,500 lbs GVW
- Heavy-duty gasoline vehicles (HDGV), 8,500+ lbs GVW
- Light-duty Diesel vehicles (LDDV)
- Light-duty Diesel trucks (LDDT), less than 8,500 lbs GVW
- Heavy-duty Diesel Vehicles (HDDV), 8,500 lbs GVW
- Motorcycles (MC).

On-Road Mobile Source Emissions

Anchorage - Summer

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	9.541296	4.716728	1.573876	0.229352	0.254633	1.362127	2.44805	0
Dioxins/Furans	15	2.83E-09	7.93E-10	2.12E-10	2.49E-11	4.61E-08	1.73E-07	1.9E-07	0
Acetaldehyde	35	9.896597	5.297502	1.588804	0.253731	0.348092	1.861432	11.55781	0
Acrolein	39	1.925457	0.838533	0.237588	0.204284	0.096504	0.517835	1.333533	0
Arsenic Compounds	46	0	0	0	0	0.000218	0.001078	6.59E-05	0
Benzene	48	490.5377	169.1238	48.84856	5.117222	0.566199	3.026657	4.213522	0
Chromium Compound:	75	0.024137	0.00677	0.001808	0.000191	0.000218	0.001078	0.000603	0
Ethylbenzene	99	89.99534	31.20844	8.866169	1.125383	0.055145	0.295906	0.762019	0
Formaldehyde	109	26.50008	14.18336	4.41183	1.108352	1.092816	5.842005	31.38444	0
n-Hexane	118	152.597	42.19154	12.02632	1.670916	0.15165	0.813741	2.095552	0
Lead Compounds	124	0.042401	0.015196	0.004057	0.000781	0	0	0	0
Manganese Compound	127	0.008094	0.00227	0.000606	0.000381	0.000327	0.001617	0.000376	0
Mercury Compounds	128	0	0	0	3.18E-05	0.000109	0.000539	0	0
Nickel Compounds	146	0.017554	0.004923	0.001315	0.000223	0.000109	0.000539	0.001209	0
POM as 16 PAH	162	0.038722	0.016692	0.004633	0.000531	0.001473	0.007902	0.021299	0
Propionaldehyde	164	1.925457	0.838533	0.237588	0.027857	0.488036	2.618765	2.324157	0
Styrene	172	10.91092	4.751687	1.34633	0	0.057903	0.310701	0.80012	0
Toluene	176	563.4256	202.5456	57.51559	7.204029	0.088233	0.473449	1.21923	0
Xylene	185	312.0689	112.7819	32.02382	4.003346	0.132349	0.710174	1.828845	0
POM as 7 PAH		0.021407	0.009304	0.00251	0.000279	0.000421	0.002259	0.006089	0

Anchorage - Spring

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	13.56169	6.63761	2.117176	0.25838	0.242863	1.280024	2.353164	0
Dioxins/Furans	15	2.83E-09	7.93E-10	2.12E-10	2.49E-11	4.61E-08	1.73E-07	1.9E-07	0
Acetaldehyde	35	13.95392	7.494939	2.190341	0.292434	0.332036	1.749458	11.10818	0
Acrolein	39	2.764664	1.211323	0.338683	0.240424	0.092256	0.487893	1.282017	0
Arsenic Compounds	46	0	0	0	0	0.000218	0.001078	6.59E-05	0
Benzene	48	473.2474	188.9318	54.57641	4.159609	0.539982	2.844283	4.050319	0
Chromium Compound:	75	0.024137	0.00677	0.001808	0.000191	0.000218	0.001078	0.000603	0
Ethylbenzene	99	72.75345	31.41399	8.877417	0.864715	0.052718	0.278796	0.732581	0

On-Road Mobile Source Emissions

Formaldehyde	109	37.40749	19.88429	5.961001	1.253733	1.042095	5.489492	30.16226	0
n-Hexane	118	47.50755	19.40949	5.712939	0.569327	0.144974	0.766689	2.014599	0
Lead Compounds	124	0.042401	0.015196	0.004057	0.000781	0	0	0	0
Manganese Compound	127	0.008094	0.00227	0.000606	0.000381	0.000327	0.001617	0.000376	0
Mercury Compounds	128	0	0	0	3.18E-05	0.000109	0.000539	0	0
Nickel Compounds	146	0.017554	0.004923	0.001315	0.000223	0.000109	0.000539	0.001209	0
POM as 16 PAH	162	0.055599	0.024113	0.006604	0.000625	0.001408	0.007445	0.020477	0
Propionaldehyde	164	2.764664	1.211323	0.338683	0.032785	0.466552	2.467345	2.234373	0
Styrene	172	15.66643	6.864164	1.919203	0	0.055354	0.292736	0.76921	0
Toluene	176	506.1295	219.277	61.81426	6.012506	0.084348	0.446074	1.17213	0
Xylene	185	284.5516	123.3352	34.75686	3.380063	0.126522	0.669111	1.758195	0
POM as 7 PAH		0.030738	0.01344	0.003577	0.000328	0.000402	0.002128	0.005854	0

Anchorage - Winter

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	16.90561	8.216965	2.730787	0.302165	0.254633	1.362127	2.44805	0
Dioxins/Furans	15	2.83E-09	7.93E-10	2.12E-10	2.49E-11	4.61E-08	1.73E-07	1.9E-07	0
Acetaldehyde	35	50.95519	26.72184	7.053214	0.801629	0.348092	1.861432	11.55781	0
Acrolein	39	3.25049	1.448249	0.404227	0.260039	0.096504	0.517835	1.333533	0
Arsenic Compounds	46	0	0	0	0	0.000218	0.001078	6.59E-05	0
Benzene	48	421.9153	174.1096	49.97759	3.848393	0.566199	3.026657	4.213522	0
Chromium Compound	75	0.024137	0.00677	0.001808	0.000191	0.000218	0.001078	0.000603	0
Ethylbenzene	99	80.01247	35.58742	9.931681	0.869483	0.055145	0.295906	0.762019	0
Formaldehyde	109	51.96744	30.88465	8.892679	1.62873	1.092816	5.842005	31.38444	0
n-Hexane	118	39.0634	17.21626	4.801432	0.415872	0.15165	0.813741	2.095552	0
Lead Compounds	124	0.042401	0.015196	0.004057	0.000781	0	0	0	0
Manganese Compound	127	0.008094	0.00227	0.000606	0.000381	0.000327	0.001617	0.000376	0
Mercury Compounds	128	0	0	0	3.18E-05	0.000109	0.000539	0	0
Nickel Compounds	146	0.017554	0.004923	0.001315	0.000223	0.000109	0.000539	0.001209	0
POM as 16 PAH	162	0.065369	0.028829	0.007882	0.000676	0.001473	0.007902	0.021299	0
Propionaldehyde	164	3.25049	1.448249	0.404227	0.03546	0.488036	2.618765	2.324157	0
Styrene	172	18.41944	8.206747	2.29062	0	0.057903	0.310701	0.80012	0
Toluene	176	565.4321	251.5947	70.21684	6.150217	0.088233	0.473449	1.21923	0
Xylene	185	318.5519	141.7507	39.56094	3.465321	0.132349	0.710174	1.828845	0
POM as 7 PAH		0.036139	0.016069	0.00427	0.000355	0.000421	0.002259	0.006089	0

On-Road Mobile Source Emissions

Anchorage - Fall

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	13.02317	6.357706	2.169821	0.27402	0.254633	1.362127	2.44805	0
Dioxins/Furans	15	2.83E-09	7.93E-10	2.12E-10	2.49E-11	4.61E-08	1.73E-07	1.9E-07	0
Acetaldehyde	35	39.43202	20.5469	5.476855	0.71675	0.348092	1.861432	11.55781	0
Acrolein	39	2.50323	1.111423	0.312347	0.232648	0.096504	0.517835	1.333533	0
Arsenic Compounds	46	0	0	0	0	0.000218	0.001078	6.59E-05	0
Benzene	48	326.4972	133.8549	38.67416	3.436438	0.566199	3.026657	4.213522	0
Chromium Compound:	75	0.024137	0.00677	0.001808	0.000191	0.000218	0.001078	0.000603	0
Ethylbenzene	99	61.70459	27.33516	7.680612	0.777256	0.055145	0.295906	0.762019	0
Formaldehyde	109	40.20282	23.90846	6.99782	1.469152	1.092816	5.842005	31.38444	0
n-Hexane	118	30.34536	13.28662	3.729495	0.370122	0.15165	0.813741	2.095552	0
Lead Compounds	124	0.042401	0.015196	0.004057	0.000781	0	0	0	0
Manganese Compound	127	0.008094	0.00227	0.000606	0.000381	0.000327	0.001617	0.000376	0
Mercury Compounds	128	0	0	0	3.18E-05	0.000109	0.000539	0	0
Nickel Compounds	146	0.017554	0.004923	0.001315	0.000223	0.000109	0.000539	0.001209	0
POM as 16 PAH	162	0.050341	0.022124	0.006091	0.000605	0.001473	0.007902	0.021299	0
Propionaldehyde	164	2.50323	1.111423	0.312347	0.031725	0.488036	2.618765	2.324157	0
Styrene	172	14.18497	6.298062	1.769964	0	0.057903	0.310701	0.80012	0
Toluene	176	435.907	193.2114	54.29091	5.498957	0.088233	0.473449	1.21923	0
Xylene	185	245.5695	108.8539	30.58729	3.098451	0.132349	0.710174	1.828845	0
POM as 7 PAH		0.027831	0.012332	0.003299	0.000318	0.000421	0.002259	0.006089	0

On-Road Mobile Source Emissions

Fairbanks - Summer

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	3.244996	3.017166	1.056203	0.120809	0.097356	0.728714	1.56358	0
Dioxins/Furans	15	1.16E-09	5.26E-10	1.46E-10	1.24E-11	2.58E-08	1.32E-07	1.49E-07	0
Acetaldehyde	35	3.256308	3.195821	0.994968	0.123409	0.133081	0.996273	7.380993	0
Acrolein	39	0.61671	0.494371	0.145245	0.092632	0.037015	0.278313	0.851683	0
Arsenic Compounds	46	0	0	0	0	0.000122	0.000822	5.16E-05	0
Benzene	48	137.1412	88.1694	26.40083	2.259582	0.216349	1.619441	2.691077	0
Chromium Compounds	75	0.009884	0.004493	0.001251	9.48E-05	0.000122	0.000822	0.000473	0
Ethylbenzene	99	28.35488	18.23064	5.386422	0.542536	0.021151	0.159036	0.486676	0
Formaldehyde	109	8.898132	8.831832	2.858351	0.57669	0.417417	3.126319	20.04085	0
n-Hexane	118	47.44745	24.3617	7.249509	0.855633	0.058166	0.437349	1.338359	0
Lead Compounds	124	0.017363	0.010085	0.002808	0.000388	0	0	0	0
Manganese Compounc	127	0.003315	0.001507	0.000419	0.00019	0.000183	0.001233	0.000295	0
Mercury Compounds	128	0	0	0	1.58E-05	6.09E-05	0.000411	0	0
Nickel Compounds	146	0.007188	0.003267	0.00091	0.000111	6.09E-05	0.000411	0.000947	0
POM as 16 PAH	162	0.012402	0.009841	0.002832	0.000241	0.000565	0.004247	0.013603	0
Propionaldehyde	164	0.61671	0.494371	0.145245	0.012632	0.187189	1.407469	1.484362	0
Styrene	172	3.494691	2.801437	0.823054	0	0.022209	0.166988	0.51101	0
Toluene	176	177.9404	118.5087	34.98009	3.43954	0.033842	0.254458	0.778682	0
Xylene	185	98.59232	66.00354	19.47944	1.90866	0.050763	0.381687	1.168023	0
POM as 7 PAH		0.006857	0.005485	0.001534	0.000126	0.000161	0.001214	0.003889	0

Fairbanks - Spring

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	5.243659	4.915113	1.609518	0.147775	0.097356	0.728714	1.56358	0
Dioxins/Furans	15	1.16E-09	5.26E-10	1.46E-10	1.24E-11	2.58E-08	1.32E-07	1.49E-07	0
Acetaldehyde	35	5.252044	5.246694	1.565697	0.152901	0.133081	0.996273	7.380993	0
Acrolein	39	1.008841	0.824337	0.235318	0.116265	0.037015	0.278313	0.851683	0
Arsenic Compounds	46	0	0	0	0	0.000122	0.000822	5.16E-05	0
Benzene	48	144.0856	109.6321	32.22955	1.764254	0.216349	1.619441	2.691077	0
Chromium Compounds	75	0.009884	0.004493	0.001251	9.48E-05	0.000122	0.000822	0.000473	0
Ethylbenzene	99	24.87035	20.26614	5.784738	0.388429	0.021151	0.159036	0.486676	0

On-Road Mobile Source Emissions

Formaldehyde	109	14.34721	14.41028	4.405678	0.706659	0.417417	3.126319	20.04085	0
n-Hexane	118	12.23705	9.829642	2.804504	0.184966	0.058166	0.437349	1.338359	0
Lead Compounds	124	0.017363	0.010085	0.002808	0.000388	0	0	0	0
Manganese Compounc	127	0.003315	0.001507	0.000419	0.00019	0.000183	0.001233	0.000295	0
Mercury Compounds	128	0	0	0	1.58E-05	6.09E-05	0.000411	0	0
Nickel Compounds	146	0.007188	0.003267	0.00091	0.000111	6.09E-05	0.000411	0.000947	0
POM as 16 PAH	162	0.020288	0.01641	0.004589	0.000302	0.000565	0.004247	0.013603	0
Propionaldehyde	164	1.008841	0.824337	0.235318	0.015854	0.187189	1.407469	1.484362	0
Styrene	172	5.716766	4.671241	1.333466	0	0.022209	0.166988	0.51101	0
Toluene	176	175.6904	143.2599	40.89274	2.74807	0.033842	0.254458	0.778682	0
Xylene	185	98.97541	80.71262	23.03903	1.548432	0.050763	0.381687	1.168023	0
POM as 7 PAH		0.011216	0.009146	0.002486	0.000159	0.000161	0.001214	0.003889	0

Fairbanks - Winter

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	6.955195	6.753338	2.144414	0.163714	0.10269	0.780176	1.614344	0
Dioxins/Furans	15	1.16E-09	5.26E-10	1.46E-10	1.24E-11	2.58E-08	1.32E-07	1.49E-07	0
Acetaldehyde	35	6.135501	6.074211	1.781499	0.168986	0.140351	1.06621	7.622596	0
Acrolein	39	1.121051	0.952104	0.269227	0.128109	0.039141	0.297974	0.880852	0
Arsenic Compounds	46	0	0	0	0	0.000122	0.000822	5.16E-05	0
Benzene	48	145.5567	113.2002	32.91331	1.833177	0.228309	1.734046	2.778823	0
Chromium Compounds	75	0.009884	0.004493	0.001251	9.48E-05	0.000122	0.000822	0.000473	0
Ethylbenzene	99	27.61949	23.39643	6.61553	0.428203	0.022367	0.170271	0.503344	0
Formaldehyde	109	16.98942	18.34226	5.495439	0.782853	0.44057	3.346525	20.69693	0
n-Hexane	118	13.54616	11.32026	3.20012	0.204429	0.061508	0.468244	1.384196	0
Lead Compounds	124	0.017363	0.010085	0.002808	0.000388	0	0	0	0
Manganese Compounc	127	0.003315	0.001507	0.000419	0.00019	0.000183	0.001233	0.000295	0
Mercury Compounds	128	0	0	0	1.58E-05	6.09E-05	0.000411	0	0
Nickel Compounds	146	0.007188	0.003267	0.00091	0.000111	6.09E-05	0.000411	0.000947	0
POM as 16 PAH	162	0.022545	0.018953	0.00525	0.000333	0.000597	0.004547	0.014069	0
Propionaldehyde	164	1.121051	0.952104	0.269227	0.017469	0.197944	1.506896	1.5352	0
Styrene	172	6.352621	5.395254	1.525622	0	0.023485	0.178784	0.528511	0
Toluene	176	195.1401	165.4062	46.77045	3.029116	0.035786	0.272433	0.805351	0
Xylene	185	109.9346	93.19119	26.3509	1.706765	0.05368	0.40865	1.208026	0
POM as 7 PAH		0.012464	0.010564	0.002844	0.000175	0.000171	0.0013	0.004022	0

On-Road Mobile Source Emissions

Fairbanks - Fall

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	5.373369	5.209527	1.706549	0.143721	0.091987	0.677536	1.512033	0
Dioxins/Furans	15	1.16E-09	5.26E-10	1.46E-10	1.24E-11	2.58E-08	1.32E-07	1.49E-07	0
Acetaldehyde	35	4.801668	4.684751	1.403262	0.149956	0.125692	0.926048	7.139077	0
Acrolein	39	0.902141	0.760755	0.218409	0.114878	0.035159	0.258763	0.823568	0
Arsenic Compounds	46	0	0	0	0	0.000122	0.000822	5.16E-05	0
Benzene	48	115.7292	90.23195	26.66597	1.644367	0.204208	1.505829	2.602586	0
Chromium Compounds	75	0.009884	0.004493	0.001251	9.48E-05	0.000122	0.000822	0.000473	0
Ethylbenzene	99	22.25621	18.70839	5.370481	0.383969	0.020091	0.147864	0.47061	0
Formaldehyde	109	13.17538	13.99349	4.298748	0.688328	0.394249	2.906026	19.3848	0
n-Hexane	118	10.99222	9.087859	2.607239	0.183279	0.055249	0.406627	1.294178	0
Lead Compounds	124	0.017363	0.010085	0.002808	0.000388	0	0	0	0
Manganese Compounds	127	0.003315	0.001507	0.000419	0.00019	0.000183	0.001233	0.000295	0
Mercury Compounds	128	0	0	0	1.58E-05	6.09E-05	0.000411	0	0
Nickel Compounds	146	0.007188	0.003267	0.00091	0.000111	6.09E-05	0.000411	0.000947	0
POM as 16 PAH	162	0.018143	0.015144	0.004259	0.000299	0.000536	0.003948	0.013154	0
Propionaldehyde	164	0.902141	0.760755	0.218409	0.015665	0.177802	1.3086	1.435361	0
Styrene	172	5.112135	4.310947	1.237651	0	0.021095	0.155258	0.494141	0
Toluene	176	157.1958	132.2391	37.96194	2.716222	0.032145	0.236583	0.752976	0
Xylene	185	88.55442	74.50283	21.38764	1.530465	0.048217	0.354875	1.129464	0
POM as 7 PAH		0.01003	0.008441	0.002307	0.000157	0.000153	0.001129	0.00376	0

On-Road Mobile Source Emissions

Juneau - Summer

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	2.709372	1.260883	0.986037	0.364853	0.010277	0.007307	0.659626	0.115494
Dioxins/Furans	15	4.42E-10	1.31E-10	6.4E-11	2.91E-11	1.97E-09	9.87E-10	5.33E-08	3.55E-12
Acetaldehyde	35	2.25268	1.165737	0.835989	0.378503	0.014041	0.009991	3.113331	0.075344
Acrolein	39	0.357073	0.17144	0.113015	0.285711	0.003906	0.002782	0.359422	0.007533
Arsenic Compounds	46	0	0	0	0	9.32E-06	6.15E-06	1.85E-05	0
Benzene	48	35.33252	15.61288	10.21573	3.372609	0.022852	0.016242	1.135116	0.604152
Chromium Compounds	75	0.003775	0.001123	0.000546	0.000223	9.32E-06	6.15E-06	0.000169	0
Ethylbenzene	99	10.40977	4.827613	3.153673	1.166288	0.002232	0.00159	0.205384	0
Formaldehyde	109	6.108008	3.455438	2.605695	1.745734	0.044095	0.031349	8.45359	0.281221
n-Hexane	118	9.215049	3.90655	2.487925	1.098051	0.006138	0.004372	0.564806	0
Lead Compounds	124	0.006631	0.00252	0.001226	0.000914	0	0	0	2.15E-05
Manganese Compounds	127	0.001266	0.000377	0.000183	0.000446	1.4E-05	9.23E-06	0.000105	0
Mercury Compounds	128	0	0	0	3.72E-05	4.66E-06	3.08E-06	0	0
Nickel Compounds	146	0.002745	0.000817	0.000397	0.00026	4.66E-06	3.08E-06	0.000339	0
POM as 16 PAH	162	0.007181	0.003413	0.002204	0.000742	5.96E-05	4.25E-05	0.005741	0.000144
Propionaldehyde	164	0.357073	0.17144	0.113015	0.038961	0.019754	0.014071	0.626421	0
Styrene	172	2.023412	0.971495	0.640418	0	0.002344	0.001669	0.215653	0
Toluene	176	70.80422	33.08107	21.65322	7.888938	0.003571	0.002544	0.328614	0
Xylene	185	39.68594	18.5608	12.15223	4.418411	0.005357	0.003816	0.492922	0
POM as 7 PAH		0.00397	0.001902	0.001194	0.00039	1.7E-05	1.21E-05	0.001641	7.42E-05

Juneau - Spring

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	3.430766	1.594686	1.203667	0.399381	0.010277	0.007307	0.659626	0.130352
Dioxins/Furans	15	4.42E-10	1.31E-10	6.4E-11	2.91E-11	1.97E-09	9.87E-10	5.33E-08	3.55E-12
Acetaldehyde	35	2.847801	1.475511	1.029637	0.417133	0.014041	0.009991	3.113331	0.08502
Acrolein	39	0.452061	0.218761	0.140878	0.317514	0.003906	0.002782	0.359422	0.008504
Arsenic Compounds	46	0	0	0	0	9.32E-06	6.15E-06	1.85E-05	0
Benzene	48	42.40972	19.08539	12.3515	3.518509	0.022852	0.016242	1.135116	0.613112
Chromium Compounds	75	0.003775	0.001123	0.000546	0.000223	9.32E-06	6.15E-06	0.000169	0
Ethylbenzene	99	11.90851	5.726056	3.704801	1.174411	0.002232	0.00159	0.205384	0

On-Road Mobile Source Emissions

Formaldehyde	109	7.708015	4.363539	3.185735	1.913115	0.044095	0.031349	8.45359	0.317405
n-Hexane	118	7.805532	3.665722	2.41329	0.85044	0.006138	0.004372	0.564806	0
Lead Compounds	124	0.006631	0.00252	0.001226	0.000914	0	0	0	2.15E-05
Manganese Compounds	127	0.001266	0.000377	0.000183	0.000446	1.4E-05	9.23E-06	0.000105	0
Mercury Compounds	128	0	0	0	3.72E-05	4.66E-06	3.08E-06	0	0
Nickel Compounds	146	0.002745	0.000817	0.000397	0.00026	4.66E-06	3.08E-06	0.000339	0
POM as 16 PAH	162	0.009091	0.004355	0.002747	0.000825	5.96E-05	4.25E-05	0.005741	0.000162
Propionaldehyde	164	0.452061	0.218761	0.140878	0.043297	0.019754	0.014071	0.626421	0
Styrene	172	2.56168	1.239646	0.798311	0	0.002344	0.001669	0.215653	0
Toluene	176	82.82523	39.88387	25.77743	8.114322	0.003571	0.002544	0.328614	0
Xylene	185	46.56379	22.42682	14.49265	4.55778	0.005357	0.003816	0.492922	0
POM as 7 PAH		0.005026	0.002427	0.001488	0.000434	1.7E-05	1.21E-05	0.001641	8.38E-05

Juneau - Winter

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	5.395436	2.373347	1.709703	0.457978	0.010535	0.007593	0.672822	0.153894
Dioxins/Furans	15	4.43E-10	1.31E-10	6.4E-11	2.91E-11	1.97E-09	9.87E-10	5.23E-08	3.55E-12
Acetaldehyde	35	4.114701	2.109553	1.42708	0.478146	0.014398	0.010375	3.176571	0.100354
Acrolein	39	0.689563	0.321559	0.200479	0.36382	0.004008	0.002884	0.366578	0.010031
Arsenic Compounds	46	0	0	0	0	9.32E-06	6.15E-06	1.81E-05	0
Benzene	48	61.29821	26.40255	16.41886	3.675992	0.023424	0.01687	1.158155	0.687051
Chromium Compounds	75	0.003781	0.001117	0.000546	0.000223	9.32E-06	6.15E-06	0.000166	0
Ethylbenzene	99	16.95312	7.90668	4.925674	1.220899	0.00229	0.001648	0.209473	0
Formaldehyde	109	10.85448	6.156838	4.358449	2.193782	0.045199	0.032561	8.624576	0.374657
n-Hexane	118	8.223641	3.838066	2.381256	0.59524	0.006298	0.004532	0.57605	0
Lead Compounds	124	0.006642	0.002507	0.001226	0.000914	0	0	0	2.15E-05
Manganese Compounds	127	0.001268	0.000374	0.000183	0.000446	1.4E-05	9.23E-06	0.000104	0
Mercury Compounds	128	0	0	0	3.72E-05	4.66E-06	3.08E-06	0	0
Nickel Compounds	146	0.00275	0.000812	0.000397	0.00026	4.66E-06	3.08E-06	0.000332	0
POM as 16 PAH	162	0.013867	0.006401	0.003909	0.000945	6.12E-05	4.4E-05	0.005855	0.000191
Propionaldehyde	164	0.689563	0.321559	0.200479	0.049612	0.020267	0.014585	0.638892	0
Styrene	172	3.907525	1.822169	1.13605	0	0.002405	0.00173	0.219947	0
Toluene	176	119.8398	55.88968	34.82447	8.6284	0.003664	0.002637	0.335157	0
Xylene	185	67.51768	31.4881	19.62049	4.86109	0.005496	0.003955	0.502735	0
POM as 7 PAH		0.007667	0.003568	0.002118	0.000497	1.75E-05	1.26E-05	0.001674	9.88E-05

On-Road Mobile Source Emissions

Juneau - Fall

		lbs. per Day							
		LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC
1,3 Butadiene	9	4.146624	1.839205	1.366736	0.419955	0.010535	0.007593	0.672822	0.133059
Dioxins/Furans	15	4.43E-10	1.31E-10	6.4E-11	2.91E-11	1.97E-09	9.87E-10	5.23E-08	3.55E-12
Acetaldehyde	35	3.178452	1.63564	1.133666	0.435595	0.014398	0.010375	3.176571	0.086758
Acrolein	39	0.529523	0.247847	0.157271	0.328974	0.004008	0.002884	0.366578	0.008687
Arsenic Compounds	46	0	0	0	0	9.32E-06	6.15E-06	1.81E-05	0
Benzene	48	48.9112	20.98137	13.28811	3.537212	0.023424	0.01687	1.158155	0.643321
Chromium Compounds	75	0.003781	0.001117	0.000546	0.000223	9.32E-06	6.15E-06	0.000166	0
Ethylbenzene	99	14.06628	6.488807	4.143602	1.234245	0.00229	0.001648	0.209473	0
Formaldehyde	109	8.417013	4.787897	3.487827	2.009539	0.045199	0.032561	8.624576	0.323948
n-Hexane	118	9.499256	4.157412	2.717532	0.934155	0.006298	0.004532	0.57605	0
Lead Compounds	124	0.006642	0.002507	0.001226	0.000914	0	0	0	2.15E-05
Manganese Compounds	127	0.001268	0.000374	0.000183	0.000446	1.4E-05	9.23E-06	0.000104	0
Mercury Compounds	128	0	0	0	3.72E-05	4.66E-06	3.08E-06	0	0
Nickel Compounds	146	0.00275	0.000812	0.000397	0.00026	4.66E-06	3.08E-06	0.000332	0
POM as 16 PAH	162	0.010649	0.004934	0.003067	0.000855	6.12E-05	4.4E-05	0.005855	0.000166
Propionaldehyde	164	0.529523	0.247847	0.157271	0.04486	0.020267	0.014585	0.638892	0
Styrene	172	3.000629	1.404469	0.891202	0	0.002405	0.00173	0.219947	0
Toluene	176	97.64624	45.19442	28.81824	8.500767	0.003664	0.002637	0.335157	0
Xylene	185	54.88208	25.41279	16.20134	4.77281	0.005496	0.003955	0.502735	0
POM as 7 PAH		0.005887	0.00275	0.001661	0.000449	1.75E-05	1.26E-05	0.001674	8.56E-05

Anchorage

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
No.	CAS No.	Chemical Name	LDGV	LDGT1	LDGT2	HDTV	LDDV	LDDT	HDDV	MC	Mobile Totals
1	79345	1,1,2,2-Tetrachloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	79005	1,1,2-Trichloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	57147	1,1-Dimethyl hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	120821	1,2,4-Trichlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	96128	1,2-Dibromo-3-chloropropane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	122667	1,2-Diphenylhydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	106887	1,2-Epoxybutane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	75558	1,2-Propylenimine (2-Methyl aziridine)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	106990	1,3-Butadiene	2.420	1.183	0.392	0.049	0.046	0.245	0.442	0.000	4.776
10	542756	1,3-Dichloropropene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	1120714	1,3-Propane sultone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	106467	1,4-Dichlorobenzene(p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	540841	2,24-Trimethylpentane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	95954	2,4,5-Trichlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17	88062	2,4,6-Trichlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	94757	2,4-D, salts and esters	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	51285	2,4-Dinitrophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	121142	2,4-Dinitrotoluene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21	584849	2,4-Toluene diisocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	95807	2,4-Toluene diamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	53963	2-Acetylaminofluorene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24	532274	2-Chloroacetophenone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	79469	2-Nitropropane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	91941	3,3-Dichlorobenzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27	119904	3,3-Dimethoxybenzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28	119937	3,3-Dimethyl benzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	101144	4,4-Methylene bis (2-chloroaniline)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	101779	4,4'-Methylenedianiline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31	534521	4,6-Dinitro-o-cresol, and salts	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	92671	4-Aminobiphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33	92933	4-Nitrobiphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	100027	4-Nitrophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	75070	Acetaldehyde	5.212	2.740	0.744	0.094	0.063	0.335	2.089	0.000	11.277
36	60355	Acetamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37	75058	Acetonitrile	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38	98862	Acetophenone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39	107028	Acrolein	0.477	0.210	0.059	0.043	0.017	0.093	0.241	0.000	1.140
40	79061	Acrylamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
41	79107	Acrylic Acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
42	107131	Acrylonitrile	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	107051	Allyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44	62533	Aniline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	N/A	Antimony Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46	N/A	Arsenic Compounds (inorganic includi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
47	1332214	Asbestos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
48	71432	Benzene (including benzene from gas	78.119	30.387	8.764	0.756	0.102	0.544	0.762	0.000	119.433
49	92875	Benzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	98077	Benzotrichloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
51	100447	Benzyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	N/A	Beryllium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
53	57578	beta-Propiolactone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	92524	Biphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	542881	Bis(chloromethyl)ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
57	75252	Bromoform	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
58	N/A	Cadmium Compouns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
59	156627	Calcium cyanamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	133062	Captan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
61	63252	Carbaryl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
62	75150	Carbon disulfide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	56235	Carbon tetrachloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
64	463581	Carbonyl sulfide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
65	120809	Catechol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
66	133904	Chloramben	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
67	57749	Chlordane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
68	7782505	Chlorine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
69	79118	Chloroacetic acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	108907	Chlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
71	510156	Chlorobenzilate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
72	67663	Chloroform	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
73	107302	Chloromethyl methyl ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	126998	Chloroprene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
75	N/A	Chromium Chompounds	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.006
76	N/A	Cobalt Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
77	N/A	Coke Oven Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	1319773	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	95487	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	108394	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
81	106445	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	98828	Cumene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Anchorage

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
83	N/A	Cyanide Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	3547044	DDE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	334883	Diazomethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	132649	Dibenzofurans	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
87	84742	Dibutylphthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]e	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
89	62737	Dichlorvos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	111422	Diethanolamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	64675	Diethyl sulfate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	60117	Dimethyl aminoazobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	79447	Dimethyl caramoyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	68122	Dimethyl formamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	131113	Dimethyl phthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	77781	Dimethyl sulfate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	140885	Ethyl acrylate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	100414	Ethyl benzene	13.891	5.728	1.613	0.166	0.010	0.053	0.138	0.000	21.599
100	51796	Ethyl carbamate (Urethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	75003	Ethyl chloride (Chloroethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	1006934	Ethylene dibromide (Dibromoethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	107062	Ethylene dichloride (1,2-Dichloroethan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	107211	Ethylene glycol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	151564	Ethylene imine (Axiridine)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	75218	Ethylene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	96457	Ethylene thiourea	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	75343	Ethylidene dichloride (1,1-Dichloroetha	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	5000	Formaldehyde	7.121	4.054	1.198	0.249	0.197	1.050	5.672	0.000	19.542
110	N/A	Glycol ethers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	76448	Heptachlor	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	118741	Hexachlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	87683	Hexachlorobutadiene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	77474	Hexachlorocyclopentadiene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	67721	Hexachloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	822060	Hexamethylene-1,6 diisocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	680319	Hexamethylphosphoramide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	110543	Hexane	12.297	4.202	1.199	0.138	0.027	0.146	0.379	0.000	18.388
119	302012	Hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	7647010	Hydrochloric acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	123319	Hydroquinone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	78591	Isophorone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Anchorage

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
124	N/A	Lead Compounds	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.011
125	58899	Lindane (all isomers)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	108316	Maleic anhydride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	N/A	Manganese Compounds	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
128	N/A	Mercury Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	67561	Methanol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	72435	Methoxychlor	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	74839	Methyl bromide(Bromomethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	71556	Methyl chloroform (1,1,1-Trichloroetha	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	78933	Methyl ethyl ketone (2-Butanone)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	60344	Methyl hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	74884	Methyl iodide (Iodomethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	108101	Methyl isobutyl ketone (Hexone)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	624839	Methyl isocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	80626	Methyl methacrylate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	1634044	Methyl tert butyl ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	74873	Methylchloride (Chloromethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	75092	Methylene chloride(Dichloromethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	101688	Methylene diphenyl diisocyanate (MDI)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	N/A	Mineral fibers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	121697	N,N-Diethyl anniline (N,N-Dimethylanir	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	91203	Naphthalene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	N/A	Nickel Compounds	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.005
147	98953	Nitrobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	62759	N-Nitrosodimethylamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	59892	N-Nitrosomorpholine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	684935	N-Nitroso-N-methylurea	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	90040	o-Anisidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	95534	o-Toluidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	56382	Parathion	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	82688	Pentachloromitrobenzene (Quintobenz	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	87865	Pentachlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	108952	Phenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	75445	Phosgene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	7723140	Phosphorus	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	7803512	Phospine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	85449	Phthalic anhydride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	1336363	Polychlorinated biphenyls (Aroclors)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	N/A	Polycyclic Organic Matter	0.010	0.004	0.001	0.000	0.000	0.001	0.004	0.000	0.021
163	106503	p-Phenylemediamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	123386	Propionaldehyde	0.477	0.210	0.059	0.006	0.088	0.471	0.420	0.000	1.731

Anchorage

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
165	114261	Propoxur(Baygon)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	78875	Propylene dichloride (1,2-Dichloroprop.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	75569	Propylene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	91225	Quinoline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	106514	Quinone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	N/A	Radionuclides (including radon)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	N/A	Selenium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	100425	Styrene	2.700	1.192	0.334	0.000	0.010	0.056	0.145	0.000	4.437
173	96093	Styrene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	127184	Tetrachloroethylene (Perchloroethylene)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	7550450	Titanium tetrachloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	108883	Toluene	94.485	39.540	11.125	1.134	0.016	0.085	0.220	0.000	146.606
177	8001352	Toxaphene (chlorinated camphene)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	79016	Trichloroethylene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	121448	Triethylamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	1582098	Trifluralin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
181	108054	Vinyl acetate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
182	593602	Vinyl bromide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
183	75014	Vinyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
184	75354	Vinylidene chloride (1,1-Dichloroethyle	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
185	1330207	Xylenes (isomers and mixture)	52.959	22.207	6.247	0.636	0.024	0.128	0.331	0.000	82.531
186	95476	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
187	108383	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
188	106423	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Totals:			270.2	111.7	31.7	3.3	0.6	3.2	10.8	0.0	431.5

Fairbanks

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HdGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
1	79345	1,1,2,2-Tetrachloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	79005	1,1,2-Trichloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	57147	1,1-Dimethyl hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	120821	1,2,4-Trichlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	96128	1,2-Dibromo-3-chloropropane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	122667	1,2-Diphenylhydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	106887	1,2-Epoxybutane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	75558	1,2-Propylenimine (2-Methyl aziridine)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	106990	1,3-Butadiene	0.950	0.908	0.297	0.026	0.018	0.133	0.285	0.000	2.617
10	542756	1,3-Dichloropropene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	1120714	1,3-Propane sultone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	106467	1,4-Dichlorobenzene(p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	540841	2,24-Trimethylpentane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	95954	2,4,5-Trichlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17	88062	2,4,6-Trichlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	94757	2,4-D, salts and esters	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	51285	2,4-Dinitrophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	121142	2,4-Dinitrotoluene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21	584849	2,4-Tolluene diisocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	95807	2,4-Toluene diamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	53963	2-Acetylaminofluorene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24	532274	2-Chloroacetophenone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	79469	2-Nitropropane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	91941	3,3-Dichlorobenzidene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27	119904	3,3-Dimethoxybenzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28	119937	3,3-Dimethyl benzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	101144	4,4-Methylene bis (2-chloroaniline)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	101779	4,4'-Methylenedianiline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31	534521	4,6-Dinitro-o-cresol, and salts	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	92671	4-Aminobiphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33	92933	4-Nitrobiphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	100027	4-Nitrophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	75070	Acetaldehyde	0.887	0.876	0.262	0.027	0.024	0.182	1.347	0.000	3.606
36	60355	Acetamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37	75058	Acetonitrile	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38	98862	Acetophenone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39	107028	Acrolein	0.166	0.138	0.040	0.021	0.007	0.051	0.155	0.000	0.578
40	79061	Acrylamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
41	79107	Acrylic Acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Section 112 Hazardous Air Pollutants										On-Road	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDTV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
42	107131	Acrylonitrile	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	107051	Allyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44	62533	Aniline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	N/A	Antimony Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46	N/A	Arsenic Compounds (inorganic includi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
47	1332214	Asbestos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
48	71432	Benzene (including benzene from gas	24.752	18.306	5.393	0.342	0.039	0.296	0.491	0.000	49.620
49	92875	Benzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	98077	Benzotrichloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
51	100447	Benzyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	N/A	Beryllium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
53	57578	beta-Propiolactone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	92524	Biphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	542881	Bis(chloromethyl)ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
57	75252	Bromoform	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
58	N/A	Cadmium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
59	156627	Calcium cyanamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	133062	Captan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
61	63252	Carbaryl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
62	75150	Carbon disulfide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	56235	Carbon tetrachloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
64	463581	Carbonyl sulfide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
65	120809	Catechol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
66	133904	Chloramben	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
67	57749	Chlordane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
68	7782505	Chlorine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
69	79118	Chloroacetic acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	108907	Chlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
71	510156	Chlorobenzilate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
72	67663	Chloroform	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
73	107302	Chloromethyl methyl ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	126998	Chloroprene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
75	N/A	Chromium Compounds	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.003
76	N/A	Cobalt Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
77	N/A	Coke Oven Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	1319773	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	95487	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	108394	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
81	106445	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	98828	Cumene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Section 112 Hazardous Air Pollutants										On-Road	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HdGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
83	N/A	Cyanide Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	3547044	DDE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	334883	Diazomethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	132649	Dibenzofurans	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
87	84742	Dibutylphthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]e	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
89	62737	Dichlorvos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	111422	Diethanolamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	64675	Diethyl sulfate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	60117	Dimethyl aminoazobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	79447	Dimethyl caramoyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	68122	Dimethyl formamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	131113	Dimethyl phthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	77781	Dimethyl sulfate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	140885	Ethyl acrylate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	100414	Ethyl benzene	4.704	3.677	1.057	0.080	0.004	0.029	0.089	0.000	9.639
100	51796	Ethyl carbamate (Urethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	75003	Ethyl chloride (Chloroethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	1006934	Ethylene dibromide (Dibromoethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	107062	Ethylene dichloride (1,2-Dichloroethan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	107211	Ethylene glycol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	151564	Ethylene imine (Axiridine)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	75218	Ethylene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	96457	Ethylene thiourea	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	75343	Ethylidene dichloride (1,1-Dichloroetha	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	5000	Formaldehyde	2.437	2.536	0.778	0.126	0.076	0.571	3.657	0.000	10.181
110	N/A	Glycol ethers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	76448	Heptachlor	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	118741	Hexachlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	87683	Hexachlorobutadiene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	77474	Hexachlorocyclopentadiene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	67721	Hexachloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	822060	Hexamethylene-1,6 diisocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	680319	Hexamethylphosphoramide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	110543	Hexane	3.843	2.491	0.724	0.065	0.011	0.080	0.244	0.000	7.457
119	302012	Hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	7647010	Hydrochloric acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	123319	Hydroquinone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	78591	Isophorone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
124	N/A	Lead Compounds	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.006
125	58899	Lindane (all isomers)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	108316	Maleic anhydride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	N/A	Manganese Compounds	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
128	N/A	Mercury Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	67561	Methanol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	72435	Methoxychlor	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	74839	Methyl bromide(Bromomethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	71556	Methyl chloroform (1,1,1-Trichloroetha	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	78933	Methyl ethyl ketone (2-Butanone)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	60344	Methyl hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	74884	Methyl iodide (Iodomethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	108101	Methyl isobutyl ketone (Hexone)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	624839	Methyl isocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	80626	Methyl methacrylate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	1634044	Methyl tert butyl ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	74873	Methylchloride (Chloromethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	75092	Methylene chloride(Dichloromethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	101688	Methylene diphenyl diisocyanate (MDI)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	N/A	Mineral fibers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	121697	N,N-Diethyl anniline (N,N-Dimethylanir	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	91203	Naphthalene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	N/A	Nickel Compounds	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002
147	98953	Nitrobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	62759	N-Nitrosodimethylamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	59892	N-Nitrosomorpholine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	684935	N-Nitroso-N-methylurea	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	90040	o-Anisidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	95534	o-Toluidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	56382	Parathion	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	82688	Pentachloromitrobenzene (Quintobenz	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	87865	Pentachlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	108952	Phenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	75445	Phosgene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	7723140	Phosphorus	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	7803512	Phospine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	85449	Phthalic anhydride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	1336363	Polychlorinated biphenyls (Aroclors)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	N/A	Polycyclic Organic Matter	0.003	0.003	0.001	0.000	0.000	0.001	0.002	0.000	0.010
163	106503	p-Phenylemediamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	123386	Propionaldehyde	0.166	0.138	0.040	0.003	0.034	0.257	0.271	0.000	0.909

Fairbanks

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>On-Road Mobile Totals</u>
165	114261	Propoxur(Baygon)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	78875	Propylene dichloride (1,2-Dichloroprop.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	75569	Propylene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	91225	Quinoline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	106514	Quinone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	N/A	Radionuclides (including radon)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	N/A	Selenium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	100425	Styrene	0.943	0.784	0.224	0.000	0.004	0.030	0.093	0.000	2.079
173	96093	Styrene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	127184	Tetrachloroethylene (Perchloroethylene)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	7550450	Titanium tetrachloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	108883	Toluene	32.210	25.523	7.328	0.544	0.006	0.046	0.142	0.000	65.800
177	8001352	Toxaphene (chlorinated camphene)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	79016	Trichloroethylene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	121448	Triethylamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	1582098	Trifluralin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
181	108054	Vinyl acetate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
182	593602	Vinyl bromide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
183	75014	Vinyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
184	75354	Vinylidene chloride (1,1-Dichloroethyle	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
185	1330207	Xylenes (isomers and mixture)	18.070	14.345	4.118	0.305	0.009	0.070	0.213	0.000	37.131
186	95476	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
187	108383	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
188	106423	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Totals:			89.1	69.7	20.3	1.5	0.2	1.7	7.0	0.0	189.6

Juneau

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HdGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
1	79345	1,1,2,2-Tetrachloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	79005	1,1,2-Trichloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	57147	1,1-Dimethyl hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	120821	1,2,4-Trichlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	96128	1,2-Dibromo-3-chloropropane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	122667	1,2-Diphenylhydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	106887	1,2-Epoxybutane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	75558	1,2-Propylenimine (2-Methyl aziridine)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	106990	1,3-Butadiene	0.716	0.322	0.240	0.075	0.002	0.001	0.122	0.024	1.502
10	542756	1,3-Dichloropropene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	1120714	1,3-Propane sultone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	106467	1,4-Dichlorobenzene(p)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	540841	2,24-Trimethylpentane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	95954	2,4,5-Trichlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17	88062	2,4,6-Trichlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	94757	2,4-D, salts and esters	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	51285	2,4-Dinitrophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	121142	2,4-Dinitrotoluene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21	584849	2,4-Tolluene diisocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	95807	2,4-Toluene diamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	53963	2-Acetylaminofluorene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24	532274	2-Chloroacetophenone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	79469	2-Nitropropane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	91941	3,3-Dichlorobenzidene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27	119904	3,3-Dimethoxybenzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28	119937	3,3-Dimethyl benzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	101144	4,4-Methylene bis (2-chloroaniline)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	101779	4,4'-Methylenedianiline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31	534521	4,6-Dinitro-o-cresol, and salts	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	92671	4-Aminobiphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33	92933	4-Nitrobiphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34	100027	4-Nitrophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	75070	Acetaldehyde	0.565	0.291	0.202	0.078	0.003	0.002	0.574	0.016	1.731
36	60355	Acetamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37	75058	Acetonitrile	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38	98862	Acetophenone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39	107028	Acrolein	0.093	0.044	0.028	0.059	0.001	0.001	0.066	0.002	0.292
40	79061	Acrylamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
41	79107	Acrylic Acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Juneau

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HdGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
42	107131	Acrylonitrile	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43	107051	Allyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44	62533	Aniline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	N/A	Antimony Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46	N/A	Arsenic Compounds (inorganic includi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
47	1332214	Asbestos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
48	71432	Benzene (including benzene from gas	8.575	3.745	2.385	0.644	0.004	0.003	0.209	0.116	15.682
49	92875	Benzidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	98077	Benzotrichloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
51	100447	Benzyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	N/A	Beryllium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
53	57578	beta-Propiolactone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
54	92524	Biphenyl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	542881	Bis(chloromethyl)ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
57	75252	Bromoform	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
58	N/A	Cadmium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
59	156627	Calcium cyanamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	133062	Captan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
61	63252	Carbaryl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
62	75150	Carbon disulfide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	56235	Carbon tetrachloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
64	463581	Carbonyl sulfide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
65	120809	Catechol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
66	133904	Chloramben	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
67	57749	Chlordane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
68	7782505	Chlorine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
69	79118	Chloroacetic acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
70	108907	Chlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
71	510156	Chlorobenzilate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
72	67663	Chloroform	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
73	107302	Chloromethyl methyl ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74	126998	Chloroprene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
75	N/A	Chromium Compounds	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
76	N/A	Cobalt Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
77	N/A	Coke Oven Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	1319773	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	95487	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	108394	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
81	106445	Cresols/Creshlic acid (isomers and mi	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	98828	Cumene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Juneau

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants										On-Road	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HdGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
83	N/A	Cyanide Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	3547044	DDE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	334883	Diazomethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	132649	Dibenzofurans	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
87	84742	Dibutylphthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]e	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
89	62737	Dichlorvos	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	111422	Diethanolamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	64675	Diethyl sulfate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	60117	Dimethyl aminoazobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	79447	Dimethyl caramoyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	68122	Dimethyl formamide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	131113	Dimethyl phthalate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	77781	Dimethyl sulfate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	140885	Ethyl acrylate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	100414	Ethyl benzene	2.434	1.138	0.727	0.219	0.000	0.000	0.038	0.000	4.556
100	51796	Ethyl carbamate (Urethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	75003	Ethyl chloride (Chloroethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	1006934	Ethylene dibromide (Dibromoethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	107062	Ethylene dichloride (1,2-Dichloroethan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	107211	Ethylene glycol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	151564	Ethylene imine (Axiridine)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	75218	Ethylene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	96457	Ethylene thiourea	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	75343	Ethylidene dichloride (1,1-Dichloroetha	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	5000	Formaldehyde	1.510	0.856	0.622	0.359	0.008	0.006	1.558	0.059	4.978
110	N/A	Glycol ethers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	76448	Heptachlor	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	118741	Hexachlorobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	87683	Hexachlorobutadiene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	77474	Hexachlorocyclopentadiene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	67721	Hexachloroethane	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	822060	Hexamethylene-1,6 diisocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	680319	Hexamethylphosphoramide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	110543	Hexane	1.585	0.710	0.456	0.159	0.001	0.001	0.104	0.000	3.016
119	302012	Hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	7647010	Hydrochloric acid	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	123319	Hydroquinone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	78591	Isophorone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Juneau

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											On-Road
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HdGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>Mobile Totals</u>
124	N/A	Lead Compounds	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
125	58899	Lindane (all isomers)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	108316	Maleic anhydride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	N/A	Manganese Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	N/A	Mercury Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	67561	Methanol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	72435	Methoxychlor	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	74839	Methyl bromide(Bromomethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	71556	Methyl chloroform (1,1,1-Trichloroetha	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	78933	Methyl ethyl ketone (2-Butanone)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	60344	Methyl hydrazine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	74884	Methyl iodide (Iodomethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	108101	Methyl isobutyl ketone (Hexone)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	624839	Methyl isocyanate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	80626	Methyl methacrylate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	1634044	Methyl tert butyl ether	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	74873	Methylchloride (Chloromethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	75092	Methylene chloride(Dichloromethane)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	101688	Methylene diphenyl diisocyanate (MDI)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	N/A	Mineral fibers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	121697	N,N-Diethyl anniline (N,N-Dimethylanir	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	91203	Naphthalene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	N/A	Nickel Compounds	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
147	98953	Nitrobenzene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	62759	N-Nitrosodimethylamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	59892	N-Nitrosomorpholine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	684935	N-Nitroso-N-methylurea	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	90040	o-Anisidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	95534	o-Toluidine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	56382	Parathion	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	82688	Pentachloromitrobenzene (Quintobenz	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	87865	Pentachlorophenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	108952	Phenol	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	75445	Phosgene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	7723140	Phosphorus	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	7803512	Phospine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	85449	Phthalic anhydride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	1336363	Polychlorinated biphenyls (Aroclors)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	N/A	Polycyclic Organic Matter	0.002	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.005
163	106503	p-Phenylemediamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	123386	Propionaldehyde	0.093	0.044	0.028	0.008	0.004	0.003	0.115	0.000	0.294

Juneau

Annual On-Road Motor Vehicle HAP Emissions (ton/yr) - 1999

Section 112 Hazardous Air Pollutants											
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>LDGV</u>	<u>LDGT1</u>	<u>LDGT2</u>	<u>HDGV</u>	<u>LDDV</u>	<u>LDDT</u>	<u>HDDV</u>	<u>MC</u>	<u>On-Road Mobile Totals</u>
165	114261	Propoxur(Baygon)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	78875	Propylene dichloride (1,2-Dichloroprop.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	75569	Propylene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	91225	Quinoline	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	106514	Quinone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	N/A	Radionuclides (including radon)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	N/A	Selenium Compounds	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	100425	Styrene	0.524	0.248	0.158	0.000	0.000	0.000	0.040	0.000	0.971
173	96093	Styrene oxide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	127184	Tetrachloroethylene (Perchloroethylene)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	7550450	Titanium tetrachloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	108883	Toluene	16.932	7.941	5.068	1.512	0.001	0.000	0.061	0.000	31.514
177	8001352	Toxaphene (chlorinated camphene)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	79016	Trichloroethylene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	121448	Triethylamine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	1582098	Trifluralin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
181	108054	Vinyl acetate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
182	593602	Vinyl bromide	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
183	75014	Vinyl chloride	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
184	75354	Vinylidene chloride (1,1-Dichloroethyle	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
185	1330207	Xylenes (isomers and mixture)	9.520	4.466	2.850	0.849	0.001	0.001	0.091	0.000	17.777
186	95476	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
187	108383	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
188	106423	Xylenes (isomers and mixture)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Totals:			42.6	19.8	12.8	4.0	0.0	0.0	3.0	0.2	82.3

APPENDIX C

Off-Road Mobile Sources

- **C-1 Air Toxics from Aircraft**
- **C-2 Air Toxics from Locomotives**
- **C-3 Air Toxics from Commercial Marine Vessels**
- **C-4 Air Toxics from Other Nonroad Mobile Sources**

APPENDIX C-1

Air Toxics from Aircraft

Appendix C-1

Estimation of Air Toxics from Aircraft

As with the nonroad mobile source toxics inventories developed in this effort, hazardous air pollutants (HAPs) from aircraft were estimated by first generating inventories for hydrocarbon (HC) emissions. Once the HC emission inventories were developed, estimates of the percentage of each toxic compound of interest in the total HC emissions from aircraft were applied to the HC emission inventories to generate toxics estimates. Those percentages, or “toxics fractions,” were compiled primarily from data that EPA developed for use in the 1996 National Toxics Inventory. As described below, emission estimates were prepared for calendar year 1999 for the communities of Anchorage, Fairbanks, and Juneau. Table C-1-1 below lists the specific airports and airbases analyzed in this study for the three different communities. In addition to these airports, data on helicopter ice field activity in Juneau were also included. Local data on aircraft activity (i.e., landings and takeoffs by aircraft type) were compiled with the help of ADEC staff.

Table C-1-1

Alaska Airports Studied

Code	City	State and Airport Name
ANC	Anchorage	Anchorage International Airport
EDF	Anchorage	Elmendorf Air Force Base
LHD	Anchorage	Lake Hood Seaplane Base
MRI	Anchorage	Merrill Field
EIL	Fairbanks	Eielson Air Force Base
FAI	Fairbanks	Fairbanks International Airport
FBK	Fairbanks/Fort Wainwright	Wainwright Army Air Field
JNU	Juneau	Juneau International Airport

HC Emissions Estimates

In its simplest form, an emission inventory is the product of an emission factor (e.g., grams of HC per mile, lb of HC per 1000 lbs of fuel, etc.) and a measure of equipment activity (e.g., miles driven, gallons of fuel used, etc.). In the case of aircraft emissions, activity is broken down into landing and takeoff (LTO) cycles.

EDMS Model - The Emissions & Dispersion Modeling System (EDMS) is administered by the Federal Aviation Administration (FAA) in cooperation with the United States Air Force (USAF), and is the preferred model by the FAA for estimating emissions from airports. The model is used to determine HC emission levels generated by typical airport/air base sources such as aircrafts and ground support equipment. In order to generate an emissions inventory of an airport/air base, specific aircraft model/airframe names and annual LTOs are used as inputs. When lacking specific data, default values can be used for other variables such as mixing heights and engine assignments. EDMS includes default values for mixing heights, aircraft to engine assignments, aircraft to GSE/ Aerospace Ground Equipment (ASE) assignments, and time in LTO modes. It also includes the latest aircraft engine emission factors from the International Civil Aviation Organization (ICAO) Engine Exhaust Emissions Data Bank, vehicle emission factors from the EPA's MOBILE5a, and EPA-validated dispersion models. From these, estimates of the total annual HC emitted from each location can be obtained. Note, however, that not all engines have been tested for their emission factors. In these cases, mostly when dealing with helicopters, estimates for emissions were generated using a similar aircraft's emission factors.

LTOs for Anchorage, Fairbanks, and Juneau - A detailed discussion of contacts established to obtain information on LTOs is presented in the IPP in Appendix A. Detailed information on commercial airline activity is available for the large domestic carriers at each of the international airports in Anchorage and Fairbanks. Those data include LTOs by airline and airframe (e.g., 737-400, etc.) and are available from the Federal Aviation Administration. Detailed airframe information was also obtained for the major air force bases, namely, Elmendorf and Eielson AFB. On the other hand, data from Juneau International were limited to the number of LTOs on a monthly basis at the airport, with no specifics on aircraft or airframe types. In addition, the data for general aviation from smaller airstrips are less specific and in some cases only include annual LTOs, with no information on airframe type. Similar problems were encountered with LTO data obtained for air taxi and military activities at these smaller venues.

In cases where airframe data are not available for general aviation and air taxi aircraft, weighted average emission rates per LTO were obtained from EPA's *Procedures for Emission Inventory Preparation* (1992) and used to estimate emissions. However, no similar option was available for military aircraft. To address this problem, emission estimates were made using military helicopter emission factors and representative aircraft emission factors. Where no airframe data were available for the military fleet, emission factors for a military helicopter, a Sikorsky SH-3E, were used. It was assumed that the majority of the 23 annual military LTOs from this field were helicopter flights, and the SH-3E's engine (T58-GE-5) was the most common engine used in military turbine helicopters. The same emission factors were used to represent the helicopter fleet from Fort Wainwright, which had airframe data, but no emission factors were available for those engines. Lastly, emissions from the military fleet at Juneau International were estimated using the emission factors for C-130 aircraft. In general, when detailed engine/airframe data

were not available for military aircraft, it was assumed that turbine powered helicopters were the primary source of activity.

HC Results - The resulting HC emission levels found for each community are summarized in Table C-1-2. For each city, the emissions are organized according to aircraft category and engine type (i.e., turbines or pistons).

Table C-1-2

HC Emission Levels in Tons per Year

Aircraft Category*	ANCHORAGE		FAIRBANKS		JUNEAU	
	Turbines	Pistons	Turbines	Pistons	Turbines	Pistons
Commercial Jets/ Air Carriers	422.11	---	17.20	---	5.07	---
Air Taxis	10.30	43.38	4.12	7.78	22.42	42.36
General Aviation	1.99	32.84	0.22	3.60	56.59	6.10
Military Aircraft	100.28	0.01	197.62	0.03	6.68	0.05

* In some cases, data for air taxis and general aviation were reported together. In these cases, the total was categorized as air taxis.

As shown above, the highest levels of HC at about 422 tons per year can be found from commercial jets or air carriers in Anchorage, most of which are from the Anchorage International Airport (ANC). With ANC having the highest 1999 activity levels in the airports studied, its commercial jet HC level is almost 25 times that of Fairbanks and more than 80 times that of Juneau. A closer look at the corresponding airport activities showed that ANC had much higher activity levels for jumbo jets such as A-300s and L-1011s compared to both Fairbanks and Juneau. The majority of commercial jets or air carriers that operated out of Fairbanks International (FAI) and Juneau International (JNU) airports were smaller, medium-range jets such as B-727s and B-737s. A comparison between the emission factors of jumbo jets and medium-range jets shows that HC emissions from jumbo jets are more than 15 times higher than those from medium range jets.

Toxics Fractions

As noted above, the calculation of air toxics is performed by applying a “toxics fraction” to hydrocarbon emissions. For example, if test data suggest that hydrocarbon exhaust from a piston engine aircraft contains 4.2% benzene, then the toxics fraction for benzene for that equipment type is 0.042. If the total exhaust hydrocarbon emissions for that source is determined to be 100 lbs per day, then the benzene inventory is calculated as:

$$\text{Benzene} = 100 \text{ lb/day HC} * 0.042 \text{ lb benzene/lb HC} = 4.2 \text{ lb/day}$$

Thus, once the aircraft hydrocarbon inventory was generated for each of the study areas, it was a simple matter to apply the appropriate toxics fractions to generate the toxics inventories.

The toxics fractions used for this study were based on those used to prepare the 1996 National Toxics Inventory,¹ which were developed by EPA's Office of Mobile Sources.² Because detailed toxics data on aircraft are not available, the compounds for which toxics fractions were developed by EPA are limited to the following:

1,3-Butadiene	POM as 7-PAH
Acetaldehyde	POM as 16-PAH
Acrolein	Propionaldehyde
Benzene	Styrene
Ethyl Benzene	Toluene
Formaldehyde	Xylene
n-Hexane	

Because the fuels and the exhaust emission characteristics of piston engines differ from turbine engines, EPA developed separate toxics fractions for each of these engine types. In addition, separate fractions were developed for commercial, air taxi, and general aviation aircraft. Although EPA generated toxics fractions based on TOG, those estimates were adjusted by Sierra (using EPA-derived TOG/THC ratios) so that the fractions used in this effort were based on THC. In that way, the toxics fractions could be applied directly to the THC output from the EDMS model. A summary of the toxics fractions used in this effort is contained in Table C-1-3. For the case of military aircrafts, commercial turbine and general aviation piston toxics fractions were used.

¹ "Documentation for the 1996 Base Year National Toxics Inventory for Aircraft Sources," Prepared by Eastern Research Group for the U.S. Environmental Protection Agency, September 30, 1999.

² "Source Identification and Base Year 1990 Emission Inventory Guidance for Mobile Source HAPs on the OAQPS List of 40 Priority HAPs," Memorandum from Rich Cook (U.S. Environmental Protection Agency) to Anne Pope (U.S. Environmental Protection Agency), June 11, 1997.

Table C-1-3

Toxics Fractions Used for Aircraft Emissions

Compound	Basis	Commercial Turbine	Air Taxis		General Aviation	
			Turbine	Piston	Turbine	Piston
1,3-Butadiene	THC	0.022005	0.017661	0.010433	0.017295	0.010216
Acetaldehyde	THC	0.056815	0.048596	0.006601	0.047589	0.006463
Acrolein	THC	0.027696	0.023173	0.000639	0.022693	0.000625
Benzene	THC	0.023717	0.020136	0.043116	0.019719	0.042217
Ethylbenzene	THC	0.002078	0.001687	0.015650	0.001652	0.015323
Formaldehyde	THC	0.183497	0.159061	0.028638	0.155766	0.028041
n-Hexane	THC	0.000000	0.000000	0.007452	0.000000	0.007297
POM as 16-PAH	THC	0.000128	0.000068	0.000068	0.000029	0.000029
POM as 7-PAH	THC	0.000001	0.000007	0.000007	0.000009	0.000009
Propionaldehyde	THC	0.011614	0.010124	0.000639	0.009914	0.000625
Styrene	THC	0.004817	0.004162	0.003620	0.004076	0.003544
Toluene	THC	0.006357	0.005512	0.110718	0.005398	0.108410
Xylene	THC	0.005868	0.004950	0.062386	0.004847	0.061085

In addition to the compounds listed above, lead (Pb) emissions were estimated in this effort. Those estimates were prepared only for aircraft equipped with piston engines, because tetra-ethyl lead is added to aviation gasoline. Based on the 100LL specification, it was assumed that aviation gasoline used in Alaska contains 2 grams of lead per gallon of fuel. Based on CRC data, aviation gasoline has a density of about 720 kg/m³, so the mass fraction of lead in aviation gasoline is:

$$\text{Mass}_{\text{Avgas}} = 1 \text{ gal} * 0.0037854 \text{ m}^3/\text{gal} * 720,000 \text{ g/m}^3 = 2,725 \text{ g}$$

$$x_{\text{Pb}} = 2 \text{ g Pb} / \text{gal Avgas} = 2 \text{ g Pb} / 2725 \text{ g Avgas} = 0.00073$$

It was assumed that all of the lead in aviation gasoline is emitted in the exhaust gas stream. Unfortunately, the EDMS model does not report fuel consumption estimates. As a result, it was not possible to apply the mass fraction of lead in gasoline (i.e., 0.00073) to the fuel usage. However, SO₂ emissions are calculated by the model, and those estimates are based on fuel usage. The model assumes that aviation gasoline has a fuel sulfur content of 0.006 wt%, which is a mass fraction of 0.00006 (or 60 ppm). Thus, if the model calculates SO₂ emissions to be 10 kg from a particular set of aircraft, then the fuel usage would have been:

$$\text{Fuel}_{10 \text{ kg SO}_2} = [10 \text{ kg SO}_2 * (32 \text{ kg S}/64 \text{ kg SO}_2)] / 0.00006 = 83,333 \text{ kg}$$

and the lead emissions would then be:

$$\text{Pb}_{10 \text{ kg SO}_2} = 83,333 \text{ kg Fuel} * 0.00073 \text{ kg Pb/ kg Fuel} = 60.8 \text{ kg}$$

Thus, the Pb/SO₂ ratio is:

$$\text{Pb/SO}_2 = 60.8/10 = 6.08$$

and lead emissions can be estimated from SO₂ emissions simply by multiplying the SO₂ emissions by 6.08.

Toxics Results

Anchorage - Table C-1-4 shows the HAP levels estimated for the city of Anchorage for calendar year 1999. As indicated, commercial aircraft make up 66% of the toxics inventory in Anchorage at about 145 tons per year. The highest total levels were obtained from formaldehyde at about 100 tons per year, which is 45% of the total inventory, followed by acetaldehyde at nearly 31 tons per year.

Table C-1-4

1999 Toxics Levels in Tons per Year in Anchorage

Hazardous Air Pollutants	Commercial	Air Taxi		Gen. Aviation		Military		HAP Total
Chemical Name	Turbine	Turbine	Piston	Turbine	Piston	Turbine	Piston	
1,3-Butadiene	9.289	0.182	0.453	0.034	0.336	2.207	9.19E-05	12.500
Acetaldehyde	23.982	0.501	0.286	0.095	0.212	5.697	5.82E-05	30.774
Acrolein	11.691	0.239	0.028	0.045	0.021	2.777	5.63E-06	14.800
Benzene	10.011	0.207	1.871	0.039	1.387	2.378	3.80E-04	15.894
Ethyl benzene	0.877	0.017	0.679	0.003	0.503	0.208	1.38E-04	2.289
Formaldehyde	77.456	1.639	1.242	0.310	0.921	18.401	2.52E-04	99.970
Hexane	0.000	0.000	0.323	0.000	0.240	0.000	6.57E-05	0.563
Lead	0.000	0.000	9.880	0.000	5.068	0.000	0.000	14.948
Polycyclic Organic Matter	0.054	0.001	0.003	5.70E-05	0.001	0.013	2.58E-07	0.071
Propionaldehyde	4.902	0.104	0.028	0.020	0.021	1.165	5.63E-06	6.239
Styrene	2.033	0.043	0.157	0.008	0.116	0.483	3.19E-05	2.841
Toluene	2.683	0.057	4.803	0.011	3.560	0.637	9.76E-04	11.753
Xylenes (isomers and mixture)	2.477	0.051	2.707	0.010	2.006	0.588	5.50E-04	7.839
TOTAL	145.455	3.041	22.460	0.575	14.391	34.556	2.55E-03	220.481

Fairbanks - The resulting toxics inventory from Fairbanks is shown below in Table C-1-5. Unlike Anchorage, turbine-powered military aircraft emissions make up the majority of the inventory at 68 tons per year (84%). The toxic pollutants emitted from commercial air carrier application make up only 7% of the total inventory as compared to 66% in Anchorage, which reflects the lower commercial activity level in Fairbanks. Likewise, formaldehyde occurs at the highest total levels at about 42 tons per year (49%), followed again by acetaldehyde at about 13 tons per year.

Table C-1-5

1999 Toxics Levels in Tons per Year in Fairbanks

Hazardous Air Pollutants	Commercial	Air Taxi		Gen. Aviation		Military		HAP Total
	Turbine	Turbine	Piston	Turbine	Piston	Turbine	Piston	
1,3-Butadiene	0.378	0.073	0.081	0.004	0.037	4.349	3.27E-04	4.922
Acetaldehyde	0.977	0.200	0.051	0.010	0.023	11.227	2.07E-04	12.490
Acrolein	0.476	0.095	0.005	0.005	0.002	5.473	2.00E-05	6.057
Benzene	0.408	0.083	0.336	0.004	0.152	4.687	1.35E-03	5.671
Ethyl benzene	0.036	0.007	0.122	0.000	0.055	0.411	4.90E-04	0.631
Formaldehyde	3.155	0.655	0.223	0.034	0.101	36.262	8.97E-04	40.431
Hexane	0.000	0.000	0.058	0.000	0.026	0.000	2.33E-04	0.085
Lead	0.000	0.000	0.783	0.000	1.488	0.000	0.013	2.284
Polycyclic Organic Matter	0.002	2.79E-04	0.001	6.24E-06	1.03E-04	0.025	9.16E-07	0.028
Propionaldehyde	0.200	0.042	0.005	0.002	0.002	2.295	2.00E-05	2.546
Styrene	0.083	0.017	0.028	0.001	0.013	0.952	1.13E-04	1.094
Toluene	0.109	0.023	0.862	0.001	0.391	1.256	3.47E-03	2.645
Xylenes (isomers and mixture)	0.101	0.020	0.485	0.001	0.220	1.160	1.95E-03	1.989
TOTAL	5.925	1.216	3.039	0.063	2.511	68.096	2.22E-02	80.872

Juneau - The estimated 1999 toxics inventory for Juneau is summarized in Table C-1-6. As an indication of the activity level distribution in Juneau, commercial operations account for only about 4% of the total toxics inventory. In contrast to both Anchorage and Fairbanks, the highest activity level and thus main source of toxic air pollutants are turbine general aviation helicopters. These helicopters that tour the ice fields contribute to about 16 tons per year, or 36% of the total inventory. Of the total toxics inventory, about 35% is formaldehyde, with the highest toxics level at about 16 tons per year, followed by toluene at almost 6 tons per year.

Table C-1-6

1999 Toxics Levels in Tons per Year in Juneau

Hazardous Air Pollutants Chemical Name	Commercial	Air Taxi		Gen. Aviation		Military		HAP Total
	Turbine	Turbine	Piston	Turbine	Piston	Turbine	Piston	
1,3-Butadiene	0.112	0.396	0.442	0.979	0.062	0.147	5.52E-04	2.138
Acetaldehyde	0.288	1.090	0.280	2.693	0.039	0.379	3.49E-04	4.770
Acrolein	0.141	0.520	0.027	1.284	0.004	0.185	3.38E-05	2.160
Benzene	0.120	0.451	1.826	1.116	0.258	0.158	2.28E-03	3.932
Ethyl benzene	0.011	0.038	0.663	0.094	0.093	0.014	8.27E-04	0.913
Formaldehyde	0.931	3.566	1.213	8.815	0.171	1.225	1.51E-03	15.923
Hexane	0.000	0.000	0.316	0.000	0.045	0.000	3.94E-04	0.361
Lead	0.000	0.000	3.131	0.000	0.941	0.000	0.017	4.089
Polycyclic Organic Matter	0.001	0.002	0.003	0.002	1.75E-04	0.001	1.55E-06	0.008
Propionaldehyde	0.059	0.227	0.027	0.561	0.004	0.078	3.38E-05	0.955
Styrene	0.024	0.093	0.153	0.231	0.022	0.032	1.91E-04	0.556
Toluene	0.032	0.124	4.690	0.305	0.661	0.042	5.85E-03	5.861
Xylenes (isomers and mixture)	0.030	0.111	2.643	0.274	0.373	0.039	3.30E-03	3.473
TOTAL	1.748	6.617	15.414	16.353	2.673	2.301	3.24E-02	45.139

Uncertainties and Recommended Improvements

HC Inventory - One key uncertainty is the distribution of LTOs by aircraft type for different aircraft categories at smaller airstrips and at Juneau International. As noted above, no data are currently available for general aviation, air taxis, and military operations from these facilities except for the annual number of LTOs. In addition, the inventory should be improved as more engine emission factor data become available.

Toxics Fractions - Because test data are extremely limited, the toxics fractions are generally subject to large uncertainties for this category of nonroad sources. However, there is very little that can be done within the framework of this study to reduce those uncertainties. One area that could be investigated, however, is the lead fraction. Although the 100LL specification sets a maximum lead content of 2 grams per gallon, there is no guarantee that the maximum is seen in the field. Thus, some effort should be devoted to better characterizing aviation gasoline in Alaska before the toxics inventories are finalized.

APPENDIX C-2

Air Toxics from Locomotives

Appendix C-2

Estimation of Air Toxics from Locomotives

As with the nonroad mobile source toxics inventories developed in this effort, hazardous air pollutants (HAPs) from railroad operations were estimated by first generating inventories for hydrocarbon (HC) emissions. Once the HC emission inventories were developed, estimates of the percentage of each toxic compound of interest in the total HC emissions from aircraft were applied to the HC emission inventories to generate toxics estimates. Those percentages, or "toxics fractions," were compiled primarily from data that EPA developed for use in the 1996 National Toxics Inventory. As described in the Inventory Preparation Plan for Toxic Emissions, railroad emission estimates have been prepared for calendar year 1999 for the communities of Anchorage and Fairbanks. Locomotive fuel consumption in these communities was provided by the Alaska Railroad Corporation (ARRC).

HC Emissions Estimates

In its simplest form, an emission inventory is the product of an emission factor (e.g., grams of HC per mile, lb of HC per 1000 lbs of fuel, etc.) and a measure of equipment activity (e.g., miles driven, gallons of fuel used, etc.). In the case of locomotive emissions, activity is based on gallons of fuel used. Emission factors are in units of lbs of HC per gallons of fuel used. Separate emission factors are available for line-haul and switching (or yard) operation. AP-42 is the source of the emission factors.

Requests for locomotive fuel consumption data were submitted to the ARRC, who responded with estimates of fuel consumed by locomotive type in each community. Estimates of yard operation fuel consumption were based on the number of shifts worked and gallons consumed per shift by locomotive type. Estimates of line-haul fuel consumption were based on estimates of ton miles traveled within the boundaries of the community and gallons of fuel consumed per ton-mile of operation. Fuel use was estimated to be 1,141,000 gallons per year in Anchorage and 962,000 per year in Fairbanks. When these values were combined with the emission factors from AP-42, HC emissions were estimated to be 17.5 tons per year in Anchorage and 16.1 tons per year in Fairbanks.

Toxics Fractions

As noted above, the calculation of air toxics is performed by applying a toxics fraction to hydrocarbon emissions (in the case of organic species) or particulate emissions (in the case of metallic compounds). For example, if test data suggest that hydrocarbon exhaust from a locomotive contains 0.9% benzene, then the toxics fraction for benzene for that equipment type is 0.009. If the total exhaust hydrocarbon emissions for that source is determined to be 100 lbs per day, then the benzene inventory is calculated as:

$$\text{Benzene} = 100 \text{ lb/day HC} * 0.009 \text{ lb benzene/lb HC} = 0.9 \text{ lb/day}$$

Thus, once the locomotive hydrocarbon and particulate inventories were generated for each of the study areas, it was a simple matter to apply the appropriate toxics fractions to prepare the toxics inventories.

The toxics fractions used for this study were based on those used to prepare the 1996 National Toxics Inventory,^{*} which were developed by EPA's Office of Mobile Sources.^{**} Because detailed toxics data on locomotives are not available, the compounds for which toxics fractions were developed by EPA are limited to the following:

Acrolein	Xylene
Ethylbenzene	Arsenic
n-Hexane	Chromium
Propionaldehyde	Manganese
Styrene	Nickel
Toluene	

In addition to the compounds listed above, estimates were also prepared for benzene, formaldehyde, and acetaldehyde, which are compounds typically emitted from Diesel engines. Although no toxics fractions specific to locomotives for these compounds are available from the documentation prepared for the National Toxics Inventory, Sierra used data available on large stationary Diesel engines to serve as a surrogate for locomotive engines. These estimates were obtained from EPA's AP-42 emission factor series.^{*} A summary of the toxics fractions used to generate the toxics emission inventories for this study is contained in Table C-2-1

^{*}"Documentation for the 1996 Base Year National Toxics Inventory for Commercial Marine Vessel and Locomotive Mobile Sources," Prepared by Eastern Research Group for the U.S. Environmental Protection Agency, September 30, 1999.

^{**}"Source Identification and Base Year 1990 Emission Inventory Guidance for Mobile Source HAPs on the OAQPS List of 40 Priority HAPs," Memorandum from Rich Cook (U.S. Environmental Protection Agency) to Anne Pope (U.S. Environmental Protection Agency), June 11, 1997.

^{*}"Compilation of Air Pollutant Emission Factors. Volume I: Stationary Point and Area Sources," Fifth Edition, U.S. Environmental Protection Agency, January 1995.

Toxics Results

A summary of the 1999 toxic emission levels for locomotives is presented in Tables C-2-2 for Anchorage and Table C-2-3 for Fairbanks.

**Table C-2-1
Toxics Fractions Used for Locomotive Mobile Sources**

Compound	Basis	Locomotive Diesel-Electrics	Source
Acrolein	VOC	0.00350	1996 NTI
Ethylbenzene	VOC	0.00200	1996 NTI
n-Hexane	VOC	0.00550	1996 NTI
Propionaldehyde	VOC	0.00610	1996 NTI
Styrene	VOC	0.00210	1996 NTI
Toluene	VOC	0.00320	1996 NTI
Xylene	VOC	0.00480	1996 NTI
Arsenic	PM10	3.57E-07	1996 NTI
Chromium	PM10	3.27E-06	1996 NTI
Manganese	PM10	2.04E-06	1996 NTI
Nickel	PM10	6.55E-06	1996 NTI
Benzene	VOC	0.00860	AP-42 ^a
Formaldehyde	VOC	0.00088	AP-42 ^a
Acetaldehyde	VOC	0.00028	AP-42 ^a

^a Toxics fraction for benzene, formadehyde, and acetaldehyde were compiled from AP-42 estimates for stationary Diesel engines.

Table C-2-2
Summary of 1999 Locomotive Mobile Toxic Emissions Inventory
for Anchorage

Compound	Basis	Toxic Emission Total
Acetaldehyde	VOC	5.16E-03
Acrolein	VOC	6.45E-02
Arsenic Compounds (inorganic including arsine)	PM10	2.51E-06
Benzene (including benzene from gasoline)	VOC	1.58E-01
Chromium Compounds	PM10	2.30E-05
Ethyl benzene	VOC	3.68E-02
Formaldehyde	VOC	1.62E-02
Hexane	VOC	1.01E-01
Manganese Compounds	PM10	1.43E-05
Nickel Compounds	PM10	4.60E-05
Propionaldehyde	VOC	1.12E-01
Styrene	VOC	3.87E-02
Toluene	VOC	5.90E-02
Xylenes (isomers and mixture)	VOC	8.84E-02

Table C-2-3
Summary of 1999 Locomotive Mobile Toxic Emissions Inventory
for Fairbanks

Compound	Basis	Toxic Emission Total
Acetaldehyde	VOC	4.74E-03
Acrolein	VOC	5.93E-02
Arsenic Compounds (inorganic including arsine)	PM10	6.05E-06
Benzene (including benzene from gasoline)	VOC	1.46E-01
Chromium Compounds	PM10	5.54E-05
Ethyl benzene	VOC	3.39E-02
Formaldehyde	VOC	1.49E-02
Hexane	VOC	9.32E-02
Manganese Compounds	PM10	3.46E-05
Nickel Compounds	PM10	1.11E-04
Propionaldehyde	VOC	1.03E-01
Styrene	VOC	3.56E-02
Toluene	VOC	5.42E-02
Xylenes (isomers and mixture)	VOC	8.13E-02

Uncertainties and Recommended Improvements

VOC and PM10 Inventory – The emission factors are the principal source of uncertainty in the estimates presented. That is because the values in AP-42 are dated and EPA has been actively pursuing new controls for locomotives. As a result, the values employed in recent EPA locomotive rulemakings should be examined to see if more specific and updated estimates are available to characterize equipment that is currently operating in Alaska.

Toxics Fractions - Because test data are extremely limited, the toxics fractions are generally subject to large uncertainties for this category of nonroad sources. However, there is very little that can be done within the framework of this study to reduce those uncertainties.

APPENDIX C-3

Air Toxics from Commercial Marine Vessels

Appendix C-3

Estimation of Air Toxics from Commercial Marine Vessels

Commercial marine vessel (CMV) activity occurs in the port communities of Juneau and Anchorage. CMV traffic is summer-peaking in Juneau due to significant tourism-related cruise ship activity. Juneau also has year-round ferry and barge traffic. The Port of Anchorage does not have significant cruise ship activity, but does have steady year-round cargo and bulk fuel shipping operations. Fairbanks is inland with insignificant CMV traffic on the Chena and Tanana Rivers.

HAP emission factors from commercial marine vessels are not readily available. A study of CMV fuel use was conducted for EPA, which developed curves for distillate fuel use for various ship sizes and operating scenarios. Using the assumption that marine engines have similar emissions characteristics to stationary diesel engines, emissions can be estimated from information about ship size and number of port calls. There are a few ships operating in the study area that burn residual fuel in boilers for steam turbines. Fuel use and emissions for these boilers was assumed to be similar to stationary boilers, so that emissions may be calculated from the size of the ship powerplant along with the number of port calls. A typical ship powerplant size was estimated for cruise ships based on industry estimates and for ferries based on publicly available information. Information on the powerplants for the primary cargo ships using the Port of Anchorage were obtained from the ship operators.

For Juneau, the 1999 cruise ship and ferry schedules are in the public domain, and total emissions were estimated based on typical ship size. Port of Anchorage emission estimates are based on information provided by the two largest cargo ship operators on the total number of port calls for their respective vessels. Tanker and barge traffic are from actual 1995 data from EPA's Commercial Marine Activity for Deep Sea Ports in the U.S. (September 1999).

Commercial Marine Vessels - Port of Anchorage

Port of Anchorage - CSX Lines	Port of Anchorage - TOTE	Port of Anchorage - Tankers	Port of Anchorage - Barges
Activity Data Input: 230,886 gallons	Activity Data Input: 344,268 gallons	Activity Data Input: 284,664 gallons	Activity Data Input: 234,411 gallons
Activity Period/Year: 1999 Year	Activity Period/Year: 1999 Year	Activity Period/Year: 1995 Year	Activity Period/Year: 1995 Year

Section 112 Hazardous Air Pollutants			Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		All Categories
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Emissions
35	75070	Acetaldehyde	2.52E-05 lb/MMBtu	3.99E-04 tpy					2.52E-05 lb/MMBtu	4.05E-04 tpy	8.03E-04 tpy
39	107028	Acrolein	7.88E-06 lb/MMBtu	1.25E-04 tpy					7.88E-06 lb/MMBtu	1.27E-04 tpy	2.51E-04 tpy
45	N/A	Antimony Compounds			5.25E-03 lb/Mgal	9.04E-04 tpy	5.25E-03 lb/Mgal	7.47E-04 tpy			1.65E-03 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)			1.32E-03 lb/Mgal	2.27E-04 tpy	1.32E-03 lb/Mgal	1.88E-04 tpy			4.15E-04 tpy
48	71432	Benzene (including benzene from gasoline)	7.76E-04 lb/MMBtu	1.23E-02 tpy	2.14E-04 lb/Mgal	3.68E-05 tpy	2.14E-04 lb/Mgal	3.05E-05 tpy	7.76E-04 lb/MMBtu	1.25E-02 tpy	2.48E-02 tpy
52	N/A	Beryllium Compounds			2.78E-05 lb/Mgal	4.79E-06 tpy	2.78E-05 lb/Mgal	3.96E-06 tpy			8.74E-06 tpy
58	N/A	Cadmium Compounds			3.98E-04 lb/Mgal	6.85E-05 tpy	3.98E-04 lb/Mgal	5.66E-05 tpy			1.25E-04 tpy
75	N/A	Chromium Compounds			8.45E-04 lb/Mgal	1.45E-04 tpy	8.45E-04 lb/Mgal	1.20E-04 tpy			2.66E-04 tpy
76	N/A	Cobalt Compounds			6.02E-03 lb/Mgal	1.04E-03 tpy	6.02E-03 lb/Mgal	8.57E-04 tpy			1.89E-03 tpy
99	100414	Ethyl benzene			6.36E-05 lb/Mgal	1.09E-05 tpy	6.36E-05 lb/Mgal	9.05E-06 tpy			2.00E-05 tpy
109	5000	Formaldehyde	7.89E-05 lb/MMBtu	1.25E-03 tpy	3.30E-02 lb/Mgal	5.68E-03 tpy	3.30E-02 lb/Mgal	4.70E-03 tpy	7.89E-05 lb/MMBtu	1.27E-03 tpy	1.29E-02 tpy
124	N/A	Lead Compounds			1.51E-03 lb/Mgal	2.60E-04 tpy	1.51E-03 lb/Mgal	2.15E-04 tpy			4.75E-04 tpy
127	N/A	Manganese Compounds			3.00E-03 lb/Mgal	5.16E-04 tpy	3.00E-03 lb/Mgal	4.27E-04 tpy			9.43E-04 tpy
128	N/A	Mercury Compounds			1.13E-04 lb/Mgal	1.95E-05 tpy	1.13E-04 lb/Mgal	1.61E-05 tpy			3.55E-05 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)			2.36E-04 lb/Mgal	4.06E-05 tpy	2.36E-04 lb/Mgal	3.36E-05 tpy			7.42E-05 tpy
145	91203	Naphthalene	1.30E-04 lb/MMBtu	2.06E-03 tpy	1.13E-03 lb/Mgal	1.95E-04 tpy	1.13E-03 lb/Mgal	1.61E-04 tpy	1.30E-04 lb/MMBtu	2.09E-03 tpy	4.50E-03 tpy
146	N/A	Nickel Compounds			8.45E-02 lb/Mgal	1.45E-02 tpy	8.45E-02 lb/Mgal	1.20E-02 tpy			2.66E-02 tpy
162	N/A	Polycyclic Organic Matter	2.12E-04 lb/MMBtu	3.35E-03 tpy	1.30E-03 lb/Mgal	2.24E-04 tpy	1.30E-03 lb/Mgal	1.85E-04 tpy	2.12E-04 lb/MMBtu	3.40E-03 tpy	7.17E-03 tpy
171	N/A	Selenium Compounds			6.83E-04 lb/Mgal	1.18E-04 tpy	6.83E-04 lb/Mgal	9.72E-05 tpy			2.15E-04 tpy
176	108883	Toluene	2.81E-04 lb/MMBtu	4.44E-03 tpy	6.20E-03 lb/Mgal	1.07E-03 tpy	6.20E-03 lb/Mgal	8.82E-04 tpy	2.81E-04 lb/MMBtu	4.51E-03 tpy	1.09E-02 tpy
185	1330207	Xylenes (isomers and mixture)	1.93E-04 lb/MMBtu	3.05E-03 tpy	1.09E-04 lb/Mgal	1.88E-05 tpy	1.09E-04 lb/Mgal	1.55E-05 tpy	1.93E-04 lb/MMBtu	3.10E-03 tpy	6.19E-03 tpy
Total HAP Emissions			0.027 tpy		Total HAP Emissions	0.025 tpy	Total HAP Emissions	0.021 tpy	Total HAP Emissions	0.027 tpy	TOTAL 0.100 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.4-3 (diesel engines)
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data based on information obtained from CSX (see backup info).

Notes/Comments:

1. Reference: AP-42, Tables 1.3-8 and 1.3-10 (boilers)
2. Activity data based on information obtained from TOTE (see backup info).

Notes/Comments:

1. Reference: AP-42, Tables 1.3-8 and 1.3-10 (boilers)
2. Activity data based on information shown in backup spreadsheet.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3 (diesel engines)
2. Activity data based on information shown in backup spreadsheet.

Port of Anchorage Shipping Information and Activity Data

<u>Shipping Line/Item</u>	<u>Number of Port Calls</u>	<u>Duration of Activity (hr)</u>	<u>Estimated fuel Use (gal/hr)</u>	<u>TotalFuel Use (gal)</u>	<u>Comments/Assumptions</u>
TOTE - hoteling	131	12	105	165060	2.5 bbl/hr
TOTE - slow cruise	131	2	684	<u>179208</u>	fuel use: assume load is 40% of ship MRC of 30K hp; turbine efficiency 40%
			TOTAL FUEL USE	344268	Bunker C (residual); burned in ship's boilers to power steam turbine
CSX - hoteling	100	18	73	132159	fuel use: 250 g/kW-hr @ 1000 kW hoteling load
CSX - slow cruise	100	2	494	<u>98727</u>	fuel use: 250 g/kW-hr @ 40% of ship MRC of 22540 hp from Sierra Research
			TOTAL FUEL USE	230886	Diesel, burned in engines
All Tankers - hoteling	58	12	105	73080	2.5 bbl/hr
All Tankers - slow cruise	58	2	1824	<u>211584</u>	fuel use: assume load is 40% of ship MRC of 80K hp; turbine efficiency 40%
			TOTAL FUEL USE	284664	Bunker C (residual); burned in ship's boilers to power steam turbine
All Barges - hoteling	97	18	73	128194	fuel use: 250 g/kW-hr @ 1000 kW hoteling load
All Barges - slow cruise	97	2	548	<u>106217</u>	fuel use: 250 g/kW-hr @ 40% of approximate ship MRC of 25K hp from Sierra Research
			TOTAL FUEL USE	234411	Diesel, burned in tug boat engines

TOTE Info obtained

1. TOTE operates three identical container ships on the Tacoma-Anchorage route. Total displacement of each ship is 32,000 long tons
2. TOTE may 131 port calls in 1999 (3 per week from about 4/15 - 10/1; 2 per week otherwise)
3. An average stay at berth in Anchorage is 12 hours
4. The time it takes to cast off and reach the shoal is about 1 hour; same incoming from the shoal to berth
5. The powerplant consists of 30,000 HP (shaft) of steam turbine capacity burning Bunker C
6. While in port TOTE estimates that they use 2 to 3 bbl of fuel per hour

CSX Info obtained

1. From Eric Britten of CSX Lines. CSX is one of the two major cargo shippers at the Port of Anchorage, the other is Totem Ocean Trailer Express or TOTE.
2. CSX has 2 port calls per week for 50 weeks per year resulting in about 100 roundtrips. They have three vessels on the Anchorage-Tacoma route all of which are identical. They are powered by diesel IC engines rated at 22,540 HP.
3. Eric says that the CSX vessels typically arrive in the middle of the night, unload beginning at 7 am, and are ready to depart late in the evening (no later than midnight). Thus, a reasonable estimate of time in port is about 18 hours.

Other notes:

1. The fuel consumption rate of 250 g/kW-hr is from Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data, Figure 4-17 (Sierra Research, 1999) This value is the average rate of consumption for engines operating between 20-80% load.
2. The hoteling load of 1000 kW is from Table 4-6 of the same document. This value is an estimate for all commercial marine vessels except passenger vessels, where the expected hoteling load is 5000 kW
3. Tanker and barge traffic estimated from EPA's Commercial Marine Activity for Deep Sea Ports in the U.S. (9/99)
4. Based on Deep Sea Port document Cruise ship activity in Anchorage is less than 2% of total traffic and was not included.

Commercial Marine Vessels - Port of Juneau

Port of Juneau - All Cruise Ships	Port of Juneau - Marine Highway Ferry	Port of Juneau - All Barges
Activity Data Input: 2,886,432 gallons	Activity Data Input: 549,723 gallons	Activity Data Input: 362,492 gallons
Activity Period/Year: 1999 Year	Activity Period/Year: 2000 Year	Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Source Category Emission Calculations		Total - All
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Emissions</u>	<u>Emission Factor</u>	<u>Emissions</u>	<u>Emission Factor</u>	<u>Emissions</u>	<u>Emissions</u>
35	75070	Acetaldehyde	2.52E-05 lb/MMBtu	4.98E-03 tpy	2.52E-05 lb/MMBtu	9.49E-04 tpy	2.52E-05 lb/MMBtu	6.26E-04 tpy	6.56E-03 tpy
39	107028	Acrolein	7.88E-06 lb/MMBtu	1.56E-03 tpy	7.88E-06 lb/MMBtu	2.97E-04 tpy	7.88E-06 lb/MMBtu	1.96E-04 tpy	2.05E-03 tpy
48	71432	Benzene (including benzene from gasolin	7.76E-04 lb/MMBtu	1.53E-01 tpy	7.76E-04 lb/MMBtu	2.92E-02 tpy	7.76E-04 lb/MMBtu	1.93E-02 tpy	2.02E-01 tpy
109	5000	Formaldehyde	7.89E-05 lb/MMBtu	1.56E-02 tpy	7.89E-05 lb/MMBtu	2.97E-03 tpy	7.89E-05 lb/MMBtu	1.96E-03 tpy	2.05E-02 tpy
145	91203	Naphthalene	1.30E-04 lb/MMBtu	2.57E-02 tpy	1.30E-04 lb/MMBtu	4.90E-03 tpy	1.30E-04 lb/MMBtu	3.23E-03 tpy	3.38E-02 tpy
162	N/A	Polycyclic Organic Matter	2.12E-04 lb/MMBtu	4.19E-02 tpy	2.12E-04 lb/MMBtu	7.98E-03 tpy	2.12E-04 lb/MMBtu	5.26E-03 tpy	5.52E-02 tpy
176	108883	Toluene	2.81E-04 lb/MMBtu	5.56E-02 tpy	2.81E-04 lb/MMBtu	1.06E-02 tpy	2.81E-04 lb/MMBtu	6.98E-03 tpy	7.31E-02 tpy
185	1330207	Xylenes (isomers and mixture)	1.93E-04 lb/MMBtu	3.82E-02 tpy	1.93E-04 lb/MMBtu	7.27E-03 tpy	1.93E-04 lb/MMBtu	4.79E-03 tpy	5.02E-02 tpy
Total HAP Emissions			0.337 tpy		Total HAP Emissions	0.064 tpy	Total HAP Emissions	0.042 tpy	TOTAL 0.44 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.4-3 (diesel engines)
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data based on information shown in backup spreadsheet.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3 (diesel engines)
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data based on information shown in backup spreadsheet.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3 (diesel engines)
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data based on information shown in backup spreadsheet.

Port of Juneau Information and Activity Data

<u>Shipping Line/Item</u>	<u>Number of Port Calls</u>	<u>Duration of Activity (hr)</u>	<u>Estimated fuel Use (gal/hr)</u>	<u>TotalFuel Use (gal)</u>	<u>Comments/Assumptions</u>
All Cruise Ships - hoteling	543	10	367	1993392	fuel use: 250 g/kW-hr @ 5000 kW hoteling load
All Cruise Ships - slow cruise	543	2	822	<u>893040</u>	fuel use: 250 g/kW-hr @ 40% of ship MRC of 28,000 kW
			TOTAL FUEL USE	2886432	Diesel, burned in engines
Marine Highway Ferry - hoteling	692	6	73	304846	fuel use: 250 g/kW-hr @ 1000 kW hoteling load
Marine Highway Ferry - slow cruise	692	2	177	<u>244877</u>	fuel use: 250 g/kW-hr @ 40% of ship average MRC of 8079 hp from Sierra Rese
			TOTAL FUEL USE	549723	Diesel, burned in engines
All Barges - hoteling	150	18	73	198238	fuel use: 250 g/kW-hr @ 1000 kW hoteling load
All Barges - slow cruise	150	2	548	<u>164254</u>	fuel use: 250 g/kW-hr @ 40% of approximate ship MRC of 25K hp from Sierra R
			TOTAL FUEL USE	362492	Diesel, burned in tug boat engines

Other notes:

1. The fuel consumption rate of 250 g/kW-hr is from Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data, Figure 4-17 (Sierra Research, 1999)
This value is the average rate of consumption for engines operating between 20-80% load.
2. The cruise ship hoteling load of 5000 kW is from Table 4-6 of the same document, and is an estimate for all passenger ships.
3. The cruise ship kW rating is an estimated average value obtained from Dave Eley.
4. Slow cruise refers to total estimated arrival and departure time within municipality waters.
5. Cruise ship port time is average based on examination of 2000 calendar.
6. Average Ferry characteristics derived from AMHS 1998 Annual Traffic Volume Report and the AMHS Annual Financial Report 1997
7. Barge traffic estimated based on ADEC conversations with Alaska Marine Lines and Glacier Marine Transport

APPENDIX C-4

Air Toxics from Other Nonroad Mobile Sources

Appendix C-4

Estimation of Air Toxics from Nonroad Sources

The nonroad mobile source toxics inventories were developed by first generating inventories for hydrocarbon (HC) and particulate (PM₁₀) emissions using EPA's draft NONROAD model.^{*} This model calculates emissions from nonroad equipment, and categorizes them by technology type (i.e., gasoline, diesel, LPG, CNG, 2-stroke, and 4-stroke) and horsepower range. For purposes of this inventory, Sierra has combined the emissions from LPG and CNG sources (typically less than 1% of the total inventory) with those from 4-stroke equipment. The resulting HC and PM₁₀ estimates were then applied to "toxics fractions," which were, as previously noted, compiled primarily from data that EPA developed for use in the 1996 National Toxics Inventory. The resulting summer and winter emissions estimates were prepared for calendar year 1999 for the communities of Anchorage, Fairbanks, and Juneau, as described below.

EPA's NONROAD Model

The NONROAD model calculates tons of emissions for a given geographical area using the following factors:

- equipment population;
- an equipment-specific emission factor (in grams per horsepower-hour);
- the average horsepower rating of the equipment;
- the estimated annual equipment activity (hours per year);
- the average load factor for the given engine.

In addition, seasonal (month or season) and day of week (i.e., weekend vs. weekday) adjustments are applied depending on whether the end-user requests an inventory estimate expressed on an annual, seasonal, or daily basis. The equipment populations are based on national averages, and then scaled down to represent smaller geographic areas on the basis of human population and proximity to recreational, industrial, and commercial facilities.

HC and PM₁₀ Estimates

For purposes of this inventory, the Alaskan summer and winter are defined as April through September, and October through March, respectively. Therefore, Sierra performed modeling runs for each month of 1999, and combined the results according to the above definition to create the summer and winter inventories listed below.

^{*}U.S. EPA NONROAD Model, draft version 2.1, released December 1998.

HC and PM₁₀ Results - Table C-4-1 shows the summer and winter HC and PM₁₀ inventory for Anchorage, Fairbanks, and Juneau. This table also shows the relative contribution of each of the three major technology types (diesel, 2-stroke gasoline, and 4-stroke gasoline) to the total inventory. Not surprisingly, the majority of the HC emissions are from the relatively inefficient 2-stroke gasoline engines, while the majority of PM₁₀ emissions are from diesel engines. Tables C-4-2a through C-4-2f show the 25 highest sources of emissions for each of the three cities for each season. These tables show that generally one or two types of equipment (i.e., snowmobiles in the winter, outboard motors and personal watercraft in the summer) are responsible for the majority of the emissions for that season. However, the emissions from these key sources may be erroneously high due to the lack of accurate equipment population and activity data in the current version of the NONROAD model, as discussed below.

Toxics Fractions

As noted above, the calculation of air toxics is performed by applying a toxics fraction to either hydrocarbon emissions (in the case of organic species) or particulate emissions (in the case of metallic compounds). For example, if test data suggest that hydrocarbon exhaust from a leaf blower contains 2.5% benzene, then the toxics fraction for benzene for that equipment type is 0.025. If the total exhaust hydrocarbon emissions for that source is determined to be 25 lbs per day, then the benzene inventory is calculated as:

$$\text{Benzene} = 25 \text{ lb/day HC} * 0.025 \text{ lb benzene/lb HC} = 0.625 \text{ lb/day}$$

Thus, once the nonroad equipment hydrocarbon inventory was generated for each of the study areas, it was a simple matter to apply the appropriate toxics fractions to generate the toxics inventories.

The toxics fractions used for this study were based on those used to prepare the 1996 National Toxics Inventory,^{*} which were developed by EPA's Office of Mobile Sources.^{**} Because detailed toxics data on nonroad equipment and engines are not available, the compounds for which toxics fractions were developed by EPA are limited to the following:

^{*}"Documentation for the 1996 Base Year National Toxics Inventory for Nonroad Vehicle and Equipment Mobile Sources," Prepared by Eastern Research Group for the U.S. Environmental Protection Agency, September 30, 1999.

^{**}"Source Identification and Base Year 1990 Emission Inventory Guidance for Mobile Source HAPs on the OAQPS List of 40 Priority HAPs," Memorandum from Rich Cook (U.S. Environmental Protection Agency) to Anne Pope (U.S. Environmental Protection Agency), June 11, 1997.

**Table C-4-1
Relative Contribution of 2-Stroke, 4-Stroke, and Diesel Equipment
to 1999 Alaska Nonroad PM and VOC Emission Inventories**

Summer - 1999				
Anchorage				
Technology Types	Total VOC (tons)	Relative VOC Contribution (%)	Total PM10 (tons)	Relative PM10 Contribution (%)
2-Stroke	408.2	66.3%	14.6	22.2%
4-Stroke	354.5	57.5%	2.6	4.0%
Diesel	179.5	29.1%	134.1	203.4%
Totals	942.2	152.9%	151.3	229.6%
Fairbanks				
Technology Types	Total VOC (tons)	Relative VOC Contribution (%)	Total PM10 (tons)	Relative PM10 Contribution (%)
2-Stroke	438.9	46.6%	12.2	8.1%
4-Stroke	102.4	10.9%	0.6	0.4%
Diesel	74.8	7.9%	53.1	35.1%
Totals	616.1	65.4%	65.9	100.0%
Juneau				
Technology Types	Total VOC (tons)	Relative VOC Contribution (%)	Total PM10 (tons)	Relative PM10 Contribution (%)
2-Stroke	1,595.0	92.4%	83.3	78.7%
4-Stroke	102.1	5.9%	0.9	0.8%
Diesel	31.4	1.8%	21.6	20.4%
Totals	1,727.0	100.1%	105.7	100.0%

Winter - 1999				
Anchorage				
Technology Types	Total VOC (tons)	Relative VOC Contribution (%)	Total PM10 (tons)	Relative PM10 Contribution (%)
2-Stroke	244.1	35.2%	9.5	20.5%
4-Stroke	102.3	14.7%	0.9	1.9%
Diesel	95.2	13.7%	72.5	156.4%
Totals	441.5	63.7%	82.9	178.8%
Fairbanks				
Technology Types	Total VOC (tons)	Relative VOC Contribution (%)	Total PM10 (tons)	Relative PM10 Contribution (%)
2-Stroke	626.6	141.9%	15.9	19.2%
4-Stroke	24.9	5.6%	0.2	0.3%
Diesel	42.0	9.5%	30.2	36.4%
Totals	693.6	100.0%	46.3	100.0%
Juneau				
Technology Types	Total VOC (tons)	Relative VOC Contribution (%)	Total PM10 (tons)	Relative PM10 Contribution (%)
2-Stroke	437.1	94.2%	25.2	68.7%
4-Stroke	12.1	2.6%	0.1	0.3%
Diesel	14.7	3.2%	11.4	31.0%
Totals	463.8	100.0%	36.7	100.0%

Table C-4-2a
MOA NONROAD Winter 1999 Emissions Inventory - 25 Highest Sources

SCC	Equipment	Tech	Population	Activity (hrs/season)	Activity/unit (hrs/season)	PM-Exhaust (tons)	TOTAL VOC (tons)	Total Exh VOC (tons)	Exh VOC (tons)	% of Total VOC
2260004036	Snowblowers (com)	2-St	2,015	274,054	136.0	3.602	100.604	100.604	0.000	22.8%
2260007005	Logging Equipment Chain Saws > 6 HP	2-St	333	50,430	151.5	2.550	41.108	41.108	0.000	9.3%
2260001030	All Terrain Vehicles\Motorcycles	2-St	1,893	32,181	17.0	0.808	34.052	34.052	0.000	7.7%
2265006005	Generator Sets	4-St	3,405	195,786	57.5	0.226	32.214	32.214	0.000	7.3%
2260001020	Snowmobiles	2-St	20,297	10,148	0.5	0.501	21.093	21.093	0.000	4.8%
2260004035	Snowblowers (res)	2-St	6,834	54,673	8.0	0.719	20.074	20.074	0.000	4.5%
2265006030	Pressure Washers	4-St	1,583	91,009	57.5	0.119	15.216	15.216	0.000	3.4%
2270002066	Tractors/Loaders/Backhoes	Dsl	390	147,827	379.5	9.696	13.824	13.824	0.000	3.1%
2265004036	Snowblowers (com)	4-St	2,152	292,661	136.0	0.106	11.423	11.423	0.000	2.6%
2260006010	Pumps	2-St	353	38,997	110.5	0.431	10.903	10.903	0.000	2.5%
2270002072	Skid Steer Loaders	Dsl	487	133,231	273.5	7.074	10.471	10.471	0.000	2.4%
2270002060	Rubber Tire Loaders	Dsl	246	62,667	254.4	6.753	9.861	9.861	0.000	2.2%
2260002054	Concrete/Industrial Saws	2-St	79	15,949	201.4	0.533	8.959	8.959	0.000	2.0%
2270002036	Excavators	Dsl	159	58,114	365.1	5.132	8.706	8.706	0.000	2.0%
2265006010	Pumps	4-St	593	65,506	110.5	0.071	8.680	8.680	0.000	2.0%
2265006025	Welders	4-St	181	36,953	204.0	0.071	6.881	6.881	0.000	1.6%
2270008005	Airport Support Equipment	Dsl	145	53,097	366.0	4.695	6.621	6.621	0.000	1.5%
2270003060	AC\Refrigeration	Dsl	583	352,045	604.1	7.428	6.434	6.434	0.000	1.5%
2270002069	Crawler Tractor/Dozers	Dsl	240	74,980	312.9	4.913	5.416	5.416	0.000	1.2%
2265001030	All Terrain Vehicles\Motorcycles	4-St	5,913	100,526	17.0	0.042	4.703	4.703	0.000	1.1%
2265006015	Air Compressors	4-St	128	30,975	242.0	0.040	4.421	4.421	0.000	1.0%
2270002057	Rough Terrain Forklift	Dsl	132	29,297	221.3	2.407	3.323	3.323	0.000	0.8%
2270006005	Generator Sets	Dsl	326	55,081	169.0	2.524	3.290	3.290	0.000	0.7%
2260002006	Tampers/Rammers	2-St	181	9,688	53.5	0.194	3.168	3.168	0.000	0.7%
2270002051	Off-highway Trucks	Dsl	21	11,721	548.6	2.302	3.062	3.062	0.000	0.7%
						62.94	394.51	394.51	0.00	89.3%

Table C-4-2b
MOA NONROAD Summer 1999 Emissions Inventory - 25 Highest Sources

SCC	Equipment	Tech	Population	Activity (hrs/season)	Activity/unit (hrs/season)	PM-Exhaust (tons)	TOTAL VOC (tons)	Total Exh VOC (tons)	Exh VOC (tons)	% of Total VOC
2260004020	Chain Saws < 6 HP (res)	2-St	4,690	171,042	36	3.45	67.72	67.65	0.07	7.2%
2282005010	Outboard	2-St	9,818	4,172	0	0.35	66.05	6.02	60.03	7.0%
2265004010	Lawn mowers (res)	4-St	27,033	675,814	25	0.36	54.77	53.52	1.25	5.8%
2265004055	Lawn & Garden Tractors (res)	4-St	9,845	443,018	45	0.37	50.51	47.28	3.23	5.4%
2260001030	All Terrain Vehicles/Motorcycles	2-St	1,893	32,181	17	0.81	40.30	34.09	6.20	4.3%
2265004071	Commercial Turf Equipment (com)	4-St	463	315,916	682	0.38	40.15	39.91	0.25	4.3%
2260007005	Logging Equipment Chain Saws > 6 HP	2-St	333	50,430	152	2.48	40.09	39.93	0.16	4.3%
2260004026	Trimmers/Edgers/Brush Cutter (com)	2-St	911	124,820	137	1.64	38.60	38.59	0.01	4.1%
2260004031	Leafblowers/Vacuums (com)	2-St	354	99,837	282	1.76	36.40	36.40	0.00	3.9%
2282010005	Inboard/Stern Drive	4-St	2,053	872	0	0.00	35.03	0.18	34.85	3.7%
2265006005	Generator Sets	4-St	3,405	195,786	58	0.22	34.38	31.83	2.55	3.6%
2260004025	Trimmers/Edgers/Brush Cutter (res)	2-St	11,382	102,438	9	1.08	31.23	31.14	0.09	3.3%
2270002066	Tractors/Loaders/Backhoes	Dsl	390	294,321	756	19.80	28.47	28.47	0.00	3.0%
2282005015	Personal Water Craft	2-St	1,327	1,327	1	0.18	22.37	3.98	18.39	2.4%
2270002072	Skid Steer Loaders	Dsl	487	265,263	545	14.36	21.61	21.61	0.00	2.3%
2270002060	Rubber Tire Loaders	Dsl	246	124,769	507	13.76	20.33	20.33	0.00	2.2%
2260004030	Leafblowers/Vacuums (res)	2-St	5,775	57,750	10	0.70	19.91	19.86	0.05	2.1%
2270002036	Excavators	Dsl	159	115,704	727	10.58	18.13	18.13	0.00	1.9%
2260002054	Concrete/Industrial Saws	2-St	79	31,755	401	0.99	16.74	16.72	0.02	1.8%
2265006030	Pressure Washers	4-St	1,583	91,009	58	0.12	15.75	15.08	0.67	1.7%
2265004011	Lawn mowers (Com)	4-St	759	308,185	406	0.12	15.45	15.41	0.04	1.6%
2265004016	Rotary Tillers < 6 HP (com)	4-St	239	113,010	472	0.18	13.59	13.58	0.01	1.4%
2270002069	Crawler Tractor/Dozers	Dsl	240	149,285	623	9.97	11.05	11.05	0.00	1.2%
2260006010	Pumps	2-St	353	38,997	111	0.42	10.72	10.68	0.04	1.1%
2265004056	Lawn & Garden Tractors (com)	4-St	158	114,146	721	0.11	10.68	10.63	0.05	1.1%
						84.2	760.0	632.1	127.9	80.7%

Table C-4-2c
FNSB NONROAD Winter 1999 Emissions Inventory - 25 Highest Sources

SCC	Equipment	Tech	Population	Activity (hrs/season)	Activity/unit (hrs/season)	PM-Exhaust (tons)	TOTAL VOC (tons)	Total Exh VOC (tons)	Exh VOC (tons)	% of Total VOC
2260001020	Snowmobiles	2-St	10,491	251,787	24.0	13.663	575.583	575.583		83.0%
2282005010	Outboard	2-St	3,019	15,773	5.2	1.304	22.387	22.387		3.2%
2260001030	All Terrain Vehicles\Motorcycles	2-St	757	12,872	17.0	0.323	13.621	13.621		2.0%
2270009010	Other Underground Mining Equipment	Dsl	81	54,104	670.1	6.128	10.211	10.211		1.5%
2260004035	Snowblowers (res)	2-St	2,507	20,054	8.0	0.264	7.363	7.363		1.1%
2265006005	Generator Sets	4-St	723	41,600	57.5	0.048	7.233	7.233		1.0%
2270002066	Tractors/Loaders/Backhoes	Dsl	142	53,779	379.5	3.528	5.029	5.029		0.7%
2270002072	Skid Steer Loaders	Dsl	177	48,469	273.5	2.574	3.809	3.809		0.5%
2270002060	Rubber Tire Loaders	Dsl	90	22,798	254.4	2.457	3.588	3.588		0.5%
2265006030	Pressure Washers	4-St	336	19,337	57.5	0.025	3.438	3.438		0.5%
2260002054	Concrete/Industrial Saws	2-St	29	5,802	201.4	0.194	3.259	3.259		0.5%
2270002036	Excavators	Dsl	58	21,142	365.1	1.867	3.167	3.167		0.5%
2260006010	Pumps	2-St	75	8,286	110.5	0.092	2.317	2.317		0.3%
2270003060	AC\Refrigeration	Dsl	196	118,216	604.1	2.494	2.160	2.160		0.3%
2265001030	All Terrain Vehicles\Motorcycles	4-St	2,365	40,211	17.0	0.017	1.982	1.982		0.3%
2270002069	Crawler Tractor/Dozers	Dsl	87	27,278	312.9	1.787	1.970	1.970		0.3%
2265006010	Pumps	4-St	126	13,919	110.5	0.015	1.961	1.961		0.3%
2282010005	Inboard/Sterndrive	4-St	631	4,512	7.1	0.019	1.603	1.603		0.2%
2265006025	Welders	4-St	38	7,852	204.0	0.015	1.550	1.550		0.2%
2270002057	Rough Terrain Forklift	Dsl	48	10,658	221.3	0.876	1.209	1.209		0.2%
2260002006	Tampers/Rammers	2-St	66	3,525	53.5	0.071	1.152	1.152		0.2%
2270002051	Off-highway Trucks	Dsl	8	4,264	548.6	0.838	1.114	1.114		0.2%
2270002045	Cranes	Dsl	41	13,467	331.0	0.791	1.023	1.023		0.1%
2265006015	Air Compressors	4-St	27	6,581	242.0	0.009	0.994	0.994		0.1%
2270008005	Airport Support Equipment	Dsl	21	7,630	366.0	0.675	0.951	0.951		0.1%
						40.07	678.68	678.68	0.00	97.8%

Table C-4-2d
FNSB NONROAD Summer 1999 Emissions Inventory - 25 Highest Sources

SCC	Equipment	Tech	Population	Activity (hrs/season)	Activity/unit (hrs/season)	PM-Exhaust (tons)	TOTAL VOC (tons)	Total Exh VOC (tons)	Exh VOC (tons)	% of Total VOC
2282005010	Outboard	2-St	3,019	89,276	29.6	7.384	158.186	127.334	30.852	25.7%
2260001020	Snowmobiles	2-St	10,491	-	-	0.000	148.482	0.000	148.482	24.1%
2282005015	Personal Water Craft	2-St	408	21,423	52.5	2.909	73.622	64.172	9.451	12.0%
2282010005	Inboard/Sterndrive	4-St	631	25,535	40.5	0.107	26.098	8.184	17.913	4.2%
2265004010	Lawn mowers (res)	4-St	9,915	247,886	25.0	0.133	20.302	19.535	0.767	3.3%
2265004055	Lawn & Garden Tractors (res)	4-St	3,611	162,498	45.0	0.135	19.240	17.258	1.982	3.1%
2260001030	All Terrain Vehicles\Motorcycles	2-St	757	12,872	17.0	0.324	17.785	13.637	4.148	2.9%
2270009010	Other Underground Mining Equipment	Dsl	81	69,668	862.9	7.894	13.168	13.168	0.000	2.1%
2260004025	Trimmers/Edgers/Brush Cutter (res)	2-St	4,175	37,574	9.0	0.398	11.477	11.423	0.054	1.9%
2270002066	Tractors/Loaders/Backhoes	Dsl	142	107,073	755.5	7.203	10.357	10.357	0.000	1.7%
2260004020	Chain Saws < 6 HP (res)	2-St	1,581	20,556	13.0	0.289	8.135	8.100	0.035	1.3%
2270002072	Skid Steer Loaders	Dsl	177	96,502	544.5	5.226	7.863	7.863	0.000	1.3%
2265006005	Generator Sets	4-St	723	41,600	57.5	0.048	7.663	6.757	0.906	1.2%
2270002060	Rubber Tire Loaders	Dsl	90	45,390	506.6	5.004	7.398	7.398	0.000	1.2%
2260004030	Leafblowers/Vacuums (res)	2-St	2,118	21,183	10.0	0.258	7.314	7.284	0.030	1.2%
2270002036	Excavators	Dsl	58	42,093	726.9	3.849	6.594	6.594	0.000	1.1%
2260002054	Concrete/Industrial Saws	2-St	29	11,552	401.0	0.361	6.094	6.081	0.012	1.0%
2265001030	All Terrain Vehicles\Motorcycles	4-St	2,365	40,211	17.0	0.017	5.436	1.817	3.619	0.9%
2270002069	Crawler Tractor/Dozers	Dsl	87	54,309	623.1	3.626	4.018	4.018	0.000	0.7%
2265006030	Pressure Washers	4-St	336	19,337	57.5	0.026	3.440	3.201	0.239	0.6%
2270003060	AC\Refrigeration	Dsl	196	144,223	736.9	3.033	2.643	2.643	0.000	0.4%
2270002057	Rough Terrain Forklift	Dsl	48	21,220	440.7	1.771	2.475	2.475	0.000	0.4%
2260002006	Tampers/Rammers	2-St	66	7,018	106.5	0.143	2.364	2.338	0.026	0.4%
2260006010	Pumps	2-St	75	8,286	110.5	0.090	2.283	2.270	0.013	0.4%
2270002051	Off-highway Trucks	Dsl	8	8,489	1,092.4	1.698	2.266	2.266	0.000	0.4%
						51.93	574.70	356.17	218.53	93.3%

Table C-4-2e
Juneau NONROAD Winter 1999 Emissions Inventory - 25 Highest Sources

SCC	Equipment	Tech	Population	Activity (hrs/season)	Activity/unit (hrs/season)	PM-Exhaust (tons)	TOTAL VOC (tons)	Total Exh VOC (tons)	Exh VOC (tons)	% of Total VOC
2260007005	Logging Equipment Chain Saws > 6 HP	2-St	2,172	329,033	151.5	16.636	268.304	268.210	0.094	57.9%
2282005010	Outboard	2-St	18,141	94,789	5.2	7.838	144.887	134.535	10.352	31.2%
2260001030	All Terrain Vehicles\Motorcycles	2-St	505	8,582	17.0	0.216	9.235	9.080	0.154	2.0%
2270007015	Forest Eqp - Feller/Bunch/Skidder	Dsl	72	46,066	638.0	4.122	5.233	5.233	0.000	1.1%
2260001020	Snowmobiles	2-St	141	2,118	15.0	0.115	4.953	4.842	0.112	1.1%
2260004036	Snowblowers (com)	2-St	93	12,688	136.0	0.167	4.663	4.662	0.001	1.0%
2265006005	Generator Sets	4-St	292	16,793	57.5	0.019	2.778	2.757	0.020	0.6%
2260004035	Snowblowers (res)	2-St	803	6,422	8.0	0.085	2.372	2.360	0.011	0.5%
2270002066	Tractors/Loaders/Backhoes	Dsl	39	14,967	379.5	0.982	1.400	1.400	0.000	0.3%
2265001030	All Terrain Vehicles\Motorcycles	4-St	1,577	26,807	17.0	0.011	1.386	1.252	0.135	0.3%
2265006030	Pressure Washers	4-St	136	7,806	57.5	0.010	1.308	1.302	0.005	0.3%
2265007015	Shredders > 6 HP	4-St	306	7,742	25.3	0.008	1.195	1.181	0.014	0.3%
2270002072	Skid Steer Loaders	Dsl	49	13,489	273.5	0.716	1.060	1.060	0.000	0.2%
2270002060	Rubber Tire Loaders	Dsl	25	6,345	254.4	0.684	0.998	0.998	0.000	0.2%
2265003020	Forklifts	4-St	13	10,095	749.5	0.021	0.962	0.961	0.001	0.2%
2260006010	Pumps	2-St	30	3,345	110.5	0.037	0.935	0.935	0.000	0.2%
2260002054	Concrete/Industrial Saws	2-St	8	1,615	201.4	0.054	0.907	0.907	0.000	0.2%
2270002036	Excavators	Dsl	16	5,884	365.1	0.520	0.881	0.881	0.000	0.2%
2270003060	AC\Refrigeration	Dsl	70	42,073	604.1	0.888	0.769	0.769	0.000	0.2%
2265006010	Pumps	4-St	51	5,618	110.5	0.006	0.745	0.743	0.003	0.2%
2265006025	Welders	4-St	16	3,169	204.0	0.006	0.591	0.589	0.002	0.1%
2270002069	Crawler Tractor/Dozers	Dsl	24	7,591	312.9	0.497	0.548	0.548	0.000	0.1%
2265004036	Snowblowers (com)	4-St	100	13,549	136.0	0.005	0.535	0.532	0.003	0.1%
2270008005	Airport Support Equipment	Dsl	9	3,196	366.0	0.283	0.398	0.398	0.000	0.1%
2265006015	Air Compressors	4-St	11	2,657	242.0	0.003	0.379	0.378	0.001	0.1%
						33.93	457.42	446.51	10.91	98.6%

Table C-4-2f
Juneau NONROAD Summer 1999 Emissions Inventory - 25 Highest Sources

SCC	Equipment	Tech	Population	Activity (hrs/season)	Activity/unit (hrs/season)	PM-Exhaust (tons)	TOTAL VOC (tons)	Total Exh VOC (tons)	Exh VOC (tons)	% of Total VOC
2282005010	Outboard	2-St	18,141	536,506	29.6	44.372	810.180	765.215	44.964	46.9%
2282005015	Personal Water Craft	2-St	2,452	161,097	65.7	21.849	495.712	481.939	13.774	28.7%
2260007005	Logging Equipment Chain Saws > 6 HP	2-St	2,172	329,033	151.5	16.160	260.949	260.539	0.410	15.1%
2282010005	Inboard/Sterndrive	4-St	3,793	153,454	40.5	0.640	75.690	49.583	26.107	4.4%
2260001030	All Terrain Vehicles\Motorcycles	2-St	505	11,819	23.4	0.297	13.192	12.521	0.671	0.8%
2282020005	Inboard	Dsl	401	68,193	170.0	4.168	8.122	8.122	0.000	0.5%
2270007015	Forest Eqp - Feller/Bunch/Skidder	Dsl	72	46,066	638.0	4.287	5.729	5.729	0.000	0.3%
2265004010	Lawn mowers (res)	4-St	3,176	57,217	18.0	0.031	4.617	4.557	0.060	0.3%
2265004055	Lawn & Garden Tractors (res)	4-St	1,156	37,507	32.4	0.031	4.180	4.026	0.154	0.2%
2270002066	Tractors/Loaders/Backhoes	Dsl	39	29,798	755.5	2.005	2.882	2.882	0.000	0.2%
2265006005	Generator Sets	4-St	292	16,793	57.5	0.019	2.818	2.730	0.089	0.2%
2260004025	Trimmers/Edgers/Brush Cutter (res)	2-St	1,337	8,673	6.5	0.092	2.641	2.637	0.004	0.2%
2260004020	Chain Saws < 6 HP (res)	2-St	524	5,954	11.4	0.108	2.355	2.352	0.003	0.1%
2265001030	All Terrain Vehicles\Motorcycles	4-St	1,577	36,920	23.4	0.015	2.250	1.665	0.585	0.1%
2270002072	Skid Steer Loaders	Dsl	49	26,856	544.5	1.454	2.188	2.188	0.000	0.1%
2270002060	Rubber Tire Loaders	Dsl	25	12,632	506.6	1.393	2.059	2.059	0.000	0.1%
2270002036	Excavators	Dsl	16	11,714	726.9	1.071	1.835	1.835	0.000	0.1%
2260002054	Concrete/Industrial Saws	2-St	8	3,215	401.0	0.101	1.693	1.692	0.001	0.1%
2260004030	Leafblowers/Vacuums (res)	2-St	678	4,889	7.2	0.060	1.684	1.681	0.002	0.1%
2265004071	Commercial Turf Equipment (com)	4-St	21	10,541	491.5	0.013	1.344	1.339	0.005	0.1%
2265006030	Pressure Washers	4-St	136	7,806	57.5	0.011	1.317	1.293	0.023	0.1%
2260004026	Trimmers/Edgers/Brush Cutter (com)	2-St	42	4,165	98.7	0.055	1.288	1.288	0.000	0.1%
2260001020	Snowmobiles	2-St	368	-	-	0.000	1.265	0.000	1.265	0.1%
2265007015	Shredders > 6 HP	4-St	306	7,742	25.3	0.008	1.219	1.159	0.060	0.1%
2260004031	Leafblowers/Vacuums (com)	2-St	16	3,331	203.2	0.059	1.215	1.214	0.000	0.1%
						98.30	1708.42	1620.24	88.18	98.8%

1,3-Butadiene	n-Hexane
Acetaldehyde	Nickel compounds
Acrolein	POM as 7-PAH
Benzene	POM as 16-PAH
Chromium compounds	Propionaldehyde
Ethyl Benzene	Styrene
Formaldehyde	Toluene
Manganese compounds	Xylene
Mercury compounds	

Because exhaust emission characteristics from 2-stroke gasoline engines, 4-stroke gasoline engines, and Diesel engines are fundamentally different, EPA developed separate toxics fractions for each of these engine types. In addition, separate toxics fractions were developed for evaporative emissions from gasoline equipment. Finally, different toxics fractions were generated for non-oxygenated versus oxygenated gasoline. (Gasoline containing ethanol as the oxygenate was assumed to be used in the Anchorage winter inventory runs.) As noted above, the toxics fractions for the organic compounds are based on hydrocarbon emissions (in this case, VOC), while the fractions for metal compounds are based on PM₁₀ emissions.

A summary of the toxics fractions used in this effort is contained in Table C-4-3 for non-oxygenated gasoline and in Table C-4-4 for oxygenated gasoline.

Toxics Results

Table C-4-5 shows the total and seasonal toxics inventories for each of the three geographical areas. Toluene and xylene form the majority of the toxics inventory in each of the three cities during both summer and winter months. However, these and other HC-based toxics estimates may be exaggerated by disproportionately high HC emissions from several equipment categories, as discussed in detail below. Details of the toxic emission contribution from each nonroad equipment category are shown in Tables C-4-6a through C-4-6f.

Uncertainties and Recommended Improvements

NONROAD Results - EPA has utilized a top-down approach in the development of this model; national estimates for equipment population and activity have been projected for smaller regional areas based primarily on human population. The addition of area-specific data would significantly improve the accuracy of the emissions estimates produced by the NONROAD model. For example, the terrain in Juneau limits snowmobile activity in the Borough even during the winter months, which means that EPA's estimates for both population and activity in Juneau are grossly exaggerated. Likewise, EPA has not considered the wintertime ban on snowmobile activity within the Anchorage Borough, which means the activity estimates included in the model are inaccurate for this region as well.

Another area of concern is the high evaporative emissions shown for Alaskan communities from marine equipment during the winter months. The model currently calculates estimates for diurnal emissions only, which means that all of these projected evaporative emissions are attributable to the effect of ambient temperature fluctuations. In regions where the average wintertime temperature is near zero degrees Fahrenheit, it is difficult to imagine how fuel evaporation could be a significant contributing factor to the HC emission inventory.

Evaporative Emission Corrections - In all three regions, we have corrected the evaporative emissions estimates in the model output by setting them to zero for those months during which the average daily temperature is 40 degrees Fahrenheit or below. This is consistent with the basic logic used in EPA's MOBILE5 emissions model.

Toxics Fractions - The toxics fractions developed by EPA for the National Toxics Inventory were based on U.S. average gasoline. To the extent that local data are available on fuel specifications, the toxics fractions could be updated to be more specific to each of the study areas. It is hoped that fuel specification data will be obtained for the development of the on-road toxics inventory. If those data become available, the nonroad toxics fractions will be updated to reflect local fuels prior to finalizing the nonroad toxics inventories.

To more accurately reflect the annual equipment usage and seasonal activity in Alaska, a detailed discussion of the modifications to NONROAD input values implemented is presented in the next section.

**Table C-4-3
Toxics Fractions Used for Nonroad Engines and Equipment
Non-Oxygenated Gasoline**

Compound	Basis	Exhaust 2-Stroke	Exhaust 4-Stroke	Exhaust Diesel	Evap 2-Stroke	Evap 4-Stroke
1,3-Butadiene	VOC	0.00215	0.00095	0.00186	0.00000	0.00000
Acetaldehyde	VOC	0.00166	0.00410	0.07430	0.00000	0.00000
Formaldehyde	VOC	0.00254	0.01170	0.15000	0.00000	0.00000
Acrolein	VOC	0.00030	0.00070	0.01150	0.00000	0.00000
Benzene	VOC	0.02520	0.05250	0.02030	0.02200	0.02200
Ethylbenzene	VOC	0.02400	0.01980	0.00310	0.00770	0.00770
n-Hexane	VOC	0.01420	0.00992	0.00159	0.02340	0.02340
Propionaldehyde	VOC	0.00025	0.00188	0.00985	0.00000	0.00000
Styrene	VOC	0.00130	0.00076	0.00059	0.00000	0.00000
Toluene	VOC	0.09780	0.07180	0.01500	0.04130	0.04130
Xylene	VOC	0.10700	0.06780	0.01060	0.02230	0.02230
POM as 7-PAH	VOC	0.00001	0.00001	0.00000	0.00000	0.00000
POM as 16-PAH	VOC	0.00002	0.00002	0.00000	0.00000	0.00000
Chromium	PM10	0.00006	0.00006	0.00007	0.00000	0.00000
Manganese	PM10	0.00012	0.00012	0.00007	0.00000	0.00000
Mercury	PM10	0.00001	0.00001	0.00002	0.00000	0.00000
Nickel	PM10	0.00007	0.00007	0.00003	0.00000	0.00000

**Table C-4-4
Toxics Fractions Used for Nonroad Engines and Equipment
Oxygenated Gasoline (Ethanol)**

Compound	Basis	Exhaust 2-Stroke	Exhaust 4-Stroke	Exhaust Diesel	Evap 2-Stroke	Evap 4-Stroke
1,3-Butadiene	VOC	0.00215	0.00095	0.00186	0.00000	0.00000
Acetaldehyde	VOC	0.00333	0.00820	0.07430	0.00000	0.00000
Formaldehyde	VOC	0.00345	0.01590	0.15000	0.00000	0.00000
Acrolein	VOC	0.00030	0.00069	0.01150	0.00000	0.00000
Benzene	VOC	0.02260	0.04720	0.02030	0.01250	0.01250
Ethylbenzene	VOC	0.02180	0.01800	0.00310	0.00447	0.00447
n-Hexane	VOC	0.01400	0.00982	0.00159	0.00959	0.00959
Propionaldehyde	VOC	0.00024	0.00186	0.00985	0.00000	0.00000
Styrene	VOC	0.00118	0.00069	0.00059	0.00000	0.00000
Toluene	VOC	0.08900	0.06540	0.01500	0.01940	0.01940
Xylene	VOC	0.09780	0.06170	0.01060	0.01180	0.01180
POM as 7-PAH	VOC	0.00001	0.00001	0.00000	0.00000	0.00000
POM as 16-PAH	VOC	0.00002	0.00002	0.00000	0.00000	0.00000
Chromium	PM10	0.00006	0.00006	0.00007	0.00000	0.00000
Manganese	PM10	0.00012	0.00012	0.00007	0.00000	0.00000
Mercury	PM10	0.00001	0.00001	0.00002	0.00000	0.00000
Nickel	PM10	0.00007	0.00007	0.00003	0.00000	0.00000

Table C-4-5
Summary of 1999 Nonroad VOC, PM10, and Toxic Emissions Inventory
for Anchorage, Fairbanks, and Juneau Boroughs

Pollutant	MOA Winter 1999	MOA Summer 1999	MOA 1999 Total	FNSB Winter 1999	FNSB Summer 1999	FNSB 1999 Total	Juneau Winter 1999	Juneau Summer 1999	Juneau 1999 Total
Exhaust PM (tons)	82.9	151.3	234.2	46.3	65.9	112.3	36.7	105.7	142.4
TOTAL VOC (tons/)	441.5	942.2	1,383.8	693.6	616.1	1,309.7	463.8	1,728.5	2,192.2
Total Exhaust VOC (tons)	441.5	806.4	1,247.9	693.6	393.2	1,086.8	452.6	1,640.0	2,092.6
Exh VOC	430.1	784.5	1,214.6	690.4	387.2	1,077.6	450.9	1,637.3	2,088.1
Crankcase VOC	11.5	21.8	33.3	3.2	6.0	9.2	1.7	2.7	4.5
Total Evap VOC (tons)	-	135.8	135.8	-	222.9	222.9	11.2	88.5	99.7
Chemical Name									
1,3-Butadiene	0.8	1.3	2.1	1.4	0.7	2.2	1.0	3.4	4.4
Acetaldehyde	8.7	15.1	23.8	4.3	6.3	10.5	1.8	5.2	7.0
Acrolein	1.2	2.4	3.6	0.7	1.0	1.7	0.3	0.9	1.2
Benzene (including benzene from gasoline)	12.3	30.7	43.0	18.0	16.5	34.4	11.9	45.2	57.1
Chromium Chompounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ethyl benzene	7.5	15.4	22.8	15.7	9.3	24.9	10.6	39.1	49.7
Formaldehyde	16.7	31.3	48.0	8.2	12.7	20.9	3.4	9.5	12.9
Hexane	4.6	11.1	15.6	9.2	9.5	18.8	6.5	24.6	31.1
Manganese Compounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mercury Compounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nickel Compounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Polycyclic Organic Matter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Propionaldehyde	1.2	2.4	3.6	0.6	0.9	1.6	0.3	0.8	1.1
Styrene	0.4	0.8	1.2	0.9	0.4	1.3	0.6	2.1	2.6
Toluene	29.8	61.7	91.5	63.7	39.6	103.3	43.2	159.5	202.7
Xylenes (isomers and mixture)	31.2	60.1	91.3	69.2	37.0	106.1	46.8	171.5	218.3

Modifications to EPA's NONROAD Model Default Equipment Population and Activity Factors

Because EPA has used a top-down approach in developing populations and estimated annual activity factors for the equipment in the NONROAD model (i.e., distributed national equipment populations to individual states and counties based primarily on human population), it is expected that locally-generated data will improve the accuracy of the resulting NONROAD emissions estimates. In developing the Alaska Toxics Inventory, we were able to generate more accurate estimates for population and activity in the Fairbanks, Anchorage, and Juneau areas for only a handful of equipment categories. With the exception of these select modifications, (which are described in detail in the following pages), the NONROAD model defaults were used for all modeling associated with the development of this Inventory.

Personal Watercraft (PWC)

Equipment Population - ADEC staff contacted the U.S. Coast Guard and obtained registration data for PWC in all three communities. According to ADEC, boating registration enforcement is fairly rigorous in Juneau, but less so in Fairbanks because the recreational boating areas are scattered over a larger area in the interior of the state. PWC use on public land in Anchorage is limited in both Anchorage and Juneau because there are few places that are amenable to PWC use in either area; in Anchorage, the few local lakes have significant floatplane activity, which takes precedence, and in Juneau, the geography is the most significant limitation. Therefore, ADEC staff felt it was appropriate to assume that 50% of the PWC in Anchorage and Juneau are registered with the Coast Guard, but that fewer than 50% are likely to be registered in Fairbanks. In the absence of any additional data, it was decided that the NONROAD estimates for the PWC population in Anchorage and Fairbanks would be used. For Juneau, it was decided that registration data provided by the Coast Guard, with the 50% registration assumption discussed above, would provide a more accurate total.

	<u>Anchorage</u>	<u>Fairbanks</u>	<u>Juneau</u>
PWC Registered w/ Coast Guard	449 28	63	
NONROAD PWC Estimate:	1,327	408	2,452
Modified PWC Population:	1,327	408	126

Activity Estimates - Given that there are very few areas within the Anchorage Borough to use PWC, the Anchorage PWC activity has been reduced to 0.5 hours/season/unit to account for extremely limited use and equipment repair. Activity data in Fairbanks and Juneau has also been modified to reflect the limited amount of activity which actually takes place within the boundaries of the boroughs.

Hoefler Consulting Group

The NONROAD model assumes 77.3 hours of operation per year for all three communities. In addition, the ambient temperatures only allow PWC use during the warmest months of the year in each region. Seasonal PWC use has therefore been adjusted as follows:

$$\begin{array}{l} 77.3 \text{ hours/year} / 182.5 \text{ days/year} * 7 \text{ days/week} = 3 \text{ hours/week} \\ \text{(NONROAD default)} \quad \text{(6 months AK summer)} \end{array}$$

For Juneau, it was assumed that this 3 hours per week of PWC activity was reduced by 1/3 to reflect both the more limited access to bodies of water suited to the activity in that area, and the expected rainfall during this period.

	<u>Anchorage</u>	<u>Fairbanks</u>	<u>Juneau</u>
Seasonal Use (months):	May – Aug.	May - Aug.	May - Aug.
(weeks):	17.5	17.5	17.5
Activity Assumptions:	1 hr/yr	3 hrs/wk	2 hrs/wk
Modified Annual Activity:	1 hr/yr	52.5 hrs/yr	35.0 hrs/yr

Boats (Outboards, Inboards, Sterndrives)

Equipment Population - In the absence of a more accurate boat population source, we have retained the NONROAD model's estimated boating populations.

Activity Estimates - In the absence of a more accurate local sources of boating activity in Juneau and Fairbanks, we have retained the NONROAD model's default boating activity factors. However, given that there are few if any areas within the Anchorage Borough appropriate for boating activity (most area lakes are only used for float plane landings and take-offs), we have reduced the activity there to 0.5 hours/year/unit to account for equipment repairs. The specific changes for Anchorage boating activity factors are as follows:

	<u>Outboards</u> <u>(2-stk)</u>	<u>Inboard/Sterndrive</u> <u>(4-stk)</u>	<u>Inboard</u> <u>(Dsl)</u>
NONROAD Defaults	34.8 hrs/yr	47.6 hrs/yr	47.6 hrs/yr
Modified MOA Activity:	0.5 hrs/yr	0.5 hrs/yr	0.5 hrs/yr

ATVs

Lacking more accurate data, we will retain the NONROAD assumptions for ATV activity and populations. ADEC staff believe the population numbers are too high, but have no local data to use as a replacement.

The only modification to this source will be to spread the activity evenly over the entire 12 months of the year, rather than concentrating more activity during the summer months. This modification is based on conversations with members of the South East Alaska OffRoad Riders Association, who assert that ATV use in Alaskan communities is constant during all seasons of the year.

Snowmobiles

Equipment Population - ADEC staff obtained snowmobile registration from the Alaska DMV. For all three areas, ADEC believes that assuming 50% of all snowmobiles operating are registered gives a more accurate population estimate than the defaults in the NONROAD model. Therefore, this logic was applied to the DMV registrations totals for all three geographic areas, as shown below. In all three cases, this revised population estimate is believed to be more representative than the NONROAD model defaults, which appeared too low for Anchorage and Fairbanks, and too high in Juneau. (According to ADEC staff, there are few areas to ride a snowmobile in Juneau due to the terrain and climate, and it is not possible to easily transport the equipment to neighboring areas outside the Borough as is routinely done in Anchorage).

	<u>Anchorage</u>	<u>Fairbanks</u>	<u>Juneau</u>
NONROAD Population Estimate:	1,382	553	368
DMV Registration:	10,228	5,285	71
Modified Population	20,456	10,570	142

Anchorage Activity Estimates - Snowmobile use in Anchorage is banned on public land within the Borough and there are is very little private land which can be used for snowmobiling. The few areas within the Borough where snowmobiles can be operated (e.g., Chugach State Park) are closed due to avalanche danger or inclement weather for the majority of the winter. Therefore, we feel it is appropriate to reduce snowmobile activity to 0.5 hours/year to allow for engine maintenance.

NONROAD Default Activity factor: 30 hours/year
Modified MOA Activity Factor: 0.5 hours/year

Fairbanks Activity Estimates - Although snowmobile use in Fairbanks is widespread, ADEC staff feel that 20% of all snowmobile activity actually takes place outside the Borough, in the surrounding rural areas. Therefore, although the NONROAD assumption of 30 hours/yr of snowmobile activity seems appropriate, we have reduced this number by 20% to reflect the portion of activity which takes place within the geographical boundary of the Borough.

NONROAD Default Activity factor: 30 hours/year
Modified FNSB Activity Factor: $30 \text{ hours/year} * 80\% = 24 \text{ hours/year}$

Juneau Activity Estimates - In the draft report, we assumed that the basic NONROAD assumption of 30 hours of snowmobile use per year was evenly distributed over the Alaskan winter season, October through March. This assumption yields the following weekly activity estimate:

Modified Weekly
Activity Factor: $30 \text{ hours/season} / 26 \text{ weeks/season} = 1.15 \text{ hours/week}$

However, since the winter temperatures in Juneau are much warmer than in either Fairbanks or Anchorage, ADEC staff feels that limiting seasonal snowmobile activity to three months (January - March) is appropriate. Therefore, the modified annual activity factor becomes:

NONROAD Default Activity factor: 30 hours/year
Modified CBJ Annual Activity Factor: $1.15 \text{ hrs/wk} * 13 \text{ wks/year} = 15 \text{ hours/year}$

Lawn and Garden

Equipment Population - Lacking more accurate data, we will retain the NONROAD assumptions for lawn and garden activity and populations. ADEC staff believe the population numbers are too high, but have no local data to use as a replacement.

Activity Estimates - ADEC does feel it is appropriate to make seasonal activity adjustments to each of the three geographic areas. First, we assume that all lawn and garden activity takes place during the Alaska summer season, April through September. Using residential lawn mowers as an example, this gives the following estimated weekly activity factor:

25 hours/yr? / 26 weeks/yr = 1.0 hours/week
(NONROAD default
for res. lawnmowers)

However, due to regional weather patterns, ADEC staff feel it is appropriate to adjust the number of annual weeks of lawn and garden activity as follows:

	<u>Anchorage</u>	<u>Fairbanks</u>	<u>Juneau</u>
Annual L&G Usage:	May 15 - Sept. 15	May 15 - Sept. 15	May 1 - Aug. 31

This equates to approximately 17.5 weeks/yr of lawn and garden activity for each geographic area, rather than 26 weeks/yr. Distributing the 1.0 hours/week of residential lawnmower activity over this time period reduces the annual activity from 25 hours/week to 17.5 hours/week B a decrease of 30%. This categorical decrease in the annual activity for all lawn and garden equipment seems appropriate, given that the NONROAD model default assumption is that 30% of all lawn and garden activity takes place during what we have defined as the Alaska winter. So, in essence, we will simply eliminate the 30% of lawn and garden activity which the NONROAD model had assumed took place during the October through March time period.

Table C-4-6a
MOA NONROAD Emissions - Winter 1999

SCC		2260004036	2260007005	2260001030	2265006005	2260001020	2260004035	2265006030	2270002066	2265004036	2260006010	2270002072	2270002060
Equipment Name	Winter TOTAL (tons)	Snowblowers (com)	Logging Equipment Chain Saws > 6 HP	All Terrain Vehicles/Mot orcycles	Generator Sets	Snowmobiles	Snowblowers (res)	Pressure Washers	Tractors/Load ers/Backhoes	Snowblowers (com)	Pumps	Skid Steer Loaders	Rubber Tire Loaders
Tech Type		2-St	2-St	2-St	4-St	2-St	2-St	4-St	Dsl	4-St	2-St	Dsl	Dsl
Equipment Population		2,015.1	332.9	1,893.0	3,405.0	20,296.9	6,834.2	1,582.8	389.6	2,151.9	352.9	487.2	246.3
Activity (hrs/season)		274,054.0	50,429.8	32,181.1	195,786.3	10,148.4	54,673.3	91,009.2	147,826.6	292,661.0	38,996.9	133,231.4	62,666.5
Activity (hrs/season/unit)		136.00	151.50	17.00	57.50	0.50	8.00	57.50	379.47	136.00	110.50	273.49	254.43
Exhaust PM (tons)	82.88	3.60E+00	2.55E+00	8.08E-01	2.26E-01	5.01E-01	7.19E-01	1.19E-01	9.70E+00	1.06E-01	4.31E-01	7.07E+00	6.75E+00
TOTAL VOC (tons)	441.55	1.01E+02	4.11E+01	3.41E+01	3.22E+01	2.11E+01	2.01E+01	1.52E+01	1.38E+01	1.14E+01	1.09E+01	1.05E+01	9.86E+00
Total Exhaust VOC (tons)	441.55	1.01E+02	4.11E+01	3.41E+01	3.22E+01	2.11E+01	2.01E+01	1.52E+01	1.38E+01	1.14E+01	1.09E+01	1.05E+01	9.86E+00
Exh VOC	430.06	1.01E+02	4.11E+01	3.41E+01	2.78E+01	2.11E+01	2.01E+01	1.45E+01	1.36E+01	1.14E+01	1.09E+01	1.03E+01	9.67E+00
Crankcase VOC	11.49	0.00E+00	0.00E+00	0.00E+00	4.39E+00	0.00E+00	0.00E+00	7.39E-01	2.71E-01	0.00E+00	0.00E+00	2.05E-01	1.93E-01
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	2.16E-01	8.84E-02	7.32E-02	3.07E-02	4.54E-02	4.32E-02	1.45E-02	2.57E-02	1.09E-02	2.34E-02	1.95E-02	1.83E-02
Acetaldehyde	8.722	3.35E-01	1.37E-01	1.13E-01	2.64E-01	7.02E-02	6.68E-02	1.25E-01	1.03E+00	9.37E-02	3.63E-02	7.78E-01	7.33E-01
Acrolein	1.238	2.99E-02	1.22E-02	1.01E-02	2.23E-02	6.26E-03	5.96E-03	1.05E-02	1.59E-01	7.92E-03	3.24E-03	1.20E-01	1.13E-01
Benzene (including benzene from gasoline)	12.276	2.27E+00	9.29E-01	7.70E-01	1.52E+00	4.77E-01	4.54E-01	7.18E-01	2.81E-01	5.39E-01	2.46E-01	2.13E-01	2.00E-01
Chromium Chompounds	0.006	2.16E-04	1.53E-04	4.85E-05	1.35E-05	3.00E-05	4.31E-05	7.15E-06	6.79E-04	6.37E-06	2.59E-05	4.95E-04	4.73E-04
Ethyl benzene	7.458	2.19E+00	8.96E-01	7.42E-01	5.80E-01	4.60E-01	4.38E-01	2.74E-01	4.29E-02	2.06E-01	2.38E-01	3.25E-02	3.06E-02
Formaldehyde	16.743	3.47E-01	1.42E-01	1.17E-01	5.12E-01	7.28E-02	6.93E-02	2.42E-01	2.07E+00	1.82E-01	3.76E-02	1.57E+00	1.48E+00
Hexane	4.573	1.41E+00	5.76E-01	4.77E-01	3.16E-01	2.95E-01	2.81E-01	1.49E-01	2.20E-02	1.12E-01	1.53E-01	1.66E-02	1.57E-02
Manganese Compounds	0.006	4.32E-04	3.06E-04	9.70E-05	2.71E-05	6.01E-05	8.62E-05	1.43E-05	6.79E-04	1.27E-05	5.18E-05	4.95E-04	4.73E-04
Mercury Compounds	0.002	3.60E-05	2.55E-05	8.08E-06	2.26E-06	5.01E-06	7.19E-06	1.19E-06	1.94E-04	1.06E-06	4.31E-06	1.41E-04	1.35E-04
Nickel Compounds	0.003	2.52E-04	1.78E-04	5.66E-05	1.58E-05	3.50E-05	5.03E-05	8.34E-06	2.91E-04	7.43E-06	3.02E-05	2.12E-04	2.03E-04
Polycyclic Organic Matter	0.006	1.67E-03	6.82E-04	5.65E-04	4.86E-04	3.50E-04	3.33E-04	2.30E-04	2.47E-05	1.72E-04	1.81E-04	1.87E-05	1.77E-05
Propionaldehyde	1.187	2.45E-02	1.00E-02	8.31E-03	5.99E-02	5.15E-03	4.90E-03	2.83E-02	1.36E-01	2.12E-02	2.66E-03	1.03E-01	9.71E-02
Styrene	0.415	1.19E-01	4.85E-02	4.02E-02	2.22E-02	2.49E-02	2.37E-02	1.05E-02	8.21E-03	7.88E-03	1.29E-02	6.22E-03	5.86E-03
Toluene	29.842	8.95E+00	3.66E+00	3.03E+00	2.11E+00	1.88E+00	1.79E+00	9.95E-01	2.07E-01	7.47E-01	9.70E-01	1.57E-01	1.48E-01
Xylenes (isomers and mixture)	31.193	9.84E+00	4.02E+00	3.33E+00	1.99E+00	2.06E+00	1.96E+00	9.39E-01	1.47E-01	7.05E-01	1.07E+00	1.11E-01	1.05E-01

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MOA NONROAD Emissions - Winter 1999

SCC		2260002054	2270002036	2265006010	2265006025	2270008005	2270003060	2270002069	2265001030	2265006015	2270002057	2270006005	2260002006
Equipment Name	Winter TOTAL (tons)	Concrete/Industrial Saws	Excavators	Pumps	Welders	Airport Support Equipment	AC/Refrigeration	Crawler Tractor/Dozers	All Terrain Vehicles/Motorcycles	Air Compressors	Rough Terrain Forklifts	Generator Sets	Tampers/Rammers
Tech Type		2-St	Dsl	4-St	4-St	Dsl	Dsl	Dsl	4-St	4-St	Dsl	Dsl	2-St
Equipment Population		79.2	159.2	592.8	181.1	145.1	582.8	239.6	5,913.3	128.0	132.4	325.9	181.1
Activity (hrs/season)		15,949.3	58,113.9	65,506.4	36,953.3	53,097.1	352,045.2	74,980.0	100,526.4	30,975.1	29,296.7	55,080.9	9,688.5
Activity (hrs/season/unit)		201.42	365.10	110.50	204.00	366.00	604.05	312.94	17.00	242.00	221.33	169.00	53.49
Exhaust PM (tons)	82.88	5.33E-01	5.13E+00	7.08E-02	7.10E-02	4.70E+00	7.43E+00	4.91E+00	4.19E-02	4.04E-02	2.41E+00	2.52E+00	1.94E-01
TOTAL VOC (tons)	441.55	8.96E+00	8.71E+00	8.68E+00	6.88E+00	6.62E+00	6.43E+00	5.42E+00	4.70E+00	4.42E+00	3.32E+00	3.29E+00	3.17E+00
Total Exhaust VOC (tons)	441.55	8.96E+00	8.71E+00	8.68E+00	6.88E+00	6.62E+00	6.43E+00	5.42E+00	4.70E+00	4.42E+00	3.32E+00	3.29E+00	3.17E+00
Exh VOC	430.06	8.96E+00	8.54E+00	8.35E+00	6.48E+00	6.49E+00	6.31E+00	5.31E+00	3.77E+00	4.09E+00	3.26E+00	3.23E+00	3.17E+00
Crankcase VOC	11.49	0.00E+00	1.71E-01	3.34E-01	4.04E-01	1.30E-01	1.26E-01	1.06E-01	9.33E-01	3.36E-01	6.51E-02	6.45E-02	0.00E+00
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	1.93E-02	1.62E-02	8.26E-03	6.55E-03	1.23E-02	1.20E-02	1.01E-02	4.48E-03	4.21E-03	6.18E-03	6.12E-03	6.81E-03
Acetaldehyde	8.722	2.98E-02	6.47E-01	7.12E-02	5.64E-02	4.92E-01	4.78E-01	4.02E-01	3.86E-02	3.63E-02	2.47E-01	2.44E-01	1.05E-02
Acrolein	1.238	2.66E-03	1.00E-01	6.02E-03	4.77E-03	7.61E-02	7.40E-02	6.23E-02	3.26E-03	3.06E-03	3.82E-02	3.78E-02	9.41E-04
Benzene (including benzene from gasoline)	12.276	2.02E-01	1.77E-01	4.10E-01	3.25E-01	1.34E-01	1.31E-01	1.10E-01	2.22E-01	2.09E-01	6.74E-02	6.68E-02	7.16E-02
Chromium Compounds	0.006	3.20E-05	3.59E-04	4.25E-06	4.26E-06	3.29E-04	5.20E-04	3.44E-04	2.51E-06	2.42E-06	1.69E-04	1.77E-04	1.17E-05
Ethyl benzene	7.458	1.95E-01	2.70E-02	1.56E-01	1.24E-01	2.05E-02	1.99E-02	1.68E-02	8.47E-02	7.96E-02	1.03E-02	1.02E-02	6.91E-02
Formaldehyde	16.743	3.09E-02	1.31E+00	1.38E-01	1.09E-01	9.93E-01	9.65E-01	8.12E-01	7.48E-02	7.03E-02	4.98E-01	4.93E-01	1.09E-02
Hexane	4.573	1.25E-01	1.38E-02	8.52E-02	6.76E-02	1.05E-02	1.02E-02	8.61E-03	4.62E-02	4.34E-02	5.28E-03	5.23E-03	4.44E-02
Manganese Compounds	0.006	6.40E-05	3.59E-04	8.49E-06	8.52E-06	3.29E-04	5.20E-04	3.44E-04	5.03E-06	4.84E-06	1.69E-04	1.77E-04	2.33E-05
Mercury Compounds	0.002	5.33E-06	1.03E-04	7.08E-07	7.10E-07	9.39E-05	1.49E-04	9.83E-05	4.19E-07	4.04E-07	4.81E-05	5.05E-05	1.94E-06
Nickel Compounds	0.003	3.73E-05	1.54E-04	4.95E-06	4.97E-06	1.41E-04	2.23E-04	1.47E-04	2.93E-06	2.83E-06	7.22E-05	7.57E-05	1.36E-05
Polycyclic Organic Matter	0.006	1.49E-04	1.56E-05	1.31E-04	1.04E-04	1.19E-05	1.15E-05	9.69E-06	7.10E-05	6.68E-05	5.95E-06	5.89E-06	5.26E-05
Propionaldehyde	1.187	2.19E-03	8.58E-02	1.61E-02	1.28E-02	6.52E-02	6.34E-02	5.33E-02	8.75E-03	8.22E-03	3.27E-02	3.24E-02	7.73E-04
Styrene	0.415	1.06E-02	5.17E-03	5.99E-03	4.75E-03	3.93E-03	3.82E-03	3.22E-03	3.25E-03	3.05E-03	1.97E-03	1.95E-03	3.74E-03
Toluene	29.842	7.97E-01	1.31E-01	5.68E-01	4.50E-01	9.93E-02	9.65E-02	8.12E-02	3.08E-01	2.89E-01	4.98E-02	4.93E-02	2.82E-01
Xylenes (isomers and mixture)	31.193	8.76E-01	9.23E-02	5.36E-01	4.25E-01	7.02E-02	6.82E-02	5.74E-02	2.90E-01	2.73E-01	3.52E-02	3.49E-02	3.10E-01

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MOA NONROAD Emissions - Winter 1999

SCC		2270002051	2265003020	2270002045	2270006025	2270006015	2265004035	2270002075	2270002048	2268006020	2265008005	2260006005
Equipment Name	Winter TOTAL (tons)	Off-highway Trucks	Forklifts	Cranes	Welders	Air Compressors	Snowblowers (res)	Off-Highway Tractors	Graders	Gas Compressors	Airport Support Equipment	Generator Sets
Tech Type		Dsl	4-St	Dsl	Dsl	Dsl	4-St	Dsl	Dsl	4-St	4-St	2-St
Equipment Population		21.4	41.6	111.8	154.8	115.3	7,300.8	35.6	99.3	0.5	19.9	103.0
Activity (hrs/season)		11,720.7	31,208.5	37,018.6	49,781.1	46,992.1	58,406.2	10,177.9	31,929.9	1,617.6	8,599.0	5,921.2
Activity (hrs/season/unit)		548.65	749.55	330.99	321.50	407.50	8.00	285.86	321.63	3,000.00	432.39	57.50
Exhaust PM (tons)	82.88	2.30E+00	6.36E-02	2.17E+00	1.91E+00	1.89E+00	2.12E-02	1.57E+00	1.82E+00	1.33E-02	1.94E-02	6.45E-02
TOTAL VOC (tons)	441.55	3.06E+00	2.97E+00	2.81E+00	2.62E+00	2.35E+00	2.28E+00	2.15E+00	2.09E+00	1.81E+00	1.70E+00	1.57E+00
Total Exhaust VOC (tons)	441.55	3.06E+00	2.97E+00	2.81E+00	2.62E+00	2.35E+00	2.28E+00	2.15E+00	2.09E+00	1.81E+00	1.70E+00	1.57E+00
Exh VOC	430.06	3.00E+00	2.24E+00	2.76E+00	2.56E+00	2.30E+00	2.28E+00	2.10E+00	2.05E+00	1.36E+00	1.41E+00	1.57E+00
Crankcase VOC	11.49	6.00E-02	7.29E-01	5.52E-02	5.13E-02	4.60E-02	0.00E+00	4.21E-02	4.10E-02	4.50E-01	2.92E-01	0.00E+00
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name												
1,3-Butadiene	0.799	5.70E-03	2.83E-03	5.23E-03	4.86E-03	4.36E-03	2.17E-03	3.99E-03	3.89E-03	1.73E-03	1.62E-03	3.38E-03
Acetaldehyde	8.722	2.28E-01	2.44E-02	2.09E-01	1.94E-01	1.74E-01	1.87E-02	1.59E-01	1.56E-01	1.49E-02	1.39E-02	5.23E-03
Acrolein	1.238	3.52E-02	2.06E-03	3.23E-02	3.01E-02	2.70E-02	1.58E-03	2.47E-02	2.41E-02	1.26E-03	1.18E-03	4.67E-04
Benzene (including benzene from gasoline)	12.276	6.22E-02	1.40E-01	5.71E-02	5.31E-02	4.76E-02	1.08E-01	4.36E-02	4.25E-02	8.56E-02	8.01E-02	3.55E-02
Chromium Compounds	0.006	1.61E-04	3.82E-06	1.52E-04	1.34E-04	1.33E-04	1.27E-06	1.10E-04	1.27E-04	7.98E-07	1.16E-06	3.87E-06
Ethyl benzene	7.458	9.49E-03	5.35E-02	8.72E-03	8.11E-03	7.27E-03	4.10E-02	6.65E-03	6.49E-03	3.26E-02	3.05E-02	3.43E-02
Formaldehyde	16.743	4.59E-01	4.73E-02	4.22E-01	3.92E-01	3.52E-01	3.63E-02	3.22E-01	3.14E-01	2.88E-02	2.70E-02	5.42E-03
Hexane	4.573	4.87E-03	2.92E-02	4.47E-03	4.16E-03	3.73E-03	2.24E-02	3.41E-03	3.33E-03	1.78E-02	1.67E-02	2.20E-02
Manganese Compounds	0.006	1.61E-04	7.63E-06	1.52E-04	1.34E-04	1.33E-04	2.54E-06	1.10E-04	1.27E-04	1.60E-06	2.33E-06	7.74E-06
Mercury Compounds	0.002	4.60E-05	6.36E-07	4.35E-05	3.82E-05	3.79E-05	2.12E-07	3.15E-05	3.63E-05	1.33E-07	1.94E-07	6.45E-07
Nickel Compounds	0.003	6.91E-05	4.45E-06	6.52E-05	5.73E-05	5.68E-05	1.48E-06	4.72E-05	5.45E-05	9.31E-07	1.36E-06	4.52E-06
Polycyclic Organic Matter	0.006	5.48E-06	4.49E-05	5.04E-06	4.68E-06	4.20E-06	3.44E-05	3.84E-06	3.75E-06	2.74E-05	2.56E-05	2.61E-05
Propionaldehyde	1.187	3.02E-02	5.53E-03	2.77E-02	2.58E-02	2.31E-02	4.24E-03	2.11E-02	2.06E-02	3.37E-03	3.16E-03	3.84E-04
Styrene	0.415	1.82E-03	2.05E-03	1.67E-03	1.55E-03	1.39E-03	1.57E-03	1.27E-03	1.24E-03	1.25E-03	1.17E-03	1.85E-03
Toluene	29.842	4.59E-02	1.94E-01	4.22E-02	3.92E-02	3.52E-02	1.49E-01	3.22E-02	3.14E-02	1.19E-01	1.11E-01	1.40E-01
Xylenes (isomers and mixture)	31.193	3.25E-02	1.83E-01	2.98E-02	2.77E-02	2.49E-02	1.41E-01	2.27E-02	2.22E-02	1.12E-01	1.05E-01	1.54E-01

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MOA NONROAD Emissions - Winter 1999

SCC		2270002015	2270002018	2270006010	2265001060	2265002039	2265002042	2282005010	2270002030	2260001060	2265002021	2265002030	2270007015
Equipment Name	Winter TOTAL (tons)	Rollers	Scrapers	Pumps	Specialty Vehicle Carts	Concrete/Indu strial Saws	Cement & Mortar Mixers	Outboard	Trenchers	Specialty Vehicle Carts	Paving Equipment	Trenchers	Forest Eq - Feller/Bunch/S kidder
Tech Type		Dsl	Dsl	Dsl	4-St	4-St	4-St	2-St	Dsl	2-St	4-St	4-St	Dsl
Equipment Population		130.7	36.4	148.3	240.0	45.1	283.0	9,817.8	93.0	611.0	123.5	38.2	11.1
Activity (hrs/season)		33,207.9	11,136.3	29,891.2	4,858.1	9,198.5	7,949.0	737.1	18,436.6	12,365.4	7,223.4	5,136.5	7,060.4
Activity (hrs/season/unit)		254.10	305.58	201.50	20.24	203.95	28.08	0.08	198.26	20.24	58.51	134.40	638.00
Exhaust PM (tons)	82.88	1.49E+00	1.19E+00	1.14E+00	9.39E-03	1.31E-02	9.77E-03	6.10E-02	9.42E-01	1.04E-02	7.51E-03	7.57E-03	6.32E-01
TOTAL VOC (tons)	441.55	1.46E+00	1.41E+00	1.40E+00	1.32E+00	1.23E+00	1.11E+00	1.06E+00	1.06E+00	1.03E+00	9.42E-01	8.05E-01	8.02E-01
Total Exhaust VOC (tons)	441.55	1.46E+00	1.41E+00	1.40E+00	1.32E+00	1.23E+00	1.11E+00	1.06E+00	1.06E+00	1.03E+00	9.42E-01	8.05E-01	8.02E-01
Exh VOC	430.06	1.44E+00	1.38E+00	1.37E+00	1.05E+00	1.19E+00	9.66E-01	1.06E+00	1.04E+00	1.03E+00	8.70E-01	7.54E-01	7.86E-01
Crankcase VOC	11.49	2.87E-02	2.76E-02	2.75E-02	2.68E-01	4.17E-02	1.44E-01	0.00E+00	2.08E-02	0.00E+00	7.23E-02	5.07E-02	1.57E-02
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	2.72E-03	2.62E-03	2.61E-03	1.25E-03	1.17E-03	1.06E-03	2.28E-03	1.97E-03	2.22E-03	8.97E-04	7.66E-04	1.49E-03
Acetaldehyde	8.722	1.09E-01	1.05E-01	1.04E-01	1.08E-02	1.01E-02	9.11E-03	3.54E-03	7.89E-02	3.44E-03	7.72E-03	6.60E-03	5.96E-02
Acrolein	1.238	1.68E-02	1.62E-02	1.61E-02	9.12E-04	8.52E-04	7.70E-04	3.16E-04	1.22E-02	3.07E-04	6.53E-04	5.58E-04	9.22E-03
Benzene (including benzene from gasoline)	12.276	2.97E-02	2.86E-02	2.84E-02	6.21E-02	5.80E-02	5.24E-02	2.40E-02	2.15E-02	2.34E-02	4.45E-02	3.80E-02	1.63E-02
Chromium Compounds	0.006	1.04E-04	8.31E-05	7.98E-05	5.64E-07	7.87E-07	5.86E-07	3.66E-06	6.59E-05	6.24E-07	4.50E-07	4.54E-07	4.42E-05
Ethyl benzene	7.458	4.54E-03	4.37E-03	4.34E-03	2.37E-02	2.21E-02	2.00E-02	2.32E-02	3.29E-03	2.25E-02	1.70E-02	1.45E-02	2.49E-03
Formaldehyde	16.743	2.20E-01	2.11E-01	2.10E-01	2.09E-02	1.96E-02	1.77E-02	3.67E-03	1.59E-01	3.57E-03	1.50E-02	1.28E-02	1.20E-01
Hexane	4.573	2.33E-03	2.24E-03	2.23E-03	1.29E-02	1.21E-02	1.09E-02	1.49E-02	1.69E-03	1.45E-02	9.25E-03	7.90E-03	1.28E-03
Manganese Compounds	0.006	1.04E-04	8.31E-05	7.98E-05	1.13E-06	1.57E-06	1.17E-06	7.32E-06	6.59E-05	1.25E-06	9.01E-07	9.09E-07	4.42E-05
Mercury Compounds	0.002	2.98E-05	2.37E-05	2.28E-05	9.39E-08	1.31E-07	9.77E-08	6.10E-07	1.88E-05	1.04E-07	7.51E-08	7.57E-08	1.26E-05
Nickel Compounds	0.003	4.47E-05	3.56E-05	3.42E-05	6.57E-07	9.18E-07	6.84E-07	4.27E-06	2.83E-05	7.28E-07	5.26E-07	5.30E-07	1.90E-05
Polycyclic Organic Matter	0.006	2.62E-06	2.52E-06	2.51E-06	1.99E-05	1.86E-05	1.68E-05	1.76E-05	1.90E-06	1.72E-05	1.42E-05	1.22E-05	1.44E-06
Propionaldehyde	1.187	1.44E-02	1.39E-02	1.38E-02	2.45E-03	2.29E-03	2.07E-03	2.59E-04	1.05E-02	2.52E-04	1.75E-03	1.50E-03	7.90E-03
Styrene	0.415	8.70E-04	8.37E-04	8.32E-04	9.08E-04	8.49E-04	7.66E-04	1.25E-03	6.30E-04	1.22E-03	6.50E-04	5.55E-04	4.76E-04
Toluene	29.842	2.20E-02	2.11E-02	2.10E-02	8.60E-02	8.04E-02	7.26E-02	9.46E-02	1.59E-02	9.20E-02	6.16E-02	5.26E-02	1.20E-02
Xylenes (isomers and mixture)	31.193	1.55E-02	1.49E-02	1.49E-02	8.12E-02	7.59E-02	6.85E-02	1.04E-01	1.12E-02	1.01E-01	5.81E-02	4.97E-02	8.50E-03

Table C-4-6a
MOA NONROAD Emissions - Winter 1999

SCC		2270005015	2265002009	2270001060	2270002033	2270002003	2270002021	2270003020	2265002033	2265002072	2265002066	2265002015	2285002015
Equipment Name	Winter TOTAL (tons)	Agricultural Tractors	Plate Compactors	Specialty Vehicle Carts	Bore/Drill Rigs	Pavers	Paving Equipment	Forklifts	Bore/Drill Rigs	Skid Steer Loaders	Tractors/Loaders/Backhoes	Rollers	Railway Maintenance
Tech Type		Dsl	4-St	Dsl	Dsl	Dsl	Dsl	Dsl	4-St	4-St	4-St	4-St	Dsl
Equipment Population		74.3	117.8	21.2	27.2	37.3	46.9	11.6	121.5	16.3	9.3	12.2	8.2
Activity (hrs/season)		9,850.2	6,535.9	2,874.8	4,242.0	10,233.1	9,756.2	8,851.6	4,345.0	1,693.8	2,716.7	2,533.1	3,856.2
Activity (hrs/season/unit)		132.66	55.50	135.45	155.80	274.49	207.96	765.77	35.77	103.64	290.87	207.62	471.50
Exhaust PM (tons)	82.88	4.24E-01	5.06E-03	4.06E-01	4.97E-01	4.86E-01	4.85E-01	3.80E-01	3.55E-03	4.04E-03	3.86E-03	3.83E-03	2.29E-01
TOTAL VOC (tons)	441.55	7.47E-01	6.50E-01	6.28E-01	6.09E-01	5.19E-01	4.73E-01	4.37E-01	4.26E-01	4.13E-01	3.64E-01	3.61E-01	3.47E-01
Total Exhaust VOC (tons)	441.55	7.47E-01	6.50E-01	6.28E-01	6.09E-01	5.19E-01	4.73E-01	4.37E-01	4.26E-01	4.13E-01	3.64E-01	3.61E-01	3.47E-01
Exh VOC	430.06	7.33E-01	6.26E-01	6.15E-01	5.97E-01	5.09E-01	4.64E-01	4.28E-01	3.97E-01	3.37E-01	3.63E-01	3.34E-01	3.40E-01
Crankcase VOC	11.49	1.47E-02	2.40E-02	1.23E-02	1.19E-02	1.02E-02	9.28E-03	8.57E-03	2.94E-02	7.69E-02	8.07E-04	2.72E-02	6.80E-03
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	1.39E-03	6.19E-04	1.17E-03	1.13E-03	9.66E-04	8.80E-04	8.13E-04	4.06E-04	3.94E-04	3.46E-04	3.43E-04	6.45E-04
Acetaldehyde	8.722	5.55E-02	5.33E-03	4.66E-02	4.53E-02	3.86E-02	3.52E-02	3.25E-02	3.49E-03	3.39E-03	2.98E-03	2.96E-03	2.58E-02
Acrolein	1.238	8.59E-03	4.51E-04	7.22E-03	7.01E-03	5.97E-03	5.44E-03	5.03E-03	2.95E-04	2.87E-04	2.52E-04	2.50E-04	3.99E-03
Benzene (including benzene from gasoline)	12.276	1.52E-02	3.07E-02	1.27E-02	1.24E-02	1.05E-02	9.61E-03	8.87E-03	2.01E-02	1.95E-02	1.72E-02	1.70E-02	7.04E-03
Chromium Compounds	0.006	2.96E-05	3.04E-07	2.84E-05	3.48E-05	3.40E-05	3.40E-05	2.66E-05	2.13E-07	2.42E-07	2.32E-07	2.30E-07	1.60E-05
Ethyl benzene	7.458	2.32E-03	1.17E-02	1.95E-03	1.89E-03	1.61E-03	1.47E-03	1.35E-03	7.67E-03	7.44E-03	6.55E-03	6.49E-03	1.07E-03
Formaldehyde	16.743	1.12E-01	1.03E-02	9.42E-02	9.14E-02	7.79E-02	7.10E-02	6.56E-02	6.77E-03	6.57E-03	5.78E-03	5.74E-03	5.20E-02
Hexane	4.573	1.19E-03	6.38E-03	9.98E-04	9.69E-04	8.25E-04	7.53E-04	6.95E-04	4.18E-03	4.06E-03	3.57E-03	3.54E-03	5.51E-04
Manganese Compounds	0.006	2.96E-05	6.07E-07	2.84E-05	3.48E-05	3.40E-05	3.40E-05	2.66E-05	4.26E-07	4.84E-07	4.64E-07	4.60E-07	1.60E-05
Mercury Compounds	0.002	8.47E-06	5.06E-08	8.13E-06	9.93E-06	9.72E-06	9.71E-06	7.59E-06	3.55E-08	4.04E-08	3.86E-08	3.83E-08	4.58E-06
Nickel Compounds	0.003	1.27E-05	3.54E-07	1.22E-05	1.49E-05	1.46E-05	1.46E-05	1.14E-05	2.49E-07	2.82E-07	2.70E-07	2.68E-07	6.87E-06
Polycyclic Organic Matter	0.006	1.34E-06	9.82E-06	1.12E-06	1.09E-06	9.29E-07	8.47E-07	7.82E-07	6.43E-06	6.24E-06	5.49E-06	5.45E-06	6.20E-07
Propionaldehyde	1.187	7.36E-03	1.21E-03	6.18E-03	6.00E-03	5.11E-03	4.66E-03	4.30E-03	7.92E-04	7.69E-04	6.77E-04	6.71E-04	3.41E-03
Styrene	0.415	4.44E-04	4.49E-04	3.73E-04	3.62E-04	3.08E-04	2.81E-04	2.60E-04	2.94E-04	2.85E-04	2.51E-04	2.49E-04	2.06E-04
Toluene	29.842	1.12E-02	4.25E-02	9.42E-03	9.14E-03	7.79E-03	7.10E-03	6.56E-03	2.79E-02	2.70E-02	2.38E-02	2.36E-02	5.20E-03
Xylenes (isomers and mixture)	31.193	7.92E-03	4.01E-02	6.65E-03	6.46E-03	5.50E-03	5.02E-03	4.63E-03	2.63E-02	2.55E-02	2.24E-02	2.23E-02	3.67E-03

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MOA NONROAD Emissions - Winter 1999

SCC	2270002054	2270002027	2265002024	2270004036	2265003040	2265002060	2260002021	2265002003	2270002081	2260002009	2270002024	2270003030	
Equipment Name	Winter TOTAL (tons)	Crushing/Proc. Equipment	Signal Boards/Light Plants	Surfacing Equipment	Snowblowers (com)	Other General Industrial Eqp	Rubber Tire Loaders	Paving Equipment	Pavers	Other Construction Equipment	Plate Compactors	Surfacing Equipment	Sweepers/Scrubbers
Tech Type		Dsl	Dsl	4-St	Dsl	4-St	4-St	2-St	4-St	Dsl	2-St	Dsl	Dsl
Equipment Population		11.7	78.7	22.3	4.1	8.3	3.3	16.2	11.0	15.5	17.1	7.1	3.5
Activity (hrs/season)		3,744.9	14,085.9	3,644.0	1,626.7	2,669.2	562.3	950.4	1,439.3	3,140.1	946.6	1,335.6	1,946.7
Activity (hrs/season/unit)		319.29	178.87	163.16	400.00	321.17	171.18	58.51	131.06	202.61	55.50	187.56	549.55
Exhaust PM (tons)	82.88	2.44E-01	3.13E-01	3.02E-03	2.35E-01	2.30E-03	3.01E-03	1.02E-02	2.26E-03	1.99E-01	8.55E-03	2.07E-01	1.27E-01
TOTAL VOC (tons)	441.55	3.42E-01	3.32E-01	3.27E-01	3.21E-01	2.97E-01	2.82E-01	2.46E-01	2.22E-01	2.07E-01	2.06E-01	2.04E-01	1.97E-01
Total Exhaust VOC (tons)	441.55	3.42E-01	3.32E-01	3.27E-01	3.21E-01	2.97E-01	2.82E-01	2.46E-01	2.22E-01	2.07E-01	2.06E-01	2.04E-01	1.97E-01
Exh VOC	430.06	3.36E-01	3.26E-01	3.26E-01	3.14E-01	2.97E-01	2.16E-01	2.46E-01	2.04E-01	2.03E-01	2.06E-01	2.00E-01	1.93E-01
Crankcase VOC	11.49	6.71E-03	6.52E-03	1.50E-03	6.29E-03	1.40E-04	6.62E-02	0.00E+00	1.79E-02	4.07E-03	0.00E+00	3.99E-03	3.86E-03
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	6.37E-04	6.18E-04	3.11E-04	5.97E-04	2.83E-04	2.69E-04	5.28E-04	2.11E-04	3.86E-04	4.44E-04	3.79E-04	3.66E-04
Acetaldehyde	8.722	2.54E-02	2.47E-02	2.68E-03	2.38E-02	2.43E-03	2.31E-03	8.18E-04	1.82E-03	1.54E-02	6.87E-04	1.51E-02	1.46E-02
Acrolein	1.238	3.94E-03	3.82E-03	2.27E-04	3.69E-03	2.06E-04	1.96E-04	7.29E-05	1.54E-04	2.38E-03	6.13E-05	2.34E-03	2.27E-03
Benzene (including benzene from gasoline)	12.276	6.95E-03	6.75E-03	1.54E-02	6.51E-03	1.40E-02	1.33E-02	5.55E-03	1.05E-02	4.21E-03	4.66E-03	4.13E-03	4.00E-03
Chromium Compounds	0.006	1.71E-05	2.19E-05	1.81E-07	1.65E-05	1.38E-07	1.80E-07	6.10E-07	1.36E-07	1.39E-05	5.13E-07	1.45E-05	8.89E-06
Ethyl benzene	7.458	1.06E-03	1.03E-03	5.89E-03	9.94E-04	5.34E-03	5.08E-03	5.35E-03	3.99E-03	6.43E-04	4.50E-03	6.31E-04	6.11E-04
Formaldehyde	16.743	5.13E-02	4.99E-02	5.20E-03	4.81E-02	4.72E-03	4.49E-03	8.47E-04	3.53E-03	3.11E-02	7.12E-04	3.05E-02	2.95E-02
Hexane	4.573	5.44E-04	5.29E-04	3.21E-03	5.10E-04	2.91E-03	2.77E-03	3.44E-03	2.18E-03	3.30E-04	2.89E-03	3.24E-04	3.13E-04
Manganese Compounds	0.006	1.71E-05	2.19E-05	3.62E-07	1.65E-05	2.77E-07	3.61E-07	1.22E-06	2.72E-07	1.39E-05	1.03E-06	1.45E-05	8.89E-06
Mercury Compounds	0.002	4.88E-06	6.26E-06	3.02E-08	4.70E-06	2.30E-08	3.01E-08	1.02E-07	2.26E-08	3.98E-06	8.55E-08	4.14E-06	2.54E-06
Nickel Compounds	0.003	7.32E-06	9.39E-06	2.11E-07	7.06E-06	1.61E-07	2.10E-07	7.12E-07	1.58E-07	5.98E-06	5.98E-07	6.22E-06	3.81E-06
Polycyclic Organic Matter	0.006	6.13E-07	5.95E-07	4.94E-06	5.74E-07	4.48E-06	4.26E-06	4.08E-06	3.35E-06	3.71E-07	3.43E-06	3.64E-07	3.53E-07
Propionaldehyde	1.187	3.37E-03	3.27E-03	6.09E-04	3.16E-03	5.52E-04	5.25E-04	5.99E-05	4.12E-04	2.04E-03	5.03E-05	2.01E-03	1.94E-03
Styrene	0.415	2.03E-04	1.97E-04	2.26E-04	1.91E-04	2.05E-04	1.95E-04	2.90E-04	1.53E-04	1.23E-04	2.43E-04	1.21E-04	1.17E-04
Toluene	29.842	5.13E-03	4.99E-03	2.14E-02	4.81E-03	1.94E-02	1.85E-02	2.19E-02	1.45E-02	3.11E-03	1.84E-02	3.05E-03	2.95E-03
Xylenes (isomers and mixture)	31.193	3.63E-03	3.52E-03	2.02E-02	3.40E-03	1.83E-02	1.74E-02	2.40E-02	1.37E-02	2.20E-03	2.02E-02	2.16E-03	2.09E-03

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MOA NONROAD Emissions - Winter 1999

SCC	2265007015	2265003010	2270002063	2265002078	2265003030	2265002081	2270003070	2270003040	2265002057	2265002054	2285004015	2270005020	
Equipment Name	Winter TOTAL (tons)	Shredders > 6 HP	Aerial Lifts	Rubber Tire Tractor/Dozers	Dumpers/Tend ers	Sweepers/Scru bbers	Other Construction Equipment	Terminal Tractors	Other General Industrial Eqp	Rough Terrain Forklift	Crushing/Proc. Equipment	Railway Maintenance	Combines
Tech Type		4-St	4-St	Dsl	4-St	4-St	4-St	Dsl	Dsl	4-St	4-St	4-St	Dsl
Equipment Population		46.9	5.2	5.0	33.3	2.5	1.6	3.2	7.6	1.6	7.7	11.3	11.2
Activity (hrs/season)		1,186.6	840.2	1,510.8	1,413.9	573.6	203.7	1,794.6	3,023.1	226.8	621.7	1,042.9	470.2
Activity (hrs/season/unit)		25.29	162.61	300.57	42.46	232.43	124.04	566.22	395.50	138.08	80.58	92.00	41.89
Exhaust PM (tons)	82.88	1.25E-03	1.83E-03	1.41E-01	1.10E-03	1.35E-03	1.32E-03	1.06E-01	9.43E-02	1.01E-03	8.03E-04	7.10E-04	5.19E-02
TOTAL VOC (tons)	441.55	1.81E-01	1.80E-01	1.75E-01	1.40E-01	1.31E-01	1.23E-01	1.11E-01	1.10E-01	9.46E-02	8.60E-02	8.38E-02	4.99E-02
Total Exhaust VOC (tons)	441.55	1.81E-01	1.80E-01	1.75E-01	1.40E-01	1.31E-01	1.23E-01	1.11E-01	1.10E-01	9.46E-02	8.60E-02	8.38E-02	4.99E-02
Exh VOC	430.06	1.49E-01	1.43E-01	1.72E-01	1.18E-01	1.12E-01	9.45E-02	1.09E-01	1.08E-01	7.24E-02	8.57E-02	7.83E-02	4.89E-02
Crankcase VOC	11.49	3.23E-02	3.68E-02	3.44E-03	2.18E-02	1.96E-02	2.90E-02	2.17E-03	2.15E-03	2.22E-02	3.44E-04	5.55E-03	9.79E-04
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	1.73E-04	1.71E-04	3.26E-04	1.33E-04	1.25E-04	1.18E-04	2.06E-04	2.04E-04	9.00E-05	8.19E-05	7.98E-05	9.28E-05
Acetaldehyde	8.722	1.49E-03	1.48E-03	1.30E-02	1.15E-03	1.08E-03	1.01E-03	8.23E-03	8.15E-03	7.75E-04	7.06E-04	6.87E-04	3.71E-03
Acrolein	1.238	1.26E-04	1.25E-04	2.02E-03	9.71E-05	9.10E-05	8.56E-05	1.27E-03	1.26E-03	6.55E-05	5.96E-05	5.81E-05	5.74E-04
Benzene (including benzene from gasoline)	12.276	8.56E-03	8.50E-03	3.56E-03	6.61E-03	6.20E-03	5.83E-03	2.25E-03	2.23E-03	4.46E-03	4.06E-03	3.96E-03	1.01E-03
Chromium Chompounds	0.006	7.50E-08	1.10E-07	9.88E-06	6.58E-08	8.10E-08	7.89E-08	7.40E-06	6.60E-06	6.04E-08	4.82E-08	4.26E-08	3.63E-06
Ethyl benzene	7.458	3.26E-03	3.24E-03	5.44E-04	2.52E-03	2.36E-03	2.22E-03	3.43E-04	3.40E-04	1.70E-03	1.55E-03	1.51E-03	1.55E-04
Formaldehyde	16.743	2.88E-03	2.86E-03	2.63E-02	2.23E-03	2.09E-03	1.96E-03	1.66E-02	1.65E-02	1.50E-03	1.37E-03	1.33E-03	7.49E-03
Hexane	4.573	1.78E-03	1.77E-03	2.79E-04	1.38E-03	1.29E-03	1.21E-03	1.76E-04	1.74E-04	9.29E-04	8.45E-04	8.23E-04	7.93E-05
Manganese Compounds	0.006	1.50E-07	2.19E-07	9.88E-06	1.32E-07	1.62E-07	1.58E-07	7.40E-06	6.60E-06	1.21E-07	9.63E-08	8.52E-08	3.63E-06
Mercury Compounds	0.002	1.25E-08	1.83E-08	2.82E-06	1.10E-08	1.35E-08	1.32E-08	2.12E-06	1.89E-06	1.01E-08	8.03E-09	7.10E-09	1.04E-06
Nickel Compounds	0.003	8.75E-08	1.28E-07	4.23E-06	7.67E-08	9.45E-08	9.21E-08	3.17E-06	2.83E-06	7.05E-08	5.62E-08	4.97E-08	1.56E-06
Polycyclic Organic Matter	0.006	2.74E-06	2.72E-06	3.14E-07	2.12E-06	1.98E-06	1.86E-06	1.98E-07	1.96E-07	1.43E-06	1.30E-06	1.27E-06	8.93E-08
Propionaldehyde	1.187	3.37E-04	3.35E-04	1.73E-03	2.61E-04	2.44E-04	2.30E-04	1.09E-03	1.08E-03	1.76E-04	1.60E-04	1.56E-04	4.92E-04
Styrene	0.415	1.25E-04	1.24E-04	1.04E-04	9.67E-05	9.06E-05	8.52E-05	6.58E-05	6.51E-05	6.52E-05	5.94E-05	5.78E-05	2.96E-05
Toluene	29.842	1.19E-02	1.18E-02	2.63E-03	9.16E-03	8.59E-03	8.07E-03	1.66E-03	1.65E-03	6.18E-03	5.63E-03	5.48E-03	7.49E-04
Xylenes (isomers and mixture)	31.193	1.12E-02	1.11E-02	1.86E-03	8.65E-03	8.10E-03	7.62E-03	1.17E-03	1.16E-03	5.83E-03	5.31E-03	5.17E-03	5.29E-04

Table C-4-6a
MOA NONROAD Emissions - Winter 1999

SCC	2270006030	2265002045	2265005040	2270003010	2282010005	2270002039	2265003060	2270002009	2270005060	2265002027	2260003030	2265005035	
Equipment Name	Winter TOTAL (tons)	Pressure Washers	Cranes	Tillers > 6 HP	Aerial Lifts	Inboard/Stern drive	Concrete/Industrial Saws	AC/Refrigeration	Plate Compactors	Irrigation Sets	Signal Boards/Light Plants	Sweepers/Scrubbers	Sprayers
Tech Type		Dsl	4-St	4-St	Dsl	4-St	Dsl	4-St	Dsl	Dsl	4-St	2-St	4-St
Equipment Population		22.2	1.2	23.4	3.5	2,053.0	3.4	0.8	12.6	1.3	1.6	0.3	4.3
Activity (hrs/season)		1,609.3	170.3	281.5	612.7	154.1	649.8	215.6	2,033.5	270.9	172.7	80.5	95.2
Activity (hrs/season/unit)		72.50	138.75	12.01	172.97	0.08	193.92	272.52	161.82	209.18	106.32	232.43	22.34
Exhaust PM (tons)	82.88	4.62E-02	4.52E-04	1.76E-04	2.64E-02	4.09E-04	2.92E-02	2.82E-04	4.00E-02	1.55E-02	1.72E-04	7.86E-04	1.50E-04
TOTAL VOC (tons)	441.55	4.49E-02	4.25E-02	3.53E-02	3.25E-02	3.23E-02	3.03E-02	2.82E-02	2.77E-02	2.22E-02	2.06E-02	1.90E-02	1.67E-02
Total Exhaust VOC (tons)	441.55	4.49E-02	4.25E-02	3.53E-02	3.25E-02	3.23E-02	3.03E-02	2.82E-02	2.77E-02	2.22E-02	2.06E-02	1.90E-02	1.67E-02
Exh VOC	430.06	4.40E-02	3.38E-02	2.75E-02	3.18E-02	3.23E-02	2.97E-02	2.74E-02	2.72E-02	2.18E-02	2.06E-02	1.90E-02	1.46E-02
Crankcase VOC	11.49	8.79E-04	8.73E-03	7.78E-03	6.36E-04	0.00E+00	5.95E-04	7.97E-04	5.44E-04	4.36E-04	7.99E-06	0.00E+00	2.04E-03
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	8.34E-05	4.05E-05	3.36E-05	6.04E-05	3.07E-05	5.64E-05	2.68E-05	5.16E-05	4.14E-05	1.96E-05	4.08E-05	1.59E-05
Acetaldehyde	8.722	3.33E-03	3.49E-04	2.90E-04	2.41E-03	2.64E-04	2.25E-03	2.31E-04	2.06E-03	1.65E-03	1.69E-04	6.31E-05	1.37E-04
Acrolein	1.238	5.16E-04	2.95E-05	2.45E-05	3.73E-04	2.23E-05	3.49E-04	1.95E-05	3.19E-04	2.56E-04	1.43E-05	5.63E-06	1.15E-05
Benzene (including benzene from gasoline)	12.276	9.11E-04	2.01E-03	1.67E-03	6.59E-04	1.52E-03	6.16E-04	1.33E-03	5.63E-04	4.51E-04	9.73E-04	4.28E-04	7.87E-04
Chromium Compounds	0.006	3.23E-06	2.71E-08	1.06E-08	1.85E-06	2.45E-08	2.04E-06	1.69E-08	2.80E-06	1.09E-06	1.03E-08	4.71E-08	9.01E-09
Ethyl benzene	7.458	1.39E-04	7.65E-04	6.36E-04	1.01E-04	5.81E-04	9.40E-05	5.07E-04	8.60E-05	6.89E-05	3.71E-04	4.13E-04	3.00E-04
Formaldehyde	16.743	6.73E-03	6.76E-04	5.61E-04	4.87E-03	5.13E-04	4.55E-03	4.48E-04	4.16E-03	3.34E-03	3.28E-04	6.54E-05	2.65E-04
Hexane	4.573	7.13E-05	4.17E-04	3.47E-04	5.16E-05	3.17E-04	4.82E-05	2.77E-04	4.41E-05	3.54E-05	2.02E-04	2.65E-04	1.64E-04
Manganese Compounds	0.006	3.23E-06	5.42E-08	2.12E-08	1.85E-06	4.91E-08	2.04E-06	3.38E-08	2.80E-06	1.09E-06	2.06E-08	9.43E-08	1.80E-08
Mercury Compounds	0.002	9.24E-07	4.52E-09	1.76E-09	5.29E-07	4.09E-09	5.83E-07	2.82E-09	8.01E-07	3.11E-07	1.72E-09	7.86E-09	1.50E-09
Nickel Compounds	0.003	1.39E-06	3.16E-08	1.24E-08	7.93E-07	2.86E-08	8.75E-07	1.97E-08	1.20E-06	4.66E-07	1.20E-08	5.50E-08	1.05E-08
Polycyclic Organic Matter	0.006	8.03E-08	6.42E-07	5.33E-07	5.81E-08	4.87E-07	5.43E-08	4.26E-07	4.97E-08	3.98E-08	3.11E-07	3.15E-07	2.52E-07
Propionaldehyde	1.187	4.42E-04	7.91E-05	6.57E-05	3.20E-04	6.00E-05	2.99E-04	5.24E-05	2.73E-04	2.19E-04	3.83E-05	4.63E-06	3.10E-05
Styrene	0.415	2.66E-05	2.93E-05	2.44E-05	1.93E-05	2.23E-05	1.80E-05	1.94E-05	1.65E-05	1.32E-05	1.42E-05	2.24E-05	1.15E-05
Toluene	29.842	6.73E-04	2.78E-03	2.31E-03	4.87E-04	2.11E-03	4.55E-04	1.84E-03	4.16E-04	3.34E-04	1.35E-03	1.69E-03	1.09E-03
Xylenes (isomers and mixture)	31.193	4.75E-04	2.62E-03	2.18E-03	3.44E-04	1.99E-03	3.21E-04	1.74E-03	2.94E-04	2.36E-04	1.27E-03	1.85E-03	1.03E-03

Table C-4-6a
MOA NONROAD Emissions - Winter 1999

SCC		2265001020	2260005050	2270005055	2270003050	2270002042	2265005045	2270005035	2265003050	2270002078	2270005045	2265005025	2282020005
Equipment Name	Winter TOTAL (tons)	Snowmobiles	Sprayers	Other Agricultural Equipment	Other Material Handling Eqp	Cement & Mortar Mixers	Swathers	Sprayers	Other Material Handling Eqp	Dumpers/Tend ers	Swathers	Balers	Inboard
Tech Type		4-St	2-St	Dsl	Dsl	Dsl	4-St	Dsl	4-St	Dsl	Dsl	4-St	Dsl
Equipment Population		167.0	1.7	0.9	0.4	7.1	0.4	1.3	0.2	0.8	2.6	0.4	217.1
Activity (hrs/season)		83.5	38.1	91.9	70.7	654.7	11.7	32.6	30.1	158.5	79.6	8.1	16.3
Activity (hrs/season/unit)		0.50	22.34	106.41	189.64	91.94	26.53	25.14	173.87	189.23	30.72	18.99	0.08
Exhaust PM (tons)	82.88	1.01E-04	4.15E-04	5.78E-03	6.63E-03	1.13E-02	5.24E-05	2.78E-03	4.53E-05	3.80E-03	4.19E-03	2.00E-05	9.80E-04
TOTAL VOC (tons)	441.55	1.17E-02	1.09E-02	9.41E-03	8.97E-03	7.87E-03	7.20E-03	5.49E-03	5.01E-03	4.42E-03	3.54E-03	2.74E-03	1.90E-03
Total Exhaust VOC (tons)	441.55	1.17E-02	1.09E-02	9.41E-03	8.97E-03	7.87E-03	7.20E-03	5.49E-03	5.01E-03	4.42E-03	3.54E-03	2.74E-03	1.90E-03
Exh VOC	430.06	9.07E-03	1.09E-02	9.23E-03	8.79E-03	7.72E-03	5.53E-03	5.38E-03	4.63E-03	4.34E-03	3.47E-03	2.11E-03	1.90E-03
Crankcase VOC	11.49	2.68E-03	0.00E+00	1.85E-04	1.76E-04	1.54E-04	1.67E-03	1.08E-04	3.82E-04	8.67E-05	6.93E-05	6.37E-04	0.00E+00
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	0.799	1.12E-05	2.35E-05	1.75E-05	1.67E-05	1.46E-05	6.85E-06	1.02E-05	4.77E-06	8.23E-06	6.58E-06	2.61E-06	3.54E-06
Acetaldehyde	8.722	9.63E-05	3.64E-05	6.99E-04	6.66E-04	5.85E-04	5.90E-05	4.08E-04	4.11E-05	3.29E-04	2.63E-04	2.25E-05	1.41E-04
Acrolein	1.238	8.14E-06	3.24E-06	1.08E-04	1.03E-04	9.05E-05	4.99E-06	6.31E-05	3.47E-06	5.09E-05	4.07E-05	1.90E-06	2.19E-05
Benzene (including benzene from gasoline)	12.276	5.54E-04	2.47E-04	1.91E-04	1.82E-04	1.60E-04	3.40E-04	1.11E-04	2.36E-04	8.98E-05	7.18E-05	1.30E-04	3.86E-05
Chromium Chompounds	0.006	6.04E-09	2.49E-08	4.04E-07	4.64E-07	7.88E-07	3.14E-09	1.95E-07	2.72E-09	2.66E-07	2.93E-07	1.20E-09	6.86E-08
Ethyl benzene	7.458	2.11E-04	2.38E-04	2.92E-05	2.78E-05	2.44E-05	1.30E-04	1.70E-05	9.01E-05	1.37E-05	1.10E-05	4.94E-05	5.90E-06
Formaldehyde	16.743	1.87E-04	3.77E-05	1.41E-03	1.34E-03	1.18E-03	1.14E-04	8.23E-04	7.96E-05	6.63E-04	5.30E-04	4.36E-05	2.86E-04
Hexane	4.573	1.15E-04	1.53E-04	1.50E-05	1.43E-05	1.25E-05	7.07E-05	8.73E-06	4.92E-05	7.03E-06	5.62E-06	2.69E-05	3.03E-06
Manganese Compounds	0.006	1.21E-08	4.98E-08	4.04E-07	4.64E-07	7.88E-07	6.29E-09	1.95E-07	5.43E-09	2.66E-07	2.93E-07	2.40E-09	6.86E-08
Mercury Compounds	0.002	1.01E-09	4.15E-09	1.16E-07	1.33E-07	2.25E-07	5.24E-10	5.57E-08	4.53E-10	7.60E-08	8.38E-08	2.00E-10	1.96E-08
Nickel Compounds	0.003	7.05E-09	2.90E-08	1.73E-07	1.99E-07	3.38E-07	3.67E-09	8.35E-08	3.17E-09	1.14E-07	1.26E-07	1.40E-09	2.94E-08
Polycyclic Organic Matter	0.006	1.77E-07	1.81E-07	1.68E-08	1.60E-08	1.41E-08	1.09E-07	9.83E-09	7.56E-08	7.92E-09	6.33E-09	4.14E-08	3.41E-09
Propionaldehyde	1.187	2.18E-05	2.66E-06	9.27E-05	8.83E-05	7.76E-05	1.34E-05	5.41E-05	9.31E-06	4.36E-05	3.48E-05	5.10E-06	1.88E-05
Styrene	0.415	8.10E-06	1.29E-05	5.59E-06	5.33E-06	4.68E-06	4.97E-06	3.26E-06	3.46E-06	2.63E-06	2.10E-06	1.89E-06	1.13E-06
Toluene	29.842	7.68E-04	9.72E-04	1.41E-04	1.34E-04	1.18E-04	4.71E-04	8.23E-05	3.27E-04	6.63E-05	5.30E-05	1.79E-04	2.86E-05
Xylenes (isomers and mixture)	31.193	7.24E-04	1.07E-03	9.98E-05	9.50E-05	8.35E-05	4.44E-04	5.82E-05	3.09E-04	4.69E-05	3.75E-05	1.69E-04	2.02E-05

Table C-4-6a
MOA NONROAD Emissions - Winter 1999

SCC	2265002006	2265005055	2282020010	
Equipment Name	Winter TOTAL (tons)	Tampers/Ram mers	Other Agricultural Equipment	Outboard
Tech Type		4-St	4-St	Dsl
Equipment Population		0.4	0.4	2.9
Activity (hrs/season)		21.7	14.8	0.2
Activity (hrs/season/unit)		53.49	34.63	0.08
Exhaust PM (tons)	82.88	1.41E-05	1.15E-05	3.98E-06
TOTAL VOC (tons)	441.55	1.70E-03	1.48E-03	3.91E-06
Total Exhaust VOC (tons)	441.55	1.70E-03	1.48E-03	3.91E-06
Exh VOC	430.06	1.50E-03	1.26E-03	3.91E-06
Crankcase VOC	11.49	2.02E-04	2.19E-04	0.00E+00
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00
Chemical Name				
1,3-Butadiene	0.799	1.62E-06	1.41E-06	7.28E-09
Acetaldehyde	8.722	1.39E-05	1.22E-05	2.91E-07
Acrolein	1.238	1.18E-06	1.03E-06	4.50E-08
Benzene (including benzene from gasoline)	12.276	8.02E-05	7.00E-05	7.95E-08
Chromium Compounds	0.006	8.43E-10	6.88E-10	2.78E-10
Ethyl benzene	7.458	3.06E-05	2.67E-05	1.21E-08
Formaldehyde	16.743	2.70E-05	2.36E-05	5.87E-07
Hexane	4.573	1.67E-05	1.46E-05	6.22E-09
Manganese Compounds	0.006	1.69E-09	1.38E-09	2.78E-10
Mercury Compounds	0.002	1.41E-10	1.15E-10	7.95E-11
Nickel Compounds	0.003	9.84E-10	8.03E-10	1.19E-10
Polycyclic Organic Matter	0.006	2.57E-08	2.24E-08	7.01E-12
Propionaldehyde	1.187	3.16E-06	2.76E-06	3.86E-08
Styrene	0.415	1.17E-06	1.02E-06	2.33E-09
Toluene	29.842	1.11E-04	9.70E-05	5.87E-08
Xylenes (isomers and mixture)	31.193	1.05E-04	9.15E-05	4.15E-08

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2260004020	2282005010	2265004010	2265004055	2260001030	2265004071	2260007005	2260004026	2260004031	2282010005	2265006005	2260004025
Equipment Name	Summer TOTAL (tons)	Chain Saws < 6 HP (res)	Outboard	Lawn mowers (res)	Lawn & Garden Tractors (res)	All Terrain Vehicles/Moto rcycles	Commercial Turf Equipment (com)	Logging Equipment Chain Saws > 6 HP	Trimmers/E dgers/Brush Cutter (com)	Leafblowers/ Vacuums (com)	Inboard/Ster ndrive	Generator Sets	Trimmers/E dgers/Brush Cutter (res)
Tech Type		2-St	2-St	4-St	4-St	2-St	4-St	2-St	2-St	2-St	4-St	4-St	2-St
Equipment Population		4,690.4	9,817.8	27,032.6	9,844.9	1,893.0	463.2	332.9	911.1	354.0	2,053.0	3,405.0	11,382.0
Activity (hrs/season)		171,041.6	4,171.8	675,813.8	443,018.3	32,181.1	315,915.8	50,429.8	124,820.3	99,837.1	872.4	195,786.2	102,437.9
Activity (hrs/season/unit)		36.47	0.42	25.00	45.00	17.00	682.00	151.50	137.00	282.00	0.42	57.50	9.00
Exhaust PM (tons)	151.3	3.45E+00	3.45E-01	3.62E-01	3.69E-01	8.09E-01	3.83E-01	2.48E+00	1.64E+00	1.76E+00	2.31E-03	2.24E-01	1.08E+00
TOTAL VOC (tons)	942.2	6.77E+01	6.60E+01	5.48E+01	5.05E+01	4.03E+01	4.02E+01	4.01E+01	3.86E+01	3.64E+01	3.50E+01	3.44E+01	3.12E+01
Total Exhaust VOC (tons)	806.4	6.77E+01	6.02E+00	5.35E+01	4.73E+01	3.41E+01	3.99E+01	3.99E+01	3.86E+01	3.64E+01	1.79E-01	3.18E+01	3.11E+01
Exh VOC	784.5	6.77E+01	6.02E+00	5.14E+01	4.54E+01	3.41E+01	3.86E+01	3.99E+01	3.86E+01	3.64E+01	1.79E-01	2.70E+01	3.11E+01
Crankcase VOC	21.8	0.00E+00	0.00E+00	2.13E+00	1.88E+00	0.00E+00	1.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.81E+00	0.00E+00
Total Evap VOC (tons)	135.8	6.57E-02	6.00E+01	1.25E+00	3.23E+00	6.20E+00	2.46E-01	1.55E-01	8.75E-03	4.36E-03	3.49E+01	2.55E+00	8.84E-02
Chemical Name													
1,3-Butadiene	1.317	1.5E-01	1.3E-02	5.1E-02	4.5E-02	7.3E-02	3.8E-02	8.6E-02	8.3E-02	7.8E-02	1.7E-04	3.0E-02	6.7E-02
Acetaldehyde	15.123	1.1E-01	1.0E-02	2.2E-01	1.9E-01	5.7E-02	1.6E-01	6.6E-02	6.4E-02	6.0E-02	7.3E-04	1.3E-01	5.2E-02
Acrolein	2.374	2.0E-02	1.8E-03	3.7E-02	3.3E-02	1.0E-02	2.8E-02	1.2E-02	1.2E-02	1.1E-02	1.2E-04	2.2E-02	9.3E-03
Benzene (including benzene from gasoline)	30.731	1.7E+00	1.5E+00	2.8E+00	2.6E+00	1.0E+00	2.1E+00	1.0E+00	9.7E-01	9.2E-01	7.8E-01	1.7E+00	7.9E-01
Chromium Chompounds	0.010	2.1E-04	2.1E-05	2.2E-05	2.2E-05	4.9E-05	2.3E-05	1.5E-04	9.9E-05	1.1E-04	1.4E-07	1.3E-05	6.5E-05
Ethyl benzene	15.370	1.6E+00	6.1E-01	1.1E+00	9.6E-01	8.7E-01	7.9E-01	9.6E-01	9.3E-01	8.7E-01	2.7E-01	6.5E-01	7.5E-01
Formaldehyde	31.309	1.7E-01	1.5E-02	6.3E-01	5.5E-01	8.7E-02	4.7E-01	1.0E-01	9.8E-02	9.2E-02	2.1E-03	3.7E-01	7.9E-02
Hexane	11.064	9.6E-01	1.5E+00	5.6E-01	5.4E-01	6.3E-01	4.0E-01	5.7E-01	5.5E-01	5.2E-01	8.2E-01	3.8E-01	4.4E-01
Manganese Compounds	0.011	4.1E-04	4.1E-05	4.3E-05	4.4E-05	9.7E-05	4.6E-05	3.0E-04	2.0E-04	2.1E-04	2.8E-07	2.7E-05	1.3E-04
Mercury Compounds	0.003	3.4E-05	3.5E-06	3.6E-06	3.7E-06	8.1E-06	3.8E-06	2.5E-05	1.6E-05	1.8E-05	2.3E-08	2.2E-06	1.1E-05
Nickel Compounds	0.005	2.4E-04	2.4E-05	2.5E-05	2.6E-05	5.7E-05	2.7E-05	1.7E-04	1.1E-04	1.2E-04	1.6E-07	1.6E-05	7.6E-05
Polycyclic Organic Matter	0.010	1.1E-03	1.0E-04	8.1E-04	7.1E-04	5.7E-04	6.0E-04	6.6E-04	6.4E-04	6.0E-04	2.7E-06	4.8E-04	5.2E-04
Propionaldehyde	2.420	1.7E-02	1.5E-03	1.0E-01	8.9E-02	8.4E-03	7.5E-02	9.9E-03	9.5E-03	9.0E-03	3.4E-04	6.0E-02	7.7E-03
Styrene	0.757	8.8E-02	7.8E-03	4.1E-02	3.6E-02	4.4E-02	3.0E-02	5.2E-02	5.0E-02	4.7E-02	1.4E-04	2.4E-02	4.0E-02
Toluene	61.702	6.6E+00	3.1E+00	3.9E+00	3.5E+00	3.6E+00	2.9E+00	3.9E+00	3.8E+00	3.6E+00	1.5E+00	2.4E+00	3.0E+00
Xylenes (isomers and mixture)	60.084	7.2E+00	2.0E+00	3.7E+00	3.3E+00	3.8E+00	2.7E+00	4.3E+00	4.1E+00	3.9E+00	7.9E-01	2.2E+00	3.3E+00

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2270002066	2282005015	2270002072	2270002060	2260004030	2270002036	2260002054	2265006030	2265004011	2265004016	2270002069	2260006010
Equipment Name	Summer TOTAL (tons)	Tractors/Loaders/Backhoes	Personal Water Craft	Skid Steer Loaders	Rubber Tire Loaders	Leafblowers/Vacuums (res)	Excavators	Concrete/Industrial Saws	Pressure Washers	Lawn mowers (Com)	Rotary Tillers < 6 HP (com)	Crawler Tractor/Dozers	Pumps
Tech Type		Dsl	2-St	Dsl	Dsl	2-St	Dsl	2-St	4-St	4-St	4-St	Dsl	2-St
Equipment Population		389.6	1,327.2	487.2	246.3	5,775.0	159.2	79.2	1,582.8	759.1	239.4	239.6	352.9
Activity (hrs/season)		294,321.4	1,327.2	265,262.6	124,768.5	57,750.0	115,704.2	31,755.0	91,009.2	308,185.5	113,010.0	149,284.6	38,996.9
Activity (hrs/season/unit)		755.53	1.00	544.51	506.57	10.00	726.90	401.02	57.50	406.00	472.00	623.06	110.50
Exhaust PM (tons)	151.3	1.98E+01	1.81E-01	1.44E+01	1.38E+01	7.05E-01	1.06E+01	9.93E-01	1.23E-01	1.20E-01	1.79E-01	9.97E+00	4.23E-01
TOTAL VOC (tons)	942.2	2.85E+01	2.24E+01	2.16E+01	2.03E+01	1.99E+01	1.81E+01	1.67E+01	1.58E+01	1.54E+01	1.36E+01	1.10E+01	1.07E+01
Total Exhaust VOC (tons)	806.4	2.85E+01	3.98E+00	2.16E+01	2.03E+01	1.99E+01	1.81E+01	1.67E+01	1.51E+01	1.54E+01	1.36E+01	1.10E+01	1.07E+01
Exh VOC	784.5	2.79E+01	3.98E+00	2.12E+01	1.99E+01	1.99E+01	1.78E+01	1.67E+01	1.42E+01	1.54E+01	1.32E+01	1.08E+01	1.07E+01
Crankcase VOC	21.8	5.58E-01	0.00E+00	4.24E-01	3.99E-01	0.00E+00	3.55E-01	0.00E+00	9.29E-01	4.36E-02	3.37E-01	2.17E-01	0.00E+00
Total Evap VOC (tons)	135.8	0.00E+00	1.84E+01	0.00E+00	0.00E+00	4.96E-02	0.00E+00	2.01E-02	6.74E-01	3.51E-02	1.28E-02	0.00E+00	3.64E-02
Chemical Name													
1,3-Butadiene	1.317	5.3E-02	8.6E-03	4.0E-02	3.8E-02	4.3E-02	3.4E-02	3.6E-02	1.4E-02	1.5E-02	1.3E-02	2.1E-02	2.3E-02
Acetaldehyde	15.123	2.1E+00	6.6E-03	1.6E+00	1.5E+00	3.3E-02	1.3E+00	2.8E-02	6.2E-02	6.3E-02	5.6E-02	8.2E-01	1.8E-02
Acrolein	2.374	3.3E-01	1.2E-03	2.5E-01	2.3E-01	6.0E-03	2.1E-01	5.0E-03	1.1E-02	1.1E-02	9.5E-03	1.3E-01	3.2E-03
Benzene (including benzene from gasoline)	30.731	5.8E-01	5.0E-01	4.4E-01	4.1E-01	5.0E-01	3.7E-01	4.2E-01	8.1E-01	8.1E-01	7.1E-01	2.2E-01	2.7E-01
Chromium Compounds	0.010	1.4E-03	1.1E-05	1.0E-03	9.6E-04	4.2E-05	7.4E-04	6.0E-05	7.4E-06	7.2E-06	1.1E-05	7.0E-04	2.5E-05
Ethyl benzene	15.370	8.8E-02	2.4E-01	6.7E-02	6.3E-02	4.8E-01	5.6E-02	4.0E-01	3.0E-01	3.1E-01	2.7E-01	3.4E-02	2.6E-01
Formaldehyde	31.309	4.3E+00	1.0E-02	3.2E+00	3.1E+00	5.0E-02	2.7E+00	4.2E-02	1.8E-01	1.8E-01	1.6E-01	1.7E+00	2.7E-02
Hexane	11.064	4.5E-02	4.9E-01	3.4E-02	3.2E-02	2.8E-01	2.9E-02	2.4E-01	1.7E-01	1.5E-01	1.4E-01	1.8E-02	1.5E-01
Manganese Compounds	0.011	1.4E-03	2.2E-05	1.0E-03	9.6E-04	8.5E-05	7.4E-04	1.2E-04	1.5E-05	1.4E-05	2.2E-05	7.0E-04	5.1E-05
Mercury Compounds	0.003	4.0E-04	1.8E-06	2.9E-04	2.8E-04	7.0E-06	2.1E-04	9.9E-06	1.2E-06	1.2E-06	1.8E-06	2.0E-04	4.2E-06
Nickel Compounds	0.005	5.9E-04	1.3E-05	4.3E-04	4.1E-04	4.9E-05	3.2E-04	7.0E-05	8.6E-06	8.4E-06	1.3E-05	3.0E-04	3.0E-05
Polycyclic Organic Matter	0.010	5.1E-05	6.6E-05	3.9E-05	3.6E-05	3.3E-04	3.2E-05	2.8E-04	2.3E-04	2.3E-04	2.1E-04	2.0E-05	1.8E-04
Propionaldehyde	2.420	2.8E-01	9.8E-04	2.1E-01	2.0E-01	4.9E-03	1.8E-01	4.1E-03	2.8E-02	2.9E-02	2.6E-02	1.1E-01	2.6E-03
Styrene	0.757	1.7E-02	5.2E-03	1.3E-02	1.2E-02	2.6E-02	1.1E-02	2.2E-02	1.1E-02	1.2E-02	1.0E-02	6.6E-03	1.4E-02
Toluene	61.702	4.3E-01	1.1E+00	3.2E-01	3.1E-01	1.9E+00	2.7E-01	1.6E+00	1.1E+00	1.1E+00	9.8E-01	1.7E-01	1.0E+00
Xylenes (isomers and mixture)	60.084	3.0E-01	8.4E-01	2.3E-01	2.2E-01	2.1E+00	1.9E-01	1.8E+00	1.0E+00	1.0E+00	9.2E-01	1.2E-01	1.1E+00

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2265004056	2265001030	2265006010	2270003060	2265004031	2270008005	2265006025	2270002057	2260002006	2270004071	2270002051
Equipment Name	Summer TOTAL (tons)	Lawn & Garden Tractors (com)	All Terrain Vehicles/Mot orcycles	Pumps	AC\Refrigerat ion	Leafblowers/ Vacuums (com)	Airport Support Equipment	Welders	Rough Terrain Forklift	Tampers/Ram mers	Commercial Turf Equipment (com)	Off-highway Trucks
Tech Type		4-St	4-St	4-St	Dsl	4-St	Dsl	4-St	Dsl	2-St	Dsl	Dsl
Equipment Population		158.3	5,913.3	592.8	582.8	172.4	145.1	181.1	132.4	181.1	208.4	21.4
Activity (hrs/season)		114,145.5	100,526.4	65,506.3	429,495.1	48,623.8	53,097.1	36,953.3	58,329.5	19,289.7	222,592.2	23,335.8
Activity (hrs/season/unit)		721.00	17.00	110.50	736.95	282.00	366.00	204.00	440.67	106.51	1068.00	1092.35
Exhaust PM (tons)	151.3	1.09E-01	4.21E-02	7.24E-02	9.03E+00	6.92E-02	4.80E+00	7.09E-02	4.87E+00	3.93E-01	5.20E+00	4.67E+00
TOTAL VOC (tons)	942.2	1.07E+01	9.96E+00	8.91E+00	7.87E+00	7.17E+00	6.84E+00	6.82E+00	6.80E+00	6.47E+00	6.38E+00	6.23E+00
Total Exhaust VOC (tons)	806.4	1.06E+01	4.55E+00	8.58E+00	7.87E+00	7.16E+00	6.84E+00	6.59E+00	6.80E+00	6.43E+00	6.38E+00	6.23E+00
Exh VOC	784.5	1.05E+01	3.61E+00	8.22E+00	7.72E+00	6.71E+00	6.71E+00	6.17E+00	6.67E+00	6.43E+00	6.25E+00	6.11E+00
Crankcase VOC	21.8	1.14E-01	9.37E-01	3.56E-01	1.54E-01	4.47E-01	1.34E-01	4.17E-01	1.33E-01	0.00E+00	1.25E-01	1.22E-01
Total Evap VOC (tons)	135.8	5.21E-02	5.41E+00	3.26E-01	0.00E+00	1.54E-02	0.00E+00	2.32E-01	0.00E+00	4.28E-02	0.00E+00	0.00E+00
Chemical Name												
1,3-Butadiene	1.317	1.0E-02	4.3E-03	8.2E-03	1.5E-02	6.8E-03	1.3E-02	6.3E-03	1.3E-02	1.4E-02	1.2E-02	1.2E-02
Acetaldehyde	15.123	4.4E-02	1.9E-02	3.5E-02	5.8E-01	2.9E-02	5.1E-01	2.7E-02	5.1E-01	1.1E-02	4.7E-01	4.6E-01
Acrolein	2.374	7.4E-03	3.2E-03	6.0E-03	9.1E-02	5.0E-03	7.9E-02	4.6E-03	7.8E-02	1.9E-03	7.3E-02	7.2E-02
Benzene (including benzene from gasoline)	30.731	5.6E-01	3.6E-01	4.6E-01	1.6E-01	3.8E-01	1.4E-01	3.5E-01	1.4E-01	1.6E-01	1.3E-01	1.3E-01
Chromium Chompounds	0.010	6.5E-06	2.5E-06	4.3E-06	6.3E-04	4.1E-06	3.4E-04	4.3E-06	3.4E-04	2.4E-05	3.6E-04	3.3E-04
Ethyl benzene	15.370	2.1E-01	1.3E-01	1.7E-01	2.4E-02	1.4E-01	2.1E-02	1.3E-01	2.1E-02	1.5E-01	2.0E-02	1.9E-02
Formaldehyde	31.309	1.2E-01	5.3E-02	1.0E-01	1.2E+00	8.4E-02	1.0E+00	7.7E-02	1.0E+00	1.6E-02	9.6E-01	9.3E-01
Hexane	11.064	1.1E-01	1.7E-01	9.3E-02	1.3E-02	7.1E-02	1.1E-02	7.1E-02	1.1E-02	9.2E-02	1.0E-02	9.9E-03
Manganese Compounds	0.011	1.3E-05	5.0E-06	8.7E-06	6.3E-04	8.3E-06	3.4E-04	8.5E-06	3.4E-04	4.7E-05	3.6E-04	3.3E-04
Mercury Compounds	0.003	1.1E-06	4.2E-07	7.2E-07	1.8E-04	6.9E-07	9.6E-05	7.1E-07	9.7E-05	3.9E-06	1.0E-04	9.3E-05
Nickel Compounds	0.005	7.6E-06	2.9E-06	5.1E-06	2.7E-04	4.8E-06	1.4E-04	5.0E-06	1.5E-04	2.7E-05	1.6E-04	1.4E-04
Polycyclic Organic Matter	0.010	1.6E-04	6.9E-05	1.3E-04	1.4E-05	1.1E-04	1.2E-05	9.9E-05	1.2E-05	1.1E-04	1.1E-05	1.1E-05
Propionaldehyde	2.420	2.0E-02	8.5E-03	1.6E-02	7.8E-02	1.3E-02	6.7E-02	1.2E-02	6.7E-02	1.6E-03	6.3E-02	6.1E-02
Styrene	0.757	8.1E-03	3.4E-03	6.5E-03	4.7E-03	5.4E-03	4.1E-03	5.0E-03	4.0E-03	8.4E-03	3.8E-03	3.7E-03
Toluene	61.702	7.7E-01	5.5E-01	6.3E-01	1.2E-01	5.1E-01	1.0E-01	4.8E-01	1.0E-01	6.3E-01	9.6E-02	9.3E-02
Xylenes (isomers and mixture)	60.084	7.2E-01	4.3E-01	5.9E-01	8.3E-02	4.9E-01	7.3E-02	4.5E-01	7.2E-02	6.9E-01	6.8E-02	6.6E-02

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2270002045	2265004015	2260004016	2270002075	2270002048	2265004075	2265006015	2265003020	2265004040	2270006005	2265001060	2265004076
Equipment Name	Summer TOTAL (tons)	Cranes	Rotary Tillers < 6 HP (res)	Rotary Tillers < 6 HP (com)	Off-Highway Tractors	Graders	Other Lawn & Garden Eqp. (res)	Air Compressors	Forklifts	Rear Engine Riding Mowers (res)	Generator Sets	Specialty Vehicle Carts	Other Lawn & Garden Eqp. (com)
Tech Type		Dsl	4-St	2-St	Dsl	Dsl	4-St	4-St	4-St	4-St	Dsl	4-St	4-St
Equipment Population		111.8	2,376.9	39.1	35.6	99.3	485.0	128.0	41.6	1,440.3	325.9	240.0	348.9
Activity (hrs/season)		73,703.7	40,406.9	18,450.6	20,264.1	63,572.1	29,586.5	30,975.1	38,074.3	51,852.3	55,080.9	10,743.9	21,281.7
Activity (hrs/season/unit)		659.01	17.00	472.00	569.14	640.37	61.00	242.00	914.45	36.00	169.00	44.76	61.00
Exhaust PM (tons)	151.3	4.35E+00	1.41E-02	1.65E-01	3.23E+00	3.68E+00	5.45E-02	3.87E-02	7.73E-02	2.71E-02	2.53E+00	2.10E-02	3.92E-02
TOTAL VOC (tons)	942.2	5.53E+00	4.70E+00	4.68E+00	4.44E+00	4.27E+00	4.22E+00	4.16E+00	3.62E+00	3.50E+00	3.30E+00	3.18E+00	3.03E+00
Total Exhaust VOC (tons)	806.4	5.53E+00	4.57E+00	4.68E+00	4.44E+00	4.27E+00	4.19E+00	4.02E+00	3.60E+00	3.32E+00	3.30E+00	2.86E+00	3.01E+00
Exh VOC	784.5	5.43E+00	4.37E+00	4.68E+00	4.35E+00	4.19E+00	4.05E+00	3.68E+00	2.71E+00	3.19E+00	3.23E+00	2.26E+00	2.91E+00
Crankcase VOC	21.8	1.09E-01	2.05E-01	0.00E+00	8.70E-02	8.37E-02	1.39E-01	3.39E-01	8.87E-01	1.30E-01	6.46E-02	6.03E-01	9.96E-02
Total Evap VOC (tons)	135.8	0.00E+00	1.27E-01	1.14E-03	0.00E+00	0.00E+00	2.95E-02	1.39E-01	1.89E-02	1.74E-01	0.00E+00	3.20E-01	2.13E-02
Chemical Name													
1,3-Butadiene	1.317	1.0E-02	4.4E-03	1.0E-02	8.3E-03	7.9E-03	4.0E-03	3.8E-03	3.4E-03	3.2E-03	6.1E-03	2.7E-03	2.9E-03
Acetaldehyde	15.123	4.1E-01	1.9E-02	7.8E-03	3.3E-01	3.2E-01	1.7E-02	1.6E-02	1.5E-02	1.4E-02	2.4E-01	1.2E-02	1.2E-02
Acrolein	2.374	6.4E-02	3.2E-03	1.4E-03	5.1E-02	4.9E-02	2.9E-03	2.8E-03	2.5E-03	2.3E-03	3.8E-02	2.0E-03	2.1E-03
Benzene (including benzene from gasoline)	30.731	1.1E-01	2.4E-01	1.2E-01	9.0E-02	8.7E-02	2.2E-01	2.1E-01	1.9E-01	1.8E-01	6.7E-02	1.6E-01	1.6E-01
Chromium Compounds	0.010	3.0E-04	8.4E-07	9.9E-06	2.3E-04	2.6E-04	3.3E-06	2.3E-06	4.6E-06	1.6E-06	1.8E-04	1.3E-06	2.4E-06
Ethyl benzene	15.370	1.7E-02	9.2E-02	1.1E-01	1.4E-02	1.3E-02	8.3E-02	8.1E-02	7.1E-02	6.7E-02	1.0E-02	5.9E-02	6.0E-02
Formaldehyde	31.309	8.3E-01	5.4E-02	1.2E-02	6.7E-01	6.4E-01	4.9E-02	4.7E-02	4.2E-02	3.9E-02	4.9E-01	3.3E-02	3.5E-02
Hexane	11.064	8.8E-03	4.8E-02	6.6E-02	7.1E-03	6.8E-03	4.2E-02	4.3E-02	3.6E-02	3.7E-02	5.2E-03	3.6E-02	3.0E-02
Manganese Compounds	0.011	3.0E-04	1.7E-06	2.0E-05	2.3E-04	2.6E-04	6.5E-06	4.6E-06	9.3E-06	3.2E-06	1.8E-04	2.5E-06	4.7E-06
Mercury Compounds	0.003	8.7E-05	1.4E-07	1.6E-06	6.5E-05	7.4E-05	5.5E-07	3.9E-07	7.7E-07	2.7E-07	5.1E-05	2.1E-07	3.9E-07
Nickel Compounds	0.005	1.3E-04	9.9E-07	1.2E-05	9.7E-05	1.1E-04	3.8E-06	2.7E-06	5.4E-06	1.9E-06	7.6E-05	1.5E-06	2.7E-06
Polycyclic Organic Matter	0.010	9.9E-06	6.9E-05	7.8E-05	7.9E-06	7.6E-06	6.3E-05	6.1E-05	5.4E-05	5.0E-05	5.9E-06	4.3E-05	4.5E-05
Propionaldehyde	2.420	5.5E-02	8.6E-03	1.2E-03	4.4E-02	4.2E-02	7.9E-03	7.6E-03	6.8E-03	6.2E-03	3.2E-02	5.4E-03	5.7E-03
Styrene	0.757	3.3E-03	3.5E-03	6.1E-03	2.6E-03	2.5E-03	3.2E-03	3.0E-03	2.7E-03	2.5E-03	2.0E-03	2.2E-03	2.3E-03
Toluene	61.702	8.3E-02	3.3E-01	4.6E-01	6.7E-02	6.4E-02	3.0E-01	2.9E-01	2.6E-01	2.5E-01	4.9E-02	2.2E-01	2.2E-01
Xylenes (isomers and mixture)	60.084	5.9E-02	3.1E-01	5.0E-01	4.7E-02	4.5E-02	2.8E-01	2.8E-01	2.4E-01	2.3E-01	3.5E-02	2.0E-01	2.0E-01

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2270002015	2270002018	2260001060	2270006025	2265002042	2270006015	2265002039	2270002030	2270005015	2265002021	2265004066	2260004015
Equipment Name	Summer TOTAL (tons)	Rollers	Scrapers	Specialty Vehicle Carts	Welders	Cement & Mortar Mixers	Air Compressors	Concrete/Ind ustrial Saws	Trenchers	Agricultural Tractors	Paving Equipment	Chippers/Stu mp Grinders (com)	Rotary Tillers < 6 HP (res)
Tech Type		Dsl	Dsl	2-St	Dsl	4-St	Dsl	4-St	Dsl	Dsl	4-St	4-St	2-St
Equipment Population		130.7	36.4	611.0	154.8	283.0	115.3	45.1	93.0	74.3	123.5	13.7	382.3
Activity (hrs/season)		66,116.7	22,172.2	27,346.5	49,781.1	15,826.4	46,992.1	18,314.1	36,707.2	25,420.0	14,381.8	6,676.9	6,498.7
Activity (hrs/season/unit)		505.90	608.42	44.76	321.50	55.92	407.50	406.05	394.74	342.34	116.49	488.00	17.00
Exhaust PM (tons)	151.3	3.00E+00	2.43E+00	2.32E-02	1.91E+00	2.08E-02	1.90E+00	2.45E-02	1.92E+00	1.11E+00	1.53E-02	1.98E-02	5.75E-02
TOTAL VOC (tons)	942.2	2.98E+00	2.89E+00	2.66E+00	2.65E+00	2.36E+00	2.33E+00	2.25E+00	2.20E+00	1.97E+00	1.93E+00	1.84E+00	1.72E+00
Total Exhaust VOC (tons)	806.4	2.98E+00	2.89E+00	2.34E+00	2.65E+00	2.24E+00	2.33E+00	2.22E+00	2.20E+00	1.97E+00	1.86E+00	1.81E+00	1.71E+00
Exh VOC	784.5	2.92E+00	2.83E+00	2.34E+00	2.60E+00	1.93E+00	2.29E+00	2.13E+00	2.16E+00	1.93E+00	1.70E+00	1.59E+00	1.71E+00
Crankcase VOC	21.8	5.84E-02	5.66E-02	0.00E+00	5.21E-02	3.15E-01	4.57E-02	8.40E-02	4.31E-02	3.86E-02	1.63E-01	2.22E-01	0.00E+00
Total Evap VOC (tons)	135.8	0.00E+00	0.00E+00	3.12E-01	0.00E+00	1.20E-01	0.00E+00	3.42E-02	0.00E+00	0.00E+00	6.75E-02	3.01E-02	1.12E-02
Chemical Name													
1,3-Butadiene	1.317	5.5E-03	5.4E-03	5.0E-03	4.9E-03	2.1E-03	4.3E-03	2.1E-03	4.1E-03	3.7E-03	1.8E-03	1.7E-03	3.7E-03
Acetaldehyde	15.123	2.2E-01	2.1E-01	3.9E-03	2.0E-01	9.2E-03	1.7E-01	9.1E-03	1.6E-01	1.5E-01	7.6E-03	7.4E-03	2.8E-03
Acrolein	2.374	3.4E-02	3.3E-02	7.0E-04	3.1E-02	1.6E-03	2.7E-02	1.6E-03	2.5E-02	2.3E-02	1.3E-03	1.3E-03	5.1E-04
Benzene (including benzene from gasoline)	30.731	6.0E-02	5.9E-02	6.6E-02	5.4E-02	1.2E-01	4.7E-02	1.2E-01	4.5E-02	4.0E-02	9.9E-02	9.6E-02	4.3E-02
Chromium Chompounds	0.010	2.1E-04	1.7E-04	1.4E-06	1.3E-04	1.2E-06	1.3E-04	1.5E-06	1.3E-04	7.8E-05	9.2E-07	1.2E-06	3.4E-06
Ethyl benzene	15.370	9.2E-03	8.9E-03	5.9E-02	8.2E-03	4.5E-02	7.2E-03	4.4E-02	6.8E-03	6.1E-03	3.7E-02	3.6E-02	4.1E-02
Formaldehyde	31.309	4.5E-01	4.3E-01	6.0E-03	4.0E-01	2.6E-02	3.5E-01	2.6E-02	3.3E-01	3.0E-01	2.2E-02	2.1E-02	4.3E-03
Hexane	11.064	4.7E-03	4.6E-03	4.1E-02	4.2E-03	2.5E-02	3.7E-03	2.3E-02	3.5E-03	3.1E-03	2.0E-02	1.9E-02	2.5E-02
Manganese Compounds	0.011	2.1E-04	1.7E-04	2.8E-06	1.3E-04	2.5E-06	1.3E-04	2.9E-06	1.3E-04	7.8E-05	1.8E-06	2.4E-06	6.9E-06
Mercury Compounds	0.003	6.0E-05	4.9E-05	2.3E-07	3.8E-05	2.1E-07	3.8E-05	2.4E-07	3.8E-05	2.2E-05	1.5E-07	2.0E-07	5.7E-07
Nickel Compounds	0.005	9.0E-05	7.3E-05	1.6E-06	5.7E-05	1.5E-06	5.7E-05	1.7E-06	5.8E-05	3.3E-05	1.1E-06	1.4E-06	4.0E-06
Polycyclic Organic Matter	0.010	5.3E-06	5.2E-06	3.9E-05	4.8E-06	3.4E-05	4.2E-06	3.3E-05	3.9E-06	3.5E-06	2.8E-05	2.7E-05	2.8E-05
Propionaldehyde	2.420	2.9E-02	2.8E-02	5.8E-04	2.6E-02	4.2E-03	2.3E-02	4.2E-03	2.2E-02	1.9E-02	3.5E-03	3.4E-03	4.2E-04
Styrene	0.757	1.8E-03	1.7E-03	3.0E-03	1.6E-03	1.7E-03	1.4E-03	1.7E-03	1.3E-03	1.2E-03	1.4E-03	1.4E-03	2.2E-03
Toluene	61.702	4.5E-02	4.3E-02	2.4E-01	4.0E-02	1.7E-01	3.5E-02	1.6E-01	3.3E-02	3.0E-02	1.4E-01	1.3E-01	1.7E-01
Xylenes (isomers and mixture)	60.084	3.2E-02	3.1E-02	2.6E-01	2.8E-02	1.5E-01	2.5E-02	1.5E-01	2.3E-02	2.1E-02	1.3E-01	1.2E-01	1.8E-01

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2265008005	2265004051	2260006005	2265002030	2270001060	2270006010	2265002009	2270004066	2270002033	2265004046	2270002003	2270002021
Equipment Name	Summer TOTAL (tons)	Airport Support Equipment	Shredders < 6 HP (com)	Generator Sets	Trenchers	Specialty Vehicle Carts	Pumps	Plate Compactors	Chippers/Stu mp Grinders (com)	Bore/Drill Rigs	Front Mowers (com)	Pavers	Paving Equipment
Tech Type		4-St	4-St	2-St	4-St	Dsl	Dsl	4-St	Dsl	Dsl	4-St	Dsl	Dsl
Equipment Population		19.9	146.6	103.0	38.2	21.2	148.3	117.8	25.4	27.2	80.1	37.3	46.9
Activity (hrs/season)		9,335.7	7,329.4	5,921.2	10,226.8	6,357.8	29,891.2	13,013.0	11,818.9	8,445.8	6,891.6	20,374.0	19,424.6
Activity (hrs/season/unit)		469.43	50.00	57.50	267.60	299.55	201.50	110.50	465.00	310.20	86.00	546.51	414.04
Exhaust PM (tons)	151.3	2.00E-02	2.25E-02	6.45E-02	1.46E-02	9.15E-01	1.14E+00	1.07E-02	9.65E-01	9.99E-01	9.41E-03	9.86E-01	9.81E-01
TOTAL VOC (tons)	942.2	1.67E+00	1.65E+00	1.59E+00	1.52E+00	1.41E+00	1.40E+00	1.35E+00	1.27E+00	1.21E+00	1.11E+00	1.07E+00	9.59E-01
Total Exhaust VOC (tons)	806.4	1.63E+00	1.64E+00	1.58E+00	1.48E+00	1.41E+00	1.40E+00	1.31E+00	1.27E+00	1.21E+00	1.10E+00	1.07E+00	9.59E-01
Exh VOC	784.5	1.32E+00	1.60E+00	1.58E+00	1.38E+00	1.38E+00	1.37E+00	1.25E+00	1.25E+00	1.19E+00	1.05E+00	1.05E+00	9.40E-01
Crankcase VOC	21.8	3.04E-01	4.37E-02	0.00E+00	1.04E-01	2.77E-02	2.75E-02	5.97E-02	2.49E-02	2.37E-02	5.06E-02	2.09E-02	1.88E-02
Total Evap VOC (tons)	135.8	4.58E-02	7.01E-03	1.06E-02	3.73E-02	0.00E+00	0.00E+00	3.75E-02	0.00E+00	0.00E+00	1.22E-02	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.317	1.5E-03	1.6E-03	3.4E-03	1.4E-03	2.6E-03	2.6E-03	1.2E-03	2.4E-03	2.3E-03	1.0E-03	2.0E-03	1.8E-03
Acetaldehyde	15.123	6.7E-03	6.7E-03	2.6E-03	6.1E-03	1.0E-01	1.0E-01	5.4E-03	9.4E-02	9.0E-02	4.5E-03	7.9E-02	7.1E-02
Acrolein	2.374	1.1E-03	1.1E-03	4.7E-04	1.0E-03	1.6E-02	1.6E-02	9.2E-04	1.5E-02	1.4E-02	7.7E-04	1.2E-02	1.1E-02
Benzene (including benzene from gasoline)	30.731	8.6E-02	8.6E-02	4.0E-02	7.9E-02	2.9E-02	2.8E-02	7.0E-02	2.6E-02	2.5E-02	5.8E-02	2.2E-02	1.9E-02
Chromium Chompounds	0.010	1.2E-06	1.3E-06	3.9E-06	8.7E-07	6.4E-05	8.0E-05	6.4E-07	6.8E-05	7.0E-05	5.6E-07	6.9E-05	6.9E-05
Ethyl benzene	15.370	3.3E-02	3.3E-02	3.8E-02	3.0E-02	4.4E-03	4.3E-03	2.6E-02	3.9E-03	3.8E-03	2.2E-02	3.3E-03	3.0E-03
Formaldehyde	31.309	1.9E-02	1.9E-02	4.0E-03	1.7E-02	2.1E-01	2.1E-01	1.5E-02	1.9E-01	1.8E-01	1.3E-02	1.6E-01	1.4E-01
Hexane	11.064	1.7E-02	1.6E-02	2.3E-02	1.6E-02	2.2E-03	2.2E-03	1.4E-02	2.0E-03	1.9E-03	1.1E-02	1.7E-03	1.5E-03
Manganese Compounds	0.011	2.4E-06	2.7E-06	7.7E-06	1.7E-06	6.4E-05	8.0E-05	1.3E-06	6.8E-05	7.0E-05	1.1E-06	6.9E-05	6.9E-05
Mercury Compounds	0.003	2.0E-07	2.2E-07	6.5E-07	1.5E-07	1.8E-05	2.3E-05	1.1E-07	1.9E-05	2.0E-05	9.4E-08	2.0E-05	2.0E-05
Nickel Compounds	0.005	1.4E-06	1.6E-06	4.5E-06	1.0E-06	2.7E-05	3.4E-05	7.5E-07	2.9E-05	3.0E-05	6.6E-07	3.0E-05	2.9E-05
Polycyclic Organic Matter	0.010	2.5E-05	2.5E-05	2.6E-05	2.2E-05	2.5E-06	2.5E-06	2.0E-05	2.3E-06	2.2E-06	1.7E-05	1.9E-06	1.7E-06
Propionaldehyde	2.420	3.1E-03	3.1E-03	3.9E-04	2.8E-03	1.4E-02	1.4E-02	2.5E-03	1.3E-02	1.2E-02	2.1E-03	1.1E-02	9.4E-03
Styrene	0.757	1.2E-03	1.2E-03	2.1E-03	1.1E-03	8.4E-04	8.3E-04	9.9E-04	7.5E-04	7.2E-04	8.3E-04	6.3E-04	5.7E-04
Toluene	61.702	1.2E-01	1.2E-01	1.5E-01	1.1E-01	2.1E-02	2.1E-02	9.5E-02	1.9E-02	1.8E-02	8.0E-02	1.6E-02	1.4E-02
Xylenes (isomers and mixture)	60.084	1.1E-01	1.1E-01	1.7E-01	1.0E-01	1.5E-02	1.5E-02	9.0E-02	1.3E-02	1.3E-02	7.5E-02	1.1E-02	1.0E-02

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2265002033	2270007015	2265002072	2265004041	2265002066	2265002015	2270002054	2270002027	2270004056	2265002024	2265002060	2270003020
Equipment Name	Summer TOTAL (tons)	Bore/Drill Rigs	Forest Eqp - Feller/Bunch/Skidder	Skid Steer Loaders	Rear Engine Riding Mowers (com)	Tractors/Loaders/Backhoes	Rollers	Crushing/Proc. Equipment	Signal Boards/Light Plants	Lawn & Garden Tractors (com)	Surfacing Equipment	Rubber Tire Loaders	Forklifts
Tech Type		4-St	Dsl	4-St	4-St	4-St	4-St	Dsl	Dsl	Dsl	4-St	4-St	Dsl
Equipment Population		121.5	11.1	16.3	22.5	9.3	12.2	11.7	78.7	44.7	22.3	3.3	11.6
Activity (hrs/season)		8,650.8	7,060.4	3,372.4	12,789.4	5,409.0	5,043.4	7,456.0	28,044.9	24,335.3	7,255.3	1,119.5	10,798.9
Activity (hrs/season/unit)		71.23	638.00	206.36	569.00	579.13	413.38	635.71	356.13	544.00	324.84	340.82	934.23
Exhaust PM (tons)	151.3	7.46E-03	6.57E-01	8.09E-03	7.49E-03	7.62E-03	7.47E-03	4.88E-01	6.23E-01	5.31E-01	5.80E-03	6.02E-03	4.73E-01
TOTAL VOC (tons)	942.2	8.94E-01	8.78E-01	8.64E-01	7.23E-01	7.05E-01	6.97E-01	6.75E-01	6.64E-01	6.19E-01	6.14E-01	5.72E-01	5.56E-01
Total Exhaust VOC (tons)	806.4	8.55E-01	8.78E-01	8.17E-01	7.20E-01	6.95E-01	6.82E-01	6.75E-01	6.64E-01	6.19E-01	6.02E-01	5.52E-01	5.56E-01
Exh VOC	784.5	7.93E-01	8.61E-01	6.58E-01	7.12E-01	6.91E-01	6.26E-01	6.62E-01	6.51E-01	6.07E-01	5.98E-01	4.20E-01	5.45E-01
Crankcase VOC	21.8	6.27E-02	1.72E-02	1.60E-01	7.55E-03	4.10E-03	5.54E-02	1.32E-02	1.30E-02	1.21E-02	4.64E-03	1.33E-01	1.09E-02
Total Evap VOC (tons)	135.8	3.83E-02	0.00E+00	4.66E-02	2.72E-03	9.93E-03	1.48E-02	0.00E+00	0.00E+00	0.00E+00	1.18E-02	1.95E-02	0.00E+00
Chemical Name													
1,3-Butadiene	1.317	8.1E-04	1.6E-03	7.8E-04	6.9E-04	6.6E-04	6.5E-04	1.3E-03	1.2E-03	1.2E-03	5.7E-04	5.3E-04	1.0E-03
Acetaldehyde	15.123	3.5E-03	6.5E-02	3.4E-03	3.0E-03	2.9E-03	2.8E-03	5.0E-02	4.9E-02	4.6E-02	2.5E-03	2.3E-03	4.1E-02
Acrolein	2.374	6.0E-04	1.0E-02	5.7E-04	5.0E-04	4.9E-04	4.8E-04	7.8E-03	7.6E-03	7.1E-03	4.2E-04	3.9E-04	6.4E-03
Benzene (including benzene from gasoline)	30.731	4.6E-02	1.8E-02	4.4E-02	3.8E-02	3.7E-02	3.6E-02	1.4E-02	1.3E-02	1.3E-02	3.2E-02	2.9E-02	1.1E-02
Chromium Compounds	0.010	4.5E-07	4.6E-05	4.9E-07	4.5E-07	4.6E-07	4.5E-07	3.4E-05	4.4E-05	3.7E-05	3.5E-07	3.6E-07	3.3E-05
Ethyl benzene	15.370	1.7E-02	2.7E-03	1.7E-02	1.4E-02	1.4E-02	1.4E-02	2.1E-03	2.1E-03	1.9E-03	1.2E-02	1.1E-02	1.7E-03
Formaldehyde	31.309	1.0E-02	1.3E-01	9.6E-03	8.4E-03	8.1E-03	8.0E-03	1.0E-01	1.0E-01	9.3E-02	7.0E-03	6.5E-03	8.3E-02
Hexane	11.064	9.4E-03	1.4E-03	9.2E-03	7.2E-03	7.1E-03	7.1E-03	1.1E-03	1.1E-03	9.8E-04	6.2E-03	5.9E-03	8.8E-04
Manganese Compounds	0.011	9.0E-07	4.6E-05	9.7E-07	9.0E-07	9.1E-07	9.0E-07	3.4E-05	4.4E-05	3.7E-05	7.0E-07	7.2E-07	3.3E-05
Mercury Compounds	0.003	7.5E-08	1.3E-05	8.1E-08	7.5E-08	7.6E-08	7.5E-08	9.8E-06	1.2E-05	1.1E-05	5.8E-08	6.0E-08	9.5E-06
Nickel Compounds	0.005	5.2E-07	2.0E-05	5.7E-07	5.2E-07	5.3E-07	5.2E-07	1.5E-05	1.9E-05	1.6E-05	4.1E-07	4.2E-07	1.4E-05
Polycyclic Organic Matter	0.010	1.3E-05	1.6E-06	1.2E-05	1.1E-05	1.0E-05	1.0E-05	1.2E-06	1.2E-06	1.1E-06	9.1E-06	8.3E-06	1.0E-06
Propionaldehyde	2.420	1.6E-03	8.6E-03	1.5E-03	1.4E-03	1.3E-03	1.3E-03	6.7E-03	6.5E-03	6.1E-03	1.1E-03	1.0E-03	5.5E-03
Styrene	0.757	6.5E-04	5.2E-04	6.2E-04	5.5E-04	5.3E-04	5.2E-04	4.0E-04	3.9E-04	3.7E-04	4.6E-04	4.2E-04	3.3E-04
Toluene	61.702	6.3E-02	1.3E-02	6.1E-02	5.2E-02	5.0E-02	5.0E-02	1.0E-02	1.0E-02	9.3E-03	4.4E-02	4.0E-02	8.3E-03
Xylenes (isomers and mixture)	60.084	5.9E-02	9.3E-03	5.6E-02	4.9E-02	4.7E-02	4.7E-02	7.2E-03	7.0E-03	6.6E-03	4.1E-02	3.8E-02	5.9E-03

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2265004030	2260002021	2268006020	2265002003	2270002081	2260002009	2270002024	2270002063	2285002015	2265002078	2265003040	2265004025
Equipment Name	Summer TOTAL (tons)	Leafblowers/ Vacuums (res)	Paving Equipment	Gas Compressors	Pavers	Other Construction Equipment	Plate Compactors	Surfacing Equipment	Rubber Tire Tractor/Dozer s	Railway Maintenance	Dumpers/Ten ders	Other General Industrial Eqp	Trimmers/Ed gers/Brush Cutter (res)
Tech Type		4-St	2-St	4-St	4-St	Dsl	2-St	Dsl	Dsl	Dsl	4-St	4-St	4-St
Equipment Population		300.3	16.2	0.5	11.0	15.5	17.1	7.1	5.0	8.2	33.3	8.3	186.1
Activity (hrs/season)		3,002.8	1,892.2	1,617.6	2,865.7	6,252.0	1,884.6	2,659.2	3,008.0	3,856.2	2,815.1	3,256.4	1,674.8
Activity (hrs/season/unit)		10.00	116.49	3000.00	260.94	403.39	110.50	373.44	598.43	471.50	84.54	391.83	9.00
Exhaust PM (tons)	151.3	1.95E-03	2.04E-02	1.16E-02	4.46E-03	4.03E-01	1.70E-02	4.18E-01	2.87E-01	2.34E-01	2.24E-03	2.39E-03	9.97E-04
TOTAL VOC (tons)	942.2	5.11E-01	4.94E-01	4.85E-01	4.37E-01	4.20E-01	4.12E-01	4.10E-01	3.58E-01	3.56E-01	2.95E-01	2.92E-01	2.58E-01
Total Exhaust VOC (tons)	806.4	5.05E-01	4.93E-01	4.85E-01	4.24E-01	4.20E-01	4.10E-01	4.10E-01	3.58E-01	3.56E-01	2.78E-01	2.89E-01	2.55E-01
Exh VOC	784.5	4.87E-01	4.93E-01	3.65E-01	3.87E-01	4.12E-01	4.10E-01	4.02E-01	3.51E-01	3.49E-01	2.32E-01	2.89E-01	2.46E-01
Crankcase VOC	21.8	1.84E-02	0.00E+00	1.20E-01	3.70E-02	8.24E-03	0.00E+00	8.04E-03	7.01E-03	6.99E-03	4.60E-02	3.26E-04	9.26E-03
Total Evap VOC (tons)	135.8	5.84E-03	1.86E-03	0.00E+00	1.27E-02	0.00E+00	1.77E-03	0.00E+00	0.00E+00	0.00E+00	1.77E-02	3.04E-03	3.49E-03
Chemical Name													
1,3-Butadiene	1.317	4.8E-04	1.1E-03	4.6E-04	4.0E-04	7.8E-04	8.8E-04	7.6E-04	6.7E-04	6.6E-04	2.6E-04	2.8E-04	2.4E-04
Acetaldehyde	15.123	2.1E-03	8.2E-04	2.0E-03	1.7E-03	3.1E-02	6.8E-04	3.0E-02	2.7E-02	2.6E-02	1.1E-03	1.2E-03	1.0E-03
Acrolein	2.374	3.5E-04	1.5E-04	3.4E-04	3.0E-04	4.8E-03	1.2E-04	4.7E-03	4.1E-03	4.1E-03	1.9E-04	2.0E-04	1.8E-04
Benzene (including benzene from gasoline)	30.731	2.7E-02	1.2E-02	2.5E-02	2.3E-02	8.5E-03	1.0E-02	8.3E-03	7.3E-03	7.2E-03	1.5E-02	1.5E-02	1.3E-02
Chromium Chompounds	0.010	1.2E-07	1.2E-06	7.0E-07	2.7E-07	2.8E-05	1.0E-06	2.9E-05	2.0E-05	1.6E-05	1.3E-07	1.4E-07	6.0E-08
Ethyl benzene	15.370	1.0E-02	1.2E-02	9.6E-03	8.5E-03	1.3E-03	9.8E-03	1.3E-03	1.1E-03	1.1E-03	5.6E-03	5.7E-03	5.1E-03
Formaldehyde	31.309	5.9E-03	1.3E-03	5.7E-03	5.0E-03	6.3E-02	1.0E-03	6.2E-02	5.4E-02	5.3E-02	3.2E-03	3.4E-03	3.0E-03
Hexane	11.064	5.2E-03	7.0E-03	4.8E-03	4.5E-03	6.7E-04	5.9E-03	6.5E-04	5.7E-04	5.7E-04	3.2E-03	2.9E-03	2.6E-03
Manganese Compounds	0.011	2.3E-07	2.4E-06	1.4E-06	5.4E-07	2.8E-05	2.0E-06	2.9E-05	2.0E-05	1.6E-05	2.7E-07	2.9E-07	1.2E-07
Mercury Compounds	0.003	2.0E-08	2.0E-07	1.2E-07	4.5E-08	8.1E-06	1.7E-07	8.4E-06	5.7E-06	4.7E-06	2.2E-08	2.4E-08	1.0E-08
Nickel Compounds	0.005	1.4E-07	1.4E-06	8.1E-07	3.1E-07	1.2E-05	1.2E-06	1.3E-05	8.6E-06	7.0E-06	1.6E-07	1.7E-07	7.0E-08
Polycyclic Organic Matter	0.010	7.6E-06	8.2E-06	7.3E-06	6.4E-06	7.5E-07	6.8E-06	7.3E-07	6.4E-07	6.4E-07	4.2E-06	4.4E-06	3.8E-06
Propionaldehyde	2.420	9.5E-04	1.2E-04	9.1E-04	8.0E-04	4.1E-03	1.0E-04	4.0E-03	3.5E-03	3.5E-03	5.2E-04	5.4E-04	4.8E-04
Styrene	0.757	3.8E-04	6.4E-04	3.7E-04	3.2E-04	2.5E-04	5.3E-04	2.4E-04	2.1E-04	2.1E-04	2.1E-04	2.2E-04	1.9E-04
Toluene	61.702	3.7E-02	4.8E-02	3.5E-02	3.1E-02	6.3E-03	4.0E-02	6.2E-03	5.4E-03	5.3E-03	2.1E-02	2.1E-02	1.8E-02
Xylenes (isomers and mixture)	60.084	3.4E-02	5.3E-02	3.3E-02	2.9E-02	4.5E-03	4.4E-02	4.3E-03	3.8E-03	3.8E-03	1.9E-02	2.0E-02	1.7E-02

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2265002081	2270003030	2265004026	2265003010	2265007015	2265002057	2265002054	2265003030	2270003070	2270003040	2270005020	2265005040
Equipment Name	Summer TOTAL (tons)	Other Construction Equipment	Sweepers/Sc rubbers	Trimmers/Ed gers/Brush Cutter (com)	Aerial Lifts	Shredders > 6 HP	Rough Terrain Forklift	Crushing/Pro c. Equipment	Sweepers/Sc rubbers	Terminal Tractors	Other General Industrial Eqp	Combines	Tillers > 6 HP
Tech Type		4-St	Dsl	4-St	4-St	4-St	4-St	4-St	4-St	Dsl	Dsl	Dsl	4-St
Equipment Population		1.6	3.5	16.3	5.2	46.9	1.6	7.7	2.5	3.2	7.6	11.2	23.4
Activity (hrs/season)		405.6	2,374.9	2,236.4	1,025.0	1,186.6	451.5	1,237.8	699.7	2,189.4	3,688.2	1,213.4	726.6
Activity (hrs/season/unit)		246.96	670.45	137.00	198.39	25.29	274.92	160.42	283.57	690.78	482.50	108.11	30.99
Exhaust PM (tons)	151.3	2.62E-03	1.60E-01	1.85E-03	2.24E-03	1.26E-03	2.01E-03	1.56E-03	1.62E-03	1.32E-01	1.17E-01	1.35E-01	4.55E-04
TOTAL VOC (tons)	942.2	2.55E-01	2.54E-01	2.51E-01	2.32E-01	2.00E-01	1.94E-01	1.65E-01	1.57E-01	1.40E-01	1.37E-01	1.29E-01	9.93E-02
Total Exhaust VOC (tons)	806.4	2.41E-01	2.54E-01	2.51E-01	2.15E-01	1.78E-01	1.85E-01	1.61E-01	1.52E-01	1.40E-01	1.37E-01	1.29E-01	8.93E-02
Exh VOC	784.5	1.83E-01	2.49E-01	2.49E-01	1.70E-01	1.44E-01	1.40E-01	1.60E-01	1.28E-01	1.37E-01	1.35E-01	1.27E-01	6.90E-02
Crankcase VOC	21.8	5.78E-02	4.98E-03	1.45E-03	4.57E-02	3.37E-02	4.43E-02	1.24E-03	2.42E-02	2.74E-03	2.69E-03	2.54E-03	2.03E-02
Total Evap VOC (tons)	135.8	1.38E-02	0.00E+00	3.85E-04	1.69E-02	2.28E-02	9.13E-03	3.77E-03	5.07E-03	0.00E+00	0.00E+00	0.00E+00	9.99E-03
Chemical Name													
1,3-Butadiene	1.317	2.3E-04	4.7E-04	2.4E-04	2.0E-04	1.7E-04	1.8E-04	1.5E-04	1.4E-04	2.6E-04	2.6E-04	2.4E-04	8.5E-05
Acetaldehyde	15.123	9.9E-04	1.9E-02	1.0E-03	8.8E-04	7.3E-04	7.6E-04	6.6E-04	6.2E-04	1.0E-02	1.0E-02	9.6E-03	3.7E-04
Acrolein	2.374	1.7E-04	2.9E-03	1.8E-04	1.5E-04	1.2E-04	1.3E-04	1.1E-04	1.1E-04	1.6E-03	1.6E-03	1.5E-03	6.3E-05
Benzene (including benzene from gasoline)	30.731	1.3E-02	5.2E-03	1.3E-02	1.2E-02	9.8E-03	9.9E-03	8.5E-03	8.1E-03	2.8E-03	2.8E-03	2.6E-03	4.9E-03
Chromium Chompounds	0.010	1.6E-07	1.1E-05	1.1E-07	1.3E-07	7.5E-08	1.2E-07	9.4E-08	9.7E-08	9.3E-06	8.2E-06	9.4E-06	2.7E-08
Ethyl benzene	15.370	4.9E-03	7.9E-04	5.0E-03	4.4E-03	3.7E-03	3.7E-03	3.2E-03	3.0E-03	4.3E-04	4.3E-04	4.0E-04	1.8E-03
Formaldehyde	31.309	2.8E-03	3.8E-02	2.9E-03	2.5E-03	2.1E-03	2.2E-03	1.9E-03	1.8E-03	2.1E-02	2.1E-02	1.9E-02	1.0E-03
Hexane	11.064	2.7E-03	4.0E-04	2.5E-03	2.5E-03	2.3E-03	2.0E-03	1.7E-03	1.6E-03	2.2E-04	2.2E-04	2.1E-04	1.1E-03
Manganese Compounds	0.011	3.1E-07	1.1E-05	2.2E-07	2.7E-07	1.5E-07	2.4E-07	1.9E-07	1.9E-07	9.3E-06	8.2E-06	9.4E-06	5.5E-08
Mercury Compounds	0.003	2.6E-08	3.2E-06	1.9E-08	2.2E-08	1.3E-08	2.0E-08	1.6E-08	1.6E-08	2.6E-06	2.3E-06	2.7E-06	4.6E-09
Nickel Compounds	0.005	1.8E-07	4.8E-06	1.3E-07	1.6E-07	8.8E-08	1.4E-07	1.1E-07	1.1E-07	4.0E-06	3.5E-06	4.0E-06	3.2E-08
Polycyclic Organic Matter	0.010	3.6E-06	4.5E-07	3.8E-06	3.3E-06	2.7E-06	2.8E-06	2.4E-06	2.3E-06	2.5E-07	2.5E-07	2.3E-07	1.3E-06
Propionaldehyde	2.420	4.5E-04	2.5E-03	4.7E-04	4.0E-04	3.3E-04	3.5E-04	3.0E-04	2.9E-04	1.4E-03	1.4E-03	1.3E-03	1.7E-04
Styrene	0.757	1.8E-04	1.5E-04	1.9E-04	1.6E-04	1.3E-04	1.4E-04	1.2E-04	1.2E-04	8.3E-05	8.2E-05	7.7E-05	6.8E-05
Toluene	61.702	1.8E-02	3.8E-03	1.8E-02	1.6E-02	1.4E-02	1.4E-02	1.2E-02	1.1E-02	2.1E-03	2.1E-03	1.9E-03	6.8E-03
Xylenes (isomers and mixture)	60.084	1.7E-02	2.7E-03	1.7E-02	1.5E-02	1.3E-02	1.3E-02	1.1E-02	1.0E-02	1.5E-03	1.5E-03	1.4E-03	6.3E-03

Table C-4-6b
MOA NONROAD Emissions - Summer 1999

SCC		2265002045	2285004015	2270002039	2270005060	2270002009	2265005035
Equipment Name	Summer TOTAL (tons)	Cranes	Railway Maintenance	Concrete/Ind ustrial Saws	Irrigation Sets	Plate Compactors	Sprayers
Tech Type		4-St	4-St	Dsl	Dsl	Dsl	4-St
Equipment Population		1.2	11.3	3.4	1.3	12.6	4.3
Activity (hrs/season)		339.0	1,042.9	1,293.8	699.1	4,048.6	245.8
Activity (hrs/season/unit)		276.25	92.00	386.08	539.82	322.18	57.66
Exhaust PM (tons)	151.3	9.03E-04	7.15E-04	5.89E-02	4.01E-02	7.97E-02	4.07E-04
TOTAL VOC (tons)	942.2	8.81E-02	8.61E-02	6.22E-02	5.69E-02	5.53E-02	4.50E-02
Total Exhaust VOC (tons)	806.4	8.30E-02	8.20E-02	6.22E-02	5.69E-02	5.53E-02	4.31E-02
Exh VOC	784.5	6.55E-02	7.55E-02	6.09E-02	5.58E-02	5.42E-02	3.75E-02
Crankcase VOC	21.8	1.75E-02	6.43E-03	1.22E-03	1.12E-03	1.08E-03	5.64E-03
Total Evap VOC (tons)	135.8	5.10E-03	4.16E-03	0.00E+00	0.00E+00	0.00E+00	1.89E-03
Chemical Name							
1,3-Butadiene	1.317	7.9E-05	7.8E-05	1.2E-04	1.1E-04	1.0E-04	4.1E-05
Acetaldehyde	15.123	3.4E-04	3.4E-04	4.6E-03	4.2E-03	4.1E-03	1.8E-04
Acrolein	2.374	5.8E-05	5.7E-05	7.1E-04	6.5E-04	6.4E-04	3.0E-05
Benzene (including benzene from gasoline)	30.731	4.5E-03	4.4E-03	1.3E-03	1.2E-03	1.1E-03	2.3E-03
Chromium Chompounds	0.010	5.4E-08	4.3E-08	4.1E-06	2.8E-06	5.6E-06	2.4E-08
Ethyl benzene	15.370	1.7E-03	1.7E-03	1.9E-04	1.8E-04	1.7E-04	8.7E-04
Formaldehyde	31.309	9.7E-04	9.6E-04	9.3E-03	8.5E-03	8.3E-03	5.0E-04
Hexane	11.064	9.4E-04	9.1E-04	9.9E-05	9.0E-05	8.8E-05	4.7E-04
Manganese Compounds	0.011	1.1E-07	8.6E-08	4.1E-06	2.8E-06	5.6E-06	4.9E-08
Mercury Compounds	0.003	9.0E-09	7.1E-09	1.2E-06	8.0E-07	1.6E-06	4.1E-09
Nickel Compounds	0.005	6.3E-08	5.0E-08	1.8E-06	1.2E-06	2.4E-06	2.8E-08
Polycyclic Organic Matter	0.010	1.3E-06	1.2E-06	1.1E-07	1.0E-07	9.9E-08	6.5E-07
Propionaldehyde	2.420	1.6E-04	1.5E-04	6.1E-04	5.6E-04	5.4E-04	8.1E-05
Styrene	0.757	6.3E-05	6.2E-05	3.7E-05	3.4E-05	3.3E-05	3.3E-05
Toluene	61.702	6.2E-03	6.1E-03	9.3E-04	8.5E-04	8.3E-04	3.2E-03
Xylenes (isomers and mixture)	60.084	5.7E-03	5.6E-03	6.6E-04	6.0E-04	5.9E-04	3.0E-03

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2260001020	2282005010	2260001030	2270009010	2260004035	2265006005	2270002066	2270002072	2270002060	2265006030	2260002054	2270002036
Equipment Name	Winter TOTAL (tons)	Snowmobiles	Outboard	All Terrain Vehicles/Mot orcycles	Other Underground Mining Equipment	Snowblowers (res)	Generator Sets	Tractors/Load ers/Backhoes	Skid Steer Loaders	Rubber Tire Loaders	Pressure Washers	Concrete/Ind ustrial Saws	Excavators
Tech Type		2-St	2-St	2-St	Dsl	2-St	4-St	Dsl	Dsl	Dsl	4-St	2-St	Dsl
Equipment Population		10,491.1	3,018.7	757.2	80.7	2,506.7	723.5	141.7	177.2	89.6	336.3	28.8	57.9
Activity (hrs/season)		251,787.4	15,773.1	12,872.4	54,103.6	20,054.0	41,599.8	53,778.9	48,469.2	22,797.9	19,337.2	5,802.3	21,141.7
Activity (hrs/season/unit)		24.00	5.23	17.00	670.11	8.00	57.50	379.47	273.49	254.43	57.50	201.42	365.10
Exhaust PM (tons)	46.35	1.37E+01	1.30E+00	3.23E-01	6.13E+00	2.64E-01	4.79E-02	3.53E+00	2.57E+00	2.46E+00	2.53E-02	1.94E-01	1.87E+00
TOTAL VOC (tons)	693.60	5.76E+02	2.24E+01	1.36E+01	1.02E+01	7.36E+00	7.23E+00	5.03E+00	3.81E+00	3.59E+00	3.44E+00	3.26E+00	3.17E+00
Total Exhaust VOC (tons)	693.60	5.76E+02	2.24E+01	1.36E+01	1.02E+01	7.36E+00	7.23E+00	5.03E+00	3.81E+00	3.59E+00	3.44E+00	3.26E+00	3.17E+00
Exh VOC	690.38	5.76E+02	2.24E+01	1.36E+01	1.00E+01	7.36E+00	6.30E+00	4.93E+00	3.73E+00	3.52E+00	3.28E+00	3.26E+00	3.11E+00
Crankcase VOC	3.22	0.00E+00	0.00E+00	0.00E+00	2.00E-01	0.00E+00	9.33E-01	9.86E-02	7.47E-02	7.03E-02	1.57E-01	0.00E+00	6.21E-02
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	1.24E+00	4.81E-02	2.93E-02	1.90E-02	1.58E-02	6.89E-03	9.35E-03	7.09E-03	6.67E-03	3.27E-03	7.01E-03	5.89E-03
Acetaldehyde	4.266	9.55E-01	3.72E-02	2.26E-02	7.59E-01	1.22E-02	2.97E-02	3.74E-01	2.83E-01	2.67E-01	1.41E-02	5.41E-03	2.35E-01
Acrolein	0.689	1.73E-01	6.72E-03	4.09E-03	1.17E-01	2.21E-03	5.06E-03	5.78E-02	4.38E-02	4.13E-02	2.41E-03	9.78E-04	3.64E-02
Benzene (including benzene from gasoline)	17.954	1.45E+01	5.64E-01	3.43E-01	2.07E-01	1.86E-01	3.80E-01	1.02E-01	7.73E-02	7.28E-02	1.81E-01	8.21E-02	6.43E-02
Chromium Chompounds	0.003	8.20E-04	7.83E-05	1.94E-05	4.29E-04	1.58E-05	2.87E-06	2.47E-04	1.80E-04	1.72E-04	1.52E-06	1.16E-05	1.31E-04
Ethyl benzene	15.663	1.38E+01	5.37E-01	3.27E-01	3.17E-02	1.77E-01	1.43E-01	1.56E-02	1.18E-02	1.11E-02	6.81E-02	7.82E-02	9.82E-03
Formaldehyde	8.190	1.46E+00	5.69E-02	3.46E-02	1.53E+00	1.87E-02	8.46E-02	7.54E-01	5.71E-01	5.38E-01	4.02E-02	8.28E-03	4.75E-01
Hexane	9.212	8.17E+00	3.18E-01	1.93E-01	1.62E-02	1.05E-01	7.17E-02	8.00E-03	6.06E-03	5.70E-03	3.41E-02	4.63E-02	5.04E-03
Manganese Compounds	0.004	1.64E-03	1.57E-04	3.88E-05	4.29E-04	3.16E-05	5.75E-06	2.47E-04	1.80E-04	1.72E-04	3.04E-06	2.33E-05	1.31E-04
Mercury Compounds	0.001	1.37E-04	1.30E-05	3.23E-06	1.23E-04	2.64E-06	4.79E-07	7.06E-05	5.15E-05	4.91E-05	2.53E-07	1.94E-06	3.73E-05
Nickel Compounds	0.002	9.56E-04	9.13E-05	2.26E-05	1.84E-04	1.85E-05	3.35E-06	1.06E-04	7.72E-05	7.37E-05	1.77E-06	1.36E-05	5.60E-05
Polycyclic Organic Matter	0.011	9.55E-03	3.72E-04	2.26E-04	1.83E-05	1.22E-04	1.09E-04	9.00E-06	6.82E-06	6.42E-06	5.19E-05	5.41E-05	5.67E-06
Propionaldehyde	0.616	1.42E-01	5.53E-03	3.36E-03	1.01E-01	1.82E-03	1.36E-02	4.95E-02	3.75E-02	3.53E-02	6.46E-03	8.05E-04	3.12E-02
Styrene	0.858	7.48E-01	2.91E-02	1.77E-02	6.07E-03	9.57E-03	5.48E-03	2.99E-03	2.26E-03	2.13E-03	2.61E-03	4.24E-03	1.88E-03
Toluene	63.704	5.63E+01	2.19E+00	1.33E+00	1.53E-01	7.20E-01	5.19E-01	7.54E-02	5.71E-02	5.38E-02	2.47E-01	3.19E-01	4.75E-02
Xylenes (isomers and mixture)	69.184	6.16E+01	2.40E+00	1.46E+00	1.08E-01	7.88E-01	4.90E-01	5.33E-02	4.04E-02	3.80E-02	2.33E-01	3.49E-01	3.36E-02

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2260006010	2270003060	2265001030	2270002069	2265006010	2282010005	2265006025	2270002057	2260002006	2270002051	2270002045	2265006015
Equipment Name	Winter TOTAL (tons)	Pumps	AC\Refrigeration	All Terrain Vehicles\Mot orcycles	Crawler Tractor/Dozers	Pumps	Inboard/Stern drive	Welders	Rough Terrain Forklift	Tampers/Rammers	Off-highway Trucks	Cranes	Air Compressors
Tech Type		2-St	Dsl	4-St	Dsl	4-St	4-St	4-St	Dsl	2-St	Dsl	Dsl	4-St
Equipment Population		75.0	195.7	2,365.3	87.2	126.0	631.2	38.5	48.2	65.9	7.8	40.7	27.2
Activity (hrs/season)		8,285.9	118,216.0	40,210.6	27,277.5	13,918.5	4,511.5	7,851.7	10,658.1	3,524.6	4,263.9	13,467.3	6,581.4
Activity (hrs/season/unit)		110.50	604.05	17.00	312.94	110.50	7.15	204.00	221.33	53.49	548.65	330.99	242.00
Exhaust PM (tons)	46.35	9.17E-02	2.49E+00	1.68E-02	1.79E+00	1.50E-02	1.88E-02	1.51E-02	8.76E-01	7.07E-02	8.38E-01	7.91E-01	8.58E-03
TOTAL VOC (tons)	693.60	2.32E+00	2.16E+00	1.98E+00	1.97E+00	1.96E+00	1.60E+00	1.55E+00	1.21E+00	1.15E+00	1.11E+00	1.02E+00	9.94E-01
Total Exhaust VOC (tons)	693.60	2.32E+00	2.16E+00	1.98E+00	1.97E+00	1.96E+00	1.60E+00	1.55E+00	1.21E+00	1.15E+00	1.11E+00	1.02E+00	9.94E-01
Exh VOC	690.38	2.32E+00	2.12E+00	1.61E+00	1.93E+00	1.89E+00	1.60E+00	1.46E+00	1.19E+00	1.15E+00	1.09E+00	1.00E+00	9.23E-01
Crankcase VOC	3.22	0.00E+00	4.24E-02	3.73E-01	3.86E-02	7.10E-02	0.00E+00	8.58E-02	2.37E-02	0.00E+00	2.18E-02	2.01E-02	7.13E-02
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	4.98E-03	4.02E-03	1.89E-03	3.66E-03	1.87E-03	1.53E-03	1.48E-03	2.25E-03	2.48E-03	2.07E-03	1.90E-03	9.47E-04
Acetaldehyde	4.266	3.85E-03	1.61E-01	8.13E-03	1.46E-01	8.04E-03	6.57E-03	6.36E-03	8.98E-02	1.91E-03	8.28E-02	7.60E-02	4.08E-03
Acrolein	0.689	6.95E-04	2.48E-02	1.39E-03	2.27E-02	1.37E-03	1.12E-03	1.09E-03	1.39E-02	3.46E-04	1.28E-02	1.18E-02	6.96E-04
Benzene (including benzene from gasoline)	17.954	5.84E-02	4.39E-02	1.04E-01	4.00E-02	1.03E-01	8.42E-02	8.14E-02	2.45E-02	2.90E-02	2.26E-02	2.08E-02	5.22E-02
Chromium Compounds	0.003	5.50E-06	1.75E-04	1.01E-06	1.25E-04	9.02E-07	1.13E-06	9.05E-07	6.13E-05	4.24E-06	5.86E-05	5.54E-05	5.15E-07
Ethyl benzene	15.663	5.56E-02	6.70E-03	3.92E-02	6.11E-03	3.88E-02	3.17E-02	3.07E-02	3.75E-03	2.77E-02	3.45E-03	3.17E-03	1.97E-02
Formaldehyde	8.190	5.88E-03	3.24E-01	2.32E-02	2.96E-01	2.29E-02	1.88E-02	1.81E-02	1.81E-01	2.93E-03	1.67E-01	1.54E-01	1.16E-02
Hexane	9.212	3.29E-02	3.44E-03	1.97E-02	3.13E-03	1.94E-02	1.59E-02	1.54E-02	1.92E-03	1.64E-02	1.77E-03	1.63E-03	9.86E-03
Manganese Compounds	0.004	1.10E-05	1.75E-04	2.01E-06	1.25E-04	1.80E-06	2.26E-06	1.81E-06	6.13E-05	8.48E-06	5.86E-05	5.54E-05	1.03E-06
Mercury Compounds	0.001	9.17E-07	4.99E-05	1.68E-07	3.57E-05	1.50E-07	1.88E-07	1.51E-07	1.75E-05	7.07E-07	1.68E-05	1.58E-05	8.58E-08
Nickel Compounds	0.002	6.42E-06	7.48E-05	1.17E-06	5.36E-05	1.05E-06	1.32E-06	1.06E-06	2.63E-05	4.95E-06	2.51E-05	2.37E-05	6.00E-07
Polycyclic Organic Matter	0.011	3.85E-05	3.87E-06	2.99E-05	3.53E-06	2.96E-05	2.42E-05	2.34E-05	2.16E-06	1.91E-05	1.99E-06	1.83E-06	1.50E-05
Propionaldehyde	0.616	5.72E-04	2.13E-02	3.73E-03	1.94E-02	3.69E-03	3.01E-03	2.91E-03	1.19E-02	2.85E-04	1.10E-02	1.01E-02	1.87E-03
Styrene	0.858	3.01E-03	1.28E-03	1.50E-03	1.17E-03	1.49E-03	1.22E-03	1.18E-03	7.18E-04	1.50E-03	6.62E-04	6.08E-04	7.54E-04
Toluene	63.704	2.27E-01	3.24E-02	1.42E-01	2.96E-02	1.41E-01	1.15E-01	1.11E-01	1.81E-02	1.13E-01	1.67E-02	1.54E-02	7.14E-02
Xylenes (isomers and mixture)	69.184	2.48E-01	2.29E-02	1.34E-01	2.09E-02	1.33E-01	1.09E-01	1.05E-01	1.28E-02	1.23E-01	1.18E-02	1.08E-02	6.74E-02

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2270008005	2265004035	2270005015	2270002075	2270002048	2270006005	2265003020	2265001060	2270006025	2270002015	2270002018
Equipment Name	Winter TOTAL (tons)	Airport Support Equipment	Snowblowers (res)	Agricultural Tractors	Off-Highway Tractors	Graders	Generator Sets	Forklifts	Specialty Vehicle Carts	Welders	Rollers	Scrapers
Tech Type		Dsl	4-St	Dsl	Dsl	Dsl	Dsl	4-St	4-St	Dsl	Dsl	Dsl
Equipment Population		20.8	2,677.9	79.7	13.0	36.1	69.3	9.5	96.0	32.9	47.5	13.3
Activity (hrs/season)		7,630.4	21,423.2	10,578.1	3,702.7	11,616.0	11,703.3	7,142.3	1,943.2	10,577.3	12,081.0	4,051.3
Activity (hrs/season/unit)		366.00	8.00	132.66	285.86	321.63	169.00	749.55	20.24	321.50	254.10	305.58
Exhaust PM (tons)	46.35	6.75E-01	7.77E-03	4.55E-01	5.72E-01	6.60E-01	5.36E-01	1.46E-02	3.76E-03	4.06E-01	5.42E-01	4.32E-01
TOTAL VOC (tons)	693.60	9.51E-01	8.92E-01	8.02E-01	7.81E-01	7.61E-01	6.99E-01	6.86E-01	5.56E-01	5.56E-01	5.33E-01	5.12E-01
Total Exhaust VOC (tons)	693.60	9.51E-01	8.92E-01	8.02E-01	7.81E-01	7.61E-01	6.99E-01	6.86E-01	5.56E-01	5.56E-01	5.33E-01	5.12E-01
Exh VOC	690.38	9.33E-01	8.92E-01	7.87E-01	7.65E-01	7.46E-01	6.85E-01	5.19E-01	4.49E-01	5.45E-01	5.22E-01	5.02E-01
Crankcase VOC	3.22	1.87E-02	0.00E+00	1.57E-02	1.53E-02	1.49E-02	1.37E-02	1.67E-01	1.07E-01	1.09E-02	1.04E-02	1.00E-02
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name												
1,3-Butadiene	1.449	1.77E-03	8.49E-04	1.49E-03	1.45E-03	1.42E-03	1.30E-03	6.53E-04	5.30E-04	1.03E-03	9.91E-04	9.53E-04
Acetaldehyde	4.266	7.07E-02	3.66E-03	5.96E-02	5.80E-02	5.66E-02	5.19E-02	2.81E-03	2.28E-03	4.13E-02	3.96E-02	3.81E-02
Acrolein	0.689	1.09E-02	6.25E-04	9.23E-03	8.98E-03	8.76E-03	8.04E-03	4.80E-04	3.89E-04	6.39E-03	6.13E-03	5.89E-03
Benzene (including benzene from gasoline)	17.954	1.93E-02	4.68E-02	1.63E-02	1.58E-02	1.55E-02	1.42E-02	3.60E-02	2.92E-02	1.13E-02	1.08E-02	1.04E-02
Chromium Compounds	0.003	4.72E-05	4.66E-07	3.18E-05	4.00E-05	4.62E-05	3.75E-05	8.73E-07	2.25E-07	2.84E-05	3.79E-05	3.02E-05
Ethyl benzene	15.663	2.95E-03	1.77E-02	2.49E-03	2.42E-03	2.36E-03	2.17E-03	1.36E-02	1.10E-02	1.72E-03	1.65E-03	1.59E-03
Formaldehyde	8.190	1.43E-01	1.04E-02	1.20E-01	1.17E-01	1.14E-01	1.05E-01	8.02E-03	6.51E-03	8.34E-02	7.99E-02	7.69E-02
Hexane	9.212	1.51E-03	8.85E-03	1.28E-03	1.24E-03	1.21E-03	1.11E-03	6.80E-03	5.52E-03	8.84E-04	8.47E-04	8.15E-04
Manganese Compounds	0.004	4.72E-05	9.32E-07	3.18E-05	4.00E-05	4.62E-05	3.75E-05	1.75E-06	4.51E-07	2.84E-05	3.79E-05	3.02E-05
Mercury Compounds	0.001	1.35E-05	7.77E-08	9.10E-06	1.14E-05	1.32E-05	1.07E-05	1.46E-07	3.76E-08	8.11E-06	1.08E-05	8.64E-06
Nickel Compounds	0.002	2.02E-05	5.44E-07	1.36E-05	1.72E-05	1.98E-05	1.61E-05	1.02E-06	2.63E-07	1.22E-05	1.62E-05	1.30E-05
Polycyclic Organic Matter	0.011	1.70E-06	1.35E-05	1.44E-06	1.40E-06	1.36E-06	1.25E-06	1.04E-05	8.40E-06	9.95E-07	9.54E-07	9.17E-07
Propionaldehyde	0.616	9.37E-03	1.68E-03	7.90E-03	7.69E-03	7.50E-03	6.89E-03	1.29E-03	1.05E-03	5.47E-03	5.25E-03	5.05E-03
Styrene	0.858	5.65E-04	6.76E-04	4.77E-04	4.64E-04	4.52E-04	4.15E-04	5.20E-04	4.22E-04	3.30E-04	3.16E-04	3.04E-04
Toluene	63.704	1.43E-02	6.41E-02	1.20E-02	1.17E-02	1.14E-02	1.05E-02	4.92E-02	3.99E-02	8.34E-03	7.99E-03	7.69E-03
Xylenes (isomers and mixture)	69.184	1.01E-02	6.05E-02	8.51E-03	8.27E-03	8.07E-03	7.41E-03	4.65E-02	3.77E-02	5.89E-03	5.65E-03	5.43E-03

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2270006015	2265002039	2265001020	2265002042	2260001060	2270002030	2265002021	2260006005	2265002030	2270006010	2265008005	2265002009
Equipment Name	Winter TOTAL (tons)	Air Compressors	Concrete/Industrial Saws	Snowmobiles	Cement & Mortar Mixers	Specialty Vehicle Carts	Trenchers	Paving Equipment	Generator Sets	Trenchers	Pumps	Airport Support Equipment	Plate Compactors
Tech Type		Dsl	4-St	4-St	4-St	2-St	Dsl	4-St	2-St	4-St	Dsl	4-St	4-St
Equipment Population		24.5	16.4	86.2	103.0	244.4	33.8	44.9	21.9	13.9	31.5	3.2	42.8
Activity (hrs/season)		9,984.7	3,346.4	2,069.5	2,891.8	4,946.2	6,707.2	2,627.9	1,258.1	1,868.7	6,351.1	1,520.9	2,377.8
Activity (hrs/season/unit)		407.50	203.95	24.00	28.08	20.24	198.26	58.51	57.50	134.40	201.50	469.64	55.50
Exhaust PM (tons)	46.35	4.03E-01	4.77E-03	3.61E-03	3.56E-03	4.16E-03	3.43E-01	2.73E-03	1.37E-02	2.75E-03	2.42E-01	3.18E-03	1.84E-03
TOTAL VOC (tons)	693.60	4.98E-01	4.78E-01	4.42E-01	4.29E-01	4.13E-01	3.86E-01	3.65E-01	3.34E-01	3.12E-01	2.98E-01	2.71E-01	2.53E-01
Total Exhaust VOC (tons)	693.60	4.98E-01	4.78E-01	4.42E-01	4.29E-01	4.13E-01	3.86E-01	3.65E-01	3.34E-01	3.12E-01	2.98E-01	2.71E-01	2.53E-01
Exh VOC	690.38	4.89E-01	4.63E-01	3.46E-01	3.77E-01	4.13E-01	3.79E-01	3.39E-01	3.34E-01	2.93E-01	2.92E-01	2.25E-01	2.44E-01
Crankcase VOC	3.22	9.77E-03	1.52E-02	9.59E-02	5.25E-02	0.00E+00	7.57E-03	2.63E-02	0.00E+00	1.84E-02	5.84E-03	4.60E-02	8.72E-03
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	9.27E-04	4.55E-04	4.21E-04	4.09E-04	8.89E-04	7.18E-04	3.48E-04	7.18E-04	2.97E-04	5.54E-04	2.58E-04	2.41E-04
Acetaldehyde	4.266	3.70E-02	1.96E-03	1.81E-03	1.76E-03	6.86E-04	2.87E-02	1.50E-03	5.54E-04	1.28E-03	2.21E-02	1.11E-03	1.04E-03
Acrolein	0.689	5.73E-03	3.34E-04	3.10E-04	3.01E-04	1.24E-04	4.44E-03	2.56E-04	1.00E-04	2.18E-04	3.42E-03	1.90E-04	1.77E-04
Benzene (including benzene from gasoline)	17.954	1.01E-02	2.51E-02	2.32E-02	2.25E-02	1.04E-02	7.84E-03	1.92E-02	8.42E-03	1.64E-02	6.04E-03	1.42E-02	1.33E-02
Chromium Compounds	0.003	2.82E-05	2.86E-07	2.17E-07	2.13E-07	2.50E-07	2.40E-05	1.64E-07	8.23E-07	1.65E-07	1.70E-05	1.91E-07	1.10E-07
Ethyl benzene	15.663	1.54E-03	9.46E-03	8.76E-03	8.50E-03	9.92E-03	1.20E-03	7.24E-03	8.02E-03	6.17E-03	9.23E-04	5.36E-03	5.01E-03
Formaldehyde	8.190	7.47E-02	5.59E-03	5.17E-03	5.02E-03	1.05E-03	5.79E-02	4.28E-03	8.48E-04	3.65E-03	4.47E-02	3.17E-03	2.96E-03
Hexane	9.212	7.92E-04	4.74E-03	4.39E-03	4.26E-03	5.87E-03	6.14E-04	3.62E-03	4.74E-03	3.09E-03	4.73E-04	2.69E-03	2.51E-03
Manganese Compounds	0.004	2.82E-05	5.72E-07	4.33E-07	4.27E-07	4.99E-07	2.40E-05	3.28E-07	1.65E-06	3.31E-07	1.70E-05	3.82E-07	2.21E-07
Mercury Compounds	0.001	8.05E-06	4.77E-08	3.61E-08	3.56E-08	4.16E-08	6.85E-06	2.73E-08	1.37E-07	2.75E-08	4.85E-06	3.18E-08	1.84E-08
Nickel Compounds	0.002	1.21E-05	3.34E-07	2.53E-07	2.49E-07	2.91E-07	1.03E-05	1.91E-07	9.60E-07	1.93E-07	7.27E-06	2.23E-07	1.29E-07
Polycyclic Organic Matter	0.011	8.92E-07	7.21E-06	6.68E-06	6.48E-06	6.86E-06	6.91E-07	5.52E-06	5.54E-06	4.71E-06	5.33E-07	4.09E-06	3.82E-06
Propionaldehyde	0.616	4.91E-03	8.98E-04	8.32E-04	8.07E-04	1.02E-04	3.80E-03	6.87E-04	8.25E-05	5.86E-04	2.93E-03	5.09E-04	4.75E-04
Styrene	0.858	2.96E-04	3.62E-04	3.35E-04	3.26E-04	5.37E-04	2.29E-04	2.77E-04	4.34E-04	2.36E-04	1.77E-04	2.05E-04	1.92E-04
Toluene	63.704	7.47E-03	3.43E-02	3.18E-02	3.08E-02	4.04E-02	5.79E-03	2.62E-02	3.27E-02	2.24E-02	4.47E-03	1.94E-02	1.82E-02
Xylenes (isomers and mixture)	69.184	5.28E-03	3.24E-02	3.00E-02	2.91E-02	4.42E-02	4.09E-03	2.48E-02	3.57E-02	2.11E-02	3.16E-03	1.84E-02	1.71E-02

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2270001060	2282020005	2270002033	2270002003	2270002021	2265002033	2265002072	2265002066	2265002015	2265002024	2270002054	2270002027
Equipment Name	Winter TOTAL (tons)	Specialty Vehicle Carts	Inboard	Bore/Drill Rigs	Pavers	Paving Equipment	Bore/Drill Rigs	Skid Steer Loaders	Tractors/Loaders/Backhoes	Rollers	Surfacing Equipment	Crushing/Proc. Equipment	Signal Boards/Light Plants
Tech Type		Dsl	Dsl	Dsl	Dsl	Dsl	4-St	4-St	4-St	4-St	4-St	Dsl	Dsl
Equipment Population		8.5	66.8	9.9	13.6	17.1	44.2	5.9	3.4	4.4	8.1	4.3	28.6
Activity (hrs/season)		1,149.9	2,004.8	1,543.2	3,722.8	3,549.3	1,580.7	616.2	988.3	921.5	1,325.7	1,362.4	5,124.4
Activity (hrs/season/unit)		135.45	30.03	155.80	274.49	207.96	35.77	103.64	290.87	207.62	163.16	319.29	178.87
Exhaust PM (tons)	46.35	1.63E-01	1.23E-01	1.81E-01	1.77E-01	1.77E-01	1.29E-03	1.47E-03	1.41E-03	1.39E-03	1.10E-03	8.87E-02	1.14E-01
TOTAL VOC (tons)	693.60	2.51E-01	2.39E-01	2.22E-01	1.89E-01	1.72E-01	1.65E-01	1.58E-01	1.42E-01	1.40E-01	1.28E-01	1.25E-01	1.21E-01
Total Exhaust VOC (tons)	693.60	2.51E-01	2.39E-01	2.22E-01	1.89E-01	1.72E-01	1.65E-01	1.58E-01	1.42E-01	1.40E-01	1.28E-01	1.25E-01	1.21E-01
Exh VOC	690.38	2.46E-01	2.39E-01	2.17E-01	1.85E-01	1.69E-01	1.54E-01	1.30E-01	1.42E-01	1.30E-01	1.27E-01	1.22E-01	1.19E-01
Crankcase VOC	3.22	4.92E-03	0.00E+00	4.35E-03	3.70E-03	3.38E-03	1.07E-02	2.80E-02	2.94E-04	9.90E-03	5.47E-04	2.44E-03	2.37E-03
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	4.67E-04	4.44E-04	4.12E-04	3.51E-04	3.20E-04	1.57E-04	1.51E-04	1.35E-04	1.33E-04	1.21E-04	2.32E-04	2.25E-04
Acetaldehyde	4.266	1.87E-02	1.77E-02	1.65E-02	1.40E-02	1.28E-02	6.77E-04	6.49E-04	5.81E-04	5.72E-04	5.23E-04	9.25E-03	8.99E-03
Acrolein	0.689	2.89E-03	2.75E-03	2.55E-03	2.17E-03	1.98E-03	1.16E-04	1.11E-04	9.93E-05	9.77E-05	8.93E-05	1.43E-03	1.39E-03
Benzene (including benzene from gasoline)	17.954	5.10E-03	4.85E-03	4.50E-03	3.83E-03	3.50E-03	8.67E-03	8.31E-03	7.45E-03	7.32E-03	6.70E-03	2.53E-03	2.46E-03
Chromium Compounds	0.003	1.14E-05	8.58E-06	1.26E-05	1.24E-05	1.24E-05	7.76E-08	8.81E-08	8.43E-08	8.37E-08	6.59E-08	6.21E-06	7.97E-06
Ethyl benzene	15.663	7.78E-04	7.40E-04	6.87E-04	5.85E-04	5.34E-04	3.27E-03	3.13E-03	2.81E-03	2.76E-03	2.53E-03	3.86E-04	3.75E-04
Formaldehyde	8.190	3.77E-02	3.58E-02	3.32E-02	2.83E-02	2.58E-02	1.93E-03	1.85E-03	1.66E-03	1.63E-03	1.49E-03	1.87E-02	1.81E-02
Hexane	9.212	3.99E-04	3.80E-04	3.52E-04	3.00E-04	2.74E-04	1.64E-03	1.57E-03	1.41E-03	1.38E-03	1.27E-03	1.98E-04	1.92E-04
Manganese Compounds	0.004	1.14E-05	8.58E-06	1.26E-05	1.24E-05	1.24E-05	1.55E-07	1.76E-07	1.69E-07	1.67E-07	1.32E-07	6.21E-06	7.97E-06
Mercury Compounds	0.001	3.25E-06	2.45E-06	3.61E-06	3.54E-06	3.53E-06	1.29E-08	1.47E-08	1.41E-08	1.39E-08	1.10E-08	1.77E-06	2.28E-06
Nickel Compounds	0.002	4.88E-06	3.68E-06	5.42E-06	5.30E-06	5.30E-06	9.05E-08	1.03E-07	9.84E-08	9.76E-08	7.69E-08	2.66E-06	3.42E-06
Polycyclic Organic Matter	0.011	4.49E-07	4.27E-07	3.97E-07	3.38E-07	3.08E-07	2.49E-06	2.39E-06	2.14E-06	2.11E-06	1.93E-06	2.23E-07	2.16E-07
Propionaldehyde	0.616	2.47E-03	2.35E-03	2.18E-03	1.86E-03	1.70E-03	3.10E-04	2.98E-04	2.67E-04	2.62E-04	2.40E-04	1.23E-03	1.19E-03
Styrene	0.858	1.49E-04	1.42E-04	1.32E-04	1.12E-04	1.02E-04	1.25E-04	1.20E-04	1.08E-04	1.06E-04	9.67E-05	7.40E-05	7.18E-05
Toluene	63.704	3.77E-03	3.58E-03	3.32E-03	2.83E-03	2.58E-03	1.19E-02	1.14E-02	1.02E-02	1.00E-02	9.16E-03	1.87E-03	1.81E-03
Xylenes (isomers and mixture)	69.184	2.66E-03	2.53E-03	2.35E-03	2.00E-03	1.83E-03	1.12E-02	1.07E-02	9.62E-03	9.46E-03	8.65E-03	1.32E-03	1.28E-03

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2268006020	2285002015	2265002060	2270003020	2260002021	2265002003	2270002081	2260002009	2270002024	2265003040	2270002063	2265002078
Equipment Name	Winter TOTAL (tons)	Gas Compressors	Railway Maintenance	Rubber Tire Loaders	Forklifts	Paving Equipment	Pavers	Other Construction Equipment	Plate Compactors	Surfacing Equipment	Other General Industrial Eq	Rubber Tire Tractor/Dozers	Dumpers/Tenders
Tech Type		4-St	Dsl	4-St	Dsl	2-St	4-St	Dsl	2-St	Dsl	4-St	Dsl	4-St
Equipment Population		0.1	2.7	1.2	2.6	5.9	4.0	5.6	6.2	2.6	1.9	1.8	12.1
Activity (hrs/season)		343.7	1,294.9	204.6	2,025.8	345.7	523.6	1,142.4	344.4	485.9	610.9	549.6	514.4
Activity (hrs/season/unit)		3000.00	471.50	171.18	765.77	58.51	131.06	202.61	55.50	187.56	321.17	300.57	42.46
Exhaust PM (tons)	46.35	2.83E-03	7.69E-02	1.09E-03	8.69E-02	3.70E-03	8.23E-04	7.25E-02	3.11E-03	7.54E-02	5.27E-04	5.14E-02	3.99E-04
TOTAL VOC (tons)	693.60	1.18E-01	1.16E-01	1.07E-01	1.00E-01	8.93E-02	8.57E-02	7.54E-02	7.51E-02	7.41E-02	7.25E-02	6.38E-02	5.41E-02
Total Exhaust VOC (tons)	693.60	1.18E-01	1.16E-01	1.07E-01	1.00E-01	8.93E-02	8.57E-02	7.54E-02	7.51E-02	7.41E-02	7.25E-02	6.38E-02	5.41E-02
Exh VOC	690.38	8.86E-02	1.14E-01	8.31E-02	9.81E-02	8.93E-02	7.92E-02	7.40E-02	7.51E-02	7.26E-02	7.25E-02	6.26E-02	4.61E-02
Crankcase VOC	3.22	2.92E-02	2.28E-03	2.41E-02	1.96E-03	0.00E+00	6.49E-03	1.48E-03	0.00E+00	1.45E-03	3.21E-05	1.25E-03	7.94E-03
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	1.12E-04	2.16E-04	1.02E-04	1.86E-04	1.92E-04	8.16E-05	1.40E-04	1.61E-04	1.38E-04	6.90E-05	1.19E-04	5.15E-05
Acetaldehyde	4.266	4.83E-04	8.65E-03	4.39E-04	7.43E-03	1.48E-04	3.52E-04	5.60E-03	1.25E-04	5.50E-03	2.97E-04	4.74E-03	2.22E-04
Acrolein	0.689	8.25E-05	1.34E-03	7.50E-05	1.15E-03	2.68E-05	6.00E-05	8.68E-04	2.25E-05	8.52E-04	5.08E-05	7.34E-04	3.79E-05
Benzene (including benzene from gasoline)	17.954	6.19E-03	2.36E-03	5.63E-03	2.03E-03	2.25E-03	4.50E-03	1.53E-03	1.89E-03	1.50E-03	3.81E-03	1.30E-03	2.84E-03
Chromium Compounds	0.003	1.70E-07	5.38E-06	6.56E-08	6.08E-06	2.22E-07	4.94E-08	5.07E-06	1.87E-07	5.28E-06	3.16E-08	3.59E-06	2.39E-08
Ethyl benzene	15.663	2.33E-03	3.61E-04	2.12E-03	3.10E-04	2.14E-03	1.70E-03	2.34E-04	1.80E-03	2.30E-04	1.44E-03	1.98E-04	1.07E-03
Formaldehyde	8.190	1.38E-03	1.75E-02	1.25E-03	1.50E-02	2.27E-04	1.00E-03	1.13E-02	1.91E-04	1.11E-02	8.49E-04	9.57E-03	6.33E-04
Hexane	9.212	1.17E-03	1.85E-04	1.06E-03	1.59E-04	1.27E-03	8.51E-04	1.20E-04	1.07E-03	1.18E-04	7.19E-04	1.01E-04	5.36E-04
Manganese Compounds	0.004	3.39E-07	5.38E-06	1.31E-07	6.08E-06	4.44E-07	9.88E-08	5.07E-06	3.73E-07	5.28E-06	6.33E-08	3.59E-06	4.78E-08
Mercury Compounds	0.001	2.83E-08	1.54E-06	1.09E-08	1.74E-06	3.70E-08	8.23E-09	1.45E-06	3.11E-08	1.51E-06	5.27E-09	1.03E-06	3.99E-09
Nickel Compounds	0.002	1.98E-07	2.31E-06	7.66E-08	2.61E-06	2.59E-07	5.76E-08	2.17E-06	2.18E-07	2.26E-06	3.69E-08	1.54E-06	2.79E-08
Polycyclic Organic Matter	0.011	1.78E-06	2.08E-07	1.62E-06	1.79E-07	1.48E-06	1.29E-06	1.35E-07	1.25E-06	1.33E-07	1.10E-06	1.14E-07	8.17E-07
Propionaldehyde	0.616	2.22E-04	1.15E-03	2.01E-04	9.85E-04	2.21E-05	1.61E-04	7.43E-04	1.85E-05	7.29E-04	1.36E-04	6.29E-04	1.02E-04
Styrene	0.858	8.93E-05	6.91E-05	8.12E-05	5.94E-05	1.16E-04	6.50E-05	4.48E-05	9.76E-05	4.40E-05	5.50E-05	3.79E-05	4.10E-05
Toluene	63.704	8.46E-03	1.75E-03	7.70E-03	1.50E-03	8.74E-03	6.16E-03	1.13E-03	7.34E-03	1.11E-03	5.21E-03	9.57E-04	3.88E-03
Xylenes (isomers and mixture)	69.184	7.99E-03	1.23E-03	7.27E-03	1.06E-03	9.56E-03	5.81E-03	8.00E-04	8.03E-03	7.85E-04	4.92E-03	6.77E-04	3.67E-03

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2270005020	2265002081	2270003030	2265003010	2265005040	2265002057	2265002054	2265003030	2285004015	2270003070	2270003040	2270005060
Equipment Name	Winter TOTAL (tons)	Combines	Other Construction Equipment	Sweepers/Scrubbers	Aerial Lifts	Trillers > 6 HP	Rough Terrain Forklift	Crushing/Proc. Equipment	Sweepers/Scrubbers	Railway Maintenance	Terminal Tractors	Other General Industrial Eq	Irrigation Sets
Tech Type		Dsl	4-St	Dsl	4-St	4-St	4-St	4-St	4-St	4-St	Dsl	Dsl	Dsl
Equipment Population		12.1	0.6	0.8	1.2	25.2	0.6	2.8	0.6	3.8	0.7	1.7	1.4
Activity (hrs/season)		505.0	74.1	445.5	192.3	302.3	82.5	226.2	131.3	350.2	410.7	691.9	290.9
Activity (hrs/season/unit)		41.89	124.04	549.55	162.61	12.01	138.08	80.58	232.43	92.00	566.22	395.50	209.18
Exhaust PM (tons)	46.35	5.58E-02	4.78E-04	2.91E-02	4.18E-04	1.89E-04	3.66E-04	2.92E-04	3.09E-04	2.38E-04	2.42E-02	2.16E-02	1.67E-02
TOTAL VOC (tons)	693.60	5.36E-02	4.69E-02	4.51E-02	4.31E-02	4.01E-02	3.59E-02	3.35E-02	3.16E-02	2.99E-02	2.54E-02	2.51E-02	2.39E-02
Total Exhaust VOC (tons)	693.60	5.36E-02	4.69E-02	4.51E-02	4.31E-02	4.01E-02	3.59E-02	3.35E-02	3.16E-02	2.99E-02	2.54E-02	2.51E-02	2.39E-02
Exh VOC	690.38	5.25E-02	3.64E-02	4.42E-02	3.47E-02	3.18E-02	2.78E-02	3.34E-02	2.71E-02	2.80E-02	2.49E-02	2.46E-02	2.34E-02
Crankcase VOC	3.22	1.05E-03	1.05E-02	8.84E-04	8.43E-03	8.36E-03	8.07E-03	1.25E-04	4.49E-03	1.86E-03	4.97E-04	4.92E-04	4.68E-04
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	9.97E-05	4.46E-05	8.38E-05	4.10E-05	3.82E-05	3.42E-05	3.19E-05	3.01E-05	2.85E-05	4.72E-05	4.67E-05	4.44E-05
Acetaldehyde	4.266	3.98E-03	1.92E-04	3.35E-03	1.77E-04	1.64E-04	1.47E-04	1.38E-04	1.30E-04	1.23E-04	1.88E-03	1.86E-03	1.77E-03
Acrolein	0.689	6.16E-04	3.28E-05	5.18E-04	3.02E-05	2.81E-05	2.51E-05	2.35E-05	2.21E-05	2.09E-05	2.92E-04	2.89E-04	2.75E-04
Benzene (including benzene from gasoline)	17.954	1.09E-03	2.46E-03	9.15E-04	2.26E-03	2.11E-03	1.89E-03	1.76E-03	1.66E-03	1.57E-03	5.15E-04	5.10E-04	4.85E-04
Chromium Compounds	0.003	3.90E-06	2.87E-08	2.04E-06	2.51E-08	1.14E-08	2.20E-08	1.75E-08	1.85E-08	1.43E-08	1.69E-06	1.51E-06	1.17E-06
Ethyl benzene	15.663	1.66E-04	9.29E-04	1.40E-04	8.54E-04	7.94E-04	7.11E-04	6.64E-04	6.25E-04	5.92E-04	7.86E-05	7.78E-05	7.40E-05
Formaldehyde	8.190	8.04E-03	5.49E-04	6.76E-03	5.04E-04	4.69E-04	4.20E-04	3.92E-04	3.70E-04	3.50E-04	3.80E-03	3.76E-03	3.58E-03
Hexane	9.212	8.52E-05	4.65E-04	7.17E-05	4.28E-04	3.98E-04	3.56E-04	3.33E-04	3.13E-04	2.97E-04	4.03E-05	3.99E-05	3.80E-05
Manganese Compounds	0.004	3.90E-06	5.74E-08	2.04E-06	5.01E-08	2.27E-08	4.40E-08	3.50E-08	3.71E-08	2.86E-08	1.69E-06	1.51E-06	1.17E-06
Mercury Compounds	0.001	1.12E-06	4.78E-09	5.81E-07	4.18E-09	1.89E-09	3.66E-09	2.92E-09	3.09E-09	2.38E-09	4.84E-07	4.32E-07	3.33E-07
Nickel Compounds	0.002	1.67E-06	3.35E-08	8.72E-07	2.93E-08	1.33E-08	2.57E-08	2.04E-08	2.16E-08	1.67E-08	7.26E-07	6.48E-07	5.00E-07
Polycyclic Organic Matter	0.011	9.59E-08	7.08E-07	8.07E-08	6.51E-07	6.06E-07	5.42E-07	5.07E-07	4.77E-07	4.52E-07	4.54E-08	4.49E-08	4.27E-08
Propionaldehyde	0.616	5.28E-04	8.82E-05	4.44E-04	8.11E-05	7.54E-05	6.75E-05	6.31E-05	5.94E-05	5.62E-05	2.50E-04	2.47E-04	2.35E-04
Styrene	0.858	3.18E-05	3.55E-05	2.68E-05	3.27E-05	3.04E-05	2.72E-05	2.54E-05	2.39E-05	2.27E-05	1.51E-05	1.49E-05	1.42E-05
Toluene	63.704	8.04E-04	3.37E-03	6.76E-04	3.10E-03	2.88E-03	2.58E-03	2.41E-03	2.27E-03	2.15E-03	3.80E-04	3.76E-04	3.58E-04
Xylenes (isomers and mixture)	69.184	5.68E-04	3.18E-03	4.78E-04	2.92E-03	2.72E-03	2.44E-03	2.27E-03	2.14E-03	2.03E-03	2.69E-04	2.66E-04	2.53E-04

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2265005035	2265002045	2260005050	2270002039	2270005055	2270002009	2265003060	2270006030	2265005045	2265002027	2270003010	2270005035
Equipment Name	Winter TOTAL (tons)	Sprayers	Cranes	Sprayers	Concrete/Industrial Saws	Other Agricultural Equipment	Plate Compactors	AC\Refrigeration	Pressure Washers	Swathers	Signal Boards/Light Plants	Aerial Lifts	Sprayers
Tech Type		4-St	4-St	2-St	Dsl	Dsl	Dsl	4-St	Dsl	4-St	4-St	Dsl	Dsl
Equipment Population		4.6	0.4	1.8	1.2	0.9	4.6	0.3	4.7	0.5	0.6	0.8	1.4
Activity (hrs/season)		102.3	61.9	40.9	236.4	98.7	739.8	72.4	341.9	12.6	62.8	140.2	35.0
Activity (hrs/season/unit)		22.34	138.75	22.34	193.92	106.41	161.82	272.52	72.50	26.53	106.32	172.97	25.14
Exhaust PM (tons)	46.35	1.61E-04	1.64E-04	4.45E-04	1.06E-02	6.20E-03	1.46E-02	9.46E-05	9.81E-03	5.63E-05	6.25E-05	6.05E-03	2.99E-03
TOTAL VOC (tons)	693.60	1.91E-02	1.62E-02	1.17E-02	1.10E-02	1.01E-02	1.01E-02	1.01E-02	9.53E-03	8.17E-03	8.03E-03	7.43E-03	5.90E-03
Total Exhaust VOC (tons)	693.60	1.91E-02	1.62E-02	1.17E-02	1.10E-02	1.01E-02	1.01E-02	1.01E-02	9.53E-03	8.17E-03	8.03E-03	7.43E-03	5.90E-03
Exh VOC	690.38	1.69E-02	1.30E-02	1.17E-02	1.08E-02	9.91E-03	9.90E-03	9.82E-03	9.34E-03	6.38E-03	8.03E-03	7.28E-03	5.78E-03
Crankcase VOC	3.22	2.19E-03	3.17E-03	0.00E+00	2.16E-04	1.98E-04	1.98E-04	2.68E-04	1.87E-04	1.80E-03	2.91E-06	1.46E-04	1.16E-04
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	1.449	1.81E-05	1.54E-05	2.52E-05	2.05E-05	1.88E-05	1.88E-05	9.61E-06	1.77E-05	7.78E-06	7.65E-06	1.38E-05	1.10E-05
Acetaldehyde	4.266	7.82E-05	6.64E-05	1.95E-05	8.20E-04	7.51E-04	7.50E-04	4.14E-05	7.08E-04	3.35E-05	3.29E-05	5.52E-04	4.38E-04
Acrolein	0.689	1.33E-05	1.13E-05	3.52E-06	1.27E-04	1.16E-04	1.16E-04	7.06E-06	1.10E-04	5.72E-06	5.62E-06	8.54E-05	6.78E-05
Benzene (including benzene from gasoline)	17.954	1.00E-03	8.51E-04	2.96E-04	2.24E-04	2.05E-04	2.05E-04	5.30E-04	1.93E-04	4.29E-04	4.22E-04	1.51E-04	1.20E-04
Chromium Compounds	0.003	9.68E-09	9.87E-09	2.67E-08	7.42E-07	4.34E-07	1.02E-06	5.67E-09	6.87E-07	3.38E-09	3.75E-09	4.24E-07	2.09E-07
Ethyl benzene	15.663	3.77E-04	3.21E-04	2.81E-04	3.42E-05	3.13E-05	3.13E-05	2.00E-04	2.95E-05	1.62E-04	1.59E-04	2.30E-05	1.83E-05
Formaldehyde	8.190	2.23E-04	1.90E-04	2.98E-05	1.65E-03	1.52E-03	1.51E-03	1.18E-04	1.43E-03	9.56E-05	9.40E-05	1.11E-03	8.84E-04
Hexane	9.212	1.89E-04	1.61E-04	1.67E-04	1.75E-05	1.61E-05	1.61E-05	1.00E-04	1.52E-05	8.11E-05	7.97E-05	1.18E-05	9.37E-06
Manganese Compounds	0.004	1.94E-08	1.97E-08	5.34E-08	7.42E-07	4.34E-07	1.02E-06	1.13E-08	6.87E-07	6.75E-09	7.50E-09	4.24E-07	2.09E-07
Mercury Compounds	0.001	1.61E-09	1.64E-09	4.45E-09	2.12E-07	1.24E-07	2.91E-07	9.46E-10	1.96E-07	5.63E-10	6.25E-10	1.21E-07	5.98E-08
Nickel Compounds	0.002	1.13E-08	1.15E-08	3.12E-08	3.18E-07	1.86E-07	4.37E-07	6.62E-09	2.94E-07	3.94E-09	4.37E-09	1.82E-07	8.97E-08
Polycyclic Organic Matter	0.011	2.88E-07	2.45E-07	1.95E-07	1.97E-08	1.81E-08	1.81E-08	1.52E-07	1.71E-08	1.23E-07	1.21E-07	1.33E-08	1.06E-08
Propionaldehyde	0.616	3.58E-05	3.05E-05	2.90E-06	1.09E-04	9.96E-05	9.94E-05	1.90E-05	9.39E-05	1.54E-05	1.51E-05	7.32E-05	5.81E-05
Styrene	0.858	1.44E-05	1.23E-05	1.52E-05	6.55E-06	6.00E-06	6.00E-06	7.65E-06	5.66E-06	6.19E-06	6.09E-06	4.41E-06	3.50E-06
Toluene	63.704	1.37E-03	1.16E-03	1.15E-03	1.65E-04	1.52E-04	1.51E-04	7.25E-04	1.43E-04	5.87E-04	5.77E-04	1.11E-04	8.84E-05
Xylenes (isomers and mixture)	69.184	1.29E-03	1.10E-03	1.25E-03	1.17E-04	1.07E-04	1.07E-04	6.84E-04	1.01E-04	5.54E-04	5.45E-04	7.87E-05	6.25E-05

Table C-4-6c
FNSB NONROAD Emissions - Winter 1999

SCC		2260003030	2270005045	2265005025	2270002042	2270003050	2265005055	2270002078	2265003050	2265002006	2282020010
Equipment Name	Winter TOTAL (tons)	Sweepers/Scrubbers	Swathers	Balers	Cement & Mortar Mixers	Other Material Handling Eqp	Other Agricultural Equipment	Dumpers/Tenders	Other Material Handling Eqp	Tampers/Rammers	Outboard
Tech Type		2-St	Dsl	4-St	Dsl	Dsl	4-St	Dsl	4-St	4-St	Dsl
Equipment Population		0.1	2.8	0.5	2.6	0.1	0.5	0.3	0.0	0.1	0.9
Activity (hrs/season)		18.4	85.5	8.7	238.2	16.2	15.9	57.7	6.9	7.9	20.3
Activity (hrs/season/unit)		232.43	30.72	18.99	91.94	189.64	34.63	189.23	173.87	53.49	22.52
Exhaust PM (tons)	46.35	1.80E-04	4.50E-03	2.14E-05	4.09E-03	1.52E-03	1.23E-05	1.38E-03	1.04E-05	5.11E-06	3.70E-04
TOTAL VOC (tons)	693.60	4.34E-03	3.80E-03	3.11E-03	2.86E-03	2.05E-03	1.69E-03	1.61E-03	1.22E-03	6.58E-04	3.70E-04
Total Exhaust VOC (tons)	693.60	4.34E-03	3.80E-03	3.11E-03	2.86E-03	2.05E-03	1.69E-03	1.61E-03	1.22E-03	6.58E-04	3.70E-04
Exh VOC	690.38	4.34E-03	3.72E-03	2.43E-03	2.81E-03	2.01E-03	1.46E-03	1.58E-03	1.13E-03	5.84E-04	3.70E-04
Crankcase VOC	3.22	0.00E+00	7.44E-05	6.84E-04	5.62E-05	4.02E-05	2.35E-04	3.15E-05	8.73E-05	7.35E-05	0.00E+00
Total Evap VOC (tons)	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chemical Name											
1,3-Butadiene	1.449	9.33E-06	7.06E-06	2.96E-06	5.33E-06	3.82E-06	1.61E-06	2.99E-06	1.16E-06	6.26E-07	6.87E-07
Acetaldehyde	4.266	7.20E-06	2.82E-04	1.28E-05	2.13E-04	1.52E-04	6.94E-06	1.20E-04	4.99E-06	2.70E-06	2.75E-05
Acrolein	0.689	1.30E-06	4.37E-05	2.18E-06	3.29E-05	2.36E-05	1.19E-06	1.85E-05	8.53E-07	4.60E-07	4.25E-06
Benzene (including benzene from gasoline)	17.954	1.09E-04	7.71E-05	1.63E-04	5.81E-05	4.17E-05	8.89E-05	3.27E-05	6.40E-05	3.45E-05	7.50E-06
Chromium Compounds	0.003	1.08E-08	3.15E-07	1.29E-09	2.87E-07	1.06E-07	7.39E-10	9.68E-08	6.22E-10	3.07E-10	2.59E-08
Ethyl benzene	15.663	1.04E-04	1.18E-05	6.17E-05	8.88E-06	6.36E-06	3.35E-05	4.99E-06	2.41E-05	1.30E-05	1.15E-06
Formaldehyde	8.190	1.10E-05	5.70E-04	3.64E-05	4.30E-04	3.08E-04	1.98E-05	2.41E-04	1.43E-05	7.70E-06	5.54E-05
Hexane	9.212	6.16E-05	6.04E-06	3.09E-05	4.55E-06	3.26E-06	1.68E-05	2.56E-06	1.21E-05	6.52E-06	5.88E-07
Manganese Compounds	0.004	2.16E-08	3.15E-07	2.57E-09	2.87E-07	1.06E-07	1.48E-09	9.68E-08	1.24E-09	6.14E-10	2.59E-08
Mercury Compounds	0.001	1.80E-09	9.00E-08	2.14E-10	8.19E-08	3.04E-08	1.23E-10	2.77E-08	1.04E-10	5.11E-11	7.41E-09
Nickel Compounds	0.002	1.26E-08	1.35E-07	1.50E-09	1.23E-07	4.55E-08	8.62E-10	4.15E-08	7.25E-10	3.58E-10	1.11E-08
Polycyclic Organic Matter	0.011	7.20E-08	6.80E-09	4.70E-08	5.13E-09	3.67E-09	2.56E-08	2.88E-09	1.84E-08	9.93E-09	6.61E-10
Propionaldehyde	0.616	1.07E-06	3.74E-05	5.85E-06	2.82E-05	2.02E-05	3.18E-06	1.58E-05	2.29E-06	1.24E-06	3.64E-06
Styrene	0.858	5.64E-06	2.26E-06	2.36E-06	1.70E-06	1.22E-06	1.28E-06	9.56E-07	9.23E-07	4.99E-07	2.19E-07
Toluene	63.704	4.24E-04	5.70E-05	2.24E-04	4.30E-05	3.08E-05	1.22E-04	2.41E-05	8.75E-05	4.72E-05	5.54E-06
Xylenes (isomers and mixture)	69.184	4.64E-04	4.02E-05	2.11E-04	3.04E-05	2.17E-05	1.15E-04	1.71E-05	8.26E-05	4.46E-05	3.92E-06

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2282005010	2260001020	2282005015	2282010005	2265004010	2265004055	2260001030	2270009010	2260004025	2270002066	2260004020
Equipment Name		Summer TOTAL (tons)	Outboard	Snowmobiles	Personal Water Craft	Inboard/Stern drive	Lawn mowers (res)	Lawn & Garden Tractors (res)	All Terrain Vehicles/Mot orcycles	Other Underground Mining Equipment	Trimmers/Ed gers/Brush Cutter (res)	Tractors/Load ers/Backhoes	Chain Saws < 6 HP (res)
Tech Type			2-St	2-St	2-St	4-St	4-St	4-St	2-St	Dsl	2-St	Dsl	2-St
Equipment Population			3,018.65	10,491.14	408.06	631.23	9,915.44	3,611.06	757.20	80.74	4,174.87	141.72	1,581.21
Activity (hrs/season)			89,276.0	-	21,423.3	25,535.2	247,886.0	162,497.5	12,872.4	69,667.7	37,573.8	107,073.3	20,555.8
Activity (hrs/season/unit)			29.57	-	52.50	40.45	25.00	45.00	17.00	862.89	9.00	755.53	13.00
Exhaust PM (tons)		65.92	7.38E+00	0.00E+00	2.91E+00	1.07E-01	1.33E-01	1.35E-01	3.24E-01	7.89E+00	3.98E-01	7.20E+00	2.89E-01
TOTAL VOC (tons)		616.06	1.58E+02	1.48E+02	7.36E+01	2.61E+01	2.03E+01	1.92E+01	1.78E+01	1.32E+01	1.15E+01	1.04E+01	8.14E+00
Total Exhaust VOC (tons)		393.20	1.27E+02	0.00E+00	6.42E+01	8.18E+00	1.95E+01	1.73E+01	1.36E+01	1.32E+01	1.14E+01	1.04E+01	8.10E+00
Exh VOC		387.22	1.27E+02	0.00E+00	6.42E+01	8.18E+00	1.88E+01	1.66E+01	1.36E+01	1.29E+01	1.14E+01	1.02E+01	8.10E+00
Crankcase VOC		5.98	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.80E-01	6.88E-01	0.00E+00	2.58E-01	0.00E+00	2.03E-01	0.00E+00
Total Evap VOC (tons)		222.86	3.09E+01	1.48E+02	9.45E+00	1.79E+01	7.67E-01	1.98E+00	4.15E+00	0.00E+00	5.42E-02	0.00E+00	3.51E-02
Chemical Name	CAS No.												
1,3-Butadiene	79345	0.74	0.274	0.00E+00	1.38E-01	7.79E-03	1.86E-02	1.64E-02	2.93E-02	2.45E-02	2.46E-02	1.93E-02	1.74E-02
Acetaldehyde	79005	6.26	0.211	0.00E+00	1.07E-01	3.36E-02	8.01E-02	7.08E-02	2.26E-02	9.78E-01	1.90E-02	7.70E-01	1.34E-02
Acrolein	57147	0.98	0.038	0.00E+00	1.93E-02	5.73E-03	1.37E-02	1.21E-02	4.09E-03	1.51E-01	3.43E-03	1.19E-01	2.43E-03
Benzene (including benzene from gasoline)	120821	16.45	3.888	3.27E+00	1.83E+00	8.24E-01	1.04E+00	9.50E-01	4.35E-01	2.67E-01	2.89E-01	2.10E-01	2.05E-01
Chromium Compounds	96128	0.00	0.000	0.00E+00	1.75E-04	6.39E-06	7.97E-06	8.13E-06	1.94E-05	5.53E-04	2.39E-05	5.04E-04	1.74E-05
Ethyl benzene	122667	9.28	3.294	1.14E+00	1.61E+00	3.00E-01	3.93E-01	3.57E-01	3.59E-01	4.08E-02	2.75E-01	3.21E-02	1.95E-01
Formaldehyde	106887	12.70	0.323	0.00E+00	1.63E-01	9.58E-02	2.29E-01	2.02E-01	3.46E-02	1.98E+00	2.90E-02	1.55E+00	2.06E-02
Hexane	75558	9.54	2.530	3.47E+00	1.13E+00	5.00E-01	2.12E-01	2.18E-01	2.91E-01	2.09E-02	1.63E-01	1.65E-02	1.16E-01
Manganese Compounds	106990	0.01	0.001	0.00E+00	3.49E-04	1.28E-05	1.59E-05	1.63E-05	3.88E-05	5.53E-04	4.77E-05	5.04E-04	3.47E-05
Mercury Compounds	542756	0.00	0.000	0.00E+00	2.91E-05	1.07E-06	1.33E-06	1.35E-06	3.24E-06	1.58E-04	3.98E-06	1.44E-04	2.89E-06
Nickel Compounds	1120714	0.00	0.001	0.00E+00	2.04E-04	7.46E-06	9.30E-06	9.48E-06	2.27E-05	2.37E-04	2.78E-05	2.16E-04	2.02E-05
Polycyclic Organic Matter	106467	0.01	0.002	0.00E+00	1.07E-03	1.24E-04	2.95E-04	2.61E-04	2.26E-04	2.36E-05	1.90E-04	1.85E-05	1.34E-04
Propionaldehyde	123911	0.94	0.031	0.00E+00	1.59E-02	1.54E-02	3.67E-02	3.24E-02	3.37E-03	1.30E-01	2.82E-03	1.02E-01	2.00E-03
Styrene	540841	0.42	0.166	0.00E+00	8.34E-02	6.20E-03	1.48E-02	1.31E-02	1.77E-02	7.82E-03	1.48E-02	6.15E-03	1.05E-02
Toluene	1746016	39.56	13.727	6.13E+00	6.67E+00	1.33E+00	1.43E+00	1.32E+00	1.51E+00	1.98E-01	1.12E+00	1.55E-01	7.94E-01
Xylenes (isomers and mixture)	95954	36.95	14.313	3.31E+00	7.08E+00	9.54E-01	1.34E+00	1.21E+00	1.55E+00	1.40E-01	1.22E+00	1.10E-01	8.67E-01

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2270002072	2265006005	2270002060	2260004030	2270002036	2260002054	2265001030	2270002069	2265006030	2270003060	2270002057
Equipment Name		Summer TOTAL (tons)	Skid Steer Loaders	Generator Sets	Rubber Tire Loaders	Leafblowers/Vacuums (res)	Excavators	Concrete/Industrial Saws	All Terrain Vehicles/Motocycles	Crawler Tractor/Dozers	Pressure Washers	AC\Refrigeration	Rough Terrain Forklift
Tech Type			Dsl	4-St	Dsl	2-St	Dsl	2-St	4-St	Dsl	4-St	Dsl	Dsl
Equipment Population			177.23	723.47	89.60	2,118.25	57.91	28.81	2,365.33	87.17	336.30	195.70	48.15
Activity (hrs/season)			96,501.8	41,599.8	45,390.4	21,182.5	42,092.9	11,552.4	40,210.6	54,309.3	19,337.2	144,223.5	21,220.1
Activity (hrs/season/unit)			544.51	57.50	506.57	10.00	726.90	401.02	17.00	623.06	57.50	736.95	440.67
Exhaust PM (tons)		65.92	5.23E+00	4.76E-02	5.00E+00	2.58E-01	3.85E+00	3.61E-01	1.68E-02	3.63E+00	2.62E-02	3.03E+00	1.77E+00
TOTAL VOC (tons)		616.06	7.86E+00	7.66E+00	7.40E+00	7.31E+00	6.59E+00	6.09E+00	5.44E+00	4.02E+00	3.44E+00	2.64E+00	2.48E+00
Total Exhaust VOC (tons)		393.20	7.86E+00	6.76E+00	7.40E+00	7.28E+00	6.59E+00	6.08E+00	1.82E+00	4.02E+00	3.20E+00	2.64E+00	2.48E+00
Exh VOC		387.22	7.71E+00	5.74E+00	7.25E+00	7.28E+00	6.47E+00	6.08E+00	1.44E+00	3.94E+00	3.00E+00	2.59E+00	2.43E+00
Crankcase VOC		5.98	1.54E-01	1.02E+00	1.45E-01	0.00E+00	1.29E-01	0.00E+00	3.75E-01	7.88E-02	1.97E-01	5.18E-02	4.85E-02
Total Evap VOC (tons)		222.86	0.00E+00	9.06E-01	0.00E+00	3.04E-02	0.00E+00	1.22E-02	3.62E+00	0.00E+00	2.39E-01	0.00E+00	0.00E+00
Chemical Name	CAS No.												
1,3-Butadiene	79345	0.74	1.46E-02	6.43E-03	1.38E-02	1.57E-02	1.23E-02	1.31E-02	1.73E-03	7.47E-03	3.05E-03	4.92E-03	4.60E-03
Acetaldehyde	79005	6.26	5.84E-01	2.77E-02	5.50E-01	1.21E-02	4.90E-01	1.01E-02	7.45E-03	2.99E-01	1.31E-02	1.96E-01	1.84E-01
Acrolein	57147	0.98	9.04E-02	4.73E-03	8.51E-02	2.19E-03	7.58E-02	1.82E-03	1.27E-03	4.62E-02	2.24E-03	3.04E-02	2.85E-02
Benzene (including benzene from gasoline)	120821	16.45	1.60E-01	3.75E-01	1.50E-01	1.84E-01	1.34E-01	1.54E-01	1.75E-01	8.16E-02	1.73E-01	5.36E-02	5.02E-02
Chromium Compounds	96128	0.00	3.66E-04	2.86E-06	3.50E-04	1.55E-05	2.69E-04	2.17E-05	1.01E-06	2.54E-04	1.57E-06	2.12E-04	1.24E-04
Ethyl benzene	122667	9.28	2.44E-02	1.41E-01	2.29E-02	1.75E-01	2.04E-02	1.46E-01	6.38E-02	1.25E-02	6.52E-02	8.19E-03	7.67E-03
Formaldehyde	106887	12.70	1.18E+00	7.91E-02	1.11E+00	1.85E-02	9.89E-01	1.54E-02	2.13E-02	6.03E-01	3.74E-02	3.96E-01	3.71E-01
Hexane	75558	9.54	1.25E-02	8.82E-02	1.18E-02	1.04E-01	1.05E-02	8.66E-02	1.03E-01	6.39E-03	3.74E-02	4.20E-03	3.94E-03
Manganese Compounds	106990	0.01	3.66E-04	5.72E-06	3.50E-04	3.10E-05	2.69E-04	4.34E-05	2.02E-06	2.54E-04	3.15E-06	2.12E-04	1.24E-04
Mercury Compounds	542756	0.00	1.05E-04	4.76E-07	1.00E-04	2.58E-06	7.70E-05	3.61E-06	1.68E-07	7.25E-05	2.62E-07	6.07E-05	3.54E-05
Nickel Compounds	1120714	0.00	1.57E-04	3.33E-06	1.50E-04	1.81E-05	1.15E-04	2.53E-05	1.18E-06	1.09E-04	1.84E-06	9.10E-05	5.31E-05
Polycyclic Organic Matter	106467	0.01	1.41E-05	1.02E-04	1.32E-05	1.21E-04	1.18E-05	1.01E-04	2.74E-05	7.19E-06	4.83E-05	4.73E-06	4.43E-06
Propionaldehyde	123911	0.94	7.74E-02	1.27E-02	7.29E-02	1.80E-03	6.50E-02	1.50E-03	3.42E-03	3.96E-02	6.02E-03	2.60E-02	2.44E-02
Styrene	540841	0.42	4.67E-03	5.12E-03	4.39E-03	9.47E-03	3.92E-03	7.91E-03	1.38E-03	2.39E-03	2.43E-03	1.57E-03	1.47E-03
Toluene	1746016	39.56	1.18E-01	5.23E-01	1.11E-01	7.14E-01	9.89E-02	5.95E-01	2.80E-01	6.03E-02	2.40E-01	3.96E-02	3.71E-02
Xylenes (isomers and mixture)	95954	36.95	8.33E-02	4.78E-01	7.84E-02	7.80E-01	6.99E-02	6.51E-01	2.04E-01	4.26E-02	2.22E-01	2.80E-02	2.62E-02

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2260002006	2260006010	2270002051	2270005015	2270002045	2265006010	2265004015	2270002075	2270002048	2265004075
Equipment Name		Summer TOTAL (tons)	Tampers/Rammers	Pumps	Off-highway Trucks	Agricultural Tractors	Cranes	Pumps	Rotary Tillers < 6 HP (res)	Off-Highway Tractors	Graders	Other Lawn & Garden Equip. (res)
Tech Type			2-St	2-St	Dsl	Dsl	Dsl	4-St	4-St	Dsl	Dsl	4-St
Equipment Population			65.89	74.99	7.77	79.74	40.69	125.96	871.83	12.95	36.12	177.91
Activity (hrs/season)			7,017.5	8,285.9	8,489.5	27,298.4	26,813.2	13,918.5	14,821.1	7,372.0	23,127.4	10,852.2
Activity (hrs/season/unit)			106.51	110.50	1,092.35	342.34	659.01	110.50	17.00	569.14	640.37	61.00
Exhaust PM (tons)		65.92	1.43E-01	8.98E-02	1.70E+00	1.19E+00	1.58E+00	1.54E-02	5.16E-03	1.18E+00	1.34E+00	2.00E-02
TOTAL VOC (tons)		616.06	2.36E+00	2.28E+00	2.27E+00	2.11E+00	2.01E+00	1.94E+00	1.75E+00	1.61E+00	1.55E+00	1.55E+00
Total Exhaust VOC (tons)		393.20	2.34E+00	2.27E+00	2.27E+00	2.11E+00	2.01E+00	1.82E+00	1.67E+00	1.61E+00	1.55E+00	1.53E+00
Exh VOC		387.22	2.34E+00	2.27E+00	2.22E+00	2.07E+00	1.97E+00	1.75E+00	1.59E+00	1.58E+00	1.52E+00	1.48E+00
Crankcase VOC		5.98	0.00E+00	0.00E+00	4.44E-02	4.14E-02	3.95E-02	7.57E-02	7.52E-02	3.16E-02	3.05E-02	5.08E-02
Total Evap VOC (tons)		222.86	2.60E-02	1.29E-02	0.00E+00	0.00E+00	0.00E+00	1.16E-01	7.80E-02	0.00E+00	0.00E+00	1.81E-02
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	5.03E-03	4.88E-03	4.22E-03	3.93E-03	3.74E-03	1.73E-03	1.59E-03	3.00E-03	2.89E-03	1.45E-03
Acetaldehyde	79005	6.26	3.88E-03	3.77E-03	1.68E-01	1.57E-01	1.50E-01	7.47E-03	6.84E-03	1.20E-01	1.15E-01	6.26E-03
Acrolein	57147	0.98	7.01E-04	6.81E-04	2.61E-02	2.43E-02	2.32E-02	1.28E-03	1.17E-03	1.86E-02	1.79E-02	1.07E-03
Benzene (including benzene from gasoline)	120821	16.45	5.95E-02	5.75E-02	4.60E-02	4.29E-02	4.09E-02	9.82E-02	8.93E-02	3.28E-02	3.15E-02	8.06E-02
Chromium Compounds	96128	0.00	8.57E-06	5.39E-06	1.19E-04	8.33E-05	1.11E-04	9.23E-07	3.10E-07	8.23E-05	9.37E-05	1.20E-06
Ethyl benzene	122667	9.28	5.63E-02	5.46E-02	7.03E-03	6.55E-03	6.24E-03	3.70E-02	3.37E-02	5.00E-03	4.82E-03	3.04E-02
Formaldehyde	106887	12.70	5.94E-03	5.76E-03	3.40E-01	3.17E-01	3.02E-01	2.13E-02	1.95E-02	2.42E-01	2.33E-01	1.79E-02
Hexane	75558	9.54	3.38E-02	3.25E-02	3.60E-03	3.36E-03	3.20E-03	2.08E-02	1.84E-02	2.57E-03	2.47E-03	1.56E-02
Manganese Compounds	106990	0.01	1.71E-05	1.08E-05	1.19E-04	8.33E-05	1.11E-04	1.85E-06	6.19E-07	8.23E-05	9.37E-05	2.40E-06
Mercury Compounds	542756	0.00	1.43E-06	8.98E-07	3.40E-05	2.38E-05	3.17E-05	1.54E-07	5.16E-08	2.35E-05	2.68E-05	2.00E-07
Nickel Compounds	1120714	0.00	1.00E-05	6.29E-06	5.09E-05	3.57E-05	4.75E-05	1.08E-06	3.61E-07	3.53E-05	4.02E-05	1.40E-06
Polycyclic Organic Matter	106467	0.01	3.88E-05	3.77E-05	4.06E-06	3.78E-06	3.60E-06	2.75E-05	2.52E-05	2.89E-06	2.78E-06	2.31E-05
Propionaldehyde	123911	0.94	5.77E-04	5.61E-04	2.23E-02	2.08E-02	1.98E-02	3.42E-03	3.14E-03	1.59E-02	1.53E-02	2.87E-03
Styrene	540841	0.42	3.04E-03	2.95E-03	1.35E-03	1.26E-03	1.20E-03	1.38E-03	1.27E-03	9.59E-04	9.23E-04	1.16E-03
Toluene	1746016	39.56	2.30E-01	2.23E-01	3.40E-02	3.17E-02	3.02E-02	1.36E-01	1.23E-01	2.42E-02	2.33E-02	1.10E-01
Xylenes (isomers and mixture)	95954	36.95	2.51E-01	2.43E-01	2.40E-02	2.24E-02	2.13E-02	1.26E-01	1.15E-01	1.71E-02	1.65E-02	1.04E-01

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2265006025	2265001060	2265004035	2282020005	2265004040	2260001060	2270002015	2265001020	2270002018	2270008005
Equipment Name		Summer TOTAL (tons)	Welders	Specialty Vehicle Carts	Snowblowers (res)	Inboard	Rear Engine Riding Mowers (res)	Specialty Vehicle Carts	Rollers	Snowmobiles	Scrapers	Airport Support Equipment
Tech Type			4-St	4-St	4-St	Dsl	4-St	2-St	Dsl	4-St	Dsl	Dsl
Equipment Population			38.49	96.01	2,677.90	66.76	528.31	244.38	47.54	86.23	13.26	20.85
Activity (hrs/season)			7,851.7	4,297.6	-	11,347.4	19,019.2	10,938.6	24,053.1	-	8,066.2	7,630.4
Activity (hrs/season/unit)			204.00	44.76	-	169.97	36.00	44.76	505.90	-	608.42	366.00
Exhaust PM (tons)		65.92	1.51E-02	8.38E-03	0.00E+00	6.93E-01	9.93E-03	9.30E-03	1.09E+00	0.00E+00	8.84E-01	6.90E-01
TOTAL VOC (tons)		616.06	1.48E+00	1.35E+00	1.35E+00	1.35E+00	1.32E+00	1.15E+00	1.08E+00	1.07E+00	1.05E+00	9.83E-01
Total Exhaust VOC (tons)		393.20	1.40E+00	1.14E+00	0.00E+00	1.35E+00	1.21E+00	9.38E-01	1.08E+00	0.00E+00	1.05E+00	9.83E-01
Exh VOC		387.22	1.31E+00	8.99E-01	0.00E+00	1.35E+00	1.16E+00	9.38E-01	1.06E+00	0.00E+00	1.03E+00	9.64E-01
Crankcase VOC		5.98	8.85E-02	2.41E-01	0.00E+00	0.00E+00	4.79E-02	0.00E+00	2.12E-02	0.00E+00	2.06E-02	1.93E-02
Total Evap VOC (tons)		222.86	8.25E-02	2.14E-01	1.35E+00	0.00E+00	1.07E-01	2.09E-01	0.00E+00	1.07E+00	0.00E+00	0.00E+00
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	1.33E-03	1.09E-03	0.00E+00	2.51E-03	1.15E-03	2.02E-03	2.02E-03	0.00E+00	1.95E-03	1.83E-03
Acetaldehyde	79005	6.26	5.73E-03	4.68E-03	0.00E+00	1.00E-01	4.97E-03	1.56E-03	8.05E-02	0.00E+00	7.80E-02	7.30E-02
Acrolein	57147	0.98	9.79E-04	7.98E-04	0.00E+00	1.55E-02	8.49E-04	2.81E-04	1.25E-02	0.00E+00	1.21E-02	1.13E-02
Benzene (including benzene from gasoline)	120821	16.45	7.52E-02	6.46E-02	2.98E-02	2.74E-02	6.60E-02	2.82E-02	2.20E-02	2.36E-02	2.13E-02	2.00E-02
Chromium Compounds	96128	0.00	9.04E-07	5.03E-07	0.00E+00	4.85E-05	5.96E-07	5.58E-07	7.65E-05	0.00E+00	6.19E-05	4.83E-05
Ethyl benzene	122667	9.28	2.83E-02	2.42E-02	1.04E-02	4.19E-03	2.48E-02	2.41E-02	3.36E-03	8.28E-03	3.25E-03	3.05E-03
Formaldehyde	106887	12.70	1.64E-02	1.33E-02	0.00E+00	2.03E-01	1.42E-02	2.38E-03	1.63E-01	0.00E+00	1.57E-01	1.47E-01
Hexane	75558	9.54	1.58E-02	1.63E-02	3.17E-02	2.15E-03	1.45E-02	1.82E-02	1.72E-03	2.52E-02	1.67E-03	1.56E-03
Manganese Compounds	106990	0.01	1.81E-06	1.01E-06	0.00E+00	4.85E-05	1.19E-06	1.12E-06	7.65E-05	0.00E+00	6.19E-05	4.83E-05
Mercury Compounds	542756	0.00	1.51E-07	8.38E-08	0.00E+00	1.39E-05	9.93E-08	9.30E-08	2.19E-05	0.00E+00	1.77E-05	1.38E-05
Nickel Compounds	1120714	0.00	1.05E-06	5.87E-07	0.00E+00	2.08E-05	6.95E-07	6.51E-07	3.28E-05	0.00E+00	2.65E-05	2.07E-05
Polycyclic Organic Matter	106467	0.01	2.11E-05	1.72E-05	0.00E+00	2.42E-06	1.83E-05	1.56E-05	1.94E-06	0.00E+00	1.88E-06	1.76E-06
Propionaldehyde	123911	0.94	2.63E-03	2.14E-03	0.00E+00	1.33E-02	2.28E-03	2.32E-04	1.07E-02	0.00E+00	1.03E-02	9.68E-03
Styrene	540841	0.42	1.06E-03	8.64E-04	0.00E+00	8.03E-04	9.19E-04	1.22E-03	6.44E-04	0.00E+00	6.24E-04	5.84E-04
Toluene	1746016	39.56	1.04E-01	9.07E-02	5.59E-02	2.03E-02	9.15E-02	1.00E-01	1.63E-02	4.44E-02	1.57E-02	1.47E-02
Xylenes (isomers and mixture)	95954	36.95	9.66E-02	8.21E-02	3.02E-02	1.43E-02	8.46E-02	1.05E-01	1.15E-02	2.40E-02	1.11E-02	1.04E-02

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2265006015	2265002042	2265003020	2265002039	2270002030	2265002021	2270006005	2260004015	2260004035	2270001060
Equipment Name		Summer TOTAL (tons)	Air Compressors	Cement & Mortar Mixers	Forklifts	Concrete/Indu strial Saws	Trenchers	Paving Equipment	Generator Sets	Rotary Tillers < 6 HP (res)	Snowblowers (res)	Specialty Vehicle Carts
Tech Type			4-St	4-St	4-St	4-St	Dsl	4-St	Dsl	2-St	2-St	Dsl
Equipment Population			27.20	102.97	9.53	16.41	33.83	44.91	69.25	140.22	2,506.75	8.49
Activity (hrs/season)			6,581.4	5,757.6	8,713.6	6,662.6	13,354.0	5,232.1	11,703.3	2,383.7	-	2,543.1
Activity (hrs/season/unit)			242.00	55.92	914.45	406.05	394.74	116.49	169.00	17.00	-	299.55
Exhaust PM (tons)		65.92	8.23E-03	7.57E-03	1.77E-02	8.91E-03	6.98E-01	5.56E-03	5.37E-01	2.11E-02	0.00E+00	3.66E-01
TOTAL VOC (tons)		616.06	9.03E-01	8.87E-01	8.31E-01	8.25E-01	8.00E-01	7.16E-01	7.00E-01	6.34E-01	6.32E-01	5.65E-01
Total Exhaust VOC (tons)		393.20	8.53E-01	8.14E-01	8.24E-01	8.04E-01	8.00E-01	6.75E-01	7.00E-01	6.28E-01	0.00E+00	5.65E-01
Exh VOC		387.22	7.81E-01	7.00E-01	6.20E-01	7.73E-01	7.84E-01	6.16E-01	6.86E-01	6.28E-01	0.00E+00	5.54E-01
Crankcase VOC		5.98	7.21E-02	1.14E-01	2.03E-01	3.06E-02	1.57E-02	5.94E-02	1.37E-02	0.00E+00	0.00E+00	1.11E-02
Total Evap VOC (tons)		222.86	4.95E-02	7.30E-02	7.23E-03	2.08E-02	0.00E+00	4.11E-02	0.00E+00	6.85E-03	6.32E-01	0.00E+00
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	8.12E-04	7.75E-04	7.84E-04	7.65E-04	1.49E-03	6.43E-04	1.30E-03	1.35E-03	0.00E+00	1.05E-03
Acetaldehyde	79005	6.26	3.50E-03	3.34E-03	3.38E-03	3.30E-03	5.94E-02	2.77E-03	5.20E-02	1.04E-03	0.00E+00	4.20E-02
Acrolein	57147	0.98	5.97E-04	5.70E-04	5.76E-04	5.63E-04	9.20E-03	4.72E-04	8.05E-03	1.88E-04	0.00E+00	6.50E-03
Benzene (including benzene from gasoline)	120821	16.45	4.59E-02	4.43E-02	4.34E-02	4.27E-02	1.62E-02	3.63E-02	1.42E-02	1.60E-02	1.39E-02	1.15E-02
Chromium Compounds	96128	0.00	4.94E-07	4.54E-07	1.06E-06	5.34E-07	4.88E-05	3.34E-07	3.76E-05	1.26E-06	0.00E+00	2.56E-05
Ethyl benzene	122667	9.28	1.73E-02	1.67E-02	1.64E-02	1.61E-02	2.48E-03	1.37E-02	2.17E-03	1.51E-02	4.86E-03	1.75E-03
Formaldehyde	106887	12.70	9.98E-03	9.52E-03	9.64E-03	9.41E-03	1.20E-01	7.90E-03	1.05E-01	1.59E-03	0.00E+00	8.48E-02
Hexane	75558	9.54	9.62E-03	9.78E-03	8.34E-03	8.46E-03	1.27E-03	7.66E-03	1.11E-03	9.07E-03	1.48E-02	8.98E-04
Manganese Compounds	106990	0.01	9.88E-07	9.08E-07	2.12E-06	1.07E-06	4.88E-05	6.68E-07	3.76E-05	2.53E-06	0.00E+00	2.56E-05
Mercury Compounds	542756	0.00	8.23E-08	7.57E-08	1.77E-07	8.91E-08	1.40E-05	5.56E-08	1.07E-05	2.11E-07	0.00E+00	7.32E-06
Nickel Compounds	1120714	0.00	5.76E-07	5.30E-07	1.24E-06	6.24E-07	2.09E-05	3.89E-07	1.61E-05	1.48E-06	0.00E+00	1.10E-05
Polycyclic Organic Matter	106467	0.01	1.29E-05	1.23E-05	1.24E-05	1.21E-05	1.43E-06	1.02E-05	1.25E-06	1.04E-05	0.00E+00	1.01E-06
Propionaldehyde	123911	0.94	1.60E-03	1.53E-03	1.55E-03	1.51E-03	7.88E-03	1.27E-03	6.90E-03	1.55E-04	0.00E+00	5.57E-03
Styrene	540841	0.42	6.47E-04	6.17E-04	6.24E-04	6.09E-04	4.75E-04	5.12E-04	4.16E-04	8.16E-04	0.00E+00	3.36E-04
Toluene	1746016	39.56	6.33E-02	6.15E-02	5.94E-02	5.86E-02	1.20E-02	5.02E-02	1.05E-02	6.17E-02	2.61E-02	8.48E-03
Xylenes (isomers and mixture)	95954	36.95	5.90E-02	5.68E-02	5.60E-02	5.50E-02	8.48E-03	4.67E-02	7.42E-03	6.73E-02	1.41E-02	5.99E-03

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2270006025	2265002030	2265002009	2270006015	2270002033	2270002003	2270002021	2260006005	2265002033	2265002072
Equipment Name		Summer TOTAL (tons)	Welders	Trenchers	Plate Compactors	Air Compressors	Bore/Drill Rigs	Pavers	Paving Equipment	Generator Sets	Bore/Drill Rigs	Skid Steer Loaders
Tech Type			Dsl	4-St	4-St	Dsl	Dsl	Dsl	Dsl	2-St	4-St	4-St
Equipment Population			32.90	13.90	42.84	24.50	9.91	13.56	17.07	21.88	44.19	5.95
Activity (hrs/season)			10,577.3	3,720.5	4,734.1	9,984.7	3,072.6	7,412.0	7,066.6	1,258.1	3,147.1	1,226.9
Activity (hrs/season/unit)			321.50	267.60	110.50	407.50	310.20	546.51	414.04	57.50	71.23	206.36
Exhaust PM (tons)		65.92	4.05E-01	5.30E-03	3.88E-03	4.03E-01	3.64E-01	3.59E-01	3.57E-01	1.37E-02	2.72E-03	2.94E-03
TOTAL VOC (tons)		616.06	5.64E-01	5.61E-01	4.97E-01	4.96E-01	4.41E-01	3.88E-01	3.49E-01	3.39E-01	3.34E-01	3.25E-01
Total Exhaust VOC (tons)		393.20	5.64E-01	5.39E-01	4.75E-01	4.96E-01	4.41E-01	3.88E-01	3.49E-01	3.36E-01	3.10E-01	2.97E-01
Exh VOC		387.22	5.53E-01	5.01E-01	4.53E-01	4.86E-01	4.32E-01	3.80E-01	3.42E-01	3.36E-01	2.88E-01	2.39E-01
Crankcase VOC		5.98	1.11E-02	3.78E-02	2.17E-02	9.72E-03	8.64E-03	7.61E-03	6.84E-03	0.00E+00	2.28E-02	5.81E-02
Total Evap VOC (tons)		222.86	0.00E+00	2.27E-02	2.28E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E-03	2.33E-02	2.84E-02
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	1.05E-03	5.13E-04	4.52E-04	9.22E-04	8.20E-04	7.22E-04	6.49E-04	7.22E-04	2.95E-04	2.83E-04
Acetaldehyde	79005	6.26	4.19E-02	2.21E-03	1.95E-03	3.68E-02	3.27E-02	2.88E-02	2.59E-02	5.57E-04	1.27E-03	1.22E-03
Acrolein	57147	0.98	6.49E-03	3.77E-04	3.32E-04	5.70E-03	5.07E-03	4.46E-03	4.01E-03	1.01E-04	2.17E-04	2.08E-04
Benzene (including benzene from gasoline)	120821	16.45	1.15E-02	2.88E-02	2.54E-02	1.01E-02	8.95E-03	7.88E-03	7.08E-03	8.54E-03	1.68E-02	1.62E-02
Chromium Compounds	96128	0.00	2.83E-05	3.18E-07	2.33E-07	2.82E-05	2.55E-05	2.51E-05	2.50E-05	8.23E-07	1.63E-07	1.77E-07
Ethyl benzene	122667	9.28	1.75E-03	1.08E-02	9.57E-03	1.54E-03	1.37E-03	1.20E-03	1.08E-03	8.09E-03	6.32E-03	6.09E-03
Formaldehyde	106887	12.70	8.46E-02	6.30E-03	5.55E-03	7.44E-02	6.61E-02	5.82E-02	5.23E-02	8.53E-04	3.63E-03	3.47E-03
Hexane	75558	9.54	8.97E-04	5.87E-03	5.24E-03	7.88E-04	7.01E-04	6.17E-04	5.55E-04	4.86E-03	3.62E-03	3.61E-03
Manganese Compounds	106990	0.01	2.83E-05	6.36E-07	4.66E-07	2.82E-05	2.55E-05	2.51E-05	2.50E-05	1.65E-06	3.26E-07	3.53E-07
Mercury Compounds	542756	0.00	8.10E-06	5.30E-08	3.88E-08	8.06E-06	7.27E-06	7.18E-06	7.14E-06	1.37E-07	2.72E-08	2.94E-08
Nickel Compounds	1120714	0.00	1.21E-05	3.71E-07	2.72E-07	1.21E-05	1.09E-05	1.08E-05	1.07E-05	9.60E-07	1.90E-07	2.06E-07
Polycyclic Organic Matter	106467	0.01	1.01E-06	8.13E-06	7.17E-06	8.87E-07	7.89E-07	6.95E-07	6.24E-07	5.57E-06	4.69E-06	4.48E-06
Propionaldehyde	123911	0.94	5.56E-03	1.01E-03	8.92E-04	4.88E-03	4.34E-03	3.82E-03	3.44E-03	8.29E-05	5.83E-04	5.58E-04
Styrene	540841	0.42	3.35E-04	4.08E-04	3.60E-04	2.94E-04	2.62E-04	2.30E-04	2.07E-04	4.36E-04	2.35E-04	2.25E-04
Toluene	1746016	39.56	8.46E-03	3.96E-02	3.50E-02	7.44E-03	6.61E-03	5.82E-03	5.23E-03	3.30E-02	2.32E-02	2.25E-02
Xylenes (isomers and mixture)	95954	36.95	5.98E-03	3.70E-02	3.27E-02	5.25E-03	4.67E-03	4.11E-03	3.70E-03	3.60E-02	2.16E-02	2.08E-02

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FNSB NONROAD Emissions - Summer 1999

SCC			2270006010	2265008005	2265002066	2265002015	2270002054	2270002027	2265002024	2265002060	2265004030	2260002021
Equipment Name		Summer TOTAL (tons)	Pumps	Airport Support Equipment	Tractors/Loaders/ Backhoes	Rollers	Crushing/Proc. Equipment	Signal Boards/Light Plants	Surfacing Equipment	Rubber Tire Loaders	Leafblowers/V acuums (res)	Paving Equipment
Tech Type			Dsl	4-St	4-St	4-St	Dsl	Dsl	4-St	4-St	4-St	2-St
Equipment Population			31.52	3.24	3.40	4.44	4.27	28.65	8.13	1.20	110.14	5.91
Activity (hrs/season)			6,351.1	1,689.5	1,967.8	1,834.8	2,712.5	10,202.7	2,639.4	407.3	1,101.4	688.4
Activity (hrs/season/unit)			201.50	521.71	579.13	413.38	635.71	356.13	324.84	340.82	10.00	116.49
Exhaust PM (tons)		65.92	2.43E-01	3.35E-03	2.77E-03	2.72E-03	1.77E-01	2.27E-01	2.11E-03	2.19E-03	7.17E-04	7.42E-03
TOTAL VOC (tons)		616.06	2.98E-01	2.64E-01	2.58E-01	2.56E-01	2.46E-01	2.42E-01	2.26E-01	2.12E-01	1.88E-01	1.80E-01
Total Exhaust VOC (tons)		393.20	2.98E-01	2.53E-01	2.52E-01	2.47E-01	2.46E-01	2.42E-01	2.18E-01	2.01E-01	1.84E-01	1.79E-01
Exh VOC		387.22	2.92E-01	2.05E-01	2.51E-01	2.27E-01	2.41E-01	2.37E-01	2.17E-01	1.52E-01	1.78E-01	1.79E-01
Crankcase VOC		5.98	5.84E-03	4.86E-02	1.49E-03	2.02E-02	4.82E-03	4.74E-03	1.69E-03	4.83E-02	6.76E-03	0.00E+00
Total Evap VOC (tons)		222.86	0.00E+00	1.10E-02	6.04E-03	8.99E-03	0.00E+00	0.00E+00	7.16E-03	1.19E-02	3.58E-03	1.13E-03
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	5.54E-04	2.41E-04	2.40E-04	2.36E-04	4.57E-04	4.49E-04	2.08E-04	1.91E-04	1.76E-04	3.85E-04
Acetaldehyde	79005	6.26	2.21E-02	1.04E-03	1.03E-03	1.01E-03	1.83E-02	1.79E-02	8.96E-04	8.22E-04	7.56E-04	2.97E-04
Acrolein	57147	0.98	3.43E-03	1.77E-04	1.77E-04	1.73E-04	2.83E-03	2.78E-03	1.53E-04	1.40E-04	1.29E-04	5.38E-05
Benzene (including benzene from gasoline)	120821	16.45	6.05E-03	1.35E-02	1.34E-02	1.32E-02	4.99E-03	4.90E-03	1.16E-02	1.08E-02	9.76E-03	4.54E-03
Chromium Compounds	96128	0.00	1.70E-05	2.01E-07	1.66E-07	1.63E-07	1.24E-05	1.59E-05	1.27E-07	1.31E-07	4.30E-08	4.45E-07
Ethyl benzene	122667	9.28	9.24E-04	5.10E-03	5.04E-03	4.97E-03	7.62E-04	7.49E-04	4.38E-03	4.06E-03	3.68E-03	4.31E-03
Formaldehyde	106887	12.70	4.47E-02	2.96E-03	2.95E-03	2.90E-03	3.69E-02	3.62E-02	2.56E-03	2.35E-03	2.16E-03	4.55E-04
Hexane	75558	9.54	4.74E-04	2.77E-03	2.64E-03	2.66E-03	3.91E-04	3.84E-04	2.33E-03	2.27E-03	1.91E-03	2.57E-03
Manganese Compounds	106990	0.01	1.70E-05	4.02E-07	3.33E-07	3.26E-07	1.24E-05	1.59E-05	2.53E-07	2.63E-07	8.60E-08	8.91E-07
Mercury Compounds	542756	0.00	4.86E-06	3.35E-08	2.77E-08	2.72E-08	3.55E-06	4.53E-06	2.11E-08	2.19E-08	7.17E-09	7.42E-08
Nickel Compounds	1120714	0.00	7.29E-06	2.34E-07	1.94E-07	1.90E-07	5.32E-06	6.80E-06	1.48E-07	1.53E-07	5.02E-08	5.20E-07
Polycyclic Organic Matter	106467	0.01	5.33E-07	3.83E-06	3.81E-06	3.74E-06	4.40E-07	4.32E-07	3.30E-06	3.03E-06	2.79E-06	2.97E-06
Propionaldehyde	123911	0.94	2.93E-03	4.76E-04	4.74E-04	4.65E-04	2.42E-03	2.38E-03	4.11E-04	3.77E-04	3.47E-04	4.43E-05
Styrene	540841	0.42	1.77E-04	1.92E-04	1.91E-04	1.88E-04	1.46E-04	1.44E-04	1.66E-04	1.52E-04	1.40E-04	2.33E-04
Toluene	1746016	39.56	4.47E-03	1.86E-02	1.84E-02	1.81E-02	3.69E-03	3.62E-03	1.60E-02	1.49E-02	1.34E-02	1.76E-02
Xylenes (isomers and mixture)	95954	36.95	3.16E-03	1.74E-02	1.72E-02	1.70E-02	2.60E-03	2.56E-03	1.50E-02	1.39E-02	1.26E-02	1.92E-02

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2265002003	2270002081	2260002009	2270002024	2270005020	2270002063	2270003020	2285002015	2265005040	2265002078
Equipment Name		Summer TOTAL (tons)	Pavers	Other Construction Equipment	Plate Compactors	Surfacing Equipment	Combines	Rubber Tire Tractor/Dozers	Forklifts	Railway Maintenance	Tillers > 6 HP	Dumpers/Tenders
Tech Type			4-St	Dsl	2-St	Dsl	Dsl	Dsl	Dsl	Dsl	4-St	4-St
Equipment Population			4.00	5.64	6.20	2.59	12.05	1.83	2.65	2.75	25.18	12.11
Activity (hrs/season)			1,042.5	2,274.5	685.6	967.4	1,303.1	1,094.3	2,471.4	1,294.9	780.3	1,024.1
Activity (hrs/season/unit)			260.94	403.39	110.50	373.44	108.11	598.43	934.23	471.50	30.99	84.54
Exhaust PM (tons)		65.92	1.62E-03	1.47E-01	6.17E-03	1.52E-01	1.45E-01	1.04E-01	1.08E-01	7.86E-02	4.89E-04	8.16E-04
TOTAL VOC (tons)		616.06	1.62E-01	1.53E-01	1.50E-01	1.49E-01	1.39E-01	1.30E-01	1.27E-01	1.20E-01	1.14E-01	1.12E-01
Total Exhaust VOC (tons)		393.20	1.54E-01	1.53E-01	1.49E-01	1.49E-01	1.39E-01	1.30E-01	1.27E-01	1.20E-01	9.56E-02	1.01E-01
Exh VOC		387.22	1.41E-01	1.50E-01	1.49E-01	1.46E-01	1.36E-01	1.28E-01	1.25E-01	1.17E-01	7.38E-02	8.40E-02
Crankcase VOC		5.98	1.35E-02	3.00E-03	0.00E+00	2.93E-03	2.73E-03	2.55E-03	2.49E-03	2.35E-03	2.18E-02	1.67E-02
Total Evap VOC (tons)		222.86	7.72E-03	0.00E+00	1.08E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-02	1.08E-02
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	1.47E-04	2.84E-04	3.21E-04	2.78E-04	2.59E-04	2.42E-04	2.37E-04	2.23E-04	9.11E-05	9.59E-05
Acetaldehyde	79005	6.26	6.31E-04	1.14E-02	2.48E-04	1.11E-02	1.03E-02	9.67E-03	9.45E-03	8.89E-03	3.92E-04	4.13E-04
Acrolein	57147	0.98	1.08E-04	1.76E-03	4.47E-05	1.72E-03	1.60E-03	1.50E-03	1.46E-03	1.38E-03	6.70E-05	7.05E-05
Benzene (including benzene from gasoline)	120821	16.45	8.25E-03	3.10E-03	3.78E-03	3.03E-03	2.82E-03	2.64E-03	2.58E-03	2.43E-03	5.42E-03	5.53E-03
Chromium Compounds	96128	0.00	9.74E-08	1.03E-05	3.70E-07	1.06E-05	1.01E-05	7.30E-06	7.57E-06	5.50E-06	2.93E-08	4.89E-08
Ethyl benzene	122667	9.28	3.11E-03	4.74E-04	3.59E-03	4.63E-04	4.31E-04	4.03E-04	3.94E-04	3.71E-04	2.03E-03	2.08E-03
Formaldehyde	106887	12.70	1.80E-03	2.29E-02	3.79E-04	2.24E-02	2.09E-02	1.95E-02	1.91E-02	1.80E-02	1.12E-03	1.18E-03
Hexane	75558	9.54	1.71E-03	2.43E-04	2.14E-03	2.37E-04	2.21E-04	2.07E-04	2.02E-04	1.90E-04	1.37E-03	1.25E-03
Manganese Compounds	106990	0.01	1.95E-07	1.03E-05	7.40E-07	1.06E-05	1.01E-05	7.30E-06	7.57E-06	5.50E-06	5.87E-08	9.79E-08
Mercury Compounds	542756	0.00	1.62E-08	2.93E-06	6.17E-08	3.04E-06	2.90E-06	2.09E-06	2.16E-06	1.57E-06	4.89E-09	8.16E-09
Nickel Compounds	1120714	0.00	1.14E-07	4.40E-06	4.32E-07	4.56E-06	4.35E-06	3.13E-06	3.24E-06	2.36E-06	3.42E-08	5.71E-08
Polycyclic Organic Matter	106467	0.01	2.33E-06	2.74E-07	2.48E-06	2.67E-07	2.49E-07	2.33E-07	2.28E-07	2.14E-07	1.44E-06	1.52E-06
Propionaldehyde	123911	0.94	2.89E-04	1.51E-03	3.68E-05	1.47E-03	1.37E-03	1.28E-03	1.25E-03	1.18E-03	1.80E-04	1.89E-04
Styrene	540841	0.42	1.17E-04	9.08E-05	1.94E-04	8.87E-05	8.26E-05	7.73E-05	7.56E-05	7.11E-05	7.25E-05	7.64E-05
Toluene	1746016	39.56	1.14E-02	2.29E-03	1.46E-02	2.24E-03	2.09E-03	1.95E-03	1.91E-03	1.80E-03	7.61E-03	7.68E-03
Xylenes (isomers and mixture)	95954	36.95	1.06E-02	1.62E-03	1.60E-02	1.58E-03	1.47E-03	1.38E-03	1.35E-03	1.27E-03	6.88E-03	7.07E-03

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2268006020	2265002081	2265004025	2265002057	2265003040	2270005060	2265002054	2270003030	2265003010	2265005035
Equipment Name	Tech Type	Summer TOTAL (tons)	Gas Compressors	Other Construction Equipment	Trimmers/Edgers/Brush Cutter (res)	Rough Terrain Forklift	Other General Industrial Eqp	Irrigation Sets	Crushing/Proc. Equipment	Sweepers/Scrubbers	Aerial Lifts	Sprayers
			4-St	4-St	4-St	4-St	4-St	Dsl	4-St	Dsl	4-St	4-St
Equipment Population			0.11	0.60	68.26	0.60	1.90	1.39	2.81	0.81	1.18	4.58
Activity (hrs/season)			343.7	147.6	614.3	164.3	745.2	750.8	450.3	543.5	234.6	263.9
Activity (hrs/season/unit)			3,000.00	246.96	9.00	274.92	391.83	539.82	160.42	670.45	198.39	57.66
Exhaust PM (tons)		65.92	2.47E-03	9.55E-04	3.66E-04	7.32E-04	5.47E-04	4.31E-02	5.68E-04	3.66E-02	5.12E-04	4.37E-04
TOTAL VOC (tons)		616.06	1.03E-01	9.59E-02	9.52E-02	7.26E-02	6.72E-02	6.11E-02	6.07E-02	5.81E-02	5.57E-02	4.96E-02
Total Exhaust VOC (tons)		393.20	1.03E-01	8.74E-02	9.30E-02	6.70E-02	6.61E-02	6.11E-02	5.84E-02	5.81E-02	4.92E-02	4.62E-02
Exh VOC		387.22	7.75E-02	6.64E-02	8.96E-02	5.09E-02	6.60E-02	5.99E-02	5.80E-02	5.70E-02	3.88E-02	4.01E-02
Crankcase VOC		5.98	2.56E-02	2.10E-02	3.40E-03	1.61E-02	7.46E-05	1.20E-03	4.50E-04	1.14E-03	1.05E-02	6.06E-03
Total Evap VOC (tons)		222.86	0.00E+00	8.42E-03	2.14E-03	5.55E-03	1.16E-03	0.00E+00	2.29E-03	0.00E+00	6.46E-03	3.39E-03
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	9.81E-05	8.32E-05	8.86E-05	6.38E-05	6.29E-05	1.14E-04	5.56E-05	1.08E-04	4.69E-05	4.40E-05
Acetaldehyde	79005	6.26	4.22E-04	3.59E-04	3.81E-04	2.75E-04	2.71E-04	4.54E-03	2.40E-04	4.32E-03	2.02E-04	1.89E-04
Acrolein	57147	0.98	7.21E-05	6.12E-05	6.51E-05	4.69E-05	4.62E-05	7.03E-04	4.09E-05	6.68E-04	3.45E-05	3.23E-05
Benzene (including benzene from gasoline)	120821	16.45	5.41E-03	4.78E-03	4.93E-03	3.64E-03	3.49E-03	1.24E-03	3.12E-03	1.18E-03	2.73E-03	2.50E-03
Chromium Compounds	96128	0.00	1.48E-07	5.73E-08	2.19E-08	4.39E-08	3.28E-08	3.02E-06	3.41E-08	2.56E-06	3.07E-08	2.62E-08
Ethyl benzene	122667	9.28	2.04E-03	1.80E-03	1.86E-03	1.37E-03	1.32E-03	1.89E-04	1.17E-03	1.80E-04	1.02E-03	9.41E-04
Formaldehyde	106887	12.70	1.21E-03	1.02E-03	1.09E-03	7.84E-04	7.73E-04	9.16E-03	6.84E-04	8.71E-03	5.76E-04	5.40E-04
Hexane	75558	9.54	1.02E-03	1.06E-03	9.73E-04	7.95E-04	6.83E-04	9.71E-05	6.33E-04	9.24E-05	6.39E-04	5.38E-04
Manganese Compounds	106990	0.01	2.96E-07	1.15E-07	4.39E-08	8.78E-08	6.56E-08	3.02E-06	6.82E-08	2.56E-06	6.14E-08	5.24E-08
Mercury Compounds	542756	0.00	2.47E-08	9.55E-09	3.66E-09	7.32E-09	5.47E-09	8.62E-07	5.68E-09	7.33E-07	5.12E-09	4.37E-09
Nickel Compounds	1120714	0.00	1.73E-07	6.68E-08	2.56E-08	5.12E-08	3.83E-08	1.29E-06	3.98E-08	1.10E-06	3.58E-08	3.06E-08
Polycyclic Organic Matter	106467	0.01	1.56E-06	1.32E-06	1.40E-06	1.01E-06	9.98E-07	1.09E-07	8.82E-07	1.04E-07	7.43E-07	6.97E-07
Propionaldehyde	123911	0.94	1.94E-04	1.64E-04	1.75E-04	1.26E-04	1.24E-04	6.02E-04	1.10E-04	5.72E-04	9.25E-05	8.68E-05
Styrene	540841	0.42	7.81E-05	6.63E-05	7.05E-05	5.08E-05	5.01E-05	3.63E-05	4.43E-05	3.45E-05	3.73E-05	3.50E-05
Toluene	1746016	39.56	7.40E-03	6.63E-03	6.77E-03	5.04E-03	4.79E-03	9.16E-04	4.29E-03	8.71E-04	3.80E-03	3.46E-03
Xylenes (isomers and mixture)	95954	36.95	6.98E-03	6.12E-03	6.36E-03	4.67E-03	4.51E-03	6.48E-04	4.01E-03	6.16E-04	3.48E-03	3.21E-03

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2265003030	2265002045	2270003070	2270003040	2260005050	2265005045	2285004015	2270005055	2270002039	2270002009
Equipment Name		Summer TOTAL (tons)	Sweepers/Scrubbers	Cranes	Terminal Tractors	Other General Industrial Eq	Sprayers	Swathers	Railway Maintenance	Other Agricultural Equipment	Concrete/Industrial Saws	Plate Compactors
Tech Type			4-St	4-St	Dsl	Dsl	2-St	4-St	4-St	Dsl	Dsl	Dsl
Equipment Population			0.56	0.45	0.73	1.75	1.83	0.47	3.81	0.93	1.22	4.57
Activity (hrs/season)			160.1	123.3	501.1	844.1	105.6	32.5	350.2	254.6	470.7	1,472.9
Activity (hrs/season/unit)			283.57	276.25	690.78	482.50	57.66	68.47	92.00	274.59	386.08	322.18
Exhaust PM (tons)		65.92	3.71E-04	3.29E-04	3.03E-02	2.68E-02	1.15E-03	1.45E-04	2.40E-04	1.62E-02	2.14E-02	2.90E-02
TOTAL VOC (tons)		616.06	3.66E-02	3.32E-02	3.20E-02	3.14E-02	3.09E-02	3.02E-02	2.98E-02	2.64E-02	2.26E-02	2.01E-02
Total Exhaust VOC (tons)		393.20	3.47E-02	3.01E-02	3.20E-02	3.14E-02	3.06E-02	1.94E-02	2.75E-02	2.64E-02	2.26E-02	2.01E-02
Exh VOC		387.22	2.91E-02	2.38E-02	3.14E-02	3.08E-02	3.06E-02	1.48E-02	2.53E-02	2.59E-02	2.22E-02	1.97E-02
Crankcase VOC		5.98	5.54E-03	6.37E-03	6.28E-04	6.16E-04	0.00E+00	4.63E-03	2.16E-03	5.18E-04	4.43E-04	3.94E-04
Total Evap VOC (tons)		222.86	1.94E-03	3.10E-03	0.00E+00	0.00E+00	3.32E-04	1.08E-02	2.33E-03	0.00E+00	0.00E+00	0.00E+00
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	3.30E-05	2.87E-05	5.95E-05	5.84E-05	6.57E-05	1.85E-05	2.62E-05	4.91E-05	4.21E-05	3.74E-05
Acetaldehyde	79005	6.26	1.42E-04	1.24E-04	2.38E-03	2.33E-03	5.08E-05	7.95E-05	1.13E-04	1.96E-03	1.68E-03	1.49E-03
Acrolein	57147	0.98	2.43E-05	2.11E-05	3.68E-04	3.61E-04	9.17E-06	1.36E-05	1.92E-05	3.04E-04	2.60E-04	2.31E-04
Benzene (including benzene from gasoline)	120821	16.45	1.86E-03	1.65E-03	6.50E-04	6.38E-04	7.78E-04	1.26E-03	1.49E-03	5.36E-04	4.59E-04	4.08E-04
Chromium Compounds	96128	0.00	2.23E-08	1.97E-08	2.12E-06	1.88E-06	6.90E-08	8.71E-09	1.44E-08	1.13E-06	1.50E-06	2.03E-06
Ethyl benzene	122667	9.28	7.02E-04	6.21E-04	9.92E-05	9.74E-05	7.36E-04	4.67E-04	5.62E-04	8.19E-05	7.01E-05	6.24E-05
Formaldehyde	106887	12.70	4.06E-04	3.53E-04	4.80E-03	4.71E-03	7.77E-05	2.27E-04	3.22E-04	3.96E-03	3.39E-03	3.02E-03
Hexane	75558	9.54	3.89E-04	3.72E-04	5.09E-05	4.99E-05	4.42E-04	4.45E-04	3.27E-04	4.20E-05	3.60E-05	3.20E-05
Manganese Compounds	106990	0.01	4.46E-08	3.94E-08	2.12E-06	1.88E-06	1.38E-07	1.74E-08	2.88E-08	1.13E-06	1.50E-06	2.03E-06
Mercury Compounds	542756	0.00	3.71E-09	3.29E-09	6.05E-07	5.37E-07	1.15E-08	1.45E-09	2.40E-09	3.24E-07	4.29E-07	5.80E-07
Nickel Compounds	1120714	0.00	2.60E-08	2.30E-08	9.08E-07	8.05E-07	8.05E-08	1.02E-08	1.68E-08	4.85E-07	6.43E-07	8.70E-07
Polycyclic Organic Matter	106467	0.01	5.24E-07	4.55E-07	5.73E-08	5.62E-08	5.08E-07	2.93E-07	4.15E-07	4.73E-08	4.05E-08	3.60E-08
Propionaldehyde	123911	0.94	6.52E-05	5.66E-05	3.15E-04	3.09E-04	7.55E-06	3.64E-05	5.17E-05	2.60E-04	2.23E-04	1.98E-04
Styrene	540841	0.42	2.63E-05	2.28E-05	1.90E-05	1.87E-05	3.98E-05	1.47E-05	2.08E-05	1.57E-05	1.34E-05	1.19E-05
Toluene	1746016	39.56	2.57E-03	2.29E-03	4.80E-04	4.71E-04	3.00E-03	1.84E-03	2.07E-03	3.96E-04	3.39E-04	3.02E-04
Xylenes (isomers and mixture)	95954	36.95	2.40E-03	2.11E-03	3.39E-04	3.33E-04	3.28E-03	1.56E-03	1.92E-03	2.80E-04	2.40E-04	2.13E-04

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC			2270005035	2265002027	2265005025	2265003060	2270005045	2270006030	2270003010	2270002042	2260003030	2265005055
Equipment Name		Summer TOTAL (tons)	Sprayers	Signal Boards/Light Plants	Balers	AC\Refrigeratio n	Swathers	Pressure Washers	Aerial Lifts	Cement & Mortar Mixers	Sweepers/Scru bbers	Other Agricultural Equipment
Tech Type			Dsl	4-St	4-St	4-St	Dsl	Dsl	Dsl	Dsl	2-St	4-St
Equipment Population			1.39	0.59	0.46	0.27	2.78	4.72	0.81	2.59	0.08	0.46
Activity (hrs/season)			90.2	125.1	22.4	88.3	220.5	341.9	171.1	474.2	22.5	40.9
Activity (hrs/season/unit)			64.86	211.68	49.01	332.48	79.28	72.50	211.03	183.06	283.57	89.37
Exhaust PM (tons)		65.92	7.76E-03	1.17E-04	5.54E-05	1.15E-04	1.17E-02	9.83E-03	7.42E-03	8.15E-03	2.03E-04	3.20E-05
TOTAL VOC (tons)		616.06	1.53E-02	1.37E-02	1.19E-02	1.17E-02	9.83E-03	9.54E-03	9.15E-03	5.70E-03	4.92E-03	4.48E-03
Total Exhaust VOC (tons)		393.20	1.53E-02	1.34E-02	7.40E-03	1.12E-02	9.83E-03	9.54E-03	9.15E-03	5.70E-03	4.91E-03	4.08E-03
Exh VOC		387.22	1.50E-02	1.33E-02	5.63E-03	1.08E-02	9.64E-03	9.36E-03	8.97E-03	5.59E-03	4.91E-03	3.43E-03
Crankcase VOC		5.98	3.00E-04	2.47E-05	1.77E-03	4.26E-04	1.93E-04	1.87E-04	1.79E-04	1.12E-04	0.00E+00	6.51E-04
Total Evap VOC (tons)		222.86	0.00E+00	3.73E-04	4.51E-03	4.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-05	3.97E-04
Chemical Name	CAS No.											
1,3-Butadiene	79345	0.74	2.85E-05	1.27E-05	7.05E-06	1.07E-05	1.83E-05	1.77E-05	1.70E-05	1.06E-05	1.06E-05	3.88E-06
Acetaldehyde	79005	6.26	1.14E-03	5.48E-05	3.04E-05	4.60E-05	7.30E-04	7.09E-04	6.80E-04	4.24E-04	8.15E-06	1.67E-05
Acrolein	57147	0.98	1.76E-04	9.36E-06	5.18E-06	7.86E-06	1.13E-04	1.10E-04	1.05E-04	6.56E-05	1.47E-06	2.86E-06
Benzene (including benzene from gasoline)	120821	16.45	3.11E-04	7.10E-04	4.88E-04	5.99E-04	2.00E-04	1.94E-04	1.86E-04	1.16E-04	1.24E-04	2.23E-04
Chromium Compounds	96128	0.00	5.43E-07	7.03E-09	3.33E-09	6.93E-09	8.16E-07	6.88E-07	5.20E-07	5.71E-07	1.22E-08	1.92E-09
Ethyl benzene	122667	9.28	4.75E-05	2.68E-04	1.81E-04	2.26E-04	3.05E-05	2.96E-05	2.84E-05	1.77E-05	1.18E-04	8.39E-05
Formaldehyde	106887	12.70	2.30E-03	1.56E-04	8.66E-05	1.31E-04	1.47E-03	1.43E-03	1.37E-03	8.56E-04	1.25E-05	4.77E-05
Hexane	75558	9.54	2.43E-05	1.41E-04	1.79E-04	1.22E-04	1.56E-05	1.52E-05	1.45E-05	9.07E-06	7.00E-05	4.98E-05
Manganese Compounds	106990	0.01	5.43E-07	1.41E-08	6.65E-09	1.39E-08	8.16E-07	6.88E-07	5.20E-07	5.71E-07	2.44E-08	3.84E-09
Mercury Compounds	542756	0.00	1.55E-07	1.17E-09	5.54E-10	1.15E-09	2.33E-07	1.97E-07	1.48E-07	1.63E-07	2.03E-09	3.20E-10
Nickel Compounds	1120714	0.00	2.33E-07	8.20E-09	3.88E-09	8.08E-09	3.50E-07	2.95E-07	2.23E-07	2.45E-07	1.42E-08	2.24E-09
Polycyclic Organic Matter	106467	0.01	2.74E-08	2.02E-07	1.12E-07	1.69E-07	1.76E-08	1.71E-08	1.64E-08	1.02E-08	8.15E-08	6.16E-08
Propionaldehyde	123911	0.94	1.51E-04	2.51E-05	1.39E-05	2.11E-05	9.68E-05	9.40E-05	9.01E-05	5.62E-05	1.21E-06	7.67E-06
Styrene	540841	0.42	9.09E-06	1.01E-05	5.61E-06	8.51E-06	5.84E-06	5.67E-06	5.44E-06	3.39E-06	6.38E-06	3.09E-06
Toluene	1746016	39.56	2.30E-04	9.76E-04	7.18E-04	8.25E-04	1.47E-04	1.43E-04	1.37E-04	8.56E-05	4.81E-04	3.09E-04
Xylenes (isomers and mixture)	95954	36.95	1.62E-04	9.15E-04	6.02E-04	7.71E-04	1.04E-04	1.01E-04	9.70E-05	6.05E-05	5.25E-04	2.86E-04

Table C-4-6d
FNSB NONROAD Emissions - Summer 1999

SCC		2270002078	
Equipment Name		Summer TOTAL (tons)	Dumpers/Tenders
Tech Type			Dsl
Equipment Population			0.30
Activity (hrs/season)			114.8
Activity (hrs/season/unit)			376.8
Exhaust PM (tons)		65.92	2.75E-03
TOTAL VOC (tons)		616.06	3.20E-03
Total Exhaust VOC (tons)		393.20	3.20E-03
Exh VOC		387.22	3.14E-03
Crankcase VOC		5.98	6.28E-05
Total Evap VOC (tons)		222.86	0.00E+00
Chemical Name	CAS No.		
1,3-Butadiene	79345	0.74	5.96E-06
Acetaldehyde	79005	6.26	2.38E-04
Acrolein	57147	0.98	3.69E-05
Benzene (including benzene from gasoline)	120821	16.45	6.50E-05
Chromium Compounds	96128	0.00	1.93E-07
Ethyl benzene	122667	9.28	9.93E-06
Formaldehyde	106887	12.70	4.81E-04
Hexane	75558	9.54	5.10E-06
Manganese Compounds	106990	0.01	1.93E-07
Mercury Compounds	542756	0.00	5.51E-08
Nickel Compounds	1120714	0.00	8.26E-08
Polycyclic Organic Matter	106467	0.01	5.74E-09
Propionaldehyde	123911	0.94	3.16E-05
Styrene	540841	0.42	1.90E-06
Toluene	1746016	39.56	4.81E-05
Xylenes (isomers and mixture)	95954	36.95	3.40E-05

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2260007005	2282005010	2260001030	2270007015	2260001020	2260004036	2265006005	2260004035	2270002066	2265001030	2265006030	2265007015
Equipment Name	Winter TOTAL (tons)	Logging Equipment Chain Saws > 6 HP	Outboard	All Terrain Vehicles/Mot orcycles	Forest Eqp - Feller/Bunch/S kidder	Snowmobiles	Snowblowers (com)	Generator Sets	Snowblowers (res)	Tractors/Load ers/Backhoes	All Terrain Vehicles/Mot orcycles	Pressure Washers	Shredders > 6 HP
Tech Type		2-St	2-St	2-St	Dsl	2-St	2-St	4-St	2-St	Dsl	4-St	4-St	4-St
Equipment Population		2,171.8	18,140.7	504.8	72.2	141.2	93.3	292.0	802.8	39.4	1,576.9	135.8	306.1
Activity (hrs/season)		329,033.5	94,789.0	8,581.6	46,066.0	2,117.7	12,687.7	16,792.6	6,422.5	14,966.6	26,807.0	7,805.9	7,741.8
Activity (hrs/season/unit)		151.50	5.23	17.00	638.00	15.00	136.00	57.50	8.00	379.47	17.00	57.50	25.29
Exhaust PM (tons)	36.66	1.66E+01	7.84E+00	2.16E-01	4.12E+00	1.15E-01	1.67E-01	1.93E-02	8.45E-02	9.82E-01	1.12E-02	1.02E-02	8.16E-03
TOTAL VOC (tons)	463.76	2.68E+02	1.45E+02	9.23E+00	5.23E+00	4.95E+00	4.66E+00	2.78E+00	2.37E+00	1.40E+00	1.39E+00	1.31E+00	1.19E+00
Total Exhaust VOC (tons)	452.60	2.68E+02	1.35E+02	9.08E+00	5.23E+00	4.84E+00	4.66E+00	2.76E+00	2.36E+00	1.40E+00	1.25E+00	1.30E+00	1.18E+00
Exh VOC	450.86	2.68E+02	1.35E+02	9.08E+00	5.13E+00	4.84E+00	4.66E+00	2.38E+00	2.36E+00	1.37E+00	1.00E+00	1.24E+00	9.70E-01
Crankcase VOC	1.74	0.00E+00	0.00E+00	0.00E+00	1.03E-01	0.00E+00	0.00E+00	3.77E-01	0.00E+00	2.74E-02	2.49E-01	6.33E-02	2.11E-01
Total Evap VOC (tons)	11.16	9.44E-02	1.04E+01	1.54E-01	0.00E+00	1.12E-01	1.31E-03	2.04E-02	1.13E-02	0.00E+00	1.35E-01	5.39E-03	1.39E-02
Chemical Name													
1,3-Butadiene	0.955	5.77E-01	2.89E-01	1.95E-02	9.73E-03	1.04E-02	1.00E-02	2.62E-03	5.07E-03	2.60E-03	1.19E-03	1.24E-03	1.12E-03
Acetaldehyde	1.844	4.45E-01	2.23E-01	1.51E-02	3.89E-01	8.04E-03	7.74E-03	1.13E-02	3.92E-03	1.04E-01	5.13E-03	5.34E-03	4.84E-03
Acrolein	0.305	8.05E-02	4.04E-02	2.72E-03	6.02E-02	1.45E-03	1.40E-03	1.93E-03	7.08E-04	1.61E-02	8.76E-04	9.11E-04	8.27E-04
Benzene (including benzene from gasoline)	11.897	6.76E+00	3.62E+00	2.32E-01	1.06E-01	1.24E-01	1.18E-01	1.45E-01	5.97E-02	2.84E-02	6.87E-02	6.85E-02	6.23E-02
Chromium Chomponds	0.002	9.98E-04	4.70E-04	1.29E-05	2.89E-04	6.90E-06	1.00E-05	1.16E-06	5.07E-06	6.87E-05	6.70E-07	6.13E-07	4.90E-07
Ethyl benzene	10.593	6.44E+00	3.31E+00	2.19E-01	1.62E-02	1.17E-01	1.12E-01	5.48E-02	5.67E-02	4.34E-03	2.58E-02	2.58E-02	2.35E-02
Formaldehyde	3.417	6.81E-01	3.42E-01	2.31E-02	7.85E-01	1.23E-02	1.18E-02	3.23E-02	5.99E-03	2.10E-01	1.46E-02	1.52E-02	1.38E-02
Hexane	6.454	3.81E+00	2.15E+00	1.33E-01	8.32E-03	7.14E-02	6.62E-02	2.78E-02	3.38E-02	2.23E-03	1.56E-02	1.30E-02	1.20E-02
Manganese Compounds	0.004	2.00E-03	9.41E-04	2.59E-05	2.89E-04	1.38E-05	2.00E-05	2.32E-06	1.01E-05	6.87E-05	1.34E-06	1.23E-06	9.79E-07
Mercury Compounds	0.000	1.66E-04	7.84E-05	2.16E-06	8.24E-05	1.15E-06	1.67E-06	1.93E-07	8.45E-07	1.96E-05	1.12E-07	1.02E-07	8.16E-08
Nickel Compounds	0.002	1.16E-03	5.49E-04	1.51E-05	1.24E-04	8.05E-06	1.17E-05	1.35E-06	5.92E-06	2.95E-05	7.82E-07	7.15E-07	5.71E-07
Polycyclic Organic Matter	0.007	4.45E-03	2.23E-03	1.51E-04	9.37E-06	8.04E-05	7.74E-05	4.16E-05	3.92E-05	2.51E-06	1.89E-05	1.97E-05	1.78E-05
Propionaldehyde	0.271	6.62E-02	3.32E-02	2.24E-03	5.15E-02	1.20E-03	1.15E-03	5.18E-03	5.83E-04	1.38E-02	2.35E-03	2.45E-03	2.22E-03
Styrene	0.572	3.49E-01	1.75E-01	1.18E-02	3.11E-03	6.29E-03	6.06E-03	2.09E-03	3.07E-03	8.31E-04	9.49E-04	9.87E-04	8.95E-04
Toluene	43.210	2.62E+01	1.36E+01	8.94E-01	7.85E-02	4.78E-01	4.56E-01	1.99E-01	2.31E-01	2.10E-02	9.54E-02	9.37E-02	8.54E-02
Xylenes (isomers and mixture)	46.809	2.87E+01	1.46E+01	9.75E-01	5.55E-02	5.21E-01	4.99E-01	1.87E-01	2.53E-01	1.48E-02	8.79E-02	8.84E-02	8.04E-02

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2270002072	2270002060	2265003020	2260006010	2260002054	2270002036	2270003060	2265006010	2265006025	2270002069	2265004036	2270008005
Equipment Name	Winter TOTAL (tons)	Skid Steer Loaders	Rubber Tire Loaders	Forklifts	Pumps	Concrete/Industrial Saws	Excavators	AC/Refrigeration	Pumps	Welders	Crawler Tractor/Dozers	Snowblowers (com)	Airport Support Equipment
Tech Type		Dsl	Dsl	4-St	2-St	2-St	Dsl	Dsl	4-St	4-St	Dsl	4-St	Dsl
Equipment Population		49.3	24.9	13.5	30.3	8.0	16.1	69.7	50.8	15.5	24.3	99.6	8.7
Activity (hrs/season)		13,489.0	6,344.6	10,094.7	3,344.8	1,614.8	5,883.7	42,073.4	5,618.5	3,169.5	7,591.3	13,549.1	3,195.5
Activity (hrs/season/unit)		273.49	254.43	749.55	110.50	201.42	365.10	604.05	110.50	204.00	312.94	136.00	366.00
Exhaust PM (tons)	36.66	7.16E-01	6.84E-01	2.06E-02	3.70E-02	5.40E-02	5.20E-01	8.88E-01	6.07E-03	6.09E-03	4.97E-01	4.92E-03	2.83E-01
TOTAL VOC (tons)	463.76	1.06E+00	9.98E-01	9.62E-01	9.35E-01	9.07E-01	8.81E-01	7.69E-01	7.45E-01	5.91E-01	5.48E-01	5.35E-01	3.98E-01
Total Exhaust VOC (tons)	452.60	1.06E+00	9.98E-01	9.61E-01	9.35E-01	9.07E-01	8.81E-01	7.69E-01	7.43E-01	5.89E-01	5.48E-01	5.32E-01	3.98E-01
Exh VOC	450.86	1.04E+00	9.79E-01	7.26E-01	9.35E-01	9.07E-01	8.64E-01	7.54E-01	7.14E-01	5.54E-01	5.38E-01	5.32E-01	3.91E-01
Crankcase VOC	1.74	2.08E-02	1.96E-02	2.36E-01	0.00E+00	0.00E+00	1.73E-02	1.51E-02	2.87E-02	3.46E-02	1.08E-02	0.00E+00	7.81E-03
Total Evap VOC (tons)	11.16	0.00E+00	0.00E+00	5.71E-04	2.92E-04	1.90E-04	0.00E+00	0.00E+00	2.61E-03	1.86E-03	0.00E+00	2.81E-03	0.00E+00
Chemical Name													
1,3-Butadiene	0.955	1.97E-03	1.86E-03	9.15E-04	2.01E-03	1.95E-03	1.64E-03	1.43E-03	7.07E-04	5.61E-04	1.02E-03	5.06E-04	7.41E-04
Acetaldehyde	1.844	7.88E-02	7.42E-02	3.94E-03	1.55E-03	1.51E-03	6.55E-02	5.71E-02	3.05E-03	2.41E-03	4.07E-02	2.18E-03	2.96E-02
Acrolein	0.305	1.22E-02	1.15E-02	6.73E-04	2.81E-04	2.72E-04	1.01E-02	8.84E-03	5.20E-04	4.12E-04	6.31E-03	3.72E-04	4.58E-03
Benzene (including benzene from gasoline)	11.897	2.15E-02	2.03E-02	5.05E-02	2.36E-02	2.29E-02	1.79E-02	1.56E-02	3.91E-02	3.10E-02	1.11E-02	2.80E-02	8.09E-03
Chromium Compounds	0.002	5.01E-05	4.79E-05	1.23E-06	2.22E-06	3.24E-06	3.64E-05	6.21E-05	3.64E-07	3.65E-07	3.48E-05	2.95E-07	1.98E-05
Ethyl benzene	10.593	3.29E-03	3.10E-03	1.90E-02	2.24E-02	2.18E-02	2.73E-03	2.38E-03	1.47E-02	1.17E-02	1.70E-03	1.05E-02	1.24E-03
Formaldehyde	3.417	1.59E-01	1.50E-01	1.12E-02	2.38E-03	2.30E-03	1.32E-01	1.15E-01	8.69E-03	6.89E-03	8.22E-02	6.22E-03	5.98E-02
Hexane	6.454	1.69E-03	1.59E-03	9.55E-03	1.33E-02	1.29E-02	1.40E-03	1.22E-03	7.43E-03	5.89E-03	8.72E-04	5.34E-03	6.34E-04
Manganese Compounds	0.004	5.01E-05	4.79E-05	2.47E-06	4.44E-06	6.47E-06	3.64E-05	6.21E-05	7.28E-07	7.31E-07	3.48E-05	5.91E-07	1.98E-05
Mercury Compounds	0.000	1.43E-05	1.37E-05	2.06E-07	3.70E-07	5.40E-07	1.04E-05	1.78E-05	6.07E-08	6.09E-08	9.95E-06	4.92E-08	5.65E-06
Nickel Compounds	0.002	2.15E-05	2.05E-05	1.44E-06	2.59E-06	3.78E-06	1.56E-05	2.66E-05	4.25E-07	4.26E-07	1.49E-05	3.45E-07	8.48E-06
Polycyclic Organic Matter	0.007	1.90E-06	1.79E-06	1.45E-05	1.55E-05	1.51E-05	1.58E-06	1.38E-06	1.12E-05	8.89E-06	9.81E-07	8.03E-06	7.13E-07
Propionaldehyde	0.271	1.04E-02	9.83E-03	1.81E-03	2.31E-04	2.24E-04	8.68E-03	7.57E-03	1.40E-03	1.11E-03	5.40E-03	1.00E-03	3.92E-03
Styrene	0.572	6.30E-04	5.93E-04	7.29E-04	1.22E-03	1.18E-03	5.24E-04	4.57E-04	5.63E-04	4.46E-04	3.26E-04	4.03E-04	2.37E-04
Toluene	43.210	1.59E-02	1.50E-02	6.91E-02	9.15E-02	8.87E-02	1.32E-02	1.15E-02	5.34E-02	4.24E-02	8.22E-03	3.83E-02	5.98E-03
Xylenes (isomers and mixture)	46.809	1.12E-02	1.06E-02	6.52E-02	1.00E-01	9.71E-02	9.34E-03	8.15E-03	5.04E-02	4.00E-02	5.81E-03	3.61E-02	4.22E-03

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2265006015	2265001060	2270002057	2260002006	2270002051	2265004035	2270002045	2260001060	2270006005	2270006025	2270002075
Equipment Name	Winter TOTAL (tons)	Air Compressors	Specialty Vehicle Carts	Rough Terrain Forklift	Tampers/Rammers	Off-highway Trucks	Snowblowers (res)	Cranes	Specialty Vehicle Carts	Generator Sets	Welders	Off-Highway Tractors
Tech Type		4-St	4-St	Dsl	2-St	Dsl	4-St	Dsl	2-St	Dsl	Dsl	Dsl
Equipment Population		11.0	64.0	13.4	18.3	2.2	857.6	11.3	162.9	28.0	13.3	3.6
Activity (hrs/season)		2,656.7	1,295.5	2,966.1	980.9	1,186.7	6,861.0	3,747.9	3,297.4	4,724.3	4,269.7	1,030.5
Activity (hrs/season/unit)		242.00	20.24	221.33	53.49	548.65	8.00	330.99	20.24	169.00	321.50	285.86
Exhaust PM (tons)	36.66	3.46E-03	2.50E-03	2.44E-01	1.97E-02	2.33E-01	2.49E-03	2.20E-01	2.77E-03	2.16E-01	1.64E-01	1.59E-01
TOTAL VOC (tons)	463.76	3.79E-01	3.61E-01	3.36E-01	3.21E-01	3.10E-01	2.94E-01	2.85E-01	2.83E-01	2.82E-01	2.24E-01	2.17E-01
Total Exhaust VOC (tons)	452.60	3.78E-01	3.53E-01	3.36E-01	3.21E-01	3.10E-01	2.69E-01	2.85E-01	2.76E-01	2.82E-01	2.24E-01	2.17E-01
Exh VOC	450.86	3.49E-01	2.82E-01	3.30E-01	3.21E-01	3.04E-01	2.69E-01	2.79E-01	2.76E-01	2.77E-01	2.20E-01	2.13E-01
Crankcase VOC	1.74	2.88E-02	7.14E-02	6.60E-03	0.00E+00	6.08E-03	0.00E+00	5.58E-03	0.00E+00	5.53E-03	4.40E-03	4.26E-03
Total Evap VOC (tons)	11.16	1.12E-03	7.98E-03	0.00E+00	4.04E-04	0.00E+00	2.42E-02	0.00E+00	7.76E-03	0.00E+00	0.00E+00	0.00E+00
Chemical Name												
1,3-Butadiene	0.955	3.60E-04	3.36E-04	6.26E-04	6.90E-04	5.77E-04	2.56E-04	5.30E-04	5.92E-04	5.25E-04	4.17E-04	4.04E-04
Acetaldehyde	1.844	1.55E-03	1.45E-03	2.50E-02	5.32E-04	2.30E-02	1.10E-03	2.12E-02	4.57E-04	2.10E-02	1.67E-02	1.61E-02
Acrolein	0.305	2.65E-04	2.47E-04	3.87E-03	9.62E-05	3.57E-03	1.89E-04	3.28E-03	8.27E-05	3.24E-03	2.58E-03	2.50E-03
Benzene (including benzene from gasoline)	11.897	1.99E-02	1.87E-02	6.83E-03	8.09E-03	6.29E-03	1.47E-02	5.78E-03	7.11E-03	5.73E-03	4.55E-03	4.41E-03
Chromium Compounds	0.002	2.08E-07	1.50E-07	1.71E-05	1.18E-06	1.63E-05	1.50E-07	1.54E-05	1.66E-07	1.52E-05	1.15E-05	1.11E-05
Ethyl benzene	10.593	7.50E-03	7.06E-03	1.04E-03	7.70E-03	9.61E-04	5.52E-03	8.83E-04	6.67E-03	8.75E-04	6.95E-04	6.73E-04
Formaldehyde	3.417	4.43E-03	4.13E-03	5.05E-02	8.15E-04	4.65E-02	3.15E-03	4.27E-02	7.00E-04	4.23E-02	3.37E-02	3.26E-02
Hexane	6.454	3.78E-03	3.69E-03	5.35E-04	4.56E-03	4.93E-04	3.24E-03	4.53E-04	4.09E-03	4.49E-04	3.57E-04	3.45E-04
Manganese Compounds	0.004	4.15E-07	3.01E-07	1.71E-05	2.36E-06	1.63E-05	2.99E-07	1.54E-05	3.33E-07	1.52E-05	1.15E-05	1.11E-05
Mercury Compounds	0.000	3.46E-08	2.50E-08	4.87E-06	1.97E-07	4.66E-06	2.49E-08	4.40E-06	2.77E-08	4.33E-06	3.27E-06	3.18E-06
Nickel Compounds	0.002	2.42E-07	1.75E-07	7.31E-06	1.38E-06	6.99E-06	1.75E-07	6.61E-06	1.94E-07	6.49E-06	4.91E-06	4.78E-06
Polycyclic Organic Matter	0.007	5.71E-06	5.34E-06	6.02E-07	5.32E-06	5.55E-07	4.07E-06	5.10E-07	4.57E-06	5.05E-07	4.02E-07	3.89E-07
Propionaldehyde	0.271	7.11E-04	6.64E-04	3.31E-03	7.92E-05	3.05E-03	5.06E-04	2.81E-03	6.81E-05	2.78E-03	2.21E-03	2.14E-03
Styrene	0.572	2.87E-04	2.68E-04	2.00E-04	4.17E-04	1.84E-04	2.04E-04	1.69E-04	3.58E-04	1.68E-04	1.33E-04	1.29E-04
Toluene	43.210	2.72E-02	2.57E-02	5.05E-03	3.14E-02	4.65E-03	2.03E-02	4.27E-03	2.73E-02	4.23E-03	3.37E-03	3.26E-03
Xylenes (isomers and mixture)	46.809	2.57E-02	2.41E-02	3.57E-03	3.43E-02	3.29E-03	1.88E-02	3.02E-03	2.97E-02	2.99E-03	2.38E-03	2.30E-03

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2270002048	2270006015	2268006020	2270001060	2265008005	2270002015	2270002018	2282010005	2270003020	2260006005	2265002039	2270006010
Equipment Name	Winter TOTAL (tons)	Graders	Air Compressors	Gas Compressors	Specialty Vehicle Carts	Airport Support Equipment	Rollers	Scrapers	Inboard/Stern drive	Forklifts	Generator Sets	Concrete/Indu strial Saws	Pumps
Tech Type		Dsl	Dsl	4-St	Dsl	4-St	Dsl	Dsl	4-St	Dsl	2-St	4-St	Dsl
Equipment Population		10.1	9.9	0.0	5.7	2.4	13.2	3.7	116.0	3.7	8.8	4.6	12.7
Activity (hrs/season)		3,232.7	4,030.5	138.7	766.6	1,399.1	3,362.1	1,127.5	-	2,863.1	507.9	931.3	2,563.8
Activity (hrs/season/unit)		321.63	407.50	3,000.00	135.45	589.59	254.10	305.58	-	765.77	57.50	203.95	201.50
Exhaust PM (tons)	36.66	1.84E-01	1.62E-01	1.14E-03	1.08E-01	2.38E-03	1.51E-01	1.20E-01	0.00E+00	1.23E-01	5.53E-03	1.33E-03	9.78E-02
TOTAL VOC (tons)	463.76	2.12E-01	2.01E-01	1.78E-01	1.67E-01	1.53E-01	1.48E-01	1.43E-01	1.41E-01	1.41E-01	1.35E-01	1.26E-01	1.20E-01
Total Exhaust VOC (tons)	452.60	2.12E-01	2.01E-01	1.78E-01	1.67E-01	1.53E-01	1.48E-01	1.43E-01	0.00E+00	1.41E-01	1.35E-01	1.25E-01	1.20E-01
Exh VOC	450.86	2.08E-01	1.97E-01	1.34E-01	1.64E-01	1.22E-01	1.45E-01	1.40E-01	0.00E+00	1.39E-01	1.35E-01	1.21E-01	1.18E-01
Crankcase VOC	1.74	4.15E-03	3.94E-03	4.43E-02	3.28E-03	3.01E-02	2.91E-03	2.80E-03	0.00E+00	2.77E-03	0.00E+00	4.22E-03	2.36E-03
Total Evap VOC (tons)	11.16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.57E-04	0.00E+00	0.00E+00	1.41E-01	0.00E+00	8.47E-05	3.23E-04	0.00E+00
Chemical Name													
1,3-Butadiene	0.955	3.94E-04	3.74E-04	1.70E-04	3.11E-04	1.45E-04	2.76E-04	2.65E-04	0.00E+00	2.63E-04	2.90E-04	1.19E-04	2.23E-04
Acetaldehyde	1.844	1.57E-02	1.49E-02	7.32E-04	1.24E-02	6.26E-04	1.10E-02	1.06E-02	0.00E+00	1.05E-02	2.24E-04	5.14E-04	8.93E-03
Acrolein	0.305	2.44E-03	2.31E-03	1.25E-04	1.93E-03	1.07E-04	1.71E-03	1.64E-03	0.00E+00	1.63E-03	4.04E-05	8.77E-05	1.38E-03
Benzene (including benzene from gasoline)	11.897	4.30E-03	4.08E-03	9.37E-03	3.40E-03	8.02E-03	3.01E-03	2.89E-03	3.11E-03	2.87E-03	3.40E-03	6.59E-03	2.44E-03
Chromium Chompounds	0.002	1.29E-05	1.14E-05	6.85E-08	7.58E-06	1.43E-07	1.06E-05	8.41E-06	0.00E+00	8.59E-06	3.32E-07	7.96E-08	6.85E-06
Ethyl benzene	10.593	6.57E-04	6.24E-04	3.53E-03	5.19E-04	3.02E-03	4.60E-04	4.42E-04	1.09E-03	4.38E-04	3.24E-03	2.48E-03	3.72E-04
Formaldehyde	3.417	3.18E-02	3.02E-02	2.09E-03	2.51E-02	1.79E-03	2.22E-02	2.14E-02	0.00E+00	2.12E-02	3.42E-04	1.47E-03	1.80E-02
Hexane	6.454	3.37E-04	3.20E-04	1.77E-03	2.66E-04	1.52E-03	2.36E-04	2.27E-04	3.31E-03	2.25E-04	1.92E-03	1.25E-03	1.91E-04
Manganese Compounds	0.004	1.29E-05	1.14E-05	1.37E-07	7.58E-06	2.86E-07	1.06E-05	8.41E-06	0.00E+00	8.59E-06	6.64E-07	1.59E-07	6.85E-06
Mercury Compounds	0.000	3.68E-06	3.25E-06	1.14E-08	2.17E-06	2.38E-08	3.01E-06	2.40E-06	0.00E+00	2.46E-06	5.53E-08	1.33E-08	1.96E-06
Nickel Compounds	0.002	5.51E-06	4.87E-06	7.99E-08	3.25E-06	1.67E-07	4.52E-06	3.61E-06	0.00E+00	3.68E-06	3.87E-07	9.29E-08	2.93E-06
Polycyclic Organic Matter	0.007	3.79E-07	3.60E-07	2.69E-06	3.00E-07	2.30E-06	2.65E-07	2.55E-07	0.00E+00	2.53E-07	2.24E-06	1.89E-06	2.15E-07
Propionaldehyde	0.271	2.09E-03	1.98E-03	3.36E-04	1.65E-03	2.87E-04	1.46E-03	1.40E-03	0.00E+00	1.39E-03	3.33E-05	2.36E-04	1.18E-03
Styrene	0.572	1.26E-04	1.19E-04	1.35E-04	9.94E-05	1.16E-04	8.81E-05	8.47E-05	0.00E+00	8.40E-05	1.75E-04	9.50E-05	7.14E-05
Toluene	43.210	3.18E-03	3.02E-03	1.28E-02	2.51E-03	1.10E-02	2.22E-03	2.14E-03	5.84E-03	2.12E-03	1.32E-02	9.01E-03	1.80E-03
Xylenes (isomers and mixture)	46.809	2.25E-03	2.13E-03	1.21E-02	1.77E-03	1.04E-02	1.57E-03	1.51E-03	3.15E-03	1.50E-03	1.44E-02	8.51E-03	1.27E-03

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2265002042	2270002030	2265002021	2265003040	2265002030	2265002009	2270003030	2270002033	2265003010	2270002003	2270002021	2265002033
Equipment Name	Winter TOTAL (tons)	Cement & Mortar Mixers	Trenchers	Paving Equipment	Other General Industrial Eqp	Trenchers	Plate Compactors	Sweepers/Scrubbers	Bore/Drill Rigs	Aerial Lifts	Pavers	Paving Equipment	Bore/Drill Rigs
Tech Type		4-St	Dsl	4-St	4-St	4-St	4-St	Dsl	Dsl	4-St	Dsl	Dsl	4-St
Equipment Population		28.7	9.4	12.5	2.7	3.9	11.9	1.1	2.8	1.7	3.8	4.7	12.3
Activity (hrs/season)		804.8	1,866.6	731.3	863.4	520.0	661.7	629.7	429.5	271.8	1,036.0	987.8	439.9
Activity (hrs/season/unit)		28.08	198.26	58.51	321.17	134.40	55.50	549.55	155.80	162.61	274.49	207.96	35.77
Exhaust PM (tons)	36.66	9.89E-04	9.54E-02	7.60E-04	7.45E-04	7.67E-04	5.12E-04	4.11E-02	5.03E-02	5.91E-04	4.92E-02	4.92E-02	3.60E-04
TOTAL VOC (tons)	463.76	1.14E-01	1.07E-01	9.67E-02	9.60E-02	8.24E-02	6.67E-02	6.37E-02	6.17E-02	5.88E-02	5.26E-02	4.79E-02	4.38E-02
Total Exhaust VOC (tons)	452.60	1.13E-01	1.07E-01	9.60E-02	9.59E-02	8.20E-02	6.63E-02	6.37E-02	6.17E-02	5.83E-02	5.26E-02	4.79E-02	4.34E-02
Exh VOC	450.86	9.86E-02	1.05E-01	8.87E-02	9.59E-02	7.69E-02	6.39E-02	6.25E-02	6.05E-02	4.64E-02	5.15E-02	4.70E-02	4.05E-02
Crankcase VOC	1.74	1.46E-02	2.11E-03	7.32E-03	4.54E-05	5.13E-03	2.43E-03	1.25E-03	1.21E-03	1.19E-02	1.03E-03	9.40E-04	2.97E-03
Total Evap VOC (tons)	11.16	1.13E-03	0.00E+00	6.38E-04	9.17E-05	3.52E-04	3.54E-04	0.00E+00	0.00E+00	5.09E-04	0.00E+00	0.00E+00	3.62E-04
Chemical Name													
1,3-Butadiene	0.955	1.08E-04	2.00E-04	9.14E-05	9.13E-05	7.81E-05	6.31E-05	1.18E-04	1.15E-04	5.55E-05	9.78E-05	8.91E-05	4.14E-05
Acetaldehyde	1.844	4.64E-04	7.98E-03	3.94E-04	3.93E-04	3.36E-04	2.72E-04	4.73E-03	4.58E-03	2.39E-04	3.91E-03	3.56E-03	1.78E-04
Acrolein	0.305	7.92E-05	1.24E-03	6.72E-05	6.72E-05	5.74E-05	4.64E-05	7.33E-04	7.09E-04	4.08E-05	6.04E-04	5.51E-04	3.04E-05
Benzene (including benzene from gasoline)	11.897	5.97E-03	2.18E-03	5.06E-03	5.04E-03	4.31E-03	3.49E-03	1.29E-03	1.25E-03	3.07E-03	1.07E-03	9.73E-04	2.29E-03
Chromium Compounds	0.002	5.94E-08	6.68E-06	4.56E-08	4.47E-08	4.60E-08	3.07E-08	2.88E-06	3.52E-06	3.54E-08	3.44E-06	3.44E-06	2.16E-08
Ethyl benzene	10.593	2.25E-03	3.33E-04	1.91E-03	1.90E-03	1.63E-03	1.32E-03	1.97E-04	1.91E-04	1.16E-03	1.63E-04	1.49E-04	8.63E-04
Formaldehyde	3.417	1.32E-03	1.61E-02	1.12E-03	1.12E-03	9.60E-04	7.76E-04	9.56E-03	9.25E-03	6.82E-04	7.88E-03	7.19E-03	5.08E-04
Hexane	6.454	1.15E-03	1.71E-04	9.68E-04	9.54E-04	8.22E-04	6.66E-04	1.01E-04	9.81E-05	5.90E-04	8.36E-05	7.62E-05	4.39E-04
Manganese Compounds	0.004	1.19E-07	6.68E-06	9.12E-08	8.95E-08	9.20E-08	6.15E-08	2.88E-06	3.52E-06	7.09E-08	3.44E-06	3.44E-06	4.32E-08
Mercury Compounds	0.000	9.89E-09	1.91E-06	7.60E-09	7.45E-09	7.67E-09	5.12E-09	8.22E-07	1.01E-06	5.91E-09	9.84E-07	9.83E-07	3.60E-09
Nickel Compounds	0.002	6.93E-08	2.86E-06	5.32E-08	5.22E-08	5.37E-08	3.59E-08	1.23E-06	1.51E-06	4.13E-08	1.48E-06	1.47E-06	2.52E-08
Polycyclic Organic Matter	0.007	1.71E-06	1.92E-07	1.45E-06	1.45E-06	1.24E-06	1.00E-06	1.14E-07	1.10E-07	8.80E-07	9.41E-08	8.58E-08	6.56E-07
Propionaldehyde	0.271	2.13E-04	1.06E-03	1.81E-04	1.80E-04	1.54E-04	1.25E-04	6.28E-04	6.08E-04	1.10E-04	5.18E-04	4.72E-04	8.17E-05
Styrene	0.572	8.58E-05	6.38E-05	7.28E-05	7.27E-05	6.22E-05	5.03E-05	3.78E-05	3.66E-05	4.42E-05	3.12E-05	2.85E-05	3.29E-05
Toluene	43.210	8.18E-03	1.61E-03	6.92E-03	6.89E-03	5.90E-03	4.78E-03	9.56E-04	9.25E-04	4.20E-03	7.88E-04	7.19E-04	3.13E-03
Xylenes (isomers and mixture)	46.809	7.70E-03	1.14E-03	6.52E-03	6.51E-03	5.57E-03	4.50E-03	6.75E-04	6.54E-04	3.96E-03	5.57E-04	5.08E-04	2.95E-03

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2265003030	2265002072	2265002066	2265002015	2270003070	2270003040	2265004055	2270002054	2270002027	2265002024	2265002060	2260002021
Equipment Name	Winter TOTAL (tons)	Sweepers/Scrubbers	Skid Steer Loaders	Tractors/Loaders/Backhoes	Rollers	Terminal Tractors	Other General Industrial Eq	Lawn & Garden Tractors (res)	Crushing/Proc. Equipment	Signal Boards/Light Plants	Surfacing Equipment	Rubber Tire Loaders	Paving Equipment
Tech Type		4-St	4-St	4-St	4-St	Dsl	Dsl	4-St	Dsl	Dsl	4-St	4-St	2-St
Equipment Population		0.8	1.7	0.9	1.2	1.0	2.5	1,156.5	1.2	8.0	2.3	0.3	1.6
Activity (hrs/season)		185.5	171.5	275.1	256.5	580.5	977.9	-	379.1	1,426.1	368.9	56.9	96.2
Activity (hrs/season/unit)		232.43	103.64	290.87	207.62	566.22	395.50	-	319.29	178.87	163.16	171.18	58.51
Exhaust PM (tons)	36.66	4.37E-04	4.09E-04	3.91E-04	3.88E-04	3.42E-02	3.05E-02	0.00E+00	2.47E-02	3.17E-02	3.06E-04	3.04E-04	1.03E-03
TOTAL VOC (tons)	463.76	4.26E-02	4.25E-02	3.72E-02	3.69E-02	3.58E-02	3.55E-02	3.54E-02	3.47E-02	3.37E-02	3.35E-02	2.89E-02	2.49E-02
Total Exhaust VOC (tons)	452.60	4.25E-02	4.21E-02	3.71E-02	3.68E-02	3.58E-02	3.55E-02	0.00E+00	3.47E-02	3.37E-02	3.34E-02	2.87E-02	2.49E-02
Exh VOC	450.86	3.61E-02	3.43E-02	3.70E-02	3.40E-02	3.51E-02	3.48E-02	0.00E+00	3.40E-02	3.30E-02	3.32E-02	2.20E-02	2.49E-02
Crankcase VOC	1.74	6.35E-03	7.79E-03	8.17E-05	2.75E-03	7.03E-04	6.96E-04	0.00E+00	6.79E-04	6.60E-04	1.52E-04	6.70E-03	0.00E+00
Total Evap VOC (tons)	11.16	1.53E-04	4.41E-04	9.39E-05	1.40E-04	0.00E+00	0.00E+00	3.54E-02	0.00E+00	0.00E+00	1.11E-04	1.84E-04	1.76E-05
Chemical Name													
1,3-Butadiene	0.955	4.04E-05	4.01E-05	3.53E-05	3.50E-05	6.67E-05	6.60E-05	0.00E+00	6.45E-05	6.26E-05	3.18E-05	2.73E-05	5.34E-05
Acetaldehyde	1.844	1.74E-04	1.73E-04	1.52E-04	1.51E-04	2.66E-03	2.64E-03	0.00E+00	2.57E-03	2.50E-03	1.37E-04	1.18E-04	4.13E-05
Acrolein	0.305	2.97E-05	2.95E-05	2.60E-05	2.57E-05	4.12E-04	4.08E-04	0.00E+00	3.98E-04	3.87E-04	2.34E-05	2.01E-05	7.46E-06
Benzene (including benzene from gasoline)	11.897	2.23E-03	2.22E-03	1.95E-03	1.93E-03	7.28E-04	7.20E-04	7.80E-04	7.03E-04	6.83E-04	1.75E-03	1.51E-03	6.27E-04
Chromium Compounds	0.002	2.62E-08	2.45E-08	2.35E-08	2.33E-08	2.40E-06	2.14E-06	0.00E+00	1.73E-06	2.22E-06	1.83E-08	1.83E-08	6.18E-08
Ethyl benzene	10.593	8.42E-04	8.37E-04	7.35E-04	7.29E-04	1.11E-04	1.10E-04	2.73E-04	1.07E-04	1.04E-04	6.61E-04	5.70E-04	5.97E-04
Formaldehyde	3.417	4.97E-04	4.92E-04	4.34E-04	4.30E-04	5.38E-03	5.32E-03	0.00E+00	5.20E-03	5.05E-03	3.90E-04	3.36E-04	6.31E-05
Hexane	6.454	4.25E-04	4.28E-04	3.70E-04	3.68E-04	5.70E-05	5.64E-05	8.29E-04	5.51E-05	5.35E-05	3.34E-04	2.89E-04	3.53E-04
Manganese Compounds	0.004	5.24E-08	4.90E-08	4.69E-08	4.66E-08	2.40E-06	2.14E-06	0.00E+00	1.73E-06	2.22E-06	3.67E-08	3.65E-08	1.24E-07
Mercury Compounds	0.000	4.37E-09	4.09E-09	3.91E-09	3.88E-09	6.84E-07	6.10E-07	0.00E+00	4.94E-07	6.34E-07	3.06E-09	3.04E-09	1.03E-08
Nickel Compounds	0.002	3.06E-08	2.86E-08	2.74E-08	2.72E-08	1.03E-06	9.15E-07	0.00E+00	7.41E-07	9.51E-07	2.14E-08	2.13E-08	7.21E-08
Polycyclic Organic Matter	0.007	6.41E-07	6.36E-07	5.60E-07	5.55E-07	6.42E-08	6.35E-08	0.00E+00	6.20E-08	6.02E-08	5.04E-07	4.33E-07	4.13E-07
Propionaldehyde	0.271	7.99E-05	7.91E-05	6.97E-05	6.91E-05	3.53E-04	3.49E-04	0.00E+00	3.41E-04	3.32E-04	6.27E-05	5.40E-05	6.14E-06
Styrene	0.572	3.22E-05	3.19E-05	2.81E-05	2.79E-05	2.13E-05	2.11E-05	0.00E+00	2.06E-05	2.00E-05	2.53E-05	2.18E-05	3.23E-05
Toluene	43.210	3.06E-03	3.04E-03	2.67E-03	2.65E-03	5.38E-04	5.32E-04	1.46E-03	5.20E-04	5.05E-04	2.40E-03	2.07E-03	2.43E-03
Xylenes (isomers and mixture)	46.809	2.88E-03	2.86E-03	2.52E-03	2.50E-03	3.80E-04	3.76E-04	7.90E-04	3.67E-04	3.57E-04	2.26E-03	1.95E-03	2.66E-03

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Juneau NONROAD Emissions - Winter 1999

SCC		2265002003	2270002081	2260002009	2270002024	2270002063	2270004036	2265002078	2265004010	2265002081	2270003010	2265002057	2265002054
Equipment Name	Winter TOTAL (tons)	Pavers	Other Construction Equipment	Plate Compactors	Surfacing Equipment	Rubber Tire Tractor/Dozers	Snowblowers (com)	Dumpers/Tend ers	Lawn mowers (res)	Other Construction Equipment	Aerial Lifts	Rough Terrain Forklift	Crushing/Proc. Equipment
Tech Type		4-St	Dsl	2-St	Dsl	Dsl	Dsl	4-St	4-St	4-St	Dsl	4-St	4-St
Equipment Population		1.1	1.6	1.7	0.7	0.5	0.2	3.4	3,175.5	0.2	1.1	0.2	0.8
Activity (hrs/season)		145.7	317.9	95.8	135.2	153.0	75.3	143.1	-	20.6	198.2	23.0	62.9
Activity (hrs/season/unit)		131.06	202.61	55.50	187.56	300.57	400.00	42.46	-	124.04	172.97	138.08	80.58
Exhaust PM (tons)	36.66	2.29E-04	2.02E-02	8.65E-04	2.10E-02	1.43E-02	1.09E-02	1.11E-04	0.00E+00	1.33E-04	8.56E-03	1.02E-04	8.13E-05
TOTAL VOC (tons)	463.76	2.27E-02	2.10E-02	2.09E-02	2.06E-02	1.78E-02	1.49E-02	1.44E-02	1.37E-02	1.27E-02	1.05E-02	9.70E-03	8.81E-03
Total Exhaust VOC (tons)	452.60	2.26E-02	2.10E-02	2.09E-02	2.06E-02	1.78E-02	1.49E-02	1.43E-02	0.00E+00	1.26E-02	1.05E-02	9.62E-03	8.78E-03
Exh VOC	450.86	2.08E-02	2.06E-02	2.09E-02	2.02E-02	1.74E-02	1.46E-02	1.21E-02	0.00E+00	9.62E-03	1.03E-02	7.37E-03	8.74E-03
Crankcase VOC	1.74	1.81E-03	4.12E-04	0.00E+00	4.04E-04	3.48E-04	2.92E-04	2.21E-03	0.00E+00	2.93E-03	2.06E-04	2.25E-03	3.49E-05
Total Evap VOC (tons)	11.16	1.20E-04	0.00E+00	1.67E-05	0.00E+00	0.00E+00	0.00E+00	1.67E-04	1.37E-02	1.31E-04	0.00E+00	8.63E-05	3.56E-05
Chemical Name													
1,3-Butadiene	0.955	2.15E-05	3.90E-05	4.49E-05	3.83E-05	3.30E-05	2.77E-05	1.36E-05	0.00E+00	1.20E-05	1.95E-05	9.16E-06	8.35E-06
Acetaldehyde	1.844	9.26E-05	1.56E-03	3.47E-05	1.53E-03	1.32E-03	1.11E-03	5.85E-05	0.00E+00	5.15E-05	7.80E-04	3.94E-05	3.60E-05
Acrolein	0.305	1.58E-05	2.41E-04	6.27E-06	2.37E-04	2.04E-04	1.71E-04	9.99E-06	0.00E+00	8.79E-06	1.21E-04	6.73E-06	6.14E-06
Benzene (including benzene from gasoline)	11.897	1.19E-03	4.26E-04	5.27E-04	4.18E-04	3.61E-04	3.02E-04	7.53E-04	3.02E-04	6.62E-04	2.13E-04	5.07E-04	4.61E-04
Chromium Chompounds	0.002	1.37E-08	1.41E-06	5.19E-08	1.47E-06	1.00E-06	7.65E-07	6.66E-09	0.00E+00	7.99E-09	5.99E-07	6.12E-09	4.88E-09
Ethyl benzene	10.593	4.48E-04	6.51E-05	5.01E-04	6.39E-05	5.51E-05	4.62E-05	2.84E-04	1.06E-04	2.50E-04	3.25E-05	1.91E-04	1.74E-04
Formaldehyde	3.417	2.64E-04	3.15E-03	5.31E-05	3.09E-03	2.66E-03	2.24E-03	1.67E-04	0.00E+00	1.47E-04	1.57E-03	1.13E-04	1.03E-04
Hexane	6.454	2.27E-04	3.34E-05	2.97E-04	3.28E-05	2.82E-05	2.37E-05	1.46E-04	3.21E-04	1.28E-04	1.67E-05	9.74E-05	8.79E-05
Manganese Compounds	0.004	2.75E-08	1.41E-06	1.04E-07	1.47E-06	1.00E-06	7.65E-07	1.33E-08	0.00E+00	1.60E-08	5.99E-07	1.22E-08	9.75E-09
Mercury Compounds	0.000	2.29E-09	4.03E-07	8.65E-09	4.20E-07	2.86E-07	2.19E-07	1.11E-09	0.00E+00	1.33E-09	1.71E-07	1.02E-09	8.13E-10
Nickel Compounds	0.002	1.60E-08	6.05E-07	6.06E-08	6.29E-07	4.29E-07	3.28E-07	7.77E-09	0.00E+00	9.32E-09	2.57E-07	7.14E-09	5.69E-09
Polycyclic Organic Matter	0.007	3.41E-07	3.76E-08	3.47E-07	3.69E-08	3.18E-08	2.67E-08	2.16E-07	0.00E+00	1.90E-07	1.88E-08	1.45E-07	1.33E-07
Propionaldehyde	0.271	4.25E-05	2.07E-04	5.16E-06	2.03E-04	1.75E-04	1.47E-04	2.68E-05	0.00E+00	2.36E-05	1.03E-04	1.81E-05	1.65E-05
Styrene	0.572	1.71E-05	1.25E-05	2.72E-05	1.22E-05	1.06E-05	8.85E-06	1.08E-05	0.00E+00	9.52E-06	6.24E-06	7.29E-06	6.65E-06
Toluene	43.210	1.63E-03	3.15E-04	2.04E-03	3.09E-04	2.66E-04	2.24E-04	1.03E-03	5.66E-04	9.07E-04	1.57E-04	6.94E-04	6.32E-04
Xylenes (isomers and mixture)	46.809	1.53E-03	2.23E-04	2.24E-03	2.18E-04	1.88E-04	1.58E-04	9.72E-04	3.06E-04	8.54E-04	1.11E-04	6.54E-04	5.96E-04

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2260003030	2282005015	2265002045	2265001020	2270005015	2270006030	2265003060	2270002039	2270003050	2270002009	2265002027	2265004040
Equipment Name	Winter TOTAL (tons)	Sweepers/Scrubbers	Personal Water Craft	Cranes	Snowmobiles	Agricultural Tractors	Pressure Washers	AC/Refrigeration	Concrete/Industrial Saws	Other Material Handling Eqp	Plate Compactors	Signal Boards/Light Plants	Rear Engine Riding Mowers (res)
Tech Type		2-St	2-St	4-St	4-St	Dsl	Dsl	4-St	Dsl	Dsl	Dsl	4-St	4-St
Equipment Population		0.1	10.0	0.1	1.2	0.4	1.9	0.1	0.3	0.1	1.3	0.2	169.2
Activity (hrs/season)		26.0	-	17.2	17.7	50.8	138.0	25.8	65.8	22.9	205.9	17.5	-
Activity (hrs/season/unit)		232.43	-	138.75	15.00	132.66	72.50	272.52	193.92	189.64	161.82	106.32	-
Exhaust PM (tons)	36.66	2.54E-04	0.00E+00	4.58E-05	3.05E-05	2.18E-03	3.96E-03	3.37E-05	2.95E-03	2.15E-03	4.05E-03	1.74E-05	0.00E+00
TOTAL VOC (tons)	463.76	6.13E-03	5.94E-03	4.37E-03	4.37E-03	3.85E-03	3.85E-03	3.38E-03	3.07E-03	2.90E-03	2.81E-03	2.11E-03	1.91E-03
Total Exhaust VOC (tons)	452.60	6.13E-03	0.00E+00	4.33E-03	3.56E-03	3.85E-03	3.85E-03	3.37E-03	3.07E-03	2.90E-03	2.81E-03	2.10E-03	0.00E+00
Exh VOC	450.86	6.13E-03	0.00E+00	3.44E-03	2.75E-03	3.78E-03	3.77E-03	3.27E-03	3.01E-03	2.84E-03	2.75E-03	2.10E-03	0.00E+00
Crankcase VOC	1.74	0.00E+00	0.00E+00	8.84E-04	8.08E-04	7.56E-05	7.54E-05	9.52E-05	6.02E-05	5.69E-05	5.51E-05	8.09E-07	0.00E+00
Total Evap VOC (tons)	11.16	8.40E-07	5.94E-03	4.82E-05	8.10E-04	0.00E+00	0.00E+00	9.03E-06	0.00E+00	0.00E+00	0.00E+00	5.79E-06	1.91E-03
Chemical Name													
1,3-Butadiene	0.955	1.32E-05	0.00E+00	4.12E-06	3.39E-06	7.17E-06	7.16E-06	3.21E-06	5.71E-06	5.39E-06	5.23E-06	2.00E-06	0.00E+00
Acetaldehyde	1.844	1.02E-05	0.00E+00	1.77E-05	1.46E-05	2.86E-04	2.86E-04	1.38E-05	2.28E-04	2.15E-04	2.09E-04	8.61E-06	0.00E+00
Acrolein	0.305	1.84E-06	0.00E+00	3.03E-06	2.49E-06	4.43E-05	4.42E-05	2.36E-06	3.53E-05	3.33E-05	3.23E-05	1.47E-06	0.00E+00
Benzene (including benzene from gasoline)	11.897	1.55E-04	1.31E-04	2.28E-04	2.05E-04	7.82E-05	7.81E-05	1.77E-04	6.23E-05	5.89E-05	5.70E-05	1.10E-04	4.21E-05
Chromium Compounds	0.002	1.52E-08	0.00E+00	2.75E-09	1.83E-09	1.53E-07	2.77E-07	2.02E-09	2.07E-07	1.50E-07	2.84E-07	1.04E-09	0.00E+00
Ethyl benzene	10.593	1.47E-04	4.57E-05	8.60E-05	7.67E-05	1.19E-05	1.19E-05	6.68E-05	9.52E-06	8.99E-06	8.71E-06	4.16E-05	1.47E-05
Formaldehyde	3.417	1.56E-05	0.00E+00	5.06E-05	4.16E-05	5.78E-04	5.77E-04	3.94E-05	4.61E-04	4.35E-04	4.21E-04	2.46E-05	0.00E+00
Hexane	6.454	8.71E-05	1.39E-04	4.40E-05	5.43E-05	6.13E-06	6.12E-06	3.36E-05	4.88E-06	4.61E-06	4.47E-06	2.10E-05	4.48E-05
Manganese Compounds	0.004	3.05E-08	0.00E+00	5.49E-09	3.66E-09	1.53E-07	2.77E-07	4.04E-09	2.07E-07	1.50E-07	2.84E-07	2.09E-09	0.00E+00
Mercury Compounds	0.000	2.54E-09	0.00E+00	4.58E-10	3.05E-10	4.37E-08	7.92E-08	3.37E-10	5.90E-08	4.29E-08	8.11E-08	1.74E-10	0.00E+00
Nickel Compounds	0.002	1.78E-08	0.00E+00	3.20E-09	2.13E-09	6.55E-08	1.19E-07	2.36E-09	8.85E-08	6.44E-08	1.22E-07	1.22E-09	0.00E+00
Polycyclic Organic Matter	0.007	1.02E-07	0.00E+00	6.53E-08	5.37E-08	6.90E-09	6.89E-09	5.09E-08	5.50E-09	5.19E-09	5.03E-09	3.17E-08	0.00E+00
Propionaldehyde	0.271	1.51E-06	0.00E+00	8.13E-06	6.69E-06	3.80E-05	3.79E-05	6.33E-06	3.02E-05	2.86E-05	2.77E-05	3.95E-06	0.00E+00
Styrene	0.572	7.97E-06	0.00E+00	3.28E-06	2.70E-06	2.29E-06	2.29E-06	2.55E-06	1.82E-06	1.72E-06	1.67E-06	1.59E-06	0.00E+00
Toluene	43.210	6.00E-04	2.45E-04	3.13E-04	2.89E-04	5.78E-05	5.77E-05	2.42E-04	4.61E-05	4.35E-05	4.21E-05	1.51E-04	7.90E-05
Xylenes (isomers and mixture)	46.809	6.56E-04	1.32E-04	2.94E-04	2.59E-04	4.09E-05	4.08E-05	2.29E-04	3.25E-05	3.07E-05	2.98E-05	1.43E-04	4.26E-05

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2265003050	2265004015	2265004071	2260004025	2270002042	2260004020	2260004030	2270002078	2265004075	2270005020	2265004056	2265004046
Equipment Name	Winter TOTAL (tons)	Other Material Handling Eq	Rotary Tillers < 6 HP (res)	Commercial Turf Equipment (com)	Trimmers/Edgers/Brush Cutter (res)	Cement & Mortar Mixers	Chain Saws < 6 HP (res)	Leafblowers/Vacuums (res)	Dumpers/Tenders	Other Lawn & Garden Eq. (res)	Combines	Lawn & Garden Tractors (com)	Front Mowers (com)
Tech Type		4-St	4-St	4-St	2-St	Dsl	2-St	2-St	Dsl	4-St	Dsl	4-St	4-St
Equipment Population		0.1	279.2	21.4	1,337.0	0.7	524.0	678.4	0.1	57.0	0.1	7.3	3.7
Activity (hrs/season)		9.7	-	-	-	66.3	-	-	16.1	-	2.4	-	-
Activity (hrs/season/unit)		173.87	-	-	-	91.94	-	-	189.23	-	41.89	-	-
Exhaust PM (tons)	36.66	1.46E-05	0.00E+00	0.00E+00	0.00E+00	1.14E-03	0.00E+00	0.00E+00	3.85E-04	0.00E+00	2.68E-04	0.00E+00	0.00E+00
TOTAL VOC (tons)	463.76	1.63E-03	1.40E-03	1.06E-03	9.69E-04	7.97E-04	6.64E-04	5.43E-04	4.48E-04	3.24E-04	2.57E-04	2.25E-04	1.98E-04
Total Exhaust VOC (tons)	452.60	1.62E-03	0.00E+00	0.00E+00	0.00E+00	7.97E-04	0.00E+00	0.00E+00	4.48E-04	0.00E+00	2.57E-04	0.00E+00	0.00E+00
Exh VOC	450.86	1.50E-03	0.00E+00	0.00E+00	0.00E+00	7.81E-04	0.00E+00	0.00E+00	4.39E-04	0.00E+00	2.52E-04	0.00E+00	0.00E+00
Crankcase VOC	1.74	1.23E-04	0.00E+00	0.00E+00	0.00E+00	1.56E-05	0.00E+00	0.00E+00	8.78E-06	0.00E+00	5.05E-06	0.00E+00	0.00E+00
Total Evap VOC (tons)	11.16	5.38E-06	1.40E-03	1.06E-03	9.69E-04	0.00E+00	6.64E-04	5.43E-04	0.00E+00	3.24E-04	0.00E+00	2.25E-04	1.98E-04
Chemical Name													
1,3-Butadiene	0.955	1.54E-06	0.00E+00	0.00E+00	0.00E+00	1.48E-06	0.00E+00	0.00E+00	8.33E-07	0.00E+00	4.79E-07	0.00E+00	0.00E+00
Acetaldehyde	1.844	6.64E-06	0.00E+00	0.00E+00	0.00E+00	5.92E-05	0.00E+00	0.00E+00	3.33E-05	0.00E+00	1.91E-05	0.00E+00	0.00E+00
Acrolein	0.305	1.13E-06	0.00E+00	0.00E+00	0.00E+00	9.17E-06	0.00E+00	0.00E+00	5.15E-06	0.00E+00	2.96E-06	0.00E+00	0.00E+00
Benzene (including benzene from gasoline)	11.897	8.52E-05	3.07E-05	2.33E-05	2.13E-05	1.62E-05	1.46E-05	1.20E-05	9.09E-06	7.13E-06	5.23E-06	4.95E-06	4.36E-06
Chromium Compounds	0.002	8.79E-10	0.00E+00	0.00E+00	0.00E+00	7.98E-08	0.00E+00	0.00E+00	2.69E-08	0.00E+00	1.87E-08	0.00E+00	0.00E+00
Ethyl benzene	10.593	3.21E-05	1.07E-05	8.17E-06	7.46E-06	2.47E-06	5.12E-06	4.18E-06	1.39E-06	2.49E-06	7.98E-07	1.73E-06	1.53E-06
Formaldehyde	3.417	1.90E-05	0.00E+00	0.00E+00	0.00E+00	1.20E-04	0.00E+00	0.00E+00	6.72E-05	0.00E+00	3.86E-05	0.00E+00	0.00E+00
Hexane	6.454	1.62E-05	3.27E-05	2.48E-05	2.27E-05	1.27E-06	1.55E-05	1.27E-05	7.12E-07	7.58E-06	4.09E-07	5.26E-06	4.64E-06
Manganese Compounds	0.004	1.76E-09	0.00E+00	0.00E+00	0.00E+00	7.98E-08	0.00E+00	0.00E+00	2.69E-08	0.00E+00	1.87E-08	0.00E+00	0.00E+00
Mercury Compounds	0.000	1.46E-10	0.00E+00	0.00E+00	0.00E+00	2.28E-08	0.00E+00	0.00E+00	7.70E-09	0.00E+00	5.36E-09	0.00E+00	0.00E+00
Nickel Compounds	0.002	1.03E-09	0.00E+00	0.00E+00	0.00E+00	3.42E-08	0.00E+00	0.00E+00	1.15E-08	0.00E+00	8.03E-09	0.00E+00	0.00E+00
Polycyclic Organic Matter	0.007	2.45E-08	0.00E+00	0.00E+00	0.00E+00	1.43E-09	0.00E+00	0.00E+00	8.02E-10	0.00E+00	4.61E-10	0.00E+00	0.00E+00
Propionaldehyde	0.271	3.05E-06	0.00E+00	0.00E+00	0.00E+00	7.85E-06	0.00E+00	0.00E+00	4.41E-06	0.00E+00	2.54E-06	0.00E+00	0.00E+00
Styrene	0.572	1.23E-06	0.00E+00	0.00E+00	0.00E+00	4.73E-07	0.00E+00	0.00E+00	2.66E-07	0.00E+00	1.53E-07	0.00E+00	0.00E+00
Toluene	43.210	1.17E-04	5.76E-05	4.38E-05	4.00E-05	1.20E-05	2.74E-05	2.24E-05	6.72E-06	1.34E-05	3.86E-06	9.29E-06	8.19E-06
Xylenes (isomers and mixture)	46.809	1.10E-04	3.11E-05	2.37E-05	2.16E-05	8.45E-06	1.48E-05	1.21E-05	4.75E-06	7.22E-06	2.73E-06	5.02E-06	4.42E-06

Table C-4-6e
Juneau NONROAD Emissions - Winter 1999

SCC		2265005040	2265002006	2265004011	2265004066	2260004015	2270005060
Equipment Name	Winter TOTAL (tons)	Tillers > 6 HP	Tampers/Ram mers	Lawn mowers (Com)	Chippers/Stump Grinders (com)	Rotary Tillers < 6 HP (res)	Irrigation Sets
Tech Type		4-St	4-St	4-St	4-St	2-St	Dsl
Equipment Population		0.1	0.0	35.1	0.6	44.9	0.0
Activity (hrs/season)		1.5	2.2	-	-	-	1.4
Activity (hrs/season/unit)		12.01	53.49	-	-	-	209.18
Exhaust PM (tons)	36.66	9.10E-07	1.42E-06	0.00E+00	0.00E+00	0.00E+00	8.01E-05
TOTAL VOC (tons)	463.76	1.89E-04	1.75E-04	1.52E-04	1.30E-04	1.22E-04	1.15E-04
Total Exhaust VOC (tons)	452.60	1.84E-04	1.73E-04	0.00E+00	0.00E+00	0.00E+00	1.15E-04
Exh VOC	450.86	1.44E-04	1.53E-04	0.00E+00	0.00E+00	0.00E+00	1.12E-04
Crankcase VOC	1.74	4.01E-05	2.05E-05	0.00E+00	0.00E+00	0.00E+00	2.25E-06
Total Evap VOC (tons)	11.16	4.81E-06	1.64E-06	1.52E-04	1.30E-04	1.22E-04	0.00E+00
Chemical Name							
1,3-Butadiene	0.955	1.75E-07	1.65E-07	0.00E+00	0.00E+00	0.00E+00	2.13E-07
Acetaldehyde	1.844	7.54E-07	7.10E-07	0.00E+00	0.00E+00	0.00E+00	8.52E-06
Acrolein	0.305	1.29E-07	1.21E-07	0.00E+00	0.00E+00	0.00E+00	1.32E-06
Benzene (including benzene from gasoline)	11.897	9.76E-06	9.13E-06	3.34E-06	2.86E-06	2.69E-06	2.33E-06
Chromium Compounds	0.002	5.46E-11	8.54E-11	0.00E+00	0.00E+00	0.00E+00	5.61E-09
Ethyl benzene	10.593	3.68E-06	3.44E-06	1.17E-06	1.00E-06	9.43E-07	3.56E-07
Formaldehyde	3.417	2.15E-06	2.03E-06	0.00E+00	0.00E+00	0.00E+00	1.72E-05
Hexane	6.454	1.94E-06	1.76E-06	3.55E-06	3.04E-06	2.87E-06	1.82E-07
Manganese Compounds	0.004	1.09E-10	1.71E-10	0.00E+00	0.00E+00	0.00E+00	5.61E-09
Mercury Compounds	0.000	9.10E-12	1.42E-11	0.00E+00	0.00E+00	0.00E+00	1.60E-09
Nickel Compounds	0.002	6.37E-11	9.96E-11	0.00E+00	0.00E+00	0.00E+00	2.40E-09
Polycyclic Organic Matter	0.007	2.78E-09	2.62E-09	0.00E+00	0.00E+00	0.00E+00	2.05E-10
Propionaldehyde	0.271	3.46E-07	3.26E-07	0.00E+00	0.00E+00	0.00E+00	1.13E-06
Styrene	0.572	1.39E-07	1.31E-07	0.00E+00	0.00E+00	0.00E+00	6.81E-08
Toluene	43.210	1.34E-05	1.25E-05	6.26E-06	5.37E-06	5.06E-06	1.72E-06
Xylenes (isomers and mixture)	46.809	1.26E-05	1.18E-05	3.38E-06	2.90E-06	2.73E-06	1.22E-06

Table C-4-6f
Juneau NONROAD Emissions - Summer 1999

SCC		2282005010	2282005015	2260007005	2282010005	2260001030	2282020005	2270007015	2265004010	2265004055	2270002066	2265006005	2260004025
Equipment Name	Summer TOTAL (tons)	Outboard	Personal Water Craft	Logging Equipment Chain Saws > 6 HP	Inboard/Stern drive	All Terrain Vehicles/Motor cycles	Inboard	Forest Eqp - Feller/Bunch/ Skidder	Lawn mowers (res)	Lawn & Garden Tractors (res)	Tractors/Load ers/Backhoes	Generator Sets	Trimmers/Ed gers/Brush Cutter (res)
Tech Type		2-St	2-St	2-St	4-St	2-St	Dsl	Dsl	4-St	4-St	Dsl	4-St	2-St
Equipment Population		18,140.7	2,452.3	2,171.8	3,793.4	504.8	401.2	72.2	3,175.5	1,156.5	39.4	292.0	1,337.0
Activity (hrs/season)		536,505.9	161,097.2	329,033.5	153,454.3	11,819.0	68,192.6	46,066.0	57,216.6	37,507.4	29,798.4	16,792.6	8,672.7
Activity (hrs/season/unit)		29.57	65.69	151.50	40.45	23.41	169.97	638.00	18.02	32.43	755.53	57.50	6.49
Exhaust PM (tons)	105.7	4.44E+01	2.18E+01	1.62E+01	6.40E-01	2.97E-01	4.17E+00	4.29E+00	3.07E-02	3.13E-02	2.00E+00	1.92E-02	9.18E-02
TOTAL VOC (tons)	1,728.5	8.10E+02	4.96E+02	2.61E+02	7.57E+01	1.32E+01	8.12E+00	5.73E+00	4.62E+00	4.18E+00	2.88E+00	2.82E+00	2.64E+00
Total Exhaust VOC (tons)	1,640.0	7.65E+02	4.82E+02	2.61E+02	4.96E+01	1.25E+01	8.12E+00	5.73E+00	4.56E+00	4.03E+00	2.88E+00	2.73E+00	2.64E+00
Exh VOC	1,637.3	7.65E+02	4.82E+02	2.61E+02	4.96E+01	1.25E+01	8.12E+00	5.62E+00	4.38E+00	3.87E+00	2.83E+00	2.32E+00	2.64E+00
Crankcase VOC	2.7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-01	1.80E-01	1.59E-01	5.65E-02	4.12E-01	0.00E+00
Total Evap VOC (tons)	88.5	4.50E+01	1.38E+01	4.10E-01	2.61E+01	6.71E-01	0.00E+00	0.00E+00	5.95E-02	1.54E-01	0.00E+00	8.87E-02	4.21E-03
Chemical Name													
1,3-Butadiene	3.427	1.65E+00	1.04E+00	5.60E-01	4.72E-02	2.69E-02	1.51E-02	1.07E-02	4.34E-03	3.83E-03	5.36E-03	2.60E-03	5.67E-03
Acetaldehyde	5.185	1.27E+00	8.00E-01	4.32E-01	2.03E-01	2.08E-02	6.03E-01	4.26E-01	1.87E-02	1.65E-02	2.14E-01	1.12E-02	4.38E-03
Acrolein	0.873	2.30E-01	1.45E-01	7.82E-02	3.47E-02	3.76E-03	9.34E-02	6.59E-02	3.19E-03	2.82E-03	3.31E-02	1.91E-03	7.91E-04
Benzene (including benzene from gasoline)	45.163	2.03E+01	1.24E+01	6.57E+00	3.18E+00	3.30E-01	1.65E-01	1.16E-01	2.41E-01	2.15E-01	5.85E-02	1.45E-01	6.65E-02
Chromium Chomponds	0.007	2.66E-03	1.31E-03	9.70E-04	3.84E-05	1.78E-05	2.92E-04	3.00E-04	1.84E-06	1.88E-06	1.40E-04	1.15E-06	5.51E-06
Ethyl benzene	39.071	1.87E+01	1.17E+01	6.26E+00	1.18E+00	3.06E-01	2.52E-02	1.78E-02	9.07E-02	8.09E-02	8.94E-03	5.47E-02	6.33E-02
Formaldehyde	9.479	1.94E+00	1.22E+00	6.62E-01	5.80E-01	3.18E-02	1.22E+00	8.59E-01	5.33E-02	4.71E-02	4.32E-01	3.19E-02	6.70E-03
Hexane	24.643	1.19E+01	7.17E+00	3.71E+00	1.10E+00	1.93E-01	1.29E-02	9.11E-03	4.66E-02	4.35E-02	4.58E-03	2.92E-02	3.75E-02
Manganese Compounds	0.012	5.32E-03	2.62E-03	1.94E-03	7.68E-05	3.57E-05	2.92E-04	3.00E-04	3.68E-06	3.75E-06	1.40E-04	2.31E-06	1.10E-05
Mercury Compounds	0.001	4.44E-04	2.18E-04	1.62E-04	6.40E-06	2.97E-06	8.34E-05	8.57E-05	3.07E-07	3.13E-07	4.01E-05	1.92E-07	9.18E-07
Nickel Compounds	0.007	3.11E-03	1.53E-03	1.13E-03	4.48E-05	2.08E-05	1.25E-04	1.29E-04	2.15E-06	2.19E-06	6.01E-05	1.35E-06	6.43E-06
Polycyclic Organic Matter	0.027	1.27E-02	8.00E-03	4.32E-03	7.49E-04	2.08E-04	1.45E-05	1.03E-05	6.88E-05	6.08E-05	5.16E-06	4.12E-05	4.38E-05
Propionaldehyde	0.829	1.89E-01	1.19E-01	6.44E-02	9.32E-02	3.09E-03	8.00E-02	5.64E-02	8.57E-03	7.57E-03	2.84E-02	5.13E-03	6.51E-04
Styrene	2.069	9.95E-01	6.27E-01	3.39E-01	3.76E-02	1.63E-02	4.82E-03	3.40E-03	3.45E-03	3.05E-03	1.71E-03	2.07E-03	3.43E-03
Toluene	159.502	7.67E+01	4.77E+01	2.55E+01	4.64E+00	1.25E+00	1.22E-01	8.59E-02	3.30E-01	2.95E-01	4.32E-02	2.00E-01	2.58E-01
Xylenes (isomers and mixture)	171.495	8.29E+01	5.19E+01	2.79E+01	3.94E+00	1.35E+00	8.61E-02	6.07E-02	3.10E-01	2.76E-01	3.06E-02	1.87E-01	2.82E-01

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Juneau NONROAD Emissions - Summer 19

SCC		2260004020	2265001030	2270002072	2270002060	2270002036	2260002054	2260004030	2265004071	2265006030	2260004026	2260001020	2265007015
Equipment Name	Summer TOTAL (tons)	Chain Saws < 6 HP (res)	All Terrain Vehicles/Mot orcycles	Skid Steer Loaders	Rubber Tire Loaders	Excavators	Concrete/Ind ustrial Saws	Leafblowers/ Vacuums (res)	Commercial Turf Equipment (com)	Pressure Washers	Trimmers/Edg ers/Brush Cutter (com)	Snowmobiles	Shredders > 6 HP
Tech Type		2-St	4-St	Dsl	Dsl	Dsl	2-St	2-St	4-St	4-St	2-St	2-St	4-St
Equipment Population		524.0	1,576.9	49.3	24.9	16.1	8.0	678.4	21.4	135.8	42.2	368.5	306.1
Activity (hrs/season)		5,953.6	36,919.9	26,856.4	12,632.1	11,714.4	3,215.0	4,889.3	10,541.1	7,805.9	4,164.8	-	7,741.8
Activity (hrs/season/unit)		11.36	23.41	544.51	506.57	726.90	401.02	7.21	491.53	57.50	98.74	-	25.29
Exhaust PM (tons)	105.7	1.08E-01	1.54E-02	1.45E+00	1.39E+00	1.07E+00	1.01E-01	5.96E-02	1.28E-02	1.06E-02	5.48E-02	0.00E+00	8.20E-03
TOTAL VOC (tons)	1,728.5	2.35E+00	2.25E+00	2.19E+00	2.06E+00	1.84E+00	1.69E+00	1.68E+00	1.34E+00	1.32E+00	1.29E+00	1.26E+00	1.22E+00
Total Exhaust VOC (tons)	1,640.0	2.35E+00	1.66E+00	2.19E+00	2.06E+00	1.84E+00	1.69E+00	1.68E+00	1.34E+00	1.29E+00	1.29E+00	0.00E+00	1.16E+00
Exh VOC	1,637.3	2.35E+00	1.32E+00	2.15E+00	2.02E+00	1.80E+00	1.69E+00	1.68E+00	1.30E+00	1.21E+00	1.29E+00	0.00E+00	9.39E-01
Crankcase VOC	2.7	0.00E+00	3.44E-01	4.29E-02	4.04E-02	3.60E-02	0.00E+00	0.00E+00	4.19E-02	7.96E-02	0.00E+00	0.00E+00	2.20E-01
Total Evap VOC (tons)	88.5	2.89E-03	5.85E-01	0.00E+00	0.00E+00	0.00E+00	8.25E-04	2.36E-03	4.61E-03	2.34E-02	1.64E-04	1.26E+00	6.04E-02
Chemical Name													
1,3-Butadiene	3.427	5.06E-03	1.58E-03	4.07E-03	3.83E-03	3.41E-03	3.64E-03	3.61E-03	1.27E-03	1.23E-03	2.77E-03	0.00E+00	1.10E-03
Acetaldehyde	5.185	3.90E-03	6.82E-03	1.63E-01	1.53E-01	1.36E-01	2.81E-03	2.79E-03	5.49E-03	5.30E-03	2.14E-03	0.00E+00	4.75E-03
Acrolein	0.873	7.06E-04	1.17E-03	2.52E-02	2.37E-02	2.11E-02	5.08E-04	5.04E-04	9.37E-04	9.05E-04	3.86E-04	0.00E+00	8.11E-04
Benzene (including benzene from gasoline)	45.163	5.93E-02	1.00E-01	4.44E-02	4.18E-02	3.73E-02	4.27E-02	4.24E-02	7.04E-02	6.84E-02	3.24E-02	2.78E-02	6.22E-02
Chromium Chompounds	0.007	6.47E-06	9.27E-07	1.02E-04	9.75E-05	7.50E-05	6.03E-06	3.58E-06	7.66E-07	6.35E-07	3.29E-06	0.00E+00	4.92E-07
Ethyl benzene	39.071	5.65E-02	3.75E-02	6.78E-03	6.38E-03	5.69E-03	4.06E-02	4.04E-02	2.66E-02	2.58E-02	3.09E-02	9.74E-03	2.34E-02
Formaldehyde	9.479	5.97E-03	1.95E-02	3.28E-01	3.09E-01	2.75E-01	4.30E-03	4.27E-03	1.57E-02	1.51E-02	3.27E-03	0.00E+00	1.36E-02
Hexane	24.643	3.35E-02	3.02E-02	3.48E-03	3.27E-03	2.92E-03	2.41E-02	2.39E-02	1.34E-02	1.34E-02	1.83E-02	2.96E-02	1.29E-02
Manganese Compounds	0.012	1.29E-05	1.85E-06	1.02E-04	9.75E-05	7.50E-05	1.21E-05	7.16E-06	1.53E-06	1.27E-06	6.58E-06	0.00E+00	9.84E-07
Mercury Compounds	0.001	1.08E-06	1.54E-07	2.91E-05	2.79E-05	2.14E-05	1.01E-06	5.96E-07	1.28E-07	1.06E-07	5.48E-07	0.00E+00	8.20E-08
Nickel Compounds	0.007	7.55E-06	1.08E-06	4.36E-05	4.18E-05	3.21E-05	7.04E-06	4.18E-06	8.94E-07	7.41E-07	3.84E-06	0.00E+00	5.74E-07
Polycyclic Organic Matter	0.027	3.90E-05	2.51E-05	3.92E-06	3.69E-06	3.29E-06	2.81E-05	2.79E-05	2.02E-05	1.95E-05	2.14E-05	0.00E+00	1.75E-05
Propionaldehyde	0.829	5.81E-04	3.13E-03	2.16E-02	2.03E-02	1.81E-02	4.18E-04	4.15E-04	2.52E-03	2.43E-03	3.18E-04	0.00E+00	2.18E-03
Styrene	2.069	3.06E-03	1.26E-03	1.30E-03	1.22E-03	1.09E-03	2.20E-03	2.19E-03	1.02E-03	9.80E-04	1.67E-03	0.00E+00	8.78E-04
Toluene	159.502	2.30E-01	1.44E-01	3.28E-02	3.09E-02	2.75E-02	1.66E-01	1.65E-01	9.63E-02	9.38E-02	1.26E-01	5.22E-02	8.57E-02
Xylenes (isomers and mixture)	171.495	2.52E-01	1.26E-01	2.32E-02	2.18E-02	1.95E-02	1.81E-01	1.80E-01	9.09E-02	8.82E-02	1.38E-01	2.82E-02	7.99E-02

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Juneau NONROAD Emissions - Summer 19

SCC		2260004031	2265003020	2270002069	2270003060	2260006010	2265001060	2265006010	2270002057	2260001060	2260002006	2270002051
Equipment Name	Summer TOTAL (tons)	Leafblowers/Vacuums (com)	Forklifts	Crawler Tractor/Dozers	AC/Refrigeration	Pumps	Specialty Vehicle Carts	Pumps	Rough Terrain Forklift	Specialty Vehicle Carts	Tampers/Rammers	Off-highway Trucks
Tech Type		2-St	4-St	Dsl	Dsl	2-St	4-St	4-St	Dsl	2-St	2-St	Dsl
Equipment Population		16.4	13.5	24.3	69.7	30.3	64.0	50.8	13.4	162.9	18.3	2.2
Activity (hrs/season)		3,331.2	12,315.5	15,114.3	51,329.6	3,344.8	2,865.0	5,618.5	5,905.5	7,292.4	1,953.0	2,362.6
Activity (hrs/season/unit)		203.24	914.45	623.06	736.95	110.50	44.76	110.50	440.67	44.76	106.51	1,092.35
Exhaust PM (tons)	105.7	5.86E-02	2.50E-02	1.01E+00	1.08E+00	3.62E-02	5.59E-03	6.21E-03	4.93E-01	6.20E-03	3.97E-02	4.73E-01
TOTAL VOC (tons)	1,728.5	1.21E+00	1.17E+00	1.12E+00	9.41E-01	9.17E-01	7.98E-01	7.47E-01	6.89E-01	6.59E-01	6.52E-01	6.31E-01
Total Exhaust VOC (tons)	1,640.0	1.21E+00	1.16E+00	1.12E+00	9.41E-01	9.16E-01	7.63E-01	7.36E-01	6.89E-01	6.25E-01	6.51E-01	6.31E-01
Exh VOC	1,637.3	1.21E+00	8.77E-01	1.10E+00	9.22E-01	9.16E-01	6.02E-01	7.05E-01	6.75E-01	6.25E-01	6.51E-01	6.18E-01
Crankcase VOC	2.7	0.00E+00	2.87E-01	2.19E-02	1.84E-02	0.00E+00	1.61E-01	3.05E-02	1.35E-02	0.00E+00	0.00E+00	1.24E-02
Total Evap VOC (tons)	88.5	8.18E-05	2.48E-03	0.00E+00	0.00E+00	1.27E-03	3.46E-02	1.14E-02	0.00E+00	3.37E-02	1.76E-03	0.00E+00
Chemical Name												
1,3-Butadiene	3.427	2.61E-03	1.11E-03	2.08E-03	1.75E-03	1.97E-03	7.26E-04	7.01E-04	1.28E-03	1.34E-03	1.40E-03	1.17E-03
Acetaldehyde	5.185	2.02E-03	4.77E-03	8.31E-02	6.99E-02	1.52E-03	3.13E-03	3.02E-03	5.12E-02	1.04E-03	1.08E-03	4.69E-02
Acrolein	0.873	3.64E-04	8.15E-04	1.29E-02	1.08E-02	2.75E-04	5.34E-04	5.15E-04	7.92E-03	1.88E-04	1.95E-04	7.25E-03
Benzene (including benzene from gasoline)	45.163	3.06E-02	6.12E-02	2.27E-02	1.91E-02	2.31E-02	4.08E-02	3.89E-02	1.40E-02	1.65E-02	1.64E-02	1.28E-02
Chromium Compounds	0.007	3.52E-06	1.50E-06	7.06E-05	7.56E-05	2.17E-06	3.35E-07	3.73E-07	3.45E-05	3.72E-07	2.38E-06	3.31E-05
Ethyl benzene	39.071	2.91E-02	2.31E-02	3.47E-03	2.92E-03	2.20E-02	1.54E-02	1.47E-02	2.14E-03	1.53E-02	1.56E-02	1.96E-03
Formaldehyde	9.479	3.08E-03	1.36E-02	1.68E-01	1.41E-01	2.33E-03	8.93E-03	8.61E-03	1.03E-01	1.59E-03	1.65E-03	9.46E-02
Hexane	24.643	1.72E-02	1.16E-02	1.78E-03	1.50E-03	1.30E-02	8.38E-03	7.57E-03	1.10E-03	9.66E-03	9.28E-03	1.00E-03
Manganese Compounds	0.012	7.03E-06	3.00E-06	7.06E-05	7.56E-05	4.35E-06	6.71E-07	7.45E-07	3.45E-05	7.44E-07	4.77E-06	3.31E-05
Mercury Compounds	0.001	5.86E-07	2.50E-07	2.02E-05	2.16E-05	3.62E-07	5.59E-08	6.21E-08	9.86E-06	6.20E-08	3.97E-07	9.45E-06
Nickel Compounds	0.007	4.10E-06	1.75E-06	3.03E-05	3.24E-05	2.54E-06	3.91E-07	4.35E-07	1.48E-05	4.34E-07	2.78E-06	1.42E-05
Polycyclic Organic Matter	0.027	2.02E-05	1.76E-05	2.00E-06	1.68E-06	1.52E-05	1.15E-05	1.11E-05	1.23E-06	1.04E-05	1.08E-05	1.13E-06
Propionaldehyde	0.829	3.00E-04	2.19E-03	1.10E-02	9.26E-03	2.26E-04	1.43E-03	1.38E-03	6.79E-03	1.54E-04	1.61E-04	6.21E-03
Styrene	2.069	1.58E-03	8.82E-04	6.64E-04	5.59E-04	1.19E-03	5.78E-04	5.58E-04	4.09E-04	8.13E-04	8.46E-04	3.75E-04
Toluene	159.502	1.19E-01	8.37E-02	1.68E-02	1.41E-02	8.97E-02	5.62E-02	5.33E-02	1.03E-02	6.25E-02	6.37E-02	9.46E-03
Xylenes (isomers and mixture)	171.495	1.30E-01	7.90E-02	1.19E-02	9.97E-03	9.81E-02	5.25E-02	5.02E-02	7.30E-03	6.76E-02	6.96E-02	6.69E-03

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SCC		2265006025	2270002045	2265004011	2265004016	2270002075	2270002048	2270008005	2265004015	2270001060	2265004075	2265004056	2265006015
Equipment Name	Summer TOTAL (tons)	Welders	Cranes	Lawn mowers (Com)	Rotary Tillers < 6 HP (com)	Off-Highway Tractors	Graders	Airport Support Equipment	Rotary Tillers < 6 HP (res)	Specialty Vehicle Carts	Other Lawn & Garden Eqp. (res)	Lawn & Garden Tractors (com)	Air Compressors
Tech Type		4-St	Dsl	4-St	4-St	Dsl	Dsl	Dsl	4-St	Dsl	4-St	4-St	4-St
Equipment Population		15.5	11.3	35.1	11.1	3.6	10.1	8.7	279.2	5.7	57.0	7.3	11.0
Activity (hrs/season)		3,169.5	7,462.1	10,283.1	3,770.8	2,051.6	6,436.3	3,195.5	3,421.0	1,695.4	2,504.9	3,808.7	2,656.7
Activity (hrs/season/unit)		204.00	659.01	292.61	340.18	569.14	640.37	366.00	12.25	299.55	43.96	519.64	242.00
Exhaust PM (tons)	105.7	6.08E-03	4.40E-01	3.99E-03	5.98E-03	3.27E-01	3.72E-01	2.89E-01	1.19E-03	2.44E-01	4.62E-03	3.63E-03	3.32E-03
TOTAL VOC (tons)	1,728.5	5.73E-01	5.60E-01	5.18E-01	4.56E-01	4.49E-01	4.32E-01	4.12E-01	3.95E-01	3.77E-01	3.58E-01	3.58E-01	3.50E-01
Total Exhaust VOC (tons)	1,640.0	5.65E-01	5.60E-01	5.17E-01	4.56E-01	4.49E-01	4.32E-01	4.12E-01	3.89E-01	3.77E-01	3.56E-01	3.57E-01	3.45E-01
Exh VOC	1,637.3	5.29E-01	5.49E-01	5.16E-01	4.44E-01	4.40E-01	4.24E-01	4.04E-01	3.72E-01	3.69E-01	3.45E-01	3.53E-01	3.16E-01
Crankcase VOC	2.7	3.57E-02	1.10E-02	1.46E-03	1.12E-02	8.81E-03	8.48E-03	8.07E-03	1.74E-02	7.39E-03	1.17E-02	3.81E-03	2.91E-02
Total Evap VOC (tons)	88.5	8.08E-03	0.00E+00	6.59E-04	2.41E-04	0.00E+00	0.00E+00	0.00E+00	6.06E-03	0.00E+00	1.41E-03	9.77E-04	4.85E-03
Chemical Name													
1,3-Butadiene	3.427	5.38E-04	1.04E-03	4.93E-04	4.34E-04	8.35E-04	8.04E-04	7.66E-04	3.71E-04	7.01E-04	3.39E-04	3.40E-04	3.28E-04
Acetaldehyde	5.185	2.32E-03	4.16E-02	2.12E-03	1.87E-03	3.34E-02	3.21E-02	3.06E-02	1.60E-03	2.80E-02	1.46E-03	1.46E-03	1.41E-03
Acrolein	0.873	3.95E-04	6.44E-03	3.62E-04	3.19E-04	5.16E-03	4.97E-03	4.73E-03	2.73E-04	4.33E-03	2.50E-04	2.50E-04	2.41E-04
Benzene (including benzene from gasoline)	45.163	2.98E-02	1.14E-02	2.72E-02	2.39E-02	9.12E-03	8.78E-03	8.36E-03	2.06E-02	7.65E-03	1.87E-02	1.88E-02	1.82E-02
Chromium Compounds	0.007	3.65E-07	3.08E-05	2.40E-07	3.59E-07	2.29E-05	2.61E-05	2.02E-05	7.15E-08	1.71E-05	2.77E-07	2.18E-07	1.99E-07
Ethyl benzene	39.071	1.12E-02	1.74E-03	1.02E-02	9.03E-03	1.39E-03	1.34E-03	1.28E-03	7.76E-03	1.17E-03	7.07E-03	7.07E-03	6.86E-03
Formaldehyde	9.479	6.61E-03	8.40E-02	6.05E-03	5.33E-03	6.74E-02	6.49E-02	6.18E-02	4.56E-03	5.65E-02	4.17E-03	4.17E-03	4.03E-03
Hexane	24.643	5.79E-03	8.91E-04	5.15E-03	4.53E-03	7.14E-04	6.87E-04	6.55E-04	4.00E-03	5.99E-04	3.57E-03	3.56E-03	3.53E-03
Manganese Compounds	0.012	7.29E-07	3.08E-05	4.79E-07	7.18E-07	2.29E-05	2.61E-05	2.02E-05	1.43E-07	1.71E-05	5.54E-07	4.36E-07	3.99E-07
Mercury Compounds	0.001	6.08E-08	8.81E-06	3.99E-08	5.98E-08	6.54E-06	7.45E-06	5.78E-06	1.19E-08	4.88E-06	4.62E-08	3.63E-08	3.32E-08
Nickel Compounds	0.007	4.26E-07	1.32E-05	2.80E-07	4.19E-07	9.82E-06	1.12E-05	8.67E-06	8.34E-08	7.32E-06	3.23E-07	2.54E-07	2.33E-07
Polycyclic Organic Matter	0.027	8.53E-06	1.00E-06	7.81E-06	6.88E-06	8.04E-07	7.74E-07	7.37E-07	5.88E-06	6.74E-07	5.38E-06	5.39E-06	5.20E-06
Propionaldehyde	0.829	1.06E-03	5.52E-03	9.73E-04	8.57E-04	4.42E-03	4.26E-03	4.06E-03	7.32E-04	3.71E-03	6.70E-04	6.71E-04	6.48E-04
Styrene	2.069	4.28E-04	3.33E-04	3.92E-04	3.45E-04	2.67E-04	2.57E-04	2.45E-04	2.95E-04	2.24E-04	2.70E-04	2.70E-04	2.61E-04
Toluene	159.502	4.09E-02	8.40E-03	3.72E-02	3.27E-02	6.74E-03	6.49E-03	6.18E-03	2.82E-02	5.65E-03	2.57E-02	2.57E-02	2.49E-02
Xylenes (isomers and mixture)	171.495	3.85E-02	5.94E-03	3.51E-02	3.09E-02	4.76E-03	4.58E-03	4.36E-03	2.65E-02	3.99E-03	2.42E-02	2.42E-02	2.35E-02

Table C-4-6f
Juneau NONROAD Emissions - Summer 19

SCC		2270002015	2270002018	2265004040	2270006005	2265004031	2265002042	2270006025	2265002039	2270002030	2270004071	2270006015	2265002021
Equipment Name	Summer TOTAL (tons)	Rollers	Scrapers	Rear Engine Riding Mowers (res)	Generator Sets	Leafblowers/Vacuums (com)	Cement & Mortar Mixers	Welders	Concrete/Industrial Saws	Trenchers	Commercial Turf Equipment (com)	Air Compressors	Paving Equipment
Tech Type		Dsl	Dsl	4-St	Dsl	4-St	4-St	Dsl	4-St	Dsl	Dsl	Dsl	4-St
Equipment Population		13.2	3.7	169.2	28.0	8.0	28.7	13.3	4.6	9.4	9.6	9.9	12.5
Activity (hrs/season)		6,694.0	2,244.8	4,390.0	4,724.3	1,622.4	1,602.3	4,269.7	1,854.2	3,716.4	7,427.2	4,030.5	1,456.1
Activity (hrs/season/unit)		505.90	608.42	25.95	169.00	203.24	55.92	321.50	406.05	394.74	769.73	407.50	116.49
Exhaust PM (tons)	105.7	3.04E-01	2.46E-01	2.29E-03	2.17E-01	2.31E-03	2.11E-03	1.63E-01	2.48E-03	1.94E-01	1.73E-01	1.63E-01	1.55E-03
TOTAL VOC (tons)	1,728.5	3.02E-01	2.92E-01	2.91E-01	2.83E-01	2.40E-01	2.32E-01	2.28E-01	2.26E-01	2.23E-01	2.13E-01	2.00E-01	1.91E-01
Total Exhaust VOC (tons)	1,640.0	3.02E-01	2.92E-01	2.83E-01	2.83E-01	2.40E-01	2.27E-01	2.28E-01	2.25E-01	2.23E-01	2.13E-01	2.00E-01	1.89E-01
Exh VOC	1,637.3	2.96E-01	2.86E-01	2.72E-01	2.77E-01	2.25E-01	1.95E-01	2.23E-01	2.16E-01	2.18E-01	2.09E-01	1.96E-01	1.72E-01
Crankcase VOC	2.7	5.91E-03	5.73E-03	1.10E-02	5.54E-03	1.49E-02	3.19E-02	4.47E-03	8.50E-03	4.37E-03	4.17E-03	3.92E-03	1.65E-02
Total Evap VOC (tons)	88.5	0.00E+00	0.00E+00	8.31E-03	0.00E+00	2.90E-04	4.93E-03	0.00E+00	1.40E-03	0.00E+00	0.00E+00	0.00E+00	2.77E-03
Chemical Name													
1,3-Butadiene	3.427	5.61E-04	5.43E-04	2.69E-04	5.26E-04	2.29E-04	2.16E-04	4.24E-04	2.14E-04	4.14E-04	3.96E-04	3.72E-04	1.80E-04
Acetaldehyde	5.185	2.24E-02	2.17E-02	1.16E-03	2.10E-02	9.85E-04	9.32E-04	1.69E-02	9.21E-04	1.65E-02	1.58E-02	1.49E-02	7.73E-04
Acrolein	0.873	3.47E-03	3.36E-03	1.98E-04	3.25E-03	1.68E-04	1.59E-04	2.62E-03	1.57E-04	2.56E-03	2.45E-03	2.30E-03	1.32E-04
Benzene (including benzene from gasoline)	45.163	6.12E-03	5.93E-03	1.50E-02	5.74E-03	1.26E-02	1.20E-02	4.62E-03	1.18E-02	4.52E-03	4.32E-03	4.06E-03	9.96E-03
Chromium Compounds	0.007	2.13E-05	1.72E-05	1.37E-07	1.52E-05	1.38E-07	1.26E-07	1.14E-05	1.49E-07	1.36E-05	1.21E-05	1.14E-05	9.29E-08
Ethyl benzene	39.071	9.35E-04	9.06E-04	5.66E-03	8.76E-04	4.76E-03	4.54E-03	7.06E-04	4.46E-03	6.90E-04	6.60E-04	6.20E-04	3.75E-03
Formaldehyde	9.479	4.52E-02	4.38E-02	3.31E-03	4.24E-02	2.81E-03	2.66E-03	3.42E-02	2.63E-03	3.34E-02	3.19E-02	3.00E-02	2.21E-03
Hexane	24.643	4.80E-04	4.64E-04	3.00E-03	4.49E-04	2.39E-03	2.37E-03	3.62E-04	2.26E-03	3.54E-04	3.38E-04	3.18E-04	1.94E-03
Manganese Compounds	0.012	2.13E-05	1.72E-05	2.75E-07	1.52E-05	2.77E-07	2.53E-07	1.14E-05	2.97E-07	1.36E-05	1.21E-05	1.14E-05	1.86E-07
Mercury Compounds	0.001	6.08E-06	4.92E-06	2.29E-08	4.34E-06	2.31E-08	2.11E-08	3.27E-06	2.48E-08	3.88E-06	3.47E-06	3.25E-06	1.55E-08
Nickel Compounds	0.007	9.12E-06	7.38E-06	1.60E-07	6.51E-06	1.62E-07	1.47E-07	4.90E-06	1.74E-07	5.82E-06	5.20E-06	4.88E-06	1.08E-07
Polycyclic Organic Matter	0.027	5.40E-07	5.23E-07	4.27E-06	5.06E-07	3.63E-06	3.43E-06	4.08E-07	3.39E-06	3.98E-07	3.81E-07	3.58E-07	2.85E-06
Propionaldehyde	0.829	2.97E-03	2.88E-03	5.32E-04	2.78E-03	4.51E-04	4.27E-04	2.24E-03	4.22E-04	2.19E-03	2.10E-03	1.97E-03	3.54E-04
Styrene	2.069	1.79E-04	1.74E-04	2.14E-04	1.68E-04	1.82E-04	1.72E-04	1.35E-04	1.70E-04	1.32E-04	1.26E-04	1.19E-04	1.43E-04
Toluene	159.502	4.52E-03	4.38E-03	2.06E-02	4.24E-03	1.73E-02	1.65E-02	3.42E-03	1.62E-02	3.34E-03	3.19E-03	3.00E-03	1.37E-02
Xylenes (isomers and mixture)	171.495	3.20E-03	3.10E-03	1.94E-02	3.00E-03	1.63E-02	1.55E-02	2.41E-03	1.53E-02	2.36E-03	2.26E-03	2.12E-03	1.28E-02

Table C-4-6f
Juneau NONROAD Emissions - Summer 19

SCC		2270003020	2265008005	2260004016	2265002030	2260004015	2260006005	2265002009	2270002033	2270006010	2270002003	2265004035	2265004076
Equipment Name	Summer TOTAL (tons)	Forklifts	Airport Support Equipment	Rotary Tillers < 6 HP (com)	Trenchers	Rotary Tillers < 6 HP (res)	Generator Sets	Plate Compactors	Bore/Drill Rigs	Pumps	Pavers	Snowblowers (res)	Other Lawn & Garden Equip. (com)
Tech Type		Dsl	4-St	2-St	4-St	2-St	2-St	4-St	Dsl	Dsl	Dsl	4-St	4-St
Equipment Population		3.7	2.4	1.8	3.9	44.9	8.8	11.9	2.8	12.7	3.8	857.6	16.2
Activity (hrs/season)		3,493.0	1,637.4	615.6	1,035.4	550.2	507.9	1,317.5	855.1	2,563.8	2,062.8	-	710.1
Activity (hrs/season/unit)		934.23	690.00	340.18	267.60	12.25	57.50	110.50	310.20	201.50	546.51	-	43.96
Exhaust PM (tons)	105.7	1.53E-01	2.68E-03	5.50E-03	1.47E-03	4.87E-03	5.53E-03	1.08E-03	1.01E-01	9.81E-02	9.99E-02	0.00E+00	1.31E-03
TOTAL VOC (tons)	1,728.5	1.80E-01	1.61E-01	1.56E-01	1.52E-01	1.45E-01	1.36E-01	1.34E-01	1.23E-01	1.20E-01	1.08E-01	1.05E-01	1.01E-01
Total Exhaust VOC (tons)	1,640.0	1.80E-01	1.59E-01	1.56E-01	1.50E-01	1.45E-01	1.36E-01	1.33E-01	1.23E-01	1.20E-01	1.08E-01	0.00E+00	1.01E-01
Exh VOC	1,637.3	1.76E-01	1.26E-01	1.56E-01	1.40E-01	1.45E-01	1.36E-01	1.27E-01	1.20E-01	1.18E-01	1.06E-01	0.00E+00	9.77E-02
Crankcase VOC	2.7	3.53E-03	3.36E-02	0.00E+00	1.05E-02	0.00E+00	0.00E+00	6.05E-03	2.40E-03	2.36E-03	2.12E-03	0.00E+00	3.32E-03
Total Evap VOC (tons)	88.5	0.00E+00	1.12E-03	2.14E-05	1.53E-03	5.32E-04	3.68E-04	1.54E-03	0.00E+00	0.00E+00	0.00E+00	1.05E-01	3.99E-04
Chemical Name													
1,3-Butadiene	3.427	3.34E-04	1.52E-04	3.36E-04	1.43E-04	3.11E-04	2.91E-04	1.26E-04	2.28E-04	2.24E-04	2.01E-04	0.00E+00	9.61E-05
Acetaldehyde	5.185	1.34E-02	6.54E-04	2.59E-04	6.17E-04	2.40E-04	2.25E-04	5.44E-04	9.11E-03	8.94E-03	8.02E-03	0.00E+00	4.14E-04
Acrolein	0.873	2.07E-03	1.12E-04	4.68E-05	1.05E-04	4.35E-05	4.07E-05	9.28E-05	1.41E-03	1.38E-03	1.24E-03	0.00E+00	7.07E-05
Benzene (including benzene from gasoline)	45.163	3.65E-03	8.40E-03	3.93E-03	7.93E-03	3.66E-03	3.42E-03	7.00E-03	2.49E-03	2.44E-03	2.19E-03	2.31E-03	5.31E-03
Chromium Compounds	0.007	1.07E-05	1.61E-07	3.30E-07	8.85E-08	2.92E-07	3.32E-07	6.48E-08	7.08E-06	6.87E-06	6.99E-06	0.00E+00	7.85E-08
Ethyl benzene	39.071	5.57E-04	3.17E-03	3.75E-03	2.99E-03	3.48E-03	3.26E-03	2.64E-03	3.80E-04	3.73E-04	3.35E-04	8.10E-04	2.00E-03
Formaldehyde	9.479	2.70E-02	1.87E-03	3.97E-04	1.76E-03	3.68E-04	3.44E-04	1.55E-03	1.84E-02	1.80E-02	1.62E-02	0.00E+00	1.18E-03
Hexane	24.643	2.86E-04	1.61E-03	2.22E-03	1.53E-03	2.07E-03	1.93E-03	1.35E-03	1.95E-04	1.91E-04	1.72E-04	2.46E-03	1.01E-03
Manganese Compounds	0.012	1.07E-05	3.22E-07	6.60E-07	1.77E-07	5.84E-07	6.64E-07	1.30E-07	7.08E-06	6.87E-06	6.99E-06	0.00E+00	1.57E-07
Mercury Compounds	0.001	3.06E-06	2.68E-08	5.50E-08	1.47E-08	4.87E-08	5.53E-08	1.08E-08	2.02E-06	1.96E-06	2.00E-06	0.00E+00	1.31E-08
Nickel Compounds	0.007	4.59E-06	1.88E-07	3.85E-07	1.03E-07	3.41E-07	3.87E-07	7.56E-08	3.04E-06	2.94E-06	3.00E-06	0.00E+00	9.16E-08
Polycyclic Organic Matter	0.027	3.22E-07	2.41E-06	2.59E-06	2.27E-06	2.40E-06	2.25E-06	2.00E-06	2.20E-07	2.15E-07	1.93E-07	0.00E+00	1.53E-06
Propionaldehyde	0.829	1.77E-03	3.00E-04	3.86E-05	2.83E-04	3.58E-05	3.35E-05	2.49E-04	1.21E-03	1.18E-03	1.06E-03	0.00E+00	1.90E-04
Styrene	2.069	1.07E-04	1.21E-04	2.03E-04	1.14E-04	1.88E-04	1.76E-04	1.01E-04	7.28E-05	7.14E-05	6.41E-05	0.00E+00	7.66E-05
Toluene	159.502	2.70E-03	1.15E-02	1.53E-02	1.09E-02	1.42E-02	1.33E-02	9.59E-03	1.84E-03	1.80E-03	1.62E-03	4.34E-03	7.27E-03
Xylenes (isomers and mixture)	171.495	1.91E-03	1.08E-02	1.67E-02	1.02E-02	1.55E-02	1.45E-02	9.03E-03	1.30E-03	1.27E-03	1.14E-03	2.35E-03	6.86E-03

Table C-4-6f
Juneau NONROAD Emissions - Summer 19

SCC		2270002021	2265003040	2265002033	2265002072	2270003030	2265003010	2265002066	2265002015	2270002054	2270002027	2265002024	2265004066
Equipment Name	Summer TOTAL (tons)	Paving Equipment	Other General Industrial Eq	Bore/Drill Rigs	Skid Steer Loaders	Sweepers/Scrubbers	Aerial Lifts	Tractors/Loaders/Backhoes	Rollers	Crushing/Proc. Equipment	Signal Boards/Light Plants	Surfacing Equipment	Chippers/Stump Grinders (com)
Tech Type		Dsl	4-St	4-St	4-St	Dsl	4-St	4-St	4-St	Dsl	Dsl	4-St	4-St
Equipment Population		4.7	2.7	12.3	1.7	1.1	1.7	0.9	1.2	1.2	8.0	2.3	0.6
Activity (hrs/season)		1,966.6	1,053.3	875.8	341.4	768.2	331.5	547.6	510.6	754.9	2,839.4	734.6	222.8
Activity (hrs/season/unit)		414.04	391.83	71.23	206.36	670.45	198.39	579.13	413.38	635.71	356.13	324.84	351.71
Exhaust PM (tons)	105.7	9.93E-02	7.73E-04	7.56E-04	8.19E-04	5.18E-02	7.23E-04	7.72E-04	7.56E-04	4.94E-02	6.31E-02	5.87E-04	6.60E-04
TOTAL VOC (tons)	1,728.5	9.71E-02	9.40E-02	8.83E-02	8.47E-02	8.21E-02	7.19E-02	7.09E-02	6.97E-02	6.84E-02	6.72E-02	6.15E-02	6.12E-02
Total Exhaust VOC (tons)	1,640.0	9.71E-02	9.36E-02	8.67E-02	8.28E-02	8.21E-02	6.97E-02	7.05E-02	6.91E-02	6.84E-02	6.72E-02	6.11E-02	6.06E-02
Exh VOC	1,637.3	9.52E-02	9.35E-02	8.03E-02	6.67E-02	8.05E-02	5.49E-02	7.01E-02	6.35E-02	6.70E-02	6.59E-02	6.06E-02	5.32E-02
Crankcase VOC	2.7	1.90E-03	1.05E-04	6.35E-03	1.62E-02	1.61E-03	1.48E-02	4.15E-04	5.61E-03	1.34E-03	1.32E-03	4.70E-04	7.42E-03
Total Evap VOC (tons)	88.5	0.00E+00	3.98E-04	1.57E-03	1.91E-03	0.00E+00	2.21E-03	4.08E-04	6.06E-04	0.00E+00	0.00E+00	4.84E-04	5.65E-04
Chemical Name													
1,3-Butadiene	3.427	1.81E-04	8.91E-05	8.25E-05	7.89E-05	1.53E-04	6.63E-05	6.71E-05	6.58E-05	1.27E-04	1.25E-04	5.81E-05	5.77E-05
Acetaldehyde	5.185	7.21E-03	3.84E-04	3.55E-04	3.40E-04	6.10E-03	2.86E-04	2.89E-04	2.83E-04	5.08E-03	5.00E-03	2.50E-04	2.48E-04
Acrolein	0.873	1.12E-03	6.55E-05	6.07E-05	5.80E-05	9.44E-04	4.88E-05	4.93E-05	4.84E-05	7.86E-04	7.73E-04	4.27E-05	4.24E-05
Benzene (including benzene from gasoline)	45.163	1.97E-03	4.92E-03	4.59E-03	4.39E-03	1.67E-03	3.71E-03	3.71E-03	3.64E-03	1.39E-03	1.36E-03	3.22E-03	3.19E-03
Chromium Compounds	0.007	6.95E-06	4.64E-08	4.53E-08	4.91E-08	3.62E-06	4.34E-08	4.63E-08	4.54E-08	3.46E-06	4.42E-06	3.52E-08	3.96E-08
Ethyl benzene	39.071	3.01E-04	1.86E-03	1.73E-03	1.65E-03	2.55E-04	1.40E-03	1.40E-03	1.37E-03	2.12E-04	2.08E-04	1.21E-03	1.20E-03
Formaldehyde	9.479	1.46E-02	1.09E-03	1.01E-03	9.69E-04	1.23E-02	8.15E-04	8.25E-04	8.09E-04	1.03E-02	1.01E-02	7.14E-04	7.09E-04
Hexane	24.643	1.54E-04	9.37E-04	8.97E-04	8.66E-04	1.31E-04	7.43E-04	7.09E-04	7.00E-04	1.09E-04	1.07E-04	6.17E-04	6.14E-04
Manganese Compounds	0.012	6.95E-06	9.27E-08	9.07E-08	9.83E-08	3.62E-06	8.68E-08	9.26E-08	9.08E-08	3.46E-06	4.42E-06	7.05E-08	7.92E-08
Mercury Compounds	0.001	1.99E-06	7.73E-09	7.56E-09	8.19E-09	1.04E-06	7.23E-09	7.72E-09	7.56E-09	9.88E-07	1.26E-06	5.87E-09	6.60E-09
Nickel Compounds	0.007	2.98E-06	5.41E-08	5.29E-08	5.73E-08	1.55E-06	5.06E-08	5.40E-08	5.29E-08	1.48E-06	1.89E-06	4.11E-08	4.62E-08
Polycyclic Organic Matter	0.027	1.74E-07	1.41E-06	1.31E-06	1.25E-06	1.47E-07	1.05E-06	1.06E-06	1.04E-06	1.22E-07	1.20E-07	9.22E-07	9.15E-07
Propionaldehyde	0.829	9.56E-04	1.76E-04	1.63E-04	1.56E-04	8.09E-04	1.31E-04	1.32E-04	1.30E-04	6.74E-04	6.62E-04	1.15E-04	1.14E-04
Styrene	2.069	5.77E-05	7.09E-05	6.57E-05	6.28E-05	4.88E-05	5.28E-05	5.34E-05	5.24E-05	4.06E-05	3.99E-05	4.63E-05	4.59E-05
Toluene	159.502	1.46E-03	6.73E-03	6.29E-03	6.03E-03	1.23E-03	5.09E-03	5.08E-03	4.99E-03	1.03E-03	1.01E-03	4.40E-03	4.37E-03
Xylenes (isomers and mixture)	171.495	1.03E-03	6.35E-03	5.91E-03	5.66E-03	8.70E-04	4.77E-03	4.79E-03	4.70E-03	7.25E-04	7.13E-04	4.15E-03	4.12E-03

Table C-4-6f
Juneau NONROAD Emissions - Summer 19

SCC		2265002060	2265004051	2260002021	2265003030	2260004035	2270003070	2270003040	2265002003	2265004030	2285002015	2270002081	2270004066
Equipment Name	Summer TOTAL (tons)	Rubber Tire Loaders	Shredders < 6 HP (com)	Paving Equipment	Sweepers/Scrubbers	Snowblowers (res)	Terminal Tractors	Other General Industrial Eqp	Pavers	Leafblowers/Vacuums (res)	Railway Maintenance	Other Construction Equipment	Chippers/Stump Grinders (com)
Tech Type		4-St	4-St	2-St	4-St	2-St	Dsl	Dsl	4-St	4-St	Dsl	Dsl	Dsl
Equipment Population		0.3	6.8	1.6	0.8	802.8	1.0	2.5	1.1	35.3	1.0	1.6	1.2
Activity (hrs/season)		113.3	244.6	191.6	226.3	-	708.2	1,193.0	290.1	254.2	460.9	633.0	394.4
Activity (hrs/season/unit)		340.82	36.04	116.49	283.57	-	690.78	482.50	260.94	7.21	471.50	403.39	335.14
Exhaust PM (tons)	105.7	6.10E-04	7.50E-04	2.07E-03	5.25E-04	0.00E+00	4.28E-02	3.79E-02	4.52E-04	1.66E-04	2.80E-02	4.08E-02	3.22E-02
TOTAL VOC (tons)	1,728.5	5.68E-02	5.52E-02	4.99E-02	4.98E-02	4.90E-02	4.52E-02	4.44E-02	4.35E-02	4.33E-02	4.26E-02	4.26E-02	4.24E-02
Total Exhaust VOC (tons)	1,640.0	5.60E-02	5.51E-02	4.99E-02	4.91E-02	0.00E+00	4.52E-02	4.44E-02	4.30E-02	4.30E-02	4.26E-02	4.26E-02	4.24E-02
Exh VOC	1,637.3	4.25E-02	5.36E-02	4.99E-02	4.13E-02	0.00E+00	4.44E-02	4.35E-02	3.93E-02	4.15E-02	4.18E-02	4.17E-02	4.15E-02
Crankcase VOC	2.7	1.34E-02	1.46E-03	0.00E+00	7.83E-03	0.00E+00	8.87E-04	8.71E-04	3.74E-03	1.56E-03	8.35E-04	8.34E-04	8.31E-04
Total Evap VOC (tons)	88.5	8.00E-04	1.32E-04	7.65E-05	6.64E-04	4.90E-02	0.00E+00	0.00E+00	5.21E-04	2.78E-04	0.00E+00	0.00E+00	0.00E+00
Chemical Name													
1,3-Butadiene	3.427	5.33E-05	5.24E-05	1.07E-04	4.67E-05	0.00E+00	8.42E-05	8.26E-05	4.09E-05	4.10E-05	7.92E-05	7.92E-05	7.88E-05
Acetaldehyde	5.185	2.29E-04	2.26E-04	8.28E-05	2.01E-04	0.00E+00	3.36E-03	3.30E-03	1.76E-04	1.76E-04	3.16E-03	3.16E-03	3.15E-03
Acrolein	0.873	3.92E-05	3.85E-05	1.50E-05	3.44E-05	0.00E+00	5.20E-04	5.11E-04	3.01E-05	3.01E-05	4.90E-04	4.89E-04	4.87E-04
Benzene (including benzene from gasoline)	45.163	2.96E-03	2.89E-03	1.26E-03	2.59E-03	1.08E-03	9.19E-04	9.01E-04	2.27E-03	2.27E-03	8.65E-04	8.64E-04	8.60E-04
Chromium Compounds	0.007	3.66E-08	4.50E-08	1.24E-07	3.15E-08	0.00E+00	3.00E-06	2.66E-06	2.71E-08	9.93E-09	1.96E-06	2.86E-06	2.25E-06
Ethyl benzene	39.071	1.11E-03	1.09E-03	1.20E-03	9.77E-04	3.78E-04	1.40E-04	1.38E-04	8.56E-04	8.54E-04	1.32E-04	1.32E-04	1.31E-04
Formaldehyde	9.479	6.55E-04	6.44E-04	1.27E-04	5.74E-04	0.00E+00	6.79E-03	6.66E-03	5.03E-04	5.04E-04	6.39E-03	6.38E-03	6.36E-03
Hexane	24.643	5.74E-04	5.49E-04	7.10E-04	5.03E-04	1.15E-03	7.19E-05	7.06E-05	4.39E-04	4.33E-04	6.77E-05	6.77E-05	6.74E-05
Manganese Compounds	0.012	7.32E-08	8.99E-08	2.48E-07	6.30E-08	0.00E+00	3.00E-06	2.66E-06	5.42E-08	1.99E-08	1.96E-06	2.86E-06	2.25E-06
Mercury Compounds	0.001	6.10E-09	7.50E-09	2.07E-08	5.25E-09	0.00E+00	8.56E-07	7.59E-07	4.52E-09	1.66E-09	5.60E-07	8.16E-07	6.44E-07
Nickel Compounds	0.007	4.27E-08	5.25E-08	1.45E-07	3.67E-08	0.00E+00	1.28E-06	1.14E-06	3.16E-08	1.16E-08	8.39E-07	1.22E-06	9.66E-07
Polycyclic Organic Matter	0.027	8.45E-07	8.31E-07	8.28E-07	7.41E-07	0.00E+00	8.10E-08	7.95E-08	6.49E-07	6.50E-07	7.62E-08	7.62E-08	7.58E-08
Propionaldehyde	0.829	1.05E-04	1.04E-04	1.23E-05	9.23E-05	0.00E+00	4.46E-04	4.37E-04	8.09E-05	8.09E-05	4.20E-04	4.19E-04	4.17E-04
Styrene	2.069	4.24E-05	4.17E-05	6.48E-05	3.72E-05	0.00E+00	2.69E-05	2.64E-05	3.26E-05	3.26E-05	2.53E-05	2.53E-05	2.52E-05
Toluene	159.502	4.05E-03	3.96E-03	4.88E-03	3.55E-03	2.03E-03	6.79E-04	6.66E-04	3.11E-03	3.10E-03	6.39E-04	6.38E-04	6.36E-04
Xylenes (isomers and mixture)	171.495	3.81E-03	3.74E-03	5.34E-03	3.34E-03	1.09E-03	4.80E-04	4.71E-04	2.93E-03	2.92E-03	4.51E-04	4.51E-04	4.49E-04

Table C-4-6f
Juneau NONROAD Emissions - Summer 19

SCC		2268006020	2260002009	2270002024	2265004046	2270002063	2265002078	2265002081	2265004041	2265004025	2270004056	2265002057	2265002054
Equipment Name	Summer TOTAL (tons)	Gas Compressors	Plate Compactors	Surfacing Equipment	Front Mowers (com)	Rubber Tire Tractor/Dozers	Dumpers/Tend ers	Other Construction Equipment	Rear Engine Riding Mowers (com)	Trimmers/Edg ers/Brush Cutter (res)	Lawn & Garden Tractors (com)	Rough Terrain Forklift	Crushing/Proc. Equipment
Tech Type		4-St	2-St	Dsl	4-St	Dsl	4-St	4-St	4-St	4-St	Dsl	4-St	4-St
Equipment Population		0.0	1.7	0.7	3.7	0.5	3.4	0.2	1.0	21.9	2.1	0.2	0.8
Activity (hrs/season)		138.7	190.8	269.2	230.0	304.5	285.0	41.1	426.7	141.8	812.0	45.7	125.3
Activity (hrs/season/unit)		3,000.00	110.50	373.44	61.98	598.43	84.54	246.96	410.09	6.49	392.07	274.92	160.42
Exhaust PM (tons)	105.7	9.97E-04	1.72E-03	4.23E-02	3.14E-04	2.90E-02	2.27E-04	2.66E-04	2.50E-04	8.44E-05	1.77E-02	2.04E-04	1.58E-04
TOTAL VOC (tons)	1,728.5	4.16E-02	4.16E-02	4.15E-02	3.72E-02	3.62E-02	2.89E-02	2.50E-02	2.42E-02	2.19E-02	2.06E-02	1.91E-02	1.65E-02
Total Exhaust VOC (tons)	1,640.0	4.16E-02	4.15E-02	4.15E-02	3.70E-02	3.62E-02	2.81E-02	2.44E-02	2.42E-02	2.17E-02	2.06E-02	1.87E-02	1.63E-02
Exh VOC	1,637.3	3.13E-02	4.15E-02	4.07E-02	3.53E-02	3.55E-02	2.35E-02	1.85E-02	2.39E-02	2.09E-02	2.02E-02	1.42E-02	1.62E-02
Crankcase VOC	2.7	1.03E-02	0.00E+00	8.14E-04	1.69E-03	7.10E-04	4.65E-03	5.85E-03	2.52E-04	7.84E-04	4.05E-04	4.49E-03	1.25E-04
Total Evap VOC (tons)	88.5	0.00E+00	7.27E-05	0.00E+00	2.30E-04	0.00E+00	7.27E-04	5.68E-04	5.11E-05	1.66E-04	0.00E+00	3.75E-04	1.55E-04
Chemical Name													
1,3-Butadiene	3.427	3.96E-05	8.92E-05	7.73E-05	3.52E-05	6.73E-05	2.68E-05	2.32E-05	2.30E-05	2.07E-05	3.84E-05	1.78E-05	1.55E-05
Acetaldehyde	5.185	1.70E-04	6.89E-05	3.09E-03	1.52E-04	2.69E-03	1.15E-04	1.00E-04	9.91E-05	8.90E-05	1.53E-03	7.66E-05	6.70E-05
Acrolein	0.873	2.91E-05	1.24E-05	4.78E-04	2.59E-05	4.16E-04	1.97E-05	1.71E-05	1.69E-05	1.52E-05	2.37E-04	1.31E-05	1.14E-05
Benzene (including benzene from gasoline)	45.163	2.18E-03	1.05E-03	8.43E-04	1.95E-03	7.35E-04	1.49E-03	1.29E-03	1.27E-03	1.14E-03	4.19E-04	9.90E-04	8.61E-04
Chromium Chompounds	0.007	5.98E-08	1.03E-07	2.96E-06	1.88E-08	2.03E-06	1.36E-08	1.59E-08	1.50E-08	5.07E-09	1.24E-06	1.22E-08	9.49E-09
Ethyl benzene	39.071	8.23E-04	9.96E-04	1.29E-04	7.34E-04	1.12E-04	5.63E-04	4.87E-04	4.79E-04	4.31E-04	6.40E-05	3.73E-04	3.25E-04
Formaldehyde	9.479	4.87E-04	1.05E-04	6.23E-03	4.32E-04	5.43E-03	3.29E-04	2.85E-04	2.83E-04	2.54E-04	3.10E-03	2.19E-04	1.91E-04
Hexane	24.643	4.12E-04	5.91E-04	6.60E-05	3.72E-04	5.76E-05	2.96E-04	2.55E-04	2.41E-04	2.19E-04	3.28E-05	1.94E-04	1.66E-04
Manganese Compounds	0.012	1.20E-07	2.06E-07	2.96E-06	3.77E-08	2.03E-06	2.72E-08	3.19E-08	3.00E-08	1.01E-08	1.24E-06	2.44E-08	1.90E-08
Mercury Compounds	0.001	9.97E-09	1.72E-08	8.46E-07	3.14E-09	5.81E-07	2.27E-09	2.66E-09	2.50E-09	8.44E-10	3.55E-07	2.04E-09	1.58E-09
Nickel Compounds	0.007	6.98E-08	1.20E-07	1.27E-06	2.20E-08	8.71E-07	1.59E-08	1.86E-08	1.75E-08	5.91E-09	5.32E-07	1.43E-08	1.11E-08
Polycyclic Organic Matter	0.027	6.28E-07	6.89E-07	7.43E-08	5.58E-07	6.48E-08	4.25E-07	3.68E-07	3.65E-07	3.28E-07	3.69E-08	2.82E-07	2.47E-07
Propionaldehyde	0.829	7.82E-05	1.02E-05	4.09E-04	6.95E-05	3.57E-04	5.29E-05	4.59E-05	4.54E-05	4.08E-05	2.03E-04	3.51E-05	3.07E-05
Styrene	2.069	3.15E-05	5.39E-05	2.47E-05	2.80E-05	2.15E-05	2.13E-05	1.85E-05	1.83E-05	1.65E-05	1.23E-05	1.42E-05	1.24E-05
Toluene	159.502	2.99E-03	4.06E-03	6.23E-04	2.66E-03	5.43E-04	2.05E-03	1.78E-03	1.74E-03	1.57E-03	3.10E-04	1.36E-03	1.18E-03
Xylenes (isomers and mixture)	171.495	2.82E-03	4.44E-03	4.40E-04	2.51E-03	3.84E-04	1.92E-03	1.67E-03	1.64E-03	1.48E-03	2.19E-04	1.28E-03	1.11E-03

Table C-4-6f
Juneau NONROAD Emissions - Summer 19

SCC		2270003010	2282020010	2265004036	2270005015	2285004015	2265001020
Equipment Name	Summer TOTAL (tons)	Aerial Lifts	Outboard	Snowblowers (com)	Agricultural Tractors	Railway Maintenance	Snowmobiles
Tech Type		Dsl	Dsl	4-St	Dsl	4-St	4-St
Equipment Population		1.1	5.4	99.6	0.4	1.4	3.0
Activity (hrs/season)		241.8	689.3	-	131.1	124.6	-
Activity (hrs/season/unit)		211.03	127.48	-	342.34	92.00	-
Exhaust PM (tons)	105.7	1.05E-02	1.26E-02	0.00E+00	5.71E-03	8.54E-05	0.00E+00
TOTAL VOC (tons)	1,728.5	1.29E-02	1.26E-02	1.22E-02	1.01E-02	1.00E-02	9.16E-03
Total Exhaust VOC (tons)	1,640.0	1.29E-02	1.26E-02	0.00E+00	1.01E-02	9.79E-03	0.00E+00
Exh VOC	1,637.3	1.27E-02	1.26E-02	0.00E+00	9.95E-03	9.03E-03	0.00E+00
Crankcase VOC	2.7	2.54E-04	0.00E+00	0.00E+00	1.99E-04	7.68E-04	0.00E+00
Total Evap VOC (tons)	88.5	0.00E+00	0.00E+00	1.22E-02	0.00E+00	2.01E-04	9.16E-03
Chemical Name							
1,3-Butadiene	3.427	2.41E-05	2.35E-05	0.00E+00	1.89E-05	9.32E-06	0.00E+00
Acetaldehyde	5.185	9.61E-04	9.39E-04	0.00E+00	7.54E-04	4.02E-05	0.00E+00
Acrolein	0.873	1.49E-04	1.45E-04	0.00E+00	1.17E-04	6.86E-06	0.00E+00
Benzene (including benzene from gasoline)	45.163	2.63E-04	2.56E-04	2.69E-04	2.06E-04	5.19E-04	2.02E-04
Chromium Compounds	0.007	7.34E-07	8.83E-07	0.00E+00	4.00E-07	5.12E-09	0.00E+00
Ethyl benzene	39.071	4.01E-05	3.92E-05	9.41E-05	3.15E-05	1.95E-04	7.06E-05
Formaldehyde	9.479	1.94E-03	1.90E-03	0.00E+00	1.52E-03	1.15E-04	0.00E+00
Hexane	24.643	2.06E-05	2.01E-05	2.86E-04	1.61E-05	1.02E-04	2.14E-04
Manganese Compounds	0.012	7.34E-07	8.83E-07	0.00E+00	4.00E-07	1.02E-08	0.00E+00
Mercury Compounds	0.001	2.10E-07	2.52E-07	0.00E+00	1.14E-07	8.54E-10	0.00E+00
Nickel Compounds	0.007	3.15E-07	3.78E-07	0.00E+00	1.71E-07	5.98E-09	0.00E+00
Polycyclic Organic Matter	0.027	2.31E-08	2.26E-08	0.00E+00	1.82E-08	1.48E-07	0.00E+00
Propionaldehyde	0.829	1.27E-04	1.24E-04	0.00E+00	1.00E-04	1.84E-05	0.00E+00
Styrene	2.069	7.68E-06	7.51E-06	0.00E+00	6.03E-06	7.42E-06	0.00E+00
Toluene	159.502	1.94E-04	1.90E-04	5.05E-04	1.52E-04	7.12E-04	3.78E-04
Xylenes (isomers and mixture)	171.495	1.37E-04	1.34E-04	2.72E-04	1.08E-04	6.69E-04	2.04E-04

APPENDIX D

Area Sources

- **D-1 Data Gathering and Calculation Methodology**
- **D-2 Municipality of Anchorage Area Sources**
- **D-3 Fairbanks North Star Borough Area Sources**
- **D-4 City and Borough of Juneau Area Sources**

APPENDIX D-1

Data Gathering and Calculation Methodology

Appendix D-1

Data Gathering and Calculation Methodology

The following sections provide backup information on each area source category addressed in the 1999 Air Toxics Inventory and should be referenced in conjunction with the comments provided in the emission calculation spreadsheets included for area sources within the Municipality of Anchorage, Fairbanks Northstar Borough, and the City and Borough of Juneau (Appendices D-2, D-3, and D-4, respectively).

Asphalt Plants

Discussions with an Anchorage asphalt plant operator lead to the following assumptions: Most stationary plants are natural gas (NG) batch systems. Most mobile systems are oil-fired (diesel-) drum systems; NG-drum systems are rare. A reasonable estimate of the operating plants in Alaska is a 75/25 split – that is, 75% of the plants are stationary NG batch and 25% are mobile diesel drum.

Department of Transportation (DOT) activity data for 1999 (94,000 tons) were obtained from the “Contracts Report (Engineer's Estimates)”. Municipality of Anchorage (MOA) information was obtained from Jerry Hansen, Project Manager. Fairbanks/Juneau activity data were pro-rated based on the ratio of their populations to Anchorage's population in 1999.

Factors: NG-batch: AP-42 Tables 11.1-9 and 11.1-12
 Oil-drum: AP-42 Tables 11.1-10 and 11.1-13

All asphalt production was assumed to occur during the summer (April-September) months.

Asphalt Paving

Asphalt paving activity levels were based on the assumption that all material produced in the asphalt plants (see above) is used for paving. This simplified the need to obtain distance/depth paving data from many different pavement contractors in each of the three cities/boroughs. Fairbanks/Juneau activity data were pro-rated based on the ratio of their populations to Anchorage's population in 1999. As with asphalt production, all asphalt paving was assumed to occur during the summer (April-September) months.

A representative at Emulsion Products in Anchorage provided information on typical types of produced paving material. AP-42 lists factors for three types of paving material: RC, MC, and SC. Emulsion Products stated that RC, MC, and SC types were popular many years ago but were rarely used any more. However, on *rare* occasions MC30 is used in federal projects as a prime coat between the crushed aggregate and the asphalt. MC30 was chosen to obtain the AP-42 emission factors, which are considered higher than those encountered in modern low-emulsion pavement materials. As a result, a conservative estimate of HAPs has been calculated. The number “30” denotes 30% of diluent in the cutback: Therefore, 17% of the cutback (solvent) evaporated (see AP-42 Table 4.5-1).

Gasoline Distribution/Service Stations

Factors were obtained from AP-42, Section 5.2, where the following formulas were located:

$$EF_{\text{voc total}} = (EF_{\text{voc fill}} + EF_{\text{voc b\&e}} + EF_{\text{voc vd}} + EF_{\text{voc s}})$$

where,

EF _{voc fill} = 0.3 lb/kgal	VOC emission factor associated with filling USTs (Balanced submerged filling, Stage I controls)
EF _{voc b&e} = 1.0 lb/kgal	VOC emission factor associated with breathing and emptying losses from USTs
EF _{voc vd} = 1.1 lb/kgal	VOC emission factor associated with vapor displacement from automobile tanks during refilling (Stage II controls)
<u>EF_{voc s} = 0.7 lb/kgal</u>	VOC emission factor associated with spillage during automobile refilling

$$EF_{\text{voc total}} = 3.1 \text{ lb/kgal}$$

An Anchorage gasoline station operator stated that all stations should have been converted to stringent Stage I (filling) controls by now. EPA’s SPECIATE database was used to speciate the gasoline vapors (Profile No. 7000, Service Station Profile). All gasoline distribution calculations were assumed to occur equally between the summer (April-September) and winter (January-March and October-December) months.

Used Oil Combustion

HCG researched *used* oil (not to be confused with *waste* oil which is officially designated as hazardous waste and whose combustion is illegal in the state of AK).

The only data on used oil was located in AP-42 Section 1.11, where it stated that nationally, used oil was burned at a rate of 590,000,000 gallons in 1983. This value was prorated to Anchorage/Fairbanks/Juneau 1999 levels based on US Census population data. Therefore Anchorage was calculated to have combusted 650,607 gallons, Fairbanks: 212,907 gallons, and Juneau: 76,193 gallons. All used oil combustion was assumed to occur equally between the summer (April-September) and winter (January-March and October-December) months.

Surface Coatings

Activity data were obtained from “1998 US Census Bureau Report MA32F(98)-1: Paint and Allied Products”. The volumes were pro-rated to 1998 populations of the 3 cities/boroughs. US activity data fall into 3 categories: architectural, product, and special coatings. All coating activities were assumed to occur equally between summer (April-September) and winter (January-March and October-December) months.

Architectural paint:

- Architectural paints are assumed to be sold and used as two types: 70% water-based (low-solvent) and 30% solvent-based.
- Solvent is assumed to be 60% (by volume) of the solvent-based paint/coatings.
- Solvent densities are assumed to be 7.36 lb/gallon.
- Water-based paints are assumed to emit 25% of the VOCs as solvent-based paints.

Product Coatings and Special Purpose Coatings calculations:

- Product and special coatings are assumed to be sold as 30% water-based (low-solvent) and 70% solvent-based. Note: this is the opposite distribution of architectural paint sales, since more solvent-based paints were/are used in product coatings.
- Again, water-based paints are assumed to emit 25% of the VOCs as solvent-based paints.

Factors: 1998 US Census Bureau Report MA32F(98)-1: Paint and Allied Products
AP-42 Section 4.2.2.1.2, Tables 4.2.2.1-2 and 4.2.2.1-3

Speciate: Profile No. 1003 (Surface coating – solvent-based paint)
Profile No. 1013 (Surface coating – water-based paint)
Profile No. 6002 (Surface coating – industrial)

Wildfires

An Alaska Department of Natural Resources (DNR) website was used to obtain activity data (<http://www.dnr.state.ak.us/forestry/firestats.htm>). According to the information at this website, Fairbanks had 6,206 acres of burned land due to wildfires in 1999, and Anchorage had 781 acres of wildfires in the same year. The DNR's definition of Anchorage includes the area from Girdwood to the Mat-Su valley and therefore the 781 acres is considered a conservative estimate of the area of land damaged by wildfires. No data were presented for Juneau because the statistics fall under the jurisdiction of the US Forest Service (USFS). However, Ms. Dean Brown of DNR obtained the USFS data and found that no wildfires occurred in 1999.

Factors: Dept. of Nat. Resources website
(<http://www.dnr.state.ak.us/forestry/firestats.htm>)
AP-42, Table 13.1-1 and Section 13.1.2
Speciate (Profile No. 0307 – Miscellaneous Burning, Forest Fires)

AP-42, Table 13.1-1 yielded two factors: Coastal zones = 60 tons/acre fuel loading
Interior zones = 11 tons/acre fuel loading

Section 13.1.2 yielded two more factors: 17 pounds particulate/ton fuel burned
24 pounds hydrocarbon/ton fuel burned

However, SPECIATE only yielded one emission factor, 1,3-Butadiene (0.52% of VOC's). Emission factors for metals were not found. All wildfires were assumed to occur during the summer (April-September) months, when conditions were warm and dry.

Open Burning

Estimating the amount of open burning that occurs in a borough is difficult to do accurately because much of the activity occurs without a permit. Two open burning scenarios in which permit approvals were issued were considered:

- Firefighter Training
- Brush Burning

Firefighting Training

Firefighting activity data were obtained from Ann Lawton/Rachel Cunningham of ADEC in the form of Open Burn approvals and "Summary of Fire Training" reports. Rough

volumes of diesel, gasoline and propane were provided in the reports. However, it was impossible to obtain valid factors for propane and gasoline combustion, so all fuel was assumed to be diesel.

For Alyeska Pipeline, a firm within the study area with an Open-Burn Approval for firefighter training, the consumption of diesel was estimated to be 200 gallons/exercise (maximum usage as outlined in the Open-Burn Approval) with 28 exercises/year in 1999 (as mentioned in Open-burn Approval) for a total of 5,600 gallons total. All open burning was assumed to occur equally between summer (April-September) and winter (January-March and October-December) months.

Factors: AP-42, Tables 1.3-2 (assume residential furnace factor) and 1.3-9 (metals)
SPECIATE (Profile No. 0002, External Combustion Boiler – Distillate Oil)

Brush Burning

Brush burning approvals are available from DNR. The approvals are considered inadequate because (1) many burns occur without a permit, and (2) no mention is made as to the actual volume of burned brush in the approvals. Therefore, brush burning is not included in this report.

Residential Woodstoves/Fireplaces

Wood combustion activity data were estimated based on surveys previously performed in conjunction with the preparation of 1990 CO inventories for Anchorage and Fairbanks and a 1993 Mendenhall Valley (Juneau) wood use study. The activity data were converted to a per-household level using 1990 household data, and then extrapolated to 1999 using 1990 and 1999 US Census data. Anchorage wood use data from 1990 is available, but only for the portion of the Municipality classified as non-attainment for CO. Thus, the 1990 non-attainment area wood use was adjusted to reflect the total Municipality of Anchorage wood use. Then the total mass of wood was scaled up again to reflect wood use in 1999. Juneau data were extrapolated in similar fashion in that the Mendenhall Valley is a subset of Juneau. Wood use patterns in the Valley were extended to the entire City and Borough of Juneau. Pollutant emission factors were based on those contained in AP-42 for residential woodstoves and fireplaces.

Propane Heating

The 1990 US Census contains activity data necessary to complete the calculations. Additionally, AP-42 contains a Total VOC emission factor. However, no speciated data

exist and therefore propane heating was discounted from this study. The expected emissions from this source category are negligible.

Residential/Commercial Natural Gas Heating

Natural Gas heating activity data were estimated based on surveys previously performed in conjunction with the preparation of 1990 CO inventory for Anchorage. In general, the activity data converted to a per-household level using 1990 household data, and then extrapolated to 1999 using 1990 and 1999 US Census data. This method was required because the 1990 data for Anchorage consisted only of the portion of the municipality which is classified as non-attainment for CO.

Fugitive Dust Sources

Fugitive Dust contains five sub-categories, which are listed below:

- Paved Roads – see Appendix B (Onroad Mobile Sources)
- Unpaved Roads – see Appendix C (Offroad Mobile Sources)
- Heavy Construction Operations – see Appendix C (Offroad Mobile Sources)
- Aggregate Handling and Storage Piles – see below
- Industrial Wind Erosion – see below

Aggregate Handling and Storage Piles

HCG researched the amount of wind-borne particulates that arise from aggregate handling and storage piles (for example, sand/gravel processing). Although AP-42 contains TSP and PM₁₀ emission factors for airborne particulates (dust) produced from open ground, AP-42 and SPECIATE do not contain speciated information on this dust. Therefore, HAP emissions from aggregate handling/storage piles were not available for this study.

Industrial Wind Erosion

AP-42 only considers airborne dust arising from coal piles. Therefore as with aggregate handling and storage piles, no information on HAP emissions from industrial wind erosion was available.

Consumer Products

Per capita emission factors were available for the following categories: personal care products, household products, automotive after market products, adhesives and

sealants, FIFRA-regulated products, coatings and related products, and miscellaneous. 36 hazardous air pollutants were listed throughout the various seven categories. Emissions were estimated using per capita factors and census data.

Factors Reference: Emission Inventory Improvement Program. August 1996. Chapter 5: Consumer and Commercial Solvent Use. In: EIIP Volume III, Area Sources Preferred and Alternative Methods. U.S, Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-454/R-97-004c. Research Triangle Park, North Carolina. July 1997.

Structure Fires

Activity data were provided from the State of Alaska Fire Marshall's Office in Anchorage. The Fire Marshall's office only identified those fires reported that were residential and nonresidential. Total number of fires for Anchorage, Fairbanks, and Juneau were 406, 71, and 49, respectively.

Factors References: Radian Corporation. Development of Area Source Hazardous Air Pollutant Inventories, Volume 1: Air Toxic Emission Inventory for the Chicago Area, Draft Report. Prepared for the EPA Air and Energy Engineering Research Laboratory. Research Triangle Park, North Carolina. July 1995. Pp. 3-59 through 3-61.

Emission Inventory Improvement Program. August 1996. Chapter 5: Consumer and Commercial Solvent Use. In: EIIP Volume III, Area Sources Preferred and Alternative Methods. U.S, Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-454/R-97-004c. Research Triangle Park, North Carolina. July 1997. Pp. 4-4 and 4-5.

Table D-1-1

**Screening of AP-42 Area Source Categories
Based on Expected Significance of Source Category**

Source Category	High Priority	Medium Priority	Low Priority	Not In Study Area	Unsure If In Study Area
External Combustion Sources					
Bituminous And Subbituminous Coal Combustion	X				
Anthracite Coal Combustion				X	
Fuel Oil Combustion	X				
Natural Gas Combustion	X				
Liquefied Petroleum Gas Combustion			X		
Wood Waste Combustion In Boilers				X	
Lignite Combustion				X	
Bagasse Combustion In Sugar Mills				X	
Residential Fireplaces	X				
Residential Wood Stoves	X				
Waste Oil Combustion		X			
Solid Waste Disposal					
Refuse Combustion	X				
Sewage Sludge Incineration	X				
Medical Waste Incineration	X				
Landfills			X		
Open Burning		X			
Automobile Body Incineration				X	
Conical Burners				X	
Stationary Internal Combustion Sources					
Stationary Gas Turbines For Electricity Generation	X				
Heavy-duty Natural Gas-fired Pipeline Compressor Engines				X	
Gasoline And Diesel Industrial Engines		X			
Large Stationary Diesel And All Stationary Dual-fuel Engines		X			
Evaporation Loss Sources					
Dry Cleaning		X			
Nonindustrial Surface Coating		X			
General Industrial Surface Coating		X			
Can Coating				X	
Magnet Wire Coating				X	
Other Metal Coating			X		
Flat Wood Interior Panel Coating				X	
Paper Coating				X	
Polymeric Coating Of Supporting Substrates				X	
Automobile And Light Duty Truck Surface Coating Operations			X		
Pressure Sensitive Tapes And Labels				X	
Metal Coil Surface Coating				X	
Large Appliance Surface Coating				X	
Metal Furniture Surface Coating				X	
Magnetic Tape Manufacturing				X	
Surface Coating Of Plastic Parts For Business Machines				X	
Waste Water Collection, Treatment And Storage			X		
Polyester Resin Plastic Products Fabrication				X	
Asphalt Paving Operations		X			
Solvent Degreasing			X		
Waste Solvent Reclamation			X		
Tank And Drum Cleaning			X		
Graphic Arts			X		

Table D-1-1

**Screening of AP-42 Area Source Categories
Based on Expected Significance of Source Category**

Source Category	High Priority	Medium Priority	Low Priority	Not In Study Area	Unsure If In Study Area
General Graphic Printing			X		
Publication Gravure Printing			X		
Commercial/Consumer Solvent Use		X			
Textile Fabric Printing				X	
Petroleum Industry					
Petroleum Refining	X				
Transportation And Marketing Of Petroleum Liquids	X				
Natural Gas Processing				X	
Organic Chemical Process Industry					
Carbon Black				X	
Adipic Acid				X	
Explosives				X	
Paint And Varnish				X	
Phthalic Anhydride				X	
Plastics				X	
Polyvinyl Chloride				X	
Poly(ethylene terephthalate)				X	
Polystyrene				X	
Polypropylene				X	
Printing Ink				X	
Soap And Detergents				X	
Synthetic Fibers				X	
Synthetic Rubber				X	
Terephthalic Acid				X	
Lead Alkyl				X	
Pharmaceuticals Production				X	
Maleic Anhydride				X	
Methanol				X	
Acetone And Phenol				X	
Propylene				X	
Benzene, Toluene And Xylenes				X	
Butadiene				X	
Cumene				X	
Ethanol				X	
Ethyl Benzene				X	
Ethylene				X	
Ethylene Dichloride And Vinyl Chloride				X	
Ethylene Glycol				X	
Ethylene Oxide				X	
Formaldehyde				X	
Glycerine				X	
Isopropyl Alcohol				X	
Liquid Storage Tanks					
Organic Liquid Storage Tanks		X			
Inorganic Chemical Industry					
Synthetic Ammonia				X	
Urea			X		
Ammonium Nitrate				X	

Table D-1-1

**Screening of AP-42 Area Source Categories
Based on Expected Significance of Source Category**

Source Category	High Priority	Medium Priority	Low Priority	Not In Study Area	Unsure If In Study Area
Ammonium Sulfate				X	
Normal Superphosphates				X	
Triple Superphosphates				X	
Ammonium Phosphate				X	
Hydrochloric Acid				X	
Hydrofluoric Acid				X	
Nitric Acid				X	
Phosphoric Acid				X	
Sulfuric Acid				X	
Chlor-Alkali				X	
Sodium Carbonate				X	
Sulfur Recovery				X	
Hydrogen Cyanide			X		
Food And Agricultural Industries					
Tilling Operations			X		
Fertilizer Application			X		
Pesticide Application			X		
Orchard Heaters				X	
Cotton Harvesting				X	
Grain Harvesting			X		
Rice Harvesting				X	
Cane Sugar Harvesting				X	
Cattle Feedlots				X	
Swine Feedlots				X	
Poultry Houses				X	
Dairy Farms			X		
Meat Packing Plants				X	
Meat Smokehouses			X		
Meat Rendering Plants				X	
Manure Processing			X		
Poultry Slaughtering				X	
Natural And Processed Cheese				X	
Cotton Ginning				X	
Canned Fruits And Vegetables				X	
Dehydrated Fruits And Vegetables				X	
Pickles, Sauces And Salad Dressings				X	
Grain Processing				X	
Grain Elevators And Processes				X	
Cereal Breakfast Food				X	
Pet Food				X	
Alfalfa Dehydration				X	
Pasta Manufacturing				X	
Bread Baking			X		
Corn Wet Milling				X	
Confectionery Products				X	
Sugar Processing				X	
Cane Sugar Processing				X	
Beet Sugar Processing				X	
Salted And Roasted Nuts And Seeds				X	
Almond Processing				X	
Peanut Processing				X	

Table D-1-1

**Screening of AP-42 Area Source Categories
Based on Expected Significance of Source Category**

Source Category	High Priority	Medium Priority	Low Priority	Not In Study Area	Unsure If In Study Area
Fats And Oils				X	
Vegetable Oil Processing				X	
Beverages			X		
Malt Beverages			X		
Wines And Brandy				X	
Distilled Spirits			X		
Miscellaneous Food And Kindred Products			X		
Fish Processing			X		
Coffee Roasting			X		
Snack Chip Deep Fat Frying				X	
Yeast Production				X	
Tobacco Products				X	
Leather Tanning				X	
Agricultural Wind Erosion			X		
Wood Products Industry					
Lumber			X		
Chemical Wood Pulping				X	
Pulp Bleaching				X	
Papermaking				X	
Plywood				X	
Reconstituted Wood Products				X	
Waferboard And Oriented Strand Board				X	
Particleboard				X	
Medium Density Fiberboard				X	
Charcoal				X	
Wood Preserving			X		
Mineral Products Industry					
Hot Mix Asphalt Plants		X			
Asphalt Roofing		X			
Bricks And Related Clay Products				X	
Calcium Carbide Manufacturing				X	
Refractory Manufacturing				X	
Portland Cement Manufacturing				X	
Ceramic Products Manufacturing				X	
Clay And Fly Ash Sintering				X	
Western Surface Coal Mining				X	
Coal Cleaning			X		
Coal Conversion					X
Concrete Batching			X		
Glass Fiber Manufacturing					X
Frit Manufacturing					X
Glass Manufacturing					X
Gypsum Manufacturing			X		
Lime Manufacturing				X	
Mineral Wool Manufacturing				X	
Construction Aggregate Processing			X		
Sand And Gravel Processing		X			
Crushed Stone Processing			X		
Lightweight Aggregate Manufacturing			X		
Phosphate Rock Processing				X	

Table D-1-1

**Screening of AP-42 Area Source Categories
Based on Expected Significance of Source Category**

Source Category	High Priority	Medium Priority	Low Priority	Not In Study Area	Unsure If In Study Area
Diatomite Processing				X	
Taconite Ore Processing				X	
Metallic Minerals Processing			X		
Clay Processing				X	
Talc Processing				X	
Feldspar Processing				X	
Vermiculite Processing				X	
Alumina Manufacturing				X	
Perlite Manufacturing				X	
Abrasives Manufacturing				X	
Metallurgical Industry					
Primary Aluminum Production				X	
Coke Production				X	
Primary Copper Smelting				X	
Ferroalloy Production				X	
Iron And Steel Production				X	
Primary Lead Smelting				X	
Zinc Smelting				X	
Secondary Aluminum Operations				X	
Secondary Copper Smelting And Alloying				X	
Gray Iron Foundries				X	
Secondary Lead Processing				X	
Secondary Magnesium Smelting .				X	
Steel Foundries				X	
Secondary Zinc Processing				X	
Storage Battery Production				X	
Lead Oxide And Pigment Production				X	
Miscellaneous Lead Products				X	
Leadbearing Ore Crushing And Grinding				X	
Electric Arc Welding			X		
Electroplating			X		
Miscellaneous Sources					
Wildfires And Prescribed Burning		X			
Fugitive Dust Sources		X			
Paved Roads		X			
Unpaved Roads		X			
Heavy Construction Operations		X			
Aggregate Handling And Storage Piles			X		
Industrial Wind Erosion			X		
Explosives Detonation			X		
Wet Cooling Towers (cooling ponds in FNSB)			X		
Industrial Flares			X		

APPENDIX D-2

Municipality of Anchorage Area Sources

Table D-2-1

Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
Municipality of Anchorage

Section 112 Hazardous Air Pollutants			Anchorage TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Residential Heating - NG	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities
No.	CAS No.	Chemical Name																
1	79345	1,1,2,2-Tetrachloroethane	0.010 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.010 tpy
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	0.003 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.003 tpy
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	0.005 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.005 tpy
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	2.925 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.924 tpy	0.001 tpy
10	542756	1,3-Dichloropropene	20.62 tpy	-----	-----	-----	-----	-----	-----	-----	-----	20.62 tpy	-----	-----	-----	-----	-----	-----
11	1120714	1,3-Propane sultone	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----
12	106467	1,4-Dichlorobenzene(p)	10.74 tpy	-----	-----	-----	-----	-----	-----	-----	-----	10.71 tpy	-----	0.017 tpy	-----	-----	-----	0.009 tpy
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	-----	-----
14	540841	2,2,4-Trimethylpentane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.460 tpy	0.038 tpy	0.006 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.416 tpy
36	60355	Acetamide	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
37	75058	Acetonitrile	0.041 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.041 tpy
38	98862	Acetophenone	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	-----	-----
39	107028	Acrolein	1.068 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	-----	-----	1.030 tpy	-----	-----	-----	-----	-----	-----	0.038 tpy
40	79061	Acrylamide	0.160 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.160 tpy
41	79107	Acrylic Acid	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
42	107131	Acrylonitrile	0.010 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.010 tpy
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.012 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	0.011 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	0.133 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.001 tpy	0.003 tpy	-----	-----	-----	0.130 tpy
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	7.187 tpy	0.017 tpy	0.003 tpy	-----	-----	2.328 tpy	2.548 tpy	-----	-----	0.001 tpy	-----	0.030 tpy	0.885 tpy	-----	-----	1.375 tpy

Table D-2-1

Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
Municipality of Anchorage

Section 112 Hazardous Air Pollutants			Anchorage TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Residential Heating - NG	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities
No.	CAS No.	Chemical Name																
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
50	98077	Benzotrithloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	0.007 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	0.006 tpy
52	N/A	Beryllium Compounds	0.104 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.000 tpy	0.000 tpy	-----	-----	-----	0.103 tpy
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
57	75252	Bromoform	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----
58	N/A	Cadmium Compounds	0.045 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.002 tpy	0.016 tpy	-----	-----	-----	0.027 tpy
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
61	63252	Carbaryl	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
62	75150	Carbon disulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	0.001 tpy
64	463581	Carbonyl sulfide	0.004 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.004 tpy
65	120809	Catechol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
68	7782505	Chlorine	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
69	79118	Chloroacetic acid	0.005 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.005 tpy
70	108907	Chlorobenzene	9.235 tpy	-----	-----	-----	-----	-----	-----	-----	-----	9.231 tpy	-----	-----	-----	-----	-----	0.004 tpy
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
72	67663	Chloroform	0.128 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.128 tpy	-----	-----	-----	-----	-----	0.000 tpy
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
74	126998	Chloroprene	0.062 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.062 tpy	-----	-----
75	N/A	Chromium Compounds	0.079 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.012 tpy	0.020 tpy	-----	0.002 tpy	-----	0.044 tpy
76	N/A	Cobalt Compounds	0.012 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	0.010 tpy
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
78	1319773	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
79	95487	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
80	108394	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
81	106445	Cresols/Cresylic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
82	98828	Cumene	0.010 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.010 tpy
83	N/A	Cyanide Compounds	8.604 tpy	-----	-----	-----	-----	-----	-----	-----	8.284 tpy	-----	-----	-----	-----	-----	-----	0.320 tpy
84	3547044	DDE	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
85	334883	Diazomethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	0.032 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.004 tpy	-----	-----	-----	-----	-----	0.027 tpy
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-2-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Anchorage TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Residential Heating - NG	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities	
No.	CAS No.	Chemical Name																	
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	0.002 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.002 tpy
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	3.333 tpy	0.121 tpy	0.021 tpy	-----	-----	-----	0.249 tpy	-----	-----	0.268 tpy	-----	-----	2.276 tpy	-----	-----	0.398 tpy	
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
101	75003	Ethyl chloride (Chloroethane)	1.525 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.525 tpy	-----	-----	-----	
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	-----	-----	
104	107211	Ethylene glycol	1.427 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.426 tpy	-----	-----	0.000 tpy	
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
106	75218	Ethylene oxide	1.946 tpy	-----	-----	-----	-----	-----	-----	-----	-----	1.946 tpy	-----	-----	-----	-----	-----	-----	
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
109	5000	Formaldehyde	4.519 tpy	0.059 tpy	0.010 tpy	-----	-----	-----	-----	0.010 tpy	0.239 tpy	0.163 tpy	1.553 tpy	1.081 tpy	-----	-----	-----	1.403 tpy	
110	N/A	Glycol ethers	5.219 tpy	-----	-----	-----	-----	-----	-----	-----	-----	5.219 tpy	-----	-----	-----	-----	-----	-----	
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
116	822060	Hexamethylene-1,6 diisocyanate	0.059 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.059 tpy	
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
118	110543	Hexane	51.37 tpy	-----	-----	-----	-----	-----	4.652 tpy	0.002 tpy	-----	11.13 tpy	0.344 tpy	25.95 tpy	-----	-----	-----	9.298 tpy	
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
120	7647010	Hydrochloric acid	5.052 tpy	-----	-----	-----	-----	-----	-----	-----	3.528 tpy	0.000 tpy	-----	-----	-----	-----	-----	1.524 tpy	
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.193 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.002 tpy	-----	-----	-----	-----	-----	0.191 tpy	
122	123319	Hydroquinone	0.021 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.021 tpy	
123	78591	Isophorone	0.122 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.122 tpy	-----	-----	-----	-----	-----	-----	
124	N/A	Lead Compounds	0.020 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.002 tpy	-----	-----	-----	-----	0.019 tpy	
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
127	N/A	Manganese Compounds	0.043 tpy	0.000 tpy	-----	-----	-----	0.020 tpy	-----	0.000 tpy	-----	-----	0.002 tpy	0.005 tpy	-----	-----	-----	0.015 tpy	
128	N/A	Mercury Compounds	0.068 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.001 tpy	0.004 tpy	-----	-----	-----	0.064 tpy	
129	67561	Methanol	89.97 tpy	-----	-----	-----	-----	-----	-----	-----	-----	89.94 tpy	-----	-----	-----	-----	-----	0.033 tpy	
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
131	74839	Methyl bromide(Bromomethane)	28.62 tpy	-----	-----	-----	-----	-----	-----	-----	-----	28.62 tpy	-----	-----	-----	-----	-----	0.000 tpy	
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	50.21 tpy	-----	-----	-----	-----	-----	-----	-----	-----	49.93 tpy	-----	-----	-----	-----	-----	0.272 tpy	
133	78933	Methyl ethyl ketone (2-Butanone)	94.03 tpy	0.000 tpy	0.000 tpy	-----	-----	0.348 tpy	-----	-----	-----	6.520 tpy	-----	-----	86.47 tpy	-----	-----	0.691 tpy	
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
136	108101	Methyl isobutyl ketone (Hexone)	64.52 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.976 tpy	-----	-----	62.85 tpy	-----	-----	0.700 tpy	
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
139	1634044	Methyl tert butyl ether	0.042 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.003 tpy	-----	-----	-----	-----	-----	0.039 tpy	
140	74873	Methylchloride (Chloromethane)	1.391 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.353 tpy	-----	-----	0.038 tpy	
141	75092	Methylene chloride(Dichloromethane)	22.02 tpy	-----	-----	-----	-----	-----	-----	-----	-----	4.693 tpy	-----	-----	13.57 tpy	-----	-----	3.748 tpy	
142	101688	Methylene diphenyl diisocyanate (MDI)	0.058 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.058 tpy	
143	N/A	Mineral fibers	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	
144	121897	N,N-Diethyl aniline (N,N-Dimethylaniline)	0.004 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.004 tpy	-----	-----	

Table D-2-1

Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
Municipality of Anchorage

Section 112 Hazardous Air Pollutants			Anchorage TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Residential Heating - NG	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities
No.	CAS No.	Chemical Name																
145	91203	Naphthalene	6.324 tpy	-----	-----	-----	-----	0.346 tpy	-----	-----	-----	5.944 tpy	-----	0.009 tpy	-----	-----	-----	0.025 tpy
146	N/A	Nickel Compounds	0.060 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.003 tpy	0.030 tpy	-----	-----	-----	0.026 tpy
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	0.038 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.038 tpy
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromittrobenzene (Quintobenzene)	0.141 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.141 tpy
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
159	7803512	Phospine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	1.258 tpy	0.011 tpy	-----	-----	0.242 tpy	0.877 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.127 tpy
163	106503	p-Phenylemediamine	3.710 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.710 tpy
164	123386	Propionaldehyde	0.081 tpy	0.002 tpy	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.079 tpy
165	114261	Propoxur (Baygon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	0.013 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.013 tpy
167	75569	Propylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
169	106514	Quinone	0.019 tpy	0.011 tpy	0.002 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.006 tpy
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	0.000 tpy
172	100425	Styrene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	172.0 tpy	-----	-----	167.6 tpy	-----	-----	-----	-----	-----	3.639 tpy	-----	-----	-----	-----	-----	0.809 tpy
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
176	108883	Toluene	378.7 tpy	0.072 tpy	0.012 tpy	-----	-----	0.877 tpy	2.963 tpy	-----	-----	55.32 tpy	-----	0.049 tpy	312.5 tpy	-----	-----	6.982 tpy
177	8001352	Toxaphene (chlorinated camphene)	0.003 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.003 tpy
178	79016	Trichloroethylene	0.252 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.063 tpy	-----	-----	-----	-----	-----	0.189 tpy
179	121448	Triethylamine	0.108 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.108 tpy	-----	-----	-----	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	0.295 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.295 tpy	-----	-----	-----
182	593602	Vinyl bromide	0.042 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.042 tpy
183	75014	Vinyl chloride	0.016 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.016 tpy
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	0.016 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.016 tpy
185	1330207	Xylenes (isomers and mixture)	209.2 tpy	0.154 tpy	0.026 tpy	-----	-----	0.243 tpy	1.302 tpy	-----	-----	26.16 tpy	-----	-----	179.8 tpy	-----	-----	1.517 tpy
186	95476	Xylenes (isomers and mixture)	19.73 tpy	-----	-----	-----	-----	-----	0.360 tpy	-----	-----	-----	-----	-----	18.84 tpy	-----	-----	0.523 tpy
187	108383	Xylenes (isomers and mixture)	0.010 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.010 tpy
188	106423	Xylenes (isomers and mixture)	0.030 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.030 tpy
Total HAP Emissions			1280 tpy	0.49 tpy	0.08 tpy	168 tpy	0.24 tpy	5.04 tpy	12.1 tpy	0.01 tpy	13.1 tpy	331 tpy	1.92 tpy	27.2 tpy	682 tpy	0.07 tpy	2.92 tpy	35.64 tpy

Asphalt Plants - Anchorage

NG-Fired Batch Asphalt Plant
 Activity Data Input: **70,613 tons**
 Activity Period/Year: **1999 Year**

Oil-Fired Drum Asphalt Plant
 Activity Data Input: **23,538 tons**
 Activity Period/Year: **1999 Year**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde	6.40E-04 lb/ton	2.26E-02 tpy	1.30E-03 lb/ton	1.53E-02 tpy	3.79E-02 tpy
39	107028	Acrolein			2.60E-05 lb/ton	3.06E-04 tpy	3.06E-04 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	6.60E-07 lb/ton	2.33E-05 tpy	1.10E-06 lb/ton	1.29E-05 tpy	3.62E-05 tpy
48	71432	Benzene (including benzene from gasoline)	3.50E-04 lb/ton	1.24E-02 tpy	4.10E-04 lb/ton	4.83E-03 tpy	1.72E-02 tpy
58	N/A	Cadmium Compounds	8.40E-07 lb/ton	2.97E-05 tpy	4.40E-07 lb/ton	5.18E-06 tpy	3.48E-05 tpy
75	N/A	Chromium Compounds	8.90E-07 lb/ton	3.14E-05 tpy	1.20E-05 lb/ton	1.41E-04 tpy	1.73E-04 tpy
99	100414	Ethyl benzene	3.30E-03 lb/ton	1.17E-01 tpy	3.80E-04 lb/ton	4.47E-03 tpy	1.21E-01 tpy
109	5000	Formaldehyde	8.60E-04 lb/ton	3.04E-02 tpy	2.40E-03 lb/ton	2.82E-02 tpy	5.86E-02 tpy
124	N/A	Lead Compounds	7.40E-07 lb/ton	2.61E-05 tpy	3.30E-06 lb/ton	3.88E-05 tpy	6.50E-05 tpy
127	N/A	Manganese Compounds	9.90E-06 lb/ton	3.50E-04 tpy	1.10E-05 lb/ton	1.29E-04 tpy	4.79E-04 tpy
128	N/A	Mercury Compounds	4.50E-07 lb/ton	1.59E-05 tpy	7.30E-09 lb/ton	8.59E-08 tpy	1.60E-05 tpy
133	78933	Methyl ethyl ketone (2-Butanone)			2.00E-05 lb/ton	2.35E-04 tpy	2.35E-04 tpy
146	N/A	Nickel Compounds	4.20E-06 lb/ton	1.48E-04 tpy	1.50E-05 lb/ton	1.77E-04 tpy	3.25E-04 tpy
162	N/A	Polycyclic Organic Matter	1.27E-04 lb/ton	4.49E-03 tpy	5.81E-04 lb/ton	6.83E-03 tpy	1.13E-02 tpy
164	123386	Propionaldehyde			1.30E-04 lb/ton	1.53E-03 tpy	1.53E-03 tpy
169	106514	Quinone	2.70E-04 lb/ton	9.53E-03 tpy	1.60E-04 lb/ton	1.88E-03 tpy	1.14E-02 tpy
176	108883	Toluene	1.80E-03 lb/ton	6.36E-02 tpy	7.50E-04 lb/ton	8.83E-03 tpy	7.24E-02 tpy
185	1330207	Xylenes (isomers and mixture)	4.30E-03 lb/ton	1.52E-01 tpy	1.60E-04 lb/ton	1.88E-03 tpy	1.54E-01 tpy
			Total HAP Emissions	0.412 tpy	Total HAP Emissions	0.075 tpy	0.487 tpy

Notes/Comments:
 1. Reference: AP-42, Tables 11.1-9 and 11.1-12.
 2. Activity data from DOT and MOA.

Notes/Comments:
 1. Reference: AP-42, Tables 11.1-10 and 11.1-13.
 2. Activity data from DOT and MOA.

Asphalt Plants - Anchorage

Asphalt Plants Activity Data

DOT Contracts 1999

Engineers

Estimate	Units		
52,819 tons	=	52,819 tons	
5,103 tons	=	5,103 tons	
2,273 tons	=	2,273 tons	
126 tons	=	126 tons	
660 tons	=	660 tons	
177 tons	=	177 tons	
13,300 Mg	=	13,087 tons	
608 Mg	=	598 tons	
5,006 Mg	=	4,926 tons	
276 Mg	=	272 tons	
420 Mg	=	413 tons	
210 Mg	=	207 tons	

DOT total 80,661 tons

MOA total 13,490 tons

Anchorage total 94,151 tons

Notes:

1. DOT info from Contracts Report (engineer's estimates).
2. MoA info from Jerry Hansen, Project Manager.
3. Assume the following proportions: 75% to stationary NG-fired plants and 25% to diesel-fired mobile plants.
4. NG-fired = batch and Diesel = drum (conversation with operator at Wilder hot plant, Anchorage, 6/15/00).

Asphalt Paving - Anchorage

NG-Fired Batch Asphalt Plant	Oil-Fired Drum Asphalt Plant
Activity Data Input: 70,613 tons	Activity Data Input: 23,538 tons
Activity Period/Year: 1999 Year	Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>	
35	75070	Acetaldehyde	6.40E-04 lb/ton	3.84E-03 tpy	1.30E-03 lb/ton	2.60E-03 tpy	6.44E-03 tpy	
39	107028	Acrolein			2.60E-05 lb/ton	5.20E-05 tpy	5.20E-05 tpy	
48	71432	Benzene (including benzene from gasoline)	3.50E-04 lb/ton	2.10E-03 tpy	4.10E-04 lb/ton	8.20E-04 tpy	2.92E-03 tpy	
99	100414	Ethyl benzene	3.30E-03 lb/ton	1.98E-02 tpy	3.80E-04 lb/ton	7.60E-04 tpy	2.06E-02 tpy	
109	5000	Formaldehyde	8.60E-04 lb/ton	5.16E-03 tpy	2.40E-03 lb/ton	4.80E-03 tpy	9.96E-03 tpy	
133	78933	Methyl ethyl ketone (2-Butanone)			2.00E-05 lb/ton	4.00E-05 tpy	4.00E-05 tpy	
164	123386	Propionaldehyde			1.30E-04 lb/ton	2.60E-04 tpy	2.60E-04 tpy	
169	106514	Quinone	2.70E-04 lb/ton	1.62E-03 tpy	1.60E-04 lb/ton	3.20E-04 tpy	1.94E-03 tpy	
176	108883	Toluene	1.80E-03 lb/ton	1.08E-02 tpy	7.50E-04 lb/ton	1.50E-03 tpy	1.23E-02 tpy	
185	1330207	Xylenes (isomers and mixture)	4.30E-03 lb/ton	2.58E-02 tpy	1.60E-04 lb/ton	3.20E-04 tpy	2.61E-02 tpy	
			Total HAP Emissions	0.069 tpy	Total HAP Emissions	0.011 tpy	TOTAL	0.081 tpy

Notes/Comments:

1. Reference: AP-42, Tables 11.1-9 and 11.1-12.
2. Activity data from DOT and MOA.

Notes/Comments:

1. Reference: AP-42, Tables 11.1-10 and 11.1-13.
2. Activity data from DOT and MOA.

Asphalt Paving Activity Data - Anchorage

DOT Contracts 1999

Engineers

Estimate	Units	=	
52,819 ton		=	52,819 tons
5,103 ton		=	5,103 tons
2,273 ton		=	2,273 tons
126 ton		=	126 tons
660 ton		=	660 tons
177 ton		=	177 tons
13,300 Mg		=	13,087 tons
608 Mg		=	598 tons
5,006 Mg		=	4,926 tons
276 Mg		=	272 tons
420 Mg		=	413 tons
210 Mg		=	207 tons

DOT total	80,661 tons
MOA total	13,490 tons
Anchorage TOTAL	94,151 tons

Notes:

1. DOT info from Contracts Report (engineer's estimates).
2. MoA info from Jerry Hansen, Project Manager.
3. Assume the following proportions: 75% to stationary NG-fired plants and 25% to diesel-fired mobile plants.
4. NG-fired = batch and Diesel = drum (conversation with operator at Wilder hot plant, Anchorage, 6/15/00).

Source: Phone conversation with Summit Paving, Lake Otis, Anchorage, 344-2644. Assume 4 inches of pavement for 90% of roads. Assume remaining 10% of roads are private/residential and are ~3 inches in depth. Therefore, average weighted depth = 3.9 inches.

Phone conversation with Jerry at Emulsion Products in Anchorage, 277-7752

RC, MC, and SC very rarely used any more. On rare occasions MC30 is used in federal projects (therefore MC30 was used as a factor). MC30 thought to be 30% of diluent in cutback: Therefore 17% of cutback evaporated (see AP-42 Table 4.5-1).

Formula:

$$\text{Evoc} = \text{VOC emissions in lb/yr} = \text{QA} * (\text{WPEvap}/100)$$

$$\text{QA} = \text{mass of cutback asphalt used (lb)}$$

$$\text{WPEvap} = \text{weight \% of asphalt that evaporates}$$

Dry Cleaners - Anchorage

Dry Cleaners

Activity Data Input: 257,808 capita
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
174	127184	Tetrachloroethylene (Perchloroethylene)	1.3 lb/yr/capita	167.6 tpy
			Total HAP Emissions	168 tpy

Notes/Comments:

1. Reference: AP-42, Table 4.1-2.
2. Activity (population) data from MoA census information.

Residential Fireplaces - Anchorage

Residential Fireplaces

Activity Data Input: 30,252 tons

Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants

<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>
162	N/A	Polycyclic Organic Matter

Source Category Emission Calculations

<u>Emission Factor</u>	<u>Estimated Emissions</u>
1.60E-02 lb/ton	2.42E-01 tpy

Total HAP Emissions 0.242 tpy

Notes/Comments:

1. Reference: AP-42, Table 1.9-1.
2. Activity data extrapolated from 1990 CO study (see backup).

Estimated Woodstove and Fireplace Activity Data - Anchorage

<u>Description</u>	<u>Survey Data</u>						
	<u>West</u>	<u>East</u>	<u>South</u>	<u>Rabbit C.</u>	<u>North</u>	<u>Central</u>	<u>Eagle R.</u>
% households w/ woodstove*	7	0	8	32	5	0	19
% households w/ fireplace*	67	57	63	70	40	50	60
Number of Households*	11,359	16,989	11,141	5,992	14,815	2,065	8,129
Number of households w/ woodstove*	795	0	891	1,917	741	0	1,545
Number of households w/ fireplace*	7,611	9,684	7,019	4,194	5,926	1,033	4,877
Hrs of burning per week (houses w/fireplace or woodstove)*	5	1	3	6	1	2	18
wooduse (lb/hr) - woodstove*	4	4	4	4	4	4	4
wooduse (lb/hr) - fireplace*	11	11	11	11	11	11	11
Wooduse per week (lb) - woodstoves (sector)*	12,523	0	7,799	42,951	2,852	0	97,304
Wooduse per week - fireplaces (sector)*	376,721	138,477	193,018	295,286	71,705	17,036	965,725

Extrapolations

Wooduse per week - woodstoves (total - all sectors)	163,429 lb
Wooduse per week - fireplaces (total - all sectors)	2,057,968 lb
Total number of households 1990 (NAA, from above)	70,490
Total number of households 1990 (from census data for MoA)	82,702
Wooduse per week - woodstoves (total - all sectors) 1990 MoA data	191,742 lb
Wooduse per week - fireplaces (total - all sectors) 1990 MoA data	2,414,500 lb
Total population 1990 (MoA data)	226,338
Total population 1999 (MoA data)	257,808
Wooduse per week - woodstoves (total - all sectors) 1999	218,402 lb
Wooduse per week - fireplaces (total - all sectors) 1999	2,750,211 lb
Wooduse per Year - woodstoves (total - all sectors) 1999	2,402 ton/yr
Wooduse per Year - fireplaces (total - all sectors) 1999	30,252 ton/yr
assume wooduse from November - March (22 weeks)	

* Indicates data from Anchorage 1990 Base Year Carbon Monoxide Emission Inventory

Residential Woodstoves - Anchorage

Residential Woodstoves

Activity Data Input: 2,402 tons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene (including benzene from gasoline)	1.94E+00 lb/ton	2.33E+00 tpy
58	N/A	Cadmium Compounds	2.20E-05 lb/ton	2.64E-05 tpy
75	N/A	Chromium Compounds	1.00E-06 lb/ton	1.20E-06 tpy
127	N/A	Manganese Compounds	1.70E-02 lb/ton	2.04E-02 tpy
133	78933	Methyl ethyl ketone (2-Butanone)	2.90E-01 lb/ton	3.48E-01 tpy
145	91203	Naphthalene	2.88E-01 lb/ton	3.46E-01 tpy
146	N/A	Nickel Compounds	1.40E-05 lb/ton	1.68E-05 tpy
162	N/A	Polycyclic Organic Matter	7.30E-01 lb/ton	8.77E-01 tpy
176	108883	Toluene	7.30E-01 lb/ton	8.77E-01 tpy
185	1330207	Xylenes (isomers and mixture)	2.02E-01 lb/ton	2.43E-01 tpy
Total HAP Emissions			5.039 tpy	

Notes/Comments:

1. Reference: AP-42, Table 1.10-2, 10-3 and 10-4.
2. Activity data extrapolated from 1990 CO study (see backup).

Estimated Woodstove and Fireplace Activity Data - Anchorage

<u>Description</u>	<u>Survey Data</u>						
	<u>West</u>	<u>East</u>	<u>South</u>	<u>Rabbit C.</u>	<u>North</u>	<u>Central</u>	<u>Eagle R.</u>
% households w/ woodstove*	7	0	8	32	5	0	19
% households w/ fireplace*	67	57	63	70	40	50	60
Number of Households*	11,359	16,989	11,141	5,992	14,815	2,065	8,129
Number of households w/ woodstove*	795	0	891	1,917	741	0	1,545
Number of households w/ fireplace*	7,611	9,684	7,019	4,194	5,926	1,033	4,877
Hrs of burning per week (houses w/fireplace or woodstove)*	5	1	3	6	1	2	18
wooduse (lb/hr) - woodstove*	4	4	4	4	4	4	4
wooduse (lb/hr) - fireplace*	11	11	11	11	11	11	11
Wooduse per week (lb) - woodstoves (sector)*	12,523	0	7,799	42,951	2,852	0	97,304
Wooduse per week - fireplaces (sector)*	376,721	138,477	193,018	295,286	71,705	17,036	965,725
Extrapolations							
Wooduse per week - woodstoves (total - all sectors)	163,429 lb						
Wooduse per week - fireplaces (total - all sectors)	2,057,968 lb						
Total number of households 1990 (NAA, from above)	70,490						
Total number of households 1990 (from census data for MoA)	82,702						
Wooduse per week - woodstoves (total - all sectors) 1990 MoA data	191,742 lb						
Wooduse per week - fireplaces (total - all sectors) 1990 MoA data	2,414,500 lb						
Total population 1990 (MoA data)	226,338						
Total population 1999 (MoA data)	257,808						
Wooduse per week - woodstoves (total - all sectors) 1999	218,402 lb						
Wooduse per week - fireplaces (total - all sectors) 1999	2,750,211 lb						
Wooduse per Year - woodstoves (total - all sectors) 1999	2,402 ton/yr						
Wooduse per Year - fireplaces (total - all sectors) 1999	30,252 ton/yr						
Assume wooduse from November - March (22 weeks)							

* Indicates data from Anchorage 1990 Base Year Carbon Monoxide Emission Inventory

Gasoline Distribution / Service Stations - Anchorage

Gasoline Distribution - Service Stations
 Activity Data Input: 178,663,083 gallons
 Activity Period/Year: 2000 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene (including benzene from gasoline)	0.92 %	2.55 tpy
99	100414	Ethyl benzene	0.09 %	0.25 tpy
118	110543	Hexane	1.68 %	4.65 tpy
176	108883	Toluene	1.07 %	2.96 tpy
185	1330207	Xylenes (isomers and mixture)	0.47 %	1.30 tpy
186	95476	Xylenes (isomers and mixture)	0.13 %	0.36 tpy
			Total HAP Emissions	12.074 tpy

Gasoline Distribution / Service Stations - Anchorage

Gasoline Distribution Activity Data:

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 (Stage II controls)
EFvoc s = 0.7 lb/kgal VOC emission factor associated with spillage during automobile refilling

3.1 lb/kgal
3. Source: Phone conversation with Raymond Measles, Tesoro, Anchorage, June 13, 2000 (561-5521)
R.M. stated that all stations should have been converted to Stage I (filling) controls by now.
4. Speciate was used to obtain the refined emission factors (Profile Number 7000).

Anchorage 1999 Aggregated Fuel Sales (from ADEC)

Gasoline 178,663,083
Diesel 16,030,257 includes Diesel #1, Diesel #2, and Diesel #2 Blended
Jet A Fuel 34,166,580
Avgas 10,855,446
quantities are stated in GALLONS

Open Burning (Diesel) - Anchorage

Open Burning (Diesel)

Activity Data Input: 17,192 gallons

Activity Period/Year: 1999 Year

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	0.000 tpy
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.000 tpy
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.000 tpy
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.000 tpy
109	5000	Formaldehyde	1.214 lb/Mgal	0.010 tpy
118	110543	Hexane	0.269 lb/Mgal	0.002 tpy
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.000 tpy
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.000 tpy
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.000 tpy
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.000 tpy
Total HAP Emissions				0.013 tpy

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.
3. Firefighter training was the only activity considered in open burning.

Structural Fires - Anchorage

Activity Data Input: 406 total fires
 Activity Period: 1999 year

Section 112 Hazardous Air Pollutants

<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
39	107028	Acrolein	2.55E-05 lb/dscf	1.03E+00 tons
83	N/A	Cyanide Compounds	2.05E-04 lb/dscf	8.28E+00 tons
109	5000	Formaldehyde	5.91E-06 lb/dscf	2.39E-01 tons
120	7647010	Hydrochloric acid	8.73E-05 lb/dscf	3.53E+00 tons

Total HAP Emissions 13.081 tons

Notes/Comments:

1. Emission factors apply to sum of residential and nonresidential fires.
2. Activity data provided courtesy of State of Alaska Fire Marshall's Office, Anchorage.

Structural Fires Backup Data - Anchorage

F-Factor (Ref. 1)	9,570 dscf/MMBtu
HHV Factor (Ref. 2)	9,044 Btu/lb
Fuel Loading Factor (Ref. 2)	1.15 tons of material burned/fire

Sample calculation for volume of gas generated per amount burned:

$$\begin{aligned} & \text{Volume Gas Generated (dscf) / Material Burned (ton)} \\ &= \text{F-Factor (dscf/MMBtu)} * \text{HHV (Btu/lb)} * (1/2000) * (1/1e6) \\ &= 173,102 \text{ dscf / ton burned} \end{aligned}$$

Sample calculation for emission rate of acrolein produced per amount burned:

$$\begin{aligned} & \text{Weight of Gas Generated (lb) / Material Burned (ton)} \\ &= \text{Emission Factor (lb/dscf)} * \text{Volume Gas Generated Per Amount Burned (dscf/ton)} \\ &= 4.41 \text{ lb Acrolein / ton burned} \end{aligned}$$

Sample calculation for emission estimate for Acrolein:

$$\begin{aligned} &= \text{Number of Fires} * \text{Fuel Loading Factor (tons of material burned/fire)} * \text{Emission Rate of Acrolein (lb/ton burned)} \\ &= 1.03\text{E}+00 \text{ tons of Acrolein} \end{aligned}$$

Notes/Comments:

1. Reference: Development of Area Source Hazardous Air Pollutant Inventories, Vol 1: Air Toxic Emission Inventory.
2. Reference: EIIP Volume III, Area Sources Preferred and Alternative Methods.

Consumer Products - Anchorage

		Personal Care Products		Household Products		Automotive Aftermarket Products		Adhesives & Sealants		FIFRA-Regulated Products		Coatings & Related Products		Miscellaneous		Total - All Categories		
		Activity Data: 257,808 Capita		Activity Data: 257,808 Capita		Activity Data: 257,808 Capita		Activity Data: 257,808 Capita		Activity Data: 257,808 Capita		Activity Data: 257,808 Capita		Activity Data: 257,808 Capita				
		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year				
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		Emissions		
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															2.06E+01 tons	
12	106467	1,4-Dichlorobenzene(p)			4.79E-02 lb/yr/cap	6.17E+00 tons											1.07E+01 tons	
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)							1.09E-05 lb/yr/cap	1.41E-03 tons							1.41E-03 tons	
25	79469	2-Nitropropane							2.12E-06 lb/yr/cap	2.73E-04 tons							2.73E-04 tons	
36	60355	Acetamide	1.38E-07 lb/yr/cap	1.78E-05 tons													1.78E-05 tons	
38	98862	Acetophenone											8.53E-06 lb/yr/cap	1.10E-03 tons			1.10E-03 tons	
41	79107	Acrylic Acid							3.94E-09 lb/yr/cap	5.08E-07 tons							5.08E-07 tons	
48	71432	Benzene (including benzene from gasoline)					4.72E-06 lb/yr/cap	6.08E-04 tons									6.08E-04 tons	
63	56235	Carbon tetrachloride															5.23E-08 tons	
70	108907	Chlorobenzene											7.16E-02 lb/yr/cap	9.23E+00 tons			9.23E+00 tons	
72	67663	Chloroform															1.28E-01 tons	
86	132649	Dibenzofurans							3.60E-05 lb/yr/cap	4.64E-03 tons							1.04E-03 tons	
94	68122	Dimethyl formamide	2.71E-05 lb/yr/cap	3.49E-03 tons			2.78E-08 lb/yr/cap	3.58E-06 tons	8.07E-06 lb/yr/cap	1.04E-03 tons							4.48E-03 tons	
99	100414	Ethyl benzene			2.56E-06 lb/yr/cap	3.30E-04 tons	7.51E-05 lb/yr/cap	9.68E-03 tons	2.29E-07 lb/yr/cap	2.95E-05 tons							2.68E-01 tons	
103	107062	Ethylene dichloride (1,2-Dichloroethane)	4.62E-06 lb/yr/cap	5.96E-04 tons	3.52E-08 lb/yr/cap	4.54E-06 tons			1.36E-05 lb/yr/cap	1.75E-03 tons			1.30E-03 lb/yr/cap	1.68E-01 tons	6.86E-04 lb/yr/cap	8.84E-02 tons	6.00E-04 tons	
106	75218	Ethylene oxide			6.74E-06 lb/yr/cap	8.69E-04 tons											1.95E+00 tons	
109	5000	Formaldehyde							2.51E-05 lb/yr/cap	3.24E-03 tons							1.63E-01 tons	
110	N/A	Glycol ethers	1.52E-05 lb/yr/cap	1.96E-03 tons	5.31E-03 lb/yr/cap	6.84E-01 tons	2.69E-02 lb/yr/cap	3.47E+00 tons	1.28E-04 lb/yr/cap	1.65E-02 tons							5.22E+00 tons	
118	110543	Hexane			2.09E-03 lb/yr/cap	2.69E-01 tons	3.53E-03 lb/yr/cap	4.55E-01 tons	7.83E-02 lb/yr/cap	1.01E+01 tons							1.11E+01 tons	
120	7647010	Hydrochloric acid			1.75E-06 lb/yr/cap	2.26E-04 tons											2.26E-04 tons	
121	7664393	Hydrogen fluoride (Hydrofluoric acid)			8.75E-08 lb/yr/cap	1.13E-05 tons	1.41E-05 lb/yr/cap	1.82E-03 tons									1.83E-03 tons	
123	78591	Isophorone															1.22E-01 tons	
129	67561	Methanol	5.67E-07 lb/yr/cap	7.31E-05 tons	6.66E-04 lb/yr/cap	8.59E-02 tons	6.61E-01 lb/yr/cap	8.52E+01 tons	6.82E-04 lb/yr/cap	8.79E-02 tons			9.47E-04 lb/yr/cap	1.22E-01 tons	1.60E-02 lb/yr/cap	2.06E+00 tons	8.99E+01 tons	
131	74839	Methyl bromide(Bromomethane)															2.86E+01 tons	
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	7.45E-04 lb/yr/cap	9.60E-02 tons	2.85E-02 lb/yr/cap	3.67E+00 tons	7.63E-02 lb/yr/cap	9.84E+00 tons	2.14E-01 lb/yr/cap	2.76E+01 tons							4.99E+01 tons	
133	78933	Methyl ethyl ketone (2-Butanone)	1.75E-05 lb/yr/cap	2.26E-03 tons	4.49E-03 lb/yr/cap	5.79E-02 tons	3.04E-03 lb/yr/cap	3.92E-01 tons	3.91E-02 lb/yr/cap	5.04E+00 tons							6.52E+00 tons	
136	108101	Methyl isobutyl ketone (Hexone)			1.08E-04 lb/yr/cap	1.39E-02 tons	8.73E-04 lb/yr/cap	1.13E-01 tons	1.24E-03 lb/yr/cap	1.60E-01 tons							9.76E-01 tons	
139	1634044	Methyl tert butyl ether															3.04E-03 tons	
141	75092	Methylene chloride(Dichloromethane)			2.39E-03 lb/yr/cap	3.08E-01 tons	4.83E-03 lb/yr/cap	6.23E-01 tons	8.78E-03 lb/yr/cap	1.13E+00 tons							4.69E+00 tons	
145	91203	Naphthalene			5.52E-07 lb/yr/cap	7.12E-05 tons	2.26E-06 lb/yr/cap	2.91E-04 tons	1.07E-04 lb/yr/cap	1.38E-02 tons							5.94E+00 tons	
174	127184	Tetrachloroethylene (Perchloroethylene)			2.96E-03 lb/yr/cap	3.82E-01 tons	2.35E-02 lb/yr/cap	3.03E+00 tons	6.75E-04 lb/yr/cap	8.70E-02 tons							3.64E+00 tons	
176	106883	Toluene	3.41E-03 lb/yr/cap	4.40E-01 tons	5.82E-04 lb/yr/cap	7.50E-02 tons	2.49E-02 lb/yr/cap	3.21E+00 tons	8.43E-02 lb/yr/cap	1.09E+01 tons							5.53E+01 tons	
178	79016	Trichloroethylene			4.34E-05 lb/yr/cap	5.59E-03 tons	2.67E-04 lb/yr/cap	3.44E-02 tons	3.88E-05 lb/yr/cap	5.00E-03 tons							6.27E-02 tons	
179	121448	Triethylamine															1.08E-01 tons	
181	108054	Vinyl acetate							4.94E-08 lb/yr/cap	6.37E-06 tons							6.37E-06 tons	
185	1330207	Xylenes (isomers and mixture)			3.28E-03 lb/yr/cap	4.23E-01 tons	1.20E-02 lb/yr/cap	1.55E+00 tons	9.76E-03 lb/yr/cap	1.26E+00 tons							2.62E+01 tons	
		Total HAPs	0.5 tons		Total HAPs	12.2 tons	Total HAPs	107.9 tons	Total HAPs	56.4 tons	Total HAPs	97.6 tons	Total HAPs	54.3 tons	Total HAPs	2.6 tons	Total	331.5 tons

Notes/Comments (all categories):

1. Reference: EIP Volume III, Area Sources Preferred and Alternative Methods.
2. Activity (population) data based on Anchorage Bowl Comprehensive Plan (March 2000).

Residential / Commercial Fuel Oil Heating - Anchorage

Residential/Commercial Heating - Oil

Activity Data Input: 2,558,119 gallons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.001 tons
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.000 tons
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.002 tons
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.012 tons
109	5000	Formaldehyde	1.214 lb/Mgal	1.553 tons
118	110543	Hexane	0.269 lb/Mgal	0.344 tons
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.002 tons
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.002 tons
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.001 tons
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.003 tons
Total HAP Emissions			1.920 tpy	

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.
3. Activity data from from 1990 Anchorage CO Emissions Inventory (see backup info).

Residential / Commercial Fuel Oil Heating - Anchorage
Estimated Residential/Commercial Activity

<u>Description</u>	<u>Data/Extrapolations</u>
Total number of households 1990 (US Census data for MoA)	82,702
Total Anchorage population, 1990 (US Census data for MoA)	226,338
Total Anchorage population, 1999 (MoA data)	257,808
Calculated number of households in MoA, 1999	94,201
Percentage of Households w/ Oil Heat	1.2 %
Calculated number of households in MoA w/ Oil Heat, 1999	1130
Estimated Daily fuel Oil Use (households w/ oil heat; average for year)*	6.2 gal/day
Estimated Total Daily Fuel Oil Use	7009 gal/day
Estimated Total Annual Fuel Oil Use	2,558,119 gal/yr

* Indicates data from Fairbanks 1990 Base Year Carbon Monoxide Emission Inventory (Sierra Research)

Residential / Commercial Natural Gas Heating - Anchorage

Residential / Commercial Heating - NG

Activity Data Input: 28,835 MMscf
Activity Period/Year: 1999 Year

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	1.73E-02 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	2.00E-04 lb/MMscf	2.88E-03 tpy
48	71432	Benzene (including benzene from gasoline)	2.10E-03 lb/MMscf	3.03E-02 tpy
52	N/A	Beryllium Compounds	1.20E-05 lb/MMscf	1.73E-04 tpy
58	N/A	Cadmium Compounds	1.10E-03 lb/MMscf	1.59E-02 tpy
75	N/A	Chromium Compounds	1.40E-03 lb/MMscf	2.02E-02 tpy
76	N/A	Cobalt Compounds	8.40E-05 lb/MMscf	1.21E-03 tpy
109	5000	Formaldehyde	7.50E-02 lb/MMscf	1.08E+00 tpy
118	110543	Hexane	1.80E+00 lb/MMscf	2.60E+01 tpy
127	N/A	Manganese Compounds	3.80E-04 lb/MMscf	5.48E-03 tpy
128	N/A	Mercury Compounds	2.60E-04 lb/MMscf	3.75E-03 tpy
145	91203	Naphthalene	6.10E-04 lb/MMscf	8.79E-03 tpy
146	N/A	Nickel Compounds	2.10E-03 lb/MMscf	3.03E-02 tpy
171	N/A	Selenium Compounds	2.40E-05 lb/MMscf	3.46E-04 tpy
176	108883	Toluene	3.40E-03 lb/MMscf	4.90E-02 tpy
Total HAP Emissions			27.22 tpy	

Notes/Comments:

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

Residential Commercial NG Heating Activity Data - Anchorage

Residential/Commercial NG Heating Activity Data

Number of Households in non-attainment area (NAA)*	11,359
West	16,989
East	14,815
North	2,065
Central	
Total number of households 1990 (NAA, from above)	45,228
Total number of households 1990 (US Census data for MoA)	82,702
Total Anchorage population, 1990	226,338
Residential/Commercial Natural Gas consumption in NAA, 1990*	13,844 MMscf
Extrapolated Residential/Commercial Natural Gas consumption in MoA, 1990	25,315 MMscf
Calculated number of households in NAA, 1999	51,516
Calculated number of households in MoA, 1999	94,201
Total Anchorage population, 1999	257,808
Extrapolated Residential/Commercial Natural Gas consumption in NAA, 1999	15,769 MMscf
Extrapolated Residential/Commercial Natural Gas consumption in MoA, 1999	28,835 MMscf

* Indicates data from Anchorage 1990 Base Year Carbon Monoxide Emission Inventory, Sierra Research, 1993.

Surface Coating - Anchorage

Architectural Coatings	Product Coatings	Special Purpose Coatings
Water-based Activity Data: 445,504 gallons Activity Period: 1998 Year	Oil-based Activity Data: 190,930 gallons Activity Period: 1998 Year	Activity Data: 165,382 gallons Activity Period: 1998 Year

Section 112 Hazardous Air Pollutants			Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categories
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Emissions
48	71432	Benzene (including benzene from gasoline)	0.36 %	0.9 tpy							0.89 tpy
99	100414	Ethyl benzene			0.54 %	2.3 tpy					2.28 tpy
101	75003	Ethyl chloride (Chloroethane)	0.62 %	1.5 tpy							1.52 tpy
104	107211	Ethylene glycol	0.58 %	1.4 tpy							1.43 tpy
133	78933	Methyl ethyl ketone (2-Butanone)			0.54 %	2.3 tpy	8.1 %	61.3 tpy	8.1 %	22.9 tpy	86.47 tpy
136	108101	Methyl isobutyl ketone (Hexone)			0.36 %	1.5 tpy	5.9 %	44.6 tpy	5.9 %	16.7 tpy	62.85 tpy
140	74873	Methylchloride (Chloromethane)	0.55 %	1.4 tpy							1.35 tpy
141	75092	Methylene chloride(Dichloromethane)	5.52 %	13.6 tpy							13.57 tpy
176	108883	Toluene			37.87 %	159.7 tpy	14.7 %	111.2 tpy	14.7 %	41.6 tpy	312.45 tpy
181	108054	Vinyl acetate	0.12 %	0.3 tpy							0.30 tpy
185	1330207	Xylenes (isomers and mixture)			3.7 %	15.6 tpy	15.8 %	119.5 tpy	15.8 %	44.7 tpy	179.83 tpy
186	95476	Xylenes (isomers and mixture)			4.47 %	18.8 tpy					18.84 tpy
Total HAPs			19.1 tpy	19.1 tpy	Total HAPs	200.2 tpy	Total HAPs	336.6 tpy	Total HAPs	125.9 tpy	681.8 tpy

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-base 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, Coating Application, Water-based Paint Industrial.

Surface Coating Backup Data - Anchorage

Surface Coatings Calculations, Based on Population (1999)

U.S. Population 272,690,813

Alaska Populations:	<u>1998</u>	<u>1999</u>	
Anchorage	255,618	257,808	
Fairbanks	84,253	84,366	
Juneau	30,143	30,192	

United States 1998 Quantity of Shipments of Paint, Varnish, and Lacquer (Gallons)

Location	Percent of US Population	Architectural Coatings	Product Coatings	Special Purpose	TOTAL GALLONS
USA	100%	673,174,000	467,584,000	174,929,000	1,315,687,000

Data from 1998 US Census Bureau Report MA32F(98)-1: Paint and Allied Products

1999 Surface Coating Allocation, Based on Population (Gallons)

Location	1998 % of US Population	Architectural Coatings	Product Coatings	Special Purpose	TOTAL GALLONS
Anchorage	0.0937%	636,434	442,064	165,382	1,243,880
Fairbanks	0.0309%	209,772	145,707	54,511	409,989
Juneau	0.0111%	75,050	52,129	19,502	146,681
TOTAL		921,255	639,900	239,395	1,800,550

VOC Emissions (Pounds)

Location	1998 % of US Population	Architectural Coatings		Product Coatings	Special Purpose
		Water-based	Oil-based		
Anchorage	0.0937%	491,836	843,147	1,512,921	566,003
Fairbanks	0.0309%	162,112	277,906	498,667	186,557
Juneau	0.0111%	57,998	99,426	178,407	66,744
TOTAL		711,946	1,220,479	2,189,994	819,304

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.

Definitions:

Architectural

Exterior waterborne (latex)
 Interior waterborne (latex)
 Exterior solvent-borne (oil)
 Interior solvent-borne (oil)
 Architectural lacquers
 "Do-it-yourself" wood and furniture finishes

Special Purpose Coatings:

Industrial maintenance paints (interior, exterior)
 Marine coatings (off-shore structures, marine refinishing coatings)
 Traffic paints
 Metallic paints (aluminum, zinc bronze, etc.)
 Automobile refinishing coatings
 Aerosol paints
 Roof coatings
 Multi-color paints

Product Coatings

Automotive finishes
 Truck and bus finishes
 Other transportation finishes (aircraft, railroad, etc.)
 Wood and composition board flat-stock finishes
 Wood furniture and fixture finishes
 Appliance finishes
 Sheet, strip and coil coatings on metals
 Metal decorating finishes (can, container and closure coatings)
 Machinery and equipment finishes
 Paper and paperboard coatings (not ink)
 Metal furniture and fixtures finishes
 Electrical insulating varnishes
 Magnet wire coatings

Percentages based on 1999 Population data (<http://venus.census.gov/cdrom/lookup/961017877>)

Used Oil Combustion - Anchorage

Activity Data Input: **650,607 gallons**
 Activity Period/Year: **1999 Year**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
12	106467	1,4-Dichlorobenzene(p)	8.30E-07 lb/kgal	2.70E-07 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	2.50E-03 lb/kgal	8.13E-04 tpy
52	N/A	Beryllium Compounds	1.80E-03 lb/kgal	5.86E-04 tpy
58	N/A	Cadmium Compounds	2.90E-04 lb/kgal	9.43E-05 tpy
75	N/A	Chromium Compounds	1.90E-01 lb/kgal	6.18E-02 tpy
76	N/A	Cobalt Compounds	7.60E-03 lb/kgal	2.47E-03 tpy
145	91203	Naphthalene	1.20E-02 lb/kgal	3.90E-03 tpy
Total HAP Emissions			0.070 tpy	

Notes/Comments:

1. Reference: AP-42, Section 1.11, including 1996 revisions.
2. Activity data also from AP-42, Section 1.11.

Used Oil Combustion Activity Data - Anchorage

Used Oil Combustion, Based on Population (1999)

U.S. Population (1983)	233,791,994
U.S. Population (1999)	272,690,813
Alaska Populations:	
Anchorage	257,808
Fairbanks	84,366
Juneau	30,192

United States Quantity of Used Oil Burned (Gallons)

Location	Used Oil Burned (1983)	Estimated Used Oil Burned (1999)
USA	590,000,000	688,165,480

1983 data from from AP-42section 1.11, Waste Oil Combustion

Population data from US Census web-site

Used-oil Combustion Allocation, Based on 1999 Population (Gallons)

Location	Percent of US Population*	Gallons Used Oil Burned (1999)
Anchorage	0.0945%	650,607
Fairbanks	0.0309%	212,907
Juneau	0.0111%	76,193
TOTAL	0.1366%	939,707

*Percentages based on 1999 Population data (<http://venus.census.gov/cdrom/lookup/961017877>)

Wildfires - Anchorage

Anchorage Wildfires

Activity Data Input: 781 acres
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants		
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>
9	106990	1,3-Butadiene

Source Category Emission Calculations	
<u>Emission Factor</u>	<u>Estimated Emissions</u>
0.520 lb/lb/ VOC	2.924 tons
Total HAP Emissions	2.924 tons

Notes/Comments:

1. Reference: AP-42, Tables 13.1-1 and 13.1-2 and Speciate.
2. Activity data from AK Division of Forestry website.
3. Emission Factor Development:
 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

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9	Facility No. 10	TOTAL
No.	CAS No.	Chemical Name	AK Seafood Int.	Airline Support	Native Med Ctr	ML&P Plant 1	ML&P Plant 2	Air Traffic Ctr	AIA	WWater Facility	Chevron Ter.	Equilon Ter.	Facilities 1-10
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----	0.003 tpy	-----	-----	0.003 tpy
7	106887	1,2-Epoxybutane	-----	-----	-----	-----	-----	-----	-----	0.005 tpy	-----	-----	0.005 tpy
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
10	542756	1,3-Dichloropropene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	-----	0.000 tpy	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
14	540841	2,24-Trimethylpentane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	-----	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.008 tpy	-----	-----	0.005 tpy	0.157 tpy	0.000 tpy	0.000 tpy	0.160 tpy	-----	-----	0.330 tpy
36	60355	Acetamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
38	98862	Acetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
39	107028	Acrolein	0.001 tpy	-----	-----	0.001 tpy	0.025 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	0.027 tpy
40	79061	Acrylamide	-----	-----	-----	-----	-----	-----	-----	0.160 tpy	-----	-----	0.160 tpy
41	79107	Acrylic Acid	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
42	107131	Acrylonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	-----	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.001 tpy	-----	-----	0.001 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.118 tpy	-----	-----	0.119 tpy
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	0.010 tpy	0.000 tpy	0.000 tpy	0.001 tpy	0.047 tpy	0.000 tpy	0.542 tpy	-----	0.100 tpy	0.250 tpy	0.951 tpy
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	-----	-----	-----	-----	-----	-----	-----	0.006 tpy	-----	-----	0.006 tpy
52	N/A	Beryllium Compounds	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.093 tpy	-----	-----	0.093 tpy
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9	Facility No. 10	TOTAL
No.	CAS No.	Chemical Name	AK Seafood Int.	Airline Support	Native Med Ctr	ML&P Plant 1	ML&P Plant 2	Air Traffic Ctr	AIA	WWater Facility	Chevron Ter.	Equilon Ter.	Facilities 1-10
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
58	N/A	Cadmium Compouns	0.001 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.006 tpy	-----	-----	0.007 tpy
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
61	63252	Carbaryl	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.000 tpy
62	75150	Carbon disulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	0.000 tpy
64	463581	Carbonyl sulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
65	120809	Catechol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
69	79118	Chloroacetic acid	-----	-----	-----	-----	-----	-----	-----	0.005 tpy	-----	-----	0.005 tpy
70	108907	Chlorobenzene	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.000 tpy
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
72	67663	Chloroform	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.006 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	-----	-----	-----	0.007 tpy
76	N/A	Cobalt Compounds	-----	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	-----	-----	-----	0.000 tpy
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
82	98828	Cumene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
83	N/A	Cyanide Compounds	-----	-----	-----	-----	-----	-----	-----	0.320 tpy	-----	-----	0.320 tpy
84	3547044	DDE	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.000 tpy
85	334883	Diazomethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	-----	-----	-----	0.004 tpy	0.126 tpy	-----	0.002 tpy	-----	-----	-----	0.131 tpy
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
104	107211	Ethylene glycol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9	Facility No. 10	TOTAL
No.	CAS No.	Chemical Name	AK Seafood Int.	Airline Support	Native Med Ctr	ML&P Plant 1	ML&P Plant 2	Air Traffic Ctr	AIA	WWater Facility	Chevron Ter.	Equilon Ter.	Facilities 1-10
109	5000	Formaldehyde	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
110	N/A	Glycol ethers	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	110543	Hexane	0.180 tpy	0.046 tpy	0.088 tpy	-----	-----	-----	0.014 tpy	-----	0.371 tpy	0.500 tpy	1.199 tpy
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	-----	0.024 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.024 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
122	123319	Hydroquinone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
123	78591	Isophorone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
124	N/A	Lead Compounds	0.001 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.001 tpy	-----	-----	-----	0.002 tpy
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.001 tpy	0.000 tpy	0.000 tpy	0.001 tpy	0.001 tpy	-----	0.000 tpy	-----	-----	-----	0.003 tpy
128	N/A	Mercury Compounds	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.001 tpy	0.051 tpy	-----	-----	0.052 tpy
129	67561	Methanol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.000 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
133	78933	Methyl ethyl ketone (2-Butanone)	-----	-----	-----	-----	-----	-----	0.073 tpy	-----	-----	-----	0.073 tpy
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	-----	-----	-----	-----	-----	-----	-----	0.003 tpy	-----	-----	0.003 tpy
140	74873	Methylchloride (Chloromethane)	-----	-----	-----	-----	-----	-----	-----	0.038 tpy	-----	-----	0.038 tpy
141	75092	Methylene chloride(Dichloromethane)	-----	-----	-----	-----	-----	-----	3.570 tpy	-----	-----	-----	3.570 tpy
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----	-----	-----	-----	-----	-----	0.058 tpy	-----	-----	0.058 tpy
143	N/A	Mineral fibers	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.000 tpy
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
145	91203	Naphthalene	0.001 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.005 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	0.006 tpy
146	N/A	Nickel Compounds	0.002 tpy	0.000 tpy	0.000 tpy	0.003 tpy	0.002 tpy	-----	0.000 tpy	-----	-----	-----	0.007 tpy
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	-----	-----	-----	-----	-----	-----	-----	0.038 tpy	-----	-----	0.038 tpy
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromitrobenzene (Quintobenzene)	-----	-----	-----	-----	-----	-----	-----	0.141 tpy	-----	-----	0.141 tpy
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	0.000 tpy
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	-----	-----	-----	0.001 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.001 tpy
159	7803512	Phosphine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	-----	0.000 tpy	0.000 tpy	0.000 tpy	0.009 tpy	-----	0.111 tpy	0.001 tpy	-----	-----	0.121 tpy

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9	Facility No. 10	TOTAL
No.	CAS No.	Chemical Name	AK Seafood Int.	Airline Support	Native Med Ctr	ML&P Plant 1	ML&P Plant 2	Air Traffic Ctr	AIA	WWater Facility	Chevron Ter.	Equilon Ter.	Facilities 1-10
163	106503	p-Phenylemediamine	0.824 tpy	0.002 tpy	0.004 tpy	0.086 tpy	2.786 tpy	0.000 tpy	0.008 tpy	-----	-----	-----	3.710 tpy
164	123386	Propionaldehyde	-----	-----	-----	-----	-----	-----	0.018 tpy	0.061 tpy	-----	-----	0.079 tpy
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
169	106514	Quinone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	-----	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy
172	100425	Styrene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	-----	-----	-----	-----	-----	-----	0.001 tpy	0.048 tpy	-----	-----	0.049 tpy
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
176	108883	Toluene	0.004 tpy	0.000 tpy	0.000 tpy	0.016 tpy	0.510 tpy	0.000 tpy	4.090 tpy	-----	0.073 tpy	0.500 tpy	5.193 tpy
177	8001352	Toxaphene (chlorinated camphene)	-----	-----	-----	-----	-----	-----	-----	0.003 tpy	-----	-----	0.003 tpy
178	79016	Trichloroethylene	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	0.001 tpy
179	121448	Triethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
182	593602	Vinyl bromide	-----	-----	-----	-----	-----	-----	-----	0.042 tpy	-----	-----	0.042 tpy
183	75014	Vinyl chloride	-----	-----	-----	-----	-----	-----	-----	0.006 tpy	-----	-----	0.006 tpy
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----	-----	-----	-----	-----	-----	0.006 tpy	-----	-----	0.006 tpy
185	1330207	Xylenes (isomers and mixture)	0.003 tpy	-----	-----	0.008 tpy	0.251 tpy	0.000 tpy	0.001 tpy	0.006 tpy	0.017 tpy	0.250 tpy	0.535 tpy
186	95476	Xylenes (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	0.006 tpy	-----	-----	0.006 tpy
187	108383	Xylenes (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	0.010 tpy	-----	-----	0.010 tpy
188	106423	Xylenes (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	0.030 tpy	-----	-----	0.030 tpy
Total HAP Emissions			1.04 tpy	0.07 tpy	0.09 tpy	0.13 tpy	3.92 tpy	0.001 tpy	8.43 tpy	1.42 tpy	0.56 tpy	1.50 tpy	17.2 tpy

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			TOTAL	Facility No. 11	Facility No. 12	Facility No. 13	Facility No. 14	Facility No. 15	Facility No. 16	Facility No. 17	Facility No. 18	Facility No. 19	TOTAL
No.	CAS No.	Chemical Name	Facilities 1-10	AS&G Klatt Rd	AS&G Recycle	CEA IGT	Delta Storage	EAFB	Ft Richardson	Providence	Tesoro Ter.	Williams Ter.	Area Facilities
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----	-----	0.010 tpy	-----	-----	-----	0.010 tpy
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	0.003 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.003 tpy
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	0.005 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.005 tpy
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	0.001 tpy
10	542756	1,3-Dichloropropene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	0.000 tpy	-----	0.000 tpy	-----	0.000 tpy	0.008 tpy	-----	0.001 tpy	-----	-----	0.009 tpy
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
14	540841	2,2,4-Trimethylpentane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Tolluene diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.330 tpy	0.013 tpy	-----	0.001 tpy	-----	0.021 tpy	-----	0.051 tpy	-----	-----	0.416 tpy
36	60355	Acetamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----	0.041 tpy	-----	-----	-----	-----	0.041 tpy
38	98862	Acetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
39	107028	Acrolein	0.027 tpy	0.000 tpy	-----	0.000 tpy	-----	0.002 tpy	-----	0.008 tpy	-----	-----	0.038 tpy
40	79061	Acrylamide	0.160 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.160 tpy
41	79107	Acrylic Acid	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
42	107131	Acrylonitrile	-----	-----	-----	-----	-----	-----	0.010 tpy	-----	-----	-----	0.010 tpy
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.001 tpy	-----	0.000 tpy	-----	0.000 tpy	0.000 tpy	0.010 tpy	0.000 tpy	-----	-----	0.011 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	0.119 tpy	0.000 tpy	-----	-----	-----	0.001 tpy	0.010 tpy	-----	-----	-----	0.130 tpy
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	0.951 tpy	0.007 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.071 tpy	0.080 tpy	0.017 tpy	0.136 tpy	0.113 tpy	1.375 tpy
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
50	98077	Benzotrithloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	0.006 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.006 tpy
52	N/A	Beryllium Compounds	0.093 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.000 tpy	0.010 tpy	0.000 tpy	-----	-----	0.103 tpy
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			TOTAL	Facility No. 11	Facility No. 12	Facility No. 13	Facility No. 14	Facility No. 15	Facility No. 16	Facility No. 17	Facility No. 18	Facility No. 19	TOTAL
No.	CAS No.	Chemical Name	Facilities 1-10	AS&G Klatt Rd	AS&G Recycle	CEA IGT	Delta Storage	EAFB	Ft Richardson	Providence	Tesoro Ter.	Williams Ter.	Area Facilities
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
58	N/A	Cadmium Compounds	0.007 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.009 tpy	0.010 tpy	0.001 tpy	-----	-----	0.027 tpy
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
61	63252	Carbaryl	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
62	75150	Carbon disulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	0.000 tpy	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	0.001 tpy
64	463581	Carbonyl sulfide	-----	-----	-----	-----	-----	0.004 tpy	-----	-----	-----	-----	0.004 tpy
65	120809	Catechol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	0.001 tpy
69	79118	Chloroacetic acid	0.005 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.005 tpy
70	108907	Chlorobenzene	0.000 tpy	-----	-----	-----	-----	0.003 tpy	-----	-----	-----	-----	0.004 tpy
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
72	67663	Chloroform	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	0.000 tpy
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.007 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.006 tpy	0.030 tpy	0.001 tpy	-----	-----	0.044 tpy
76	N/A	Cobalt Compounds	0.000 tpy	-----	0.000 tpy	-----	0.000 tpy	0.000 tpy	0.010 tpy	0.000 tpy	-----	-----	0.010 tpy
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
82	98828	Cumene	-----	-----	-----	-----	-----	0.000 tpy	0.010 tpy	-----	-----	-----	0.010 tpy
83	N/A	Cyanide Compounds	0.320 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.320 tpy
84	3547044	DDE	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
85	334883	Diazomethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	-----	-----	-----	-----	-----	0.027 tpy	-----	-----	-----	-----	0.027 tpy
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----	-----	-----	0.002 tpy	-----	-----	-----	-----	0.002 tpy
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	0.131 tpy	0.068 tpy	-----	0.001 tpy	-----	0.077 tpy	0.050 tpy	0.041 tpy	0.010 tpy	0.021 tpy	0.398 tpy
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
104	107211	Ethylene glycol	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	0.000 tpy
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			TOTAL	Facility No. 11	Facility No. 12	Facility No. 13	Facility No. 14	Facility No. 15	Facility No. 16	Facility No. 17	Facility No. 18	Facility No. 19	TOTAL
No.	CAS No.	Chemical Name	Facilities 1-10	AS&G Klatt Rd	AS&G Recycle	CEA IGT	Delta Storage	EAFB	Ft Richardson	Providence	Tesoro Ter.	Williams Ter.	Area Facilities
109	5000	Formaldehyde	-----	0.043 tpy	0.000 tpy	0.013 tpy	0.001 tpy	0.290 tpy	0.100 tpy	0.956 tpy	-----	-----	1.403 tpy
110	N/A	Glycol ethers	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----	0.059 tpy	-----	-----	-----	-----	0.059 tpy
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	110543	Hexane	1.199 tpy	0.006 tpy	0.000 tpy	-----	0.029 tpy	6.294 tpy	0.200 tpy	1.225 tpy	0.119 tpy	0.227 tpy	9.298 tpy
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	0.024 tpy	-----	-----	-----	-----	-----	1.500 tpy	-----	-----	-----	1.524 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	-----	-----	-----	-----	-----	0.001 tpy	0.190 tpy	-----	-----	-----	0.191 tpy
122	123319	Hydroquinone	-----	-----	-----	-----	-----	0.021 tpy	-----	-----	-----	-----	0.021 tpy
123	78591	Isophorone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
124	N/A	Lead Compounds	0.002 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.003 tpy	0.010 tpy	0.003 tpy	-----	-----	0.019 tpy
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.003 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.001 tpy	0.010 tpy	0.000 tpy	-----	-----	0.015 tpy
128	N/A	Mercury Compounds	0.052 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.002 tpy	0.010 tpy	0.000 tpy	-----	-----	0.064 tpy
129	67561	Methanol	-----	-----	-----	-----	-----	0.033 tpy	-----	-----	-----	-----	0.033 tpy
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	-----	-----	-----	-----	-----	0.272 tpy	-----	-----	-----	-----	0.272 tpy
133	78933	Methyl ethyl ketone (2-Butanone)	0.073 tpy	-----	-----	-----	-----	0.598 tpy	0.020 tpy	-----	-----	-----	0.691 tpy
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	-----	-----	-----	-----	-----	0.690 tpy	0.010 tpy	-----	-----	-----	0.700 tpy
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	0.003 tpy	-----	-----	-----	-----	0.036 tpy	-----	-----	-----	-----	0.039 tpy
140	74873	Methylchloride (Chloromethane)	0.038 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.038 tpy
141	75092	Methylene chloride(Dichloromethane)	3.570 tpy	-----	-----	-----	-----	0.148 tpy	0.030 tpy	-----	-----	-----	3.748 tpy
142	101688	Methylene diphenyl diisocyanate (MDI)	0.058 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.058 tpy
143	N/A	Mineral fibers	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
145	91203	Naphthalene	0.006 tpy	0.001 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.005 tpy	0.010 tpy	0.002 tpy	-----	-----	0.025 tpy
146	N/A	Nickel Compounds	0.007 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.007 tpy	0.010 tpy	0.001 tpy	-----	-----	0.026 tpy
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	0.038 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.038 tpy
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromitrobenzene (Quintobenzene)	0.141 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.141 tpy
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
159	7803512	Phospine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	0.121 tpy	0.002 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.002 tpy	-----	0.003 tpy	-----	-----	0.127 tpy

Table D-2-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			TOTAL	Facility No. 11	Facility No. 12	Facility No. 13	Facility No. 14	Facility No. 15	Facility No. 16	Facility No. 17	Facility No. 18	Facility No. 19	TOTAL
No.	CAS No.	Chemical Name	Facilities 1-10	AS&G Klatt Rd	AS&G Recycle	CEA IGT	Delta Storage	EAFB	Ft Richardson	Providence	Tesoro Ter.	Williams Ter.	Area Facilities
163	106503	p-Phenylethylenediamine	3.710 tpy	----	----	----	----	----	----	----	----	----	3.710 tpy
164	123386	Propionaldehyde	0.079 tpy	----	----	----	----	----	----	----	----	----	0.079 tpy
165	114261	Propoxur(Baygon)	----	----	----	----	----	----	----	----	----	----	----
166	78875	Propylene dichloride (1,2-Dichloropropane)	----	----	----	----	----	0.003 tpy	0.010 tpy	----	----	----	0.013 tpy
167	75569	Propylene oxide	----	----	----	----	----	----	----	----	----	----	----
168	91225	Quinoline	----	----	----	----	----	----	----	----	----	----	----
169	106514	Quinone	----	0.006 tpy	----	----	----	----	----	----	----	----	0.006 tpy
170	N/A	Radionuclides (including radon)	----	----	----	----	----	----	----	----	----	----	----
171	N/A	Selenium Compounds	0.000 tpy	0.000 tpy	0.000 tpy	----	0.000 tpy	0.000 tpy	----	0.000 tpy	----	----	0.000 tpy
172	100425	Styrene	----	----	----	----	----	----	----	----	----	----	----
173	96093	Styrene oxide	----	----	----	----	----	----	----	----	----	----	----
174	127184	Tetrachloroethylene (Perchloroethylene)	0.049 tpy	----	----	----	----	----	0.760 tpy	----	----	----	0.809 tpy
175	7550450	Titanium tetrachloride	----	----	----	----	----	----	----	----	----	----	----
176	108883	Toluene	5.193 tpy	0.004 tpy	0.000 tpy	0.002 tpy	0.000 tpy	0.827 tpy	0.430 tpy	0.168 tpy	0.128 tpy	0.230 tpy	6.982 tpy
177	8001352	Toxaphene (chlorinated camphene)	0.003 tpy	----	----	----	----	----	----	----	----	----	0.003 tpy
178	79016	Trichloroethylene	0.001 tpy	----	----	----	----	0.149 tpy	0.040 tpy	----	----	----	0.189 tpy
179	121448	Triethylamine	----	----	----	----	----	----	----	----	----	----	----
180	1582098	Trifluralin	----	----	----	----	----	----	----	----	----	----	----
181	108054	Vinyl acetate	----	----	----	----	----	----	----	----	----	----	----
182	593602	Vinyl bromide	0.042 tpy	----	----	----	----	----	----	----	----	----	0.042 tpy
183	75014	Vinyl chloride	0.006 tpy	----	----	----	----	----	0.010 tpy	----	----	----	0.016 tpy
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	0.006 tpy	----	----	----	----	----	0.010 tpy	----	----	----	0.016 tpy
185	1330207	Xylenes (isomers and mixture)	0.535 tpy	0.089 tpy	----	0.001 tpy	----	0.083 tpy	0.280 tpy	0.082 tpy	0.088 tpy	0.360 tpy	1.517 tpy
186	95476	Xylenes (isomers and mixture)	0.006 tpy	0.000 tpy	tpy	----	----	0.497 tpy	0.020 tpy	----	----	----	0.523 tpy
187	108383	Xylenes (isomers and mixture)	0.010 tpy	0.000 tpy	0.000 tpy	----	----	----	----	----	----	----	0.010 tpy
188	106423	Xylenes (isomers and mixture)	0.030 tpy	0.000 tpy	----	----	----	----	----	----	----	----	0.030 tpy
Total HAP Emissions			17.2 tpy	0.24 tpy	0.001 tpy	0.02 tpy	0.03 tpy	10.3 tpy	3.9 tpy	2.6 tpy	0.48 tpy	0.95 tpy	35.64 tpy

Alaska Seafood International - Anchorage

Diesel-Fired Boilers/Heaters		Diesel-Fired Engines less than 600 hp	
Activity Data Input:	1,338,000 gallons	Activity Data Input:	150,000 gallons
Activity Period/Year:	see Note 3 Year	Activity Period/Year:	see Note 3 Year

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			7.67E-04 lb/MMBtu	7.88E-03 tpy	7.88E-03 tpy	
39	107028	Acrolein			9.25E-05 lb/MMBtu	9.50E-04 tpy	9.50E-04 tpy	
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.000 tons			3.85E-04 tpy	
48	71432	Benzene(including benzene from gasoline)			9.33E-04 lb/MMBtu	9.59E-03 tpy	9.59E-03 tpy	
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.000 tons			2.29E-04 tpy	
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.001 tons			1.01E-03 tpy	
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.006 tons			6.14E-03 tpy	
109	5000	Formaldehyde	1.214 lb/Mgal	0.812 tons	1.18E-03 lb/MMBtu	1.21E-02 tpy	8.24E-01 tpy	
118	110543	Hexane	0.269 lb/Mgal	0.180 tons			1.80E-01 tpy	
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.001 tons			8.16E-04 tpy	
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.001 tons			1.28E-03 tpy	
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.000 tons			2.75E-04 tpy	
145	91203	Naphthalene			8.48E-05 lb/MMBtu	8.71E-04 tpy	8.71E-04 tpy	
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.002 tons			1.65E-03 tpy	
176	108883	Toluene			4.09E-04 lb/MMBtu	4.20E-03 tpy	4.20E-03 tpy	
185	1330207	Xylenes (isomers and mixture)			2.85E-04 lb/MMBtu	2.93E-03 tpy	2.93E-03 tpy	
Total HAP Emissions				1.004 tpy	Total HAP Emissions	0.039 tpy	TOTAL	1.04 tpy

Notes/Comments:

- Reference: AP-42, Tables 1.3-2 (assume residential furnace factor), 1.3-9, and Spex.
- Assume diesel fuel heat content of 137,000 Btu/gal
- Activity data from permit, since built in 8/99

Notes/Comments:

- Reference: AP-42, Table 3.3-2
- Assume diesel fuel heat content of 137,000 Btu/gal
- Activity data from permit, since built in 8/99

Airline Support - Anchorage

Starved Air Incinerators Activity Data Input: 22 tons Activity Period/Year: 1999 Year	NG-Fired Boilers/Heaters Activity Data Input: 51 MMscf Activity Period/Year: 1999 Year
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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	3.07E-05 tpy	3.07E-05 tpy	
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	2.94E-06 lb/ton	3.24E-08 tpy			3.24E-08 tpy	
45	N/A	Antimony Compounds			2.04E-04 lb/MMscf	5.21E-06 tpy	5.21E-06 tpy	
46	N/A	Arsenic Compounds (inorganic including arsine)	6.69E-04 lb/ton	7.37E-06 tpy			7.37E-06 tpy	
48	71432	Benzene (including benzene from gasoline)			2.10E-03 lb/MMscf	5.37E-05 tpy	5.37E-05 tpy	
52	N/A	Beryllium Compounds			1.20E-05 lb/MMscf	3.07E-07 tpy	3.07E-07 tpy	
58	N/A	Cadmium Compounds	2.41E-03 lb/ton	2.65E-05 tpy	1.10E-03 lb/MMscf	2.81E-05 tpy	5.46E-05 tpy	
75	N/A	Chromium Compounds	3.31E-03 lb/ton	3.64E-05 tpy	1.40E-03 lb/MMscf	3.58E-05 tpy	7.22E-05 tpy	
76	N/A	Cobalt Compounds			8.40E-05 lb/MMscf	2.15E-06 tpy	2.15E-06 tpy	
109	5000	Formaldehyde			7.50E-02 lb/MMscf	1.92E-03 tpy	1.92E-03 tpy	
118	110543	Hexane			1.80E+00 lb/MMscf	4.60E-02 tpy	4.60E-02 tpy	
120	7647010	Hydrochloric acid	2.15E+00 lb/ton	2.37E-02 tpy			2.37E-02 tpy	
124	N/A	Lead Compounds			5.00E-03 lb/MMscf	1.28E-04 tpy	1.28E-04 tpy	
127	N/A	Manganese Compounds			3.80E-04 lb/MMscf	9.71E-06 tpy	9.71E-06 tpy	
128	N/A	Mercury Compounds	5.60E-03 lb/ton	6.17E-05 tpy	2.60E-04 lb/MMscf	6.65E-06 tpy	6.83E-05 tpy	
145	91203	Naphthalene			6.10E-04 lb/MMscf	1.56E-05 tpy	1.56E-05 tpy	
146	N/A	Nickel Compounds	5.52E-03 lb/ton	6.08E-05 tpy	2.10E-03 lb/MMscf	5.37E-05 tpy	1.14E-04 tpy	
162	N/A	Polycyclic Organic Matter			8.82E-05 lb/MMscf	2.25E-06 tpy	2.25E-06 tpy	
171	N/A	Selenium Compounds			2.40E-05 lb/MMscf	6.13E-07 tpy	6.13E-07 tpy	
176	108883	Toluene			3.40E-03 lb/MMscf	8.69E-05 tpy	8.69E-05 tpy	
Total HAP Emissions				0.024 tpy	Total HAP Emissions		0.048 tpy	TOTAL
							0.072 tpy	

Notes/Comments:
 1. Reference: AP-42, Tables 2.1-9
 2. Activity data from 1999 FOR

Notes/Comments:
 1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4
 3. Activity data from 1999 FOR

Alaska Native Medical Center - Anchorage

Diesel-Fired Boilers/Heaters Activity Data Input: 556 gallons Activity Period/Year: 1999 Year	Natural Gas-Fired Boilers/Heaters Activity Data Input: 98 MMscf Activity Period/Year: 1999 Year
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Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories	
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>	
12	106467	1,4-Dichlorobenzene(p)			1.20E-03 lb/MMscf	5.86E-05 tpy	5.86E-05 tpy	
45	N/A	Antimony Compounds			2.04E-04 lb/MMscf	9.96E-06 tpy	9.96E-06 tpy	
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.000 tons			1.60E-07 tpy	
48	71432	Benzene (including benzene from gasoline)			2.10E-03 lb/MMscf	1.02E-04 tpy	1.02E-04 tpy	
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.000 tons	1.20E-05 lb/MMscf	5.86E-07 tpy	6.81E-07 tpy	
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.000 tons	1.10E-03 lb/MMscf	5.37E-05 tpy	5.41E-05 tpy	
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.000 tons	1.40E-03 lb/MMscf	6.83E-05 tpy	7.09E-05 tpy	
76	N/A	Cobalt Compounds			8.40E-05 lb/MMscf	4.10E-06 tpy	4.10E-06 tpy	
109	5000	Formaldehyde	1.214 lb/Mgal	0.000 tons	7.50E-02 lb/MMscf	3.66E-03 tpy	4.00E-03 tpy	
118	110543	Hexane	0.269 lb/Mgal	0.000 tons	1.80E+00 lb/MMscf	8.79E-02 tpy	8.79E-02 tpy	
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.000 tons	5.00E-03 lb/MMscf	2.44E-04 tpy	2.44E-04 tpy	
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.000 tons	3.80E-04 lb/MMscf	1.85E-05 tpy	1.91E-05 tpy	
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.000 tons	2.60E-04 lb/MMscf	1.27E-05 tpy	1.28E-05 tpy	
145	91203	Naphthalene			6.10E-04 lb/MMscf	2.98E-05 tpy	2.98E-05 tpy	
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.000 tons	2.10E-03 lb/MMscf	1.02E-04 tpy	1.03E-04 tpy	
162	N/A	Polycyclic Organic Matter			8.82E-05 lb/MMscf	4.30E-06 tpy	4.30E-06 tpy	
171	N/A	Selenium Compounds			2.40E-05 lb/MMscf	1.17E-06 tpy	1.17E-06 tpy	
176	108883	Toluene			3.40E-03 lb/MMscf	1.66E-04 tpy	1.66E-04 tpy	
Total HAP Emissions				0.000 tpy	Total HAP Emissions	0.092 tpy	TOTAL	0.09 tpy

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
 3. Activity data from 1999 FORs.

Notes/Comments:
 1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4
 2. Activity data from 1999 FORs.

Anchorage Municipal Light Power Plant 1

Natural Gas-Fired Turbines
Activity Data Input: 238 MMscf
Activity Period/Year: 1999 Year

Diesel-Fired Turbines for Electricity Generation
Activity Data Input: 32,653 gallons
Activity Period/Year: 1999 Year

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	4.00E-05 lb/MMBtu	4.85E-03 tpy			4.85E-03 tpy
39	107028	Acrolein	6.40E-06 lb/MMBtu	7.76E-04 tpy			7.76E-04 tpy
45	N/A	Antimony Compounds			2.20E-05 lb/MMBtu	4.92E-05 tpy	4.92E-05 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)			4.90E-06 lb/MMBtu	1.10E-05 tpy	1.10E-05 tpy
48	71432	Benzene(including benzene from gasoline)	1.20E-05 lb/MMBtu	1.45E-03 tpy			1.45E-03 tpy
52	N/A	Beryllium Compounds			3.30E-07 lb/MMBtu	7.38E-07 tpy	7.38E-07 tpy
58	N/A	Cadmium Compounds			4.20E-06 lb/MMBtu	9.39E-06 tpy	9.39E-06 tpy
75	N/A	Chromium Compounds			4.70E-05 lb/MMBtu	1.05E-04 tpy	1.05E-04 tpy
76	N/A	Cobalt Compounds			9.10E-06 lb/MMBtu	2.04E-05 tpy	2.04E-05 tpy
99	100414	Ethyl benzene	3.20E-05 lb/MMBtu	3.88E-03 tpy			3.88E-03 tpy
109	5000	Formaldehyde	7.10E-04 lb/MMBtu	8.60E-02 tpy			8.60E-02 tpy
124	N/A	Lead Compounds			5.80E-05 lb/MMBtu	1.30E-04 tpy	1.30E-04 tpy
127	N/A	Manganese Compounds			3.40E-04 lb/MMBtu	7.60E-04 tpy	7.60E-04 tpy
128	N/A	Mercury Compounds			8.40E-06 lb/MMBtu	1.88E-05 tpy	1.88E-05 tpy
145	91203	Naphthalene	1.30E-06 lb/MMBtu	1.58E-04 tpy			1.58E-04 tpy
146	N/A	Nickel Compounds			1.20E-03 lb/MMBtu	2.68E-03 tpy	2.68E-03 tpy
158	7723140	Phosphorus			3.00E-04 lb/MMBtu	6.71E-04 tpy	6.71E-04 tpy
162	N/A	Polycyclic Organic Matter	2.20E-06 lb/MMBtu	2.67E-04 tpy			2.67E-04 tpy
171	N/A	Selenium Compounds			5.30E-06 lb/MMBtu	1.19E-05 tpy	1.19E-05 tpy
176	108883	Toluene	1.30E-04 lb/MMBtu	1.58E-02 tpy			1.58E-02 tpy
185	1330207	Xylenes (isomers and mixture)	6.40E-05 lb/MMBtu	7.76E-03 tpy			7.76E-03 tpy
			Total HAP Emissions	0.121 tpy	Total HAP Emissions	0.004 tpy	TOTAL 0.13 tpy

Notes/Comments:
 1. Reference: AP-42, Table 3.1-3
 2. Assume NG heating value of 1020 Btu/scf.
 3. Activity data from 1999 FOR.

Notes/Comments:
 1. Reference: AP-42, Table 3.1-4
 2. Assume diesel fuel heat content of 137,000 Btu/gal
 3. Activity data from 1999 FOR

Anchorage Municipal Light Power Plant 2

Natural Gas-Fired Turbines Activity Data Input: 7,693 MMscf Activity Period/Year: 1999 Year	Diesel-Fired Turbines for Electricity Generation Activity Data Input: 24,012 gallons Activity Period/Year: 1999 Year
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Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories	
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>	
35	75070	Acetaldehyde	4.00E-05 lb/MMBtu	1.57E-01 tpy			1.57E-01 tpy	
39	107028	Acrolein	6.40E-06 lb/MMBtu	2.51E-02 tpy			2.51E-02 tpy	
45	N/A	Antimony Compounds			2.20E-05 lb/MMBtu	3.62E-05 tpy	3.62E-05 tpy	
46	N/A	Arsenic Compounds (inorganic including arsine)			4.90E-06 lb/MMBtu	8.06E-06 tpy	8.06E-06 tpy	
48	71432	Benzene(including benzene from gasoline)	1.20E-05 lb/MMBtu	4.71E-02 tpy			4.71E-02 tpy	
52	N/A	Beryllium Compounds			3.30E-07 lb/MMBtu	5.43E-07 tpy	5.43E-07 tpy	
58	N/A	Cadmium Compounds			4.20E-06 lb/MMBtu	6.91E-06 tpy	6.91E-06 tpy	
75	N/A	Chromium Compounds			4.70E-05 lb/MMBtu	7.73E-05 tpy	7.73E-05 tpy	
76	N/A	Cobalt Compounds			9.10E-06 lb/MMBtu	1.50E-05 tpy	1.50E-05 tpy	
99	100414	Ethyl benzene	3.20E-05 lb/MMBtu	1.26E-01 tpy			1.26E-01 tpy	
109	5000	Formaldehyde	7.10E-04 lb/MMBtu	2.79E+00 tpy			2.79E+00 tpy	
124	N/A	Lead Compounds			5.80E-05 lb/MMBtu	9.54E-05 tpy	9.54E-05 tpy	
127	N/A	Manganese Compounds			3.40E-04 lb/MMBtu	5.59E-04 tpy	5.59E-04 tpy	
128	N/A	Mercury Compounds			8.40E-06 lb/MMBtu	1.38E-05 tpy	1.38E-05 tpy	
145	91203	Naphthalene	1.30E-06 lb/MMBtu	5.10E-03 tpy			5.10E-03 tpy	
146	N/A	Nickel Compounds			1.20E-03 lb/MMBtu	1.97E-03 tpy	1.97E-03 tpy	
158	7723140	Phosphorus			3.00E-04 lb/MMBtu	4.93E-04 tpy	4.93E-04 tpy	
162	N/A	Polycyclic Organic Matter	2.20E-06 lb/MMBtu	8.63E-03 tpy			8.63E-03 tpy	
171	N/A	Selenium Compounds			5.30E-06 lb/MMBtu	8.72E-06 tpy	8.72E-06 tpy	
176	108883	Toluene	1.30E-04 lb/MMBtu	5.10E-01 tpy			5.10E-01 tpy	
185	1330207	Xylenes (isomers and mixture)	6.40E-05 lb/MMBtu	2.51E-01 tpy			2.51E-01 tpy	
			Total HAP Emissions	3.915 tpy	Total HAP Emissions	0.003 tpy	TOTAL	3.92 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-3
2. Assume NG heating value of 1020 Btu/scf.
3. Activity data from 1999 FOR.

Notes/Comments:

1. Reference: AP-42, Table 3.1-4
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data from 1999 FOR

Anchorage Air Route Traffic Control Center

Diesel-Fired Engines less than 600 hp

Activity Data Input: 5,711 gallons

Activity Period/Year: 1998 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde	7.67E-04 lb/MMBtu	3.00E-04 tpy
39	107028	Acrolein	9.25E-05 lb/MMBtu	3.62E-05 tpy
48	71432	Benzene(including benzene from gasoline)	9.33E-04 lb/MMBtu	3.65E-04 tpy
109	5000	Formaldehyde	1.18E-03 lb/MMBtu	4.62E-04 tpy
145	91203	Naphthalene	8.48E-05 lb/MMBtu	3.32E-05 tpy
176	108883	Toluene	4.09E-04 lb/MMBtu	1.60E-04 tpy
185	1330207	Xylenes (isomers and mixture)	2.85E-04 lb/MMBtu	1.11E-04 tpy
			Total HAP Emissions	0.001 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.3-2
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data from 1998 Annual Report

Anchorage International Airport

Anchorage International Airport
 Activity Data Input: -
 Activity Period/Year: 1996 Year

Section 112 Hazardous Air Pollutants			Source Category	Emission Calculations
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde		4.09E-04
39	107028	Acrolein		8.08E-06 tpy
45	N/A	Antimony Compounds		8.21E-06 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		1.32E-04 tpy
48	71432	Benzene(including benzene from gasoline)		5.42E-01 tpy
52	N/A	Beryllium Compounds		5.45E-06 tpy
58	N/A	Cadmium Compounds		3.83E-05 tpy
63	56235	Carbon tetrachloride		4.80E-04 tpy
75	N/A	Chromium Compounds		4.69E-04 tpy
76	N/A	Cobalt Compounds		1.56E-05 tpy
99	100414	Ethyl benzene		1.60E-03 tpy
109	5000	Formaldehyde		7.88E-03 tpy
110	N/A	Glycol ethers		1.81E-02 tpy
118	110543	Hexane		1.44E-02 tpy
124	N/A	Lead Compounds		9.73E-04 tpy
127	N/A	Manganese Compounds		1.14E-04 tpy
128	N/A	Mercury Compounds		5.28E-04 tpy
133	78933	Methyl ethyl ketone (2-Butanone)		7.25E-02 tpy
141	75092	Methylene chloride(Dichloromethane)		3.57E+00 tpy
145	91203	Naphthalene		2.12E-04 tpy
146	N/A	Nickel Compounds		4.75E-04 tpy
156	108952	Phenol		5.38E-08 tpy
162	N/A	Polycyclic Organic Matter		1.11E-01 tpy
174	127184	Tetrachloroethylene (Perchloroethylene)		5.76E-04 tpy
176	108883	Toluene		4.09E+00 tpy
178	79016	Trichloroethylene		5.27E-04 tpy
185	1330207	Xylenes (isomers and mixture)		5.17E-04 tpy
Total HAP Emissions				8.433 tpy

Notes/Comments:

1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4
3. Activity data from 12/97 Final Emission Inventory Report

Anchorage Water Wastewater Utility

Sewage Sludge Incinerators

Activity Data Input: **6,404 tons**
 Activity Period/Year: **1999 Year**

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	2.63E-03 tpy
7	106887	1,2-Epoxybutane	1.60E-03 lb/ton	5.12E-03 tpy
35	75070	Acetaldehyde	5.00E-02 lb/ton	1.60E-01 tpy
40	79061	Acrylamide	5.00E-02 lb/ton	1.60E-01 tpy
45	N/A	Antimony Compounds	3.00E-04 lb/ton	9.61E-04 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	3.70E-02 lb/ton	1.18E-01 tpy
51	100447	Benzyl chloride	1.90E-03 lb/ton	6.08E-03 tpy
52	N/A	Beryllium Compounds	2.90E-02 lb/ton	9.29E-02 tpy
58	N/A	Cadmium Compounds	1.80E-03 lb/ton	5.76E-03 tpy
61	63252	Carbaryl	2.00E-05 lb/ton	6.40E-05 tpy
69	79118	Chloroacetic acid	1.50E-03 lb/ton	4.80E-03 tpy
70	108907	Chlorobenzene	6.00E-05 lb/ton	1.92E-04 tpy
83	N/A	Cyanide Compounds	1.00E-01 lb/ton	3.20E-01 tpy
84	3547044	DDE	7.60E-06 lb/ton	2.43E-05 tpy
110	N/A	Glycol ethers	1.90E-02 lb/ton	6.08E-02 tpy
128	N/A	Mercury Compounds	1.60E-02 lb/ton	5.12E-02 tpy
131	74839	Methyl bromide(Bromomethane)	1.20E-04 lb/ton	3.84E-04 tpy
139	1634044	Methyl tert butyl ether	8.00E-04 lb/ton	2.56E-03 tpy
140	74873	Methylchloride (chloromethane)	1.20E-02 lb/ton	3.84E-02 tpy
142	101688	Methylene diphenyl diisocyanate (MDI)	1.80E-02 lb/ton	5.76E-02 tpy
143	N/A	Mineral fibers	1.70E-06 lb/ton	5.44E-06 tpy
151	90040	o-Anisidine	1.20E-02 lb/ton	3.84E-02 tpy
154	82688	Pentachloromitrobenzene(Quintobenzene)	4.40E-02 lb/ton	1.41E-01 tpy
162	N/A	Polycyclic Organic Matter	3.00E-04 lb/ton	9.61E-04 tpy
174	127184	Tetrachloroethylene (Perchloroethylene)	1.50E-02 lb/ton	4.80E-02 tpy
177	8001352	Toxaphene(chlorinated camphene)	8.00E-04 lb/ton	2.56E-03 tpy
182	593602	Vinyl bromide	1.30E-02 lb/ton	4.16E-02 tpy
183	75014	Vinyl chloride	1.90E-03 lb/ton	6.08E-03 tpy
184	75354	Vinylidene chloride(1,1-Dichloroethylene)	1.90E-03 lb/ton	6.08E-03 tpy
185	1330207	Xylenes (isomers and mixture)	1.90E-03 lb/ton	6.08E-03 tpy
186	95476	Xylenes (isomers and mixture)	1.90E-03 lb/ton	6.08E-03 tpy
187	108383	Xylenes (isomers and mixture)	3.00E-03 lb/ton	9.61E-03 tpy
188	106423	Xylenes (isomers and mixture)	9.40E-03 lb/ton	3.01E-02 tpy
Total HAP Emissions				1.425 tpy

Notes/Comments:

1. Reference: AP-42, Tables 2.2-1, 2.2-3, 2.2-4 & 2.2-5
2. Activity data from 1999 FORs.

Anchorage Terminal Chevron

Activity Data Input:

Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene(including benzene from gasoline)		0.100 tpy
118	110543	Hexane		0.371 tpy
176	108883	Toluene		0.073 tpy
185	1330207	Xylenes (isomers and mixture)		0.017 tpy
			Total HAP Emissions	0.560 tpy

Notes/Comments:

1. TRI Inventory for Chevron

Anchorage Terminal Equilon

Activity Data Input:

Activity Period/Year:

1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene(including benzene from gasoline)	500 lb/yr	2.50E-01 tpy
118	110543	Hexane	1000 lb/yr	5.00E-01 tpy
176	108883	Toluene	1000 lb/yr	5.00E-01 tpy
185	1330207	Xylenes (isomers and mixture)	500 lb/yr	2.50E-01 tpy
Total HAP Emissions				1.5 tpy

Notes/Comments:

1. TRI Inventory for Chevron

ASG Klatt Road Facility - Anchorage

Batch Hot Mix Asphalt Plant	NG-Fired Boilers/Heaters	Diesel-Fired Engines less than 600 hp
Activity Data Input: 41,260 tons	Activity Data Input: 0.141 MMscf	Activity Data Input: 1,950 gallons
Activity Period: 1999 Year	Activity Period: 1999 Year	Activity Period: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categories
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions	Emission Factor	Estimated Emission:	Emission Factor	Estimated Emissions	Estimated Emissions
35	75070	Acetaldehyde	6.40E-04 lb/ton	0.013 tpy			7.67E-04 lb/MMBtu	1.02E-04 tpy	1.33E-02 tpy
46		Arsenic Compounds (inorganic including arsini	6.60E-07 lb/ton	0.000 tpy	4.2 lb/10 ¹² Btu	0.000 tons			2.55E-05 tpy
48	71432	Benzene (including benzene from gasoline)	3.50E-04 lb/ton	0.007 tpy			9.33E-04 lb/MMBtu	1.25E-04 tpy	7.35E-03 tpy
52		Beryllium Compounds	2.20E-07 lb/ton	0.000 tpy	2.5 lb/10 ¹² Btu	0.000 tons			1.16E-05 tpy
58		Cadmium Compounds	8.40E-07 lb/ton	0.000 tpy	11 lb/10 ¹² Btu	0.000 tons			4.84E-05 tpy
75		Chromium Compounds	8.90E-07 lb/ton	0.000 tpy	67 lb/10 ¹² Btu	0.000 tons			2.08E-04 tpy
99	100414	Ethyl benzene	3.30E-03 lb/ton	0.068 tpy					6.81E-02 tpy
109	5000	Formaldehyde	8.60E-04 lb/ton	0.018 tpy	1.214 lb/Mgal	0.025 tons	1.18E-03 lb/MMBtu	1.58E-04 tpy	4.29E-02 tpy
124		Lead Compounds	7.40E-07 lb/ton	0.000 tpy	8.9 lb/10 ¹² Btu	0.000 tons			4.04E-05 tpy
127		Manganese Compounds	9.90E-06 lb/ton	0.000 tpy	14 lb/10 ¹² Btu	0.000 tons			2.44E-04 tpy
128		Mercury Compounds	4.50E-07 lb/ton	0.000 tpy	3.0 lb/10 ¹² Btu	0.000 tons			1.78E-05 tpy
145	91203	Naphthalene	4.20E-05 lb/ton	0.001 tpy			8.48E-05 lb/MMBtu	1.13E-05 tpy	8.78E-04 tpy
146		Nickel Compounds	4.20E-06 lb/ton	0.000 tpy	18 lb/10 ¹² Btu	0.000 tons			1.38E-04 tpy
162		Polycyclic Organic Matter	8.50E-05 lb/ton	0.002 tpy					1.75E-03 tpy
169	106514	Quinone	2.70E-04 lb/ton	0.006 tpy					5.57E-03 tpy
171		Selenium Compounds	9.20E-08 lb/ton	0.000 tpy					1.90E-06 tpy
176	108883	Toluene	1.80E-04 lb/ton	0.004 tpy			4.09E-04 lb/MMBtu	5.46E-05 tpy	3.77E-03 tpy
185	1330207	Xylenes (isomers and mixture)	4.30E-03 lb/ton	0.089 tpy			2.85E-04 lb/MMBtu	3.81E-05 tpy	8.87E-02 tpy
			Total HAP Emissions	0.207 tpy	Total HAP Emissions	0.031 tpy	Total HAP Emissions	0.001 tpy	TOTAL
									2.39E-01 tpy

Notes/Comments:
 1. Reference: AP-42, Tables 11.1-9 and 11.1-12
 2. Activity data from 1999 FOR and Title V Application

Notes/Comments:
 1. Reference: AP-42, Tables 1.3-2 (assume residential furnace factor), 1.3-9, and Speciate
 2. Activity data from 1999 FOR and Title V Application

Notes/Comments:
 1. Reference: AP-42, Table 3.3-2
 2. Assume diesel fuel heat content of 137,000 Btu/gal
 3. Activity data from 1999 FOR and Title V Application

Alaska Soil Recycling - Anchorage

Diesel-Fired Engines less than 600 hp
Activity Data Input: 0 gallons
Activity Period/Year: 1999 Year

Natural Gas-Fired Boilers/Heaters
Activity Data Input: 0.404 MMscf
Activity Period/Year: 1999 Year

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	2.42E-07 tpy	2.42E-07 tpy
35	75070	Acetaldehyde	7.67E-04 lb/MMBtu	0.00E+00 tpy			0.00E+00 tpy
39	107028	Acrolein	9.25E-05 lb/MMBtu	0.00E+00 tpy			0.00E+00 tpy
45	N/A	Antimony Compounds			2.04E-04 lb/MMscf	4.12E-08 tpy	4.12E-08 tpy
48	71432	Benzene(including benzene from gasoline)	9.33E-04 lb/MMBtu	0.00E+00 tpy	2.10E-03 lb/MMscf	4.24E-07 tpy	4.24E-07 tpy
52	N/A	Beryllium Compounds			1.20E-05 lb/MMscf	2.42E-09 tpy	2.42E-09 tpy
58	N/A	Cadmium Compounds			1.10E-03 lb/MMscf	2.22E-07 tpy	2.22E-07 tpy
75	N/A	Chromium Compounds			1.40E-03 lb/MMscf	2.83E-07 tpy	2.83E-07 tpy
76	N/A	Cobalt Compounds			8.40E-05 lb/MMscf	1.70E-08 tpy	1.70E-08 tpy
109	5000	Formaldehyde	1.18E-03 lb/MMBtu	0.00E+00 tpy	7.50E-02 lb/MMscf	1.51E-05 tpy	1.51E-05 tpy
118	110543	Hexane			1.80E+00 lb/MMscf	3.64E-04 tpy	3.64E-04 tpy
124	N/A	Lead Compounds			5.00E-03 lb/MMscf	1.01E-06 tpy	1.01E-06 tpy
127	N/A	Manganese Compounds			3.80E-04 lb/MMscf	7.68E-08 tpy	7.68E-08 tpy
128	N/A	Mercury Compounds			2.60E-04 lb/MMscf	5.25E-08 tpy	5.25E-08 tpy
145	91203	Naphthalene	8.48E-05 lb/MMBtu	0.00E+00 tpy	6.10E-04 lb/MMscf	1.23E-07 tpy	1.23E-07 tpy
146	N/A	Nickel Compounds			2.10E-03 lb/MMscf	4.24E-07 tpy	4.24E-07 tpy
162	N/A	Polycyclic Organic Matter			8.82E-05 lb/MMscf	1.78E-08 tpy	1.78E-08 tpy
171	N/A	Selenium Compounds			2.40E-05 lb/MMscf	4.85E-09 tpy	4.85E-09 tpy
176	108883	Toluene	4.09E-04 lb/MMBtu	0.00E+00 tpy	3.40E-03 lb/MMscf	6.87E-07 tpy	6.87E-07 tpy
185	1330207	Xylenes (isomers and mixture)	2.85E-04 lb/MMBtu	0.00E+00 tpy			0.00E+00 tpy
Total HAP Emissions				0.000 tpy	Total HAP Emissions	0.000 tpy	TOTAL 3.82E-04 tpy

Notes/Comments:

- Reference: AP-42, Table 3.3-2
- Assume diesel fuel heat content of 137,000 Btu/gal
- Activity data from 1999 FORs.

Notes/Comments:

- Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4
- Note that these emissions represent a natural gas fired dirt burner.
- Activity data from 1999 FORs.

Chugach Electric Association International Generation Terminal - Anchorage

Natural Gas-Fired Turbines - Anchorage
 Activity Data Input: 35 MMscf
 Activity Period/Year: 1999 Year

Diesel-Fired Engines less than 600 hp - Anchorage
 Activity Data Input: 22 gallons
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde	4.00E-05 lb/MMBtu	7.16E-04 tpy	7.67E-04 lb/MMBtu	1.17E-06 tpy	7.17E-04 tpy
39	107028	Acrolein	6.40E-06 lb/MMBtu	1.15E-04 tpy	9.25E-05 lb/MMBtu	1.41E-07 tpy	1.15E-04 tpy
48	71432	Benzene(including benzene from gasoline)	1.20E-05 lb/MMBtu	2.15E-04 tpy	9.33E-04 lb/MMBtu	1.42E-06 tpy	2.16E-04 tpy
99	100414	Ethyl benzene	3.20E-05 lb/MMBtu	5.73E-04 tpy			5.73E-04 tpy
109	5000	Formaldehyde	7.10E-04 lb/MMBtu	1.27E-02 tpy	1.18E-03 lb/MMBtu	1.79E-06 tpy	1.27E-02 tpy
145	91203	Naphthalene	1.30E-06 lb/MMBtu	2.33E-05 tpy	8.48E-05 lb/MMBtu	1.29E-07 tpy	2.34E-05 tpy
162	N/A	Polycyclic Organic Matter	2.20E-06 lb/MMBtu	3.94E-05 tpy			3.94E-05 tpy
176	108883	Toluene	1.30E-04 lb/MMBtu	2.33E-03 tpy	4.09E-04 lb/MMBtu	6.22E-07 tpy	2.33E-03 tpy
185	1330207	Xylenes (isomers and mixture)	6.40E-05 lb/MMBtu	1.15E-03 tpy	2.85E-04 lb/MMBtu	4.33E-07 tpy	1.15E-03 tpy
			Total HAP Emissions	0.018 tpy	Total HAP Emissions	0.000 tpy	TOTAL 0.02 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-3
2. Assume NG heating value of 1020 Btu/scf.
3. Activity data from 1999 FORs

Notes/Comments:

1. Reference: AP-42, Table 3.3-2
2. Assume diesel fuel heat content of 137,000 Btu/gal
3. Activity data from 1999 FORs

Delta Airlines Glycol Storage - Anchorage

Natural Gas-Fired Boilers/Heaters

Activity Data Input: 32 MMscf
 Activity Period/Year: 1996 Year

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	1.94E-05 tpy
45	N/A	Antimony Compounds	2.04E-04 lb/MMscf	3.30E-06 tpy
48	71432	Benzene(including benzene from gasoline)	2.10E-03 lb/MMscf	3.40E-05 tpy
52	N/A	Beryllium Compounds	1.20E-05 lb/MMscf	1.94E-07 tpy
58	N/A	Cadmium Compounds	1.10E-03 lb/MMscf	1.78E-05 tpy
75	N/A	Chromium Compounds	1.40E-03 lb/MMscf	2.27E-05 tpy
76	N/A	Cobalt Compounds	8.40E-05 lb/MMscf	1.36E-06 tpy
109	5000	Formaldehyde	7.50E-02 lb/MMscf	1.22E-03 tpy
118	110543	Hexane	1.80E+00 lb/MMscf	2.92E-02 tpy
124	N/A	Lead Compounds	5.00E-03 lb/MMscf	8.10E-05 tpy
127	N/A	Manganese Compounds	3.80E-04 lb/MMscf	6.16E-06 tpy
128	N/A	Mercury Compounds	2.60E-04 lb/MMscf	4.21E-06 tpy
145	91203	Naphthalene	6.10E-04 lb/MMscf	9.88E-06 tpy
146	N/A	Nickel Compounds	2.10E-03 lb/MMscf	3.40E-05 tpy
162	N/A	Polycyclic Organic Matter	8.82E-05 lb/MMscf	1.43E-06 tpy
171	N/A	Selenium Compounds	2.40E-05 lb/MMscf	3.89E-07 tpy
176	108883	Toluene	3.40E-03 lb/MMscf	5.51E-05 tpy
Total HAP Emissions				0.031 tpy

Notes/Comments:

1. Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4
2. Activity data from 1997 Title V application
3. Only the N.G. fired equipment are included.

The application identifies about 0.5 tpy of VOCs from fuel tanks, solvents, and paint booths.

Elmendorf Air Force Base - Anchorage

Activity Data Input: N/A
Activity Period/Year: 1998

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions
1	79345	1,1,2,2-Tetrachloroethane		
9	106990	1,3-Butadiene		1.05E-03 tpy
12	106467	1,4-Dichlorobenzene(p)		7.94E-03 tpy
35	75070	Acetaldehyde		2.05E-02 tpy
37	75058	Acetonitrile		4.09E-02 tpy
39	107028	Acrolein		2.48E-03 tpy
45	N/A	Antimony Compounds		2.10E-04 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		7.05E-04 tpy
48	71432	Benzene(including benzene from gasoline)		7.12E-02 tpy
52	N/A	Beryllium Compounds		5.00E-05 tpy
58	N/A	Cadmium Compounds		9.25E-03 tpy
63	56235	Carbon tetrachloride		1.00E-04 tpy
64	463581	Carbonyl sulfide		3.60E-03 tpy
68	7782505	Chlorine		6.65E-04 tpy
70	108907	Chlorobenzene		3.40E-03 tpy
72	67663	Chloroform		4.00E-04 tpy
75	N/A	Chromium Compounds		6.30E-03 tpy
76	N/A	Cobalt Compounds		2.90E-04 tpy
82	98828	Cumene		4.00E-04 tpy
94	68122	Dimethyl formamide		2.71E-02 tpy
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)		1.65E-03 tpy
99	100414	Ethyl benzene		7.70E-02 tpy
104	107211	Ethylene glycol		4.85E-04 tpy
109	5000	Formaldehyde		2.90E-01 tpy
116	822060	Hexamethylene-1,6 diisocyanate		5.93E-02 tpy
118	110543	Hexane		6.29E+00 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)		9.45E-04 tpy
122	123319	Hydroquinone		2.05E-02 tpy
124	N/A	Lead Compounds		2.65E-03 tpy
127	N/A	Manganese Compounds		1.35E-03 tpy
128	N/A	Mercury Compounds		1.62E-03 tpy
129	67561	Methanol		3.26E-02 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)		2.72E-01 tpy
133	78933	Methyl ethyl ketone (2-Butanone)		5.98E-01 tpy
136	108101	Methyl isobutyl ketone (Hexone)		6.90E-01 tpy
139	1634044	Methyl tert butyl ether		3.60E-02 tpy
141	75092	Methylene chloride(Dichloromethane)		1.48E-01 tpy
145	91203	Naphthalene		5.40E-03 tpy
146	N/A	Nickel Compounds		7.30E-03 tpy
162	N/A	Polycyclic Organic Matter		1.62E-03 tpy
166	78875	Propylene dichloride (1,2-Dichloropropane)		2.50E-03 tpy
171	N/A	Selenium Compounds		1.30E-04 tpy
176	108883	Toluene		8.27E-01 tpy
178	79016	Trichloroethylene		1.49E-01 tpy
185	1330207	Xylenes (isomers and mixture)		8.25E-02 tpy
186	95476	Xylenes (isomers and mixture)		4.97E-01 tpy
Total HAP Emissions				10.3 tpy

Notes/Comments:

1. Reference: EAFB 1998 HAPs Emissions Inventory
2. Values shown are total base-wide actual 1998 emissions.

Fort Richardson Army Base - Anchorage

Activity Data Input: N/A
Activity Period/Year: 1997 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Estimated Emissions</u>
1	79345	1,1,2,2-Tetrachloroethane		1.00E-02 tpy
42	107131	Acrylonitrile		1.00E-02 tpy
45	N/A	Antimony Compounds		1.00E-02 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		1.00E-02 tpy
48	71432	Benzene (including benzene from gasoline)		8.00E-02 tpy
52	N/A	Beryllium Compounds		1.00E-02 tpy
58	N/A	Cadmium Compounds		1.00E-02 tpy
75	N/A	Chromium Compounds		3.00E-02 tpy
76	N/A	Cobalt Compounds		1.00E-02 tpy
82	98828	Cumene		1.00E-02 tpy
99	100414	Ethyl benzene		5.00E-02 tpy
109	5000	Formaldehyde		1.00E-01 tpy
118	110543	Hexane		2.00E-01 tpy
120	7647010	Hydrochloric acid		1.50E+00 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)		1.90E-01 tpy
124	N/A	Lead Compounds		1.00E-02 tpy
127	N/A	Manganese Compounds		1.00E-02 tpy
128	N/A	Mercury Compounds		1.00E-02 tpy
133	78933	Methyl ethyl ketone (2-Butanone)		2.00E-02 tpy
136	108101	Methyl isobutyl ketone (Hexone)		1.00E-02 tpy
141	75092	Methylene chloride(Dichloromethane)		3.00E-02 tpy
145	91203	Naphthalene		1.00E-02 tpy
146	N/A	Nickel Compounds		1.00E-02 tpy
166	78875	Propylene dichloride (1,2-Dichloropropane)		1.00E-02 tpy
174	127184	Tetrachloroethylene (Perchloroethylene)		7.60E-01 tpy
176	108883	Toluene		4.30E-01 tpy
178	79016	Trichloroethylene		4.00E-02 tpy
183	75014	Vinyl chloride		1.00E-02 tpy
184	75354	Vinylidene chloride (1,1-Dichloroethylene)		1.00E-02 tpy
185	1330207	Xylenes (isomers and mixture)		0.28 tpy
186	95476	Xylenes (isomers and mixture)		2.00E-02 tpy
Total HAP Emissions				11.4 tpy

Notes/Comments:

1. Reference: Ft Rich 1997 Title V Application
2. Values shown are total base-wide actual 1997 emissions.
3. Total also includes 7.54 tpy from "insignificant sources" per Title V application.

Providence Alaska Medical Center - Anchorage

NG-Fired Turbines	NG-Fired Boilers/Heaters	Diesel-Fired Engines greater than 600 hp
Activity Data Input: 2,500 MMscf	Activity Data Input: 1,361 MMscf	Activity Data Input: 12,500 gallons
Activity Period: 7/97 - 6/98 Year	Activity Period: 7/97 - 6/98 Year	Activity Period: 7/97 - 6/98 Year

Section 112 Hazardous Air Pollutants			Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categories
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions	Emission Factor	Estimated Emissions	Emission Factor	Estimated Emissions	Estimated Emissions
12	106467	1,4-Dichlorobenzene(p)			1.20E-03 lb/MMscf	8.17E-04 tpy			8.17E-04 tpy
35	75070	Acetaldehyde	4.00E-05 lb/MMBtu	5.10E-02 tpy			2.52E-05 lb/MMBtu	2.16E-05 tpy	5.10E-02 tpy
39	107028	Acrolein	6.40E-06 lb/MMBtu	8.16E-03 tpy			7.88E-06 lb/MMBtu	6.75E-06 tpy	8.17E-03 tpy
45	N/A	Antimony Compounds			2.04E-04 lb/MMscf	1.39E-04 tpy			1.39E-04 tpy
48	71432	Benzene (including benzene from gasoline)	1.20E-05 lb/MMBtu	1.53E-02 tpy	2.10E-03 lb/MMscf	1.43E-03 tpy	7.76E-04 lb/MMBtu	6.64E-04 tpy	1.74E-02 tpy
52	N/A	Beryllium Compounds			1.20E-05 lb/MMscf	8.17E-06 tpy			8.17E-06 tpy
58	N/A	Cadmium Compounds			1.10E-03 lb/MMscf	7.49E-04 tpy			7.49E-04 tpy
75	N/A	Chromium Compounds			1.40E-03 lb/MMscf	9.53E-04 tpy			9.53E-04 tpy
76	N/A	Cobalt Compounds			8.40E-05 lb/MMscf	5.72E-05 tpy			5.72E-05 tpy
99	100414	Ethyl benzene	3.20E-05 lb/MMBtu	4.08E-02 tpy					4.08E-02 tpy
109	5000	Formaldehyde	7.10E-04 lb/MMBtu	9.05E-01 tpy	7.50E-02 lb/MMscf	5.10E-02 tpy	7.89E-05 lb/MMBtu	6.76E-05 tpy	9.56E-01 tpy
118	110543	Hexane			1.80E+00 lb/MMscf	1.22E+00 tpy			1.22E+00 tpy
124	N/A	Lead Compounds			5.00E-03 lb/MMscf	3.40E-03 tpy			3.40E-03 tpy
127	N/A	Manganese Compounds			3.80E-04 lb/MMscf	2.59E-04 tpy			2.59E-04 tpy
128	N/A	Mercury Compounds			2.60E-04 lb/MMscf	1.77E-04 tpy			1.77E-04 tpy
145	91203	Naphthalene	1.30E-06 lb/MMBtu	1.66E-03 tpy	6.10E-04 lb/MMscf	4.15E-04 tpy	1.30E-04 lb/MMBtu	1.11E-04 tpy	2.18E-03 tpy
146	N/A	Nickel Compounds			2.10E-03 lb/MMscf	1.43E-03 tpy			1.43E-03 tpy
162	N/A	Polycyclic Organic Matter	2.20E-06 lb/MMBtu	2.81E-03 tpy	8.82E-05 lb/MMscf	6.00E-05 tpy	2.12E-04 lb/MMBtu	1.82E-04 tpy	3.05E-03 tpy
171	N/A	Selenium Compounds			2.40E-05 lb/MMscf	1.63E-05 tpy			1.63E-05 tpy
176	108883	Toluene	1.30E-04 lb/MMBtu	1.66E-01 tpy	3.40E-03 lb/MMscf	2.31E-03 tpy	2.81E-04 lb/MMBtu	2.41E-04 tpy	1.68E-01 tpy
185	1330207	Xylenes (isomers and mixture)	6.40E-05 lb/MMBtu	8.16E-02 tpy			1.93E-04 lb/MMBtu	1.65E-04 tpy	8.18E-02 tpy
		Total HAP Emissions		1.272 tpy	Total HAP Emissions	1.288 tpy	Total HAP Emissions	0.001 tpy	TOTAL 2.56 tpy

Notes/Comments:

- Reference: AP-42, Table 3.1-3
- Assume NG heating value of 1020 Btu/scf.
- Activity data from Title V application

Notes/Comments:

- Reference: AP-42, Tables 1.4-2, 1.4-3, and 1.4-4
- Activity data from Title V application

Notes/Comments:

- Reference: AP-42, Table 3.4-3
- Assume diesel fuel heat content of 137,000 Btu/gal
- Activity data from Title V application

Tesoro Terminals I and II - Anchorage

Activity Data Input: N/A
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category	Emission Calculations
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene(including benzene from gasoline)		1.36E-01 tpy
99	100414	Ethyl benzene		9.50E-03 tpy
118	110543	Hexane		1.19E-01 tpy
176	108883	Toluene		1.28E-01 tpy
185	1330207	Xylenes (isomers and mixture)		8.80E-02 tpy
Total HAP Emissions				0.5 tpy

Notes/Comments:
 1. 1999 TRI Inventory data

Williams Alaska Petroleum - Anchorage

Activity Data Input: N/A
 Activity Period/Year: 1999 Year

<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Source Category</u>	<u>Emission Calculations</u>
			<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene(including benzene from gasoline)		1.13E-01 tpy
99	100414	Ethyl benzene		2.10E-02 tpy
118	110543	Hexane		2.27E-01 tpy
176	108883	Toluene		2.30E-01 tpy
185	1330207	Xylenes (isomers and mixture)		3.60E-01 tpy
			Total HAP Emissions	1.0 tpy

Notes/Comments:
 1. 1999 TRI Inventory data

APPENDIX D-3

Fairbanks North Star Borough Area Sources

Table D-3-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities
No.	CAS No.	Chemical Name															
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	4.271 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.260 tpy	0.011 tpy
10	542756	1,3-Dichloropropene	6.640 tpy	-----	-----	-----	-----	-----	-----	-----	-----	6.640 tpy	-----	-----	-----	-----	-----
11	1120714	1,3-Propane sulfone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	3.449 tpy	-----	-----	-----	-----	-----	-----	-----	-----	3.449 tpy	-----	-----	0.000 tpy	-----	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
14	540841	2,2,4-Trimethylpentane	0.612 tpy	-----	-----	-----	-----	0.612 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.227 tpy	0.012 tpy	0.002 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.213 tpy
36	60355	Acetamide	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
38	98862	Acetophenone	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
39	107028	Acrolein	0.543 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.180 tpy	-----	-----	-----	-----	-----	0.363 tpy
40	79061	Acrylamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
41	79107	Acrylic Acid	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
42	107131	Acrylonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.032 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.032 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	0.028 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.016 tpy	-----	0.000 tpy	-----	0.012 tpy
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	31.02 tpy	0.006 tpy	0.001 tpy	-----	-----	27.174 tpy	0.476 tpy	-----	-----	0.000 tpy	-----	0.290 tpy	-----	-----	3.075 tpy
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
Fairbanks North Star Borough

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities
No.	CAS No.	Chemical Name															
50	98077	Benzotrichloride	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
51	100447	Benzyl chloride	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
52	N/A	Beryllium Compounds	0.010 tpy	0.000 tpy	----	----	----	----	----	0.000 tpy	----	----	0.009 tpy	----	0.000 tpy	----	0.001 tpy
53	57578	beta-Propiolactone	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
54	92524	Biphenyl	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
56	542881	Bis(chloromethyl)ether	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
57	75252	Bromoform	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
58	N/A	Cadmium Compounds	0.050 tpy	0.000 tpy	----	----	----	0.000 tpy	----	0.000 tpy	----	----	0.041 tpy	----	0.000 tpy	----	0.009 tpy
59	156627	Calcium cyanamide	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
60	133062	Captan	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
61	63252	Carbaryl	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
62	75150	Carbon disulfide	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
63	56235	Carbon tetrachloride	0.000 tpy	----	----	----	----	----	----	----	----	0.000 tpy	----	----	----	----	0.000 tpy
64	463581	Carbonyl sulfide	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
65	120809	Catechol	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
66	133904	Chloramben	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
67	57749	Chlordane	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
68	7782505	Chlorine	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
69	79118	Chloroacetic acid	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
70	108907	Chlorobenzene	2.972 tpy	----	----	----	----	----	----	----	----	2.972 tpy	----	----	----	----	----
71	510156	Chlorobenzilate	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
72	67663	Chloroform	0.041 tpy	----	----	----	----	----	----	----	----	0.041 tpy	----	----	----	----	----
73	107302	Chloromethyl methyl ether	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
74	126998	Chloroprene	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
75	N/A	Chromium Compounds	0.363 tpy	0.000 tpy	----	----	----	0.000 tpy	----	0.000 tpy	----	----	0.249 tpy	----	0.020 tpy	----	0.093 tpy
76	N/A	Cobalt Compounds	0.014 tpy	----	----	----	----	----	----	----	----	----	----	----	0.001 tpy	----	0.013 tpy
77	N/A	Coke Oven Emissions	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
79	95487	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
80	108394	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
81	106445	Cresols/Creshlic acid (isomers and mixture)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
82	98828	Cumene	0.220 tpy	----	----	----	----	----	----	----	----	----	----	----	----	----	0.220 tpy
83	N/A	Cyanide Compounds	1.449 tpy	----	----	----	----	----	----	----	1.449 tpy	----	----	----	----	----	----
84	3547044	DDE	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
85	334883	Diazomethane	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
86	132649	Dibenzofurans	0.000 tpy	----	----	----	----	----	----	----	----	0.000 tpy	----	----	----	----	----
87	84742	Dibutylphthalate	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
89	62737	Dichlorvos	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
90	111422	Diethanolamine	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
91	64675	Diethyl sulfate	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
92	60117	Dimethyl aminoazobenzene	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
93	79447	Dimethyl caramoyl chloride	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
94	68122	Dimethyl formamide	0.001 tpy	----	----	----	----	----	----	----	----	0.001 tpy	----	----	----	----	----
95	131113	Dimethyl phthalate	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
96	77781	Dimethyl sulfate	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
98	140885	Ethyl acrylate	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

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Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Wildfires	Area Source Facilities
No.	CAS No.	Chemical Name															
99	100414	Ethyl benzene	1.551 tpy	0.040 tpy	0.007 tpy	-----	-----	-----	0.002 tpy	-----	-----	0.086 tpy	-----	0.745 tpy	-----	-----	0.671 tpy
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	0.499 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.499 tpy	-----	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
104	107211	Ethylene glycol	0.467 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.467 tpy	-----	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	0.627 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.627 tpy	-----	-----	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
109	5000	Formaldehyde	33.37 tpy	0.019 tpy	0.003 tpy	-----	-----	-----	-----	0.009 tpy	0.042 tpy	0.053 tpy	32.960 tpy	-----	-----	-----	0.288 tpy
110	N/A	Glycol ethers	1.680 tpy	-----	-----	-----	-----	-----	-----	-----	-----	1.680 tpy	-----	-----	-----	-----	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	110543	Hexane	13.71 tpy	-----	-----	-----	-----	-----	0.295 tpy	0.002 tpy	-----	3.582 tpy	7.310 tpy	-----	-----	-----	2.519 tpy
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	1.104 tpy	-----	-----	-----	-----	-----	-----	-----	0.617 tpy	0.000 tpy	-----	-----	-----	-----	0.487 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	-----
122	123319	Hydroquinone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
123	78591	Isophorone	0.039 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.039 tpy	-----	-----	-----	-----	-----
124	N/A	Lead Compounds	0.118 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.033 tpy	-----	-----	-----	0.085 tpy
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.782 tpy	0.000 tpy	-----	-----	-----	0.238 tpy	-----	0.000 tpy	-----	-----	0.052 tpy	-----	-----	-----	0.492 tpy
128	N/A	Mercury Compounds	0.026 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.011 tpy	-----	-----	-----	0.015 tpy
129	67561	Methanol	28.95 tpy	-----	-----	-----	-----	-----	-----	-----	-----	28.95 tpy	-----	-----	-----	-----	-----
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
131	74839	Methyl bromide (Bromomethane)	9.213 tpy	-----	-----	-----	-----	-----	-----	-----	-----	9.213 tpy	-----	-----	-----	-----	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	16.08 tpy	-----	-----	-----	-----	-----	-----	-----	-----	16.08 tpy	-----	-----	-----	-----	0.000 tpy
133	78933	Methyl ethyl ketone (2-Butanone)	34.46 tpy	0.000 tpy	0.000 tpy	-----	-----	4.066 tpy	-----	-----	-----	2.099 tpy	-----	28.30 tpy	-----	-----	-----
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	20.88 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.314 tpy	-----	20.57 tpy	-----	-----	-----
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----	-----
140	74873	Methylchloride (Chloromethane)	0.443 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.443 tpy	-----	-----	-----
141	75092	Methylene chloride (Dichloromethane)	8.403 tpy	-----	-----	-----	-----	-----	-----	-----	-----	1.511 tpy	-----	4.442 tpy	-----	-----	2.450 tpy
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
143	N/A	Mineral fibers	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
145	91203	Naphthalene	5.977 tpy	-----	-----	-----	-----	4.038 tpy	-----	-----	-----	1.914 tpy	-----	-----	-----	-----	0.023 tpy
146	N/A	Nickel Compounds	1.797 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.067 tpy	-----	-----	-----	1.729 tpy
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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Fairbanks North Star Borough**

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No.	CAS No.	Chemical Name															
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromitrobenzene (Quintobenzene)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.431 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.431 tpy
159	7803512	Phosphine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	10.28 tpy	0.004 tpy	-----	-----	0.010 tpy	10.236 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.033 tpy
163	106503	p-Phenylethylenediamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
164	123386	Propionaldehyde	0.001 tpy	0.001 tpy	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
165	114261	Propoxur (Baygon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
169	106514	Quinone	0.004 tpy	0.004 tpy	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.008 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.008 tpy
172	100425	Styrene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	55.12 tpy	-----	-----	53.950 tpy	-----	-----	-----	-----	-----	1.171 tpy	-----	-----	-----	-----	0.000 tpy
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
176	108883	Toluene	137.58 tpy	0.024 tpy	0.004 tpy	-----	-----	10.236 tpy	1.977 tpy	-----	-----	17.81 tpy	-----	102.2 tpy	-----	-----	5.276 tpy
177	8001352	Toxaphene (chlorinated camphene)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
178	79016	Trichloroethylene	0.020 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.020 tpy	-----	-----	-----	-----	0.000 tpy
179	121448	Triethylamine	0.035 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.035 tpy	-----	-----	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	0.097 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	0.097 tpy	-----	-----	-----
182	593602	Vinyl bromide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
183	75014	Vinyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
185	1330207	Xylenes (isomers and mixture)	73.31 tpy	0.050 tpy	0.009 tpy	-----	-----	2.832 tpy	0.093 tpy	-----	-----	8.423 tpy	-----	58.85 tpy	-----	-----	3.049 tpy
186	95476	Xylenes (isomers and mixture)	6.167 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.167 tpy	-----	-----	0.000 tpy
187	108383	Xylenes (isomers and mixture)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
188	106423	Xylenes (isomers and mixture)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
Total HAP Emissions			515.2 tpy	0.16 tpy	0.03 tpy	54.0 tpy	0.01 tpy	58.8 tpy	3.5 tpy	0.01 tpy	2.29 tpy	106.7 tpy	40.7 tpy	223 tpy	0.02 tpy	4.26 tpy	21.6 tpy

Asphalt Plants - Fairbanks

NG-Fired Batch Asphalt Plants
Activity Data Input: 23,108 tons
Activity Period/Year: 1999 Year

Oil-Fired Drum Asphalt Plants
Activity Data Input: 7,703 tons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde	0.00064 lb/ton	7.39E-03 tpy	0.0013 lb/ton	5.01E-03 tpy	1.24E-02 tpy
39	107028	Acrolein			0.000026 lb/ton	1.00E-04 tpy	1.00E-04 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	6.60E-07 lb/ton	7.63E-06 tpy	1.10E-06 lb/ton	4.24E-06 tpy	1.19E-05 tpy
48	71432	Benzene (including benzene from gasoline)	0.00035 lb/ton	4.04E-03 tpy	0.00041 lb/ton	1.58E-03 tpy	5.62E-03 tpy
52	N/A	Beryllium Compounds	2.20E-07 lb/ton	2.54E-06 tpy			2.54E-06 tpy
58	N/A	Cadmium Compounds	8.40E-07 lb/ton	9.71E-06 tpy	4.40E-07 lb/ton	1.69E-06 tpy	1.14E-05 tpy
75	N/A	Chromium Compounds	8.90E-07 lb/ton	1.03E-05 tpy	1.20E-05 lb/ton	4.62E-05 tpy	5.65E-05 tpy
99	100414	Ethyl benzene	0.0033 lb/ton	3.81E-02 tpy	0.00038 lb/ton	1.46E-03 tpy	3.96E-02 tpy
109	5000	Formaldehyde	0.00086 lb/ton	9.94E-03 tpy	0.0024 lb/ton	9.24E-03 tpy	1.92E-02 tpy
124	N/A	Lead Compounds	7.40E-07 lb/ton	8.55E-06 tpy	3.30E-06 lb/ton	1.27E-05 tpy	2.13E-05 tpy
127	N/A	Manganese Compounds	9.90E-06 lb/ton	1.14E-04 tpy	1.10E-05 lb/ton	4.24E-05 tpy	1.57E-04 tpy
128	N/A	Mercury Compounds	4.50E-07 lb/ton	5.20E-06 tpy	7.30E-09 lb/ton	2.81E-08 tpy	5.23E-06 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)					0.00E+00 tpy
133	78933	Methyl ethyl ketone (2-Butanone)			0.00002 lb/ton	7.70E-05 tpy	7.70E-05 tpy
146	N/A	Nickel Compounds	4.20E-06 lb/ton	4.85E-05 tpy	1.50E-05 lb/ton	5.78E-05 tpy	1.06E-04 tpy
162	N/A	Polycyclic Organic Matter	1.27E-04 lb/ton	1.47E-03 tpy	5.81E-04 lb/ton	2.24E-03 tpy	3.70E-03 tpy
164	123386	Propionaldehyde			0.00013 lb/ton	5.01E-04 tpy	5.01E-04 tpy
169	106514	Quinone	0.00027 lb/ton	3.12E-03 tpy	0.00016 lb/ton	6.16E-04 tpy	3.74E-03 tpy
176	108883	Toluene	0.0018 lb/ton	2.08E-02 tpy	0.00075 lb/ton	2.89E-03 tpy	2.37E-02 tpy
185	1330207	Xylenes (isomers and mixture)	0.0043 lb/ton	4.97E-02 tpy	0.00016 lb/ton	6.16E-04 tpy	5.03E-02 tpy
Total HAP Emissions				0.135 tpy	Total HAP Emissions		0.024 tpy
					TOTAL		0.159 tpy

Notes/Comments:

1. Reference: AP-42, Tables 11.1-9 and 11.1-12
2. Activity data derived from Anchorage DOT and MoA and 1999 population data.

Notes/Comments:

1. Reference: AP-42, Tables 11.1-10 and 11.1-13
2. Activity data derived from Anchorage DOT and MoA and 1999 population data.

Asphalt Plant Production Data - Fairbanks

DOT Contracts 1999

Engineers

Estimate	Units	Units - tons
	52819 ton	52,819
	5103 ton	5,103
	2273 ton	2,273
	126 ton	126
	660 ton	660
	177 ton	177
	13300 Mg	13,087
	608 Mg	598
	5006 Mg	4,926
	276 Mg	272
	420 Mg	413
	210 Mg	207

DOT total	80,661
MOA total	<u>13,490</u>
Anchorage total	94,151

Populations	
Anchorage	Fairbanks
257,808	84,366

Faribanks total 30,810

Notes:

1. DOT info from Contracts Report (engineer's estimates)
2. MoA info from Jerry Hansen, Project Manager
3. Assume the following proportions: 75% to stationary NG-fired plants and 25% to diesel-fired mobile plants.
4. NG-fired = batch and Diesel = drum (conversation with operator at Wilder hot plant, Anchorage, 6/15/00)

Asphalt Paving - Fairbanks

NG-Fired Batch Asphalt Plant
 Activity Data Input: 23,108 tons
 Activity Period/Year: 1999 Year

Oil-Fired Drum Asphalt Plant
 Activity Data Input: 7,703 tons
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories	
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>	
35	75070	Acetaldehyde	0.00064 lb/ton	1.26E-03 tpy	0.0013 lb/ton	8.51E-04 tpy	2.11E-03 tpy	
39	107028	Acrolein			0.000026 lb/ton	1.70E-05 tpy	1.70E-05 tpy	
48	71432	Benzene (including benzene from gasoline)	0.00035 lb/ton	6.87E-04 tpy	0.00041 lb/ton	2.68E-04 tpy	9.56E-04 tpy	
99	100414	Ethyl benzene	0.0033 lb/ton	6.48E-03 tpy	0.00038 lb/ton	2.49E-04 tpy	6.73E-03 tpy	
109	5000	Formaldehyde	0.00086 lb/ton	1.69E-03 tpy	0.0024 lb/ton	1.57E-03 tpy	3.26E-03 tpy	
133	78933	Methyl ethyl ketone (2-Butanone)			0.00002 lb/ton	1.31E-05 tpy	1.31E-05 tpy	
164	123386	Propionaldehyde			0.00013 lb/ton	8.51E-05 tpy	8.51E-05 tpy	
169	106514	Quinone	0.00027 lb/ton	5.30E-04 tpy	0.00016 lb/ton	1.05E-04 tpy	6.35E-04 tpy	
176	108883	Toluene	0.0018 lb/ton	3.54E-03 tpy	0.00075 lb/ton	4.91E-04 tpy	4.03E-03 tpy	
185	1330207	Xylenes (isomers and mixture)	0.0043 lb/ton	8.45E-03 tpy	0.00016 lb/ton	1.05E-04 tpy	8.55E-03 tpy	
Total HAP Emissions				0.023 tpy	Total HAP Emissions	0.004 tpy	TOTAL	0.026 tpy

Notes/Comments:

1. Reference: AP-42, Tables 11.1-9 and 11.1-12
2. Activity data from DOT and MoA, adjusted for Fairbanks' population.

Notes/Comments:

1. Reference: AP-42, Tables 11.1-10 and 11.1-13
2. Activity data from DOT and MoA, adjusted for Fairbanks' population.

Asphalt Paving Activity Data - Fairbanks

Asphalt Paving Activity Data

DOT Contracts 1999, Anchorage

Engineers

Estimate	Units		
52,819 ton	=	52,819 tons	
5,103 ton	=	5,103 tons	
2,273 ton	=	2,273 tons	
126 ton	=	126 tons	
660 ton	=	660 tons	
177 ton	=	177 tons	
13,300 Mg	=	13,087 tons	
608 Mg	=	598 tons	
5,006 Mg	=	4,926 tons	
276 Mg	=	272 tons	
420 Mg	=	413 tons	
210 Mg	=	207 tons	

DOT total	80,661 tons
MOA total	13,490 tons
Anchorage total	94,151 tons

Populations	
Anchorage	Fairbanks
257,808	84,366

Fairbanks total 30,810 tons

Notes:

1. DOT info from Contracts Report (engineer's estimates).
2. MoA info from Jerry Hansen, Project Manager.
3. Assume the following proportions: 75% to stationary NG-fired plants and 25% to diesel-fired mobile plants.
4. NG-fired = batch and Diesel = drum (conversation with operator at Wilder hot plant, Anchorage, 6/15/00).
5. Fairbanks tonnage prorated based on 1999 population estimates (32.7%).

Other Notes:

1. Emissions above are volatile organic HAP emissions from asphalt plants.
2. Source: Phone conversation with Summit Paving, Lake Otis, Anchorage, 344-2644. Assume 4 inches of pavement for 90% of roads. Assume remaining 10% of roads are private/residential and are ~3 inches in depth. Therefore, average weighted depth = 3.9 inches.
3. Phone conversation with Jerry at Emulsion Products in Anchorage, 277-7752
RC, MC, and SC very rarely used any more. On rare occasions MC30 is used in federal projects (therefore MC30 was used as a factor). MC30 thought to be 30% of diluent in cutback: Therefore 17% of cutback evaporated (see AP-42 Table 4.5-1).

4. Formula:

Evoc = VOC emissions in lb/yr = QA * (WPEvap/100)
 QA = mass of cutback asphalt used (lb)
 WPEvap = weight % of asphalt that evaporates

Dry Cleaners - Fairbanks

All Dry Cleaners

Activity Data Input: 83,000 capita
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
174	127184	Tetrachloroethylene (Perchloroethylene)	1.3 lb/yr/capita	53.95 tpy
			Total HAP Emissions	53.950 tpy

Notes/Comments:

1. Reference: AP-42, Table 4.1-2
2. Activity (population) data based on Fairbanks North Star Borough website (www.co.fairbanks.ak.us/).

Residential Wood Combustion in Fireplaces - Fairbanks

Residential Fireplaces
Activity Data Input: 1,296 tons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
162	N/A	Polycyclic Organic Matter	1.60E-02 lb/ton	1.04E-02 tpy
			Total HAP Emissions	0.010 tpy

Notes/Comments:

1. Reference: AP-42, Table 1.9-1
2. Activity data extrapolated from 1990 CO study (see backup)

Estimated Woodstove and Fireplace Activity Data - Fairbanks

<u>Description</u>	<u>Survey Data/Extrapolations</u>
% households w/ woodstove*	28.28 %
% households w/ fireplace*	6.31 %
Number of Households in survey*	428
Number of households in survey w/ woodstove*	121
Number of households in survey w/ fireplace*	27
Total number of cords burned per year in survey - woodstoves*	327
Total number of cords burned per year in survey - fireplaces*	15
Total weight of wood burned per year in survey - woodstoves*	785,088 lb/yr
Total weight of wood burned per year in survey - fireplaces* - 80 ft ³ /cord, 30 lb/ft ³	36,288 lb/yr
Total number of Fairbanks households 1990 (from census data)	26,693
Extrapolated wood burned per year (based on 1990 census) - woodstoves	48,963,444 lb/yr
Extrapolated wood burned per year (based on 1990 census) - fireplaces	2,263,167 lb/yr
Total population 1990 (Fairbanks Borough data)	73,624
Total population 1999 (Fairbanks Borough data)	84,336
Extrapolated wood burned per year (1999) - woodstoves	28,044 ton/yr
Extrapolated wood burned per year (1999) - fireplaces	1,296 ton/yr

* Indicates data from Anchorage 1990 Base Year Carbon Monoxide Emission Inventory (based on 1990 Fairbanks RWC Survey data)

Woodstoves - Fairbanks

Residential Woodstoves

Activity Data Input: 28,044 tons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene (including benzene from gasoline)	1.94E+00 lb/ton	2.72E+01 tpy
58	N/A	Cadmium Compounds	2.20E-05 lb/ton	3.08E-04 tpy
75	N/A	Chromium Compounds	1.00E-06 lb/ton	1.40E-05 tpy
127	N/A	Manganese Compounds	1.70E-02 lb/ton	2.38E-01 tpy
133	78933	Methyl ethyl ketone (2-Butanone)	2.90E-01 lb/ton	4.07E+00 tpy
145	91203	Naphthalene	2.88E-01 lb/ton	4.04E+00 tpy
146	N/A	Nickel Compounds	1.40E-05 lb/ton	1.96E-04 tpy
162	N/A	Polycyclic Organic Matter	7.30E-01 lb/ton	1.02E+01 tpy
176	108883	Toluene	7.30E-01 lb/ton	1.02E+01 tpy
185	1330207	Xylenes (isomers and mixture)	2.02E-01 lb/ton	2.83E+00 tpy
Total HAP Emissions			58.822 tpy	

Notes/Comments:

1. Reference: AP-42, Table 1.10-2, 10-3 and 10-4.
2. Activity data extrapolated from 1990 CO study (see backup)

Estimated Woodstove and Fireplace Activity Data - Fairbanks

<u>Description</u>	<u>Survey Data/Extrapolations</u>
% households w/ woodstove*	28.28 %
% households w/ fireplace*	6.31 %
Number of Households in survey*	428
Number of households in survey w/ woodstove*	121
Number of households in survey w/ fireplace*	27
Total number of cords burned per year in survey - woodstoves*	327
Total number of cords burned per year in survey - fireplaces*	15
Total weight of wood burned per year in survey - woodstoves*	785,088 lb/yr
Total weight of wood burned per year in survey - fireplaces* - 80 ft ³ /cord, 30 lb/ft ³	36,288 lb/yr
Total number of Fairbanks households 1990 (from census data)	26,693
Extrapolated wood burned per year (based on 1990 census) - woodstoves	48,963,444 lb/yr
Extrapolated wood burned per year (based on 1990 census) - fireplaces	2,263,167 lb/yr
Total population 1990 (Fairbanks Borough data)	73,624
Total population 1999 (Fairbanks Borough data)	84,336
Extrapolated wood burned per year (1999) - woodstoves	28,044 ton/yr
Extrapolated wood burned per year (1999) - fireplaces	1,296 ton/yr

* Indicates data from Anchorage 1990 Base Year Carbon Monoxide Emission Inventory (based on 1990 Fairbanks RWC Survey data)

Gasoline Service Stations - Fairbanks

Gasoline Service Stations

Activity Data Input: 39,858,095 gallons
Activity Period/Year: 2000 Year

Section 112 Hazardous Air Pollutants

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
14	540841	2,24-Trimethylpentane	0.0099 lb/lb VOC	0.61 tons
48	71432	Benzene (including benzene from gasoline)	0.0077 lb/lb VOC	0.48 tons
99	100414	Ethyl benzene	0.00004 lb/lb VOC	0.00 tons
118	110543	Hexane	0.00478 lb/lb VOC	0.30 tons
176	108883	Toluene	0.032 lb/lb VOC	1.98 tons
185	1330207	Xylenes (isomers and mixture)	0.0015 lb/lb VOC	0.09 tons
Total HAP Emissions				3.455 tpy

Notes/Comments:

- Reference: AP-42, Section 5.2
- 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 for vapor displacement from automobile tanks during refilling (Stage II control)
 - EFvoc s = 0.7 lb/kgal VOC emission factor associated with spillage during automobile refilling
- Source: Phone conversation with Raymond Measles, Tesoro, Anchorage, June 13, 2000 (561-5521)>
RM stated that all stations should have been converted to Stage I (filling) controls by now.
- Activity data extrapolated from Anchorage using vehicle miles traveled (VMT) ratio. Anchorage activity data and VMT data obtained from ADEC.
178663083 gallons x 419.5/1880.4 = 39858095 gallons

Gasoline Service Stations - Fairbanks

Is)

Open Burning - Fairbanks

Open Burning (Diesel)

Activity Data Input: 14,753 gallons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.000 tpy
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.000 tpy
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.000 tpy
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.000 tpy
109	5000	Formaldehyde	1.214 lb/Mgal	0.009 tpy
118	110543	Hexane	0.269 lb/Mgal	0.002 tpy
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.000 tpy
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.000 tpy
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.000 tpy
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.000 tpy
Total HAP Emissions				0.011 tpy

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.
3. Firefighter training was the only activity considered in open burning.
Assume Alyeska trained once per week for 28 weeks @ 200 gallons per session.

Structural Fires - Fairbanks

Activity Data Input: 71 total fires
Activity Period: 1999 year

Section 112 Hazardous Air Pollutants		
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>
39	107028	Acrolein
83	N/A	Cyanide Compounds
109	5000	Formaldehyde
120	7647010	Hydrochloric acid

Source Category Emission Calculations	
<u>Emission Factor</u>	<u>Estimated Emissions</u>
2.55E-05 lb/dscf	1.80E-01 tons
2.05E-04 lb/dscf	1.45E+00 tons
5.91E-06 lb/dscf	4.18E-02 tons
8.73E-05 lb/dscf	6.17E-01 tons

Total HAP Emissions 2.288 tons

Notes/Comments:

1. Emission factors apply to sum of residential and nonresidential fires.
2. Activity data provided courtesy of State of Alaska Fire Marshall's Office, Anchorage.

Structural Fires Data - Fairbanks

F-Factor (Ref. 1)	9,570 dscf/MMBtu
HHV Factor (Ref. 2)	9,044 Btu/lb
Fuel Loading Factor (Ref. 2)	1.15 tons of material burned/fire

Sample calculation for volume of gas generated per amount burned:

$$\begin{aligned} & \text{Volume Gas Generated (dscf) / Material Burned (ton)} \\ & = \text{F-Factor (dscf/MMBtu)} * \text{HHV (Btu/lb)} * (1/2000) * (1/1\text{e}6) \\ & = 173,102 \text{ dscf / ton burned} \end{aligned}$$

Sample calculation for emission rate of acrolein produced per amount burned:

$$\begin{aligned} & \text{Weight of Gas Generated (lb) / Material Burned (ton)} \\ & = \text{Emission Factor (lb/dscf)} * \text{Volume Gas Generated Per Amount Burned (dscf/ton)} \\ & = 4.41 \text{ lb Acrolein / ton burned} \end{aligned}$$

Sample calculation for emission estimate of Acrolein:

$$\begin{aligned} & = \text{Number of Fires} * \text{Fuel Loading Factor (tons of material burned/fire)} * \text{Emission Rate of Acrolein (lb/ton burned)} \\ & = 1.80\text{E-}01 \text{ tons of Acrolein} \end{aligned}$$

Notes/Comments:

1. Reference: Development of Area Source Hazardous Air Pollutant Inventories, Vol 1: Air Toxic Emission Inventory.
2. Reference: EIIP Volume III, Area Sources Preferred and Alternative Methods.

Consumer Products - Fairbanks

		Personal Care Products		Household Products		Automotive Aftermarket Products		Adhesives & Sealants		FIFRA-Regulated Products		Coatings & Related Products		Miscellaneous				
		Activity Data: 83,000 capita		Activity Data: 83,000 capita		Activity Data: 83,000 capita		Activity Data: 83,000 capita		Activity Data: 83,000 capita		Activity Data: 83,000 capita		Activity Data: 83,000 capita				
		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year				
Section 112 Hazardous Air Pollutants																		
No.	CAS No.	Chemical Name	Source Category	Calculations	Source Category	Calculations	Source Category	Calculations	Source Category	Calculations	Source Category	Calculations	Source Category	Calculations	Source Category	Calculations	Total - All Categories	
			Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Emissions	
10	542756	1,3-Dichloropropene															6.64E+00 tons	
12	106467	1,4-Dichlorobenzene(p)			4.79E-02 lb/yr/cap	1.99E+00 tons											3.45E+00 tons	
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)							1.09E-05 lb/yr/cap	4.52E-04 tons							4.52E-04 tons	
25	79469	2-Nitropropane							2.12E-06 lb/yr/cap	8.80E-05 tons							8.80E-05 tons	
36	60355	Acetamide	1.38E-07 lb/yr/cap	5.73E-06 tons													5.73E-06 tons	
38	98862	Acetophenone											8.53E-06 lb/yr/cap	3.54E-04 tons			3.54E-04 tons	
41	79107	Acrylic Acid							3.94E-09 lb/yr/cap	1.64E-07 tons							1.64E-07 tons	
48	71432	Benzene (including benzene from gasoline)						4.72E-06 lb/yr/cap	1.96E-04 tons								1.96E-04 tons	
63	56235	Carbon tetrachloride											4.10E-10 lb/yr/cap	1.70E-08 tons			1.70E-08 tons	
70	108907	Chlorobenzene									7.16E-02 lb/yr/cap	2.97E+00 tons	1.51E-05 lb/yr/cap	6.27E-04 tons			2.97E+00 tons	
72	67663	Chloroform					3.60E-05 lb/yr/cap	1.49E-03 tons					9.55E-04 lb/yr/cap	3.96E-02 tons			4.11E-02 tons	
86	132649	Dibenzofurans							8.07E-06 lb/yr/cap	3.35E-04 tons							3.35E-04 tons	
94	68122	Dimethyl formamide	2.71E-05 lb/yr/cap	1.12E-03 tons			2.78E-08 lb/yr/cap	1.15E-06 tons	2.29E-07 lb/yr/cap	9.50E-06 tons							1.44E-03 tons	
99	100414	Ethyl benzene			2.56E-06 lb/yr/cap	1.06E-04 tons	7.51E-05 lb/yr/cap	3.12E-03 tons	1.36E-05 lb/yr/cap	5.64E-04 tons	1.30E-03 lb/yr/cap	5.40E-02 tons	6.86E-04 lb/yr/cap	2.85E-02 tons			8.62E-02 tons	
103	107062	Ethylene dichloride (1,2-Dichloroethane)	4.62E-06 lb/yr/cap	1.92E-04 tons	3.52E-08 lb/yr/cap	1.46E-06 tons											1.92E-04 tons	
106	75218	Ethylene oxide															6.27E-01 tons	
109	5000	Formaldehyde			6.74E-06 lb/yr/cap	2.80E-04 tons			2.51E-05 lb/yr/cap	1.04E-03 tons			8.55E-04 lb/yr/cap	3.55E-02 tons			5.26E-02 tons	
110	N/A	Glycol ethers	1.52E-05 lb/yr/cap	6.31E-04 tons	5.31E-03 lb/yr/cap	2.20E-01 tons	2.69E-02 lb/yr/cap	1.12E+00 tons	1.28E-04 lb/yr/cap	5.31E-03 tons	5.65E-03 lb/yr/cap	2.34E-01 tons	2.24E-03 lb/yr/cap	9.30E-02 tons	2.42E-04 lb/yr/cap	1.00E-02 tons	1.68E+00 tons	
118	110543	Hexane															3.58E+00 tons	
120	7647010	Hydrochloric acid															7.26E-05 tons	
121	7664393	Hydrogen fluoride (Hydrofluoric acid)															5.89E-04 tons	
123	78591	Isophorone			8.75E-08 lb/yr/cap	3.63E-06 tons	1.41E-05 lb/yr/cap	5.85E-04 tons									3.93E-02 tons	
129	67561	Methanol	5.67E-07 lb/yr/cap	2.35E-05 tons	6.66E-04 lb/yr/cap	2.76E-02 tons	6.61E-01 lb/yr/cap	2.74E+01 tons	6.82E-04 lb/yr/cap	2.83E-02 tons			9.47E-04 lb/yr/cap	3.93E-02 tons	1.60E-02 lb/yr/cap	6.64E-01 tons	1.84E-02 lb/yr/cap	7.64E-01 tons
131	74839	Methyl bromide(Bromomethane)															9.21E+00 tons	
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	7.45E-04 lb/yr/cap	3.09E-02 tons	2.85E-02 lb/yr/cap	1.18E+00 tons	7.63E-02 lb/yr/cap	3.17E+00 tons	2.14E-01 lb/yr/cap	8.88E+00 tons	5.99E-02 lb/yr/cap	2.49E+00 tons	7.69E-03 lb/yr/cap	3.19E-01 tons	2.46E-04 lb/yr/cap	1.02E-02 tons	1.61E+01 tons	
133	78933	Methyl ethyl ketone (2-Butanone)	1.75E-05 lb/yr/cap	7.26E-04 tons	4.49E-04 lb/yr/cap	1.86E-02 tons	3.04E-03 lb/yr/cap	1.26E-01 tons	3.91E-02 lb/yr/cap	1.62E+00 tons	2.01E-05 lb/yr/cap	8.34E-04 tons	7.94E-03 lb/yr/cap	3.30E-01 tons	1.01E-05 lb/yr/cap	4.19E-04 tons	2.10E+00 tons	
136	108101	Methyl isobutyl ketone (Hexone)			1.08E-04 lb/yr/cap	4.48E-03 tons	8.73E-04 lb/yr/cap	3.62E-02 tons	1.24E-03 lb/yr/cap	5.15E-02 tons	9.01E-05 lb/yr/cap	3.74E-03 tons	5.26E-03 lb/yr/cap	2.18E-01 tons			3.14E-01 tons	
139	1634044	Methyl tert butyl ether					2.36E-05 lb/yr/cap	9.79E-04 tons									9.79E-04 tons	
141	75092	Methylene chloride(Dichloromethane)			2.39E-03 lb/yr/cap	9.92E-02 tons	4.83E-03 lb/yr/cap	2.00E-01 tons	8.78E-03 lb/yr/cap	3.64E-01 tons	6.81E-04 lb/yr/cap	2.83E-02 tons	1.97E-02 lb/yr/cap	8.18E-01 tons	2.38E-05 lb/yr/cap	9.88E-04 tons	1.51E+00 tons	
145	91203	Naphthalene			5.52E-07 lb/yr/cap	2.29E-05 tons	2.26E-06 lb/yr/cap	9.38E-05 tons	1.07E-04 lb/yr/cap	4.44E-03 tons	4.60E-02 lb/yr/cap	1.91E+00 tons	5.75E-06 lb/yr/cap	2.39E-04 tons			1.91E+00 tons	
174	127184	Tetrachloroethylene (Perchloroethylene)			2.96E-03 lb/yr/cap	1.23E-01 tons	2.35E-02 lb/yr/cap	9.75E-01 tons	6.75E-04 lb/yr/cap	2.80E-02 tons	1.92E-04 lb/yr/cap	7.97E-03 tons	1.48E-04 lb/yr/cap	6.14E-03 tons	7.53E-04 lb/yr/cap	3.12E-02 tons	1.17E+00 tons	
176	108883	Toluene	3.41E-03 lb/yr/cap	1.42E-01 tons	5.82E-04 lb/yr/cap	2.42E-02 tons	2.49E-02 lb/yr/cap	1.03E+00 tons	8.43E-02 lb/yr/cap	3.50E+00 tons			3.16E-01 lb/yr/cap	1.31E+01 tons	2.46E-06 lb/yr/cap	1.02E-04 tons	1.78E+01 tons	
178	79016	Trichloroethylene			4.34E-05 lb/yr/cap	1.80E-03 tons	2.67E-04 lb/yr/cap	1.11E-02 tons	3.88E-05 lb/yr/cap	1.61E-03 tons			1.37E-04 lb/yr/cap	5.69E-03 tons			2.02E-02 tons	
179	121448	Triethylamine											5.26E-04 lb/yr/cap	2.18E-02 tons			3.48E-02 tons	
181	108054	Vinyl acetate							4.94E-08 lb/yr/cap	2.05E-06 tons							2.05E-06 tons	
185	1330207	Xylenes (isomers and mixture)			3.28E-03 lb/yr/cap	1.36E-01 tons	1.20E-02 lb/yr/cap	4.98E-01 tons	9.76E-03 lb/yr/cap	4.05E-01 tons	1.37E-01 lb/yr/cap	5.69E+00 tons	4.05E-02 lb/yr/cap	1.68E+00 tons	4.31E-04 lb/yr/cap	1.79E-02 tons	8.42E+00 tons	
Total HAPs			0.175 tons		Total HAPs	3.913 tons		Total HAPs	34.748 tons		Total HAPs	18.143 tons		Total HAPs	31.429 tons		Total HAPs	17.474 tons
																	Total HAPs	0.835 tons
																		106.716 tons

Notes/Comments:

1. Reference: EIIP Volume III, Area Sources Preferred and Alternative Methods.
2. Activity (population) data based on Fairbanks North Star Borough website (www.co.fairbanks.ak.us/).

Residential / Commercial Fuel Oil Heating - Fairbanks

Residential/Commercial Oil Combustion
Activity Data Input: 54,296,512 gallons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.016 tons
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.009 tons
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.041 tons
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.249 tons
109	5000	Formaldehyde	1.214 lb/Mgal	32.960 tons
118	110543	Hexane	0.269 lb/Mgal	7.310 tons
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.033 tons
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.052 tons
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.011 tons
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.067 tons
			Total HAP Emissions	40.748 tpy

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.
3. Activity data extrapolated from 1990 Fairbanks CO Emissions Inventory.

Residential / Commercial Fuel Oil Heating - Fairbanks
Estimated Residential/Commercial Activity

<u>Description</u>	<u>Data/Extrapolations</u>
Annual Fuel Oil Sales*	47,400,000 gal/yr
Total population 1990 (Fairbanks Borough data)	73,624
Total population 1999 (Fairbanks Borough data)	84,336
Extrapolated Residential/Commercial Fuel Oil Sales (1999)	54,296,512 gal/yr

* Indicates data from Fairbanks 1990 Base Year Carbon Monoxide Emission Inventory (Sierra Research)

Surface Coating - Fairbanks

			Architectural Coatings		Product Coatings		Special Purpose Coatings				
			Water-based		Oil-based						
			Activity Data: 145,788 gallons		Activity Data: 62,481 gallons		Activity Data: 144,663 gallons		Activity Data: 54,120 gallons		
			Activity Period: 1998 Year		Activity Period: 1998 Year		Activity Period: 1998 Year		Activity Period: 1998 Year		
Section 112 Hazardous Air Pollutants			Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categories
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Emissions
48	71432	Benzene (including benzene from gasoline)	0.36 %	0.3 tons							2.90E-01 tpy
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)									0.00E+00 tpy
98	140885	Ethyl acrylate									0.00E+00 tpy
99	100414	Ethyl benzene			0.54 %	0.7 tons					7.45E-01 tpy
101	75003	Ethyl chloride (Chloroethane)	0.62 %	0.5 tons							4.99E-01 tpy
104	107211	Ethylene glycol	0.58 %	0.5 tons							4.67E-01 tpy
133	78933	Methyl ethyl ketone (2-Butanone)			0.54 %	0.7 tons	8.1 %	20.1 tons	8.1 %	7.5 tons	2.83E+01 tpy
136	108101	Methyl isobutyl ketone (Hexone)			0.36 %	0.5 tons	5.9 %	14.6 tons	5.9 %	5.5 tons	2.06E+01 tpy
140	74873	Methylchloride (Chloromethane)	0.55 %	0.4 tons							4.43E-01 tpy
141	75092	Methylene chloride(Dichloromethane)	5.52 %	4.4 tons							4.44E+00 tpy
176	108883	Toluene			37.87 %	52.2 tons	14.7 %	36.4 tons	14.7 %	13.6 tons	1.02E+02 tpy
181	108054	Vinyl acetate	0.12 %	0.1 tons							9.66E-02 tpy
185	1330207	Xylenes (isomers and mixture)			3.7 %	5.1 tons	15.8 %	39.1 tons	15.8 %	14.6 tons	5.88E+01 tpy
186	95476	Xylenes (isomers and mixture)			4.47 %	6.2 tons					6.17E+00 tpy
			Total HAPs	6.237 tpy	Total HAPs	65.502 tpy	Total HAPs	110.159 tpy	Total HAPs	41.212 tpy	223.109 tpy

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-base 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.

Surface Coating Data - Fairbanks

Surface Coatings Estimates, Based on Population (1999)

U.S. Population	272,690,813
Alaska Populations:	
Anchorage	257,808
Fairbanks	84,366
Juneau	30,192

United States 1998 Quantity of Shipments of Paint, Varnish, and Lacquer (Gallons)

Location	Percent of US Population	Architectural Coatings	Product Coatings	Special Purpose	TOTAL GALLONS
USA	100%	673,174,000	467,584,000	174,929,000	1,315,687,000

Data from 1998 US Census Bureau Report MA32F(98)-1: Paint and Allied Products

Surface Coating Allocation, Based on Population (Gallons)

Location	Percent of US Population	Architectural Coatings	Product Coatings	Special Purpose	TOTAL GALLONS
Anchorage	0.0945%	636,434	442,064	165,382	1,243,880
Fairbanks	0.0309%	208,269	144,663	54,120	407,052
Juneau	0.0111%	74,533	51,770	19,368	145,671
TOTAL		919,236	638,497	238,870	1,796,603

VOC Emissions (Pounds)

Location	Percent of US Population	Architectural Coatings		Product Coatings	Special Purpose
		Water-based	Oil-based		
Anchorage	0.0945%	491,836	843,147	1,512,921	566,003
Fairbanks	0.0309%	160,950	275,915	495,094	185,221
Juneau	0.0111%	57,599	98,741	177,179	66,285
TOTAL		710,385	1,217,803	2,185,194	817,508

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.

Definitions:

Architectural

Exterior waterborne (latex)
 Interior waterborne (latex)
 Exterior solvent-borne (oil)
 Interior solvent-borne (oil)
 Architectural lacquers
 "Do-it-yourself" wood and furniture finishes

Special Purpose Coatings:

Industrial maintenance paints (interior, exterior)
 Marine coatings (off-shore structures, marine refinishing coatings)
 Traffic paints
 Metallic paints (aluminum, zinc bronze, etc.)
 Automobile refinishing coatings
 Aerosol paints
 Roof coatings
 Multi-color paints

Product Coatings

Automotive finishes
 Truck and bus finishes
 Other transportation finishes (aircraft, railroad, etc.)
 Wood and composition board flat-stock finishes
 Wood furniture and fixture finishes
 Appliance finishes
 Sheet, strip and coil coatings on metals
 Metal decorating finishes (can, container and closure coatings)
 Machinery and equipment finishes
 Paper and paperboard coatings (not ink)
 Metal furniture and fixtures finishes
 Electrical insulating varnishes
 Magnet wire coatings

Used Oil Combustion - Fairbanks

Used Oil Combustion

Activity Data Input: 212,907 gallons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
12	106467	1,4-Dichlorobenzene(p)	8.30E-07 lb/kgal	8.84E-08 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	2.50E-03 lb/kgal	2.66E-04 tpy
52	N/A	Beryllium Compounds	1.80E-03 lb/kgal	1.92E-04 tpy
58	N/A	Cadmium Compounds	2.90E-04 lb/kgal	3.09E-05 tpy
75	N/A	Chromium Compounds	1.90E-01 lb/kgal	2.02E-02 tpy
76	N/A	Cobalt Compounds	7.60E-03 lb/kgal	8.09E-04 tpy
145	91203	Naphthalene	1.20E-02 lb/kgal	1.28E-03 tpy
			Total HAP Emissions	0.023 tpy

Notes/Comments:

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

Used Oil Backup Info - Fairbanks

Waste Oil Combustion, based on population (1999)

U.S. Population (1983)	233,791,994
U.S. Population (1999)	272,690,813
Alaska Populations:	
Anchorage	257,808
Fairbanks	84,366
Juneau	30,192

United States Quantity of Used Oil Burned (Gallons)

Location	Used Oil Burned (1983)	Estimated Used Oil Burned (1999)
USA	590,000,000	688,165,480

1983 data from from AP-42section 1.11, Waste Oil Combustion

Population data from US Census web-site

Used-oil Combustion Allocation, Based on 1999 Population (Gallons)

Location	Percent of US Population	Gallons Used Oil Burned (1999)
Anchorage	0.0945%	650,607
Fairbanks	0.0309%	212,907
Juneau	0.0111%	76,193
TOTAL	0.1366%	939,707

Percentages based on 1999 Population data (<http://venus.census.gov/cdrom/lookup/961017877>)

Wildfires - Fairbanks

Wildfires

Activity Data Input: 6,206 acres
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants		
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>
9	106990	1,3-Butadiene

Source Category Emission Calculations	
<u>Emission Factor</u>	<u>Estimated Emissions</u>
0.520 %	4.260 tons
Total HAP Emissions	4.260 tons

Notes/Comments:

1. Reference: AP-42, Tables 13.1-1 and 13.1-2 and Speciate.
2. Activity data from AK Division of Forestry website.
3. Emission Factor Development:
 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

Table D-3-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9
No.	CAS No.	Chemical Name	Area Facilities	Alyeska	Fort Knox Mine	Fairbanks Hospital	Fairbanks Airport	GVEA Chena 6	GVEA N. Pole	GVEA Zehnder	PetroStar Refinery	Williams N. Pole
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	0.011 tpy	-----	0.001 tpy	-----	-----	-----	-----	-----	-----	0.010 tpy
10	542756	1,3-Dichloropropene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
14	540841	2,2,4-Trimethylpentane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D. salts and esters	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.213 tpy	-----	0.022 tpy	0.000 tpy	0.000 tpy	-----	-----	0.000 tpy	0.000 tpy	0.190 tpy
36	60355	Acetamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
38	98862	Acetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
39	107028	Acrolein	0.363 tpy	-----	0.003 tpy	0.000 tpy	0.000 tpy	-----	-----	0.000 tpy	0.000 tpy	0.360 tpy
40	79061	Acrylamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
41	79107	Acrylic Acid	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
42	107131	Acrylonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.032 tpy	-----	-----	-----	0.000 tpy	0.000 tpy	0.030 tpy	0.001 tpy	-----	-----
46	N/A	Arsenic Compounds (inorganic including arsine)	0.012 tpy	-----	0.004 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.007 tpy	0.000 tpy	0.000 tpy	-----
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	3.075 tpy	-----	0.027 tpy	0.000 tpy	0.005 tpy	-----	-----	0.001 tpy	0.023 tpy	3.020 tpy
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
52	N/A	Beryllium Compounds	0.001 tpy	-----	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.000 tpy	-----
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
58	N/A	Cadmium Compounds	0.009 tpy	-----	0.001 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.006 tpy	0.000 tpy	0.001 tpy	-----

Table D-3-2

Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Fairbanks North Star Borough

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9
No.	CAS No.	Chemical Name	Area Facilities	Alyeska	Fort Knox Mine	Fairbanks Hospital	Fairbanks Airport	GVEA Chena 6	GVEA N. Pole	GVEA Zehnder	PetroStar Refinery	Williams N. Pole
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
61	63252	Carbaryl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
62	75150	Carbon disulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	0.000 tpy	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
64	463581	Carbonyl sulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
65	120809	Catechol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
69	79118	Chloroacetic acid	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
70	108907	Chlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
72	67663	Chloroform	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.093 tpy	-----	0.019 tpy	0.001 tpy	0.000 tpy	0.000 tpy	0.065 tpy	0.003 tpy	0.005 tpy	-----
76	N/A	Cobalt Compounds	0.013 tpy	-----	0.000 tpy	-----	0.000 tpy	0.000 tpy	0.013 tpy	0.001 tpy	-----	-----
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
82	98828	Cumene	0.220 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.220 tpy
83	N/A	Cyanide Compounds	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
84	3547044	DDE	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
85	334883	Diazomethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	0.671 tpy	-----	-----	0.000 tpy	0.001 tpy	-----	-----	-----	0.000 tpy	0.670 tpy
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
104	107211	Ethylene glycol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
109	5000	Formaldehyde	0.288 tpy	-----	0.062 tpy	0.008 tpy	0.001 tpy	-----	-----	0.000 tpy	0.026 tpy	0.190 tpy
110	N/A	Glycol ethers	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-3-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9
No.	CAS No.	Chemical Name	Area Facilities	Alyeska	Fort Knox Mine	Fairbanks Hospital	Fairbanks Airport	GVEA Chena 6	GVEA N. Pole	GVEA Zehnder	PetroStar Refinery	Williams N. Pole
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	110543	Hexane	2.519 tpy	-----	0.013 tpy	-----	0.005 tpy	-----	-----	-----	0.130 tpy	2.370 tpy
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	0.487 tpy	-----	-----	0.387 tpy	-----	-----	-----	-----	-----	0.100 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
122	123319	Hydroquinone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
123	78591	Isophorone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
124	N/A	Lead Compounds	0.085 tpy	-----	0.001 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.080 tpy	0.003 tpy	0.001 tpy	-----
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.492 tpy	-----	0.003 tpy	0.000 tpy	0.000 tpy	0.001 tpy	0.468 tpy	0.019 tpy	-----	-----
128	N/A	Mercury Compounds	0.015 tpy	-----	0.002 tpy	0.001 tpy	0.000 tpy	0.000 tpy	0.012 tpy	0.000 tpy	-----	-----
129	67561	Methanol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
133	78933	Methyl ethyl ketone (2-Butanone)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140	74873	Methylchloride (Chloromethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
141	75092	Methylene chloride(Dichloromethane)	2.450 tpy	-----	-----	-----	2.450 tpy	-----	-----	-----	-----	-----
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
143	N/A	Mineral fibers	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
145	91203	Naphthalene	0.023 tpy	-----	0.002 tpy	0.000 tpy	0.000 tpy	-----	-----	0.000 tpy	0.001 tpy	0.020 tpy
146	N/A	Nickel Compounds	1.729 tpy	-----	0.003 tpy	0.001 tpy	0.001 tpy	0.003 tpy	1.651 tpy	0.068 tpy	0.001 tpy	-----
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromicrobenzene (Quintobenzene)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	0.000 tpy	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.431 tpy	-----	-----	-----	-----	0.001 tpy	0.413 tpy	0.017 tpy	-----	-----
159	7803512	Phospine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	0.033 tpy	-----	-----	0.000 tpy	0.000 tpy	-----	-----	0.000 tpy	0.002 tpy	0.030 tpy
163	106503	p-Phenylemediamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
164	123386	Propionaldehyde	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
169	106514	Quinone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.008 tpy	-----	-----	0.000 tpy	-----	0.000 tpy	0.007 tpy	0.000 tpy	-----	-----
172	100425	Styrene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	0.000 tpy	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----

Table D-3-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Area Source Facilities
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6	Facility No. 7	Facility No. 8	Facility No. 9
No.	CAS No.	Chemical Name	Area Facilities	Alyeska	Fort Knox Mine	Fairbanks Hospital	Fairbanks Airport	GVEA Chena 6	GVEA N. Pole	GVEA Zehnder	PetroStar Refinery	Williams N. Pole
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
176	108883	Toluene	5.276 tpy	-----	0.119 tpy	0.001 tpy	1.350 tpy	-----	-----	0.000 tpy	0.016 tpy	3.790 tpy
177	8001352	Toxaphene (chlorinated camphene)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
178	79016	Trichloroethylene	0.000 tpy	-----	-----	-----	0.000 tpy	-----	-----	-----	-----	-----
179	121448	Triethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
182	593602	Vinyl bromide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
183	75014	Vinyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
185	1330207	Xylenes (isomers and mixture)	3.049 tpy	-----	0.008 tpy	0.000 tpy	0.000 tpy	-----	-----	0.000 tpy	0.000 tpy	3.040 tpy
186	95476	Xylenes (isomers and mixture)	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
187	108383	Xylenes (isomers and mixture)	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
188	106423	Xylenes (isomers and mixture)	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----	-----	-----	-----
Total HAP Emissions			21.60 tpy	0.00 tpy	0.29 tpy	0.40 tpy	3.81 tpy	0.01 tpy	2.75 tpy	0.12 tpy	0.21 tpy	14.01 tpy

Note: Eielson Air Force Base is also an area source facility within the FNSB. Based on the facility's Title 5 permit application, total base-wide HAP emissions are 17 tpy. These total emissions were not specified in the application, and as such, have not been included in this table.

Alyeska Pipeline Service Company - Fairbanks

Alyeska Pipeline Service Company
Activity Data Input: N/A
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants

<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>
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<u>Source Category</u>	<u>Emission Calculations</u>
<u>Emission Factor</u>	<u>Estimated Emissions</u>

Total HAP Emissions	0.0 tpy
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Notes/Comments:

1. Reference: 1999 FOR, no activity.

Fairbanks Gold Mining - Fort Knox Mine

Fort Knox Mine - Title V data
 Activity Data Input: N/A
 Activity Period/Year: 1997 Year

Fort Knox Mine - TRI Data
 Activity Data Input:
 Activity Period/Year: 1998 Year

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
9	106990	1,3-Butadiene		1.14E-03 tpy			1.14E-03 tpy
35	75070	Acetaldehyde		2.23E-02 tpy			2.23E-02 tpy
39	107028	Acrolein		2.68E-03 tpy			2.68E-03 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		4.40E-03 tpy			4.40E-03 tpy
48	71432	Benzene(including benzene from gasoline)		2.71E-02 tpy			2.71E-02 tpy
52	N/A	Beryllium Compounds		1.79E-04 tpy			1.79E-04 tpy
58	N/A	Cadmium Compounds		1.16E-03 tpy			1.16E-03 tpy
75	N/A	Chromium Compounds		5.50E-03 tpy	2.80E+01 lb/yr	1.40E-02 tpy	1.95E-02 tpy
76	N/A	Cobalt Compounds		8.00E-06 tpy			8.00E-06 tpy
109	5000	Formaldehyde		6.23E-02 tpy			6.23E-02 tpy
118	110543	Hexane		1.33E-02 tpy			1.33E-02 tpy
124	N/A	Lead Compounds		6.35E-04 tpy			6.35E-04 tpy
127	N/A	Manganese Compounds		3.45E-03 tpy			3.45E-03 tpy
128	N/A	Mercury Compounds		2.14E-03 tpy			2.14E-03 tpy
145	91203	Naphthalene		2.46E-03 tpy			2.46E-03 tpy
146	N/A	Nickel Compounds		1.68E-03 tpy	3.00E+00 lb/yr	1.50E-03 tpy	3.18E-03 tpy
176	108883	Toluene		1.19E-01 tpy			1.19E-01 tpy
185	1330207	Xylenes (isomers and mixture)		8.28E-03 tpy			8.28E-03 tpy
Total HAP Emissions				0.28 tpy	Total HAP Emissions	0.02 tpy	TOTAL 0.29 tpy

Notes/Comments:
 1. Reference: Fairbanks Gold Mining, Fort Knox Mine, Title V application of 9/97.
 2. Values shown are facility wide as reported in the application.

Notes/Comments:
 1. 1998 TRI Inventory data.

Fairbanks Hospital

Diesel-Fired Boilers/Heaters	Diesel-Fired Engines greater than 600 hp	Starved Air Incinerators
Activity Data Input: 258,545 gallons	Activity Data Input: 3,974 gallons	Activity Data Input: 360 tons
Activity Period/Year: 1997 Year	Activity Period/Year: 1997 Year	Activity Period/Year: 1997 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories	
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions	Emission Factor	Estimated Emissions	Emission Factor	Estimated Emissions	Estimated Emissions	
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin					2.94E-06 lb/ton	5.29E-07 tpy	5.29E-07 tpy	
35	75070	Acetaldehyde			2.52E-05 lb/MMBtu	6.86E-06 tpy			6.86E-06 tpy	
39	107028	Acrolein			7.88E-06 lb/MMBtu	2.15E-06 tpy			2.15E-06 tpy	
46	N/A	Arsenic Compounds (inorganic including arsine)	4 lb/10 ¹² Btu	7.08E-05 tpy			6.69E-04 lb/ton	1.20E-04 tpy	1.91E-04 tpy	
48	71432	Benzene (including benzene from gasoline)	2.14E-04 lb/Mgal	2.77E-05 tpy	7.76E-04 lb/MMBtu	2.11E-04 tpy			2.39E-04 tpy	
52	N/A	Beryllium Compounds	3 lb/10 ¹² Btu	5.31E-05 tpy					5.31E-05 tpy	
58	N/A	Cadmium Compounds	3 lb/10 ¹² Btu	5.31E-05 tpy			2.41E-03 lb/ton	4.34E-04 tpy	4.87E-04 tpy	
75	N/A	Chromium Compounds	3 lb/10 ¹² Btu	5.31E-05 tpy			3.31E-03 lb/ton	5.96E-04 tpy	6.49E-04 tpy	
99	100414	Ethyl benzene	6.36E-05 lb/Mgal	8.22E-06 tpy					8.22E-06 tpy	
109	5000	Formaldehyde	6.10E-02 lb/Mgal	7.89E-03 tpy	7.89E-05 lb/MMBtu	2.15E-05 tpy			7.91E-03 tpy	
120	7647010	Hydrochloric acid					2.15E+00 lb/ton	3.87E-01 tpy	3.87E-01 tpy	
124	N/A	Lead Compounds	9 lb/10 ¹² Btu	1.59E-04 tpy					1.59E-04 tpy	
127	N/A	Manganese Compounds	6 lb/10 ¹² Btu	1.06E-04 tpy					1.06E-04 tpy	
128	N/A	Mercury Compounds	3 lb/10 ¹² Btu	5.31E-05 tpy			5.60E-03 lb/ton	1.01E-03 tpy	1.06E-03 tpy	
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	2.36E-04 lb/Mgal	3.05E-05 tpy					3.05E-05 tpy	
145	91203	Naphthalene	1.13E-03 lb/Mgal	1.46E-04 tpy	1.30E-04 lb/MMBtu	3.54E-05 tpy			1.81E-04 tpy	
146	N/A	Nickel Compounds	3 lb/10 ¹² Btu	5.31E-05 tpy			5.52E-03 lb/ton	9.94E-04 tpy	1.05E-03 tpy	
162	N/A	Polycyclic Organic Matter	0.0033 lb/Mgal	4.27E-04 tpy	2.12E-04 lb/MMBtu	5.77E-05 tpy			4.84E-04 tpy	
171	N/A	Selenium Compounds	15 lb/10 ¹² Btu	2.66E-04 tpy					2.66E-04 tpy	
176	108883	Toluene	6.20E-03 lb/Mgal	8.01E-04 tpy	2.81E-04 lb/MMBtu	7.65E-05 tpy			8.78E-04 tpy	
185	1330207	Xylenes (isomers and mixture)	1.09E-04 lb/Mgal	1.41E-05 tpy	1.93E-04 lb/MMBtu	5.25E-05 tpy			6.66E-05 tpy	
186	95476	Xylenes (isomers and mixture)	1.09E-04 lb/Mgal	1.41E-05 tpy	1.93E-04 lb/MMBtu	5.25E-05 tpy			6.66E-05 tpy	
187	108383	Xylenes (isomers and mixture)	1.09E-04 lb/Mgal	1.41E-05 tpy	1.93E-04 lb/MMBtu	5.25E-05 tpy			6.66E-05 tpy	
188	106423	Xylenes (isomers and mixture)	1.09E-04 lb/Mgal	1.41E-05 tpy	1.93E-04 lb/MMBtu	5.25E-05 tpy			6.66E-05 tpy	
Total HAP Emissions			0.010 tpy		Total HAP Emissions	0.001 tpy	Total HAP Emissions	0.390 tpy	TOTAL	0.401 tpy

Notes/Comments:
 1. Reference: AP-42, Tables 1.3-9 and 1.3-10.
 2. Assume diesel fuel heat content of 137,000 Btu/gal.
 3. Activity data from Title V application.

Notes/Comments:
 1. Reference: AP-42, Table 3.4-3.
 2. Assume diesel fuel heat content of 137,000 Btu/gal.
 3. Activity data from Title V application.
 4. Facility has 2 engine-generator sets.

Notes/Comments:
 1. Reference: AP-42, Table 2.1-9.
 2. Activity data from Title V application.

Fairbanks International Airport

Activity Data Input: N/A
 Activity Period/Year: 1997 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions
35	75070	Acetaldehyde		2.45E-04 tpy
39	107028	Acrolein		5.33E-07 tpy
45	N/A	Antimony Compounds		2.25E-08 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		3.55E-05 tpy
48	71432	Benzene(including benzene from gasoline)		4.69E-03 tpy
52	N/A	Beryllium Compounds		2.14E-05 tpy
58	N/A	Cadmium Compounds		9.19E-05 tpy
63	56235	Carbon tetrachloride		1.25E-06 tpy
75	N/A	Chromium Compounds		4.83E-04 tpy
76	N/A	Cobalt Compounds		2.60E-08 tpy
99	100414	Ethyl benzene		5.79E-04 tpy
109	5000	Formaldehyde		1.48E-03 tpy
118	110543	Hexane		5.21E-03 tpy
124	N/A	Lead Compounds		1.58E-04 tpy
127	N/A	Manganese Compounds		1.12E-04 tpy
128	N/A	Mercury Compounds		2.40E-05 tpy
141	75092	Methylene chloride(Dichloromethane)		2.45E+00 tpy
145	91203	Naphthalene		3.58E-05 tpy
146	N/A	Nickel Compounds		1.36E-03 tpy
156	108952	Phenol		1.40E-10 tpy
162	N/A	Polycyclic Organic Matter		2.44E-04 tpy
174	127184	Tetrachloroethylene (Perchloroethylene)		1.50E-06 tpy
176	108883	Toluene		1.35E+00 tpy
178	79016	Trichloroethylene		1.45E-06 tpy
185	1330207	Xylenes (isomers and mixture)		1.68E-04 tpy
Total HAP Emissions				3.815 tpy

Notes/Comments:

3. Activity data from December 4, 1997 Application for Owner Requested Limits.

Golden Valley Electric Association Chena 6 - Fairbanks

Diesel-Fired Turbines for Electricity Generation

Activity Data Input: 40,159 gallons

Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants

Source Category Emission Calculations

<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
45	N/A	Antimony Compounds	2.20E-05 lb/MMBtu	6.05E-05 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	4.90E-06 lb/MMBtu	1.35E-05 tpy
52	N/A	Beryllium Compounds	3.30E-07 lb/MMBtu	9.08E-07 tpy
58	N/A	Cadmium Compounds	4.20E-06 lb/MMBtu	1.16E-05 tpy
75	N/A	Chromium Compounds	4.70E-05 lb/MMBtu	1.29E-04 tpy
76	N/A	Cobalt Compounds	9.10E-06 lb/MMBtu	2.50E-05 tpy
124	N/A	Lead Compounds	5.80E-05 lb/MMBtu	1.60E-04 tpy
127	N/A	Manganese Compounds	3.40E-04 lb/MMBtu	9.35E-04 tpy
128	N/A	Mercury Compounds	8.40E-06 lb/MMBtu	2.31E-05 tpy
146	N/A	Nickel Compounds	1.20E-03 lb/MMBtu	3.30E-03 tpy
158	7723140	Phosphorus	3.00E-04 lb/MMBtu	8.25E-04 tpy
171	N/A	Selenium Compounds	5.30E-06 lb/MMBtu	1.46E-05 tpy
Total HAP Emissions				0.005 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-4.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from 1999 FORs.

Golden Valley Electric Association North Pole - Fairbanks

Diesel-Fired Turbines for Electricity Generation

Activity Data Input: 20,087,676 gallons

Activity Period/Year: 1996 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
45	N/A	Antimony Compounds	2.20E-05 lb/MMBtu	3.03E-02 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	4.90E-06 lb/MMBtu	6.74E-03 tpy
52	N/A	Beryllium Compounds	3.30E-07 lb/MMBtu	4.54E-04 tpy
58	N/A	Cadmium Compounds	4.20E-06 lb/MMBtu	5.78E-03 tpy
75	N/A	Chromium Compounds	4.70E-05 lb/MMBtu	6.47E-02 tpy
76	N/A	Cobalt Compounds	9.10E-06 lb/MMBtu	1.25E-02 tpy
124	N/A	Lead Compounds	5.80E-05 lb/MMBtu	7.98E-02 tpy
127	N/A	Manganese Compounds	3.40E-04 lb/MMBtu	4.68E-01 tpy
128	N/A	Mercury Compounds	8.40E-06 lb/MMBtu	1.16E-02 tpy
146	N/A	Nickel Compounds	1.20E-03 lb/MMBtu	1.65E+00 tpy
158	7723140	Phosphorus	3.00E-04 lb/MMBtu	4.13E-01 tpy
171	N/A	Selenium Compounds	5.30E-06 lb/MMBtu	7.29E-03 tpy
			Total HAP Emissions	2.751 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-4.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from Title V application.

Golden Valley Electric Association Zehnder Facility - Fairbanks

Diesel-Fired Turbines for Electricity Generation Fairbanks
Activity Data Input: 829,248 gallons
Activity Period/Year: 1999 Year

Diesel-Fired Engines greater than 600 hp - Fairbanks
Activity Data Input: 13,562 gallons
Activity Period/Year: 1999 Year

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			2.52E-05 lb/MMBtu	2.34E-05 tpy	2.34E-05 tpy
39	107028	Acrolein			7.88E-06 lb/MMBtu	7.32E-06 tpy	7.32E-06 tpy
45	N/A	Antimony Compounds	2.20E-05 lb/MMBtu	1.25E-03 tpy			1.25E-03 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	4.90E-06 lb/MMBtu	2.78E-04 tpy			2.78E-04 tpy
48	71432	Benzene(including benzene from gasoline)			7.76E-04 lb/MMBtu	7.21E-04 tpy	7.21E-04 tpy
52	N/A	Beryllium Compounds	3.30E-07 lb/MMBtu	1.87E-05 tpy			1.87E-05 tpy
58	N/A	Cadmium Compounds	4.20E-06 lb/MMBtu	2.39E-04 tpy			2.39E-04 tpy
75	N/A	Chromium Compounds	4.70E-05 lb/MMBtu	2.67E-03 tpy			2.67E-03 tpy
76	N/A	Cobalt Compounds	9.10E-06 lb/MMBtu	5.17E-04 tpy			5.17E-04 tpy
109	5000	Formaldehyde			7.89E-05 lb/MMBtu	7.33E-05 tpy	7.33E-05 tpy
124	N/A	Lead Compounds	5.80E-05 lb/MMBtu	3.29E-03 tpy			3.29E-03 tpy
127	N/A	Manganese Compounds	3.40E-04 lb/MMBtu	1.93E-02 tpy			1.93E-02 tpy
128	N/A	Mercury Compounds	8.40E-06 lb/MMBtu	4.77E-04 tpy			4.77E-04 tpy
145	91203	Naphthalene			1.30E-04 lb/MMBtu	1.21E-04 tpy	1.21E-04 tpy
146	N/A	Nickel Compounds	1.20E-03 lb/MMBtu	6.82E-02 tpy			6.82E-02 tpy
158	7723140	Phosphorus	3.00E-04 lb/MMBtu	1.70E-02 tpy			1.70E-02 tpy
162	N/A	Polycyclic Organic Matter			2.12E-04 lb/MMBtu	1.97E-04 tpy	1.97E-04 tpy
171	N/A	Selenium Compounds	5.30E-06 lb/MMBtu	3.01E-04 tpy			3.01E-04 tpy
176	108883	Toluene			2.81E-04 lb/MMBtu	2.61E-04 tpy	2.61E-04 tpy
185	1330207	Xylenes (isomers and mixture)			1.93E-04 lb/MMBtu	1.79E-04 tpy	1.79E-04 tpy
Total HAP Emissions				0.114 tpy	Total HAP Emissions	0.002 tpy	TOTAL 0.12 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-4.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from 1999 FOR.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from 1999 FOR.

Petro Star North Pole Refinery - Fairbanks

Petro Star Refinery - Title V Data
 Activity Data Input: N/A
 Activity Period/Year: 1996 Year

Section 112 Hazardous Air Pollutants			Source Category	Emission Calculations
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde		1.02E-06 tpy
39	107028	Acrolein		3.26E-06 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		3.00E-04 tpy
48	71432	Benzene (including benzene from gasoline)		2.25E-02 tpy
52	N/A	Beryllium Compounds		2.00E-04 tpy
58	N/A	Cadmium Compounds		1.00E-03 tpy
75	N/A	Chromium Compounds		5.00E-03 tpy
99	100414	Ethyl benzene		3.39E-05 tpy
109	5000	Formaldehyde		2.59E-02 tpy
118	110543	Hexane		1.30E-01 tpy
124	N/A	Lead Compounds		1.00E-03 tpy
145	91203	Naphthalene		6.03E-04 tpy
146	N/A	Nickel Compounds		1.00E-03 tpy
162	N/A	Polycyclic Organic Matter		1.76E-03 tpy
176	108883	Toluene		1.63E-02 tpy
185	1330207	Xylenes (isomers and mixture)		6.61E-05 tpy
			Total HAP Emissions	0.21 tpy

Notes/Comments:

1. Reference: PetroStar Title V application.
2. Values shown are total facility-wide actual 1996 emissions.

Williams North Pole Refinery - Fairbanks

Williams North Pole Refinery
 Activity Data Input: N/A
 Activity Period/Year: 1998 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Total - All Categories
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>
1	79345	1,1,2,2-Tetrachloroethane			
9	106990	1,3-Butadiene		1.00E-02 tpy	1.00E-02 tpy
35	75070	Acetaldehyde		1.90E-01 tpy	1.90E-01 tpy
39	107028	Acrolein		3.60E-01 tpy	3.60E-01 tpy
48	71432	Benzene(including benzene from gasoline)		3.02E+00 tpy	3.02E+00 tpy
82	98828	Cumene		2.20E-01 tpy	2.20E-01 tpy
99	100414	Ethyl benzene		6.70E-01 tpy	6.70E-01 tpy
109	5000	Formaldehyde		1.90E-01 tpy	1.90E-01 tpy
118	110543	Hexane		2.37E+00 tpy	2.37E+00 tpy
120	7647010	Hydrochloric acid		1.00E-01 tpy	1.00E-01 tpy
145	91203	Naphthalene		2.00E-02 tpy	2.00E-02 tpy
162	N/A	Polycyclic Organic Matter		3.00E-02 tpy	3.00E-02 tpy
176	108883	Toluene		3.79E+00 tpy	3.79E+00 tpy
185	1330207	Xylenes (isomers and mixture)		3.04E+00 tpy	3.04E+00 tpy
Total HAP Emissions				14.0 tpy	TOTAL 1.40E+01 tpy

Notes/Comments:

1. Reference: Williams 1998 Actual emissions.
2. Values shown are total facility-wide actual 1998 emissions.

APPENDIX D-4

City and Borough of Juneau Area Sources

Table D-4-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Area Source Facilities
No.	CAS No.	Chemical Name														
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
10	542756	1,3-Dichloropropene	2.440 tpy	-----	-----	-----	-----	-----	-----	-----	-----	2.440 tpy	-----	-----	-----	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	1.267 tpy	-----	-----	-----	-----	-----	-----	-----	-----	1.267 tpy	-----	-----	0.000 tpy	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
14	540841	2,24-Trimethylpentane	0.095 tpy	-----	-----	-----	-----	-----	0.095 tpy	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.030 tpy	0.004 tpy	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.024 tpy
36	60355	Acetamide	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
38	98862	Acetophenone	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
39	107028	Acrolein	0.125 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.124 tpy	-----	-----	-----	-----	0.000 tpy
40	79061	Acrylamide	0.023 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.023 tpy
41	79107	Acrylic Acid	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----

Table D-4-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Area Source Facilities
No.	CAS No.	Chemical Name														
42	107131	Acrylonitrile	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
46	N/A	Arsenic Compounds (inorganic including	0.023 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.006 tpy	-----	0.000 tpy	0.017 tpy
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
48	71432	Benzene (including benzene from gasolin	0.369 tpy	0.002 tpy	0.000 tpy	-----	-----	0.161 tpy	0.074 tpy	-----	-----	0.000 tpy	-----	0.104 tpy	-----	0.028 tpy
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
52	N/A	Beryllium Compounds	0.017 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.003 tpy	-----	0.000 tpy	0.013 tpy
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
58	N/A	Cadmium Compounds	0.016 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.015 tpy	-----	0.000 tpy	0.001 tpy
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
61	63252	Carbaryl	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
62	75150	Carbon disulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
64	463581	Carbonyl sulfide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
65	120809	Catechol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
69	79118	Chloroacetic acid	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
70	108907	Chlorobenzene	1.092 tpy	-----	-----	-----	-----	-----	-----	-----	-----	1.092 tpy	-----	-----	-----	0.000 tpy
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
72	67663	Chloroform	0.015 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.015 tpy	-----	-----	-----	-----
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.097 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.089 tpy	-----	0.007 tpy	0.000 tpy
76	N/A	Cobalt Compounds	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	0.000 tpy
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixtu	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixtu	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixtu	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixtu	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
82	98828	Cumene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-4-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Area Source Facilities
No.	CAS No.	Chemical Name														
83	N/A	Cyanide Compounds	1.046 tpy	-----	-----	-----	-----	-----	-----	-----	1.000 tpy	-----	-----	-----	-----	0.046 tpy
84	3547044	DDE	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
85	334883	Diazomethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ethy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy	-----	-----	-----	-----
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxyprop	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	0.315 tpy	0.014 tpy	0.002 tpy	-----	-----	-----	0.000 tpy	-----	-----	0.032 tpy	-----	0.267 tpy	-----	-----
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	0.179 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.179 tpy	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
104	107211	Ethylene glycol	0.167 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.167 tpy	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	0.230 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.230 tpy	-----	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
109	5000	Formaldehyde	11.86 tpy	0.007 tpy	0.001 tpy	-----	-----	-----	-----	0.002 tpy	0.029 tpy	0.019 tpy	11.80 tpy	-----	-----	0.003 tpy
110	N/A	Glycol ethers	0.626 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.617 tpy	-----	-----	-----	0.009 tpy
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
118	110543	Hexane	3.980 tpy	-----	-----	-----	-----	-----	0.046 tpy	0.000 tpy	-----	1.316 tpy	2.617 tpy	-----	-----	-----
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	0.474 tpy	-----	-----	-----	-----	-----	-----	-----	0.426 tpy	0.000 tpy	-----	-----	-----	0.048 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	-----
122	123319	Hydroquinone	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
123	78591	Isophorone	0.014 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.014 tpy	-----	-----	-----	-----

Table D-4-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Area Source Facilities
No.	CAS No.	Chemical Name														
124	N/A	Lead Compounds	0.012 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.012 tpy	-----	-----	0.000 tpy
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.023 tpy	0.000 tpy	-----	-----	-----	0.001 tpy	-----	0.000 tpy	-----	-----	0.019 tpy	-----	-----	0.003 tpy
128	N/A	Mercury Compounds	0.012 tpy	0.000 tpy	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	0.004 tpy	-----	-----	0.008 tpy
129	67561	Methanol	10.64 tpy	-----	-----	-----	-----	-----	-----	-----	-----	10.64 tpy	-----	-----	-----	-----
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	3.386 tpy	-----	-----	-----	-----	-----	-----	-----	-----	3.386 tpy	-----	-----	-----	0.000 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	5.908 tpy	-----	-----	-----	-----	-----	-----	-----	-----	5.908 tpy	-----	-----	-----	-----
133	78933	Methyl ethyl ketone (2-Butanone)	10.92 tpy	0.000 tpy	0.000 tpy	-----	-----	0.024 tpy	-----	-----	-----	0.771 tpy	-----	10.13 tpy	-----	-----
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	7.475 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.115 tpy	-----	7.360 tpy	-----	-----
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	-----	-----	0.000 tpy
140	74873	Methylchloride (Chloromethane)	0.164 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.158 tpy	-----	0.006 tpy
141	75092	Methylene chloride(Dichloromethane)	2.145 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.555 tpy	-----	1.590 tpy	-----	-----
142	101688	Methylene diphenyl diisocyanate (MDI)	0.008 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.008 tpy
143	N/A	Mineral fibers	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
145	91203	Naphthalene	0.732 tpy	-----	-----	-----	-----	0.024 tpy	-----	-----	-----	0.703 tpy	-----	-----	0.000 tpy	0.005 tpy
146	N/A	Nickel Compounds	0.034 tpy	0.000 tpy	-----	-----	-----	0.000 tpy	-----	0.000 tpy	-----	-----	0.024 tpy	-----	-----	0.010 tpy
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	0.006 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.006 tpy
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromitrobenzene (Quintobenzen)	0.020 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.020 tpy
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.002 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.002 tpy
159	7803512	Phospine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	0.070 tpy	0.001 tpy	-----	-----	0.001 tpy	0.061 tpy	-----	-----	-----	-----	-----	-----	-----	0.008 tpy
163	106503	p-Phenylemediamine	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
164	123386	Propionaldehyde	0.000 tpy	0.000 tpy	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table D-4-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - All Area Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Asphalt Plants	Asphalt Paving	Dry Cleaners	Residential Fireplaces	Residential Woodstoves	Service Stations	Open Burning	Structural Fires	Consumer Products	Residential Heating - Oil	Surface Coating	Used Oil Combustion	Area Source Facilities
No.	CAS No.	Chemical Name														
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropan	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
169	106514	Quinone	0.002 tpy	0.001 tpy	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
172	100425	Styrene	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	20.26 tpy	-----	-----	19.83 tpy	-----	-----	-----	-----	-----	0.430 tpy	-----	-----	-----	0.007 tpy
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
176	108883	Toluene	43.53 tpy	0.008 tpy	0.001 tpy	-----	-----	0.061 tpy	0.309 tpy	-----	-----	6.545 tpy	-----	36.60 tpy	-----	0.010 tpy
177	8001352	Toxaphene (chlorinated camphene)	0.000 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy
178	79016	Trichloroethylene	0.007 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.007 tpy	-----	-----	-----	-----
179	121448	Triethylamine	0.013 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.013 tpy	-----	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	0.035 tpy	-----	-----	-----	-----	-----	-----	-----	-----	0.000 tpy	-----	0.035 tpy	-----	-----
182	593602	Vinyl bromide	0.006 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.006 tpy
183	75014	Vinyl chloride	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	0.001 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.001 tpy
185	1330207	Xylenes (isomers and mixture)	24.21 tpy	0.018 tpy	0.003 tpy	-----	-----	0.017 tpy	0.014 tpy	-----	-----	3.095 tpy	-----	21.06 tpy	-----	0.005 tpy
186	95476	Xylenes (isomers and mixture)	2.212 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.207 tpy	-----	0.005 tpy
187	108383	Xylenes (isomers and mixture)	0.005 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.005 tpy
188	106423	Xylenes (isomers and mixture)	0.008 tpy	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.008 tpy
Total HAP Emissions			156 tpy	0.06 tpy	0.01 tpy	19.8 tpy	0.001 tpy	0.3 tpy	0.5 tpy	0.003 tpy	1.58 tpy	39.2 tpy	14.6 tpy	79.8 tpy	0.01 tpy	0.3 tpy

Asphalt Plants - Juneau

NG-Fired Batch Asphalt Plant	Oil-Fired Drum Asphalt Plant
Activity Data Input: 8,270 tons	Activity Data Input: 2,757 tons
Activity Period/Year: 1999 Year	Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories
No.	CAS No.	Chemical Name	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde	6.40E-04 lb/ton	2.65E-03 tpy	1.30E-03 lb/ton	1.79E-03 tpy	4.44E-03 tpy
39	107028	Acrolein			2.60E-05 lb/ton	3.58E-05 tpy	3.58E-05 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	6.60E-07 lb/ton	2.73E-06 tpy	1.10E-06 lb/ton	1.52E-06 tpy	4.25E-06 tpy
48	71432	Benzene (including benzene from gasoline)	3.50E-04 lb/ton	1.45E-03 tpy	4.10E-04 lb/ton	5.65E-04 tpy	2.01E-03 tpy
52	N/A	Beryllium Compounds	2.20E-07 lb/ton	9.10E-07 tpy			9.10E-07 tpy
58	N/A	Cadmium Compounds	8.40E-07 lb/ton	3.47E-06 tpy	4.40E-07 lb/ton	6.06E-07 tpy	4.08E-06 tpy
75	N/A	Chromium Compounds	8.90E-07 lb/ton	3.68E-06 tpy	1.20E-05 lb/ton	1.65E-05 tpy	2.02E-05 tpy
99	100414	Ethyl benzene	3.30E-03 lb/ton	1.36E-02 tpy	3.80E-04 lb/ton	5.24E-04 tpy	1.42E-02 tpy
109	5000	Formaldehyde	8.60E-04 lb/ton	3.56E-03 tpy	2.40E-03 lb/ton	3.31E-03 tpy	6.86E-03 tpy
124	N/A	Lead Compounds	7.40E-07 lb/ton	3.06E-06 tpy	3.30E-06 lb/ton	4.55E-06 tpy	7.61E-06 tpy
127	N/A	Manganese Compounds	9.90E-06 lb/ton	4.09E-05 tpy	1.10E-05 lb/ton	1.52E-05 tpy	5.61E-05 tpy
128	N/A	Mercury Compounds	4.50E-07 lb/ton	1.86E-06 tpy	7.30E-09 lb/ton	1.01E-08 tpy	1.87E-06 tpy
133	78933	Methyl ethyl ketone (2-Butanone)			2.00E-05 lb/ton	2.76E-05 tpy	2.76E-05 tpy
146	N/A	Nickel Compounds	4.20E-06 lb/ton	1.74E-05 tpy	1.50E-05 lb/ton	2.07E-05 tpy	3.80E-05 tpy
162	N/A	Polycyclic Organic Matter	1.27E-04 lb/ton	5.25E-04 tpy	5.81E-04 lb/ton	8.00E-04 tpy	1.33E-03 tpy
164	123386	Propionaldehyde			1.30E-04 lb/ton	1.79E-04 tpy	1.79E-04 tpy
169	106514	Quinone	2.70E-04 lb/ton	1.12E-03 tpy	1.60E-04 lb/ton	2.21E-04 tpy	1.34E-03 tpy
176	108883	Toluene	1.80E-03 lb/ton	7.44E-03 tpy	7.50E-04 lb/ton	1.03E-03 tpy	8.48E-03 tpy
185	1330207	Xylenes (isomers and mixture)	4.30E-03 lb/ton	1.78E-02 tpy	1.60E-04 lb/ton	2.21E-04 tpy	1.80E-02 tpy
Total HAP Emissions				0.048 tpy	Total HAP Emissions		0.009 tpy
					Total		0.057 tpy

Notes/Comments:

1. Reference: AP-42, Tables 11.1-9 and 11.1-12.
2. Activity data derived from Anchorage DOT and MoA and 1999 population data.

Notes/Comments:

1. Reference: AP-42, Tables 11.1-10 and 11.1-13.
2. Activity data derived from Anchorage DOT and MoA and 1999 population data.

Ashpalt Plants - Juneau

DOT Contracts 1999

Engineers

Estimate	Units	Units - tons
52819	ton	52,819
5103	ton	5,103
2273	ton	2,273
126	ton	126
660	ton	660
177	ton	177
13300	Mg	13,087
608	Mg	598
5006	Mg	4,926
276	Mg	272
420	Mg	413
210	Mg	207

DOT total	80,661
MOA total	<u>13,490</u>
Anchorage total	94,151

Populations	
Anchorage	Juneau
257,808	30,192

Juneau total **11,026**

Notes:

1. DOT info from Contracts Report (engineer's estimates).
2. MoA info from Jerry Hansen, Project Manager.
3. Assume the following proportions: 75% to stationary NG-fired plants and 25% to diesel-fired mobile plants.
4. NG-fired = batch and Diesel = drum (conversation with operator at Wilder hot plant, Anchorage, 6/15/00).

Asphalt Paving - Juneau

NG-Fired Batch Asphalt Plant
 Activity Data Input: 8,270 tons
 Activity Period/Year: 1999 Year

Oil-Fired Drum Asphalt Plant
 Activity Data Input: 2,757 tons
 Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Emission Calculations		Emission Calculations		Total - All Categories	
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions	Emission Factor	Estimated Emissions	Estimated Emissions	
1	79345	1,1,2,2-Tetrachloroethane						
35	75070	Acetaldehyde	0.00064 lb/ton	4.50E-04 tpy	0.0013 lb/ton	3.05E-04 tpy	7.54E-04 tpy	
39	107028	Acrolein			0.000026 lb/ton	6.09E-06 tpy	6.09E-06 tpy	
48	71432	Benzene (including benzene from gasoline)	0.00035 lb/ton	2.46E-04 tpy	0.00041 lb/ton	9.61E-05 tpy	3.42E-04 tpy	
99	100414	Ethyl benzene	0.0033 lb/ton	2.32E-03 tpy	0.00038 lb/ton	8.90E-05 tpy	2.41E-03 tpy	
109	5000	Formaldehyde	0.00086 lb/ton	6.05E-04 tpy	0.0024 lb/ton	5.62E-04 tpy	1.17E-03 tpy	
133	78933	Methyl ethyl ketone (2-Butanone)			0.00002 lb/ton	4.69E-06 tpy	4.69E-06 tpy	
164	123386	Propionaldehyde			0.00013 lb/ton	3.05E-05 tpy	3.05E-05 tpy	
169	106514	Quinone	0.00027 lb/ton	1.90E-04 tpy	0.00016 lb/ton	3.75E-05 tpy	2.27E-04 tpy	
176	108883	Toluene	0.0018 lb/ton	1.27E-03 tpy	0.00075 lb/ton	1.76E-04 tpy	1.44E-03 tpy	
185	1330207	Xylenes (isomers and mixture)	0.0043 lb/ton	3.02E-03 tpy	0.00016 lb/ton	3.75E-05 tpy	3.06E-03 tpy	
Total HAP Emissions				0.008 tpy	Total HAP Emissions	0.001 tpy	Total	0.009 tpy

Notes/Comments:

1. Reference: AP-42, Tables 11.1-9 and 11.1-12.
2. Activity data from DOT and MoA, adjusted for Juneau's population.

Notes/Comments:

1. Reference: AP-42, Tables 11.1-10 and 11.1-13.
2. Activity data from DOT and MoA, adjusted for Juneau's population.

Source: Phone conversation with Summit Paving, Lake Otis, Anchorage, 344-2644. Assume 4 inches of pavement for 90% of roads. Assume remaining 10% of roads are private/residential and are ~3 inches in depth. Therefore, average weighted depth = 3.9 inches.

Phone conversation with Jerry at Emulsion Products in Anchorage, 277-7752

RC, MC, and SC very rarely used any more. On rare occasions MC30 is used in federal projects (therefore MC30 was used as a factor). MC30 thought to be 30% of diluent in cutback: Therefore 17% of cutback evaporated (see AP-42 Table 4.5-1).

Formula:

Evoc = VOC emissions in lb/yr = QA * (WPevap/100)

QA = mass of cutback asphalt used (lb)

WPevap = weight % of asphalt that evaporates

Asphalt Paving - Juneau

DOT Contracts 1999, Anchorage Engineers

Estimate	Units
52,819 ton	52,819 tons
5,103 ton	5,103 tons
2,273 ton	2,273 tons
126 ton	126 tons
660 ton	660 tons
177 ton	177 tons
13,300 Mg	13,087 tons
608 Mg	598 tons
5,006 Mg	4,926 tons
276 Mg	272 tons
420 Mg	413 tons
210 Mg	207 tons

DOT total	80,661 tons
MOA total	<u>13,490</u> tons
Anchorage total	94,151 tons

Populations	
Anchorage	Juneau
257,808	30,192

Juneau total 11,026 tons

Notes:

1. DOT info from Contracts Report (engineer's estimates).
2. MoA info from Jerry Hansen, Project Manager.
3. Assume the following proportions: 75% to stationary NG-fired plants and 25% to diesel-fired mobile plants.
4. NG-fired = batch and Diesel = drum (conversation with operator at Wilder hot plant, Anchorage, 6/15/00).
5. Fairbanks tonnage prorated based on 1999 population estimates (32.7%).

Dry Cleaners - Juneau

Activity Data Input: 30,500 capita
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
174	127184	Tetrachloroethylene (Perchloroethylene)	1.3 lb/yr/capita	19.825 tpy
Total HAP Emissions				20 tpy

Notes/Comments:

1. Reference: AP-42, Table 4.1-2.
2. Activity (population) data based on Juneau website (www.juneau.lib.ak.us/).

Residential Fireplaces - Juneau

Activity Data Input: 70 tons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
162	N/A	Polycyclic Organic Matter	1.60E-02 lb/ton	5.56E-04 tpy
			Total HAP Emissions	0.001 tpy

Notes/Comments:

1. Reference: AP-42, Table 1.9-1.
2. Activity data extrapolated from 1990 CO study (see backup).

Residential Fireplaces - Juneau
Estimated Woodstove and Fireplace Activity

<u>Description</u>	<u>Survey Data/Extrapolations</u>
% households w/ woodstove*	40 %
% households w/ fireplace*	3 %
% households w/ pellet stove*	4 %
Number of Households in survey*	353
Number of households in survey w/ woodstove or pellet stove*	141
Number of households in survey w/ fireplace*	11
Number of households in survey w/ pellet stove*	14
Total number of cords burned per year in survey - woodstoves*	1.8
Total number of cords burned per year in survey - fireplaces*	1.8
Total number of cords burned per year in survey - pellet stoves*	N/A
Total weight of wood burned per year in survey - woodstoves*	4320 lb/yr
Total weight of wood burned per year in survey - fireplaces*	4320 lb/yr
Total weight of wood burned per year in survey - pellet stoves* - 80 ft ³ /cord, 30 lb/ft ³	6000 lb/yr
Total number of Juneau households 1990 (from census data)	9902
Extrapolated wood burned per year (based on 1990 census) - woodstoves	121180 lb/yr
Extrapolated wood burned per year (based on 1990 census) - fireplaces	121180 lb/yr
Extrapolated wood burned per year (based on 1990 census) - pellet stoves	168306 lb/yr
Total population 1990 (Municipality of Juneau data)	26313
Total population 1999 (Municipality of Juneau data)	30192
Extrapolated wood burned per year (1999) - woodstoves + pellet stoves	166 ton/yr
Extrapolated wood burned per year (1999) - fireplaces	70 ton/yr

* Indicates data from Mendenhall 1993 Wood Heating Survey

Residential Woodstoves - Juneau

Residential Woodstoves
Activity Data Input: 166 tons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene (including benzene from gasoline)	1.94E+00 lb/ton	1.61E-01 tpy
58	N/A	Cadmium Compounds	2.20E-05 lb/ton	1.83E-06 tpy
75	N/A	Chromium Compounds	1.00E-06 lb/ton	8.30E-08 tpy
127	N/A	Manganese Compounds	1.70E-02 lb/ton	1.41E-03 tpy
133	78933	Methyl ethyl ketone (2-Butanone)	2.90E-01 lb/ton	2.41E-02 tpy
145	91203	Naphthalene	2.88E-01 lb/ton	2.39E-02 tpy
146	N/A	Nickel Compounds	1.40E-05 lb/ton	1.16E-06 tpy
162	N/A	Polycyclic Organic Matter	7.30E-01 lb/ton	6.06E-02 tpy
176	108883	Toluene	7.30E-01 lb/ton	6.06E-02 tpy
185	1330207	Xylenes (isomers and mixture)	2.02E-01 lb/ton	1.68E-02 tpy
			Total HAP Emissions	0.348 tpy

Notes/Comments:

1. Reference: AP-42, Table 1.10-2, 10-3 and 10-4.
2. Activity data extrapolated from Wood Heating Survey (see backup).

Residential Woodstoves - Juneau
Estimated Woodstove and Fireplace Activity

<u>Description</u>	<u>Survey Data/Extrapolations</u>
% households w/ woodstove*	40 %
% households w/ fireplace*	3 %
% households w/ pellet stove*	4 %
Number of Households in survey*	353
Number of households in survey w/ woodstove or pellet stove*	141
Number of households in survey w/ fireplace*	11
Number of households in survey w/ pellet stove*	14
Total number of cords burned per year in survey - woodstoves*	1.8
Total number of cords burned per year in survey - fireplaces*	1.8
Total number of cords burned per year in survey - pellet stoves*	N/A
Total weight of wood burned per year in survey - woodstoves*	4320 lb/yr
Total weight of wood burned per year in survey - fireplaces*	4320 lb/yr
Total weight of wood burned per year in survey - pellet stoves* - 80 ft ³ /cord, 30 lb/ft ³	6000 lb/yr
Total number of Juneau households 1990 (from census data)	9902
Extrapolated wood burned per year (based on 1990 census) - woodstoves	121180 lb/yr
Extrapolated wood burned per year (based on 1990 census) - fireplaces	121180 lb/yr
Extrapolated wood burned per year (based on 1990 census) - pellet stoves	168306 lb/yr
Total population 1990 (Municipality of Juneau data)	26313
Total population 1999 (Municipality of Juneau data)	30192
Extrapolated wood burned per year (1999) - woodstoves + pellet stoves	166 ton/yr
Extrapolated wood burned per year (1999) - fireplaces	70 ton/yr

* Indicates data from Mendenhall 1993 Wood Heating Survey

Gasoline Service Stations - Juneau

Activity Data Input: 6,223,374 gallons
Activity Period/Year: 2000 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions
14	540841	2,24-Trimethylpentane	0.0099 lb/lb VOC	0.10 tons
48	71432	Benzene (including benzene from gasoline)	0.0077 lb/lb VOC	0.07 tons
99	100414	Ethyl benzene	0.00004 lb/lb VOC	0.00 tons
118	110543	Hexane	0.00478 lb/lb VOC	0.05 tons
176	108883	Toluene	0.032 lb/lb VOC	0.31 tons
185	1330207	Xylenes (isomers and mixture)	0.0015 lb/lb VOC	0.01 tons
Total HAP Emissions			0.539 tpy	

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 (Stage II controls)
 - EFvoc s = 0.7 lb/kgal VOC emission factor associated with spillage during automobile refilling
3. Source: Phone conversation with Raymond Measles, Tesoro, Anchorage, June 13, 2000 (561-5521)> RM stated that all stations should have been converted to Stage I (filling) controls by now.
4. Activity data extrapolated from Anchorage using vehicle miles traveled (VMT) ratio. Anchorage activity data and VMT data obtained from ADEC.
178663083 gallons x 65.5/1880.4 = 6223374 gallons

Open Burning - Juneau

Activity Data Input: **3,431 gallons**
 Activity Period/Year: **1999 Year**

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.000 tons
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.000 tons
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.000 tons
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.000 tons
109	5000	Formaldehyde	1.214 lb/Mgal	0.002 tons
118	110543	Hexane	0.269 lb/Mgal	0.000 tons
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.000 tons
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.000 tons
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.000 tons
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.000 tons
Total HAP Emissions				0.003 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.
3. Firefighter training was the only activity considered in open burning.

Structural Fires - Juneau

Activity Data Input: 49 total fires
Activity Period: 1999 year

Section 112 Hazardous Air Pollutants

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

Source Category Emission Calculations

<u>Emission Factor</u>	<u>Estimated Emissions</u>
2.55E-05 lb/dscf	1.24E-01 tons
2.05E-04 lb/dscf	1.00E+00 tons
5.91E-06 lb/dscf	2.88E-02 tons
8.73E-05 lb/dscf	4.26E-01 tons

Total HAP Emissions 1.579 tons

Notes/Comments:

1. Emission factors apply to sum of residential and nonresidential fires.
2. Activity data provided courtesy of State of Alaska Fire Marshall's Office, Anchorage.

Structural Fires Data - Juneau

F-Factor (Ref. 1)	9,570 dscf/MMBtu
HHV Factor (Ref. 2)	9,044 Btu/lb
Fuel Loading Factor (Ref. 2)	1.15 tons of material burned/fire

Sample calculation for volume of gas generated per amount burned:

$$\begin{aligned} & \text{Volume Gas Generated (dscf) / Material Burned (ton)} \\ & = \text{F-Factor (dscf/MMBtu)} * \text{HHV (Btu/lb)} * (1/2000) * (1/1\text{e}6) \\ & = 173,102 \text{ dscf / ton burned} \end{aligned}$$

Sample calculation for emission rate of acrolein produced per amount burned:

$$\begin{aligned} & \text{Weight of Gas Generated (lb) / Material Burned (ton)} \\ & = \text{Emission Factor (lb/dscf)} * \text{Volume Gas Generated Per Amount Burned (dscf/ton)} \\ & = 4.41 \text{ lb Acrolein / ton burned} \end{aligned}$$

Sample calculation for emission estimate for Acrolein:

$$\begin{aligned} & = \text{Number of Fires} * \text{Fuel Loading Factor (tons of material burned/fire)} * \text{Emission Rate of Acrolein (lb/ton burned)} \\ & = 1.24\text{E-}01 \text{ tons Acrolein} \end{aligned}$$

Notes/Comments:

1. Reference: Development of Area Source Hazardous Air Pollutant Inventories, Vol 1: Air Toxic Emission Inventory.
2. Reference: EIIP Volume III, Area Sources Preferred and Alternative Methods.

Consumer Products - Juneau

		Personal Care Products		Household Products		Automotive Aftermarket Products		Adhesives & Sealants		FIFRA-Regulated Products		Coatings & Related Products		Miscellaneous		Total - All Categories		
		Activity Data: 30,500 capita		Activity Data: 30,500 capita		Activity Data: 30,500 capita		Activity Data: 30,500 capita		Activity Data: 30,500 capita		Activity Data: 30,500 capita		Activity Data: 30,500 capita				
		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year		Activity Period: 1999 year				
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		Estimated Emissions		
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions		
10	542756	1,3-Dichloropropene															2.44E+00 tons	
12	106467	1,4-Dichlorobenzene(p)			4.79E-02 lb/yr/cap	7.30E-01 tons											1.27E+00 tons	
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)															1.66E-04 tons	
25	79469	2-Nitropropane							1.09E-05 lb/yr/cap	1.66E-04 tons							3.23E-05 tons	
36	60355	Acetamide	1.38E-07 lb/yr/cap	2.10E-06 tons					2.12E-06 lb/yr/cap	3.23E-05 tons							2.10E-06 tons	
38	98862	Acetophenone											8.53E-06 lb/yr/cap	1.30E-04 tons			1.30E-04 tons	
41	79107	Acrylic Acid							3.94E-09 lb/yr/cap	6.01E-08 tons							6.01E-08 tons	
48	71432	Benzene (including benzene from gasoline)					4.72E-06 lb/yr/cap	7.20E-05 tons									7.20E-05 tons	
63	56235	Carbon tetrachloride											4.10E-10 lb/yr/cap	6.25E-09 tons			6.25E-09 tons	
70	108907	Chlorobenzene									7.16E-02 lb/yr/cap	1.09E+00 tons	1.51E-05 lb/yr/cap	2.30E-04 tons			1.09E+00 tons	
72	67663	Chloroform				3.60E-05 lb/yr/cap	5.49E-04 tons						9.55E-04 lb/yr/cap	1.46E-02 tons			1.51E-02 tons	
86	132649	Dibenzofurans							8.07E-06 lb/yr/cap	1.23E-04 tons							1.23E-04 tons	
94	68122	Dimethyl formamide	2.71E-05 lb/yr/cap	4.13E-04 tons			2.78E-08 lb/yr/cap	4.24E-07 tons	2.29E-07 lb/yr/cap	3.49E-06 tons						7.43E-06 lb/yr/cap	1.13E-04 tons	
99	100414	Ethyl benzene			2.56E-06 lb/yr/cap	3.90E-05 tons	7.51E-05 lb/yr/cap	1.15E-03 tons									3.17E-02 tons	
103	107062	Ethylene dichloride (1,2-Dichloroethane)	4.62E-06 lb/yr/cap	7.05E-05 tons	3.52E-08 lb/yr/cap	5.37E-07 tons			1.36E-05 lb/yr/cap	2.07E-04 tons			1.30E-03 lb/yr/cap	1.98E-02 tons	6.86E-04 lb/yr/cap	1.05E-02 tons	7.10E-05 tons	
106	75218	Ethylene oxide											1.51E-02 lb/yr/cap	2.30E-01 tons			2.30E-01 tons	
109	5000	Formaldehyde			6.74E-06 lb/yr/cap	1.03E-04 tons			2.51E-05 lb/yr/cap	3.83E-04 tons			8.55E-04 lb/yr/cap	1.30E-02 tons			1.93E-02 tons	
110	N/A	Glycol ethers	1.52E-05 lb/yr/cap	2.32E-04 tons	5.31E-03 lb/yr/cap	8.10E-02 tons	2.68E-02 lb/yr/cap	4.10E-01 tons	1.28E-04 lb/yr/cap	1.95E-03 tons	5.65E-03 lb/yr/cap	8.62E-02 tons	2.24E-03 lb/yr/cap	3.42E-02 tons	2.42E-04 lb/yr/cap	3.68E-03 tons	6.17E-01 tons	
118	110543	Hexane			1.75E-06 lb/yr/cap	2.67E-05 tons	3.53E-03 lb/yr/cap	5.38E-02 tons	7.83E-02 lb/yr/cap	1.19E+00 tons			2.39E-03 lb/yr/cap	3.64E-02 tons			1.32E+00 tons	
120	7647010	Hydrochloric acid			8.75E-08 lb/yr/cap	1.33E-06 tons	1.41E-05 lb/yr/cap	2.15E-04 tons									2.67E-05 tons	
121	764393	Hydrogen fluoride (Hydrofluoric acid)															2.16E-04 tons	
123	79591	Isophorone															1.44E-02 tons	
129	67561	Methanol	5.67E-07 lb/yr/cap	8.65E-06 tons	6.66E-04 lb/yr/cap	1.02E-02 tons	6.61E-01 lb/yr/cap	1.01E+01 tons	6.82E-04 lb/yr/cap	1.04E-02 tons			9.47E-04 lb/yr/cap	1.44E-02 tons	1.60E-02 lb/yr/cap	2.44E-01 tons	1.84E-02 lb/yr/cap	2.81E-01 tons
131	74839	Methyl bromide(Bromomethane)											9.48E-04 lb/yr/cap	1.45E-02 tons			1.06E+01 tons	
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	7.45E-04 lb/yr/cap	1.14E-02 tons	2.85E-02 lb/yr/cap	4.35E-01 tons	7.63E-02 lb/yr/cap	1.16E+00 tons	2.14E-01 lb/yr/cap	3.26E+00 tons			2.22E-01 lb/yr/cap	3.39E+00 tons			3.39E+00 tons	
133	78933	Methyl ethyl ketone (2-Butanone)	1.75E-05 lb/yr/cap	2.67E-04 tons	4.49E-04 lb/yr/cap	6.85E-03 tons	3.04E-03 lb/yr/cap	4.64E-02 tons	3.91E-02 lb/yr/cap	5.96E-01 tons			5.99E-02 lb/yr/cap	9.13E-01 tons	7.69E-03 lb/yr/cap	1.17E-01 tons	2.46E-04 lb/yr/cap	3.75E-03 tons
136	108101	Methyl isobutyl ketone (Hexone)			1.08E-04 lb/yr/cap	1.65E-03 tons	8.73E-04 lb/yr/cap	1.33E-02 tons	1.24E-03 lb/yr/cap	1.89E-02 tons			2.01E-05 lb/yr/cap	3.07E-04 tons	7.94E-03 lb/yr/cap	1.21E-01 tons	1.01E-05 lb/yr/cap	1.54E-04 tons
139	1634044	Methyl tert butyl ether					2.36E-05 lb/yr/cap	3.60E-04 tons					9.01E-05 lb/yr/cap	1.37E-03 tons	5.26E-03 lb/yr/cap	8.02E-02 tons		1.15E-01 tons
141	75092	Methylene chloride(Dichloromethane)			2.39E-03 lb/yr/cap	3.64E-02 tons	4.83E-03 lb/yr/cap	7.37E-02 tons	8.78E-03 lb/yr/cap	1.34E-01 tons			6.81E-04 lb/yr/cap	1.04E-02 tons	1.97E-02 lb/yr/cap	3.00E-01 tons	2.38E-05 lb/yr/cap	3.63E-04 tons
145	91203	Naphthalene			5.52E-07 lb/yr/cap	8.42E-06 tons	2.26E-06 lb/yr/cap	3.45E-05 tons	1.07E-04 lb/yr/cap	1.63E-03 tons			4.60E-02 lb/yr/cap	7.02E-01 tons	5.75E-06 lb/yr/cap	8.77E-05 tons		7.03E-01 tons
174	127184	Tetrachloroethylene (Perchloroethylene)			2.96E-03 lb/yr/cap	4.51E-02 tons	2.35E-02 lb/yr/cap	3.58E-01 tons	6.75E-04 lb/yr/cap	1.03E-02 tons			1.92E-04 lb/yr/cap	2.93E-03 tons	1.48E-04 lb/yr/cap	2.26E-03 tons	7.53E-04 lb/yr/cap	1.15E-02 tons
176	108883	Toluene	3.41E-03 lb/yr/cap	5.20E-02 tons	5.82E-04 lb/yr/cap	8.88E-03 tons	2.49E-02 lb/yr/cap	3.80E-01 tons	8.43E-02 lb/yr/cap	1.29E+00 tons					3.16E-01 lb/yr/cap	4.82E+00 tons	2.46E-06 lb/yr/cap	3.75E-05 tons
178	79016	Trichloroethylene			4.34E-05 lb/yr/cap	6.62E-04 tons	2.67E-04 lb/yr/cap	4.07E-03 tons	3.88E-05 lb/yr/cap	5.92E-04 tons					1.37E-04 lb/yr/cap	2.09E-03 tons		7.41E-03 tons
179	121448	Triethylamine											3.13E-04 lb/yr/cap	4.77E-03 tons	5.26E-04 lb/yr/cap	8.02E-03 tons		1.28E-02 tons
181	108054	Vinyl acetate							4.94E-08 lb/yr/cap	7.53E-07 tons								7.53E-07 tons
185	1330207	Xylenes (isomers and mixture)			3.28E-03 lb/yr/cap	5.00E-02 tons	1.20E-02 lb/yr/cap	1.83E-01 tons	9.76E-03 lb/yr/cap	1.49E-01 tons			1.37E-01 lb/yr/cap	2.09E+00 tons	4.05E-02 lb/yr/cap	6.18E-01 tons	4.31E-04 lb/yr/cap	6.57E-03 tons
			Total HAPs	0.064 tons	Total HAPs	1.438 tons	Total HAPs	12.769 tons	Total HAPs	6.667 tons	Total HAPs	11.549 tons	Total HAPs	6.421 tons	Total HAPs	0.307 tons	39.215 tons	

Notes/Comments:
 1. Reference: EIIIP Volume III, Area Sources Preferred and Alternative Methods.
 2. Activity (population) data based on Juneau website (www.juneau.lib.ak.us/).

Residential / Commercial Fuel Oil Heating - Juneau

Activity Data Input: 19,437,966 gallons
Activity Period/Year: Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
46	N/A	Arsenic Compounds (inorganic including arsine)	4.2 lb/10 ¹² Btu	0.006 tons
52	N/A	Beryllium Compounds	2.5 lb/10 ¹² Btu	0.003 tons
58	N/A	Cadmium Compounds	11 lb/10 ¹² Btu	0.015 tons
75	N/A	Chromium Compounds	67 lb/10 ¹² Btu	0.089 tons
109	5000	Formaldehyde	1.214 lb/Mgal	11.800 tons
118	110543	Hexane	0.269 lb/Mgal	2.617 tons
124	N/A	Lead Compounds	8.9 lb/10 ¹² Btu	0.012 tons
127	N/A	Manganese Compounds	14 lb/10 ¹² Btu	0.019 tons
128	N/A	Mercury Compounds	3.0 lb/10 ¹² Btu	0.004 tons
146	N/A	Nickel Compounds	18 lb/10 ¹² Btu	0.024 tons
			Total HAP Emissions	14.588 tpy

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.
3. Activity data extrapolated from 1990 Fairbanks CO Emissions Inventory extrapolated to Juneau.

Residential / Commercial Fuel Oil Heating - Juneau
Estimated Residential / Commercial Activity

<u>Description</u>	<u>Data/Extrapolations</u>
Annual Fuel Oil Sales (Fairbanks)*	47,400,000 gal/yr
Total population 1990 (Fairbanks Borough data)	73,624
Total population 1999 (Fairbanks Borough data)	84,336
Extrapolated Residential/Commercial Fuel Oil Sales (1999) - Fairbanks	54,296,512
Total population 1999 (Municipality of Juneau data)	30,192
Extrapolated Residential/Commercial Fuel Oil Sales (1999) - Juneau	19,437,966 gal/yr

* Indicates data from Fairbanks 1990 Base Year Carbon Monoxide Emission Inventory (Sierra Research)

Surface Coating - Juneau

			Architectoral Coatings		Product Coatings		Special Purpose Coatings				
			Water-based	Oil-based							
			Activity Data: 52,173 gallons	Activity Data: 22,366 gallons	Activity Data: 51,770 gallons	Activity Data: 19,368 gallons					
			Activity Period: 1998 Year	Activity Period: 1998 Year	Activity Period: 1998 Year	Activity Period: 1998 Year					
Section 112 Hazardous Air Pollutants	Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categories		
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Estimated Emissions		
48	71432	Benzene (including benzene from gasoline)	0.36 %	0.1 tpy					0.10 tpy		
99	100414	Ethyl benzene			0.54 %	0.3 tpy			0.27 tpy		
101	75003	Ethyl chloride (Chloroethane)	0.62 %	0.2 tpy					0.18 tpy		
104	107211	Ethylene glycol	0.58 %	0.2 tpy					0.17 tpy		
133	78933	Methyl ethyl ketone (2-Butanone)			0.54 %	0.3 tpy	8.1 %	7.2 tpy	10.13 tpy		
136	108101	Methyl isobutyl ketone (Hexone)			0.36 %	0.2 tpy	5.9 %	5.2 tpy	7.36 tpy		
140	74873	Methylchloride (Chloromethane)	0.55 %	0.2 tpy					0.16 tpy		
141	75092	Methylene chloride(Dichloromethane)	5.52 %	1.6 tpy					1.59 tpy		
176	108883	Toluene			37.87 %	18.7 tpy	14.7 %	13.0 tpy	36.60 tpy		
181	108054	Vinyl acetate	0.12 %	0.0 tpy					0.03 tpy		
185	1330207	Xylenes (isomers and mixture)			3.7 %	1.8 tpy	15.8 %	14.0 tpy	21.06 tpy		
186	95476	Xylenes (isomers and mixture)			4.47 %	2.2 tpy			2.21 tpy		
Total HAPs			2.232 tpy		Total HAPs	23.447 tpy	Total HAPs	39.422 tpy	Total HAPs	14.748 tpy	79.850 tpy
Notes/Comments:			Notes/Comments:		Notes/Comments:		Notes/Comments:				
1. Reference: AP-42, Section 4.2.			1. Reference: AP-42, Section 4.2.		1. Reference: AP-42, Section 4.2.		1. Reference: AP-42, Section 4.2.				
2. SPECIATE, Surface Coating Operations, Coating Application,			2. SPECIATE, Surface Coating Operations, Solvent-based Paint.		2. SPECIATE, Surface Coating Operations, Industrial.		2. SPECIATE, Surface Coating Operations, Industrial.				

Surface Coating Data - Juneau

Surface Coatings Calculations, Based on Population (1999)

U.S. Population	272,690,813
Alaska Populations:	
Anchorage	257,808
Fairbanks	84,366
Juneau	30,192

United States 1998 Quantity of Shipments of Paint, Varnish, and Lacquer (Gallons)

Location	Percent of US Population	Architectural Coatings	Product Coatings	Special Purpose	TOTAL GALLONS
USA	100%	673,174,000	467,584,000	174,929,000	1,315,687,000

Data from 1998 US Census Bureau Report MA32F(98)-1: Paint and Allied Products

Surface Coating Allocation, Based on Population (Gallons)

Location	Percent of US Population	Architectural Coatings	Product Coatings	Special Purpose	TOTAL GALLONS
Anchorage	0.0945%	636,434	442,064	165,382	1,243,880
Fairbanks	0.0309%	208,269	144,663	54,120	407,052
Juneau	0.0111%	74,533	51,770	19,368	145,671
TOTAL		919,236	638,497	238,870	1,796,603

VOC Emissions (Pounds)

Location	Percent of US Population	Architectural Coatings		Product Coatings	Special Purpose
		Water-based	Oil-based		
Anchorage	0.0945%	491,836	843,147	1,512,921	566,003
Fairbanks	0.0309%	160,950	275,915	495,094	185,221
Juneau	0.0111%	57,599	98,741	177,179	66,285
TOTAL		710,385	1,217,803	2,185,194	817,508

Notes on architectural paint calculations:

- Solvent is assumed to be 60% (by volume) of the paint/coatings.
- Solvent densities are assumed to be 7.36 lb/gallon.
- Architectural paints are assumed to be 70% water-based (low-solvent) and 30% solvent-based.
- Water-based paints are assumed to emit 25% of the VOCs in solvent-based paints.
- 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:

- Product coatings are assumed to be 30% water-based (low-solvent) and 70% solvent-based.
- Water-based paints are assumed to emit 25% of the VOCs in solvent-based paints.

Definitions:

Architectural:

Exterior waterborne (latex)
 Interior waterborne (latex)
 Exterior solvent-borne (oil)
 Interior solvent-borne (oil)
 Architectural lacquers
 "Do-it-yourself" wood and furniture finishes

Special Purpose Coatings:

Industrial maintenance paints (interior, exterior)
 Marine coatings (off-shore structures, marine refinishing coatings)
 Traffic paints
 Metallic paints (aluminum, zinc bronze, etc.)
 Automobile refinishing coatings
 Aerosol paints
 Roof coatings
 Multi-color paints

Product Coatings:

Automotive finishes
 Truck and bus finishes
 Other transportation finishes (aircraft, railroad, etc.)
 Wood and composition board flat-stock finishes
 Wood furniture and fixture finishes
 Appliance finishes
 Sheet, strip and coil coatings on metals
 Metal decorating finishes (can, container and closure coatings)
 Machinery and equipment finishes
 Paper and paperboard coatings (not ink)
 Metal furniture and fixtures finishes
 Electrical insulating varnishes
 Magnet wire coatings

Used Oil Combustion - Juneau

Activity Data Input: 76,193 gallons
Activity Period/Year: 1999 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
12	106467	1,4-Dichlorobenzene(p)	8.30E-07 lb/kgal	3.16E-08 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	2.50E-03 lb/kgal	9.52E-05 tpy
52	N/A	Beryllium Compounds	1.80E-03 lb/kgal	6.86E-05 tpy
58	N/A	Cadmium Compounds	2.90E-04 lb/kgal	1.10E-05 tpy
75	N/A	Chromium Compounds	1.90E-01 lb/kgal	7.24E-03 tpy
76	N/A	Cobalt Compounds	7.60E-03 lb/kgal	2.90E-04 tpy
145	91203	Naphthalene	1.20E-02 lb/kgal	4.57E-04 tpy
			Total HAP Emissions	0.008 tpy

Notes/Comments:

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

Used Oil Combustion - Juneau

Used Oil Combustion, based on population (1999)

U.S. Population (1983)	233,791,994
U.S. Population (1999)	272,690,813
Alaska Populations:	
Anchorage	257,808
Fairbanks	84,366
Juneau	30,192

United States Quantity of Used Oil Burned (Gallons)

Location	Used Oil Burned (1983)	Estimated Used Oil Burned (1999)
USA	590,000,000	688,165,480

1983 data from from AP-42section 1.11, Waste Oil Combustion

Population data from US Census web-site

Used-oil Combustion Allocation, Based on 1999 Population (Gallons)

Location	Percent of US Population	Gallons Used Oil Burned (1999)
Anchorage	0.0945%	650,607
Fairbanks	0.0309%	212,907
Juneau	0.0111%	76,193
TOTAL	0.1366%	939,707

Percentages based on 1999 Population data (<http://venus.census.gov/cdrom/lookup/961017877>)

Table D-4-2

**Summary of Estimated 1998 Hazardous Air Pollutant Emissions - Area Source Facilities
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6
No.	CAS No.	Chemical Name	Area Facilities	Auke Bay	Juneau Airport	Wastewater Plant	Greens Creek Mine	Youngs Boat Dock	Lemon Creek
1	79345	1,1,2,2-Tetrachloroethane	-----	-----	-----	-----	-----	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----	-----	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----	-----	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----	-----	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----	-----	-----	-----	-----
7	106887	1,2-Epoxybutane	0.001 tpy	-----	-----	0.001 tpy	-----	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----	-----	-----	-----	-----
9	106990	1,3-Butadiene	-----	-----	-----	-----	-----	-----	-----
10	542756	1,3-Dichloropropene	-----	-----	-----	-----	-----	-----	-----
11	1120714	1,3-Propane sultone	-----	-----	-----	-----	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	-----	-----	-----	-----	-----	-----	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----	-----	-----	-----	-----	-----
14	540841	2,2,4-Trimethylpentane	-----	-----	-----	-----	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	-----	-----	-----	0.000 tpy	-----	-----
16	95954	2,4,5-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----	-----	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----	-----	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----	-----	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----	-----	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----	-----	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----	-----	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----	-----	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----	-----	-----	-----	-----
25	79469	2-Nitropropane	-----	-----	-----	-----	-----	-----	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----	-----	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----	-----	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----	-----	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----	-----	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----	-----	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----	-----	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----	-----	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----	-----	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----	-----	-----	-----	-----
35	75070	Acetaldehyde	0.024 tpy	0.000 tpy	0.000 tpy	0.023 tpy	0.000 tpy	0.000 tpy	0.000 tpy
36	60355	Acetamide	-----	-----	-----	-----	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----	-----	-----	-----	-----
38	98862	Acetophenone	-----	-----	-----	-----	-----	-----	-----
39	107028	Acrolein	0.000 tpy	0.000 tpy	0.000 tpy	-----	0.000 tpy	0.000 tpy	0.000 tpy
40	79061	Acrylamide	0.023 tpy	-----	-----	0.023 tpy	-----	-----	-----
41	79107	Acrylic Acid	-----	-----	-----	-----	-----	-----	-----
42	107131	Acrylonitrile	-----	-----	-----	-----	-----	-----	-----
43	107051	Allyl chloride	-----	-----	-----	-----	-----	-----	-----
44	62533	Aniline	-----	-----	-----	-----	-----	-----	-----
45	N/A	Antimony Compounds	0.000 tpy	0.000 tpy	-----	0.000 tpy	-----	-----	0.000 tpy
46	N/A	Arsenic Compounds (inorganic including ars	0.017 tpy	0.000 tpy	-----	0.017 tpy	0.000 tpy	-----	0.000 tpy
47	1332214	Asbestos	-----	-----	-----	-----	-----	-----	-----

Table D-4-2

**Summary of Estimated 1998 Hazardous Air Pollutant Emissions - Area Source Facilities
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6
No.	CAS No.	Chemical Name	Area Facilities	Auke Bay	Juneau Airport	Wastewater Plant	Greens Creek Mine	Youngs Boat Dock	Lemon Creek
48	71432	Benzene (including benzene from gasoline)	0.028 tpy	0.000 tpy	0.000 tpy	-----	0.012 tpy	0.001 tpy	0.015 tpy
49	92875	Benzidine	-----	-----	-----	-----	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----	-----	-----	-----	-----
51	100447	Benzyl chloride	0.001 tpy	-----	-----	0.001 tpy	-----	-----	-----
52	N/A	Beryllium Compounds	0.013 tpy	0.000 tpy	-----	0.013 tpy	-----	-----	0.000 tpy
53	57578	beta-Propiolactone	-----	-----	-----	-----	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----	-----	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----	-----	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----	-----	-----	-----	-----
57	75252	Bromoform	-----	-----	-----	-----	-----	-----	-----
58	N/A	Cadmium Compounds	0.001 tpy	0.000 tpy	-----	0.001 tpy	0.000 tpy	-----	0.000 tpy
59	156627	Calcium cyanamide	-----	-----	-----	-----	-----	-----	-----
60	133062	Captan	-----	-----	-----	-----	-----	-----	-----
61	63252	Carbaryl	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
62	75150	Carbon disulfide	-----	-----	-----	-----	-----	-----	-----
63	56235	Carbon tetrachloride	-----	-----	-----	-----	-----	-----	-----
64	463581	Carbonyl sulfide	-----	-----	-----	-----	-----	-----	-----
65	120809	Catechol	-----	-----	-----	-----	-----	-----	-----
66	133904	Chloramben	-----	-----	-----	-----	-----	-----	-----
67	57749	Chlordane	-----	-----	-----	-----	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----	-----	-----	-----	-----
69	79118	Chloroacetic acid	0.001 tpy	-----	-----	0.001 tpy	-----	-----	-----
70	108907	Chlorobenzene	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
71	510156	Chlorobenzilate	-----	-----	-----	-----	-----	-----	-----
72	67663	Chloroform	-----	-----	-----	-----	-----	-----	-----
73	107302	Chloromethyl methyl ether	-----	-----	-----	-----	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----	-----	-----	-----	-----
75	N/A	Chromium Compounds	0.000 tpy	0.000 tpy	-----	-----	0.000 tpy	-----	0.000 tpy
76	N/A	Cobalt Compounds	0.000 tpy	0.000 tpy	-----	-----	-----	-----	0.000 tpy
77	N/A	Coke Oven Emissions	-----	-----	-----	-----	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----	-----	-----	-----	-----
82	98828	Cumene	-----	-----	-----	-----	-----	-----	-----
83	N/A	Cyanide Compounds	0.046 tpy	-----	-----	0.046 tpy	-----	-----	-----
84	3547044	DDE	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
85	334883	Diazomethane	-----	-----	-----	-----	-----	-----	-----
86	132649	Dibenzofurans	-----	-----	-----	-----	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----	-----	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----	-----	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----	-----	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----	-----	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----	-----	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----	-----	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----	-----	-----	-----	-----
94	68122	Dimethyl formamide	-----	-----	-----	-----	-----	-----	-----

Table D-4-2

**Summary of Estimated 1998 Hazardous Air Pollutant Emissions - Area Source Facilities
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6
No.	CAS No.	Chemical Name	Area Facilities	Auke Bay	Juneau Airport	Wastewater Plant	Greens Creek Mine	Youngs Boat Dock	Lemon Creek
95	131113	Dimethyl phthalate	-----	-----	-----	-----	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----	-----	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----	-----	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----	-----	-----	-----	-----
99	100414	Ethyl benzene	-----	-----	-----	-----	-----	-----	-----
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----	-----	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	-----	-----	-----	-----	-----	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----	-----	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----
104	107211	Ethylene glycol	-----	-----	-----	-----	-----	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----	-----	-----	-----	-----
106	75218	Ethylene oxide	-----	-----	-----	-----	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----	-----	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----	-----	-----	-----	-----	-----
109	5000	Formaldehyde	0.003 tpy	0.000 tpy	0.000 tpy	-----	0.001 tpy	0.001 tpy	0.002 tpy
110	N/A	Glycol ethers	0.009 tpy	-----	-----	0.009 tpy	-----	-----	-----
111	76448	Heptachlor	-----	-----	-----	-----	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----	-----	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----	-----	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----	-----	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----	-----	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----	-----	-----	-----	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----	-----	-----	-----	-----	-----
118	110543	Hexane	-----	-----	-----	-----	-----	-----	-----
119	302012	Hydrazine	-----	-----	-----	-----	-----	-----	-----
120	7647010	Hydrochloric acid	0.048 tpy	-----	-----	-----	0.048 tpy	-----	-----
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	-----	-----	-----	-----	-----	-----	-----
122	123319	Hydroquinone	-----	-----	-----	-----	-----	-----	-----
123	78591	Isophorone	-----	-----	-----	-----	-----	-----	-----
124	N/A	Lead Compounds	0.000 tpy	0.000 tpy	-----	-----	-----	-----	0.000 tpy
125	58899	Lindane (all isomers)	-----	-----	-----	-----	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----	-----	-----	-----	-----
127	N/A	Manganese Compounds	0.003 tpy	0.001 tpy	-----	-----	-----	-----	0.002 tpy
128	N/A	Mercury Compounds	0.008 tpy	0.000 tpy	-----	0.007 tpy	0.000 tpy	-----	0.000 tpy
129	67561	Methanol	-----	-----	-----	-----	-----	-----	-----
130	72435	Methoxychlor	-----	-----	-----	-----	-----	-----	-----
131	74839	Methyl bromide(Bromomethane)	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	-----	-----	-----	-----	-----	-----	-----
133	78933	Methyl ethyl ketone (2-Butanone)	-----	-----	-----	-----	-----	-----	-----
134	60344	Methyl hydrazine	-----	-----	-----	-----	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----	-----	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	-----	-----	-----	-----	-----	-----	-----
137	624839	Methyl isocyanate	-----	-----	-----	-----	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----	-----	-----	-----	-----
139	1634044	Methyl tert butyl ether	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
140	74873	Methylchloride (Chloromethane)	0.006 tpy	-----	-----	0.006 tpy	-----	-----	-----
141	75092	Methylene chloride(Dichloromethane)	-----	-----	-----	-----	-----	-----	-----

Table D-4-2

**Summary of Estimated 1998 Hazardous Air Pollutant Emissions - Area Source Facilities
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Facility No. 1	Facility No. 2	Facility No. 3	Facility No. 4	Facility No. 5	Facility No. 6
No.	CAS No.	Chemical Name	Area Facilities	Auke Bay	Juneau Airport	Wastewater Plant	Greens Creek Mine	Youngs Boat Dock	Lemon Creek
142	101688	Methylene diphenyl diisocyanate (MDI)	0.008 tpy	-----	-----	0.008 tpy	-----	-----	-----
143	N/A	Mineral fibers	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----	-----	-----	-----	-----
145	91203	Naphthalene	0.005 tpy	0.000 tpy	0.000 tpy	-----	0.002 tpy	0.000 tpy	0.003 tpy
146	N/A	Nickel Compounds	0.010 tpy	0.004 tpy	-----	-----	0.000 tpy	-----	0.005 tpy
147	98953	Nitrobenzene	-----	-----	-----	-----	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----	-----	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----	-----	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----	-----	-----	-----	-----
151	90040	o-Anisidine	0.006 tpy	-----	-----	0.006 tpy	-----	-----	-----
152	95534	o-Toluidine	-----	-----	-----	-----	-----	-----	-----
153	56382	Parathion	-----	-----	-----	-----	-----	-----	-----
154	82688	Pentachloromirobenzene (Quintobenzene)	0.020 tpy	-----	-----	0.020 tpy	-----	-----	-----
155	87865	Pentachlorophenol	-----	-----	-----	-----	-----	-----	-----
156	108952	Phenol	-----	-----	-----	-----	-----	-----	-----
157	75445	Phosgene	-----	-----	-----	-----	-----	-----	-----
158	7723140	Phosphorus	0.002 tpy	0.001 tpy	-----	-----	-----	-----	0.001 tpy
159	7803512	Phospine	-----	-----	-----	-----	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----	-----	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----	-----	-----	-----	-----
162	N/A	Polycyclic Organic Matter	0.008 tpy	0.000 tpy	0.000 tpy	0.000 tpy	0.003 tpy	-----	0.004 tpy
163	106503	p-Phenylemediamine	-----	-----	-----	-----	-----	-----	-----
164	123386	Propionaldehyde	-----	-----	-----	-----	-----	-----	-----
165	114261	Propoxur(Baygon)	-----	-----	-----	-----	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----	-----	-----	-----	-----	-----
167	75569	Propylene oxide	-----	-----	-----	-----	-----	-----	-----
168	91225	Quinoline	-----	-----	-----	-----	-----	-----	-----
169	106514	Quinone	-----	-----	-----	-----	-----	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----	-----	-----	-----	-----
171	N/A	Selenium Compounds	0.000 tpy	0.000 tpy	-----	-----	-----	-----	0.000 tpy
172	100425	Styrene	-----	-----	-----	-----	-----	-----	-----
173	96093	Styrene oxide	-----	-----	-----	-----	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	0.007 tpy	-----	-----	0.007 tpy	-----	-----	-----
175	7550450	Titanium tetrachloride	-----	-----	-----	-----	-----	-----	-----
176	108883	Toluene	0.010 tpy	0.000 tpy	0.000 tpy	-----	0.004 tpy	0.000 tpy	0.005 tpy
177	8001352	Toxaphene (chlorinated camphene)	0.000 tpy	-----	-----	0.000 tpy	-----	-----	-----
178	79016	Trichloroethylene	-----	-----	-----	-----	-----	-----	-----
179	121448	Triethylamine	-----	-----	-----	-----	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----	-----	-----	-----	-----
181	108054	Vinyl acetate	-----	-----	-----	-----	-----	-----	-----
182	593602	Vinyl bromide	0.006 tpy	-----	-----	0.006 tpy	-----	-----	-----
183	75014	Vinyl chloride	0.001 tpy	-----	-----	0.001 tpy	-----	-----	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	0.001 tpy	-----	-----	0.001 tpy	-----	-----	-----
185	1330207	Xylenes (isomers and mixture)	0.005 tpy	0.000 tpy	0.000 tpy	0.001 tpy	-----	0.000 tpy	0.004 tpy
186	95476	Xylenes (isomers and mixture)	0.005 tpy	-----	-----	0.001 tpy	-----	-----	0.004 tpy
187	108383	Xylenes (isomers and mixture)	0.005 tpy	-----	-----	0.001 tpy	-----	-----	0.004 tpy
188	106423	Xylenes (isomers and mixture)	0.008 tpy	-----	-----	0.004 tpy	-----	-----	0.004 tpy

Table D-4-2

Summary of Estimated 1998 Hazardous Air Pollutant Emissions - Area Source Facilities
City and Borough of Juneau

Section 112 Hazardous Air Pollutants			Juneau TOTAL Area Facilities	Facility No. 1 Auke Bay	Facility No. 2 Juneau Airport	Facility No. 3 Wastewater Plant	Facility No. 4 Greens Creek Mine	Facility No. 5 Youngs Boat Dock	Facility No. 6 Lemon Creek
No.	CAS No.	Chemical Name							
Total HAP Emissions			0.3 tpy	0.008 tpy	0.0001 tpy	0.20 tpy	0.07 tpy	0.002 tpy	0.053 tpy

Auke Bay - Junueau

Diesel-Fired Turbines for Electricity Generation
Activity Data Input: 49,281 gallons
Activity Period/Year: 1996 Year

Diesel-Fired Engines greater than 600 hp
Activity Data Input: 6,831 gallons
Activity Period/Year: 1996 Year

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			2.52E-05 lb/MMBtu	1.18E-05 tpy	1.18E-05 tpy	
39	107028	Acrolein			7.88E-06 lb/MMBtu	3.69E-06 tpy	3.69E-06 tpy	
45	N/A	Antimony Compounds	2.20E-05 lb/MMBtu	7.43E-05 tpy			7.43E-05 tpy	
46	N/A	Arsenic Compounds (inorganic including arsine)	4.90E-06 lb/MMBtu	1.65E-05 tpy			1.65E-05 tpy	
48	71432	Benzene(including benzene from gasoline)			7.76E-04 lb/MMBtu	3.63E-04 tpy	3.63E-04 tpy	
52	N/A	Beryllium Compounds	3.30E-07 lb/MMBtu	1.11E-06 tpy			1.11E-06 tpy	
58	N/A	Cadmium Compounds	4.20E-06 lb/MMBtu	1.42E-05 tpy			1.42E-05 tpy	
75	N/A	Chromium Compounds	4.70E-05 lb/MMBtu	1.59E-04 tpy			1.59E-04 tpy	
76	N/A	Cobalt Compounds	9.10E-06 lb/MMBtu	3.07E-05 tpy			3.07E-05 tpy	
109	5000	Formaldehyde			7.89E-05 lb/MMBtu	3.69E-05 tpy	3.69E-05 tpy	
124	N/A	Lead Compounds	5.80E-05 lb/MMBtu	1.96E-04 tpy			1.96E-04 tpy	
127	N/A	Manganese Compounds	3.40E-04 lb/MMBtu	1.15E-03 tpy			1.15E-03 tpy	
128	N/A	Mercury Compounds	8.40E-06 lb/MMBtu	2.84E-05 tpy			2.84E-05 tpy	
145	91203	Naphthalene			1.30E-04 lb/MMBtu	6.08E-05 tpy	6.08E-05 tpy	
146	N/A	Nickel Compounds	1.20E-03 lb/MMBtu	4.05E-03 tpy			4.05E-03 tpy	
158	7723140	Phosphorus	3.00E-04 lb/MMBtu	1.01E-03 tpy			1.01E-03 tpy	
162	N/A	Polycyclic Organic Matter			2.12E-04 lb/MMBtu	9.92E-05 tpy	9.92E-05 tpy	
171	N/A	Selenium Compounds	5.30E-06 lb/MMBtu	1.79E-05 tpy			1.79E-05 tpy	
176	108883	Toluene			2.81E-04 lb/MMBtu	1.31E-04 tpy	1.31E-04 tpy	
185	1330207	Xylenes (isomers and mixture)			1.93E-04 lb/MMBtu	9.03E-05 tpy	9.03E-05 tpy	
Total HAP Emissions				0.007 tpy	Total HAP Emissions	0.001 tpy	TOTAL	0.01 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-4.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from operating permit application.
4. Facility has 2 turbines.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from operating permit application.
4. Facility has 1 engine-generator set.

Juneau International Airport

Diesel-Fired Engines less than 600 hp
Activity Data Input: 281 gallons
Activity Period/Year: Potential Year

Diesel-Fired Engines greater than 600 hp
Activity Data Input: 469 gallons
Activity Period/Year: Potential Year

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	7.67E-04 lb/MMBtu	1.48E-05 tpy	2.52E-05 lb/MMBtu	8.10E-07 tpy	1.56E-05 tpy
39	107028	Acrolein	9.25E-05 lb/MMBtu	1.78E-06 tpy	7.88E-06 lb/MMBtu	2.53E-07 tpy	2.03E-06 tpy
48	71432	Benzene(including benzene from gasoline)	9.33E-04 lb/MMBtu	1.80E-05 tpy	7.76E-04 lb/MMBtu	2.49E-05 tpy	4.29E-05 tpy
109	5000	Formaldehyde	1.18E-03 lb/MMBtu	2.27E-05 tpy	7.89E-05 lb/MMBtu	2.53E-06 tpy	2.52E-05 tpy
145	91203	Naphthalene	8.48E-05 lb/MMBtu	1.63E-06 tpy	1.30E-04 lb/MMBtu	4.18E-06 tpy	5.81E-06 tpy
176	108883	Toluene	4.09E-04 lb/MMBtu	7.87E-06 tpy	2.81E-04 lb/MMBtu	9.03E-06 tpy	1.69E-05 tpy
185	1330207	Xylenes (isomers and mixture)	2.85E-04 lb/MMBtu	5.49E-06 tpy	1.93E-04 lb/MMBtu	6.20E-06 tpy	1.17E-05 tpy
Total HAP Emissions				0.0001 tpy	Total HAP Emissions		0.0001 tpy
					TOTAL		0.0001 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.3-2.
 2. Assume diesel fuel heat content of 137,000 Btu/gal.
 3. Activity data from July 6, 1998 application for Preapproved Limit.
- Still missing other existing sources. These other sources have a combined NOx emission rate of 1.018 tpy.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from July 6, 1998 application for Preapproved Limit.

Juneau-Douglas Wastewater Treatment Plant

Sewage Sludge Incinerator
Activity Data Input: 920 tons
Activity Period/Year: 1999 Year

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	3.77E-04 tpy
7	106887	1,2-Epoxybutane	1.60E-03 lb/ton	7.36E-04 tpy
35	75070	Acetaldehyde	5.00E-02 lb/ton	2.30E-02 tpy
40	79061	Acrylamide	5.00E-02 lb/ton	2.30E-02 tpy
45	N/A	Antimony Compounds	3.00E-04 lb/ton	1.38E-04 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	3.70E-02 lb/ton	1.70E-02 tpy
51	100447	Benzyl chloride	1.90E-03 lb/ton	8.74E-04 tpy
52	N/A	Beryllium Compounds	2.90E-02 lb/ton	1.33E-02 tpy
58	N/A	Cadmium Compounds	1.80E-03 lb/ton	8.28E-04 tpy
61	63252	Carbaryl	2.00E-05 lb/ton	9.20E-06 tpy
69	79118	Chloroacetic acid	1.50E-03 lb/ton	6.90E-04 tpy
70	108907	Chlorobenzene	6.00E-05 lb/ton	2.76E-05 tpy
83	N/A	Cyanide Compounds	1.00E-01 lb/ton	4.60E-02 tpy
84	3547044	DDE	7.60E-06 lb/ton	3.50E-06 tpy
110	N/A	Glycol ethers	1.90E-02 lb/ton	8.74E-03 tpy
128	N/A	Mercury Compounds	1.60E-02 lb/ton	7.36E-03 tpy
131	74839	Methyl bromide(Bromomethane)	1.20E-04 lb/ton	5.52E-05 tpy
139	1634044	Methyl tert butyl ether	8.00E-04 lb/ton	3.68E-04 tpy
140	74873	Methylchloride (chloromethane)	1.20E-02 lb/ton	5.52E-03 tpy
142	101688	Methylene diphenyl diisocyanate (MDI)	1.80E-02 lb/ton	8.28E-03 tpy
143	N/A	Mineral fibers	1.70E-06 lb/ton	7.82E-07 tpy
151	90040	o-Anisidine	1.20E-02 lb/ton	5.52E-03 tpy
154	82688	Pentachloromitrobenzene(Quintobenzene)	4.40E-02 lb/ton	2.02E-02 tpy
162	N/A	Polycyclic Organic Matter	3.00E-04 lb/ton	1.38E-04 tpy
174	127184	Tetrachloroethylene (Perchloroethylene)	1.50E-02 lb/ton	6.90E-03 tpy
177	8001352	Toxaphene(chlorinated camphene)	8.00E-04 lb/ton	3.68E-04 tpy
182	593602	Vinyl bromide	1.30E-02 lb/ton	5.98E-03 tpy
183	75014	Vinyl chloride	1.90E-03 lb/ton	8.74E-04 tpy
184	75354	Vinylidene chloride(1,1-Dichloroethylene)	1.90E-03 lb/ton	8.74E-04 tpy
185	1330207	Xylenes (isomers and mixture)	1.90E-03 lb/ton	8.74E-04 tpy
186	95476	Xylenes (isomers and mixture)	1.90E-03 lb/ton	8.74E-04 tpy
187	108383	Xylenes (isomers and mixture)	3.00E-03 lb/ton	1.38E-03 tpy
188	106423	Xylenes (isomers and mixture)	9.40E-03 lb/ton	4.32E-03 tpy
Total HAP Emissions			0.205 tpy	

Notes/Comments:

1. Reference: AP-42, Tables 2.2-1, 2.2-3, 2.2-4 & 2.2-5.
2. Activity data from 1999 FOR.

Kennecott Greens Creek Mine - Juneau

Diesel-Fired Engines greater than 600 hp Activity Data: 217,936 gallons Activity Period: 1999 Year	Diesel-Fired Engines less than 600 hp Activity Data: 123 gallons Activity Period: 1999 Year	Diesel-Fired Boilers/Heaters Activity Data: 0.000 gallons Activity Period: 1999 Year	Starved Air Incinerators Activity Data: 45 tons Activity Period: 1999 Year
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Section 112 Hazardous Air Pollutants			Source Category Calculations		Source Category Calculations		Source Category Calculations		Source Category Calculations		Total - All Categories					
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Estimated Emissions					
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin							2.94E-06	lb/ton	6.57E-08 tpy	6.57E-08 tpy				
35	75070	Acetaldehyde	2.52E-05	lb/MMBtu	3.76E-04	tpy	7.67E-04	lb/MMBtu	6.46E-06	tpy	3.83E-04	tpy				
39	107028	Acrolein	7.88E-06	lb/MMBtu	1.18E-04	tpy	9.25E-05	lb/MMBtu	7.79E-07	tpy	1.18E-04	tpy				
46	N/A	Arsenic Compounds (inorganic including arsine)					4.2	lb/10 ¹² Btu	0.000	tpy	6.69E-04	lb/ton	1.49E-05	tpy		
48	71432	Benzene(including benzene from gasoline)	7.76E-04	lb/MMBtu	1.16E-02	tpy	9.33E-04	lb/MMBtu	7.86E-06	tpy	1.16E-02	tpy	1.16E-02	tpy		
52	N/A	Beryllium Compounds					2.5	lb/10 ¹² Btu	0.000	tpy			0.00E+00	tpy		
58	N/A	Cadmium Compounds					11	lb/10 ¹² Btu	0.000	tpy	2.41E-03	lb/ton	5.38E-05	tpy		
75	N/A	Chromium Compounds					67	lb/10 ¹² Btu	0.000	tpy	3.31E-03	lb/ton	7.39E-05	tpy		
109	5000	Formaldehyde	7.89E-05	lb/MMBtu	1.18E-03	tpy	1.18E-03	lb/MMBtu	9.94E-06	tpy	1.214	lb/Mgal	0.000	tpy		
118	110543	Hexane					0.269	lb/Mgal	0.000	tpy			0.00E+00	tpy		
120	7647010	Hydrochloric acid									2.15E+00	lb/ton	4.80E-02	tpy		
124	N/A	Lead Compounds					8.9	lb/10 ¹² Btu	0.000	tpy			0.00E+00	tpy		
127	N/A	Manganese Compounds					14	lb/10 ¹² Btu	0.000	tpy			0.00E+00	tpy		
128	N/A	Mercury Compounds					3.0	lb/10 ¹² Btu	0.000	tpy	5.60E-03	lb/ton	1.25E-04	tpy		
145	91203	Naphthalene	1.30E-04	lb/MMBtu	1.94E-03	tpy	8.48E-05	lb/MMBtu	7.14E-07	tpy			1.94E-03	tpy		
146	N/A	Nickel Compounds					18	lb/10 ¹² Btu	0.000	tpy	5.52E-03	lb/ton	1.23E-04	tpy		
162	N/A	Polycyclic Organic Matter	2.12E-04	lb/MMBtu	3.16E-03	tpy							3.16E-03	tpy		
176	108883	Toluene	2.81E-04	lb/MMBtu	4.19E-03	tpy	4.09E-04	lb/MMBtu	3.45E-06	tpy			4.20E-03	tpy		
Total HAPs			0.025	tpy	Total HAPs	0.000	tpy	Total HAPs	0.000	tpy	Total HAPs	0.048	tpy	TOTAL	0.07	tpy

Notes/Comments:

1. Reference: AP-42, Table 3.4-3.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from 1999 FORs.

Notes/Comments:

1. Reference: AP-42, Table 3.3-2.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from 1999 FORs.

Notes/Comments:

1. Reference: AP-42, Tables 1.3-2 (assume residential furnace factor),
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from 1999 FORs.

Notes/Comments:

1. Reference: AP-42, Tables 2.1-9.
2. No incinerator identified in Title V.
3. Only 1st half of 1999 FOR lists tons material incinerated. Double

Kennecott Greens Creek Youngs Bay Boat Dock - Juneau

Diesel-Fired Engines less than 600 hp

Activity Data Input: 8,000 gallons

Activity Period/Year: N/A Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
35	75070	Acetaldehyde	7.67E-04 lb/MMBtu	4.20E-04 tpy
39	107028	Acrolein	9.25E-05 lb/MMBtu	5.07E-05 tpy
48	71432	Benzene(including benzene from gasoline)	9.33E-04 lb/MMBtu	5.11E-04 tpy
109	5000	Formaldehyde	1.18E-03 lb/MMBtu	6.47E-04 tpy
145	91203	Naphthalene	8.48E-05 lb/MMBtu	4.65E-05 tpy
176	108883	Toluene	4.09E-04 lb/MMBtu	2.24E-04 tpy
185	1330207	Xylenes (isomers and mixture)	2.85E-04 lb/MMBtu	1.56E-04 tpy
Total HAP Emissions			0.002 tpy	

Notes/Comments:

1. Reference: AP-42, Table 3.3-2.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from Pre-approved Limit No. PAL 000432.

Lemon Creek - Juneau

Diesel-Fired Turbines for Electricity

Activity Data Input: **66,260** gallons
 Activity Period/Year: **1996** Year

Diesel-Fired Engines greater than 600 hp

Activity Data Input: **282,096** gallons
 Activity Period/Year: **1996** Year

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			2.52E-05 lb/MMBtu	4.87E-04 tpy	4.87E-04 tpy		
39	107028	Acrolein			7.88E-06 lb/MMBtu	1.52E-04 tpy	1.52E-04 tpy		
45	N/A	Antimony Compounds	2.20E-05 lb/MMBtu	9.99E-05 tpy			9.99E-05 tpy		
46	N/A	Arsenic Compounds (inorganic including arsine)	4.90E-06 lb/MMBtu	2.22E-05 tpy			2.22E-05 tpy		
48	71432	Benzene (including benzene from gasoline)			7.76E-04 lb/MMBtu	1.50E-02 tpy	1.50E-02 tpy		
52	N/A	Beryllium Compounds	3.30E-07 lb/MMBtu	1.50E-06 tpy			1.50E-06 tpy		
58	N/A	Cadmium Compounds	4.20E-06 lb/MMBtu	1.91E-05 tpy			1.91E-05 tpy		
75	N/A	Chromium Compounds	4.70E-05 lb/MMBtu	2.13E-04 tpy			2.13E-04 tpy		
76	N/A	Cobalt Compounds	9.10E-06 lb/MMBtu	4.13E-05 tpy			4.13E-05 tpy		
109	5000	Formaldehyde			7.89E-05 lb/MMBtu	1.52E-03 tpy	1.52E-03 tpy		
124	N/A	Lead Compounds	5.80E-05 lb/MMBtu	2.63E-04 tpy			2.63E-04 tpy		
127	N/A	Manganese Compounds	3.40E-04 lb/MMBtu	1.54E-03 tpy			1.54E-03 tpy		
128	N/A	Mercury Compounds	8.40E-06 lb/MMBtu	3.81E-05 tpy			3.81E-05 tpy		
145	91203	Naphthalene			1.30E-04 lb/MMBtu	2.51E-03 tpy	2.51E-03 tpy		
146	N/A	Nickel Compounds	1.20E-03 lb/MMBtu	5.45E-03 tpy			5.45E-03 tpy		
158	7723140	Phosphorus	3.00E-04 lb/MMBtu	1.36E-03 tpy			1.36E-03 tpy		
162	N/A	Polycyclic Organic Matter			2.12E-04 lb/MMBtu	4.10E-03 tpy	4.10E-03 tpy		
171	N/A	Selenium Compounds	5.30E-06 lb/MMBtu	2.41E-05 tpy			2.41E-05 tpy		
176	108883	Toluene			2.81E-04 lb/MMBtu	5.43E-03 tpy	5.43E-03 tpy		
185	1330207	Xylenes (isomers and mixture)			1.93E-04 lb/MMBtu	3.73E-03 tpy	3.73E-03 tpy		
186	95476	Xylenes (isomers and mixture)			1.93E-04 lb/MMBtu	3.73E-03 tpy	3.73E-03 tpy		
187	108383	Xylenes (isomers and mixture)			1.93E-04 lb/MMBtu	3.73E-03 tpy	3.73E-03 tpy		
188	106423	Xylenes (isomers and mixture)			1.93E-04 lb/MMBtu	3.73E-03 tpy	3.73E-03 tpy		
Total HAP Emissions				0.009 tpy	Total HAP Emissions		0.044 tpy	TOTAL	0.053 tpy

Notes/Comments:

1. Reference: AP-42, Table 3.1-4.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from operating permit application.
4. Facility has 2 turbines.

Notes/Comments:

1. Reference: AP-42, Table 3.4-3.
2. Assume diesel fuel heat content of 137,000 Btu/gal.
3. Activity data from operating permit application.
4. Facility has 9 engine-generator sets.

APPENDIX E

Point Sources

Table E-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Anchorage TOTAL All Point Sources	Facility No. 1 Entech
No.	CAS No.	Chemical Name		
1	79345	1,1,2,2-Tetrachloroethane	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----
7	106887	1,2-Epoxybutane	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----
9	106990	1,3-Butadiene	-----	-----
10	542756	1,3-Dichloropropene	-----	-----
11	1120714	1,3-Propane sultone	-----	-----
12	106467	1,4-Dichlorobenzene(p)	-----	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----
14	540841	2,2,4-Trimethylpentane	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	-----	-----
16	95954	2,4,5-Trichlorophenol	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----
18	94757	2,4-D, salts and esters	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----
22	95807	2,4-Toluene diamine	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----
24	532274	2-Chloroacetophenone	-----	-----
25	79469	2-Nitropropane	-----	-----
26	91941	3,3-Dichlorobenzidene	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----
32	92671	4-Aminobiphenyl	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----
34	100027	4-Nitrophenol	-----	-----
35	75070	Acetaldehyde	-----	-----
36	60355	Acetamide	-----	-----
37	75058	Acetonitrile	-----	-----
38	98862	Acetophenone	-----	-----
39	107028	Acrolein	-----	-----
40	79061	Acrylamide	-----	-----
41	79107	Acrylic Acid	-----	-----
42	107131	Acrylonitrile	-----	-----
43	107051	Allyl chloride	-----	-----
44	62533	Aniline	-----	-----
45	N/A	Antimony Compounds	0.019 tpy	0.019 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	0.000 tpy	0.000 tpy
47	1332214	Asbestos	-----	-----
48	71432	Benzene (including benzene from gasoline)	-----	-----
49	92875	Benzidine	-----	-----
50	98077	Benzotrichloride	-----	-----
51	100447	Benzyl chloride	-----	-----
52	N/A	Beryllium Compounds	0.005 tpy	0.005 tpy
53	57578	beta-Propiolactone	-----	-----
54	92524	Biphenyl	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----
57	75252	Bromoform	-----	-----
58	N/A	Cadmium Compounds	0.008 tpy	0.008 tpy
59	156627	Calcium cyanamide	-----	-----
60	133062	Captan	-----	-----
61	63252	Carbaryl	-----	-----
62	75150	Carbon disulfide	-----	-----
63	56235	Carbon tetrachloride	-----	-----
64	463581	Carbonyl sulfide	-----	-----

Table E-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Anchorage TOTAL All Point Sources	Facility No. 1 Entech
No.	CAS No.	Chemical Name		
65	120809	Catechol	-----	-----
66	133904	Chloramben	-----	-----
67	57749	Chlordane	-----	-----
68	7782505	Chlorine	0.153 tpy	0.153 tpy
69	79118	Chloroacetic acid	-----	-----
70	108907	Chlorobenzene	-----	-----
71	510156	Chlorobenzilate	-----	-----
72	67663	Chloroform	-----	-----
73	107302	Chloromethyl methyl ether	-----	-----
74	126998	Chloroprene	-----	-----
75	N/A	Chromium Chompounds	0.001 tpy	0.001 tpy
76	N/A	Cobalt Compounds	-----	-----
77	N/A	Coke Oven Emissions	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----
82	98828	Cumene	-----	-----
83	N/A	Cyanide Compounds	-----	-----
84	3547044	DDE	-----	-----
85	334883	Diazomethane	-----	-----
86	132649	Dibenzofurans	-----	-----
87	84742	Dibutylphthalate	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----
89	62737	Dichlorvos	-----	-----
90	111422	Diethanolamine	-----	-----
91	64675	Diethyl sulfite	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----
94	68122	Dimethyl formamide	-----	-----
95	131113	Dimethyl phthalate	-----	-----
96	77781	Dimethyl sulfite	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----
98	140885	Ethyl acrylate	-----	-----
99	100414	Ethyl benzene	-----	-----
100	51796	Ethyl carbamate (Urethane)	-----	-----
101	75003	Ethyl chloride (Chloroethane)	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	-----	-----
104	107211	Ethylene glycol	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----
106	75218	Ethylene oxide	-----	-----
107	96457	Ethylene thiourea	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----
109	5000	Formaldehyde	-----	-----
110	N/A	Glycol ethers	-----	-----
111	76448	Heptachlor	-----	-----
112	118741	Hexachlorobenzene	-----	-----
113	87683	Hexachlorobutadiene	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----
115	67721	Hexachloroethane	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----
118	110543	Hexane	-----	-----
119	302012	Hydrazine	-----	-----
120	7647010	Hydrochloric acid	48.900 tpy	48.900 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	0.218 tpy	0.218 tpy
122	123319	Hydroquinone	-----	-----
123	78591	Isophorone	-----	-----
124	N/A	Lead Compounds	0.106 tpy	0.106 tpy
125	58899	Lindane (all isomers)	-----	-----
126	108316	Maleic anhydride	-----	-----
127	N/A	Manganese Compounds	0.001 tpy	0.001 tpy
128	N/A	Mercury Compounds	0.156 tpy	0.156 tpy

Table E-1

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
Municipality of Anchorage**

Section 112 Hazardous Air Pollutants			Anchorage TOTAL	Facility No. 1
No.	CAS No.	Chemical Name	All Point Sources	Entech
129	67561	Methanol	-----	-----
130	72435	Methoxychlor	-----	-----
131	74839	Methyl bromide(Bromomethane)	-----	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	-----	-----
133	78933	Methyl ethyl ketone (2-Butanone)	-----	-----
134	60344	Methyl hydrazine	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	-----	-----
137	624839	Methyl isocyanate	-----	-----
138	80626	Methyl methacrylate	-----	-----
139	1634044	Methyl tert butyl ether	-----	-----
140	74873	Methylchloride (Chloromethane)	-----	-----
141	75092	Methylene chloride(Dichloromethane)	-----	-----
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----
143	N/A	Mineral fibers	-----	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----
145	91203	Naphthalene	-----	-----
146	N/A	Nickel Compounds	0.001 tpy	0.001 tpy
147	98953	Nitrobenzene	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----
151	90040	o-Anisidine	-----	-----
152	95534	o-Toluidine	-----	-----
153	56382	Parathion	-----	-----
154	82688	Pentachloromitrobenzene (Quintobenzene)	-----	-----
155	87865	Pentachlorophenol	-----	-----
156	108952	Phenol	-----	-----
157	75445	Phosgene	-----	-----
158	7723140	Phosphorus	-----	-----
159	7803512	Phospine	-----	-----
160	85449	Phthalic anhydride	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----
162	N/A	Polycyclic Organic Matter	0.000 tpy	0.000 tpy
163	106503	p-Phenylemediamine	-----	-----
164	123386	Propionaldehyde	-----	-----
165	114261	Propoxur(Baygon)	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----
167	75569	Propylene oxide	-----	-----
168	91225	Quinoline	-----	-----
169	106514	Quinone	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----
171	N/A	Selenium Compounds	-----	-----
172	100425	Styrene	-----	-----
173	96093	Styrene oxide	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	-----	-----
175	7550450	Titanium tetrachloride	-----	-----
176	108883	Toluene	-----	-----
177	8001352	Toxaphene (chlorinated camphene)	-----	-----
178	79016	Trichloroethylene	-----	-----
179	121448	Triethylamine	-----	-----
180	1582098	Trifluralin	-----	-----
181	108054	Vinyl acetate	-----	-----
182	593602	Vinyl bromide	-----	-----
183	75014	Vinyl chloride	-----	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----
185	1330207	Xylenes (isomers and mixture)	-----	-----
186	95476	Xylenes (isomers and mixture)	-----	-----
187	108383	Xylenes (isomers and mixture)	-----	-----
188	106423	Xylenes (isomers and mixture)	-----	-----
Total HAP Emissions			49.6 tpy	49.6 tpy

Table E-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2
No.	CAS No.	Chemical Name	All Point Sources	Fort Wainwright	U.A. Fairbanks
1	79345	1,1,2,2-Tetrachloroethane	0.030 tpy	0.030 tpy	-----
2	79005	1,1,2-Trichloroethane	-----	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----	-----
7	106887	1,2-Epoxybutane	-----	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----	-----
9	106990	1,3-Butadiene	-----	-----	-----
10	542756	1,3-Dichloropropene	-----	-----	-----
11	1120714	1,3-Propane sultone	-----	-----	-----
12	106467	1,4-Dichlorobenzene(p)	-----	-----	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----	-----
14	540841	2,24-Trimethylpentane	-----	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	-----	-----	-----
16	95954	2,4,5-Trichlorophenol	-----	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----	-----
18	94757	2,4-D, salts and esters	-----	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----	-----
22	95807	2,4-Toluene diamine	-----	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----	-----
24	532274	2-Chloroacetophenone	-----	-----	-----
25	79469	2-Nitropropane	-----	-----	-----
26	91941	3,3-Dichlorobenzidene	-----	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----	-----
29	101144	4,4-Methylene bis (2-chloroaniline)	-----	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----	-----
32	92671	4-Aminobiphenyl	-----	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----	-----
34	100027	4-Nitrophenol	-----	-----	-----
35	75070	Acetaldehyde	-----	-----	-----
36	60355	Acetamide	-----	-----	-----
37	75058	Acetonitrile	-----	-----	-----
38	98862	Acetophenone	-----	-----	-----
39	107028	Acrolein	-----	-----	-----
40	79061	Acrylamide	-----	-----	-----
41	79107	Acrylic Acid	-----	-----	-----
42	107131	Acrylonitrile	0.050 tpy	0.050 tpy	-----
43	107051	Allyl chloride	-----	-----	-----
44	62533	Aniline	-----	-----	-----
45	N/A	Antimony Compounds	-----	-----	-----
46	N/A	Arsenic Compounds (inorganic including arsenic)	1.230 tpy	1.230 tpy	-----
47	1332214	Asbestos	-----	-----	-----
48	71432	Benzene (including benzene from gasoline)	0.250 tpy	0.030 tpy	0.220 tpy
49	92875	Benzidine	-----	-----	-----
50	98077	Benzotrichloride	-----	-----	-----
51	100447	Benzyl chloride	-----	-----	-----
52	N/A	Beryllium Compounds	-----	-----	-----
53	57578	beta-Propiolactone	-----	-----	-----
54	92524	Biphenyl	-----	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----	-----
57	75252	Bromoform	-----	-----	-----
58	N/A	Cadmium Compounds	0.100 tpy	0.100 tpy	-----
59	156627	Calcium cyanamide	-----	-----	-----
60	133062	Captan	-----	-----	-----
61	63252	Carbaryl	-----	-----	-----
62	75150	Carbon disulfide	0.010 tpy	0.010 tpy	-----
63	56235	Carbon tetrachloride	0.010 tpy	0.010 tpy	-----
64	463581	Carbonyl sulfide	0.010 tpy	0.010 tpy	-----

Table E-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2
No.	CAS No.	Chemical Name	All Point Sources	Fort Wainwright	U.A. Fairbanks
65	120809	Catechol	-----	-----	-----
66	133904	Chloramben	-----	-----	-----
67	57749	Chlordane	-----	-----	-----
68	7782505	Chlorine	-----	-----	-----
69	79118	Chloroacetic acid	-----	-----	-----
70	108907	Chlorobenzene	0.350 tpy	0.350 tpy	-----
71	510156	Chlorobenzilate	-----	-----	-----
72	67663	Chloroform	0.010 tpy	0.010 tpy	-----
73	107302	Chloromethyl methyl ether	-----	-----	-----
74	126998	Chloroprene	-----	-----	-----
75	N/A	Chromium Compounds	0.010 tpy	0.010 tpy	-----
76	N/A	Cobalt Compounds	0.010 tpy	0.010 tpy	-----
77	N/A	Coke Oven Emissions	-----	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----	-----
82	98828	Cumene	0.380 tpy	0.380 tpy	-----
83	N/A	Cyanide Compounds	-----	-----	-----
84	3547044	DDE	-----	-----	-----
85	334883	Diazomethane	-----	-----	-----
86	132649	Dibenzofurans	-----	-----	-----
87	84742	Dibutylphthalate	-----	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----	-----
89	62737	Dichlorvos	-----	-----	-----
90	111422	Diethanolamine	-----	-----	-----
91	64675	Diethyl sulfate	-----	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----	-----
94	68122	Dimethyl formamide	-----	-----	-----
95	131113	Dimethyl phthalate	-----	-----	-----
96	77781	Dimethyl sulfate	-----	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----	-----
98	140885	Ethyl acrylate	-----	-----	-----
99	100414	Ethyl benzene	0.520 tpy	0.520 tpy	-----
100	51796	Ethyl carbamate (Urethane)	-----	-----	-----
101	75003	Ethyl chloride (Chloroethane)	0.010 tpy	0.010 tpy	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	0.010 tpy	0.010 tpy	-----
104	107211	Ethylene glycol	-----	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----	-----
106	75218	Ethylene oxide	-----	-----	-----
107	96457	Ethylene thiourea	-----	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	0.030 tpy	0.030 tpy	-----
109	5000	Formaldehyde	0.420 tpy	0.220 tpy	0.200 tpy
110	N/A	Glycol ethers	-----	-----	-----
111	76448	Heptachlor	-----	-----	-----
112	118741	Hexachlorobenzene	-----	-----	-----
113	87683	Hexachlorobutadiene	-----	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----	-----
115	67721	Hexachloroethane	-----	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	0.010 tpy	0.010 tpy	-----
117	680319	Hexamethylphosphoramide	-----	-----	-----
118	110543	Hexane	0.710 tpy	0.710 tpy	-----
119	302012	Hydrazine	-----	-----	-----
120	7647010	Hydrochloric acid	160.010 tpy	118.210 tpy	41.800 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	19.990 tpy	14.780 tpy	5.210 tpy
122	123319	Hydroquinone	-----	-----	-----
123	78591	Isophorone	-----	-----	-----
124	N/A	Lead Compounds	0.800 tpy	0.800 tpy	-----
125	58899	Lindane (all isomers)	-----	-----	-----
126	108316	Maleic anhydride	-----	-----	-----
127	N/A	Manganese Compounds	-----	-----	-----
128	N/A	Mercury Compounds	0.010 tpy	0.010 tpy	-----

Table E-2

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
Fairbanks North Star Borough**

Section 112 Hazardous Air Pollutants			Fairbanks TOTAL	Facility No. 1	Facility No. 2
No.	CAS No.	Chemical Name	All Point Sources	Fort Wainwright	U.A. Fairbanks
129	67561	Methanol	0.010 tpy	0.010 tpy	-----
130	72435	Methoxychlor	-----	-----	-----
131	74839	Methyl bromide (Bromomethane)	-----	-----	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	0.010 tpy	0.010 tpy	-----
133	78933	Methyl ethyl ketone (2-Butanone)	0.390 tpy	0.390 tpy	-----
134	60344	Methyl hydrazine	-----	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	0.060 tpy	0.060 tpy	-----
137	624839	Methyl isocyanate	-----	-----	-----
138	80626	Methyl methacrylate	-----	-----	-----
139	1634044	Methyl tert butyl ether	-----	-----	-----
140	74873	Methylchloride (Chloromethane)	-----	-----	-----
141	75092	Methylene chloride (Dichloromethane)	0.170 tpy	0.170 tpy	-----
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----	-----
143	N/A	Mineral fibers	-----	-----	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----	-----
145	91203	Naphthalene	0.140 tpy	0.140 tpy	-----
146	N/A	Nickel Compounds	-----	-----	-----
147	98953	Nitrobenzene	-----	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----	-----
151	90040	o-Anisidine	-----	-----	-----
152	95534	o-Toluidine	-----	-----	-----
153	56382	Parathion	-----	-----	-----
154	82688	Pentachloromitrobenzene (Quintobenzene)	-----	-----	-----
155	87865	Pentachlorophenol	-----	-----	-----
156	108952	Phenol	0.380 tpy	0.380 tpy	-----
157	75445	Phosgene	-----	-----	-----
158	7723140	Phosphorus	-----	-----	-----
159	7803512	Phospine	-----	-----	-----
160	85449	Phthalic anhydride	-----	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----	-----
162	N/A	Polycyclic Organic Matter	-----	-----	-----
163	106503	p-Phenylemediamine	-----	-----	-----
164	123386	Propionaldehyde	-----	-----	-----
165	114261	Propoxur (Baygon)	-----	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	0.010 tpy	0.010 tpy	-----
167	75569	Propylene oxide	-----	-----	-----
168	91225	Quinoline	-----	-----	-----
169	106514	Quinone	-----	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----	-----
171	N/A	Selenium Compounds	-----	-----	-----
172	100425	Styrene	0.370 tpy	0.370 tpy	-----
173	96093	Styrene oxide	-----	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	0.090 tpy	0.090 tpy	-----
175	7550450	Titanium tetrachloride	-----	-----	-----
176	108883	Toluene	2.340 tpy	2.340 tpy	-----
177	8001352	Toxaphene (Chlorinated Camphene)	-----	-----	-----
178	79016	Trichloroethylene	0.050 tpy	0.050 tpy	-----
179	121448	Triethylamine	-----	-----	-----
180	1582098	Trifluralin	-----	-----	-----
181	108054	Vinyl acetate	-----	-----	-----
182	593602	Vinyl bromide	-----	-----	-----
183	75014	Vinyl chloride	0.060 tpy	0.060 tpy	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----	-----
185	1330207	Xylenes (isomers and mixture)	1.100 tpy	1.100 tpy	-----
186	95476	Xylenes (isomers and mixture)	-----	-----	-----
187	108383	Xylenes (isomers and mixture)	-----	-----	-----
188	106423	Xylenes (isomers and mixture)	-----	-----	-----
Total HAP Emissions			190.2 tpy	145.2 tpy	47.43 tpy

Table E-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL All Point Sources	Facility No. 1 U.S. Waste Services
No.	CAS No.	Chemical Name		
1	79345	1,1,2,2-Tetrachloroethane	-----	-----
2	79005	1,1,2-Trichloroethane	-----	-----
3	57147	1,1-Dimethyl hydrazine	-----	-----
4	120821	1,2,4-Trichlorobenzene	-----	-----
5	96128	1,2-Dibromo-3-chloropropane	-----	-----
6	122667	1,2-Diphenylhydrazine	-----	-----
7	106887	1,2-Epoxybutane	-----	-----
8	75558	1,2-Propylenimine (2-Methyl aziridine)	-----	-----
9	106990	1,3-Butadiene	-----	-----
10	542756	1,3-Dichloropropene	-----	-----
11	1120714	1,3-Propane sultone	-----	-----
12	106467	1,4-Dichlorobenzene(p)	-----	-----
13	123911	1,4-Dioxane (1,4-Diethyleneoxide)	-----	-----
14	540841	2,2,4-Trimethylpentane	-----	-----
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000 tpy	0.000 tpy
16	95954	2,4,5-Trichlorophenol	-----	-----
17	88062	2,4,6-Trichlorophenol	-----	-----
18	94757	2,4-D, salts and esters	-----	-----
19	51285	2,4-Dinitrophenol	-----	-----
20	121142	2,4-Dinitrotoluene	-----	-----
21	584849	2,4-Toluene diisocyanate	-----	-----
22	95807	2,4-Toluene diamine	-----	-----
23	53963	2-Acetylaminofluorene	-----	-----
24	532274	2-Chloroacetophenone	-----	-----
25	79469	2-Nitropropane	-----	-----
26	91941	3,3-Dichlorobenzidine	-----	-----
27	119904	3,3-Dimethoxybenzidine	-----	-----
28	119937	3,3-Dimethyl benzidine	-----	-----
29	101144	4,4'-Methylene bis (2-chloroaniline)	-----	-----
30	101779	4,4'-Methylenedianiline	-----	-----
31	534521	4,6-Dinitro-o-cresol, and salts	-----	-----
32	92671	4-Aminobiphenyl	-----	-----
33	92933	4-Nitrobiphenyl	-----	-----
34	100027	4-Nitrophenol	-----	-----
35	75070	Acetaldehyde	-----	-----
36	60355	Acetamide	-----	-----
37	75058	Acetonitrile	-----	-----
38	98862	Acetophenone	-----	-----
39	107028	Acrolein	-----	-----
40	79061	Acrylamide	-----	-----
41	79107	Acrylic Acid	-----	-----
42	107131	Acrylonitrile	-----	-----
43	107051	Allyl chloride	-----	-----
44	62533	Aniline	-----	-----
45	N/A	Antimony Compounds	-----	-----
46	N/A	Arsenic Compounds (inorganic including arsine)	0.009 tpy	0.009 tpy
47	1332214	Asbestos	-----	-----
48	71432	Benzene (including benzene from gasoline)	-----	-----
49	92875	Benzidine	-----	-----
50	98077	Benzotrichloride	-----	-----
51	100447	Benzyl chloride	-----	-----
52	N/A	Beryllium Compounds	-----	-----
53	57578	beta-Propiolactone	-----	-----
54	92524	Biphenyl	-----	-----
55	117817	Bis(2-ethylhexyl)phthalate (DEHP)	-----	-----
56	542881	Bis(chloromethyl)ether	-----	-----
57	75252	Bromoform	-----	-----
58	N/A	Cadmium Compounds	0.032 tpy	0.032 tpy
59	156627	Calcium cyanamide	-----	-----
60	133062	Captan	-----	-----
61	63252	Carbaryl	-----	-----
62	75150	Carbon disulfide	-----	-----
63	56235	Carbon tetrachloride	-----	-----
64	463581	Carbonyl sulfide	-----	-----

Table E-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Facility No. 1
No.	CAS No.	Chemical Name	All Point Sources	U.S. Waste Services
65	120809	Catechol	-----	-----
66	133904	Chloramben	-----	-----
67	57749	Chlordane	-----	-----
68	7782505	Chlorine	-----	-----
69	79118	Chloroacetic acid	-----	-----
70	108907	Chlorobenzene	-----	-----
71	510156	Chlorobenzilate	-----	-----
72	67663	Chloroform	-----	-----
73	107302	Chloromethyl methyl ether	-----	-----
74	126998	Chloroprene	-----	-----
75	N/A	Chromium Chompounds	0.043 tpy	0.043 tpy
76	N/A	Cobalt Compounds	-----	-----
77	N/A	Coke Oven Emissions	-----	-----
78	1319773	Cresols/Creshlic acid (isomers and mixture)	-----	-----
79	95487	Cresols/Creshlic acid (isomers and mixture)	-----	-----
80	108394	Cresols/Creshlic acid (isomers and mixture)	-----	-----
81	106445	Cresols/Creshlic acid (isomers and mixture)	-----	-----
82	98828	Cumene	-----	-----
83	N/A	Cyanide Compounds	-----	-----
84	3547044	DDE	-----	-----
85	334883	Diazomethane	-----	-----
86	132649	Dibenzofurans	-----	-----
87	84742	Dibutylphthalate	-----	-----
88	111444	Dichloroethyl ether (Bis[2-chloroethyl]ether)	-----	-----
89	62737	Dichlorvos	-----	-----
90	111422	Diethanolamine	-----	-----
91	64675	Diethyl sulfate	-----	-----
92	60117	Dimethyl aminoazobenzene	-----	-----
93	79447	Dimethyl caramoyl chloride	-----	-----
94	68122	Dimethyl formamide	-----	-----
95	131113	Dimethyl phthalate	-----	-----
96	77781	Dimethyl sulfate	-----	-----
97	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)	-----	-----
98	140885	Ethyl acrylate	-----	-----
99	100414	Ethyl benzene	-----	-----
100	51796	Ethyl carbamate (Urethane)	-----	-----
101	75003	Ethyl chloride (Chloroethane)	-----	-----
102	1006934	Ethylene dibromide (Dibromoethane)	-----	-----
103	107062	Ethylene dichloride (1,2-Dichloroethane)	-----	-----
104	107211	Ethylene glycol	-----	-----
105	151564	Ethylene imine (Axiridine)	-----	-----
106	75218	Ethylene oxide	-----	-----
107	96457	Ethylene thiourea	-----	-----
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	-----	-----
109	5000	Formaldehyde	-----	-----
110	N/A	Glycol ethers	-----	-----
111	76448	Heptachlor	-----	-----
112	118741	Hexachlorobenzene	-----	-----
113	87683	Hexachlorobutadiene	-----	-----
114	77474	Hexachlorocyclopentadiene	-----	-----
115	67721	Hexachloroethane	-----	-----
116	822060	Hexamethylene-1,6 diisocyanate	-----	-----
117	680319	Hexamethylphosphoramide	-----	-----
118	110543	Hexane	-----	-----
119	302012	Hydrazine	-----	-----
120	7647010	Hydrochloric acid	28.208 tpy	28.208 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	-----	-----
122	123319	Hydroquinone	-----	-----
123	78591	Isophorone	-----	-----
124	N/A	Lead Compounds	-----	-----
125	58899	Lindane (all isomers)	-----	-----
126	108316	Maleic anhydride	-----	-----
127	N/A	Manganese Compounds	-----	-----
128	N/A	Mercury Compounds	0.073 tpy	0.073 tpy

Table E-3

**Summary of Estimated 1999 Hazardous Air Pollutant Emissions - Point Sources
City and Borough of Juneau**

Section 112 Hazardous Air Pollutants			Juneau TOTAL	Facility No. 1
No.	CAS No.	Chemical Name	All Point Sources	U.S. Waste Services
129	67561	Methanol	-----	-----
130	72435	Methoxychlor	-----	-----
131	74839	Methyl bromide(Bromomethane)	-----	-----
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	-----	-----
133	78933	Methyl ethyl ketone (2-Butanone)	-----	-----
134	60344	Methyl hydrazine	-----	-----
135	74884	Methyl iodide (Iodomethane)	-----	-----
136	108101	Methyl isobutyl ketone (Hexone)	-----	-----
137	624839	Methyl isocyanate	-----	-----
138	80626	Methyl methacrylate	-----	-----
139	1634044	Methyl tert butyl ether	-----	-----
140	74873	Methylchloride (Chloromethane)	-----	-----
141	75092	Methylene chloride(Dichloromethane)	-----	-----
142	101688	Methylene diphenyl diisocyanate (MDI)	-----	-----
143	N/A	Mineral fibers	-----	-----
144	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)	-----	-----
145	91203	Naphthalene	-----	-----
146	N/A	Nickel Compounds	0.072 tpy	0.072 tpy
147	98953	Nitrobenzene	-----	-----
148	62759	N-Nitrosodimethylamine	-----	-----
149	59892	N-Nitrosomorpholine	-----	-----
150	684935	N-Nitroso-N-methylurea	-----	-----
151	90040	o-Anisidine	-----	-----
152	95534	o-Toluidine	-----	-----
153	56382	Parathion	-----	-----
154	82688	Pentachloromicrobenzene (Quintobenzene)	-----	-----
155	87865	Pentachlorophenol	-----	-----
156	108952	Phenol	-----	-----
157	75445	Phosgene	-----	-----
158	7723140	Phosphorus	-----	-----
159	7803512	Phospine	-----	-----
160	85449	Phthalic anhydride	-----	-----
161	1336363	Polychlorinated biphenyls (Aroclors)	-----	-----
162	N/A	Polycyclic Organic Matter	-----	-----
163	106503	p-Phenylemediamine	-----	-----
164	123386	Propionaldehyde	-----	-----
165	114261	Propoxur(Baygon)	-----	-----
166	78875	Propylene dichloride (1,2-Dichloropropane)	-----	-----
167	75569	Propylene oxide	-----	-----
168	91225	Quinoline	-----	-----
169	106514	Quinone	-----	-----
170	N/A	Radionuclides (including radon)	-----	-----
171	N/A	Selenium Compounds	-----	-----
172	100425	Styrene	-----	-----
173	96093	Styrene oxide	-----	-----
174	127184	Tetrachloroethylene (Perchloroethylene)	-----	-----
175	7550450	Titanium tetrachloride	-----	-----
176	108883	Toluene	-----	-----
177	8001352	Toxaphene (chlorinated camphene)	-----	-----
178	79016	Trichloroethylene	-----	-----
179	121448	Triethylamine	-----	-----
180	1582098	Trifluralin	-----	-----
181	108054	Vinyl acetate	-----	-----
182	593602	Vinyl bromide	-----	-----
183	75014	Vinyl chloride	-----	-----
184	75354	Vinylidene chloride (1,1-Dichloroethylene)	-----	-----
185	1330207	Xylenes (isomers and mixture)	-----	-----
186	95476	Xylenes (isomers and mixture)	-----	-----
187	108383	Xylenes (isomers and mixture)	-----	-----
188	106423	Xylenes (isomers and mixture)	-----	-----
Total HAP Emissions			28.4 tpy	28.4 tpy

Entech - Anchorage

Activity Data Input: N/A
 Activity Period/Year: - Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
45	N/A	Antimony Compounds		1.87E-02 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)		3.54E-04 tpy
52	N/A	Beryllium Compounds		4.73E-03 tpy
58	N/A	Cadmium Compounds		8.00E-03 tpy
68	7782505	Chlorine		1.53E-01 tpy
75	N/A	Chromium Compounds		1.13E-03 tpy
120	7647010	Hydrochloric acid		4.89E+01 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)		2.18E-01 tpy
124	N/A	Lead Compounds		1.06E-01 tpy
127	N/A	Manganese Compounds		8.29E-04 tpy
128	N/A	Mercury Compounds		1.56E-01 tpy
146	N/A	Nickel Compounds		8.68E-04 tpy
162	N/A	Polycyclic Organic Matter		2.03E-04 tpy
Total HAP Emissions				49.6 tpy

Notes/Comments:

1. Values shown are total potential emissions from 3/25/98 application

Fort Wainwright Army Base

Activity Data Input: N/A
 Activity Period/Year: 1997 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
No.	CAS No.	Chemical Name	Emission Factor	Estimated Emissions
1	79345	1,1,2,2-Tetrachloroethane	N/A	3.00E-02 tpy
42	107131	Acrylonitrile	N/A	5.00E-02 tpy
46	N/A	Arsenic Compounds (inorganic including arsine)	N/A	1.23E+00 tpy
48	71432	Benzene (including benzene from gasoline)	N/A	3.00E-02 tpy
58	N/A	Cadmium Compounds	N/A	1.00E-01 tpy
62	75150	Carbon disulfide	N/A	1.00E-02 tpy
63	56235	Carbon tetrachloride	N/A	1.00E-02 tpy
64	463581	Carbonyl sulfide	N/A	1.00E-02 tpy
70	108907	Chlorobenzene	N/A	3.50E-01 tpy
72	67663	Chloroform	N/A	1.00E-02 tpy
75	N/A	Chromium Compounds	N/A	1.00E-02 tpy
76	N/A	Cobalt Compounds	N/A	1.00E-02 tpy
82	98828	Cumene	N/A	3.80E-01 tpy
99	100414	Ethyl benzene	N/A	5.20E-01 tpy
101	75003	Ethyl chloride (Chloroethane)	N/A	1.00E-02 tpy
103	107062	Ethylene dichloride (1,2-Dichloroethane)	N/A	1.00E-02 tpy
108	75343	Ethylidene dichloride (1,1-Dichloroethane)	N/A	3.00E-02 tpy
109	5000	Formaldehyde	N/A	2.20E-01 tpy
116	822060	Hexamethylene-1,6 diisocyanate	N/A	1.00E-02 tpy
118	110543	Hexane	N/A	7.10E-01 tpy
120	7647010	Hydrochloric acid	N/A	1.18E+02 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)	N/A	1.48E+01 tpy
124	N/A	Lead Compounds	N/A	8.00E-01 tpy
128	N/A	Mercury Compounds	N/A	1.00E-02 tpy
129	67561	Methanol	N/A	1.00E-02 tpy
132	71556	Methyl chloroform (1,1,1-Trichloroethane)	N/A	1.00E-02 tpy
133	78933	Methyl ethyl ketone (2-Butanone)	N/A	3.90E-01 tpy
136	108101	Methyl isobutyl ketone (Hexone)	N/A	6.00E-02 tpy
141	75092	Methylene chloride(Dichloromethane)	N/A	1.70E-01 tpy
145	91203	Naphthalene	N/A	1.40E-01 tpy
156	108952	Phenol	N/A	3.80E-01 tpy
166	78875	Propylene dichloride (1,2-Dichloropropane)	N/A	1.00E-02 tpy
172	100425	Styrene	N/A	3.70E-01 tpy
174	127184	Tetrachloroethylene (Perchloroethylene)	N/A	9.00E-02 tpy
176	108883	Toluene	N/A	2.34E+00 tpy
178	79016	Trichloroethylene	N/A	5.00E-02 tpy
183	75014	Vinyl chloride	N/A	6.00E-02 tpy
185	1330207	Xylenes (isomers and mixture)	N/A	1.10E+00 tpy

Total HAP Emissions	142.7 tpy
Insignificant Sources	2.51 tpy
Total HAP Emissions	145.2 tpy

Notes/Comments:

1. Reference: Ft Wain 1997 Title V Application
2. Values shown are total base-wide actual 1997 emissions.
3. Total also includes 2.51 tpy from "insignificant sources" per Title V application.

University of Alaska - Fairbanks

Activity Data Input: N/A
Activity Period/Year: 1996 Year

Section 112 Hazardous Air Pollutants			Source Category	Emission Calculations
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
48	71432	Benzene(including benzene from gasoline)		2.20E-01 tpy
109	5000	Formaldehyde		2.00E-01 tpy
120	7647010	Hydrochloric acid		4.18E+01 tpy
121	7664393	Hydrogen fluoride (Hydrofluoric acid)		5.21E+00 tpy
			Total HAP Emissions	47.4 tpy

Notes/Comments:

1. Reference: UA Fairbanks Title V application
2. Values shown are campus wide as reported in the application
3. An additional 1.87 tpy of other HAPs is not included above because it was not speciated.

USA Waste Services - Juneau

Starved Air Incinerator

Activity Data Input: 26,240 tons
 Activity Period/Year: 1999/2000 Year

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
15	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	2.94E-06 lb/ton	3.86E-05 tpy
46	N/A	Arsenic Compounds (inorganic includ	6.69E-04 lb/ton	8.78E-03 tpy
58	N/A	Cadmium Compouns	2.41E-03 lb/ton	3.16E-02 tpy
75	N/A	Chromium Chompounds	3.31E-03 lb/ton	4.34E-02 tpy
120	7647010	Hydrochloric acid	2.15E+00 lb/ton	2.82E+01 tpy
128	N/A	Mercury Compounds	5.60E-03 lb/ton	7.35E-02 tpy
146	N/A	Nickel Compounds	5.52E-03 lb/ton	7.24E-02 tpy
Total HAP Emissions				28.438 tpy

Notes/Comments:

1. Reference: AP-42, Tables 2.1-9
2. Activity data from 1999/2000 FOR
3. 2 through 4 Qtr 1999 and 1 Qtr 2000,

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	Polycyclic 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:

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

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

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.

Area Source Category	Page
Airline Support	F-3-2
Asphalt Paving	F-3-3
Consumer Products	F-3-4
Diesel-Fired Boilers and Heaters	F-3-5
Diesel Engines (> 600 HP)	F-3-6
Diesel Engines (< 600 HP)	F-3-7
Diesel Turbine Generators	F-3-8
Dry Cleaners	F-3-9
Gasoline Service Stations	F-3-10
Natural Gas-Fired Asphalt Plants	F-3-11
Natural Gas-Fired Boilers and Heaters	F-3-12
Natural Gas-Fired Turbines	F-3-13
Oil-Fired Asphalt Plants	F-3-14
Open Burning of Diesel	F-3-15
Residential and Commercial Natural Gas Combustion	F-3-16
Residential Fireplaces	F-3-17
Residential and Commercial Fuel Oil Combustion	F-3-18
Residual Oil-Fired Boilers	F-3-19
Sewage Sludge Incinerators	F-3-20
Starved-Air Incinerators	F-3-21
Structural Fires	F-3-22
Surface Coating (Painting)	F-3-23
Used Oil Combustion	F-3-24
Wildfires	F-3-25
Woodstoves	F-3-26

Airline Support

Starved Air Incinerators
Activity Data Input: tons

NG-Fired Boilers/Heaters
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	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>	
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 Compounds	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 Compounds	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	Polycyclic 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
Activity Data Input: tons

Oil-Fired Drum Asphalt Plant
Activity Data Input: tons

Section 112 Hazardous Air Pollutants			Source Category Emission Calculations		Source Category Emission Calculations		Total - All Categories
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>	<u>Estimated Emissions</u>
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		
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Total - All 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				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						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	7.43E-06 lb/yr/cap 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	
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	
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	
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	
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	
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	
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	3.16E-01 lb/yr/cap	0.00E+00 tons	2.46E-06 lb/yr/cap 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				0.00E+00 tons	
181	108054	Vinyl acetate						4.94E-08 lb/yr/cap	0.00E+00 tons	9.76E-03 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			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	
		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:

- 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 Compounds	11 lb/10 ¹² Btu	0.000E+00 tons
75	N/A	Chromium Compounds	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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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	Polycyclic 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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			0.00E+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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	4.20E-06 lb/MMBtu	0.00E+00 tons
75	N/A	Chromium Compounds	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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	8.40E-07 lb/ton	0.00E+00 tons
75	N/A	Chromium Compounds	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	Polycyclic 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:

- 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 Compounds	1.10E-03 lb/MMscf	0.00E+00 tons
75	N/A	Chromium Compounds	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	Polycyclic 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:

- 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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	Polycyclic 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	4.40E-07 lb/ton	0.00E+00 tons
75	N/A	Chromium Compounds	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	Polycyclic 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	11 lb/10 ¹² Btu	0.000E+00 tons
75	N/A	Chromium Compounds	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 Compounds	1.10E-03 lb/MMscf	0.00E+00 tons
75	N/A	Chromium Compounds	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:

- 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
162	N/A	Polycyclic 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	11 lb/10 ¹² Btu	0.000E+00 tons
75	N/A	Chromium Compounds	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 Compounds	3.98E-04 lb/Mgal	0.00E+00 tons
75	N/A	Chromium Compounds	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	Polycyclic 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:

- 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 Compounds	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 diisocyanate (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	Polycyclic 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	2.41E-03 lb/ton	0.00E+00 tons
75	N/A	Chromium Compounds	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.

Structural Fires

Activity Data Input: total fires

Section 112 Hazardous Air Pollutants

<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Source Category</u>	<u>Emission Calculations</u>
			<u>Emission Factor</u>	<u>Estimated Emissions</u>
39	107028	Acrolein		2.55E-05 lb/dscf 0.00E+00 tons
83	N/A	Cyanide Compounds		2.05E-04 lb/dscf 0.00E+00 tons
109	5000	Formaldehyde		5.91E-06 lb/dscf 0.00E+00 tons
120	7647010	Hydrochloric acid		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 burned/fire

Sample calculation for volume of gas generated per amount burned:

$$\begin{aligned} & \text{Volume Gas Generated (dscf) / Material Burned (ton)} \\ & = \text{F-Factor (dscf/MMBtu)} * \text{HHV (Btu/lb)} * (1/2000) * (1/1e6) \\ & = 173,102 \text{ dscf / ton burned} \end{aligned}$$

Sample calculation for emission rate of acrolein produced per amount burned:

$$\begin{aligned} & \text{Weight of Gas Generated (lb) / Material Burned (ton)} \\ & = \text{Emission Factor (lb/dscf)} * \text{Volume Gas Generated Per Amount Burned (dscf/ton)} \\ & = 4.41 \text{ lb Acrolein / ton burned} \end{aligned}$$

Sample calculation for emission estimates:

$$\begin{aligned} & = \text{Number of Fires} * \text{Fuel Loading Factor (tons of material burned/fire)} * \text{Emission Rate of Acrolein (lb/ton burned)} \\ & = 0.00E+00 \text{ tons} \end{aligned}$$

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 Categories
No.	CAS No.	Chemical Name	Factor	Emissions	Factor	Emissions	Factor	Emissions	Factor	Emissions	Estimated Emission
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:

- Reference: AP-42, Section 4.2.
- SPECIATE, Surface Coating Operations, Coating Application, Water-based Paint.

Notes/Comments:

- Reference: AP-42, Section 4.2.
- SPECIATE, Surface Coating Operations, Solvent-based Paint.

Notes/Comments:

- Reference: AP-42, Section 4.2.
- SPECIATE, Surface Coating Operations, Industrial.

Notes/Comments:

- Reference: AP-42, Section 4.2.
- SPECIATE, Surface Coating Operations, Industrial.

Notes on architectural paint calculations:

- Solvent is assumed to be 60% (by volume) of the paint/coatings.
- Solvent densities are assumed to be 7.36 lb/gallon.
- Architectural paints are assumed to be 70% water-based (low-solvent) and 30% solvent-based.
- Water-based paints are assumed to emit 25% of the VOCs in solvent-based paints.
- 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:

- Product coatings are assumed to be 30% water-based (low-solvent) and 70% solvent-based.
- 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	
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>	<u>Emission Factor</u>	<u>Estimated Emissions</u>
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 Compounds	2.90E-04 lb/kgal	0.00E+00 tons
75	N/A	Chromium Compounds	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

Activity Data Input: **Wildfires** acres

Section 112 Hazardous Air Pollutants		
<u>No.</u>	<u>CAS No.</u>	<u>Chemical Name</u>
9	106990	1,3-Butadiene

Source Category Emission Calculations	
<u>Emission Factor</u>	<u>Estimated Emissions</u>
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
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