

SECTION 3

STATIONARY AREA SOURCES

Area sources include all sources which are too small or too numerous to be treated individually as point sources. The majority of source categories considered for inclusion in this inventory were identified from Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone Volume I: General Guidance for Stationary Sources (EPA-450/4-91-016)³. The stationary area source categories that will be addressed in this inventory are shown in Table 3-1. Previous inventories have demonstrated that the contribution of these source categories is significant enough to warrant inclusion in this periodic inventory. Mobile sources (both non-road and highway) will be discussed in Sections 4 and 5, respectively.

The following source categories were not included in the inventory: slash burning, frost control, forest fires, open refuse burning, electric utility fuel combustion, charcoal grilling, marine vessels, and aircraft engine testing. These categories were excluded from the inventory because the activities did not occur within the CO non-attainment area (NAA), the District has regulations which prohibit such activities within the non-attainment area, or the emissions were determined to be negligible during the CO season.

One of two approaches was used to calculate area source emissions for the Truckee Meadows:

- commodity consumption-related emission factors
- level-of-activity emission factors

The methodology used for each stationary area source is shown in Table 3-1. The emissions from most area sources were estimated using the emission factors from AP-42⁴. Emissions from area sources which are not addressed in AP-42 were estimated using factors in Methods for Assessing Area Source Emissions in California (State of California Air Resources Board)⁵. The reference document used to determine emission factors for each specific source is also listed in Table 3-1.

The activity/commodity level data for all point sources within the District being considered aggregately as stationary area sources were taken from the District's Permitting database. The Permitting database contains all point sources that emit at least two (2) pounds/day of the criteria pollutants (aggregate). Activity is reported to the District on an annual basis as part of the permit renewal process. Activity data for area sources that are not contained within the permitting database, such as fire data, were obtained from local agencies. Table 3-2 lists the sources of the activity/commodity data that was used to estimate emissions.

The control efficiencies applied to stationary area source data were determined from the permitting database during permit renewal. Emission control efficiency data for a specific source were derived from either source test data, mass balance calculations, engineering judgment, or AP-42. Details of annual emission calculations are either contained directly in the text, in an Appendix, or are illustrated by examples following this section's main text.

**TABLE 3-1
STATIONARY AREA SOURCE CATEGORIES**

Source Category	Emission Methodology^a	Emission Factor Source
<u>Stationary Source Fuel Combustion</u>		
Industrial/Commercial	1	AP-42
Residential	1	AP-42
<u>Waste Disposal, Treatment, and Recovery</u>		
Industrial/Commercial Incineration	2	AP-42
Pathological Incineration	2	AP-42
Wastewater Treatment Plant	2	AP-42
<u>Residential Wood Combustion</u>		
Fireplaces	1	AP-42
Woodstoves	1	AP-42
Pellet Stoves	1	AP-42
<u>Miscellaneous Area Sources</u>		
Asphalt Processes	2	AP-42
Wildfires	2	AP-42
Structure Fires	2	MAASEC
Automobile Fires	2	MAASEC
Fire Fighting Training	2	AP-42
Prescribed Burning	2	AP-42
Refuse Burning	2	AP-42
Commercial Charbroiling	2	AP-42

^a 1 - commodity consumption-related emission factors
2 - level-of-activity emission factors

NOTE: The abbreviations used above refer to the following reference documents:

AP-42: Compilation of Air Pollutant Emission Factors (AP-42) Volume I, U.S. Environmental Protection Agency, Fifth Edition, 1995.⁴

MAASEC: Methods for Assessing Area Source Emissions in California, State of California Air Resources Board, September 1991.⁵

**TABLE 3-2
ACTIVITY/COMMODITY DATA SOURCES**

Source Category	Activity Data Source
Industrial/Commercial Fuel Combustion	Sierra Pacific Power Company, Fuel Oil Distributors
Residential Fuel Combustion	Sierra Pacific Power Company, Fuel Oil Distributors, LPG Distributors
Industrial Incineration	AQMD Permitting Database
Pathological Incineration	AQMD Permitting Database
Wastewater Treatment	AQMD Permitting Database
Residential Wood Combustion	Local Wood Use Surveys
Asphalt Processes	AQMD Permitting Database
Wildfires	Fire Control Agencies
Structure Fires	Fire Control Agencies
Automobile Fires	Fire Control Agencies
Fire Fighting Training	Fire Control Agencies
Prescribed Burning	Fire Control Agencies
Refuse Burning	Fire Control Agencies
Commercial Charbroiling	AQMD Permitting Database

The examples demonstrate how the permitting database calculated the emissions for each type of permitted source. Following the examples for each source category is a list of the permit numbers from which the emissions were derived and then added together to obtain the total emissions for the category. Appendix A.1 contains the list of all the general permitted sources within Washoe County. Any permit listed in Appendix A.1, which is not included in an area source category, was omitted because the source did not have any CO emissions, was outside of the CO NAA, or the CO emissions were excluded to avoid double counting the emissions.

Once annual emissions were determined, they were apportioned to the peak CO season using the seasonal adjustment factors (SAF) listed in the EPA Procedures document³. Where an SAF was not listed for a given source category, it was calculated using the following equation⁵:

$$SAF = \frac{(Peak\ CO\ Season\ Activity)(12\ months)}{(Annual\ Activity)(Peak\ CO\ Season\ months = 3)}$$

Daily emissions can then be determined using the calculated SAF and the equation below:

$$Emission / Typical\ Day\ (lbs / day) = \frac{(Annual\ Emissions\ (lbs / year)) * SAF}{(\# Activity\ Days\ per\ week) * (52\ weeks\ per\ year)}$$

Table 3-3 summarizes the SAF and number of activity days used for each source category. The table also indicates whether the SAF listed was obtained from the reference document or derived using the above equations.

Stationary area sources were responsible for approximately 2,397 tons/year of carbon monoxide in 2002. Peak season emissions for these sources totaled 35,470 lbs/day. Table 3-4 provides a summary of stationary area source emissions. Figure 3-1 shows the relative contribution of each source category to these totals. There is no significant difference in relative source contribution between annual emissions and peak season emissions. The majority of CO emissions from stationary area sources -- 76%, are the result of residential wood/solid fuel combustion. The remainder of this section will describe in greater detail each area source category.

TABLE 3-3
ESTIMATION PROCEDURES FOR STATIONARY AREA SOURCES

SOURCE CATEGORY	SAF Source	SAF	Weekly Activity (days/week)
<u>Stationary Source Fuel Combustion</u>			
Industrial/Commercial			
Fuel Oil	CALC	1.04	6
LPG	CALC	1.04	6
Natural Gas	CALC	1.04	6
Residential			
Fuel Oil	CALC	1.1	7
LPG	CALC	1.1	7
Natural Gas	CALC	1.1	7
<u>Waste Disposal, Treatment, and Recovery</u>			
Industrial/Commercial Incineration	REF	Uniform	7
Pathological Incineration	REF	Uniform	7
Wastewater Treatment	REF	Uniform	7
<u>Residential Wood Combustion</u>			
Fireplaces	CALC	3.2	7
Woodstoves	CALC	3.2	7
Pellet Stoves	CALC	3.2	7
<u>Miscellaneous Area Sources</u>			
Asphalt Processes	CALC	0	6
Wildfires	CALC	Table 3-9	7
Structure Fires	CALC	Table 3-10	7
Automobile Fires	CALC	Table 3-11	7
Fire Fighting Training	CALC	Table 3-12	7
Prescribed Burning	CALC	Table 3-13	7
Refuse Burning	CALC	Table 3-14	7
Commercial Charbroiling	CALC	Uniform	7

Note: The abbreviations used above refer to the following references:

REF: Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone - Volume I, Table 5.8-1, page 5-18³.

CALC: These values were calculated using the equations appearing in the text.

**TABLE 3-4
CO NAA
STATIONARY AREA SOURCE EMISSIONS SUMMARY**

Source Category	CO Emissions	
	tons/yr	lbs/day
Stationary Fuel Combustion Sources (External and Internal)		
Industrial/Commercial Fuel Combustion	226	1,881
Residential Fuel Combustion	136	1,040
Category Total	362	2,920
Waste Disposal/Treatment/Recovery		
Commercial/Industrial Incineration	0.01	0
Pathological Incineration	1	7
Wastewater Treatment	2	11
Category Total	3	18
Residential Wood Combustion		
Firesplaces	1,259	22,144
Woodstoves/Inserts	527	9,257
Pellet Stoves	29	517
Category Total	1,815	31,918
Miscellaneous Area Sources		
Asphalt Processes	45	0
Wildfires	74	412
Structure Fires	53	176
Automobile Fires	3	13
Firefighting Training	0	0
Prescribed Burning	0	3
Refuse Fires	2	10
Commerical Charbroiling	38	211
Category Total	216	826
Total - All Stationary Area Sources	2,397	35,682

Note: The numbers do not add up due to rounding.

2002 Annual Emissions for CO NAA Stationary Area Sources (tons/year)

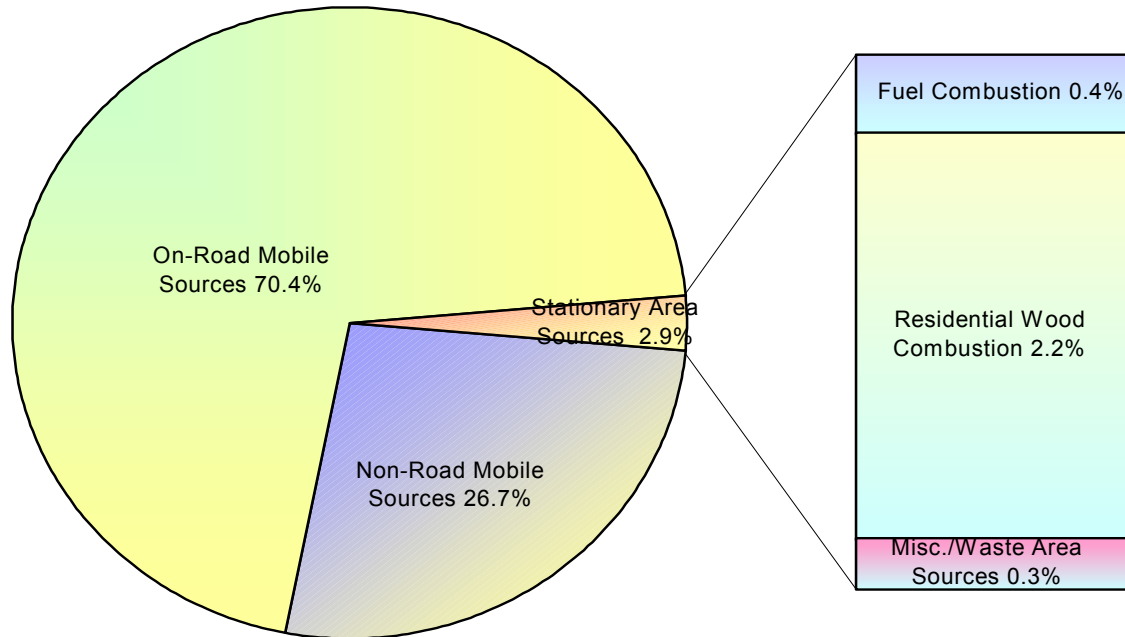


Figure 3-1

STATIONARY SOURCE FUEL COMBUSTION

Carbon monoxide emissions for stationary source fuel combustion within the NAA totaled 362 tons/year in 2002. This accounts for approximately 15% of emissions from stationary area sources. Emissions for this source category were subdivided into two classes:

- Industrial/Commercial
- Residential

Sixty-two percent of the emissions were from industrial/commercial units while the remaining 38% came from residential units.

Natural gas, fuel oil, and LPG consumption were determined through questionnaires sent to the local utility and each fuel distributor in the area. The local utility reported total natural gas sales within Reno and Sparks as 10.97×10^9 scf. This number was used for the NAA. Total fuel oil sales within the NAA was estimated at 14,744,901 gallons since data collected from the distributors was incomplete. The estimated sales was calculated based on the percent population increase as determined by the Washoe County Department of Comprehensive Planning Consensus Forecast from 1996 to 2015. Likewise, since incomplete data of total LPG sales within the NAA was available from the distributors, an estimate of 4,685,469 gallons was calculated based on the same percent population increase as stated in this paragraph above.

Emissions for the industrial/commercial class were determined from consumption data from the local utility and distributors even though the AQMD permitting database contains data on many of those sources. It was decided that since the database only track sources with emissions greater than 2 lbs/day, many of the small commercial units would be missed. Therefore, in order to avoid double counting, any permit in AQMD's permitting database that covered commercial external combustion was excluded. A few of the permitted industrial external combustion units are included in the county-wide total because they use fuel oil number 5 or 6 and staff did not get consumption data for those fuels because they cannot be burned within the PM₁₀/CO NAA.

AP-42 emission factors⁴ were used to determine emissions -- see Appendix B.5 for calculation data sheets and a list of the distributors that responded.

Table 3-5 summarizes the fuel combustion data and emissions for this source category in the PM₁₀/CO NAA, and for comparisons, gives the entire county CO emissions. The emissions listed in the table are given as both annual emissions (tons/year) and typical daily peak season emissions (lbs/day). The peak season emissions were determined using the equations listed at the beginning of this Section and the seasonal adjustment factors and number of activity days listed in Table 3-3.

**TABLE 3-5
SUMMARY OF FUEL COMBUSTION EMISSIONS**

Source Type	CO NAA Activity Level	Unit	CO Emissions		
			CO NAA (lbs/CO day)	Annual CO NAA (tpy)	Annual County (tpy)
Industrial/Commercial					
Natural Gas	4,968,138,193	scf	1,766	209	251
Distillate Fuel Oil	5,755,552	gal	96	14	17
LPG	1,784,557	gal	19	3	7
Subtotal			1,881	226	275
Residential					
Natural Gas	5,530,581,374	scf	887	111	163
Distillate Fuel Oil	8,989,348	gal	136	22	31
LPG	2,900,912	gal	17	3	7
Subtotal			1,040	136	200
Total	--	--	2,920	362	475

Note: The numbers do not add up due to rounding.

WASTE DISPOSAL, TREATMENT, AND RECOVERY

Carbon monoxide emissions for this source category were approximately 3 tons/year in 2002. This was less than 1% of total carbon monoxide emissions from stationary area sources in the NAA. Emissions for this category were subdivided into three classes:

- Industrial/Commercial Incineration
- Pathological Incineration
- Wastewater Treatment

The emissions from all sources in this category were determined from the AQMD permitting database. Emissions were calculated within the database using AP-42 emission factors⁴, and activity data reported by each source during the annual permit renewal process. In 2002, there were thirteen (13) sources within the NAA in this category.

Peak season emissions were approximately 18 lbs/day. These typical daily emission levels were determined using the seasonal adjustment factors and number of activity days listed in Table 3-3. See example 1 for calculations and list of permit numbers in this source category.

RESIDENTIAL WOOD/SOLID FUEL COMBUSTION

Within the NAA CO emissions from this source category were estimated at 1,815 tons/year. This accounts for 76% of all carbon monoxide emissions from stationary area sources. Emission sources in this category were subdivided into three classes:

- Fireplaces
- Woodstoves
- Pellet Stoves

The relative contribution of each source class is shown in Figure 3-2. Emissions were determined using averaged activity data compiled during four studies conducted by the Washoe County Air Quality Management Division (AQMD) between 1993 and 2002. Appendix B.9 contains a copy of the latest 2001-2002 survey results and a report the AQMD completed comparing the surveys and their results. The report explains in greater detail that the AQMD hired a local marketing and survey company to administer the survey on a random sample of households within Washoe County. The four (4) surveys provided the average activity data listed in Table 3-6.

**TABLE 3-6
RESIDENTIAL WOOD/SOLID FUEL COMBUSTION ACTIVITY DATA**

Type of Device	Average Cords or Tons used per Device		Total # of Devices		# of Devices Used		Total Amount of Cords or Tons used	
	CO NAA	County	CO NAA	County	CO NAA	County	CO NAA	County
Fireplace	0.6	0.72	30,437	35,292	12,435	14,419	7,461	10,382
Woodstove/Insert								
Certified	1.47	1.66	2,606	4,974	1,599	3,553	2,351	5,898
Uncertified	1.47	1.66	2,606	4,974	1,599	3,553	2,351	5,898
WOOD TOTAL							12,162	22,178
Pellet Stoves	0.84	1.06	2,013	3,671	1,776	3,198	1,492	3,390

Using 2,673 lbs per cord as the average weight for wood and the emission factors from AP-42, 5th Edition, the emissions are estimated in Table 3-7.

**TABLE 3-7
SUMMARY OF CO EMISSIONS FOR RESIDENTIAL WOOD/SOLID FUEL COMBUSTION**

Type of Device	Avg Weight of Wood (lb/cord)*	Total tons of wood or pellets used per year		CO Emission Factor (lbs/ton)	CO Emissions (tons/year)	
		CO NAA	County		CO NAA	County
Fireplace	2,673	9,971.6	13,875.1	252.6	1,259.4	1,752.4
Woodstove/Insert						
Certified	2,673	3,141.5	7,882.7	104.4	164.0	411.5
Uncertified	2,673	3,141.5	7,882.7	230.8	362.5	909.7
Pellet Stoves	-	1,492	3,390	39.4	29.4	66.8
TOTAL					1,815	3,140

2002 Annual Emissions Stationary Area Sources Wood/Solid Fuel Combustion



Figure 3-2

The seasonal adjustment factor was calculated assuming 80% of the annual activity for this source category occurs during the peak CO season. The number of days a week each device type was used was derived from data collected from the 2001-2002 AQMD survey (see Appendix B.9). Table 3-8 contains the weekly activity for each type of device and then summarizes the peak season emissions for the NAA using the equation shown in the beginning of this section and the SAF in Table 3-3.

**TABLE 3-8
RESIDENTIAL WOOD/SOLID FUEL COMBUSTION PEAK SEASON EMISSIONS**

Type of Device	Weekly Activity (during winter) (days/week)	NAA Peak CO Season Emissions (lbs/day)
Fireplaces	7	22,144
Woodstove/Inserts	7	9,257
Pellet Stoves	7	517
TOTAL	--	31,918

Note: assumed winter season is 13 weeks

MISCELLANEOUS AREA SOURCES

Carbon monoxide emissions within the NAA for this source category totaled 216 tons/year in 2002. This is approximately 9% of carbon monoxide emissions from stationary area sources. Emissions for this source category were subdivided into eight classes:

- Asphalt Processes
- Wildfires
- Structure Fires
- Automobile Fires
- Fire Fighting Training
- Prescribed Burning
- Refuse Fires
- Commercial Charbroiling

Each source class will be discussed individually below.

ASPHALT PROCESSES

Emissions from asphalt processes totaled 45 tons/year in 2002. Emissions were determined from the permitting database maintained by the AQMD. Five Asphalt processing facilities were permitted in Washoe County in 2002. Only three of these sources were located within the Truckee Meadows NAA. The emissions were calculated by the Permitting Database using AP-42 emission factors⁴ and activity data reported during the annual permit renewal process. See example 2 for calculations and a list of permits included in this source category.

The peak season emissions were determined using a seasonal adjustment factor calculated from the equation presented earlier in this section. Because ambient temperatures during the peak CO season were below the acceptable operating range for the facilities, one hundred percent of the activity was assumed to occur outside of the peak CO season.

WILDFIRES

Emissions of CO from this source totaled 74 tons/year in 2002. Emissions were determined from activity data reported by each of the two fire control agencies functioning within the Truckee Meadows NAA: City of Reno Fire Department and City of Sparks Fire Department. The number of wildfires reported by each agency is given in Table 3-9. The typical open area fire in the Truckee Meadows covers an approximate area of 0.5 acres and is fueled primarily by grass, brush, rubbish, and weeds. From AP-42, the average fuel loading was estimated to be 8 tons/acre. An emission factor of 140 lbs/ton burned, also from AP-42, was used to calculate the total annual emissions. See Appendix B.7 for calculations.

The typical peak season emissions were determined to be approximately 412 lbs/day. The daily emissions were determined using the seasonal adjustment factors listed in Table 3-9. The SAFs were calculated from the actual number of fires reported during the peak CO season.

**TABLE 3-9
WILDFIRE ACTIVITY DATA REPORTED FOR 2002**

Fire Agency	Number of Fires	SAF
City of Reno Fire Department	215	1.21
City of Sparks Fire Department	50	0.16

STRUCTURE FIRES

Emissions for this source totaled 53 tons/year. Again, emissions were determined from activity data reported by the three fire control agencies. The number of structure fires reported by each agency is given in Table 3-10. An emission factor of 327.6 lbs/fire, from MAASEC⁵, was used to calculate the total annual emissions. See Appendix B.7 for calculations.

**TABLE 3-10
STRUCTURE FIRE ACTIVITY DATA REPORTED FOR 2002**

Fire Agency	Number of Fires	SAF
City of Reno Fire Department	243	0.36
City of Sparks Fire Department	80	1.35

The typical peak season emissions were determined to be approximately 176 lbs/day. The level of daily emissions was determined using the seasonal adjustment factors listed in Table 3-10. The SAFs were calculated from the actual number of fires reported for the peak CO season.

AUTOMOBILE FIRES

Emissions from automobile fires totaled 3 tons/year. The number of automobile fires reported by each fire control agency is given below in Table 3-11. Of the total responses reported by the Truckee Meadows Fire Protection District, only 20% were assumed to be within the NAA. An emission factor of 21.25 lbs/fire, from MAASEC⁵, was used to calculate the total annual emissions. See Appendix B.7 for calculations.

The typical peak season emissions were determined to be approximately 13 lbs/day. The level of daily emissions were determined using the seasonal adjustment factors listed in Table 3-11. The SAFs were calculated from the actual number of fires reported for the peak CO season.

**TABLE 3-11
AUTOMOBILE FIRE ACTIVITY DATA REPORTED FOR 2002**

Fire Agency	Number of Fires	SAF
City of Reno Fire Department	234	0.84
City of Sparks Fire Department	68	0.41

FIRE FIGHTING TRAINING

The Cities of Reno and Sparks did not have any training fires in 2002. All fire fighting training were done at the University of Nevada, Reno’s Fire Training Academy within Washoe County. This facility is located outside the CO NAA; therefore, it is not included in this inventory; however, it is included as a point source in the Ozone Inventory.

The CO emissions for fire training totaled 0 ton/yr in 2002. The typical peak season emissions were 0 lbs/day as well.

OTHER/PREScribed BURNING

Emissions from prescribed burning totaled 0 ton/year. Emissions were determined from activity data reported by each of the two fire control agencies. The number of burn permits issued by each agency is given below in Table 3-12. Material burned was assumed to be one ton for each permit issued. See Appendix B.7 for calculations and emission factors used.

No permits may be issued during the winter season, emissions from burn permits alone during the peak CO season are estimated to be zero. However, included in this category are other or unauthorized burns so the peak season emissions from those fires are estimated at 3 lbs/day.

**TABLE 3-12
PREScribed BURNING ACTIVITY DATA REPORTED FOR 2002**

Fire Agency	Number of Permits	SAF
City of Reno Fire Department	0	0
City of Sparks Fire Department	3	1.33

REFUSE FIRES

Emissions from refuse fires totaled 2 tons/year. The number of refuse fires reported by each fire control agency is given below in Table 3-13.

**TABLE 3-13
REFUSE FIRE ACTIVITY DATA REPORTED FOR 2002**

Fire Agency	Number of Permits	SAF
City of Reno Fire Department	59	0.61
City of Sparks Fire Department	31	1.55

The typical peak season emissions were determined to be approximately 10 lbs/day. The level of daily emissions was determined using the seasonal adjustment factors listed in Table 3-13. The SAFs were calculated from the actual number of fires reported for the peak CO season.

COMMERCIAL CHARBROILING

Carbon monoxide emissions from this source category totaled 38 tons/year in 2002. Emissions from commercial charbroiling were determined from the permitting database maintained by the AQMD and from the local fire departments if they issued burn permits for "Event BBQs". In 2002, there were 64 restaurants permitted, but only nine produced CO emissions by using either wood or charcoal in some type of cooking process.

Permitted restaurants report on an annual basis the amount of food they cook, and if applicable the quantity of wood or charcoal they use. Based on that information the carbon monoxide emissions were estimated using AP-42, Section 1.9 emission factors for wood combustion, contained in Table 1.9-1. The peak season emissions were estimated to be 211 lbs/day. See Example 3 for a restaurant example calculation and Appendix B.8 for a list of restaurant permits.

**EXAMPLE CALCULATION AND LIST OF AGGREGATED
PERMIT NUMBERS FOR
THE AREA SOURCE CATEGORY - WASTE DISPOSAL,
TREATMENT, AND RECOVERY**

EXAMPLE 1

A-1 Incinerator, Inc.

General Facility Information:

A-1 Incinerator, Inc. operates a pathological incinerator. Incinerators are regulated by Washoe County regulation under Section 040.046 and 040.050. These regulations address equipment design requirements and particulate emissions. Rule effectiveness was not applied because CO emissions depend on the equipment design. During the annual renewal of the Air Quality permit, our office confirms the equipment specifications, the condition of the equipment, and obtains the following information:

Type: Pathological Incinerator
Max. rate: 200 lbs/hr
Hours of Operation: 1,000 hrs/yr.

Emission factors for both pathological and industrial incinerators are found in Volume I of AP-42, Fifth Edition, Section 2. Emission factors for A-1's pathological incinerator are from AP-42, Table 2.6-2.

Annual Emission Calculations:

$$200 \text{ lbs/hr} * 1,000 \text{ hrs/yr.} * \frac{1 \text{ ton}}{2000 \text{ lbs}} = 100 \text{ tons/yr.}$$

Particulate Matter Emissions:

$$4.67 \text{ lbs/ton} * 100 \text{ tons/yr.} = 467 \text{ lbs/yr.}$$

or **0.23 ton PM/yr.**

SOx Emissions:

$$2.17 \text{ lbs/ton} * 100 \text{ tons/yr.} = 217 \text{ lbs/yr.}$$

or **0.11 ton SOx/yr.**

NOx Emissions:

$$3.56 \text{ lbs/ton} * 100 \text{ tons/yr.} = 356 \text{ lbs/yr.}$$

or **0.18 ton NOx/yr.**

CO Emissions:

$$2.95 \text{ lbs/ton} * 100 \text{ tons/yr.} = 295 \text{ lbs/yr.}$$

or **0.15 ton CO/yr.**

VOC Emissions:

$$0.299 \text{ lb./ton} * 100 \text{ tons/yr.} = 240 \text{ lbs/yr.}$$

or **0.01 ton VOC/yr.**

Peak Season Emission Calculations:

The reported activity level for this facility was essentially constant throughout the year; therefore, no seasonal adjustment factor was applied (SAF = 1).

CO --

$$E_s = \frac{0.15 \text{ tons/yr.} * 2000 \text{ lbs/ton} * 1}{7 \text{ days/week} * 52 \text{ weeks/yr.}}$$

$$E_s = \mathbf{1.0 \text{ lbs CO/CO day}}$$

**2002 CO EMISSIONS INVENTORY
LIST OF PERMITS FROM THE WCAQMD'S PERMITTING DATA BASE FOR
THE WASTE DISPOSAL, TREATMENT, AND RECOVERY AREA SOURCE CATEGORY**

INDUSTRIAL/COMMERCIAL INCINERATION:

(for emissions data see Appendix A and cross reference permit number)

1. A01120A
2. J01112A
3. G00039A

PATHOLOGICAL INCINERATION:

(for emissions data see Appendix A and cross reference permit number)

1. C00045A
2. E00004A
3. F00033A
4. J00849A
5. J00870A
6. J01813A
7. J01947A
8. J01972A

WASTEWATER TREATMENT

(for emissions data see Appendix A and cross reference permit number)

1. L01355A

**EXAMPLE CALCULATION AND LIST OF AGGREGATED
PERMIT NUMBERS FOR
THE AREA SOURCE CATEGORY - ASPHALT PROCESS**

EXAMPLE 2

A-1 Asphalt Plant

General Facility Information:

A-1 Asphalt Plant has a drum mix asphalt plant located in Washoe County's CO non-attainment area. A-1 submitted the following information as requested by the AQMD during the annual compliance inspection to renew the Air Quality Permit To Operate:

Total Production:	100,000 tons/yr.
Hours Operated:	2240 hours/yr.
Control Equipment:	Baghouse w/99.8% control efficiency
Acres of Storage Piles:	5 acres

Primary emissions consist of particulate matter and gaseous volatile organics which result from the heating and mixing of the asphalt cement. Criteria pollutants are also emitted from the various types of diesel-powered equipment which are run in conjunction with the asphalt plants such as loaders or generators. This source is subject to an NSPS regulation for particulate emissions only and is not regulated for CO emissions so rule effectiveness was not applied.

Emission factors for asphalt batching are from section 11.1 of AP-42 Volume I, Fifth Edition, emissions from diesel-powered equipment are from Section 7.2 of AP-42 Volume II.

Annual Emission Calculations:

Asphalt Mixing -- emission factors from Section 8.1 of AP-42 Volume I

Total Suspended Particulate (TSP) Emissions:	
	$32 \text{ lbs/ton} \times 100,000 \text{ tons/yr.} \times (1 - .998) = 6,400 \text{ lbs/yr.}$
	or = 3.2 tons/yr.
PM ₁₀ Emissions:	
	$4.5 \text{ lbs/ton} \times 100,000 \text{ tons/yr.} \times (1 - .998) = 900 \text{ lbs/yr.}$
	or = 0.45 tons/yr.
SOx Emissions:	
	0.056 lb./ton (average between clean and dirty fuel)
	$0.056 \text{ lb./ton} \times 100,000 \text{ tons/yr.} = 5,600 \text{ lbs/yr.}$
	or = 2.8 tons/yr.
NOx Emissions:	
	$0.075 \text{ lb./ton} \times 100,000 \text{ tons/yr.} = 7,500 \text{ lbs/yr.}$
	or = 3.8 tons/yr.
VOC Emissions:	
	$0.0082 \text{ lb./ton} \times 100,000 \text{ tons/yr.} = 820 \text{ lbs/yr.}$
	or = 0.4 tons/yr.
CO Emissions:	
	$0.036 \text{ lb./ton} \times 100,000 \text{ tons/yr.} = 3,600 \text{ lbs/yr.}$
	or = 1.8 tons/yr.
Toxics Emissions:	
	$0.066 \text{ lb./ton} \times 100,000 \text{ tons/yr.} = 660 \text{ lbs/yr.}$
	or = 0.33 ton/yr.

Fugitive Emissions -- emission factors from Section 8.19.1-1 of AP-42 Volume I, Fourth Edition, with 70% control efficiency for water application:

TSP from Active Storage piles:	
	$13.2 \text{ lbs/acre day} \times 5 \text{ acres} \times 2240/24 \text{ hrs} \times (1 - .70) = 1,848 \text{ lbs/yr.}$
	or = 0.92 ton/yr.
TSP from Inactive Storage piles:	
	$3.5 \text{ lbs/day} \times 5 \text{ acres} \times (8760 - 2240)/24 \text{ hrs} = 4,745.2 \text{ lbs/yr.}$
	or = 2.38 tons/yr.

EXAMPLE 2, CONT

Diesel Equipment -- emission factors from Section 7.2 of AP-42 Volume II for a loader

TSP Emissions:

$$0.172 \text{ lb./hr} \times 2240 \text{ hrs/yr.} = 385.3 \text{ lbs/yr. or } \mathbf{0.19 \text{ ton/yr.}}$$

SOx Emissions:

$$0.182 \text{ lb./hr} \times 2240 \text{ hrs/yr.} = 407.7 \text{ lbs/yr. or } \mathbf{0.20 \text{ ton/yr.}}$$

NOx Emissions:

$$1.89 \text{ lbs/hr} \times 2240 \text{ hrs/yr.} = 4,233.6 \text{ lbs/yr. or } \mathbf{2.12 \text{ tons/yr.}}$$

VOC Emissions:

$$0.25 \text{ lb./hr} \times 2240 \text{ hrs yr.} = 560.0 \text{ lbs/yr. or } \mathbf{0.28 \text{ ton/yr.}}$$

CO Emissions:

$$0.57 \text{ lb./hr} \times 2240 \text{ hrs/yr.} = 1,276.8 \text{ lbs/yr. or } \mathbf{0.64 \text{ ton/yr.}}$$

SUMMARY OF EMISSIONS COMPUTED IN PERMITTING DATA BASE

POLLUTANT	TOTAL EMISSIONS (tons/yr.)
PM ₁₀	6.69
SOx	3.0
NOx	5.9
VOC	0.68
CO	2.4
TOXICS	0.3

The mobile emissions had to be subtracted from the permitting database emission total for CO to avoid double counting in the inventory. **Therefore A-1's total CO emissions, excluding mobile diesel equipment, are 2.4 tpy - 0.64 tpy = 1.8 tpy.**

Peak Season Emission Calculations:

Because ambient temperatures during the peak CO season were below the acceptable operating range for a facility in this category, one hundred percent of the activity was assumed to occur outside the peak CO season; therefore, the seasonal adjustment factor 0 (SAF = 0).

CO --

$$E_s = \frac{1.8 \text{ tons/yr.} \times 2000 \text{ lbs/ton} \times 0}{6 \text{ days/week} \times 52 \text{ weeks/yr.}}$$

$$E_s = \mathbf{0.0 \text{ lb. CO/CO day}}$$

2002 CO EMISSIONS INVENTORY LIST OF PERMITS FROM THE WCAQMD'S PERMITTING DATA BASE FOR THE ASPHALT PROCESSES AREA SOURCE CATEGORY IN THE NAA (for emissions data, see Appendix A and cross reference permit number)

ASPHALT PROCESSES

1. F01179A
2. F01610A
3. H11A
4. I01853A

**EXAMPLE CALCULATION FOR
THE AREA SOURCE CATEGORY - COMMERCIAL
CHARBROILING
(For a list of permitted facilities see Appendix B.8.)**

EXAMPLE 3

A-1 Restaurant

General Facility Information:

During the permit renewal process a large Hotel Casino supplied the following:

Operates 24 hrs/day, 7 days/week, 52 weeks/year.
 Fry 200,000 lbs of meat/year
 Broil 80,000 lbs of meat/year
 Wood Oven 10 cords/year

Source emissions of VOC, NOx and CO result from the cooking of meat, but emissions are primarily due to the combustion of wood and/or charcoal if used. New facilities are subject to Washoe County Regulation Section 040.033 that requires BACT for any source with emissions exceeding 10 lbs/day. However, none of the facilities addressed in this inventory, including A-1, is subject to this regulation and thus uncontrolled; therefore, rule effectiveness was not applied.

Emission factors for the cooking of meat were obtained from information and studies conducted by South Coast Air Quality Management District and their subsequent rule, Rule 1138 - Restaurant Operations:

Frying	Emission Factor	Broiling	Emission Factor
PM ₁₀	0.004 lb./meat	PM ₁₀	0.004 lb./meat
NO _x	0.001 lb./meat	NO _x	0.001 lb./meat
CO	0.0 lb./meat	CO	0.0 lb./meat
SO _x	0.0 lb./meat	SO _x	0.0 lb./meat
VOC	0.008 lb./meat	VOC	0.008 lb./meat

Emission factors for wood/charcoal ovens were obtained from AP-42, Fifth Edition, Section 1.9, Table 1.9-2:

Pollutant	Wood and Charcoal Use Emission Factor	Emission Factor (assuming 2,500 lbs/wood per cord)
PM ₁₀	34.6 lb./ton	43.24 lb./cord
NO _x	2.6 lb./ton	3.25 lb./cord
CO	252.6 lb./ton	315.75 lb./cord
SO _x	0.4 lb./ton	0.5 lb./cord
VOC	229.0 lb./ton	286.25 lb./cord
Toxics	2.4 lb./ton	3.0 lb./cord

Annual Emission Calculations:

NOx Emissions:

Frying 0.001 lb./lb. meat * 200,000 lbs/yr. = 200 lbs/yr. or 0.1 ton NOx/yr.
 Broiling 0.001 lb./lb. meat * 80,000 lbs/yr. = 80 lbs/yr. or 0.0 ton NOx/yr.
 Wood 3.25 lbs/cord * 10 cords/yr. = 32.5 lbs/yr. or 0.0 ton NOx/yr.
TOTAL NOx = 0.1 ton/yr.

CO Emissions:

Frying N/A -- 0.0 lb./lb. meat
 Broiling N/A -- 0.0 lb./lb. meat
 Wood 315.75 lbs/cord * 10 cords/yr. = 3,157.5 lbs/yr. or 1.6 ton CO/yr.
TOTAL CO = 1.6 tons/yr.

VOC Emissions:

Frying 0.004 lb./lb. meat * 200,000 lbs/yr. = 800 lbs/yr. or 0.4 ton VOC/yr.
 Broiling 0.008 lb./lb. meat * 80,000 lbs/yr. = 640 lbs/yr. or 0.3 ton VOC/yr.
 Wood 286.25 lb./cord * 10 cords/yr. = 2,862.5 lbs/yr. or 1.4 tons VOC/yr.
TOTAL VOC = 2.1 tons/yr.

SO_x Emissions:

Frying N/A -- 0.0 lb./lb. meat
 Broiling N/A -- 0.0 lb./lb. meat
 Wood 0.5 lb./cord * 10 cords/yr. = 5 lbs/yr. or 0 tons SO_x/yr.
TOTAL SO_x = 2.1 tons/yr.

PM₁₀ Emissions:

Frying 0.004 lb./lb. meat * 200,000 lbs/yr. = 800 lbs/yr. or 0.4 ton PM₁₀/yr
Broiling 0.008 lb./lb. meat * 80,000 lbs/yr. = 640 lbs/yr. or 0.3 ton PM₁₀/yr
Wood 43.24 lb./cord * 10 cords/yr. = 432.4 lbs/yr. or 0.2 tons PM₁₀/yr

TOTAL PM₁₀ = 1 ton/yr.

Peak Season CO Emission Calculations:

The reported activity level for this facility was essentially constant throughout the year; therefore, no seasonal adjustment factor was applied (SAF = 1).

CO --

$$E_s = \frac{1.6 \text{ tons/yr.} * 2000 \text{ lbs/ton} * 1}{7 \text{ days/week} * 52 \text{ weeks/yr.}}$$

E_s = 8.8 lbs CO/CO day