

State of Colorado

Technical Support Document For Lead Attainment In Colorado: Eight-Factor Analysis

For the State of Colorado 2009 Lead Designations



September 17, 2009

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Colorado Eight-Factor Analysis for Lead Attainment

Designation Recommendation

The State recommends that the entire state of Colorado be designated as attainment or attainment/unclassifiable for the 2008 revised lead standard. This recommendation is based on monitoring information that indicates the region is in compliance with the lead standard and a minimal quantity of lead emissions from sources..

Overview

On October 15, 2008, the United States Environmental Protection Agency (EPA) Administrator signed into law a new National Ambient Air Quality Standard (NAAQS) for lead. This new standard substantially lowered the level by a factor of ten from 1.5 micrograms per cubic meter (ug/m³) to 0.15 ug/m³. In addition, the averaging period was changed from a calendar quarterly average to a rolling three-month average that cannot be exceeded over a three-year period. The basis of the standard was kept as lead from total suspended particulates (TSP), however the form of the standard was changed from calculating at “standard temperature and pressure” to “local temperature and pressure.”

The EPA requires states base their designations on monitoring data results over a three year period for calendar years 2006 - 2008. Based on the 2006 - 2008 results, Colorado is in attainment of the new standard. While not technically required in this analysis, Colorado notes that one three-month rolling average including data prior to the 2006 – 2008 timeframe (November 2005 - January 2006) exceeded the 0.015 ug/m³, as recorded by a source-oriented monitor located across the street from the American Smelting and Refining Company (ASARCO) plant in Denver. These results were attributed to remediation activities at the ASARCO plant and surrounding neighborhoods, as the plant was no longer in operation. The ASARCO plant and surrounding neighborhoods were remediated and closed in August 2006. There were some spikes in lead concentrations in 2005 and some elevated levels in early 2006 due to remediation work at the plant involving moving and burial of contaminated soils. However, ambient air lead concentrations dropped an order of magnitude below the new standard of 0.15 ug/m³ after the remediation work was completed. To be transparent, the Division opted to identify these November and December 2005 data and use them to determine the January and February 3-month rolling averages. Again, these 2005 data are not technically required in this analysis.

For PM_{2.5} and Ozone, the EPA provided nine criteria, or “factors,” which may be used to support attainment/non-attainment determinations and, if necessary, to help determine the appropriate size of a non-attainment area. With Lead, only eight of the nine factors are listed by EPA for use; the “traffic and commuting patterns” factor is not listed as Lead is no longer used in motor vehicle fuels (Ref. Federal Register, Vol. 73, No. 219, 12 November 2008). EPA recommended that States base their analysis on using the eight factors, along with proposed non-attainment boundaries, for any areas that are not meeting the federal standard. Since only two areas nationwide (one in Montana, one in Missouri) appear to violate the revised Lead standard, EPA has not suggested criteria they would use in determining Lead non-attainment boundaries, but the

State is providing an analysis for Lead using the eight criteria to support the conclusion that the whole state of Colorado be designated as attainment or attainment/unclassifiable with the new lead NAAQS. The eight factors that must be addressed are:

1. Air quality data
2. Emissions data
3. Population density and degree of urbanization
4. Growth rates and patterns
5. Meteorology
6. Geography/topography
7. Jurisdictional boundaries
8. Level of control of emission sources

The following analysis discusses these eight factors as necessary to demonstrate that Colorado should be designated as attainment or attainment/unclassifiable for the new lead NAAQS. It must also be noted that this attainment demonstration applies only to non-tribal lands over which the State of Colorado has direct air quality jurisdiction.

Factor #1: Air Quality Data

The air quality analysis looked at all known monitoring sites for lead in Colorado for 2006 through 2008. Due to the new standard being based on a three-month rolling average, data from November and December 2005 as well as January 2006 constitute the first three-month average ending in January 2006 (although the 2005 data are not technically required). A map of the site locations is presented in Figure 1. As can be seen, there was not a lot of monitoring in Colorado. Because lead levels decreased nationwide in the past few decades, EPA no longer required many lead monitors. In fact EPA only required one lead monitor in each region, commencing in 2005. Denver's lead monitor is the only monitor in Region 8 operated by a State Agency.

Figure 2 presents long term lead trends for the Denver-CAMP site, which is one of the longest operating lead sites in Colorado. Lead monitoring at this site was discontinued at the end of 2006. However, it is evident that ambient lead levels have decreased dramatically over time. Much of this decrease is due to the phase out of leaded gasoline starting in the 1970's.

The lead (TSP) data for 2006 to 2008 are presented in Table 1 and graphically in Figure 3. Excluding the 2005 data, all sites in Colorado are in attainment of the new NAAQS. However for transparency, November and December 2005 data were included to render the January 2006 rolling average and caused the Denver-Clinicare site for the three month average including November 2005 – January 2006 to exceed the 0.15 ug/m³ standard. The high value occurred due to remediation work at the ASARCO site in 2005 and 2006. At that time contaminated soil was being actively remediated on the ASARCO property. Below are some facts about ASARCO:

- The site was operated from 1886-2006.
- Separated impurities from gold, silver, copper and lead.
- Refined cadmium, with lead as a byproduct.

- Colorado Department of Public Health and Environment sued ASARCO in Dec. 1983 - Natural Resource Damage Suit (NRDS) site, pre- Superfund.
- Cleanup of community soils began in the summer of 1994 and was completed in the summer of 2002. The site was fully remediated and closed in Aug. 2006.
- More than four square miles and soil from approximately 761 properties were cleaned up.
- 70 acres of commercial property were remediated.
- Cleanup of the industrial drainage ditch was completed in the fall of 1995.
- The terrace drain was completed early in 1999 and treats about 12,000 gallons of water per day.

Technically, all three-month rolling average lead values for sites in Colorado are well below 0.15 ug/m³. Excluding the November and December 2005 data, the Denver-Clinicare site demonstrates attainment with the new standard. However, by including November and December 2005 in the January 2006 rolling three-month average, Colorado has one three-month rolling average that exceeds the new standard. Table 1 shows that once the remediation was completed in August 2006 and the ASARCO facility was closed, the ambient air concentrations of lead from TSP at the Denver-Clinicare site dropped more than 10-fold from 0.190 to 0.010 ug/m³. Figure 4 illustrates monitored lead values at the ASARCO for 2004 – 2006 and depicts the changes in monitored values which the changes in operation and remediation of the site and surrounding neighborhood.

Colorado stopped monitoring for TSP-lead in December 2006 at all but one site, because EPA reduced funding for parameters at some sites that were well below the NAAQS (i.e. carbon monoxide and lead) to focus on other monitoring efforts, such as National Core or NCore sites and trace gases. EPA also later decided that lead monitoring was only needed in the most populous city in each region. In Region 8, the most populous city is Denver. The Denver Municipal Animal Shelter (DMAS) site was proposed as the NCore site for Colorado, and the DMAS site had similar concentrations to all other Denver area sites after mitigation at the ASARCO site (see Table 1). Thus it was decided to keep the lead monitor at the NCore site. Colorado also monitors metals from PM₁₀, which includes lead, at the Grand Junction Powell Building site. The Grand Junction site is a National Air Toxics Trends Station.

Figure 5 presents the lead (PM₁₀) values from the National Air Toxics Trends Site in Grand Junction. There is no proposed NAAQS for lead from PM₁₀. However, with Regional Administrator approval, EPA is allowing for sources that emit lead as fumes or as fine particles, PM₁₀ to be used as a surrogate for lead where lead is not anticipated to exceed 0.10 ug/m³ for a three-month average. While the Grand Junction site is not a source-oriented site, the values are more than an order of magnitude below this surrogate value.

Figure 1. Map of Lead Ambient Air Monitoring Sites 2006-2008.

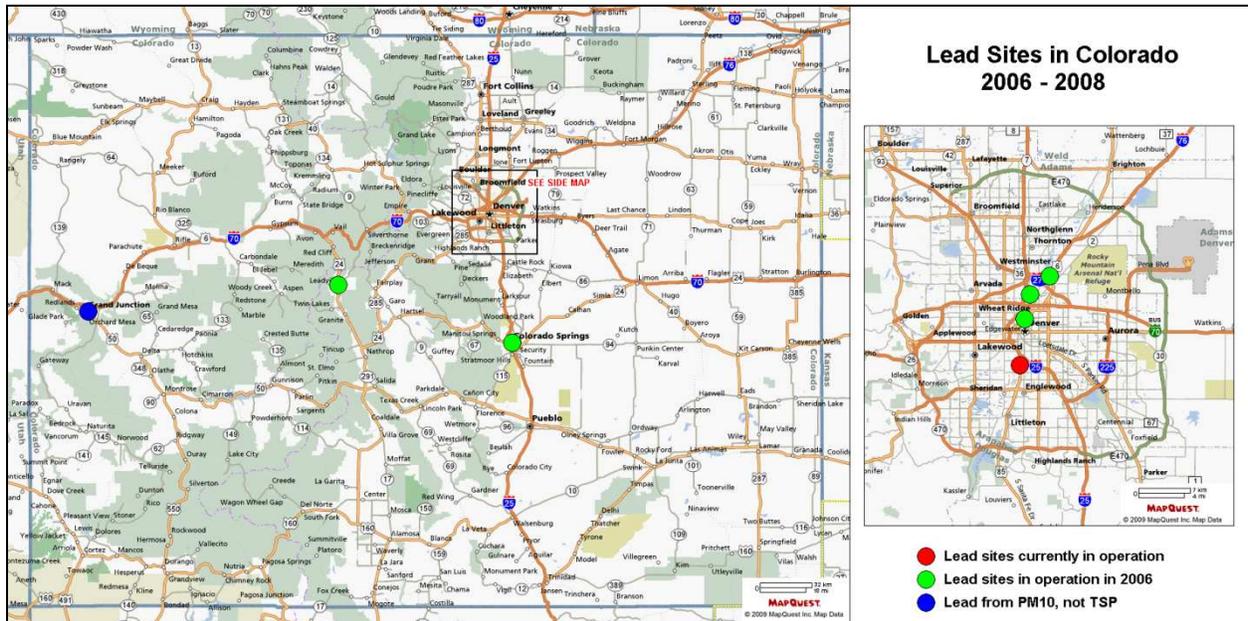


Figure 2. Historical Lead Monitoring Concentration Trends in Denver.

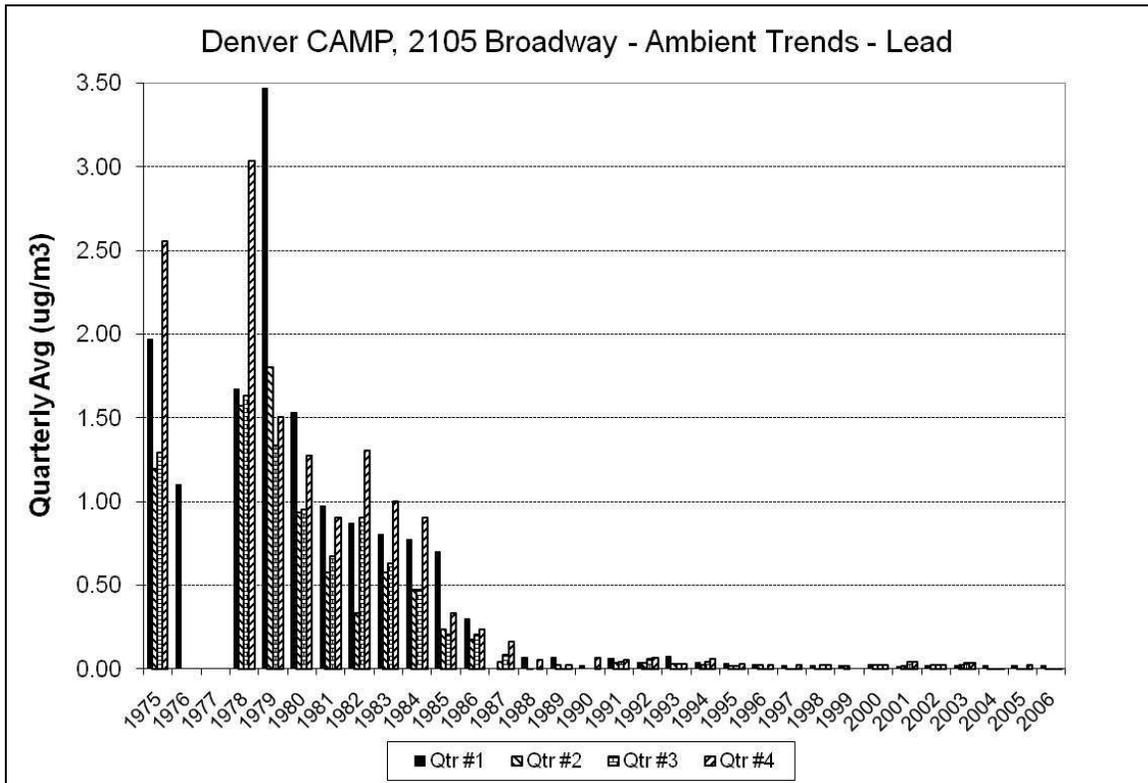


Figure 3. Colorado Lead Ambient Air Concentration Trends.

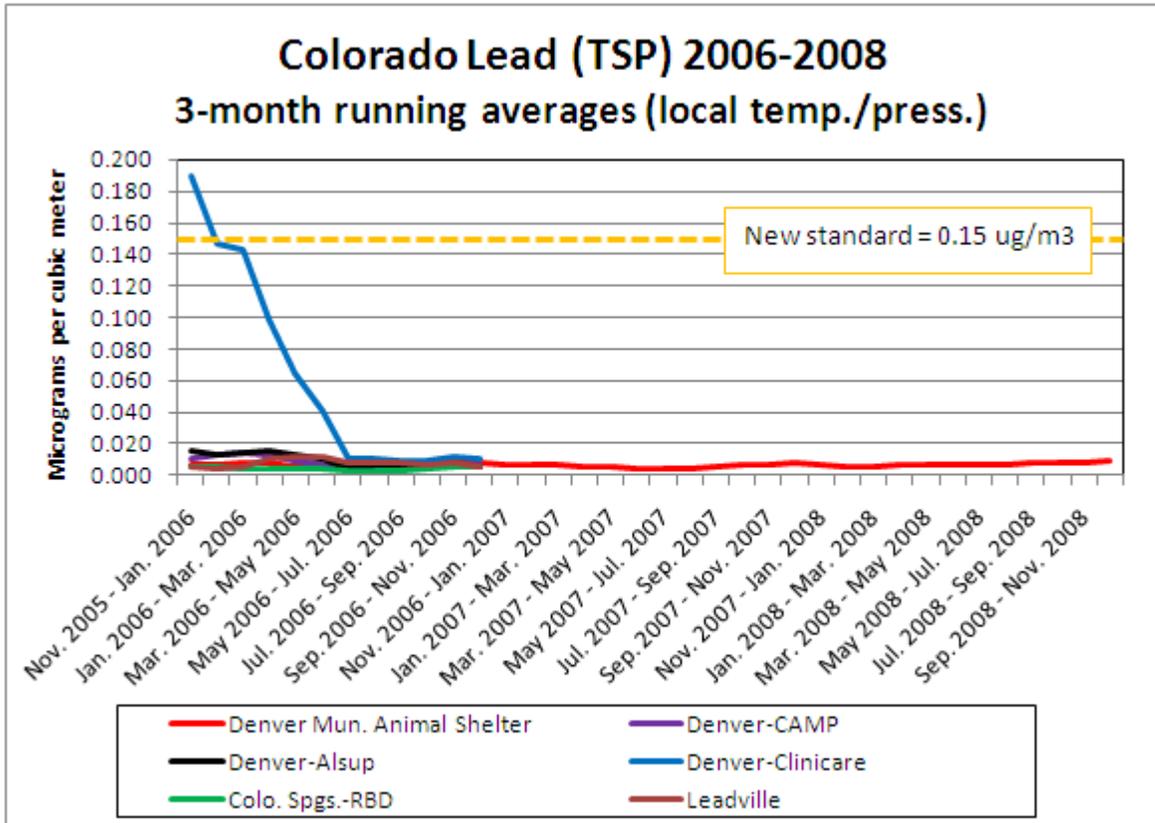


Figure 4. ASARCO/Clinicare Lead Concentration Trends

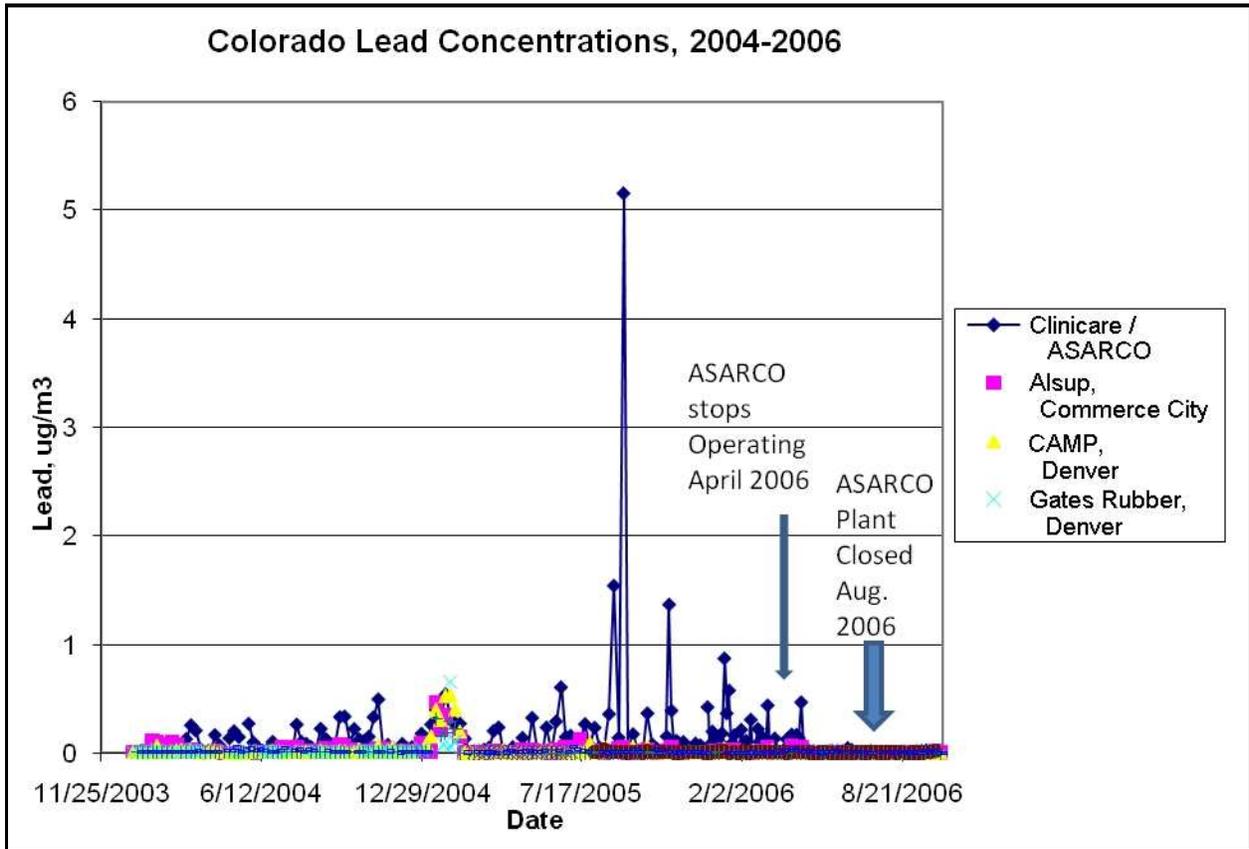


Figure 5. Grand Junction Lead (PM10) Concentration Trends.

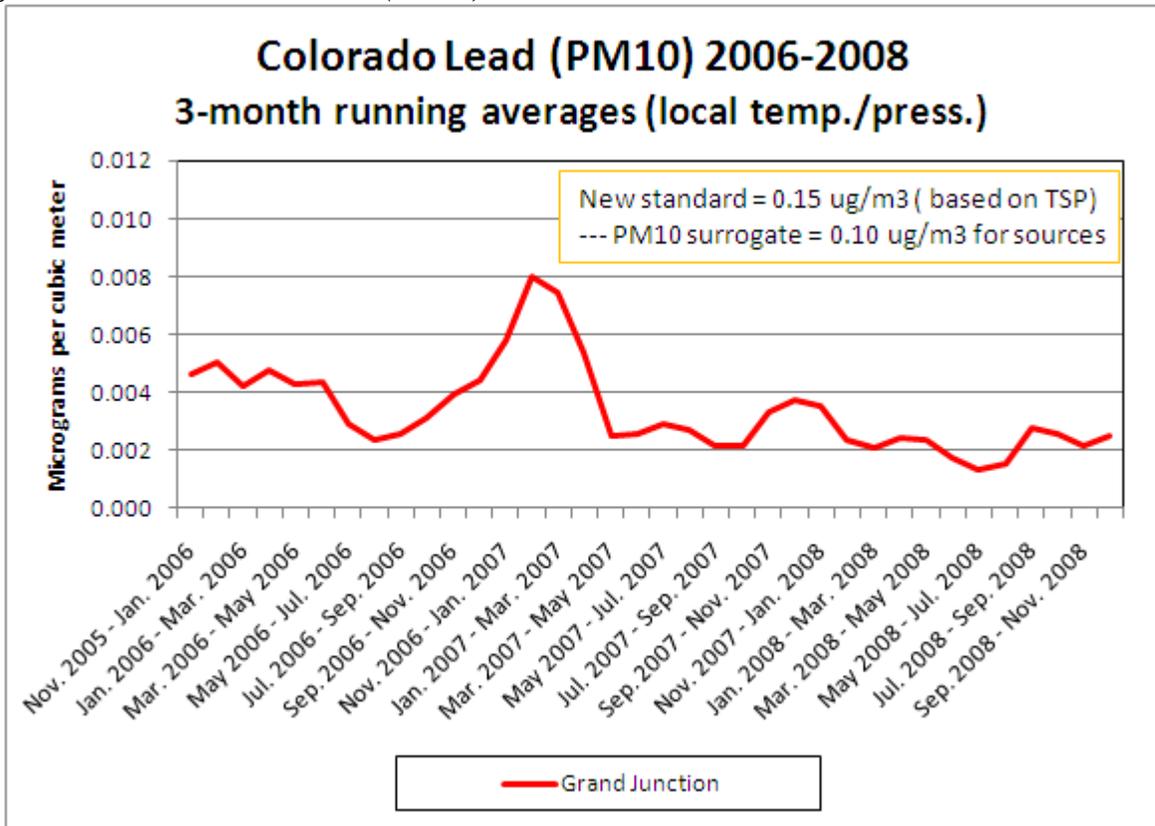


Table 1. Colorado Lead Monitoring Data Summary.

Colorado Lead (TSP) – 3-Month Rolling Averages (ug/m3)						
	Denver Mun. Animal Shelter 08-031- 0025	Denver CAMP 08-031- 0002	Comm. City - Alsup 08-001- 0006	Denver Clinicare 08-001- 0002	Colo. Spgs. RBD 08-041- 0006	Leadville 08-065- 0001
Nov. 2005 – Jan. 2006	0.007	0.011	0.015	0.190*	0.006	0.005
Dec. 2005 – Feb. 2006	0.007	0.013	0.013	0.147	0.005	0.004
Jan. 2006 – Mar. 2006	0.008	0.014	0.014	0.142	0.004	0.006
Feb. 2006 – Apr. 2006	0.008	0.012	0.015	0.098	0.004	0.010
Mar. 2006 – May 2006	0.006	0.009	0.013	0.064	0.004	0.012
Apr. 2006 – Jun. 2006	0.006	0.007	0.010	0.041	0.004	0.012
May 2006 – Jul. 2006	0.005	0.006	0.004	0.011	0.003	0.009
Jun. 2006 – Aug. 2006	0.005	0.006	0.004	0.010	0.003	0.008
Jul. 2006 – Sep. 2006	0.006	0.005	0.005	0.009	0.003	0.008
Aug. 2006 – Oct. 2006	0.008	0.006	0.005	0.009	0.004	0.007
Sep. 2006 – Nov. 2006	0.008	0.006	0.006	0.011	0.005	0.008
Oct. 2006 – Dec. 2006	0.008	0.007	0.006	0.010	0.005	0.004
Nov. 2006 – Jan. 2007	0.007	Site shut down	Site shut down	Site shut down	Site shut down	Site shut down
Dec. 2006 – Feb. 2007	0.007					
Jan. 2007 – Mar. 2007	0.007					
Feb. 2007 – Apr. 2007	0.006					
Mar. 2007 – May 2007	0.005					
Apr. 2007 – Jun. 2007	0.004					
May 2007 – Jul. 2007	0.004					
Jun. 2007 – Aug. 2007	0.005					
Jul. 2007 – Sep. 2007	0.005					
Aug. 2007 – Oct. 2007	0.007					
Sep. 2007 – Nov. 2007	0.007					
Oct. 2007 – Dec. 2007	0.008					
Nov. 2007 – Jan. 2008	0.007					
Dec. 2007 – Feb. 2008	0.005					
Jan. 2008 – Mar. 2008	0.006					
Feb. 2008 – Apr. 2008	0.006					
Mar. 2008 – May 2008	0.007					
Apr. 2008 – Jun. 2008	0.006					
May 2008 – Jul. 2008	0.007					
Jun. 2008 – Aug. 2008	0.007					
Jul. 2008 – Sep. 2008	0.008					
Aug. 2008 – Oct. 2008	0.007					
Sep. 2008 – Nov. 2008	0.008					
Oct. 2008 – Dec. 2008	0.009					
*Value exceeding the level of the standard						

Factor #2: Emissions Data

Lead is a metal which is found naturally in the environment in addition to in manufactured products. Historically, major sources of lead emissions have been industrial sources and motor vehicles (i.e. cars and trucks). As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector dramatically declined by 95 percent between 1980 and 1999. Also, levels of lead in the air decreased by 94 percent between 1980 and 1999. Today, the highest levels of lead in air are usually found near active lead smelters-of which Colorado has none. Other stationary source producers of lead are waste incinerators, utilities, lead-acid battery manufacturers (Ref: <http://www.epa.gov/air/lead/index.html>), industrial processes, and primarily metals processing (Ref: <http://www.epa.gov/air/lead/basic.html>). However, as lead was banned from automobile fuels and has been well controlled from most stationary sources, the major sources of lead emissions have changed over the years. Lead is still used in piston engine aircraft (general aviation) and that source is now the largest source of lead emissions to the air in the nation, as can be seen in Figure 6. Figure 7 graphically shows the sources of lead emissions in Colorado and Table 2 shows this information by county.

There are several emissions data sources for the State of Colorado. These include the National Emissions Inventory (NEI), Toxic Release Inventory (TRI) and the Colorado Air Pollutant Emission Inventory (populated by Air Pollutant Emission Notice or APEN data). Table 3 provides the NEI and TRI data for the highest emissions facilities in 2005 for Colorado. These are the most current NEI data available on EPA's website and include all emissions data for each county (State, Tribal, etc.). Only the highest NEI emitters are shown because emissions for the other facilities is well below the action threshold level of 1.0 TPY. The 2008 NEI was not available for this technical support document. Table 4 provides the APEN Inventory as of October 17, 2008 for the highest emissions facilities in Colorado. These data are as reported on the APEN by the source and have not been reviewed. Some of the sources have reported their uncontrolled emissions, rather than their actual emissions. Note that the Colorado inventory does not include emissions from Tribal lands. Emissions listed from NEI and TRI are generally conservative estimates, whereas emissions from APEN Inventory are generally actual emissions. Colorado reviewed all data in EPA's 2005 NEI and TRI data. If a source's actual, NEI or TRI emissions were above 0.5 tons per year (TPY), emissions were reviewed and possibly recalculated since some sources submit lead data based on potential to emit rather than their actual emissions.

Based on NEI data, the largest point source of lead emissions in Colorado is the Colorado-Golden Energy Corporation (CENC) power plant located in Golden, Colorado (formerly Trigen Nations Energy). After a review of the EPA 2005 NEI and TRI data, only the CENC lead emissions of 1.819 TPY (2005 NEI) exceeded EPA's 1.0 TPY monitoring threshold. However a review of the APEN data for the facility indicated the facility was reporting their potential to emit emissions in the 2005 NEI, rather than their actual emissions, which resulted in an overestimation of actual lead emissions by a factor of nine. Upon review, actual emissions for this source are 0.208 tons per year in 2005 as seen in Table 5. Revisions to the 2005 NEI for the

CENC facility - 0.208 TPY - will be submitted to EPA in 2009. In addition, Colorado re-calculated lead emissions from this facility for 2006 and 2007 at 0.206 and 0.182 TPY, respectively (Table 5). Thus, lead emissions from the CENC facility are well below the 1.0 TPY threshold that triggers EPA's source-oriented lead monitoring requirements.

Based on information from EPA, Centennial Airport has emissions of 1.18 TPY. (Ref: Hoyer, Manning, & Irvine, 2008) Centennial Airport has the second largest emissions from general aviation aircraft in the United States. Emissions of lead due to piston engine aircraft at Centennial Airport are estimated by LTO (Landing and Takeoff) operations of general aviation aircraft in 2002. These LTO estimates account only for the lead emitted during landing, taxi, idle and take-off. They do not include lead emitted outside the LTO cycle, which is more widely dispersed in the environment. Based on the Hoyer calculations, Centennial Airport was found to have emissions over the one TPY threshold. Thus, a monitor is required to be installed and operational by January 1, 2010. Because other airports in the area are significantly below the 1.0 TPY threshold, no additional analysis was necessary for other Colorado airports with general aviation activities. Jefferson County airport in Broomfield, Colorado had the second highest estimated emission in Colorado with 456 kg/year or 0.503 TPY (ref. Hoyer, Manning, & Irvine, 2008). Figure 8 shows the traffic volume of airport operations at Centennial Airport from 2006-2009.

Figure 6. Sources of Lead in the US.

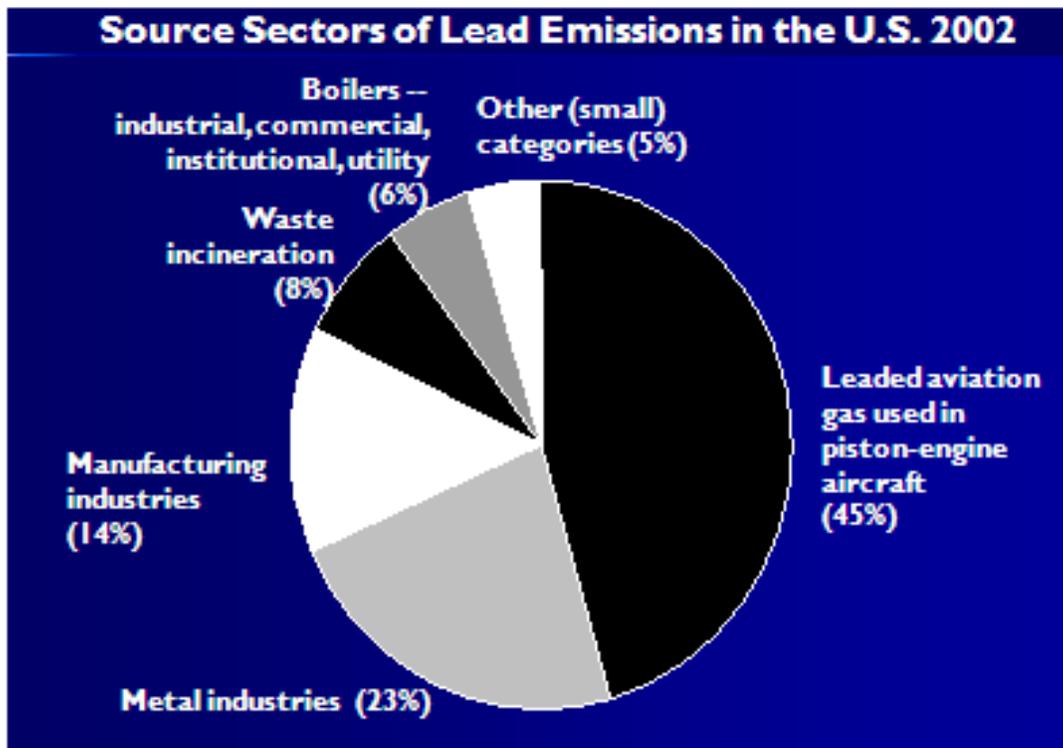
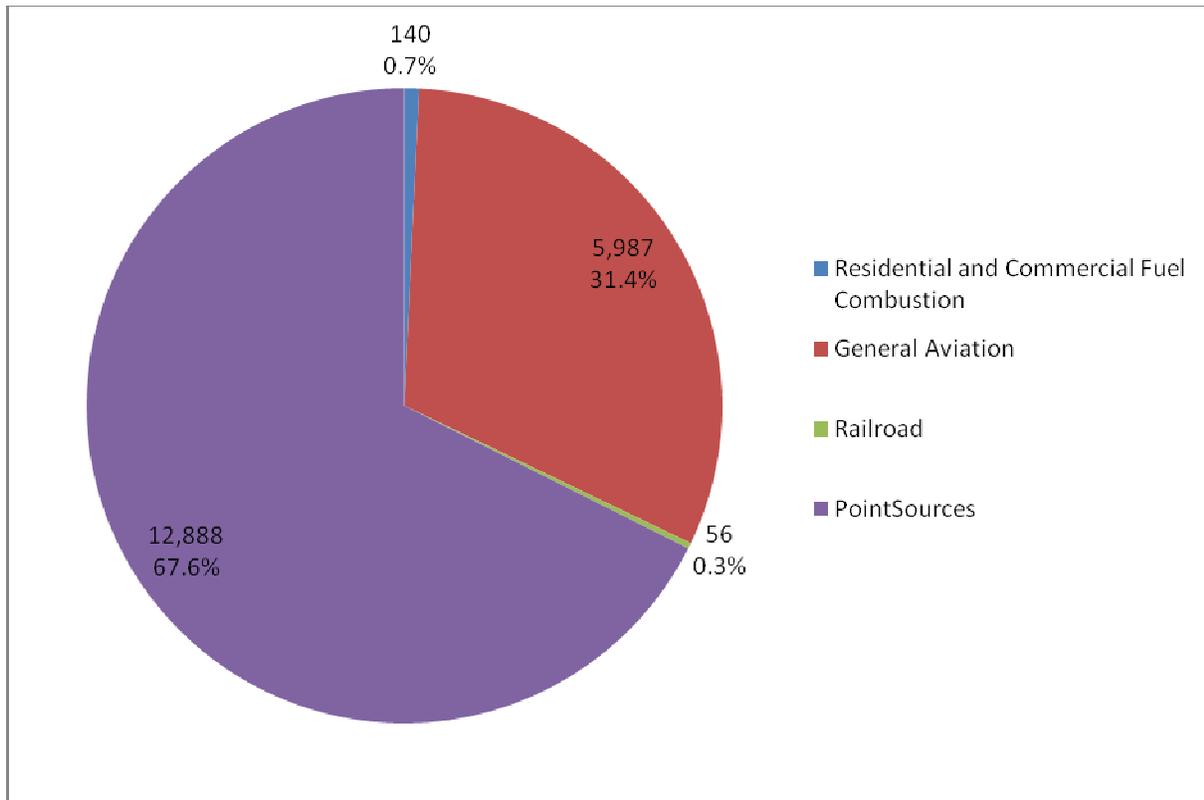


Figure 7. Sources of Lead in Colorado



Note: 2002 Data in pounds/year

Table 2. Colorado Air Pollutant Emission Inventory for Lead by County - 2002

State and County FIPS Code	County	Residential and Commercial Fuel Combustion	General Aviation	Railroad	Point Sources	TOTAL
08001	Adams County	0.00321	0.15401	0.00197	1.871051	2.03024
08003	Alamosa County	0.00025	0.03649	0.00004		0.03678
08005	Arapahoe County	0.01104	0.59093	0.00080	0.179611	0.78238
08007	Archuleta County	0.00012	0.02464			0.02476
08009	Baca County	0.00003	0.00397	0.00038		0.00438
08011	Bent County	0.00031	0.00463	0.00060		0.00554
08013	Boulder County	0.00537	0.24751	0.00067	0.46365	0.71720
08014	Broomfield County	0.00059	0.02726	0.00014		0.02799
08015	Chaffee County	0.00022	0.02795			0.02818
08017	Cheyenne County	0.00003		0.00044		0.00047
08019	Clear Creek County	0.00012				0.00012
08021	Conejos County	0.00011		0.00002		0.00013
08023	Costilla County	0.00005		0.00005		0.00010
08025	Crowley County	0.00001				0.00001
08027	Custer County	0.00004				0.00004
08029	Delta County	0.00078	0.01984	0.00044		0.02106

08031	Denver County	0.01391	0.02040	0.00048	0.185752	0.22054
08033	Dolores County	0.00003				0.00003
08035	Douglas County	0.00152		0.00098		0.00250
08037	Eagle County	0.00111	0.03781	0.00099		0.03990
08039	Elbert County	0.00007		0.00019		0.00026
08041	El Paso County	0.00770	0.30531	0.00152	0.518	0.83254
08043	Fremont County	0.00087	0.01767	0.00003	0.027545	0.04611
08045	Garfield County	0.00066	0.01072	0.00092		0.01230
08047	Gilpin County	0.00019		0.00043		0.00063
08049	Grand County	0.00028	0.00942	0.00104		0.01074
08051	Gunnison County	0.00034	0.03497	0.00017		0.03548
08053	Hinsdale County	0.00002				0.00002
08055	Huerfano County	0.00034	0.00602	0.00122		0.00759
08057	Jackson County	0.00003				0.00003
08059	Jefferson County	0.00605	0.27646	0.00061	1.867541	2.15066
08061	Kiowa County	0.00003	0.00391			0.00393
08063	Kit Carson County	0.00008	0.01133			0.01141
08065	Lake County	0.00007	0.01209	0.00005		0.01220
08067	La Plata County	0.00075	0.05579			0.05655
08069	Larimer County	0.00319	0.14276	0.00015	0.117408	0.26351
08071	Las Animas County	0.00018	0.01236	0.00136		0.01390
08073	Lincoln County	0.00007	0.00697	0.00048		0.00752
08075	Logan County	0.00023	0.00737	0.00122		0.00882
08077	Mesa County	0.00161	0.11570	0.00082		0.11814
08079	Mineral County	0.00001		0.00003		0.00005
08081	Moffat County	0.00029	0.00391	0.00019	0.116	0.12038
08083	Montezuma County	0.00033	0.01751			0.01785
08085	Montrose County	0.00057	0.02905	0.00009	0.0015	0.03122
08087	Morgan County	0.00022	0.00992	0.00214	0.068352	0.08063
08089	Otero County	0.00020	0.01015	0.00059		0.01095
08091	Ouray County	0.00005				0.00005
08093	Park County	0.00006				0.00006
08095	Phillips County	0.00009	0.01004			0.01014
08097	Pitkin County	0.00067	0.04606			0.04673
08099	Prowers County	0.00015	0.02161	0.00021		0.02196
08101	Pueblo County	0.00159	0.09556	0.00173	0.706481	0.80536
08103	Rio Blanco County	0.00016	0.08478			0.08494
08105	Rio Grande County	0.00016	0.01018	0.00005		0.01039
08107	Routt County	0.00068	0.04135	0.00041	0.000585	0.04302
08109	Saguache County	0.00006				0.00006
08111	San Juan County	0.00005				0.00005
08113	San Miguel County	0.00020	0.01761		0.000563	0.01837
08115	Sedgwick County	0.00005	0.00039	0.00027		0.00071
08117	Summit County	0.00086				0.00086
08119	Teller County	0.00025				0.00025
08121	Washington County	0.00003	0.03112	0.00106		0.03222
08123	Weld County	0.00160	0.31053	0.00271	0.320124	0.63496
08125	Yuma County	0.00010	0.02933	0.00045		0.02988

TPY	Totals	0.07006	2.99343	0.02815	6.44416	9.53580
Lbs/Yr	Totals	140	5,987	56	12,888	19,072

Table 3. 2005 NEI Emission Sources Compared with TRI Lead Emissions for Colorado.

<u>County</u>	<u>NEI SITE ID</u>	<u>Facility Name</u>	<u>Facility Type</u>	<u>2005 NEI v 2 Emissions (TPY)</u>	<u>2005 TRI Emissions (TPY)</u>	<u>Address</u>	<u>City</u>
Jefferson	5269	Trigen-Nations Energy Co L.L.P.	Combination Utilities, NEC	1.819000009	0.0095	25 10TH ST	<u>GOLDEN</u>
Pueblo	CO0048	Cf&I Steel, L.P. Db a Rocky Mountain Steel Mills	Steel Works, Blast Furnaces (Including Coke Ovens), and Rolling Mills	0.42	0.42	2100 S FWY	<u>PUEBLO</u>
El Paso	CO0410 850	Cappadona's Family Svces	Funeral Services and Crematories	0.363999993	-	3407 N EL PASO ST	<u>COLORADO SPRINGS</u>
Weld	1532	Nichols Aluminum - Golden	Secondary Smelting and Refining of Nonferrous Metals	0.320100009	0.01536	1405 E. 14TH ST	<u>FORT LUPTON</u>
Teller	1827	Cripple Creek & Victor Gold Mining Co	Gold Ores	0.14215	0.14215	1280 HWY 67	<u>VICTOR</u>
El Paso	476	U S Army Fort Carson Range Facility	National Security	0.1145	0.1145	RTE. 2 WILDERNESS RD. BLDG. 9550	<u>FORT CARSON</u>
Pueblo	CO0250	Davis Wire Pueblo Corp	Steel Wiredrawing and Steel Nails and Spikes	0.114	0.114	2100 S FWY BLDG 14	<u>PUEBLO</u>
Adams	4603	Optima Batteries Inc.	Storage Batteries	0.1125	0.1125	17500 E 22ND. AVE	<u>AURORA</u>
El Paso	477	Peterson Afb 21ces Cev	National Security	0.107500002	-	580 GOODFELLOW ST	<u>COLORADO SPRINGS</u>
Denver	3727	Power Engineering	Electroplating, Plating, Polishing, Anodizing, and Coloring	0.100000001	-	2525 S DELAWARE ST	<u>DENVER</u>
Adams	CO0010 943	Serck Svcs Db a Denver Radiator & Shutter	Automotive Repair Shops, NEC	0.052 Revised by EPA	-	5501 PEARL ST	<u>DENVER</u>

Note: Only Sources > 0.1 TPY plus 1 revised source are included.

Table 4. Stationary Source 2007 Air Pollutant Emission Inventory for Lead in Colorado

Facility Name	Address	City	Revised by	Revised by
			SSP TPY	SSP Lbs/Yr
			Actual 2007	Actual 2007
			Pb	Pb
			Emissions	Emissions
			TPY	Lbs/Yr
Optima Batteries Inc	17500 E 22nd Ave	Aurora	0.46500	930.0
CF&I Steel LP	2100 S. Freeway	Pueblo	0.38850	777.0
Cappadona's Family Services	3407 N El Paso St	Colorado Springs	0.36400	728.0
Golden Aluminum Co.	1405 E. 14th St	Fort Lupton	0.32010	640.2
City & County of Denver	1390 Decatur St	Denver	0.18850	377.0
Colorado-Golden Energy Corporation	25 10th St	Golden	0.18150	363.0
Power Engineering	2525 S Delaware St	Denver	0.10000	200.0
Serck Svcs DBA Denver Radiator & Shutter	5501 Pearl St	Denver	0.09825	196.5
US Army HQ Ft Carson 4th Inf Mec Pcms	36086 Us Highway 350	Trinidad, 29.0 Mi Ne Of	0.08750	175.0
Western Sugar Co	18317 Highway 144	Fort Morgan Area	0.06835	136.7
Colo Mental Health Institute at Pueblo	1600 W 24th St	Pueblo	0.06663	133.3
Tony J Beltramo & Sons Inc	1541 Stockyard Rd	Pueblo	0.06064	121.3
Western Metals Recycling	2100 W Oxford Ave	Sheridan	0.05998	120.0
Mikron Assembly Technology	562 Sable Blvd	Aurora	0.05515	110.3
Sanmina-Sci Corporation	702 Bandlely Dr	Fountain	0.05150	103.0
Davis Wire Pueblo Corp.	2100 South Dr Bldg 14	Pueblo	0.03100	62.0
Clean Harbors	21211 County Road 32.2	Sterling	0.02855	57.1
Denver Truck & Trailer	5280 Newport St	Commerce City	0.02150	43.0
Western Foundries	100 Martin St	Longmont, S Of	0.01905	38.1
Rocky Mountain Bottle Co	10619 W 50th Ave	Wheat Ridge	0.01520	30.4
Pet Cremation Services, Inc.	12000 W 52nd Ave	Wheat Ridge	0.01394	27.9
Colorado Springs Utilities-Drake Plant	700 Conejos St	Colorado Springs	0.00910	18.2
Holcim (US) Inc. Portland Plant	3500 Hwy 120	Florence, 3.8 Mi E Of	0.00470	9.4
Colorado Springs Utilities - Nixon Plant	14020 Ray Nixon Rd.	Fountain Area	0.00290	5.8
Tri State Generation Nucla	30739 Dd 31 Rd	Nucla, 2.6 Mi E Of	0.00200	4.0
IR Security and Safety	3899 Hancock Expy	Security	0.00185	3.7
Metro Wastewater Reclamation Dist/Trigen	6450 York St	Commerce City Area	0.00100	2.0
Oak Creek Junior High S Routt Cnty Sd	Grant St	Oak Creek	0.00059	1.2
Imperial Funeral Home & Cemetery	5450 Hwy 78 West	Pueblo	0.00051	1.0
Brite Line Technologies Inc	10660 E 51st Ave	Denver	0.00005	0.1
Total			2.70753	5,415.1

* Colorado Air Pollutant Emission Inventory data retrieved on October 17, 2008; not reviewed

Note: Only sources >0.1 lbs/year are listed

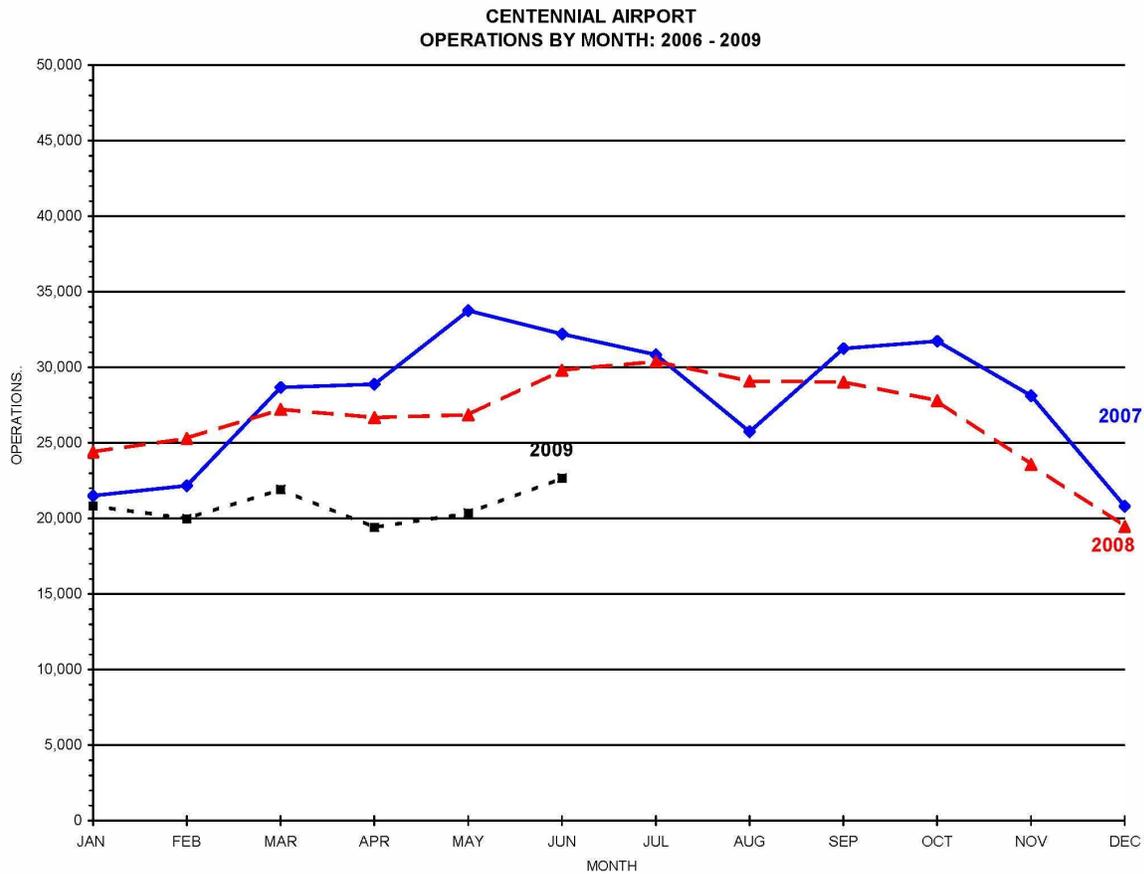
Note 2: Crematory data reviewed 9/14/09. The emissions for Cappadona's Family Services, Pet Cremation Services Inc, and Imperial Funeral Home and Cemetery have been corrected.

Emissions from these sources are 0 TPY individually. As a result, these sources are no longer listed in the APEN inventory.

Table 5. Actual Lead Emissions at Colorado-Golden Energy Corporation

Year	Lead Lbs/Yr	Lead TPY
2005	415	0.208
2006	411	0.206
2007	363	0.182

Figure 8. Centennial Airport Operations (Takeoffs and Landings)



(Ref: <http://www.centennialairport.com/Operations-Statistics>)

Factor # 3: Population Density and Degree of Urbanization

The region’s population density/degree of urbanization information illustrates that the urbanization and the associated activities that can result in lead emissions is concentrated within the Front Range area of Colorado, from Fort Collins in the north through Denver to Colorado Springs in the south. Most of the industries, such as boilers, manufacturing metals industries, and waste incineration that emit lead are located in the most populated areas of the state. Also, airports with the most piston engine aircraft (general aviation) activity are located in or near the highest populated urban areas. Urbanization rapidly diminishes beyond the central portion of the Front Range area. Because population in the surrounding counties is low by comparison, and the human landscape is mainly rural, the population/ urbanization information supports the recommended attainment or attainment/unclassifiable designation for the State.

EPA requires that each Core Based Statistical Area (CBSA) with a population above 500,000 people should have a neighborhood scale TSP-lead monitor by 2011 (Ref: Federal Register, Vol. 73, No. 219, November 12th 2008, Page 67,029). These are called non-source oriented or

population oriented monitors. A neighborhood scale lead monitor is already located in the Denver-Aurora-Boulder CBSA at the Denver Municipal Animal Shelter site. Neighborhood scale monitors are population oriented monitors sited in areas that are representative of concentrations that are homogeneous for 500 m – 4 km around the site. Another neighborhood scale monitor is required to be installed in Colorado Springs by January 1, 2011. These are the only two areas in the state with a CBSA population above 500,000.

Core Based Statistical Area (CBSA) describes both metropolitan and micropolitan areas. A metro area contains a core urban area population of 50,000 or more, and a micro area contains an urban core population of at least 10,000 (but less than 50,000). Each metro or micro area may consist of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration – which is measured by commuting to work - with the urban core. (Ref: <http://www.census.gov/population/www/metroareas/metroarea.html>)

Figure 9 shows the boundaries of the CBSAs for Colorado. Colorado does not currently have any non-attainment areas for lead. Figure 10 shows the population density and the degree of urbanization for Colorado based on the 2000 US Census. The Front Range area is evident by the higher population densities.

Figure 9. 2004 Core Based Statistical Areas and Counties in Colorado

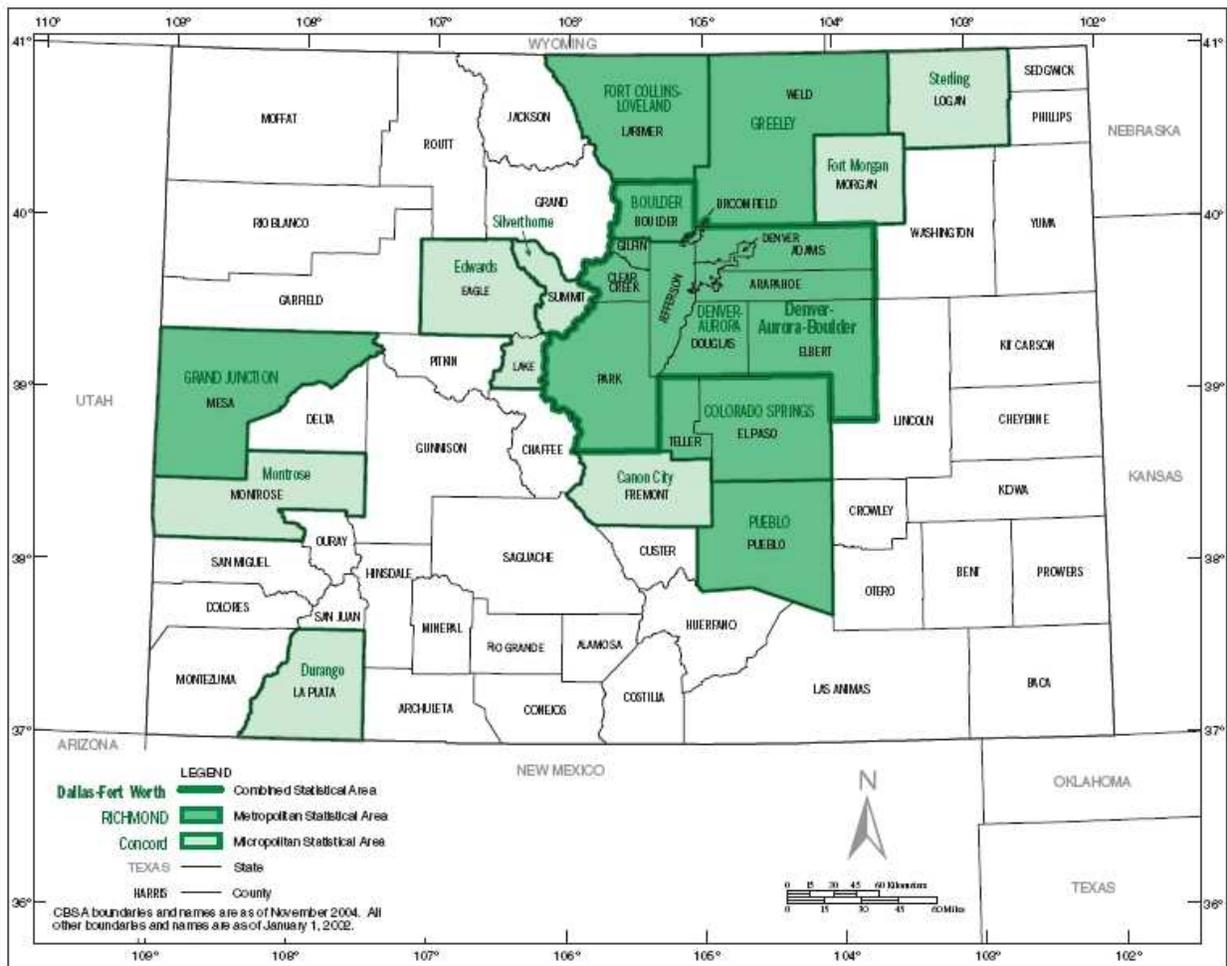
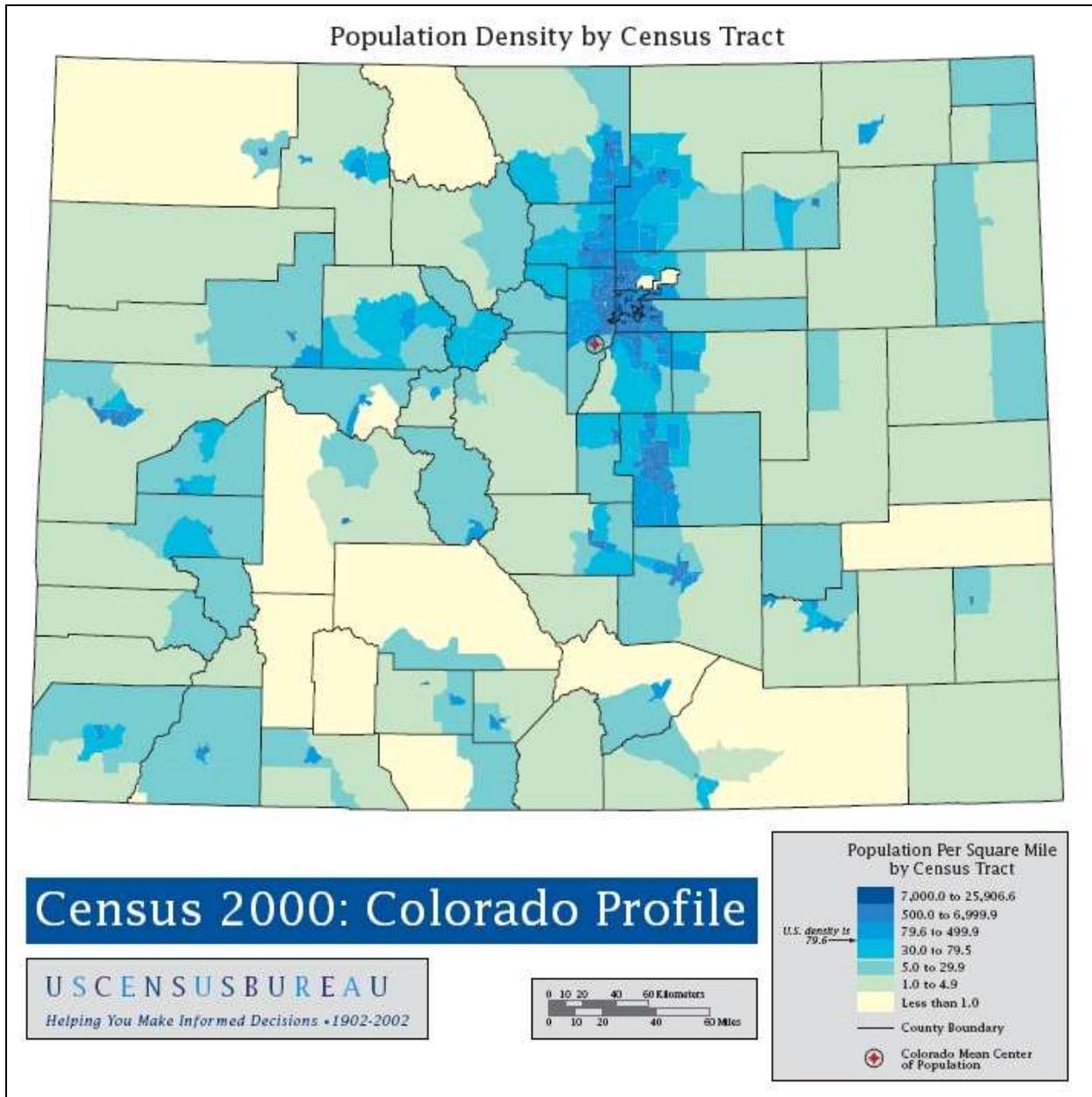


Figure 10. Population Density & Degree of Urbanization for Colorado



Factor #4: Expected Growth

The region's growth rates and patterns illustrate that vast majority of increased population and urbanization will occur within the current Front Range area. Population density and developed areas are projected to rapidly diminish beyond the core area of the Front Range. Because projected population and activity in the surrounding counties is low by comparison, and the human landscape is projected to be rural with small pockets of development, the growth information supports the recommended attainment designation for the current or recently monitored Front Range area and attainment/unclassifiable for the rest of the state.

Table 6 provides a summary of population growth for Colorado from 2000 to 2006. It can be seen that approximately 80 percent of the population resides in the Front Range area. Table 7 shows population projections out to 2035. As with current populations, it shows that approximately 80 percent of the population will continue to be in the Front Range area.

Table 6. Final Colorado Population Estimates by Region, 2000-2007

REGIONS	USCB Count								Avg Annual % Change			
	April, 2000	July, 2001	July, 2002	July, 2003	July, 2004	July, 2005	July, 2006	July, 2007	00-01	03-04	05-06	06-07
COLORADO	4,262,989	4,457,665	4,531,539	4,595,814	4,664,062	4,731,799	4,827,387	4,919,884	4.6%	1.5%	2.0%	1.9%
FRONT RANGE	3,473,684	3,641,078	3,703,367	3,756,129	3,816,232	3,875,689	3,956,233	4,033,438	4.8%	1.6%	2.1%	2.0%
Denver-Bldr Region	2,362,308	2,484,748	2,522,699	2,556,011	2,595,704	2,629,526	2,680,647	2,734,483	5.2%	1.6%	1.9%	2.0%
Denver PMSA	2,092,494	2,201,954	2,237,979	2,270,656	2,308,393	2,341,421	2,389,900	2,439,829	5.2%	1.7%	2.1%	2.1%
Boulder PMSA	269,814	282,794	284,720	285,355	287,311	288,105	290,747	294,654	4.8%	0.7%	0.9%	1.3%
North Front Range	432,420	454,451	467,319	478,650	491,335	504,562	518,516	532,759	5.1%	2.7%	2.8%	2.7%
Fort Collins MSA	251,494	261,208	266,789	269,061	273,883	276,755	282,052	288,244	3.9%	1.8%	1.9%	2.2%
Greeley MSA	180,926	193,243	200,530	209,589	217,452	227,807	236,464	244,515	6.8%	3.8%	3.8%	3.4%
Colo. Springs MSA	537,484	557,695	566,518	572,899	579,626	590,686	603,987	610,473	3.8%	1.2%	2.3%	1.1%
Pueblo MSA	141,472	144,184	146,831	148,569	149,567	150,915	153,083	155,723	1.9%	0.7%	1.4%	1.7%
WESTERN SLOPE	459,423	480,254	488,573	496,838	505,055	513,541	527,475	542,296	4.5%	1.7%	2.7%	2.8%
Region 9	80,071	82,614	83,736	84,846	85,949	87,155	89,020	90,452	3.2%	1.3%	2.1%	1.6%
Region 10	86,348	89,162	90,644	91,881	93,393	94,934	96,799	99,334	3.3%	1.6%	2.0%	2.6%
Region 11	198,906	206,001	210,077	214,075	218,297	222,602	230,613	238,901	3.6%	2.0%	3.6%	3.6%
Grand Junction MSA	116,255	120,209	122,427	125,098	127,904	130,604	135,301	140,416	3.4%	2.2%	3.6%	3.8%
Region 12	94,098	102,477	104,116	106,036	107,416	108,850	111,043	113,609	8.9%	1.3%	2.0%	2.3%
CENTRAL MTNS.	125,373	128,052	129,681	131,215	130,927	131,501	132,272	133,317	2.1%	-0.2%	0.6%	0.8%
Clr. Crk. & Gilpin	14,079	14,331	14,373	14,478	14,431	14,465	14,487	14,549	1.8%	-0.3%	0.2%	0.4%
Park Co.	14,523	15,277	15,609	16,072	16,289	16,529	16,682	17,005	5.2%	1.4%	0.9%	1.9%
Region 13	73,702	75,038	75,766	75,994	76,091	76,279	76,698	77,237	1.8%	0.1%	0.5%	0.7%
Region 14	23,069	23,406	23,933	24,671	24,116	24,228	24,405	24,526	1.5%	-2.2%	0.7%	0.5%
SAN LUIS VALLEY	46,190	46,934	47,386	48,076	48,669	48,665	48,527	48,204	1.6%	1.2%	-0.3%	-0.7%
EASTERN PLAINS	158,319	161,347	162,532	163,556	163,179	162,403	162,880	162,629	1.9%	-0.2%	0.3%	-0.2%
Region 1	69,669	71,701	72,079	72,614	72,230	72,103	72,346	72,368	2.9%	-0.5%	0.3%	0.0%
Region 5	36,201	37,822	38,497	38,865	38,994	38,927	39,119	38,953	4.5%	0.3%	0.5%	-0.4%
Region 6	52,449	51,824	51,956	52,077	51,955	51,373	51,415	51,308	-1.2%	-0.2%	0.1%	-0.2%
NON-FRONT RANGE	789,305	816,587	828,172	839,685	847,830	856,110	871,154	886,446	3.5%	1.0%	1.8%	1.8%

Source: Colorado Division of Local Government, Demography Office

Table 7. Preliminary Population Forecasts by Region, 2000-2035

PRELIMINARY POPULATION FORECASTS BY REGION, 2000 - 2035																
REGIONS	SDO Est.	SDO Proj.	Average Annual Percent Change													
	July, 2000	July, 2005	July, 2010	July, 2015	July, 2020	July, 2025	July, 2030	July, 2035	00-05	05-10	10-15	15-20	20-25	25-30	30-35	
COLORADO	4,339,549	4,731,787	5,218,144	5,737,305	6,287,021	6,823,546	7,331,876	7,819,775	1.7%	2.0%	1.9%	1.8%	1.7%	1.4%	1.3%	
FRONT RANGE	3,539,515	3,875,712	4,263,593	4,660,257	5,066,529	5,469,592	5,846,224	6,215,054	1.8%	1.9%	1.8%	1.7%	1.5%	1.3%	1.2%	
Denver-Bldr Region	2,419,052	2,629,533	2,877,742	3,108,296	3,351,060	3,580,826	3,780,421	3,958,718	1.7%	1.8%	1.6%	1.5%	1.3%	1.1%	0.9%	
Denver PMSA	2,143,981	2,341,428	2,574,465	2,787,334	3,010,705	3,221,794	3,405,910	3,572,567	1.8%	1.9%	1.6%	1.6%	1.4%	1.1%	1.0%	
Boulder PMSA	275,071	288,105	303,277	320,962	340,355	359,032	374,511	386,151	0.9%	1.0%	1.1%	1.2%	1.1%	0.8%	0.6%	
North Front Range	436,691	504,566	574,114	649,778	736,519	834,154	935,315	1,036,352	2.9%	2.6%	2.5%	2.5%	2.5%	2.3%	2.1%	
Fort Collins MSA	253,131	276,757	306,176	338,548	373,471	410,990	446,962	480,691	1.8%	2.0%	2.0%	2.0%	1.9%	1.7%	1.5%	
Greeley MSA	183,560	227,809	267,938	311,230	363,048	423,164	488,353	555,661	4.4%	3.3%	3.0%	3.1%	3.1%	2.9%	2.6%	
Colo. Springs MSA	541,718	590,696	646,954	724,165	784,942	844,412	903,778	975,994	1.7%	1.8%	2.3%	1.6%	1.5%	1.4%	1.5%	
Pueblo MSA	142,054	150,917	164,783	178,018	194,008	210,200	226,710	243,990	1.2%	1.8%	1.6%	1.7%	1.6%	1.5%	1.5%	
WESTERN SLOPE	468,368	513,484	598,399	683,247	779,051	867,185	958,860	1,044,209	1.9%	3.1%	2.7%	2.7%	2.2%	2.0%	1.7%	
Region 9	80,862	87,128	94,824	107,849	123,431	137,538	151,042	163,815	1.5%	1.7%	2.6%	2.7%	2.2%	1.9%	1.6%	
Region 10	86,866	94,909	107,791	124,650	141,293	158,170	173,794	186,606	1.8%	2.6%	2.9%	2.5%	2.3%	1.9%	1.4%	
Region 11	201,181	222,608	272,948	309,995	354,820	395,994	441,868	483,195	2.0%	4.2%	2.6%	2.7%	2.2%	2.2%	1.8%	
Grand Junction MSA	117,653	130,605	153,457	169,603	188,396	206,057	230,087	249,963	2.1%	3.3%	2.0%	2.1%	1.8%	2.2%	1.7%	
Region 12	99,459	108,839	122,836	140,753	159,507	175,483	192,156	210,593	1.8%	2.4%	2.8%	2.5%	1.9%	1.8%	1.8%	
CENTRAL MTNS.	126,179	131,507	142,040	161,377	184,268	206,319	225,550	240,603	0.8%	1.6%	2.6%	2.7%	2.3%	1.8%	1.3%	
Cir. Crk. & Gilpin	14,162	14,464	15,101	16,777	18,568	20,342	22,080	23,720	0.4%	0.9%	2.1%	2.0%	1.8%	1.7%	1.4%	
Park Co.	14,698	16,525	18,748	23,462	29,553	35,954	40,596	43,345	2.4%	2.6%	4.6%	4.7%	4.0%	2.5%	1.3%	
Region 13	74,172	76,287	82,539	92,626	104,765	115,949	126,680	135,496	0.6%	1.6%	2.3%	2.5%	2.0%	1.8%	1.4%	
Region 14	23,147	24,231	25,652	28,512	31,382	34,074	36,194	38,042	0.9%	1.1%	2.1%	1.9%	1.7%	1.2%	1.0%	
SAN LUIS VALLEY	46,416	48,654	49,041	52,869	56,938	60,638	64,130	67,431	0.9%	0.2%	1.5%	1.5%	1.3%	1.1%	1.0%	
EASTERN PLAINS	159,071	162,430	165,071	179,555	200,235	219,812	237,112	252,478	0.4%	0.3%	1.7%	2.2%	1.9%	1.5%	1.3%	
Region 1	70,139	72,118	73,794	79,832	87,284	94,872	101,846	108,380	0.6%	0.5%	1.6%	1.8%	1.7%	1.4%	1.3%	
Region 5	36,598	38,941	39,385	45,712	56,869	67,091	76,044	83,781	1.2%	0.2%	3.0%	4.5%	3.4%	2.5%	2.0%	
Region 6	52,334	51,371	51,892	54,011	56,082	57,849	59,222	60,317	-0.4%	0.2%	0.8%	0.8%	0.6%	0.5%	0.4%	
NON-FRONT RANGE	800,034	856,075	954,551	1,077,048	1,220,492	1,353,954	1,485,652	1,604,721	1.4%	2.2%	2.4%	2.5%	2.1%	1.9%	1.6%	

Source: Colorado Division of Local Government, Demography Office

Factor #5: Meteorology

Lead and lead compounds are emitted directly into the ambient air by combustion processes and by re-entrainment as fugitive dust. No complex chemistry is needed to form lead or lead compounds in the ambient air. Unlike ozone, lead is stable in the air. Thus, concentrations of lead are typically found to be highest near lead emitters. Meteorology is useful alone and in dispersion models to determine where lead is dispersed and to locate the maximum concentration zone for siting lead monitors. Wind roses are included in this document to show the prevailing wind directions for the areas where lead monitors are located, or plan to be located in the next two years.

Figure 11. Denver International Airport 10-Year Wind Rose from the National Climatic Data Center

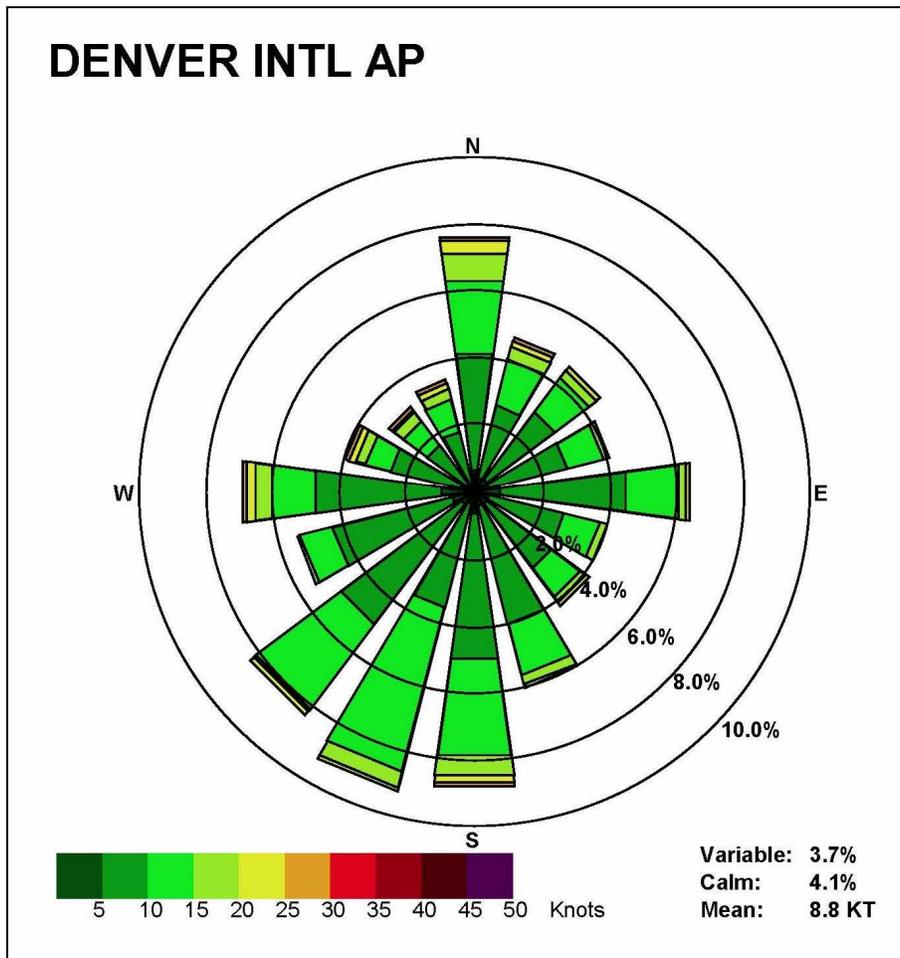


Figure 12. Denver CAMP Monitoring Site 2008 Wind Rose

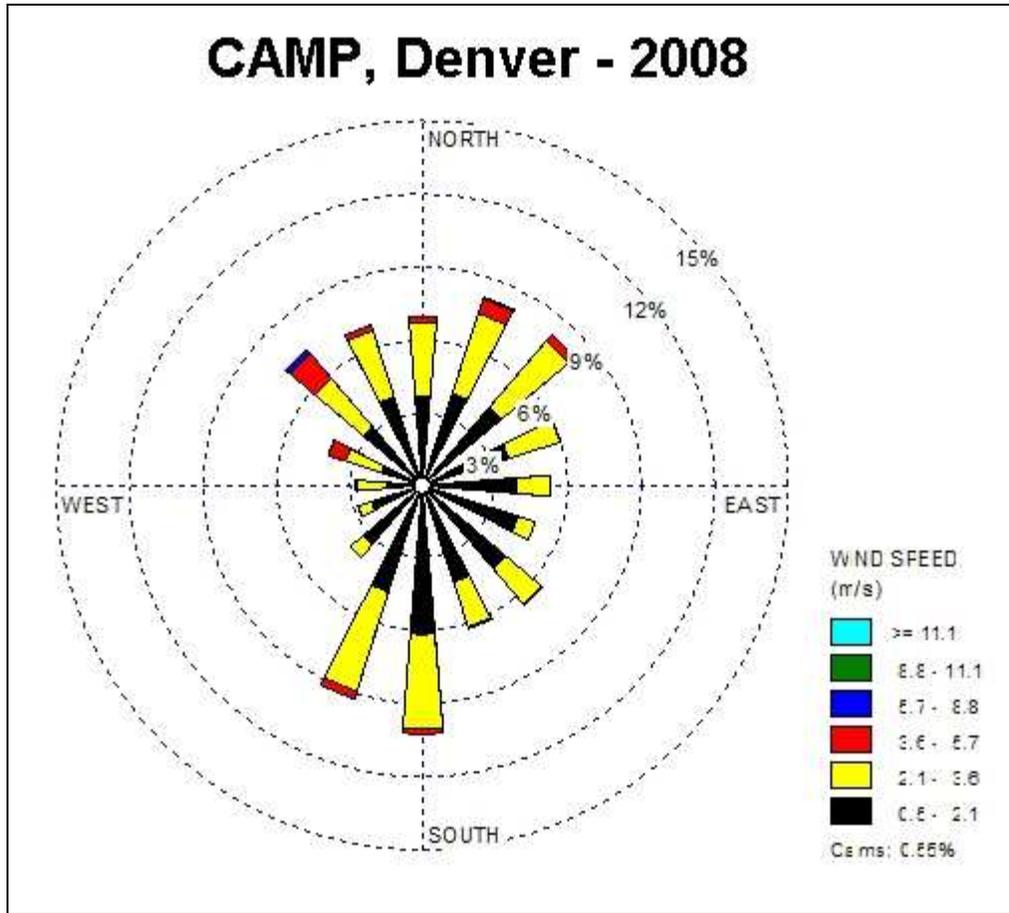


Figure 13. Alsup Elementary School Monitoring Site 2008 Wind Rose

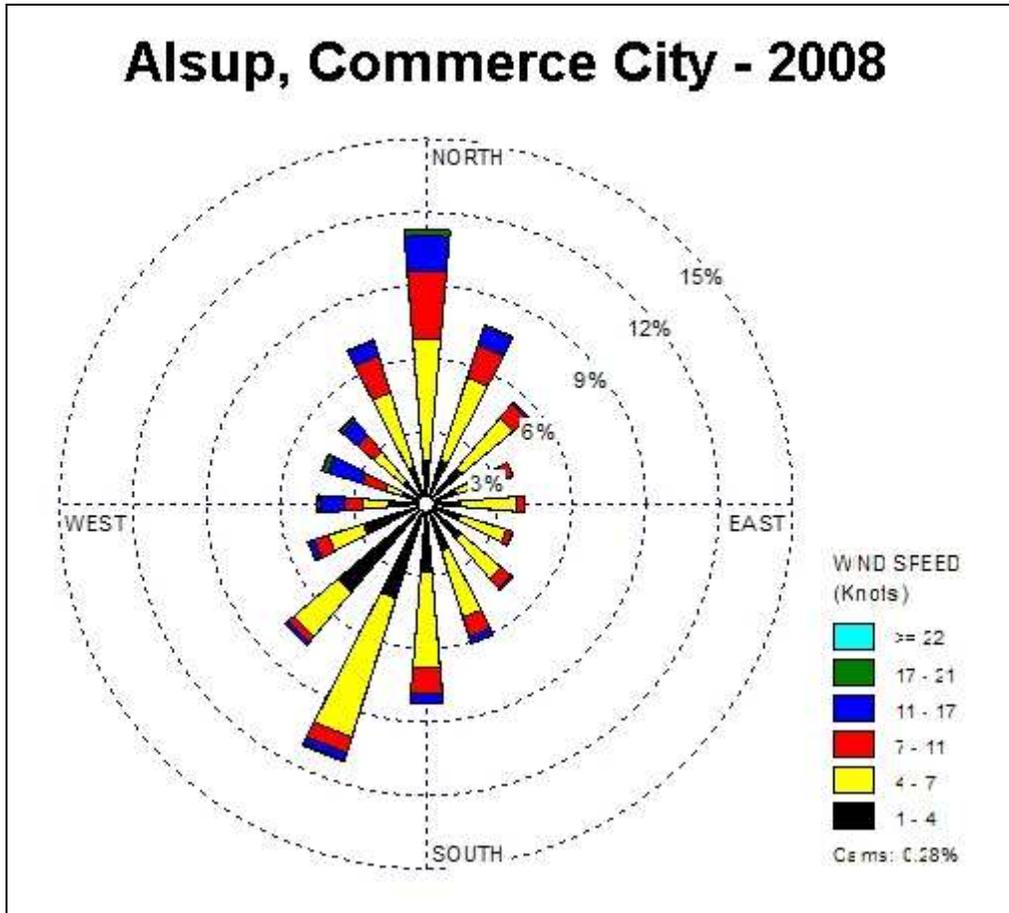
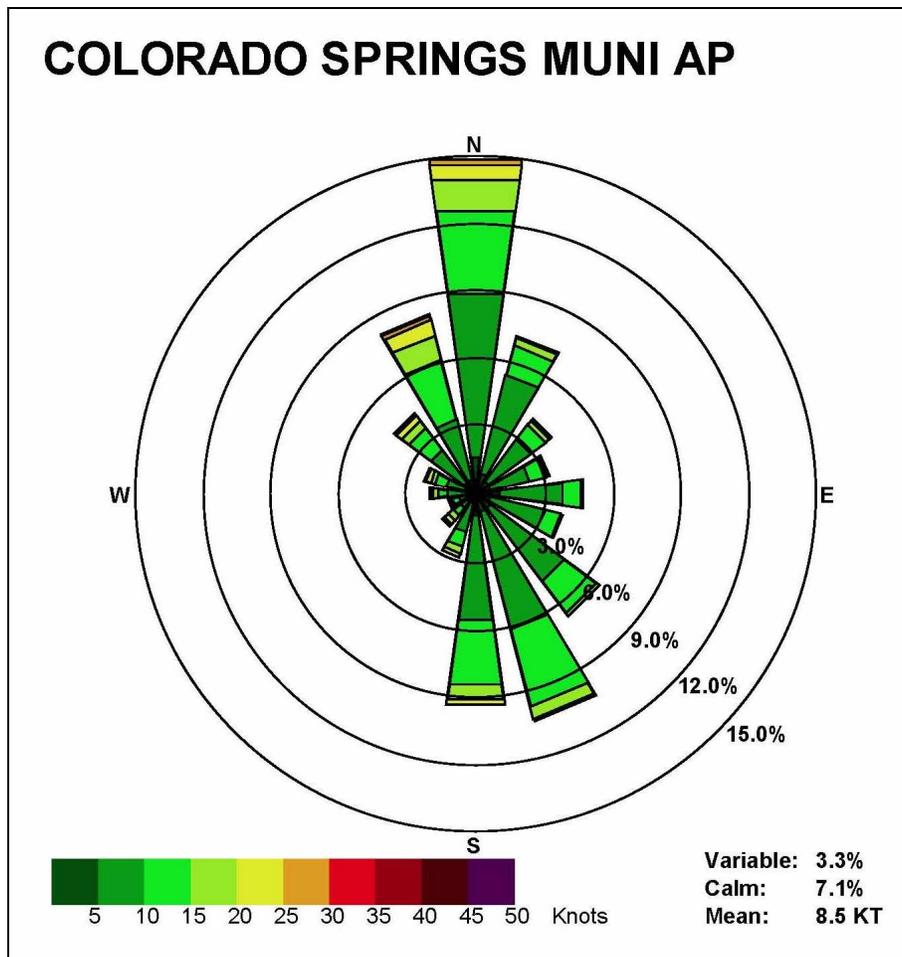


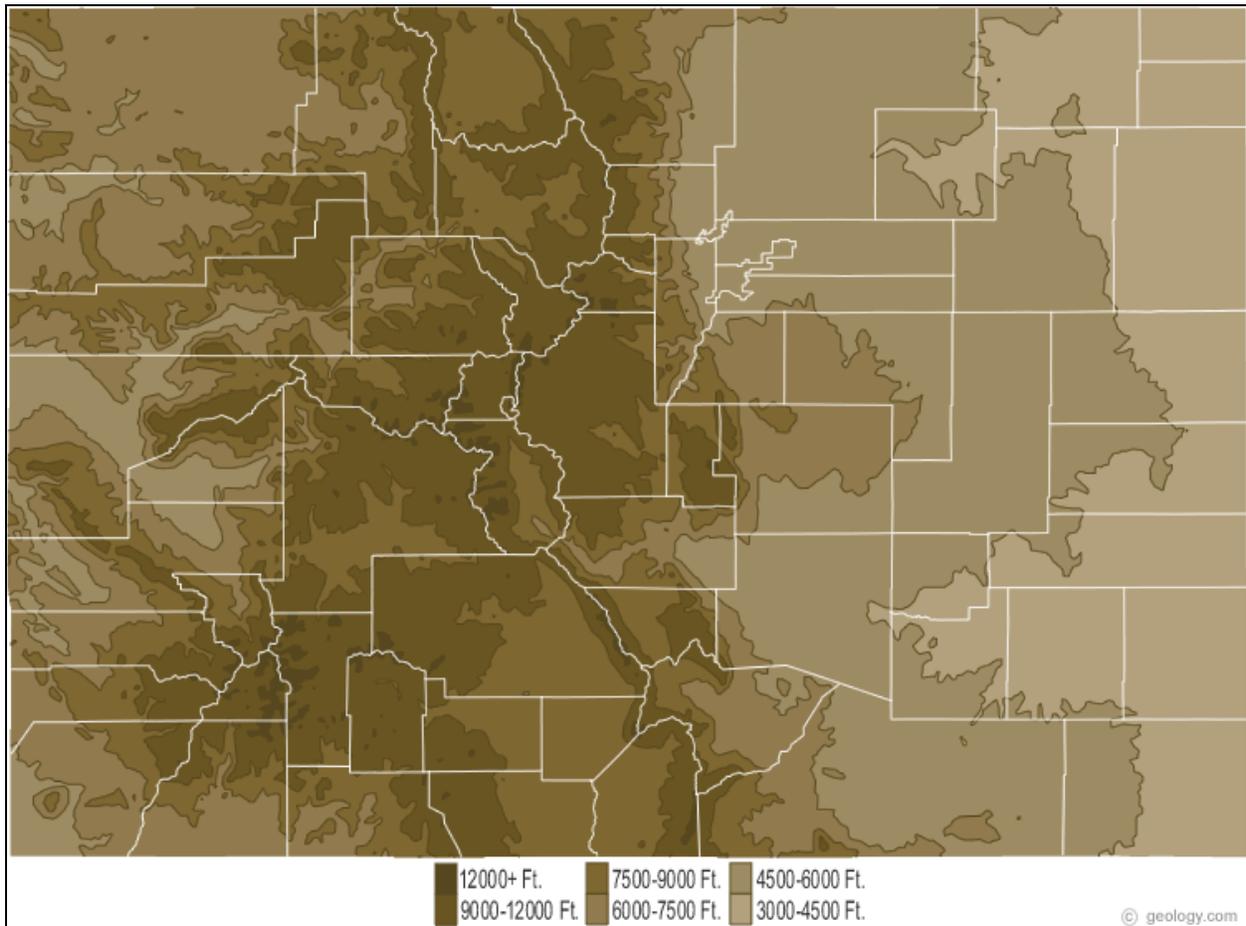
Figure 15. Colorado Springs Municipal Airport 10-Year Wind Rose from the National Climatic Data Center



Factor #6: Geography/Topography

Colorado is defined by high plains in the east, mountains in the center and plateaus in the west. Figure 16 provides an elevation map for Colorado that shows these distinct areas in more detail. Since lead is emitted directly from sources, topography typically only has an effect at a localized level where air movement can be trapped.

Figure 16. Elevation Map of Colorado



Factor #7: Jurisdictional Boundaries

Colorado Air Quality Control Commission

The Colorado Air Quality Control Commission (AQCC) is the regulatory body with responsibility for adopting air quality regulations consistent with state statute including the responsibility and the authority to adopt state implementation plans (SIPs) and implementing regulations. The AQCC takes action on SIPs and regulations through a public rulemaking process. The AQCC has nine members who are appointed by the Governor and confirmed by the State Senate.

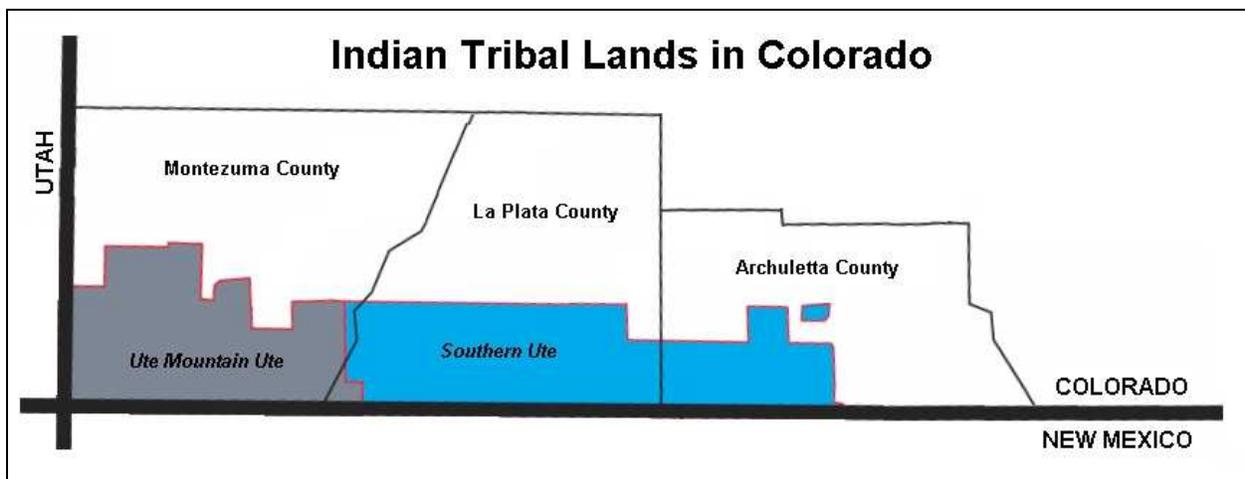
Southern Ute Indian Tribe and Ute Mountain Ute Indian Tribe

Three counties in Southwest Colorado - Archuleta, La Plata and Montezuma – include two Indian Tribal Nations, the Southern Ute and Ute Mountain Ute. As indicated in Figure 17, the

Southern Ute Indian Tribal (SUIT) lands extend along the Colorado-New Mexico border from just inside southeastern Montezuma County, across all of southern La Plata County, and into part of southwestern Archuleta County. The Ute Mountain Ute Indian Tribal (UMUIT) lands extend along the Colorado-New Mexico border in southern Montezuma County and just into southwestern La Plata County, with a portion extending into New Mexico.

The State of Colorado's AQCC and Air Pollution Control Division exercise air quality jurisdiction in Colorado counties outside the boundaries of the Tribal lands. Air quality regulatory authority for the SUIT Reservation is generally exercised at the present by the EPA and the SUIT/State of Colorado Environmental Commission (Public Law 108-336, 10/18/2004). Air quality regulatory authority for the UMUIT Reservation is generally exercised at the present by the EPA.

Figure 17. Indian Tribes in Colorado



Factor #8: Level of Control of Emission Sources

Controls are not needed as all sites in Colorado are in attainment or attainment/unclassifiable. The only site that showed problems attaining the new lead NAAQS was located across the street from ASARCO at the Denver-Clinicare site. The monitoring site was shut down after the ASARCO site and surrounding neighborhoods were remediated and the entire facility was closed in August 2006. Lead concentrations at the Denver-Clinicare site after August 2006 dropped an order of magnitude below the new standard to 0.010 ug/m³. Concentrations at the three other Denver metro area sites also decreased during the remainder of 2006. The rolling three-month averages dropped to around 0.005, 0.006, and 0.008 ug/m³ at Alsup Elementary in Commerce City, CAMP in downtown Denver, and the Denver Animal Shelter in south Denver, respectively. The Denver Animal Shelter site continues to monitor for lead and the highest 3-month rolling average since August 2006 was 0.009 ug/m³, which is well below the standard of 0.15 ug/m³. Thus, there is no need for further lead controls in Colorado.

Summary Conclusions:

The data and analysis presented by the eight factors provide documentation and compelling evidence supporting a finding that Colorado should be designated as attainment or attainment/unclassifiable for the 2008 lead NAAQS. It is important to note that only areas over which Colorado has direct air quality jurisdiction are included in this attainment attainment/unclassifiable finding and recommendation. The Southern Ute Indian Tribe, and the Southern Ute Indian Tribe/State of Colorado Environmental Commission, as well as the Ute Mountain Ute Indian Tribe, are distinct nations or entities and consequently such Tribal lands are specifically excluded from this designation recommendation.

A summary of the reasons for the attainment or attainment/unclassifiable designations include:

1. Technically, all three-month rolling average lead values for sites in Colorado are well below 0.15 ug/m³. However, by including November and December 2005 in the January 2006 rolling three-month average, Colorado has one three-month rolling average that exceeds the new standard. This higher three-month average is due to the operation and remediation of the ASARCO facility and surrounding neighborhoods. Since the ASARCO facility was remediated and closed in August 2006, there is no purpose to classifying the area as non-attainment.
2. Emissions data for point sources shows that all point sources are far below the 1 ton per year threshold set by EPA.
3. Emissions data for one non-road mobile source shows that Centennial Airport has emissions of 1.18 tons per year. A monitor will be installed at this site by January 1, 2010.
4. Population density areas above 500,000 including Colorado Springs will have a monitor installed by January 1, 2011.

This eight-factor analysis provide documentation and compelling evidence supporting a finding that the State of Colorado be designated as attainment and attainment/unclassifiable for the revised lead standard. Table 8 provides a complete listing of the recommended designations, by area. Figure 18 provides a map of the Air Quality Control Regions for Lead Designations in Colorado. These recommendations are based on (1) monitoring information that indicates compliance with the revised standard, (2) population levels, and (3) emissions data that shows where the state must add monitors and where new monitors are not needed due to low lead emissions.

Table 8. Recommended Lead Designations by Area for Colorado

2009 Colorado Designations for Lead NAAQS (based on 2006–2008 monitoring data)	
Air Quality Control Regions (AQCR)	Lead NAAQS Designation
State AQCR 01 Logan County Morgan County Phillips County Sedgwick County Washington County Yuma County	Attainment/Unclassifiable
State AQCR 02 Larimer County Weld County	Attainment/Unclassifiable
State AQCR 03 Adams County Arapahoe County Boulder County (including the portion of Rocky Mountain National Park therein) Broomfield County Clear Creek County Denver County Douglas County Jefferson County Gilpin County	Attainment
State AQCR 04 El Paso County Park County Teller County	Attainment/Unclassifiable
State AQCR 05 Cheyenne County Elbert County Kit Carson County Lincoln County	Attainment/Unclassifiable
State AQCR 06 Baca County Bent County Crowley County Kiowa County Otero County Prowers County	Attainment/Unclassifiable
State AQCR 07 Huerfano County Las Animas County Pueblo County	Attainment/Unclassifiable
State AQCR 08 Alamosa County	Attainment/Unclassifiable

2009 Colorado Designations for Lead NAAQS (based on 2006–2008 monitoring data)	
Air Quality Control Regions (AQCR)	Lead NAAQS Designation
Conejos County Costilla County Mineral County Rio Grande County Saguache County	
State AQCR 09 Archuleta County (part) excluding Southern Ute Indian Tribe (SUIT) lands Dolores County La Plata County (part) excluding SUIT and Ute Mountain Ute Tribe lands Montezuma County (part) excluding SUIT and Ute Mountain Ute Tribe lands San Juan County	Attainment/Unclassifiable
State AQCR 10 Delta County Gunnison County Hinsdale County Montrose County Ouray County San Miguel County	Attainment/Unclassifiable
State AQCR 11 Garfield County Mesa County Moffat County Rio Blanco County	Attainment/Unclassifiable
State AQCR 12 Eagle County Grand County Jackson County Pitkin County Routt County Summit County	Attainment/Unclassifiable
State AQCR 13 Chaffee County Custer County Fremont County Lake County	Attainment/Unclassifiable

Figure 18. Map of Air Quality Control Regions for Lead Designations in Colorado

