Air Quality Technical Report

State Highway 82 / Entrance to Aspen
Environmental Reevaluation

February 28, 2007

Colorado Department of Transportation, Region 3

and

Federal Highway Administration, Colorado Division

Prepared by:

HDR Engineering, Inc.

Contents

Tables

Figures

1.0 Affected Environment

This report provides a reevaluation of the air quality analysis presented in the 1997 State Highway 82/Entrance to Aspen Final Environmental Impact Study (FEIS) for the Preferred Alternative selected in the Record of Decision (ROD) issued in August 1998.[1]

The study area defined for air quality is in an area which, at the time of publication of the FEIS and ROD, was designated by the US Environmental Protection Agency (EPA) under 40 CFR 81 as an air quality non-attainment area for particles under 10 microns in diameter (PM_{10}) with respect to National Ambient Air Quality Standards (NAAQS). However, the area is now considered to be an attainment/maintenance area for PM_{10}, after being re-designated as such on July 14, 2003. For projects in areas designated as attainment/maintenance, federal conformity rules (40 CFR 93) and guidance have been established to help ensure that federal actions or approvals do not impede state or local agency plans to maintain compliance with the NAAQS. The entire study area is and always has been an attainment area for all pollutants other than PM_{10}.

1.1 Methodology

The affected environment was characterized in terms of its attainment status for all criteria pollutants, described in the following section. Monitoring data within the study area was reviewed to provide a historical record of the air quality since the ROD was issued. This air quality reevaluation uses current traffic counts and projections to estimate air pollutants emissions within the study area, following the same general methods used in the Technical Support Document (TSD) (CDPHE, 2000) associated with the Maintenance Plan for the Aspen Area (dated December 20, 2000 and approved July 14, 2003 by EPA) and the currently approved State Implementation Plan (SIP).

By comparing air emissions based on the current and most recent projected traffic counts associated with the Preferred Alternative to emissions listed in the current SIP, and per 40 CFR 93, this reevaluation will determine whether air quality will conform to the allowable emissions in the current SIP, and therefore, whether the air quality-related findings of the 1998 ROD are still valid.

1.2 Regulatory Overview

Since the FEIS was published in 1997, a number of new air quality regulations have been promulgated. One of these rules established primary and secondary NAAQS for particles under 2.5 microns in diameter

[1] The 1997 FEIS analyzed PM_{10} emissions by category of alternative, rather than each individual alternative. The Preferred Alternative (as selected in the 1998 ROD) was included in the "Average of DSEIS Alternatives" on FEIS Table V-6, page V-25. This reevaluation addresses only the Preferred Alternative, rather than an average of alternatives, or any other individual alternative.

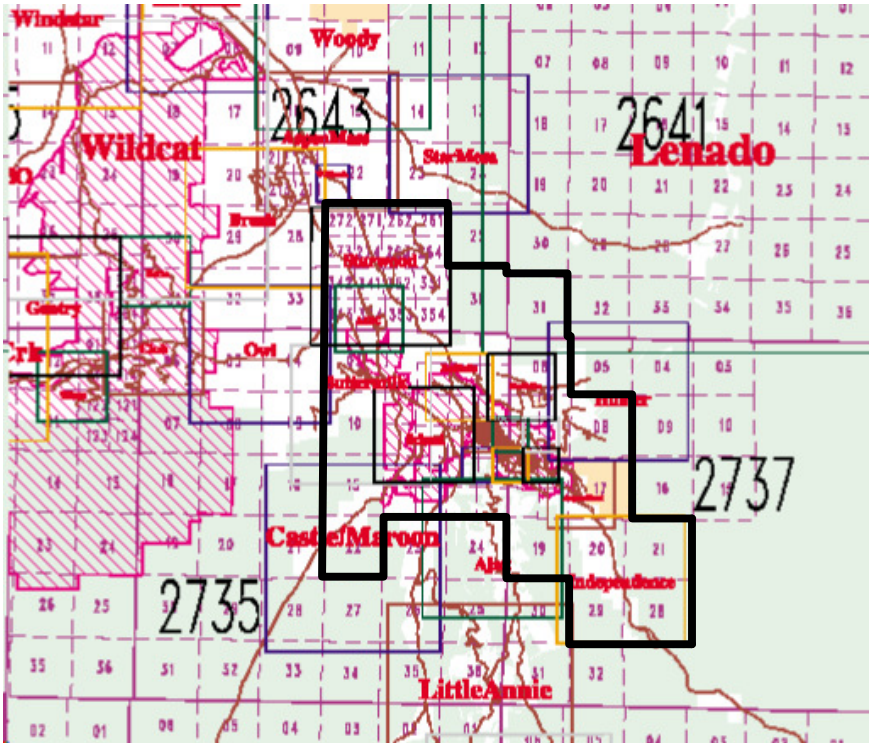
($PM_{2.5}$). Pitkin County is considered to be an attainment area with respect to $PM_{2.5}$ (as is the entire State of Colorado). There has been no monitoring of $PM_{2.5}$ in Pitkin County, because air pollution control agencies do not expect levels of emissions in the area to present a concern for violation of the NAAQS for this pollutant.

Another change to the NAAQS is the elimination of the 1-hour ozone standard, which was replaced with an 8-hour ozone standard. Pitkin County is an attainment area with respect to the ozone standard. There has been no monitoring of ozone in Pitkin County, because air pollution control agencies do not expect levels of emissions in the area to present a concern for violation of the NAAQS for this pollutant.

The Transportation Conformity Rule was amended on July 1, 2004 (69 Federal Register 40004) to include criteria and procedures for the 8-hour ozone and $PM_{2.5}$ NAAQS. As noted above, Pitkin County is an attainment area with respect to these pollutants.

A rule regarding hot-spot analyses for $PM_{2.5}$ and PM_{10} was made final on March 10, 2006 (71 Federal Register 12468). This rule establishes project-level criteria to demonstrate that statutory requirements of the Clean Air Act are met. Under the rule, a hot-spot analysis must be completed for project-level conformity determinations for "projects of air quality concern" in PM_{10} and $PM_{2.5}$ non-attainment and maintenance areas. This rule applies to part of Pitkin County (the Aspen area, which is encompassed by portions of the Parcels 2737, 2735, 2641, and 2643 as shown below on Figure 1-1) as defined by the Pitkin County Planning Department because it is a maintenance area for PM_{10}. The maintenance area is defined as the area within the bold boundary shown in Figure 1-1. However, a quantitative analysis is not required because EPA has issued no quantitative modeling guidance for PM_{10} and $PM_{2.5}$ (40 CFR 93.123(b)(2)). PM_{10} is therefore addressed qualitatively in this report.

Figure 1-1
Aspen PM_{10} Maintenance Area



The 24-hour ambient air quality standard for $PM_{2.5}$ is in the process of being lowered from 65 µg/m^3 to 35 µg/m^3. This standard, which is based on a 3-year average of the 98th percentile of 24-hour concentrations, is effective December 17, 2006. EPA does not anticipate that Pitkin County will be classified as non-attainment for $PM_{2.5}$ as a result of this change (http://epa.gov/pm/pdfs/20061025_graphsmaps.pdf).

The FHWA has recently issued guidance on the analysis of mobile source air toxics (MSATs) for highway projects in relation to the NEPA process (FHWA, 2006). The guidance describes a tiered approach for analyzing MSATs depending on specific project circumstances. A quantitative analysis would be recommended for projects involving the creation or alteration of a major intermodal freight facility, or that would have projected annual average daily traffic (AADT) in the range of 140,000 or higher in the design year, and would be in close proximity to concentrations of vulnerable populations (schools, nursing homes, hospitals, etc.). The State Highway 82 Entrance to Aspen project does not meet these criteria, but instead falls into the second category for which FHWA recommends a qualitative analysis of MSATs. (See Section 2.2.1 for more detail.)

1.3 Description of the Existing Condition

The project area is located in a designated attainment area with respect to NAAQS for ozone (which is affected by volatile organic compounds (VOCs), also referred to as hydrocarbons), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and $PM_{2.5}$ as identified by EPA under 40 CFR 81. At the time of the FEIS publication, the project area was designated as a NAAQS non-attainment area for PM_{10}. The area was re-designated by EPA as an attainment/maintenance area for PM_{10} on July 14, 2003. For other pollutants, there are no monitoring data available in the area, but due to a lack of significant emissions sources for these pollutants, there is no expectation of air quality issues for these pollutants.

Table 1-1 provides a summary of air quality monitoring data in Aspen, taken from EPA's Air Quality System database (USEPA, 2006). The data show that there have been no exceedances of the PM_{10} 24-hour or annual standards since publication of the FEIS. In fact, other than in 1997 when the 24-hour highest, second-high (H2H) monitored concentration was 89 $\mu g/m^3$, no H2H monitored concentration has been 50 percent of the standard of 150 $\mu g/m^3$.

It should also be noted that attainment for a region is determined on a 3-year average of data. Given that the two prior year 24-hour concentrations are much lower than the standard, and the 2006 24-hour concentration to-date is also much lower than the standard (46 $\mu g/m^3$), there appears to be no danger of the region falling back into non-attainment status in the near future, barring unforeseen and unpredictable changes.

The location of the EPA monitoring equipment within Aspen was changed in 2002. The current location is on the top of a three-story structure, but current plans are to relocate the monitoring site back to street level.

Table 1-1
Monitored Particulate Matter Under 10 Microns in Diameter (PM_{10}) in Aspen

Year	24-Hour H2H[a] Concentration[b]	24-Hour NAAQS[b]	Annual Concentration[b]	Annual NAAQS[b]
1997	89	150	21	50
1998	64		23	
1999	73		25	
2000	71		22	
2001	66		23	
2002[c]	58		24	
2002[c]	49		20	
2003	70		19	
2004	46		18	
2005	64		19	

Notes

[a] High, Second High (H2H) value. One exceedance of the 24-Hour NAAQS is allowed per year.

[b] Concentrations shown are in micrograms per cubic meter ($\mu g/m^3$). The result shown is the higher of two monitors located at the same address for all years except 1997, which is the result from only one monitor.

[c] In 2002, the PM_{10} monitors in Aspen changed locations. At the start of 2002 and in previous years, the PM_{10} monitors were located at 420 East Main Street. By the end of 2002 and in subsequent years, the PM_{10} monitors were located at 120 Mill Street.

Source: EPA's Air Quality System Quick Look Report (AMP450) accessed Nov. 14, 2006.

In addition to PM_{10}, EPA's AirData database was queried for available monitoring data for all other criteria pollutants (CO, NO_2, Ozone, SO_2, $PM_{2.5}$, and Lead) for the past 10 years. There are currently no monitoring data available for these pollutants, as there are no expectations of air quality problems for these pollutants.

Two components of the Preferred Alternative have been constructed since the publication of the FEIS and ROD: (1) Owl Creek Road and West Buttermilk Road have been relocated to create a new, signalized intersection with State Highway 82 near the Buttermilk Ski Area; and (2) the roundabout at the Maroon Creek Road intersection has been completed.

In addition, the Maroon Creek Bridge Replacement Project is currently under construction, scheduled for completion by spring of 2008. This project is being constructed as a bridge replacement without any increase in roadway capacity. However, it will accommodate the Entrance to Aspen Preferred Alternative in the future by removing the center median and re-striping for two general-purpose lanes and two exclusive bus lanes.

The intersection of Truscott Drive and State Highway 82 was completed in 2001. While this intersection is not part of the Entrance to Aspen Project, its configuration accommodates the alignment for the east approach to the Maroon Creek Bridge Replacement Project.

A transportation easement across the Marolt-Thomas Open Space was conveyed from the City of Aspen to CDOT in August of 2002, as part of land exchange and mitigation agreements between CDOT and the City of Aspen and Pitkin County. (Refer to Appendix A and B in the 1998 Record of Decision for details of the open space conveyance agreements and mitigation commitments.)

2.0 Environmental Consequences

2.1 Methodology

The Technical Support Document (TSD) which accompanied the PM_{10} Redesignation Request and Maintenance Plan for the Aspen Area, and which was dated December 20, 2000, was obtained from the Colorado Air Pollution Control Division and reviewed. The existing and future pollutant emissions addressed in this analysis include existing and future project area PM_{10} emissions using the same factors and assumptions used in the TSD, with the following modifications:

- Existing analysis year is 2005 as opposed to 1997. Future analysis year is 2030 as opposed to 2015. Emissions from the activities described below were estimated and projected, as applicable, for both the existing and future year.
- State Highway 82 average annual daily traffic (AADT) for existing and future years was updated using the most recently available traffic projections and divided throughout the area by the same emissions inventory grid defined in the TSD (see Appendix A). Arterial, local, and gravel roads were assigned the same vehicle miles traveled (VMT) as that used in the TSD for 2005, for lack of current traffic data for these road types. (This is a reasonable assumption based on the decrease in AADT from 1997 to 2005; see further discussion of the current AADT below.) AADT was updated using the latest planning assumptions and traffic count information, as described in the technical reports for Social Environment and Community Character (FHWA and CDOT, February 2007c) and Traffic Characteristics and Safety (FHWA and CDOT, February, 2007b). The AADT growth rate assumed from 2005 to 2030 varies between 1.12% and 2.05% per year, depending on the roadway segment of State Highway 82 (see Appendix A).[2]
- Emissions due to wood-burning fireplaces were assumed to remain capped through 2030 due to local ordinances.
- Emissions due to wood-burning stoves were compounded annually by 1.6 percent from the 1997 data for both 2005 and 2030, to be consistent with the increases used in the TSD.
- Emissions due to restaurants were compounded annually by 1.6 percent from the 1997 data for both 2005 and 2030, to be consistent with the increases used in the TSD.

[2] Growth projections are based on actual traffic count data at various count locations. The adopted Regional Transportation Plan (RTP) and the Statewide RTP use this data and methodology, so it is also consistent with local plans and growth data.

- Aircraft emissions were projected to increase at a rate of 2.5 percent annually from the 1997 data for both 2005 and 2030, to be consistent with the increases used in the TSD.

The pollutant of concern in this analysis is PM_{10}. Other criteria pollutants, including VOCs, NOx, CO, SO2, and $PM_{2.5}$ are not of concern for this project because the area is designated as attainment for these pollutants. For roadway projects in non-attainment or maintenance areas, transportation conformity rules apply and hot-spot analyses are required for CO. Pitkin County is an attainment area with respect to CO and, therefore, is exempt from a CO hot-spot analysis.

The process used to calculate PM_{10} emissions from roads in the TSD was repeated using updated projected AADT for State Highway 82 (CDOT, 2006). These AADT data were assigned to the appropriate inventory grid, consistent with the grid used in the TSD. The TSD emissions were originally "modeled" using the paved road emission factor equation from EPA Publication AP-42. For the reevaluation, it is assumed that the paved road equation used in the TSD is still applicable. Since the preparation of the TSD, there has been only a very small (insignificant) change in the AP-42 equation, which has also been incorporated into the latest (MOBILE6.2) emissions model. This minor change in the AP-42 equation would reduce current PM_{10} emission estimates by less than 1% compared to the equation used in the prior TSD analysis. Therefore, the emissions estimates provided in this reevaluation are only very slightly conservative (high), and are thus consistent with the latest emissions model (MOBILE6.2) estimation procedures.

In the majority of inventory grid cells, the AADT for State Highway 82 in 2005 was approximately the same as the AADT in 1997. This decrease in projected growth is attributable to the general economic decline following September 11, 2001, as well as implementation of an incremental Transportation Management (TM) Program by the City of Aspen in 1995 (see the Traffic Characteristics and Safety Technical Report, and the System Management Technical Report for the Entrance to Aspen Environmental Reevaluation for more information on AADT). In light of this, the VMTs for arterial, local, and unpaved roads in 2005 were assumed to be the same as those in the TSD for 1997, to be conservative. The projected VMTs for arterial, local, and unpaved roads in 2030 were calculated based on the relationship between 2005 and 2030 volumes for State Highway 82, or calculated by the CDOT data base future traffic calculator (available on the CDOT website at www.dot.state.co.us). For unpaved roads, the same emission factor used in the TSD was used in this analysis.

Paved road emission factors, which were calculated using EPA's equation for re-entrained paved road dust (AP-42, 13.2.1 Paved Roads), were assumed to be the same factors used in the TSD. There are no new silt loading data which would be more appropriate to use for this reevaluation. For the purposes of the TSD, the paved road emission factors were based on a silt loading sampling study performed on March 3-20, 1997, and were substantially increased in the TSD from the sampled values (increases ranging from 42.5 percent to 217 percent, depending on the road type) to assume worst-case street sanding emissions. The TSD applied increases to the sampled values to account for the fact that the silt sampling was not conducted under worst-case silt loading conditions.

For all sources other than roads, the increase rates used in the TSD were also used here. In all cases, 1997 levels were increased by a proportional rate to 2005, depending on the source type, and increased from there by the same rate to 2030. Contributions from these sources are minimal compared to the estimated PM_{10} emissions from State Highway 82.

2.2 Preferred Alternative

2.2.1 PM10 Evaluation – Qualitative Hot-Spot Analysis and Comparison to Emissions Budget

This project is within a federally designated air quality attainment/maintenance area for PM_{10}. Federal conformity rules (40 CFR 93) and guidance have been established to help ensure that federal actions or approvals do not impede state or local agency plans to attain or maintain compliance with NAAQS. A project of this type, which is not currently listed in a conforming plan and TIP, must comply with applicable criteria listed in 40 CFR 93.109, Table 1. There are currently no EPA-approved models or methodology available to quantitatively analyze individual projects for their potential to cause or contribute to PM_{10} concentrations.

PM_{10} monitoring data (refer to Table 1-1) shows the project area to be within NAAQS, with concentrations being less than half the standard for every year since 1998. The most recent violation of the standard occurred in 1991.

Since the adoption of the currently approved SIP (approved by EPA on July 14, 2003), the amount of sanding in the project area has substantially increased, as shown in Table 2-1. The City of Aspen had at one point used de-icers, but has begun using sand again as the preferred method to combat snow and ice on roadways, as allowed by the SIP. No direct correlation can be made between either a) the amount of sanding in the project area over the course of a winter season or b) lack of de-icer use, and the monitored concentrations shown in Table 1-1. Although sanding in the project area has substantially increased, the data in Table 1-1 shows a decreasing trend since the publication of the FEIS.

Table 2-1
Aspen Sanding Data[a]

Winter Season	Tons Sand
1996-97	ND
1997-98	ND
1998-99	ND
1999-2000	ND
2000-01	ND
2001-02	180
2002-03	389.7
2003-04	326.9
2004-05	581.5
2005-06	770.3

[a] Data provided by Lee Cassin, Environmental Health Director for the City of Aspen.
ND = No data.

The emission factors, which were used for the current and future PM_{10} emissions estimates (see Appendix A), accounted for street sanding through a silt loading study in the project area and, as noted in the TSD, by substantially increasing these emission factors (increases ranging from 42.5 percent to 217 percent depending on road type) based on silt loading data from Montana and elsewhere in Colorado.

Control measures which are listed in the SIP and discussed more explicitly in Section 3.0, are permanent and enforceable. These measures were included in the SIP and adopted to help the area achieve and maintain attainment with PM_{10} standards. Operational and construction emissions as a result of this project will not affect the implementation of these currently required control measures.

In the Aspen maintenance plan, Colorado established an emissions budget of 16,668 lbs/day for the year 2015 and beyond, of which 16,244 lbs/day were attributed to mobile sources. The total of the 2015 mobile source portion of the PM_{10} emissions budget includes emissions from fugitive dust and vehicle exhaust from highways, paved arterial and local roads, and gravel roads. EPA's approval of 16,668 lbs/day as the budget means that this value must be used for conformity determinations for 2015 and beyond. However, to be conservative, PM_{10} emissions in the study area were compared to the mobile source portion of the budget in this reevaluation.

Table 2-2 shows the estimated PM_{10} emissions in the study area from all mobile sources. As shown in the table, and in Appendix A, the estimated emissions in 2005 and in 2030 in the project area compare favorably to the emissions calculated in the approved SIP for 1997 and 2015. Mobile source emissions for the project area are largely driven (via re-entrained fugitive dust) by the VMT on Highway 82, and the decrease in emissions between the 1997 data in the SIP and current (2005) conditions is the result of a relative decrease in estimated VMT. Similarly, the lower PM_{10} emissions forecasted in 2030 compared to the 2015 SIP estimate are due to today's lower VMT estimate for 2030.[3] As shown in Table 2-2, the Preferred Alternative conforms with the 2015 SIP, and mobile source PM_{10} emissions would remain within the mobile source portion of the emissions budget of 16,244 lbs/day in the year 2030. (See Section 3.0 for a discussion of control and mitigation measures for mobile source emissions.)

[3] All VMT data, previous and current, uses the CDOT traffic database and forecasts based on historic trend analysis for continuous count locations (the same locations are used for both analyses). The decrease in the projected VMT from the FEIS to 2006 is attributable to several factors, including a slow down in the growth of traffic and transit ridership (including a short-term downturn) as a result of the economic downturn following September 11, 2001, as well as the Transportation Management (TM) program implemented by the City of Aspen in 1995. The TM program includes effective measure to detour travel into town including parking restrictions and fees. See the System Management Technical Report (FHWA and CDOT, February 2007a) for more detail.

Table 2-2
State Highway 82 VMT and Total PM_{10} Emissions from All Mobile Sources

Year	VMT (SH 82)	PM_{10} Emissions from All Mobile Sources (Total lbs/day)		
		Road Dust Activity (All Roads)	Vehicle Exhaust	Total
1997	117,706[a]	10,087[c]	44[c]	10,131[c]
2015 (projected in 2003)	189,036[a]	16,200[c]	44[c]	**16,244[c,e]**
2005	116,402[b]	9,846[d]	44[d]	9,890[d]
2015 (updated projections)[f]	142,067	12,082	44	12,126
2025[f]	167,732	14,318	44	14,318
2030	180,564[b]	15,436[d]	44[d]	**15,480[d]**

Notes:
[a] 1997 and 2015 VMT from Technical Support Document (TSD) (CDPHE, 2000)
[b] 2005 and 2030 VMT calculated for this reevaluation (Appendix A). See also System Management and Traffic Technical Report for updated traffic forecasts (FHWA and CDOT, 2007a, 2007b).
[c] 1997 and 2015 PM_{10} emissions from EPA, Federal Register Volume 68, Number 94, Pages 26212-26220, May 15, 2003.
[d] 2005 and 2030 PM_{10} emissions calculated for this reevaluation (Appendix A)
[e] 16,244 lb/day is the portion of the PM_{10} emissions budget that is attributable to mobile sources for 2015 and beyond, set forth in the 2015 SIP (Federal Register, Volume 68, Number 94, Pages 26212-26220, May 15, 2003)
[f] Updated 2015 values and 2025 values were interpolated from 2005 and 2030 calculations, to show that the years for which consistency with the budget is demonstrated is no more than 10 years apart, per 40 CFR 118(b).

In addition to the mobile sources described above, other PM_{10} emission sources include aircraft and restaurant activity, wood-burning stoves and inserts, and wood-burning fireplaces. (In addition to re-entrained road dust, wood-burning is a primary source of PM_{10} emissions in the Aspen area. The City of Aspen and Pitkin County have adopted local ordinances that limit the number of wood-burning devices in new construction in the Aspen area, and also have adopted local ordinances that require emission controls for new restaurant grills.) As shown in Table 2-3, and in Appendix A, the total PM_{10} emissions in the study area are estimated to be 15,964 lbs/day in the year 2030, remaining within the total emissions budget of 16,668 lbs/day as set forth in the SIP for the year 2015 and beyond.

Table 2-3
Total PM_{10} Emissions - All Sources
(lbs/day)

Year	All Mobile Sources [a]	Aircraft & Restaurant	Wood Burning	Total
1997 [b]	10,131	55	317	10,503
2015 (projected in 2003) [b]	16,244	80	345	**16,668** [d]
2005 [c]	9,890	65	329	10,284
2015 (updated projections)[e]	12,126	83	347	12,556
2025[e]	14,318	100	366	14,784
2030 [c]	15,480	109	375	**15,964**

Notes:
[a] See Table 2-2 for mobile source emissions
[b] PM_{10} emissions for 1997 and 2015 from EPA, Federal Register Volume 68, Number 94, Pages 26212-26220, May 15, 2003.
[c] PM_{10} emissions for 2005 and 2030 calculated for this reevaluation (see Appendix A)
[d] 16,668 lbs/day is the total (all sources) PM_{10} emissions budget for 2015 and beyond, set forth in the 2015 SIP (Federal Register, Volume 68, Number 94, Pages 26212-26220, May 15, 2003)
[e] Updated 2015 values and 2025 values were interpolated from 2005 and 2030 calculations, to show that the years for which consistency with the budget is demonstrated is no more than 10 years apart, per 40 CFR 118(b).

In conclusion, in 2030, it is expected there would be reduced PM_{10} emissions in the general area of the project, relative to the emissions projected in the SIP for 2015, due to CDOT's reduced AADT projections. This qualitative evaluation of PM_{10} indicates that the air quality impacts of these emissions should remain below NAAQS limits in 2030, based on the finding by EPA that the prior 2015 emission inventory would maintain compliance with NAAQS limits.

Conformity Requirements and Summary of Criteria Met

Under 40 CFR 93.104(d), air quality conformity must be re-determined when three years have elapsed since the most recent major step to advance a project, and a Reevaluation is done. Under 40 CFR 93.109, Table 1, the Transportation Conformity rules summarize conformity criteria for a "project not from a conforming plan and TIP." There is not an approved Long-Range Transportation Plan ("Plan") in this largely rural area of Colorado, and there is no approved Transportation Improvement Plan (TIP) applicable to the project area. Therefore, the criteria listed in this portion of Table 1 must be met to

determine that the project is in conformity with Clean Air Act requirements. The applicable criteria from Table 1 of 40 CFR 93.109, and a brief description of how each are met, follows:

1) 93.110 Latest planning assumptions – the latest planning assumptions, including updated land use plans, traffic data and projections were documented for the reevaluation and used in this air quality analysis (see Section 2.1, Methodology, for more information).

2) 93.111 Latest emissions model – As described in Section 2.1, Methodology, the process used to calculate PM_{10} emissions from roads in the TSD was repeated using updated projected AADT for State Highway 82 (CDOT, 2006). These AADT data were assigned to the appropriate inventory grid, consistent with the grid used in the TSD. The TSD emissions were originally "modeled" using the paved road emission factor equation from EPA Publication AP-42. For the reevaluation, it is assumed that the paved road equation used in the TSD is still applicable. Since the preparation of the TSD, there has been only a very small (insignificant) change in the AP-42 equation, which has also been incorporated into the latest (MOBILE6.2) emissions model. This minor change in the AP-42 equation would reduce current PM_{10} emission estimates by less than 1% compared to the equation used in the prior TSD analysis. Therefore, the emissions estimates provided in this reevaluation are only very slightly conservative (high), and are thus consistent with the latest emissions model (MOBILE6.2) estimation procedures.

3) 93.113(d) TCMs (Transportation Control Measures) – the TCMs included in the enforceable State Implementation Plan (SIP) for the area will continue to apply if the proposed project is implemented.

4) 93.114 – Currently conforming Plan and TIP – Under 93.114(b), it states "this criterion is not required to be satisfied at the time of project approval for a TCM specifically included in the applicable SIP." Because the Aspen area is not within the jurisdiction of a Metropolitan Planning Organization (MPO) with a Long Range Plan and TIP, this requirement does not apply to this reevaluation for determining conformity (Haas, 2006).

5) 93.116 – CO and PM10 hot-spots – PM_{10} quantitative hot-spot analysis is not currently required by EPA rules. Qualitative PM_{10} evaluation has been completed as described above. CO hot-spot analysis is not required because the area is attainment with respect to CO.

6) 93.117 – PM_{10} control measures – PM_{10} control measures included in the enforceable State Implementation Plan (SIP) for the area will continue to apply if the proposed project is implemented.

7) 93.118 or 93.119 – Emissions budget or emissions reduction – the analysis presented above shows that the emissions budget will be met with project implementation.

Thus, the Preferred Alternative is in conformity with the SIP for 2015 and the Clean Air Act requirements. This reevaluation addresses all applicable conformity requirements in 40 CFR 93.

2.2.2 Mobile Source Air Toxics (MSATs)

On February 3, 2006, the FHWA released its interim guidance on when and how to analyze MSATs in the NEPA process for highways. The following discussion is in accordance with the interim guidance.

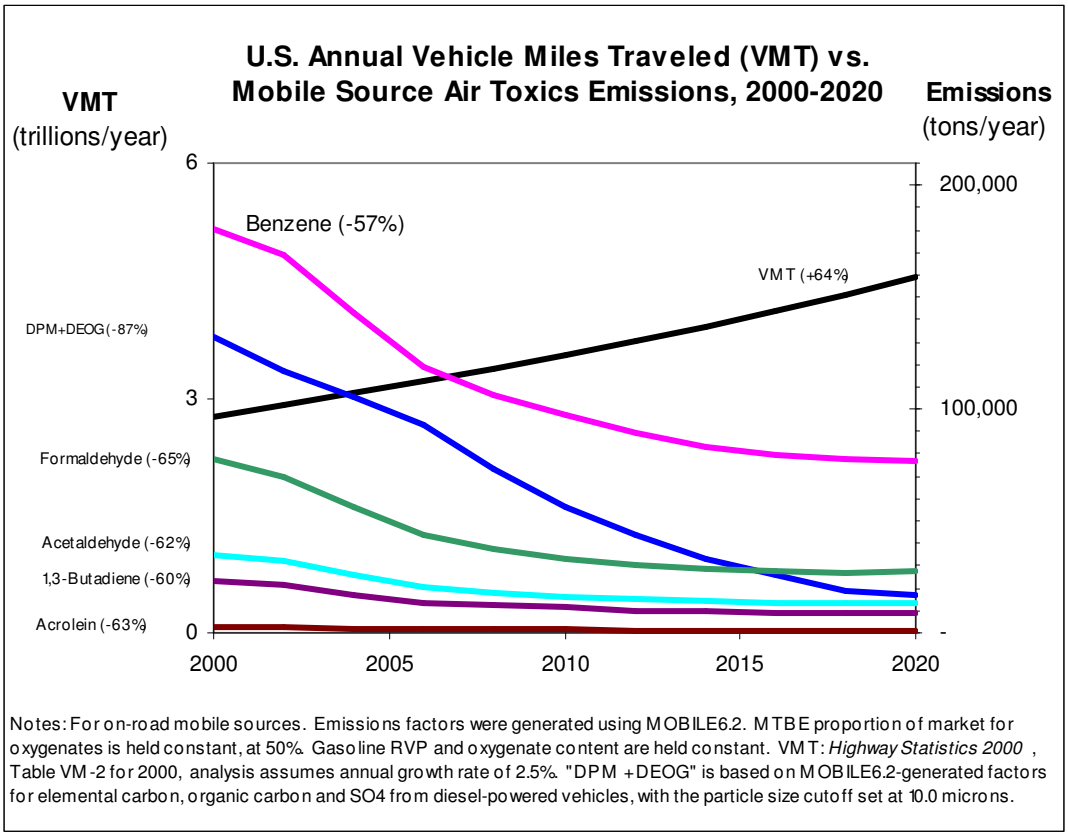
In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). The FHWA has prepared guidance (dated February 3, 2006) on the analysis of mobile source air toxics for highway projects.

MSATs are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from native soils, liquid deicers, engine wear or from impurities in oil or gasoline. (See Document No.EPA420-R-00-023, December 2000).

The EPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these control programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent, as shown in Figure 2-1.

As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

Figure 2-1
Annual VMT vs. MSAT Emissions 2000-2020



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: *Highway Statistics 2000*, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM+DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.

Unavailable Information for Project Specific MSAT Impact Analysis

This report includes a basic analysis of the likely MSAT emission impacts of the Preferred Alternative selected in the 1998 ROD. However, available technical tools do not allow the prediction of the project-specific health impacts of the emission changes associated with the project. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

Information that is Unavailable or Incomplete. Evaluating the environmental and health impacts from MSATs on a proposed highway/transit project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. Emissions: The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While

MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model--emission factors are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.

These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. Dispersion. The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program (NCHRP) is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with

the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.

- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.

- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes—particularly respiratory problems[4]. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable the performance of a more comprehensive evaluation of the health impacts specific to this project.

[4] South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community. Because of the uncertainties outlined above, FHWA believes a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the transportation project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from the Preferred Alternative and MSAT concentrations or exposures created by the Preferred Alternative cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether the Preferred Alternative selected in the 1998 ROD would have "significant adverse impacts on the human environment."

This document provides a qualitative analysis of MSAT emissions relative to the Preferred Alternative and acknowledges that the project may result in increased exposure to MSAT emissions in certain locations, while decreasing exposures in other locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

Project-Level MSAT Discussion

As discussed above, FHWA believes technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this transportation project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the transportation project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying potential MSAT emissions from the Preferred Alternative. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

For the Preferred Alternative selected in the 1998 ROD, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT). As shown previously in Table 2-2, VMT in the project corridor has decreased from 117,706 in 1997 to 116,402 in 2005. This decrease is attributable to declines in economic activity after September 11, 2001, increased bus ridership in the corridor, and the Incremental Transportation Management (TM) program implemented as part of the Preferred Alternative. (See the System Management Technical Report for the State Highway 82/Entrance to Aspen Environmental Reevaluation (FHWA and CDOT, February 2007a) for more detail.) The Entrance to Aspen FEIS (1997) showed VMT in the year 2015 estimated to be 189,036. The updated forecast for the

year 2030, done for this reevaluation, shows VMT in the corridor estimated to be 180,564 (see Table 2-2). Economic downturns, transit ridership increases, and the TM program have reduced the estimated future VMT in the study area since 1997; however, the increase in VMT between now and 2030 would tend to increase potential MSAT emissions. Implementation of the remaining components of the Preferred Alternative, exclusive bus lanes/light rail transit (LRT), would reduce congestion in the corridor which may reduce future MSAT emission rates due to increased speeds, and would also minimize VMT growth in the project area, tending to minimize any MSAT growth. According to EPA's MOBILE6.2 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases and newer low-emitting engines will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future. On a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will, over time, cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

3.0 Mitigation Measures

Best Management Practices (BMPs) for controlling emissions will be implemented during construction of the Preferred Alternative. These practices are primarily related to mitigating emissions from fugitive dust. Potential measures include street cleaning programs, including more frequent sweeping, vacuuming, and/or flushing to reduce dust in problem areas. Application of water to construction sites will also provide for increased dust control during construction.

The City of Aspen has adopted various ongoing mitigation practices to control mobile source PM_{10} emissions which are permanent and enforceable as a condition of the approved Colorado SIP. These practices include the following (Federal Register Volume 68, Number 94, May 15, 2003):

(1) Street Sanding Control - Use street sanding materials containing less than "one percent fines" with a durability index of less than 30 percent.

(2) Street Sweeping Requirements - Street sweeping is mandatory on defined roadways within Aspen within four days of the roadways becoming free and clear of snow and ice following each sanding deployment.

(3) Paid Parking Requirements: Parking on public streets within the City of Aspen's commercial core and surrounding residential areas is restricted through parking fees and permits to reduce traffic and encourage transit ridership.

4.0 Summary of Impacts and Mitigation

As noted in Section 1.0, air quality impacts were described in the FEIS for categories of alternatives, rather than each individual alternative. The Preferred Alternative (as selected in the 1998 ROD) was included in the "Average of DSEIS Alternatives" in the FEIS, Table V-6, page V-25. For this reevaluation, the Preferred Alternative was assessed for air quality impacts as an individual project, rather than an average of alternatives. Therefore, there is no valid, direct comparison of PM_{10} impacts identified in the FEIS to those calculated in this reevaluation. Section 2.2.1 above provides the comparisons between the 1997/2005 base years and the 2015/2030 design years, based on the 2015 SIP and the reevaluation assessment. As stated, it is expected there would be reduced PM_{10} emissions in the general area of the project, relative to the emissions projected in the SIP for 2015, due to the reduced AADT (and VMT) projections. The Preferred Alternative is in conformity with the current SIP and the Clean Air Act requirements.

Mitigation was summarized in the FEIS as consisting of measures in the 1997 SIP. Mitigation measures are updated in Section 3.0 above, based on the 2015 SIP.

5.0 Agency Coordination

Technical data was obtained for this study from the City of Aspen Director of the Environmental Health Department (Cassin, 2006), and the CDPHE Air Pollution Control Division (CDPHE, 2000). All contacts and data used are noted in the Section 6, References.

As required in 40 CFR 93 for conformity determinations, interagency coordination was conducted between FHWA, EPA, and CDPHE, APCD. An interagency meeting was held on October 26, 2006, and all parties reviewed the draft version of this technical report. All agency comments and revisions have been incorporated into this final report. In addition, comments on the draft report from the Aspen Department of Environmental Health have been addressed in this final report.

6.0 References

Cassin, Lee. 2006. Director, City of Aspen, Department of Environmental Health. Personal communication with Dan Miller and Lucy Bowen, May 25, 2006.

City of Aspen & Pitkin County. July 2006. GIS data & Mapping. http://www.aspenpitkin.com/depts/46/images/parcelmap_index.pdf.

Code of Federal Regulations (CFR). Title 40, Part 81. Designation of Areas for Air Quality Planning Purposes. 40 CFR 81.306, Colorado.

_____. Title 40, Part 93. Determining Conformity of Federal Actions to State or Federal Implementation Plans. 40 CFR 93.123(b)(2), PM_{10} and $PM_{2.5}$ hot-spot analyses.

Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division. 2000. Technical Support Document for the PM_{10} Redesignation Request and Maintenance Plan for the Aspen Area. December 20, 2000 (adopted January 11, 2001).

Colorado Department of Transportation (CDOT). July 2006. Traffic Data. http://www.dot.state.co.us

Federal Highway Administration (FHWA). 2006. Cynthia J. Burbank. Memorandum: Interim Guidance on Air Toxic Analysis in NEPA Documents. February 3, 2006

_____.2002. Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance, Report to Congress. Chapter 19: Air Quality, Page 19-3.

FHWA and CDOT. 2007a. System Management Technical Report, State Highway 82/Entrance to Aspen Environmental Reevaluation. Prepared by HDR Engineering, Inc. February 2007.

_____. 2007b. Traffic Characteristics and Safety Technical Report, State Highway 82/Entrance to Aspen Environmental Reevaluation. Prepared by HDR Engineering, Inc. February, 2007.

_____. 2007c. Social Environment and Community Characteristics Technical Report, State Highway 82/Entrance to Aspen Environmental Reevaluation. Prepared by HDR Engineering, Inc. February, 2007.

Haas, William. 2006. FHWA Transportation Planner. Personal Communication with Lucy Bowen, HDR Engineering, Inc. on November 3, 2006.

Office of the Federal Register, National Archives and Records Administration. Volume 71, Number 47, Pages 12468-12511. March 10, 2006.

_____. Volume 68, Number 94, Pages 26212-26220. May 15, 2003.

_____. Volume 69, Number 126, Pages 40004-40081. July 1, 2004.

United States Environmental Protection Agency. Air Quality System Database, Quick Look Report (AMP450), November 14, 2006.

_____. http://epa.gov/pm/pdfs/20061025_graphsmaps.pdf. Support maps and graphs for September 21, 2006 Particulate Matter rule change. Accessed November 2, 2006.

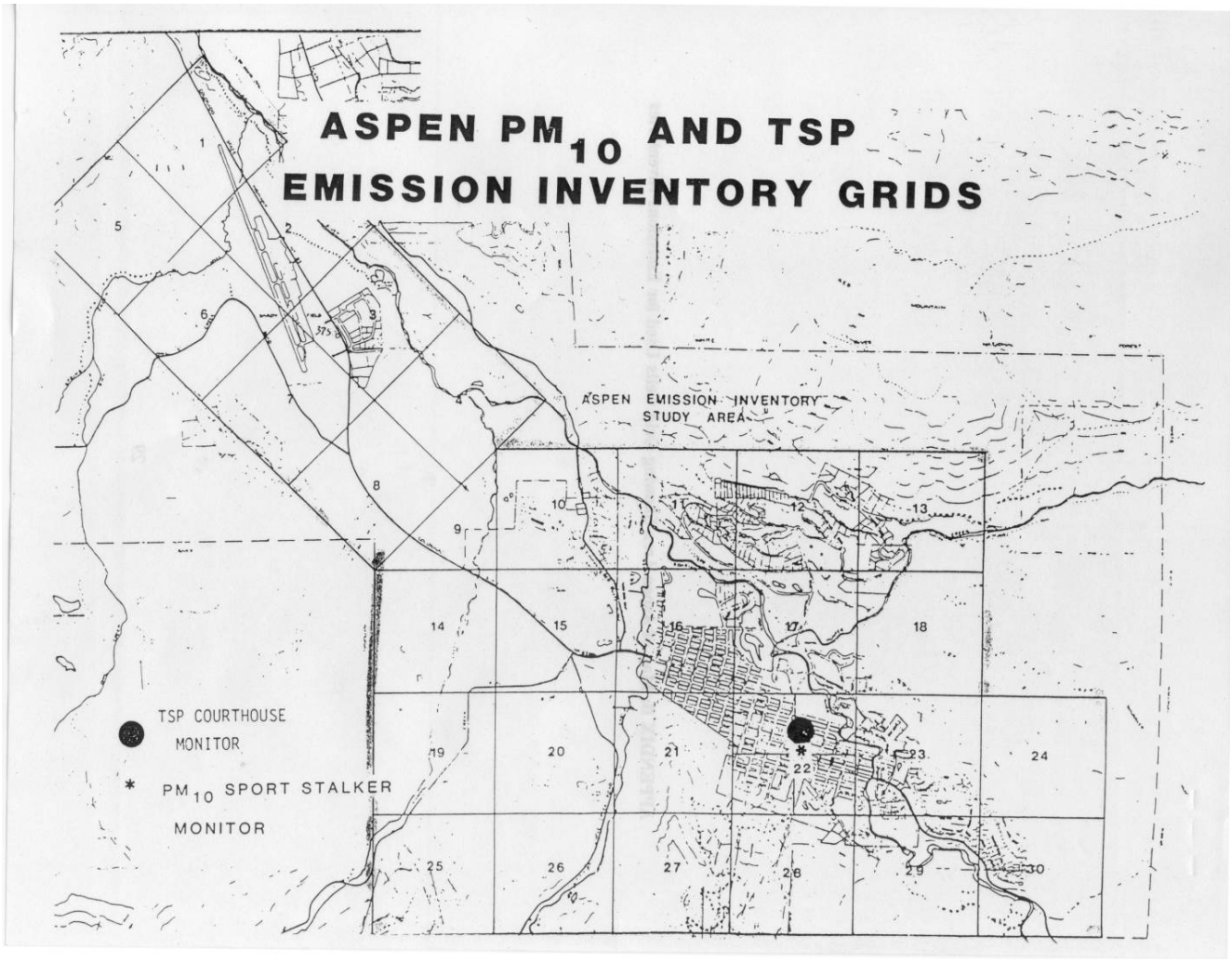
_____. 2003. AP42, Fifth Edition, Volume 1, Chapter 13: Miscellaneous Sources. Section 13.2.1, Paved Roads. December 2003.

7.0 List of Preparers

Scott Zilka, Air Quality Specialist, HDR Engineering, Inc.

Ed Liebsch, Senior Air Quality Specialist, HDR Engineering, Inc.

Appendix A
VMT and PM10 Emissions Data


ASPEN PM10 AND TSP
EMISSION INVENTORY GRIDS
ASPEN EMISSION INVENTORY
STUDY AREA
TSP COURTHOUSE
MONITOR
PM10 SPORT STALKER
MONITOR