

Second 10-Year Maintenance Plan for the Truckee Meadows 8-Hour Carbon Monoxide Attainment Area

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- B. Truckee Meadows Projected CO Seasonal Emissions

ACRONYMS

AERR	Air Emissions Reporting Requirements
AQMD	Washoe County Health District - Air Quality Management Division
AQS	Air Quality System
CO	Carbon Monoxide
CAA	Clean Air Act
CERR	Consolidated Emissions Reporting Rule
CFR	Code of Federal Regulations
EI	Emissions Inventory
EPA	United States Environmental Protection Agency
FR	Federal Register
HA	Hydrographic Area
MA	Maintenance Area
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emissions Budget
NAA	Non-Attainment Area
NAAQS	National Ambient Air Quality Standard
NCore	National Core Multi-Pollutant Monitoring Station
RTC	Regional Transportation Commission
RWC	Residential Wood Combustion
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Station
SPM	Special Purpose Monitoring
VMT	Vehicle Miles Traveled
WCDBOH	Washoe County District Board of Health

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CHAPTER 1

INTRODUCTION

The Truckee Meadows¹ has attained the 8-hour Carbon Monoxide (CO) National Ambient Air Quality Standards (NAAQS) since 1991. A Redesignation Request and Maintenance Plan for the Truckee Meadows Carbon Monoxide Non-Attainment Area (NAA) was submitted to the Environmental Protection Agency (EPA) in September 2005, and the Truckee Meadows was redesignated to attainment status effective August 4, 2008.² This State Implementation Plan (SIP) revision is to address the completion of the second 10-year CO maintenance plan demonstrating continued attainment through 2030.

Washoe County is located in the northwest portion of Nevada and is bounded by the states of California, Oregon, and the counties of Humboldt, Pershing, Storey, Churchill, Lyon, and Carson City (Figure 1-1). The Truckee Meadows is approximately 200 square miles in size and situated in the southern portion of Washoe County. It is geographically identified as Hydrographic Area (HA) 87 as defined by the State of Nevada, Division of Water Resources. It is surrounded by mountain ranges, which can lead to wintertime temperature inversions, where a layer of cold air is trapped in the valley. Warmer air above the inversion acts as a lid, containing and concentrating air pollutants. Much of Washoe County's urban population lives in the Truckee Meadows. Anthropogenic activities, such as automobile use and residential wood combustion (RWC), are also concentrated here.

Figure 1-1
Washoe County, Nevada



The Truckee Meadows covers an area governed by three political entities - the County of Washoe, the City of Reno, and the City of Sparks. The AQMD is the designated agency responsible for air quality management throughout the entire county.

There have been no exceedances or violations of the 8-hour CO standard since 1991. The AQMD Redesignation Request and Maintenance Plan submitted to the EPA in 2005 demonstrated attainment and maintenance of the CO standards through 2016. On July 3, 2008, EPA published a final rule redesignating the Truckee Meadows to attainment of the CO NAAQS.³ Since 2008, monitored CO concentrations have been consistently more than 65% below the NAAQS. Table 1-1 lists the first and second highest 8-hour CO concentrations from 2008 to 2013.

¹ Identified as the "Reno Planning Area" in 40 CFR 81.329.

² 73 FR 38124 (July 3, 2008).

³ 73 FR 38124 (July 3, 2008).

Table 1-1
2008-2013 Truckee Meadows 8-hour CO Concentrations (ppm)

Year	2008	2009	2010	2011	2012	2013
1 st High	2.9	2.9	2.8	3.3	2.4	2.6
2 nd High	2.9	2.6	2.6	2.9	2.3	2.4

This Maintenance Plan was prepared in accordance with Section 175A of the Clean Air Act (CAA). It is being submitted four years prior to the expiration of the first ten year period in order to coordinate milestone years of the PM₁₀ Motor Vehicle Emission Budget (MVEB). A PM₁₀ Redesignation Request and Maintenance Plan is expected to be submitted to EPA along with this CO Maintenance Plan. This plan demonstrates continued maintenance of the CO standard in the Truckee Meadows through 2030 and establishes MVEBs for 2015, 2020, 2025, and 2030.

CHAPTER 2

MAINTENANCE PLAN

In accordance with Section 175A of the CAA, the AQMD has prepared and is submitting this second 10-year maintenance plan. The purpose of this SIP revision is to provide for maintenance of the 8-hour CO NAAQS for an additional ten years following the first 10-year period. This maintenance plan meets Section 107(d)(3)(E) requirements by including the following core provisions to ensure continued maintenance of the 8-hour CO NAAQS.

- Attainment Inventory;
- Maintenance Demonstration;
- Motor Vehicle Emissions Budget;
- Monitoring Network;
- Verification of Continued Attainment; and
- Contingency Plan.

Attainment Inventory

The AQMD developed a 1990 baseline emissions inventory as part of the “Moderate” CO NAA State Implementation Plan (SIP). Since 1990, periodic emission inventories have been compiled on a triennial schedule with the most recent inventory prepared for 2011. The 2011 emissions inventory (Table 2-1)⁴ is identified as the attainment inventory because it used the best and updated methodologies for all sources, and it has the most comprehensive and current emission inventory that is sufficient to continue to attain the NAAQS.

Table 2-1
2011 CO Attainment Inventory (lbs/day)

Source Category	2011 Attainment Inventory
Point	3,361
Nonpoint	154,956
Non-road	50,706
On-road	<u>163,500</u>
Total*	372,522

* Totals may not add up due to rounding.

Below is a summary of procedures used to ensure that CO emissions were calculated and apportioned accurately for the Truckee Meadows. Complete documentation is included in “Washoe County, Nevada 2011 Periodic Emissions Inventory”.

⁴ Washoe County, Nevada; 2011 Periodic Emissions Inventory; modified to reflect new onroad emissions from new VMT.

Point Sources: Latitude/Longitude coordinates are maintained for each point source. Geographic Information Systems (GIS) software was used to overlay HA 87 onto all point sources to determine if it was to be included in the Truckee Meadows CO emissions inventory.

Nonpoint Sources: Nonpoint sources with an AQMD operating permit are managed in the emissions inventory as if it were a point source (see above). Other nonpoint sources are grouped by Source Classification Code (SCC) and assigned a surrogate, which is spatially representative of that process. Typical surrogates are population, dwelling units, employment, and VMT. Surrogates are spatially disaggregated into a variety of geographies such as census areas (blocks, block groups, and tracts), Transportation Analysis Zones (TAZ), and ZIP codes. GIS is used to determine what portion of each surrogate is included in HA 87. This fraction is applied to county-level emissions for each SCC emissions to determine Truckee Meadows CO emissions.

Non-Road Mobile Sources: Non-Road Mobile Sources are grouped by SCCs and assigned a surrogate which is spatially representative of that process. Surrogate fractions are applied to county-level emissions for each SCC emissions to determine Truckee Meadows CO emissions.

On-Road Mobile Sources: The Metropolitan Planning Organization (MPO) manages the regional transportation demand model. The model includes planning assumptions, such as population and VMT, for each TAZ in the county. GIS software was used to overlay HA 87 onto all TAZs to determine if it was to be included in the Truckee Meadows CO emissions inventory. Data from TAZs within HA 87 were combined and incorporated into the MOVES model to calculate on-road mobile source CO emissions.

Maintenance Demonstration

Maintaining the CO NAAQS may be demonstrated by showing that future emissions will not exceed the level of the attainment inventory. Also, attainment must be demonstrated for the 10-year period following EPA's approval action on the redesignation request. In November 2005, the NDEP submitted AQMD's "Redesignation Request and Maintenance Plan for the Truckee Meadows Carbon Monoxide Non-Attainment Area" to EPA. EPA approved the Redesignation Request and Maintenance Plan in July 2008. This maintenance plan demonstrates attainment for the remainder of the first maintenance period (through 2018) as well as the second 10-year period (2018-2028). Since a state may go beyond the minimum requirements of the CAA, the horizon year of this maintenance plan will be 2030 to eliminate the requirement for the MPO to perform additional conformity findings for in-between analysis years.

Although the first maintenance period is scheduled to end in 2018, the 2015 projected emissions calculated in this maintenance plan will replace the 2016 emission projection from the first maintenance plan. The rationale for this stems from the availability of better planning assumptions and improved emission calculation methodologies, which were not available 10 years ago. The updated methodologies include the change from using MOBILE6 modeling

software to model on-road emissions 10 years ago, to the MOVES model used in this report. In addition, more detailed data are available now that made emission projections and control calculations more representative of the region.

Truckee Meadows Maintenance Emissions Limit

The 2011 periodic emissions inventory⁵ was used as a baseline to develop a maintenance emissions limit for the Truckee Meadows. Growth and control factors were applied to the emission categories of the 2011 inventory to generate a 2030 Truckee Meadows maintenance emissions limit. The growth factors were based on demographic, economic, VMT, and meteorological data (Appendix A). Control factors were based on planned emission reduction strategies.

2011 was an unusually active year for wildfires during the CO season. To approximate a more normal wildfire emission during the CO season, an average of the four previous inventory years' (1999, 2002, 2005, and 2008) wildfire emissions were used for planning year projections (Table 2-2). The rationale is that wildfire emissions alone should not drive future year planning purposes. Future large scale wildfires during CO season will be treated as exceptional events and will be submitted to the EPA for exclusion when they occur.

Table 2-2
Historic Truckee Meadows CO Wildfire Emission Inventories (lbs/day)

Inventory Year	CO Emissions
1999	197
2002	412
2005	103
2008	156
2011	105,092
Average (1999-2008)	217
Average (1999-2011)	21,192

Based on these methodologies, the 2011 Truckee Meadows CO emissions limit was established at 267,648 lbs/day (Table 2-3).

⁵Washoe County, Nevada; 2011 Periodic Emissions Inventory and Appendices A, B, C

Table 2-3
Truckee Meadows CO Emission Inventories (lbs/day)

Source Category	2011	2011
	Periodic Inventory	Maintenance Emission Limit
Point	3,361	3,361
Nonpoint	154,956	50,081
Non-Road Mobile	50,706	50,706
On-Road Mobile	<u>163,500</u>	<u>163,500</u>
Total*	372,522	267,648

* Totals may not add up due to rounding.

The 2011 Truckee Meadows CO maintenance emissions limit will be identified as the attainment inventory because it:

- Uses the most accurate emissions inventory methodologies;
- Is a comprehensive and current emissions inventory;
- Identifies the level of emissions in the Truckee Meadows sufficient to maintain the NAAQS; and
- Will be the emissions inventory most consistent with the 2030 projected inventory required for demonstrating maintenance of the NAAQS.

Maintenance of the NAAQS

The projected 2030 emissions inventory used the 2011 Truckee Meadows emissions inventory as its baseline, except for the wildfire category, which is explained in the previous section. Each of the emission categories in the 2011 Truckee Meadows emissions inventory (Appendix B) was projected to 2030 level using one of the following EPA emission methodologies or models.⁶

1. Baseline Emission Projections: Washoe County’s 2030 population, employment, and VMT forecasts (Appendix A) were used as surrogates to project the 2030 emissions. These forecasts were consistent with those used by the local MPO.
2. EPA Models: The non-road and on-road motor vehicle categories accounted for approximately 59% of the 2011 Truckee Meadows emissions inventory. To ensure consistency throughout the maintenance demonstration period, the same non-road and on-road models (NONROAD2008a and MOVES2010b) were used to estimate the 2030 inventory.

The 2030 on-road vehicles category incorporated the latest planning assumptions for the transportation network including VMT, vehicle speeds, and vehicle population for

⁶ “Procedures for Preparing Emissions Projections” (EPA-450/4-91-019).

passenger cars and trucks. As with previous periodic emission inventories, these planning assumptions were consistent with those used by the MPO for their transportation plans.

3. Emission Category Surveys: Residential wood combustion is a significant source of CO emissions. The RWC category is updated on a regular basis via an emission category survey. As part of the CO maintenance plan SIP, the AQMD is committed to conducting this survey at least once every three years.⁷

Table 2-4 lists the 2011 Truckee Meadows Maintenance Emissions Limit and the 2015, 2020, 2025, and 2030 projected emissions for the four major CO emission categories. A more detailed inventory can be found in Appendix B.

Table 2-4
Truckee Meadows CO Maintenance Emission Inventories (lbs/day)

Source Category	2011*	2015	2020	2025	2030
Point	3,361	3,768	4,357	4,974	5,678
Nonpoint	50,081	47,820	45,236	42,845	40,355
Non-road	50,706	43,725	45,385	48,320	51,656
On-road	<u>163,500</u>	<u>150,330</u>	<u>140,129</u>	<u>138,938</u>	<u>142,686</u>
Total**	267,648	245,642	235,107	235,077	240,375

* Truckee Meadows Maintenance Emissions Limit.

** Totals may not add up due to rounding.

Summary

Population, households, employment, and VMT are projected to increase through 2030 and beyond. Federally enforceable CO control programs targeting gasoline-powered motor vehicles, RWC, and diesel-powered motor vehicles will help offset this growth. Because future emissions are not projected to exceed the level of the 2011 Truckee Meadows maintenance emissions inventory, the 8-hour CO NAAQS will be maintained through the attainment demonstration period.

Motor Vehicle Emissions Budget

Transportation conformity is required by Section 176(c) of the CAA. Under EPA's transportation conformity regulations,⁸ transportation plans and improvement programs must be consistent with, or conform to, the motor vehicle emissions budget (MVEB) defined in the applicable SIP. These budgets specify the level of on-road motor vehicle emissions that are

⁷ 73 FR 38124 (July 3, 2008).

⁸ 40 CFR 93.

consistent with attainment and maintenance of air quality standards and should include an adequate safety margin.⁹

Emissions inventory data for the years 2015 through 2030 were used to establish the MVEB. The MVEB includes on-road vehicles, heavy duty diesel vehicle (HDDV) idling, and a safety margin. The safety margin is the excess emissions between the total projected emissions for a specific year and the 2011 maintenance emissions limit (Table 2-5).

Table 2-5
Truckee Meadows CO Safety Margin (lbs/day)

Category	2015	2020	2025	2030
2011 Maintenance Emissions Limit	267,648	267,648	267,648	267,648
CO Maintenance Emissions Inventory	245,642	235,107	235,077	240,375
Safety Margin	22,006	32,540	32,571	27,272

The MVEB is set at a level that keeps the intermediate (2020 and 2025) and horizon (2030) year Truckee Meadows CO emissions less than the 2011 Truckee Meadows maintenance emissions limit. For years beyond 2030, the MVEB will remain at the 2030 level of 169,959 lbs/day (Table 2-6). Because of significant updates to emission models, emission methodologies, and planning assumptions, this MVEB will replace the budgets that EPA approved in 2008.¹⁰

Table 2-6
Truckee Meadows CO MVEB (lbs/day)

Category	2015	2020	2025	2030
On-Road Vehicles	149,794	139,529	138,288	141,961
HDDV Diesel Idling	536	600	649	7,250
Safety Margin	<u>22,006</u>	<u>32,540</u>	<u>32,571</u>	<u>27,272</u>
Motor Vehicle Emissions Budget	172,336	172,670	171,509	169,959

Monitoring Network

The Truckee Meadows is currently a CO maintenance area. The AQMD will continue to operate an appropriate CO monitoring network, in accordance with 40 CFR 58, to verify the attainment status of the area. In addition, Washoe County's CO monitoring network will be reviewed annually pursuant to 40 CFR 58.10 to ensure the network meets the monitoring objectives defined in 40 CFR 58, Appendix D. Funding to meet these objectives has been, and will be,

⁹ Safety margin means the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance. (40 CFR 93.101)

¹⁰ 73 FR 38128 (July 3, 2008).

primarily obtained from: 1) EPA Section 105 grants, and 2) Nevada Department of Motor Vehicles funds.

Ambient CO monitoring data will continue to be collected and quality assured in accordance with 40 CFR 58, recorded in the Air Quality System (AQS), and available for public review. Table 2-6 lists the CO monitoring sites and Figure 2-1 features the South Reno Monitoring station as an example.

Figure 2-1
South Reno Monitoring Site



Table 2-7
Active Washoe County CO Monitoring Sites

Site ID	Site Name	Site Address	City
32-031-0016	Reno3	301 "A" State Street	Reno
32-031-0020	South Reno	4110 DeLucchi Lane	Reno
32-031-0022	Galletti	305 Galletti Way	Reno
32-031-0025	Toll	684 "A" SR 341	Reno
32-031-1005	Sparks	750 4 th Street	Sparks
32-031-2009	Lemmon Valley	325 W. Patrician Drive	Reno

Verification of Continued Attainment

As described in the previous section, the AQMD will continue to operate and maintain an appropriate CO monitoring network. Ambient air monitoring data will be used to verify continued attainment and maintenance of the 8-hour CO NAAQS.

Tracking actual emissions can identify potential increases in ambient CO levels. The AQMD has three existing mechanisms to track emissions. These mechanisms, listed below, will remain in place and be used to screen for significant increases in actual CO emissions.

1. Periodic Emissions Inventories: The AQMD will continue to prepare, and submit to EPA, comprehensive periodic CO emissions inventories on a triennial schedule. The last periodic emissions inventory was prepared for calendar year 2011.
2. Consolidated Emissions Reporting Rule (CERR) and Air Emissions Reporting Rule (AERR): The CERR and AERR simplify and streamline emissions reporting

requirements. It requires regular updates of point and area sources within Washoe County. The AQMD will continue to meet the requirements of the CERR and AERR.

3. Residential Wood Use Survey: Residential wood combustion is a significant CO source during the winter season. The AQMD has completed nine residential wood use surveys between 1993 and 2013. These surveys estimated the device (fireplaces, woodstoves, and pellet stoves) population, amount of wood burned, and CO emissions in Washoe County. As part of this maintenance plan,¹¹ the AQMD is committed to conducting this survey at least once every three years.

Furthermore, AQMD's Enforcement Branch is staffed with five inspectors to ensure compliance with local air quality regulations. They inspect for permit conditions, respond to complaints, patrol and enforce no-burn days during the burn season, and issue warnings and citations for any violations found.

When no-burn days are issued, the enforcement staff will patrol neighborhoods for visible smoke from chimneys. They also respond to complaints from neighbors of the home owners who are burning their wood burning devices during a no-burn day. They will order the home owner to stop burning immediately and issue the home owner a warning for the first offense. Then they will return three to four hours later to ensure that the smoke has ceased to be emitted from the chimney. If the smoke continues, the home owner would then be issued a citation.

Continued ambient air monitoring and emissions tracking will ensure verification of continued attainment and maintenance of the 8-hour CO NAAQS.

Contingency Plan

Section 175A of the CAA requires that a maintenance plan include contingency provisions, as necessary, to promptly correct any violation of the CO NAAQS that occurs after redesignation of the area. The plan should clearly identify:

- Specific indicators, or triggers, which will be used to determine when contingency measures need to be implemented;
- The contingency measures to be adopted;
- A schedule and procedure for adoption and implementation; and
- A specific time limit for action.

The typical CO season in the Truckee Meadows is November, December, and January. This is when the highest ambient CO concentrations, and possible exceedances, are most likely to occur. The contingency measures in this plan target sources that significantly contribute to the CO season emissions inventory. The AQMD will establish a two-tiered contingency plan based on ambient air monitoring data.

¹¹ 73 FR 38124 (July 3, 2008).

Contingency Plan - Tier 1

Trigger Mechanism - Tier 1: An exceedance (greater than or equal to 9.5 ppm to adjust for rounding) of the 8-hour CO NAAQS verified from any State and Local Air Monitoring Station (SLAMS), Special Purpose Monitoring (SPM) or National Core Multi-Pollutant Monitoring Station (NCore) site operated within Washoe County.

Contingency Measure - Tier 1: Begin the rulemaking process to redefine “Carbon Monoxide; Stage 1 (Alert) Episode” in Washoe County District Board of Health (WCDBOH) Regulation 050.001.¹² The “Stage 1 (Alert) Episode” level shall be reduced from 9.4 ppm to 9.0 ppm. This measure will activate “Stage 1 (Alert) Episode” procedures at pre-exceedance CO levels. These procedures will reduce CO emissions by:

- Terminating open burning;¹³
- Terminating the use of incinerators subject to AQMD operating permits;¹⁴
- Curtailment of unnecessary motor vehicle use through AQMD’s public outreach program;¹⁵
- Prohibiting burning of solid fuel in any commercial or residential stoves and/or fireplaces within the Truckee Meadows;¹⁶ and
- Curtailment of all AQMD permitted sources that have the potential to emit 50 tons or more of CO per year within the Truckee Meadows.¹⁷

In addition, within 45 days of reaching the first trigger mechanism, the EPA Regional Office will be notified that this contingency measure has been implemented.

Implementation Schedule - Tier 1: Rulemaking process to begin promptly. The rule revision shall be adopted by the WCDBOH and implemented before the next CO season (November, December, and January). Prompt action and implementation of this contingency measure may prevent future exceedances and violations of the CO NAAQS.

Contingency Plan - Tier 2

Trigger Mechanism - Tier 2: A second non-overlapping exceedance (9.5 ppm or greater) of the 8-hour CO NAAQS in the same calendar year from any SLAMS, SPM, or NCore site operated within Washoe County. A second non-overlapping exceedance occurring at the same site as the first exceedance in the same calendar year is a violation of the NAAQS.

Contingency Measure - Tier 2: The AQMD will maintain a list of potential contingency measures and provide recommendations for implementation to the WCDBOH. The recommendations will also include a timeline for adoption and implementation to promptly

¹² Emergency Episode Plan (Adopted 03/23/06).

¹³ WCDBOH Regulations 040.035 and 050.001.

¹⁴ WCDBOH Regulation 050.001.

¹⁵ WCDBOH Regulation 050.001.

¹⁶ WCDBOH Regulations 040.051 and 050.001.

¹⁷ WCDBOH Regulations 050.001.

correct any violation of the NAAQS. The list of potential contingency measures will concentrate on the two significant emission categories that impact CO season emissions. Table 2-8 summarizes the current list.

Table 2-8
Potential CO Contingency Measures

Emission Category	Potential Contingency Measure
Residential Wood Combustion	<ul style="list-style-type: none"> • Increase one acre lot size exemption • Mandatory curtailment at lower CO concentrations • Change out program to cleaner burning devices
Mobile Sources	<ul style="list-style-type: none"> • Strengthen inspection & maintenance (smog check) program • Reinstate oxygenated fuels program • Non-road & on-road diesel engine repowers and rebuilds • Truck Stop Electrification systems • Fleet modernization • Strengthen maximum idling time for diesel vehicles

In addition, within 45 days of reaching the second trigger mechanism, the EPA Regional Office will be notified that this contingency measure has been implemented.

Implementation Schedule - Tier 2: Recommendations to the WCDBOH shall occur at their next regularly scheduled meeting, but no later than 45 days after triggering the contingency measures. The list of potential measures will be reviewed and updated at least once every three years. The WCDBOH is the governing body for the AQMD and currently meets on the fourth Thursday each month. Because of changes in growth and technology, the effectiveness of each measure may vary over time. A triennial review and reprioritization of the measures in coordination with the periodic CO emissions inventory should be adequate to anticipate the need for additional emission reductions. Contingency measures recommended to the WCDBOH shall be adopted and implemented as promptly and expediently as possible. Any adopted measure shall remain in effect regardless of changes to Washoe County's CO attainment status.

The AQMD two-tiered contingency plan meets Condition 5.e of the Calcagni Memorandum by promptly and expediently addressing future exceedances of the CO NAAQS with trigger mechanisms, contingency measures, adoption schedules, and implementation schedules.

Appendix A

Growth Factors for Emission Projections

Appendix A.1 - Growth Factors for 2015, 2020, 2025, and 2030 Projections

Appropriate and reasonable growth and control assumptions ensure that planning emissions for 2015 through 2030 are realistically projected. Control factors were developed based on historic data and reasonable assumptions.

Growth and control factors for each emission category are listed in Table A-1. Detailed data for the growth factors are further listed in Table A-2.

Portions of the growth factors are based on various data from the Washoe County Consensus Forecast, used by the MPO in the development of its 2035 Regional Transportation Plan (RTP). These data are provided in 5-year increment.

The historic climatic data were obtained from the National Oceanic and Atmospheric Agency, with future data based on 30-year normal averages between 1980 and 2010.

Table A-1 – Grow & Control Factors used for Truckee Meadows CO Emissions Projection

Major Category	Sub-Category	Growth Surrogate(s)	Control Factor(s)
POINT SOURCES			
	Geothermal	POP	None
	Printing	EMP	None
	Airports & Heliports		
	GSE	AP	None
	Military Aircraft	UNI	None
	Commercial Aircraft	AP	None
	Gen Aviation - piston	AP	None
	Gen Aviation - turbine	AP	None
	Air Taxi - piston	AP	None
	Air Taxi - turbine	AP	None
	APU	AP	None
	Buffer Zone	POP&EMP	None
NONPOINT SOURCES			
	Stationary Source Fuel Combustion		
	Industrial Fuel Combustion	EMP	None
	Com/Inst Fuel Combustion	EMP	None
	Res. Fuel Combustion	HH&HDD	None
	Res. Wood Combustion		
	Fireplaces	HDD	No new solid fuel device is allowed w/in HA87, unless the property has ≥ 1 acre. Since not many parcels w/in HA87 are ≥ 1 acre, assumed that no new FPs will be installed. Also assumed that 1%/year of wood FPs will be replaced with gas FPs.
	Woodstoves/Inserts		
	<i>Non-certified</i>	HDD	No new non-certified WS allowed. Older stoves being removed upon real estate transaction. Assumed future replacement apportionment of 75% Phase II WS, 20% Pellet stoves, and 5% gas FPs. Replacement % derived from historic data for Ph II WS & PS.
	<i>Certified, Phase 1</i>	HDD	No new Phase I WS allowed. Older stoves gradually being removed due to age. Assumed 5% reduction per year.
	<i>Certified, Phase 2</i>		
	Pellet Stoves	Growth&HDD Growth&HDD	
	Industrial Processes		
	Chemical Manufacturing	EMP	None
	Commercial Cooking	POP	None
	Food & Kindred Products - Manufacturing	EMP	None
	Mineral Processes	EMP	None
	Rubber/Plastic Processes	EMP	None
	Fabricated Metals	EMP	None
	Construction - Stationary		
	<i>Road Construction</i>	PGR	None
	<i>Residential Dust Projects (Non-Road Const.)</i>	PGR	None
	<i>Commercial Dust Projects (Non-Road Const.)</i>	EGR	None
	<i>Asphalt, Sand and Gravel, Abrasive Blasting</i>	EGR	None
	Machinery	EMP	None
	Mining and Quarrying - Stationary	EMP	None
	Miscellaneous Industrial Processes	EMP	None
	Solvent Utilization		
	Architectural Coatings	HH	None
	Auto Refinishing	EMP	None
	Wood Furniture	EMP	None
	Paper	EMP	None
	Plastic Products	EMP	None
	Machinery & Equipment	EMP	None

Electronic & Other Electrical	EMP	None
Misc. Manufacturing	EMP	None
Other Solvent Utilization		
Degreasing	EMP	None
Dry Cleaning	EMP	None
Graphic Arts	EMP	None
Misc. Industrial Processes	EMP	None
Misc. Commercial Processes	EMP	None
Misc. Consumer/ Com. Solv.	EMP	None
Cutback Asphalt Application	EMP	None
Emulsified Asphalt Appl.	EMP	None
Pesticide, Fungicide & Rodenticide	EMP	None
Storage and Transport		
Gas Service Station	EMP	None
Organic Chemical Storage	EMP	None
Waste Disp/Treat/Recovery		
Commercial/Industrial Incineration	EMP	None
Publicly Owned Treatment Works	POP/HH	None
Remediation/Reclamation/ Recycle	EMP	None
Misc. Non-Point Sources		
Paved Road Fugitive Emissions	VMT(RTP)	Sand:Salt ratio shifted over the years. Based on historic data, anticipate 15% reduction in sand usage per year. Assumed 2.6% per year of all future unpaved roads to be paved based on WC historic averages from 1985 - 2011 and past EI unpaved:paved road ratio.
Paved Road Fugitive Emissions, Sanding & Salting	SNO	
Unpaved Road Fugitive Emissions	LVMT	
Dirt Road Fugitive Emissions	-	
Wildfires	UNI	
Structure Fires	UNI	
Motor Vehicle Fires	UNI	
Firefighting Training	UNI	
Open/Permit Burning	UNI	
Prescribed Burning	UNI	
Refuse Fires	UNI	
Auto & Misc. Repair Shops	POP	
Health Services, Hospitals	POP	
Essay Labs	EMP	
Human & Animal Cremation	POP	
<u>NON-ROAD MOBILE SOURCES</u>		
CNG Engines	NR2008a	None
Diesel Engines	NR2008a	None
Gasoline Engines	NR2008a	None
LPG Engines	NR2008a	None
Locomotives	EMP	None
<u>ON-ROAD MOBILE SOURCES</u>		
On-Road Vehicles*	MOVES2010b	None
HDDV Diesel Idling*	MOVES2010b	None
* Sub-Category included in MVEB		

Table A-2– Growth Factors for 2015-2030 Projections for the Truckee Meadows Hydrographic Area

Growth Factors	2010	2011	2015	2020	2025	2030	Reference
Uniform (UNI)	1.000	1.000	1.000	1.000	1.000	1.000	---
Daily Vehicle Miles Traveled (VMT) Ratio using 2011 Baseline	5,773,560	6,080,990 1.000	6,157,848 1.013	6,596,915 1.085	7,040,489 1.158	7,390,867 1.215	RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Local Vehicle Miles Traveled (LVMT) Ratio using 2011 Baseline	472,725	497,198 1.000	503,316 1.012	539,802 1.086	585,265 1.177	634,418 1.276	RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Population (POP) Ratio using 2011 Baseline	280,881	283,288 1.000	292,914 1.034	313,771 1.108	328,272 1.159	341,696 1.206	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Population Growth Rate (PGR) Ratio using 2011 Baseline	1.000	1.009 1.000	1.034 1.025	1.071 1.062	1.046 1.037	1.016 1.007	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Households (HH) Ratio using 2011 Baseline	113,418	114,468 1.000	118,666 1.037	127,912 1.117	134,278 1.173	140,216 1.225	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Household Growth Rate (HHGR) Ratio using 2011 Baseline	1.000	1.009 1.000	1.037 1.027	1.078 1.068	1.050 1.040	1.017 1.008	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Employment (EMP) Ratio using 2011 Baseline	211,596	215,663 1.000	231,931 1.075	252,698 1.172	274,153 1.271	297,252 1.378	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Employment Growth Rate (EGR) Ratio using 2011 Baseline	1.000	1.019 1.000	1.075 1.055	1.090 1.069	1.085 1.064	1.032 1.013	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Ag/Mining/Constr Employment (AMC) Ratio using 2011 Baseline	14,869	15,114 1.000	16,096 1.065	17,439 1.154	18,847 1.247	20,348 1.346	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
AMC Emp Growth Rate (AMCGR) Ratio using 2011 Baseline	1.000	1.017 1.000	1.065 1.048	1.083 1.066	1.081 1.063	1.030 1.014	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Mfg/Trans/Com/Util/wholesale (MTCUW) Ratio using 2011 Baseline	29,049	29,531 1.000	31,457 1.065	34,059 1.153	36,803 1.246	39,768 1.347	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
MTCUW Emp Growth Rate (MTCUWGR) Ratio using 2011 Baseline	1.000	1.017 1.000	1.065 1.048	1.083 1.065	1.081 1.063	1.031 1.014	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
Service & Office Emp (SVCOF) Ratio using 2011 Baseline	61,942	63,181 1.000	68,139 1.078	74,567 1.180	81,173 1.285	88,221 1.396	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
SVCOF Emp Growth Rate (SVCOGR) Ratio using 2011 Baseline	1.000	1.020 1.000	1.078 1.057	1.094 1.073	1.089 1.067	1.033 1.013	2012 WC Consensus data, as interpreted by RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013.
RNO Airport Passenger (AP) Ratio using 2011 Baseline	3,823,393	3,945,186 1.000	4,432,360 1.123	5,138,320 1.302	5,876,196 1.489	6,720,031 1.703	RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013. 2010 is actual data, the rest projected.
Airport Passenger Growth Rate (APGR) Ratio using 2011 Baseline	1.000	1.032 1.000	1.123 1.089	1.159 1.123	1.144 1.108	1.053 1.020	RTC of Washoe County; "2035 Regional Transportation Plan", April 19, 2013. 2010 is actual data, the rest projected.
Heating Degree Days (HDD)* Ratio using 2011 Baseline	2,368	2,499 1.000	2,501 1.001	2,501 1.001	2,501 1.001	2,501 1.001	National Climatic Data Center. Normal, Means and Extremes; Reno, NV (RNO) 30-year Normals (1980-2010) for 2015 forward.
Rainfall >= 0.01 inch (Rain)* Ratio using 2011 Baseline	34.0	5.0 1.000	18.3 3.660	18.3 3.660	18.3 3.660	18.3 3.660	National Climatic Data Center. Normal, Means and Extremes; Reno, NV (RNO) 30-year Normals (1980-2010) for 2015 forward.
Snowfall >= 1 inch (SNO)* Ratio using 2011 Baseline	3.0	1.0 1.000	3.8 3.800	3.8 3.800	3.8 3.800	3.8 3.800	National Climatic Data Center. Normal, Means and Extremes; Reno, NV (RNO) 30-year Normals (1980-2010) for 2015 forward.

Episodic RWC EI Factors:

Rule Penetration	0.85	0.85	0.88	0.88	0.88	0.88	Washoe County Residential Wood Use Survey
Rule Effectiveness	0.86	0.86	0.74	0.74	0.74	0.74	Reports compiled by InfoSearch for 2009-2010
Control Efficiency	1.00	1.00	1.00	1.00	1.00	1.00	(May 2010) & 2012-2013 (May 2013).

Note: 2011 data is from Washoe County's Emissions Inventory compilation.

* Includes Jan, Nov, & Dec., 2015 - 2030 data are 30-year normal from 1981-2010, from 2013 NOAA Weather Summary file.

Note: The population and employment data are not specifically included in the main body of the RTP, but were used as inputs for the transportation model that generates VMT data. These data (2010, 15, 20, 25, 30) came from 2012 Washoe County Consensus Forecast, as provided by Judy Althoff/RTC. Airport passenger data, which was also used in the RTP, were provided by Peter Bang/RTC.

Appendix A.1 – Residential Wood Combustion

The 2009-2010 winter season survey was used to estimate the 2011 emission for RWC. An adjustment factor of 0.921 based on heating degree days and households was applied to the 2009-2010 survey to estimate the 2011 emission. This factor accounts for the colder 2009-2010 winter season and higher population as compared to the 2011-2012 winter season and population.

The most recent survey was completed for the 2012-2013 winter season. Likewise, adjustment factor based on heating degree days (HDD) was applied to the 2012-2013 survey to calculate the emissions from 2015 through 2030. Since non-certified woodstoves are not allowed within the Truckee Meadows, and new installation of certified phase II or fireplaces are only allowed on a property with greater or equal to one acre in size, the growth factors for the various RWC devices vary. Table A-3 is a summary of the adjustment methodologies used to project future RWC emissions. This factor accounts for the milder 2011-2012 winter season (2,499 heating degree days) compared to the historic normal (2,501 heating degree days) (Appendix A). This estimate is conservative and assumes that projected CO emissions stay consistent with the heating degree days and allowable future RWC devices within the Truckee Meadows. It is used because RWC in the Truckee Meadows is controlled by a regulation that: 1) is permanent and enforceable, 2) does not allow non-EPA certified devices in new dwelling units, and 3) requires non-EPA certified devices to be upgraded or removed upon real estate transactions.

Table A-3 – Truckee Meadows CO Emission Projection Calculation Methodologies for RWC

RWC Device	Future Emission Projection Methodology	Rationale
Fireplaces	Device number set at 2011 EI level, adjusted by HDD.	No new fireplaces can be installed within the Truckee Meadows unless the property is greater or equal to 1 acre in size. Also assumed when aging fireplaces are replaced with newer ones, 1% per year will be replaced by gas fireplaces.
Non-certified woodstoves	Device number decreases by 128 per annum from 2011 EI level, based on the average number of devices removed from 2006 - 2012, adjusted by HDD.	Non-certified woodstoves are prohibited from installation within the Truckee Meadows. Assumed 100% of the non-certified woodstoves are replaced by 75% Phase II woodstoves, 20% pellet stoves, and 5% gas fireplaces.
EPA Certified Phase I woodstoves	Device number is capped at the 2011 EI level, adjusted by HDD and 5% replacement per year.	Since these Phase I devices were replaced by Phase II devices in 1990, no new Phase I devices are allowed within the Truckee Meadows.
EPA Certified Phase II woodstoves	Device number increases by 96 per annum from 2011 EI level, which is 75% of the average non-certified stoves being removed annually, adjusted by HDD.	Assumed that 75% of the non-certified woodstoves are replaced with EPA certified phase II devices. This is a more conservative estimate, not accounting for some of the non-certified woodstoves that could have been removed without being replaced.
Pellet stoves	Device number increases by 26 per annum from 2011 EI level, which is 20% of the average non-certified stoves being removed annually, adjusted by HDD.	Assumed that 20% of the non-certified woodstoves are replaced with pellet stoves. This is a more conservative estimate, not accounting for some of the non-certified woodstoves that could have been removed without being replaced.

Appendix B

Truckee Meadows Projected CO Seasonal Emissions

Table B-1 – Truckee Meadows Projected CO Seasonal Emissions (lbs/day)

Major Category	Sub-Category	2011 Attain EI	2011 Maint Em Limit	Projected CO Emissions (lbs/day)			
				2015	2020	2025	2030
POINT SOURCES							
	Geothermal	N/A	N/A	N/A	N/A	N/A	N/A
	Printing	N/A	N/A	N/A	N/A	N/A	N/A
	Airports & Heliports						
	GSE	1,280	1,280	1,438	1,668	1,907	2,181
	Military Aircraft	65	65	65	65	65	65
	Commercial Aircraft	767	767	861	998	1,142	1,306
	Gen Aviation - piston	860	860	966	1,120	1,280	1,464
	Gen Aviation - turbine	163	163	183	212	243	278
	Air Taxi - piston	108	108	121	140	160	183
	Air Taxi - turbine	63	63	70	82	93	107
	APU	55	55	62	72	82	94
	Buffer Zone	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
	Subtotal	3,361	3,361	3,768	4,357	4,974	5,678
NONPOINT SOURCES							
	Stationary Source Fuel Combustion						
	Industrial Fuel Combustion	419	419	451	491	533	578
	Com/Inst Fuel Combustion	1,672	1,672	1,798	1,959	2,125	2,304
	Res. Fuel Combustion	1,300	1,300	1,349	1,454	1,527	1,594
	Res. Wood Combustion						
	Fireplaces	25,804	25,804	24,772	23,552	22,392	21,290
	Woodstoves/Inserts						
	Non-certified	9,547	9,547	8,007	6,073	4,139	2,205
	Certified, Phase 1	4,952	4,952	4,002	3,002	2,251	1,266
	Certified, Phase 2	4,333	4,333	5,310	6,467	7,547	8,699
	Pellet Stoves	826	826	868	920	973	1,025
	Subtotal	48,853	48,853	46,557	43,918	41,487	38,961
	Industrial Processes						
	Chemical Manufacturing	-	-	-	-	-	-
	Commercial Cooking	507	507	524	562	588	612
	Food & Kindred Products - Manufacturing	3	3	3	3	3	4
	Mineral Processes	37	37	40	44	47	51
	Rubber/Plastic Processes	-	-	-	-	-	-
	Fabricated Metals	1	1	1	1	1	1
	Construction - Stationary						
	Road Construction	-	-	-	-	-	-
	Residential Dust Projects (Non-Road Const.)	-	-	-	-	-	-
	Commercial Dust Projects (Non-Road Const.)	-	-	-	-	-	-
	Asphalt, Sand and Gravel, Abrasive Blasting	111	111	117	119	118	113
	Machinery	4	4	4	5	5	6
	Mining and Quarrying - Stationary	0	0	0	0	0	0
	Miscellaneous Industrial Processes	93	93	100	109	118	128
	Subtotal	756	756	790	842	881	914
	Solvent Utilization						
	Architectural Coatings	-	-	-	-	-	-
	Auto Refinishing	-	-	-	-	-	-
	Wood Furniture	-	-	-	-	-	-
	Paper	-	-	-	-	-	-
	Plastic Products	-	-	-	-	-	-
	Machinery & Equipment	-	-	-	-	-	-
	Electronic & Other Electrical	-	-	-	-	-	-
	Misc. Manufacturing	-	-	-	-	-	-
	Subtotal	-	-	-	-	-	-
	Other Solvent Utilization						
	Degreasing	-	-	-	-	-	-
	Dry Cleaning	-	-	-	-	-	-
	Graphic Arts	-	-	-	-	-	-
	Misc. Industrial Processes	-	-	-	-	-	-
	Misc. Commercial Processes	-	-	-	-	-	-
	Misc. Consumer/ Com. Solv.	-	-	-	-	-	-
	Cutback Asphalt Application	-	-	-	-	-	-
	Emulsified Asphalt Appl.	-	-	-	-	-	-
	Pesticide, Fungicide & Rodenticide	-	-	-	-	-	-
	Subtotal	-	-	-	-	-	-
	Storage and Transport						
	Gas Service Station	-	-	-	-	-	-
	Organic Chemical Storage	18	18	20	22	23	25
	Subtotal	18	18	20	22	23	25
	Waste Disp/Treat/Recovery						
	Commercial/Industrial Incineration	-	-	-	-	-	-
	Publicly Owned Treatment Works	N/A	N/A	N/A	N/A	N/A	N/A
	Remediation/Reclamation/ Recycle	1	1	1	1	1	1
	Subtotal	1	1	1	1	1	1

Misc. Non-Point Sources						
Paved Road Fugitive Emissions	-	-	-	-	-	-
Paved Road Fugitive Emissions, Sanding & Salting	-	-	-	-	-	-
Unpaved Road Fugitive Emissions	-	-	-	-	-	-
Dirt Road Fugitive Emissions	-	-	-	-	-	-
Wildfires	105,092	217	217	217	217	217
Structure Fires	86	86	86	86	86	86
Motor Vehicle Fires	5	5	5	5	5	5
Firefighting Training	-	-	-	-	-	-
Open/Permit Burning	105	105	105	105	105	105
Prescribed Burning	-	-	-	-	-	-
Refuse Fires	37	37	37	37	37	37
Auto & Misc. Repair Shops	0	0	0	0	0	0
Health Services, Hospitals	-	-	-	-	-	-
Essay Labs	N/A	N/A	N/A	N/A	N/A	N/A
Human & Animal Cremation	4	4	4	4	4	4
Subtotal	105,328	453	453	453	454	454
TOTAL NONPOINT SOURCES	154,956	50,081	47,820	45,236	42,845	40,355
<u>NON-ROAD MOBILE SOURCES</u>						
CNG Engines	196	196	134	106	101	100
Diesel Engines	2,427	2,427	1,986	1,236	824	626
Gasoline Engines	45,010	45,010	40,320	43,149	46,535	50,040
LPG Engines	2,985	2,985	1,191	792	747	769
Locomotives	88	88	94	103	112	121
Subtotal	50,706	50,706	43,725	45,385	48,320	51,656
<u>ON-ROAD MOBILE SOURCES</u>						
On-Road Vehicles*	162,988	162,988	149,794	139,529	138,288	141,961
HDDV Diesel Idling*	512	512	536	600	649	725
Subtotal	163,500	163,500	150,330	140,129	138,938	142,686
Grand Total	372,522	267,648	245,642	235,107	235,077	240,375
Safety Margin			22,006	32,540	32,571	27,272
* Sub-Category included in MVEB			172,336	172,670	171,509	169,959