

**The Path Forward:**  
**Reducing Ozone Pollution  
to Protect Public Health  
in the Colorado Front Range**

Developed by  
A Coalition of Colorado's Local Governments  
and  
Environmental Groups

Including:

Boulder County Public Health  
Denver Environmental Health  
City of Fort Collins Air Quality Program  
Jefferson County Environmental Health

Environmental Defense  
Rocky Mountain Clean Air Action

## **Introduction**

This past summer, numerous air monitors ranging from Fort Collins to Chatfield Park reported levels of ozone or “smog” above the national health-based air quality standard (NAAQS). As a result, the ozone health standard was violated, triggering federal Clean Air Act requirements for a comprehensive air quality management plan to restore healthy air. In addition, Governor Ritter asked the Denver Regional Air Quality Council (RAQC) to develop short and long-term measures aimed at reducing ozone pollution in the Front Range. Importantly, the Governor stressed the need to “be more aggressive in developing and strengthening air quality programs” to reduce ground-level ozone and urged the RAQC to develop measures to reduce ozone by next summer.<sup>1</sup>

This paper represents the collaborative effort of a group of governmental bodies and non-profit organizations dedicated to improving the air quality in a number of counties in the Front Range including Denver, Boulder, Jefferson, Douglas, Broomfield, Adams, Arapahoe and parts of Larimer and Weld (cumulatively the Denver Metro Area). These groups include: Denver Environmental Health, Boulder County Public Health, City of Fort Collins Air Quality Program, Jefferson County Environmental Health, Environmental Defense and Rocky Mountain Clean Air Action. The purpose of this paper is to assist the RAQC in its effort to develop protective ozone reduction strategies for the Denver Metro Area consistent with the Governor’s call for a strengthened air quality program. To that end, we have assembled a comprehensive list of strategies, each of which has been analyzed according to the following criteria:

- Short-term, early action measures that provide immediate benefits
- Long-term benefits
- Multi-pollutant reduction benefits
- Ecosystem health benefits
- Cost-effectiveness
- Successful demonstration and implementation in other jurisdictions.

In light of the Governor’s request to have in place ozone reduction strategies by the next ozone season (summer 2008), we recommend the following strategies for priority implementation:

- Adoption of a Colorado clean car program
- Amendment and lowering of Colorado’s motor vehicle emissions cutpoints for Hydrocarbons (HC) and Volatile Organic Compounds (VOCs)
- Green completions for all new oil and gas well completions, recompletions and workover activities
- Oil and Gas Leak Inspection and Maintenance Program
- Adoption of an “Employer Trip Reduction Program” by medium and large employers

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<sup>1</sup> Letter from Governor Bill Ritter, Jr., to Andrew Spielman, Chairman, Denver RAQC (July 26, 2007).

- Colorado Air Quality Control Commission (AQCC) adoption of a model anti-idling law. RAQC cooperation in assisting municipal, local and county governments to opt-in voluntarily
- Voluntary green certification for lawn-care companies that choose to use electric, or low-emission gasoline, lawn and garden equipment
- Voluntary supply of 7.0 psi Reid Vapor Pressure fuel across the Front Range that will lower the volatility of gasoline

## I. OVERVIEW

### A. Ozone Chemistry

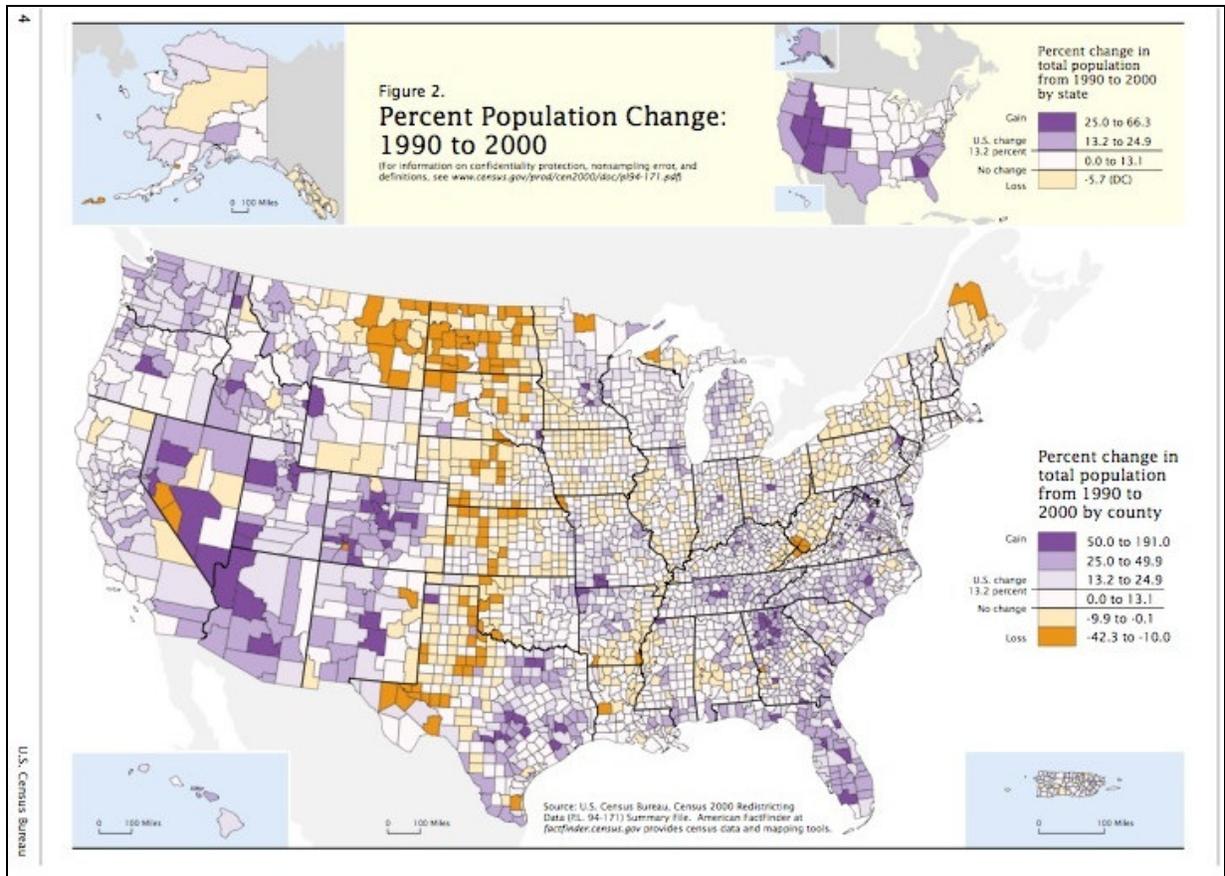
Ozone is formed when nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) found in the emissions from cars, power plants, and other sources react in the presence of sunlight. Hotter temperatures and increased sunlight during summer months create the perfect conditions for this reaction to occur.

#### 1. *Growth in the Front Range and Regional Nature of Ozone Pollution*

The increases in ozone levels across the Denver Metro Area coincide with growth in population and associated developments that are spreading out from the city centers. With these developments, air quality problems are becoming more regional in character with the impacts of key pollutants like ozone and particulate pollution becoming more widespread. In the past year ozone exceedances were recorded at locations ranging from Fort Collins to Chatfield State Park.<sup>2</sup> The map below shows recent growth in the U.S., with most of the fastest growing regions in the West, including the Front Range.

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<sup>2</sup> See <http://apcd.state.co.us/psi/ozone.htm>.



Colorado is already showing signs of the impacts of regional growth and of climate change on air quality as can be noted in the recent trends in regional air quality. As Colorado enters its next round of air quality management planning to restore healthy air, it is essential to address ozone in the context of these broader, interconnected issues of climate change and regional growth. Evaluation of emission reduction strategies need to be evaluated under predicted changes in climate for the Front Range in particular. Emissions and impacts for the entire Front Range region need to be part of the consideration since both the emission patterns and the effected populations are becoming increasingly regional.

## 2. *The Need for Both NO<sub>x</sub> and VOC Reductions*

To address the ozone problem in the Denver Metro Area the prudent approach is to seek reductions in the overall pollution burden, including reductions of both NO<sub>x</sub> and VOCs, the ozone precursors. A variety of studies have shown that both major precursors should be controlled to effectively reduce ozone pollution. The California Air Resources Board released a report on the “weekend effect” which concluded that concerns raised over a potential NO<sub>x</sub> disbenefit do not justify altering the strategy of reducing both NO<sub>x</sub> and VOCs.<sup>3</sup> An earlier report from NARSTO emphasized the complex nature of the issue but recognized that both NO<sub>x</sub> and VOC controls are appropriate under a variety of circumstances, including ozone programs to

<sup>3</sup> California Environmental Protection Agency, Air Resources Board, The Ozone Weekend Effect in California: Executive Summary 17 (2003).

address regional air quality.<sup>4</sup> Because ozone formation is dependent on local concentrations of VOCs and NO<sub>x</sub> (which vary spatially and temporally) as well as meteorological effects that effect mixing rates, control of both pollutants is necessary to achieve broad reductions over a wide area such as the Front Range.

Past experience in areas with high ozone levels has shown the efficacy of controls for both NO<sub>x</sub> and VOCs, and even where the weekend effect is observed, those controls have reduced ozone levels. NO<sub>x</sub> controls are necessary in the Denver Metro Area because not all areas are VOC limited, and further because NO<sub>x</sub> emissions have a variety of other environmental impacts, including regional haze and nitrogen deposition at Rocky Mountain National Park, which can be mitigated through NO<sub>x</sub> controls.

For these reasons we urge the RAQC to consider strategies for reducing NO<sub>x</sub> as well as VOC emissions both to address ozone pollution problems and other environmental impacts from these pollutants.

### 3. *Ozone Pollution in the Context of a Changing Climate*

The formation of ozone is impacted by climate. The atmospheric chemical processes that control the production of ozone are determined largely by the volume of ozone-forming contaminants together with temperature and other factors such as sunlight and relative humidity. As the temperature and other meteorological factors change, production of air pollutants also will be affected. For example, as temperatures increase, ozone levels also will rise.

Strategies for improving air quality traditionally have been assessed by examining the relative benefits of different emission reduction strategies and assuming that changes in climate were not a factor. As predictions of changes in the climate over the next few decades are being increasingly acknowledged by the scientific community, the impacts of these changes in temperature and other meteorological factors on air quality needs to be factored into air quality assessments. Many studies are already demonstrating the impacts of climate change on future air quality, in particular the anticipated increases in ozone and particulate pollution production in many areas. These studies are briefly summarized below.

- Shiliang Wu et al., *Effects of 2000-2050 Global Climate Change on Ozone Air Quality in the United States*, submitted J. OF GEOPHYSICAL RESEARCH (2007). This study estimates increases in the maximum 8-hour average for ozone of 2-5 ppb, with increases of up to 10ppb for severe ozone episodes.
- Tagaris et al., *Impacts of Global Climate Change and Emissions on Regional Ozone and Fine Particulate Matter Concentrations over the United States*, 112 J. OF GEOPHYSICAL RESEARCH D14312 (2007). This study estimates that future ozone levels will decrease due to planned controls on precursor emissions, although climate change alone will lead to an increase in biogenic emissions of ozone precursors.
- K. Murazaki & P. Hess, *How Does Climate Change Contribute to Surface Ozone Change over the United States*, 111 J. OF GEOPHYSICAL RESEARCH D05301 (2006). This study

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<sup>4</sup> North American Research Strategy for Tropospheric Ozone (NARTSO), Assessment of Tropospheric Ozone Pollution: A North American Perspective 3-17-18 (2000).

estimates that climate change alone would lead to increases in ozone levels in polluted areas, if emissions remained the same.

- Lamb et al., *Multi-scale Modeling of the Effects of Global Climate Change upon Regional Air Quality* (2007). This presentation predicted peak ozone increases of 5 to 15 ppb due to climate change, leading to significant increases in occurrences above the current 80 ppb standard.

The impacts of climate change on ozone formation need to be acknowledged and, if possible, quantitatively assessed, as detailed strategies for addressing ozone over the short and long term are developed.

## **B. Health Impacts**

There is vast and incontrovertible evidence supporting the association between the exposure to ozone and a suite of adverse health effects. In the past decade, over 1,700 studies have been published which examined the association between exposure to varying concentrations of ozone and human and environmental health effects.<sup>5</sup> These studies, which build upon a strong base of scientific data gleaned over decades, conclusively demonstrate that short-term exposure to ozone is associated with a number of serious health effects including “changes in the respiratory tract, pulmonary function decrements, respiratory symptoms, respiratory inflammation ... increased emergency department visits and hospital admission”, and “increases in restricted activity days and school absences.”<sup>6</sup> More recent studies also demonstrate that short-term ozone exposure directly or indirectly contributes to premature mortality and cardio-pulmonary mortality.<sup>7</sup> Long-term exposure to ozone, ranging from weeks to years, is likewise associated with a range of adverse health effects including “seasonal declines in lung function or reduced lung function development, increases in inflammation, and development of asthma in children and adults.”<sup>8</sup>

Ozone affects certain groups more acutely than others. Due to the early development of their lungs and their propensity for spending greater time outdoors, ozone especially affects the health of children. According to EPA, “[c]hildren with and without asthma were found to be particularly susceptible to O<sub>3</sub> [ozone] effects on lung function and generally have greater lung function responses than older people.”<sup>9</sup> In addition, people who spend time outdoors, such as “outdoor workers..., adolescents, and adults who engage in outdoor activities” are also at greater risk of ozone exposure.<sup>10</sup> People with asthma are likely to react more severely to ozone exposure than their healthy counterparts.<sup>11</sup> The elderly are at greatest risk for ozone-related “mortality and hospitalization.”<sup>12</sup>

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<sup>5</sup> Testimony of Stephen L. Johnson, Administrator of U.S. EPA, before the Senate Committee on Environment and Public Works (July 11, 2007).

<sup>6</sup> U.S. EPA, *Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information*, 3-4 (July 2007).

<sup>7</sup> *Id.* at 3-33.

<sup>8</sup> *Id.* at 3-25.

<sup>9</sup> U.S. EPA (2007), *Control of Emissions from Nonroad Spark-Ignition Engines and Equipment*, 72 Fed. Reg. 28,098, 37,826 (proposed May 18, 2007).

<sup>10</sup> *Id.* at 37,846.

<sup>11</sup> *Id.* at 37,826. In a 2004 survey, the Centers for Disease Control and Prevention found that 8.7% of adults in Colorado reported that they currently suffer from asthma as compared to 8.1% nationally. U.S. Department of

### C. Ecosystem Health Impacts

Ozone pollution also poses a threat to Colorado's unique natural landscapes.<sup>13</sup> According to the EPA, ozone may be the pollutant with the "greatest potential for regional-scale forest impacts".<sup>14</sup> Exposure to severe ozone dramatically weakens the health of ponderosa pines and increases the chance of forest fires caused by large amounts of dry, dead underbrush.<sup>15</sup> NOx pollution contributes to nitrogen deposition.<sup>16</sup> Nitrogen deposition has caused, and is expected to continue to cause, species shifts, unnatural chemical changes in lakes and streams, reduced habitat and loss of alpine flowers.<sup>17</sup> NOx emissions also contribute to reduced visibility when transformed into nitrate aerosols.<sup>18</sup> Indeed, the number of poor visibility days in Rocky Mountain National Park has increased in recent years.<sup>19</sup>

### D. History of North Front Range Ozone Pollution

In December 2004, EPA proposed designating eleven counties in the northern Front Range as out of attainment with the 8-hour ozone health standard. In early 2004 the state of Colorado entered into an Early Action Compact (EAC) with EPA. Pursuant to the EAC, the state agreed to a more expeditious timeframe for achieving the ozone NAAQS in the Denver Metro Area in exchange for relief from certain federal Clean Air Act (CAA) provisions. Specifically, the state committed to attaining the ozone NAAQS by Dec. 31, 2007.<sup>20</sup>

Under the EAC, measures were implemented to reduce ozone forming emissions. Despite these efforts, in the summer of 2007, fifteen air quality monitor stations across the Front Range recorded ten exceedances of the current ozone NAAQS of .08 ppm, while five monitors recorded

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Health and Human Services, Centers for Disease Control and Prevention (CDC), *Behavioral Risk Factor Surveillance System Survey Data*, Atlanta, Georgia (2004). This corresponds to almost 300,000 adults in Colorado. *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> Exceedances of the ozone NAAQS in sensitive places like Rocky Mountain National Park are not uncommon. For example, in 2002 and 2003 the air monitor at Rocky Mountain National Park recorded ozone levels of 0.087 and 0.086 ppm. Tamera Blett and Kristi Morris, Air Resources Division of the National Park Service, Rocky Mountain National Park Initiative, *Nitrogen Deposition: Issues and Effects in Rocky Mountain National Park, Technical Background Document*, Denver CO 27 (March 2004).

<sup>14</sup> U.S. EPA (2007), Draft Regulatory Impact Analysis, Control of Emissions from Marine and Small SI Engines, Vessels, and Equipment, Chapter 2, 16 (April 2004).

<sup>15</sup> Zack Parsons and Steven Arnold, Colorado Department of Health and Environment *Ozone Transport in the West: An Exploratory Study* (July 2004), available at <http://www.cdphs.state.co.us/ap/down/ozonettransport.pdf> at 9.

<sup>16</sup> NOx emissions from motor vehicles are one of the primary air pollutants contributing to nitrogen deposition in the park. According to the Rocky Mountain National Park Initiative Study, mobile sources are the greatest contributor to NOx emissions in the Front Range and the state of Colorado, accounting for 42% of the NOx emitted in the Front Range and 33% in the entire state in 2002. *Nitrogen Deposition: Issues and Effects in Rocky Mountain National Park, Technical Background Document*, *supra* note 13, at 10.

<sup>17</sup> "[H]igh elevation ecosystems in Rocky Mountain National Park have been changed by the effects of nitrogen deposition." *Id.* at iii-iv and 12.

<sup>18</sup> *Id.* at v.

<sup>19</sup> *Id.* at 12.

<sup>20</sup> Early Action Compact, Ozone Action Plan, Proposed Revision to the State Implementation Plan, Approved by the CO Air Quality Control Commission 3 (Dec. 17, 2006).

exceedances at least five times each. When unhealthy ozone levels are anticipated the Colorado Department of Public Health and Environment (CDPHE) issues public health advisories, or “ozone alerts”, advising people to limit the amount of time they spend outdoors and take other precautionary measures to help decrease ozone levels. CDPHE issued 49 ozone alerts in 2006 and 44 as of August 31, 2007.<sup>21</sup>

While there have been numerous exceedances of the ozone NAAQS, not until very recently did the number and severity of high ozone days combine to equal a violation of the NAAQS.<sup>22</sup> The tipping point occurred this summer when the air quality monitor at Rocky Flats near the Boulder/Jefferson county line recorded an eight-hour rolling average ozone concentration of .088 ppm. This reading marked the fourth exceedance of the NAAQS over the last three years at the Rocky Flats monitor. Accordingly, the EPA formally designated the area out of compliance with the ozone NAAQS on November 20, 2007, and Colorado will be required to develop a comprehensive air quality management plan to restore healthy air.<sup>23</sup>

Absent significant reductions in the emissions that contribute to the formation of ozone, it is unlikely that the Denver Metro Area will succeed in timely attainment of the ozone NAAQS. Recently, a group of scientists charged with advising EPA regarding air quality standards unanimously recommended EPA tighten the existing 8-hour ozone standard, observing that the current ozone health standard is insufficient to protect human health.<sup>24</sup> In response, EPA proposed to strengthen the current ozone standard.<sup>25</sup> If EPA promulgates a more protective ozone standard, consistent with a body of medical science, Colorado may need to strengthen its ozone reduction strategies. Governor Ritter’s recent letter urged the RAQC to “consider the addition of elements that would further reduce ozone levels that may be necessary to meet the recently proposed lower federal ozone standard.”<sup>26</sup>

While the challenges facing the Denver Metro Area are significant, the good news is that they are in no way insurmountable. Just as there are many sources and factors that contribute to the formation of ground-level ozone, so there are myriad feasible strategies available to combat it. Many of these measures have been demonstrated successfully in other jurisdictions facing equally poor or worse ozone problems. We therefore provide the following recommended strategies to reduce ozone forming emissions before the next ozone season and over time as part of Colorado’s development of a comprehensive strategy to restore healthy air.

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<sup>21</sup> See <http://www.ozoneaware.org/> (last visited Oct. 24, 2007).

<sup>22</sup> While any individual 8-hr reading that is over the current standard of .08 ppm is an exceedance of the NAAQS, a violation of the NAAQS only occurs when the three-year average of the fourth maximum values at a monitor exceeds the federal standard.

<sup>23</sup> Areas that fail to meet national health based air standards must submit state implementation plans (SIPs) to EPA. EPA has authority to accept or reject elements of a state implementation plan depending on the degree to which a state’s plan conforms to federal clean air requirements.

<sup>24</sup> Letter from Clean Air Science Advisory Committee to Stephen L. Johnson, Administrator, U.S. EPA, Clean Air Science Advisory Committee’s (CASAC) Peer Review of the Agency’s 2<sup>nd</sup> Draft Ozone Staff Paper (Oct. 24, 2006).

<sup>25</sup> Proposed Rule for the National Ambient Air Quality Standards for Ozone, 72 Fed. Reg. 37,818 (proposed July 11, 2007).

<sup>26</sup> Letter from Governor Bill Ritter Jr., to Andrew Spielman, *supra* note 1.

## II. STRATEGIES

### A. Fuels Sector

Lowering the Reid Vapor Pressure (RVP) of gasoline has an effect on both exhaust and evaporative emissions from sources that use gasoline (on-road vehicles and off-road equipment). It also has an effect on the evaporative VOC emissions of sources used to store and transport gasoline (fuel tanks of on-road vehicles and off-road equipment, portable fuel containers, and the gasoline distribution network). Ozone nonattainment areas throughout the U.S. have adopted ozone control strategies that require either Federal Reformulated Gasoline (RFG) or low RVP gasoline (~7.0 RVP).

#### 1. *Reformulated Gasoline*

The Federal RFG program is authorized under section 211(k) of the CAA. EPA regulations specify content and performance requirements for RFG, which reduces motor vehicle emissions of VOCs, NO<sub>x</sub>, CO, and air toxics. Ozone nonattainment areas where the CAA does not mandate RFG (such as Denver) may opt-into the federal RFG program under section 211(k). To opt-in to RFG, the state Governor applies to the EPA, and EPA sets an effective date for the program to apply in that area, which is no later than one year from the date of application. EPA must grant the RFG opt-in to a state where the Governor requests to opt-in. Section 211(k)(6)(A)(i) of the CAA provides that “[u]pon the application of the Governor of a State, the Administrator *shall apply*” the reformulated gasoline standards.<sup>27</sup>

The EPA guidance indicates that “EPA supports the state opt-in to RFG as an environmentally beneficial, cost-effective, and administratively simple ozone control measure.” This guidance was issued in 1997 and since then Tier 2 sulfur in gasoline requirements have slightly reduced the effectiveness of RFG against conventional gasoline; this is because lower sulfur content in conventional gasoline and RFG reduces the deterioration of emission controls (e.g. catalytic converters). At the same time, RFG and similar cleaner gasoline standards are widely recognized to provide considerable cost-effective benefits in reducing ozone and other airborne contaminants. In the Phoenix metropolitan area, for example, the Arizona Clean Burning Gasoline program has proven effective in cutting summertime smog while reducing air toxics, carbon monoxide and particulate pollution.

Counties that have RFG must meet the RFG requirements, which specify an overall VOC, NO<sub>x</sub>, and air toxics reduction for the gasoline. In many RFG areas, the gasoline volatility is typically less than 7.0 RVP. Up until the time that the Energy Policy Act of 2005 was passed (in August of 2005), every gallon of RFG was required to contain a minimum of 2.0 wt % oxygen, which, in most areas of the U.S, is now ethanol. In the Chicago area, for example, 100% of the gasoline sold contains ethanol, at about 2.7 wt %. No RVP waiver is allowed for RFG. However, under the Energy Policy Act, there is no minimum oxygen content for RFG, therefore, gasoline marketers could start marketing no-ethanol gasoline, as long as it meets the other RFG performance requirements.

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<sup>27</sup> 42 U.S.C. § 7545(k)(6)(A)(i) (emphasis added).

As of 2004, the Denver area was required to use 7.8 RVP gasoline, with a 1 pound per square inch (psi) waiver for ethanol blending up to 10 percent. Federal RFG, with a typical RVP of less than 7.0, is not eligible for a 1 psi ethanol waiver, though ethanol can be used in RFG.

Both RFG and low RVP gasoline are expected to increase the costs of gasoline to motorists. These measures, however, are highly cost-effective, and have proven to be more effective and efficient than many other ozone abatement strategies.

In April of 2005, the American Petroleum Institute released a study entitled the “Potential Effects of the 8-Hour Ozone Standard on Gasoline Supply, Demand, and Production Costs”, conducted by MathPro<sup>28</sup>. This study was designed to “identify and evaluate potential effects of the 8-hour ozone standard on operations, product supply, and costs in *normal steady-state* operation of the U.S. refining and logistics system.”

In general, MathPro found that the gasoline distribution system is capable of handling increased volumes of special gasolines and delivering these volumes to the nonattainment areas that may require them during period of normal, steady-state operations. However, MathPro also found that many existing pipeline and terminal facilities do not have the capacity to handle additional gasoline segregations, and that where this situation exists, the distribution system would be able to meet new requirements for special gasolines in given nonattainment areas, but only with some spillover or quality give-way – that is, supply of a special gasoline requirement in a nonattainment area adjacent to or near-by areas that do not require that gasoline.

The study also examined the volumes of conventional gasoline, 7.8 RVP gasoline, 7.0 RVP gasoline, and RFG if all nonattainment areas required the next level of gasoline control. For example, nonattainment areas with conventional gasoline were assumed to need 7.8 RVP gasoline, areas with 7.8 RVP gasoline were assumed to need 7.0 gasoline, and areas with 7.0 gasoline were assumed to require RFG. Areas with RFG were assumed to keep RFG (no further control in these areas).

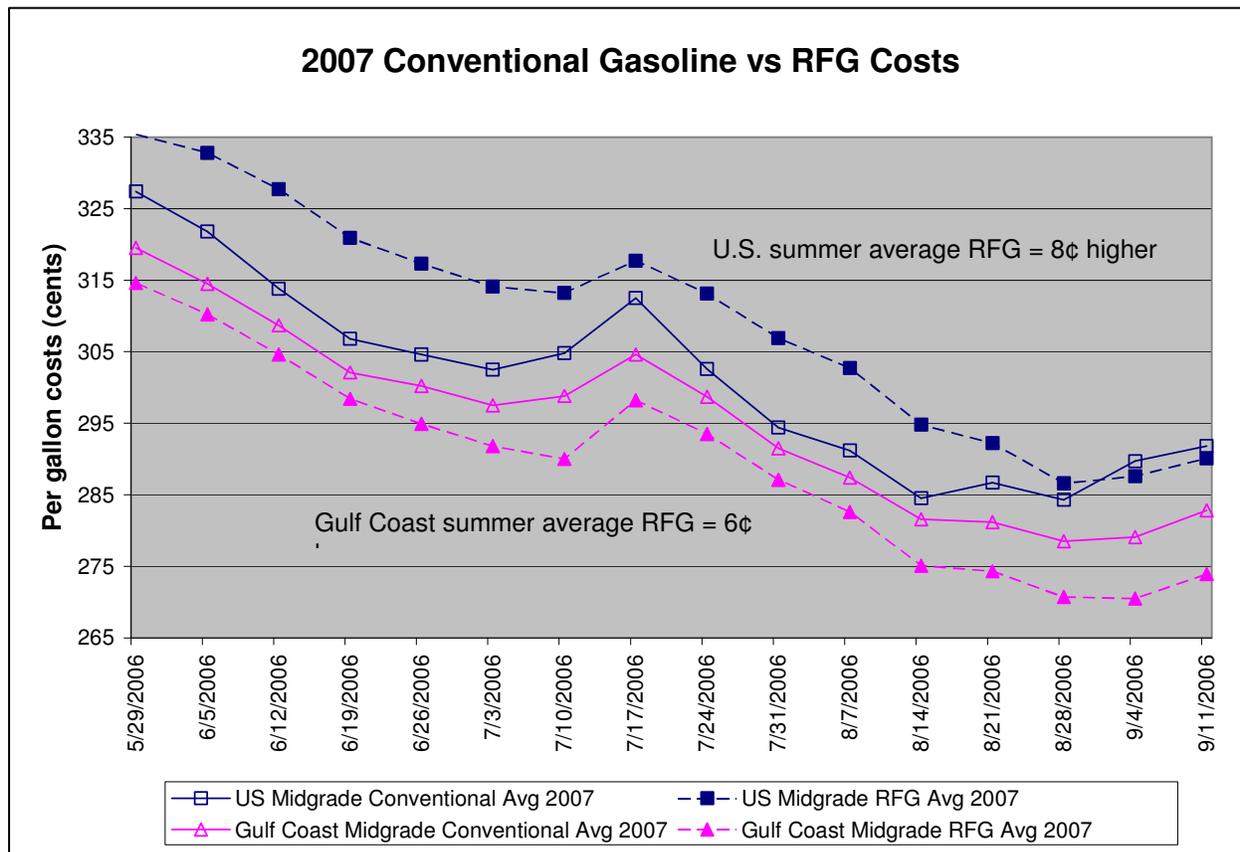
Finally, the study examined incremental costs of these special gasolines. For example, in the Lake Michigan region, the study estimated that 7.8 RVP gasoline would cost about 1.2 ¢/gallon more than conventional gasoline, 7.0 RVP gasoline would cost 0.6 ¢/gallon – 3.0 ¢/gallon more than 7.8 RVP gasoline, and RFG would cost 1.7¢/gallon - 6.2 ¢/gallon more than 7.0 RVP gasoline. In other words, in the Lake Michigan region, RFG would cost 3.5¢/gallon – 10.4¢/gallon more than conventional gasoline.

2007 summer retail gasoline prices for U.S. and Gulf Coast average conventional and reformulated gasoline are shown in the figure below. On average, U.S. average ozone season RFG costs 8¢/gallon more than conventional gasoline, in line with the estimates above. On the other hand, Gulf Coast RFG was 6¢/gallon less than conventional gasoline. This may be due to the fact that many large metropolitan areas along the Gulf Coast require RFG and it is produced

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<sup>28</sup> MathPro Inc. and Stillwater Associates for the American Petroleum Institute, Potential Effects of the 8-Hour Ozone Standard on Gasoline Supply, Demand, and Production Costs (April 15, 2005).

at large refineries, whereas areas that use conventional gasoline acquire it from smaller refineries within or outside the region.



Source: Energy Information Administration, [http://www.eia.doe.gov/oil\\_gas/petroleum/data\\_publications/wrgp/mogas\\_history.html](http://www.eia.doe.gov/oil_gas/petroleum/data_publications/wrgp/mogas_history.html)

- **Timeframe for implementation:** Effective one year from Governor’s request to EPA.
2. *Adoption of a Lower Reid Vapor Pressure Gas*

Colorado currently caps the RVP of gasoline sold during the summer months at 7.8 psi. According to the CDPDE, capping the RVP of fuel at 7.0 psi will result in ozone reduction benefits by reducing the amount of VOCs emitted from fuel.<sup>29</sup>

In order to adopt a lower RVP fuel, Colorado must obtain EPA approval.<sup>30</sup> Approval requests may be included as part of the CAA SIP process. The request must demonstrate that the state low RVP fuel program is necessary to achieve the ozone NAAQS. “Necessary” means that no

<sup>29</sup> CO Department of Public Health and Environment, Ozone Reduction Strategies from Fuels 5 (Nov. 7 2007), available at <http://www.ozoneaware.org/documents/Fuels-Kaufman.pdf>.

<sup>30</sup> The CAA prohibits states from adopting fuel RVP different from that permitted under federal law absent a waiver. CAA § 211(c)(3)(C); 42 U.S.C. § 7547(c)(3)(C). While the Energy Policy Act of 2005 also places some limitations on the ability of a state to adopt a lower RVP than the federal, the Energy Policy Act specifically exempts 7.0 RVP fuels from this requirement. Accordingly, the only impediment to CO adopting a lower RVP fuel is the need to obtain a waiver from EPA under the CAA.

other measures exist that would bring about timely attainment or that other measures exist, but are unreasonable or impracticable.

Several states around the country have obtained waivers from EPA and implemented 7.0 RVP state fuel programs in communities with unhealthy ozone concentrations. For example, Kansas City, Missouri; Kansas City, Kansas; El Paso, Texas; Birmingham, Alabama; and Detroit/Ann Arbor, Michigan all have 7.0 RVP state fuel programs. Other communities also utilize 7.0 RVP gasoline incorporated with other gasoline controls such as sulfur reductions (Atlanta, Georgia) and a Clean Burning Gasoline program (Phoenix, Arizona). These states have seen “significant reductions in targeted emissions at a very low cost.”<sup>31</sup>

We urge the RAQC to work with fuel suppliers to the Denver Metro Area in providing 7.0 psi RVP fuel on a voluntary basis immediately to help protect human health from harmful smog concentrations in the 2008 ozone season. In addition, we urge AQCC to adopt a rule requiring either 7.0 psi RVP or Federal RFG, and obtain EPA approval, as part of the ozone SIP due in December 2008.

- **Timeframe for implementation:** Voluntary adoption for implementation in 2008 ozone season followed by request for low RVP gasoline or RFG in the 2008 ozone SIP. Implementation in 2009-10 pending EPA approval.

### 3. *Ethanol Waiver*

As part of an initiative to reduce the volatility of gasoline, Colorado should also evaluate removal of the 1.0 psi ethanol waiver during the summer season, until lower RVP fuels are available. Under 40 C.F.R. § 80.27, gasoline that contains at least 10 percent ethanol by volume qualifies for an additional 1.0 psi above the approved RVP. For example, if a state fuel program provides for an RVP of 7.8 psi during the summer season, the ethanol waiver allows the overall RVP of the gasoline to be 8.8 psi as long as the fuel contains 9-10% ethanol by volume. Gasoline blended with ethanol evaporates more readily than non-blended gasoline and increases the permeability of gasoline in fuel systems and storage containers, resulting in higher VOC emissions. Colorado can decrease emission of ozone precursors by requesting a removal of the ethanol waiver.

A state has two options for removing the 1.0 psi ethanol waiver. First, in accordance with the process outlined above for requesting a lower RVP fuel program, the state can implement a fuel program that does not incorporate the ethanol waiver. Specifically, when Colorado asks for EPA approval of a 7.0 psi RVP program it may also request to opt-out of the ethanol waiver. El Paso, Texas utilizes a 7.0 RVP program that does not provide for an ethanol waiver.

Alternatively, a state can opt-out of the ethanol waiver under Section 211(h)(5) of the federal Clean Air Act.<sup>32</sup> This section allows the governor of a state to notify the EPA, with “supporting documentation” that the ethanol waiver “will increase emissions that contribute to air pollution

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<sup>31</sup> U.S. EPA, Task Force on Boutique Fuels, Report to the President 6 (June 2006).

<sup>32</sup> 42 U.S.C. § 7545(h)(5).

in any area of the State.”<sup>33</sup> The Administrator shall, by regulation, apply a lower RVP limitation on all gasoline during the ozone season, including gasoline containing 10% ethanol.

Removal of the ethanol waiver would not restrict ethanol from being blended with gasoline. Instead, it would require that refiners reduce the overall volatility of gasoline that can include ethanol. A recent report for Congress determined that the costs of opting out of the ethanol waiver “are not likely to be large.”<sup>34</sup>

Durbin et al (2006)<sup>35</sup> studied the effects of ethanol and volatility parameters on exhaust emissions in California on Low Emission Vehicles (LEV) and Super Low Emission Vehicles (SULEV). Key findings were that:

- Non-methane organic gases (NMOG) emissions increased by 14% when ethanol content was increased from the zero (E0) to the high level (E10). (NMOG emissions increased by 35% when T50 was increased from the low to the high level)
  - Formaldehyde emissions increased by 23% when T50 was increased from the low to the high level.
  - Air toxic emissions increased by anywhere from 73% (Acetaldehyde) to 18% (Benzene) to 22% (1,3-butadiene ) when ethanol content was increased from E0 to E10.<sup>36</sup>
- **Timeframe for implementation:** Request for removal of ethanol waiver as part of December 2008 SIP. Implementation in 2009 pending EPA approval.

#### 4. *Enhanced Stage II Vapor Recovery for Larger Stations*

Significant evaporative emissions of VOCs and air toxics can occur during the refueling of vehicles at the pump. There are currently two primary methods available for reducing refueling evaporative emissions. The first, Stage II vapor recovery, is installed on pumps at gas stations. This method works by capturing gasoline vapors when a vehicle is being fueled and returning the vapors through the pump hose to the petroleum storage tank instead of releasing them into the air. On some vehicles, Stage II vapor recovery systems help capture up to 95 percent of harmful gasoline vapors that may otherwise be released to the atmosphere.<sup>37</sup>

The second, Onboard Refueling Vapor Recovery (ORVR), is a vehicle emission control system that captures fuel vapors from the vehicle gas tank during refueling. Unlike Stage II vapor-recovery systems, ORVR works by capturing fuel vapors and directing them to a carbon canister inside the vehicle’s engine which absorbs the vapors. When the engine is in operation, it draws

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<sup>33</sup> *Id.*

<sup>34</sup> S. REP. NO. 108-57 at 30 (2003).

<sup>35</sup> Durbin, T.D.; Miller, J.W.; Younglove, T.; Huai, T.; Cocker, K., 2006. Effects of Ethanol and Volatility Parameters on Exhaust Emissions, CRC Project No. E-67.

<sup>36</sup> Only a high T<sub>90</sub> fuel (~355 F) was used so no conclusions can be drawn for fuels with lower levels of T<sub>90</sub>.

<sup>37</sup> See [http://www.tceq.state.tx.us/implementation/air/vaporrecovery/vapor\\_recovery.html](http://www.tceq.state.tx.us/implementation/air/vaporrecovery/vapor_recovery.html).

the vapors into the engine intake manifold to be used as fuel.<sup>38</sup> ORVR controls are being phased in by EPA and are currently required on 40% of 1998 model year cars, 80% of 1999 model year cars, and 100% of 2000 model year and later cars. Light-duty trucks have a six-year phase-in period, starting in model year 2001. EPA anticipates ORVR will be in “widespread” use sometime after 2010.<sup>39</sup> According to EPA, ORVR controls will reduce VOCs and air toxics by approximately 300,000 to 400,000 tons per year (tpy) nationwide.<sup>40</sup>

Importantly, not all vapor recovery systems are compatible with ORVR controls. In order to ensure greater compatibility, the California Air Resources Board (CARB) identified two vapor recovery systems that have proven to work with onboard ORVR controls.<sup>41</sup> CARB estimates that ORVR controls will be available on 50% of vehicle miles traveled in 2005, 65% in 2010, and 95% in 2020. Nevertheless, California expects to keep its Phase II vapor recovery systems in place until at least 2020 or longer to maintain emissions reductions.<sup>42</sup>

Other states, such as Illinois, require the use of Stage II recovery systems within nonattainment areas and at gas stations that dispense, on average, more than 10,000 gallons of gasoline per month for the last 12 months of operation.<sup>43</sup> In Colorado, the number of “terminals” determines the size of the fueling station. Each terminal includes two pumps. We recommend this strategy apply only to the larger stations designated as those with ten or more terminals (or 20 pumps).

Costs for the equipment and installation of Stage II recovery systems range from approximately \$17,000 for two dispensers to \$50,000 for twelve. There are obvious economies of scale for multi-installation. The chart below includes estimates of costs for equipment and installation as well as in-station diagnostic costs.

<b>Estimated Phase II EVR and ISD Costs<sup>44</sup></b>				
Number of Gasoline Dispensers	2	4	6	12
Total Cost for Equipment and Installation*	\$17,240	\$24,925	\$32,765	\$56,285
In-Station Diagnostic Costs (ISD)*	\$13,600	\$16,500	\$19,700	\$28,900
<b>Total (rounded to nearest \$100)</b>	<b>\$30,800</b>	<b>\$41,400</b>	<b>\$52,500</b>	<b>\$85,200</b>

\*Required for stations dispensing >600,000 gallons/yr

<sup>38</sup> U.S. EPA, Office of Air and Radiation, Office of Transportation and Air Quality, Commonly Asked Questions about ORVR, at <http://www.epa.gov/otaq/regs/ld-hwy/onboard/orvrq-a.txt>.

<sup>39</sup> EPA has not defined a specific date or the meaning of “widespread use.”

<sup>40</sup> U.S. EPA, Commonly Asked Questions about ORVR, *supra* note 38.

<sup>41</sup> California Air Resources Board Air Monitoring and Laboratory Division, Update on Enhanced Vapor Recovery (EVR) and In-Station Diagnostics (ISD) at Gasoline Dispensing Facilities (August 2, 2007), *available at* [http://www.arb.ca.gov/vapor/arb\\_evrtalk080207](http://www.arb.ca.gov/vapor/arb_evrtalk080207).

<sup>42</sup> *Id.*

<sup>43</sup> Illinois Environmental Protection Agency, Stage I and Stage II Vapor Recovery Programs, <http://www.epa.state.il.us/air/stage-ii-vapor-recovery.html>.

<sup>44</sup> California Air Resources Board Air Monitoring and Laboratory Division, Update on Enhanced Vapor Recovery (EVR) and In-Station Diagnostics (ISD) at Gasoline Dispensing Facilities ( August 2, 2007), *available at* [http://www.arb.ca.gov/vapor/arb\\_evrtalk080207.pdf](http://www.arb.ca.gov/vapor/arb_evrtalk080207.pdf).

While it is hoped that ORVR systems may eventually make the need for Phase II vapor recovery systems obsolete, it will be at least ten years before ORVR systems are widely in place. In addition, questions remain regarding the functionality of ORVR systems over the life of a vehicle. To address these issues, installation of Phase II vapor recovery systems (i.e., only those compatible with ORVR) should be required on the larger fueling stations in the Front Range.

- **Timeframe for implementation:** Inclusion in December 2008 SIP. Implementation in 2010 or 2011 to allow adequate lead time for installation.

**B. Gasoline Vehicles**

*1. Revise Motor Vehicle Emissions Inspection Cut Points*

EPA’s IM240 guidance proposes two different motor vehicle emission pass/fail points (cutpoints) for Hydro Carbons (HC) and NOx. States may either choose to adopt EPA’s less stringent “start-up” cutpoints or the more stringent “final” cutpoints. Both sets of cutpoints are designed to identify vehicles with malfunctioning emission control systems that contribute to excess pollution, albeit at differing levels.

Colorado currently uses EPA’s less stringent “start-up” cutpoints. Specifically, as of Jan 1, 2006 Colorado matches EPA Final Cut Points only for model years 1996 and newer light duty gas vehicles (LDGV) measured in grams per mile (gpm). As indicated in the table below, there is a significant discrepancy for light-duty gasoline vehicles and trucks between Colorado and EPA’s cutpoints for both HC and NOx. In fact, CO’s NOx cutpoints for light duty trucks model year 1996 and beyond are approximately 5x higher than EPA’s final cutpoints though 2015.

Model Year	Colorado HC Cut Points (gpm)	EPA Final HC Cut Points (gpm)	Colorado NOx Cut Points (gpm)	EPA Final NOx Cut Points (gpm)
1996 and Newer Light Duty Vehicles	1.2	0.6	3.0	1.5
1984 – 1995 Vehicles	2.0 – 3.0	0.8	6.0	2.0
1996 and Newer Trucks (< 8500 lbs)	4.0	0.6 – 0.8	9.0 (thru 2015)	1.5 - 2.0
1988-1995 Trucks (< 8500 lbs)	4.0	0.8	9.0 (thru 2015)	2.5 – 3.5

CO's cutpoints do not reflect the state of modern emissions control technology. Light duty vehicles make up approximately 37 percent of the fleet in the metropolitan Denver counties.<sup>45</sup> Therefore the comparatively lenient cutpoints for light duty vehicles are significant in terms of emissions contribution from the on-road mobile sector.

We recommend Colorado adopt more stringent HC and NOx cutpoints used to determine compliance with Regulation 11 (Motor Vehicle Emissions Inspection Program). CDPHE should perform a pass-fail analysis based on lower cut points to better inform this discussion.

- **Timeframe for Implementation:** AQCC adoption of more stringent cutpoints in early 2008.

## 2. *Clean Car Program*

States may either follow the federal motor emissions standards or those adopted (or pending adoption) by 16 other states, including a number in the west. These more protective state standards include the following components: (1) exhaust emission standards for carbon monoxide, NOx, particulate matter and formaldehyde; (2) a declining fleet-average emission standard for non-methane organic gases (NMOGs); and a zero emission vehicle (ZEV) mandate.<sup>46</sup> The program also includes greenhouse gas (GHG) emission standards that require reductions in methane, carbon dioxide (CO<sub>2</sub>), nitrous oxide and hydrofluorocarbons from passenger cars, light duty trucks and medium duty passenger vehicles.<sup>47</sup> Section 177 of the Clean Air Act requires that states implementing clean car programs provide automobile manufacturers with a two year lead time. In November, the Governor announced a clean air blueprint to reduce heat-trapping greenhouse gases that provided for adoption of the Colorado clean car program.

The adoption of a Colorado clean car program would result in greater reductions of ozone precursors, as well as other pollutants such as air toxics and GHGs than those realized under the federal standards. As the graph below demonstrates, VOC reductions of approximately 7% are likely to be seen immediately, with benefits increasing over time.<sup>48</sup> Modeling done by Oregon

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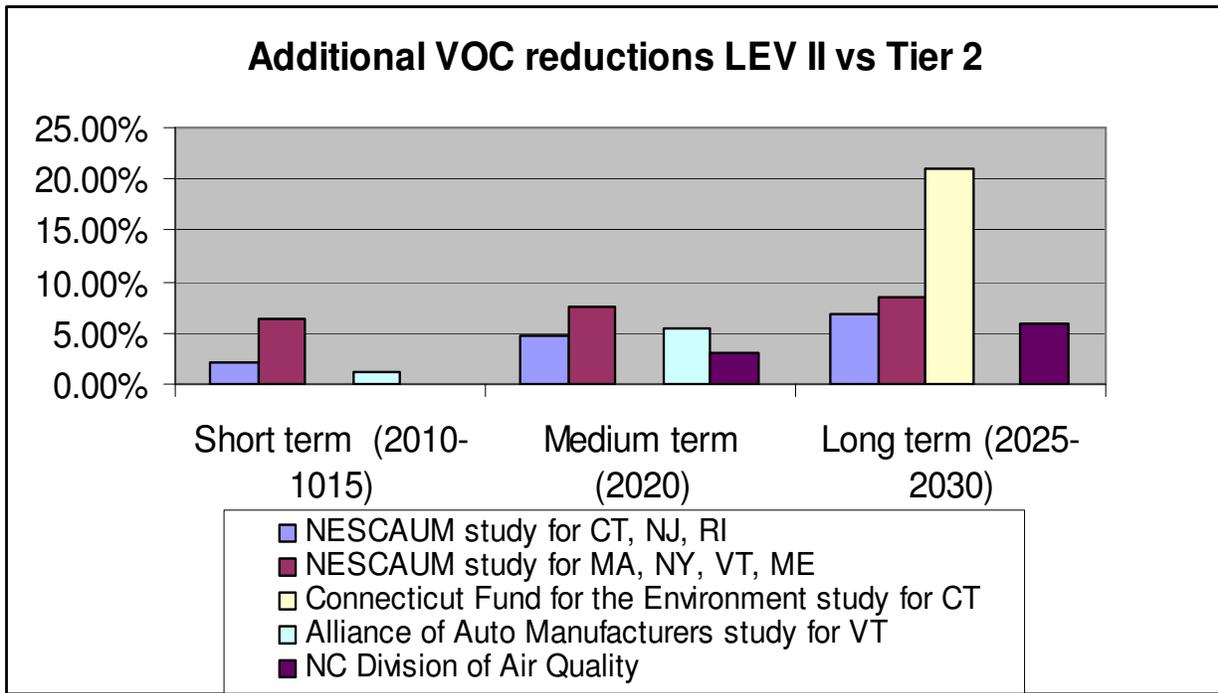
<sup>45</sup> Colorado Dept. of Public Health and Environment, analysis of Colorado Dept. of Revenue 2001 vehicle registration database.

<sup>46</sup> The current ZEV standard requires that 10% of a manufacturer's light-duty fleet be ZEV in 2005 and 16% in 2018.

<sup>47</sup> To date, the following states have adopted, or are in the process of adopting, state clean car programs: NY, NJ, PA, CT, MD, VT, MA, RI, ME, OR, WA, FL, AZ, NM, and UT.

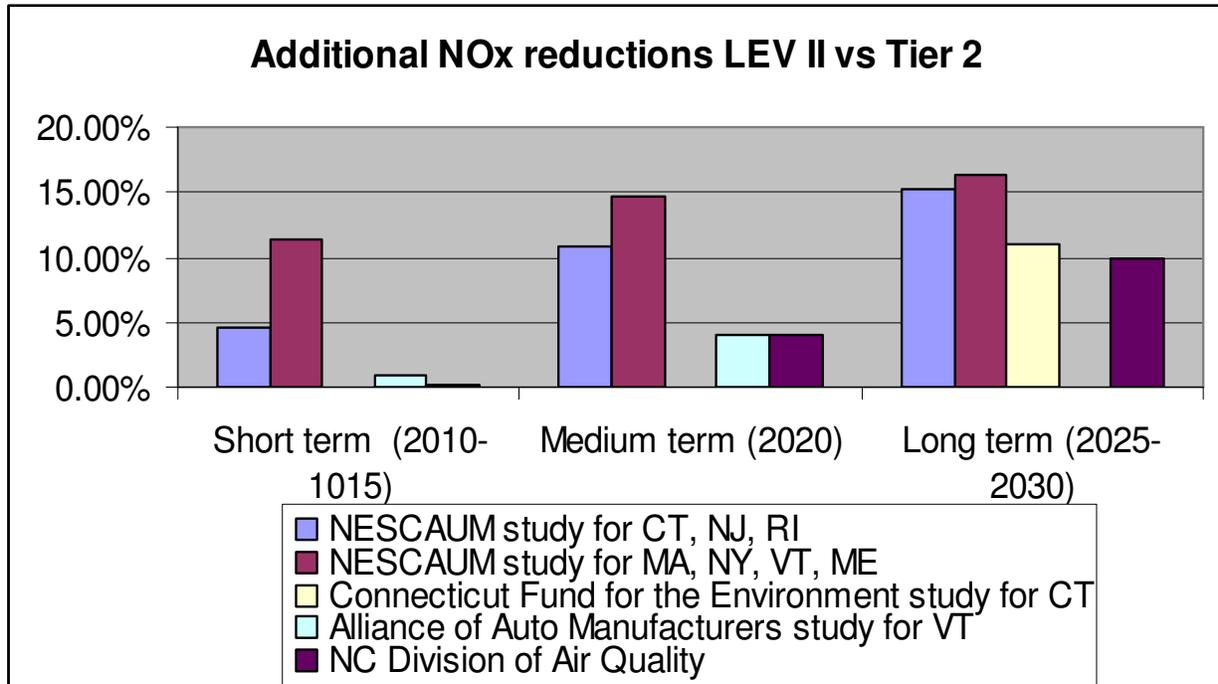
<sup>48</sup> Studies cited in graph for VOC and NOx reductions are taken from the following sources: The Clean Air Association of the Northeast States Summary of NESCAUM Analysis Evaluating the NOx, HC, and CO Emission Reduction Potential from Adoption of the California Low Emission Vehicle (LEV II) Standards (June, 2005); David R. Brown, Sc.D, Rebecca M. Jensen, MPH, MEM, Dana M. Young, Curtis P. Johnson, Donald S. Strait, *The Drive for Cleaner Air in Connecticut: The Benefits of Adopting the California Low-Emission Vehicle Standard for Cars and Light Duty Trucks* (September, 2003); Jeremy Heiken, Air Improvement Resource, Inc. Memorandum to Greg Dana, Alliance of Automobile Manufacturers, *Emissions comparison between the Federal and California motor vehicle programs in Vermont* (March 30, 2004); Mike Abraczinskas, Phyllis Jones, Vicki Chandler, Pat Bello, North Carolina Department of Environment and Natural Resources Division of Air Quality, *Emissions and Air Quality Analysis of the California Low Emission Vehicle II (CA LEV-II) Standards in North Carolina* (January, 2007).

and Washington predict that implementation of state standards will result in additional VOC reductions from new vehicles ranging from 12% to 21% in 2020.<sup>49</sup>



<sup>49</sup> State of Oregon, Governor's Vehicle Emissions Workgroup Report, 26 (OR Workgroup).

Additional NOx benefits will also be realized with a Colorado clean car program. As the following graph shows, NESCAUM predicts an 11% additional NOx benefit between 2010 and 2015 and a 15-16% greater reduction between the years 2025-2030. Modeling done by Oregon and Washington predicts reductions of 30 to 33% by 2020, only 11 years after implementation.<sup>50</sup>



All studies reveal considerably greater air toxic reductions due to the near-zero evaporative emission standards that would be provided under the Colorado clean car program. Most studies show considerable reductions by 2020 ranging from approximately 18% to 25%.<sup>51</sup> Adoption of the ZEV sales mandate is expected to produce an additional 3% reduction overall.<sup>52</sup>

Greenhouse gas reductions will also be significant. The Oregon Department of Environmental quality found that the implementation of the GHG standards will result in a 22% reduction of GHGs by 2012 and a 30% reduction by 2016 and will reduce GHG emissions from the light duty passenger fleet in Oregon by 87,000 CO2 equivalent tons per day in 2020 and 155,200 CO2 equivalent tons per day in 2030.<sup>53</sup>

<sup>50</sup> *Id.* at 3.

<sup>51</sup> See Northeast States for Coordinated Air Use Management, *Comparing the Emissions Reductions of the LEV II Program to the Tier 2 Program* (October, 2003); Elizabeth Ridlington, Tony Dutzik, Brad Heavner, MaryPIRG Foundation. *Cleaner Cars, Cleaner Air: How Low-Emission Vehicle Standards Can Cut Air Pollution in Maryland*, (February, 2005); Mike Abraczynskas, Phyllis Jones, Vicki Chandler, Pat Bello, North Carolina Department of Environment and Natural Resources Division of Air Quality, *Emissions and Air Quality Analysis of the California Low Emission Vehicle II (CA LEV-II) Standards in North Carolina* (January, 2007); See also OR workgroup, *supra* note 49, at 27 (air toxic benefits in 2020 range from 4%-9% without inspection and maintenance (IM) program to 6% to 11% with IM program).

<sup>52</sup> OR Workgroup, *supra* note 49, at 54.

<sup>53</sup> *Id.*

The adoption of the Colorado clean car program would result in net savings to the consumers at the pump over the life of the vehicle. Because cars certified to GHG standards will be more fuel efficient, consumers would save \$20.37 to \$25.68 per month in 2017, assuming fuel prices consistent with current prices of \$3.00 a gallon.<sup>54</sup>

States that have adopted the clean car standards anticipate relatively low implementation costs and ease of administration. According to NESCAUM, adoption and implementation of the program is expected to require anywhere from ¼ to 4 full-time employees.<sup>55</sup> Oregon anticipated hiring 2 full time staff to adopt and implement a clean car program.<sup>56</sup>

We recommend Colorado promptly carry out the Governor's commitment to adopt the Colorado clean car standards immediately given the significant ozone, GHG and other benefits available from lower tailpipe emissions requirements.

- **Timeframe for Implementation:** Adoption of a clean car program in 2008 as part of December 2008 SIP with implementation beginning in 2010.

### 3. *Inspection and Maintenance in the Northern Front Range*<sup>57</sup>

On-road mobile source emissions contribute a significant amount to anthropogenic ozone precursors. These emissions can be reduced through emissions inspection programs. There are several options available for emission programs, including the IM240 test and the on-board diagnostics test or some modification of that test.

#### a. IM240

In 2006, 340,000 vehicles received an emissions test in the north Front Range, or 28% of all vehicles tested in Colorado. Of the vehicles tested in the enhanced IM240 area, 5.8% failed the enhanced IM 240. Repairs of these failed vehicle resulted in a 60% reduction in hydrocarbon emissions, or an average drop of 1.5 gm/mi hydrocarbon for cars and 1.7 gm/mi hydrocarbon for light duty trucks.<sup>58</sup>

If 20,000 vehicles in the North Front Range area were tested, failed, and then repaired, significant reductions in mobile source hydrocarbon emission would result. The burden on the clean segment of the north Front Range fleet could be minimized by increasing the percentage of clean screened vehicles, as is anticipated in the Denver region. Given that the State already has a contactor offering an IM240 program supplemented by clean screen in the Denver/Boulder metro area, expanding this type of program to the north Front Range could likely be accomplished by

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<sup>54</sup> *Id.* at 34.

<sup>55</sup> Christine Kirby, MA DEQ, Presentation on behalf of NESCAUM before the Denver RAQC (September 20, 2007).

<sup>56</sup> OR Workgroup, *supra* note 49, at 72.

<sup>57</sup> The Northern Front Range area should include the boundaries of the 8-hr ozone non-attainment area in the NFR.

<sup>58</sup> CPDHE, Annual Report on the Automobile Inspection and Readjustment Program (July 2007), *available at* <http://www.cdphe.state.co.us/ap/down/imreport.pdf>.

2008. This would lead to short-term reduction of ozone precursors, as well as a readily quantifiable SIP measure.

b. OBD

Several states are implementing OBD emission inspections. A scaled back OBD test that fails for a subset of codes relating directly to hydrocarbon and evaporative emissions, supplemented by a visual and pressure check of the vehicle's evaporative system, may offer a lower-cost alternative to reduce on-road hydrocarbon emissions. Furthermore, low-cost portable evaporative system pressure testers are entering the marketplace that can enable inexpensive, quick evaporative inspections. Because of the potential lower cost of a limited scope OBD program, it would be valuable to explore this alternative as well.

We propose that both of the following IM tests be evaluated and that the program that is the most cost-effective and achieves the highest emissions reductions be implemented: (1) the IM240 test or (2) an on-board diagnostics program with visual and other inspection of evaporative components.

Implementation of an I/M program in this region would also reduce the number of vehicles failing the current IM 240 area then registering in Larimer or Weld counties, and may reduce the 20% "disappearance phenomenon" as well.

- **Timeframe for Implementation:** The IM240 test could most likely begin implementation in the region as soon as 2008, pending AQCC action and any necessary legislative approvals. Implementation of a new OBD-type program could take longer, but might be accomplished by 2009.

4. *Anti-Idling Ordinances, Financial Incentives and Voluntary Measures to Reduce Truck Idling*

EPA estimates that idling trucks consume, annually, over 950 million gallons of diesel fuel, and emit approximately 200,000 tons of NO<sub>x</sub> and over 10 million tons of carbon dioxide (CO<sub>2</sub>). The average emissions per a heavy duty diesel truck are 12 grams per hour of HC, 140 grams per hour of NO<sub>x</sub> and 8200 grams per hour of CO<sub>2</sub>. Heavy duty diesel trucks are also considerable gas-guzzlers, consuming no less than 0.80 gallons per hour.<sup>59</sup>

There are a number of ways to reduce truck idling. We examine three below: anti-idling regulation; voluntary measures; and financial incentive programs.

a. Anti-Idling Ordinances

Anti-Idling ordinances can play an important role in reducing truck idling and emissions.

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<sup>59</sup> These data are based on 42 unique test scenarios that represent actual long-duration truck idling conditions, for a typical 1980s to 2001 model year idling truck. U.S. EPA, Emissions Facts: Impacts of Truck Idling on Air Emissions and Fuel Consumption, EPA420-F-03-002 (February 2003).

The trucking industry has identified inconsistency in state and local idling laws as a barrier to greater implementation of idle reduction technologies and strategies. Approximately fifteen states and dozens of local jurisdictions currently have idling laws. In order to address the confusion created by multiple, non-uniform laws and ordinances, EPA developed a model state idling law.<sup>60</sup> EPA intends the adoption of this model law to foster greater compliance with idling requirements and raise awareness of the available idle-reduction strategies among regulatory agencies and the trucking industry.<sup>61</sup>

Key components of EPA's model state idling law include:

- Allows up to 5 minutes of idling in any 60 minute period, except during required loading and unloading and specified exemptions for health, safety and law-enforcement.<sup>62</sup>
- Allows up to 30 minutes of idling during periods of loading and unloading, such as distribution centers, retail stores and ports.

b. Voluntary Measures

A significant portion of the trucking industry has embraced various idling technology to save fuel and decrease emissions. A few examples of voluntary steps truck companies can take to reduce idling emissions are:

- Install auxiliary power units that produce electricity to run auxiliary cab-powered devices such as heaters, air conditioners and microwave ovens. According to EPA, in a study of 100 trucks, diesel-fired auxiliary cab heaters provided 2.4% fuel savings and a two year payback given fuel prices of \$2.40/gal.
- Phase-change systems, an auxiliary technology that cools truck cabs while the engine is off, cooled for 10 hours at 85°F and 7 hours at 90°F ambient and reduced idling by 3%<sup>63</sup>
- Battery-powered cab system cooled for 6.5 hours and reduced idling by 3% and only required 6-8 hours of recharge
- Improve cab insulation, A/C performance, and airflow
- Travel America truck center in Commerce City, Colorado recently installed 50 shore-power stations (Idle-Aire stations) that allow truckers to heat, cool and power their cabs without idling. Efforts such as these should be recognized and rewarded as they significantly decrease the need for truck idling in dense urban areas
- Schneider National installed 6,000+ auxiliary-powered heaters and expects to have approximately 80% of its fleet equipped with such units this winter. Wal-Mart also plans to outfit its entire fleet with diesel heating and electric cooling auxiliary power units<sup>64</sup>

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<sup>60</sup> U.S. EPA, Model State Idling Law, EPA420-S-06-00 (April 2006), *available at* <http://www.epa.gov/smartway/documents/420s06001.pdf>.

<sup>61</sup> *Id.* at 3.

<sup>62</sup> The specified exemptions include: traffic conditions; safety or health emergencies; emergency or law enforcement vehicles; maintenance, repair or diagnostic purposes; state or federal inspection programs; work-related mechanical or electrical operations other than propulsion; armored vehicles.

<sup>63</sup> U.S. EPA, Emissions Facts: Impacts of Truck Idling on Air Emissions and Fuel Consumption, *supra* note 59.

<sup>64</sup> Glenn Keller, Linda Gaines, Terry Levinson, Argonne National Lab, Idling Reduction Technologies, Presentation to National Academy of Sciences Committee Review of the 21st Century Truck Partnership (January 23-25, 2007).

c. Financial Assistance Programs

Numerous technologies are currently available to help companies reduce fuel consumption and install idling technology. However, one of the major barriers to widespread adoption of retrofits, auxiliary power units (APUs) and other voluntary measures is a lack of investment capital. State loan programs can greatly assist trucking companies interested in doing the right thing to attain their idling reduction goals.

Examples of state loan programs to reduce investment capital requirements for small and medium firms include:

- Arkansas and Minnesota offer loans to small businesses for idle reduction technologies.<sup>65</sup>
- Oregon provides low-cost lease-to-own or no-interest arrangements on auxiliary power units for truckers<sup>66</sup>
- Wisconsin provides grants to freight motor carrier's newer truck tractors. The program is designed to award \$1 million per year in grants for five years<sup>67</sup>
- California provides funds to support the incremental cost of cleaner diesel engines and equipment. Eligible projects include the installation costs for auxiliary power units<sup>68</sup>
- Pennsylvania provides up to 50% matching grants, to a maximum of \$7,500, to enable small Pennsylvania businesses to adopt or acquire energy efficient or pollution prevention equipment

d. State Diesel Retrofit Programs

EPA's diesel retrofit program, along with leading state programs like California's Carl Moyer Program and Texas' Emission Reduction Plan, have shown that diesel retrofits are a feasible and cost-effective means to reduce pollution from existing engines. Both state programs have significantly reduced ozone-forming emissions from the diesel engines on the road today. Similarly, EPA's clean diesel program including its school bus retrofit program have provided both local health benefits due to microscale impacts of diesel exhaust while also cutting ozone-forming contaminants.

For immediate benefits next ozone season, we urge the RAQC to recommend the AQCC adopt EPA's model state idling law administratively and to work with local, municipal and county governments who wish to opt-in to the model law voluntarily. This will greatly facilitate compliance and enforcement while providing uniformity to the trucking industry.

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<sup>65</sup> See State of Arkansas, Dept. of Environmental Quality, at <http://www.adeq.state.ar.us/poa/businessasst.htm>; Minnesota Pollution Control Agency, [http://www.pca.state.mn.us/programs/sbomb\\_loan.html](http://www.pca.state.mn.us/programs/sbomb_loan.html)

<sup>66</sup> Lane Regional Air Protection Agency, <http://www.lrapa.org>.

<sup>67</sup> Wisconsin State Legislature at <http://www/legis.state.wi.us/> (click on "Wisconsin Law").

<sup>68</sup> California Environmental Protection Agency, Air Resources Board, Carl Moyer Memorial Air Quality Standards, <http://www.arb.ca.gov/msprog/moyer/moyer.htm>.

- **Timeframe for Implementation:** AQCC adoption of model idling law and voluntary opt-in in 2008. Financial incentive and diesel retrofit programs incorporated into December 2008 SIP.

#### 4. *Employer Trip Reduction Program*

Employer-Based Trip Reduction Programs are designed to reduce vehicle miles traveled by single-occupancy commuters traveling to and from their place of employment. Through the program large employers develop a “trip reduction program” and an annual report documenting methods they have adopted for reducing single occupancy vehicle commuting commensurate with a pre-defined level.

Utah has implemented such a trip reduction program.<sup>69</sup> The Utah program includes all employers with more than 100 employees including private-sector firms, universities, school districts, and government entities. The program seeks a 20% reduction in single-occupancy commuting during peak travel periods (6 a.m. to 10 a.m., Mondays through Fridays). Employers that demonstrate employees already meet or exceed the target rate of single-occupancy vehicle commuting are exempt from the program.

Under the terms of the Utah program, employers assign a trip reduction coordinator, conduct an employee survey of commuting distance and commuting patterns, and develop an approvable “Trip Reduction Plan.” The plan, which is updated annually, includes the actions necessary for the company to achieve an established single-occupancy vehicle commute rate. Actions included in the trip reduction plan can include but are not limited to:

- Subsidized bus passes
- Rideshare matching programs
- Vanpool leasing programs
- Telecommuting programs
- Compressed work week schedule programs and flexible work schedule programs
- Work site parking fee programs
- Preferential parking for rideshare participants
- Transportation for business related activities
- A guaranteed ride home program
- On-site facility improvements
- Soliciting feedback from employees
- On-site daycare facilities
- Coordination with local transit authorities for improved mass transit service and information on mass transit programs
- Recognition and rewards for employee participation
- Cash payouts in lieu of parking reimbursement
- On-site shower facilities

We urge the RAQC to recommend to AQCC adoption of a mandatory employer trip reduction program in the Denver Metro Area.

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<sup>69</sup> See UT ADMIN. CODE § R307-320 (2007).

- **Timeframe for Implementation:** AQCC adoption and implementation of employer trip reduction plan in 2008.

## 5. *Consumer Incentive Programs*

The public's awareness of the importance of issues such as climate change and ozone pollution is on the rise. Accordingly, programs that provide the public with relatively easy and inexpensive ways to reduce ozone pollution and help the environment are likely to be successful and cost-effective. Some such programs may include:

- Voluntary usage of electric lawn mowers and garden equipment during hot summer days or on weekends.
- Cash rebates or vouchers for the purchase of electric lawn mowers and garden equipment
- Tax breaks and energy efficiency rebates for the purchase of electric lawn mowers and garden equipment
- An expansion of the RAQCs Ozone Aware alerts
- Green certification for lawn care companies that primarily use electric and low-emission gas equipment and mowers

According to a report done by the California Air Resources Board (CARB) in 2004, voluntary measures that enhance the use of electric mowers and garden equipment, incentive programs and consumer awareness programs rated high on a feasibility scale.<sup>70</sup> Cost-effectiveness, measured by dollar per pound of HC and NOx reductions, ranged from \$9-\$18 for incentive programs to \$10-\$18 for consumer awareness programs.

The biggest obstacle identified by CARB to implementation of rebate and voucher incentives was durable funding. CARB identified the use of state matching funds or mitigation fees as possible funding sources. The San Joaquin Valley Air Pollution Control District also proposed working with housing developments and developers to require outdoor electric outlets to make it easier to power lawn and garden equipment.

We believe a green certification program can be implemented immediately before the next summer ozone season. In addition, we urge the RAQC to recommend that county and municipal governments lead by example and replace their gasoline-powered lawnmowers and lawn and garden equipment with newer, electric models in the hopes that consumers will follow suit voluntarily.

- **Timeframe for Implementation:** 2008 for green-certification for lawn-care companies and the beginning of a phased-in change from gasoline to electric mowers and garden equipment by municipal, local and county governments.

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<sup>70</sup> California Air Resources Board, Staff Report, Report to the Board on the Potential Electrification Programs for Small Off-Road Engines (April 2, 2004), available at <http://www.arb.ca.gov/msprog/offroad/sore/staff-report-electrification-programs.doc>.

## 6. *Feebate*

A feebate is a financing mechanism to encourage the purchase of high fuel-efficiency vehicles. A feebate charges users of less fuel-efficient vehicles a fee. The revenue collected can be used as a rebate to purchasers of more fuel-efficient vehicles, to subsidize mass transportation costs, or for other more energy-efficient travel. Studies have shown that a national feebate program could reduce CO<sub>2</sub> emissions from vehicles by 20%.<sup>71</sup>

The benefits of a feebate program are that it is a relatively efficient way of promoting the purchase of more fuel-efficient vehicles or the use of public transportation as users of less fuel-efficient vehicles directly pay for the externalities they incur upon society. Feebate programs have been considered by various state and federal lawmakers over the past fifteen years.<sup>72</sup>

- **Timeframe for implementation:** Adopt a statewide feebate program in 2008 as part of 2008 SIP effective for registrations beginning in 2009.

### C. Point Sources: Oil and Gas

Colorado has seen a substantial increase in the production of oil and gas in the last five years. It has been argued that the rate of growth in this industry will slow as exploration of known formations comes to maturation; however, the demand for domestic production is sure to rise in an increasingly tight energy market.

The majority of VOC emissions in the oil and gas sector are essentially product losses.<sup>73</sup> The implementation of cost-effective pollution controls and practices will not only benefit public health, it will also minimize the waste of a finite resource by promoting system-wide efficiency in regards to extraction, treatment and transport of oil and natural gas, thereby providing substantial savings and payback to the oil and gas industry.

#### 1. *Green Completions for Oil and Gas Wells*

Green completions can virtually eliminate the venting of natural gas produced during well completions, recompletions and workovers by capturing the produced gas and delivering it for sale. A major operator in Colorado has designed green completion equipment that can safely yield completion gas recovery rates in excess of 90%.<sup>74</sup> Over a five year period, the same

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<sup>71</sup> American Council for an Energy Efficient Economy (2005).

<sup>72</sup> Several states, many of them in the Northeast, have actively considered feebates as a tool for greenhouse gas reduction, as is Canada.

<sup>73</sup> One product, methane, is of particular significance as it contributes both to high concentrations of ground-level ozone and climate change. See Presentation by Lisa Clarke, Air Pollution Control Division, Technical Service Program, (July 27 2006); J. Jason West et al., *Global Benefits of Mitigating Ozone Pollution with Methane Emission Controls*, 103 PNAS 3988 (March 14, 2006). Indeed the West study estimates that “reducing anthropogenic methane emissions by 20% beginning in 2010 would decrease the average daily maximum 8-h surface ozone by ~1 part per billion by volume globally.” *Id.*

<sup>74</sup> Vincent, R. Reducing Methane Emissions During Completion Operations presented at the Producers Technology Transfer Workshop, Glenwood Springs, Colorado (September 11, 2007), available at [http://www.epa.gov/gasstar/workshops/glenwood\\_sept2007/04\\_recs.pdf](http://www.epa.gov/gasstar/workshops/glenwood_sept2007/04_recs.pdf).

operator showed that every dollar spent associated with the costs of gas recovery yielded a return of \$8-\$9.<sup>75</sup> With a return on investment of less than one year, this is an extremely cost-effective strategy that will produce dividends on an ongoing basis.

Green completions are not generally seen as feasible for exploratory wells because the infrastructure needed to recover gas is not yet in place.<sup>76</sup> The Denver Julesburg Basin, however, has been developed for many years and the necessary infrastructure for green completions is in place. Thus, the use of flares for well completion gases should only be used when the pressure of the well is insufficient to pursue green completions.

Colorado's emissions inventory for oil and gas has not thoroughly investigated and quantified VOC emissions during well completions. The state, however, currently estimates that roughly 60% of produced gases are flared and the remainder is vented directly into the atmosphere.<sup>77</sup> Data provided by an operator for wells in Colorado, although not in the same formation, showed that for every new well completion, 21.8 million square feet (MMSCF) of well completion gases are generated.<sup>78</sup> Using the standard conversion of 5.5 tons of VOC per MMSCF and accounting for the flaring of 60% of the produced gas, this corresponds to emissions of 63.3 tons of VOCs per new well completed. In 2006 there were 972 gas wells that began production in the nonattainment area, which would correspond to over 61,000 tons of VOCs emitted into the atmosphere.<sup>79</sup> Wyoming currently requires green completions for all activities in their Jonah Pinedale development. Like the program already in place in Wyoming, mandatory green completions, with at least 90% capture, would reduce emissions by over 49,000 tons per year or approximately 136 tons per day for new wells alone.

- **Timeframe for Implementation:** AQCC adoption of rule in early 2008 for implementation by next ozone season.

## 2. *Oil and Gas Leak Inspection and Maintenance Program*

This program would seek to reduce fugitive VOC emissions from oil and gas operations and help industry recover methane for a savings. The program is similar to what is already in place for the Denver metro ozone action area, but also encompasses fugitive emissions from all new and existing natural gas compressor stations. It would broaden the application of EPA's New Source Performance Standards (Subpart KKK) to better control VOC emissions from leaking components, employ a Directed Inspection and Maintenance program, consistent with the best management practices of EPA's Natural Gas STAR program, and take advantage of the opportunities provided by pipeline repair and maintenance projects to identify and repair leaks.

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<sup>75</sup> *Id.*

<sup>76</sup> CH2M Hill, Review of Oil and Gas Operation Emissions and Control Options, prepared for Colorado Department of Public Health and Environment, Air Pollution Control Division, (June 29, 2007).

<sup>77</sup> Bar-Ilan, A. and R. Friesen, A. Pollack, and A. Hoats, *Draft Final Report: WRAP Area Source Emissions Inventory Projections and Control Strategy Evaluation, Phase II*, prepared for the Western Governor's Association, (September, 2007), available at [http://www.wrapair.org/forums/ssjf/documents/eictts/OilGas/2007-10\\_Phase\\_II\\_O&G\\_Final\\_Report\\_v10-07.pdf](http://www.wrapair.org/forums/ssjf/documents/eictts/OilGas/2007-10_Phase_II_O&G_Final_Report_v10-07.pdf).

<sup>78</sup> EPA, Lessons Learned from Natural Gas STAR, available at <http://www.epa.gov/gasstar/resources/lessons.htm>

<sup>79</sup> CO Oil and Gas Conservation Commission, 2006 Production Summary, at [www.cogcc.state.co.us](http://www.cogcc.state.co.us).

Leaks from valves, connectors, compressor seals and lines in production equipment account for more than 60% of all product losses (VOC emissions); however, they are largely invisible, unregulated and go unnoticed.<sup>80</sup> Valves, in particular are a significant emissions point, accounting for approximately 10% of total leaking components, but nearly one third of total fugitive emissions. These losses can be greatly reduced through a directed inspection and maintenance program (DI&M).

A DI&M plan, which includes optical sensing is more cost-effective than traditional hand-held analyzers and allows for faster identification and repair of leaks.<sup>81</sup> DI&M has been voluntarily used by several operators and has shown to be extremely cost-effective, the identification and repair of leaking valves yields a payback in less than one month and a system-wide profit seen in less than two years. The purchase of infrared optical sensors is the only capital equipment necessary and once personnel have been trained this practice can be rapidly deployed throughout the industry.

In addition to the timely identification and repair of leaking components at compressor stations, pipeline replacement and repair projects provide a rare opportunity to inspect and maintain both internal and external components on pipeline valves. This practice has shown good payback, particularly in regards to preserving pipeline integrity, as well as enhanced worker safety.

- **Timeframe for Implementation:** AQCC adoption of rule in early 2008 for implementation by next ozone season.

### 3. *Production and Processing Standards*

Glycol dehydrators, reciprocating internal combustion compressor engines, and drill rig engines are two large sources of VOCs and NOx. Current rules for the Denver metro area require the largest glycol dehydrators to reduce VOCs by 90% and internal combustion compressor engines to control NOx, CO and VOC emissions. There are, however, currently no limits on emissions from drill rig engines. We propose that existing rules be modified to further reduce VOCs from all glycol dehydrators and compressor engines, and to adopt emission limits for drill rig engines.

The use of controls to reduce VOC emissions from glycol dehydrators is extremely cost-effective and can yield significant payback for industry.<sup>82</sup> Effective controls include the use of desiccant dehydrator replacement or vapor recovery units. Additionally, Wyoming, as well as industry sources, reports that an emissions reduction standard of 98% for dehydrators emitting at least 12 tpy is cost-effective.<sup>83</sup> California currently requires smaller dehydrators to reduce uncontrolled emissions by 90% in order to reduce ozone formation.<sup>84</sup> We propose a standard that would require all new and modified glycol dehydrators, to control VOCs by at least 98% and existing

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<sup>80</sup> Lessons Learned from Natural Gas STAR, *supra* note 78.

<sup>81</sup> CH2M Hill Paper, *supra* note 76.

<sup>82</sup> Fernandez, R., R. Petrusak, D. Robinson, and D. Zavadil, *Cost-effective methane emissions reductions for small and midsize natural gas producers*, Journal of Petroleum Technology (June 2005), at <http://www.epa.gov/gasstar/pdf/CaseStudy.pdf>.

<sup>83</sup> Wyoming Department of Environmental Quality, Oil and Gas Potential BACT Revisions (2006).

<sup>84</sup> South Coast Air Quality Management District Rules, Source Specific Rules: Oil and Gas Production Wells. Rule 1148.1, at <http://www.aqmd.gov/rules/reg/reg11/r1148-1.pdf>.

dehydrators to control emissions by 90%. This standard can be met with the use of desiccant dehydrators, similar zero emissions dehydrators, the use of flares, or through other technologies. By establishing a maximum allowable emission rate our proposal provides industry flexibility in determining how to meet the standard.

We further recommend extending the emission limits currently required for new and reconstructed natural gas-fired reciprocating internal combustion engines to existing engines with a horsepower of 100 or greater,<sup>85</sup> and natural gas-fired engines with a horsepower of 25 and lower.<sup>86</sup> We propose that all new and existing stationary natural gas-fired internal combustion engines meet the following emissions rates by the compliance dates listed below:

Maximum Engine Horsepower	Compliance Date	NOx g/hp-hr	CO g/hp-hr	NMHC g/hp-hr
25-500 hp	January 1, 2009	2.0	4.0	1.0
	January 1, 2011	1.0	2.0	0.7
Greater than 500 hp	July 1, 2008	2.0	4.0	1.0
	July 1, 2010	1.0	2.0	0.7

VOC emissions will be further reduced and yield a payback due to methane savings by requiring periodic replacement of compressor engine rods and rod packing.<sup>87</sup> Compressor rod and/or packing must be replaced whenever VOC emissions average 25% higher than baseline emissions. Dry seals must be considered as replacements for wet seals. Baseline emissions are considered to be the VOC emissions recorded immediately after replacing rods and/or rod packing.

Lastly, we also propose requiring diesel-fired internal combustion engines to reduce emissions at a rate similar to what other states have proposed and based on what is achievable with cost-effective emission controls, which is equivalent to a 90% reduction in NOx emissions.<sup>88</sup> In addition, all drill rig engines should meet federal Tier II on-road diesel engine emission standards.

- **Timeframe for Implementation:** Inclusion in 2008 SIP with implementation beginning on June 1, 2009.

<sup>85</sup> Colorado Air Quality Control Commission Rules, Regulation 7, Section XVII, *available at* <http://www.cdphe.state.co.us/ap/reg7/o&greg7.pdf>.

<sup>86</sup> This would make the rule as applied to 25 horsepower and lower natural gas-fired engines consistent with EPA proposed rules. *See* U.S. EPA, Proposed Rules Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (2006).

<sup>87</sup> U.S. EPA, Lessons Learned from Natural Gas STAR Partners: Reducing Methane Emissions from Compressor Rod Packing Systems, at [http://www.epa.gov/gasstar/pdf/lessons/ll\\_rodpack.pdf](http://www.epa.gov/gasstar/pdf/lessons/ll_rodpack.pdf).

<sup>88</sup> Ventura County Air Pollution Control District Rules, Source Specific Rules: Internal Combustion Engines, Rule 74.9, *available at* <http://www.arb.ca.gov/DRDB/VEN/CURHTML/R74-9.PDF>.

#### 4. Flash and Venting Emissions

Flash emissions, like fugitive emissions, are tantamount to product losses. Thus, controls for VOC emissions are extremely cost-effective and can quickly yield a payback for industry through product recovery.<sup>89</sup> A requirement that all new and modified facilities control emissions, regardless of size, provides industry an opportunity to reap savings by installing cost-effective controls and elevating system-wide control without disrupting existing operations.<sup>90</sup>

Oil and gas wells collect gas, known as casing head gas, in the annular space between the well's casing and the tubing. This casing head gas is generally vented directly into the atmosphere, even though it is comprised of methane and other saleable products. The venting of emissions from wells and associated equipment, particularly venting well casing head gases, is another significant source of VOC emissions.<sup>91</sup> Emissions inventories in other states have shown that the venting of casing head gas from a single well emits nearly 0.13 tons per year of VOCs.<sup>92</sup> In the nonattainment area, there are currently over 13,700 active wells, which corresponds to emissions of 4.64 tpd of VOCs (1695 tpy) solely from the venting of casing head gas.<sup>93</sup> Emissions of VOCs can be reduced by approximately 64 tons per day (tpd) (1695 (tpy)) by routing these gases to a closed-loop system capable of 98% control. This technology has been shown to yield a quick payback, generally in less than one year, because of the increased yield on methane.<sup>94</sup> California has prohibited the practice of venting casing head gas and uncontrolled production gases from other treatment and processing units since 2004, due to the significant ozone impacts<sup>95</sup>

Also, industry could replace venting equipment, such as pneumatic pumps and actuated valves, with a comparable zero-emissions device. The majority of these instruments are used in production as control devices and are powered by the high-pressure natural gas that is readily available onsite. Gas-powered pneumatic devices are a significant source of emissions as they passively emit natural gas into the atmosphere. The preference towards pneumatic devices over electrical and mechanical devices lies in the assumption that sites do not have available electricity. Colorado's ozone nonattainment area, however, has been significantly developed and unlike production in remote areas, many sites do have access to electricity. Operators can continue to utilize existing piping, control instruments and valve actuators, thereby reducing costs and disruptions to the system, by converting a gas-powered control system to an electrically-powered compressed air control system. Furthermore, in the event that electricity is

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<sup>89</sup> U.S. EPA, Lessons Learned from Natural Gas STAR Partners: Installing Vapor Recovery Units on Crude Oil Storage Tanks, *available at* [http://www.epa.gov/gasstar/pdf/lessons/ll\\_final\\_vap.pdf](http://www.epa.gov/gasstar/pdf/lessons/ll_final_vap.pdf).

<sup>90</sup> Wyoming Department of Environmental Quality, Oil and Gas Production Facilities, Chapter 6, Section 2 Permitting Guidance, DRAFT (2007), *available at* <http://deq.state.wy.us/AQD/Miscellaneous/2007%20GUIDANCE.pdf>.

<sup>91</sup> Pollock, A., J. Russell, J. Grant, and R. Friesen, *Ozone precursors emission inventory for San Juan and Rio Arriba Counties, New Mexico. Final Report Prepared for New Mexico Environment Department* (August 31, 2006), *available at* [http://www.nmenv.state.nm.us/aqb/projects/San\\_Juan\\_Ozone/NM\\_Area\\_Emissions\\_report.pdf](http://www.nmenv.state.nm.us/aqb/projects/San_Juan_Ozone/NM_Area_Emissions_report.pdf).

<sup>92</sup> South Coast Air Quality Management District, Final Staff Report for Proposed Rule 1148.1—Oil and Gas Production Wells (Feb. 24, 2004).

<sup>93</sup> CO Oil and Gas Commission, Weekly/Monthly Statistics, *available at* <http://www.cogcc.state.co.us>.

<sup>94</sup> U.S. EPA, Natural Gas STAR Program, PRO Fact Sheet No. 701, Connect Casing to Vapor Recovery Unit, *at* [http://www.epa.gov/gasstar/pdf/pro\\_pdfs\\_eng/connectcasingtovaporrecoveryunit.pdf](http://www.epa.gov/gasstar/pdf/pro_pdfs_eng/connectcasingtovaporrecoveryunit.pdf).

<sup>95</sup> South Coast Air Quality Management District Rules, Source Specific Rules: Oil and Gas Production Wells, Rule 1148.1, *available at* <http://www.aqmd.gov/rules/reg/reg11/r1148-1.pdf>.

unavailable or impractical, operators can utilize solar-powered systems or non-bleeding displacement controllers. Conversion away from traditional gas-powered control systems has the added advantage of reducing emissions by over 98%.<sup>96</sup> Importantly, operators have reported that these retrofits generally pay for themselves within a period of 1-2 years.<sup>97</sup>

We propose that all new or modified facilities must control flash emissions from all storage tanks or vessels in VOC service by 98%. And, in addition, that all operators of existing production wells must achieve a system-wide control of VOC emissions of 85% by June 1, 2008 and 95% control by June 1, 2010.<sup>98</sup>

We further propose that all pneumatic devices, including pumps and controller valves, separators and heater treaters, well casing heads and any source whose uncontrolled emissions are  $\geq 15$  tpy VOC, or  $\geq 5$  tpy or any combination of HAPs, shall be prohibited from venting VOCs as of June 1, 2010. Emissions of VOCs from these sources must be collected from the source(s) using a closed system device capable of reducing uncontrolled emissions by 98% or controlled by an alternative Division-approved method that achieves a VOC reduction of 98% or more.

- **Timeframe for Implementation:** Incorporation into December 2008 SIP. Implementation required as of June 1, 2010

#### **D. Point Source – Industrial**

##### *1. Coal-fired Power Plants*

In the eastern and mid-west United States, clean air rules adopted by the U.S. Environmental Protection Agency, called the NOx SIP Call, have led to NOx reductions from coal-fired power plants and in turn, reductions in ozone pollution throughout the region.<sup>99</sup> Reducing NOx would also result in a number of co-benefits, including reduced haze and particulate pollution.<sup>100</sup> Reductions in NOx from coal-fired power plants in the Denver metro region are likely to provide similar benefits.

Five coal-fired power plants together create one of the largest sources of anthropogenic NOx emissions in the Front Range according to the most recent inventory data. Three are located

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<sup>96</sup> Bar-Ilan, A. and R. Friesen, A. Pollack, and A. Hoats, Draft Final Report: WRAP Area Source Emissions Inventory Projections and Control Strategy Evaluation, Phase II, prepared for the Western Governor's Association. (September, 2007), *available at*

[http://www.wrapair.org/forums/ssjf/documents/eiccts/OilGas/2007-10\\_Phase\\_II\\_O&G\\_Final\\_Report\\_v10-07.pdf](http://www.wrapair.org/forums/ssjf/documents/eiccts/OilGas/2007-10_Phase_II_O&G_Final_Report_v10-07.pdf).

<sup>97</sup> U.S. EPA, Lessons Learned from Natural Gas STAR Partners: Options for Reducing Methane Emissions from Pneumatic Devices in the Natural Gas Industry, *available at*

[http://www.epa.gov/gasstar/pdf/lessons/ll\\_pneumatics.pdf](http://www.epa.gov/gasstar/pdf/lessons/ll_pneumatics.pdf).

<sup>98</sup> If a 95% system-wide reduction is determined to be economically infeasible, an operator may apply for an alternative system-wide standard, but in no case shall an operator achieve a system wide reduction of less than 90%.

<sup>99</sup> See <http://epa.gov/air/airtrends/2005/ozonenbp/onbpcontents.pdf#page=1>.

<sup>100</sup> Reducing NOx emissions would have a myriad of co-benefits. For example, NOx contribute to fine particulate matter formation, which is associated with a variety of serious public health issues including premature mortality. NOx also contribute to regional haze and their reduction will improve visibility including visibility in economically significant natural areas such as national parks. NOx also contributes to acid rain and change of species composition in native grassland

within the mapped EAC area, including Xcel’s Arapahoe, Cherokee, and Valmont Stations. Two are located outside, but very near, the EAC area, including Xcel’s Pawnee Station and Platte River Power Authority’s Rawhide Energy Station.<sup>101</sup> Collectively these power plants release an average of over 22,000 tons of NOx every year, including over 10,000 tons of NOx every ozone season.<sup>102</sup> See Table Below. On average, daily NOx emissions during the year are 61.68 tons/day. This is over 20% of the total NOx inventory for the Denver metro area.

Facility Unit	2005 Tons	2006 Tons	Average Overall Tons	2005 Average Tons/Day	2006 Average Tons/Day	Average Overall Tons/Day Emissions
<b>Arapahoe</b>						
Boiler #3	1446.8	1705.9	1576.35	3.96	4.67	4.32
Boiler #4	889.7	1157.2	1023.45	2.44	3.17	2.80
<b>Cherokee</b>						
Boiler #1	1439.6	1415.6	1427.6	3.94	3.88	3.91
Boiler #2	3383.5	2820.5	3102	9.27	7.73	8.50
Boiler #3	1820.2	1870.2	1845.2	4.99	5.12	5.06
Boiler #4	4157.6	4096.7	4127.15	11.39	11.22	11.31
<b>Pawnee</b>						
Boiler#1	3668.1	4602.7	4135.4	10.05	12.61	11.33
<b>Rawhide (PRPA)</b>						
Boiler #1	3733.1	200.2	2866.65	10.23	5.48	7.85
<b>Valmont</b>						
Boiler #5	2514.1	2303.9	2409	6.89	6.31	6.60
		<b>TOTALS</b>	<b>22512.8</b>			<b>61.68</b>

A NOx reduction strategy that calls for all coal-fired power plant boilers to meet an emission limit of 0.15 lb/mmBtu or less over a 30-day period is consistent with rules in other parts of the country, such as the NOx SIP Call and Clean Air Interstate Rule, and is considered to constitute reasonably available control technology (RACT).<sup>103</sup> A NOx emission rate of 0.15 lb/mmBtu is

<sup>101</sup> Although the Pawnee and Rawhide Energy Stations are located outside the EAC area, modeling done for the EAC suggests that these sources contribute to boundary conditions and therefore contribute to ozone pollution in the Denver metro region.

<sup>102</sup> Based on an average of 2005 and 2006 emissions reported through the EPA’s Acid Rain Program, database at <http://cfpub.epa.gov/gdm/index.cfm>. The ozone season is defined as May 1 through September 30.

<sup>103</sup> See <http://pubweb.epa.gov/ttn/naaqs/ozone/rto/otag/finalrpt/chp6/final.htm>.

comparable to that required by the NOx SIP call.<sup>104</sup> If boilers meet a 0.15 lb/mmBtu NOx rate throughout the year, it would amount to average daily emissions of 29.66 tons of NOx per day. The total NOx reduction would be 51.91%, based on average emissions from 2005 and 2006.

The table below outlines the methodology used to calculate the expected level of reductions based on heat input data from the EPA’s acid rain program database.

	<b>2005 Heat Input (mmBtu)</b>	<b>2006 Heat Input (mmBtu)</b>	<b>Average Heat Input (lb/mmBtu)</b>	<b>Pounds of NOx Under Proposal (average heat input x 0.15 lb/mmBtu)</b>	<b>Tons of NOx Emitted Under Proposal</b>
<b>Arapahoe</b>					
Boiler #3	4,273,658	2,768,829	4,021,244	603,186.53	301.59
Boiler #4	8,601,435	7,591,623	8,096,529	1,214,479.35	607.24
<b>Cherokee</b>					
Boiler #1	8,367,917	8,154,781	8,261,349	1,239,202.35	619.60
Boiler #2	8,012,872	9,681,982	8,847,427	1,327,114.05	663.56
Boiler #3	11,794,683	10,756,231	11,275,457	1,691,318.55	845.66
Boiler #4	25,232,866	27,246,266	26,239,566	3,935,934.90	1967.97
<b>Pawnee</b>					
Boiler#1	43,563,056	34,507,188	39,035,122	5,855,268.30	2927.63
<b>Rawhide (PRPA)</b>					
Boiler #1	24,927,462	23,042,718	23,985,090	3,597,763.50	1798.88
<b>Valmont</b>					
Boiler #5	13,399,051	15,810,833	14,604,942	2,190,741.30	1095.37
				<b>TOTAL</b>	<b>10827.50</b>

Industry would have flexibility in determining the best approach to meeting the 0.15 lb/mmBtu NOx limit. Options include combustion controls, fuel switching and blending, decreased utilization, dispatch re-ordering, and post-combustion controls including selective catalytic reduction (“SCR”). According to the EPA, the cost of meeting a 0.15 lb/mmBtu NOx limit is “highly cost-effective,” averaging \$1,720/ton of NOx reduced<sup>105</sup> This would add up to a total

<sup>104</sup> See, e.g., [http://www.epa.gov/tncaaa1/t1/fact\\_sheets/noxsipf.pdf](http://www.epa.gov/tncaaa1/t1/fact_sheets/noxsipf.pdf). Total emissions based on a 0.15 lb/mmBtu limit are based on the average heat input for the years 2005 and 2006, as submitted to the EPA’s acid rain program.

<sup>105</sup> See [http://www.epa.gov/ttn/oarpg/t1/fr\\_notices/126fina.pdf](http://www.epa.gov/ttn/oarpg/t1/fr_notices/126fina.pdf).

cost of \$20,761,604.00 annually to meet a 0.15 lb/mmBtu NOx limit, achieving a reduction of 12,070 tons of NOx/year.

	<b>Average NOx Emissions (tons)</b>	<b>Emissions With 0.15 lb/mmBtu Limit</b>	<b>Total Reduction (tons)</b>	<b>Cost of Reductions (assuming \$1,720/ton of NOx)</b>
<b>Arapahoe</b>				
Boiler #3	1,576.35	301.59	1,274.76	\$2,192,587.2
Boiler #4	1157.2	607.24	549.96	\$945,931.2
<b>Cherokee</b>				
Boiler #1	1,415.6	619.60	796	\$1,369,120
Boiler #2	2,820.5	663.56	2,156.94	\$3,709,936.8
Boiler #3	1,870.2	845.66	1,024.54	\$1,762,208.8
Boiler #4	4,096.7	1,967.97	2,128.73	\$3,661,415.6
<b>Pawnee</b>				
Boiler#1	4,602.7	2,927.63	1,595.3	\$2,743,916
<b>Rawhide (PRPA)</b>				
Boiler #1	2,866.65	1,798.88	1,230.84	\$2,117,044.8
<b>Valmont</b>				
Boiler #5	2,409	1,095.37	1,313.63	\$2,259,443.6
			<b>TOTAL COST</b>	<b>\$20,761,604.00</b>

We propose incorporating a 0.15 lb/mmBtu NOx limit in the 2008 ozone SIP for implementation by May 1, 2010. Such a rule should include recordkeeping and reporting requirements sufficient to ensure the enforceability and effectiveness of the proposal. Monitoring should be conducted using existing continuous emission monitors. We propose that as part of their quarterly reporting, Xcel and Platte River Power Authority be required to disclose total NOx emissions from each unit, total actual daily NOx emissions, total heat input, and average emission rates for the quarter. On November 15, 2007, Xcel Energy filed an integrated resource plan with the Colorado PUC that provided for retiring Arapahoe Units 3 and 4 from service. If approved, these retirements would cut global warming pollution and help restore healthier air.

- **Timeframe for Implementation:** Incorporation into the December 2008 SIP followed by implementation in 2010.

## 2. *Demand Side Management*

One of the best ways to reduce harmful pollution is to reduce the need for the activity that causes it. Demand Side Management (DSM) can be a cost effective and appealing tool for reducing ozone pollution. In the utilities sector, DSM provides opportunities to reduce VOC emissions (specifically methane) from natural gas utilities, as well as NO<sub>x</sub> emissions from power plants. Reductions in demand for electricity and natural gas lead to reductions in emissions from power plants and from fugitive emissions through natural gas delivery systems.

Some important DSM strategies that should be considered in Colorado include the following:

- Efficiency Programs for Natural Gas Utilities
- Energy Savings Standards for Electric Utilities
- Decoupling, or performance-based incentives for utilities
- Innovative electricity rates including real-time pricing together with smart meters

We urge the Regional Air Quality Council and the Air Quality Control Commission to evaluate these options and to work with other agencies to develop DSM programs across the Denver Metro Area. Xcel's November 15<sup>th</sup> resource plan for Colorado calls for expansive DSM. We urge the PUC to strengthen and expand DSM and energy efficiency programs that provide considerable multi-pollutant benefits.

## 3. *Cement Kilns*

Clean air rules adopted by several states and approved by the EPA have called for NO<sub>x</sub> reductions from cement kilns in order to reduce ozone pollution.<sup>106</sup> Reductions in NO<sub>x</sub> from cement kilns in the Denver metro region are likely to provide similar benefits.

Only one cement kiln is currently in operation in the Denver metro region. The Lyons cement plant, owned and operated by CEMEX, Inc., is located in north Boulder County near the town of Lyons. CEMEX operates a coal-fired preheater/precalciner kiln at the Lyons cement plant and is allowed to emit 2,649 tons of NO<sub>x</sub> annually from the kiln. In 2005, the cement plant reported an emission rate of 9.00 lbs of NO<sub>x</sub>/ton of clinker produced.<sup>107</sup> The amount of NO<sub>x</sub> allowed to be released by the CEMEX Lyons plant is more than most of the coal-fired power plant units in the Denver metro region.

The CEMEX Lyons cement plant has also come under scrutiny for its NO<sub>x</sub> emissions. Both Rocky Mountain Clean Air Action and the EPA have put CEMEX on notice of numerous violations of New Source Review Prevention of Significant Deterioration requirements regarding

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<sup>106</sup> States that have adopted NO<sub>x</sub> reductions from cement kilns include California, Pennsylvania, and Texas. See <http://www.epa.gov/fedrgstr/EPA-AIR/2002/January/Day-02/a32099.htm>, <http://www.epa.gov/fedrgstr/EPA-AIR/2006/September/Day-29/a15988.htm>, and [http://www.tceq.state.tx.us/assets/public/implementation/air/sip/dfw/dfw\\_ad\\_sip\\_2007/Complete\\_DFW\\_SIP\\_for\\_Webpage\\_052407.pdf](http://www.tceq.state.tx.us/assets/public/implementation/air/sip/dfw/dfw_ad_sip_2007/Complete_DFW_SIP_for_Webpage_052407.pdf). The Ozone Transport Commission has also adopted model rules for states that target NO<sub>x</sub> emissions from cement kilns. See <http://www.otcair.org/document.asp?fview=Report#>.

<sup>107</sup> Based on the Air Pollution Control Division's June 14-15, 2005 inspection of the CEMEX Lyons cement plant.

significant NOx emission increases.<sup>108</sup> If these violations are remedied, the CEMEX Lyons cement plant will be required to meet NOx limits that represent Best Available Control Technology.

The Ozone Transport Commission has also adopted model rules for states targeting NOx emissions from cement kilns. Those recommendations call for a NOx emission rate of 1.52 lbs/ton of clinker for precalciner kilns. According to the Commission, the cost/ton of NOx reduced is less than \$2,500 for these emission rates.<sup>109</sup>

In light of this information, we propose a process of establishing NOx limits at the CEMEX Lyons cement plant to reduce ozone in the Denver metro region. We propose that a full Best Available Control Technology analysis be completed to establish a NOx limit for the cement plant. This analysis must consider post-combustion controls, such as nonselective catalytic reduction and selective catalytic reduction. In no case however, shall NOx emission rates from the cement plant exceed 1.52 lbs/ton of clinker produced over a 30-day period.

Such a rule should include recordkeeping and reporting requirements sufficient to ensure the enforceability and effectiveness of the proposal. Monitoring should be conducted using existing continuous emission monitors. We propose that CEMEX be required to report quarterly, disclosing total monthly NOx emissions from the kiln, total monthly clinker production, and average monthly emission rates for the quarter.

This proposal would ensure an 83% or more reduction in NOx emissions from the CEMEX Lyons cement plant. Estimated cost of the proposed rule would be \$4.4 million. The total NOx reductions and costs are presented in the table below.

<b>Current Clinker Production</b>	<b>Current NOx Emissions</b>	<b>Current NOx Emission Rate</b>	<b>Proposed NOx Emission Rate</b>	<b>Total NOx Emissions Under Proposal (% Reduction)</b>	<b>Cost of Proposed Rule</b>
472,053 tons/year	2,125.46 tons/year	9.00 lbs/ton of clinker	<1.52 lbs/ton of clinker	358.76 tons/year (83% reduction)	~\$2,500/ton of NOx reduced
				<b>TOTAL COST</b>	<b>\$4,416,750</b>

Reducing NOx from the CEMEX Lyons cement plant will lead to a number of co-benefits. The cement plant is located less than 20 miles away from Rocky Mountain National Park and

<sup>108</sup> See <http://www.ourcleanair.org/cemex>.

<sup>109</sup> OTC Final Technical Support Document, available at <http://www.otcair.org/document.asp?fview=Report#>.

reducing NOx will help alleviate the impacts of nitrogen deposition to the Park.<sup>110</sup> Reducing NOx will also reduce haze and particulate pollution in the region.

- **Timeframe for Implementation:** Incorporate as part of December 2008 SIP followed by implementation in 2010.

#### **E. Area Sources: Reducing Ozone from Products and Practices**

The Ozone Transport Commission (OTC) has developed a number of model rules for addressing a variety of sources of ozone-causing pollution. These model rules are described below.<sup>111</sup>

##### 1. *Model Rule for Adhesives and Sealants*

The evaporation of solvents used in the application of adhesives, sealants, adhesive primers, and sealant primer also contribute to VOC emissions. The OTC Model Rule for adhesives and sealants is intended to reduce VOCs from these sources. Products containing adhesives and sealants are commonly used in “industrial and commercial operations such as wood product manufacturers, upholstery shops, adhesives retailers and architectural trades, such as building construction, floor covering installation and roof repair.”<sup>112</sup>

The 2001 OTC Model Rule covers most adhesives and sealants under its Consumer Products Model Rule (see Section V.3 below). The 2001 model rule exempts, however, products sold in large quantities. The 2006 does not contain this same broad exemption. The 2006 OTC Model Rule is based on determinations of reasonably available control technology (RACT) and best available retrofit control technology (BARCT). The 2006 Model Rule controls VOC emissions from adhesives and sealants through several control mechanisms such as requiring that applicators of adhesives and sealants either utilize a low VOC content product or use add-on controls that limit VOC emissions. The rule also requires storage of products in closed containers and mandatory labeling of products.

Adhesives and sealants contribute about 45 tons per day of VOCs. The adoption of control technologies and lower VOC content products can result in approximately a 65 percent reduction in VOC emissions.<sup>113</sup> Compliance costs vary among controls. It is expected that most affected businesses will begin utilizing lower VOC materials rather than more expensive add-on controls. Available savings from the use of lower VOC products are approximately \$1,060 whereas the costs are approximately \$2,320 per ton of VOC reduced.<sup>114</sup> Add-on controls, on the contrary, can cost anywhere from \$9,000 to \$110,000 per ton of VOC reduced. Implementation costs in

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<sup>110</sup> The National Park Service and Colorado Department of Public Health and Environment have both stated that, “[I]t is clear that to decrease N [nitrogen] deposition in RMNP [Rocky Mountain National Park], NOx and/or NH3 emissions decreases need to occur.” See <http://www.cdphe.state.co.us/ap/rmnp/NDRPAugust07.pdf> at 52.

<sup>111</sup> The text of the model rules may be found at [http://www.otcair.org/projects\\_details.asp?FID=99&fview=stationary#](http://www.otcair.org/projects_details.asp?FID=99&fview=stationary#).

<sup>112</sup> OTC, Identification and Evaluation of Candidate Control Measures, Final Support Document. 3-1, *supra* note 109.

<sup>113</sup> *Id.* at 3-4.

<sup>114</sup> *Id.* at 3-5.

Colorado however are likely to be significantly less as lower VOC products are already available on the market.

## 2. *Model Rule for Consumer Products*

Consumer products are a significant source of VOC emissions. While federal rules for many consumer products exist, the OTC Model Rules are more stringent. The model rule for consumer products covers a wide array of items sold to retail customers that include personal care products, household products, adhesives and sealants, and some automotive-related products.<sup>115</sup> The rules establish emission limits for individual products and prohibits the manufacture, distribution, and sale of products that do not meet the standards.

VOC reductions from consumer products regulations will reach 2,208 tons per year in California once the 2006 OTC rules are fully implemented. This represents an additional 2.0 percent reduction over the benefits seen from the 2001 Model Rule. Implementation costs in Colorado are likely to be low as consumer products that comply with the OTC rules are already widely available.<sup>116</sup>

## 3. *Model Rule for Cutback and Emulsified Asphalt Paving*

Cutpoint and emulsified asphalt also contribute significant VOC emissions. Cutback asphalt is created by the blending of asphalt cement with a dilutant that contains petroleum distillates. Emulsified asphalt results from the blending of asphalt with water and an emulsifying agent like soap.<sup>117</sup> The VOC emissions from these sources are addressed separately.

Each of the thirteen OTC states has adopted regulations for the use of cutback asphalt. The regulations vary slightly from state to state. Many of the states have completely banned the use of cutback asphalt during the summer ozone season.<sup>118</sup> Other states have banned its use where VOC content exceeds 5 percent.<sup>119</sup>

Most of the OTC states have adopted regulations controlling the use of emulsified asphalt. The regulations set limits on the VOC content allowed depending on the type of use or type of asphalt. Only Connecticut, the District of Columbia, and Massachusetts have declined from regulating emulsified asphalt at all.

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<sup>115</sup> The 2006 Model Rule defines Consumer Products as: “a chemically formulated product used by household and institutional consumers including, but not limited to, detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings. As used in this rule, “consumer products” shall also refer to aerosol adhesives, including aerosol adhesives used for consumer, industrial or commercial uses.”

<sup>116</sup> See New Jersey Workgroup Recommendations and Other Potential Control Measures VOC Workshop, Recommendations, 3 at [http://www.nj.gov/dep/airworkgroups/docs/wps/VOC001\\_fin.pdf](http://www.nj.gov/dep/airworkgroups/docs/wps/VOC001_fin.pdf).

<sup>117</sup> OTC Final Support Document, *supra* note 109, at 3-5.

<sup>118</sup> DE, DC, ME, MD, NH, NJ, NY, PA, RI, VA

<sup>119</sup> CT, MA, VT.

The 2006 OTC Model Rule recommends complete prohibition of the use of cutback asphalt during the summer ozone season and limits emulsified asphalt to .25 percent VOC. Because low-VOC alternatives currently exist that comply with the regulation, “no additional costs are expected from their use.”<sup>120</sup>

- **Timeframe for Implementation:** Inclusion in December 2008 SIP.

## **F. Expanded Transit Alternatives**

Reducing ozone precursors from on-road mobile sources can be accomplished through tightening vehicle emissions standards, emissions inspection programs, fuel reformulation, and reducing vehicle miles traveled (VMT). VMT reduction is perhaps the most challenging strategy yet brings important ozone and transit improvements that have multipollutant benefits. Given the challenge of developing a durable blueprint to restore healthy air, transportation plans designed to minimize on-road emissions are critical.

The Colorado Climate Action Panel recently released recommendations to expand and improve transit service in Colorado.<sup>121</sup> One of the recommended measures calls for the creation of a statewide funding source for transit systems and encourages the Colorado Transportation Finance and Implementation Panel (blue ribbon panel) to include transit set-asides in any funding mechanism recommended by the panel. The Climate Action Panel also calls for all new large residential developments to devise a resident travel plan that will achieve a 20% transit mode share. If developments are not able to achieve this goal, they must make a payment in lieu of taxes. The Panel also recommends supporting the activities of the Rocky Mountain Rail Authority and the Colorado Rail Association. The panel estimates that improvements to, and expansion of, transit routes will reduce passenger VMT 6% by 2020.<sup>122</sup>

### *1. Neighborhood ECO-Pass Program*

RTD currently provides a deeply discounted annual bus pass to neighborhood organization for all members of participating households. Eco-Pass is a photo ID bus pass that entitles residents to one year of unlimited travel on all RTD Local, Express, Regional, call-n-Ride, and Light Rail routes, plus unlimited skyRide service to Denver International Airport. This program should be actively encouraged in neighborhoods across the RTD District and made available across the Front Range.

The program has been implemented in the City of Boulder since 2005. To date, 24 neighborhoods in Boulder (and one in Lafayette) offer the Neighborhood Eco Pass (NECO) Pass to nearly 4,430 residents. With additional subsidies provided by the City of Boulder, the annual cost for this pass is \$56 to \$128 per household. There is also a 50

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<sup>120</sup> OTC Final Support Document, *supra* note 109, at 3-7.

<sup>121</sup> While the primary aim of the Climate Action Panel’s recommendation is the reduction of greenhouse gases, expanded transit options will also reduce ozone.

<sup>122</sup> <http://www.coloradoclimate.org/ewebeditpro/items/O14F12985.pdf> at 9.

percent discount to first time NECO Pass neighborhoods. The pass is valued at \$1,600 if it is purchased outside of this program.<sup>123</sup>

Once community organizations create a NECO Pass agreement with RTD, eligible residents are issued individual photo ID passes. RTD will schedule photo sessions at your site. All communities within the RTD District are eligible. The neighborhood is required to be represented by a registered neighborhood organization, association, city or county government entity for the purpose of entering into an agreement with RTD.

RTD charges an annual fee per housing unit. The price reflects the number of eligible housing units, amount of transit availability and usage. A \$5,000 contract minimum is required to initiate a Neighborhood Eco Pass contract, yet, still offers substantial savings when compared to the per person price of a monthly pass.

### *2. Free Rides on High Pollution Days*

Offering a free ride can increase bus ridership on potentially high pollution days. This was the operating principle for transportation officials across Northern Virginia this summer. Local bus routes across Fairfax, Arlington, and Loudon Counties offered free bus service on high pollution days through mid-September 2007.<sup>124</sup>

Free ride days can increase awareness of unhealthy air quality conditions and encourage more people to be aware of when high pollution day alerts are called. It would also introduce people who usually drive to the bus system so they will be more likely to use it in the future.

RTD currently offers three free passes to anyone who pledges to use alternative transportation at least once a week through the “Drive Smart Thursdays” campaign.<sup>125</sup> Alternatively, this program could be enhanced to provide bus passes to pledge participants that could be used for free rides on high pollution days during the summer.

### *3. Bus Smart Card*

Smart Cards reduce the amount of time bus users have to wait in line, eliminate the need for correct change, and encourage ridership. Though costly, this action could substantially increase the ridership and allow more flexibility in billing structures.

One such card, being installed in the U.K., the “NoWcard” features a photograph of the holder and is loaded with data which identifies the concessionary fare entitlement of the holder. When the holder presents his NoWcard to the ticket machine on the bus for the first time, the smart

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<sup>123</sup> City of Boulder, Neighborhood Eco-Pass (NEC) Pass program, [http://www.bouldercolorado.gov/index.php?option=com\\_content&task=view&id=4293&Itemid=320](http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=4293&Itemid=320).

<sup>124</sup> *Free Bus Rides Available In N.Va. On Days When Air Is Unhealthy*, Examiner.com article, <http://www.examiner.com/a-732752~Free%20bus%20rides%20available%20in%20N.Va.%20on%20days%20when%20air%20is%20unhealthy.html> (downloaded October 2007).

<sup>125</sup> Ride Smart Thursday, at <http://www.ridesmarthursdays.com/index.cfm>.

card automatically prompts the ticket machine to calculate the relevant fare and any other incentives such as age or employer programs. Through this \$9 million program, 300,000 NoWcards have already been issued with the aim of having all 1,800 buses in the region operating the smart ticketing technology by the autumn of 2007.

Similar card systems are in wide use in many rail transit systems or rail and bus authorities in the country. Eventually, the card technology could be expanded to replace other cash uses, such as paying at city parking garages or parking meters.

- **Timeframe for Implementation:** As soon as practicable based on further discussions with regional transit authorities.

### **G. Key Federal Measures**

While Colorado can do a lot on its own to reduce ozone pollution in Denver Metro Area, there are a number of key areas over which the federal government retains primary authority. Three such areas are particularly worth noting as each contributes significant ozone precursors, as well as other air pollution, to the air millions of Coloradans breathe.

#### *1. Small Spark-Ignition Engines*

Despite their size, spark-ignition small engines, such as those commonly found in lawn and garden equipment are big polluters. According to EPA, spark-ignition small engines not only produce about one fourth the amount of smog forming hydrocarbons as all of the cars on the road today but their emissions are concentrated during conditions especially conducive to ozone formation.<sup>126</sup> California officials report that, on a gallon for gallon basis, these engines discharge 93 times more smog forming emissions than model year 2006 cars.<sup>127</sup> Spark-ignition small engines also emit significant levels of PM, air toxics and carbon monoxide.

Congress directed EPA to set more stringent Phase III regulations for new small spark-ignition engines by December 1, 2004, and to issue final regulations by December 31, 2005.<sup>128</sup> This spring EPA published proposed rules to strengthen most of the existing Phase II regulations currently in effect. For example, the proposed exhaust emissions standards for sterndrive and inboard marine small engines represent significant reductions of 70% in HC and NOx and 50% in CO emissions.<sup>129</sup> The proposed standards for lawn and garden equipment will achieve emissions reductions of approximately 35% below the current federal levels.<sup>130</sup> However, EPA has yet to finalize these new rules. Given the significant contribution to ozone nonattainment the emissions from these engines produce, we urge EPA to finalize the Phase III rules immediately.

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<sup>126</sup> U.S. EPA, EPA 454/R-03-005, National Air Quality Emission Trends Report, App. A (2003)

<sup>127</sup> Felicity Barringer, *A Greener Way to Cut the Grass Runs Afoul of a Powerful Lobby*, N.Y. Times, April 24, 2006.

<sup>128</sup> See 2004 Omnibus Appropriations Bill, Section 428(b) of Pub. Law No. 108-199 (Jan. 23, 2004).

<sup>129</sup> Control of Emissions from Nonroad Spark-Ignition Engines and Equipment, *supra* note 9, at 28,115.

<sup>130</sup> *Id.* at 28,139.

## 2. *Locomotives*

Locomotive engines contribute significant amounts to ozone, PM, SO<sub>2</sub>, air toxic and GHG pollution. EPA estimates that in 2006 locomotives nationally will emit 930,000 tons of ozone-forming NO<sub>x</sub>—as much as 120 coal-fired power plants—and more than 32,000 tons of particulate pollution.

In 2004, EPA repeatedly committed to strengthen federal clean air standards for locomotives and to setting final rules to reduce locomotive emissions by the middle of 2006. While EPA recently published proposed rules, the agency has yet to finalize them. Despite the fact that EPA has found locomotive diesel engines can be designed to use the same high-efficiency exhaust emission controls now being developed for large highway and nonroad diesel engines, EPA's current locomotive rules do not reflect the capacity of available modern exhaust emission control devices to dramatically lower locomotive pollution. Modern technologies will allow locomotive engines to reduce NO<sub>x</sub> and particulate matter emissions by 90%. For example, hybrid switcher engines, called Green Goats, use a combination of rechargeable batteries and a low-emissions diesel engine to cut emissions by 80–90% and reduce fuel use by 40–70%.

To reduce idling, various technologies have been introduced, including auxiliary power units, which keep engines warm while they are turned off. Furthermore, communities across the country have set up pilot projects to curb locomotive emissions and reduce fuel consumption. For example, in Chicago an anti-idling project saved over 14,000 gallons of fuel and in Texas, more than a dozen hybrid-diesel Green Goat trains have been deployed. While these voluntary pilot programs play an important role in incubating new technologies, they are often limited in scope. Federal leadership is essential to keep these far-reaching clean air solutions for locomotive engines on the right track. Therefore, we urge EPA to finalize promptly new locomotive standards to reduce diesel pollution.

## 3. *New Source Review*

The New Source Review (NSR) program is one of the pillars of the CAA's promise to ensure healthy air to all Americans. For a quarter of a century, the CAA's NSR program has protected Coloradans by requiring large industrial facilities to modernize air pollution control equipment when expanding their operations and increasing air pollution levels. Unfortunately, EPA has advanced a number of revisions to the NSR program which have resulted in exempting older, dirtier stationary sources from keeping up with the pace of modern emission control technology. As a result, while newer sources must install modern technology to curb the emissions of ozone precursors and other contaminants, older sources built some ten to twenty years before the advent of cleaner technologies, are permitted to continue to emit significant amounts of pollution into their air. Despite push-back from some federal courts that have likened EPA's NSR rollbacks to "a Humpty Dumpty world", EPA has continued to pursue rollbacks to long-standing clean air protections. The Denver Metro Area faces a significant challenge in meeting the ozone NAAQS and restoring clean air and improved visibility to its citizens and natural places. We urge EPA to halt the dangerous NSR rollbacks and equal the playing field between old and new stationary sources in Colorado.

## **Conclusion**

Ozone pollution in the Denver Metro Area is a serious public health and environmental problem. However, as the clean air strategies examined in this blueprint demonstrate, there are many available measures to reduce ozone. Colorado can win the fight against ozone pollution, and its concomitant adverse human health and environmental impacts, provided that we act with the appropriate level of determination and immediacy required by the challenge before us.