Kootenai Metropolitan Planning Organization

Overview and Impact of Recent Idaho Vehicle Inspection Legislation (Idaho Code Chapter 1, Section 39-116B)

May 29, 2008

Introduction

On April 1, 2008, Governor Otter signed a new air quality law pertaining to motor vehicle emissions testing.

The new Idaho law requires implementing an auto emissions inspection program, or equivalent mitigation measures approved by the Department of Environmental Quality (DEQ), whenever any pollutant achieves 85% of the national ambient air quality standard. DEQ has indicated that ozone is one pollutant that has the potential to trigger this requirement in the Coeur d'Alene metropolitan statistical area. Consequently, there has been significant discussion about the impacts of this new law with respect to ozone levels in our air.

The United States Environmental Protection Agency (EPA) first established ozone standards in 1971. Through the years, the standards were adjusted as the EPA, American Lung Association, states and various industries struggled to balance the health effects of ozone against the cost of control measures. Most recently, in March of 2008, the EPA lowered its national standard for ground level ozone from 0.084 parts per million (ppm) to 0.075 ppm, averaged over an 8-hour period. Areas of the country where this standard is exceeded will be designated as federal "non-attainment" areas for ozone.

This paper is intended to provide the KMPO Policy Board with a general overview of the ozone issue, a summary of the potential impacts of the new legislation on Kootenai County, and some suggested actions for KMPO Policy Board consideration.

The Issue with Ground-Level Ozone

Most people think of ozone as a beneficial chemical for our planet, and indeed high in the stratosphere, ozone protects the earth from excessive ultraviolet radiation. At lower levels, however, the EPA considers ozone a dangerous pollutant that has been linked to respiratory problems and damage to crops and other vegetation.

Ground-level ozone is not actually emitted by motor vehicles. Instead, it is created when various chemicals react with heat and light from the sun. Vapors from fuels, paints and other chemicals, as well as combustion byproducts from

the burning of wood and fossil fuels, may produce ozone when exposed to sunlight. Because sunlight is needed to produce ground-level ozone, the highest concentrations are usually experienced on hot summer days.

Ground-level ozone may be naturally occurring as well, as volatile organic chemicals released from trees and other vegetation react with sunlight. Determining sources of ground-level ozone and managing its production is thus a complex and difficult undertaking.

The transportation industry contributes to the production of ground-level ozone in two ways:

a) As automobile engines burn fuel, tailpipe emissions can react with sunlight to produce ozone. The same is true of emissions from trucks, locomotives and airplanes and all other vehicles with combustion engines.

b) When large underground fuel storage tanks and individual vehicle gasoline tanks are filled, fuel vapors are pushed out of these tanks and into the surrounding air. The reaction of these vapors with sunlight can create ozone.

Gasoline vapors are extremely volatile. The vapors that result from spilling one shot glass of gasoline on the ground have the same ozone-producing potential as the tailpipe emissions released from driving a typical car 25 miles.[1] Airplane fuel is even more volatile than gasoline for automobiles. While diesel *combustion* can contribute significantly to ozone production, vapors from diesel fuel itself are not as volatile as gasoline vapors, and therefore of somewhat less concern.

Overview of New Idaho Law

The intent of the legislation recently approved in Idaho is to help prevent areas of the state from becoming federal air quality non-attainment areas.

If DEQ determines that an airshed has air pollutant levels that equal or exceed 85% of the national standard, and if DEQ determines that emissions from motor vehicles constitute one of the top two sources of that pollutant, then the new law requires that a vehicle emissions testing program or other equivalent control measure must be implemented.

In determining the most effective control measures for ozone, regulators typically look at two primary sources of ozone compounds. First there are mobile sources such as automobiles and other petroleum powered vehicles. Second are stationary sources like power plants, gas stations, lumber mills, dry cleaners, auto body shops, etc. (A third major source of ozone compounds is naturally

[1] Puget Sound Clean Air Agency

occurring volatile organic compounds that come primarily from trees. However, these sources are excluded from discussion here, as control measures for vegetative sources of ozone are beyond the purview of KMPO.)

The new Idaho law addresses only one of these sources -- the mobile source -- and prescribes the same control measure (vehicle inspection and maintenance program) for all pollutants, regardless of this control measure's effectiveness at reducing the specific pollutant in question.

The new law states that the applicable airshed will be defined by DEQ, *within a metropolitan statistical area*. In Kootenai County, the designated metropolitan statistical area is the "urbanized" area as defined by the US Census, which includes the cities of Coeur d'Alene, Post Falls, Hayden, Dalton Gardens, Fernan Lake Village, and Huetter, and small portions of the adjacent unincorporated county.

Proponents of the new law have stated that the 85% criteria is not an official "standard". However, the new law sets air pollutant thresholds for the purposes of triggering a vehicle emissions program requirement. So for all practical purposes these lower thresholds are indeed standards.

Where ozone is concerned, the new Idaho law establishes a de facto state standard of 0.064 parts per million (ppm), based on 85% of the current national standard of 0.075 ppm.

A scan of laws and rules promulgated by other states across the nation indicates Idaho's approach is quite stringent. For the purposes of implementing vehicle inspection and maintenance (I&M) programs, the national 8-hour standard for ozone (0.075 ppm) appears to be used in all states except California, where the California Air Resources Board has established a state standard for ozone of 0.070 parts per million.

The new law encourages a joint agreement between DEQ and counties or councils of cities to implement a vehicle inspection program. And the law also provides an opportunity for counties or councils of cities to propose alternative measures. If DEQ does not agree with alternative measures that may be proposed locally, and if the county or council of cities does not support implementing a vehicle inspection program, the law requires DEQ to step in and establish a state-operated vehicle inspection and maintenance program.

Vehicle Inspection and Maintenance Programs

I&M programs are the subject of significant public debate, stemming from citizen perception that such programs carry significant cost and public inconvenience without demonstrated benefit.

The effectiveness of emissions testing programs is highly dependent on local conditions. Factors such as the age and composition of the vehicular fleet, the number of vehicle miles travelled, vehicle speeds, summer temperatures, wind speeds and many other conditions all influence the amount of ozone that may be reduced through such programs. Complex computer models are typically used to forecast the anticipated air quality benefits of vehicle emissions testing.

Because localized conditions play such a large role in the type and amount of pollutants generated by mobile sources, there is no “one size fits all” vehicle emissions testing program. State programs are highly individualized when it comes to selecting which cars to test, when and how often to test, and how to accomplish the testing.

Many states with vehicle I&M programs are moving away from direct pollutant measurement at the tailpipe, and are relying instead on the on-board diagnostic devices installed in newer vehicles. North Carolina, for example, has completely phased out tail pipe testing, and only requires on-board diagnostic testing of vehicles newer than 1996, with no testing of vehicles older than 1996.

In addition to on-board computer diagnostic systems that help to ensure emissions systems are functioning properly, new cars are also being developed to capture fuel vapors when the vehicle is fueled. Captured vapors are stored in an on-board tank designed specifically for this purpose and the vapors are ultimately directed to the engine where they are burned off. This technology is called “on-board vapor recovery”.

Ongoing technical advancements such as these affect our ability to forecast the potential benefits of an emissions testing program. Significant technologic improvements have led to cars that pollute less. As newer, cleaner cars replace the older ones, it follows that ozone and other pollutant levels will change. While the end result should be good, this phenomenon makes it difficult to determine how much ozone reduction benefit can actually be derived directly from emissions testing programs, and how much would occur regardless of testing, simply from improved vehicle emissions technology.

While working to pass the Idaho emissions testing law, lawmakers promoted I&M programs for automobiles as one of the most cost effective ways to mitigate ozone production. The governor echoed this opinion, citing the cost effectiveness of I&M programs when he reluctantly signed the bill into law. However, many states that currently have I&M testing are moving away from these programs because stricter emission-control standards on new vehicles, on-board vapor recovery and on-board diagnostic systems are rendering the traditional I&M programs obsolete.

Washington State's Inspection and Maintenance Program

Because of the proximity of Spokane to Kootenai County, a review of Washington's experience with I&M testing is appropriate.

In Spokane County, a vehicle I&M program was established in 1985, as a control measure for carbon monoxide. Currently in Spokane, a combination of tailpipe testing for older cars, and on-board diagnostics testing for vehicle model years 1996 and newer is used. Cars which are newer than 5 years or older than 25 years are currently exempt from testing. And vehicles manufactured with California emissions standards (2009 and newer) will never require testing under Washington's I&M program.

Washington's I&M program will end in 2019. Until then, fewer and fewer emissions tests will be conducted in Washington each year.

Vehicles in Spokane are inspected every two years. During the 2006-2007 testing period:

60,922 vehicles were tested
51,642 passed
8,535 failed
745 tests were waived

Of those vehicles that failed, the amount of emissions reduction upon retest cannot be determined from available data. Part of the reason is that tests using the on board diagnostic method do not measure tailpipe emissions directly. The on-board diagnostic test is essentially a "pass-fail" test determined by querying the vehicle's computer. (The same computer code which causes the "check engine" light to come on in many vehicles will return a failed test.) The on-board diagnostic test ascertains whether a vehicle's emission system is operating properly, but it is not possible to know how much pollutant a vehicle actually emits using this test method.

Early on in Washington's program, when tailpipe emissions were measured directly for nearly every vehicle, it was possible to gauge the effectiveness of the program for carbon monoxide (CO) emissions. Unfortunately, Washington's target pollutant was CO rather than ozone. It is not scientifically valid to translate the results of Washington's I&M program for CO emissions to a potential I&M program targeting ozone in Kootenai County. Consequently the following details are provided for anecdotal interest only: In 1997, vehicles which failed and were retested in Washington showed an average per vehicle reduction of 23% in CO emissions.[2] However, this 23% represented an improvement only for vehicles which initially failed and were retested, which was approximately 12% of all vehicles tested. Hence the actual CO reduction obtained through the I&M

[2] Washington State Department of Ecology, *Emission Check Program Evaluation*, October 1998.

program was a much smaller percentage of the total amount produced by all vehicles.

Since 1997, significant improvements in vehicle emissions technology have occurred. It follows that Washington's emission testing program is having less beneficial effect as time goes on. And indeed for this reason, the program will be phased out in 2019.

Alternatives to Vehicle Emissions Testing

As previously mentioned, Washington will no longer test new vehicles starting in 2009, and will completely eliminate its I&M program statewide by the end of 2019. Instead, the Spokane Regional Clean Air Agency is focusing its ozone abatement efforts on vapor recovery at stationary sources.

According to a 2002 nationwide study sponsored by the Transportation Research Board (TRB) of the most cost effective methods to mitigate ozone, the Spokane Regional Clean Air Agency's approach may be worth replicating in Kootenai County.[3] The TRB study, which compared mobile source mitigation efforts that were funded with federal Congestion Management and Air Quality (CMAQ) money to the cost of other mobile and stationary mitigation efforts that were not eligible for CMAQ funds, provides cost-effectiveness information for various air pollution control strategies.

To compare the cost effectiveness of various strategies outlined in the TRB's report, we focused on mobile and stationary source control measures with a cost-per-ton reduction of $10,000 or less. Several example control measures are listed below for both mobile and stationary sources. (It is important to note that in virtually every case, EPA modeled predictions were used as opposed to actual measured emission reductions.)

Mobile Sources Example Control Measures	**Average cost-per-ton reduction VOC-equivalent emissions (Year 2000 dollars)**
I&M Testing	$1,800 to $5,800[a]
Implementing California Level II Emissions standards	$2,000
Reformulated Gasoline	$2,000 +

[a]It must be noted that the Transportation Research Board's study cites another report by the National Research Council in 2001 which revealed that the actual effectiveness of many I&M programs – particularly those using EPA or California modeling software -- fall significantly short

[3] Special Report 264*, The CMAQ Program: Assessing 10 Years of Experience,* Transportation Research Board, Board on Environmental Studies and Toxicology, National Research Council Division on Earth and Life Studies 2002.

of modeled predictions. Costs for emissions reduction through I&M testing programs may therefore be higher than indicated.

Stationary Sources Example Control Measures	**Average cost-per-ton VOC reduction (Year 2000 dollars)**
Lithographic printing modifications	-$400[b]
Stage 1 Vapor Recovery at gas stations	**$200**
Switching to emulsified asphalts for road surfacing	$0
Low VOC solvents for open top, degreasing	$100
Low VOC coatings for rubber and plastic manufacture	$1,200
Incineration at bakeries	$1,800
VOC limits on traffic marking paints	$4,900

[b]Negative value indicates that some modifications of lithographic printing can show a return on investment rather than a net cost.

The examples provided are not a complete list. The TRB report identified 17 additional stationary source control measures for VOC's,and 44 different stationary source control measures for NOx with average costs-per-ton under $10,000.

The research in the TRB report indicates that stationary mitigation strategies are in many ways more cost effective than regulating mobile sources. However, the report also concluded that most mobile source emissions occur in populated areas, while many stationary sources occur in less-populated areas. It is therefore important to be cautious in selecting control measures. The higher health-related damages from greater population exposure could justify the implementation of higher-cost mobile source control measures. However, the American Lung Association's "A" rating for our area issued earlier this month for low levels of smog-forming ozone raises questions about whether health concerns are a major driver for regulating ozone in our region.

Stage 1 vapor recovery at gas stations is a control measure where fuel suppliers are required to capture gasoline vapors released when large underground fuel tanks are filled. Given that stage 1 vapor recovery is on the order of 10 times more cost effective than a vehicle I&M program, it may be wise to investigate this strategy first.

Stage 2 vapor recovery is used in some states to capture fuel vapors at the pump as individual vehicles are fueled. (Fuel station pumps with stage 2 recovery systems have a rubber boot around the fuel nozzle to keep gas vapors from being released into the surrounding air.) However, the advent of on-board vapor recovery systems in new vehicles will soon render stage 2 vapor recovery systems at the pump obsolete.

A public awareness campaign may also help to reduce ozone levels, as citizens learn the impact of activities like using paints and solvents, or fueling their cars during daytime hours on hot sunny days.

KMPO Concerns and Issues

A number of concerns and questions have been expressed by Board members and KMPO staff.

Ozone Monitoring Station Location

The location of the current ozone monitoring station in Kootenai County has drawn significant scrutiny. Board members have expressed concern that a single monitoring station located directly downwind of the airport, at the northern edge of the urbanized area boundary, may not provide an accurate representation of ozone levels within the metropolitan statistical area.

In response, DEQ has advised that the monitor location was selected using federal siting criteria, and that the monitor at this location is accurately monitoring the ozone pollution that the majority population in the county is breathing. DEQ has also noted that even if additional monitoring sites were added, values from the highest reading monitor will be used.

Lack of Sufficient and Adequate Data

Before determining whether Kootenai County will be impacted by the new state law, a thorough Air Emissions Inventory will need to be prepared by DEQ. This should be an extensive effort to determine where sources of pollutants that contribute to ozone production occur in Kootenai County. Sources to be inventoried should include:

- Large point sources – these are individual industry locations that each contribute significant amounts of pollutants to the airshed.

- Area sources – these are smaller sources that may be small contributors individually, but could have a significant cumulative impact. Some examples include:

  Industrial and commercial and residential fuel combustion;
  Solvent uses such as dry cleaning, paints, coatings;
  Pesticide application;
  Petroleum and petroleum transport;
  Vehicle refueling;
  Service station storage tanks;
  Chemical storage and transport;
  Aircraft refueling;

Local fuel storage (such as at airports, public agencies or for private use);
Waste disposal sites;
Incinerators;
Sewage treatment works;
Repair shops;
Health and hospital services;

- Non-road mobile sources – these include sources such as airplanes, trains, and construction and farm equipment.

- On-road mobile sources – cars, trucks, buses. (KMPO can assist with the computer modeling for this source.)

- Biogenic sources – chemical emissions from living vegetation.

The above list is not intended to be comprehensive, and there may be many other sources that are appropriate to include in an Air Emissions Inventory for Kootenai County. An inventory preparation plan should be prepared to describe the process that DEQ will use to ascertain the location and impact of each type of source, and the quality control/quality assurance measures that will be used to ensure confidence in the data.

Funding and Enforcement of Alternative Control Measures

While the new law allows DEQ to consider proposals for alternative control measures, no state funding is provided for the research and development of alternative measures.

Various funding programs become available from time to time through the EPA, however the programs change from year to year. So far in 2008, the EPA has solicited proposals for two programs, which may be relevant to the ozone issue in Kootenai County. A "SmartWay Clean Diesel Finance Program", targeted at reducing diesel emissions, closes on June 9. A “Community Action for a Renewed Environment (CARE) Program”, to help communities understand the many sources of risks associated with environmental toxins was offered earlier in the year and is now closed. Staff will continue to monitor potential grant programs as they become available, however at this time, grant funding for development of alternative ozone control measures has not been identified.

Air Quality Modeling

At the present time, the air quality modeling software accepted by the EPA is known as “MOBILE6”. An independent comparison of air quality estimates

produced by MOBILE6 and actual air quality conditions found that the software's ability to accurately predict fleet emission factors is highly variable.[4]

The EPA is moving to a new software standard known as "MOVES" (Motor Vehicle Emission Simulator), and is in the process of collecting comments on this proposed software change.

Traffic volume forecasts from KMPO's travel demand model (VISUM model) will be needed for input to an air quality model. At the present time, the KMPO model is in the midst of an update, which must be completed before volume forecasts can be prepared with confidence.

The VISUM model update should be complete by the end of summer, however there is an additional complication associated with the schedule for Kootenai County's comp plan update. To predict future travel patterns and forecast volumes, we should base assumptions for housing densities and commercial and industrial uses on the county's future land use plan. It may be necessary to make some interim assumptions prior to adoption of the new comp plan.

Recommended Next Steps for KMPO

The KMPO Policy Board has already forwarded concerns to DEQ about the lack of scientific information related to ozone sources in Kootenai County. Some additional steps that the KMPO Policy Board may want to consider at this time include:

- Obtain an independent third party opinion on the number of monitors and recommended monitoring location(s) that will be needed to accurately represent ozone levels within the Coeur d'Alene metropolitan statistical area.

- Request that DEQ provide an air inventory preparation plan for KMPO review prior to beginning work.

- Provide a standing agenda item at KMPO Policy Board meetings for regular reports by DEQ as information is assembled and evaluated.

- Support and monitor KMPO staff efforts to update the KMPO regional travel demand model, so that it may be used to help estimate air quality impacts from mobile sources.

- Consider moving forward with local legislation to require Stage 1 vapor recovery at gas stations in Kootenai County. According to Spokane Regional Clean Air, the cost to retrofit a gas station for stage-one vapor

[4] Pollack, A.K., et. al., *Evaluation of the U.S. EPA Mobile6 Highway Vehicle Emission Factor Model;* Coordinating Research Council, Inc. March 2004.

recovery is between $1,000 and $2,500 depending on the system that is installed. There are two approved contractors in Spokane who could do the work at this cost. Considering that the Coeur d'Alene metropolitan statistical area may be barely above the state's self-imposed threshold, this mitigation strategy may help to avoid triggering the I&M testing requirement.

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Sources and references used for background material:

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