BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF MAKING RECOMMENDATIONS TO THE ENVIRONMENTAL QUALITY COMMISSION OF THE STATE OF OREGON CONCERNING THE SECOND PORTLAND AREA CARBON MONOXIDE MAINTENANCE PLAN	))))))	RESOLUTION NO. 04- 3457 Introduced by Councilor Park

WHEREAS, in 1996 the Oregon Department of Environmental Quality prepared a draft Carbon Monoxide Maintenance Plan; and

WHEREAS, Metro reviewed the draft Plan, and, after consultation with the Joint Policy Advisory Committee on Transportation, adopted Resolution No. 96-2260, For the Purpose of Recommending to the Environmental Quality Commission the Transportation Control Measures (TCM's), contingencies, and emissions budgets to be included in the Portland Region's Ozone and Carbon Monoxide (CO) Maintenance Plans; and

WHEREAS, in 1996, the Oregon Environmental Quality Commission approved a Portland Area Carbon Monoxide Maintenance Plan and submitted the Plan to the United States Environmental Protection Agency (EPA); and

WHEREAS, on September 2, 1997 the EPA approved the Carbon Monoxide Maintenance Plan for the Portland, Oregon area; and

WHEREAS, the EPA and the Oregon Environmental Quality Commission agreed that an updated plan would be submitted to the EPA by the year 2005; and

WHEREAS, the Department of Environmental Quality is producing a draft Second Portland Area Carbon Monoxide Maintenance Plan; and

WHEREAS, while the subject of the Maintenance Plan is carbon monoxide, other pollutants including volatile organic compounds, oxides of nitrogen, air toxics such as benzene and acrolein and other emissions from transportation sources are of concern and can be ameliorated through local air quality actions; and

WHEREAS, the Oregon Administrative Rules for the Department of Environmental Quality concerning transportation conformity (OAR 340-252-0060) state that the metropolitan planning organization shall be responsible for: "(iv) Developing and evaluating TCMs in ozone and/or carbon monoxide nonattainment and/or maintenance areas"; and "(v) providing technical and policy input on emission budgets"; and

WHEREAS, the Transportation Policy Alternatives Committee, the Joint Policy Advisory Committee on Transportation and the Metro Council have reviewed and discussed the transportation aspects of the draft Second Portland Area Carbon Monoxide Maintenance Plan including transportation control measures, emission budgets, subregional areas and oxygenated fuels ; now therefore

BE IT RESOLVED,

1. The Metro Council recommends to the Environmental Quality Commission of the State of Oregon that the transportation control measures as listed in Exhibit A, be included in the Second Portland Area Carbon Monoxide Maintenance Plan.

2. The Metro Council will take the following actions and encourages and supports its local government partners and state and other regional agencies to:

a. continue support of efforts to develop and redevelop in centers and mixed use areas within the urban portion of the region by providing funding for, and cooperating, with the Transit Oriented Development program, the Regional Travel Options program, and any similar programs and projects in the urban area,

b. continue to implement the 2040 Growth Concept to encourage growth patterns that can be served by a balanced transportation system, including walking, biking, transit as well as motor vehicles in order to maintain air quality within the region as well as meeting other region-wide goals.

c. keep urban growth boundary and growth forecasts and allocations up-to-date and coordinated for use in future conformity determinations,

d. maintain support for the Portland Central City Transportation Management Plan, including its parking regulations, to encourage transit use, walking and biking as convenient and effective methods of transportation for people within the Central City area, recognizing that auto trips and goods movement via trucks will remain an important component of travel within the Central City. Any changes to parking regulations should strive to realize or exceed the existing central city parking assumptions of the regional transportation model, especially the parking, transit pass and fareless area factors.

e. maintain support of the Metro code provisions that regulate parking requirements for the region;

f. maintain and enhance support for the DEQ Employee Commute Option program to find ways of encouraging employers to provide ECO programs and advance the participation of employees in such programs.

3. The Metro Council recommends that the carbon monoxide motor vehicle emission budgets (winter, daily) for the region be set as follows:

2005	2010	2017
1,238,575 lbs	1,033,578 lbs	1,181,341 lbs

4. The Metro Council recommends that the emission set asides for industrial sources be set at 14,880 pounds per day of carbon monoxide or 2,700 tons per year.

5. The Metro Council recommends that the subregional areas, namely, that area included in the Portland Central City Transportation Management Plan, and the 82nd Avenue subregion, not be included in the Second Portland Area CO Maintenance Plan and that the region not be required to complete additional air quality analyses for subregions over and above the required region-wide analysis.

ADOPTED by the Metro Council this 17th day of June, 2004.

David Bragdon, Council President

Approved as to Form:

Daniel B. Cooper, Metro Attorney

Exhibit A
Resolution No. 04-3457

Transportation Control Measures Recommended for Inclusion in the Second Portland Area Carbon Monoxide Air Quality Maintenance Plan

1. Transportation Control Measures.
a. a 5 year rolling average of 1.0 % per cent per year increase in regional transit revenue hours weighted by capacity, including the addition of Interstate MAX in 2004, between the years 2006 through 2017 ; and

b. program at least 28 miles of bikeways or trails, consistent with State and regional bikeway standards between the years 2006 through 2017, including a cumulative average of 5 miles funded in each biennium from all sources in the MTIP, these facilities in addition to those required for expansion or reconstruction projects under ORS 366.514; and

c. program at least nine miles of pedestrian paths in mixed use centers between the years 2006 through 2017, including the funding of a cumulative average of 1 ½ miles in each biennium from all sources in each MTIP, these facilities in addition to those required for expansion or reconstruction projects under ORS 366.514, except where such expansion or reconstruction is located within a mixed use center.

2. Contingent Actions.

a. Metro will review the vehicle miles traveled per capita (vmt/capita) based on the most recent estimates of population and daily vehicle miles traveled from Federal, State sources, as reviewed and verified by Metro.

b. Should reported vmt per capita exceed a rate of 21.5 vmt/capita (a 10 percent increase above the 2002 rate) for the Oregon portion of the Portland-Vancouver Air Quality Maintenance Area for two successive years, the following measures would become required TCM for the region:

i. Washington County Commuter Rail within six years after exceeding the 21.5 vmt/capita rate;

ii. I-205 LRT within six years after exceeding the 21.5 vmt/capita rate;

iii. an increase of efforts for the Regional Travel Options Program sufficient to increase the number of employers reached by the program by at least 5 % per year the number of employers currently subject to the DEQ Employee Commute

Options program. Alternatively, specific projects from the Regic Transportation Options program could be substituted.

iv. an increase of funding of at least 5 % per year greater than current funding for Transit Oriented Development projects.

v. Other programs or projects consistent with State and Federal law as may be determined by the Metro Council after consultation with the Joint Policy Advisory Committee on Transportation.

c. Should vmt/capita exceed 20.5 daily vmt/capita (a 5 % increase above the 2002 rate) for two successive years, the Standing Committee [TPAC, as defined at OAR 340-252-0060 (2) (b) (A) (iii)] shall be convened to consider:

i) whether there is a data problem with the trigger; and,

ii) if there is not a data problem with the trigger, identification of and analysis of effectiveness of those local actions that could reduce air pollutant emissions; and,

iii) whether a recommendation to initiate one or more of these local air quality actions until the 2002 vmt/capita level is one again attained, should be made to JPACT.

STAFF REPORT

IN CONSIDERATION OF RESOLUTION NO. 04-3457, FOR THE PURPOSE OF MAKING RECOMMENDATIONS TO THE ENVIRONMENTAL QUALITY COMMISSION OF THE STATE OF OREGON CONCERNING THE SECOND PORTLAND AREA CARBON MONOXIDE MAINTENANCE PLAN

Date: June 1, 2004 Prepared by: Mark Turpel

BACKGROUND

Consistent with Federal Clean Air Act, the Environmental Quality Commission of the State of Oregon (EQC) has directed that a draft Second Portland Area Carbon Monoxide Maintenance Plan (CO Plan) be prepared. This CO Plan will be completed in draft form and provided to the public for review in Fall, 2004 with an anticipated final decision by the EQC late 2004 or early 2005. The EQC's CO Plan will then be submitted to the US Environmental Protection Agency for approval.

In order to coordinate with the region, the Department of Environmental Quality (DEQ) has worked with local governments in the region to identify CO Plan issues prior to completion of a draft plan. Accordingly, the region has the opportunity to make recommendations about the CO Plan prior to a draft CO Plan being completed for public comment. In addition, Metro and local governments may also participate in the Fall CO Plan public process.

Several issues have been identified that pertain to transportation and/or the region's economy. On May 28,2004, TPAC met and provided technical review and recommendations. These issues include:

1) What should be the region's CO motor vehicle emission budgets (maximum levels of CO that transportation sources could generate out to the year 2020 and beyond);

(TPAC recommended that budgets that provide a 1 percent per year increase to the year 2010 be used and that a 2017 and beyond budget be based on a 1 percent per year to 2017 plus a 1.5 percent per year to 2037 be used for the 2017 budget.)

2) Should subregions for analyzing CO concentrations in downtown Portland and 82nd Avenue be continued?

(TPAC recommended deleting these subareas and no longer requiring separate conformity determinations for these subareas consistent with the DEQ recommendation.)

3) Should local air quality actions (known as Transportation Control Measures, or TCM) be included in the CO Plan;

(TPAC recommended reducing the number of TCM from nine to three and including contingent TCM should there be unexpected increases in vehicle miles per capita.)

4) Should the DEQ vehicle emissions test procedure be changed;

(TPAC recommended these tests be changed consistent with the DEQ recommendation)

5) Should Contingency Plan provisions be maintained;

6) What should be the CO Growth Allowance for new businesses in the region;

(TPAC recommended the previous growth allowance level be used as all CO emissions are expected to be reduced over the lifetime of the Plan.)

7) Should oxygenated fuels in the region be recommended to be continued or not.

(TPAC heard DEQ information about this issue, but made no recommendations.)

Items 1,2, 4 through 7 are addressed in the accompanying memorandum from DEQ, marked attachment A. Item 3 is addressed in the accompanying Metro memorandum marked attachment 2.

ANALYSIS/INFORMATION

1. **Known Opposition** There is no know opposition concerning the motor vehicle emission budgets, removing subregions, continuing with contingency plans or using the proposed growth allowance. Some have expressed concern with including TCM in the CO Plan, with changing DEQ vehicle emission procedures and with either including or eliminating oxygenated fuels.

2. **Legal Antecedents** Federal law includes the Clean Air Act (42 U.S.C. 7401) as well as transportation legislation (23 U.S.C 109j) concerning transportation plans, programs and projects developed, funded or approved by the US Department of Transportation. State legislation includes OAR Chapter 340, Division 252. Metro legal antecedents include *Resolution No. 96-2260, For the Purpose of Recommending to the Environmental Quality Commission the Transportation Control Measures (TCM's), contingencies, and emission budgets to be included in the Portland Region's Ozone and Carbon Monoxide (CO) Maintenance Plans*, and numerous resolutions concerning transportation conformity of the region's transportation plan and metropolitan transportation improvement program.

3. **Anticipated Effects** Adoption of this resolution will support the progress of the CO Plan, which, when adopted will make it possible for the region to demonstrate required transportation conformity for CO.

4. **Budget Impacts** No direct budget impacts to Metro.

RECOMMENDED ACTION

It is recommended that Resolution 04-3457 be approved.

Attachment 1 to
Staff Report for
Resolution 04-3457

State of Oregon
Department of Environmental Quality

Memorandum

Date: May 19, 2004

To: Transportation Policy Alternatives Committee

From: Dave Nordberg, (503) 229-5519

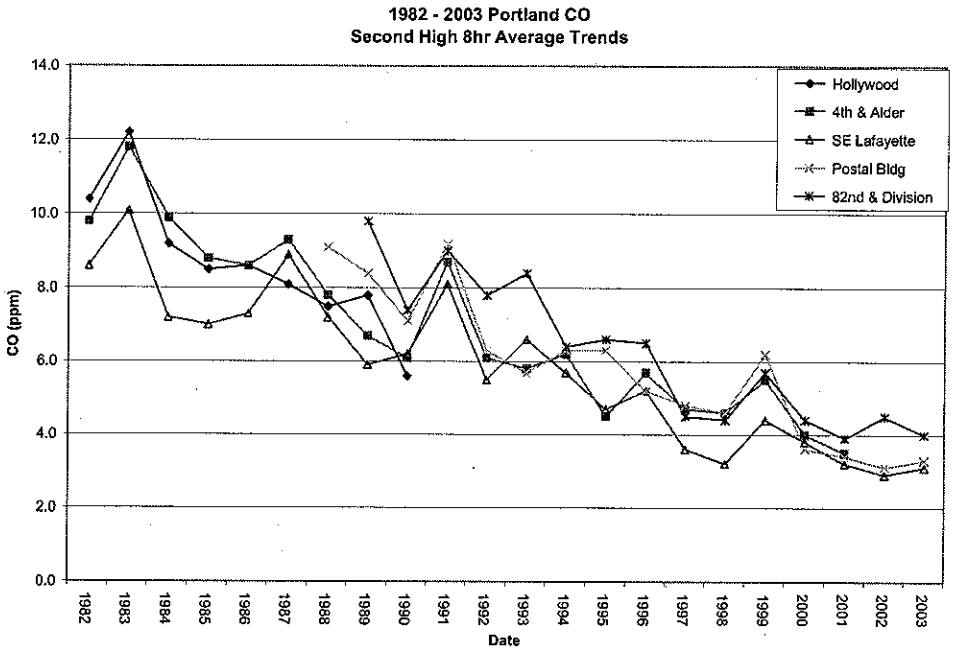
Subject: Portland Area Carbon Monoxide Maintenance Plan

Background

In the early 1970s, the Portland area exceeded the 8 hour air quality standard for carbon monoxide (CO) approximately 1 out of every 3 winter days. The Environmental Protection Agency, Oregon DEQ, Metro and the City of Portland adopted a number of control measures that effectively reduced CO concentrations. These measures included new car emission controls, the vehicle emissions testing program, wintertime oxygenated fuel, LAER (Lowest Achievable Emissions Rate) emissions control equipment for expanding industry, the downtown parking lid and the downtown traffic circulation plan. In 1991, the area achieved the 9 ppm National Ambient Air Quality Standard for CO, and in 1997 EPA redesignated the area to attainment for carbon monoxide.

As a condition of being designated to attainment, DEQ prepared the first CO Maintenance Plan. That plan detailed the strategies the area would use to stay within the carbon monoxide limit ten years into the future. The Plan took advantage of the area's Urban Growth Boundary and the 2040 Growth Concept by using both as new control measures. The plan demonstrated that air quality could be maintained while eliminating the downtown parking lid, and reducing the emission control requirement on new industry from LAER to the less restrictive BACT (Best Available Control Technology). The plan also demonstrated that the wintertime oxygenated fuel requirement was no longer needed for the area to continue to comply with the CO standard, however the Environmental Quality Commission (EQC) decided to retain the oxy-fuel requirement to provide an added degree of safety.

Since the Plan was adopted, carbon monoxide concentrations continued to decline as shown below:



Portland's Second CO Maintenance Plan

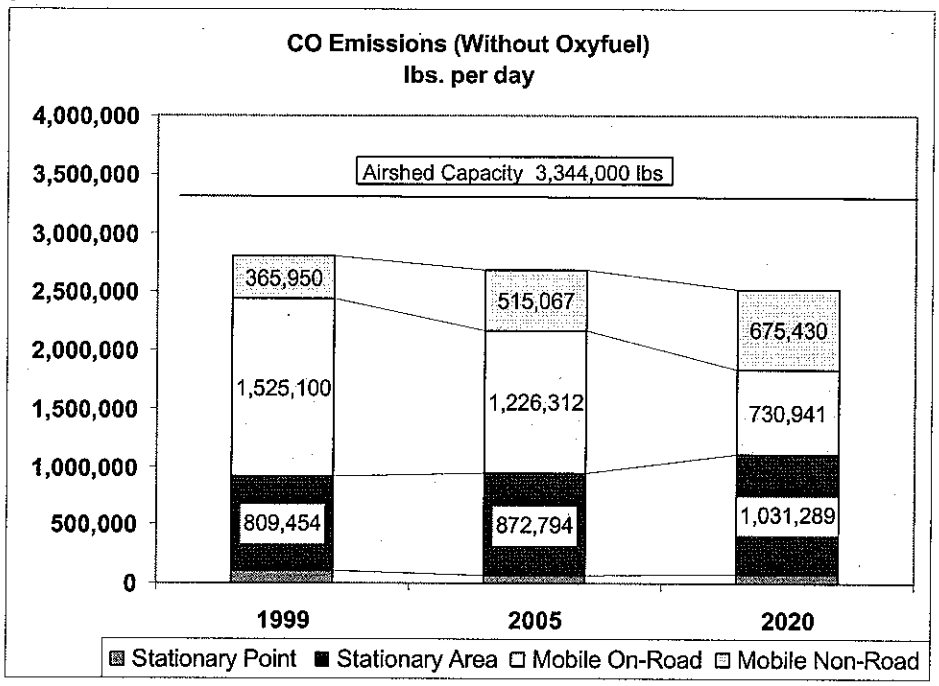
The Clean Air Act requires a second maintenance plan to be submitted to EPA 8 years after the first plan is approved. DEQ is now preparing the second plan to meet that requirement and to establish a new Motor Vehicle Emissions Budgets using EPA's new Mobile6 emissions factor model. Because many of the emissions reduction strategies used in the plan affect transportation planning DEQ is involving the metropolitan planning organization (MPO) in shaping the plan's requirements before it is proposed for public comment. DEQ's schedule for developing and implementing the plan follows:

TPAC Review	May 28, 2004
JPACT Review	Jun. 10, 2004
Metro Council Recommendation	Jun. 17, 2004
Public Comment Period:	~Aug. 16 to Sept. 17, 2004
Public Hearing:	~Sept. 16, 2004
EQC Plan Adoption:	Dec. 9 or 10, 2004 (target)
Submission to EPA:	Dec. 31, 2004
EPA Approval (Federal Register):	Aug. 2005?
Effective Date:	Nov. 2005?

While the Department is requesting the MPO's recommendations on several issues, it is important to note that Environmental Quality Commission (EQC) has final responsibility for determining the requirements of the next Portland Area Carbon Monoxide Plan. The Commission may or may not agree with recommendations made by the MPO, local jurisdictions, or others who comment on the new plan.

Future Carbon Monoxide Projections

DEQ estimated the amount of regional carbon monoxide emissions expected in the future using Metro's travel demand model and Metro's estimates of future growth. The Department then compared future emissions to the airshed's capacity (to accommodate carbon monoxide) and found that the region would stay well below the 9 ppm CO standard throughout the foreseeable future. Projected emissions are shown below in comparison to the airshed's capacity of 3,344,000 lbs. of CO per winter day.



	1999	2005	2020
Industrial Emissions	104,984	65,517	76,258
Area Sources	809,454	872,794	1,031,289
On-Road Emissions	1,525,100	1,226,312	730,941
Non-Road Emissions	365,950	515,067	675,430
Total:	2,805,488	2,679,690	2,513,918

[Projections assume no oxygenated fuel and replacing the enhanced emissions test with the basic test.]

Preliminary CO Plan Provisions

Because the airshed analysis shows the region will continue to maintain the CO standard by a wide margin, DEQ proposes to rely on basic provisions to demonstrate how the area will maintain the CO standard in the future. These provisions will include the Tier II/Low Sulfur Fuel federal requirements, and BACT--the existing level of industrial control requirements. DEQ also proposes to continue the vehicle emissions testing program (in slightly modified form) and to maintain the current industrial growth allowance of 14,880 lbs. of CO per day.

Because oxygenated fuel is not needed to continue meeting the carbon monoxide standard, DEQ may recommend that the EQC discontinue that requirement. However, oxygenated fuel enjoys significant support in the community and the decision of the Commission will not be known until late this year. Therefore, DEQ is developing the Portland area plan without relying on the CO emissions reductions produced by oxygenated fuel which will allow the Environmental Quality Commission the flexibility to retain or eliminate the wintertime oxygenated fuel requirement.

Finally, the Portland CO Plan is being written to project maintenance through 2020--the last transportation analysis year on which the air quality plan is based. However, the area's obligation for the second plan only extends to 2017, so the plan will expire after 2017.

Requested MPO Recommendations

DEQ requests the MPO's recommendations on 3 issues related to transportation planning:

1. Motor Vehicle Emissions Budgets (MVEBs)

MVEBs are typically established in relation to projected future vehicle emissions. Given the large safety margin between projected future emissions and airshed capacity, DEQ recommends setting CO MVEBs at projected on-road motor vehicle emissions plus an additional amount. Two techniques for doing this are to add a flat 10% to projected on-road emissions or to increase future emissions projections by 1% per year.

In addition, DEQ suggests that the CO plan set a single MVEB for years beyond 2020. The Department recommends that the post plan budget be sized to accommodate vehicle emission growth of 1.5% per year through 2037 (20 years beyond the end of 2017--the last year of the required air quality planning period). This approach would allow the MPO to write a 20 year Regional Transportation Plan (RTP) in the final year of the Second CO Maintenance Plan that is able to demonstrate conformity with the 2020+ emissions budget for the last year of the RTP.

Emissions budgets based on the above rationales would be:

Year	2005	2010	2020	2020+
Forecast	1,226312	975,074	730,941	------
10%	1,348,943	1,072,581	804,035	1,009,064
1% per yr.	1,238,575	1,033,578	847,891	1,064,103

(Emissions are expressed in lbs. of CO per winter day.)

Issue for TPAC: Does the committee prefer to add a safety margin to the Motor Vehicle Emissions Budget for carbon monoxide? If so, should that margin be based on a flat 10% or an annual 1% increase?

2. Sub Regions

In addition to specifying emissions budget for the Portland region, the current CO Plan includes additional emissions budgets for two sub regions: the Central Business District of downtown Portland and 82nd Ave. Corridor (Division to Woodstock). Designation of these sub regions seems to have had little or no air quality benefit and adds administrative burden to Metro's conformity demonstrations. DEQ proposes eliminating these sub regions from the new plan.

Issue for TPAC: Does the committee concur with DEQ's recommendation to eliminate sub regions?

3. Transportation Control Measures (TCMs)

The current CO Plan includes a variety of TCMs—measures that are reinforced under the transportation conformity rules. Metro is the lead agency for developing any new TCMs and has prepared a separate staff report on this issue.

Issue for TPAC: Which TCMs (if any) should be specified in the new CO plan?

Other CO Plan Issues

The new CO maintenance plan will address additional issues that are not directly related to transportation planning. The Department is not asking for the Metropolitan Planning Organization's recommendation on these matters, but will note whatever comments are offered.

4. Enhanced Emissions Test

Under DEQ's current emissions testing program in the Portland area, 1981 through 1995 vehicles are subject to the "enhanced" test while 1996 and newer vehicles are subject to the more OBD (On Board Diagnostics) test. The OBD test is quicker and more effective than the enhanced test and will become increasingly dominant as 1996 and newer vehicles become an ever larger portion of the fleet. DEQ will therefore propose to replace the enhanced test requirement for 1981 – 1995 vehicles with the quicker and easier "basic" (two speed idle) emissions test. This change would increase on-road emissions from the Portland area fleet 1.4% in 2005 and by smaller amounts thereafter. This change would be a SIP revision only. The actual test requirement would not occur until DEQ demonstrates that the change is also acceptable in for precursors of ozone.

5. Contingency Plan

DEQ proposes to continue the current contingency plan provisions (possibly modified by TCM decisions):

Phase 1: CO within 90% of National Ambient Air Quality Standard (NAAQS) (2^{nd} high =8.1 ppm):

Convene planning group to consider applying additional strategies

Phase 2: Violation of CO NAAQS (2^{nd} high =9.5 ppm):

Reinstate LAER for industrial sources
Remove Growth Allowance (Offsets Required)
Reinstate Downtown Parking Lid (if violation is downtown)
Reinstate Oxy-fuel (if removed)

6. Growth Allowance

The current CO maintenance plan specifies an amount of CO emissions that can be used by new or expanding industry. This relieves new businesses from having to offset their increased emissions with a greater of emission reductions in the same airshed. DEQ suggests continuing the Industrial Growth Allowance for carbon monoxide at the existing level: 14,880 lbs. per day or 2700 tons per year.

7. Oxygenated Fuel

The Clean Air Act Amendments of 1990 mandated the use of wintertime oxygenated fuel in areas such as Portland that failed to meet the National Ambient Air Quality Standard for carbon monoxide. Since then, Portland's CO concentrations have improved significantly, and oxygenated fuel has a far lower CO reduction benefit. This reduced benefit is largely due to the increasing prevalence of computerized engine controls which effectively minimize emissions without fuel additives. However, oxygenated fuel continues to generate significant carbon monoxide reductions in the less sophisticated engines used in non-road vehicles (such as lawnmowers, generators and construction equipment). Emissions projections with and without oxygenated fuel show the following carbon monoxide reduction effects:

Oxy-fuel effects (on-road vehicles):	-5.1 % in 2005, -1.6% in 2020
Oxy-fuel effects (non-road engines):	-16.5% in 2005, -15% in 2020
Net effects of oxy-fuel:	-5.2% in 2005, - 4.5% in 2020

While oxygenated fuel is no longer needed for Portland to continue meeting the air quality standard for CO, fuel oxygenated with ethanol can have other benefits. First, gasoline oxygenated with 10% ethanol produces an estimated 5 to 8% net reduction in the toxicity of motor vehicle emissions. Second, using ethanol to fuel motor vehicles is generally considered to reduce greenhouse gas emissions significantly; however, estimates are subject to some debate. Estimated greenhouse gas benefits vary according to the type of milling process used, the distance between where feedstock is raised and where it is used, plus the degree to which dried distillers' grain (a by-product of ethanol production) displaces the use of whole grain for fattening livestock. Another benefit is that ethanol is a renewable fuel that decreases the nation's dependence on foreign oil.

On the other hand, the petroleum industry indicates that retaining an oxygenated fuel requirement could contribute to an upward pressure on fuel cost and would perpetuate an unnecessary requirement. The use of ethanol as fuel also qualifies for a 52¢ per gallon federal tax credit which may affect some evaluations of net costs and benefits.

The Department's recommendation to the Environmental Quality Commission on this matter is being developed in consultation with other government agencies.

State of Oregon
Department of Environmental Quality

Memorandum

Date: May 27, 2004

To: Transportation Policy Alternatives Committee

From: Dave Nordberg, (503) 229-5519

Subject: Portland Area Carbon Monoxide (CO) Maintenance Plan

DEQ, in consultation with EPA Region 10, has determined that the last year of the Portland Area CO Maintenance Plan does not need to be a full transportation analysis year. Therefore, DEQ will be able to end the Maintenance Plan 2017 without triggering significant additional modeling effort. To accommodate this change DEQ must express a Motor Vehicle Emissions Budget for the last year of the plan. Therefore, DEQ recommends that the emissions budgets proposed in the Department's memo of May 19, 2004 be modified as shown:

Year	2005	2010	2017
Forecast	1,226312	975,074	804,181
10%	1,348,943	1,072,581	1,149,979
1% per yr.	1,238,575	1,033,578	1,181,341

(Emissions are expressed in lbs. of CO per winter day.)

The May 19th memo describes two techniques for setting the emissions budget out to 2017: adding a flat 10% to emissions projections, and adding 1% per year to emissions projections. (2017 emissions actually accommodate growth to 2037.)

Environmental Impact of Motor Vehicle Exhaust Emissions in Portland, Oregon

Background

Air pollution from cars comes from by-products of the combustion process (burning fuel in the engine to power the car) and from the evaporation of the fuel itself. Emissions from an individual car vary greatly, depending on the type of car, how it is driven, and the time of year it is driven, among other things.

Gasoline and diesel fuels are mixtures of hydrocarbons, which are compounds which contain hydrogen and carbon atoms. In a "perfect" engine, oxygen in the air would convert all of the hydrogen in the fuel to water, and all of the carbon in the fuel to carbon dioxide. Nitrogen in the air would remain unaffected. In reality, the combustion process cannot be perfect, and automotive engines emit several types of pollutants.

Pollutants and Health Effects

Here are the types of air pollutants associated with motor vehicles, and their health effects:

Volatile Organic Compounds (VOC):
Volatile organic compound emissions result when fuel molecules in the engines do not burn or burn only partially. VOCs also escape into the air through fuel evaporation. VOCs react in the presence of nitrogen oxides and sunlight to form ground-level ozone, a major component of smog. Ozone irritates the eyes, damages the lungs, and aggravates respiratory problems.

Nitrogen Oxides (NO_x):
Under the high pressure and temperature conditions in an engine, nitrogen and oxygen atoms in the air react to form various nitrogen oxides, collectively known as NO_x. Nitrogen oxides, like volatile organic compounds, are precursors to the formation of ozone. They also contribute to the formation of acid rain.

Carbon Monoxide (CO):
Carbon monoxide is a product of incomplete combustion and occurs when carbon in the fuel is partially oxidized rather than fully oxidized to carbon dioxide. Carbon monoxide reduces the flow of oxygen in the bloodstream and is particularly dangerous to persons with heart disease.

Carbon Dioxide (CO_2).
Carbon dioxide does not directly impair human health, but it is a "greenhouse gas" that traps the earth's heat and contributes to the potential for global warming.

Air Toxics:
Air toxics are air pollutants that cause adverse health effects. Carcinogens are compounds that cause cancer. Non-cancer health effects such as reproductive and neurological problems are also of concern. Motor vehicles emit several pollutants that are known or probable carcinogens, such as benzene; formaldehyde, acetaldehyde, 1,3-

butadiene and diesel particulate matter. The danger to human health from a toxic air pollutant depends on the amount and length of exposure.

EPA estimates that mobile sources of air toxics (cars, trucks and buses) account for as much as half of all cancers attributed to outdoor sources of air toxics. Non-road mobile sources (such as construction equipment and watercraft) emit air toxics as well. Some toxic compounds (such as benzene) are present in gasoline and are emitted to the air when gasoline evaporates or passes through the engine as unburned fuel. A significant amount of automotive benzene comes from the incomplete combustion of compounds such as toluene and xylene that are chemically very similar to benzene. Formaldehyde, acetaldehyde, diesel particulate matter, and 1,3-butadiene are not present in fuel but are by-products of incomplete combustion. Formaldehyde and acetaldehyde are also formed through a secondary process when other mobile source pollutants undergo chemical reactions in the atmosphere.

Environmental Impact:

Much progress has been made in both automotive technologies and fuel formulations to reduce the amount of air pollution from motor vehicles. However, much of the recent improvements in the amount of emissions from motor vehicles have been offset by increases in the number of miles driven. Therefore, local actions to encourage citizens to use alternatives to driving motor vehicles will have a beneficial impact on air quality.

The following is an illustration of "typical" motor vehicle pollutants for the Portland fleet in the year 2005, based on emission factors generated by the Mobile6 model, using winter driving conditions with oxygenated fuel at 40 mph.

Pollutant	Emissions
VOC	1.064 g/mi
NO_x	2.199 g/mi
CO	18.9 g/mi
CO2	20 lb/gallon of gasoline
Benzene	38.493 mg/mi
1,3 Butadiene	3.563 mg/mi
Formaldehyde	14.703 mg/mi
Acetaldehyde	10.844 mg/mi
Acrolein	0.763 mg/mi

Prepared by the Oregon Department of Environmental Quality, May 19, 2004

Sources:
EPA Office of Transportation and Air Quality factsheet 400-F-92-007 and OMS-2
http://www.epa.gov/air/transport/index.html
Mobile 6 model run dated 9/24/03 (VOC, NO_x, CO) and 3/4/2004 (air toxics)

M E M O R A N D U M

METRO

Attachment 2 to Staff Report for Resolution 04-3457

TO: Andy Cotugno, Planning Director
FROM: Mark Turpel, Principal Planner
DATE: June 1, 2004
SUBJECT: Air quality, CO Maintenance Plan and Transportation Control Measures (TCM)

In response to the upcoming draft Second Portland Area Carbon Monoxide Air Quality Maintenance Plan (CO Plan), there has been substantial discussion of TCMs by TPAC and an ad hoc TCM subcommittee formed that held two meetings to discuss the best approach to TCMs. From these discussions, the issues have been raised that include the following:

1. Should TCMs be included in the CO Plan.

Response. TCMs are voluntary and if they are included in the plan and not implemented Federal funds could be withheld for transportation expansion projects, so there is a risk assumed if included in the new CO Plan (the current plan has nine TCMs). In addition, CO has become much less of a problem in this region, actual levels of CO have dropped well below maximum limits and are expected to decrease even more in the future. However, the region may wish to consider the impact of other transportation generated air pollutants, such as volatile organic compounds and oxides of Nitrogen (precursors of ground level ozone, or smog). Transportation shares the airshed with industrial ozone sources and the region is very close to the maximum permitted level. In addition, there are air toxics such as benzene or acrolein and other air pollutants, including greenhouse gases such as carbon dioxide for which concerns have been raised. The CO Plan provides a regulatory means of addressing air pollution while other pollutants do not have plans with this feature. Accordingly, it is recommended that the number of TCMs be decreased from nine to three to recognize progress made with CO and that contingent TCMs also be included in the plan in the event that transportation trends are adverse in order to provide some means of addressing other pollutants as well as to continue to encourage reducing CO emissions.

2. If contingent TCMs are included, what trigger should be used and how will it work.

Response. Contingent TCMs are proposed using a vehicle miles traveled per capita measurement. Each year the vmt/capita will be calculated and reported. Action would be triggered: 1) (at greater than 5 percent above 2002 levels for two years in a row) evaluation of whether there is a transportation/air quality problem (or whether there is a vmt/capita measurement problem) that should be addressed and if so, what local air quality actions might be taken - without any commitment to take action; 2) (at greater than 10 percent above 2002 levels for two years in a row) specific TCMs are required to be implemented including transit improvements, alternatives to single occupant vehicle use and transit oriented development support.

3. Concerning contingent TCM, is the baseline year (2002), a reasonable starting point? Have past trends been influenced by employment trends and 2002 vmt/capita dampened by unemployment? and,

4. Concerning contingent TMC, is HPMS data reliable enough to use as an evaluation factor?

Table 1 plots vmt/capita (dvmt/person) and vmt/employee. Each show a similar pattern - that is, increases during the 1980's and a plateau and slight decline over the 1990's. This leads to the conclusion that the vmt has not been greatly influenced by employment or population growth. However, it does appear that vmt/employee is a somewhat more stable measure (less deviation from the mean) than vmt/capita (see Table 2).

However, using employment based data to compare against vmt has its own issues. For example, the employment data used in the analysis is from the Bureau of Economic Analysis (BEA). BEA data lags by about 2 years, therefore we do not have 2001 and 2002 data. So use of BEA data for a trigger would mean comparing the most current vmt data against employment data that is two year old or simply using two year old vmt and employment data.

Generally speaking, Metro is migrating from the use of BEA data to Bureau of Labor Statistics data (BLS) BLS employment data, however, uses SMSA geography. As the SMSA boundaries have changed over the past years, we don't have a continuous, consistent set of historical BLS employment data from which to analyze the use of BLS data for past stability (deviation from a mean) and appropriateness for use in a vmt/employee measurement.

A suggestion was made to State of Oregon Office of Economic Analysis data. While population and unemployment data is readily available from this source, historical employment data was not found and it would take additional time to explore whether OEA has historical employment data different from BLS and BEA, whether such data could be broken down for the Metro area and whether any time lag exists for these data.

Accordingly, a trigger measure choice must be made between: 1) using BEA employment data that would always be two years old but more stable than population data; 2) using BLS employment data that would be timely, but no analysis of its historical stability could be done; 3) taking more time to explore the use of OEA data, or 4) using population data that would be timely, but not quite as stable as BEA employment data.

The other part of the measurement, vehicle miles traveled, is another variable about which concerns have also been expressed. That is, the HPMS data (gathered by ODOT and recommended for use in the trigger) varies from year to year. Concern has been expressed about not making the trigger so sensitive that it could be set off by slight variations, or "noise" in the data. Accordingly, in order to examine variability of the vmt data, traffic volumes reported by electronic sensors managed by ODOT for the freeways ringing downtown Portland were gathered for analysis. Table 3 shows five days in April and four days in May, 2002 when traffic volumes

at single points on the reported freeways were gathered. It has been hypothesized that ideally, the mean variation for each freeway should be the same. However, the data show that different freeways have differing means, with as little variation as six percent to as much as nine percent. It does seem likely however, that the larger the data set, the less noise is likely to be reported as individual low anomalies would likely cancel out high deviations. In addition, Metro forecasts future vmt in the region to remain flat (that is, not to increase) Nevertheless, designing a trigger that is activated by "noise" is a concern.

Several choices exist for how sensitive a trigger to set. One approach is to consider just the past historic rate of variability and to avoid activating the trigger needlessly. Another choice is to consider both the historic rate and the forecasts of future. It has been proposed that the trigger not be activated for a high reading for just one year, rather that it be triggered only if two consecutive years are registered in order to avoid an anomalous year or reading. In addition, the contingent TCM trigger has been proposed to include two levels - the first being a "soft" trigger that would activate analysis of the change in vmt per capita or job and why that reading might have occurred and to consider, but not mandate, a list of possible local air quality actions that could be initiated. The second trigger level - a "hard" trigger, would be activated at a higher threshold and would include a specific list of local air quality actions that would have to be done or risk loss of transportation funds.

Accordingly, the following is recommended for contingent TCM triggers.

- 5% trigger - would require that should reported vmt/capita for two consecutive years exceed 20.5 dvmt/capita, that the Standing Committee (TPAC) shall be activated to consider:

a) whether there is a data problem with the trigger; and,

b) if there is not a data problem with the trigger, identification of and analysis of effectiveness of those local actions that could reduce air pollutant emissions; and,

c) whether a recommendation to initiate one or more of these local air quality actions should be made to JPACT.

- 10% trigger - would require two consecutive years exceeding 21.5 daily vmt/capita. Should this level of vmt/capita be exceeded, mandatory TCM would be required.

Should HMPS data parameters change (such as higher quality ITS data become available) the region could, with the advise of the Standing Committee (TPAC) revise the trigger, including using another data base, if warranted. Triggers are calculated using a 2002 base year of 19.5 dvmt/capita (daily vehicle miles data from the Highway Performance Monitoring System,HPMS, and population for the three Oregon counties as checked by Metro prior to use)

5. Is vmt/capita the right measure for a trigger or should emissions be used?

Carbon monoxide is one of many transportation air emissions. CO generation from transportation sources is expected to continue to drop, as is total CO to the year 2020. (Transportation based CO emissions are estimated to drop by about 50 percent - from 1.5 million pounds per winter day ion 1999 to .731 million pounds per day in 2020. Total CO emissions are expected to decrease from 2.8 million pounds in 1999 to 2.5 in the year 2020.

However, there are other air pollutants from transportation that are high and trending higher. These include precursors of ground level ozone (volatile organic compounds and oxides of Nitrogen). While we do not currently forecast that the region will exceed air quality standards in the implementation of the Regional Transportation Plan, the region is close to the maximum standard. Exceeding the standard could have adverse consequences to the region's economy as well as transportation system.

In addition, there are several air toxics about which concern has been stated. Transportation is responsible for as much as ½ or more of some of these toxics, including benzene and acrolein.

Although contested, greenhouse gases such as CO_2 are of concern such that the Governors of the three western US states (California, Oregon and Washington) are looking at means to decrease greenhouse gases, including those from transportation sources. Greater vehicle miles traveled, (even if vmt/capita or job decreases) could lead to added levels of some of these pollutants and air toxics even though CO emissions continue to decrease. Accordingly, using CO emissions as a trigger would not track with the expected increase of other air pollutants. Measuring all pollutants of concern, while very useful, is not data readily available on a yearly basis at this time.

Accordingly, a transportation based measure that is consistent with the definition of Transportation Control Measures ("...any measure....for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use...") has been proposed.

6. Should the proposed bike and ped facilities financed through the MTIP be the only improvements counted or should the region be able to count all additions, including those required by existing state law?

An easy method of accounting for bike and ped facilities is for Metro to track the MTIP. Are local governments and ODOT willing to agree to reporting requirements for number of bike and ped facilities built? It is suggested that short of local and State agreement to report such data, that Metro track MTIP funding of bike and pedestrian projects as the appropriate method of tracking progress for this TCM.

7. Should the synergistic effects of bike and ped facilities placed in the right places be taken into consideration?

Bike and ped facilities along with other local actions (land use patterns and designs, transit service, etc.) interact to encourage or discourage walking and biking. However, Metro staff is not aware of how to account for these interactions. How should these synergistic effects be taken into consideration? This question may be better answered in broader discussions during future MTIP updates.

8. The trigger numbers should be clarified so that further interpretation is not needed.

This was done. See above.

9. Do we have the capacity to easily achieve the full TCM's?

We have checked with TriMet and they have agreed with the transit service increase TCM. Counting all types of bike facilities we have built 103 miles compared with a goal of 28. Pedestrian facilities built were 10.6 miles compared with a goal of 9.

10. Are the contingent "hard trigger" TCM measures flexible enough to be managed?

The soft trigger trips before the hard trigger and should provide help to avoid the hard trigger. By introducing flexibility to the hard trigger, we can't quantify them and therefore could not advance them in the event of conformity lapse, losing one benefit of having them listed as contingent TCM.

11. The formula for the annual average transit increase should be clarified.

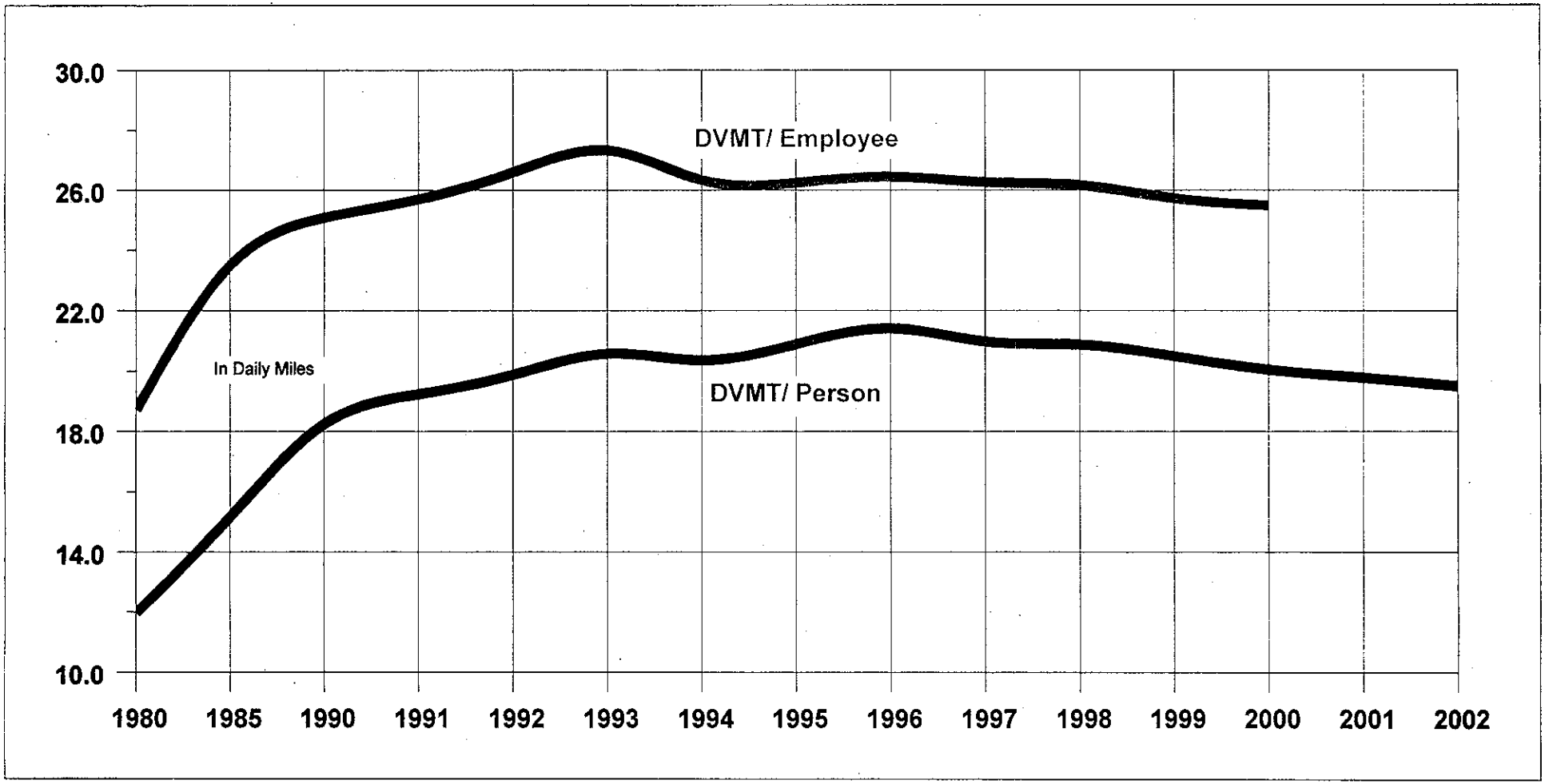
The basic idea of the formula is to recognize that increases in transit service differs depending on the type of vehicle used. Buses typically are able to accommodate about 60 people (seated and standing), while LRT vehicles can accommodate as many as 200 people (again counting people both seated and standing). A formula has been proposed as follows: bus hours of transit revenue hours plus LRT transit hours (weighted by the difference between LRT vehicles and buses) plus streetcar revenue hours (weighted by the difference between streetcars and buses) plus commuter rail revenue hours (weighted by the difference between commuter rail cars and buses). In formula format this would be expressed as:

Bus + (LRT x factor) + (streetcar x factor) + commuter rail x factor). The total increase for the year will be compared with the previous transit revenue hours and in order to meet the TCM, TriMet will need to show at least a one percent increase over the past year. (The measure is cumulative average, so that for example in the first year transit revenue hours could increase by 2 percent and the second year by only ½ percent and the TCM would still be met.)

Please let me know if you have any questions about this information.

A Comparison of Portland Daily Vehicle Miles of Travel Per Person and Per Employee

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
DVMT/ Person (Miles)*	12.0	15.1	18.8	19.2	19.8	20.9	20.1	20.9	21.7	20.8	21.0	20.5	20.0	19.8	19.5
DVMT/ Employee (Miles)	18.7	24.3	25.2	25.6	26.5	27.9	26.0	26.3	26.6	26.2	26.3	25.7	25.5	n/a	n/a



** Portland Population and Travel (DVMT, Daily Vehicle Miles of Travel) are from the Highway Performance Monitoring System (HPMS, ODOT-Salem). Data from correspondence, and verified with the FHWA, Wash., D.C. Portland is defined as the Oregon portion of the Federal-Aid Urban Area 27 (The Portland-Vancouver* Urbanized Area), and consists of a geographic area which includes Multnomah County and portions of Washington and Clackamas Counties in Oregon.

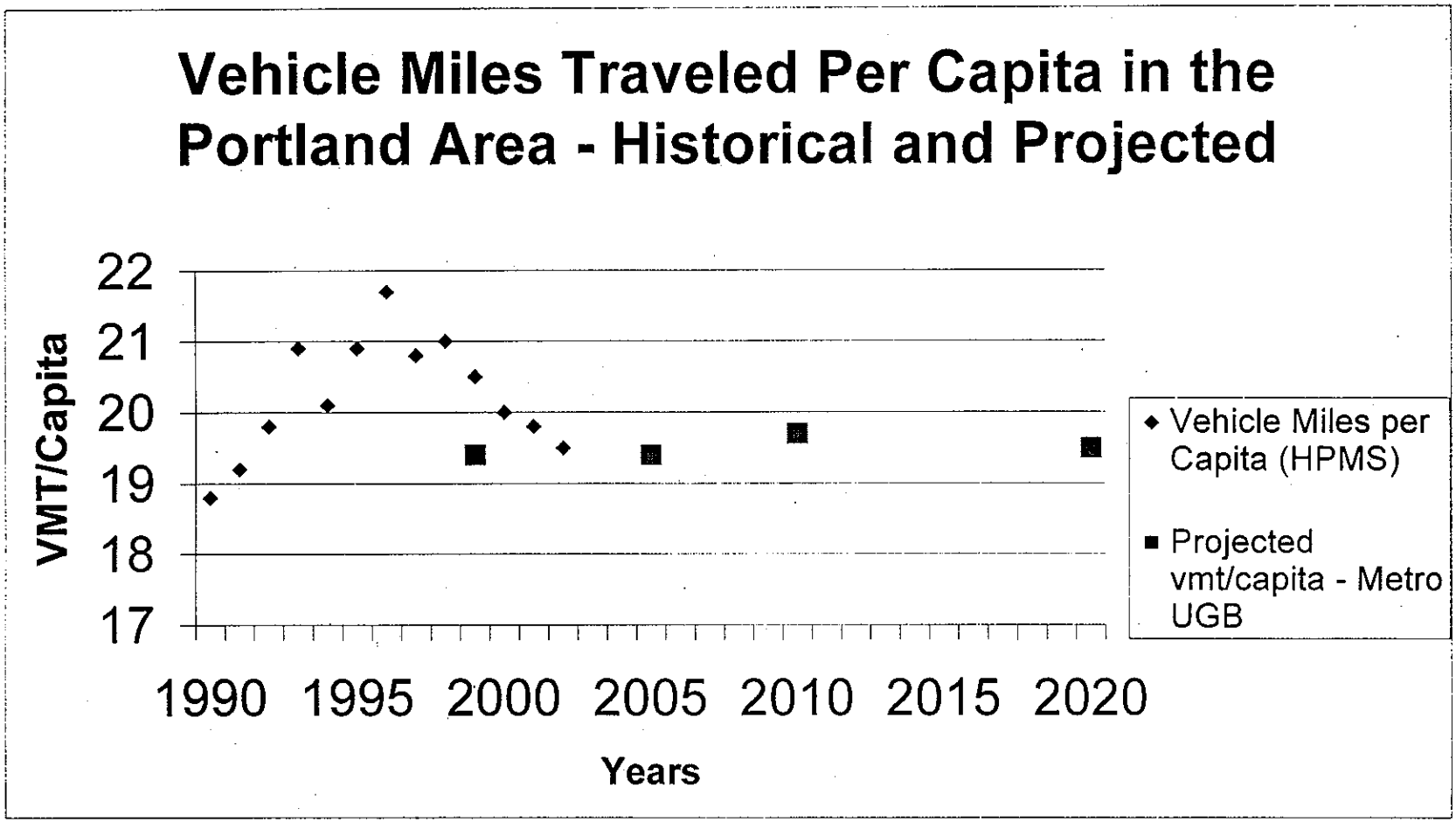
***Employment is for the Portland Metropolitan Statistical Area (MSA) and includes Clackamas, Multnomah, and Washington Counties in Oregon. An area basically equivalent to that used for population and DVMT. The data is from the Metro Regional Data Book, September 2002; and originally is from the Bureau of Economic Analysis, Table CA 25; REIS, May 2002; (nonfarm employment includes proprietors).*

TABLE 1

A Comparison of Portland Daily Vehicle Miles of Travel Per Person and Per Employee

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
DVMT/ Person (Miles)*	12.0	15.1	18.8	19.2	19.8	20.9	20.1	20.9	21.7	20.8	21.0	20.5	20.0	19.8	19.5
DVMT/ Employee (Miles)	18.7	24.3	25.2	25.6	26.5	27.9	26.0	26.3	26.6	26.2	26.3	25.7	25.5	n/a	n/a
DVMT/ Person % Change		26%	25%	2%	3%	6%	-4%	4%	4%	-4%	1%	-2%	-2%	-1%	-2%
DVMT/ Employee % Change		30%	4%	2%	3%	5%	-7%	1%	1%	-1%	0%	-2%	-1%		
DVMT/ Person, Mean 1991 to 2000			20.5												
DVMT/ Employee, Mean 1991 to 2000			26.3												
DVMT/ Person, Standard Deviation 1991 to 2000					=STDEV(19.2,19.8,20.9,20.1,20.9,21.7,20.8,21.0,20.5,20.0)										0.72
DVMT/ Employee, Standard Deviation 1991 to 2000					=STDEV(25.6,26.5,27.9,26.0,26.3,26.6,26.2,26.3,25.7,25.5)									Smallest	0.69
DVMT/ Person, Mean + & -1 Standard Deviation 1991 to 2000 = 20.5-.72; 20.5+.72 =									19.78	21.22		80% fall within 1 SD of Mean			
DVMT/ Employee, Mean + & -1 Standard Deviation 1991 to 2000 = 26.3-.69; 26.3+.69									25.61	26.99		90% fall within 1 SD of Mean			
DVMT/ Person, Mean 1990 to 2000			20.3												
DVMT/ Employee, Mean 1990 to 2000			26.2												
DVMT/ Person, Standard Deviation 1990 to 2000					=STDEV(18.8,19.2,19.8,20.9,20.1,20.9,21.7,20.8,21.0,20.5,20.0)										0.85
DVMT/ Employee, Standard Deviation 1990 to 2000					=STDEV(25.2,25.6,26.5,27.9,26.0,26.3,26.6,26.2,26.3,25.7,25.5									Smallest	0.73
DVMT/ Person, Mean + & -1 Standard Deviation 1990 to 2000 = 20.3-.85; 20.3+.85 =									19.45	21.15		73% fall within 1 SD of Mean			
DVMT/ Employee, Mean + & -1 Standard Deviation 1990 to 2000 = 26.2-.73; 26.2+.73									25.47	26.93		82% fall within 1 SD of Mean			

TABLE 2



Daily vmt/capita for the Portland side of the metropolitan area:

actual													Forecast			
1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2005**	**2010**	**2020**	
18.8	19.2	19.8	20.9	20.1	20.9	21.7	20.8	21.0	20.5	20.0	19.8	19.5				HPMS data
									19.4				19.4	19.7	19.5	Forecast

5% increase over 2002 rate of 19.5 = 20.5 10% increase over 2002 rate = 21.5

ATR Data Summary - Wednesdays In April & May 2003

By Name & Station Number; Source ODOT (Combined Traffic Volume Directions)

		Apr-02	Apr-09	Apr-16	Apr-23	Apr-30	May-07	May-14	May-21	May-28	*Mean*	<M	>M
Stadium (I-405)	26-005	107,391	110,434	111,085	104,451	109,720	107,950	111,359	112,582	112,246	109,691	-5%	3%
W Banfield (I-5)	26-015	152,621	157,649	155,370	146,019	156,152	150,386	158,784	158,223	159,598	154,978	-6%	3%
Iowa St (I-5)	26-016	157,238	158,985	162,360	153,935	160,011	158,421	161,358	162,485	163,249	159,782	-4%	2%
Yamhill (I-205)	26-018	167,650	168,621	171,130	158,491	171,425	170,417	n/a	163,574	171,102	167,801	-6%	2%
Minnesota (I-5)	26-019	141,912	141,970	144,9[illegible]	140,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	141,967	-3%	3%
Fremont (I-405)	26-027	123,730	121,990	126,552	123,547	125,640	126,618	126,659	128,263	129,141	125,793	-3%	3%
Combined ATR Mean		141,757	143,275	145,238	137,747	144,552	143,105	141,459	145,601	147,395	143,348	-4%	3%