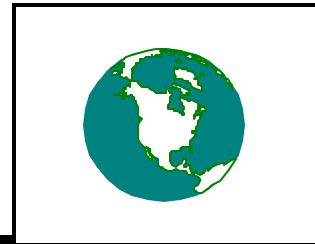


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# CAR LINES

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Issue 99-4



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1.	BP Amoco's Browne Criticizes UK Energy Tax .....	-1-
2.	German Car Bosses Resist Recycling Law .....	-1-
3.	Climate Change Will Increase European Health Woes .....	-2-
4.	Iceland Moving Toward A Hydrogen Economy .....	-2-
5.	Heavy Duty Status And Challenges .....	-3-
6.	Another Court Decision Stuns EPA .....	-6-
7.	EPA Issues Tier 2 Supplementary NPRM .....	-7-
8.	Mexico Tightens Standards .....	-15-
9.	Clean Air Trust Survey Finds Public Wants Dirty Diesel Trucks Cleaned Up .....	-15-
10.	U.S. Tries Organic Lubricants .....	-16-
11.	ARB, SCAQMD Measure Pollutants in Vehicles .....	-17-
12.	U.S. Aims For 5 Percent Windpower by 2020 .....	-18-
13.	Acid Rain Falls On One Third of China .....	-19-
14.	Philippine Leader OKs Clean Air Act .....	-19-
15.	Recent Developments Regarding Japan's Pollution Law Suit .....	-20-
16.	Lead & Children .....	-20-
17.	Leaded Gasoline Phase Out .....	-21-

## EUROPE

### 1. BP Amoco's Browne Criticizes UK Energy Tax

BP Amoco Chief Executive Sir John Browne launched a fierce attack on Britain's proposed energy tax, saying it would fail to cut greenhouse gas emissions.

"This proposal is ineffective and intellectually unjustifiable. It is so disappointing to see the government in this country adopting policies which do not always carry the right incentive," Browne told the National Environmental Research Council.

"To change behavior you have to give people an alternative - a choice - so that they can use fuels which are less energy intensive and so they can find their own ways of reducing emissions," he said.

The British government aims to introduce the energy tax - known as the 'climate change levy' - in April 2001. Proposed in March's UK budget, it will target the use of coal, natural gas and electricity.

Browne said the tax's impact on BP Amoco itself would be quite small. But he argued it would be better to encourage emissions trading, which allows companies to sell their emission allowances to parties who would face higher costs if they made the cuts themselves.

Countries can also trade obligations to reduce emissions that deplete the ozone layer by shifting cuts from one country to another.

"Reductions are achieved at the lowest possible cost. "We've adopted an internal trading system to meet our own targets," he said.

"That is driving our business units towards investment in technologies that can reduce emissions at the least cost and encouraging them to make local choices between hydrocarbon energy sources and CO2-free sources of energy."

### 2. German Car Bosses Resist Recycling Law

Germany's top car manufacturers have met with Chancellor Gerhard Schroeder in a last-minute bid to block a European Union law that would force them to carry the cost of recycling used cars. The heads of Volkswagen AG, BMW, DaimlerChrysler, General Motors' Opel and Ford met Schroeder to complain about the law, which will oblige them to recycle or reuse 80 percent of cars by weight from 2005.

It would require car makers to carry the cost of taking back "end of life" vehicles, a measure that industry estimates would cost up to \$200 for each of the 150 million cars on Europe's roads.

EU ministers are scheduled to approve the law, which has already been delayed once at Germany's behest, at a session set for Thursday and Friday.

VW, Europe's largest car maker and whose headquarters is in Schroeder's north German power base, has lobbied particularly hard to have the law watered down.

Bonn has played down reports of a new row between Schroeder and the Greens over the EU car recycling law.

Bonn wants to convince its car sector that the wording of the legislation would allow national lawmakers to implement it in such a way as not to hurt industry too badly.

Car makers have said for example they could accept the law if they only had to pay for the recycling of cars registered after it comes into effect, and not for the existing stock of vehicles on the road.

### **3. Climate Change Will Increase European Health Woes**

Climate changes due to global warming could cause a host of major health problems in Europe including an increase in diseases such as malaria and encephalitis, doctors warned late last week. They advised governments to take urgent action to minimize the impact of rising temperatures and changes in rainfall patterns which could cause flooding, disrupt water supplies and sewage disposal and cause toxic waste sites to overflow.

"Few countries in Europe have undertaken national or subnational assessments on the impacts of climate change on human health," Savi Kovats, of the London School of Hygiene and Tropical Medicines, said in a report in the British Medical Journal.

"There is an urgent need to consider how to improve research and monitoring, how to minimize adverse health impacts and how to achieve Europe-wide co-ordination, sharing of information, and participation in wider international efforts in this area."

Kovats and a team of experts from an international working group convened by the World Health Organization (WHO) said countries will need to adapt to changes caused by global warming.

The average temperature in Europe has increased by 0.8 Celsius during the past century and is likely to continue rising, bringing with it more heat waves, air pollution and deaths, the researchers said.

Rising temperatures could result in more stomach complaints and insect-borne diseases and lead to the reintroduction of malaria in Eastern Europe, they said.

The researchers said "improved co-ordination of data on infection across Europe will be needed".

The publication of the report coincided with the third European Ministerial Conference on Environment and Health in London, which was organized by the WHO.

Ministers from 51 member countries were expected to sign a protocol on water and health during the three-day conference and were to consider a charter on transport, environment and health to reduce air pollution from cars.

### **4. Iceland Moving Toward A Hydrogen Economy**

An Icelandic consortium, Vistorka hf. (EcoEnergy Ltd.), has signed a Cooperation Agreement with DaimlerChrysler, Norsk Hydro and the Royal Dutch/Shell Group setting up a joint venture to investigate the potential for eventually replacing the use of fossil fuels in Iceland with hydrogen and creating the world's first "hydrogen economy".

The joint venture, called the Icelandic Hydrogen and Fuel Cell Company Ltd., with an equity capital of \$1 million, will test various applications utilizing hydrogen fuel cells or hydrogen carriers. One of the first could be a hydrogen/fuel cell-powered bus service in Reykjavik, with further projects being introduced between 2000 and 2002.

In a ceremony in Reykjavik the Minister for environmental affairs, Mr. Gudmundur Bjarnason, said: "The Government of Iceland welcomes the establishment of this company

by these parties and considers that the choice of location for this project is an acknowledgment of Iceland's distinctive status and long-term potential. The initiative taken by the parties involved in this project deserves to be applauded and respected."

The majority partner, Vistorka hf. (EcoEnergy Ltd.), is owned by a group of Icelandic companies, led by the New Business Venture Fund. Vistorka has been established specifically to take part in the joint venture.

Each of the three other partners has equal rights and shares and already has expertise in this field. DaimlerChrysler has been developing the fuel cell technology for automobile applications since 1991 and intends to mass-produce fuel cell vehicles for commercialization by the middle of the coming decade. Norsk Hydro has long experience in the production of hydrogen and hydrogen carriers and the development of hydrogen systems.

Shell has recently set up a hydrogen business and has developed technology which can convert liquid fuels into a hydrogen-rich gas.

Dr. Ferdinand Panik, the head of the fuel cell projects at DaimlerChrysler, said: "We support the Icelandic vision for a fuel cell and hydrogen economy, because this is a great opportunity for industry and government jointly to create an innovative and future-oriented program. The Icelandic approach may become a pioneering example of sustainable economic and industrial development."

Norsk Hydro's head of Research and Development, Bjørn Sund, said: "Norsk Hydro has a long history of production and industrial use of hydrogen. We believe that hydrogen and fuel cells offer a great potential for future applications in the energy markets, and that cooperation between the energy, automotive

and other industries is essential for providing solutions to the environmental challenges related to consumption of energy. The Icelandic initiative provides a good basis for further development of such cooperation."

Jan Smeele, acting Chief Executive Officer of Shell Hydrogen, said: "Shell is continually looking for opportunities to participate in new energy solutions and the introduction of fuel cells in mobile and stationary applications could possibly revolutionize the world's energy picture. Iceland has shown the dedication to play a pioneering role in this process. We have been active in Iceland for more than 70 years and are very pleased to get a chance to participate, together with our Icelandic partner Skeljungur hf., in this exciting new venture."

The joint venture ultimately aims to convert both the public and private transportation sectors, including fishing vessels. Work will also be carried out in to the effective production, storage and distribution of hydrogen and hydrogen carriers.

Iceland has large potential for renewable energy sources which, so far, have only been harnessed to a limited degree. Some 67% of its primary energy consumption is supplied by hydro- and geothermal sources, the highest percentage share among OECD countries. The Icelandic Government has further development of the renewable domestic energy resources on its agenda. Such use could contribute significantly to reducing the emission of greenhouse gases.

## NORTH AMERICA

### 5. Heavy Duty Status And Challenges

Over the past thirty years, substantial effort has been directed at the state and national level to reduce emissions from light duty

vehicles. As a result, in spite of a substantial increase in the number of these vehicles and the miles they drive each day, overall emissions are down significantly. However, parallel reduction have not occurred with heavy duty trucks and buses and off road vehicles with the result that these vehicles are now the dominant source of both criteria pollutants and toxins. In fact, for a variety of reasons - difficulty and expense in developing a meaningful regulatory strategy, lack of high priority attention, industry resistance and even outright cheating, to cite just a few - it appears that these vehicles and engines are not significantly cleaner than they were 20 years ago.

According to EPA, approximately 3% of total on highway sales consist of heavy duty diesel engines and another 5% are heavy duty gasoline. Heavy duty diesels will be responsible for about 14% of total nationwide NOx emissions in 2000 while heavy duty gasoline will contribute another 1%. About 7% of direct annual PM2.5 emissions comes from heavy duty vehicles; the fraction can be much higher in urban areas.

The next year or two will provide a significant opportunity to correct this problem. Manufacturers who were caught cheating and who represent over 90% of the heavy duty diesel industry are subject to court oversight as a result of consent agreements they signed late last year. Further a variety of regulatory measures are either in process or will soon be which could require very substantial reductions of NOx, PM and toxic emissions.

#### **A. Legal or Regulatory Drivers**

A series of items are currently in various stages of play to address heavy duty vehicle emissions as summarized below.

#### **i. 1999 Technology Review of 2004 Standards**

When EPA adopted tighter NOx and HC standards for heavy duty engines, to go into effect for the 2004 Model Year, they promised to conduct a technology review in 1999 to assess whether the standards could be achieved and whether even tighter standards might be possible. An NPRM has been drafted which has been submitted to OMB. The key provisions of the Notice of Proposed Rulemaking (NPRM) are expected to be as follows:

- to reaffirm the technological feasibility of the 2004 NMHC + NOx standards (2.4/2.5 g/bhp-hr) with high flow, cooled EGR as the principle technology

- to propose a 1.0 g/bhp-hr NMHC + NOx standard for heavy duty gasoline engines (incomplete vehicles)

- to assure in use compliance with standards by the above diesel and gasoline engines by incorporating a not to exceed emissions cap (testing anyplace on the engine map should not exceed 1.25 times any standard), adding an additional engine dyno test (the Euro 3 steady state cycle), requiring manufacturers to carry out an in use testing program and incorporating on board diagnostics for heavy duty.

- for complete gasoline vehicles, proposing the CARB medium duty LEV 1 standards with chassis dyno certification for vehicles between 8,000 and 14,000 lbs. GVW.

EPA is also expected in the heavy duty NPRM to solicit comment on tighter standards for heavy duty vehicles and engines in the future. Levels under consideration by EPA are believed to be 0.015 g/bhp-hr for PM and NOx

of 1.0 by some time in the 2004 to 2007 time frame.

**ii. ANPRM on Sulfur Levels in Diesel Fuel**

EPA has also issued an Advanced Notice of Proposed Rulemaking (ANPRM) regarding the introduction of low sulfur (50 ppm maximum) diesel fuel sometime in the 2004 to 2007 time frame. [The recent decision by ARCO to introduce very low sulfur diesel <10 ppm on average, has stimulated momentum toward very low sulfur diesel fuel. The Association of state and local air pollution officials has also issued a resolution which calls for the introduction of low sulfur diesel fuel.]

EPA hopes to issue an NPRM on low sulfur diesel fuel later this year and a final rule in the Spring of 2000.

**iii. Toxins**

EPA has for several years been attempting to finalize a report designating diesel particulate as a probable human carcinogen. They are in a dialogue with CASAC on this report and hope to submit a new draft in October of this year. EPA ORD recently completed a discussion document which it submitted to CASAC in preparation for a meeting to review how it intends to address the earlier CASAC comments on the 1998 draft. ORD then hopes to finalize this diesel toxicity report in the Spring of 2000.

Based on this report, EPA OMS will carry out an exposure assessment and risk assessment and depending upon the outcome issue an NPRM calling for tighter PM standards in the future.

**iv. Consent Agreement**

Last Fall, the Justice Department and the

Environmental Protection Agency reached an agreement to resolve charges that several companies - Caterpillar Inc., Cummins Engine Company, Detroit Diesel Corporation, Mack Trucks, Inc., Navistar International Transportation Corporation, Renault Vehicules Industriels, s.a. and Volvo Truck Corporation - violated the Clean Air Act by installing devices that defeat emission controls. The companies comprise 95 percent of the U.S. heavy duty diesel engine market.

The companies sold an estimated 1.3 million of the affected engines, which emitted more than 1.3 million tons of excess NOX in 1998 alone, which is six percent of all NOX emissions from cars, trucks and industrial sources. This is equivalent to the NOX emissions from an additional 65 million cars being on the road.

Under the agreements lodged with the U.S. District Court for the District of Columbia, the companies agreed to meet the 2004 standards by October 2002. The companies also will ensure that when older heavy duty diesel engines are rebuilt, their excess emissions will be reduced. The companies also will move up the date for meeting certain NOX emission standards applicable to non-road engines such as construction equipment.

In addition to reducing NOX emissions from the heavy duty diesel engines, the companies agreed to undertake a number of projects to lower NOX emissions, including research and development projects to design low-emitting engines that use new technologies and cleaner fuels.

The manufacturers will be subject to additional heavy penalties if they do not meet the agreement deadlines, and will be required to demonstrate compliance with the settlement on tests, which supplement the

Federal Test Procedure to ensure there are no new defeat devices used. To assure in use compliance with the standards, the manufacturers agreed to incorporate a not to exceed emissions cap (testing anyplace on the engine map should not exceed 1.25 times any standard), adding an additional engine dyno test (the Euro 3 steady state cycle), and to carry out an in use testing program.

Part of the civil penalties will be paid to the California Air Resources Board, with which the companies have made a related settlement.

The Consent Agreements have not yet received final court approval.

## 6. Another Court Decision Stuns EPA

A federal appeals court ordered the Environmental Protection Agency to suspend implementation of a rule requiring 22 states to take measures that control interstate movement of smog-causing pollution.

The court decision, pending consideration of a lawsuit challenging the rule, is the second blow against a major EPA air pollution regulation in two weeks. The same appeals court turned back the EPA's smog and soot regulation on May 14.

The action by a three-judge panel of the U.S. Court of Appeals for the District of Columbia directs the EPA to stop implementing the regulation, pending consideration of a lawsuit that had challenged the requirements.

As a result, the 22 states, from Michigan to Maine, will not be required to submit plans in September that would describe in detail how they intend to reduce the interstate transport of pollution. The actual pollution reductions are not expected to be required until 2003 and in some cases 2005.

It's not certain how the ruling will affect eventual implementation of the rule, even if the EPA turns back the legal challenge. The EPA said in a statement that the court's action was a "procedural delay."

The lawsuit challenging the rule was filed by several Midwest states and a number of utilities that operate coal-burning power plants in the Midwest and Ohio Valley.

The tougher emission controls, announced by the EPA last October, would most greatly affect coal-burning power plants in the Ohio Valley and Midwest. Environmentalists have argued those plants produce large amounts of nitrogen oxide that eventually drifts to the Northeast as smog, making it difficult for those states to comply with federal air quality standards.

Some of the Midwest states and the utilities have argued that the long-range transport problem has been exaggerated.

The appeals court said it was granting a partial stay of the regulation so states would not have to meet the September deadline for submitting implementation plans, pending a further order by the court.

The case is being heard by Judges Douglas H. Ginsburg, Stephen F. Williams and Judith W. Rogers. Ginsburg and Williams both were on the three-judge panel that on May 14 overturned the EPA's regulation requiring tougher controls on soot and smog. That decision is expected to be appealed by the Clinton administration.

Responding to the ruling, the EPA said in a statement that "this is a procedural delay to allow all parties to argue their case" that "temporarily delays these important health protection for the American people."

"The Environmental Protection Agency and a number of states will argue before the court the need to move forward with these important public health potations," the agency continued.

In reaction, EPA temporarily stayed its action regarding petitions filed under section 126 of the Clean Air Act until November 30, 1999. This will result in some but not all of the 22 states being brought under the NOx control umbrella while the Court appeal works its way through the system.

#### **7. EPA Issues Tier 2 Supplementary NPRM**

EPA published a Notice of Proposed Rulemaking (NPRM) on May 13, 1999, proposing a major program designed to significantly reduce the emissions from new passenger cars and light trucks, including pickup trucks, minivans, and sport-utility vehicles (the "Tier 2 program"). This program would provide for cleaner air by significantly reducing vehicle emissions that contribute to increased ambient levels of ozone and particulate matter (PM), as well as other types of pollution. The proposed program combines requirements for cleaner vehicles and requirements for lower levels of sulfur in gasoline. On May 14, 1999, a panel of the Court of Appeals for the District of Columbia Circuit ruled, among other things, that the recently-promulgated national ambient air quality standards (NAAQS) for ozone and PM represented unconstitutional delegations of authority, and remanded the record to EPA for further consideration. This document clarifies that the decision of the panel does not change EPA's proposed requirements for a Tier 2 program and does not impact EPA's proposed determination that the Tier 2 program is a necessary and appropriate regulatory program that would provide cleaner air and greater public health protection. This

document also provides additional ozone modeling information that was not included in the Notice of Proposed Rulemaking.

EPA continues to believe that there is a need for further reductions in emissions to attain or maintain the ozone and PM<sub>10</sub> NAAQS. The NPRM discussed this need criterion in relation to both the 8-hour and the 1-hour ozone standards and in relation to both the revised PM<sub>10</sub> and the pre-existing PM<sub>10</sub> standards. It is clear from the proposal that further reductions are needed to ensure achievement of the 1-hour ozone and pre-existing PM<sub>10</sub> NAAQS. 72 million people outside of California lived in 36 metropolitan areas and 2 counties designated nonattainment under the 1-hour ozone NAAQS as of August 10, 1998, while 13 million people outside of California lived in 68 counties designated nonattainment under the pre-existing PM<sub>10</sub> NAAQS. 64 of the counties, with a population of about 8 million people, are not included in current ozone nonattainment areas. Therefore, approximately 80 million people live in areas currently designated nonattainment under one or both of the NAAQS.

Though EPA projects that ozone control programs will reduce the number of these areas in the future, it is clear that, absent Tier 2 controls, nonattainment problems under the 1-hour ozone standard will continue well into the future. In the proposal, EPA projected future ozone levels by applying a "rollback method" to selected areas in the region analyzed by the Ozone Transport Assessment Group (OTAG).<sup>1</sup> We used this method to estimate 2007 design values for both the 8-hour and 1-hour ozone standards. The 1-hour results indicated that eight

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<sup>1</sup> OTAG evaluated a region that included all or part of the easternmost 37 states.



metropolitan areas and two rural counties with a combined population of approximately 39 million are projected to have design values in excess of the 1-hour ozone NAAQS in 2007, after presuming implementation of controls from the Regional Ozone Transport Rule (ROTR).<sup>2</sup> As indicated in Table 1, these

areas would be scattered throughout the OTAG region, including areas in Texas, Louisiana, Indiana and throughout the northeast, indicating that nonattainment of the 1-hour ozone standard would remain a substantial and widespread concern.

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<sup>2</sup> The design value is the calculated ozone level, based on ozone measurements in the area, that is compared to the NAAQS to determine compliance with the standard.

**Table 1.** Metropolitan areas/ rural counties with design values projected to exceed the 1-hour standard in 2007 using rollback method with ROTR controls but without Tier 2/Sulfur Controls.

Name	Design Value (ppb)	Pop'n.
Iberville County LA	132	31,049
La Porte County IN	131	107,066
Beaumont-Port Arthur, TX MSA	129	361,218
Hartford, CT MSA	125	1,157,585
Houston-Galveston-Brazoria, TX CMSA	175	3,731,029
Longview-Marshall, TX MSA	129	193,801
Memphis, TN-AR-MS MSA *	125	1,007,306
New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA	136	19,549,649
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD CMSA	126	5,893,019
Washington-Baltimore, DC-MD-VA-WV CMSA	126	6,726,395
	total population	38,758,117
	# of metro areas	8
	metro pop.	38,620,002
	# of counties	2
	county pop.	138,115

\* = 1-hour ozone NAAQS no longer applies in a portion of the MSA

The OTAG analysis region did not include California, and therefore EPA does not have comparable projections of future air quality in that state. It is important to note that California has under its authority designed and implemented a vehicle and fuel control program, and therefore EPA did not propose to apply the proposed Tier 2/gasoline sulfur program in California. However, in its proposal EPA noted in qualitative terms the importance of the Tier 2 and sulfur control reductions to California's efforts to reach attainment with the 1-hour ozone standard. Nine areas in California currently designated as nonattainment, and two counties currently designated as being in attainment, with a population of approximately 30 million, have current design values above the 1-

hour ozone NAAQS. It appears that some California areas with an attainment deadline of 1999 will not meet that date, and therefore will require additional emission reductions to attain. Attainment of the 1-hour standard in the remaining areas by their various later attainment dates remains the goal of California and EPA, but will be challenging to accomplish. Though this regulation does not directly regulate California vehicles, ozone levels in California are reduced through reductions in emissions from vehicles sold outside California that subsequently enter California temporarily or permanently. According to California, about 7 to 10 percent of all car and light truck travel in California takes place in vehicles originally sold outside of California. In fact, the state of California has recently filed an update to

its State Implementation Plan for the South Coast Air Basin that expressly claims that the Tier 2 program will lead to four tons of reduced NOx emissions per day in the South Coast area in 2010.<sup>3</sup> Furthermore, low gasoline sulfur levels would prevent poisoning of the catalysts of California vehicles that travel outside California and later return to the state.

The 1-hour ozone design values for 2007 presented in Table 1 above were based on an analysis approach called the "rollback method" that combines modeling results for future years with recent measured ozone levels to project future ozone levels. The general concept in this method is to first determine the design value from the monitoring data for a three-year base period, then estimate the percentage reduction between the base year and a future year (the year 2007 is used in Table 1) using the regional ozone modeling system. Finally, the percentage reduction is applied to the ambient design value to project the design value for the future year. A more detailed discussion of this approach appears in the draft RIA.

The rollback approach was applied to both the 1-hour or 8-hour ozone predictions in the Tier 2/gasoline sulfur proposal. EPA has more commonly used the "exceedence

method," which estimates future ozone levels from the modeling results more directly. The exceedence approach is more consistent than the rollback method with EPA's guidance to states regarding technical methods used to demonstrate attainment with the existing 1-hour ozone standard. In this method, the predicted ozone concentrations in 2007 are compared to the ozone standard of interest to characterize whether the area is likely to experience an exceedence of the ozone standard in the future.

In light of the recent Court decision, EPA is providing a more thorough presentation of the available ozone modeling data on the need for additional emission reductions to meet the 1-hour ozone standard, to provide additional information for public comment.

In the ROTR, EPA used the exceedence method to determine whether designated 1-hour nonattainment areas would be likely to experience exceedences in 2007, considering the effects of growth and emission control measures. EPA used an exceedence approach to estimate the impacts of controls on 1-hour ozone concentrations because this approach is more consistent with the 1-hour standard than a rollback approach. The form of the 1-hour standard considers the number of exceedences at a monitoring site over a three-year period. Year-to-year variations in meteorological conditions can result in considerable variation in the number of exceedences at a given location across successive three-year periods. Using the exceedence approach based on modeling for specific ozone episodes provides for a

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<sup>3</sup> California Air Resources Board, Executive Order G-99-037, May 20, 1999, Attachment A, p.6-7, 10. The four tons per day NOx reductions cited, represents only a small fraction of the emission reductions needed in the South Coast to attain the NAAQS.

consistent set of meteorological conditions over which to evaluate the effects of control strategies on 1-hour exceedences. In moving to an 8-hour standard, EPA changed the form of the standard from an exceedence based approach to an average concentration based approach. Specifically, 8-hour design values are calculated as the 3-year average of the 4th highest 8-hour value in each year at a monitoring site. As a result of this multi-year averaging, the effects of variations in year-to-year meteorological conditions are reduced and thus, 8-hour design values are likely to be more stable over time than 1-hour exceedences. The rollback method, which is based on the average ozone reductions calculated from model predictions, is consistent with the form and temporal stability of 8-hour design values.

Consistent with our guidance on 1-hour attainment demonstrations and with our reliance on the exceedence approach in the ROTR, EPA has now analyzed the air quality modeling results using the exceedence method. The results of this analysis are presented as supplemental information that bears on our proposed finding regarding the need for additional reductions in ozone precursor emissions to help areas attain the NAAQS.

Table 2 shows results of the exceedence

method for the 1-hour standard. It lists 17 current nonattainment areas that are projected to experience exceedences of the 1-hour standard in 2007, even after implementation of the ROTR, the National Low Emission Vehicle Program, the 2004 highway diesel engine standards, the Phase II nonroad diesel engine standards, and other federal emission control measures.<sup>4</sup> These results indicate that there are more, and more geographically dispersed, metropolitan areas which need further ozone precursor emission reductions to meet the 1-hour ozone NAAQS, than was indicated by the rollback method as reported in Table 1. The population of these 17 areas exceeds 70 million.

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<sup>4</sup> The deadline for submission of state implementation plans under the ROTR was recently stayed by a panel of the Court of Appeals for the D.C. Circuit pending further review. EPA believes that the ROTR is fully consistent with the Clean Air Act and should be upheld. However, it should be noted that in the absence of the controls mandated in the ROTR, the emission reductions from the Tier 2 program would be even more necessary for compliance with the NAAQS.

**Table 2.** Metropolitan areas projected to experience exceedences of the 1-hour standard in 2007 or 2010, as applicable, with ROTR controls but without Tier 2/Sulfur Controls. Does not include areas for which the 1-Hour Ozone NAAQS no longer applies.

<b>Metropolitan Area</b>	<b>1990 Population</b>
Atlanta, GA MSA	2,959,500
Baton Rouge, LA MSA <sup>a</sup>	528,261
Beaumont-Port Arthur, TX MSA <sup>a</sup>	361,218
Birmingham, AL MSA	839,942
Chicago-Gary-Kenosha, IL-IN-WI CMSA	8,239,820
Cincinnati-Hamilton, OH-KY-IN CMSA <sup>b</sup>	1,817,569
Dallas-Fort Worth, TX CMSA <sup>a</sup>	4,037,282
Hartford, CT MSA	1,157,585
Houston-Galveston-Brazoria, TX CMSA <sup>a</sup>	3,731,029
Los Angeles-Riverside-San Bernardino CA CMSA <sup>a,c</sup>	13,000,000
Louisville, KY-IN MSA	949,012
Milwaukee-Racine, WI CMSA	1,607,183
New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA	19,549,649
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD CMSA	5,893,019
Springfield, MA MSA	587,884
St. Louis, MO-IL MSA	2,492,348
Washington-Baltimore, DC-MD-VA-WV CMSA	6,726,395
Total Population	74,479,686
Number of Areas	17

<sup>a</sup> = These areas are not subject to the ROTR and were modeled accordingly.

<sup>b</sup> = 1-hour ozone NAAQS proposed to no longer apply.

<sup>c</sup> = The attainment date considered for Los Angeles-Riverside-San Bernardino is 2010. For other listed areas, the date considered is 2007. For the former area, the possibility of 2010 exceedences without Tier 2/Sulfur controls is inferred from the inclusion of these reductions in the most recently submitted SIP update. For other areas, the prediction is based on the exceedence method applied to regional ozone modeling results.

EPA's preliminary analysis indicates that the proposed Tier 2/Sulfur program would reduce the number and severity of ozone

exceedences in areas currently designated nonattainment under the existing 1-hour ozone standard. We expect to conduct further analysis of the impact of the Tier 2/sulfur program on exceedences of the current 1-hour ozone standard as part of our analysis for the final rule.

EPA invites comment on the appropriateness of using the exceedence and/or rollback method in this rulemaking for purposes of analyzing future compliance with the 1-hour ozone NAAQS.

As discussed at length in the proposed rule, emissions from LDVs and LDTs will represent a large percentage of emissions of ozone precursors once the ROTR is implemented. To the extent that significant additional reductions in precursors are needed for the areas discussed above to attain or maintain the 1-hour ozone NAAQS, EPA believes that reductions from LDVs and LDTs in particular will be necessary.

The NO<sub>x</sub> and sulfur dioxide emissions from LDVs and LDTs also contribute to elevated particulate matter levels as these emissions are transformed by physical and chemical processes in the atmosphere. The resulting particulate matter contributes to current and projected nonattainment with the pre-existing PM<sub>10</sub> standard. In the NPRM, EPA presented its projection that 33 counties outside of California, with a population of approximately eleven million, and twelve counties in California, with a population of about seven million, would not be in attainment with the pre-existing PM<sub>10</sub> standard in 2010, absent further emission

reductions<sup>5</sup>. These projections were made during the rulemaking that established the revised PM<sub>10</sub> standard. The following additional information is presented regarding current and projected attainment of the pre-existing PM<sub>10</sub> standard.

Twenty-one of the 45 counties which EPA projected to be in nonattainment with the pre-existing PM<sub>10</sub> standard in 2010 are not part of metropolitan areas. In these 21 rural counties, PM<sub>10</sub> levels are likely to be dominated by natural events (volcanoes, wind-blown dust, or wildfires) or by single large industrial sources of PM<sub>10</sub>. As such, the PM and PM precursor reductions from the Tier2/Sulfur proposal are less likely to materially affect their attainment and maintenance of the standard, although EPA invites comment on this issue.

Table 3 lists the 24 urban counties projected to be in nonattainment in 2010. For two areas (Lubbock Co. and Spokane Co.) there is specific indication that natural events are responsible for the high PM<sub>10</sub> levels. Also, while Philadelphia was

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<sup>5</sup> The predictions of 2010 nonattainment under the pre-existing PM<sub>10</sub> NAAQS were made on the basis of individual counties, not metropolitan areas. The methods used to project PM concentrations in 2010 from 1990 emissions and ambient concentration data introduce several sources of uncertainty. Uncertainties exist regarding emission inventory estimates from human and natural sources, monitoring data, and the models used to account for physical and chemical processes in the atmosphere.

projected to be in nonattainment in this analysis, additional emission reductions have since occurred there through a source shutdown, which may result in PM<sub>10</sub> attainment in 2010. The remaining 21 urban counties contain about 15 million people. The reductions in PM and PM precursors resulting from the Tier 2/Sulfur

rule would help to reach and maintain the NAAQS in such areas. Of these 21 counties and 15 million people, 17 counties and 9 million people are not included in the projected ozone exceedence areas listed in Table 2 above.

**Table 3.** Counties, in metropolitan areas only, projected not to attain the pre-existing PM<sub>10</sub> standard in 2010.

<b>Name</b>	<b>Population (1990)</b>
Bernalillo Co NM	480,577
Kern Co CA	369,608
Scott Co IA	150,973
Lane Co OR	282,912
Fresno Co CA	667,000
Harris Co TX <sup>a</sup>	2,818,199
Clark Co NV	741,368
Riverside Co CA <sup>a</sup>	1,170,413
San Bernardino Co CA <sup>a</sup>	1,418,380
Lubbock Co TX <sup>b</sup>	222,636
Ouachita Par LA	142,938
Davidson Co TN	510,784
New Haven Co CT <sup>a</sup>	804,219
Cass Co NE	21,318
Philadelphia Co PA <sup>a,c</sup>	1,585,577
Maricopa Co AZ	2,122,101
Utah Co UT	263,590
Pennington Co SD	81,343
Washoe Co NV	254,667
Yolo Co CA	141,000
San Diego Co CA	2,498,016
Santa Cruz Co CA	229,734
Spokane Co WA <sup>d</sup>	361,333
Hancock Co WV	35,233
	<b>Total Population</b>
	17,373,919
	<b>Number of Areas</b>
	24
Population of 21 Areas Without Specific Indication	15,204,373

of Natural Events or Additional Emission Reduction	
Population of 17 Areas Without Specific Indication of Natural Events or Additional Emission Reduction, and Not Listed in Table 2	8,993,162

<sup>a</sup> Counties in areas also projected to exceed the 1-hour ozone standard (listed in Table 2 above).

<sup>b</sup> PM10 levels in excess of the NAAQS in Lubbock Co. TX are considered to be due to fugitive dust from agricultural land. The area is implementing USDA guidelines on control of fugitive dust.

<sup>c</sup> Monitored PM10 levels in excess of the NAAQS in Philadelphia Co. PA are considered to have been due to a lead smelting operation which has ceased operation.

<sup>d</sup> The state of Washington has submitted a Natural Events Action Plan for Spokane Co.

Based on the above, EPA reiterates its proposed finding that there is a need for further reductions in emissions in order to attain or maintain the NAAQS, even when consideration is limited to the one-hour ozone and the pre-existing PM<sub>10</sub> NAAQS. A total of approximately 83 million people living in 17 metropolitan areas and 17 individual metropolitan counties projected to not be in attainment of either or both of these standards would be helped by Tier 2/Sulfur controls.

**8. Mexico Tightens Standards**

Mexico recently issued new standards for new vehicles. From the model 2001 all vehicles sold in the country will have to comply with TIER I standards. However, last year the government offered a two year waiver of the I/M test to those vehicles from the model 1999 that meet the emission limits of a compact TIER I vehicle; as a result, all vehicles model 1999 (including large vans) meet this standard. Therefore, in practice Mexico has already reached TIER I for all vehicles.

The government is now negotiating with PEMEX a timetable for producing gasoline

with: first stage 150 ppm of S, and second stage: 50 ppm of S.

**9. Clean Air Trust Survey Finds Public Wants Dirty Diesel Trucks Cleaned Up**

The American public overwhelmingly supports tough new clean air controls for big diesel trucks, according to a new national public opinion survey.

The survey, conducted for the Clean Air Trust, found that registered voters want big diesel vehicles to use the best available pollution control technology. Voters also support cleaner diesel fuel despite increased costs that could be passed on to consumers.

The survey was released as a coalition of state and local government and health and environmental groups called for the federal government to take tougher action to clean up big trucks, a major source of smog, soot and toxic air pollution. Tougher controls are being resisted by diesel engine makers, the petroleum industry and the trucking lobby.

The survey found that 90 percent of voters want big diesel vehicles to use the best available pollution control technology. Frank O'Donnell, executive director of the Clean Air Trust, noted that today's truck standards "are



so pitifully weak that most trucks do not use an available truck version of the catalytic converter used on automobiles.” The U.S. Environmental Protection Agency is reviewing standards for future trucks.

Respondents to the survey also overwhelmingly (61 percent to 21 percent) endorsed cleaner diesel fuel for big trucks even when told that could mean “higher costs” [which] will be passed onto consumers.” O’Donnell noted that removing most of the sulfur from diesel fuel would enable advanced pollution control devices that could sharply reduce truck pollution.

The U.S. Environmental Protection Agency has issued an “advanced notice” of its intent to crack down on diesel sulfur. O’Donnell noted that state and local clean-air regulators have joined environmental and health groups in calling for a “dramatic reduction in diesel sulfur” to promote advanced cleanup technology.

Seven of 10 survey respondents also said “18-wheelers and other big diesel vehicles” should be required to meet the same strict pollution standards as passenger cars. “This is a remarkable response – and one that underscores intense public support for cleaner trucks – when you consider that today’s trucks may spew out the pollution equivalent of 150 cars,” O’Donnell added.

In answer to other questions, survey respondents:

- Overwhelmingly said (83 percent to 10 percent) diesel passenger vehicles should have to meet the same pollution standards as gasoline-powered vehicles.
- Strongly opposed (59 percent to 20 percent) increased use of high-polluting diesel passenger vehicles in order to

improve fuel economy.

- Clearly believe (57 percent to 15 percent) that exhaust from diesel-fueled pickup trucks and sport utility vehicles is dirtier than exhaust from similar vehicles that use gasoline.

The survey of 800 adults, 18 years or older who are registered to vote, was conducted May 20-24 by Lake Snell Perry & Associates. The margin of error is +/- 3.5 percent.

## 10. U.S. Tries Organic Lubricants

More than a half century after Henry Ford dreamed of building a car out of common agriculture products, a team of entrepreneurs may have figured out how to lubricate engines using vegetables. A fleet of U.S. Postal Service trucks is currently wheeling around the state of Michigan using AMG 2000, a lubricant made of vegetable oils that is aimed at serving the environment while creating a new niche market for farmers.

A plant to produce 20,000 gallons of the engine oil this year will be finished in two weeks in north-central Michigan. Provided eight months of postal service testing go off without a hitch, the five impresarios of research and development firm Agro Management foresee licensing their formula for production within two years.

And that would probably delight Ford, who in 1941 unveiled a car sporting 14 panels made of soy-based composite material that were attached to a metal vehicle frame. The lightweight soy car proved resilient and boasted more efficient fuel consumption.

AMG 2000 is a brew consisting of a vegetable-base oil, an oil made up of hydroxy fatty acids and another consisting of vegetable or animal waxes.

Candidates for the base stocks include soybeans, canola, safflower and sunflower. The typical hydroxy fatty acid is castor and waxes include jojoba, meadowfoam and lanolin. The natural ingredients going into the mix are designed to produce more benign emissions, improve gas mileage and oil consumption, and reduce wear on internal combustion engine parts.

"Unlike the conventional lubricants of the prior art, the vegetable-based oil of the present invention is derived from a renewable source, is biodegradable by naturally occurring microbes in the environment and is non-toxic to flora and fauna," the patent reads.

Some 60 postal vehicles will try out the new fluid until next April, allowing examination of its handling characteristics, toxicity and recycling and disposal capabilities.

Michigan was a natural spot for a trial run as it is an agricultural hotbed with leading crops such as soybeans and canola as well as the home of Detroit, the auto-making capital of the country. Influential agriculture groups around the state and legislative bodies pushed for the deal to go through.

The postal system is buying the stuff for about \$2 a quart, or roughly double what a regular petroleum-based oil would cost.

High price tags have prevented other alternative resources such as bio-diesel - which costs three to four times more than regular diesel - from excelling in the marketplace.

Availability is also a common problem.

Previous attempts to lube engines with vegetable oils have consisted of additives to petroleum-based oil. But AMG 2000 "improves upon the prior art by providing a liquid

lubricant that is composed principally of vegetable based components," the patent reads.

The inventors of AMG 2000 herald the reusable facet of their product.

The product AMG 2000 would replace, crude petroleum, is a non-renewable natural resource that is regularly dumped indiscriminately after being drained from internal combustion engines.

#### **11. ARB, SCAQMD Measure Pollutants in Vehicles**

The California Air Resources Board (ARB) and the South Coast Air Quality Management District (SCAQMD) have announced that exposure to some air pollutants and toxic compounds may be ten times higher inside vehicles than in ambient air. The two-year, \$440,000 study is the first ever to gather particulate data inside vehicles and the first to collect real-time information under a range of traffic and driving conditions.

Dr. Alan Lloyd, ARB Chairman said, "We're learning that peoples' highest daily exposure to air pollutants may be during their commute to and from work. Also, we have concerns about the potential impact on bus riders, especially children. Therefore, I've asked the ARB staff to collect more data to evaluate the risks."

The study's objectives were to measure motorists' personal exposure to common motor vehicle pollutants in Los Angeles and Sacramento, two areas that have high levels of motor vehicle-generated air pollution.

Funded by the ARB, with support from the SCAQMD, the study measured the direct exposure to motor vehicle occupants from gaseous pollutants, diesel soot and other fine

particles.

As part of the study, ARB researchers also began looking at pollutant levels inside school buses. Future ARB research may include projects that will better define the pollutant levels to which children are exposed while traveling to and from school.

Researchers found levels of hydrocarbons and carbon monoxide were between two and ten times higher inside vehicles than at roadside or fixed monitoring stations. Researchers also found similar levels of toxic compounds such as benzene, 1,3-butadiene, ethyl benzene, toluene, xylene and MTBE, all considered toxic by the ARB and USEPA. The variations depended on the pollutant, the type of road and the level of traffic.

Researchers found that as much as one-half of the pollutants inside test cars were emitted by the vehicle ahead. In general, levels of toxins and other pollutants are higher inside vehicles than in outdoor ambient air because cars are surrounded by emissions from other vehicles on freeways and streets.

"We know that air pollutants in ambient outdoor air pose a health risk to Southland residents," said Barry Wallerstein, SCAQMD Executive Officer. "This study confirms that commuters face an additional risk breathing the polluted air inside their cars."

According to the research data, motorists who used air conditioning systems and those who drove with their air vents open were exposed to similar amounts of pollution. Researchers learned that people who use car pool lanes were exposed to pollutant levels well below those measured in other traffic lanes, possibly because car pool lanes are less congested and further removed from the truck lanes.

## 12. U.S. Aims For 5 Percent Windpower by 2020

U.S. Energy Secretary Bill Richardson has announced a plan to generate 5 percent of the nation's electricity from wind power by 2020, saying new technology and restructured markets make the goal attainable. Speaking to a wind power conference in Vermont, Richardson said the U.S. possesses fertile conditions for harnessing the wind for electric power needs.

Richardson said now was the time to boost use of renewable fuels, like wind, solar and biomass, as costs decline and "green power" demand grows in competitive electricity markets.

Currently, only one-tenth of 1 percent of the nation's power needs are met by wind power. In addition to national goals, the Richardson plan would have the federal government - the country's largest energy user - rely on wind for 5 percent of its power needs by 2010. To make the wind as viable an energy option as possible, Richardson said the Clinton administration would invest \$1.2 million in 10 wind turbine testing projects in 10 different states.

The Clinton fiscal year 2000 budget also asks for an extension of the wind-production credit of 1.7 cents per kilowatt-hour, which will expire on June 30.

Richardson also noted that the administration's electricity restructuring proposal calls for electricity suppliers to cover 7.5 percent of their sales with generation from non-hydroelectric renewables by the year 2010.

An alternative bipartisan bill authored by Oklahoma Republican Representative Steve Largent and Massachusetts Democrat

Representative Ed Markey in the House Commerce Subcommittee on Energy and Power calls for a 3 percent renewable portfolio level.

Called Wind Powering America, the Department of Energy plan also seeks to double the number of states that have more than 20 megawatts of wind capacity to 16 by the year 2005, and triple the number to 24 by 2010.

Nationally, wind-power generating capacity was expected to measure around 2,500 megawatts by the end of June, some 900 megawatts more than the same period of 1998, or the equivalent of one medium-sized nuclear power plant.

### ASIA-PACIFIC

#### 13. Acid Rain Falls On One Third of China

Acid rain falls on 30 percent of China's land mass, according to an official report on the Chinese environment which has just been released. And one in 10 Chinese companies flouts environmental regulations.

"The environmental situation facing China remains severe," said the 1998 annual review of the environment unveiled by Xie Zhenhua, head of the State Environmental Protection Administration (SEPA). The report highlighted some success in cleaning up major rivers, but said factories spewing chemicals and industrial waste were holding back real progress.

Coal dust laced with sulphur dioxide was the main air pollutant.

Beijing was getting tough by holding local officials accountable and jailing severe offenders. Factories were being helped to

convert to cleaner - but more costly - production.

Water quality in the Yangtze, Huai and Pearl rivers had improved from 1997 and there was an overall reduction of sulphur dioxide, smoke and dust in the air, the report said. But the waters of the Yellow, Hai and Songhua rivers had not improved from 1997, and the Liao river was dirtier.

A SEPA survey found most Chinese considered environmental pollution a "grave problem", but thought over-population, crime, education and unemployment were more pressing issues. Eighty-six percent of Chinese believed environmental degradation was a result of "poor law enforcement" or "failure to obey the law".

Xie said China spent one percent of its gross domestic product on environmental programs - the highest proportion of any developing nation.

Half the world's 10 most polluted cities are in China, according to the World Health Organization.

#### 14. Philippine Leader OKs Clean Air Act

Philippine President Joseph Estrada signed a landmark Clean Air Act into law despite lobbying by businesses and oil companies that complained the law would increase their costs.

Air pollution in the Southeast Asian country has already reached alarming levels, according to the Asian Development Bank.

"In the long run, this will be good for our government and our people, especially the poor," Estrada said. "The health of our people is our No. 1 concern."

The three major Philippine oil companies -- Petron Corp., Pilipinas Shell, and Caltex Philippines -- estimated they will spend at least \$158 million to upgrade their refineries to meet the new air standards.

A key feature of the law is a ban on the use of incinerators.

Biomedical waste incinerators now in operation will be phased out over three years. Only cremation and agricultural burning practices, already covered by existing laws, will continue.

The environmental group Greenpeace described the law as an "environmental milestone." Greenpeace spokesman Von Hernandez said the law makes the Philippines the first country in the world to approve a nationwide ban on incinerators.

Environmentalists say incinerators emit toxic substances such as dioxin, carbon dioxide, mercury and lead.

The law also orders the phase-out of leaded gasoline by next year and requires a reduction in the sulfur content of diesel fuel used by vehicles and factories. It also requires industries to install anti-pollution devices.

The Manila-based Asian Development Bank says air pollution from vehicle and industrial emissions in the Philippines poses severe health hazards, particularly to children and the elderly.

The worst offenders are diesel vehicles, which make up more than 40 percent of the 3.2 million registered vehicles in metropolitan Manila, the bank says.

#### **15. Recent Developments Regarding Japan's Pollution Law Suit**

The air pollution lawsuit (APL) of Kawasaki underway for as many as 17yrs was brought to a close on May 20. A reconciliation was approved between the plaintiffs and the defendant (MOC). The content of reconciliation is to prevent air pollution and its health effects due to exhaust of cars, jointly with the residents; former plaintiffs and MOC. MOC did not pay any compensation to the plaintiffs.

After this reconciliation, there remains only one similar kind of APL in Nagoya city, the 4th biggest city in the country. Because the issue in the Nagoya trial is the same as in Kawasaki one can forecast the same final result as for the Nagoya trial.

The last remaining APL is in Tokyo. Defendants in the lawsuit are Toyota and all other diesel car makers in Japan and MOC..

The issue in the Tokyo lawsuit is substantially different from other APLs; i.e., car makers produced many cars and sold them with the result that there were severe traffic jams due to inadequate traffic control. Because of that, emitted exhaust gases accumulated alongside the roads with the result that residents living close to the road are and have been heavily exposed to them. They suffered adverse effects including respiratory diseases. Therefore, the Tokyo Metropolitan Governor who is in charge of traffic control in the city of Tokyo is being added to the list of defendants.

### **GENERAL**

#### **16. Lead & Children**

Two new studies rekindle the issues surrounding lead poisoning in children. The first study deals with children's teeth, and finds that increased cavities are related to

higher blood lead levels. The second study looks at calcium intake and lead levels. It found that children in high risk urban areas, who don't consume enough calcium aren't protected from the effects of ingesting lead paint chips.

**17. Leaded Gasoline Phase Out**

After several years of effort by many organizations to reduce the lead use in gasoline, now seems to be an appropriate time to take stock of where we are, what the prospects are in the immediate future, and to identify the major additional targets of opportunity.

**A. Countries Which Have Already Phased Out The Use of Lead in Gasoline**

The following thirty nine (39) countries are estimated to either already have phased out the use of leaded gasoline or are expected to do so before the end of 1999:

- Canada
- Argentina
- Austria
- Bahamas
- Belize
- Bermuda
- Bolivia
- Brazil
- Colombia
- Costa Rica
- Denmark
- Dominican Republic
- El Salvador
- Finland
- Germany
- Guam
- Guatemala
- Haiti
- Honduras
- Hong Kong

- Hungary
- Iceland
- Japan
- New Zealand
- Nicaragua
- Norway
- Puerto Rico
- Singapore
- Slovakia
- South Korea
- Sweden
- Netherlands
- Thailand
- United States
- US Virgin Islands
- Luxembourg
- Bangladesh
- Mexico
- Portugal

**B. Countries Which Are Expected To Phase Out The Use of Lead in Gasoline in 2000**

An additional eleven (11) countries are expected to join the Unleaded Club by the end of 2000 as listed below.

- United Kingdom
- France
- Trinidad and Tobago
- Taiwan
- Monaco
- China
- Belgium
- Philippines
- India
- Nepal
- Switzerland

**C. Countries Which Are Expected To Phase Out The Use of Lead in Gasoline in 2001**

In 2001, three (3) additional countries,

Uruguay, Ecuador and Egypt, are expected to join the Unleaded Club.

**D. Countries Which Are Expected To Phase Out the Use Of Lead in Gasoline in 2002**

Panama is expected to join the Unleaded Club in 2002.

**E. Countries Which Are Expected To Phase Out the Use Of Lead in Gasoline in 2003**

In 2003, three (3) additional countries are expected to join the Unleaded Club.

Ireland  
Italy  
Jamaica

**F. Countries Which Are Expected To Phase Out the Use Of Lead in Gasoline in 2004**

Two (2) additional countries are expected to join the Unleaded Club in 2004.

Greece  
Spain

**G. Countries Which Are Expected To Phase Out the Use Of Lead in Gasoline in 2005**

Two (2) additional countries, Peru and Bulgaria, are expected to join the Unleaded Club in 2005, bringing the total to 61 countries by that time.

**H. Additional Countries Which**

**Are the Most Likely Candidates To Phase Out the Use Of Lead in Gasoline by 2005**

There are five (5) additional countries which are highly promising prospects for phasing out the use of lead in gasoline by 2005 but have not yet made firm decisions to do so. These countries are listed below.

Australia  
Romania  
Chile  
Czech Republic  
Poland

**I. Major Targets of Opportunity**

Based on their continued high consumption of leaded gasoline, the following countries should receive major additional focus to eliminate lead in gasoline.

Confederation of Independent States  
Nigeria  
Saudi Arabia  
Venezuela  
South Africa  
Indonesia  
Iraq  
Libya  
Algeria  
Iran  
Kuwait  
Turkey  
United Arab Emirates  
Syria  
Israel  
Malaysia

**J. Overall Summary**

Summarizing the above leads to the following conclusions:

- < 39 countries have already phased out the use of leaded gasoline (or will do so during 1999) and this will likely rise to 61 countries by 2005
- < about 79% of all gasoline sold in the world is currently unleaded and this will likely rise to 86% by 2005
- < an additional 5 countries already use unleaded gasoline and seem to be prime candidates for complete lead phase out; if lead were eliminated in these countries, the total fraction of unleaded sales would rise to almost

- < 87%.  
16 additional countries, many of which are in the Middle East or North Africa will consume the bulk of the remaining leaded gasoline in 2005; if lead were eliminated from gasoline in these countries, total unleaded sales would surpass 98% and the complete elimination of leaded fuel seems likely.