Originally Processed With FOIA(s):
2001-1865-F; 2001-1978-F

FOIA Number:
2001-1978-F

FOIA MARKER

This is not a textual record. This is used as an administrative marker by the George Bush Presidential Library Staff.

Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Counsels Office, White House
Series: Holmstead, Jeffrey, Files
Subseries: Environmental Subject Files

OA/ID Number: 45125
Folder ID Number: 45125-032

Folder Title:
Clean Air Act - Reformulated Gasoline

Stack:	Row:	Section:	Shelf:	Position:
G	12	7	7	3

Octane International, Ltd.
2075 S. University #240
Denver, Colorado 80210
303-744-6449, FAX 303-744-6581

CAA
Ref. Gratz

October 2, 1991

Mr. Jeff Holmstead
Associate White House Counsel to the President
Old Executive Office Bldg, #106
Washington, DC 20500

Dear Jeff,

At the direction of Mr. Boyden Gray, please find enclosed drafts of proposed letters from Mr. Gray to Messrs. Reilly and Mr. Charles Gray of the EPA.

Could you please send us a copy of your final letter.

Thanks for your help.

Sincerely,

Bill Orr
President

enclosures:

confidential draft

Mr. William K. Reilly, Administrator
United States Environmental Protection Agency
401 M Street, S. W.
Washington, D.C. 20460

Dear Mr. Reilly,

The process of converting the Clean Air Act into a set of enforceable regulations has no doubt been daunting. I don't envy your task.

As you proceed, I would urge you to remember that the ultimate goal is a safer cleaner environment. In the case of reformulated and oxygenated fuels as set forth under Section 211(k) and (m), respectively, a primary concern is the fuel's CO generation and ozone formation potentials. I would hope that the final regulations contain enough flexibility to allow innovative products and technologies the ability to compete in the market place, especially those which favorably impact CO generation and ozone formation potential.

It has come to my attention that the EPA is proceeding in its regulations on the basis of fixed RVP's and total mass emissions, and not necessarily CO generation (oxygenated fuels) or reactivity (reformulated fuels). This appears to be problematic because methanol/co-solvent blends ("methanol blends") while increasing RVP and mass emissions, due to the azeotroping effect of alcohols, have favorable reductions in CO and do not necessarily increase ozone formation potential. The proposed regulations appear to discriminate against methanol fuels in this regard.

As a further example of discrimination, 10% ethanol blends have been accorded a 1 psi RVP exemption for oxygenated fuel applications (CO), while methanol blends (including methanol/ethanol co-solvent blends) have not. Any distinction in CO reduction between an ethanol or methanol blend containing the same amount of oxygen is hard to phantom.

I have recently had the occasion of visiting with representatives of a methanol blend company who claim their technology would actually provide an environmentally safer and cleaner fuel, but are prevented from reaching the market due to the EPA's oxygenated and reformulated fuels regulations.

Perhaps you could look into this matter and take appropriate action as necessary to remedy this problem.

Sincerely,

Boyden Gray

Confidential Draft

Mr. Charles Gray, Director
Emission Control Technology
Environmental Protection Agency
Director Emission Control Technology
Motor Vehicle Emission Laboratory
Ann Arbor, MI 48105

Dear Mr. Gray,

The process of converting the Clean Air Act into a set of enforceable regulations has no doubt been daunting. I don't envy your task.

As you proceed, I would urge you to remember that the ultimate goal is a safer cleaner environment. In the case of reformulated fuels as set forth under Section 211(k) a primary concern is the fuel's ozone formation potential. I would hope that the final regulations contain enough flexibility to allow innovative products and technologies the ability to compete in the market place, especially those which favorably impact ozone formation potential.

It has come to my attention that the EPA is proceeding in its regulations on the basis of fixed RVP's and total mass emissions, and not necessarily the reactivity of a fuel. This appears to be problematic because methanol blends while increasing RVP and mass emissions, due to the azeotroping effect of alcohols, do not necessarily increase ozone formation. The proposed regulations appear to discriminate against methanol fuels.

I have recently had the occasion of visiting with a methanol blend company which claims that its technology would actually provide an environmentally safer and cleaner fuel, yet is prevented from reaching the market due to the EPA's regulations on RVP (simple model) and total mass emissions (complex model).

Wouldn't reactivity be the better and fairer standard? Is it possible that current regulations could be modified to remedy this problem? Would reliance upon 211(k)(4)(B) or perhaps Section 241 provide a logical basis to make the modification? Wouldn't such modification be desirable if it results in a cleaner fuel being introduced than now permitted by the regulations?

Sincerely,

Boyden Gray

ONE HUNDRED SECOND CONGRESS

JOHN D. DINGELL, MICHIGAN, CHAIRMAN

JAMES H. SCHEUER, NEW YORK
HENRY A. WAXMAN, CALIFORNIA
PHILIP R. SHARP, INDIANA
EDWARD J. MARKEY, MASSACHUSETTS
AL SWIFT, WASHINGTON
CARDISS COLLINS, ILLINOIS
MIKE SYNAR, OKLAHOMA
W.J. "BILLY" TAUZIN, LOUISIANA
RON WYDEN, OREGON
RALPH M. HALL, TEXAS
DENNIS E. ECKART, OHIO
BILL RICHARDSON, NEW MEXICO
JIM SLATTERY, KANSAS
GERRY SIKORSKI, MINNESOTA
JOHN BRYANT, TEXAS
J. ROY ROWLAND, GEORGIA
THOMAS J. MANTON, NEW YORK
EDOLPHUS TOWNS, NEW YORK
C. THOMAS MCMILLEN, MARYLAND
GERRY E. STUDDS, MASSACHUSETTS
PETER H. KOSTMAYER, PENNSYLVANIA
RICHARD H. LEHMAN, CALIFORNIA
CLAUDE HARRIS, ALABAMA

NORMAN F. LENT, NEW YORK
CARLOS J. MOORHEAD, CALIFORNIA
MATTHEW J. RINALDO, NEW JERSEY
WILLIAM E. DANNEMEYER, CALIFORNIA
DON RITTER, PENNSYLVANIA
THOMAS J. BLILEY, JR., VIRGINIA
JACK FIELDS, TEXAS
MICHAEL G. OXLEY, OHIO
MICHAEL BILIRAKIS, FLORIDA
DAN SCHAEFER, COLORADO
JOE BARTON, TEXAS
SONNY CALLAHAN, ALABAMA
ALEX MCMILLAN, NORTH CAROLINA
J. DENNIS HASTERT, ILLINOIS
CLYDE C. HOLLOWAY, LOUISIANA
FRED UPTON, MICHIGAN

JOHN S. ORLANDO, CHIEF OF STAFF
JOHN M. CLOUGH, JR., STAFF DIRECTOR

U.S. House of Representatives
Committee on Energy and Commerce
Room 2125, Rayburn House Office Building
Washington, DC 20515

October 1, 1991

The Honorable William K. Reilly
Administrator
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Dear Administrator Reilly:

Enclosed is a memorandum and a proposed amendment to the Clean Air Act from Mr. Bill Orr, President of Octane International, Ltd. of Denver, Colorado who was referred to the Committee by Congresswoman Pat Schroeder. Mr. Orr claims that his firm is threatened with the possibility of going out-of-business because of the 1990 amendments to the Clean Air Act and the implementing regulations, including the recent regulatory negotiation agreement. He refers particularly to Section 211(k)(3)(B) which provides that reductions required "shall be on a mass basis." He suggests that an amendment may be offered in the Senate to the National Energy bill or an appropriations bill to address his concerns.

He is aware that I strongly oppose amendments to the CAA whether made directly or indirectly. Nevertheless, I am concerned, as is Congresswoman Schroeder, about these claims. I do not want to see businesses terminated and jobs lost under the CAA.

I request by October 24, 1991 your views and comments on his claims and the extent to which the CAA, the regulations, and the above agreement will affect his business and his employees. Please provide the details.

With best wishes.

Sincerely,

JOHN D. DINGELL
CHAIRMAN

Enclosure

cc: The Honorable Norman F. Lent, Ranking Minority Member
Committee on Energy and Commerce

The Honorable Philip R. Sharp, Chairman
Subcommittee on Energy and Power

The Honorable Carlos J. Moorhead, Ranking Minority Member
Subcommittee on Energy and Power

The Honorable Henry A. Waxman, Chairman
Subcommittee on Health and the Environment

The Honorable William E. Dannemeyer, Ranking Minority Member
Subcommittee on Health and the Environment

The Honorable Patricia Schroeder, Member
U.S. House of Representatives

Mr. Bill Orr, President
Octane International, Ltd.

Octane International, Ltd.

Bill Orr
President

2075 S. University #240
Denver, Colorado 80210

303-744-6449
FAX 303-744-6581

PROPOSED AMENDMENT TO 211(h)(4)

42 USC Section 7545 CAA section 211
(h) Reid Vapor Pressure requirements

(4) ~~Ethanol Waiver~~ **Alcohol Waivers** - For fuel blends containing gasoline and 10 percent denatured anhydrous ethanol, **or methanol blends waivered under Section 211(f)**, the Reid vapor pressure limitation ~~under this subsection~~ shall be one pound per square inch (psi) greater than the applicable Reid vapor pressure limitations established under **subsections (k), (m),** paragraph (1) **of this subsection, and regulations promulgated thereunder**; Provided, however, That **for paragraph (1) of this subsection when utilizing ethanol** a distributor, blender, market, reseller, carrier, retailer, or wholesale purchaser-consumer shall be deemed to be in full compliance with the provisions of this subsection and the regulations promulgated thereunder if it can demonstrate (by showing receipt of a certification or other evidence acceptable to the Administrator) that--

(A) the gasoline portion of the blend complies with the Reid vapor pressure limitations promulgated pursuant to this subsection;
(B) the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4); and
(C) no additional alcohol or other additive had been added to increase the Reid Vapor Pressure of the ethanol portion of the blend.

THE AMENDMENT IS NECESSARY BECAUSE:

* Substantial resources have been expended to develop technology employing alcohols for fuel additive usage.

* Ethanol blends are produced from renewable biomass resources. Methanol blends can be produced from natural gas, renewable resources, garbage, lignite and coal, including high sulphur containing coal. Thus significant quantities of sulphur containing coal can be employed to produce pollution reducing alcohol additives, without risking adverse sulphur emissions normally associated with burning such coals. Significant additional employment opportunity exists in those states with the natural gas and coal resources.

* At the one pound Reid Vapor Pressure (RVP) exemption the ozone formation potential properties of methanol blends are the same as, if not modestly better than ethanol. Reduced ozone formation potential at elevated RVP's was the grounds for which Congress exempted ethanol's 1 psi at 211(h). To deny methanol blends which perform as good or better the same exemption is grossly discriminatory.

* The proposed regulations for reformulated fuels under 211(k), do not consider the ozone formation potential on the basis of reactivity. Rather Volatile Organic Compounds (VOC) under the ACT are strictly defined on a mass basis, meaning that VOC's with little or no reactivity are treated the same as VOC's having very high reactivity/ozone formation potential. Therefore, while 211(h) provides an RVP exemption, the proposed regulations of 211(k) operate to deny said exemption, providing MTBE an undeserved advantage.

* In order to comply with the ACT and given the nature of the refining industry, distribution systems, opt in procedures, etc., industry experts estimate that 50% of the U.S. gasoline pool will be reformulated by 1997-2000.

* **Without the proposed amendment the economic viability of environmentally attractive and previously 211(f) waivered alcohol additives is <u>non-existent</u>. Industry will not make the necessary capital investment to expand capacity. Without the availability of alcohol additives the full implementation of the reformulated fuels portion of the Act is not likely. Severe feedstock and other limitations exist which will prelude MTBE from satisfying mandated requirements.**

* The proposed amendment provides an even playing field for all EPA approved additives based upon technical merit.

September 20, 1991

FAX

To: Bill Orr, Octane International,Ltd.

Fax No. 202-783-1523

From: Bill Marshall, NIPER

Phone No. 918-337-4253

The attached is an analysis of the effects of methanol blending on ozone formation potential.

09/20/91 13:07 NIPER OKLA. NO. 972 P001/003

It should be noted that the reactivity of ethanol in terms of Carter's Maximum Incremental Reactivity is 0.70 gram ozone/gram ethanol. Methanol is even lower at 0.40 gram ozone/gram methanol.

Further, the EPA waivered methanol blends will employ methanol concentrations not exceeding 5% by volume, one half that of ethanol. The methanol blends will also contain co-solvents at up to 5% by volume. The likely co-solvents include ethanol and tertiary butyl alcohol (TBA). TBA has an even lower reactivity of 0.29 gram ozone/gram TBA.

Since the reactivity of methanol and its likely co-solvents are less than ethanol, one could easily assume (using the same analytical methodology of the Systems Applications study cited above) that methanol blends adjusted for a 1 psi RVP increase would not necessarily create ozone formation potential greater than the base fuel. Further, the ozone formation potential for an RVP adjusted methanol blend could likely be less than the equivalent ethanol blend.

Effects of Blending Methanol into Gasoline on the Ozone Forming Potential of Evaporative Emissions

Hydrocarbons are emitted from automobile fuel systems by evaporation. These evaporative emissions are considered to be a significant portion of the photochemically reactive materials in urban atmospheres that produce ozone in the presence of sunlight and nitrogen oxides. The mass of evaporative emissions has been correlated with the vapor pressure of the fuel. This is the basis for the EPA's Reid Vapor Pressure (RVP) regulations for reformulated fuels.

However, ozone formation potential is not only a function of RVP, it is also a function of the reactivity of the composition of the emitted evaporative product. To understand the nature of ozone formation potential, reactivity must be considered. Different evaporative hydrocarbons will elicit a wide range of reactivity and regulation solely on the basis of mass emissions overlooks this important technical fact. It is very conceivable that by using only mass emissions regulation, poorer ozone performing fuels would be approved over superior performing fuels.

For example, it is known that the addition of lower molecular weight alcohols (methanol and ethanol) increases RVP and, subsequently, increases evaporative emissions. However, the net effect of this evaporative increase on ozone formation potential has not been established.

Reactivity of emissions (including evaporative emissions) of alcohol blends was the subject of an April 14, 1989 study prepared by Systems Applications, Inc. This study, which employed ethanol, concluded that 10% ethanol blends, which increase RVP approximately 1 psi over the base fuel, in fact reduce ozone formation potential when compared to the lower RVP base fuel.

09-20-91 13:07 NIPER OMA NO. 972 P002/003

	MaxRct	Max O3
	gO3/gHC	
Methane	0.01	0.007
Ethylene	5.30	2.600
Ethane	0.15	0.097
Acetylene	0.37	0.270
Propylene	6.60	2.800
Propane	0.33	0.230
Methylacetylene	0.37	0.270
Propadiene	7.70	3.000
Isobutane	0.85	0.570
Isobutylene	4.20	1.700
1-Butene	6.10	2.400
1,3-Butadiene	7.70	3.000
Butane	0.64	0.420
trans-2-Butene	7.30	2.800
2,2-Dimethylpropane	0.19	0.099
1-Butyne	0.37	0.270
cis-2-Butene	7.30	2.800
3-Methyl-1-butene	4.20	1.700
Methanol	0.40	0.220
Isopentane	0.88	0.590
1-Pentene	4.20	1.600
2-Methyl-1-butene	3.70	1.500
Pentane	0.64	0.450
trans-2-Pentene	6.20	2.300
3,3-Dimethyl-1-butene	3.00	1.160
cis-2-Pentene	6.20	2.300
2-Methyl-2-butene	5.00	1.800
Ethanol	0.70	0.340
2,2-Dimethylbutane	0.41	0.270
Cyclopentene	4.00	1.410
4-Methyl-1-pentene	3.00	1.160
3-Methyl-1-pentene	3.00	1.160
Cyclopentane	1.60	1.000
2,3-Dimethylbutane	0.74	0.540
2,3-Dimethyl-2-butene	4.40	1.600
2-Methylpentane	0.91	0.550
3-Methylpentane	0.95	0.630
2-Methyl-1-pentene	3.00	1.160
3-Methyl-trans-2-pentene	5.30	1.900
1-Hexene	3.00	1.160
Methyl t-Butyl Ether	0.40	0.220
Hexane	0.61	0.440
trans-3-Hexene	5.30	1.900
cis-3-Hexene	5.30	1.900
trans-2-Hexene	5.30	1.900
2-Methyl-2-Pentene	5.30	1.900
3-Methyl-cis-2-pentene	5.30	1.900
4,4-Dimethyl-1-pentene	2.40	0.880
cis-2-Hexene	5.30	1.900
3-Methyl-trans-2-pentene	5.30	1.900
3,3-Dimethyl-1-pentene	2.40	0.880
2,2-Dimethylpentane	0.85	0.530

EMISSION STANDARDS FOR CLEAN-FUEL VEHICLES UNDER THE CLEAN AIR ACT AMENDMENTS OF 1990

Introduction and Summary

The Clean Air Act Amendments of 1990[1] (the Act) revised emission standards for conventionally fueled vehicles such as those powered by gasoline or diesel fuel. The Act also established separate emission standards for clean-fuel vehicles, including those that will satisfy the fleet vehicle and California Pilot Program requirements of the legislation. The exhaust emission standards that apply to clean-fuel vehicles comprise a comprehensive set of standards that govern the certification of such vehicles. Consequently, clean-fuel vehicles will not be required to meet exhaust emission standards that apply to conventionally fueled vehicles.

This conclusion is reinforced by the legislative history of the Act. The House and Senate versions of the Clean Air Act Amendments[2] clearly intended conventional vehicle standards to apply to clean-fuel vehicles in the fleet program. The gas industry and natural gas vehicle industry informed the House/Senate Conference Committee that a total hydrocarbon (THC) standard had the potential to undermine the clean-fuel fleet program. The Conference Committee resolved this issue by adopting the California emission standards, which do not include a THC. As a result, the House and Senate Conference Committee abandoned the original House

---

[1]Pub. Law No. 101-549 (November 15, 1990).

[2]H.R. 3030 and S. 1630, respectively.

and Senate approaches and, instead, adopted the comprehensive exhaust emission standards framework for clean-fuel vehicles that now appears in the Act. Consequently, EPA does not have authority to impose a total hydrocarbon exhaust emission standard on natural gas vehicles. A further explanation of the reasoning for this conclusion is provided herein.

The Act Adopted California Low-Emission Vehicle Standards

The Act establishes specific exhaust emission standards for non-methane organic gases (NMOG), carbon monoxide (CO), nitrogen oxides (NO_x), formaldehyde (HCHO), and particulates (PM)[3] that alternative fuel vehicles must meet to be considered clean fuel vehicles, for purposes of the fleet vehicle program and the California Pilot Program.[4] These standards are taken from and are identical to those proposed by the California Air Resources Board (CARB) and approved by the State of California for low-emission motor vehicles. In addition to codifying the CARB standards as those applicable to clean-fuel vehicles, the Act also requires the standards imposed on clean fuel vehicles to be consistent with and reflect the policy judgments and interpretations of the CARB.

The adoption of the CARB program is specified in section 229 of the Act, which adds new sections 242 and 243 to the Clean Air Act. Section 242 directs EPA to promulgate regulations for clean-fuel vehicles, including those contemplated by the fleet program

---

[3]The standard for particulates applies only to vehicles that use diesel fuel.

[4]See, section 229 of the Act.

and the California Pilot Program. Section 243 specifies what the standards must be for the pollutants listed above. Importantly, the standards mandated by new section 243 are not standards for clean-fuel vehicles that can be found in either the House or Senate bills that would have amended the Clean Air Act. Rather, these standards for NMOG, CO, NO_x, HCHO, and PM are identical to the California standards for such emissions. The standards do not include a total hydrocarbon standard.

Evidence of the intent to adopt California's standards for the clean-fuel vehicle program can be found by examining the waiver provisions of the Clean Air Act. The Act retained California's authority under section 209 of the Clean Air Act to waive the otherwise applicable federal standards in favor of California's own standards. However, this waiver does not mean that California does not apply federal standards; rather, California's standards are the federal standards in that state. The Conference Committee sought to develop federal standards for the clean-fuel vehicle program, but it was cognizant of the need to avoid inconsistencies between the federal standards for the clean-fuel vehicle program and the federal standards in California represented by the low-emission vehicle standards. To avoid conflicting federal standards, the Conference Committee simply adopted the California standards. Sections 242(b) and 244 of the Act further reflect the concern about conflicting standards by making certain that the clean-fuel vehicle program standards are administered and enforced the same as the California standards.

Further indication that the Act simply adopted the CARB low emissions program, and intends to retain its connection to the CARB program, lies in the provision for future adjustments to the program. New section 243(e) of the Clean Air Act specifies that the emissions standards for federal clean-fuel vehicles will be reduced in lockstep with new reduced standards that California may adopt in the future, provided California amends its standards to be even more stringent than current standards. Even in the unlikely event that California amends its standards in the future to be less stringent, new section 243(f) would automatically adopt those less stringent standards for up to two years for federal clean-fuel vehicles.

Under the California low-emissions program, no standard for total hydrocarbons is applied to alternative fuel vehicles. The CARB program has identified NMOG as the ozone-producing emissions from vehicles that must be strictly controlled. Total hydrocarbon emissions have been determined by California to be over-inclusive for the purpose of controlling ozone-producing emissions. Further, the adoption of total hydrocarbon controls could have a negative impact on ozone control by possibly excluding certain alternative fuels from the market. By adopting the California low-emission vehicle program, Congress adopted an emission standards framework that does not include a total hydrocarbon standard. Application of a total hydrocarbon standard to alternative fuel vehicles would be contrary to the emissions framework adopted by the Conference Committee on the Act.

The Legislative History of the Act Supports the Conclusion that Conventional Vehicle Emission Standards Do Not Apply to Clean-Fuel Vehicles

The comprehensive set of exhaust emission standards for clean-fuel vehicles adopted in the Act evidences a clear Congressional intent that the CARB standards would be the sole exhaust emission standards applicable to clean-fuel vehicles. This intent is even clearer when the differences between the final legislation and the House and Senate bills are considered. For example, the House bill to amend the Clean Air Act would have required EPA to promulgate regulations under section 202(a) that would have contained specific emission standards applicable to clean-fuel vehicles. The bill specifically provided, "In addition to the specific requirements set forth in this paragraph [establishing the specific emission standards for clean-fuel vehicles], the standards applicable to such vehicles shall require compliance with the most stringent standard applicable under section 202 to emissions from conventional vehicles of the same type and model year."[5] Because EPA's total hydrocarbon standard was promulgated under section 202 of the Clean Air Act, this language would unquestionably have imposed the existing total hydrocarbon standard on clean-fuel vehicles.

Similarly, the Senate bill would have unquestionably retained the total hydrocarbon standard for clean-fuel vehicles. The

---

[5] See, proposed Clean Air Act section 212(b)(4) under section 201(b) of S. 1630, 101st Cong., 2d Sess. (as passed by House of Representatives May 23, 1990).

proposed amendment would have required EPA to promulgate emission standards for both a federal and a private clean-fuel fleet program. These standards, for ozone-forming VOCs, carcinogenic air pollutants, and HCHO, would have been imposed on clean-fuel vehicles "in addition to the standards otherwise applicable . . ." under section 202(a) of the Clean Air Act.[6] Since the total hydrocarbon standard is one of the standards that would be "otherwise applicable," it would have applied to clean-fuel vehicles under the Senate bill.

Despite the close similarity of the language in the House and Senate bills, the Conference Committee on the Act rejected the approach of establishing clean-fuel vehicle emission standards as supplemental to section 202(a) standards. Rather, the Conference Committee agreed upon a new and different plan for establishing emission standards for clean-fuel vehicles. Under this approach, EPA is directed to promulgate regulations for clean-fuel vehicles under the authority of new section 242(a),[7] rather than section 202(a). New subsection 242(a) clearly states that the regulations for clean-fuel vehicles are contained in a separate part of the Clean Air Act (Title II, Part C -- Clean Fuel Vehicles), rather than the part of the statute that controls emissions from conventional vehicles (Title II, Part A -- Motor Vehicle Emission

---

[6]See, proposed Clean Air Act section 212(a)(1)(A), section 206(b) of S. 1630, 101st Cong., 2d Sess. (as passed by the U.S. Senate April 3, 1990).

[7]Clean Air Act Amendments of 1990, 42 U.S.C. section 7582 (1990).

and Fuel Standards). Neither new section 242 nor any other provision of the Act directs EPA to publish standards for clean-fuel vehicles under section 202 of the Clean Air Act, unlike the House and Senate bills. By explicitly rejecting the approach in the Senate and House bills, in favor of establishing a new section 242, Congress clearly decided that clean-fuel vehicles would be subject only to the standards of new section 242. For this reason, the total hydrocarbon standard under section 202(a), applicable to conventional vehicles, is irrelevant to alternative fuel, clean fuel vehicles.

The Comprehensive Nature of the Clean-Fuel Vehicle Emission Standards Further Indicates that Conventional Vehicle Standards Do Not Apply

Not only did the Conference Committee establish new authority under section 242 to promulgate standards for clean-fuel vehicles, it also specified in section 243[8] the standards to be established. These standards are comprehensive in nature. The standards cover emissions of NMOG, CO, NO_x, HCHO, and PM. As stated earlier, the standards are identical to the standards promulgated by CARB for transitional low-emission vehicles (TLEVs) and low-emission vehicles (LEVs). Because NMOG emissions include reactive hydrocarbons, and standards must be promulgated for both NMOG and NO_x (the ozone precursors emitted from vehicles), the Conference Committee systematically devised a framework for controlling emissions that contribute to ozone formation that is completely

[8]Clean Air Act Amendments of 1990, 42 U.S.C. section 7583.

separate from the total hydrocarbon standard that applies to conventional vehicles.

Reference to the CO and NO_x standards for clean-fuel vehicles makes it clear that Congress intended the emissions standards under section 243 to provide a comprehensive framework of emission standards for such vehicles. The CO standards for all passenger cars and light-duty trucks that are clean-fuel vehicles under section 243 are identical to the CO standards for corresponding vehicle classes under the revised section 202 CO standards for conventional vehicles.[9] The NO_x standards for clean-fuel vehicles are nearly identical to the NO_x standards for conventional fuel vehicles of corresponding weight classes under revised section 202.[10] If the standards for conventional vehicles had been intended to apply to clean-fuel vehicles, there would have been no reason to restate the CO and NO_x standards for clean-fuel vehicles in a new section 243; the emissions framework for clean-fuel vehicles, like the earlier House and Senate versions, would simply have referenced the standards under section 202 to apply the CO and NO_x standards to such vehicles.

---

[9] See, Clean Air Act Amendments of 1990, section 203.

[10] The NO_x standards for phase I clean-fuel vehicles and phase I conventional vehicles are the same. The NO_x standards for phase II of the clean-fuel vehicle standards for passenger cars and light-duty trucks up to 6,000 lbs. gvwr are lower than the phase I standards for conventional vehicles in similar weight classes. The NO_x standards for conventionally-fueled light-duty trucks over 6,000 lbs. gvwr that are certified for 120,000 miles are very slightly different than the NO_x standard for clean-fuel vehicles of corresponding weight classes that are certified for 120,000 miles.

The fact that the Conference Committee found it necessary to include CO and NO_x standards for clean-fuel vehicles in section 243, under the authority of section 242, further indicates that the emissions standards under section 243 represent a comprehensive emission framework for clean-fuel vehicles. The Conference Committee realized that it was establishing new authority for clean-fuel vehicle emissions that was separate from the authority of section 202, and that no standards for CO and NO_x would apply to clean-fuel vehicles unless they were included in new sections 242 and 243. In short, the new emissions framework for clean-fuel vehicles supplanted any emissions standards for conventional vehicles under section 202.

The "Other Requirements" Provision in Section 242(b) Does Not Apply to Emission Standards

Section 242 is not limited to exhaust emission standards. Rather, the provision establishes an "umbrella" for all of the requirements that will apply to clean-fuel vehicles. The requirements are broken down into three categories in the text of section 242. Two of these categories, "(a) Promulgation of Standards." and "(b) Other Requirements." are important to this analysis.

Category "(a) Promulgation of Standards." provides authority for EPA to publish regulations that contain the "standards" for clean-fuel vehicles identified in Part C of the revised Clean Air Act. The Conference Committee identified the numerical emission levels that make up the standards very specifically under "Sec.

243. Standards for Light-duty Clean Fuel Vehicles." These standards under section 243 are the comprehensive standards discussed above.

Subsection 242(b) addresses other requirements for clean-fuel vehicles. Under the "umbrella" of the requirements addressed in the heading for section 243, this represents a second, but distinct, important area of regulation for clean-fuel vehicles. The subheading for section 242(b) makes this clear by stating that section 242(b) applies to "other requirements" (i.e., requirements other than the standards addressed in section 242(a)). Taking into account the comprehensive emissions framework for clean-fuel vehicles that is laid out by section 242(a) and section 243, it would be illogical to interpret section 242(b) without reference to the restrictive use of the word "other" in the subheading for section 242(b).

Section 242(b) must be construed in light of the structure of the statute. Considering the comprehensive emissions framework for clean fuel vehicles, the word "other" has to address requirements that are entirely appropriate for clean-fuel vehicles but that do not include an intrusion into the emission framework specified in section 242(a) and section 243. In fact, the type of requirements contemplated in section 242(b) are identified in the parenthetical of the first sentence of that section. This sentence states that:

> Clean-fuel vehicles of up to 8,500 gvwr subject to standards set forth in this part shall comply with all motor vehicle requirements of this title (<u>such as requirements relating to on-board diagnostics, evaporative emissions, etc.</u>) which are

> applicable to conventional gasoline-fueled vehicles of the same category and model year, except as provided in section 244 with respect to administration and enforcement, and except to the extent that any such requirement is in conflict with the provisions of this part.

On-board diagnostics, evaporative emissions, and similar requirements for gasoline vehicles are certainly important but are not the primary target of restrictions on vehicle pollutants. Exhaust emissions are the primary target, and if such emissions had been intended to be included in the "other" requirements of subsection 242(b) they would have been identified in the parenthetical along with on-board diagnostics and evaporative emissions. This is particularly true since the comprehensive emissions framework for clean-fuel vehicles was spelled out with great specificity in section 243 and would be undermined by reading into subsection 242(b) a reference to the conventional vehicle standards of section 202. The Conference Committee could not have intended that its carefully drafted comprehensive emissions framework for clean-fuel vehicles would be overridden by some admittedly ambiguous language in the first sentence of the text of subsection 242(b) that would subject clean-fuel vehicles to the emission standards for conventional vehicles under section 202. Because subsection 242(b) applies to requirements "other" than exhaust emission standards, the exhaust emission standards for conventional vehicles are rendered irrelevant to those for clean-fuel vehicles.

The Act Requires that the Administration of the Clean-Fuel Vehicle Program Be Consistent With CARB

To ensure that the clean-fuel vehicle program would be administered consistently with both the CARB program and the Act itself, the Conference Committee on the Act included language that provides two general areas of guidance in the form of two restrictions on interpretation. These restrictions are found in new subsection 242(b) of the Clean Air Act. Even if the requirements for conventional vehicles were interpreted under subsection 242(b) to have the potential to impose section 202 standards on clean-fuel vehicles, these restrictions would prevent the application of conventional vehicle standards to clean-fuel vehicles.

The first restriction specifies that the "other" requirements for conventional vehicles that must be met by clean-fuel vehicles must be administered and enforced the same as the CARB program would administer and enforce such requirements. That is, subsection 242(b) provides that requirements for conventional vehicles must be applied to clean-fuel vehicles of the same category and model year "except as provided in section 244 with respect to administration and enforcement . . ."

Section 244 specifies that the clean-fuel vehicle program under the Act is intended to be administered and enforced in the same manner as the CARB program. The section states:

> Where the numerical clean-fuel vehicle standards applicable under this part to vehicles of not more than 8,500 lbs. gvwr are the same as numerical emission standards

> applicable in California under the Low-Emission Vehicle and Clean Fuels Regulations of the California Air Resources Board ('CARB'), such standards shall be administered and enforced by the Administrator --
>
> (1) in the same manner and with the same flexibility as the state of California administers and enforces corresponding standards applicable under the Low-Emission Vehicle and Clean Fuels Regulations of the California Air Resources Board ('CARB'); and
>
> (2) subject to the same requirements, and utilizing the same interpretations and policy judgments, as are applicable in the case of such CARB standards, including, but not limited to, requirements regarding certification, production-line testing, and in-use compliance,
>
> unless the Administrator determines (in promulgating the rules establishing the clean fuel vehicle program under this section) that any such administration and enforcement would not meet the criteria for a waiver under section 209. Nothing in this section shall apply in the case of standards under section 245 for heavy-duty vehicles.

Hence, section 244 contains an important qualifier in that it will apply only where the numerical standards under Part C for clean-fuel vehicles up to 8,500 lbs. gvwr are the same as CARB standards for such vehicles. In fact, the standards for emissions of NMOG, CO, NO_x, HCHO, and PM from clean-fuel vehicles in section 243 (the standards under Part C for vehicles up to 8,500 lbs. gvwr) are identical to the standards for such emissions under the CARB program. Therefore, the criteria for applying section 244 to clean-fuel vehicles are met. Thus, section 244 controls the "administration and enforcement" of these programs pursuant to the directive of subsection 242(b).

Since section 244 applies to the clean-fuel vehicle program, the program must be subject to the same requirements as the CARB program, and EPA must use the same interpretations and policy judgments as CARB in administering and enforcing the programs. In this context, the imposition of the NMOG standard is a policy judgment aimed at controlling ozone formation. CARB has made the policy determination that the appropriate way to control ozone formation is to ratchet down emission standards for NO_x and NMOG, not total hydrocarbons. In light of CARB's policy judgment on this standard, the language of subsection 244(2) binds EPA to CARB's policy judgment that an NMOG emission standard supplants a total hydrocarbon emission standard. Consequently, EPA is required to apply an NMOG standard to clean-fuel vehicles, instead of a total hydrocarbon standard.

Moreover, section 244(1) specifies that numerical standards in the Act that are the same as CARB standards must be administered and enforced "in the same manner and with the same flexibility" as the CARB standards. Imposing a total hydrocarbon standard on clean-fuel vehicles would violate this mandate by requiring such vehicles to meet a two-tier hydrocarbon standard (total hydrocarbon and NMOG) for essentially the same emissions with respect to the federal programs.

The second restriction under subsection 242(b) is that the "other" requirements for clean-fuel vehicles must not conflict with the provisions of Part C. The imposition of a total hydrocarbon standard on clean-fuel vehicles would represent exactly the kind of

conflict that subsection 242(b) provides should not be permitted under the guise of imposing conventional vehicle standards on clean-fuel vehicles, natural gas vehicles (NGVs) in particular. The NMOG standard in section 243 is intended to play a part in a comprehensive framework in which clean-fuel vehicles can be placed in service by targeted fleets in urban areas. Within this framework, the NMOG standard assures reasonable control of hydrocarbon emissions that would contribute to ozone formation. NGVs could meet the applicable NMOG standard for controlling harmful hydrocarbon emissions but perhaps not a total hydrocarbon standard (85% or more of hydrocarbon emissions from NGVs are nonreactive, with the remaining portion being the reactive type that contributes to ozone formation). Thus, the application of a total hydrocarbon standard could preclude NGVs from being placed in service. This would undermine the entire clean-fuel vehicle fleet program by excluding an acknowledged clean alternative fuel and skewing the market for alternative fuels in favor of competing alternative fuels. The illogical application of a total hydrocarbon standard that causes a vehicle with very low levels of harmful emissions to be banned from the fleet program would represent a clear and serious conflict with the clean-fuel vehicle program. It is precisely this type of conflict that the exception of subsection 242(b) is designed to avoid.

Two-Car Policy

One of the issues that dominated the Conference Committee was the potential that Title II of the Act could require automobile manufacturers to manufacture many variations of the same car to meet differing regulatory requirements. The policy goal was to establish a two-car program: one that met CARB standards, and one that met federal standards.

The imposition of a total hydrocarbon standard on clean-fuel vehicles would result in a three car program -- a California car that is not subject to a total hydrocarbon standard, a federal clean-fuel vehicle car that would be subject to a total hydrocarbon standard and a conventional federal car. If EPA established yet a different standard for alternative fuel vehicles that are not clean-fuel vehicles, a fourth car would emerge. Such a result clearly would be at odds with what the Congress intended to achieve in the Act. Moreover, such a policy would be illogical and could seriously erode prospects for the development and commercialization of alternative fuel vehicles.

Environmental Policy

The goal of the clean-fuel vehicle program in the Act was to place vehicles on the road that could achieve significant reductions of emissions as compared to conventional fuel vehicles. We recommend that, from a purely environmental policy perspective, EPA consider the application of a total hydrocarbon standard on clean-fuel vehicles with this principle in mind.

NGVs can achieve reductions of 85 - 90 percent of reactive hydrocarbons and well over 90 percent of CO. These reductions can be achieved even while achieving NO_x emissions that are at least as low as such emissions from conventional vehicles. These emissions can provide very substantial improvements in air quality if significant numbers of other vehicles are displaced by NGVs in the urban areas in which fleet programs will be initiated under the Act. Interpretation of the Act to exclude a vehicle that can achieve emissions reductions of these magnitudes would stand the environmental policy sought by the Act on its head. Rather than undercut the policy of putting cleaner vehicles on the road, the Act should be interpreted in such a way that clean alternative fuel vehicles are encouraged. To achieve this policy goal, the NMOG standard for clean-fuel vehicles should supplant a total hydrocarbon standard.

Conclusion

The Conference Committee on the Clean Air Act Amendments of 1990 rejected the emission standards for clean-fuel vehicles that were contained in the House and Senate proposals. Rather than devise an emissions scheme that would require vehicle manufacturers to build vehicles that meet the redundancy of both an NMOG and a total hydrocarbon standard, the Committee chose to adopt a comprehensive emissions framework modeled on the CARB program for clean-fuel vehicles. This framework includes a reasonable

restriction on hydrocarbon emissions by requiring clean-fuel vehicles to meet the NMOG standard in lieu of a total hydrocarbon standard.

In fact, the Conference Committee drafted a comprehensive framework for all emissions from clean-fuel vehicles. The emissions standards found in new section 243, implemented under the authority of new section 242, cover emissions of CO, NO_x, HCHO, and PM in addition to NMOG. Standards for these emissions under section 243 would not be necessary and would not have been restated in the case of CO and NO_x if standards for conventional vehicles had been intended to apply to clean-fuel vehicles.

Even if section 242 could be interpreted to mean that conventional standards should be applied to clean-fuel vehicles, a total hydrocarbon standard for clean-fuel vehicles would be prohibited. Such a standard would violate section 242's mandate that conventional vehicle requirements cannot be imposed on clean-fuel vehicles where such standards do not comport with the CARB standards or where conventional standards would conflict with the whole clean-fuel vehicle program.

DRAFT

MEMORANDUM

SUBJECT: Volatile Organic Compound (VOC) Emission Reductions Under the Reformulated Gasoline Provision of the Clean Air Act

FROM: Alan W. Eckert
Associate General Counsel
Air and Radiation Division

TO: E. Donald Elliott
General Counsel

The attached analysis by Nancy Ketcham-Colwill of my staff addresses a problem of statutory interpretation confronted in the implementation of the reformulated gasoline provision of the Clean Air Act (Act) as recently amended. New section 211(k) requires the marketing of reformulated gasoline in the nine worst ozone non-attainment areas, beginning January 1, 1995, with a procedure for other areas to opt into the program. EPA regulations implementing the program "shall require the greatest reduction [in VOCs and toxics] achievable through the reformulation of conventional gasoline, taking into consideration" costs, health and environmental impacts, and energy requirements (section 211(k)(1)). The regulations must also require that reformulated gasolines comply with the more stringent of either a specified formula (restricting the content of various substances such as benzene) or a performance standard (requiring a 15 percent reduction in emissions of VOCs and toxics) (section 211(k)(3)). The performance standard is measured against a baseline gasoline which is defined as having, among other things, a Reid vapor pressure (RVP) of 8.7 pounds per square inch (psi) (section 211(k)(9)).

Under new section 211(h), the RVP of conventional gasoline sold in southern parts of the country must be reduced to 7.8 psi beginning in 1992. As a result of this reduction in RVP, the VOC emissions of conventional gasoline sold in the south will be reduced by 15 percent. If reformulated gasoline is required to reduce VOC emissions by no more than the 15 percent specified in section 211(k)(3), it will provide no more reductions in VOCs than conventional gasoline will in four of the nine ozone nonattainment areas in which reformulated gasoline must be sold.

The attached analysis considers two questions regarding implementation of the VOC reduction requirement of section 211(k). Does the Agency have authority to define baseline gasoline as having an RVP lower that 8.7 in southern areas, so that southern areas will obtain a 15 percent reduction in VOCs compared to baseline gasoline emissions? If not, does the Agency have authority to require that reformulated gasoline obtain more than a 15 percent reduction in VOCs compared to baseline gasoline emissions?

As always, our analysis is governed by Chevron v. NRDC, 467 U.S. 837 (1984). If Congress has spoken with clarity on the matter, that ends our inquiry. If the statute is ambiguous, EPA's interpretation will be upheld unless clearly contrary to the statutory purposes.

As discussed in more detail in the accompanying analysis, I believe that EPA may not interpret the statutory definition of baseline gasoline as providing for an RVP in addition to and different than the RVP specified. Section 211(k)(9) defines the RVP of baseline gasoline and there is no indication that EPA has discretion to specify an additional, different RVP for baseline gasoline. Congress has spoken clearly on this issue.

At the same time, section 211(k)(1) mandates that the reformulated gasoline regulations "shall require the greatest reduction in emissions [of VOCs and toxics] achievable" in light of the various noted factors. The more detailed requirements of section 211(k), such as the performance standards, must be read in conjunction with this overall mandate to obtain the greatest achievable reductions. This leads to the conclusion that the 15 percent performance standards for VOC and toxics emissions are minimum requirements, subject to the overriding requirement that the greatest achievable reductions be obtained. Therefore, if EPA determines that reductions greater than 15 percent are achievable, after considering all the factors noted in section 211(k)(1), the Agency is required to establish a stricter performance standard, whether for VOCs, toxics, or both. The Administrator's obligation might therefore be described as "conditionally mandatory" -- a discretionary determination by the Administrator that reductions greater than 15 percent are achievable would trigger a mandatory obligation to set a more stringent performance standard.

Even if the view that the statute sets forth a conditionally mandatory duty to set a tighter performance standard is not the only possible view of the statute, it is certainly a permissible one. The interplay between the overarching requirement of sections 211(k)(1) and the minimum baseline requirements of section 211(k)(9) provide at least a sound statutory footing for the interpretation set forth above,

DRAFT

and that interpretation would thus be upheld by the courts under Chevron.

REFORMULATED GASOLINE
VOC REDUCTION REQUIREMENT

I. INTRODUCTION

Bill Rosenberg has asked for your opinion on whether EPA can interpret section 211(k) of the Clean Air Act as recently amended to require, or at least authorize EPA to require, that reformulated gasoline achieve a 15% reduction in VOC emissions in every ozone nonattainment area. Bill believes that the reformulated gasoline provision included in the 1990 amendments was intended to achieve 15% VOC reductions in every area.

Section 211(k) specifies a baseline gasoline for measuring VOC reductions that has a Reid Vapor Pressure (RVP) of 8.7 pounds per square inch (psi). RVP as used here is a measure of gasoline volatility, which is a major determinant of a gasoline's VOC emissions (the higher a gasoline's RVP, the greater its VOC emissions). However, under section 211(h) gasoline volatility must be (and already has been) reduced to at least 9.0 everywhere and to 7.8 in southern ozone nonattainment areas. The requirement that reformulated gasoline achieve a 15% reduction in VOCs from baseline gasoline with 8.7 RVP thus appears to obtain little ozone reduction benefits for southern ozone nonattainment areas, which include four of the nine ozone nonattainment areas covered by the reformulated gasoline program -- Los Angeles, San Diego, Houston and Baltimore. Such a result is unacceptable to Bill. He would like to know if we have discretion regarding the baseline gasoline specifications laid out in section 211(k), or if we have the authority to require that reformulated gasoline achieve VOC reductions greater than 15%.

II. BACKGROUND

A. The Reformulated Gasoline Provision [Tab A]

Section 211(k) prohibits the sale of gasoline not certified as reformulated to consumers in the nine worst ozone nonattainment areas beginning in 1995. (States may elect to include other ozone nonattainment areas in the program.) It requires EPA to promulgate reformulated gasoline regulations within one year of enactment. It contains several provisions relating to the requirements gasoline must meet to be certified as reformulated:

- Section 211(k)(1) states that the regulations EPA is required to promulgate "shall require the greatest reduction in emissions of ozone forming [VOCs] . . . and emissions of toxic air pollutants . . . achievable through the reformulation of conventional gasoline,

taking into consideration" costs, health and environmental impacts and energy requirements.

- Section 211(k)(2) provides that the regulations must require that reformulated gasoline comply with section 211(k)(3) and the content requirements (e.g., 1% cap on benzene, 2.0 percent oxygen minimum) set forth in section 211(k)(2) itself.

- Section 211(k)(3) states that reformulated gasoline must comply with the more stringent of the requirements set forth in subparagraphs (A) and (B).

  - Subparagraph (A) lays out a formula fuel.

  - Subparagraph (B) establishes performance standards of 15% reductions in VOCs during the high ozone season and 15% reductions in toxics during the entire year, as compared to such emissions from "baseline gasoline." Subparagraph (B) further provides that EPA is to substitute 25% for the 15% effective in the year 2000, except that EPA may adjust such 25% reduction requirement to no less than 20% or to a percentage greater than 25% based on technological feasibility, considering costs. EPA has already determined that the formula fuel does <u>not</u> achieve greater VOC reductions, so the 15% VOC reduction requirement applies.

- Section 211(k)(10)(B)(i) defines summertime baseline gasoline (the relevant baseline for the required VOC reductions) as meaning "a gasoline which meets the following specifications," including a specification for RVP 8.7 psi.

- Section 211(k)(4) requires EPA to certify a gasoline as being reformulated if it meets the content requirements of paragraph (2) and achieves equivalent or greater reductions in VOC and toxic emissions than are achieved by a gasoline meeting the "applicable requirements of paragraph (3)."

B. <u>The RVP Provision</u> **[Tab B]**

Section 211(h) requires EPA within one year of enactment to issue regulations making it unlawful to sell gasoline having an RVP greater than 9 psi beginning with the ozone season of 1992. It further requires that the regulations establish more stringent RVP standards in a nonattainment area as EPA finds necessary to achieve comparable per vehicle evaporative emissions in nonattainment areas. (Climate affects a gasoline's

volatility, with the combination of high RVP and warm weather resulting in the greatest VOC emissions. For southern areas to obtain as much emission reduction benefit as norther areas will obtain with a 9 RVP gasoline, southern areas will need gasoline with an RVP not exceeding 7.8.)

C. The Legislative History

1. RVP **[Tab C]**

Since congressional committees reached agreement on the RVP provision before even considering the reformulated gasoline section, the legislative history of section 211(h) is the appropriate backdrop for considering Congress' later statements regarding reformulated gasoline requirements.

Early in the legislative process, EPA issued a proposed rule that would require that gasoline RVP be reduced to 9.0 in Class C areas (generally speaking, the northern states) and to 7.8 in Class B areas (generally, the southern states). The Bush bill included an RVP provision that tracked EPA's proposal, and the House bill adopted that provision in all relevant respects. The Senate bill similarly required reductions in RVP to at least 9.0 and also required that RVP be lowered further as needed in ozone nonattainment areas. The House bill provision was adopted by the conference and passed.

Several months before Congress passed the amendments, EPA issued the final rule requiring that RVP be lowered to 9.0 in Class C areas and to 7.8 in Class B areas and Class A areas (very southern areas). EPA in the preamble to the rule stated that areas could further lower RVP to 7.0 if needed to achieve or maintain ozone attainment.

2. Reformulated gasoline

The bills reported out of both the House and Senate committees contained reformulated gasoline provisions that were in alike in several relevant respects. **[Tab D -- House committee; Tab E -- Senate Committee]** Both mandated that EPA issue regulations requiring that reformulated gasoline achieve the greatest emission reductions achievable, considering costs and other factors, and neither specified fuel content or performance requirements that reformulated gasoline was to meet. The House committee bill contained language ("Such [reformulated gasoline]

standards shall require the greatest reduction in ozone-forming [VOCs] and air toxic emissions achievable through the reformulation of conventional gasoline, taking into consideration the cost . . .") that is virtually identical to that now found in section 211(k)(1).

The committee bills differed in scope, with the House providing for reformulated gasoline in ozone nonattainment areas and the Senate bill providing for reformulated gasoline nationwide. The Senate bill, however, included a provision allowing EPA to establish further fuel specifications as needed to achieve and maintain any national ambient air quality standard (NAAQS).

The reformulated gasoline provisions of both committee bills were amended on the floor. **[Tab F -- Senate; Tab G -- House]** In the case of both the House and Senate amendments, the language requiring the Agency to issue regulations requiring the greatest achievable emissions reductions considering costs, etc., was retained and specific fuel requirements were grafted on. I am not aware of any legislative history regarding the amendments themselves that explain the relationship between the requirement that the regulations require the "greatest achievable reductions" and the requirement that the regulations require compliance with specific fuel content and performance requirements.

The scope of both bills' reformulated gasoline provisions changed and became the same: reformulated gasoline was to be required in the nine worst ozone nonattainment areas with other areas able to opt in. The specific fuel requirements added by the amendments were in many respects similar. They called for a minimum oxygen content, a maximum benzene content, and a prohibition on heavy metals. The Senate amendment included a 15% VOC reduction requirement over "conventional gasoline with a [RVP] of 9.0 [psi] sold in calendar year 1989." The House amendment included a requirement similar to that now found in paragraph (3) of section 211(k): to comply with the more stringent of two provisions -- a specified formula fuel or 15% reductions in VOCs and toxics.

The House amendment's 15% reduction requirement was different from section 211(k)'s language in several significant ways. First, the House amendment specified that the 15% reduction was to be measured against "1990 certification gasoline." Certification gasoline is the

gasoline used to determine compliance with EPA's auto emission standards, and it has an RVP of about 9. Section 211(k)(3)(B), on the other hand, specifies that reductions be measured from "baseline gasoline" which for purposes of VOCs is defined to have an RVP of 8.7. Second, the House amendment expressed the reduction requirement as a minimum: reformulated gasoline had to result in VOCs and toxics "at least 15 percent below" the VOC and toxic emissions that result from certification fuel. Section 211(k)(3)(B) does not modify the 15% reduction requirement with the phrase "at least" and instead adds the following statement:

> Any reduction greater than a specific percentage reduction required under this subparagraph shall be treated as satisfying such percentage reduction requirement.

Third, the House amendment increased the performance standards in two phases, calling for 20% to be substituted for 15% in 1997 and 25% to be substituted for 20% in 2000). Section 211(k)(3)(B) prescribes one increase in performance standards to 25% in the year 2000, and provides that the standard may be adjusted downward to 20% or upwards based on technological feasibility, considering costs.

Daschle, the Senate amendment's sponsor, described his amendment as seeking "to use oxygenated fuels and other benign additives to replace the toxic aromatics that are now used to boost octane in gasoline." He noted that the original version of his amendment would have required reformulated gasoline in all 101 ozone nonattainment areas, but that after negotiations with the White House and EPA, he agreed to limit it to the 9 worst nonattainment areas.

His statements in general seem to indicate that he viewed reformulated gasoline principally as a toxics control strategy. For instance, he stated that his reformulated gasoline provision with its reduced scope was "the minimum we could do if we are serious about tackling the problem of air toxins from mobile sources." He noted that refiners were going to be required to reduce the RVP of gasoline in ozone nonattainment areas and expressed concern that they may make up for the lost octane with toxic aromatics. "[I]n our most polluted cities, we face the strong likelihood that gasoline volatility could be reduced, but at the unintended expense of increased toxics, carbon monoxide, unburned hydrocarbons, and even nitrogen oxide."

At the same time, his provision required a 15% reduction in VOCs and his statements mention that requirement as well. Moreover, his provision was aimed at ozone nonattainment areas only; if the reformulated gasoline program was only meant to control toxics, it would have been logical to apply to all parts of the country since RVP was being lowered everywhere. His emphasis on toxics control probably stemmed largely from the fact that he represents makers of ethanol which is a nontoxic octane enhancer.

Daschle's statements do not clearly indicate whether he intended that reformulated gasoline achieve a 15% reduction in VOCs in southern as well as northern nonattainment areas. He did suggest that some of the gasolines then being marketed as "reformulated" were like the gasoline that his provision would require. However, none of those gasolines had an RVP of less than 7.8, while to obtain a 15% VOC reduction in southern cities EPA estimates that gasoline sold in those cities will have to have an RVP of about 7.2. Yet in defense of his amendment and the similar House amendment, he inserted into the record a "leaked" EPA cost estimate for his provision that assumed that the 15% reduction would be measured from 9 RVP gasoline for northern areas and 7.8 RVP gasoline for southern areas. **[Tab H]**

The House amendment's sponsors were Richardson and Madigan, also representatives of districts with ethanol interests. Like Daschle, Richardson spent more time explaining the toxics reduction benefits provided by the amendment, and he even characterized the ozone reduction requirement as a 15 percent reduction in "ozone-forming <u>toxic</u> emissions" (emphasis added). He also did not indicate if he intended that 15% VOC reductions be achieved in all areas; he did not mention the baseline for the reduction requirements at all. He did cite, however, to the same EPA study that Daschle did.

The conference report **[Tab I]** describes the reformulated gasoline provision of the conference agreement briefly and inaccurately. It states that the 15% reductions are "[i]n comparison to conventional gasoline," even though the conference bill substituted "baseline gasoline" for "conventional gasoline" (Daschle) and "certification gasoline" (Richardson) and defined baseline gasoline in detail.

Daschle and others, however, inserted their own explanations of the meaning of the conference bill's reformulated gasoline provision into the Congressional Record at the time of the bill's passage. None of those statements discusses the appropriate baseline for determining the reduction requirements. Most of them state that reformulated gasoline will achieve a 15% reduction in VOC and toxic emissions. More significantly, Daschle and Durenburger state that the specified reformulated gasoline requirements are minimum requirements.

Specifically, Daschle in a colloquy with Baucus [Tab J] states that "the bill directs the Administrator to promulgate regulations requiring the greatest reduction in emissions of ozone forming [VOCs] and toxic air pollutants achievable through the reformulation of conventional gasoline." The rest of the colloquy focuses on the specific requirements regarding benzene, oxygen content, and NOx emissions and the formula fuel, and both Daschle and Baucus state that these requirements may be made more stringent if feasible. They do not mention, however, the performance standards.

Durenburger [Tab K] argues that the formula and performance standards are minimum requirements and that, pursuant the general requirement to require the greatest emissions reductions achievable, the Administrator is obligated "to look at more than the formula, at the performance standards and the equivalency provision to determine whether additional measures would increase emissions reductions and are achievable."

Sharp, Fields, Hall and Simpson inserted statements that are almost identical [Tab L -- Hall] and that make the flip side of Durenburger's argument: that if the Administrator finds that the specified requirements are too costly, he should relax them as appropriate. They did not attempt to explain how the statutory language could be read to permit EPA to relax the specified requirements.

III. QUESTIONS AND PROPOSED ANSWERS

A. Can "baseline gasoline" be interpreted as having an 8.7 RVP in Class C areas and a lower RVP in Class B areas?

The program office's preferred reading of the statute would be that reformulated gasoline must achieve a 15% VOC

reduction in every ozone nonattainment area regardless of location. They would get to this result by reading the baseline gasoline 8.7 RVP specification as applying only in Class C areas and inferring that baseline gaseline has a 7.8 RVP in Class B areas.

This approach cannot be squared with the text or the history of the provision. Baseline gasoline is defined in terms of "a" gasoline meeting certain specifications, including a 8.7 RVP. I don't think the law gets more "black letter" than this. Other specified aspects of gasoline affecting VOC and toxic emissions also vary with location. To apply the logic of the program's approach, if we can "adjust" the RVP specification because in the real world RVP differs by location, why couldn't and shouldn't we adjust others that similarly vary? Obviously, this approach vitiates the meaning and utility of Congress' definition of baseline gasoline.

The legislative history makes clear that Congress understood the significance of defining a baseline from which to determine the required reductions. Different baselines, afterall, were suggested over the course of the legislative process. Given the clarity and importance of the baseline definition, the courts would almost certainly apply the rule of Chevron I in this case and find that the statute means what it says: that baseline gasoline has an RVP of 8.7.

B. <u>Does the Administrator have the authority to require VOC reductions greater than 15% in Class B areas?</u>

The program office's next best option would be to tighten the VOC performance requirement as it applies to reformulated gasoline sold in Class B areas. This option is defensible so long as the court can be persuaded that the the rule of Chevron II should apply and so long as the program office can show that tighter requirements are achievable, considering costs, and is willing to consider the achievability of tighter VOC and toxics performance standards generally.

The statute and legislative history are ambiguous as to whether Congress intended to require or authorize EPA to increase the stringency of the 1995 performance standards. On the side of finding that Congress did so intend or authorize are the following arguments:

- Section 211(k)(1) states that EPA's regulations "shall require" the greatest achievable reductions in VOC and toxic emissions.

- When the specific requirements were added, the general requirement to obtain the greatest achievable emissions was retained.

- For the relevant language of section 211(k)(1) to have any meaning or be other than superfluous, the specific requirements that follow must be read as minimums.

- The specific requirements can be read as minimums. Paragraphs (2) and (3) of section 211(k) provide that the regulations shall require that reformulated gasoline comply with the specified requirements. Requiring that reformulated gasoline comply with more stringent requirements has the effect of requiring them to meet the specified requirements.

- The reformulated gasoline program is targeted only at ozone nonattainment areas. It would be illogical to interpret the reformulated gasoline provision as not providing significant ozone reduction benefits for four of the nine covered nonattainment areas, including close to half of the covered population and gasoline sold, in the first five years of the program.

- When Congress passed the amendments, southern areas were already slated to have 7.8 RVP gasoline. Time and again members of Congress intoned that the reformulated gasoline provision would reduce VOC emissions by 15 percent. For that to be the case, EPA must have the authority to require that further VOC reductions be achieved in southern areas.

- The House and Senate authors of the reformulated gasoline amendments accepted EPA's cost estimate of their provisions. That cost estimate assumed that reformulated gasoline would accomplish 15% VOC reductions over 7.8 RVP gasoline in southern nonattainment areas.

- The statements of Daschle and Durenburger support the view that EPA may (or must) tighten the applicable requirements if reformulated gasoline can achieve greater reductions in VOC or toxic emissions, considering costs, etc.

On the other side of the issue are the following arguments (along with rebuttals to some of those arguments):

- In light of the specific requirements set forth in paragraphs (2) and (3) of section 211(k), the "shall require the greatest achievable reductions" language in paragraph (1) must be read as hortatory. The rules of statutory construction provide that the specific overrides the general.

  - The language in paragraph (1) is the same as that used in other sections of title II (see, e.g., section 202(a)(3)(A)) to require the Administrator to set standards that require the greatest feasible or achievable reductions in emissions. Statements that are merely hortatory are usually found in sections entitled "Purposes" or "Policy" (see, e.g., section 612(a)) or preceded by the words "Congress intends." The rules of statutory construction also provide that statutes shall be read so as to give all parts meaning.

- Congress specified what VOC reductions it sought for 1995. That it sought 15%, no more and no less, is underscored by the fact that section 211(k)(3)(B) explicitly provides for an increase in the stringency of the performance standards in the year 2000. Where Congress specified the timing for tightening standards, EPA does not retain discretionary authority to tighten them on different timetable.

  - The fact that section 211(k)(3)(B) provides for increasing the stringency of the performance standards is not inconsistent with EPA having independent authority under paragraph (1) to tighten the standards if achievable, considering costs, etc. In light of EPA's authority to tighten the standards, the purpose of section 211(k)(3)(B) is to ensure that the performance standards become more stringent by 2000 even if EPA does not find more stringent standards feasible.

- Section 211(k)(3)(B) also provides that EPA may only adjust the 25% performance standard for 2000 based on a feasibility finding. That Congress gave EPA express authority to tighten the 2000

performance standards implies that it did not intend EPA to have such authority with regard to the 1995 standards.

  - Congress specified that EPA could adjust the 25% reduction requirement for 2000 based on a feasibility finding because in this instance only Congress authorized EPA to relax (to 20%) as well as tighten the standard.

- The conference bill dropped the "at least" qualifier from the House version of the performance requirement.

- Gasoline meeting the RVP requirement for Class B areas will meet the 15% VOC reduction requirement for reformulated gas. But that's no reason to conclude that Congress must have intended that reformulated gasoline obtain an additional 15% VOC reduction in Class B areas. Rather, Congress understood that much of the VOC reduction achieved by reformulated gasoline would be a function of the independent requirement that it have a lower RVP in Class B areas.

- Reformulated gasoline in Class B areas will, in fact, achieve 2 to 5% additional VOC reductions over that achieved by lowering its RVP to 7.8 RVP as a result of its required oxygen content.

- Class B areas will obtain additional VOC reductions when the performance standards are increased in 2000.

- Class B areas will obtain significant toxics benefits in any event.

- States which include Class B areas have the legal authority to require further RVP reductions if needed to attain NAAQS.

  - States had the legal authority to regulate fuel as needed to control ozone before the reformulated gasoline provision was passed. One purpose of the provision was to relieve the states from having to pursue such requirements themselves on a potentially piecemeal and conflicting basis.

Overall, the arguments in favor of EPA's preferred interpretation seem more persuasive than the arguments against. But at worst, a court is apt to reach the conclusion that the statute and legislative history are ambiguous on this issue. In such a situation, the court should defer to any reasonable interpretation that the agency advances. The approach the program office wants to take -- that EPA is authorized to require VOC reductions greater than 15% to the extent feasible -- is reasonable. It gives meaning to section 211(k)(1) without rendering what follows meaningless, and it honors Congress' clear intent that reformulated gasoline help ozone nonattainment areas achieve attainment.

Taking this approach does carry the cost of obliging the Agency to consider whether exceeding the specified VOC and toxic reduction requirements is achievable generally. It is not enough for EPA to consider the need for and therefore the achievability of greater VOC reductions in Class B areas. To be consistent with its statutory interpretation, it must determine whether VOC and toxic reductions greater than 15% are achievable, considering the specified factors. Moreover, if the Agency finds further reductions are achievable in light of those factors, it must require that reformulated gasoline achieve them.

ing 0.1 gram of lead per gallon in lieu of the lead substitute gasoline additive. The Administrator shall not rank or otherwise rate the lead substitute additives. Test procedures shall be established within 1 year after the date of the enactment of the Clean Air Act Amendments of 1990. Additives shall be tested within 18 months of the date of the enactment of the Clean Air Act Amendments of 1990 or 6 months after the lead substitute additives are identified to the Administrator, whichever is later.

"(3) The Administrator may impose a user fee to recover the costs of testing of any fuel additive referred to in this subsection. The fee shall be paid by the person proposing to register the fuel additive concerned. Such fee shall not exceed $20,000 for a single fuel additive.

"(4) There are authorized to be appropriated to the Administrator not more than $1,000,000 for the second full fiscal year after the date of the enactment of the Clean Air Act Amendments of 1990 to establish test procedures and conduct engine tests as provided in this subsection. Not more than $500,000 per year is authorized to be appropriated for each of the 5 subsequent fiscal years.

"(5) Any fees collected under this subsection shall be deposited in a special fund in the United States Treasury for licensing and other services which thereafter shall be available for appropriation, to remain available until expended, to carry out the Agency's activities for which the fees were collected.".

SEC. 219. REFORMULATED GASOLINE AND OXYGENATED GASOLINE.

Section 211 of the Clean Air Act (42 U.S.C. 7545) is amended by adding the following at the end thereof:

"(k) REFORMULATED GASOLINE FOR CONVENTIONAL VEHICLES.—

"(1) EPA REGULATIONS.—Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations under this section establishing requirements for reformulated gasoline to be used in gasoline-fueled vehicles in specified nonattainment areas. Such regulations shall require the greatest reduction in emissions of ozone forming volatile organic compounds (during the high ozone season) and emissions of toxic air pollutants (during the entire year) achievable through the reformulation of conventional gasoline, taking into consideration the cost of achieving such emission reductions, any nonair-quality and other air-quality related health and environmental impacts and energy requirements.

"(2) GENERAL REQUIREMENTS.—The regulations referred to in paragraph (1) shall require that reformulated gasoline comply with paragraph (3) and with each of the following requirements (subject to paragraph (7)):

"(A) NO_x EMISSIONS.—The emissions of oxides of nitrogen (NO_x) from baseline vehicles when using the reformulated gasoline shall be no greater than the level of such emissions from such vehicles when using baseline gasoline. If the Administrator determines that compliance with the limitation on emissions of oxides of nitrogen under the preceding sentence is technically infeasible, considering the other requirements applicable under this subsection to such gasoline, the Administrator may, as appropriate to ensure

compliance with this subparagraph, adjust (or waive entirely), any other requirements of this paragraph (including the oxygen content requirement contained in subparagraph (B)) or any requirements applicable under paragraph (3)(A).

"(B) OXYGEN CONTENT.—The oxygen content of the gasoline shall equal or exceed 2.0 percent by weight (subject to a testing tolerance established by the Administrator) except as otherwise required by this Act. The Administrator may waive, in whole or in part, the application of this subparagraph for any ozone nonattainment area upon a determination by the Administrator that compliance with such requirement would prevent or interfere with the attainment by the area of a national primary ambient air quality standard.

"(C) BENZENE CONTENT.—The benzene content of the gasoline shall not exceed 1.0 percent by volume.

"(D) HEAVY METALS.—The gasoline shall have no heavy metals, including lead or manganese. The Administrator may waive the prohibition contained in this subparagraph for a heavy metal (other than lead) if the Administrator determines that addition of the heavy metal to the gasoline will not increase, on an aggregate mass or cancer-risk basis, toxic air pollutant emissions from motor vehicles.

"(3) MORE STRINGENT OF FORMULA OR PERFORMANCE STANDARDS.—The regulations referred to in paragraph (1) shall require compliance with the more stringent of either the requirements set forth in subparagraph (A) or the requirements of subparagraph (B) of this paragraph. For purposes of determining the more stringent provision, clause (i) and clause (ii) of subparagraph (B) shall be considered independently.

"(A) FORMULA.—

"(i) BENZENE.—The benzene content of the reformulated gasoline shall not exceed 1.0 percent by volume.

"(ii) AROMATICS.—The aromatic hydrocarbon content of the reformulated gasoline shall not exceed 25 percent by volume.

"(iii) LEAD.—The reformulated gasoline shall have no lead content.

"(iv) DETERGENTS.—The reformulated gasoline shall contain additives to prevent the accumulation of deposits in engines or vehicle fuel supply systems.

"(v) OXYGEN CONTENT.—The oxygen content of the reformulated gasoline shall equal or exceed 2.0 percent by weight (subject to a testing tolerance established by the Administrator) except as otherwise required by this Act.

"(B) PERFORMANCE STANDARD.—

"(i) VOC EMISSIONS.—During the high ozone season (as defined by the Administrator), the aggregate emissions of ozone forming volatile organic compounds from baseline vehicles when using the reformulated gasoline shall be 15 percent below the aggregate emissions of ozone forming volatile organic compounds from such vehicles when using baseline gasoline. Effec-

tive in calendar year 2000 and thereafter, 25 percent shall be substituted for 15 percent in applying this clause, except that the Administrator may adjust such 25 percent requirement to provide for a lesser or greater reduction based on technological feasibility, considering the cost of achieving such reductions in VOC emissions. No such adjustment shall provide for less than a 20 percent reduction below the aggregate emissions of such air pollutants from such vehicles when using baseline gasoline. The reductions required under this clause shall be on a mass basis.

"(ii) TOXICS.—During the entire year, the aggregate emissions of toxic air pollutants from baseline vehicles when using the reformulated gasoline shall be 15 percent below the aggregate emissions of toxic air pollutants from such vehicles when using baseline gasoline. Effective in calendar year 2000 and thereafter, 25 percent shall be substituted for 15 percent in applying this clause, except that the Administrator may adjust such 25 percent requirement to provide for a lesser or greater reduction based on technological feasibility, considering the cost of achieving such reductions in toxic air pollutants. No such adjustment shall provide for less than a 20 percent reduction below the aggregate emissions of such air pollutants from such vehicles when using baseline gasoline. The reductions required under this clause shall be on a mass basis.

Any reduction greater than a specific percentage reduction required under this subparagraph shall be treated as satisfying such percentage reduction requirement.

"(4) CERTIFICATION PROCEDURES.—

"(A) REGULATIONS.—The regulations under this subsection shall include procedures under which the Administrator shall certify reformulated gasoline as complying with the requirements established pursuant to this subsection. Under such regulations, the Administrator shall establish procedures for any person to petition the Administrator to certify a fuel formulation, or slate of fuel formulations. Such procedures shall further require that the Administrator shall approve or deny such petition within 180 days of receipt. If the Administrator fails to act within such 180-day period, the fuel shall be deemed certified until the Administrator completes action on the petition.

"(B) CERTIFICATION; EQUIVALENCY.—The Administrator shall certify a fuel formulation or slate of fuel formulations as complying with this subsection if such fuel or fuels—

"(i) comply with the requirements of paragraph (2), and

"(ii) achieve equivalent or greater reductions in emissions of ozone forming volatile organic compounds and emissions of toxic air pollutants than are achieved by a reformulated gasoline meeting the applicable requirements of paragraph (3).

"(C) EPA DETERMINATION OF EMISSIONS LEVEL.—Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall determine the level of emissions of ozone forming volatile organic compounds and emissions of toxic air pollutants emitted by baseline vehicles when operating on baseline gasoline. For purposes of this subsection, within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall, by rule, determine appropriate measures of, and methodology for, ascertaining the emissions of air pollutants (including calculations, equipment, and testing tolerances).

"(5) PROHIBITION.—Effective beginning January 1, 1995, each of the following shall be a violation of this subsection:

"(A) The sale or dispensing by any person of conventional gasoline to ultimate consumers in any covered area.

"(B) The sale or dispensing by any refiner, blender, importer, or marketer of conventional gasoline for resale in any covered area, without (i) segregating such gasoline from reformulated gasoline, and (ii) clearly marking such conventional gasoline as "conventional gasoline, not for sale to ultimate consumer in a covered area".

Any refiner, blender, importer or marketer who purchases property segregated and marked conventional gasoline, and thereafter labels, represents, or wholesales such gasoline as reformulated gasoline shall also be in violation of this subsection. The Administrator may impose sampling, testing, and recordkeeping requirements upon any refiner, blender, importer, or marketer to prevent violations of this section.

"(6) OPT-IN AREAS.—(A) Upon the application of the Governor of a State, the Administrator shall apply the prohibition set forth in paragraph (5) in any area in the State classified under subpart 2 of part D of title I as a Marginal, Moderate, Serious, or Severe Area (without regard to whether or not the 1980 population of the area exceeds 250,000). In any such case, the Administrator shall establish an effective date for such prohibition as he deems appropriate, not later than January 1, 1995, or 1 year after such application is received, whichever is later. The Administrator shall publish such application in the Federal Register upon receipt.

"(B) If the Administrator determines, on the Administrator's own motion or on petition of any person, after consultation with the Secretary of Energy, that there is insufficient domestic capacity to produce gasoline certified under this subsection, the Administrator shall, by rule, extend the effective date of such prohibition in Marginal, Moderate, Serious, or Severe Areas referred to in subparagraph (A) for one additional year, and may, by rule, renew such extension for 2 additional one-year periods. The Administrator shall act on any petition submitted under this paragraph within 6 months after receipt of the petition. The Administrator shall issue such extensions for areas with a lower ozone classification before issuing any such extension for areas with a higher classification.

"(7) CREDITS.—(A) The regulations promulgated under this subsection shall provide for the granting of an appropriate amount of credits to a person who refines, blends, or imports and certifies a gasoline or slate of gasoline that—

"(i) has an oxygen content (by weight) that exceeds the minimum oxygen content specified in paragraph (2);

"(ii) has an aromatic hydrocarbon content (by volume) that is less than the maximum aromatic hydrocarbon content required to comply with paragraph (3); or

"(iii) has a benzene content (by volume) that is less than the maximum benzene content specified in paragraph (2).

"(B) The regulations described in subparagraph (A) shall also provide that a person who is granted credits may use such credits, or transfer all or a portion of such credits to another person for use within the same nonattainment area, for the purpose of complying with this subsection.

"(C) The regulations promulgated under subparagraphs (A) and (B) shall ensure the enforcement of the requirements for the issuance, application, and transfer of the credits. Such regulations shall prohibit the granting or transfer of such credits for use with respect to any gasoline in a nonattainment area, to the extent the use of such credits would result in any of the following:

"(i) An average gasoline aromatic hydrocarbon content (by volume) for the nonattainment (taking into account all gasoline sold for use in conventional gasoline-fueled vehicles in the nonattainment area) higher than the average fuel aromatic hydrocarbon content (by volume) that would occur in the absence of using any such credits.

"(ii) An average gasoline oxygen content (by weight) for the nonattainment area (taking into account all gasoline sold for use in conventional gasoline-fueled vehicles in the nonattainment area) lower than the average gasoline oxygen content (by weight) that would occur in the absence of using any such credits.

"(iii) An average benzene content (by volume) for the nonattainment area (taking into account all gasoline sold for use in conventional gasoline-fueled vehicles in the nonattainment area) higher than the average benzene content (by volume) that would occur in the absence of using any such credits.

"(8) ANTI-DUMPING RULES.—

"(A) IN GENERAL.—Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations applicable to each refiner, blender, or importer of gasoline ensuring that gasoline sold or introduced into commerce by such refiner, blender, or importer (other than reformulated gasoline subject to the requirements of paragraph (1)) does not result in average per gallon emissions (measured on a mass basis) of (i) volatile organic compounds, (ii) oxides of nitrogen, (iii) carbon monoxide, and (iv) toxic air pollutants in excess of such emissions of such pollutants attributable to gasoline sold or introduced into commerce in calendar year 1990 by that refin-

er, blender, or importer. Such regulations shall take effect beginning January 1, 1995.

"(B) ADJUSTMENTS.—In evaluating compliance with the requirements of subparagraph (A), the Administrator shall make appropriate adjustments to insure that no credit is provided for improvement in motor vehicle emissions control in motor vehicles sold after the calendar year 1990.

"(C) COMPLIANCE DETERMINED FOR EACH POLLUTANT INDEPENDENTLY.—In determining whether there is an increase in emissions in violation of the prohibition contained in subparagraph (A) the Administrator shall consider an increase in each air pollutant referred to in clauses (i) through (iv) as a separate violation of such prohibition, except that the Administrator shall promulgate regulations to provide that any increase in emissions of oxides of nitrogen resulting from adding oxygenates to gasoline may be offset by an equivalent or greater reduction (on a mass basis) in emissions of volatile organic compounds, carbon monoxide, or toxic air pollutants, or any combination of the foregoing.

"(D) COMPLIANCE PERIOD.—The Administrator shall promulgate an appropriate compliance period or appropriate compliance periods to be used for assessing compliance with the prohibition contained in subparagraph (A).

"(E) BASELINE FOR DETERMINING COMPLIANCE.—If the Administrator determines that no adequate and reliable data exists regarding the composition of gasoline sold or introduced into commerce by a refiner, blender, or importer in calendar year 1990, for such refiner, blender, or importer, baseline gasoline shall be substituted for such 1990 gasoline in determining compliance with subparagraph (A).

"(9) EMISSIONS FROM ENTIRE VEHICLE.—In applying the requirements of this subsection, the Administrator shall take into account emissions from the entire motor vehicle, including evaporative, running, refueling, and exhaust emissions.

"(10) DEFINITIONS.—For purposes of this subsection—

"(A) BASELINE VEHICLES.—The term 'baseline vehicles' mean representative model year 1990 vehicles.

"(B) BASELINE GASOLINE.—

(i) SUMMERTIME.—The term 'baseline gasoline' means in the case of gasoline sold during the high ozone period (as defined by the Administrator) a gasoline which meets the following specifications:

"BASELINE GASOLINE FUEL PROPERTIES

API Gravity	57.4
Sulfur, ppm	339
Benzene, percent	1.53
RVP, psi	8.7
Octane, R+M/2	87.3
IBP, F	91
10 percent, F	128
50 percent, F	218
90 percent, F	330
End Point, F	415
Aromatics, percent	32.0

Olefins, percent	*9.2*
Saturates, percent	*58.8*

"(ii) WINTERTIME.—The Administrator shall establish the specifications of 'baseline gasoline' for gasoline sold at times other than the high ozone period (as defined by the Administrator). Such specifications shall be the specifications of 1990 industry average gasoline sold during such period.

"(C) TOXIC AIR POLLUTANTS.—The term 'toxic air pollutants' means the aggregate emissions of the following:

"Benzene
"1,3 Butadiene
"Polycyclic organic matter (POM)
"Acetaldehyde
"Formaldehyde.

"(D) COVERED AREA.—The 9 ozone nonattainment areas having a 1980 population in excess of 250,000 and having the highest ozone design value during the period 1987 through 1989 shall be 'covered areas' for purposes of this subsection. Effective one year after the reclassification of any ozone nonattainment area as a Severe ozone nonattainment area under section 181(b), such Severe area shall also be a 'covered area' for purposes of this subsection.

"(E) REFORMULATED GASOLINE.— The term 'reformulated gasoline' means any gasoline which is certified by the Administrator under this section as complying with this subsection.

"(F) CONVENTIONAL GASOLINE.—The term 'conventional gasoline' means any gasoline which does not meet specifications set by a certification under this subsection.

"(l) DETERGENTS.—Effective beginning January 1, 1995, no person may sell or dispense to an ultimate consumer in the United States, and no refiner or marketer may directly or indirectly sell or dispense to persons who sell or dispense to ultimate consumers in the United States any gasoline which does not contain additives to prevent the accumulation of deposits in engines or fuel supply systems. Not later than 2 years after the date of the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate a rule establishing specifications for such additives.

"(m) OXYGENATED FUELS.—

"(1) PLAN REVISIONS FOR CO NONATTAINMENT AREAS.—(A) Each State in which there is located all or part of an area which is designated under title I as a nonattainment area for carbon monoxide and which has a carbon monoxide design value of 9.5 parts per million (ppm) or above based on data for the 2-year period of 1988 and 1989 and calculated according to the most recent interpretation methodology issued by the Administrator prior to the enactment of the Clean Air Act Amendments of 1990 shall submit to the Administrator a State implementation plan revision under section 110 and part D of title I for such area which shall contain the provisions specified under this subsection regarding oxygenated gasoline.

"(B) A plan revision which contains such provisions shall also be submitted by each State in which there is located any area which, for any 2-year period after 1989 has a carbon mon-

(3) In clause (ii) after "such" insert "characteristic or component of a".

(b) FINDING OF NECESSITY.—Section 211(c)(4)(C) of the Clean Air Act (42 U.S.C. 7545(c)(4)(C)) is amended by adding the following at the end: "The Administrator may find that a State control or prohibition is necessary to achieve that standard if no other measures that would bring about timely attainment exist, or if other measures exist and are technically possible to implement, but are unreasonable or impracticable. The Administrator may make a finding of necessity under this subparagraph even if the plan for the area does not contain an approved demonstration of timely attainment.".

SEC. 214. FUEL WAIVERS.

(a) COVERAGE.—Section 211(f)(1) of the Clean Air Act (42 U.S.C. 7545(f)(1) is amended by inserting "(A)" immediately after "(1)" and by adding the following new subparagraph at the end thereof:

"(B) Effective upon the date of the enactment of the Clean Air Act Amendments of 1990, it shall be unlawful for any manufacturer of any fuel or fuel additive to first introduce into commerce, or to increase the concentration in use of, any fuel or fuel additive for use by any person in motor vehicles manufactured after model year 1974 which is not substantially similar to any fuel or fuel additive utilized in the certification of any model year 1975, or subsequent model year, vehicle or engine under section 206.".

(b) CONFORMING AMENDMENT.—Section 211(f)(3) of the Clean Air Act (42 U.S.C. 7545(f)(3)) is amended by inserting "(A)" immediately after "(1)".

SEC. 215. MISFUELING.

Section 211(g) of the Clean Air Act (42 U.S.C. 7545(g)) is amended to read as follows:

"(g) MISFUELING.—(1) No person shall introduce, or cause or allow the introduction of, leaded gasoline into any motor vehicle which is labeled 'unleaded gasoline only,' which is equipped with a gasoline tank filler inlet designed for the introduction of unleaded gasoline, which is a 1990 or later model year motor vehicle, or which such person knows or should know is a vehicle designed solely for the use of unleaded gasoline.

"(2) Beginning October 1, 1993, no person shall introduce or cause or allow the introduction into any motor vehicle of diesel fuel which such person knows or should know contains a concentration of sulfur in excess of 0.05 percent (by weight) or which fails to meet a cetane index minimum of 40 or such equivalent alternative aromatic level as prescribed by the Administrator under subsection (i)(2).".

RVP

SEC. 216. FUEL VOLATILITY.

Section 211 of the Clean Air Act (42 U.S.C. 7545) is amended by adding the following new subsection at the end thereof:

"(h) REID VAPOR PRESSURE REQUIREMENTS.—

"(1) PROHIBITION.—Not later than 6 months after the date of the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations making it unlawful for any person during the high ozone season (as defined by the Administrator) to sell, offer for sale, dispense, supply, offer

for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch (psi). Such regulations shall also establish more stringent Reid Vapor Pressure standards in a nonattainment area as the Administrator finds necessary to generally achieve comparable evaporative emissions (on a per-vehicle basis) in nonattainment areas, taking into consideration the enforceability of such standards, the need of an area for emission control, and economic factors.

"(2) ATTAINMENT AREAS.—The regulations under this subsection shall not make it unlawful for any person to sell, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure of 9.0 pounds per square inch (psi) or lower in any area designated under section 107 as an attainment area. Notwithstanding the preceding sentence, the Administrator may impose a Reid vapor pressure requirement lower than 9.0 pounds per square inch (psi) in any area, formerly an ozone nonattainment area, which has been redesignated as an attainment area.

"(3) EFFECTIVE DATE; ENFORCEMENT.—The regulations under this subsection shall provide that the requirements of this subsection shall take effect not later than the high ozone season for 1992, and shall include such provisions as the Administrator determines are necessary to implement and enforce the requirements of this subsection.

"(4) ETHANOL WAIVER.—For fuel blends containing gasoline and 10 percent denatured anhydrous ethanol, the Reid vapor pressure limitation under this subsection shall be one pound per square inch (psi) greater than the applicable Reid vapor pressure limitations established under paragraph (1); Provided, however, That a distributor, blender, marketer, reseller, carrier, retailer, or wholesale purchaser-consumer shall be deemed to be in full compliance with the provisions of this subsection and the regulations promulgated thereunder if it can demonstrate (by showing receipt of a certification or other evidence acceptable to the Administrator) that

"(A) the gasoline portion of the blend complies with the Reid vapor pressure limitations promulgated pursuant to this subsection, and

"(B) the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4), and

"(C) no additional alcohol or other additive has been added to increase the Reid Vapor Pressure of the ethanol portion of the blend.

"(5) AREAS COVERED.—The provisions of this subsection shall apply only to the 48 contiguous States and the District of Columbia.".

SEC. 217. DIESEL FUEL SULFUR CONTENT.

Section 211 of the Clean Air Act (42 U.S.C. 7545) is amended by adding the following new subsection at the end thereof:

"(i) SULFUR CONTENT REQUIREMENTS FOR DIESEL FUEL.—(1) Effective October 1, 1993, no person shall manufacture, sell, supply, offer for sale or supply, dispense, transport, or introduce into com-

SENATE COMMITTEE BILL ON RVP

[(3) Effective on the date of the enactment of this subsection, the regulations of the Administrator under this section respecting fuel additives (40 CFR part 80) shall be deemed amended to comply with the requirement contained in paragraph (2).

[(4) Nothing in this section shall be construed to preempt the right of any State to take action as permitted by section 211(c)(4) of this Act.]

(g)(1) No person shall introduce, or cause or allow the introduction of, leaded gasoline into any motor vehicle which is labeled "unleaded gasoline only," which is equipped with a gasoline tank filler inlet designed for the introduction of unleaded gasoline, which is a 1990 or later model year motor vehicle, or which such person knows or should know is a vehicle designed solely for the use of unleaded gasoline.

(2) Beginning October 1, 1993, no person shall introduce or cause or allow the introduction into any motor vehicle of diesel fuel which such person knows or should know contains a concentration of sulfur in excess of 0.05 per centum (by weight) or which fails to meet a cetane index minimum of 40.

(h) EVAPORATIVE EMISSIONS FROM MOTOR VEHICLE FUELS.—

(1) The Administrator shall promulgate regulations to reduce evaporative emissions from motor vehicle fuels.

RVP

(2) Regulations under this subsection shall include a standard for gasoline volatility. The standard shall apply to all gasoline sold, or offered for sale, or introduced into commerce for use in motor vehicles during the high ozone periods of each year. Effective with respect to gasoline sold in the second high ozone period which commences after the enactment of this subsection, the standard shall require that such gasoline sold, or offered for sale, or introduced into commerce for use in motor vehicles in class C areas (as defined by the American Society of Testing Materials as of the date of enactment of this subsection) shall not exceed a Reid vapor pressure of nine pounds per square inch unless the Admistrator establishes a lower number which the administrator determines to be achievable and appropriate for purposes of protecting public health and welfare. The regulations shall require a proportional reduction in areas other than such class C areas.

(3) For purposes of regulations referred to in paragraph (2), the high ozone period shall be the period between May 16 and September 15 each year or such longer period as the Administrator established for any region to cover periods of potential ozone air pollution in excesss of the standard for ozone for the region.

(4) For fuel blends containing gasoline and 10 per centum denatured anhydrous ethanol, the Reid vapor pressure elimination pursuant to this subsection shall be one pound per square inch greater than the applicable Reid vapor pressure limitations established under paragraph (2): Provided, however, That a refiner, distributor, blender, marketer, reseller, carrier, retailer, or wholesale purchaser shall be deemed to be in full compliance with the provisions of this subsection and the regulations promulgated thereunder, if it can demonstrate (by showing receipt of a certification or other evidence acceptable to the Ad-

ministrator) that (A) the gasoline portion of the blend complies with the Reid vapor pressure limitations promulgated pursuant to this subsection, and (B) the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4).

(i) DESULFURIZATION OF DIESEL FUEL.—

(1) Effective October 1, 1993, no person shall manufacture, sell, offer for sale, dispense, transport or introduce into commerce motor vehicle diesel fuel which contains a concentration of sulfur in excess of 0.05 per centum (by weight) or which fails to meet a cetane index minimum of 40.

(2) No later than twelve months after the enactment of this subsection, the Administrator shall promulgate regulations to implement and enforce the requirements of paragraph (1). The Administrator shall require manufacturers and importers of diesel fuel not intended for use in motor vehicles to dye such fuel in order to segregate it from motor vehicle diesel fuel.

(3) The sulfur content of fuel required to be used in the certification of 1991 through 1993 model year heavy-duty diesel vehicles and engines shall not exceed 0.05 per centum (by weight). The sulfur content and cetane index minimum of fuel required to be used in certification of 1994 and later model year heavy-duty diesel vehicles and engines shall comply with the regulations promulgated under paragraph (2).

(j) PROHIBITION ON LEADED GASOLINE FOR HIGHWAY USE.—Effective January 1, 1991, it shall be unlawful for any person to sell, offer for sale, or introduce into commerce, for use as fuel in any motor vehicle (as defined in section 219(2)) any gasoline which contains lead or lead additives. The Administrator may extend the January 1, 1991, deadline for up to two years, if the Administrator determines that unavailability of gasoline containing lead or lead additives for such vehicles will reduce the availability of such gasoline for farm vehicles and that alternatives to gasoline containing lead or lead additives are unavailable for use in gasoline powered farm vehicles.

(k) FUEL QUALITY.—

(1) Not later than thirty-six months after the date of enactment of this subsection the Administrator shall, after notice and opportunity for public comment, promulgate regulations establishing specifications for fuel quality which will minimize, to the extent economically and technically achievable, emissions (including evaporative emissions) of hydrocarbons, carbon monoxide, oxides of nitrogen, particulate matter and hazardous air pollutants over the useful life of vehicles and engines certified for manufacture under this title. Such regulations may prohibit the presence of fuel impurities and other substances or mandate the use of specific additives to achieve the purposes of this subsection. The regulations shall be effective for fuels sold on and after January 1, 1994. In the event that the Administrator does not promulgate the regulations required by this paragraph, effective January 1, 1994, it shall be unlawful to sell, offer for sale or introduce into commerce any fuel for use in a gasoline-powered vehicle unless such fuel contains additives effective in preventing the accumulation of deposits in fuel-injected engines.

SENATE REPORT ON RVP

to conformity. Funds received from a manufacturer are to be used by EPA to administer the recall program. The basis for the "reason to believe" would be any of the sources of information presently relied on by the Administrator to identify suspect classes of vehicles.

Fuel Volatility (Section 214)

SUMMARY

New section 214 of the Act directs the Administrator to promulgate regulations to reduce evaporative emissions from motor vehicles. The regulations will require that the volatility, measured as Reid Vapor pressure (RVP), of gasoline sold during high ozone periods (the period between May 16 and September 15 each year) not exceed 9 pounds per square inch RVP. The Administrator is authorized to establish a lower number so long as it is achievable and appropriate for the purposes of protecting public health and welfare. The 9 pounds psi limit shall apply to gasoline sold, or offered for sale, or introduced into commerce for use in motor vehicles in class C areas (as defined by the American Society of Testing Materials as of the date of enactment of this section). With comparable reductions made in the violatity of fuels sold in other ASTM areas.

For fuel blends containing gasoline and 10 percent denatured anhydrous ethanol, a one pound per square inch RVP waiver is included.

DISCUSSION

Evaporative hydrocarbon emissions from gasoline-fueled vehicles occur when gasoline vapors expand in the fuel tank and when residual engine heat causes evaportion of fuel remaining in the carburetor and the fuel lines. These emissions are dependent on fuel volatility. Evaporative emissions are a major source of hydrocarbons and increased gasoline volatility causes excess hydrocarbon emissions. EPA estimates that evaporative emissions from fuel volatility account for eight percent of the total hydrocarbon inventory nationwide.

A comprehensive analysis issued by the EPA in November, 1985, concluded that the volatility of fuels in-use is significantly higher than the volatility of fuels used during vehicle certification under the Agency's title II regulations. These existing standards, which control evaporative hydrocarbon emissions, allow vehicle control systems to be tested with certification gasoline having a volatility ranging from 8.7 psi to 9.2 pounds per square inch RVP. The average volatility for commercial fuel is now 11.5 psi, with summertime volatility increasing to over 13 psi.

A significant portion of the increase in commercial gasoline volatility has been caused by increased use of butane and other low cost higher volatile additives in gasoline. EPA volatility data collected over several years suggest the trend toward increased volatility in gasoline will continue.

In March of 1989, EPA established summertime volatility control standards for gasoline to reduce vehicle evaporative emissions. The

standards require gasoline volatility to be reduced to 10.5 pounds per square inch RVP/in class C areas.

Additional volatility reductions beyond those EPA has established are necessary to protect public health and welfare. New section 214 therefore establishes a standard requiring gasoline be reduced to 9 pounds per square inch RVP. The imposition of a 9 pound per square inch RVP will significantly reduce the level of evaporative hydrocarbon emissions in nonattainment areas and nationwide.

The reported bill includes a one pound volatility waiver for ethanol/gasoline blends containing 10 percent denatured anhydrous ethanol. This provision was included in recognition that gasoline and ethanol are mixed after the refining process has been completed. It was recognized that to require ethanol to meet a 9 pound RVP would require the creation of a production and distribution network for sub-nine pound RVP gasoline. The cost of producing and distributing this type of fuel would be prohibitive to the petroleum industry and would likely result in the termination of the availability of ethanol in the marketplace. Under this provision, the RVP limitations promulgated pursuant to this subsection for such ethanol/gasoline blends shall be one pound per square inch greater than the applicable Reid vapor pressure which apply to gasoline.

Reid vapor pressure of ethanol/gasoline blends is currently uncontrolled. Adding ethanol to gasoline increases the RVP of the blended fuel by approximately 3 to 10 percent. Generally, ethanol blends burn cleaner than pure hydrocarbon gasoline and thus cause fewer tailpipe emissions. The increase in RVP tends to cause increased evaporative emissions of volatile organic compounds (VOC's) from vehicles using ethanol blended fuel.

This provision would impose RVP controls on ethanol blends for the first time and would forego regulation of a very small percentage of the total nationwide volatile organic compounds emissions inventory. This provision will allow ethanol blending to continue to be a viable alternative fuel, with its beneficial environmental, economic, agricultural, energy security and foreign policy implications. Finally, this provision will remove the possibility that ethanol blends would be used to circumvent the proposed volatility restrictions.

Desulfurization (Section 215)

SUMMARY

Section 215 prohibits the sale of diesel fuel with a sulfur content in excess of 0.05 percent (by weight) or which fails to meet a minimum cetane index of 40. This will limit the aromatic content of diesel fuels to current levels. Heavy duty engines certified for model years 1991 through 1993 may be certified using low sulfur fuel. Diesel fuel not intended for use as a motor fuel must contain dyes, within one year of enactment, in order to segregate visually the diesel fuels.

HOUSE BILL ON RVP

cordance with the purposes of section 1905 of title 18 of the United States Code. Any authorized representative of the Administrator shall be considered an employee of the United States for purposes of section 1905 of title 18 of the United States Code. Nothing in this section shall prohibit the Administrator or authorized representative of the Administrator from disclosing records, reports or information to other officers, employees or authorized representatives of the United States concerned with carrying out this Act or when relevant in any proceeding under this Act. Nothing in this section shall authorize the withholding of information by the Administrator or any officer or employee under the Administrator's control from the duly authorized committees of the Congress.".

SEC. 216. FUEL VOLATILITY.

Section 211 (42 U.S.C. 7545) is amended by adding the following new subsection after subsection (g):

"(h) REID VAPOR PRESSURE REQUIREMENTS.—(1) Not later than 6 months after the date of the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations making it unlawful for any person during the high ozone season (as defined by the Administrator) to sell, offer for sale, dispense, supply, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch (psi).

Such regulations shall also establish more stringent Reid Vapor Pressure standards in a nonattainment area as the Administrator finds necessary to generally achieve comparable evaporative emissions (on a per-vehicle basis) in nonattainment areas, taking into consideration the enforceability of such standards, the need of an area for emission control, and economic factors. Such regulations shall not make it unlawful for any person to sell, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure of 9.0 pounds per square inch (p.s.i.) or lower in any area designated under section 107 as an attainment area.

"(2) Such regulations shall provide that the requirements of this subsection shall take effect not later than the high ozone season for 1992, and shall include such provisions as the Administrator determines are necessary to implement and enforce the requirements of this subsection.

"(3) In establishing standards for fuel volatility under this subsection, the Administrator shall permit a 1.0 pound per square inch (psi) tolerance level for gasoline containing at least 10 percent ethanol. A manufacturer or processor of gasoline containing at least 10 percent ethanol shall be deemed to be in full compliance with such standards if the Administrator provides a certification (based on testing) or other evidence acceptable to the Administrator that—

"(A) the gasoline portion of the blend complies with the gasoline volatility standards under this subsection,

"(B) the ethanol portion of the blend does not exceed its waiver conditions under subsection (f)(4), and

"(C) no additional alcohol or other additive has been added to increase the Reid Vapor Pressure of the ethanol portion of the blend.

"(4) The provisions of this subsection shall apply only to the 48 contiguous States and the District of Columbia.".

SEC. 217. DIESEL FUEL SULFUR CONTENT.

Section 211 (42 U.S.C. 7545) is amended by adding the following new subsection after subsection (h):

"(i) SULFUR CONTENT REQUIREMENTS FOR DIESEL FUEL.—(1) Effective October 1, 1993, no person shall manufacture, sell, supply, offer for sale or supply, dispense, transport, or introduce into commerce motor vehicle diesel fuel which contains a concentration of sulfur in excess of 0.05 per centum (by weight) or which fails to meet a cetane index minimum of 40.

"(2) Not later than 12 months after the date of the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations to implement and enforce the requirements of paragraph (1). The Administrator

HOUSE COMMITTEE BILL ON RVP

ance with this part and regulations thereunder, or to otherwise carry out the provision of this part, and shall, upon request of an officer or employee duly designated by the Administrator, permit such officer or employee at reasonable times to have access to and copy such records.

"(b) ENFORCEMENT AUTHORITY.—For the purposes of enforcement of this section and section 207(c), officers or employees duly designated by the Administrator upon presenting appropriate credentials are authorized—

"(1) to enter, at reasonable times, any establishment of the manufacturer, or of any person whom the manufacturer engages to perform any activity required by subsection (a), for the purposes of inspecting or observing any activity conducted pursuant to subsection (a), and

"(2) to inspect records, files, papers, processes, controls, and facilities used in performing any activity required by subsection (a), by such manufacturer or by any person whom the manufacturer engages to perform any such activity.

"(c) AVAILABILITY TO THE PUBLIC; TRADE SECRETS.—Any records, reports, or information obtained under this part shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that records, reports, or information, or a particular portion thereof (other than emission data), to which the Administrator has access under this section, if made public, would divulge methods or processes entitled to protection as trade secrets of that person, the Administrator shall consider the record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of title 18 of the United States Code. Any authorized representative of the Administrator shall be considered an employee of the United States for purposes of section 1905 of title 18 of the United States Code. Nothing in this section shall prohibit the Administrator or authorized representative of the Administrator from disclosing records, reports or information to other officers, employees or authorized representatives of the United States concerned with carrying out this Act or when relevant in any proceeding under this Act. Nothing in this section shall authorize the withholding of information by the Administrator or any officer or employee under the Administrator's control from the duly authorized committees of the Congress.".

SEC. 216. FUEL VOLATILITY.

Section 211 (42 U.S.C. 7545) is amended by adding the following new subsection after subsection (g):

"(h) REID VAPOR PRESSURE REQUIREMENTS.—(1) Not later than 6 months after the date of the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations making it unlawful for any person during the high ozone season (as defined by the Administrator) to sell, offer for sale, dispense, supply, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch (psi). Such regulations shall also establish more stringent Reid Vapor Pressure standards as the Administrator finds necessary to generally achieve comparable evaporative emissions (on a per-vehicle basis) nationwide, taking into consideration the enforceability of such standards, the need of an area for emission control, and economic factors.

"(2) Such regulations shall provide that the requirements of this subsection shall take effect not later than the high ozone season for 1992, and shall include such provisions as the Administrator determines are necessary to implement and enforce the requirements of this subsection.

"(3) In establishing standards for fuel volatility under this subsection, the Administrator shall permit a 1.0 pound per square inch (psi) tolerance level for gasoline containing at least 10 percent ethanol. A manufacturer or processor of gasoline containing at least 10 percent ethanol shall be deemed to be in full compliance with such standards if the Administrator provides a certification (based on testing) or other evidence acceptable to the Administrator that—

"(A) the gasoline portion of the blend complies with the gasoline volatility standards under this subsection,

"(B) the ethanol portion of the blend does not exceed its waiver conditions under subsection (f)(4), and

"(C) no additional alcohol or other additive has been added to increase the Reid Vapor Pressure of the ethanol portion of the blend.

"(4) The provisions of this subsection shall apply only to the 48 contiguous States and the District of Columbia.".

SEC. 217. DIESEL FUEL SULFUR CONTENT.

Section 211 (42 U.S.C. 7545) is amended by adding the following new subsection after subsection (h):

COMMITTEE
HOUSE BILL REPORT

EPA can require testing that is not otherwise available under this part, including fees for testing. Correspondingly, this section broadens the Administrator's inspection authority. This section does not authorize contractors whether or not they are acting as representatives of the Administrator to conduct inspections or have access to business sensitive information unless they are Federal officers or employees.

Section 216. Fuel Volatility

Section 216 requires the Administrator to promulgate within six months of the bill's enactment regulations requiring additional reductions in the volatility of gasoline during the high ozone season (approximately the summer months). The section specifies a maximum Reid vapor pressure standard of 9.0 pounds per square inch and requires the Administrator to establish more stringent Reid vapor pressure standards as needed to achieve comparable evaporative emissions (on a per vehicle basis) nationwide, taking into account such factors as enforceability, environmental need and costs. The regulations implementing the volatility requirements are to take effect no later than the 1992 ozone season. The regulations shall permit gasoline containing at least 9 but not more than 10 percent ethanol (by volume) to exceed the volatility requirements by up to 1.0 pounds per square inch.

Section 217. Diesel fuel sulfur content

Section 217 of the Clean Air Act amendments of 1990 revises section 215 of the Act to require a reduction in the sulfur content of diesel fuel that will reduce diesel vehicles' emission of sulfates and ease compliance with the 1994 particulate matter standard applicable to heavy-duty diesel vehicles. Specifically, section 211 as revised prohibits as of October 1, 1993, the manufacture, sale or transport of motor vehicle diesel fuel having a sulfur content of greater than 0.05 percent (by weight) or a cetane index below 40. This section also requires the Administrator to promulgate within 12 months of the bill's enactment regulations to implement and enforce the prohibition. Also the Administrator is specifically authorized to require refiners to dye fuel not subject to the sulfur content limitations in order to segregate it from the regulated fuel.

To reflect the change in diesel sulfur content that will occur over the useful life of 1991 through 1993 heavy-duty diesel engines, section 217 provides that the sulfur content of fuel used to certify diesel engines for those model years be 0.10 percent (by weight). It further provides that certification fuel used for 1994 and later model year diesel engines comply with the lower sulfur content and cetane index minimum requirements applicable to motor vehicle diesel fuel after October 1, 1993.

This provision compliments the provisions in section 212 regarding the diesel particulate standard.

Section 218. Lead substitutes for gasoline additives

A new subsection is added to section 211 of the Act relating to the registration of certain lead substitute gasoline additives. The subsection establishes procedures for EPA, in consultation with the Department of Transportation, to evaluate the effectiveness of such

HOUSE COMMITTEE BILL ON REFORM

"(j) TANK AND FUEL SYSTEM SAFETY.—The Secretary of Transportation shall, in accordance with the National Motor Vehicle Traffic Safety Act of 1966, promulgate applicable regulations regarding the safety and use of fuel storage cylinders and fuel systems, including appropriate testing and retesting, in conversions of motor vehicles.

"(k) INFORMATION COLLECTION.—For purposes of enforcing regulations implementing this section, the Administrator may, subject to the provisions of section 208(b), by regulation, require manufacturers, distributors, and retailers of motor vehicles or motor vehicle fuels to establish and maintain records, make reports, and provide information concerning the sales of—

"(1) motor vehicles capable of operating on clean alternative fuel; and

"(2) clean alternative fuels.

Nothing in this subsection shall be construed to limit the Administrator's authority under section 114, 206, or 208.

"(l) CALIFORNIA VEHICLE PROGRAM.—In the case of ozone nonattainment areas in the State of California only, notwithstanding section 209, the State may establish more stringent standards to be applicable under subsections (b) and (f) than the standards referred to in such subsections.

"(m) REDUCTIONS IN REFUELING EMISSIONS.—Reductions in refueling emissions whether achieved from retail fuel dispensing facilities ('Stage II') or vehicle-based ('onboard') controls shall be considered in the determination of compliance with the reductions in ozone-forming volatile organic compounds and other substances required under this section.

"(n) REFORMULATED GASOLINE FOR CONVENTIONAL VEHICLES.—(1) Within 24 months after the date of the enactment of the Clean Air Act Amendments of 1990, the Administration shall, after holding at least one public hearing, promulgate regulations under section 211 establishing specifications for cleaner gasoline to be used in conventional gasoline fueled vehicles. Such standards shall require the greatest reduction in ozone-forming volatile organic compounds and air toxic emissions achievable through the reformulation of conventional gasoline, taking into consideration the cost of achieving such emission reductions, and health, environmental and energy impacts. The regulations may establish specifications for gasoline intended for use in vehicles manufactured to use leaded gasoline that are different from the specifications established for gasoline intended for use in vehicles manufactured to use unleaded gasoline.

"(2) Beginning January 1, 1995, the Administrator shall require that such reformulated gasoline or cleaner fuels be offered for sale in all ozone nonattainment areas with a 1988 design value at or above 0.18 parts per million (as calculated by the most recent interpretation methodology issued by the United States Environmental Protection Agency before the date of the enactment of the Clean Air Act Amendments of 1990).

"(o) CONSULTATION WITH DEPARTMENT OF ENERGY AND DEPARTMENT OF TRANSPORTATION.—The Administrator shall coordinate with the Secretaries of the Department of Energy and the Department of Transportation in carrying out the Administrator's duties under this section.".

(c) CONFORMING AMENDMENT.—Section 202(a)(4) (42 U.S.C. 7521(a)(4)) is amended by striking out "standards prescribed under this subsection" every place it occurs and inserting "requirements prescribed under this title".

SEC. 202. EMISSION STANDARDS FOR CERTAIN MOTOR VEHICLES.

(a) STANDARDS.—Section 202 (42 U.S.C. 7521) is amended by adding the following at the end thereof:

"(g) NMHC AND CO STANDARDS FOR MODEL YEARS AFTER 1993.—Effective with respect to the model year 1994 and thereafter, the regulations under subsection (a) applicable to emissions of nonmethane hydrocarbons (NMHC) and carbon monoxide (CO) from passenger cars and light-duty trucks (LDTs) shall contain standards which provide that emissions from a specified percentage of each manufacturer's sales volume of such cars and trucks shall comply with the levels specified in table 1. The specified percentage shall be 40 percent in model year 1994, 80 percent in 1995, and 100 percent thereafter.

TABLE 1.—EMISSION STANDA
DIESEL FUELED PASSENGER
6,000 LBS. GVWR

Vehicle
Passenger Cars
LDT's (0–3,750 lbs LVW)
LDT's (3,751–5,750 lbs LVW)

Standards are expressed in grams
LVW refers to loaded vehicle weig
defined by EPA in regulations in ef
Amendments of 1990.

* In the case of the standards und
the applicable useful life shall
occurs.

** In the case of the standar
the applicable useful life shall
occurs.

"(h) NO_x AND PM STANDA
spect to the model years after 1
respect to model years after 199
tions under subsection (a) appli
particulate matter (PM) from s
provide that such emissions fr
sales volume of such cars and t
2. In the case of passenger car
model year 1994 and 100 perce
specified percentage shall be 40
ter.

"TABLE 2.—EMISSION STAN
AND DIESEL FUELED PASSE
OF UP TO 6,000 LBS. GVWR

Vehicle type
Passenger cars and LDT's wi
lbs. or less.
LTD's with LVW of 3,751 to 5,75

Standards are expressed in grams
LVW refers to loaded vehicle weig
defined by EPA in regulations in ef
Amendments of 1990.

* For these standards, for purpose
shall be 5 years or 50,000 miles (or th

"(i) PHASE II STUDY.—(1) The A
Technology Assessment, shall st
from passenger cars and light-du
The study shall consider whethe
ing after January 1, 2003, the
diesel-fueled passenger cars and
of 3,750 lbs. or less specified in t

HOUSE COMMITTEE REPORT ON REFORM

Committee amendment allows Federal agencies to purchase retrofit conventional fuel vehicles in order to meet the requirements of the clean fuel program. This provision provides an alternative source of supply for Federal fleet managers.

To be eligible for consideration, converted vehicles must meet regulatory requirements promulgated by the Administrator. Nothing in this subsection, however, is intended to limit the authority of the President's designee to require that warranty, maintenance and other services provided by original equipment manufacturers also will be available even if the vehicles are converted to clean fuel vehicles due to the unavailability of original equipment which meets the emission requirements of this amendment. Regulations promulgated by such designees under Federal procurement laws would be in addition to those promulgated by the Administrator of the EPA under section 207 of the Clean Air Act relating to warranties for compliance with emissions standards.

Finally, the subsection establishes a demonstration program for "superclean" vehicles. For the years 1995 through 1999, 10 percent of the new vehicles subject to the subsection must be designed to meet an emission standards of 0.19 gpm for VOCs.

Vehicle conversions.—Subsection (i) provides that all of the requirements of section 212 could be met through conversions, but it does not mandate such conversions. The Committee notes that fleet operators are quite concerned about any such mandate. It establishes standards for vehicle conversions. It provides that converted vehicles shall be subject to certification, warranty, and recall provisions, with the vehicle converter being considered a manufacturer for these purposes and related enforcement purposes.

Tank and fuel system safety.—Subsection (j) directs the Secretary of Transportation to promulgate regulations to insure the safety of fuel tanks and systems.

Information collection.—Subsection (k) provides additional information collection authorities to the Administrator. The Administrator may use the authorities for enforcement purposes.

California vehicle program.—Subsection (l) provides that California may establish a separate and more stringent clean alternative fuels program than those established under this section for ozone nonattainment areas within the State. This waiver of preemption is in addition to (and not in any way a limitation upon) the waiver of preemption available to California under section 209 for traditional tailpipe emissions control programs applicable to gasoline and diesel fuel vehicles.

Reductions in refueling emissions.—Subsection (m) provides that any reductions in refueling emissions from stage II controls shall be considered in determining whether a vehicle complies with emission standards under the section.

Reformulated gasoline.—Subsection (n) requires the Administrator to establish, after hearings, specifications for cleaner gasoline to be used in conventional fueled vehicles. Such cleaner gasoline must achieve the greatest reduction in ozone-forming VOC and air toxic emissions achievable through reformulation of conventional gasoline, taking into consideration the cost of achieving such emission reductions and health, environmental and energy impacts. These can be different requirements for leaded and unleaded gaso-

line vehicles. Beginning January 1, 1995, the Administrator must require that gasoline meeting the specifications be offered for sale in all ozone nonattainment areas with a 1988 design value above 0.18.

Consultation.—Subsection (o) requires the Administrator to consult with the Secretaries of the Departments of Energy and Transportation in carrying out section 212.

Test procedures.—The Committee recognizes that the feasibility of the standards prescribed under section 202 and new section 212 has been established on the basis of currently effective test procedures at the time of final passage from Committee. Accordingly, it is the Committee's intent that if EPA subsequently revises such procedures under the title, the measured emissions results under such revised procedures shall be adjusted as necessary to reflect the results that would be achieved under current procedures.

Section 202. Emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen from passenger cars

Motor vehicle emission standards.—Section 202 of the Clean Air Act Amendments of 1990 amends Clean Air Act section 202 to establish new motor vehicle emission standards. These standards are more stringent than those proposed in the bill as introduced. They essentially adopt the so-called "California" standards.

NMHC and CO.—New Clean Air Act section 202(g) establishes new emission standards for nonmethane hydrocarbons and CO applicable to passenger cars and all light-duty trucks of 6000 gvwr or less with a loaded vehicle weight of less than 5750 lbs or less produced in MY 1994 and thereafter. Forty percent of each automaker's 1994 model year passenger cars and light-duty trucks, eighty percent of each automaker's 1995 model year passenger cars and light-duty trucks, and 100 percent of each automaker's passenger cars and light-duty trucks thereafter are required to comply with emission standards provided in Table I of section 202. Current standards for total HC (which provide a cap on total HC methane emissions) and CO remain in place in addition to the new standards.

The section includes two sets of standards. A set of more stringent standards is provided for which the useful life of the emission controls for purposes of certification is to be five years or 50,000 miles, whichever first occurs. These emission standards include standards for all passenger cars, and all light-duty trucks weighing 3750 pounds loaded vehicle weight or less, of 0.25 grams per mile for nonmethane hydrocarbons and 3.4 grams per mile for CO. Slightly numerically higher standards are applicable for which the useful life of the emission controls for purposes of certification is to be 10 years or 100,000 miles, whichever first occurs. These emission standards include standards for all passenger cars, and all light-duty trucks weighing 3750 pounds loaded vehicle weight or less, of 0.31 grams per mile for nonmethane hydrocarbons and 4.2 grams per miles for CO.

NO_x and PM.—New Clean Air Act section 202(h) establishes emission standards for NO_x and particulate matter applicable to passenger cars produced in MY 1994 and thereafter, and applicable to light-duty trucks of 6000 lbs gvwr or less with a loaded vehicle

SENATE COMMITTEE BILL ON REFORM

nactment of this subsection, the
ıder this section respecting fuel
ɔe deemed amended to comply
ɔaragraph (2).
ll be construed to preempt the
permitted by section 211(c)(4) of

or cause or allow the introduc-
tor vehicle which is labeled "un-
pped with a gasoline tank filler
f unleaded gasoline, which is a
:le, or which such person knows
d solely for the use of unleaded

person shall introduce or cause
y motor vehicle of diesel fuel
know contains a concentration
m (by weight) or which fails to

ı Motor Vehicle Fuels.—
romulgate regulations to reduce
ır vehicle fuels.
bsection shall include a stand-
standard shall apply to all gaso-
r introduced into commerce for
he high ozone periods of each
asoline sold in the second high
after the enactment of this sub-
ire that such gasoline sold, or
nto commerce for use in motor
ned by the American Society of
of enactment of this subsection)
r pressure of nine pounds per
ıtor establishes a lower number
ines to be achievable and appro-
public health and welfare. The
roportional reduction in areas

ıs referred to in paragraph (2),
the period between May 16 and
longer period as the Adminis-
ın to cover periods of potential
the standard for ozone for the

gasoline and 10 per centum de-
e Reid vapor pressure elimina-
shall be one pound per square
le Reid vapor pressure limita-
ph (2): Provided, however, That
ıarketer, reseller, carrier, retail-
be deemed to be in full compli-
subsection and the regulations
ın demonstrate (by showing re-
evidence acceptable to the Ad-

ministrator) that (A) the gasoline portion of the blend complies with the Reid vapor pressure limitations promulgated pursuant to this subsection, and (B) the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4).

(i) Desulfurization of Diesel Fuel.—

(1) Effective October 1, 1993, no person shall manufacture, sell, offer for sale, dispense, transport or introduce into commerce motor vehicle diesel fuel which contains a concentration of sulfur in excess of 0.05 per centum (by weight) or which fails to meet a cetane index minimum of 40.

(2) No later than twelve months after the enactment of this subsection, the Administrator shall promulgate regulations to implement and enforce the requirements of paragraph (1). The Administrator shall require manufacturers and importers of diesel fuel not intended for use in motor vehicles to dye such fuel in order to segregate it from motor vehicle diesel fuel.

(3) The sulfur content of fuel required to be used in the certification of 1991 through 1993 model year heavy-duty diesel vehicles and engines shall not exceed 0.05 per centum (by weight). The sulfur content and cetane index minimum of fuel required to be used in certification of 1994 and later model year heavy-duty diesel vehicles and engines shall comply with the regulations promulgated under paragraph (2).

(j) Prohibition on Leaded Gasoline for Highway Use.—Effective January 1, 1991, it shall be unlawful for any person to sell, offer for sale, or introduce into commerce, for use as fuel in any motor vehicle (as defined in section 219(2)) any gasoline which contains lead or lead additives. The Administrator may extend the January 1, 1991, deadline for up to two years, if the Administrator determines that unavailability of gasoline containing lead or lead additives for such vehicles will reduce the availability of such gasoline for farm vehicles and that alternatives to gasoline containing lead or lead additives are unavailable for use in gasoline powered farm vehicles.

(k) Fuel Quality.—

REFORM

(1) Not later than thirty-six months after the date of enactment of this subsection the Administrator shall, after notice and opportunity for public comment, promulgate regulations establishing specifications for fuel quality which will minimize, to the extent economically and technically achievable, emissions (including evaporative emissions) of hydrocarbons, carbon monoxide, oxides of nitrogen, particulate matter and hazardous air pollutants over the useful life of vehicles and engines certified for manufacture under this title. Such regulations may prohibit the presence of fuel impurities and other substances or mandate the use of specific additives to achieve the purposes of this subsection. The regulations shall be effective for fuels sold on and after January 1, 1994. In the event that the Administrator does not promulgate the regulations required by this paragraph, effective January 1, 1994, it shall be unlawful to sell, offer for sale or introduce into commerce any fuel for use in a gasoline-powered vehicle unless such fuel contains additives effective in preventing the accumulation of deposits in fuel-injected engines.

(2) In order to achieve and maintain attainment of ambient air quality standards, the Administrator may promulgate regulations applicable to fuel refiners, distributors, marketers, or consumers establishing specifications for fuels (including regulations requiring the availability or sale of fuels meeting the specifications in a nonattainment area or areas) to reduce emissions of pollutants subject to a standard under this title or hazardous air pollutants from motor vehicles. In establishing such specifications and availability requirements the Administrator shall consider other environmental effects which would result from production and use of fuels meeting the specifications. The Administrator shall require as part of any specification under this paragraph that there be no increase in emissions of any other pollutant subject to a standard under this title or any hazardous air pollutant by vehicles using the specified fuel. Regulations under this paragraph shall be stated as performance standards and may be satisfied by any fuel which, as certified to the Administrator by the refiner or distributor, achieves comparable emissions reductions and otherwise satisfies the specification.

(l)(1) Except as provided in paragraph (2) and effective October 1, 1991, no person shall, during the period from October 1 to March 31 each year, sell, offer for sale, or introduce into commerce in any area classified as nonattainment for carbon monoxide any gasoline fuel for use in a motor vehicle unless the oxygen content of such fuel shall be 3.1 per centum or greater.

(2) The Administrator shall, not later than nine months after the date of enactment of this subsection, promulgate guidelines allowing the exchange of marketable oxygen credits between sellers of fuels with an oxygen content higher than that required by paragraph (1) and other sellers of fuels to offset the sale or use of fuels with a lower content than required: Provided, That such exchanges shall not be permitted between sellers located in different nonattainment areas and that the average oxygen content of fuels sold in any area that is nonattainment for carbon monoxide be 3.1 per centum or greater.

(3) The Administrator may waive, in whole or in part, the requirements of this subsection in any area upon a demonstration by the State to the satisfaction of the Administrator that the use of oxygenated fuels would prevent or interfere with the attainment by such area of a national primary ambient air quality standard (or a State or local ambient air quality standard) for any air pollutant other than carbon monoxide.

(4) Any person selling oxygenated fuel at retail pursuant to this subsection shall be required under regulations promulgated by the Administrator to label the fuel dispensing system with a notice that the fuel is oxygenated and will reduce carbon monoxide emissions from motor vehicles.

[DEVELOPMENT OF LOW-EMISSION VEHICLES

[SEC. 212. (a) For the purpose of this section—

[(1) The term "Board" means the Low-Emission Vehicle Certification Board.

[(2) The tern
tive, executive, a
United States, a

[(3) The term
cle designed for
other than a veh
ing, combat, or ta

[(4) The term
cle which—

[(A) emits
below new m
tion 202 at th
and

[(B) with r
new motor ve
at the time of

[(5) The term "
tory price applicab
(B) in any case whe
ry price, the most
or model of motor v

[(b)(1) There is estab
Board to be composed of
retary of Transportatio
Council on Environment
the National Highway S
portation, the Administr
appointed by the Presi
member of the Board as

[(2) Any member of
States may receive comp
such member is engaged
the Board shall be reim
diem in lieu of subsistenc
United States Code, for
ployed intermittently.

[(3)(A) The Chairman,
the Board, may employ an
personnel as may be nece
Board, but no individual
in excess of the rate autho
United States Code.

[(B) The Chairman may
as may be required, but a
whenever a majority of its

[(C) The Board is grantec
its responsibilities under thi

[(c) The Administrator sh
of motor vehicles qualify a
with the provisions of this se

[(d)(1) The Board shall ce
cles—

[(A) for which a cert
accordance with paragra

SENATE REPORT ON ~~FUEL OXY~~ REFORM

FUEL QUALITY (SECTION 217)

SUMMARY

Section 217 of the bill adds a new subsection (k) to section 211 of the Act to require the Administrator to promulgate fuel quality regulations. Not later than 36 months after the date of enactment of the legislation, the Administrator is required to publish regulations establishing fuel quality specifications that minimize, to the extent economically and technically achievable, emissions from fuel combustion in engines. The regulations are to minimize emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, particulate matter and hazardous air pollutants over the useful life of vehicles and engines certified for manufacture under title II of the Act. The regulations go into effect on January 1, 1994. If the Administrator fails to promulgate such regulations, it is unlawful after January 1, 1994, to sell, offer for sale or introduce into commerce any fuel that does not contain additives to prevent accumulation of deposits in fuel-injected engines.

New section 211(k)(1) of the Act authorizes the Administrator to promulgate regulations applicable to fuel refiners, distributors, marketers or consumers establishing specifications for fuels to reduce emissions of pollutants subject to a standard under title II of the Act or hazardous emissions from motor vehicles. The Administrator shall consider other environmental effects and require there be no increase in emissions of any other pollutant subject to a standard under title II or any hazardous air pollutant. Regulations are to be stated as performance standards and may be satisfied by any fuel that achieves comparable emissions reductions and otherwise satisfies the specifications.

DISCUSSION

Subsection (k)(1) requires the Administrator to establish fuel quality standards to maximize engine performance and to minimize emissions from the combustion of fuels in vehicles and engines. Engines may prematurely wear out due to impurities in the fuel. Such fuel can clog fuel injectors, cause additional corrosion and otherwise affect engine performance, and cause an increase in air pollution emissions from the engine. In addition, fuel additives, such as detergents, are available to maximize the performance of engines and minimize emissions. This paragraph requires the Administrator to assure high fuel quality and require use of detergents to maximize engine performance.

In the event that the Administrator fails to promulgate regulations, fuel may not be sold, offered for sale or introduced into commerce that does not contain additives that prevent the accumulation of deposits in fuel-injected engines. This is to assure that even in the event of agency inaction engine durability will be enhanced through use of fuel additives.

Paragraph (2) is general authority for the Administrator to establish fuel specifications and to require availability of alternative fuels that reduce air pollution emissions. Such requirements may apply to specific nonattainment areas. Any such alternative fuel requirement must take into account the environmental effects of

alternative fuel use and production. For example, concerns have been raised about the impacts on carbon dioxide emissions from coal-derived methanol. Carbon dioxide is a leading greenhouse gas. Increased CO_2 emissions from the coal conversion process would exacerbate an already serious global warming problem. The overall environmental effects must be taken into account when assessing the impact of the use of the fuel.

Alternative fuels are to be used to reduce emissions of air pollutants. Decreases in one or more pollutants cannot be justified to allow increases in other pollutants. Thus reductions in emissions of one pollutant, such as hydrocarbons, could not be justified if there is an increase in other pollutants, such as oxides of nitrogen or formaldehyde. An integrated, comprehensive emissions assessment is to be performed before selecting a particular fuel for use.

Fuel additives can present a significant threat to public health and the environment. For instance, lead is a fuel additive used to increase octane and provide lubrication for engine valves. Its negative impact on the neurological development and cognitive ability of children is well-documented. In addition, lead may poison the catalytic converters which remove other pollutants including hydrocarbons, oxides of nitrogen and carbon monoxide from exhaust. As a result, the Environmental Protection Agency has promulgated regulations to phasedown the use of lead additives in gasoline fuels.

Other additives which may pose a significant threat to public health include ethylene dibromide and ethylene dichloride (used as lead scavengers). EPA has also proposed a voluntary testing program on the health effects of methyl tertiary butyl ether (MTBE), another octane enhancer now used in approximately 20 percent of the gasoline fuel sold in the U.S. MTBE is to be listed as a hazardous air pollutant pursuant to the amendments made by in section 301 of the bill. The combustion of the methanol component of MTBE may also significantly increase formaldehyde emissions. Formaldehyde is a potent human carcinogen and a highly reactive precursor of ozone pollution.

There is less evidence on the emissions, exposure and potential adverse health effects which may be associated with lubricant formulations (motor oils). The contribution of lubricants to vehicle emissions is, in any event, only a small portion of the pollution in the exhaust from a motor vehicle in comparison to the emissions which are attributable to fuels and fuel additives.

In its 1985 air toxics strategy, the agency recognized that fuel additives may be causing a significant threat to public health and as part of that strategy EPA indicated that it would be proposing a series of protocols for the testing of fuel additives. Only the MTBE tests have been proposed to date.

Section 211(b) of the Clean Air Act gives the Administrator authority to require the manufacturer of any fuel additive to "conduct tests to determine potential public health effects of such fuel additive." Section 211(e) requires the Administrator to implement this requirement through regulations to be issued not later than three years after enactment (the language was enacted in 1977) applying to new fuel additives before their introduction into com-

merce and for additives already in commerce. These regulations have not been established by the Agency.

Section 211(c) gives the Administrator authority to "prohibit the manufacture, introduction into commerce, offering for sale or sale of any fuel or fuel additive . . . if . . . any emissions product of the fuel or fuel additive causes, or contributes, to air pollution . . ."

The Agency should implement the authorities contained in section 211 with respect to fuel additives by developing criteria (based on factors such as emissions of the additive or combustion byproducts, impact of the additive or byproducts on the emissions control systems of motor vehicles, exposure to the additive, byproducts or atmospheric transformation products and the potency of the additive, byproduct or transformation products as human and environmental toxicants) for testing determinations. Each additive should then be evaluated according to the criteria and testing programs for additives of concern should be commenced using the authority of section 211(b). As the Agency has not implemented already enacted non-discretionary provisions of law in this respect, this activity is to be completed on an expedited schedule.

Oxygenated Fuels (Section 218)

SUMMARY

New section 218 requires that gasoline sold in carbon monoxide nonattainment areas during the period from October 1 and March 31 each year, beginning October 1, 1991, must contain an oxygen content greater than 3.1 percent by weight.

Not later than 9 months after the date of enactment the Administrator is required to promulgate guidelines that allows fuel sellers to exchange oxygen credits with others in the same nonattainment area, provided that credits are generated by the sale of fuel with more than 3.1 percent oxygen are sold to offset the sale of fuel with less than 3.1 percent oxygen.

The Administrator must also promulgate regulations that require that pumps dispensing oxygenated gasoline must be labeled with a notice that the fuel is oxygenated and will reduce carbon monoxide emissions from motor vehicles.

The Administrator is given authority to waive the fuel oxygen requirement in any area where it would interfere with the attainment of any other ambient air quality standard.

DISCUSSION

This provision mandates the use of oxygenated fuels in carbon monoxide nonattainment areas. Carbon monoxide is emitted directly as a pollutant and generally the result of imperfect combustion in vehicle engines.

Oxygenated fuels offers a means for significant reduction in carbon monoxide levels, particularly at higher elevations. The Congressional Research Service estimates oxygenated fuels would reduce carbon monoxide emissions from pre-1981 vehicles by 24 percent or more. Reductions in later models would be lower due to their use of three way catalysts and oxygen sensors in the emission

DASCHLE AMENDMENT TO SENATE BILL

The Oxygenated Fuels Association recently petitioned the EPA to approve all ethers or mixtures of ethers to meet the 2.7 percent oxygen standard. To quote their request, "We believe that this expansion will result in a number of significant environmental benefits without any detrimental effects in vehicle performance or materials compatibility."

Will vehicle modification be required to use the clean octane gasoline that you propose?

No. Every car in the country will run, and run better, on cleaner gasoline.

Your amendment calls for 1 percent benzene. Benzene is a naturally occurring element in gasoline. This means that refiners will actually have to take the benzene out of the gasoline. This is expensive and will create a potential hazardous waste problem.

Untrue. Our amendment had originally proposed a 0.8 percent benzene standard, which is better environmentally, but does require extracting benzene from the gasoline. A 1.0 standard does not generally require benzene extraction. California, New York and possibly other states are or will be implementing 0.8 standard for benzene. The oil industry already knows this is coming, and is preparing for it. The EPA should have implemented the benzene standard long ago. When 85 percent of the nation's benzene emissions come from mobile sources, the problem has to be addressed. As far as creating a waste problem, the nation currently imports almost $00 million gallons of benzene, primarily for chemical uses. Obviously benzene has a market, and claims to the contrary are simply not true.

The 1.0 standard in our amendment is not restrictive.

There is currently a joint oil/auto research program underway to determine the comparative benefits of using reformulated fuels. Why mandate a specific reformulation when even the industry does not know the pros and cons of reformulated gasoline?

As it is commonly known, the joint oil/auto research program is an attempt by these industries to show that simple fuel reformulation can achieve many of the same benefits of requiring cars to run on M-85 (85 percent methanol-15 percent regular gasoline), without requiring modifications in the cars. This study will no doubt produce many very valuable results, but if the Congress were to wait for industry to do their own research before enacting policy, we'd probably still be waiting for a lead phase-out.

While the specific reformulations of gasoline will no doubt vary between refiners and localities, there are certain specifications that should be included in any attempt to make a cleaner gasoline, namely reduced aromatics content (including benzene) and increased oxygen content. These are the basic characteristics that have been the cornerstones of current clean octane gasolines in the marketplace.

A more effective manner of controlling pollution is through stricter controls on automobiles and a better inspection and maintenance program for cars.

While cars can and should be cleaner, it takes approximately 10 to 15 years for a vehicle fleet to turn over. Moreover, high aromatics gasolines are poisoning modern pollution control devices. Let's try and give Detroit a little help. According to paper presented jointly by ARCO and SUN representatives at a recent conference in Detroit, "(B)ecause of their compatibility with existing vehicles, reformulated fuels can produce an immediate impact on vehicle emissions and resulting ozone formation."

According to the Motor Vehicles Manufacturers Association (MVMA), the national trade organization of automakers, "Reformulated gasoline offers the quickest and cheapest way to obtain air quality improvements of any potential alternative fuel. Its use does not require any change in the fuel distribution infrastructure and the 'new' fuel can immediately be used in the entire gasoline vehicle fleet because no engine modifications are required."

Mr. DASCHLE. I reserve remainder of my time.

The PRESIDING OFFICER. The Senator from Montana.

Mr. BAUCUS. Mr. President, I ask the Senator if he will offer his amendment.

Mr. DASCHLE. I will.

Mr. BAUCUS. It would be helpful so Senators could see what is in the amendment.

Mr. DASCHLE. The amendment has just arrived.

At this time I send the amendment to the desk and ask for its consideration.

The PRESIDING OFFICER. The clerk will report the amendment.

The assistant legislative clerk read as follows:

The Senator from South Dakota [Mr. DASCHLE], for himself, Mr. DOLE, Mr. HARKIN, Mr. MCCLURE, Mr. DIXON, Mr. DURENBERGER, Mr. GRASSLEY, Mr. SIMON, Mr. EXON, Mr. KERREY, Mr. BURNS, Mr. CONRAD, Mr. WIRTH, Mr. LEAHY, and Mr. PRESSLER, proposes an amendment numbered 1423 to amendment No. 1293.

Mr. DASCHLE. Mr. President, I ask unanimous consent that the reading of the amendment be dispensed with.

The PRESIDING OFFICER. Without objection, it is so ordered.

The amendment is as follows:

(a) on page 214, line 21, delete "specific"; and

(b) on page 215, strike from line 5, through page 216, line 2, and insert the following:

"(2) CLEAN FUELS FOR CONVENTIONAL VEHICLES.—(A) Within one year of enactment of the Clean Air Amendments of 1990, the Administrator, pursuant to paragraph (1), shall promulgate regulations establishing specifications for reformulated gasoline to be used in conventional gasoline fueled motor vehicles in any nonattainment area with a 1989 ozone design value equal to or exceeding 0.18 parts per mission. Such regulations shall prohibit any person from selling, offering for sale, dispensing, supplying, offering for supply, transporting or introducing into commerce in such area or areas any gasoline not meeting the requirements of this paragraph for use in gasoline fueled motor vehicles. Such regulations shall take effect in accordance with the phase in schedule set forth in subparagraph (B). Such regulations shall be incorporated in the final regulations promulgated pursuant to paragraph (1).

"(B) Subject to the limitations set forth in subsection (h) and section 212(a)(11), the specifications for fuel quality promulgated pursuant to subparagraph (A) shall, at a minimum, provide for—

"(i) a maximum aromatic hydrocarbon content by volume of not greater than 30 percent as of January 1, 1992; of not greater than 28 percent as of January 1, 1994, and of not greater than 25 percent as of January 1, 1996;

"(ii) a maximum benzene content by volume which shall be the lowest concentration of benzene accompanying the maximum aromatic hydrocarbon content under clause (i) that can be achieved without additional capital investment but, in no event may such maximum benzene content be greater than 1.0 percent by volume;

"(iii) during the high ozone season (as defined by the Administrator), a 15-percent reduction in the ozone-forming potential of volatile organic compounds and no increase in oxides of nitrogen emitted from existing vehicles (as determined by the Administrator) using such fuel compared to conventional gasoline with a Reid vapor pressure of 9.0 pounds per square inch sold in calendar year 1989; and

"(iv) subject to paragraph (D), an oxygen content by weight equal to or greater than 2.0 percent as of January 1, 1992, 2.5 percent as of January 1, 1993, and 2.7 percent as of January 1, 1994, except where a higher oxygen content is required under section 211(1) or section 188, except as provided in subparagraph (D).

"(C) The regulations promulgated under paragraph (A) shall include procedures under which the Administrator shall certify fuels as complying with the specifications established pursuant to paragraph (B).

"(D) The Administrator may waive, in whole or in part the requirements of paragraph (2)(B)(iv) upon a determination by the Administrator that the use of oxygenated fuels would prevent or interfere with the attainment by such area of a national primary ambient air quality standard (or a State or local ambient air quality standard) for any air pollutant other than carbon monoxide.

"(E) Sellers of fuels subject to this paragraph with an oxygen content higher than percentages specified in subparagraph (B)(iv) shall be eligible for credits in accordance with the terms and conditions of section 211(1)(2).

"(F) The regulations promulgated under this paragraph shall include procedures under which the Administrator may certify fuels as complying with the specifications established pursuant to subparagraph (B). The regulations shall establish a procedure by which the Administrator may certify a gasoline as complying with such specifications if such gasoline (i) complies with the specification in clauses (iii) and (iv) of subparagraph (B) and (ii) achieves equivalent or greater emission reductions that are achieved by a gasoline meeting the specifications established pursuant to clauses (i) and (ii) of subparagraph (B).

"(3)(A) Any state in which there is a moderate or serious ozone non-attainment area may propose as a revision of the applicable implementation plan for such area or areas a requirement that reformulated gasoline sold, offered for sale, dispensed, supplied, offered for supply, transported or introduced into commerce in such area or areas for use in gasoline fueled motor vehicles shall be subject to all the requirements of this subsection beginning on the date specified in the revision.

"(B) For the purposed of paragraph (A), the Administrator may delay, for not to exceed three years, the date on which reformulated gasoline which meets the specifications in paragraph 2(B) is to be offered for sale or sold in order to provide adequate lead time for such fuel to be made available in necessary quantities. The decision of the Administrator to provide such delay shall be accompanied by an explanation of the reasons for such delay.".

Mr. BAUCUS. Mr. President, I yield 5 minutes to the Senator from Texas.

The PRESIDING OFFICER. The Senator from Texas is recognized for 5 minutes.

DASCHLE EXPLANATION OF HIS AMENDMENT

Mr. BAUCUS. I move to lay that motion on the table.

The motion to lay on the table was agreed to.

Mr. BAUCUS. Mr. President, I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The bill clerk proceeded to call the roll.

Mr. MITCHELL. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

ORDER OF PROCEDURE

Mr. MITCHELL. Mr. President, I am advised by the managers that Senator DASCHLE is prepared to offer his amendment which will be contested, and which will require a vote.

Accordingly, Senators should be aware that there will be another rollcall vote this evening not later than 7:15, possibly earlier if all of the time is not used and some is yielded. That will be the only other vote this evening.

Then the managers will be taking additional amendments which have been accepted, and we will return to session tomorrow to consider the amendments with respect to the allowance system, and other amendments that will be offered at that time.

So there will be one more vote this evening. That will be not later than approximately 7:15, possibly earlier, and then tomorrow we will be in session with votes possible as we continue to consider amendments as they are offered by Senators.

I thank the managers for their cooperation. I thank Senator DASCHLE very much for his cooperation.

Mr. President, I yield the floor. I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The bill clerk proceeded to call the roll.

Mr. DASCHLE. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. DASCHLE. Mr. President, I will have the draft of the amendment momentarily.

Until it arrives I think I will begin debate of the amendment.

Mr. McCLURE. Mr. President, parliamentary inquiry. Is it possible for us to start the allocation of the 1-hour time limit on the amendment so people may be informed the vote will not be beyond 7:15?

Mr. DASCHLE. I ask unanimous consent that the vote occur at 7:15.

The PRESIDING OFFICER. Without objection, it is so ordered. The vote on the Daschle amendment will occur at 7:15.

Mr. McCLURE. Mr. President, I wonder if the Senator will reformulate that request. I do not mean to delay the consideration. Under the unanimous-consent agreement, as I understand, each amendment that is in order is limited to 1 hour of general debate. Fixing a general time for when we would hold or start using the time now would achieve the same objective, but still ensure people that indeed if time is yielded back the vote could occur before 7 o'clock.

Mr. DASCHLE. I amend my unanimous-consent request in that regard, that it be held no later than 7:15, and possibly earlier.

Mr. BAUCUS. Mr. President, I reserve the right to object.

Mr. President, these negotiations concerning this bill cover many subjects. One of the subjects covered was the alternative fuels including performance requirements and specifications of gasoline. It is clear that this amendment offered by the Senator from South Dakota is the amendment which covers a subject that was very exhaustively covered.

Consequently, as the manager of the bill, as the participant in those negotiations, I feel constrained to say, which I have already said privately to the Senator from South Dakota, that this is an amendment which is a deal breaker. It breaks the deal.

Therefore, I feel further constrained to ask that the vote, if there be a vote either at 7:15 or earlier, be either on or in relation to the amendment so that I can move to table. I will only move to table at the appropriate time because consistent with all other amendments which in my judgment are deal breakers just as I moved to table those amendments I feel constrained also consistently to move to table this amendment as well.

So therefore I ask that the vote be either on or in relation to.

The PRESIDING OFFICER. Is there objection to the unanimous-consent request?

Mr. McCLURE addressed the Chair.

The PRESIDING OFFICER. The Senator from Idaho.

Mr. McCLURE. I do not mean to delay this, but I wonder if I can ask unanimous consent that the time on the Daschle amendment start running at this time and the vote thereon occur in the normal course of events under the previous order?

The PRESIDING OFFICER. Is there objection? The chair hears none. The Chair will then announce that the vote concerning the Daschle amendment will occur no later than 7:20.

Who yields time?

Mr. DASCHLE. I thank my colleagues, and I yield such time as I may consume.

The PRESIDING OFFICER. The Senator from South Dakota is recognized.

AMENDMENT NO. 1423 TO AMENDMENT NO. 1293

Mr. DASCHLE. Mr. President, the amendment I am offering, with Senators DOLE, HARKIN, DURENBERGER, McCLURE, DIXON, GRASSLEY, SIMON, EXON, KERREY, BURNS, and CONRAD, would improve air quality by cleaning up the gasoline that all of us burn every day in our cars. Specifically, this amendment seeks to use oxygenated fuels and other benign additives to replace the toxic aromatics that are now used to boost octane in gasoline.

We are not proposing a sweeping change. In fact, our amendment would merely roll back gasoline aromatics levels to those present only a decade ago. It would apply only to the nine cities that have been designated the most severe ozone nonattainment areas in the country.

At the outset, I would like to make particular mention of the contribution that Senators HARKIN and DOLE have made to the development of this amendment Senator HARKIN has been an articulate advocate for the establishment of the strongest possible reformulated gasoline standard from the beginning, and his involvement in this effort has been invaluable. Senator DOLE the distinguished Republican leader, played a pivotal role in negotiations with the administration on this amendment, and his initiative in that area has helped bring this issue to the Senate floor. Both Senator HARKIN and Senator DOLE are well known not only as leaders of the effort to stimulate national demand for agriculturally derived fuels, but also as early proponents of the value of alternative fuels as a vehicle for improving air quality and reducing our country's dependence on imports of foreign oil. I very much appreciate their help on this amendment.

Also, before proceeding with the debate, I ask unanimous consent that an explanation of responses to concerns about this amendment be printed at the conclusion of my remarks.

The PRESIDING OFFICER. Without objection, it is so ordered.

(See exhibit 1.)

Mr. DASCHLE. Mr. President, it is important to note that this amendment is a compromise drafted after a series of negotiations with EPA and White House officials. The original draft of this amendment covered all 101 ozone nonattainment areas, and we have also discussed the option of covering the 41 serious to extreme ozone nonattainment areas. We could easily justify coverage of all 101 areas, but in acknowledgement of the concerns of others and in the spirit of cooperation, we have deferred to EPA's request that the clean octane standard be applied only to the nine most severe ozone nonattainment areas, with the proviso that other communities could opt into the program. This is the minimum we can do if we are serious about tackling the problem of air toxins from mobile sources.

This modest compromise has attracted a broad range of support, as indicated by the distinguished cosponsors of the amendment as well as the endorsement of the following organizations: the National Governors Association, the National Clean Air Coalition,

the Sierra Club, Citizen Action, the Renewable Fuels Association, the National Corn Growers Association, Renew America, Farm Bureau Federal, American Agriculture Movember, SAFER—safer air through fuel enhancement, reformulation and reforestation—National Farmers Union, National Farmers Organization, Arizonans for Clean Air Now, the Idaho Ethanol Fuel Association, and the Clean Fuels Development Coalition.

The thrust of the Clean Air Act legislation before the Senate is to make the air cleaner by making cars cleaner. While cars can and should produce less pollution, it is simply unfair to heap the burden of pollution control solely on the automakers when the gasoline that cars burn produces 50-percent more pollution than gasoline of only a decade ago. This amendment would achieve substantial clean air benefits without requiring costly modification of our automobiles. Moreover, it would implement what many of the more far-sighted oil companies are already beginning to do in select regions of the country.

In the context of the Clean Air Act, it has been well documented that more than 50 percent of urban pollution comes from the combustion and evaporation of motor fuels. Mobile sources account for more than 90 percent of carbon monoxide emissions and at least half of the harmful ground level ozone formation. Also, data from the Environmental Protection Agency [EPA] shows that 55 percent of air toxins come from mobile sources. More than 80 percent of airborne benzene comes from mobile sources, as does a remarkable 98 percent of 1,3 butadiene.

If anyone has any doubts about the real world health effects of these facts, they need only ask EPA. EPA reports that more than 50 percent of the annual cancer deaths attributed to air toxics come from mobile sources.

As my colleagues from California and New York are well aware, risk from air pollution does not stop in the great outdoors. According to a May, 1989 study by the South Coast Air Quality Management District in California, commuters traveling congested roads and freeways are exposed to levels of cancer-causing air pollutants inside their cars that are up to four times higher than the levels outdoors.

In terms of cost effectiveness and immediate clean air benefits, there is no more important step we can take than cleaning up the gasoline used in conventional automobiles. This amendment would do just that by establishing an improved, cleaner gasoline standard.

There has been a great deal of discussion about what reformulated gasoline is, and everybody seems to define it differently. The generic term "reformulated gasoline" refers to changing the concentration of certain gasoline components in order to allow the gasoline to burn more cleanly. In simple terms, the focus of that effort has always been on the components used to enhance gasoline octane. In this amendment, the term "reformulated gasoline" could just as accurately be described as clean octane.

Gasoline was first reformulated when lead was phased out as a gasoline octane enhancer. While health considerations clearly necessitated this initiative, EPA failed to monitor the resulting change in gasoline composition to ensure that one poison was not replaced by another. That is exactly what happened.

In order to replace the octane lost by lead phase-outs, gasoline refiners increased the aromatics and olefin content of gasoline and raised the volatility of the gasoline. Moreover, recent octane wars, designed to increase market share, have exacerbated the problem. While the aromatics content of gasoline prior to lead phase-out was around 20-volume percent, the average aromatics content of gasoline today is greater than 32-volume percent. Premium unleaded gasoline can have an aromatics content greater than 50-volume percent.

The primary aromatics used in gasoline are benzene, toluene and xylene, all of which are EPA-listed hazardous chemicals. The amount of benzene emitted from the tailpipe is directly related to the amount of benzene found in gasoline. However, a gasoline can have no benzene and still produce benzene exhaust because of the chemical transformation that toluene and xylene undergo during the combustion process.

Recent data compiled by ARCO Chemical further demonstrates the environmental consequences of high aromatics gasoline. In an article published in the Oil and Gas Journal, December 4, 1989, ARCO scientist William Piel cites data that clearly indicates that gasoline containing more than 25-percent aromatics content results in dramatically increased levels of carbon monoxide [CO], hydrocarbons [HC] and nitrogen oxides [NO_x]. The relationship between aromatics and toxics and, in particular, benzene, has been well documented by EPA and others.

Mr. Piel concludes that high aromatics gasoline literally disables an automobile's catalytic converter, thereby resulting in the nonlinear relationship between aromatics and emissions.

The implications of the ARCO data on emissions points out the danger of relying solely on vehicle control technology for emissions reductions. It does not matter how many levels of tailpipe standards were required if the technology cannot handle the gasoline.

I want to stress to my colleagues why it is so important to adopt this clean octane standard. If the Clean Air Act amendments are passed without such a standard for existing cars in ozone nonattainment areas, overall air quality could get worse, not better, despite the well-intended efforts of those who have done such an admirable job contructing the current compromise.

Allow me to elaborate on the statement.

In ozone nonattainment area, gasoline refiners will be required to lower the volatility of gasoline in order to reduce ground level ozone. To meet the new volatility standards, gasoline refiners will remove the most volatile components of gasoline and replace them with less violatile ones. Butane is the primary component likely to be removed in order to meet the new standards. If left to their own discretion, petroleum refiners will almost certainly turn to even higher levels of aromatics to fill this gap because aromatics are relatively high octane, low volatility components.

Therefore, in our most polluted cities, we face the strong likelihood that gasoline volatility could be reduced, but at the unintended expense of increased toxics, carbon monoxide, unburned hydrocarbons, and even nitrogen oxide.

The most significant single step that can be taken to improve urban air quality is to limit aromatics content in gasoline to no higher than 25-volume percent. Further steps can and should be taken to stipulate what the reformulated gasoline should look like.

This amendment requires that gasoline in all serious, severe, and extreme ozone nonattainment areas have the following parameters:

No more than 25-volume percent aromatics hydrocarbons (including no more than 1.0-volume percent benzene);

A 15-percent reduction in ozone-forming emissions as compared to a similar automobile fueled by conventional gasoline; and

An oxygen content of at least 2.7-volume percent, based on averaging as specified in section 218 of the act.

The aromatics and oxygen content requirements would be phased in over 3 years, and other communities would be allowed to opt into the program.

Such a standard would allow refiners flexibility in making gasoline, while ensuring that one poison is not replaced by another—an unfortunate and unintended result of lead phase-out.

Some oil companies will claim that they cannot meet this standard and that, if they are forced to try, it will bankrupt the American consumer. But these arguments are false, and can easily be refuted.

One of the most important attributes of a clean octane program is that it can be implemented immediately. In fact, there are 11 EPA-approved octane-enhancers that can be used to replace aromatics, including MTBE, ETBE, ethanol and other oxygenates. The ethers, especially MTBE and ETBE, are expected to be major compoents of meeting a clean octane program. Isobutylene availability is important in overall ether supply, as iso-

percentage reduction approach should be adopted.

If this were a perfect world, I would agree that EPA and not the Congress should implement broad pollution reduction goals. Unfortunately, EPA has known about this problem for more than a decade and has repeatedly failed to address it. Despite the face that mobile source toxics account for more than half the air pollution-related cancer deaths annually, EPA does not regulate mobile source toxics. I simply do not trust EPA to implement a program that has been stonewalled for more than a decade. Congress shares the blame—oversight of this problem has been nearly non-existent.

The oil industry is one of the most powerful industries in the world. The Environmental Protection Agency is not immune to pressure, both from well financed lobbying and from divergent interests within the Administration itself. The well publicized rifts in the Administration over global warming and wetlands policy, for example, do not give me comfort that the public interest will be best served in the regulatory process. Given the EPA's history on mobile sources toxics reductions, I feel very strongly that Congress should help the EPA by providing guidelines as opposed to just giving them complete discretion.

The amendment will cost billions. Such cost estimates are absurd—pure scare tactics by the oil companies. Clean octane gasoline (with some stricter specifications than what is being offered here) is already being sold in various markets across the country at prices competitive with traditional gasoline.

Oxygenates are price competitive octane enhancers.—Using oxygenates instead of aromatics for octane has several advantages. First, they are a price-competitive octane substitute. MTBE is used in approximately 15 percent of the gasoline sold today to boost octane, and MTBE production capacity is predicted to expand by 20 percent every year. ETBE and ethanol also boost octane at prices competitive with traditional gasoline. Many others oxygenates are in production and available.

By lowering aromatics, the nation will save oil.—Today, refiners primarily get their octane by running their reformers at a more "severe" level. This increases aromatics and octane. But it is also energy intensive, and you get less gasoline as an end product. For each point increase in aromatics (i.e. 91 octane to 92 octane) in the nation's aromatics pool, more than 1 billion barrels of gasoline are lost every year.

By lowering reformer severity and aromatics content as a means of achieving octane, and replacing it with high octane oxygenates, you conserve large quantities of oil in two ways—first, savings in gasoline because of the lower severity of the refining operation of the base gasoline; and second, straight physical displacement of gasoline by oxygenates.

For example, a 2.7 oxygen percent using MTBE displaces 15 percent of the gasoline. Using ETBE, the displacement would be 17 percent. Therefore, replacing octane from aromatics with octane from oxygenates is good for energy security and our balance of trade, as well as the environment.

This amendment will save millions of barrels of oil every year.

If you assume the current octane pool is maintained, the likely cost of the amendment will be from 1 to 3 cents per gallon.—If you assume that the current octane pool is maintained (60 percent regular 87 octane, 10 percent mid-grade 89 octane, and 30 percent premium 91 and above octane), cost estimates by Information Resources, Inc., a respected oil industry analysis group, predict that gasoline prices need only increase 1 to 3 cents per gallon. As I stated, this assumes that the present octane pool is maintained. Less than 10 percent of the cars on the road need a gasoline with an octane of 91 or above. However, 30 percent of the gasoline sold is premium or super premium. This is a huge waste of money that is a direct consequence of oil company hype and advertising "octane wars." If the overall octane pool were reduced, then costs would be even less—possibly even no net cost.

Clean gasoline is being sold today at prices the same as traditional gasoline.—On Thursday, March 15, Marathon Oil announced that it was introducing reformulated gasoline (with a 25 percent aromatics level) into all of its grades (regular unleaded, mid-grade, and premium) in the entire Detroit metropolitan area. This gasoline will be price competitive with traditional gasoline. ARCO's EC-1, sold in Southern California, costs less than 2 cents more than regular gasoline to make, and is sold for the same price as regular gasoline. Would Marathon, for example, introduce reformulated gasoline into an entire metropolitan market if it costs them 30 cents more per gallon to make? I doubt it.

A report made to EPA states that it would only cost 1 to 6 cents per gallon to have the entire U.S. gasoline pool contain 15 percent MTBE.—A report for EPA by Sobotka and Co., Inc., obtained from EPA, estimates that it would only cost 1 to 6 cents per gallon to have every gallon of gasoline sold in the US contain 15 percent MTBE, which equals 2.7 percent oxygen. Our amendment only calls for 9 cities!

But the Department of Energy estimates that your amendment will cost 100 billion!

Let's examine the DOE estimate's basic assumption—that every drop of gasoline sold in the United States must meet these specifications. There are so many factual errors and fallacious assumptions in the DOE estimate that it is not even worth debating.

There is already a portion of the compromise amendment that requires the use of reformulated gasoline in our dirtiest cities. Your amendment is redundant and unnecessary.

It is true that there is a section on reformulated gasoline in the compromise amendment, and I commend the Majority Leader and the Republican Leader for persevering to make sure that cleaning up gasoline was a part of cleaning up urban air. But very simply, more needs to be done.

The provision in the compromise bill would require reformulated gasoline in the 9 dirtiest cities in the country, just as this amendment would. But this amendment addresses cleaning up gasoline used in today's cars; the compromise addresses only new cars. The standards would be phased in with new cars beginning in 1995. Therefore, the gasoline would not be fully integrated into the marketplace until 2005, assuming a 10 year fleet turnover.

By requiring a year round oxygen standard, this amendment will actually raise NO_x emissions and therefore contribute to the ground level ozone problem and acid rain.

More fantasy from the oil companies. There is not a single reputable study that links using oxygenates to increases in NO_x. In fact just the opposite is true.

I would like to cite a December article in the Oil and Gas Journal that clearly states that using oxygenates, and in particular ethers (such as ETBE and MTBE), dramatically lowers emissions of NO_x. There are several reasons for this: aromatics displacement; ethers have a lower boiling point than hydrocarbon gasoline; and oxygenated fuels burn more cleanly. Morever, there is express language in the bill that prohibits an increase in NO_x as a result of this amendment.

Some people claim that if you splash blend ethanol in summer conditions you will get more evaporative emissions because ethanol has a higher vapor pressure than gasoline. While several studies have disproved this theory, I will not debate that here. Even if splash blended ethanol did cause more evaporative emissions—an admission I am not willing to make—it cannot increase ozone under terms of this amendment. This amendment requires a 15 percent reduction in ozone forming emissions. If splash blended ethanol causes more NO_x, and therefore ozone, it cannot be used. Period. I repeat—NO_x, which is a precursor of ozone formation, and ozone formation must be reduced by the amendment

There is not enough isobutylene (the product that ethanol and methanol are mixed with to form ETBE or MTBE, respectively) nor ethanol to supply the demand that would be mandated by the amendment

Untrue. Isobutylene is a natural byproduct of the refining process, and it is manufactured by converting butane and isobutane into isobutylene. Because of the mandated reductions in gasoline vapor pressure across the nation, refiners are having to remove butane from their gasoline to make it less volatile. Therefore, there is a huge surplus in the butane supply today, and this will only grow.

Ethers provide an outlet for this butane. Rep. Phil Sharp, Chairman of the House Energy Committee's Subcommittee on Energy and Power, and I asked GAO to look into this very question, and GAO reported back that isobutylene supply would not be a limiting factor in an aggressive expansion of ether-based fuels.

As methanol is made from natural gas, there is clearly no shortage of methanol. The ethanol industry could comfortably quadruple today's level of production, meaning that at least 4 billion gallons of ethanol could be sold. Given the availability of feed stocks for ethers, and the existence of other oxygenates, the supply will easily meet the anticipated demand.

The burden of this amendment will be the hardest felt be small refineries, many in the Midwest, which may go out of business.

Exactly the opposite is true. The small refineries and the independent refiners are in a position to benefit from this amendment. The average aromatics content of the big, multinational, oil companies (formerly the Seven Sisters) is about 35 or 36 volume percent. The average aromatic content of gasoline from the independent refiners is about 26 or 27 percent. Many of the independents have not been able to afford the expensive capital investments required to make high aromatics gasoline. They instead have sold lower octane gasoline or have blended oxygenates to get their octane. They are positioned perfectly to benefit from the amendment.

This is just another attempt by the Midwestern Senators to expand the market for federally subsidized ethanol, especially since the amendment requires oxygen in gasoline.

Ethanol, and ethanol as ETBE, is clearly one of the fuels that will benefit from cleaning up gasoline. This is because ethanol and ETBE are well proven pollution fighters. But to claim that this is an ethanol amendment is wrong. The 2.7 percent oxygen standard is fuel neutral. My colleague from New Jersey, Senator Lautenberg, who I disagreed with in the debate over the oxygen standard for CO non-attainment areas, will readily admit that 2.7 is fuel neutral, as will the major oil companies.

butylene is mixed with methanol or ethanol to produce MTBE and ETBE, respectively. Isobutylene is a natural by-product of refinery operations, and it can be made from butane.

According to the General Accounting Office, isobutylene supply will expand to meet the market. As butane is in tremendous surplus today because of the new fuel volatility requirements, the availability of the feedstocks for isobutylene is all but guaranteed. MTBE is the world's fastest growing chemical, with projected supply expected to increase by more than 20 percent for the next 5 years. Given the availability of isobutylene and the expanding capacity for ether production—not to mention the current surplus in ethanol production capacity—conservative estimates put the anticipated oxygenate supply at nearly double the projected demand based on this amendment.

Of course, refiners could simply choose to make a lower aromatics gasoline and reduce octane. This would not require any new investment, and would actually save a large amount of oil. It should be pointed out that 90 percent of the automobiles in America get no benefit from an octane rating above 87. No car needs an octane rating above 91. The current octane wars are an advertising sham designed at increasing market share and profit for the major oil companies.

The claim that oil companies cannot make the clean gasoline required by this amendment is undermined by the facts of the current marketplace. Clean octane gasolines are being used today across the country. In California, ARCO has had tremendous success with their EC-1, a clean octane gasoline made with MTBE. Phillips Petroleum has announced the introduction of its "Super Clean Unleaded Plus" in Colorado. Diamond Shamrock currently sells "RG-87," a low aromatics, unleaded, and low volatility gasoline. Earlier this month, Marathon Oil announced that it was introducing clean gasoline, in all three grades, in all 161 service stations in Metropolitan Detroit. There are many other examples of clean octane gasoline, both on the market and soon to be introduced.

It is important to note that these gasolines are price competitive with traditional gasolines in the marketplace. According to comparative cost estimates prepared by Information Resources, Inc., a well-known industry consulting group, the average cost of a clean octane gasoline consistent with the standard proposed in this amendment would be only 1 to 3 cents per gallon more for regular grades. For premium grades, reformulated gasoline could result in no additional cost and may, in fact, be cheaper.

Late last week, in a hastily called press conference, the American Petroleum Institute [API] charged that the Daschle amendment will cost $100 billion and that meeting its requirements "will likely add 25 cents a gallon to consumer's fuel costs." These grossly inflated cost figures, disseminated by the major oil companies' national trade association, simply do not jibe with estimates from the EPA and other credible industry sources. They smack of the recycled horror stories that the oil industry repeatedly resorts to in its efforts to block natural gas and grain-derived fuels from entering the marketplace.

At their press conference, API also claimed that "no one knows if this amendment will help improve air quality." Yet, it is interesting to note the actions of one of API's members, Marathon Oil. Last Friday, March 23, 1990, in an article entitled "Marathon Oil Has a Cleaner-Burning Gasoline," the New York Times reported that:

> Emissions from engines using Marathon's fuel will be lower in carbon monoxide and in unburned hydrocarbons that cause the formation ozone, a prime component of smog. Marathon said the new gasoline would result in a 20 percent reduction in unburned hydrocarbon emissions and a 14 percent reduction in carbon monoxide.

The pollution fighting potential of clean octane gasoline is enormous. If all the gasoline used in the United States each year were to be reformulated, substantial reductions in ozone—at least 15 percent, carbon monoxide—20 to 30 percent, toxics—40 to 60 percent, and even nitrogen oxides would be achieved, at only a fraction of the cost of other control technologies currently being debated.

While the technology and products necessary to replace aromatics in gasoline currently exist—and while some gasolines have already been reformulated—we are sensitive to the fact that it will take some readjustment in the overall refining industry to implement this change in fuel standards. Therefore, the amendment would phase in the proposed clean octane gasoline program over 3 years for the oxygen requirement and 5 years for the aromatics reduction.

The oil industry will tell you that they favor cleaner gasoline, but that we should let them do it themselves, or let EPA design a workable program. First, it is a bit far-fetched to assume that the oil industry will improve overall gasoline composition on its own. One need only review the history of the last 10 years to see that gasoline has gotten dirtier, not cleaner. Second, we cannot simply assume that EPA will do the job, either.

With all due respect to Administrator Reilly, for whom I have great admiration and respect, it simply is not enough to make the gasoline standard subject to EPA discretion. EPA has known about the aromatics and toxics relationship resulting from lead phasedown for a decade, but has failed to act. I will cite the record of reducing benzene as an example.

Benzene was listed as a hazardous air pollutant by EPA in 1977. In November 1983, then-Administrator William Ruckelshaus made a commitment to accelerate substantially the regulatory process under section 112 of the Clean Air Act. Mr. Ruckelshaus stated that "We intend to make decisions on benzene * * * emissions standards as quickly as possible." Mr. Ruckelshaus stated that he hoped the regulations would be completed by the end of 1985. EPA openly states that more than 80 percent of the benzene in the atmosphere comes from mobile sources.

The regulations were completed on February 27, 1990. With great fanfare, EPA announced that it was implementing regulations to reduce benzene emissions by 93 percent. But if you read the fine print, the EPA regulations cover only stationary sources. The regulations address less than 20 percent of the sources of benzene emissions. Very simply, EPA has known about the problem for more than a decade and has failed to take any meaningful action.

To summarize, the Nation has a tremendous opportunity to address a chronic public health and environmental problem by mandating a strong clean octane gasoline standard. Moreover, the health and environmental standard would be implemented in an extremely cost-effective manner with minimal dislocation to the refining industry and to consumers.

According to the Motor Vehicles Manufacturers Association [MVMA], the national trade organization of automakers, cleaning up gasoline "offers the quickest and cheapest way to obtain air quality improvements of any potential alternative fuel. Its use does not require any change in the fuel distribution infrastructure and the new fuel can immediately be used in the entire gasoline vehicle fleet because no engine modifications are required."

Mr. President, this amendment makes good public policy sense and should be adopted.

EXHIBIT 1

CLEAN OCTANE GASOLINE CONCERNS AND RESPONSES

You are telling the gasoline refiners how to make gasoline. It is not this simple. Congress should not be in the business of specifying what the content of a product should be.

First, our amendment does not lock refiners into any particular fuel composition. Like the evaporative emissions fuel specifications in Section 211 of the bill, or the oxygen content fuel requirements in Section 218, our amendment seeks to control major causes of pollution that are inherent in today's high octane gasoline by establishing simple parameters on fuel quality in dirty air areas. These parameters are primarily maximum aromatics levels and minimum oxygen content. Refiners can decide how they want to get octane without using the toxic aromatics. They can decide how to achieve the oxygen standard.

Congress should set goals and not micromanage private industry. Any attempt to reduce mobile source emissions should specify the goals of the program, which in turn should be implemented by the EPA. Specifications should be avoided, and a general

HOUSE BILL AS PASSED
W/ RICHARDSON - MADIGAN
REFORM AMENDMENT

cylinders and fuel systems, including appropriate testing and retesting, in conversions of motor vehicles.

"(j) CONSULTATION WITH DEPARTMENT OF ENERGY AND DEPARTMENT OF TRANSPORTATION.—The Administrator shall coordinate with the Secretaries of the Department of Energy and the Department of Transportation in carrying out the Administrator's duties under this section.".

(c) CONFORMING AMENDMENT.—Section 202(a)(4) (42 U.S.C. 7521(a)(4)) is amended by striking out "standards prescribed under this subsection" every place it occurs and inserting "requirements prescribed under this title".

(d) REFORMULATED GASOLINE.—Section 211 is amended by adding the following new subsection at the end thereof:

"(k) CLEAN FUELS FOR CONVENTIONAL VEHICLES.—(1) Within 1 year after the enactment of the Clean Air Act Amendments of 1990 the Administrator shall promulgate regulations under this section establishing requirements for cleaner gasoline to be used in gasoline-fueled vehicles. Such regulations shall require the greatest reduction in emissions of ozone forming volatile organic compounds (during the period referred to in subparagraph (B)(i)) and emissions of harardous air pollutants achieveable through the reformulation of conventional gasoline, taking into consideration the cost of achieving such emission reductions, any

G

nonair-quality and other air-quality related health and environmental impacts, including reactivity and relative toxicity, and energy requirements. Such requirements shall comply with the more stringent of either the requirements set forth in subparagraph (A) or the requirements set forth in subparagraph (B), except that the requirements of subparagraph (A)(iii) and (iv) shall apply in all cases. For purposes of determining the more stringent provision, subparagraphs (B)(i) and (B)(ii) shall be considered independently. The requirements of subparagraph (C) shall apply in all cases.

"(A)(i) The benzene content of the fuel shall not exceed 0.8 percent by volume.

"(ii) The aromatic hydrocarbon content of the fuel shall not exceed the following limits: 30 percent by volume after January 1, 1992, 28 percent by volume after January 1, 1994, and 25 percent by volume after January 1, 1996.

"(iii) The fuel shall have no lead content.

"(iv) The fuel shall contain additives to prevent the accumulation of deposits in engine fuel supply systems.

"(v) The oxygen content of the fuel shall equal or exceed the following: 2.0 percent by weight as of January 1, 1992, 2.5 percent by weight by January 1,

1993, and 2.7 percent by weight by January 1, 1994, except as otherwise required by this Act.

"(B)(i) During the high ozone season (as defined by the Administrator), the total emissions of ozone forming volatile organic compounds from representative model year 1990 vehicles when using the fuel shall, in the aggregate, be at least 15 percent below the total emissions of ozone forming volatile organic compounds from such vehicles when using 1990 certification fuel. Effective in calendar year 1997 and thereafter, 20 percent shall be substituted for 15 percent in applying this subparagraph. Effective in calendar year 2000 and thereafter, 25 percent shall be substituted for 20 percent in applying this clause.

"(ii) During the entire year, the total emissions of hazardous air pollutants from representative model year 1990 vehicles when using the fuel shall, in the aggregate, be at least 15 percent below the total emissions of hazardous air pollutants from such vehicles when using 1990 certification fuel (or to such other levels as the administrator determines will achieve at least as great a reduction in aggregate adverse health effects as such 15 percent reduction). Effective in calendar year 1997 and thereafter, 20 percent shall be substituted for 15 percent in applying this subpara-

graph. Effective in calendar year 2000 and thereafter, 25 percent shall be substituted for 20 percent in applying this clause. For purposes of this clause, within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall, by rule, determine appropriate measures of and methodology for ascertaining the emissions of harzardous air pollutants (including calculations, equipment, and tolerances) and their aggregate health effects.

"(C) The total emissions of oxides of nitrogen from representative vehicles when using the fuel shall in the aggregate be no greater than the level of such emissions from such vehicles when using conventional gasoline (as defined by the Administrator) of the same grade which meets the requirements applicable under this section.

"(2) The regulations promulgated under this subsection shall include procedures under which the Administrator shall certify fuels as complying with the requirements established pursuant to paragraph (1). Under such regulations, the Administrator shall establish procedures for any person to petition the Administrator to certify an alternative fuel formulation, or slate of fuel formulations. The Administrator shall certify a fuel formulation or slate of fuel formulations if such fuel or fuels (A) achieves equivalent or greater reductions in

emissions of ozone forming volatile organic compounds and emissions of hazardous air pollutants than are achieved by a fuel meeting the requirements of paragraph (1) and (B) complies with the requirements of subparagraph (C) of paragraph (1). Such procedures shall further require that the Administrator shall approve or deny such petition within 90 days of receipt, and failure to act within such time shall be deemed a denial of such petition. Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall determine the level of emissions of ozone forming volatile organic compounds and emissions of hazardous air pollutants emitted by representative model year 1990 motor vehicles when operating on 1990 certification fuel.

"(3)(A) Effective January 1, 1994, no person may sell or dispense to the ultimate consumer, and no fuel refiner or marketer may directly or indirectly sell or dispense to persons who sell or dispense to ultimate consumers, in any ozone nonattainment area classified under subpart 2 of part D of title I as Severe or Extreme any fuel for use in conventional gasoline-fueled vehicles that has not been certified by the Administrator under this subsection.

"(B) Effective January 1, 1992, until January 1, 1994, no person may sell or dispense to the ultimate consumer, and no fuel refiner or marketer may directly or indirectly sell or dispense to persons who sell or dispense to ulti-

emissions of ozone forming volatile organic compounds and emissions of hazardous air pollutants than are achieved by a fuel meeting the requirements of paragraph (1) and (B) complies with the requirements of subparagraph (C) of paragraph (1). Such procedures shall further require that the Administrator shall approve or deny such petition within 90 days of receipt, and failure to act within such time shall be deemed a denial of such petition. Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall determine the level of emissions of ozone forming volatile organic compounds and emissions of hazardous air pollutants emitted by representative model year 1990 motor vehicles when operating on 1990 certification fuel.

"(3)(A) Effective January 1, 1994, no person may sell or dispense to the ultimate consumer, and no fuel refiner or marketer may directly or indirectly sell or dispense to persons who sell or dispense to ultimate consumers, in any ozone nonattainment area classified under subpart 2 of part D of title I as Severe or Extreme any fuel for use in conventional gasoline-fueled vehicles that has not been certified by the Administrator under this subsection.

"(B) Effective January 1, 1992, until January 1, 1994, no person may sell or dispense to the ultimate consumer, and no fuel refiner or marketer may directly or indirectly sell or dispense to persons who sell or dispense to ulti-

mate consumers, in any such area any fuel for use in conventional gasoline-fueled vehicles that has not been certified by the Administrator under this subsection as complying with subparagraph (A) (ii) and (v) and subparagraph (C) of paragraph (1).

"(4)(A) Upon the application of the Governor of a State, the Administrator shall apply the prohibition set forth in paragraph (3) in any area in the State classified under subpart 2 of part D of title I as a Marginal, Moderate, or Serious Area, and in any such case, the Administrator shall establish an effective date for such prohibition as he deems appropriate, not later than January 1, 1994, or 1 year after such application is received, whichever is later. The Administrator shall publish such application in the Federal Register upon receipt.

"(B) If the Administrator determines, on his own motion or on petition of any person, after consultation with the Secretary of Energy, that there is insufficient domestic capacity to produce fuel certified under this subsection, the Administrator shall, by rule, extend the effective date of such prohibition in Marginal, Moderate, or Serious Areas for one additional year, and may, by rule, renew such extension for 2 additional one-year periods. The Administrator shall act on any petition submitted under this paragraph within 6 months after receipt of the petition. The administrator shall issue

such extensions for areas with a lower ozone classification before issuing any such extension for areas with a higher classification.

"(5)(A) The regulations promulgated under this subsection shall provide for the granting of an appropriate amount of credits to a person who produces and certifies a fuel that—

"(i) has an oxygen content that exceeds the minimum oxygen content specified in paragraph (1); or

"(ii) has an aromatic hydrocarbon content that is less than the maximum aromatic hydrocarbon content specified in paragraph (1).

"(B) The regulations described in subparagraph (A) shall also provide that a person who is granted credits may use such credits, or transfer all or a portion of such credits to another person, for the purpose of complying with this subsection.

"(C) The regulations promulgated under subparagraphs (A) and (B) shall ensure the enforcement of the requirements for the issuance, application, and transfer of the credits. Such regulations shall prohibit the granting or transfer of such credits for use with respect to any fuel in a nonattainment area, if the use of such credits would result in—

"(i) an average fuel aromatic hydrocarbon content (taking into account all fuel used in all conventional gasoline-fueled vehicles in the nonattainment area)

higher than the average fuel aromatic hydrocarbon content that would occur in the absence of such credits; and

"(ii) an average fuel oxygen content (taking into account all fuel used in all conventional gasoline-fueled vehicles in the nonattainment area) lower than the average fuel oxygen content that would occur in the absence of such credits.

"(6) Within 1 year after the enactment of the Clean Air Act Amendments of 1990, the Administrator shall promulgate regulations applicable to gasoline to ensure that gasoline (other than gasoline subject to the requirements of paragraph (1)) does not result in emissions of ozone forming volatile organic compounds, nitrogen oxides, or carbon monoxide, or aggregate emissions of hazardous air pollutants from representative motor vehicles in excess of the levels of emissions of such pollutants that would result if conventional gasoline of a similar grade sold in calendar year 1989 were used in such vehicles. Such regulations shall take effect no later than January 1, 1992.

"(7) For purposes of this subsection, the term '1990 certification fuel' means fuel used in exhaust and evaporative emissions testing for 1990 model year vehicles.".

RICHARDSON EXPLANATION OF RICHARDSON-MADIGAN AMENDMENT TO HOUSE COMMITTEE REFORM PROVISION

ACCIDENTAL RELEASE INVESTIGATION BOARD

The provision would also establish an independent Accidental Release Investigation Board to investigate air toxic accidental releases and recommend changes to reduce the risk of future accidents. This Board is modeled after the extremely successful National Transportation Safety Board.

In addition, a number of provisions are included to address concerns raised by small businesses and small farmers.

SENATE LANGUAGE: OSHA

Finally, the Richardson-Bryant-Slattery-Barton provision also includes language that was passed in the Senate. This language clarifies the roles of the various Federal agencies involved in the prevention of accidental chemical releases, in particular, that of the Occupational Safety and Health Administration.

OSHA MUST PROMULGATE CHEMICAL PROCESS SAFETY STANDARDS

First, it would require OSHA to promulgate a chemical process safety standard requiring employers to take steps to prevent accidental air toxic releases, and set up procedures to mitigate and respond to releases should they occur. This includes training workers in emergency response.

Second, EPA is required to review the OSHA standard as part of its coordination function. Third, workers would be granted so-called walkaround rights when EPA or the Accident Release Board conduct an investigation. And, last, it requires the Board and OSHA, which have overlapping authorities, to set up a memorandum of understanding to avoid duplication.

Mr. Chairman, as the sponsor of the reformulated gasoline provision with my colleague, Mr. MADIGAN, I am pleased that a bipartisan committee agreement was reached on this critical issue so that it could be included in the committee amendment.

DESCRIPTION OF TODAY'S GASOLINE

The gasoline that we burn today is a complex mixture of toxic compounds and is responsible for over half of the Nation's toxic air pollution and much of our urban smog. In fact, today's gasoline is significantly more harmful than gasoline of a decade ago, containing more aromatic compounds and more volatile chemicals than ever before. The result is more fuel evaporation, more air pollution, and greater toxic exposure to the American public.

Currently, no meaningful standards govern the composition of gasoline. However, it does not have to be this way. Gasoline can be changed to a far more benign formulation while improving engine performance. Toxic and aromatic compounds can be replaced with much cleaner alcohols or alcohol derivatives such as methanol, ethanol, ethyl tertiary butyl ether [ETBE] and methyl tertiary butyl ether [MTBE] made by oil and chemical companies.

DESCRIPTION OF AMENDMENT: OZONE NONATTAINMENT

The Richardson-Madigan provision will require the nine worst ozone nonattainment cities to sell "clean" gasoline that has been reformulated to remove ozone forming and toxic air pollutants. Other cities may opt in as the program gets underway, however, EPA may delay the implementation dates to ensure that there is an ample domestic supply of reformulated gasoline.

DOES NOT MANDATE A RECIPE OR SO-CALLED GOVERNMENT GAS

The Richardson-Madigan provision does not mandate a recipe or so-called government gas, nor does it mandate ethanol. Instead the amendment establishes minimum basic standards to reduce ozone forming and toxic air pollutants in gasoline. So long as equivalent or greater emissions reductions are achieved, oil companies are free to formulate their gasoline any way they choose.

In fact, ARCO is already marketing a cleaner formulation of gasoline for the same price as regular gas in southern California. Shell, Marathon, Phillips, Conoco, and others are also reformulating gasoline at this time.

CARBON MONOXIDE NONATTAINMENT

The Richardson-Madigan provision would also require all 44 carbon monoxide nonattainment cities to sell gasoline containing a minimum of 2.7 percent oxygen to reduce carbon monoxide to acceptable levels. Those serious CO areas that fail to reduce CO to acceptable levels by the deadline would be required to sell oxygenated fuels containing 3.1 percent oxygen.

SIGNIFICANT HEALTH AND ENVIRONMENTAL BENEFITS

There are significant health and environmental benefits to be gained from reformulated gasoline. For example, during refueling or in stop and go traffic, gas station employees, motorists and pedestrians are exposed to dangerous levels of cancer causing toxics found in gasoline.

In fact, the American Lung Association estimates the annual health costs of automobile pollution range from $4.4 to $93.4 billion. The Richardson-Madigan provision requires a 15-percent reduction in toxic compound by 1994, and prohibits the "dumping" of these toxics in gasoline sold in attainment cities.

The Richardson-Madigan provision also requires a 15-percent reduction in ozone forming precursors by 1994. It is estimated that 20 percent of New York City's air pollution problems can be solved simply by cleaning up its gasoline. Additionally, by increasing the oxygen content of gasoline to 2.7 percent in CO nonattainment cities, it is estimated that carbon monoxide emissions can be reduced from between 15 and 34 percent.

SIGNIFICANT ENERGY, AGRICULTURAL, AND TRADE POLICY BENEFITS

The Richardson-Madigan provision also has significant energy, agricultural, and trade policy benefits. Energy policy analysts have been concerned for years about our increasing reliance on OPEC—$60 billion of foreign oil and hundreds of millions of dollars of aromatic compounds are imported annually.

By replacing imported aromatics with domestically produced alcohols made from corn, wheat, or other crops, we provide an important boost to our midwestern farmers and reduce the need for farm price supports. According to the GAO, this new market could save the U.S. Treasury more than $1.2 billion now spent on farm price supports annually.

To insure that we don't rely more heavily on foreign imports, the Richardson-Madigan provision provides waivers if there is insufficient domestic supply. In short, by reducing our reliance on imported oil and aromatic compounds, our balance of trade is sure to improve.

SIGNIFICANT CONSUMER AND AUTOMOTIVE BENEFITS

I would also highlight the consumer and automotive benefits of the Richardson-Madigan provision. The high levels of aromatics and olefins found in today's gasoline fouls engines, and creates deposits which lead to engine knocking.

By limiting the aromatic content of gasoline and requiring additives to prevent accumulation of deposits, the Richardson-Madigan provision will lead to longer and more satisfactory car performance. In fact, oxygenated fuels are recommended by General Motors to improve air quality, a policy Ford and Chrysler will soon endorse as well.

I would also point out that the Richardson-Madigan provision will discourage the purchase of unneeded octane. The recent GAO report on octane fraud indicated that despite hyping of high octane fuels, only a small percentage of new cars require fuels above 87 octane. The Richardson-Madigan provision will reduce the emphasis on octane rating and focus on producing cleaner gasoline to improve engine performance, the public health and the environment.

SIGNIFICANT ECONOMIC AND ENVIRONMENTAL BENEFITS

In closing, the Richardson-Madigan reformulated gasoline provision is environmentally and economically cost effective. Older, precatalytic cars are a significant portion of the emissions inventory, yet they cannot be retrofitted with pollution controls.

By cleaning up gasoline, our provision helps reduce pollution from all vehicles, including the oldest and dirtiest cars. Needed emission reductions can be achieved for only a few pennies per gallon, rather than ratcheting down on small stationary sources like bakeries, dry cleaners, and other small business with minimal environmental benefits.

REBUTTALS TO OIL COMPANY ARGUMENTS AGAINST THE RICHARDSON-MADIGAN AMENDMENT

Argument. The amendment mandates a recipe for reformulated gasoline.

Rebuttal. The Richardson-Madigan amendment establishes minimum stardards to reduce ozone forming and toxic compounds. So long as equivalent or greater emissions reductions are achieved, oil companies are free to formulate their fuels any way they choose.

Argument. The amendment is tantamount to an ethanol mandate.

Rebuttal. There are seven alcohol and ether blends or oxygenates that can provide the oxygen required in the Richardson-Madigan amendment, including methyl tertiary butyl ether [MTBE] made from oil and chemical companies.

Argument. The amendment will decrease some pollution but increase others.

Rebuttal. The Richardson-Madigan amendment expressly prohibits a fuel from being certified for sale if it results in increased nitrogen oxide emissions.

Argument. There will not be enough capacity to meet demand.

Rebuttal. If there is insufficient domestic capacity to meet demand, the Richardson-Madigan amendment provides for a series of waivers.

Argument. Consumers won't buy reformulated gasoline.

Rebuttal. Consumers prefer the Richardson-Madigan reformulated gasoline amend-

ment because it reduces the aromatic content of gasoline which fouls engines, creates engine deposits, and causes engine "knocking."

Argument. The amendment will cost billions.

Rebuttal. The Congressional Research Service, and other independent analysts estimate that gasoline can be reformulated for only a few pennies per gallon.

COMPARISON OF RICHARDSON AMENDMENT AND S. 1630

Reformulated gasoline	Richardson	S. 1630
Timeframe	Administrator shall promulgate standards effective Jan. 1, 1994.	Administrator shall promulgate standards effective Jan. 1, 1992.
Scope	1989 design value greater than 0.18 ppm (9 cities).	1989 design value greater than 0.18 ppm (9 cities).
Opt-in	Other ozone areas may implement standards if EPA and DOE certify adequate supplies.	Other ozone areas may implement reformulated fuels standards.
Opt-out	EPA shall certify other fuel fomulations which demonstrate equal or greater benefits.	EPA may certify other fuel formulations but oxygen standard must be maintained.
Specifications		
Benzene	Not more than 0.8 percent vol.	Not more than 1 percent vol.
Aromatic content: (maximum).	30 percent vol. in 1992, 28 percent vol. in 1994, 25 percent vol. in 1996.	30 percent vol. in 1992, 28 percent vol. in 1994, 25 percent vol. in 1996.
Ozone-forming emissions	Reduced 15 percent by 1995, 20 percent in 1997; and 25 percent in 2000. (No NO_x increase).	15 percent reduction in VOC's (No NO_x increase).
Oxygen content: (minimum)	2.0 percent wt. in 1992, 2.5 percent wt. in 1993, 2.7 percent wt. in 1994.	2.0 percent wt. in 1992, 2.5 percent wt. in 1993, 2.7 percent wt. in 1994.
Lead	No lead content. Effective: Jan. 1, 1994.	No lead content. effective Jan. 1, 1992.
Additives	Additives to prevent deposits by Jan. 1, 1994.	Additives to prevent deposits by Jan. 1, 1994.
Hazardous air pollotants	Reduced 15 percent by 1995, 20 percent in 1997, and 25 percent in 2000.	No similar provision.
Trading credits	Yes (oxygenates and aromatics).	Yes (oxygenates only).
Carbon Monoxide Nonattainment		
Classification	Moderate ≦ 14 ppm, Serious > 14 ppm, (44 cities).	Moderate ≦ 14 ppm, Serious > 14 ppm, (44 cities).
Oxy-fuel program	All non-attainment areas must sell fuel containing 2.7 percent wt. oxygen, if area does not reach attainment, a 3.1 percent standard must be implemented.	All nonattainment areas must sell fuel containing 3.1 percent oxygen.
Labeling	Oxygenated fuels would be labeled at retail.	Oxygenated fuels would be labeled at retail.
Date of enactment	Not later than Oct. 1, 1992.	Not later Oct. 1, 1991.

THE RICHARDSON-MADIGAN REFORMULATED FUELS AMENDMENT

The Richardson-Madigan Amendment will substantially reduce fuel-source pollution while being cost-effective for refiners and providing consumers with the high performance fuels we expect.

Moreover, it provides the proper balance between establishing sound environmental standards for gasoline while assuring appropriate industry flexibility in producing gasoline. Specifically, the Richardson-Madigan amendment will: Reduce toxic aromatic compounds to no more than 25% in gasoline sold in the most polluted cities; require 2.7% oxygen as a means of safely, economically and effectively reducing CO pollution and replacing the lost octane volume represented by reduced aromatics; and reduce ozone-forming toxic emissions by 15 percent.

Today's gasoline may contain as many as 200 different hydrocarbon chemicals. In general, unleaded gasoline contains 40–60 percent paraffins, 30–50 percent aromatics and about 10 percent olefins.

Over the past several years, in response to the lead-phasedown mandated by EPA and in order to maximize gasoline octane, the major oil refineries have dramatically increased the severity of the catalytic reformers, which while increasing octane also dramatically increases the level of aromatic compounds found in the finished gasoline.

Aromatics are highly toxic, particularly benzene, a known carcinogen. Other aromatics, such as xylene, are also highly reactive which exacerbates ozone pollution.

According to some recent studies, exposure to benzene in gasoline refueling operations, evaporative emissions in automobiles and tailpipe emissions result in 200 additional cancer cases every year in the Los Angeles basin alone. In addition, the higher aromatic levels of today's gasoline have dramatically increased ozone formation in our nation's cities.

Aromatics can be easily reduced and economically replaced, however, by operating catalytic converters less severely and adding oxygenates to replace lost octane value. No capital costs are required to lower reformer severity.

As refiners lower reformer severity, oxygenates such as MTBE, ETBE and ethanol blends can make up for and improve the lower octane gasoline produced at the refinery. There is adequate oxygenate supply to meet the oxygen content standards.

EPA has determinated the environmental benefit of oxygenated fuel use is directly related to the amount of oxygen in the fuel. The higher the oxygen percentage content, the more effective oxygenated fuels would be in reducing pollution.

BTX—BENZENE, TOLUENE AND XYLENE

Aromatic hydrocarbons, obtained from the heavier petroleum distillates found in crude oil that are not suitable for use as gasoline, are manufactured in a petroleum refinery by such processes as catalytic reforming and catalytic cracking.

The aromatic content of gasoline has grown significantly since lead phasedown was implemented nearly 15 years ago—from 22 percent of the total gasoline pool to more than 33 percent today.

In 1990, as the country's motor gasoline pool reaches almost 110 billion gallons, aromatic hydrocarbons comprise more than one-third of the amount—almost 40 billion gallons!

Each of the aromatic hydrocarbon constituents of BTX—benzene, toluene, and the mixed xylenes—are unquestionably toxic at certain dosage levels causing a serious public health concern.

According to Dick Wilson, the Director of EPA's Office of Mobile Sources, "over half of the cancer incidence [due to toxic chemcials] is caused by pollution coming from cars."

Aromatic hydrocarbons in gasoline have also exacerbated urban ozone formation in our nation's cities.

According to recent EPA estimates, almost 19 million metric tons of VOC's are emitted into the atmosphere each year in this country, and more than one-third of them, 6.5 million metric tons, are attributable to highly photo-reactive components in today's gasoline.

For improved public health and clean air, gasoline must be made cleaner, aromatic levels must be reduced, and clean octane alternatives must be utilized.

The increased use of high octane-oxygenated blending components such as ethanol, MTBE and ETBE can go a long way toward reformulating gasoline to improve public health and reduce ozone pollution while assuring the continued availability of high performance motor fuels which American consumers have come to expect.

The clear conclusion is that for both public safety and the environment the Congress should require the sale of cleaner gasolines; i.e. reduced levels of dangerous aromatics—Benzene, Toluene and Xylene, and increased levels of cleanburning, high octane/oxygen alternatives.

GOVERNMENT GAS

Statement: The major oil companies complaint that the Congress is requiring refiners to meet a gasoline recipe when setting performance standards would make more sense.

Response: In fact, the Amendment sets standards for chemical components of gasoline and not a specific fuel formulation. Target levels for hydrocarbon aromatics, benzene, air toxics and oxygenates are included, but specific fuel formulations are left to the discretion of the oil companies.

In addition, the Amendment contains a provision that allows the oil industry to produce fuels of equal or greater environmental benefit without meeting specific targets in the Amendment.

Over the last 20 years as cars have gotten cleaner, gasoline has gotten dirtier.

Gasoline today is responsible for over half the air toxics and nearly two-thirds of the urban smog (ozone).

The last time Congress reformulated gasoline (lead phasedown) the oil companies took out the lead, but replaced the lost octane with a 50% increase in toxic aromatic chemicals.

The reformulated gasoline specifications in the Amendment are the result of many months of working with petroleum experts, auto industry executives and environmentalists.

The Co-Chairman of the Auto-Oil Industry Fuels Testing Program is Joe Colucci of General Motors. On April 25, 1990, during an Oil Industry Forum, he put forward specifications for the "ideal reformulated gasoline" from the auto industry's standpoint. Specifically, General Motors recommends: 25% cap on aromatics; 0.8% maximum of benzene; and 2.5% minimum oxygenates.

General Motors' "ideal" fuel formulation is virtually identical to the fuel standards called for in the Amendment.

COST OF REFORMULATED GASOLINE

Statement: The Amendment will cost the oil refiners in excess of $30-50 billion. In addition, gasoline prices for consumers will increase by 30 cents per gallon.

Response: Recognizing that oxygenates will displace a portion of the octane market currently dominated by hydrocarbon aromatics, oil companies have sought to exaggerate the cost of replacing aromatics with safe octane enhancers.

During consideration of the Senate reformulated gasoline amendment, the API stated reformulated gasoline would cost refiners more than $100 billion! Today, API says the cost is closer to $20–25 billion.

The Federal EPA and Department of Energy have prepared a cost assessment of reformulated gasoline which states that the reformulated gasoline amendment will cost an estimated $1 billion a year. This amounts to an increase in gasoline prices of less than 4 cents per gallon.

In addition, because the EPA reformulated gasoline cost calculation is based on refinery modeling, offsets such as alternative markets for chemicals produced and octane values from alternative fuels that are used are likely to substantially reduce the cost to refiners.

Finally, it is important to note that reducing ozone and carbon monoxide levels through the production and use of reformulated gasoline is by a factor of five the least expensive option available to any nonattainment area.

There will be no price increase in gasoline to the consumers if the oil companies produce and offer for sale gasolines that contain only that level of octane necessary for the vast majority (over 98%) of the automobiles in America. Automobiles do not need 90-plus octane gasolines.

AUTOMOBILE PERFORMANCE

Statement: Major oil companies have made the claim that automobile warranties do not cover the use of oxygenated fuels such as ethanol blends. Thus, the Amendment threatens the consumer with fuel related performance problems and costly repair bills.

Response: Every auto manufacturer in the world, selling cars in the United States, fully warranties the use of 10% ethanol blends in their automobiles.

Since 1978, when General Motors took out full page newspaper advertisements in support of the use of ethanol, every model year has been fully covered for safe and dependable operation on ethanol blends.

With their 1990 Auto Warranty language, General Motors recommends the use of ethanol for air pollution reasons. The 1990 GM warranty language reads as follows:

"Gasolines for Cleaner Air:

"The fuel that you use can contribute to cleaner air. General Motors recommends that you use only gasoline treated with detergent additives that prevent deposit formation in your engine. These gasolines will help keep your engine in tune and your emission control system working properly.

"The use of oxygenated materials in gasoline can also contribute to cleaner air, especially in those parts of the country where carbon monoxide and ozone levels are high. Where available, General Motors recommends use of oxygenated fuels such as MTBE and ethanol in gasoline."

ETHANOL TAX SUBSIDY

Statement: Ethanol receives a tax subsidy in the form of a six cent reduction off the nine cent federal excise tax in gasoline. This amounts to a $.60 per gallon subsidy for ethanol. The passage of the clean air bill with the reformulated fuels amendment could require a billion dollar subsidy for ethanol.

Response: The oil companies who purchase the ethanol for blending with gasoline to make "gasohol" are the only corporate entities that are eligible to claim the tax incentive for ethanol.

No ethanol producer or manufacturer can claim the excise tax exemption for ethanol blended fuels.

The ethanol tax incentive is scheduled to expire in September 1995. The clean air legislation has no mention of an extension to the ethanol incentive.

In 1989, 840 million gallons of ethanol were produced in the U.S.: 8.4 billion gallons of ethanol blended fuels; $500 million in gasoline excise taxes was not collected; $170 million in increased business income tax payments; and $330 million in gasoline taxes not collected.

In 1990, a General Accounting Office Report stated that ethanol fuels, produced from surplus grain would save taxpayers between $480 and $560 million after the lost revenue in gasoline excise taxes was reimbursed.

ARCHER DANIELS MIDLAND (ADM)

Statement: The largest U.S. producer of ethanol is ADM, which controls over 75% of the U.S. production. The ethanol incentive and the oxygenated fuels programs are benefiting just one huge grain processor.

Response: ADM control less than 53 percent of the annual ethanol production capacity. ADM owns four separate ethanol production facilities.

The total annually domestic ethanol industry production capacity stands at over 1.1 billion gallons. While ADM's market share has remained relatively stable over the past several years, other plants have contributed to the total production capacity, thus shrinking ADM's size in the market.

ADM produces a number of food, feed and fuel products at its grain milling and processing facilities. When sweeteners are being made in the summer months from starch, the ethanol production capacity is essentially shut down.

The ethanol subsidy or incentive is not available to ADM or any other ethanol producer. While the ethanol marketing incentive does not make ethanol cheaper to manufacture or more profitable to sell in the market, it does make ethanol competitive in the gasoline octane market.

Since ADM started producing ethanol, not a single nickle of the federal incentive has gone to ADM.

AN EXPANDED ETHANOL PROGRAM WILL RAISE FOOD PRICES

Statement: Major oil companies have made the statement that the Amendment could inadvertently cause a tremendous "run-up" in food prices due to shortages for grain for feed and food supplies.

Response: Ethanol is produced from the most abundant and least cost feedstock in the world, starch. Starch is available from a host of feedstocks which could eventually be converted into ethanol, including beet and cane sugar, potatoes, corn or sorghum, and cassava.

In the U.S. much of the supply management programs in place have been concerned with over-production, not shortages. This means that there is ample feedstock to expand ethanol production without impacting the supply/demand equations and therefore price.

What ethanol does offer is the opportunity for the farmer to produce for a domestic market, to expand production and generate economies of scale to keep prices stable. It also offers the government to free itself from farm program costs for production would be for the marketplace and not the government programs.

25% of the consumer cost of food is the farm price. Thus, the consumer absorbs only 25% of a commodity price increase.

87% of total corn usage is for feed. Expanding ethanol production produces more feed in the form of high protein gluten feed and meal.

Since only the starch is used in the ethanol production, the high protein feeds remain in the poultry and livestock cycle. Ethanol production merely compacts the nutrient feed value of a corn kernel. In fact, an expanded ethanol program would probably result in lower poultry and meat prices.

Expanded ethanol production would make more corn oil available to the food chain.

A buffer against rising food prices is the Acreage Reduction Program. In the past it has been used to curtail over production. But it can also be used to offset shortages. Today, 10 million acres of corn are in the ARP . . . a 1.15 billion bushel reserve against shortfalls in supply.

OZONE

Statement: According to a recent Sierra Research Report, ethanol increases the formation of ozone.

Response: While Sierra Research did release a report which concluded that ethanol exacerbates ozone formation, it is important to note that the Report was commissioned by the American Petroleum Industry to undermine Congressional efforts to enact reformulated fuels standards—the API report contradicts the proven conclusions of numerous environmental studies conducted by the U.S. EPA and other scientific examiners over the past several years.

In fact, one EPA official has been quoted as saying that the API Report is a "cannon shell of misinformation."

In general, the Sierra Research/API Study is flawed in that it used a prototype vehicle not representative of in-use vehicles; used a motor fuel not representative of commercial gasoline; used reactivity factors that are obsolete and inaccurate, failed to take into account the automotive emissions advantages attributable to older model cars.

A February 1988 study prepared by Systems Applications, Inc. (SAI), of San Raphael, California, documents that reductions in carbon monoxide caused by ethanol blends can offset increases in ozone formation attributable to the increased volatility of ethanol blends, and, in fact, at RVP's of 9.0 psi and lower, ethanol blends can slightly reduce ozone formation.

Based on their review of SAI's initial study, EPA agreed that reductions in carbon monoxide should be considered with regard to ozone abatement efforts. In a January 1988 document transmitted to all 50 state air quality planning agencies, the EPA stated:

"States receiving ozone SIP calls and considering adoption of an alternative fuels program should account for its impact on both hydrocarbon and CO emission inventories, since both are inputs to the latest model for predicting future ozone attainment. Directionally, CO emission reductions from alternative fuels will assist in attaining the ozone NAAOS, but the strength of this effect has not yet been documented for the range of local conditions which affect ozone formation." (Guidance On Estimating Motor Vehicle Emission Reductions From the Use of Alternative Fuels and Fuel Blends, January 1988)

CARBON MONOXIDE

Statement: Levels of oxygen above 2.0 percent do not yield additional CO reductions.

Response: The addition of molecular oxygen contained in ethyl alcohol causes more air to be available in the fuel, thus the air/fuel ratio in the internal combustion engine is altered to the extent that the engine is more efficient and dramatically reduces CO emissions.

Since 1987, EPA has recognized that the use of ethanol blends can reduce fleetwide carbon monoxide exhaust emissions by 25 percent.

EPA published a technical document to be used by the States in revising their SIP's in the post-1987 era, "Guidance on Estimating Motor Vehicle Emissions Reductions From the Use of Alternative Fuels and Fuel Blends." This document lists the following exhaust emissions reductions that can be achieved by using ethanol blends:

	Percent
Non-catalyst (pre-1974 vehicles)	−22.8
Open-loop catalyst (1975–1981 vehicles)	−33.4
Closed-loop catalyst (post-1981 vehicles)	−17.2

Moreover, EPA has also stated that there is a linear relationship between oxygen and CO reduction, i.e. the higher percentage of oxygen by weight in the fuel, the "leaner" the effective fuel-to-air ratio will be and the more oxygen is available to enhance the

combustion process. As the fuel-to-air ratio becomes leaner, CO emissions are reduced.

As EPA has concluded that the percentage of oxygen by weight in the automobile's final fuel determines the amount of CO emissions reduction, there is no question that gasohol substantially reduces CO emissions. This occurs because of the high oxygen content of ethanol. The oxygen content of gasohol is 3.7 percent by weight.

NITROGEN OXIDES NOX

Statement: Ethanol increases NOx emissins which exacerbates ozone pollution.

Response: There have been numerous tests done on ethanol blended gasolines to determine the impact on NOx emissions. For example:

A Report prepared by the Department of Energy revealed that nitrogen oxides exhaust emissions from 53 test vehicles operating on 10-percent ethanol blends were reduced an average of 5.7 percent when compared to non-alcohol base gasoline exhaust emissions.

A Report prepared by engineers from General Motors Research Laboratories revealed that GM production vehicles with closed-loop catalytic converters operating on 10 percent ethanol blends had "significantly lower" exhaust nitrogen oxides emissions (22 percent) when compared to non-alcohol gasolines.

A Report prepared by the Southwest Research Institute for the EPA revealed that the use of 10 percent ethanol blends in 1975-1980 test vehicles exhibited "little or no effect" on nitrogen oxides exhaust emissions.

Moreover, reformulating gasolines to remove the more dangerous gasoline components and replacing them with clean-burning ethanol will provide even greater NOx reductions:

A recent report by Systems Applications Inc. concluded that if ethanol were used in a one-for-one replacement of the xylene fraction in unleaded gasoline in 100 percent of the motor vehicles in the City of Los Angeles that nitrogen oxide levels would be reduced by 8.8 percent.

These results of ethanol's impact on NOx emissions (or lack thereof) are consistent with EPA's conclusions that the use of ethanol blends will not exacerbate ozone formation.

EXHAUST HYDROCARBON (HC) EMISSIONS

Statement: The use of ethanol blends increases the emission of HC.

Response: In fact, EPA has definitively stated that the use of ethanol will substantial *reduce* exhaust HC emissions.

In the EPA's "Guidance on Estimating Motor Vehicle Emissions Reductions From the Use of Alternative Fuels and Fuel Blends", the Agency concludes that the following HC exhaust emissions reductions can be achieved by using ethanol blends:

	Percent
Noncatalyst (pre-1974 vehicles)	−4.2
Open-loop catalyst (1975-1981 vehicles)	−14.5
Closed-loop catalyst (post-1981 vehicles)	−2.4

EPA has stated that if all cars used 10-percent ethanol blended gasolines, an average per vehicle HC exhaust emission of volatile organic compounds (VOC's) would be reduced from 1.043 grams per mile to 0.961 grams per mile—an 8.5 percent reduction!

IMPACT TO THE HIGHWAY TRUST FUND

Statement: The tremendous market being created for ethanol will dramatically reduce monies available to the Highway Trust Fund—curtailing much needed infrastructure projects and causing employment losses in the road construction industry.

Response: Because the proposed clean fuels amendments may result in the increased use of ethanol as an oxygenate, however, oil companies have suggested that this "ethanol mandate" will dramatically reduce federal highway dollars. This is incorrect.

First, the Richardson-Madigan proposal does not require the use of ethanol. In fact, there are as many as seven EPA-approved fuels additives which will compete in the oxygenate market, including the most widely used oxygenate—MTBE, a methanol-based fuel additive produced by the major oil companies. None of these other oxygenates will impact the HTF at all.

To the extent that ethanol may be used, however, a recently released study by the Government Accounting Office concluded that while HTF revenues are reduced by the use of ethanol, because of decreased federal farm program costs, the government will actually continue to realize a net savings of between $460 and $580 million annually.

Even without these budget savings, however, it is important to note that any decrease in HTF dollars would not effect the level of funding available for road construction projects. The HTF currently has a $9 billion surplus. Appropriations to any individual state, and the resulting employment, are not effected by the excise tax exemption for ethanol blended gasolines.

While I would agree that the Congress should find a way to reimburse the HTF from the significant budget savings attributable to reduced farm program costs—the fact is the federal ethanol marketing incentive has been an extremely successful and cost-effective program, providing renewable domestic sources of energy while reducing pollution in our nation's cities—we should not sacrifice the tremendous environmental benefits this fuel can provide while we await the resolution of an accounting adjustment.

GASOHOL MANDATE

Statement: The 2.7 percent oxygen standard contained in the Richardson-Madigan amendment effectively mandates the use of only one fuel—ethanol.

Response: The requirement for 2.7 percent oxygen contained in the Richardson-Madigan Clean Octane/Reformulated Fuels Amendment is a "fuel neutral", environmentally sound fuel performance standard which will greatly reduce carbon monoxide and ozone pollution while not favoring any particular oxygenated fuel.

In fact, there are several oxygenated fuels which could meet the 2.7 percent standard today, including:

1. ARCONOL.—Tertiary Butyl Alcohol (3.7 percent oxygen)
2. Dupont Waiver.—5 percent methanol, 2.5 percent ethanol (3.7 percent oxygen)
3. Ethanol.—any blend more than 6 percent by volume (up to 3.5 percent oxygen)
4. Ethanol with MTBE.—2 percent methyl tertiary butyl ether and up to 10 percent by volume ethanol and cosolvent alcohols (3.7 percent oxygen)
5. Methanol with MTBE.—2 percent methyl tertiary butyl ether and up to 5 percent by volume methanol and minimum 2.5 percent by volume cosolvent alcohols (3.7 percent oxygen)
6. MTBE.— 15 percent methyl tertiary butyl ether by volume (2.7 percent oxygen)
7. OCTAMIX.—5 percent methanol, with other alcohol cosolvents (3.7 percent oxygen)
8. OXINOL 50.—4.75 percent methanol, 4.75 percent TBA (3.5 percent oxygen)

There are other fuels which may soon receive specific fuel waivers from EPA which will allow them to blend at the 2.7 percent oxygen standard or higher including ETBE and OTBE.

The Amendment also establishes an oxygen credits trading program which will allow all fuels—regardless of oxygen content—to compete in the marketplace. The oxygen credits trading program will allow fuel marketers choosing to sell gasoline with an oxygen content of less than 2.7 percent, including regular gasoline which has no oxygen content, to purchase oxygen credits from fuel marketers selling gasoline blended with any of the above oxygenates.

CORN/FOOD PRICE IMPACT

Statement: An increased demand for ethanol will increase the price of corn, which will be reflected in higher food prices paid by the consumer.

Response: According to a study just completed for the National Corn Growers Association (NCGA), called "Corn 2000: The Future of Ethanol", the relationship an expanded ethanol market would have to the price of corn and food would be as follows:

Increased demand for corn to produce ethanol would result in a modest increase in corn plantings over the 1993-2000 period of about 1.8 million acres per year. Producer flexibility would permit farmers to shift planting of other crops to corn in order to accommodate this demand without necessarily increasing total area planted to all crops.

A feed grain set-aside program would *not* be required beginning in 1996. This would result in a significant savings to taxpayers in government spending for farm programs.

Increased demand for ethanol would cause corn prices to increase an average of 4.5 percent over baseline levels during the 1993-2000 period.

Increased ethanol demand will have a small impact on consumer food prices and the overall rate of inflation. The Consumer Price Index for food would increase less than 2 percent over baseline levels and the overall CPI would increase about 0.3 percentage points.

These slight increases in food prices to consumers should be viewed in light of increased income and employment that are also expected to result from higher ethanol use. Despite these changes American consumers will still spend a smaller share of their disposable income on food than consumers in any other developed country in the world.

RURAL IMPACT

Statement: The economic impact on rural America will be limited relating to the production of reformulated gasoline.

Responses: Recent studies clearly indicate that reformulated gasolines which contain oxygenates such as ethanol will have a significant impact on rural economic development.

The U.S. can increase domestic capacity to produce ethanol to meet a demand of 3.3 billion gallons by the year 2000. The estimated cost of plant and equipment investment would total $3.4 billion.

The combination of increased agricultural output and investment for new ethanol facilities will add $14.4 billion to total U.S. Gross National Product (GNP). In addition, household income will increase almost $5.5 billion dollars.

Investments in new plant construction and the upgrading of capacity in existing plants would create investments in excess of $3.4 billion. In total, according to the "Corn 2000" study, over 461,000 new jobs would be created by the year 2000.

The economies of the states where new ethanol facilities will be constructed would also benefit. Of the 17 states covered in "Corn 2000" a $14 billion increase in Gross State Product (GSP) is projected, from

1993-2000. It is anticipated for example that Texas would increase it's GSP by over $860 million while creating over 27,000 new jobs within the state during this seven year period.

Increased demand for ethanol is expected to result in increased aggregate output, higher consumer incomes, and more jobs. These gains will come from at least two major areas: increased agricultural output and larger investment in plant and equipment required to produce the additional required 1.6 billion gallons of ethanol needed by the year 2000.

POTENTIAL ETHANOL PRODUCTION

Statement: In an expanded oxygenated fuels market it is doubtful that the ethanol industry could meet the increased demand created by the oil industry.

Response: The ethanol industry now has 60 producing plants in this country, with an overall capacity of 1.2 billion gallons annually. The potential for increasing production to 1.8 billion gallons in a short term span utilizing existing non-producing facilities is excellent.

There are a number of plants that are currently shut down that could be reactivated on very short notice. The combined capacity of these plants is over 600 million gallons annually.

New plant construction already on the drawing board have a total projected capacity of over 500 million gallons annually.

According to the NCGA "Corn 2000" study, it is not unrealistic to expect the ethanol industry to be able to produce in excess of 3.3 billion gallons of ethanol annually by the year 2000.

This production would be created with only a slight increase in corn production and would create new jobs for over 460,000 people while generating over $14 million in additional Gross State Product.

The production of 3.3 billion gallons of ethanol would be the equivalent of 30.3 billion gallons of 10 percent blended gasoline, or nearly one-third of Americas total annual gasoline sales.

While it is true that ethanol cannot totally replace gasoline, it is also true that for every 42 gallons of ethanol used, the need for 84 gallons of imported oil is displaced. A production level of 3.3 billion gallons would diplace 6.6 billion gallons of imported oil or roughly 12 percent of our import needs. At an average of $20 per barrel, that equates to a potential reduction of over $3 billion dollars annually.

ALDEHYDES

Statement: The burning of oxygenated fuels creates increased emissions of formaldehyde.

Response: The combustion of ethanol in gasoline engines does not produce formaldehyde. Formaldehyde, is produced from the combustion of methanol not ethanol.

Ethanol, when utilized in an internal combustion engine produces aldehydes. Aldehydes are significantly less toxic than formaldehyde.

However, automotive engineers have proven that the aldehyde and formaldehyde emissions can be effectively controlled through the use of a catalytic converter.

Gasoline produces both formaldehyde and other aldehydes. The increase of aldehyde emissions from the use of oxygenated fuels over regular unleaded gasoline, are relatively small.

WHAT THE OIL COMPANIES HAVE SAID ABOUT ETHANOL

Given the negative advertising campaign launched against ethanol blended gasolines upon the introduction of the Richardson-Madigan Reformulated fuels amendment, it is revealing to look at what oil companies have said in the past about this fuel:

Chevron: "Chevron, as a longtime marketer of gasolines with ethanol in Kentucky and Tennessee, certainly does not share any view that ethanol is somehow an undesirable additive. We know from our marketing of Chevron gasolines with ethanol, and our consumer response, that Chevron gasolines with ethanol provide consistent high performance in customer cars . . . We are proud of the quality of our Chevron gasolines with ethanol."—July 10, 1986.

Amoco: "While a number of fuel suppliers do not offer any alcohol-blended products, *Amoco has been and continues to be a major purchaser and marketer of ethanol.* We would not continue to offer our customers an alcohol blend if that fuel had caused performance problems."—August 15, 1986.

Texaco: "Since the inception of our ethanol marketing program in 1979, Texaco has sold more than one billion gallons of ethanol blended fuels. We have found that these products provide customer satisfaction equivalent to that provided by gasolines without ethanol and that they have been readily accepted as a motor fuel."—July 10, 1986.

ARCO: "ARCO Chemical has been a strong supporter of the use of alcohols in gasoline."—July 25, 1986.

Mobil: "Mobil continues to believe that ethanol blends present no special quality control problems as long as the fuels are properly blended and handled."—July 24, 1986.

WHAT THE AUTO INDUSTRY SAYS ABOUT ETHANOL

All 19 domestic and foreign automobile manufacturers marketing vehicles in the U.S. fully warranty the use of 10-percent ethanol in their vehicles.

In fact, last year, Roger B. Smith, Chairman of General Motors, announced that beginning with 1990 model cars and trucks, GM would begin recommending the use of oxygenated fuels. In making the announcement, Smith stated, "The advantage here is that the oxygen from the ether or alcohol portion of these special fuel blends can act to make the engine's air-to-fuel ratio leaner, (and) the result is less carbon monoxide."

The 1990 GM warranty language reads:

Gasolines for Cleaner Air: "The fuel that you use can contribute to cleaner air. General Motors recommends that you use only gasolines treated with detergent additives that prevent deposit formation in your engine. These gasolines will help keep your engine in tune and your emission control system working properly.

The use of oxygenated materials in gasoline can also contribute to cleaner air, especially in those parts of the country where carbon monoxide and ozone levels are high. Where available, General Motors recommends use of oxygenated fuels such as MTBE and ethanol in gasoline."

Moreover, representatives of the auto industry have suggested fuel formulations virtually identical to the standards established in the Richardson-Madigan amendment.

Joseph Colucci, GM's Fuels and Lubricants Department, recently published his recommendation for a reformulated fuels standard. That formulation included a 25 percent cap on aromatics, a 0.8 percent cap on benzene, 9 psi vapor pressure, deposit control additives and a 2.5 percent minimum oxygen requirement.

Apparently, the auto industry is extremely comfortable with both the use of ethanol blended gasolines and the fuel formulation established in this amendment.

Mr. DINGELL. Mr. Chairman, I yield 30 seconds to the distinguished gentleman from Maryland [Mr. MCMILLEN].

(Mr. MCMILLEN of Maryland asked and was given permission to revise and extend his remarks.)

Mr. MCMILLEN of Maryland. Mr. Chairman, I rise in support of the compromise amendment.

Mr. Chairman, congratulations are in order for Chairman DINGELL, and Chairman WAXMAN, who have worked ardently to bring together various factions in working out a viable compromise on the outstanding issues. Few issues in this compromise package are more important to the well-being of our urban areas than reformulated gas. It is at the gas pump, and at the tailpipe, that we can achieve some of our greatest air pollution reductions. I have special interest in the passage of this reformulated gas amendment, as Baltimore would be one of the cities covered by the legislation. Persistently in the top 10 ozone nonattainment areas of the country, Baltimore needs this special treatment. Importantly, the measure has a much needed degree of flexibility in it—specifically, cities in the future that fall below their ambient air quality requirements can opt into the system, provided that the EPA judges that doing so would not create a dramatic gas supply problem. And contention about gasoline formulation requirements have been mollified to a large extent. The proposal allows for deviation from the guidelines of the law if no discernable benefit is proven to come from the reformulation plan. I am particularly pleased about the scope of the plan—by marketing reformulated gas in nine cities initially, we are approaching the solution in a cost-effective manner, one that allows refiners time to make the necessary adjustments for the coming new gasoline market.

From national parks haze problems to the issues surrounding accidental release of toxic chemicals Representatives DINGELL, WAXMAN, and LENT, plus a whole host of others, have proven that compromise can be achieved. No doubt exists—we are well on the way to achieving our goal of better air quality for all Americans in the coming century.

Mr. DINGELL. Mr. Chairman, I yield 1 minute to the gentleman from Minnesota [Mr. VENTO].

(Mr. VENTO asked and was given permission to revise and extend his remarks.)

Mr. VENTO. Mr. Chairman, I rise in support of the committee amendment. I especially want to give credit to the gentleman from Oregon [Mr. WYDEN] and others who worked on the aspects dealing with parks and public lands. I would like to point out this does affect parks and wilderness areas.

Ironically, some of the special areas, our national heritage, are among the most sensitive and fragile areas with regard to pollution. We designated and conserved such areas because of their visual qualities, and of course because of their natural qualities, their cultural and historic qualities. But obviously if we cannot see them we cannot enjoy them, and the damage doesn't end with the ability to view such resources.

The administration failed in the mid-1980's to come up with protections

EPA COST ESTIMATE — DASCHLE DEFENSE OF HIS AMENDMENT AND SUPPORT OF RICHARDSON-MADIGAN A.

again. There is abundant evidence that other nations are developing or seeking to acquire their own chemical and biological weapons.

In light of these events, it is clear that the inhibitions against the use of chemical weapons are slipping and that the civilized nations of the world move to arrest this alarming trend toward the proliferation and use of chemical and biological weapons.

We would do well at this happy moment to remember those now verdant battlefields in France that were witness to the terrible use of poison gas in World War I. The passage of time has not caused us to forget the horror of gas in that war and the revulsion of the nations of the world afterward that led to the agreement upon the Geneva Protocol of 1925. We are now reasserting that concern and showing that the United States is willing to move back into the forefront of those nations that abhor the use of chemical weapons and will make a serious effort and comprehensive attempt to remove chemical and biological weapons from the face of this Earth. It is a solemn and serious responsibility we have undertaken, and I believe we are meeting that responsibility with distinction.

I thank my many colleagues for joining in making this a fine piece of legislation of which we can all be very proud.

I am particularly gratified to see the unanimous vote in this regard.

Mr. President, I ask unanimous consent that S. 195 be indefinitely postponed.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. PELL. Mr. President, I move that the Senate insist on its amendment and request a conference with the House on the disagreeing votes thereon and that the Chair be authorized to appoint the conferees on the part of the Senate.

The PRESIDING OFFICER. The question is on agreeing to the motion.

The motion was agreed to.

Mr. PELL. Mr. President, I suggest the absence of a quorum.

The PRESIDING OFFICER. The clerk will call the roll.

The legislative clerk proceeded to call the roll.

Mr. SIMPSON. Mr. President, I ask unanimous consent that the order for the quorum call be rescinded.

The PRESIDING OFFICER. Without objection, it is so ordered.

MORNING BUSINESS

Mr. MITCHELL. Mr. President, I ask unanimous consent that there be a period for morning business with Senators permitted to speak therein.

The PRESIDING OFFICER. Without objection, it is so ordered.

VA ADVISORY COMMITTEE DECISION ON SOFT-TISSUE SARCOMA

Mr. DASCHLE. Mr. President, today veterans exposed to agent orange have won a tremendous victory—one they should have celebrated long ago. This afternoon the VA's Advisory Committee on Environmental Hazards concluded that there is a significant statistical association between soft-tissue sarcoma and Vietnam veterans' exposure to agent orange. they will recommend to Secretary Derwinski that veterans suffering from soft-tissues sarcoma be provided VA disability compensation.

Let me explain the significance of this event. The VA's Advisory Committee on Environmental Hazards is very possibly the group least likely to come up with such a recommendation. This is the group that recommended that veterans exposed to atomic radiation not be compensated for radiation-related diseases. This is the group that recommended in November 1989 that veterans exposed to agent orange not be compensated for non-Hodgkin's lymphoma.

Nevertheless, this same group found a significant statistical association between exposure to agent orange and soft-tissue sarcoma, a rare, terminal cancer that has disabled and killed many Vietnam veterans. Several of the Advisory Committee members said the conclusion was "unavoidable." This conclusion confirms what we who have been involved in the effort to compensate veterans for agent organe-related illnesses have been saying. The evidence is there. Veterans suffering from soft-tissue sarcoma deserve compensation.

Confirmation of that fact from the Advisory Committee should set the record straight once and for all and should pave the way for consideration—by the Advisory Committee, the Secretary of Veterans Affairs, and the Congress—of compensation for other agent orange-related diseases. First among those diseases to be considered should be those outlined in the Agent Orange Scientific Task Force report and Adm. E.R. Zumwalt, Jr.'s, recent report to the Secretary.

Although I have stated some of my strong concerns about the work of the Advisory Committee in the past, some encouraging actions that should improve the Advisory Committee's review procedures were taken today. The Advisory Committee decided to strengthen its future review procedures in two important ways.

First, the Advisory Committee has decided to include more improved statisical analyses of studies based on detailed "power statements" that should allow the group to give proper weight to each study and consider all the studies together in a systematic way. Second, the Advisory Committee has decided to bring in ad hoc committee members who are expert in highly specialized fields, such as reproductive epidemiology and immunology. These experts should enhance the Advisory Committee's ability to review the scientific literature related to reproductive and immunologic effects. These actions should prove helpful in the effort to ensure expert, comprehensive, evenhanded treatment of the scientific evidence.

In spite of these encouraging signs, I remain concerned about the VA's Advisory Committee process. In addition to my general concern about the Advisory Committee's past work, I am extremely skeptical about the Advisory Committee's ability to address the full list of diseases potentially associated with agent orange in a reasonable time frame. This is certainly not the fault of the Advisory Committee members. The body of scientific evidence to be reviewed is formidable, and it simply will not be possible for the Advisory Committee to issue conslusions on each of the diseases suspected to be associated with agent orange before the VA issues its October regulations.

This situation highlights the need for an independent body to review the scientific literature, and the importance of the provision in the agent orange legislation, passed by the Senate and pending in the House, to establish such a review procedure through the National Acedemy of Sciences. It is important that these issues are resolved in a fair, timely manner, and the National Acedemy of Sciences can play an important role in that effort.

In conclusion, Mr. President, I hope this is the beginning of the end of the ordeal agent orange victims have suffered—not just for non-Hodgkin's lymphoma or soft-tissue sarcoma victims, but for all veterans disabled by their exposure to agent orange.

REFORMULATED GASOLINE

Mr. DASCHLE. Mr. President, during the past 2 weeks, we have all been assaulted by a massive advertising blitz orchestrated by the American Petroleum Institute [API] that is designed to defeat the proposed Richardson-Madigan-Waxman amendment to the Clean Air Act. This amendment, which is very similar to the Daschle-Dole-Harkin amendment adopted by the Senate last month, would require the use of cleaner burning gasoline in the Nation's dirtiest cities.

I would like to take a few moments of my colleagues' time today to address some of the charges that have been levied against the delineation of a reformulated gasoline standard in the Clean Air Act amendments.

The catchword of API's media campaign is Government gas. I'm sure all my colleagues have heard this catchy slogan during the last 2 weeks.

Government gas, to hear API tell it, is an evil creation of the U.S. Congress that is capable of polluting our cities and sending the Nation into bankrupt-

14

cy, all for the benefit of a few corn farmers in South Dakota and Kansas. That is nonsense.

In reality, Government gas is the multi-million-dollar substance that is being belched from the advertising departments of the multinational oil companies' Washington trade association, the American Petroleum Institute. An API spokesman has confirmed that the organization has alotted $2 million for media buys alone.

Two million dollars for advertisements: that is what the API is spending to mislead the public about the effect of this single amendment. This evidently does not include what is being spent in creative fees and consultants' fees.

And just why is the API pursuing this strategy?

They are trying to obscure the fact that gasoline has become almost 50 percent more toxic in the last decade alone, and that 85 percent of the benzene in the air now comes from gasoline combustion and evaporation.

They are trying to obscure the fact that 50 percent of the cancer deaths attributed to air pollution comes from mobile source pollution.

Let's walk through some of the assertions and half-truths being propagated by the API.

Charge No. 1: Scientists—not politicians—should decide how and when to reformulate gasoline. Does the API really expect anyone to believe that the reformulated gas standards that passed the Senate and are now before the House were pulled from thin air?

Just the opposite is true. The standards were the result of months of working closely with petroleum industry experts, auto makers, State air quality officials, and environmentalists. In fact, the standards are almost identical to the ideal standards outlined by General Motors; they closely mirror recommendations from ARCO and other oil companies; and they are very similar to the gasolines already being marketed by Marathon, Phillips, Conoco, and others.

Charge No. 2: The amendment will cut into efficiency. Would General Motors be recommending an even tougher gasoline standard if it reduced auto efficiency?

One of the many problems with today's high-octane, high-aromatic gasoline is that it clogs fuel injectors and can literally cripple catalytic converters. Cleaner gasoline not only produces less pollution, it also burns cleaner in your engine, making for longer engine life and a more fuel-efficient car.

Charge No. 3: Smog will increase because of Government gas. This may be the most reprehensible charge of all.

All Government data and almost all industry data clearly show that reducing aromatics and increasing oxygen makes a car burn far more cleanly. I would strongly urge the API to look at current EPA data on the subject, and to look at the December 6 Oil and Gas Journal, where an Arco scientist lays out data that clearly show that adding oxygen and reducing aromatics decreases NO_x, unburned hydrocarbons, and carbon monoxide, and therefore dramatically decreases smog.

What is the most outrageous about the API comments is that it appears that their propagandists have not even read either the Daschle/Dole/Harkin or Richardson/Madigan/Waxman amendments. Under the terms of the amendments, if a fuel does not decrease smog by at least 15 percent, it cannot be certified by the EPA Administrator. If ethanol cannot meet this standard, it cannot be used.

Charge No. 4: The amendment will cost billions of dollars. The API likes to claim that reformulating gasoline will cost between 15 and 25 cents per gallon. This contrasts with the facts of the marketplace, where several members of the API are already marketing reformulated gasolines that essentially meet the standards of the proposed amendment at little or no additional cost. Information Resources, Inc., has prepared a cost estimate of the Daschle/Dole/Harkin amendment that states that its cost will run from −2.7 cents per gallon to +2.23 cents, depending on the type of fuel that is used to meet the standard.

Finally, I have in my possession a cost estimate from the Environmental Protection Agency that says the amendment will cost only 2.9 to 3.9 cents per gallon. This estimate had to be leaked, as the millions of dollars spent by the API to discredit the amendment seem to have stalled an official cost estimate from leaving the Agency. I will insert the text of the estimate into the RECORD so my colleagues may see EPA's assumptions and computations.

Mr. President, it is time to set the record straight about the real reason for the oil industry's opposition to our clean gasoline standard. Their priority is not air quality; it is control and market share.

The multinational oil companies, in particular, are fixated on maintaining their stranglehold on the traditional hydrocarbon-only gasoline business. The clean-burning ethers and alcohols that would be required to manufacture clean gasolines would amount to less than 10 percent of the oil industry's 115 billion gallons of gasoline used in the United States each year. Yet, the API's hysterical, distortion-filled ad campaign makes it clear that they regard this intrusion as a serious threat that must be beaten back at all costs.

I sincerely hope that we all consider the source of the Government gas propaganda and keep an objective eye on the facts. The Richardson-Madigan-Waxman amendment, like its counterpart already adopted by the Senate 69 to 30, is good for our environment, our health, our energy security, and our motorists. It should be adopted.

Mr. President, I now ask unanimous consent that the text of the estimate, previously referred to, be printed in the RECORD.

There being no objection, the estimate was ordered to be printed in the RECORD, as follows:

EPA ESTIMATE ON COST OF DASCHLE GASOLINE

The final Daschle gasoline (1996) will be sold in the nine severe ozone nonattainment areas (22% of U.S. fuel consumption) and must meet the following specifications:

(a) Maximum benzene content of 1.0 volume %

(b) Maximum aromatics content of 25 vol. %

(c) Minimum oxygen content of 2.7 wt. %

(d) 15% reduction in ozone forming potential (VOCs)

(e) No increase in NO_x

Assuming MTBE is used, 15 vol. % will be needed. The octane provided by the MTBE will allow refiners to back off on reformer severity and reduce aromatics to the 25 vol. % level without any other changes to the refinery. This will also reduce benzene levels to about 1.2 vol. %. The remainder of the benzene reduction can be achieved with existing technology, possible with existing equipment.

Most of the required 15% reduction in ozone forming VOC emissions will result from the addition of oxygenate. The remainder can be achieved by reducing RVP below 9 RVP by 0.6–0.8 RVP in 1992 and by only 0.2–0.5 RVP in 1994 and beyond. The technology for this also exists and is readily available. It is also possible that methods for reducing the photochemical reactivity of VOC emissions will be confirmed by this time, allowing less costly solutions to be developed, such as reducing olefin and/or heavy aromatic concentration.

MTBE is already being produced from isobutane (and many plants are under construction), indicating that current prices (80–95¢ per gallon) will support expanded production from this source. Ample isobutane is available to provide for sufficient MTBE for this and other oxygenate programs.

The cost of Daschle gasoline is as follows:

MTBE (15 vol. % at 28¢/gal over gasoline)—4.2¢/gal.

Savings from the octane value of MTBE—−2.0.

Aromatics control to 25 vol. % (free w/ MTBE)—0.0.

Benzene control to 1 vol. %—0.5–1.0.

RVP control to 8.2–8.2 RVP—0.2–0.7.

Total cost—2.9–3.9.

FEASIBILITY AND COST OF REFORMULATED GASOLINE IN THE NINE SEVERE OZONE AREAS

(1) Daschle Amendment definitely applies to the nine severe ozone nonattainment areas representing 22% of U.S. fuel consumption, could also apply to some additional areas since a population cutoff is not included (also some uncertainty concerning whether 0.179 ppm ozone is considered 0.18 ppm or greater, which could include two more cities)

(2) All gasoline sold in these areas must have:

(a) Maximum benzene content of 1.0 volume %

(b) Maximum aromatics content of: 30 vol. % as of Jan. 1, 1992; 28 vol. % as of Jan. 1, 1994; and 25 vol. % as of Jan. 1, 1996.

(c) Minimum oxygen content of: 2.0 wt. % as of Jan. 1, 1992; 2.5 wt. % as of Jan. 1, 1993; and 2.7 wt. % as of Jan. 1, 1994.

(d) Must produce a 15% reduction in ozone forming potential of volatile organic

pare or implement a plan to attain an air quality standard: limited use of Federal highway funds or a requirement that new industry offset emissions at a 2 to 1 ratio.

Under the safety exemption to highway sanctions, the principal purpose of the project must be to improve highway safety, but the project may also have other important benefits.

The definition of major sources in current law is modified so that smaller sources of VOCs are required to control emissions (50 tons in moderate and serious areas; 25 tons in severe areas; 10 tons in extreme areas).

When a State fails to develop a plan that meets the requirements of the law, the EPA is required to promulgate a Federal Implementation Plan.

The EPA is required to issue control requirements for a number of sources of pollution, including commercial and consumer products.

A new program is established to address the interstate transport of ozone air pollution.

The conferees adopt the House language on rocket testing with the agreement that the appropriate Federal agency may find that testing required for a civilian or commercial launch program is essential to the national security.

TITLE II—MOTOR VEHICLE-RELATED PROVISIONS

Title II is based on the House bill with a number of significant modifications.

Reformulated gasoline

Cleaner, reformulated gasoline would be mandated in the nine cities with the most severe ozone pollution beginning in 1995. States could elect to have the requirements apply in other cities with ozone pollution problems. In comparison with conventional gasoline, reformulated gasoline would be required to have 15 percent lower emissions of VOCs and toxic chemicals by 1995, and greater reductions by 2000. The agreement also contains additional standards for oxygen, benzene, and aromatics.

Under section 211(k)(4), a petition for the certification of a fuel formulation or slate of fuel formulations is deemed certified if the Administrator fails to act on the petition within 180 days of its receipt. Such a petition is deemed certified until the Administrator completes action on the petition. In the event that the Administrator subsequently denies such a petition, the conferees intend that the Administrator will take appropriate steps to ensure orderly and prompt compliance.

Section 219 of the bill includes a credit program to provide flexibility in meeting the bill's requirements on the oxygen, aromatic hydrocarbon, and benzene content of reformulated gasoline. A credit program is the mechanism by which persons subject to these requirements will be allowed to pool gasoline sold in a given covered area for purposes of determining compliance with these requirements.

Under this credit program, a person may earn credit for gasoline with a higher oxygen content, lower aromatic hydrocarbon content,

or lower benzene content than otherwise required. Such credits, once earned, may be used in the same covered area in which they were earned to offset the sale or use of gasoline with a lower oxygen content, higher aromatic hydrocarbon content, or higher benzene content, as the case may be, than otherwise required. However, EPA regulations shall preclude the use of such credits to the extent that such use would result in an average content in a covered nonattainment area that is less stringent than would occur without a credit program.

The agreement establishes an oxygen content level of 2.7 percent in 44 cities with carbon monoxide pollution, starting in 1992. These provisions will encourage the use of oxygen-containing additives like ethanol and MTBE, a natural gas derivative.

It is the intent of the conferees that State Implementation Plans in CO areas implementing section 211(m)(2) shall have a prohibition similar to that provided in section 211(k)(5).

Tailpipe standards for cars and trucks

Auto manufacturers are required to reduce tailpipe emissions of hydrocarbons and oxides of nitrogen by 35 percent and 60 percent, respectively, beginning with 40 percent of the vehicles sold in 1994 and increasing to 100 percent of vehicles sold in 1998. Comparable reductions are required for light trucks such as vans and pickups.

An additional reduction in auto emissions—a 50 percent cut below the standards required in the mid-1990's—would be required after 2003 unless EPA finds that this new standard is not necessary, technologically feasible, or cost effective.

Other requirements

Vehicle manufacturers must install systems to alert drivers when an emission control system is malfunctioning.

The conference agreement retains the present section 177 language, which provides for adoption and enforcement of California vehicle standards by other States.

In addition, the agreement amends section 177 to make plain that States exercising this section 177 option may not, in such adoption and enforcement, create a "third vehicles" that is not a California vehicle or a 49-state Federal vehicles, because of the burden it would place on the motor vehicle manufacturers.

Fleet vehicles

A program for fleet vehicles is included in the agreement. Fleet vehicles covered by the program would be substantially cleaner than conventional vehicles. The fleet program applies in serious, severe, and extreme nonattainment areas to fleets of ten or more vehicles that are capable of being centrally fueled (but not including vehicles garaged at personal residences each night under normal circumstances).

The fleet program will mandate California's low emission vehicle (LEV) standards by 1998 for light-duty vehicles and light-duty trucks below 6,000 lbs. gross vehicle weight rating (gvwr), provided these vehicles are offered for sale in California. By 2001, these vehicles will be required without regard to availability in California.

DASCHLE - BAUCUS COLLOQUY

Also, eligibility for allowances is specifically and solely based on bona fide crude oil throughput and is designed to encourage refineries to install desulfurization equipment. Diesel fuel on which allowances are calculated must be directly derived from crude oil processed by the small refiner. The conference did not intend for facilities to earn allowances if distillate is brought in from outside sources and blended or finished to the 0.05-percent standard. Process activities which are not contiguous to crude oil production runs at the refinery are not eligible for allowances. However, to promote process efficiencies, the conference believed two or more refineries could jointly operate a single desulfurization facility provided that diesel fuel was exclusively derived from crude oil processed at those refineries, and that all process and desulfurization facilities are solely owned and controlled by the same small refiners.

Finally, to be eligible to earn allowances, the refinery must certify that all on and off-highway diesel fuel manufactured and sold from that facility is desulfurized to a 0.05 percent standard. This will ensure that reductions in SO_2 emissions from off-highway sources will actually occur.

LIMITATIONS

The small refinery diesel provision enables a refinery to earn a maximum of 1,500 allowances per year from October 1, 1993 to December 31, 1999. By this date, it is believed the allowance program would have sufficiently assisted refiners complying with the low sulfur diesel requirements. Also, small refiners as a class, are limited to a total of 35,000 allowances per year. If the amount of SO_2 small refiners remove per year exceeds 35,000 tons, the conference believes a proration of these allowances would be appropriate.

Facility size limitations—18,250,000 bbls/year per refinery and 50,187,500 bbls/year per small refiner—shall be measured in terms of the average of the actual annual crude oil throughout during the period January 1, 1987 to December 31, 1989. This 3-year averaging method is similar to the approach used by EPA in their final diesel desulfurization rule and is set for a past period to prevent a facility from artifically lowering rates to gain small refiner eligibility.

The conference also recognized the installation of desulfurization equipment may lead to some debottlenecking at a facility which may render plant expansion cost-effecive. If expansion occurred, the refinery would still be limited to the number of allowances it could earn. Moreover, all on and off-highway diesel sales from the facility would also be required to meet the 0.05-percent standard.

ADMINISTRATIVE AND FINANCIAL CONSIDERATIONS

Administratively, the Congress envisions the appropriate administrative agency will request small refiners to submit initial information registering and verifying their status as a small refiner, and certifying their intention to manufacture low-sulfur diesel fuel and claim allowances. After review, the agency could provide small refiners with a certificate, letter, or notice indicating the small refiner is registered with the agency and that the facility is eligible to earn allowances if requirements under Clean Air Act Amendments are met. Since allowances cannot be earned until after a facility has achieved compliance, the conference believes this type of document may help small refiners obtain investment capital to purchase desulfurization equipment. Also, to provide compliance assistance as rapidly as possible, we encourage the prompt and timely issuance of allowances to qualifying refiners.

FOOTNOTES

[1] On June 16, 1987, the Senate Environment and Public Works Committee heard testimony from the National Petroleum Refiners Association which reported that small refineries were most affected and at risk with low sulfur diesel standards: "Industry averages do not reflect the disproportionally high burdens that would be placed on some industry segments and individual refiners. For example, for the 25 refineries whose individual crude oil capacities are less than 30 thousand barrels daily, their cost burden to produce 0.05% sulfur diesel/distillate would be three times that of the industry average. This would seriously jeopardize their competitive viability." Separately, on two different occasions, the California Air Resources Board has set diesel desulfurization standards and both times provided small refiners with additional compliance leadtime.

[2] EPA's extension of compliance deadlines provides little assistance to small refineries since it requires the segregation of diesel fuel with a 0.05% sulfur content from "exempted" diesel fuel small refiners would be allowed to sell. EPA felt segregation was necessary since heavy duty diesel engine manufacturers stated they could not assure compliance with emission requirements if sulfur levels in diesel pools exceeded 0.05 percent. However, segregation of diesel fuel would prove too costly since diesel manufactured by small refiners is commingled with diesel from major refiners in pipelines, terminals and retail outlets. Segregation would require separate transportation, tanks and dispensing capabilities, all of which renders the alternative impractical.

[3] To ensure that a refinery does not use extra-sour crudes in order to earn more allowances, the provision only credits those sulfur reductions below the national average of 0.274 percent by weight, as reported by EPA.

[4] National average sulfur content in diesel fuel .00274 lbs.; Less: New diesel sulfur standard (.00050) lbs.

Excess sulfur removed per pound .00224 lbs.; Weight of diesel fuel per gallon (x) 7.1 lbs.

Amount of sulfur removed per gallon .01590 lbs.; Conversion to barrels (x) 42.

Amount of sulfur removed per barrel .66780 lbs.; Annual 0.05% diesel fuel sales (x).

Annual amount of sulfur removed from diesel lbs.; Conversion to tons (divide by 2000).

Tons of sulfur removed from diesel tons; Conversion to SO_2 (x) 1.998.

SO_2 removed per year tons.

ELEMENTAL PHOSPHORUS PLANTS

Mr. SIMPSON. Mr. President, special consideration is provided in this conference report, as it was in both the Senate and House clean air amendments, to continue the regulation of radionuclide emissions from elemental phosphorus plants, and a new subcategory of grate calcination elemental phosphorus plants, under the existing health-based authorities of section 112.

Radionuclide emissions from elemental phosphorus plants have been subject to the scrutiny of section 112 since first listed in 1979. Recently EPA revised the preexisting standard and in doing so, did protect the public health with an ample margin of safety, but did not fully consider process differences which distinguish elemental phosphorus plants utilizing grate calciners from all others. In promulgating the recent standard, the agency also did not consider the acceptability of intermediate emission levels between the level initially proposed and that ultimately finalized. The language in the conference report will allow EPA to reconsider its decision in a manner which continues to provide health-based protection for populations exposed and which recognizes the uniqueness of grate calcination elemental phosphorus plants.

Mr. CHAFEE. Again, I want to thank everyone who had a hand in this.

ON THE ESTABLISHMENT OF STATE IMPLEMENTATION PROGRAMS AND TAKING LOCAL CONDITIONS INTO ACCOUNT UNDER THE PERMITTING PROGRAM

Mr. INOUYE. Will the distinguished managers of the conference report, the Senator from Montana and the Senator from Rhode Island, confirm the operation of the permitting requirements under the conference agreement.

During the April debate on the Senate committee bill, the distinguished bill managers confirmed for this Senator that the Environmental Protection Agency must work with the States to facilitate State administration of the new permitting program. The distinguished managers also affirmed that the new operating permit system would allow flexibility for special conditions, such as the island conditions of my State, to be taken into account.

This Senator notes that the conference agreement combines the permitting provisions from the Senate bill with certain permitting provisions from the House amendments. In light of the conference modifications, is the past explanation of the permitting system still accurate with regard to the facilitation of State administration and with regard to consideration of special local conditions?

Mr. BAUCUS. EPA should in its discretion, to facilitate State administration of the permitting program and the permitting system allow flexibility for special conditions, such as conditions which may be unique to sources in the Senator's State, to be taken into account.

Mr. CHAFEE. This Senator shares that understanding.

Mr. INOUYE. I thank the distinguished managers for their clarification.

THE OXYGENATED FUELS AND REFORMULATED GASOLINE PROVISIONS OF THE CLEAN AIR ACT

Mr. DASCHLE. Mr. President, I would like to engage the distinguished chairman of the subcommittee, Mr. BAUCUS, in a colloquy concerning the

reformulated gasoline and exygenated fuels provisions of the bill for the purpose of clarification. The legislation provides the Administration with some flexibility in determining the length of the oxygenated fuels program. I am concerned about this because it could lead to different program periods being established for different CO nonattainment areas, and thereby create a patchwork of gasoline regulatory requirements that is impractical, unnecessary and confusing for consumers and gasoline marketers alike. What is the Administrator's discretion in this area, and could the Administrator require that oxygenated fuels be sold over a 6-month period?

Mr. BAUCUS. It is correct that the Administrator has some flexibility. However, the committee believes the Administrator should avoid setting widely differing program periods for each CO nonattainment area that would create a patchwork of gasoline regulatory requirements, but the committee also believes that the strongest possible program that is appropriate should be adopted.

Cold ambient temperatures and atmospheric temperature inversions are critical factors in carbon monoxide pollution formation. As a result, virtually all carbon monoxides are observed during the months between October and April when climatic changes occur. It may be that a 6-month period is the timeframe that the Administrator would select in consideration of the area's high ambient CO season for several areas. In any event, the legislation stipulates that the timeframe for the program is not to be less than 4 months.

Mr. DASCHLE. The reformulated gasoline provision contained in section 219 of the bill directs the Administrator to promulgate regulations requiring the greatest reduction in emissions of ozone forming volatile organic compounds and toxic air pollutants achievable through the reformulation of conventional gasoline. The general requirements for these regulations prohibit increases in the emission of oxides of nitrogen, establish a minimum oxygen content of 2.0 percent, and limit benzene to no more than 1.0 percent by volume.

It is my understanding that these are minimum standards. As EPA promulgates regulations, the Administrator has the flexibility to make these requirements more stringent if it is determined that tighter standards are necessary to achieve the greatest reductions in VOC's and toxics.

For example, if EPA determines that it is possible to limit benzene to less than 1.0 percent, such as 0.8 percent as in the original House bill or less, if technically and economically feasible, then EPA has the flexibility to do so. Is this the Senator's understanding as well?

Mr. BAUCUS. Yes, that is my understanding. Benzene levels should be reduced as much as is technically and economically feasible but in no case can they exceed 1 volume percent. Benzene is a known carcinogen. Yet it is widely used as an octaine enhancer in today's gasolines—averaging 1.5 to 2.5 percent in most octaine grades but as much as 5 percent in some premium grades. If EPA concludes that additional reductions in this dangerous compound are possible and practical, the provisions of this legislation allow the Administrator make the appropriate adjustments.

Similarly, if the Administrator determines that requiring more than 2.0 percent oxygen will result in greater reduction of VOC's or toxics, the legislation provides the flexibility to increase the oxygen content accordingly.

Mr. DASCHLE. The bill requires the geratest reduction in emissions of ozone forming volatile organic compounds and emissions of hazardous air pollutants achievable through the use of reformulated gasoline. In order to reach those reductions, the bill requires the Administrator to determine the more stringent of either a formula stipulated in the legislation or specific performance standards for VOC's and toxics.

The formula establishes minimum standards for benzene, aromatics, heavy metals, detergents and oxygen content. It is my understanding, again, that EPA has the flexibility to issue more stringent standards for the formula fuel if technically and economically feasible.

Mr. BAUCUS. Yes, that is correct. The Administrator has the authority to make the formula more stringent.

The objective of the formula is to establish environmentally sound standards for the most critical components of gasoline. If EPA determines that a more stringent fuel formula will yield additional environmental benefits without undue economic difficulty, the Administrator could, under this provision, adjust the formula accordingly.

Mr. BAUCUS. Mr. President, earlier today we heard some of the Senators express their concern about the economic costs of this bill. Without taking great time at this moment with the Senate, I would like to make a few observations.

First, passage of this bill will obviously inure to the benefit of our country in terms of better health, better esthetic environment, better environmental benefits. It is clear passage of this bill is going to make Americans healthier, the environment cleaner, esthetically much more pleasing.

It is also clear that there are very significant economic benefits with the passage of this bill. No. 1, for every $1 billion in pollution construction and for every $1 billion that this country invests in pollution control, there are up to 20,000 additional jobs in this country. In addition there are many jobs that are going to be lost if no legislation passes, because of greater inefficiencies that are going to occur.

I must also point out that there about 50,000 premature deaths in country because of dirty air. In a tion, 2 to 5 percent of the Ameri public suffer premature illness or mature death because of dirty Those are very definite costs to country.

Mr. President, I also would like point out that there are major ene savings as a consequence of passag this bill. For example, by the 2000 this country will be saving ab 1 million barrels of oil a day, with passage of this bill. That is because greater efficiencies in fuels, oxyg ation requirements, reformulated oline provisions. That will save proximately 500 barrels a day. M over, by the year 2005, this bill save another 500,000 barrels a day cause utilities will be encouraged switch from oil to natural gas. Th are major economic savings in this of which I think Senators should aware.

The EPA recently completed a dr report evaluating the energy impa that will result from the Clean Act.

EPA estimates that between 800, and 1 million barrels of oil per day be saved from the acid rain provisi and the mobile source provisions.

I ask unanimous consent that a c of EPA's draft report, entitled "T New Clean Air Act and Energy: F Switching Under the Clean Air Amendments," be printed in RECORD.

There being no objection, the ma rial was ordered to be printed in RECORD, as follows:

[Office of Air and Radiation, Environm tal Protection Agency, Sept. 12, 1990]

THE NEW CLEAN AIR ACT AND ENERGY: F SWITCHING UNDER THE CLEAN AIR AMENDMENTS

FUEL SWITCHING UNDER THE CLEAN AIR AC AMENDMENTS

CLEAN FUELS FROM NATURAL GAS AND AGRICULTUR

	Barrels oil/d saved [1]
Mobile sources:	
Oxygenated fuel for CO control—switch oxygenates for crude	
Reformulated gasoline—switch oxygenates for crude	
Alternative fuels and fleets program	
Fuels subtotal	[2] 5(
Acid rain: Switch natural gas for oil	[3] 300,000-5(
Total	800,000-1,0(

[1] When fully phased-in under deadlines in the bills.

[2] Estimate based on 9-city program only. With full opt-up and opt alternative fuels and reformulated gasoline provisions, an extra 2 to 3 barrels per day could be saved.

[3] Under the EPA-ICF "high" base case scenario (used in Administrati cost estimate), 300,000 barrels will be saved in the year 2000 and 5(in the year 2005.

(Reducing pollution also cuts incomplete combustion, saves wasted h boms and will result in additional energy savings.)

ACID RAIN AND ENERGY

The Clean Air Act will require major ductions in sulfur dioxide from electric u ty power plants. Utilities will achieve par these reductions by switching from fuel high in sulfur content to natural gas wi is low in sulfur content.

of people who, though not directly involved in the meetings, were a critical part of that process. I hope that people will look at that and remember that was a key to the success.

Therefore, Mr. President, it is with a great sense of pride and relief that I rise to strongly support the conference report on the Clean Air Act of 1990. At a time when the Congress and the administration are taking some well justified hits for indecision and confusion, this bill is a monument to the best in Government. This is a bill whose goal could not be more simple: to make Americans healthier. The means of accomplishing that end could not be more complicated. This is a carefully forged instrument, comprised of the best knowledge we can take from science, from economics and from law. It is a testament to the fact that we can change Government and change our society to improve people's lives.

There are many to whom the American people owe a great debt of gratitude for this achievement. The President of the United States deserves the highest commendation. Congress can craft solutions of many kinds, but only one person can put a problem on the national agenda. That is what George Bush did with his speech on June 15, 1989. He created the unbeatable momentum which reaches its conclusion today.

Our majority leader, GEORGE MITCHELL deserves tremendous credit for the passage of this legislation. He contributed not only a wealth of substantive ideas to this final product, but used the full force of his office of Senate leader to bring the bill to completion. Without his determination and skill many of the obstacles which have faced this bill would never have been overcome. I would venture to say that anyone who wants to see what kind of leader we have in this body, look at this bill.

My two colleagues from the Environment and Public Works Committee who lead us on the floor and in conference, JOHN CHAFEE and MAX BAUCUS also deserve special commendation. This is a voluminous task, and they did an outstanding job of keeping both the big picture and details in focus. I also want to thank other members of the committee, especially Senators SIMPSON and SYMMS, who were worthy adversaries on some issues, but very important contributors to bringing this process to conclusion.

Mr. President, I want to reserve a special honor in this achievement for the members of the staff who have given their lives to this effort over the last 3 years. Particularly, I want to recognize the work of Mr. Jimmie Powell, of the Senate committee staff. We are greatly blessed in this body by those who bring their talent and their conviction to bear on the Nation's business. In Jimmie's case, he brings an extraordinary intellect and a single-minded devotion to the welfare of people. I cannot fully express my admiration for his contribution and my gratitude on behalf of the people of Minnesota and America for his role in bringing this bill to completion.

Mr. President, we are taking a major step toward a healthier America today with the passage of the 1990 Clean Air Act. All Americans can breathe easier, freer and longer because of this bill.

We have established the toughest acid rain program ever proposed: a 10 million ton reduction in sulfur dioxide. This will mean cleaner lakes and bluer skies. In Minnesota, this has special significance for our lakes, which are much a part of our lives and our heritage. The Boundary Waters Canoe Area, one of the jewels of our national park system, will be protected and remain pristine because of the passage of this bill.

For the first time, we have placed tough national standards on emissions from municipal and commercial incinerators and put strict controls on any emission of 189 toxic air pollutants, compounds that cause cancer in half a million Americans. I am proud to have drafted this section in the Senate bill and to have it in the final bill. This removes a major health threat to Americans. I am hopeful that early next year, in the RCRA reauthorization, we will enact the companion ash and recycling provisions from the Senate bill.

For the first time we have enacted a national program to stop accidential chemical releases like the one that killed 2,000 people in Bhopal, India. We have created a investigative agency to study such releases when they occur, to provide information on how we can prevent recurrences, in much the same way that the National Transportation Safety Board prevents accidents by studying them exhaustively when they do happen.

We require oil companies to remove toxic additives like benzine from gasoline, and replace it with clean fuels like ethanol. That means less smog and a new market for 300 million bushels a year for America's and Minnesota's corn. That means cleaner air for all of us, and a much needed spur to America's rural economy.

We put new controls on urban buses to end diesel soot, which plagues motorists and pedestrians alike.

Mr. President, our consumer society, and the technology that serves it, have created health risks for people. Unlike the sixties, when the threats to the environment were as obvious as a discolored river or a blackened sky, today we face insidious threats. We know now that what you can't see can kill you. This bill puts science and technology back to work for people. We can find ways to produce that do not pollute.

A healthier America should be the goal of each of us. It does not come free or cheap. But what we must remember is that we pay a tremendous price today for dirty air, a price we cannot afford.

Mr. President, I would like to describe in some detail four or five of the provisions in the Clean Air Act Amendments of 1990 on which I have been most directly involved. These are complicated programs and some few words of explanation seem appropriate. I would start with reformulated gasoline.

REFORMULATED GASOLINE

Gasoline is a complicated mixture of about 200 different compounds. The exact mixture of these compounds varies over a wide range by brand and grade of gasoline. The variation in the mixture of gasoline can have an impact on air quality. Some gasoline is cleaner from an air quality perspective than other gasoline.

Motor vehicles contribute a substantial portion of the air pollution in the United States. They emit 40 to 70 percent of the pollutants contributing to ozone nonattainment and 90 percent of the carbon monoxide. Vehicle emissions account for 55 percent of the cancers attributable to air toxics and 25 percent of the global warming gases, a carbon dioxide and methane. All of this pollution begins with the fuel and can be affected by the characteristics of the fuel.

Over the 20-year history of the Clean Air Act most of the regulatory effort has focused on the vehicle itself with requirements for new pollution control technology like the catalytic converter or the evaporative canister system. Very little attention has been paid to fuel quality during that same period. Lead has been phased down because it interferes with the operation of the catalytic converter. In other respects fuels have actually become dirtier in the last 20 years. The octane provided by the lead was replaced with octane from aromatic hydrocarbons which are toxic and have other negative air pollution effects. And the volatility of gasoline has increased dramatically causing increased evaporative emissions.

The bill reported by the committee addressed some fuel quality issues. It banned lead completely. It reduced fuel volatility. It required oxygen additives in carbon monoxide nonattainment areas. And it required detergent additives to prevent deposits in fuel and engine components.

But it is possible to accomplish much more pollution reduction by focusing on the fuel. The most aggressive approach is to require alternative fuels like methanol, ethanol, compressed natural gas and electricity in the most severe nonattainment areas. These fuels would be used in new vehicles designed for that purpose. President Bush proposed an alternative fuels program in his clean air bill. The Senate adopted an alternative fuels program which applied to new cars in nine cities and in fleet vehicles.

A less aggressive, but equally important step, is to clean up the gasoline that is used by the cars which are out

there already. This strategy has come to be called reformulated gasoline. The oil companies became seriously interested in it only after the President proposed an alternative fuels program. For instance, ARCO has begun to sell a reformulated gasoline which it calls EC-1 in southern California. And consumers will see television ads for other brands claiming environmental benefits.

Senator DASCHLE offered an amendment to require reformulated gasoline when the Senate was considering the bill. It was adopted overwhelmingly. The House adopted even stronger provisions. The conferees now return to the Senate with reformulated gasoline provisions that are tough, but workable. They are phased in over a reasonable time period, they provide flexibility for compliance, but they also require steep reductions in hydrocarbon and toxic emissions.

Let me briefly summarize the elements of this program, after discussing the principal health and environmental threats that are posed by gasoline-fueled motor vehicles.

Benzene is a component of gasoline averaging about 2 percent of the volume. It was a smaller portion of gasoline before lead was removed. It is a known human carcinogen. It is the most widely dispersed air toxic causing about 15 percent of the cancers attributable to air toxics. Risks from benzene exposure reach 1 in 1,000 in urban corridors; 50 percent of the mobile source benzene emissions come from benzene in the fuel and 50 percent come from the transformation of other aromatics to benzene when they are burned.

Aromatic compounds are a substantial portion of gasoline fuel. They average 32 percent of the volume but in premium fuels may reach up to 54 percent by volume. Aromatic compounds include benzene, toluene and xylene. All three are air toxics listed in title III of the bill. They contribute to ozone formation with xylene being especially reactive. Fuels high in aromatics cause deposits in the combustion chamber of engines interfering with combustion and increasing emissions. Aromatics have a higher carbon content than the rest of gasoline, so gasoline high in aromatics contributes more to global warming. Aromatics had been only about 20 percent of the fuel in 1970 but percentages have increased substantially because the aromatics have been used to replace the octane that was lost as a result of the lead phasedown. Oxygenate fuels could be used in lieu of aromatics to provide the octane.

Adding oxygen to the fuel improves combustion. The principal benefit is to reduce carbon monoxide formation. But it also reduces the amount of unburned hydrocarbons in the exhaust. And the alcohols and their combustion byproducts are less toxic than the aromatics they would replace as octane enhancers.

Gasoline fuels may also include detergent additives which prevent deposits in the fuel system, in the carburetor or fuel injector and in the combustion chamber. Deposits increase emissions by interfering with combustion. These desposits also reduce fuel economy increasing the cost of transportation to the vehicle owner and increasing CO_2 emissions to the atmosphere.

The reformulated gasoline program included in the conference agreement begins in 1985. It will apply in the nine cities with the worst ozone nonattainment problems that have populations above 250,000. Other cities may elect to join the program at any time beginning in 1995. The Administrator may waive the effective date of the program if there is not sufficient domestic capacity to produce reformulated gasoline to meet the demand in all of the cities that elect to join the program. All of the gasoline sold in the nine worst ozone nonattainment areas and in the cities that elect to participate is to be reformulated gasoline.

There are certain elements of the gasoline formula and its emissions characteristics that will be required for every gallon of reformulated gasoline that is sold. First, it must have a benzene content not exceeding 1 percent volume. Second, the gasoline is to contain no heavy metal additives like lead or manganese. These provisions are included to reduce the toxic emissions from motor fuels and automobile tailpipes.

Third the reformulated gasoline is to have not less than 2 percent oxygen by weight. This requirement can be met by blending gasoline with a variety of additives like ethanol or MTBE. Oxygen in the fuel reduces carbon monoxide emissions and tailpipe emissions of hydrocarbons. The alcohols and ethers which are used to provide oxygen are also relatively nontoxic compared to the other components like lead and aromatics which have been used to increase octane.

Fourth, reformulated gasoline is not to increase emissions of oxides of nitrogen from levels which would have occurred without its use. NO_x, as it is called, contributes to ozone pollution and to acid rain. We don't need a formula for gasoline that addresses one environmental problem while making another worse. That is the reason for the NO_x cap.

Whether a reformulated gasoline causes increased NO_x emissions is to be determined by comparing emissions from a sample of model year 1990 cars burning a baseline gasoline that is specified in the bill and the reformulated gasoline. If NO_x emissions do not occur, than the reformulated gasoline meets the test.

Both aromatics and oxygenates may increase NO_x remissions. The general theory of this reformulated gasoline program is that aromatics will be decreased and oxygenates will be added with offsetting impacts on NO_x emission. Blended properly this theory can be implemented in practice without any increase in NO_x emissions. However, if it turns out to be technically infeasible, the administrator is given authority to adjust the oxygen requirement. Looking at the question of technical feasibility, I would point out that the aromatic content of gasoline can be reduced substantially below the 25 percent level with technically feasible measures. The Administrator is to adjust aromatic levels, first, and to the extent technically feasible before any adjustment to the oxygen requirement in the formula is modified. The aromatics level specified in the bill is a cap not a floor with the level of technically feasible aromatics reductions well below the cap.

In addition to these four elements, the Administrator is also to promulgate a rule that all gasoline sold nationwide, including reformulated gasoline in the nine cities, is to contain an additive or additive package that is effect in preventing deposits in engines and fuel systems. This requirement is to be effective in 1995. Like the requirement for benzene, heavy metals, oxygenates an the cap on NO_x emissions, it is effective year around.

So, that is one element of the reformulated gasoline program—flat requirements that apply year around to every gallon of gasoline sold in the nine cities and the cities that elect to join the program.

A second element of the program imposes performance standards on emissions from vehicles using the gasoline. And there is a complicated system applying any one or a combination of three requirements. The three requirements that are to be considered include an emissions reduction for volatile organic compounds, an emissions reduction for air toxics, and a specific formula for gasoline components.

The VOC reduction requirement is 15 percent in the year 1995. The reduction is measured in the mass of emissions comparing emissions from model year 1990 vehicles burning a baseline gasoline that is specified in the legislation and the same vehicles burning any proposed reformulated gasoline that a refiner, importer or marketer wants to distribute in the nine cities or other cities participating in the program. The VOC reduction requirement is to be increased in the year 2000. The target for that year is a reduction of 25 percent. The Administrator may set a lower level of reduction but not less than 20 percent, if the Administrator determines that 25-percent reduction is infeasible. The Administrator is also to consider larger reductions in VOC emissions for the year 2000 and after. If larger reductions are feasible, taking cost into account, the Administrator is to require them.

Taking cost into account means comparing the cost per ton of the VOC reductions achieved by a reformulated gasoline requirement with the cost per

ton of reduction for other measures which are adopted or planned for the control of VOC's in the nine cities. If reformulated gasoline is within the same range it should certainly be considered cost effective.

The 1995 and 2000 reduction requirements are to be put into place, unless the administrator determines that a reformulated gasoline meeting a formula specified in the bill can achieve greater reduction in the mass of emissions. This comparison needs some explaining because it is a complicated test. The so-called formula gasoline would have a benzene content of 1 percent, an aromatics content of 25 percent, no lead, a detergent additive, and an oxygen content of 2 percent. In other respects, the gasoline is to be the same as the baseline gasoline defined in the bill. If the Administrator determines that this formula gasoline achieves a reduction in VOC emissions of greater than 15 percent in 1995, the Administrator is to require that the formula gasoline be used. That is clear.

But beginning in the year 2000, the Administrator can adjust the VOC performance standard up or down for feasibility. If the formula gasoline gets more than a 20 percent reduction, a reduction of at least the level the formula gasoline can achieve should be specified. It could be a higher level, if some other formula that is feasible achieves greater reductions.

It is unlikely, in my view, that a gasoline meeting the baseline specifications modified to reflect the legislated formula will achieve dramatic VOC reductions. If I am correct the VOC performance standard will be in place beginning in 1995 and after the year 2000, the Administrator will be called upon to select that set of specifications for gasoline which are feasible and which attain the greatest VOC emission reduction, but not less than a 20 percent reduction.

There is a second test here. That is a comparison of the so-called formula gasoline with a toxics performance standard. The standard is similar to the VOC standard, a 15-percent reduction in 1995 and a greater reduction in the year 2000 with a target of 25 percent and authority to adjust up or down for feasibility. This test works independently from the VOC performance standard.

If the Administrator finds that the formula gasoline as specified in the bill gets a greater toxic reduction than 15 percent in 1995, the Administrator is to specify the formula as a component of any reformulated gasoline that is certified. After the year 2000, the Administrator is to select a formula which is feasible and which achieves the greatest reduction in toxic emissions which is achievable.

The bill includes a definition for toxic air pollutants which is the aggregate emissions from a vehicle of five specific pollutants: benzene, butadiene, polycyclic organic matter, acetaldehyde and formaldehyde. If one looks at emissions of these pollutants from cars on the road today, benzene makes up the largest portion of the mass. The so-called formula gasoline which contains a cap on benzene at 1 percent and a cap on aromatics at 25 percent should achieve substantial reductions in the aggregate emissions of the 5 pollutants, probably well beyond the 15-percent standard. If so, the Administrator would require that all reformulated gasoline in the nine worst ozone nonattainment areas with populations above 250,000 would satisfy the formula requirements. And if my reading of the evidence on VOC reductions is correct, this gasoline will also be required to meet a VOC performance standard which requires a 15-percent reduction in emissions.

After the year 2000, the situation is different because the Administrator is to choose the performance standard for toxics which reflects the maximum reduction in toxic emissions that is feasible taking cost into account. The formula gasoline may well achieve a reduction in toxics which exceeds 20 percent, and if so whatever it does achieve would be a floor for the performance standard after the year 2000. In this Senator's view controls on benzene and aromatics more stingent than those in the formula gasoline are certainly feasible, in fact, gasoline sold in the 1970's had lower aromatics and benzene levels. Therefore, one would expect that the toxic performance standard and not the formula would be the controlling requirement after the year 2000.

There is one final complication that needs to be addressed and that is the equivalency provision from the House bill which was adopted by the conference committee. This allows any refiner, blender, importer or marketer to certify a gasoline which meets the flat requirements that apply to every gallon—benzene not greater than 1 percent, oxygen not less than 2 percent, no increase in NO_x emissions and no heavy metals—and also meets the performance standards for VOC and toxic reductions.

As I noted a moment ago, one can foresee a circumstance in which the combination of requirements applicable in 1995 is the formula, rather than a toxics reduction, combined with a VOC reduction. This is likely since the formula gasoline gets little VOC improvement but achieves substantial reductions in benzene emissions. The equivalency provision would allow a refiner or marketer to sell a gasoline other than one meeting the specific formula, if that gasoline achieved greater reductions in toxic emissions than did a formula gasoline and if the alternative gasoline also met the VOC reductions requirement. Looked at from this perspective, the formula becomes a defacto performance standard which between 1995 and 2000 might well be greater than the 15 percent reduction specified in the bill.

Two final points need to be made with respect to this very complicated program. The performance standards and the formula stated explicitly in the legislation are only minimum requirements. Paragraph (1) of the reformulated gasoline provision clearly states that:

> Such regulations shall require the greatest reduction in emissions of ozone forming volatile organic compounds (during the high ozone season) and emissions of toxic air pollutants (during the entire year) achievable through reformulation of conventional gasoline, taking into consideration the cost of achieving such emission reductions, any nonair-quality and other air-quality related health and environmental impacts and energy requirements.

This authority is independent from the formula and the performance standards. Proper implementation of this authority will require the Administrator to look at more than the formula, at the performance standards and the equivalency provision to determine whether additional measures would increase emissions reductions and are achievable.

Finally, this legislation includes credit systems to facilitate compliance in the most cost effective manner. The credit system is a very significant threat to enforcement and may well mean massive noncompliance as we have experienced with other rules applying to the oil and petroleum marketing industries in the past. I have in mind the price and allocation rules of the 1970s. The lead banking rules. And the recent report on compliance with octane labeling requirements. This program would take aggressive enforcement to work in any event, and is made doubly difficult by the credit provisions.

Beyond the fundamental problem, one important ambiquity in the legislation needs to be clarified. Credits can only be earned and used during the periods when requirements are applicable.

As an example, consider Los Angeles which is a nonattainment area for both ozone and carbon monoxide. In that city, an oxygen requirement of 2.7 percent will apply during at least 4 winter months and a level of at least 2 percent will apply during the rest of the year. The credit system cannot be operated in such a way that credits earned for exceeding the 2 percent outside the carbon monoxide season can be used to offset the 2.7 percent requirement during the carbon monoxide season.

Furthermore, offsets must always be in hand before any gallon not in compliance with the oxygen, benzene for aromatics requirements is sold. There is no time period over which the average is determined. Rather, credits must be in hand to offset any fuel sold which is not within the specifications.

MUNICIPAL WASTE COMBUSTION

Mr. President, one of the most difficult issues in this legislation has been the solid waste combustion or munici-

for some other product could be feedstock substitution or reformulation where that was technologically and economically feasible for that product. The ultimate objective is to reduce VOC emissions to the ambient air in nonattainment areas from products where those emission reductions are technologically and economically feasible for a product consistent with the other criteria mentioned in this subsection.

The term "consumer and commercial products" for purposes of this subsection is very broad. Except for some specifically noted items, it includes any substance, product or article of use, consumption, storage, disposal, destruction or decomposition of which results in the release of VOC's. This is inconsistent with OTA's Catching Our Breath study for Congress, which found that industrial solvent use accounts for the largest percentage of total solvent use in nonattainment areas. Accordingly, the substances and products used in industrial processes are to be a high priority for EPA to study and regulate.

Fifth, I am pleased that the title on ozone depleting substances has been resolved to the satisfaction of the Congress, industry, and the environmental organizations that are concerned with this global issue. However, it is important to commend the U.N. environment programme for the groundbreaking work that resulted in the Montreal protocol, an unprecedented environmental treaty that brought the nations of the world together to address ozone protection.

As we embark on passing this CFC and HCFC legislation, we need to understand the international process from which this legislation differs; our first efforts should always be to work within the protocol process, and we need to understand that any example we set for the rest of the world must be technically feasible, scientifically based, economically justified, and environmentally significant.

The CFC phaseout presents a significant challenge to U.S. industry and potential difficulties for the U.S. economy. The commercialization of CFC substitutes is dependent on critical environmental and toxicity testing that is expected to be completed within the next 2 to 5 years. In addition, the phaseout of HCFC's by 2030 could have significant ramifications to the U.S. industries seeking to develop and market these substitutes around the world. Congress needs to be prepared to analyze the progress of the CFC alternatives, since many critical uses will depend on them, such as refrigeration, air conditioning, and medical uses. Many industries such as electronics, defense, automobile, and foam will be dependent on substitutes. Any disruption in the availability of these substitutes could be critically damaging to the environment, U.S. citizens, and the U.S. economy.

It is important that this section be implemented in a manner that recognizes the important role of U.S. industry in developing an effective international solution, and the need to avoid duplicative or overburdensome regulatory initiatives of the Federal, State, and local levels on this matter.

Finally, I add my support to the statement of interpretation of title VI offered by my colleagues from Ohio and Texas, Mr. OXLEY, and Mr. HALL. I believe the Energy and Commerce Committee has done its job in protecting human health while making required reductions cost-effective. Again, I urge the adoption of this conference report.

Mr. LENT. Mr. Speaker, I yield 1 minute to the gentleman from Vermont [Mr. SMITH].

Mr. SMITH of Vermont. Mr. Speaker, I thank the gentleman from New York [Mr. LENT] for yielding, and I rise in support of the Clean Air Act.

Coming from the State of Vermont, which has been a leader consistently in fighting for strong clean air legislation in general and an end to the pollution and the devastation caused by acid rain on our highest peaks and in our upland lakes more specificially, I, as the sole Member of Congress from Vermont, and I know all Vermonters applaud the passage of a clean air bill finally. It is a giant step forward across the board in clean air measures and an especially strong measure when it comes to fighting acid rain.

Mr. DINGELL. Mr. Speaker, I yield 1 minute to the gentleman from Texas [Mr. HALL].

(Mr. HALL of Texas asked and was given permission to revise and extend his remarks.)

Mr. HALL of Texas. Mr. Speaker, the Congress has been swept along on the tide of environmental concerns. I too joined many in the American public and in my own Fourth Congressional District of Texas who feel our next generation should be able to breathe cleaner air.

The 1977 Clean Air Act was an environmental landmark, and has done much to improve the quality of our air—motor vehicles are some 90 percent cleaner than ever before—many utilities have installed scrubbers at great expense. Yet in these amendments we are asking for more.

However, my support of this conference report is not without reservations—it concerns me in many aspects. Primarily because we tried to develop policy, in many instances, around unknown and commercially untried science. Therefore, flexibility must be considered if the technology can not be achieved. We have made no secret that many provisions were crafted to force technology—which may or may not be achievable.

We are asking our business and industrial community to move in uncharted waters—and we are asking them to do so in times of economic uncertainty and facing a recession this country has not had to address for a number of years.

The States of California, New York, New Jersey, Ohio, Texas, California, Connecticut, and Pennsylvania will be the hardest hit. Two Texas counties, Dallas and Harris rank in the top 10 for impact by requirements imposed by this legislation.

As a member of the conference committee, I was particularly concerned about the new requirements of a reformulated gas. I am not at all comfortable that what we have written as a reformulated gas policy will do what we intend. I therefore submit the following statements on what we think the program should be and intends to do by this statute.

Section 219 adds new subsections 211 (k) and (m) to establish a reformulated gasoline program for nine ozone nonattainment cities, and an oxygenated gasoline program for carbon monoxide nonattainment cities at or above 9.5 ppm.

The former program begins on January 1, 1995. The latter begins in the winter of 1992, unless waived by EPA.

Both programs may bring significant health benefits to the large populations in these areas and open new markets to farmers, at modest cost to motorists and with minimal disruptions in the supply of this critical fuel. But to achieve this balance, the Administration must adhere to the following important interpretations of and qualifications to the legislative language.

Many features of these programs were not included in the original House or Senate committee-reported versions of the bill, but were added subsequently, during floor debate. A clear legislative history for the House- and Senate-passed versions of these programs is thus not fully available. In addition, the final version of these programs set out in the conference report differs in many ways from the House- and Senate-passed versions. The following statement explains these differences and provides the legislative intent of the final version.

Cost and energy requirements: The administrator must, in shaping the reformulated gas program, consider in new 211(k)(1) the overall cost of the program's emission reductions and its effects on the Nation's "energy requirements." In particular:

The Administrator has claimed this program will only cost motorists about 4 to 6 cents per gallon extra, and the conferees have relied upon this prediction. In addition, one of the Nation's major energy requirements is an adequate supply of energy at a reasonable cost. Reformulated gasoline thus is not an "at any cost" program, and is not to be administered in a way that results in pump price increases that are significantly in excess of this estimate.

Furthermore, cost is not limited simply to the financial cost of new re-

finery investments and oxygenate producing and handling facilities, presumably spread smoothly over all gallons of the new gas that is produced and sold over a long period of time. Such a total original cost approach might be appropriate for a regulated utility industry, but it is not true for gasoline. Instead, the Administrator must recognize that gasoline is inelastic, and is traded in a deregulated commodity market where supply and demand set retail prices.

Crude oil and fuel markets have repeatedly experienced very large price increases and declines because of very small shortages or gluts. For example, 2 percent or 3 percent crude oil shortages in the two major disruptions of the 1970's doubled and tripled world oil prices. Today's worldwide crude shortage is reportedly only about 1 percent, yet prices have doubled. Similar large, rapid, up-and-down price movements occurred in January and February of this year, due to very modest weather-related shortages and gluts of heating oil, diesel fuel, and propane. In sum, modest physical shortages can easily double consumer fuel prices; worse increases would result from larger shortages.

Gasoline prices in and out of the affected areas are an obvious, unmistakable index of this program's cost. In contrast, estimates of possible future supply or even current physical supply are often uncertain or disputed, and may or may not be correct. Accordingly, this program shall not be carried out in a manner that permits even modest physical shortages of refining and oxygenate capacity, or modest disruptions in deliveries to the nine large ozone areas, if those shortages or disruptions result in unacceptable price hikes to ultimate consumers at the retail pump. This applies to all cost considerations in new 211 (k) and (m).

It is critical for the Administrator to expedite the process of defining acceptable parameters for the new fuel, testing it, and permitting the construction of new refinery capacity to produce it well before the January 1, 1995, deadline. Both the development and the enforcement of this program must recognize that lengthy or repeated refinery reconfigurations or shutdowns can spell unacceptable shortages of both conventional and reformulated gasoline, especially in view of the current record lack of spare refining capacity.

Similarly, in moving from the phase I 1995 standards for VOC's and toxic pollutants to the phase II 2000 standards, refiners may be compelled to make additional major modifications in their manufacturing processes. Typically, such modifications require as many as 5 years to complete. In recognition of this timing factor, the feasibility test and any consequent adjustment in the performance standards under 211(k)(3)(B) should be completed by the Administrator no later than January 1, 1995.

Import dependency is part of the consideration of energy requirements set by 211(k)(1). This program is premised upon domestic refining capacity. Imported reformulated—if it exists at all in 1995 or thereafter—is certainly not banned by 211(k); but EPA should ensure that reliance upon imports for early implementation does not jeopardize the development of adequate domestic facilities.

Mobil toxics: The provisions of section 206, requiring EPA rules barring hazardous air pollutants from motor vehicle fuels effective in May 1995, are not intended to create a second reformulated gasoline that is different from or meets more stringent standards than the gasoline required under 211(k). Nor may such rules conflict with, change, or nullify the antidumping rules under 211(k)(8).

Coverage: The regulations under 211(k)(2) apply to refiners, blenders, importers, and marketers. Some of these terms overlap: For example, some refiners also market their gasoline, and some marketers splash blend ethanol into gasoline, and thus are also blenders.

Baseline vehicles: New 211(k)(2)(A) and other provisions on VOC's, air toxics, and antidumping, require the use of baseline vehicles to fairly compare the emissions of different fuels.

These comparisons will occur at different times and will involve different fuels. For example, the VOC comparison may occur early, in 1992 or 1993, and will examine: First, VOC emissions from the industry's 1990 baseline gasoline; and second, VOC emissions from a specific refiner's proposed reformulated gasoline. The antidumping comparison may occur later, in 1994 for example, and will examine emissions from a specific refiner's 1990 gasoline, and from that same refiner's 1995 conventional gasoline. Enforcement comparisons may occur even later, in the late 1990's.

In all four provisions, the baseline vehicles are intended to be the same: representative model year 1990 vehicles.

Three variables will influence the comparisons: The different fuels; the test cars that burn these fuels; and the varying—and in fact declining—emissions performance of each test car over time.

The intent is that the latter two of these variables always be held constant by EPA, so that for each required comparison, only the two compared fuels vary. This prevents an improper comparison of apples and oranges.

For example, a VOC emissions test may occur in 1991, using 1-year old 1990 vehicles. This may show the required reductions have been achieved, and be the basis for huge investments in new refineries to produce the new gasoline. But years later, in 1994, for example, when the 1990 care are older and dirtier emitters, the new gasoline may fail the test it passed 3 years earlier: Even though it is chemically identical to its successful predecessor, the aging 1990 cars may have changed in unexpected ways—and show only a failing 13 percent reduction on VOC emissions, compared to a successful 16 percent reduction that occurred 3 years earlier in the younger 1990 cars.

Indeed, the use of a mass basis test that compares the percentage difference between emissions from baseline gas and from the proposed reformulated gas, may guarantee failure in subsequent tests using older, dirtier cars: Suppose baseline gas yields 100 mass units of VOC emissions on the young baseline car in 1991, and the reformulated yields 85. This 15 percent gain passes the 211(k) test. But 3 years later, the same absolute difference at a higher level would fail: 120 units and 105 units—solely from the dirtier car—are still 15 units apart, and the reformulated gas is still better, but it is only about 13 percent better.

Accordingly, the baseline vehicle provisions shall be read together with new 211(k)(4)(C) as follows:

Comparing results derived in 1 year from young baseline vehicles with those derived in later years from old baseline cars is unfair. EPA cannot do this.

Each refiner, blender, and importer shall be allowed to lock in on test successfully performed at one point in time with the baseline vehicles, and cannot thereafter have their investments imperiled by different and worse results apparently owing to an aging baseline vehicle fleet.

Chemical identity within reasonable tolerances to a successfully tested fuel is the key; continuing successful tests on an aging and increasingly unpredictable fleet are not.

Representative 1990 MY vehicles are chosen so that EPA need not assemble and maintain, through the 1990's, a much larger fleet of cars somehow representative of all cars—of all model years and makes—on the highways in 1990.

Technically infeasible: As used in the nitrogen oxide cap provision in new 211(k)(2)(A) and elsewhere, this phrase shall be interpreted in a commonsense fashion that considers all aspects of this complex new program. For example, a certain chemical process to limit NO_x may in principle be available; but if it costs $10 billion, or if it requires physical conditions like those on the surface of the sun, it is not technically feasible within the meaning of new 211(k).

Similarly, a cost-effective chemical process may exist on a laboratory or pilot plant scale, but there may not be enough time to scale it up to the full, industrial-scale level that will supply all the needs of the affected cities without a shortage. Or scientific data may be lacking, and may require years to compile. Again, in such a case, compliance would be technically infeasible.

The phrase "technological feasibility" in 211(k)(3)(B) refers to the same commonsense concerns about workability at a reasonable cost and on schedule in the real world.

An appropriate adjustment to the NO_x cap under new 211(k)(2)(A) does not allow the costlier of two different alternatives, because that would not accord with the cost consideration requirement of 211(k)(1). Nor does this adjustment authority allow EPA to in effect rewrite the formula in 211(k)(3)(A) by, for example, an adjustment that completely prohibits any benzene or aromatics. Adjust as used in subparagraph (k)(2)(A) means instead a partial waiver.

Thus, there are several ways to prevent any breach of the NO_x cap, which EPA and refiners may use separately or in combination:

An adjustment, that is, a partial waiver under (k)(2)(A),

An entire waiver under (k)(2)(A),

A waiver under (k)(2)(B), if there is interference with a NAAQ standard, or

A waiver under new 211(m)(3)(A), if the area in question is an overlap area that is subject to both the reformulated and the oxygenated gasoline programs.

Other NO_x cap issues:

The NO_x cap in 211(k)(2)(A) does not require reductions of NO_x.

NO_x cap results on baseline cars may be averaged by EPA. For example, if there are five baseline cars, and three show slight reductions, one shows no change, and one shows a slight increase, EPA may find 211(k)(2)(A) is satisfied. Requiring no increase from any of the vehicles under all operating conditions is a perfect example of how EPA, by extremely demanding test protocols, could in effect convert the NO_x cap into a NO_x reduction requirement. This is not intended.

No rewriting of the minimum performance standards in (3)(B), in any way that makes them more stringent, is allowed under the aegis of NO_x cap adjustments. Only the specified elements of the (3)(A) formula are within EPA's purview here.

Large VOC reductions gained through an oxygen content that also breaks the NO_x cap, cannot subsequently be used as the marker that must be equaled or exceeded under the more stringent of test in 211(k)(3).

A reasonable testing tolerance is expressly provided for oxygen in new 211(k)(2)(B). Under 211(k)(4)(C), EPA must also establish reasonable testing tolerances for all other aspects of this program, to minimize cost and make it workable and verifiable in the real world. EPA is specifically expected to promptly establish such tolerance limits. Similar reasonable tolerances are also intended for the CO program in 211(m).

No equivalency for benzene or oxygen: New 211(k)(2) sets forth the hard and fast features of reformulated gasoline. To be certified under new 211(k)(4)(B), each of the NO_x, oxygen, benzene, and heavy metal provisions in new paragraph (2) must always be satisfied—or waived by their own terms, as in the NO_x, oxygen, and heavy metal provisions.

In addition to these latter three waivers, flexibility is also provided by new paragraph (3), which gives refiners the choice between a formula, in (3)(A), or a performance standard, in (3)(B). The more stringent air toxic provision controls, as does the more stringent VOC—volatile organic compound—provision.

More stringent means the one achieving greater emissions reductions.

A reformulated gasoline may still qualify under (3)(B) even if it has some VOC's and some toxics that increase, compared to baseline gasoline. Aggregate decreases on a mass basis of all toxics and all VOC's are the standard; so a small decline or even a rise in one or two is not disqualifying, if other declines offset them and yield a sufficiently large aggregate decline in emissions.

Equivalency for aromatics: Read together, paragraphs 211(k) (2), (3), and (4) leave open the possibility that a reformulated gasoline may have an aromatics content exceeding 25 percent by volume. But its composition would have to be such, that both its VOC and toxic emissions were equal to or lower than those of a gasoline meeting the formula in (3)(A) or the performance standards in (3)(B).

EPA cannot take advantage of significant variations in physical and chemical properties of the many different kinds of aromatics, to "rig" a formula gasoline under (3)(A) containing an unrepresentative selection of aromatics of unusually low volatility or toxicity.

Multiple categories: Many compounds or types of chemicals noted in new 211(k) are subsets of each other. For example, benzene is an aromatic hydrocarbon, so reductions in benzene—to satisfy the benzene cap—will also count toward required reductions in aromatics and toxics as appropriate.

Benzene is also a VOC and a toxic air pollutant, so benzene reductions in the new gasoline should, for example, to some degree yield lower toxics in evaporative, running, and refueling emissions from baseline cars. Like tailpipe emission reductions, any of these three types of emission reductions—from lower benzene—would all count toward the percentage reductions for VOC's and toxics set by new 211(k)(3)(B).

Heavy metals: Reformulated gasoline may not include a heavy metal additive such as, for example, manganese.

However, under 211(k)(2)(D), the Administrator may waive this prohibition if he determines that a reformulated market-grade gasoline containing the heavy metal additive will not have—when tested on a basis consistent with that originally applied to the certification of reformulated fuel not containing the metal—total emissions of toxic air pollutants, on an aggregate mass or cancer risk basis above those which would be emitted from a reformulated, market-grade gasoline of equivalent octane which did not contain the heavy metal additive.

It would not be proper for EPA, under 211(k)(2)(C), to determine whether a heavy metal such as manganese can be granted a waiver by simply taking a reformulated gasoline and splash-blending the heavy metal additive into it; and it would be erroneous, if the five toxic air pollutant emissions increased in such a test, to then conclude that the heavy metal additive must be prohibited.

Instead, the heavy metal additive is a part of a whole reformulated fuel. It is the fuel in its entirety, not the additives, which must meet the performance standards set by 211(k). Thus, if the heavy metal additive were also an octane enhancer, and backed out aromatics, it might—when added to a regular-grade reformulated fuel—make that fuel a midgrade reformulated fuel. Accordingly, the proper course for EPA is to compare apples with apples, by comparing emissions from a market-grade reformulated fuel containing the heavy metal additive with a reformulated market grade fuel of equivalent octane that does not contain it.

This provision does not provide a substitute test for approval of fuels or fuel additives: The new tests regarding aggregate mass or cancer risk are in addition to other tests set by existing law and the new amendments to the Clean Air Act.

The existing provisions of section 211 of the Clean Air Act which require EPA to find that a fuel or a fuel additive will not cause or contribute to a failure of any emissions control device or system, will continue to be applicable to fuels and fuel additives, including additives containing heavy metals.

The 211(k)(2)(D) ban is aimed against achieving a new reformulated gasoline by the addition in the refining and blending process of new heavy metal additives. The goal is to eliminate existing toxic components of gas, and not replace them with new ones. This focus, and EPA's establishment of reasonable testing tolerances, do not set up a new ban against mere trace amounts of metals at or below levels now in baseline 1990 gasoline, and which originated in the crude oil.

Performance standards: New 211(k)(3)(B) directs the Administrator, in performing the feasibility test, to consider the cost of achieving the prescribed reductions in VOC and and toxic pollutant emissions.

In making this determination, the Administrator should assess whether the tighter phase II performance standards are cost effective, compared to alternatives that are also available

to achieve the needed reductions in emissions if the standards are not tightened. Effects of compliance with the tightened phase II standards on retail gasoline prices in the covered areas must be taken into account.

Certification: EPA must act on a petition for approval of reformulated gasoline within 180 days, in order that large investments in new facilities are not delayed by uncertainty over the proposed fuel's legality. If EPA does not act in that period, the fuel or slate of fuels is deemed certified.

"Slate of fuels" refers to a combination of the typically three grades or octanes of gasolines—premium, midgrade, and regular—and perhaps some specified proportion or relative volumes of them.

The conferees expect that procedures comparable to those under existing 211(f)(4) will apply to certifications under 211(k)(4). Any automatic approval, as a technical matter, can subsequently be nullified by an actual EPA disapproval of the petition.

Such a subsequent reversal could jeopardize large investments that were presumptively legal when made, and could create severe fuel shortages and economic hardships in affected covered areas. Accordingly, such reversals should be rare or nonexistent, and based only on extraordinarily compelling reasons.

With regard to enforcement, any such disapproval can operate only prospectively. A reasonable time period for new compliance measures—new permits, new investment, new construction—must be granted by EPA. Nor can civil penalties under section 211 be assessed in such cases, for sales after the automatic approval and before the new compliance date set after the disapproval.

Enforcement: The intent of new 211(k)(5) is to penalize only the refiner, blender, importer, or marketer who knew or reasonably should have known that:

Its conventional gasoline has been wrongfully represented as reformulated gasoline, and is illegally being sold or will be illegally sold for ultimate consumption in a covered ozone nonattainment zone, or

Its reformulated gasoline which after appropriate crediting or pooling adjustments, does not meet certification standards, is being wrongfully represented as certified reformulated gasoline and is being sold for ultimate consumption in a covered ozone nonattainment zone.

No penalties are intended for any gasoline refiner, blender, importer, or marketer under section 211(d), providing $25,000 per day civil penalties, if the wrongful conduct is taken by another entity beyond their control, or if the conduct at issue involves only wholesales of conventional gasoline intended for ultiamte consumption outside of covered areas.

For example, the following conduct is not a violation:

Refiner A wholesales both conventional and reformulated gasoline to large marketer B, who maintains large terminals in Philadelphia, a covered area. Both A and B are located in Philadelphia, and the wholesales occur there. The two kinds of gas are clearly segregated and separately and accurately marked as "certified reformulated" and "uncertified conventional." B then sells the reformulated gas in the Philadelphia area, and resells the conventional gas outside the covered Philadelphia area.

Though A has sold some uncertified gasoline to B in a covered area, no violation occurs.

Assume the same location and wholesales between refiner A and marketer B, and the same clear marking and branding of shipments. However, B then changes the markings on the uncertified gas, and sells both shipments to jobber C, who B knows makes most of his resales in the Philadelphia area.

Though A was technically covered by earlier versions of 211(k)(5), that language has been changed, and he does not violate the final provision. B has in effect smuggled conventional gas into Philadelphia, and has violated this provision. C has not. But if the markings were amateurish and the switch was obvious, or if C failed to make reasonable advance checks of quality specified by EPA, then C may also have violated this provision.

A similar interpretation applies to the enforcement provisions of new 211(m), which are to be adapted into SIP's so that enforcement standards similar to 211(k)(5) apply to the CO program.

Opt-ins: The basic purpose of new 211(k)(6) is to extend the reformulated gas program to additional areas beyond the nine original covered areas, so long as the Administrator—prior to the effective date of the program in the opt-in cities—is fully assured on three points:

That new demand from the new areas will not stretch limited domestic capacity already dedicated to the 211 (k) and (m) areas, so that those areas experience even slight physical shortages and commensurate steep price hikes;

That domestic supplies will also be adequate to fully handle the new demand in the opt-in areas; and

That refiners have adequate advance notice of increased demand created by opt-in areas, to efficiently plan, finance, gain offsets for, gain permits for, and construct the required new capacity.

Credits in general: Three different crediting programs—also referred to as "pooling" or "trading" programs—are established under new subsections 211 (k) and (m):

One for oxygen, aromatics, and benzene in reformulated gasoline, under 211(k)(7);

One for antidumping rules covering nonreformulated gasoline, under 211(k)(8); and

One for oxygen in oxygenated gasoline, in 211(m)(5).

The first and the third crediting programs operate only within a specific ozone or carbon monoxide nonattainment area. The second one applies outside of those areas and covers all of a given company's output nationwide.

To the maximum practicable extent, the Administrator should operate them in a similar fashion to minimize complexities and costs.

The overall goal, as with other trading programs in the Clean Air Act Amendments of 1990, is to permit an aggregate least-cost solution that, for example, allows the cheapest oxygen suppliers or the cheapest aromatics reducers to overachieve and handle a disproportionate share of the total burden. Less efficient competitors can buy credits and thus contract out some of the work to their more efficient brethren. Lower consumer prices are the result.

Similarly, low octane grades of one refiner's gasoline may overachieve on aromatics reductions, to offset excesses from other grades; or one of a company's three refineries may overachieve with respect to benzene or oxygen. In each case, pooling is allowed.

Averaging over time: In each of the three crediting/pooling programs, EPA must set a reasonable time period over which average specifications can be met. It could be the winter season in the oxygenated program, or a 3-month quarterly period in the reformulated program. It should not be so short—that is, a single day, hour, or minute—that averaging over time becomes impossible for mechanical or measuring reasons, or that unreasonable limits on supply flexibility and cost savings are forced on refiners, blenders, or importers.

Averaging within a company, or pooling: In view of the chemical differences among different grades and octanes of gasoline, from premium to regular, EPA is also directed to give refiners, blenders, and importers maximum reasonable flexibility to pool under 211(k)(7) on an intercompany basis. It would be impermissible for EPA to deny pooling rights to a refiner in the following case:

Refiner A has a premium reformulated with 2.0 percent benzene, a midgrade with 0.6 percent benzene, and a regular with 0.4 percent benzene. Each grade made up one-third of A's volume of sales in the same period last year, and is projected to do the same again in the coming year. Pooled together, A's gasoline meets 211(k)'s requirement. But if sales of premium turn out to be larger than expected, EPA can require greater offsetting reductions in the immediately following period.

To ease enforcement burdens, EPA could insist on checking credited vol-

umes and weights for each company at the refinery gate, the point of importation, or the point of blending.

Continuous, universal physical testing by EPA to determine that pooling complies with 211 (k) or (m) is not contemplated. Instead, refiners, blenders, and importers are expected to conduct appropriate compliance tests periodically, and maintain records suitable for EPA to fully enforce compliance. And EPA may of course go behind these records, and engage in fuller audits if it chooses.

Intracompany pooling procedures established under the certification process—for example, to allow high aromatic levels for premium with lower offsetting levels for regular—would supercede any more formal crediting procedures set up by EPA.

Many refiners may properly prefer the more informal, intracompany pooling approach; in part, this results from the obstacles that may hamper larger, EPA-regulated intercompany credit programs, which may well entail greater bureaucratic and logistic difficulties. That is why the credit programs are not mandatory, and cannot be imposed on unwilling companies. In contrast, intracompany pooling shall be allowed by EPA to any company affirmatively seeking it.

Averaging between or among companies is nevertheless permissible, and could allow variations on the following example: Refiners A and B each supply half the reformulated gasoline in a covered area. A's weighted average benzene content in the second quarter of 1996 is 1.5 percent and B's is 0.5 percent. With trading, that area's benzene content meets 211(k)'s requirement.

However, only a joint certification of both refiner's gasolines together could render legal the 1.5 percent benzene content of A's gasoline. In such a case, EPA's certification could require guarantees that B continue to supply the same covered area as A; and both companies' fuels together would be viewed as the slate of fuel certified under 211(k)(5).

Credit standard: The phrase "that would occur in the absence of such credits" as used in the three clauses of 211(k)(7)(C), refers to the aromatic, oxygen, or benzene content specified for a nonattainment area under 211(k). It means the use of pooling or credits is not allowed to change the aggregate levels of these three components of gasoline in a given area, from what they would be in that area if each single gallon exactly met 211(k)'s requirements. It does not require or allow EPA to guess what each company might do if no pooling or crediting were allowed.

Antidumping credits and rules: By nature, this program is company specific. Averaging over a certain time—quarterly, for example—and within a given company—among a single company's three different refineries, for example—is allowed.

The purpose of new 211(k)(8) is to prevent a specific company's actual post-1994 conventional gasoline from having greater emissions than that same company's actual 1990 gasoline—or the equivalent, subject to reasonable test tolerances.

Each refiner, blender, and importer is allowed to collect and compile data regarding its 1990 gasoline, and commercial data used by each such company in the ordinary course of business, and showing the identity of its suppliers, the grades of products purchased or sold, and related volumes and dates, would satisfy this provision.

In the event of inadequate and unreliable data, a substitution of baseline gasoline for actual 1990 gasoline would occur only for the specific refiner, blender, or importer with a data deficiency.

Fair tests in baseline cars are required.

This provision does not require—or provide authority for EPA to require—the reformulation of any gasoline sold outside of covered areas, and 211(k)(8)(C) is not to be construed in a way that would require such a reformulation.

Summertime baseline gasoline is as specified in (10)(B)(i). This does not indicate precisely which of the many different aromatics, olefins, and saturates are to be included in the baseline. But EPA should not "rig" or "game" the resulting baseline gasoline by selecting unrepresentative sets of these different compounds that are of unusually low volatility or toxicity.

Wintertime baseline gasoline means the average 1990 wintertime gasoline. This means gasoline sold during the first few months of 1990—in the winter—and during the last month or two of 1990—in the winter; but if split up data of this sort is unavailable, EPA can use either 1989–90 or 1990–91 data. Expedition favors the former. A nationally representative sample is required.

Harmonization: Title II does not contemplate a proliferation of new reformulated gasolines in the same State or nonattainment zone. Thus, if California, under section 249(c)(2), prescribes a more stringent or different reformulated gasoline, and requires it to be produced, distributed, and made available in California, then that prescription and requirement shall apply in California instead of the 211(k) program.

In opt-in States, the intent is that EPA shall by rule ensure that any control or prohibition respecting reformulated gasoline shall be consistent with the 211(k) requirements, the section 246 requirements respecting fleet programs, and the section 249 requirements respecting the California pilot program.

Such regulations shall ensure that no more than one prohibition or requirement respecting reformulated gasoline will apply in any area, and shall provide maximum air quality benefit consistent with technical feasibility, cost, and domestic supply and distribution capacity.

Oxygenated gasoline—covered areas: Approximately 40 areas are covered by new 211(m)(1), ranging from Los Angeles and Denver with 1988–89 carbon monoxide design values of 23.4 and 16.2, down to the relatively cleaner but still covered areas with 1988–89 design values of 9.5 ppm or more. The 1988–89 design values should use 1988–89 monitoring data to establish which areas are included in the program.

Waivers under 211(m) may however reduce this total number of areas.

Enforcement: Like 211(k)(5), new 211(m)(2) does not ban perfectly lawful and routine wholesales of unoxygenated gasoline—where the selling refiner, the sale, or the buyer are within a covered area—so long as that gasoline is intended for and does move to areas outside of the covered area, where retail sales of unoxygenated gasoline are routine and perfectly legal.

Broader literal readings of the word "any" in the phrase "any gasoline sold," or the word "indirectly" in the phrase "sold or dispensed directly or indirectly" are impermissible.

Such a reading would only cut off the wholesale fuels trade in major American port cities such as Houston, New York, Los Angeles, and Philadelphia, since many fuel dealers in these cities will supply both these cities and many other areas farther inland. A ban on any handling of unoxygenated fuel by these deals would, by reason of their status as dual suppliers to both types of areas, impose a de facto embargo on fuel shipments to uncovered inland areas where unoxygenated gasoline remains perfectly legal after late 1992. No such result is allowed.

Overlaps, types of oxygenates: The winter oxygenate requirement of 2.7 percent in 211(m)(2) overrides the lower 2.0 percent requirement under 211(k), in those cities which are subject to overlapping reformulated and oxygenated programs. But in such overlaps, all oxygen waivers under 211(k) remain available and effective, since the oxygenated gasoline in these cities is technically reformulated gasoline.

The level of 2.7 percent was chosen in part to provide more even opportunities for competition between the two major oxygenates, methyl tertiary butyl ether [MTBE], and ethyl alcohol [ethanol].

Both these oxygenates have been shown to be effective in lowering CO emissions from motor vehicles. Precisely how this occurs is complex, but is primarily related to the enleanment of the air-to-fuel ratio caused by the oxygen content of the fuel.

Other factors affecting the potential reduction of carbon monoxide involve the process by which the oxygenate is added to the finished fuel, which differs for the two major oxygenates:

MTBE is added exclusively at gasoline refining facilities, where the finished fuel may be adjusted to accommodate the blending properties of this ether. This process may result in a reduction in the finished gasoline of aromatic components which are major contributors to incomplete combustion and emissions of CO. If this reduction in CO emissions occurs, it is additive to the effects of the addition of oxygenate.

Ethanol is instead usually added to oxygenless gasoline at a gasoline terminal facility in the market area, possibly far downstream from the refinery area. The addition may occur directly in the tank wagon as gasoline is being loaded. This method may not gain the additive benefits of extra CO emission reductions achieved when oxygenate is blended in a refinery facility where further adjustments are also made to the other components of the gasoline.

Ethyl tertiary butyl ether, or ETBE, is another oxygenate that may meet the requirements of 211 (k) and (m). Others may be developed.

The Administrator may not discriminate among these different oxygenates, and should encourage fair competition among them. As long as the percentage of weight requirement is met, and other requirements of new 211 (k) and (m) are satisifed, any oxygenate should be allowed to satisfy new U.S. needs.

However, EPA must consider the different handling and transportation needs of different oxygenates, and the problems that can result if they are commingled, because these factors will bear on the adequacy of distribution capacity to, and supply in, end user markets.

Commingling of MTBE gasoline with oxygenless gasoline intended to be blended with ethanol can for example create excessive levels of oxygen, if and when ethanol is erroneously added to the already oxygen-rich MTBE gas, and produce a fuel that may violate specifications. Or ethanol, which unlike gasoline has an affinity for water, may be introduced erroneously into gasoline pipelines or storage tanks containing some water at the bottom; such tanks and pipes are adequate for MTBE blended gasoline, but may need dewatering before they can hold gasohol or ethanol.

These potential problems may require segregation of these two oxygenates and the gaoslines containing them, but of course do not disqualify either oxygenate.

Duration of winter: The legal effect of three phrases in the language of 211(m)(2)—"the portion of the year," "not less than 4 months," and "may reduce the period"—is to give EPA discretionary authority to set variable winter periods for different cities, during which oxygenated gasoline is required. Health hazards from CO, weather effects, and CO emissions with and without the required oxygenated gasoline all bear on EPA's decision here.

Stationary source waiver: The word "significantly" was added because mobile sources of CO will always contribute to some extent to nonattainment. But if the major cause of CO in a given area is stationary sources, the oxygenated gasoline program shall be waived.

Waivers for lack of distribution or supply capacity: EPA shall consider all relevant factors, including current and projected gasoline prices within and without covered CO areas in granting waivers under 211(m)(3)(C).

Though this provision refers to inadequate "supply" or "capacity," estimating the logistics and thus the ultimate capacity of a complex and interconnected system of oxygenate plants, refineries, railroad tank cars for ethanol and ethers, pipelines for blended gasolines, storage tanks, and blending facilities may be difficult. Moreover, a given capacity may be adequate in a period of low demand, but inadequate during higher demand.

To illustrate, there is disagreement today between two expert Government agencies—the Energy Information Administration and the International Energy Agency—on the fundamental question of whether there is any shortage of crude oil worldwide at present, with one of the agencies inexplicably contending there is no shortage even though crude oil prices have doubled in 2 months. The fungibility of oil, an inability to track movement of specific shipments through the distribution system, lack of real-time data on all levels of storage, and the constant influence of price on volumes supplied, all complicate this process.

Moreover, as noted earlier in 1, a tiny error of overestimation by EPA can result in very large price increases.

Accordingly, EPA should make its best advance estimate on this issue; but it should also carefuly watch cash and futures oxygenated gasoline prices, and be ready to reverse an earlier estimate of adequate capacity that proves, in the real world of market prices, to be inaccurate.

As a technical matter, there is never a shortage in a decontrolled commodity market. EPA is directed to disregard this technical reality, and focus instead on a real world meaning that includes fuel shortages and high prices.

Comprehensive EPA approach: When considering waiver petitions under 211(m)(3)(C), EPA shall—

Determine the demand for oxygenates in each covered area,

Determine the expected domestic production capacity for oxygenates likely to be available at least 3 months prior to the effective date of this provision,

Determine the necessary logistics to supply oxygenates to and within the covered areas,

Determine the minimum time requirements for the necessary supply and distribution infrastructure to be made available for each covered area,

Evaluate the demand for oxygenates outside of the covered area, and determine the effects requiring oxygen in the covered areas will have on areas currently served by oxygenates—seeking to avoid reallocation of existing supplies of oxygenate to the greatest possible extent,

Evaluate competition among covered and noncovered areas for available supplies of oxygenates, and competition's likely effect on the availability and cost of oxygenates in these areas,

Provide for a reasonable margin of safety in its estimates of supply to minimize the chances of supply shortages in covered areas,

Evaluate and seek to prevent any economically wasteful or irrational actions which may be associated with an early effective date in any covered area, such as for example, the construction of oxygenate storage tanks that will be used only in their first year because rising future oxygenate production could satisfy area demands without any storage,

Consider how much savings could be effected by delaying the early effective date in the case of such waste,

Establish a list of priority covered areas based upon their serverity of nonattainment and the role of motor vehicles in contributing to the area's nonattainment status,

Publish a list of areas to be covered each year in sufficient time to assure the availability of necessary infrastructure by the effective date, and provide for reconsideration on an areawide basis if supply shortages or infrastructure delays prevent or are likely to prevent compliance by the effective date.

No partial waivers: Too many logistic and refinery reconfiguration problems may arise if partial waivers allowing weaker oxygen concentrations, partial geographic areas, or shorter periods are granted. Section 211(m)(3)(C)(ii) bans such partial waivers to retain a balance between workability and advance certainty for suppliers.

In particular, new 211 (k) and (m) already create several new kinds of gasoline, and different oxygen concentrations may already exist under the various NO_x cap provisions of these two subsections. Further balkanizing of the gasoline industry—with different O_2 concentrations in different east coast cities, for example—potentially risks further disruptions and more individualized precision from refiners, which may not be possible. Segregating a great many individually-tailored blends will also be more difficult for the pipeline and terminal segments of the industry. The Colonial Pipeline, which serves 6 of the 40 areas, would be more prone to bottlenecks, for the given shipment might be legal in only some or one of those cities.

EPA is not bound to continue a misestimate of adequate capacity by this clause: If, for example, a price spike in midwinter indicates a shortage, a waiver under clause (i) can then be granted; such a waiver is not an impermissible partial delay or lesser waiver under clause (ii).

Other O_2 waivers: Analogously, EPA should also avoid a proliferation of too many different O_2 levels when it grants partial oxygen content waivers, to solve NO_x cap or NAAQS problems under other provisions of 211 (k) and (m).

"Distribution capacity," as used in 211(m)(3)(C), includes everything needed to get to the final pump, that is, interstate transportation, local distribution, storage, trucks, blending facilities, and so on.

Other exemptions: Neither 211(k) nor 211(m) allows EPA to grant waivers or exemptions to only a specified subset or class of refiner, blender, importer, or marketer. Rules or orders of general or particular applicability that in effect return to a scheme of preferential regulatory status for small or large refiners, for example, are not allowed.

No return to oil price and allocation controls: EPA must not, in administering the oxygenated and reformulated gasoline programs, reinvent oil price and allocation controls like those administered by the Department of Energy in the 1970's.

By its decisions on permits for MTBE plants and new refinery units and related offsets, capacity waivers, technical feasibility determinations, enforcement interpretations, and so on, EPA may force costly, lengthy compliance efforts on all segments of the gasoline refining and marketing industry.

Ill-considered regulatory decisions can create delays, and in turn, restrict supplies or certified reformulated and certified oxygenated gasoline. Delays for any reason could thus give EPA restrictive control over gasoline supplies to many of the largest American markets.

Control over supply means control over price. EPA must be sensitive to this danger: New 211 (k) and (m) do not intend to resurrect a 1970's DOE type scheme of detailed Government intervention in U.S. gasoline markets. An approach of this sort would be especially unacceptable, in view of the fact that DOE's restrictions artificially lowered prices, whereas EPA restrictions on supply would artificially raise them.

Imports: New 211(m)(3) refers to "domestic supply" because imports may be unavailable, unreliable, or highly priced. While world supplies are growing, so is world demand; foreign suppliers may not wish to disrupt existing contract relationships with foreign buyers by making spot sales to the United States; and higher world prices may boost domestic prices, as routinely happens with crude oil.

In any event, reliance on imported oxygenates or reformulated gasoline may simply trade one type of fuel import dependency for another. New 211 (k) an (m) do not prohibit such imports or raise their price; but EPA, in making planning and waiver decisons, must not count on imports to fill apparent domestic gaps.

Attainment areas: Under 211(m)(6), EPA has authority to adjust the scope, extent, oxygen concentration, duration, and geographic coverage of a 211(m) program in a previously covered area that reaches attainment. The phrase "to the extent" has been added at the end of paragraph (6) to indicate that attainment does not end completely the need for an oxygenated fuels program—since that might push the area back into nonattainment. However, attainment may mean that the oxygenated fuels program can be eased, or made smaller or shorter in some sensible fashion.

Reports: EPA is to report to Congress well in advance if problems develop in either the 211 (k) or (m) programs.

Just in Texas alone, we are talking about tripling the staff of the Texas Air Quality Board just to do the duplicative permitting process alone. The permit fees themselves will be $25 per ton and Texas businessmen will pay $40 to $50 millilion dollars per year as a result of new permit requirements. Almost 7 percent of our work force will be used just to comply with these requirements.

Because of fierce competition internationally and the additional burden this legislation will impose on our businesses to the tune of $30 to $50 million per year, the National Association of Manufacturers does not feel they can support this conference report.

In the acid deposition control title, the conference added a provision concerning information on carbon dioxide emissions monitoring from utility plants. This will allow utilities to satisfy the requirements by performing calculations using monitoring data from fuel sampling or fuel analyses.

Under title IV, acid deposition control, section 405(g) addresses those utility units in progress and for which second phase allowances are issued in amounts as designated under the available options.

Permanent allowances will be issued starting with the second phase for units listed as eligible units in progress unless the unit exercises other option provisions to receive allowances. The permanent allowances issued under any provision of section 405(g) shall be treated as are any other allowances for purposes under the act including holding, using, purchasing, trading, pooling, selling, auctioning, transferring, banking, and other uses. These allowances shall not be subject to the reallocation, reduction or redistribution mechanisms in this title. Units issued allowances under this subsection shall not exceed that annual sulfur dioxide tonnage emission limitation unless the owner or operator holds for use additional allowances equal to the amount of emissions over the initial allocation.

This act requires the Environmental Protection Agency to perform a study and to report to Congress by January 1, 1994, on the economic and environmental consequences of trading sulfur dioxide allowances for nitrogen dioxide allowances. However, because of the environmental benefits of nitrogen oxide reductions in certain urban areas as well as in rural areas, the Administrator should prepare to institute a trading system allowing nitrogen oxide emission reductions to be traded for sulfur dioxide allowances. This trading mechanism should be instituted by rulemakings as soon as the study shows, as expected, that there is no harm from such trades and that encouraging reductions in nitrogen oxides emissions from facilities could be beneficial. If the press of other requirements should delay the completion of such a report to the Congress, and barring any definitive scientific evidence to the contrary, then the Administrator should institute such a trading mechanism for nitrogen oxide emission reductions in exchange for sulfur dioxide allowances.

While there is evidence that nitrogen oxide reductions in certain ozone nonattainment areas would worsen the ambient air levels of ozone, in other urban and rural areas the decrease of nitrogen oxides would be of benefit in decreasing the potential for acid rain. In fact, the decrease of nitrogen oxides would be as beneficial as a decrease in sulfur dioxide emissions into the atmosphere. The flexibility to achieve the least-cost reductions in emissions of acidic pollutants should be encouraged and provided for by the Administrator. The nitrogen oxide emission reductions in exchange for sulfur dioxide allowances can be accomplished by a mechanism which the Administrator can establish in rulemaking, and which will benefit not only the environment but also provide an incentive to make these reductions.

Mr. Speaker, the conference committee has worked very hard to devise a tough, fair, and workable compromise concerning the further regulation of ozone depleting compounds and protection of the ozone layer. Nevertheless, I would like to stress that industries which rely on these chemicals have already been motivated by established incentives to phase out of their use of these chemicals on the most rapid timetables possible.

The Montreal protocol has been recently renegotiated to toughen the phasedown and eventual phaseout of these chemicals. Industry, which has been overwhelmingly supportive of the Montreal protocol, has been preparing for the termination of CFC production by the year 2000 well

before this legislation addressed a phaseout.

In addition, CFC recovery and recycling has been motivated by the need to prohibit venting, the increased cost of the CFC's, and the need to keep an existing supply of CFC's available to service and maintain existing equipment that will rely on CFC's beyond a phaseout. Both the automobile and the air conditioning and refrigeration industries have made substantial progress on their own to prepare an infrastructure and a marketplace for recycled CFC rerigerants. While much recovery and recycling is occuring today, these industries are already prepared for the requirements in this legislation.

While we are concerned about ozone depletion, we must be cautious that this legislation does not prematurely accelerate the phaseout of substitute compounds such as HCFC's, which the legislation addresses. I understand that scientists agree that the HCFC compounds may be used well into the next century without additional impact on the ozone layer. In fact, I understand that these HCFC's are a necessary transitional compound that will make the phaseout of CFC's possible by 2000.

I wish to make it clear that while this Congress has spoken in regard to the elimination of HCFCs, industry has our assurance that notwithstanding new and compelling scientific data proving that their use is far more detrimental to the ozone layer than earlier believed, HCFC production will not be frozen before 2015; and HCFC production will not be eliminated before 2030. Any acceleration of these established dates without scientific justification will disadvantage industries which are relying on the timetables we set into law today.

Investment in HCFC production and technology is crucial if the world is to be successful in eliminating CFC use. Passage of this law today sends a clear message to industry that HCFC investments are worthwhile and economically justified.

SECTION 701—PART B REPEAL

The conference substitute adopts the Senate proposal to create a new title VI of the Clean Air Act to address "Stratospheric Ozone Protection."

SECTION 702—STRATOSPHERIC OZONE PROTECTION

The conference substitute adopts the Senate approach and, as explained below, combines the Senate and House proposals.

DEFINITIONS—NEW SECTION 601

The conference substitute includes definitions of: appliance (combining the Senate and House proposals; baseline year (modeled after the House proposal); class I substance and class II substance (modeled after the House proposal); Commissioner (from House proposal); consumption (modeled after the Montreal Protocol); import (from the Senate bill); medical device (combining the Senate and House proposals); ozone-depletion potential (from the House proposal); and produce, produced, and production (combining the Senate and House proposals).

Controlling and ultimately eliminating the production of ozone-depleting substances is one of the key features of this new title. Therefore, the definition of "production" is extremely important.

The Senate bill, the House amendment and the conference substitute define "production" to exclude the manufacture of a controlled substance that is recycled or reused. This provision is designed to avoid the problem of double counting, i.e. forcing a producer to use production allowances when the producer is simply reprocessing a previously produced and used substance.

This provision is also designed to allow reprocessing of previously, legally produced substances after the ultimate phaseout date for production of such substances. This provision does not, however, exclude from the production controls and ultimate prohibitions a substance that is produced with the intent to eventually reuse or recycle it. All new production falls outside the scope of the "reuse/recycle" exclusion.

The manufacture of substances that are "used and entirely consumed" in the manufacture of other chemicals (or the regeneration of chemical catalysts) is also excluded from the definition of "production". This provision is necessary because some of the substances covered by this new title are feedstocks for other important substances.

The conference substitute includes a technical correction to this provision of the original Senate and House proposals. The requirement that the controlled substance be "entirely consumed" is qualified by adding the parenthetical "except for trace quantities". This modification is designed to allow for the fact that, as a result of certain chemical and physical properties, nothing is "entirely consumed."

The conference substitute does not include a requirement to construe the term "production" in a manner consistent with the Protocol because the Protocol has not yet approved destruction technologies for purposes of subtracting from the production allocation. In the course of implementing this Act, however, EPA shall consider whether an exclusion will be allowed on a case-by-case basis for the manufacture of controlled substances that are (1) not manufactured for commercial purposes; (2) coincidental, unavoidable byproducts of a manufacturing process; or (3) contained and subsequently destroyed using maximum available control technologies. When the Protocol parties have approved destruction technologies, the Administrator shall take these into account and ensure that adequate safeguards exist to preclude abuse.

The conference substitute's definition of the "Montreal Protocol" includes a reference to "amendments that have entered into force." This reference includes all such amendments, not just those that the United States has ratified.

LISTING OF CLASS I AND CLASS II SUBSTANCE—NEW SECTION 602

The substitute adopts the House amendment terminology regarding "class I and class II substance" and combines the balance of the two proposals. The minimum lists of compounds are expanded to include a number of CFCs and HCFCs that were added to the Montreal Protocol after Senate and House consideration of the legislation. The substitute also establishes a threshold ozone depletion factor of 0.2 for compounds to be listed as a class I substance. Compounds below this ODF would require the consideration of other factors by the Administrator, such as significant volume, before they should be considered for listing as class I compounds.

MONITORING AND REPORTING REQUIREMENTS—NEW SECTION 603

On a quarterly basis, or such other basis (not less than annually) as determined by the Administrator, each person who produced, imported or exported a class I or class II substance during the previous reporting period is required to file a report with EPA setting forth the amount that such person produced, imported, or exported. EPA is also authorized to use whatever information gathering authority is available in order to collect in a timely fashion the initial baseline reports necessary for establishing the production and consumption rules required by the Act.

The requirement that EPA's amended regulation shall conform to the requirements of this section does not limit EPA's authority to require additional or more detailed reporting than that required by this section. EPA's current regulations, as provided in new section 193 of title I of the Act, as added by this Act, will remain in effect until modified.

The conference substitue combines the Senate and House proposals for EPA, NASA and NOAA monitoring and reporting to Congress requirements, including the Senate proposals for a technology status report (to be submitted not later than 2015 as opposed to the original Senate date of 2010) and an emergency report regarding atmospheric chlorine loading that is projected to occur as a result of global production, consumption and use of class II substances. The reports by EPA, NASA, and NOAA should also take into account the degree to which global compliance or non-compliance with the Montreal Protocol is affecting or altering the base case scenario.

PHASEOUT OF PRODUCTION AND CONSUMPTION OF CLASS I SUBSTANCES—NEW SECTION 604

Effective January 1 of each year starting with 1991, it shall be unlawful for any person to produce any class I substance in an annual quantity greater than the relevant percentage specified in Table 2. The percentages in Table 2 refer to a maximum allowable production as a percentage of the quantity of the substance produced by such person in the baseline year (1989 for carbon tetrachloride and methyl chloroform, and 1986 for CFCs and halons).

The schedule set forth in Table 2 of the conference substitute is subject to acceleration by the Administrator under new section 606 (Accelerated Schedule).

The Montreal Protocol subjects "consumption" to the same controls and reduction schedule as applies to "production." The conference substitute includes this aspect of the Protocol and directs the Administrator to promulgate regulations to insure that the consumption of Class I substances in the United States is controlled and eliminated on the same schedule as provided in this title for production and in a manner consistent with the term as defined by the Protocol, which is, 'consumption = production + imports − exports'.

The substitute prohibits production of all class I substances (other than methyl chloroform) as of January 1, 2000, and prohibits production of methyl chloroform as of January 1, 2002. The Administrator is authorized on a conditional basis to grant specified limited extensions of the termination date for production of limited quantities of class I substances, to the extent such action is consistent with the Montreal Protocol, for: essential uses of methyl chloroform (between January 1, 2002 and January 1, 2005); medical devices; fire suppression or explo-

sion prevention on the North Slope of Alaska (solely with respect to halons between January 1, 2000 and January 1, 2005), and export to developing countries.

EPA should authorize the limited production of such applications unless it is able to determine that safe and effective substitutes are available, taking into account the effects of available substitutes on health and safety, the technological adequacy of substitutes, and other relevant factors.

The methyl chloroform extension is necessary for national security, electronics applications, transportation and building safety and other important applications where factors such as nonflammability are important (e.g., certain contact bond adhesives) and adequate substitutes have not been identified. The Administrator is also expected to examine whether safe and effective substitutes for methyl chloroform will be available for purposes of airline safety by the year 2005 and to report to Congress.

The granting of any extension under this title must be in accordance and consistent with the Montreal Protocol. If the Protocol does not authorize the extension being sought, the provision of the Protocol takes precedence and no such extension may be granted by the Administrator.

Any failure of the Administrator to promulgate regulations as required by this title, or any court order delaying the effective date of such regulations, shall not alter the effective dates of the statutory requirements and prohibitions that are set forth in this title.

It has been suggested that, with respect to the 1991 control period, there is insignificant time for EPA to complete a notice and comment rulemaking and that, notwithstanding the self-effectuating nature of the statutory requirement to reduce production in 1991, regulations are necessary to implement the "consumption" controls and would be helpful with respect to the "production" controls. It is expected that, solely with respect to the 1991 control period, existing EPA regulations will be revised by direct final rule. Such revised regulations should add baseline allocations for the chemicals not already regulated and require the 15 percent reduction where applicable to class I compounds. This will leave the original allocation and trading provisions in place until revised in accordance with this Act.

PHASEOUT OF PRODUCTION AND CONSUMPTION OF CLASS II SUBSTANCES—NEW SECTION 605

The Senate statement of national policy is modified, restated as "the purpose of Congress", and included in new section 603 (Monitoring and Reporting).

Effective January 1, 2015, production of any class II substance must be frozen at baseline levels (to be established by the Administrator) and the use of any such substance shall be unlawful unless such substance (1) has been used, recovered and recyled, (2) is used and entirely consumed (except for trace quantities) in the production of other chemicals, or (3) is used as a refrigerant in appliances manufactured prior to January 1, 2020. Effective January 1, 2030, it shall be unlawful to produce any quantity of a class II substance.

As with class I substances, the Administrator is directed to promulgate regulations to control and eliminate "consumption" (consistent with the definition in the Protocol) of class II substances and, on a conditional basis, is authorized to grant limited exceptions for purposes of use in medical devices and for export to developing countries in accordance with the Montreal Protocol.

ACCELERATED SCHEDULE—NEW SECTION 606

A combination of the Senate and House proposals is included in the conference substitute. The control schedules under sections 604 and 605 are subject to acceleration under circumstances that are defined.

EXCHANGE AUTHORITY—NEW SECTION 607

Subsection (a) of this section of the conference substitute requires the Administrator to issue allowances for class I and class II substances and requirements for transfers of these allowances. It is expected that these rules will be promulgated consistent with the production and consumption rules required under sections 604 and 605. Also, since there are no regulations required on class II compounds, it is not expected that the Administrator will promulgate production allowances for class II compounds until such time as would be required under this Act, subject to any acceleration of the phaseout of production under section 606.

The Administrator is also directed to promulgate regulations that will authorize interpollutant transfers, as in the Senate bill, and trades with other persons, as in the House amendment.

Interpollutant transfers are limited to transfers among substances listed in the same group under new section 602. This precludes, for example, the ability of a producer to avoid mandated reductions in the production of methyl chloroform in exchange for making greater reductions than is otherwise required in CFC-11 production.

The same limitation applies to trades with other persons.

NATIONAL EMISSION REDUCTION PROGRAM—NEW SECTION 608

Prior to January 1, 1992, EPA must promulgate regulations establishing standards and requirements regarding the use and disposal of class I substances during the service, repair, or disposal of appliances and industrial process refrigeration. Such standards and requirements shall become effective not later than July 1, 1992.

Within 4 years after enactment, the Administrator must promulgate regulations regarding the use and disposal of all class II substances as well as all class I uses and disposal practices that are not covered by the earlier regulations. Such regulations shall become effective not later than 12 months after promulgation.

In promulgating regulations for these uses the Administrator shall take into account the extent to which emissions reductions can be achieved, the costs and benefits of implementing available controls, and the time before which certain uses may no longer rely on the covered substances. Also, the regulations which are required to take effect 60 months from the date of enactment may still impose deadlines beyond the 60 month timeframe.

The use and disposal regulations must include standards and requirements that satisfy the criteria set forth in the bill, including requirements that reduce the use and emission of class I and class II substances to the lowest achievable level and requirements that class I and class II substances contained in bulk in appliances be removed from such appliances prior to disposal of the appliance or delivery of the appliance for recycling.

The reference to "in bulk" distinguishes this requirement from another requirement dealing with products in which a class I or class II substance is incorporated so as to constitute an inherent element of the product. An examle of the "in bulk" reference is the class I or class II refrigerant in an appliance. An example of the "inherent element" reference is the insulation in a building or insulation that was made with a class I or class II substance which is now incorporated in the walls of the appliance.

Effective July 1, 1992, it will be unlawful for any person maintaining, servicing, repairing or disposing of an appliance or industrial process refrigeration to knowingly vent, release, or dispose of any class I or class II substance used as a refrigerant in a manner which permits such substance to enter the environment. Exceptions to this prohibition are included for certain de minimis releases.

Effective 5 years after enactment, the prohibition on venting or release shall also apply to all substances that are used as refrigerants as substitutes for class I or class II refrigerants. The prohibition shall apply to all such substitute substances except in cases when the Administrator determines that the venting, release, or disposal of a particular substitute substance does not pose a threat to the environment.

SERVICING OF MOTOR VEHICLE AIR CONDITIONERS—NEW SECTION 609

Effective January 1, 1992 (or, January 1, 1993 in the case of persons who certify by January 1, 1992, that they are repairing or servicing motor vehicles at an entity which performed service on fewer than 100 motor vehicle air conditioners during 1990), any person who services motor vehicle air conditioning systems for consideration (1) must "properly use" extraction and reclamation equipment that is certified as meeting the standards set by the equipment that is certified as meeting the standards set by the Society of Automotive Engineers, and (2) must be "properly trained and certified." The phrases "properly using" and "properly trained and certified" are defined in this section of the conference substitute. This section includes a certification requirement that is applicable to each person performing service on motor vehicle air conditioners for consideration.

Effective 2 years after enactment, it shall be unlawful to sell or distribute, or offer for sale or distribution, to any person (other than professionals who are in compliance with the requirement to use extraction and reclamation equipment) any class I or class II substance that is suitable for use as a refrigerant in a motor vehicle air conditioning system and is in a container which contains less than 20 pounds of such refrigerant.

NONESSENTIAL PRODUCTS CONTAINING CHLOROFLUOROCARBONS—NEW SECTION 610

The conference substitute includes the House amendment with two modifications to the prohibition on the use of class II substances. First, the prohibition on the use of class II substances in plastic foam products does not apply to certain foams that are used for motor vehicle safety purposes in accordance with Federal Motor Vehicle Safety Standards. Second, the Administrator is authorized to grant exceptions from the prohibition on pressurized dispensers which contain a class II substance when (1) the use of the pressurized dispenser is determined to be essential as a result of flammability or worker safety concerns, and (2) the only available alternative to the use of a class II substance is the use of a class I substance which legally could be substituted for the class II substance.

The conference substitute also does not prohibit insulating foams made with class II compounds (which could include foams that are necessary for energy efficient building construction, appliances, or for the insulation of sensitive medical supplies and sensitive electronic components.)

Including authority for the Administrator to grant such exceptions is necessary to ac-

count for the fact that the aerosol ban which has been in effect in the United States since 1978 for certain class I substances is not a complete ban. Assuming the use of class I substances in certain pressurized dispensers remains legal after 1994, it may be counter-productive to prohibit the use of class II substances (substances that are generally less potent ozone depleters) in certain "essential" applications if the only available substitutes are class I substances which could be legally used in place of the class II substance. For this reason, the Administrator is authorized to grant limited exceptions. The conference substitute does not presume or imply that the existing aerosol uses or other uses not specifically listed are non-essential and the Administrator shall consider these uses on a case-by-case basis in accordance with the listed relevant factors.

LABELING—NEW SECTION 611

Effective 30 months after enactment, containers of a class I or class II substance and products containing class I substances must be labeled. Products containing or made with (but no longer containing) a class II substance must be similarly labeled if the Administrator determines that there are substitute products or manufacturing processes. The determination invoves a three part test.

Products made with but no longer containing class I substances must be labeled unless the Administrator determines that there are no substitute products or manufacturing processes. As with the previously discussed determination, the statutory language includes a three part test, including whether the substitutes reduce the overall risk to human health and the environment.

Effective January 1, 2015, the labeling requirements will apply, without exception, to all products containing a class II substance and to all products made with a process that uses a class I or class II substance.

SAFE ALTERNATIVES POLICY—NEW SECTION 612

The Administrator is directed to promulgate regulations prohibiting the replacement of any class I or class II substance with a substitute which the Administrator determines may present adverse effects to human health or the environment if an alternative that reduces the overall risk to human health and the environment has been identified. The Administrator is required to publish lists of the identified safe alternatives within 2 years of enactment. It is important to note that the standard applies to substitutes for class II compounds as well as to other compounds. It is expected that the Administrator shall not prohibit the use of a class II substance in the absence of clear information concerning the reduction of overall risk to human health and the environment by the current or potential availability of the identified substitutes. Also, the Administrator shall base risk estimates on the total environmental risk (toxicity, flammability, atmospheric, etc.) that is perceived to exist, not just the risk as it relates to ozone depletion. The Administrator shall, with the assistance of the Science Advisory Board, update the risk assessment from ozone depletion and take into account the global and domestic controls that are scheduled to occur as a result of the Montreal Protocol, this Act, and accelerated industry phaseout efforts.

The Administrator is also directed to require that any person who produces a chemical substitute for a class I substance (1) provide the Administrator with such person's health and safety studies on such substitute, including unpublished studies, and (2) notify the Administrator not less than 90 days before new or existing chemicals are introduced into interstate commerce for significant new uses as class I substitutes.

FEDERAL PROCUREMENT—NEW SECTION 613

The conference substitute includes a modified version of the House amendment's provision on federal procurement. The modification adds a deadline for other agencies to revise their regulations and a requirement that each agency certify to the President that its regulations have been modified in accordance with this section. This provision does not prohibit the purchase of equipment or products made with or relying on the covered substances, or bulk supplies of covered substances necessary to maintain or operate existing equipment, but would require the agencies to consider this in their purchasing decisions and to work towards the purchase of ozone protecting technologies to the maximum extent practicable.

RELATIONSHIP TO OTHER LAWS—NEW SECTION 614

The substitute repeals the provision of current law that preempts State and local governments in certain circumstances and establishes a narrow, two year exception to the principle of non-preemption that is codified in section 116 of the Clean Air Act.

State or local laws would be preempted if they include "servicing" requirements that would require the retrofitting or modification of existing equipment, or specific product bans that would have the practical effect of requiring new equipment designs. Also, laws would be preempted that prohibit the sale of appliances that use or contain foam insulation manufactured with covered substances. A provision is added to make it clear that this title is a supplement to the Montreal Protocol. It does not supplant the Protocol and it does not abrogate the responsibilities or obligations of the United States to implement fully the provisions of the Montreal Protocol.

Many of the provisions in this title are more stringent than the provisions of the Protocol such as the production phasedown schedule for CFCs, halons, and methyl chloroform, and the elimination date for production of methyl chloroform. There are also areas in which the Protocol has no similar provisions including the controls and elimination of HCFC production, recycling and emissions control requirement, and the safe alternatives policy.

In areas in which the Protocol is more stringent, the provisions of the Protocol are controlling. If the Protocol is modified in the future to include new provisions that are more stringent than this legislation, such more stringent provisions will be controlling.

In the sections where the Administrator or another government official is authorized to grant extensions or exceptions to the requirements of this title, the legislation includes an express limitation. The Administrator or other official may exercise such authority only to the extent that such action is consistent with the Montreal Protocol. The provisions of this Act may not be used to justify or authorize any action that is inconsistent with the terms of the Protocol.

To prevent persons subject to United States' jurisdiction from transferring technology or investing in facilities to produce controlled substances in countries that are not parties to the Montreal Protocol, the President is directed to prohibit the export of technologies used to produce a class I substance; to prohibit the direct or indirect investments in facilities designed to produce class I or class II substances in nations that are not parties to the Protocol; and to direct that no government agency provide subsidies or assistance for the purpose of producing a class I substance.

AUTHORITY OF THE ADMINISTRATOR—NEW SECTION 615

The Administrator is authorized to prescribe regulations as may be necessary to carry out this title. The phrase "to affect the stratosphere" includes, but is not limited to, stratospheric ozone depletion. Effects such as anthropogenically induced cooling of the stratosphere are included and must be considered, but only as it relates to carrying out this title on stratospheric ozone protection.

TRANSFER AMONG PARTIES TO THE MONTREAL PROTOCOL—NEW SECTION 616

A new section based on the Montreal Protocol's provisions for "industrial rationalization" is included in the conference substitute. For purpose of this section, the phrase "production allowance" is used to indicate a portion of United States' "calculated level of production", as that phrase is used in the Protocol. The authority provided in this section is limited and subject to a number of conditions, including the requirement for implementing regulations. The section is not intended to require that other nations adopt the same control schedule as adopted by the United States, but that another nation reduce its production be achieved level in the same manner as provided for in the U.S. when it is transferring production rights into the U.S. Unlike Section 607 transfers conducted under this section do not require that a 'net reduction' be achieved in production in the year in which the transfer occurs.

INTERNATIONAL COOPERATION—NEW SECTION 617

The Senate provision regarding international agreements is included in the conference substitute. As a result, United States' delegations to future meetings of the parties to the Montreal Protocol are expected to seek modifications to the Protocol, consistent with the logical framework of the Protocol, that will make the requirements of the Protocol at least as stringent as the requirements applicable in the United States as a result of this legislation. At a minimum, U.S. delegations are expected to seek control schedules for the Protocol that are consistent with the U.S. control schedule for the substances covered by this legislation.

The House provision authorizing funds to assist developing countries is included in the conference substitute. At the June 1990 meeting of the parties to the Protocol in London, representatives of China and India indicated that their countries intend to join as parties to the Protocol. In this event, the expected contribution to the fund by the United States will increase accordingly. In recognition of this new development, the conference substitute includes a provision to increase the authorization of appropriations by an additional $30,000,000 if and when China and India become parties. In the event that one but not both of the countries were to sign the Protocol, it is expected that a corresponding amount would be appropriated.

MISCELLANEOUS PROVISIONS—NEW SECTION 618

A modified version of the House provision is included in the conference substitute. This section makes it clear that more stringent state and local government requirements for the protection of the stratosphere are not preempted by this Act, except as provided for in section 614.

This section also provides that federal facilities shall be subject to all requirements

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01. Paper	Reply to EPA Legal Staff's Conclusion that a Total Hydrocarbon Emission Standard Must Be Applied to Natural Gas Vehicles (9 pp.)	08/23/91	~~P-5~~	

Collection:

Record Group: Bush Presidential Records
Office: Counsel to the President, Office of
Series: Holmstead, Jeffrey
Subseries: Environmental Subject Files
WHORM Cat.:
File Location: Clean Air Act - Reformulated Gasoline

Open on Expiration of PRA
(Document Follows)
By CaP (NLGB) on 4/24/06

Date Closed: 7/16/2002	**OA/ID Number:** 45125-032
FOIA/SYS Case #: 2001-1865-F	
Re-review Case #:	
P-2/P-5 Review Case #:	
MR Case #:	**Appeal Case #:**
MR Disposition:	**Appeal Disposition:**
Disposition Date:	**Disposition Date:**

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
P-4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
P-5 Release would disclose confidential advice between the President and his advisors, or between such advisors [a)(5) of the PRA]
P-6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

(b)(1) National security classified information [(b)(1) of the FOIA]
(b)(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
(b)(3) Release would violate a Federal statute [(b)(3) of the FOIA]
(b)(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
(b)(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
(b)(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

REPLY TO EPA LEGAL STAFF'S CONCLUSION THAT A TOTAL HYDROCARBON EMISSION STANDARD MUST BE APPLIED TO NATURAL GAS VEHICLES

SUMMARY

EPA legal staff have concluded that the Clean Air Act ("Act"), as amended by the Clean Air Act Amendments of 1990 ("CAAA"), requires the imposition of a total hydrocarbon ("THC") standard on natural gas vehicles ("NGVs") in general and clean fuel vehicles ("CFVs"), in particular. A draft rule governing emissions and related items pertaining to NGVs is to be circulated soon by EPA's Office of Mobile Sources. The draft will include a proposed THC standard for NGVs. A future draft rule concerning CFVs will also include a THC standard.

EPA's legal analysis supporting the THC standard for NGVs and CFVs does not represent a reasonable interpretation of the statute. The agency's proposal would subject NGVs to extremely burdensome requirements not imposed on other fuels or vehicles. Furthermore, the only possible justification for such regulation, concern about so-called global warming, has never served as the basis for regulating motor vehicles. Even if global warming concerns did provide a basis for regulating NGVs, EPA is precluded from regulating only THC and not other greenhouse gases, for example, carbon dioxide. Moreover, EPA would be required to extend such global warming regulation to other fuels and vehicles.

As described more fully herein, the only reasonable interpretation of the statute, supported by the history of EPA regulation of motor vehicle emissions, is that the THC standard is not applicable to NGVs or CFVs.

EPA'S CONCLUSION THAT THC STANDARDS MUST APPLY TO NGVS IS FUNDAMENTALLY FLAWED

EPA staff have concluded that there are two distinct classes of NGVs: those that certify as clean fuel vehicles under the clean fuel vehicle program in the CAAA; and all other NGVs. While the standards applicable to NGVs in general will be applied to NGVs that are clean fuel vehicles, the latter must meet more stringent standards specifically established under sections 242 and 243 of the CAAA. EPA legal staff have identified distinct legal arguments in support of their conclusion that THC standards must be applied to both categories of NGVs.

With respect to the general class of NGVs, EPA legal staff have developed the following legal syllogism to justify imposing a THC standard on NGVs: first, a THC standard is applicable to conventional vehicles; second, the Act requires EPA to regulate alternative fuel vehicles, including NGVs, in a manner that is comparable to the regulation of conventional vehicles for which

emission standards and rules have been promulgated;[1] therefore, the THC standard must be applied to natural gas vehicles. Upon scrutiny, the premises of this syllogism support a contrary conclusion.

The Requirement That THC Standards Apply To Conventional Vehicles Does Not Provide A Basis For Application Of THC Standards To NGVs

As support for its view that THC applies to conventional vehicles, EPA cites section 202(b)(1)(C) of the Act, as amended by the CAAA, and the legislative history of the CAAA. Section 202(b)(1)(C) provides, in relevant part, that:

> The Administrator may . . . revis[e] any standard prescribed or previously prescribed under this subsection . . . . Any revised standard shall require a reduction of emissions from the standard that was previously applicable. (emphasis added)

EPA legal staff argue that because the THC standard had previously been prescribed for conventional vehicles, and because elimination of the standard would not represent "a reduction of emissions," EPA must continue to apply the THC standard to conventional vehicles.

EPA cites the House Report accompanying the CAAA amendments as further support for this conclusion. The House Energy and Commerce Committee approved version of the CAAA is the source of the statutory language included in Section 202(b)(1)(C) of the Act. The report accompanying the Committee version of the bill explains that the "[c]urrent standards for total HC (which provide a cap on total HC methane emissions) and CO remain in place in addition to the new standards."[2] H. Rep. No. 490, Part 1, 101st Cong., 2d

---

[1] EPA has identified four reasons in support of this conclusion. See 54 Fed. Reg. 14426, at 14427 (April 11, 1989) (Methanol vehicle rule).

[2] It is not clear whether EPA staff believes that section 202(b)(1)(C) and the House Report language are sufficient to require imposition of a THC standard on NGVs. If EPA believes this, their reasoning is badly flawed. While section 202(b)(1)(C) and the accompanying legislative history may be relevant to gasoline vehicles, these authorities are irrelevant in considering whether the CAAA requires THC standards to be applied to NGVs. Section 202(b)(1)(C) is irrelevant because no standards applicable to NGVs have ever been prescribed by EPA. Therefore, a provision authorizing revision of prescribed or previously prescribed standards is relevant only with respect to vehicles for which standards have already been issued. The House report is equally irrelevant in that it clearly addresses section 202 standards

Sess. at 298. The new standards refer to the tailpipe exhaust emission standards for conventional vehicles included in the CAAA.

The Four Reasons Cited By EPA As Support For Applying Conventional Vehicle Standard To Methanol Vehicles Do Not Support The Conclusion That THC Standards Apply To NGVs

Having concluded that THC standards continue to apply to conventional vehicles, the next step in EPA legal staff's syllogism is that EPA must apply the conventional vehicle standards to alternative fuel vehicles, including NGVs. EPA has previously offered four reasons in support of this conclusion.[3] When fully analyzed from the perspective of NGVs, these reasons do not support extension of the THC standard to NGVs.

First, EPA has stated that the emission control requirements of the Act fail to distinguish between vehicles operating on different fuels, and that the legislative history of the Act indicates that Congress contemplated common emission standards for vehicles of different fuel types.[4] However, the legislative history of the Act does not support the conclusion that Congress contemplated common emission standards for vehicles of different fuel types. Rather, Congress generally contemplated that vehicles of different fuel types would be regulated on a comparable basis considering the environmental and health protection goals of the statute.

The crucial factor contemplated by Congress in enacting the CAAA is the need to control ozone producing emissions. The structure of the Act and the CAAA indicates that EPA should similarly regulate the ozone producing emissions of vehicles of different fuel types. There is no disagreement that Congress clearly considered non-methane hydrocarbon (NMHC) emissions to be the principal pollutant resulting in ozone formation. There is no indication that Congress considered methane emissions to contribute to ozone pollution. Also, there is no scientific evidence that would indicate that methane emissions contribute to ozone formation. Based on this, there is no justification for regulating methane emissions to control ozone.

---

applicable to conventional vehicles for which standards had previously been promulgated. The report language references "current standards" and states that such standards "remain in place." There are no current standards applicable to NGVs to keep in place. The issue of what standards should apply to NGVs is before the agency for the first time.

[3]See Note 1

[4]Id.

In fact, EPA's recent rulemaking on conventional vehicle standards clearly recognizes that controlling THC emissions is irrelevant to ozone control strategies. In that rulemaking, EPA stated that it will waive the requirement that manufacturers of conventional and methanol vehicles demonstrate compliance with the THC standard if they demonstrate compliance with the applicable NMHC standards.[5] THC control is obviously not considered relevant or important to ozone control if EPA is willing to forego any requirement that manufacturers demonstrate compliance with the current THC standard.

Thus, while the Act generally requires comparable control strategies for different vehicle types, it does not require the same standards to be imposed on all vehicles. Rather, the environmental and health reasons for regulating hydrocarbon emissions from vehicles is the need to control ozone precursors. The application of THC standards to NGVs, standards that will not be enforced with respect to gasoline, diesel or methanol vehicles, is not justified on the basis of ozone control. Comparable regulation of NGVs requires only that ozone precursor emissions from NGVs (NMHC and No_x) be controlled.

Second, in order to meet the requirement of comparable stringency in the past, EPA established standards for diesel and methanol vehicles based on the standards applicable to gasoline. This may have been appropriate for those fuels because, according to EPA, the emission characteristics of those fuels do not differ substantially in kind from those of gasoline vehicles. This is not, however, the case with NGVs. 80-85 percent of the hydrocarbon emissions from NGVs are non-reactive and do not contribute to ozone formation. In contrast, 80-85 percent of the hydrocarbon emissions from gasoline are reactive and contribute to ozone formation.

Third, EPA has stated that common standards for vehicles of different fuel types would provide equal environmental protection. With respect to hydrocarbons, the equal environmental protection that is sought is to control ozone formation. If common standards would frustrate this goal, then the adoption of common standards would be an unreasonable policy choice. This is precisely the case

---

[5]See 40 C.F.R. §86.094-23. See also 56 Fed Reg 25724, at 25731 (June 5, 1991) (Conventional and Methanol Vehicle Emissions Rule). In the Public Participation section of the final rule establishing emission standards for conventional and methanol vehicles, EPA states that respondents indicated that the application of the THC standard to such vehicles "was a nuisance rather than an extreme burden." To alleviate the "nuisance", the waiver provision was included in the final rule. In contrast, the application of a THC standard to NGVs would be an extreme burden and would be anticompetitive. If the agency followed its own logic it would not apply the THC standard to NGVs.

with NGVs, since the emissions characteristics of the NGVs are so markedly different than that of gasoline vehicles. Due to the different emissions characteristics, NGVs would find the THC standard that applies to gasoline vehicles to be an extreme burden since it would carry the potential to exclude light duty NGVs from being placed in service. This exclusion would not accomplish the policy goal of reducing ozone emissions because, overall, NGVs emit substantially less ozone forming pollutants than other vehicles and because the unburned methane emissions that exceed the THC standard do not contribute to ozone formation. Instead, the application of a THC standard would simply have the anticompetitive effect of keeping NGVs off the road. A reasonable interpretation of the statute is to accomplish equal protection of the environment by assessing the difference in fuel characteristics and setting a standard that regulates the ozone producing emissions of NGVs.

Fourth, EPA has stated that methanol vehicles are similar in type, size, and function to gasoline vehicles and, therefore, it is equitable to apply common standards to those vehicles. This is not the case for NGVs because the emissions contain relatively large amounts of non-reactive emissions. As stated previously, if NGVs are subjected to a THC standard, they would be forced off the road, unlike gasoline vehicles. This would be anticompetitive since the basis of the Act is to reduce ozone.

EPA Must Therefore Apply Only An NMHC Standard To NGVs

Thus, upon scrutiny, EPA's "comparable stringency" argument leads to the conclusion that THC standards should not apply to NGVs. As EPA has indicated, regulation of THC is unrelated and unnecessary to the reduction and control of ozone pollution. Furthermore, the impact of THC regulation on NGVs would be extremely burdensome and anticompetitive. Finally, the characteristics of emissions from NGVs are fundamentally different and have different impacts than those of conventional vehicles. Strict extension of standards applicable to conventional vehicles is unwarranted and would represent an unreasonable, illegal interpretation of the statute.

EPA IS NOT REQUIRED TO IMPOSE THC STANDARDS ON CFVS

EPA contends that section 242(b) of the CAAA requires the imposition of a THC standard on NGVs. Section 242(b) of the CAAA provides that,

> Clean-fuel vehicles of up to 8,500 gvwr subject to standards set forth in this part shall comply with all motor vehicle requirements of this title (such as requirements relating to on-board diagnostics, evaporative emissions, etc.) which are applicable to conventional gasoline-fueled vehicles of the

same category and model year . . .

Notwithstanding the fact that tailpipe exhaust emission standards are not referenced, EPA contends that the quoted parenthetical phrase establishes authority to impose a THC standard on NGVs in the CFV fleet program.

Section 242(b) Is Not Intended To Apply To Tailpipe Exhaust Emissions

The parenthetical phrase in section 242(b) cannot be considered a clear expression of Congressional intent on the issue of the imposition of a THC standard on CFVs. Section 242(a) directs EPA to promulgate standards for CFVs under Part C of Title II of the Act. Section 243 proceeds to enumerate specific exhaust emission standards that are to apply to the CFVs pursuant to the authority of Section 242(a). The standards contained in section 243 represent a comprehensive framework of emission standards for CFVs because they cover the ozone precursors non-methane organic gases "NMOG" and NOx as well as CO, PM and formaldehyde ("HCHO"). Reading the comprehensive emissions framework for CFVs in conjunction with the heading for Section 242(b) -- "Other Requirements" -- the parenthetical phrase, under its plain English meaning, unequivocally must apply to requirements other than exhaust emission standards. At best, the parenthetical phrase is ambiguous concerning THC standards.

In the absence of a clear statutory directive or statement of Congressional intent,[6] the issue is whether EPA's interpretation of the statute is reasonable. See, Chevron U.S.A., Inc. v. Natural Resources Defense Council, 467 U.S. 837 (1984). It is not. The comprehensive set of exhaust emissions standards for CFVs adopted in the CAAA, as well as the other specific references to the California Air Resources Board (CARB) in sections 243, 244 and 246, evidences a clear Congressional intent that the CARB standards would be the sole exhaust emission standards applicable to CFVs. This intent is made clear by looking at the differences between the final legislation and the House and Senate versions of the CAAA. For example, the House bill would have required EPA to promulgate regulations under section 202(a) that would have contained specific emissions standards applicable to CFVs. The bill specifically provided, "In addition to the specific requirements set forth in this paragraph [establishing the specific emission standards for CFVs], the standards applicable to such vehicles shall require compliance with the most stringent standard applicable under section 202 to emissions from conventional vehicles of the same

[6] There is no legislative history that elucidates the meaning of Section 242(b).

type and model year."[7] Because EPA's THC standard was promulgated under section 202 of the Act, this language would unquestionably have imposed the existing THC standard on CFVs.

Similarly, the Senate bill would have retained the THC standard for CFVs. The proposed amendment would have required EPA to promulgate emissions standards for both a federal and a private CFV fleet program. These standards, for ozone-forming volatile organic compounds, carcinogenic air pollutants, and HCHO would have been imposed on CFVs "in addition to the standards otherwise applicable..." under Section 202(a) of the Act.[8] Since the THC standard is one of the standards that would be "otherwise applicable," it would have applied to CFVs under the Senate bill.

Despite the close similarity of the language in the House and Senate bills, the Conference Committee rejected the approach of establishing CFV emission standards as supplemental to section 202(a) standards. The Conference Committee's approach does not include the specific provisions in the House and Senate bills referenced above that would clearly have imposed the THC standard on NGVs. Rather, the Conference Committee agreed upon a new and different plan for establishing emission standards for CFVs. Under this approach, EPA is directed to promulgate regulations for CFVs under the authority of new section 242(a), rather than section 202(a). Section 242(a) clearly states that the regulations for CFVs are contained in a separate part of the Act (Title II, Part C -- Clean Fuel Vehicles), rather than the part of the statute that controls emissions from conventional vehicles (Title II, Part A -- Motor Vehicle Emission and Fuel Standards). Unlike the House and Senate bills, neither section 242 nor any other provision of the Act directs EPA to publish standards for CFVs under section 202 of the Act. By explicitly rejecting the approach in the House and Senate bills, in favor of establishing a new section 242, Congress clearly decided that with respect to tailpipe emission standards CFVs would be subject only to the standards issued under section 242.

Not only did the Conference Committee establish new authority under section 242 to promulgate standards for CFVs, it also specified in section 243 the standards to be established. These standards are comprehensive in nature. The standards cover

---

[7]See, proposed Clean Air Act section 212(b)(4) under section 201(b) of S.1630, 101st Cong., 2d Sess. (as passed by the House of Representatives May 23, 1990).

[8]See, proposed Clean Air Act Section 212(a)(1)(A), section 206(b) of S.1630, 101st Cong. 2d Sess. (as passed by the U.S. Senate April 3, 1990).

emissions of NMOG, CO, NOx, HCHO and PM.[9] As stated earlier, the standards are identical to the standards promulgated by CARB for transitional low-emission vehicles (TLEVs) and low-emission vehicles (LEVs). Because NMOG emissions include reactive hydrocarbons, and standards must be promulgated for both NMOG and NOx, the Conference Committee systematically devised a framework for controlling emissions that contribute to ozone formation that is completely separate from the THC standard that applies to conventional vehicles.

Application Of A THC Standard To NGVs Would Conflict With The Requirements Of The CFV Program

In light of this discussion, the application of a THC standard to NGVs would clearly conflict with the CFV program, which explicitly includes natural gas as an alternative fuel. A vehicle excluded from the program because of the application of the THC standard would be a phenomenon not contemplated by and contrary to the goals of the drafters of the CAAA and would stand in stark contrast to the exclusion of a vehicle because it cannot meet the standards of section 243, a circumstance clearly contemplated by the drafters of the Amendments. Section 242(b) clearly states that such "other requirements" cannot be applied to CFVs if in conflict with the provisions and purposes of the CFV program.

EPA Is Required To Follow CARB's Judgment That THC Regulation Is Not Appropriate

Moreover, since the numerical standards under section 243 for CFVs are identical to the CARB standards, EPA must use the same policy judgments and interpretations as CARB under section 244. This includes CARB's judgment that NMOG is the only standard needed for ozone protection with respect to NGVs. Because the only stated numerical standards in section 243 are identical to CARB standards, CARB's decision not to apply a THC standard controls the application of the standards. EPA cannot argue, consistent with section 242(b), that because CARB decided not to impose a THC standard that the THC standard must be applied to CFVs.

---

[9]The CO standards for all passenger cars and light-duty trucks that are CFVs under Section 243 are identical to the CO standards for corresponding vehicle classes under the revised Section 202 standards for conventional vehicles. The phase 1 NOx standards for CFVs are identical to the phase 1 NOx standards for conventional fuel vehicles of corresponding weight classes under revised Section 202. If the standards for conventional vehicles had been intended to apply to CFVs, there would have been no reason to restate the CO and NOx standards for CFVs in a new Section 243.

The application of a THC standard would, therefore, be illogical and contrary to the overall framework of sections 242, 243 and 244 of the Amendments. In short, the THC standard would be an unreasonable and illegal interpretation of the CAAA.

THC AND GLOBAL WARMING

In the absence of any justification for regulating THC from an ozone control perspective, the only purported environmental or health related reason for regulating THC is concern about global warming. This concern does not provide a reasonable legal basis for regulating THC emissions from NGVs for three reasons.

First, EPA has never proffered global warming concerns as the basis for the regulation of motor vehicle emissions. To do so here, for the first time, in the absence of a fully developed record would clearly not pass legal muster. Second, EPA's own legal reasoning would require all vehicles (conventional, methanol, NGVs, etc.) to be regulated on a comparable stringency basis with respect to global warming. EPA did not propose such regulation in its recent final rule on emission standards for gasoline, diesel and methanol vehicles. Therefore, EPA cannot propose such regulation for NGVs.

Finally, if global warming is the basis for controls, EPA is legally prohibited from discriminating among so-called greenhouse gases. EPA cannot choose to regulate only methane and ignore carbon dioxide. From a technical perspective, net overall emissions of greenhouse gases by NGVs are less than comparable emissions from other vehicles. If EPA is prepared to regulate vehicle emissions from a global warming standpoint, it must regulate all fuels and vehicles and all greenhouse gases. Anything less is unreasonable and illegal.

CONCLUSION

EPA's legally reasoning in proposing to apply a THC standard to NGVs is fatally flawed. Under Chevron, EPA's interpretation is not permissible in that it represents an unreasonable reading of the statute. The only reasonable reading is that THC standards may not be applied to NGVs.

CAAA

Clean fuel
or
natural gas
vehicles

gas research institute

JUL 29 1991

July 25, 1991

W F MORSE

Mr. William F. Morse
Vice President, Research
Columbia Gas Systems Service Corp.
P.O. Box 2318
Columbus, OH 43216-2318

Dear Bill:

Per your request, I have looked into the NGV methane emissions issue and its potential impact on global warming. I won't discuss ozone because it is recognized that methane plays no role in that area. The importance of the debate over methane emissions and total hydrocarbon (THC) versus NMHC standards is, in my view, one of the most important subjects facing the emerging NGV market. I will try to lay out my assessment of this issue to help you in guiding NGVC interaction with EPA.

An important point that is often lost is that atmospheric methane comes overwhelmingly from decay of biological matter--a fact over which our country (and EPA) has little or no influence over or ability to control. This is discussed in several technical journals, including "Exchange of Materials Between Terrestrial Ecosystems and the Atmosphere" (Science, November 13, 1987) as well in Chris Weaver's paper "Natural Gas Vehicles and the Environment" (pp. 17-19). If EPA's charter is to protect the environment, it should be strongly brought to their attention that mandating control of methane emissions from NGVs will not provide any reasonable level of abatement to the increase of atmospheric methane. The following calculations have been modified from Chris Weaver's paper. Various sources have estimated the amount of methane released to the atmosphere at a mid-range value of 600 million tons per year. I have used this figure to estimate the percent increase in methane emissions if NGVs are highly successful (even completely displacing all fuels) and operate without and with a strict total hydrocarbon standard.

	Typical THC Emissions (grams/mile)	Maximum Vehicle Population	Miles Per Year	% Increase Methane Emissions	% Increase With Strict THC Standard
Light-Duty Vehicles (High Scenario)	1.5	5,000,000	15,000	0.021	0.006
Heavy Duty Vehicles (High Scenario)	5.0	200,000	30,000	0.006	0.002
With All U.S. Vehicles	2.5	180,000,000	20,000	2.5	0.68

The above shows that even a highly successful NGV market will not significantly alter the amount of methane released to the environment. The two columns on the right show what I believe is EPA's lack of perspective on this matter. Why should the NGV industry be burdened with excessive costs to control methane emissions that in the most optimistic case are a small fraction of annual emissions! This is obviously disproportionate and could not have any real impact if we cannot control the other 99+%.

There cannot be any reasonable environmental justification for EPA mandating strict methane control for natural gas vehicles. Further, there has been documentation to demonstrate that the composite greenhouse gas emissions from NGVs would have a net lower impact on global warming than gasoline due to the lower levels of CO_2 produced from gas combustion.

These data only begin to address the issues. Catalyst testing results show that it is possible to oxidize methane, but only at temperatures exceeding 900°F. Gasoline hydrocarbons often light-off around 500-600°F or lower. Obviously methane is a much more difficult hydrocarbon to oxidize. NGVs, especially lean-burn heavy-duty vehicles, will often have exhaust temperatures that fall below this level. Also, discussions with catalyst manufacturers and researchers have shown a great deal of skepticism that the light-off temperatures for methane could be substantially reduced in the future.

In summary, it is clear that a total hydrocarbon standard is an absurd regulation to place on natural gas vehicles--it could not be justified by any reasonable environmental benefit/cost assessment. Further, if EPA is concerned about global warming, they should strive to develop a 'greenhouse gas' limit that takes into account all of the emission factors related to this issue--not just methane. Finally, I would also like to quote Chris Weaver on this subject "*...it is clear that application of restrictive total hydrocarbon standards to natural gas engines cannot be justified by greenhouse warming considerations...eliminating NGVs from the market would result in greater greenhouse warming than would otherwise be the case. This would be doubly tragic, since the large benefits NGVs offer for urban air quality improvement and energy security would also be foregone in the process.*"

This is a matter of extreme importance to the NGV industry. A vigorous effort must be made to assist EPA in recognizing the ludicrous and premature nature of a total hydrocarbon standard for NGVs. At a minimum, EPA should defer action until a more reasonable technical consensus has been achieved on the need and approach required to prevent global warming. This viewpoint is largely my perspective on the subject and not necessarily that of GRI as an organization.

Sincerely,

Allen D. Wells

Allen D. Wells
Principal Project Manager
Engine Technology

cc: K. Davidson
S. Gauthier

EMISSION STANDARDS FOR CLEAN-FUEL VEHICLES UNDER THE CLEAN AIR ACT AMENDMENTS OF 1990

Introduction and Summary

The Clean Air Act Amendments of 1990[1] (the Act) revised emission standards for conventionally fueled vehicles such as those powered by gasoline or diesel fuel. The Act also established separate emission standards for clean-fuel vehicles, including those that will satisfy the fleet vehicle and California Pilot Program requirements of the legislation. The exhaust emission standards that apply to clean-fuel vehicles comprise a comprehensive set of standards that govern the certification of such vehicles. Consequently, clean-fuel vehicles will not be required to meet exhaust emission standards that apply to conventionally fueled vehicles.

This conclusion is reinforced by the legislative history of the Act. The House and Senate versions of the Clean Air Act Amendments[2] clearly intended conventional vehicle standards to apply to clean-fuel vehicles in the fleet program. The gas industry and natural gas vehicle industry informed the House/Senate Conference Committee that a total hydrocarbon (THC) standard had the potential to undermine the clean-fuel fleet program. The Conference Committee resolved this issue by adopting the California emission standards, which do not include a THC. As a result, the House and Senate Conference Committee abandoned the original House

---

[1]Pub. Law No. 101-549 (November 15, 1990).

[2]H.R. 3030 and S. 1630, respectively.

and Senate approaches and, instead, adopted the comprehensive exhaust emission standards framework for clean-fuel vehicles that now appears in the Act. Consequently, EPA does not have authority to impose a total hydrocarbon exhaust emission standard on natural gas vehicles. A further explanation of the reasoning for this conclusion is provided herein.

The Act Adopted California Low-Emission Vehicle Standards

The Act establishes specific exhaust emission standards for non-methane organic gases (NMOG), carbon monoxide (CO), nitrogen oxides (NO_x), formaldehyde (HCHO), and particulates (PM)[3] that alternative fuel vehicles must meet to be considered clean fuel vehicles, for purposes of the fleet vehicle program and the California Pilot Program.[4] These standards are taken from and are identical to those proposed by the California Air Resources Board (CARB) and approved by the State of California for low-emission motor vehicles. In addition to codifying the CARB standards as those applicable to clean-fuel vehicles, the Act also requires the standards imposed on clean fuel vehicles to be consistent with and reflect the policy judgments and interpretations of the CARB.

The adoption of the CARB program is specified in section 229 of the Act, which adds new sections 242 and 243 to the Clean Air Act. Section 242 directs EPA to promulgate regulations for clean-fuel vehicles, including those contemplated by the fleet program

---

[3]The standard for particulates applies only to vehicles that use diesel fuel.

[4]See, section 229 of the Act.

and the California Pilot Program. Section 243 specifies what the standards must be for the pollutants listed above. Importantly, the standards mandated by new section 243 are not standards for clean-fuel vehicles that can be found in either the House or Senate bills that would have amended the Clean Air Act. Rather, these standards for NMOG, CO, NO_x, HCHO, and PM are identical to the California standards for such emissions. The standards do not include a total hydrocarbon standard.

Evidence of the intent to adopt California's standards for the clean-fuel vehicle program can be found by examining the waiver provisions of the Clean Air Act. The Act retained California's authority under section 209 of the Clean Air Act to waive the otherwise applicable federal standards in favor of California's own standards. However, this waiver does not mean that California does not apply federal standards; rather, California's standards are the federal standards in that state. The Conference Committee sought to develop federal standards for the clean-fuel vehicle program, but it was cognizant of the need to avoid inconsistencies between the federal standards for the clean-fuel vehicle program and the federal standards in California represented by the low-emission vehicle standards. To avoid conflicting federal standards, the Conference Committee simply adopted the California standards. Sections 242(b) and 244 of the Act further reflect the concern about conflicting standards by making certain that the clean-fuel vehicle program standards are administered and enforced the same as the California standards.

Further indication that the Act simply adopted the CARB low emissions program, and intends to retain its connection to the CARB program, lies in the provision for future adjustments to the program. New section 243(e) of the Clean Air Act specifies that the emissions standards for federal clean-fuel vehicles will be reduced in lockstep with new reduced standards that California may adopt in the future, provided California amends its standards to be even more stringent than current standards. Even in the unlikely event that California amends its standards in the future to be less stringent, new section 243(f) would automatically adopt those less stringent standards for up to two years for federal clean-fuel vehicles.

Under the California low-emissions program, no standard for total hydrocarbons is applied to alternative fuel vehicles. The CARB program has identified NMOG as the ozone-producing emissions from vehicles that must be strictly controlled. Total hydrocarbon emissions have been determined by California to be over-inclusive for the purpose of controlling ozone-producing emissions. Further, the adoption of total hydrocarbon controls could have a negative impact on ozone control by possibly excluding certain alternative fuels from the market. By adopting the California low-emission vehicle program, Congress adopted an emission standards framework that does not include a total hydrocarbon standard. Application of a total hydrocarbon standard to alternative fuel vehicles would be contrary to the emissions framework adopted by the Conference Committee on the Act.

The Legislative History of the Act Supports the Conclusion that Conventional Vehicle Emission Standards Do Not Apply to Clean-Fuel Vehicles

The comprehensive set of exhaust emission standards for clean-fuel vehicles adopted in the Act evidences a clear Congressional intent that the CARB standards would be the sole exhaust emission standards applicable to clean-fuel vehicles. This intent is even clearer when the differences between the final legislation and the House and Senate bills are considered. For example, the House bill to amend the Clean Air Act would have required EPA to promulgate regulations under section 202(a) that would have contained specific emission standards applicable to clean-fuel vehicles. The bill specifically provided, "In addition to the specific requirements set forth in this paragraph [establishing the specific emission standards for clean-fuel vehicles], the standards applicable to such vehicles shall require compliance with the most stringent standard applicable under section 202 to emissions from conventional vehicles of the same type and model year."[5] Because EPA's total hydrocarbon standard was promulgated under section 202 of the Clean Air Act, this language would unquestionably have imposed the existing total hydrocarbon standard on clean-fuel vehicles.

Similarly, the Senate bill would have unquestionably retained the total hydrocarbon standard for clean-fuel vehicles. The

---

[5] See, proposed Clean Air Act section 212(b)(4) under section 201(b) of S. 1630, 101st Cong., 2d Sess. (as passed by House of Representatives May 23, 1990).

proposed amendment would have required EPA to promulgate emission standards for both a federal and a private clean-fuel fleet program. These standards, for ozone-forming VOCs, carcinogenic air pollutants, and HCHO, would have been imposed on clean-fuel vehicles "in addition to the standards otherwise applicable . . ." under section 202(a) of the Clean Air Act.[6] Since the total hydrocarbon standard is one of the standards that would be "otherwise applicable," it would have applied to clean-fuel vehicles under the Senate bill.

Despite the close similarity of the language in the House and Senate bills, the Conference Committee on the Act rejected the approach of establishing clean-fuel vehicle emission standards as supplemental to section 202(a) standards. Rather, the Conference Committee agreed upon a new and different plan for establishing emission standards for clean-fuel vehicles. Under this approach, EPA is directed to promulgate regulations for clean-fuel vehicles under the authority of new section 242(a),[7] rather than section 202(a). New subsection 242(a) clearly states that the regulations for clean-fuel vehicles are contained in a separate part of the Clean Air Act (Title II, Part C -- Clean Fuel Vehicles), rather than the part of the statute that controls emissions from conventional vehicles (Title II, Part A -- Motor Vehicle Emission

---

[6]See, proposed Clean Air Act section 212(a)(1)(A), section 206(b) of S. 1630, 101st Cong., 2d Sess. (as passed by the U.S. Senate April 3, 1990).

[7]Clean Air Act Amendments of 1990, 42 U.S.C. section 7582 (1990).

and Fuel Standards). Neither new section 242 nor any other provision of the Act directs EPA to publish standards for clean-fuel vehicles under section 202 of the Clean Air Act, unlike the House and Senate bills. By explicitly rejecting the approach in the Senate and House bills, in favor of establishing a new section 242, Congress clearly decided that clean-fuel vehicles would be subject only to the standards of new section 242. For this reason, the total hydrocarbon standard under section 202(a), applicable to conventional vehicles, is irrelevant to alternative fuel, clean fuel vehicles.

The Comprehensive Nature of the Clean-Fuel Vehicle Emission Standards Further Indicates that Conventional Vehicle Standards Do Not Apply

Not only did the Conference Committee establish new authority under section 242 to promulgate standards for clean-fuel vehicles, it also specified in section 243[8] the standards to be established. These standards are comprehensive in nature. The standards cover emissions of NMOG, CO, NO_x, HCHO, and PM. As stated earlier, the standards are identical to the standards promulgated by CARB for transitional low-emission vehicles (TLEVs) and low-emission vehicles (LEVs). Because NMOG emissions include reactive hydrocarbons, and standards must be promulgated for both NMOG and NO_x (the ozone precursors emitted from vehicles), the Conference Committee systematically devised a framework for controlling emissions that contribute to ozone formation that is completely

[8]Clean Air Act Amendments of 1990, 42 U.S.C. section 7583.

separate from the total hydrocarbon standard that applies to conventional vehicles.

Reference to the CO and NO_x standards for clean-fuel vehicles makes it clear that Congress intended the emissions standards under section 243 to provide a comprehensive framework of emission standards for such vehicles. The CO standards for all passenger cars and light-duty trucks that are clean-fuel vehicles under section 243 are identical to the CO standards for corresponding vehicle classes under the revised section 202 CO standards for conventional vehicles.[9] The NO_x standards for clean-fuel vehicles are nearly identical to the NO_x standards for conventional fuel vehicles of corresponding weight classes under revised section 202.[10] If the standards for conventional vehicles had been intended to apply to clean-fuel vehicles, there would have been no reason to restate the CO and NO_x standards for clean-fuel vehicles in a new section 243; the emissions framework for clean-fuel vehicles, like the earlier House and Senate versions, would simply have referenced the standards under section 202 to apply the CO and NO_x standards to such vehicles.

---

[9] See, Clean Air Act Amendments of 1990, section 203.

[10] The NO_x standards for phase I clean-fuel vehicles and phase I conventional vehicles are the same. The NO_x standards for phase II of the clean-fuel vehicle standards for passenger cars and light-duty trucks up to 6,000 lbs. gvwr are lower than the phase I standards for conventional vehicles in similar weight classes. The NO_x standards for conventionally-fueled light-duty trucks over 6,000 lbs. gvwr that are certified for 120,000 miles are very slightly different than the NO_x standard for clean-fuel vehicles of corresponding weight classes that are certified for 120,000 miles.

The fact that the Conference Committee found it necessary to include CO and NO_x standards for clean-fuel vehicles in section 243, under the authority of section 242, further indicates that the emissions standards under section 243 represent a comprehensive emission framework for clean-fuel vehicles. The Conference Committee realized that it was establishing new authority for clean-fuel vehicle emissions that was separate from the authority of section 202, and that no standards for CO and NO_x would apply to clean-fuel vehicles unless they were included in new sections 242 and 243. In short, the new emissions framework for clean-fuel vehicles supplanted any emissions standards for conventional vehicles under section 202.

The "Other Requirements" Provision in Section 242(b) Does Not Apply to Emission Standards

Section 242 is not limited to exhaust emission standards. Rather, the provision establishes an "umbrella" for all of the requirements that will apply to clean-fuel vehicles. The requirements are broken down into three categories in the text of section 242. Two of these categories, "(a) Promulgation of Standards." and "(b) Other Requirements." are important to this analysis.

Category "(a) Promulgation of Standards." provides authority for EPA to publish regulations that contain the "standards" for clean-fuel vehicles identified in Part C of the revised Clean Air Act. The Conference Committee identified the numerical emission levels that make up the standards very specifically under "Sec.

243. Standards for Light-duty Clean Fuel Vehicles." These standards under section 243 are the comprehensive standards discussed above.

Subsection 242(b) addresses other requirements for clean-fuel vehicles. Under the "umbrella" of the requirements addressed in the heading for section 243, this represents a second, but distinct, important area of regulation for clean-fuel vehicles. The subheading for section 242(b) makes this clear by stating that section 242(b) applies to "other requirements" (i.e., requirements other than the standards addressed in section 242(a)). Taking into account the comprehensive emissions framework for clean-fuel vehicles that is laid out by section 242(a) and section 243, it would be illogical to interpret section 242(b) without reference to the restrictive use of the word "other" in the subheading for section 242(b).

Section 242(b) must be construed in light of the structure of the statute. Considering the comprehensive emissions framework for clean fuel vehicles, the word "other" has to address requirements that are entirely appropriate for clean-fuel vehicles but that do not include an intrusion into the emission framework specified in section 242(a) and section 243. In fact, the type of requirements contemplated in section 242(b) are identified in the parenthetical of the first sentence of that section. This sentence states that:

> Clean-fuel vehicles of up to 8,500 gvwr subject to standards set forth in this part shall comply with all motor vehicle requirements of this title (<u>such as requirements relating to on-board diagnostics, evaporative emissions, etc.</u>) which are

> applicable to conventional gasoline-fueled vehicles of the same category and model year, except as provided in section 244 with respect to administration and enforcement, and except to the extent that any such requirement is in conflict with the provisions of this part.

On-board diagnostics, evaporative emissions, and similar requirements for gasoline vehicles are certainly important but are not the primary target of restrictions on vehicle pollutants. Exhaust emissions are the primary target, and if such emissions had been intended to be included in the "other" requirements of subsection 242(b) they would have been identified in the parenthetical along with on-board diagnostics and evaporative emissions. This is particularly true since the comprehensive emissions framework for clean-fuel vehicles was spelled out with great specificity in section 243 and would be undermined by reading into subsection 242(b) a reference to the conventional vehicle standards of section 202. The Conference Committee could not have intended that its carefully drafted comprehensive emissions framework for clean-fuel vehicles would be overridden by some admittedly ambiguous language in the first sentence of the text of subsection 242(b) that would subject clean-fuel vehicles to the emission standards for conventional vehicles under section 202. Because subsection 242(b) applies to requirements "other" than exhaust emission standards, the exhaust emission standards for conventional vehicles are rendered irrelevant to those for clean-fuel vehicles.

The Act Requires that the Administration of the Clean-Fuel Vehicle Program Be Consistent With CARB

To ensure that the clean-fuel vehicle program would be administered consistently with both the CARB program and the Act itself, the Conference Committee on the Act included language that provides two general areas of guidance in the form of two restrictions on interpretation. These restrictions are found in new subsection 242(b) of the Clean Air Act. Even if the requirements for conventional vehicles were interpreted under subsection 242(b) to have the potential to impose section 202 standards on clean-fuel vehicles, these restrictions would prevent the application of conventional vehicle standards to clean-fuel vehicles.

The first restriction specifies that the "other" requirements for conventional vehicles that must be met by clean-fuel vehicles must be administered and enforced the same as the CARB program would administer and enforce such requirements. That is, subsection 242(b) provides that requirements for conventional vehicles must be applied to clean-fuel vehicles of the same category and model year "except as provided in section 244 with respect to administration and enforcement . . ."

Section 244 specifies that the clean-fuel vehicle program under the Act is intended to be administered and enforced in the same manner as the CARB program. The section states:

> Where the numerical clean-fuel vehicle standards applicable under this part to vehicles of not more than 8,500 lbs. gvwr are the same as numerical emission standards

> applicable in California under the Low-Emission Vehicle and Clean Fuels Regulations of the California Air Resources Board ('CARB'), such standards shall be administered and enforced by the Administrator --
>
> (1) in the same manner and with the same flexibility as the state of California administers and enforces corresponding standards applicable under the Low-Emission Vehicle and Clean Fuels Regulations of the California Air Resources Board ('CARB'); and
>
> (2) subject to the same requirements, and utilizing the same interpretations and policy judgments, as are applicable in the case of such CARB standards, including, but not limited to, requirements regarding certification, production-line testing, and in-use compliance,
>
> unless the Administrator determines (in promulgating the rules establishing the clean fuel vehicle program under this section) that any such administration and enforcement would not meet the criteria for a waiver under section 209. Nothing in this section shall apply in the case of standards under section 245 for heavy-duty vehicles.

Hence, section 244 contains an important qualifier in that it will apply only where the numerical standards under Part C for clean-fuel vehicles up to 8,500 lbs. gvwr are the same as CARB standards for such vehicles. In fact, the standards for emissions of NMOG, CO, NO_x, HCHO, and PM from clean-fuel vehicles in section 243 (the standards under Part C for vehicles up to 8,500 lbs. gvwr) are identical to the standards for such emissions under the CARB program. Therefore, the criteria for applying section 244 to clean-fuel vehicles are met. Thus, section 244 controls the "administration and enforcement" of these programs pursuant to the directive of subsection 242(b).

Since section 244 applies to the clean-fuel vehicle program, the program must be subject to the same requirements as the CARB program, and EPA must use the same interpretations and policy judgments as CARB in administering and enforcing the programs. In this context, the imposition of the NMOG standard is a policy judgment aimed at controlling ozone formation. CARB has made the policy determination that the appropriate way to control ozone formation is to ratchet down emission standards for NO_x and NMOG, not total hydrocarbons. In light of CARB's policy judgment on this standard, the language of subsection 244(2) binds EPA to CARB's policy judgment that an NMOG emission standard supplants a total hydrocarbon emission standard. Consequently, EPA is required to apply an NMOG standard to clean-fuel vehicles, instead of a total hydrocarbon standard.

Moreover, section 244(1) specifies that numerical standards in the Act that are the same as CARB standards must be administered and enforced "in the same manner and with the same flexibility" as the CARB standards. Imposing a total hydrocarbon standard on clean-fuel vehicles would violate this mandate by requiring such vehicles to meet a two-tier hydrocarbon standard (total hydrocarbon and NMOG) for essentially the same emissions with respect to the federal programs.

The second restriction under subsection 242(b) is that the "other" requirements for clean-fuel vehicles must not conflict with the provisions of Part C. The imposition of a total hydrocarbon standard on clean-fuel vehicles would represent exactly the kind of

conflict that subsection 242(b) provides should not be permitted under the guise of imposing conventional vehicle standards on clean-fuel vehicles, natural gas vehicles (NGVs) in particular. The NMOG standard in section 243 is intended to play a part in a comprehensive framework in which clean-fuel vehicles can be placed in service by targeted fleets in urban areas. Within this framework, the NMOG standard assures reasonable control of hydrocarbon emissions that would contribute to ozone formation. NGVs could meet the applicable NMOG standard for controlling harmful hydrocarbon emissions but perhaps not a total hydrocarbon standard (85% or more of hydrocarbon emissions from NGVs are nonreactive, with the remaining portion being the reactive type that contributes to ozone formation). Thus, the application of a total hydrocarbon standard could preclude NGVs from being placed in service. This would undermine the entire clean-fuel vehicle fleet program by excluding an acknowledged clean alternative fuel and skewing the market for alternative fuels in favor of competing alternative fuels. The illogical application of a total hydrocarbon standard that causes a vehicle with very low levels of harmful emissions to be banned from the fleet program would represent a clear and serious conflict with the clean-fuel vehicle program. It is precisely this type of conflict that the exception of subsection 242(b) is designed to avoid.

Two-Car Policy

One of the issues that dominated the Conference Committee was the potential that Title II of the Act could require automobile manufacturers to manufacture many variations of the same car to meet differing regulatory requirements. The policy goal was to establish a two-car program: one that met CARB standards, and one that met federal standards.

The imposition of a total hydrocarbon standard on clean-fuel vehicles would result in a three car program -- a California car that is not subject to a total hydrocarbon standard, a federal clean-fuel vehicle car that would be subject to a total hydrocarbon standard and a conventional federal car. If EPA established yet a different standard for alternative fuel vehicles that are not clean-fuel vehicles, a fourth car would emerge. Such a result clearly would be at odds with what the Congress intended to achieve in the Act. Moreover, such a policy would be illogical and could seriously erode prospects for the development and commercialization of alternative fuel vehicles.

Environmental Policy

The goal of the clean-fuel vehicle program in the Act was to place vehicles on the road that could achieve significant reductions of emissions as compared to conventional fuel vehicles. We recommend that, from a purely environmental policy perspective, EPA consider the application of a total hydrocarbon standard on clean-fuel vehicles with this principle in mind.

NGVs can achieve reductions of 85 - 90 percent of reactive hydrocarbons and well over 90 percent of CO. These reductions can be achieved even while achieving NO_x emissions that are at least as low as such emissions from conventional vehicles. These emissions can provide very substantial improvements in air quality if significant numbers of other vehicles are displaced by NGVs in the urban areas in which fleet programs will be initiated under the Act. Interpretation of the Act to exclude a vehicle that can achieve emissions reductions of these magnitudes would stand the environmental policy sought by the Act on its head. Rather than undercut the policy of putting cleaner vehicles on the road, the Act should be interpreted in such a way that clean alternative fuel vehicles are encouraged. To achieve this policy goal, the NMOG standard for clean-fuel vehicles should supplant a total hydrocarbon standard.

Conclusion

The Conference Committee on the Clean Air Act Amendments of 1990 rejected the emission standards for clean-fuel vehicles that were contained in the House and Senate proposals. Rather than devise an emissions scheme that would require vehicle manufacturers to build vehicles that meet the redundancy of both an NMOG and a total hydrocarbon standard, the Committee chose to adopt a comprehensive emissions framework modeled on the CARB program for clean-fuel vehicles. This framework includes a reasonable

restriction on hydrocarbon emissions by requiring clean-fuel vehicles to meet the NMOG standard in lieu of a total hydrocarbon standard.

In fact, the Conference Committee drafted a comprehensive framework for all emissions from clean-fuel vehicles. The emissions standards found in new section 243, implemented under the authority of new section 242, cover emissions of CO, NO_x, HCHO, and PM in addition to NMOG. Standards for these emissions under section 243 would not be necessary and would not have been restated in the case of CO and NO_x if standards for conventional vehicles had been intended to apply to clean-fuel vehicles.

Even if section 242 could be interpreted to mean that conventional standards should be applied to clean-fuel vehicles, a total hydrocarbon standard for clean-fuel vehicles would be prohibited. Such a standard would violate section 242's mandate that conventional vehicle requirements cannot be imposed on clean-fuel vehicles where such standards do not comport with the CARB standards or where conventional standards would conflict with the whole clean-fuel vehicle program.

public hearing, promulgate regulations under paragraph (1) of this subsection changing any standard prescribed in subparagraph (A)(ii) (or revised under subparagraph (B) or previously changed under this subparagraph). No such changed standard shall apply for any model year before the model year four years after the model year during which regulations containing such changed standard are promulgated.

(F) For purposes of this paragraph, motorcycles and motorcycle engines shall be treated in the same manner as heavy-duty vehicles and engines (except as otherwise permitted under section 206(f)(1) [42 USCS § 7525(f)(1)]) unless the Administrator promulgates a rule reclassifying motorcycles as light-duty vehicles within the meaning of this section or unless the Administrator promulgates regulations under subsection (a) applying standards applicable to the emission of air pollutants from motorcycles as a separate class or category. In any case in which such standards are promulgated for such emissions from motorcycles as a separate class or category, the Administrator, in promulgating such standards, shall consider the need to achieve equivalency of emission reductions between motorcycles and other motor vehicles to the maximum extent practicable.

Not amended by the 1990 Act

(4)(A) Effective with respect to vehicles and engines manufactured after model year 1978, no emission control device, system, or element of design shall be used in a new motor vehicle or new motor vehicle engine for purposes of complying with standards prescribed under this subsection if such device, system, or element of design will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function.

onboard is §7521(a)(6)

(B) In determining whether an unreasonable risk exists under subparagraph (A), the Administrator shall consider, among other factors, (i) whether and to what extent the use of any device, system, or element of design causes, increases, reduces, or eliminates emissions of any unregulated pollutants; (ii) available methods for reducing or eliminating any risk to public health, welfare, or safety which may be associated with the use of such device, system, or element of design, and (iii) the availability of other devices, systems, or elements of design which may be used to conform to standards prescribed under this subsection without causing or contributing to such unreasonable risk. The Administrator shall include in the consideration required by this paragraph all relevant information developed pursuant to section 214 [42 USCS § 7548].

Stage II recovery

(5)(A) If the Administrator promulgates final regulations which define the degree of control required and the test procedures by which compliance could be determined for gasoline vapor recovery of uncontrolled emissions from the fueling of motor vehicles, the Administrator shall, after consultation with the Secretary of Transportation with respect to motor vehicle safety, prescribe, by regulation, fill pipe

ID # 240379 CU

WHITE HOUSE
CORRESPONDENCE TRACKING WORKSHEET

☐ O - OUTGOING
☐ H - INTERNAL
☐ I - INCOMING
Date Correspondence Received (YY/MM/DD) / /

Name of Correspondent: Frederick Potter

☐ **MI Mail Report** **User Codes:** (A) _____ (B) _____ (C) _____

Subject: Forwards a copy of paper by Daniel McKay entitled "Reformulated Gasoline - A Brief History, A Bright Future"

ROUTE TO:	ACTION		DISPOSITION	
Office/Agency (Staff Name)	Action Code	Tracking Date YY/MM/DD	Type of Response / Code	Completion Date YY/MM/DD
CMOFC	DJ ORIGINATOR	91/05/20	DJ	/ /
CMAT/7	Referral Note: A	91/05/21	S	91/05/31
	DJ Referral Note:			
	Referral Note:	/ /		/ /
	Referral Note:	/ /		/ /
	Referral Note:	/ /		/ /
	Referral Note:			

ACTION CODES:
A - Appropriate Action
C - Comment/Recommendation
D - Draft Response
F - Furnish Fact Sheet to be used as Enclosure
I - Info Copy Only/No Action Necessary
R - Direct Reply w/Copy
S - For Signature
X - Interim Reply

DISPOSITION CODES:
A - Answered
B - Non-Special Referral
C - Completed
S - Suspended

FOR OUTGOING CORRESPONDENCE:
Type of Response = Initials of Signer
Code = "A"
Completion Date = Date of Outgoing

Comments: No action required. JSH 4/1/91

Keep this worksheet attached to the original incoming letter.
Send all routing updates to Central Reference (Room 75, OEOB).
Always return completed correspondence record to Central Files.
Refer questions about the correspondence tracking system to Central Reference, ext. 2590.

5/81

Subject
CAA
Reformulated
Gasoline

#240379cn

IRI
INFORMATION RESOURCES, INC.

Frederick L. Potter
President

BOARD OF ADVISORS

George H. Unzelman
Octane & Refined Products

Dewey Mark
Refining & Marketing

Dr. Charles Ebinger
Crude Oil & International Developments

Mike Teel
Pipelines

Norman R. Sefer
Hydrocarbon Research

Harry Buchanan
Methanol & MTBE

Paul Hagstrom
Oxygenates

Guy Pluche
Europe

Charles S. Dempsey
Canada

William C. Holmberg
Environment & Renewable

Dr. John Schnittker
Agri-Economics

Carroll R. Keim
Process Economics

Robert Schwandt
Ethanol & ASTM

Andrew McHaffie
Ethanol Production

Dr. John E. Murtagh
Technology

Edward O. Welles
National Security

Nicolas Rivero
Latin America

COUNSEL'S OFFICE
RECEIVED
MAY 20 1991

May 15, 1991

The Honorable C. Boyden Gray
Counsel to The President
The White House
Washington, DC 20500

Dear Boyden:

Enclosed you'll find a copy of a paper prepared by *Octane Week* Executive Editor Daniel J. McKay, on the subject of fuel reformulation. The paper tracks the issue from the President's original bill, through market place introduction of "interim reformulated gasoline," to the EPA Reg Neg process.

I hope you will find some value and receive some personal appreciation for your own role in the process.

Wishing you every success, I remain

Sincerely yours,

Frederick L. Potter
President

FLP:lef

Enclosure: As mentioned

• INFORMATION RESOURCES INCORPORATED •
• 499 SOUTH CAPITOL STREET, SW • SUITE 406 • WASHINGTON, D.C. 20003 •
• TELEPHONE 1-800-USA-FUEL OR (202) 554-0614 • TELECOPY (202) 554-0613 •

Reformulated Gasoline -- A Brief History, A Bright Future

By Daniel J. McKay

Executive Editor, *Octane Week*

Abstract

As recently as two years ago, few could have predicted the development of reformulated gasoline. The very term was not coined until June 1989 (it originated in response to President George Bush's original Clean Air Act proposal that would have required methanol fuel and vehicles in severe ozone nonattainment areas). At the time those provisions were written, no one knew what the composition of such a reformulated gasoline would be. However, since its appearance in the proposal that President Bush delivered to the nation on June 12, 1989, the concept has jolted the imagination of thousands of professionals involved in motor fuels research, refining and marketing around the world. Oil companies, politicians, environmentalists, and consumers all have requirements that are being satisfied with the development of a cleaner version of America's most popular and widely accepted motor fuel -- gasoline.

On Sept. 1, 1989, Arco Products Company stunned the refining world with its introduction of "EC-1."[1,2] Since then, nine other major U.S. oil companies have introduced reformulated gasoline products at the retail level, each somewhat different from the others. Because such commercial products do not meet the more stringent provisions of the Clean Air Act amendments, the term "interim reformulated gasoline" was devised to differentiate these first-step rollouts from the more fundamentally altered composition of reformulated gasoline in the years ahead.

Since EC-1, new gasoline products have featured compositions different than the fuels they replaced. Several tactics were adopted in a multitude of combinations: decrease volatility, blend oxygenates, diminish aromatics, reduce sulfur content, adjust the distillation curve, restrict distribution through wide nozzles to target older vehicles.

Developing these new products has given the industry some valuable experience in the reformulation process. The exercise has also given oil companies a measure of how much more work and investments lie ahead, since none of the products on the market yet meet the 1995 requirements.

Following its introduction of EC-1, Arco has earned praise and recognition from President Bush, U.S. Environmental Protection Agency Administrator William E. Reilly, the California state legislature, the California Air Resources Board (CARB), and General Motors Chairman Roger B. Smith, among others. In addition, because of EC-1, *Octane Week* presented its Executive of the Year award to Lodwrick M. Cook, chairman and chief executive officer of Arco, and George H. Babikian, president of Arco Products Company.[3] In accepting the award, Babikian said, "EC-1 was not created to expand Arco's market share, but to prove that reformulation could be done."

Producing and distributing the expected volumes of reformulated gasoline that will meet the Clean Air Act Amendments of 1990 will challenge refiners, pipeline companies and gasoline marketers as never before. There are likely to be dislocations and adjustments. For instance, industry are likely to have problems meeting the 1992 oxygen requirements for CO attainment with MTBE and downstream blending of ethanol.[4]

If history is any guide, however, the industry will rise to the occasion. At least some of the survivors of the process will reap profits. Refiners did an excellent job in the 1980s of largely removing tetraethyl lead from the U.S. gasoline market.[5] Most oil companies resisted the lead phasedown program, but the experience changed some attitudes and opinions in corporate board rooms. As one senior executive for a U.S. oil company said, "We fought lead phasedown tooth and nail, but now we're more profitable than ever. If that's what they mean by regulation, let's have more of it!"

Arco and other refiners have proven that gasoline composition can be changed to reduce emissions. Although the extent of further changes needed in the coming years is becoming clearer, getting there will not be easy. The potential rewards, however, are great.[6]

Paper Overview

This paper will review the commercial developments in the U.S. motor fuels industry, as well as the concurrent regulatory process and emissions research findings, and will conclude with observations about developments that lie ahead this decade. The first section summarizes, one-by-one, the marketplace introduction of interim reformulated products by major oil companies. The second section examines what the Clean Air Act Amendments of 1990 spell out for refiners and others in the motor fuels industry, including some of the thorny issues that must be clarified in order for EPA to implement the law. The third section reviews some of the more promising research findings that may assist refiners to produce cleaner fuels and EPA to construct its future regulations from a scientific basis. The paper ends with some forecasts based on analysis of the downstream sector of the petroleum industry today in relation to the upcoming 1992 and 1995 regulatory milestones.

Interim Reformulated Products

Over the course of nearly two years, major oil companies have introduced "interim" reformulated products in select U.S. markets. The products are arranged chronologically, according to their rollout dates. Table 1 summarizes the properties and availability of these products.

Table 1 - Interim Reformulated Gasoline Products on the Market

Company	Name	Markets	Max. Summer Rvp	Max. Aromatics (vol.)	Max. Benzene (wt.)	Max. Sulfur (ppm)	Typical Oxygen (wt.)
Arco	EC-1	Southern California	8.0	20%	1%	300	1.0%
Arco	EC - Premium	" "	8.0	25%	1%	300	1.5%
Diamond Shamrock	RG-87	Colorado	8.5	20%	1%	300	2.0%
Conoco	RXL	Colorado	8.5	25%	2%	300	2.5%[1]
Conoco	Regular Unleaded	Montana	8.5	25%	2%[2]	450[2]	0%
Phillips	SuperClean Unleaded Plus	St. Louis	9	20%	1%	300	1.0%
"	" "	Colorado	8.5	20%	1%	300	2.0%[2]
Marathon	Amaraclean[4]	Southeastern Michigan	9.5	25%[5]	2%[5]	450[5]	1.8%
Chevron	Supreme	Los Angeles, San Diego, Santa Barbara		40-45%[2]	2%[2]	450[2]	1.0%
Shell	SU 2000-E	Nine Severe Ozone Nonattainment Cities Plus Washington, D.C.	8.5[6]	40-45%[2]	2%[2]	450[2]	1.0%
Exxon	Supreme, Plus, Extra	40 Gulf Coast and East Coast Markets	8.5	30-45%[2]	2%[2]	450[2]	1.0%[7]
Amoco	Regular, Silver, Ultimate	Washington, DC, Baltimore, Richmond, Roanoke, VA	9.0	30%	0.8%	300	2.7%
Sun	Sunoco-CL	Baltimore-Washington	9.0	30-45[2]	2%	450[2]	1.5[5]

[1]RXL in Colorado is oxygenated in winter only, as required by state oxy-fuel program.
[2]Estimated.
[3]Typical oxygen content is 2.0% in winter only, as required by state oxy-fuel program. In other months, it is 1.0% (vol.).
[4]Product lineup includes 87-octane (R+M)/2 "Milemaker Unleaded," 89-octane "Extra-M Plus" and 92-octane "Super-M Premium."
[5]Average, varies by grade.
[6]Varies by market, between 8.0 psi and 8.5 psi.
[7]Oxygenated in New York and Los Angeles metropolitan regions year-round; Virginia, Baltimore, Boston, Washington, D.C. and Spokane, WA, region in winter.

Source: *Octane Week* and Information Resources, Inc., Washington, D.C.

Arco's 'EC-1'

On Sept. 1, 1989, Arco Products Company introduced "EC-1" at 750 Arco stations from San Diego to Santa Barbara. EC-1, with an octane rating of 88 (R+M)/2*, replaced leaded gasoline in these Southern California markets. Arco produces 28,000 b/d of EC-1 at its 214,000 b/d Carson refinery in Los Angeles. Arco researchers worked more than six months to develop the new product. Arco spent between $15 million and $20 million to manufacture and develop EC-1, most of it for manufacturing costs. Company researchers selected the cleanest refining streams available at Carson, which enabled them to reduce the sulfur content of EC-1 by 80%, cut Reid vapor pressure (Rvp) from 9 psi to 8 psi, halve the benzene content and reduce the other aromatics by one-third. EC-1 has a 1.0% (wt.) minimum oxygen content, achieved by blending methyl tertiary butyl ether (MTBE) at 5.5% (vol.). MTBE makes up for octane loss incurred by eliminating tetraethyl lead.[2]

By restricting the distribution of EC-1 to wide gasoline pump nozzles, EC-1 can be used by pre-1975 automobiles and pre-1980 trucks. By using EC-1, Arco said, emissions from these vehicles could be cut between 10% and 15%, removing an estimated 350 tons/day or more of reactive organic gases, CO, and nitrogen oxides (NO_x) from Southern California's air if every pre-1975 car used EC-1.

New conversion units at the Carson refinery played a key role in producing EC-1. A new 12,000 b/d sulfuric alkylation unit came on stream at Carson, replacing an older 10,000 b/d alkylation unit. In addition, five months after the product was brought to market, Arco commissioned a 1,900 b/d MTBE plant, providing the refinery with an internal source of oxygenate.

Although manufacturing costs to produce EC-1 are 1-2¢/gallon higher than those of the leaded gasoline it replaces, Arco has kept the retail price of EC-1 the same as leaded regular. It has long been common practice for California marketers to use leaded gasoline as a "loss leader." Despite the apparent margin-slicing, Arco officials vowed to make a profit on the product. Arco did not patent the formula for EC-1. Instead, Arco volunteered to share the specifications with any interested refiner, including the Soviet Union.[7]

Diamond Shamrock's 'RG-87'

In December 1989, Diamond Shamrock R&M introduced "RG-87" in Colorado's Front Range. RG-87 replaced leaded regular at the 77 Diamond Shamrock Corner Stores in Denver, Colorado Springs and along the Front Range of the Rocky Mountains in Colorado. MTBE raised the octane to 87, which is a half number higher than the (R+M)/2 of leaded gasoline sold in those markets.[8]

Diamond Shamrock was the first company to introduce a reformulated gasoline in Colorado. Like Arco's EC-1, Diamond Shamrock's RG-87 is specifically formulated for older

cars and trucks that have been using leaded gasoline.

In producing RG-87, Diamond Shamrock eliminates lead and reduces the volatility level and aromatics content. Rvp is reduced by 1 psi below Colorado's motor fuel requirements and the recently reduced federal level. Lower vapor pressure reduces the potential level of hydrocarbon (HC) emissions, which contributes to ozone pollution.

Aromatics were reduced to half the previous level, with a maximum set at 20% (vol.). RG-87 contains no detergent package nor a lead-replacement additive for older vehicle engines with soft valve seats. Vehicles able to use the new fuel represent a relatively small percentage of the total number of vehicles in the state. However, recent studies in Denver have concluded that only 10% of the cars generate about half of all CO emissions.

Conoco's 'RXL'

In February 1990, Conoco introduced "RXL" a reformulated leaded gasoline seasonally adjusted for Colorado's varied environmental conditions, replacing the company's leaded gasoline. From November through February, when the state government's program requires gasoline in the Front Range to be oxygenated, RXL has an oxygen level of 2.5% (wt.), achieved by blending MTBE at a level of nearly 15% (vol.).[9]

In other months, RXL is not oxygenated. Instead, methylcyclopentadienyl manganese tricarbonyl (MMT) is added for octane quality. The new product, manufactured at its 43,000 b/d refinery in Commerce City, CO, is sold at more than 400 branded service stations throughout the state. The new product retains the same 86.5 octane posting as the leaded gasoline it replaced.

Emissions from vehicles using the new fuel contains less CO, NO_x, hydrocarbons and particulates, all of which contribute to Denver's unique air quality problems that include CO-induced "brown cloud" in the winter and ozone pollution in the summer. Like Arco's EC-1 in Southern California and Diamond Shamrock's RG-87 in Colorado, RXL is sold through wide-nozzle pumps for use in cars designed to run on leaded gasoline.

Seasonal adjustments to the reformulated gasoline include a 25% increase in oxygen content during the winter and reducing the Rvp to 8.5 psi during the summer. The lower summertime Rvp is 1 psi below the federal limit of 9.5 psi. The new gasoline will have a year-round base formula that reduces aromatics and contains DuPont's phosphorus-based "ValveMaster" lead-substitute additive. Conoco is a wholly-owned subsidiary of DuPont. Even if Conoco had not restricted distribution of RXL through wide pump nozzles, the new fuel could not be considered unleaded; EPA regulations ban phosphorus from unleaded gasoline because phosphorus poisons catalytic converters.

Conoco later began offering a separate reformulated unleaded regular gasoline, as well as its "RXL," leaded reformulated product, in Yellowstone National Park and other

parts of Montana and Wyoming. They are produced at the company's 48,500 b/d refinery in Billings, MT.[10]

The new unleaded regular product, like RXL, features a lower aromatics content and a Reid vapor pressure below the EPA's volatility limits. The products are available at roughly 100 Conoco branded service stations. Conoco has been the sole supplier of motor fuels in Yellowstone for nearly 75 years.

Phillips' 'SuperClean Unleaded Plus'

In February 1990, Phillips 66 Company introduced "SuperClean Unleaded Plus," a reformulated 87-octane midgrade gasoline in Colorado's Front Range.[11] In April, a somewhat different version of the product was introduced in metropolitan St. Louis, along with the announcement of a test program to measure emissions reductions.[12]

Unlike the "interim" reformulated products from Arco, Diamond Shamrock and Conoco, neither version of SuperClean Unleaded Plus is reserved for pre-catalytic converter vehicles designed for leaded gasoline. Although the Colorado product is provided on an exchange basis from Diamond Shamrock, Phillips produces the St. Louis product itself at its 105,000 b/d refinery in Borger, TX.

Phillips eliminated leaded gasoline and replaced it with an unleaded midgrade. In St. Louis, "SuperClean Unleaded Plus" contains 20 to 30% less olefins and aromatics and 35% less benzene than the average gasoline sold in St. Louis. It also features at least 2.0% (wt.) oxygen provided by MTBE, maximum aromatics content of 20% (vol.) maximum benzene content of 1% and a summertime Rvp of 8.5 psi. The fuel is sold at 125 branded service stations in the seven-county metropolitan St. Louis area. It is priced between regular unleaded and premium unleaded. Phillips is considering long-range plans to produce a reformulated product at all three company refineries. Phillips is currently building a 7,500 b/d dehydrogenation-based MTBE plant at its Borger, TX refinery.

Marathon's 'Amaraclean'

In March 1990, Marathon Petroleum Company became the first in the nation to offer a full slate of reformulated gasolines -- the "Amaraclean" product lineup in the Detroit metropolitan area.[13] The Amaraclean product slate, which is marketed through 161 branded service stations, consists of 87-octane "Milemaker Unleaded," 89-octane "Extra-M Plus" and 92-octane "Super-M Premium." All three products are MTBE blends with reduced aromatics and lower Rvp. The cleaner-burning gasolines, specially refined and blended at Marathon's 68,500 b/d Detroit refinery, are formulated to be particularly effective in pre-1981 vehicles having less sophisticated emission control systems.

Amaraclean gasolines have a summer Rvp of 9.5 psi and a winter Rvp of 13 psi. These volatility levels are 1 psi below the EPA specification and about 1/2 psi below the industry average. Aromatics in the new gasolines have been reduced 16%. With a limit of 25%, the Amaraclean line have the lowest aromatics content of any gasolines now available. The average oxygen content of the reformulated gasolines is 1.8%, achieved by blending an average of 10% MTBE. The MTBE is produced at a new 900 b/d unit at the company's Detroit refinery. With lower Rvp, evaporative pollution is reduced, lessening the formation of ground-level ozone. The company estimates that HC emissions are being reduced by 20% and CO emissions by 14%.

Shell's 'SU-2000E'

In April 1990, Shell Oil Company implemented a 10-city rollout of "SU 2000E," a premium-grade "interim" gasoline. SU-2000E is a 92-93-octane product that contains at least 5.5% (vol.) MTBE and has a Rvp lower than upcoming state and federal summer volatility specifications.[14]

The 10 cities supplied with the new product are Washington, D.C., and the nine cities defined as severe ozone non-attainment areas -- Los Angeles, New York, Chicago, Philadelphia, Houston, San Diego, Baltimore, Hartford, CT, and Milwaukee, WI. SU 2000E is manufactured at four Shell refineries -- Norco, LA, Deer Park, TX, Wood River, IL, and Wilmington, CA. Company executives project sales of the new product in 10 markets to exceed 83,300 b/d -- between 35% and 40% of the company's total premium gasoline sales nationwide. Company literature accompanying the introduction of SU-2000E used the term "environmentally enhanced" rather than "reformulated" to describe the new gasoline.

Some controversy accompanied Shell's rollout. Compared to the four reformulated products then on the market, SU 2000E made the fewest compositional changes from conventional unleaded gasoline. Unlike all four previously introduced "interim" reformulated gasolines, Shell made no reductions in aromatics or olefins. Also, Shell's unreformulated SU 2000 premium unleaded gasoline already contained roughly between 2% (vol.) and 5% (vol.) MTBE in certain areas of the United States, primarily in PADD I.

Shell officials stressed the broad geographic scale and unprecedented significant volumes available, rather than the degree of alteration to their fuel's composition. Company officials declined to disclose the added production cost, but outside estimates place the cost at roughly 1¢/gallon higher than the cost to manufacture unreformulated SU 2000. Modeling studies performed by Systems Applications, Inc. show that 80 fewer tons of hydrocarbons and CO would be emitted into the air nationwide when Shell customers use the new product.

Exxon's 'Supreme,' 'Extra' and 'Plus'

In April 1990, Exxon Company, U.S.A. announced "interim" reformulated versions of its premium and midgrade products in more than 40 major markets, first along the East and Gulf Coasts, later on the West Coast.[15] The new versions of 93 (R+M)/2 "Supreme" and 92-octane "Extra" are Exxon's premium products; "Plus" is Exxon's 89-octane midgrade. These products feature reduced Rvp and, in the New York and Los Angeles metropolitan areas, are blended with 5.5% (vol.) MTBE to help alleviate year-round CO problems. As with Shell's SU-2000E, Exxon made no reductions in aromatics or olefins.

Refining and marketing analysts said Exxon's announcement, following a similar announcement by Shell, brought to a boil a simmering controversy about what qualifies as reformulation. Although the new gasolines cost more to produce, the wholesale price for these products is competitive with other premium and midgrade gasolines.

In June 1990, Exxon started shipping reformulated 93-octane "Supreme" and 89-octane "Plus" from its 455,000 b/d refinery in Baton Rouge, LA.[16] At the same time, Exxon started rolling out the new products from its 493,000 b/d refinery in Baytown, TX. Also in mid-June, Exxon introduced lower-Rvp "Extra" in Montana, Northern Idaho, and Eastern Washington. In New York and Los Angeles, where the new products is oxygenated year-round, company officials estimate a 7% reduction in CO emissions from a typical automobile. MTBE is supplied through the company's 3,000 b/d chemical division and by spot and contract purchases. Because Spokane, WA, is a "serious" CO nonattainment area, Exxon blends 5.5% (vol.) MTBE in "Extra" sold there from November through March.

The reformulated Supreme and Plus are manufactured at three locations: The 493,000 b/d Baytown, TX, refinery, the 455,000 b/d Baton Rouge, LA, refinery, and the 120,000 b/d Linden, NJ, refinery. The new Extra delivered to metropolitan San Francisco, Sacramento and Reno is produced at Exxon's 128,000 b/d refinery in Benicia, CA. The base fuel for the new Extra delivered to Los Angeles is produced by Ultramar at its 41,600 b/d refinery, then blended with 5.5% (vol.) MTBE at the terminal. The Rvp of Exxon's reformulated "Extra" averages 8.1 psi -- a half-pound lower than the California summer industry average. California's summer Rvp limit is 9 psi.[17]

Company officials boast of being the leading producer of reduced emissions gasolines, since the lower-Rvp products are available in more than 40 markets from coast to coast. Exxon estimates sales of the new versions of these new products to be nearly 190,000 b/d -- more than half of the company's branded gasoline sales in these markets.

Chevron's 'Supreme'

In June 1990, Chevron U.S.A. Inc. introduced a reformulated version of its 92-octane "Supreme" in Los Angeles, San Diego and Santa Barbara, CA.

In addition to reducing Rvp to a range between 8.0 psi and 8.5 psi and blending a minimum of 5% (vol.) of MTBE, the new product features a tailored distillation curve for improved driveability.[18] According to company officials, this provides motorists with smoother performance in the warm-up phase for vehicles that experience stumbling, hesitation or stalling. The tailored distillation curve of the new "Supreme," however, diminishes the refinery's gasoline output.

Chevron did not specify other changes, such as a reduction in aromatics content. Company officials maintain that studies of the impact of aromatics on ozone smog formation are inconclusive. A recent two-car test conducted jointly with the California Air Resources Board (CARB) indicated that reducing aromatics did not lower emissions of HC, CO, or NO_x. Others disagree. Emissions tests performed by Arco Chemical Company, Ethyl Corporation and others in the industry link aromatics reductions directly to a measurable reduction in NOx and CO.

Chevron maintains that reducing vapor pressure will certainly lower HC emissions. Carbon monoxide emissions are reduced and the octane level is maintained by adding a minimum of 5.5% (vol.) of MTBE, or about 1% (wt.) oxygen. The Chevron/CARB effort was conducted in early 1990 at Chevron Research Technology Corporation (CRTC) and at CARB's El Monte, CA, facility.

Arco's 'EC-Premium'

On Sept. 6, 1990, a year after introducing EC-1, Arco Products Company introduced "EC-Premium." The new 92-octane gasoline replaced Arco's 91-octane "Super Unleaded" gasoline at more than 700 branded retail outlets in California markets from Santa Barbara to San Diego.[19] Like EC-1, the new product is made at the company's refinery in Carson, CA, where between 18,000 and 20,000 b/d of produced. The benzene content is 1% (vol.), overall aromatics is limited to 25% (vol.), and it contains 8.25% methyl tertiary butyl ether (MTBE). The benzene level is 63% below the average reported for all premium gasolines in a Motor Vehicle Manufacturers Association survey of the Los Angeles area.

Arco called the fuel the "cleanest burning" gasoline available in Southern California. Compared to conventional unleaded premium, Arco said the new fuel reduced emissions of cancer-causing benzene by 36%, carbon monoxide by 28% and smog-forming hydrocarbons by 21%. Refinery processing changes reduce the amount of benzene produced by up to 12,600 gallons/day. Arco has also reduced total aromatics and olefins, a group of chemical components that react in the presence of sunlight to form smog, by 25%. In addition, Arco has lowered vapor pressure by 1 psi below the California state standard.

Tests show that EC-Premium generates 28% less carbon monoxide, 21% less exhaust hydrocarbons and 36% less evaporative emissions than conventional premium gasoline.

Arco's tests showed that the introduction of EC - Premium will reduce emissions by 86,000 pounds (43 tons) per day.

Other tests, however, indicated that the new 92-octane product produces a 34% increase in emissions of 1,3-butadiene, a suspected carcinogen from some of the feedstock sent to the fluid catalytic cracking (FCC) unit. Arco confirmed the butadiene results but said the 9.8% nitrogen oxide increase was based on unreliable data. Independent researchers said that even with a 34% increase, the 1,3-butadiene concentrations were too small to be significant. Arco researchers said that despite the butadiene, EC-Premium reduces overall pollutants enough that the overall cancer risk is down by 28%. [20]

Amoco's 'Ultimate,' 'Silver' and 'Regular'

On Nov. 1, 1990, Amoco Oil Company introduced a reformulated product slate in Washington, D.C. and surrounding states. The Amoco lineup -- the only meet the 1992 requirements of the Clean Air Act Amendments of 1990. Amoco timed its rollout to closely coincide with the passage of the amendments. Amoco produces the new gasoline grades at its 420,000 b/d refinery in Texas City, TX.[21]

The product slate, which meets the 1992 requirements of the Clean Air Act amendments, is available at roughly 250 branded service stations from Baltimore to Roanoke, VA. Amoco is the leading gasoline marketer in these areas, with an estimated 20% market share.

All grades of Amoco gasoline sold in this region feature reduced vapor pressure (9.0 Rvp during summer months), 0.8% (wt.) average benzene content, and contain 30% (vol.) aromatics, or less, on an annual average basis. Amoco will add 15% (vol.) MTBE in its gasolines in winter months to address the area's carbon monoxide levels.

Company executives said they anticipate capital investments of up to $2 billion for future refinery modifications to produce gasolines that comply with the Clean Air Act Amendments of 1990.

Sun's 'Sunoco-CL'

Sun Company announced in May 1991 that it will introduce partially reformulated gasolines early this summer at 141 Sunoco stations in the Baltimore-Washington area. The new gasolines, named "Sunoco-CL" will have increased amounts of oxygen and limited levels of benzene. The introduction is being done as a "first step" toward meeting the fuel composition requirements of the 1990 Clean Air Act amendments, Sun officials said.[22]

In the Baltimore-Washington area, Sunoco's premium 94-octane Ultra gasoline, already high in oxygen content, will not drop below the 1995 summertime requirement for 2% (wt.) oxygen. He said the oxygen content of Sunoco's partially-reformulated 86-octane

Economy is increased to 1%, thereby also boosting the oxygen content of Regular, Plus, and Super -- the three intermediate grades blended from Ultra and Economy via the company's patented "Sundial" blending pump.

The new products will be refined at Sun's 170,000 b/d refinery in Marcus Hook, PA, where the company commissioned a 2,500 b/d methyl tertiary butyl ether (MTBE) plant in 1989. Benzene levels in all grades of the new gasolines are limited to 2% and that all grades have an additive that meets the 1995 requirements of the Clean Air Act. The use of oxygenates reduces emissions of both unburned hydrocarbons and carbon monoxide, company executives stressed. Officials said Sunoco-CL gasolines would be priced the same as comparable non-reformulated Sunoco gasolines, even though they cost from 2 to 5¢/gallon more to make. The company had made preliminary plans in the summer of 1990 for an introduction of an interim reformulated product in September, but the Aug. 2 invasion of Kuwait and related gasoline price spike delayed the plan.

The Clean Air Act Amendments of 1990 and Their Implementation by EPA

According to the Clean Air Act Amendments of 1990, reformulated gasoline is defined as a fuel containing a minimum average of 2.0% (wt.) oxygen; a maximum average of 1.0% (vol.) benzene; no more than 25% (vol.) aromatics; and no lead. In the alternative, a fuel that meets a 15% volatile organic compound (VOC) reduction during summer months may be certified and approved by EPA if it contains no less than 2.0% (wt.) oxygen and no more than 1% (vol.) benzene. All fuel formulations must meet a 15% reduction in air toxic emissions year-round.[4]

First, fuels sold in the 39 cities now in nonattainment of EPA carbon monoxide (CO) standards will be required to have a minimum average of 2.7% (wt.) oxygen by Nov. 1, 1992 for no less than four winter months. Some of these cities will later need to meet the reformulated fuel standards year-round. Some of the CO nonattainment cities, however, may be able to "opt-out" of the oxygen standard for a number of reasons defined in the law.

By Jan. 1, 1995, refiners marketing gasoline in the U.S. will have to meet new fuel reformulation requirements for gasoline sold in the "nine ozone nonattainment areas" of Los Angeles, New York City, Greater Connecticut, Baltimore, Philadelphia, Chicago, Milwaukee, Houston and San Diego. Later, nearly 90 other areas could choose to "opt-in" and include reformulated fuels in their state ozone-reduction strategies to meet clean air requirements.

Reformulated gasoline and oxygenated fuels provision in the law will also permit oil companies to average the oxygen, aromatics and benzene contents of all gasoline sold in the nine worst cities and other CO and ozone nonattainment areas. A credit system will be set up where marketers may be able to sell no or low-oxygen fuels. To meet oxygen

requirements under the new law, the companies selling no or low-oxygenate blends would have to obtain offsetting oxygen credits they have previously earned (banked) or purchased from gasoline blenders and refiners blending oxygenates above EPA standards.

Although the Clean Air Act Amendments of 1990 were signed into law by President Bush on Nov. 15, 1990, the responsibility of implementing the law rests with EPA. The agency has employed a novel regulatory negotiation process that has brought together representatives from industry, government and public interest groups to develop consensuses on implementation issues. The process, dubbed "Reg Neg" by its participants, involves one umbrella committee and four working groups who focus on issues of "fuel certification and testing," "supply and distribution," "anti-dumping" and "enforcement."

Reg Neg has been a source of hope to some and frustration to others, as widely divergent interests seek common ground. It represents the conciliatory approach EPA adopted for its implementation strategy.

EPA announced that it intends to issue a Notice of Proposed Rulemaking (NPRM) on reformulated gasoline and oxygenated fuels by May 31. For EPA, time is running short: under the Clean Air Act, the agency must issue final regulations on oxygenated fuels no later than Aug. 15, and on reformulated gasoline by Nov. 15. In order to permit at least one hearing prior to finalizing the regulations, the agency said it must adhere to this strict schedule. Two more meetings of the umbrella group were set for June during a 45-day comment period, culminating with a mid-July public hearing on the proposed regulations.[23]

While many key issues remain unsettled among Reg Neg participants, EPA officials said the agency may need to draft its own proposed rules on reformulated gasoline and oxygenated fuels. EPA's general counsel emphasized that agency decisions represent the views of the federal government, but that the agency cannot be legally bound to an agreement reached by the group after the NPRM is published. Based upon a legal interpretation of the Regulatory Negotiation Act of 1990 and the Administrative Procedures Act, after a regulation is proposed, Reg Neg becomes merely "another forum" for parties to have input. Binding EPA to a Reg Neg agreement after publication of the NPRM would violate Article II, Section 2 of the Constitution.

As this paper went to press, participants generally seemed optimistic about achieving something close to a consensus on most issues, except the more thorny technical ones in fuel certification. The fuel certification group was still grappling with issues of certifying fuels as being capable of meeting reformulated gasoline requirements for 15% reductions in ozone-forming VOCs and 15% reductions in air toxic emissions by 1995. Members of the group said they need to evaluate new data forthcoming from the Auto/Oil Air Quality Improvement Research Program and EPA. One of the most significant issues remaining before this group is to complete baseline emissions standards for 1990 fuels and vehicles.

This information will be used to compare the emissions benefits of fuels proposed for certification. The most serious dispute over these parameters includes the definition of the Rvp specification: whether it should be 9 psi (the 1990 summertime average) or 7.8 psi.

For 1995 certification fuels, the issue was how to define "no NOx increases," as the law requires. While state regulators and environmentalists argue that there should be an absolute zero increase, the American Petroleum Institute (API) and oxygenated fuel groups have argued that such test precision is not possible for each and every sample of the same fuel, even under the same certification test procedures. These groups argue that some flexibility should be built into the definition, such as a statistically significant error range around zero.

Other remaining issues on the fuel side are how to handle benzene exhaust emissions and defining what the term VOC means in the law. As of May 14, EPA's draft regulation contained placeholders for many of these terms and options because Auto/Oil and other information was still forthcoming. A supplemental NPRM is likely for comments on the remaining issues.

On fuel testing, it had not yet been decided what is an appropriate number of cars and tests required. The group agreed that 1989 through 1990 model year vehicles will be included as the "representative" baseline for testing, given similar technologies they employ.

For baseline emissions, the group agreed that the effects of enhanced inspection and maintenance programs (I/M, as yet undefined) and refueling controls will be factored-in. EPA's emissions model MOBILE4.1 will be used to establish exhaust, evaporative, running loss, and refueling emissions for baseline fuels, with resting losses excluded.

Anti-dumping negotiations have seen fairly significant progress toward resolving how to prevent the degradation of fuels in areas that are in attainment for criteria pollutants while ozone nonattainment areas especially are required to have reformulated gasoline marketed year-round. Remaining issues to be resolved include how to treat incremental "new capacity" at a refinery in terms of baseline fuel for certification. On ensuring that each refinery's baseline information is accurate, it was generally agreed that audits should be conducted on refiners to certify their 1990 or 1991 baseline production data.

The supply & distribution group had numerous issues remaining to be resolved, include establishing specific guidelines and criteria for states to obtain two-year waivers from the oxygenated fuels requirements under the law. The means of determining fuel costs, a factor which can be taken into account in granting a waiver to a state, remained open. The length of oxygenated fuel control periods for CO nonattainment areas was still an open issue, with recommendations to set differing program lengths in different areas and the data upon which such determinations are made still up in the air. In addition, the definition of what the law means by "domestic supply" remained unresolved.

The enforcement/credit trading group has also made good progress toward consensus, with only a few details remaining to be resolved. Although the law does not specify a minimum oxygen content standard, only an average, the group discussed whether to set a minimum requirement in CO nonattainment areas. The question of whether to compute averaging on a monthly, quarterly or semi-annual basis was still pending. Labeling questions also remained unresolved.

The group clarified who is legally responsible if a fuel does not meet the requirements of the program. The owner of gasoline sold or dispensed at the rack and/or marketed by the oxygenate blender will be liable if the fuel fails to meet program requirements. The term for this person is the Control Area Responsible party ("CAR").

Other important issues remaining to be resolved are testing tolerances and blending allowances. It appears likely, for example, that MTBE will eventually be waivered up to 2.9% (wt.) instead of 2.7% under current regulations. Oxygenate purity and test reproducibility issues are being discussed as factors in the averaging issue. Finally, the question of oxygenate linearity effects on reducing CO remained on the table, with recommendations to reexamine the issue as technology advances, perhaps annually.

On reformulated gasoline, the definition of the geographical scope of the program, taking into account the statutory differences between area designation categories is still under consideration. Finally, while the issue of averaging was debated, the work group is near to concluding that averaging will be based on the component content of the fuel (e.g., oxygen, benzene, and aromatics) not performance.

Emissions Research Findings

Work continues on a major research program -- the Auto/Oil Air Quality Improvement Research Program -- sponsored jointly by the "Big Three" U.S. automobile manufacturers and 14 U.S. oil companies. Every major oil company is also individually researching possible reformulations to gain an advantage in a fiercely competitive market. Some individual oil company research programs, briefly mentioned in the first section of this paper, are yielding some interesting findings, as is the Auto/Oil program.

New research findings are pointing toward additional strategies for reductions of a complex mix of emissions types. Some of the preliminary results of Phase I of the Auto/Oil program are described on Table II.

Table II
Main Effects of Changes in Fuel Variables on Mass Exhaust Emissions
Current Vehicle Fleet (percent change)

Emission Constituent	Change in Fuel Variable			
	Aromatics 45% → 20%	MTBE 0% → 15%	Olefins 20% → 5%	T_{90} 360° F → 280° F
HC	-6.3 ±1 1.8	-5.1 ± 1.8	6.1 ± 2.0	-21.6 ± 1.7
CO	-13.6 ± 2.9	-11.2 ± 3.1	1.5 ± 3.4	00.8 ± 3.9
NOx	2.1 ± 2.0	1.4 ± 2.0	-6.0 ± 1.9	5.0 ± 2.4

Note: Values are shown with 95% confidence intervals. Changes less than the confidence interval are not significant.
Note: An "effect" is the difference in response (HC, CO, NOx) computed using all experimental design data as particular variables (aromatics, MTBE, olefins, T90) change.

Source: Auto/Oil Air Quality Improvement Research Program.

Aromatics Content Reduction and Distillation Curve Adjustment

The Clean Air Act Amendments of 1990 require reductions in total aromatic content and benzene content of reformulated gasoline by 1995. However, the initial phase of the Auto/Oil Research Study found that reducing the boiling range (T_{90}) from 360° F to 280° F lowered hydrocarbon emissions from the current vehicles by 22%.

Recent vehicle emissions testing programs repeatedly demonstrated that lowering a gasoline's driveability index (Dl) reduces hydrocarbon (HC) tailpipe emissions.[24,25]

Driveability Index Formula

$$T = 1.5 \times T_{10} + 3.0 \times T_{50} + T_{90}$$

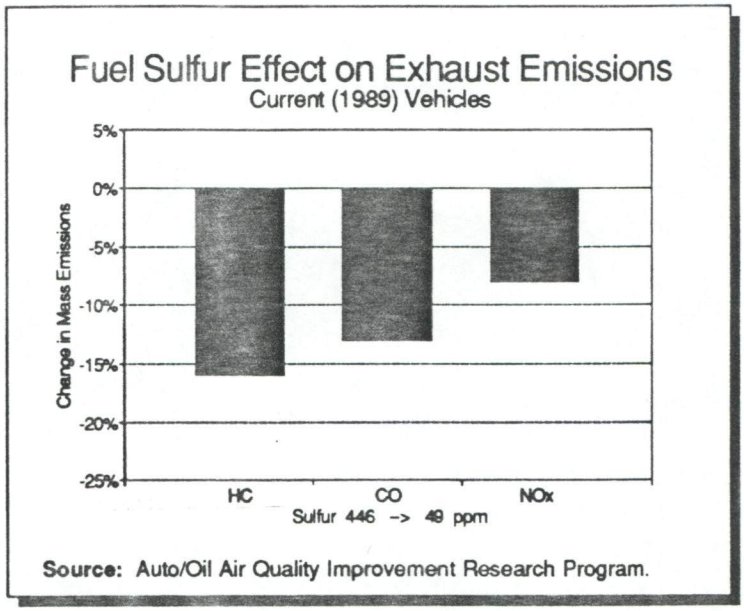
Where:
T_{10} = Point at which 10% of gasoline evaporates.
T_{50} = Point at which 50% of gasoline evaporates.
T_{90} = Point at which 90% of gasoline evaporates.

NOTE: All measurements taken according to ASTM D 86 test method.

The tests demonstrated that total aromatics content did not have a large effect on nitrogen oxides (NOx) emissions, and no measurable effect on HC or CO emissions, when the distillation characteristics of the gasolines are kept constant For the majority of vehicles, the effect is most apparent in the cold start portion of the federal Test Procedure (FTP). Although the tests were performed on an assortment of vehicles with fuels of various compositions, the finding was duplicated in four separate emissions programs.

Sulfur Reduction

A surprising finding from Phase I of the Auto/Oil program is the positive effect that a reduction in sulfur has on three major emissions types: hydrocarbon, carbon monoxide and ozone. This finding, announced in March, was greeted with much enthusiasm by refiners at the annual meeting of National Petroleum Refiners Association (NPRA).[26] The benefits seem clear, and removing sulfur can be accomplished with well-developed technology, even though it requires additional hydrogen and increases the cost of finished gasoline.



Source: Auto/Oil Air Quality Improvement Research Program.

However, the results were preliminary and based on reducing sulfur from 445 parts per million (ppm) to 49 ppm. The effect of lower sulfur levels was most dramatic on HC emissions. Compared with base gasoline with a sulfur level of 466 ppm, gasoline with a 49 ppm sulfur content reduced HC emissions roughly 16%. At the same time, CO emissions were reduced 13% and NOx were reduced almost 9%.

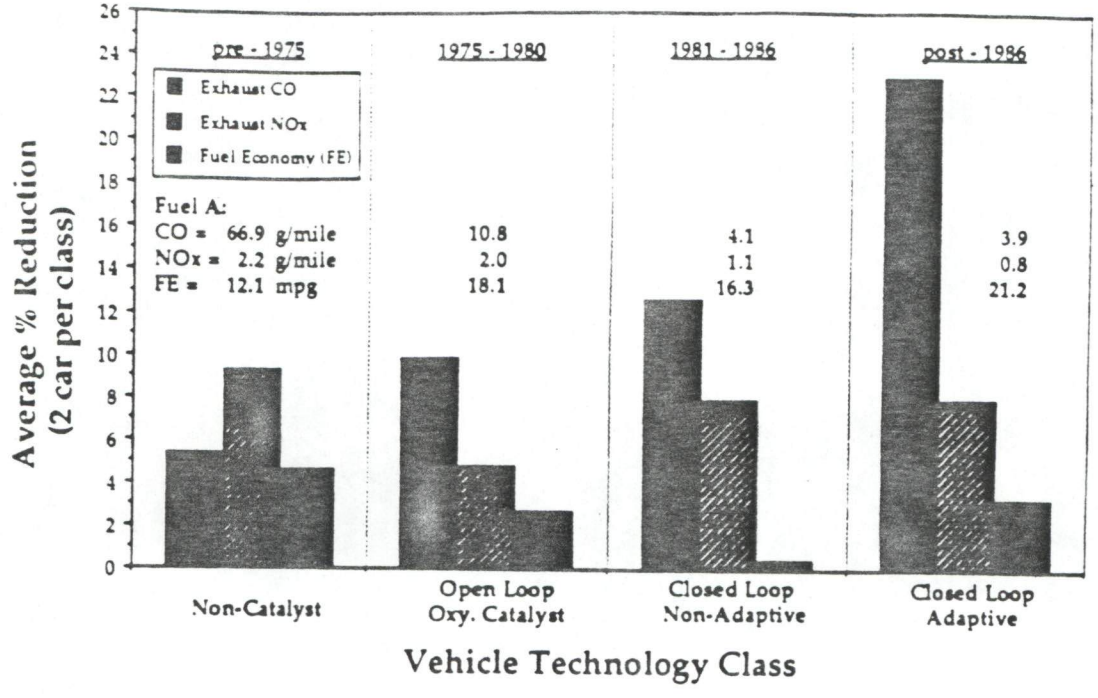
Auto/Oil researchers are currently assessing the impact of less drastic reductions in sulfur to determine whether the emissions reduction effects are linear; also, to pinpoint the level for maximum overall emissions reductions.

Speciation and Reactivity

Apart from mass emissions of HC, CO and NOx, much work continues on measuring the reactivity of individual hydrocarbon types in the presence of sunlight. The Auto/Oil program continues to work on this matter.

Research conducted by Phillips Petroleum Company and the National Institute for Petroleum and Energy Research (NIPER), meanwhile, demonstrated that reformulated gasolines are capable of making significant reductions in reactivity with respect to the formation of ozone. A two-phase test compared emissions from vehicles using Phillips' new fuel formulations to emissions from vehicles using average midgrade blends available in the St. Louis market. Hydrocarbon species determinations were made and analyzed, using

Figure 2
Carbon Monoxide, NOx and Fuel Economy Percent Reductions



NIPER's detailed hydrocarbon speciation procedures.[27]

In the first phase of the program, vehicles were tested for emissions on a vehicle dynamometer using the EPA's Federal Test Procedure (FTP) at 75° F. These emission test results were used in the second phase to predict the effect on ozone formation in the St. Louis metro area. In addition, results from the testing program were analyzed for comparison of pollutant levels from SuperClean Unleaded Plus to existing midgrades sold in St. Louis. Laboratory tests showed that formulating fuels with reduced aromatics and olefins levels, reduced vapor pressure, lower benzene and sulfur content, and increased oxygen can decrease both evaporative and tailpipe emissions.

The T_{90} of the two gasolines were 326° F for the reformulated fuel and 351° F. for the St. Louis average gasoline. The distillation curve of the reformulated gasoline had boiling points depressed about 17-29° F. from T_{30} through T_{80}, compared to average gasoline. Phillips' reformulated gasoline provided lower exhaust CO emissions for all technologies, with a statistically significant reduction achieved in cars equipped with adaptive learning.

NOx emissions were directionally reduced in all vehicle technology classes, but the reduction was determined to be insignificant when test variation was taken into account. Exhaust and evaporative HC emissions varied by technology class and emission type (see Figure 2). But significant reductions were identified for the total hydrocarbon effect in the post-1980 car technologies. The effect was strengthened when the ozone-formation potential of the emitted species was taken into account.

Forecasts for the 1990s:

In this decade, a sizeable share of the U.S. gasoline will be oxygenated as a result of the Clean Air Act Amendments. Oxygen-rich refiners and marketers will therefore have an economic advantage over those refiners in short supply. Table III shows a projection of the growth of reformulated gasoline through the decade.

Table III - U.S. Gasoline Volumes Affected by Clean Air Act Legislation (b/d)

Year	Carbon Monoxide Areas	Extreme & Severe Severe Ozone Areas	Marginal & Moderate Ozone "Opt In" Areas	Gasoline Sold in Nonattainment Areas
1992	392,485	0	0	392,485
1993	767,599	0	0	767,599
1994	773,359	0	0	773,359
1995	779,159	1,183,973	0	1,963,131
1996	785,003	1,192,851	391,389	2,369,243
1997	790,894	1,201,794	782,779	2,775,466
1998	796,823	1,210,809	1,174,168	3,181,800
1999	802,798	1,219,889	1,565,558	3,588,245
2000	808,819	1,229,041	1,956,947	3,994,808

Source: Information Resources, Inc., Washington, D.C.

Refiners and merchant oxygenate producers are making an all-out effort to build added capacity for MTBE and TAME. Fuel ethanol will supplement the oxygen available from these ethers. Ethyl tertiary butyl ether (ETBE), heretofore an oxygenate produced in a pilot plant and in test batches, may be manufactured on a commercial scale. Other forecasts include the following:

- By 1995, refiners will need over 230,000 b/d of MTBE and 120,000 b/d of ethanol to meet oxygenated fuel demand (This assumes that the market for oxygenates is split evenly between ethanol and MTBE in carbon monoxide nonattainment areas, and split 65% MTBE/35% ethanol in ozone nonattainment areas under ideal distribution conditions).
- The heavy demand for oxygenates will reactivate studies of alternative compounds for blending and for cosolvents of methanol.
- More oil companies may invest in fuel ethanol production. Texaco is a joint venture partner in Pekin Energy Company and Ashland is a joint venture partner in South Point Ethanol. Fuel ethanol formulation may be attractive because it provides higher levels of oxygen per blended gallon. Arizona-based oil refiner Giant Industries, Inc. bought ethanol producer Portales Energy in May.[28]
- As much as 60-80,000 b/d of tertiary amyl methyl ether (TAME) units will be added to U.S. refinery operations by 1995 to help meet oxygen requirements. The first several of these units were announced in late April and early May.[29, 30, 31]
- U.S. refineries will need to produce more hydrogen from sources other than the catalytic reforming unit. The need to reduce aromatics in gasoline will call for less severe reformer operations, which will reduce hydrogen output from reforming. In addition, the distillate side of the barrel will require more hydrogen for desulfurization and possibly aromatics removal.
- Gasoline imports to the United States, which have provided a crucial share of the East Coast's supply, are likely to decrease as European refineries are pressed to produce unleaded gasoline in ever-greater quantities.
- Some incremental expansion of processing capacity will occur at existing refineries, but new refineries are unlikely to be built in the United States because of the huge capital outlays required and the difficulties in obtaining permits to build them.

Acknowledgment

The author is very grateful to George Unzelman, Fred Potter, James Peeples and Maureen Lorenzetti for their constant support and counsel.

References

1. "Arco Preparing California's First "Clean Gasoline," Octane Week, Aug. 14, 1989.
2. "Arco Unveils 'EC-1,' First Reformulated Gasoline," Octane Week, Aug. 21, 1989.
3. "Arco Executives Receive Honor for First Reformulated Gasoline," Octane Week, April 2, 1990.
4. The Impact of the Clean Air Act on Motor Fuels: An Analysis of Reformulated Fuels, Information Resources, Inc., Washington, D.C. and Oxygenates, 1990 - 2000," G.H. Unzelman, F.L. Potter, J.E. Peeples et al, 1991.
5. Oxygenates in Gasoline -- The '90 Decade, G.H. Unzelman, NPRA Paper AM-91-46, NPRA Annual Meeting, San Antonio, Texas, March 17-19, 1991.
6. Unzelman, G.H., "Environmental Problems Will Unleash Opportunities in the 1990s," Octane Week, Dec. 11, 1989.
7. "Arco Offers to Share EC1 Formula with Soviets, Octane Week, Sept. 18, 1989.
8. "Diamond Shamrock Reformulates Colorado Gasoline," Octane Week, Dec. 14, 1989.
9. "Conoco to Roll Out New Reformulated Gasoline," Octane Week, Jan. 8, 1990.
10. "Conoco's Montana Refinery Making Reformulated Gasoline," Octane Week, June 11, 1990.
11. "Phillips' Reformulated Midgrade To Hit Colorado," Octane Week, Feb. 12, 1990.
12. "Phillips Selects St. Louis for New Reformulated Gasoline," Octane Week, April 9, 1990.
13. "Marathon to Reformulate Whole Slate in Detroit Area," Octane Week, March 19, 1990.
14. "New Shell Reformulated Gasoline in 10 U.S. Cities," Octane Week, April 16, 1990.
15. "Exxon Announces Two New Reformulated Gasolines," Octane Week, April 30, 1990.
16. "Exxon Begins Production of Interim Reformulated Fuel," Octane Week, June 18, 1990.
17. "Exxon Rolls Out Reformulated Products on West Coast," Octane Week, July 30, 1990.
18. "Chevron Rolls Out New Reformulated 'Supreme'" Octane Week, June 18, 1990.
19. "Arco Raises Octane In New 'EC - Premium'," Octane Week, September 10, 1990.
20. "Smog Drop Outweighs Higher Butadiene in New Arco Fuel," Octane Week, October 1, 1990.
21. "Amoco's New Reformulated Gasoline in Mid-Atlantic," Octane Week, November 5, 1990.
22. "Sun Announces 'Sunoco-CL' Interim Reformulated Slate," Octane Week, May 6, 1991.
23. 'Reg Neg' Update -- With Time Running Out, Much Work Remains, Octane Week, May 6, 1991.
24. Initial Results from the Auto/Oil Air Quality Improvement Research Program, J.M. Colucci and J.J. Wise, NPRA Paper AM-91-46, NPRA Annual Meeting, San Antonio, Texas, March 17-19, 1991.
25. The Effect of Gasoline Aromatics Content on Exhaust Emissions: A Cooperative Test Program, J.A. Gething, S.K. Hoekman, A.R. Guerrero and J.M. Lyons, SAE Paper 902073, SAE International Fuels and Lubricants Meeting, Tulsa, Okla., Oct. 22-25, 1990.
26. Distillation Adjustment: An Innovative Step to Gasoline Reformulation, J.A. Gething, SAE Paper 910382, SAE International Congress, Detroit, Feb. 25 - March 1, 1991.
27. The Total Effect of a Reformulated Gasoline on Vehicle Emissions by Technology (1973 to 1989), G.A. Schoonveld and W.F. Marshall, SAE Paper 910380, SAE International Congress, Detroit, Feb. 25 - March 1, 1991.
28. "Refiner Buys Portales Energy's New Mexico Ethanol Plant, Oxy-Fuel News, May 13, 1991.
29. "Star Enterprise to Build New TAME, MTBE Units," Octane Week, April 22, 1991.
30. Chevron to Build TAME Unit at El Segundo, CA, Refinery," Octane Week, May 6, 1991.
31. "Exxon Poised for Huge Growth in TAME Production," Octane Week, May 13, 1991.

CAA - Reformulated Gasoline

SU 2000E(TM) PREMIUM UNLEADED GASOLINE

Shell is introducing an environmentally enhanced premium unleaded gasoline, SU 2000E, on April 11. The new product will reduce hydrocarbon vapor and carbon monoxide emissions and will be marketed in the nine metropolitan areas with the most severe air quality problems and in Washington, D.C. The nine areas, besides the District of Columbia, are New York City, Hartford, Connecticut; Chicago, Houston, Los Angeles, metropolitan Philadelphia (southern New Jersey and Delaware), Baltimore, Milwaukee and San Diego.

The major air quality benefits of the new gasoline are a reduced tendency of the gasoline to evaporate and the addition of MTBE which reduces carbon monoxide automobile tailpipe emissions.

Shell views the introduction of the new gasoline as a first step toward cleaner air and not as the final solution. Virtually all cars will be able to use SU 2000E, which will have the same octane and detergent additive package as Shell's current premium gasoline, SU 2000®. While the new product will cost more to produce, it will be priced competitively in the marketplace. At present, Shell's manufacturing capabilities are limited to the production of SU 2000E for the ten areas mentioned.

Studies on the emissions and air quality impact of SU 2000E have been conducted by a recognized laboratory using approved computerized air modeling techniques. The results indicate that by using SU 2000E, rather than gasolines blended at current state and federal regulatory levels, our premium gasoline customers' cars in these areas will emit about 80 fewer tons of emissions to the air on a typical summer day.

04/05/90

EHH9008601

SU 2000E(TM) HIGHLIGHTS

* On Wednesday, April 11, Shell will be announcing the introduction of a new environmentally enhanced premium unleaded gasoline, called SU 2000E.

* The new gasoline will be marketed in all nine of the highest ozone non-attainment metropolitan areas, as well as in Washington, D.C. and will replace SU 2000(R) in these markets. The nine metropolitan areas include Los Angeles, New York, Chicago, Houston, Milwaukee, Baltimore, Philadelphia, San Diego and Hartford.

  - These areas represent about 37% of Shell's nationwide premium gasoline sales...about 90 thousand barrels per day (3.7 million gallons per day) during the summer season.

  - Premium gasoline sales area are about 41% of Shell's overall sales in these markets.

  - Shell is one of a very few marketers with the capability of supplying such a gasoline to all of these metropolitan areas.

  - The new gasoline can be used by virtually all cars.

  - The gasoline will be competitively priced in the marketplace even though it will cost approximately an additional 2 cents per gallon to produce.

* SU 2000E will feature reduced vapor pressure and the addition of MTBE.

  - Depending on the particular market the Reid Vapor Pressure (RVP) of SU 2000E will be at least a half pound below the state and/or federal legal limit in the summertime. For example:

CITY	SUMMER TIME LEGAL LIMIT	SU 2000E	DIFFERENCE
Los Angeles	9.0 PSI	8.0	1.0
Houston	9.5	8.5	1.0
New York	9.0	8.5	0.5
Chicago, July-Aug	9.5	8.5	1.0
other	10.5	8.5	2.0
Washington, D.C.	10.5	8.4	2.1

(note: complete list attached)

- Differences in vapor pressure from legal limits are a function of our manufacturing and logistical capabilities in each market.

- The new gasoline will include 5.5% volume minimum of methyl tertiary butyl ether, commonly referred to as MTBE. This level of MTBE equates to about 1% weight oxygen in the gasoline.

* **Olefin and aromatic levels in the new gasoline will not be materially different from SU 2000.**

- Shell is not moving components from one grade of gasoline to another...no "ballon squeezing."

- Composition and features:

Component:	Typical SU 2000E
Aromatics	40%
Olefins	10%
Benzene, East	1.3%
West	2.2%
Oxygen	1%
Sulphur	100ppm

Can be used in all cars regardless of age

* **Benefits based on modeling by Systems Application Inc. (SAI) using EPA and California models:**

- A total reduction of more than 80 tons/day of hydrocarbon and carbon monoxide emissions on a typical summer day; biggest impact will be in Los Angeles, Houston, Chicago, and New York.

- The 80 tons/day value is the sum of hydrocarbon (16 tons/day) and carbon monoxide reductions (66 tons/day) offset by a small increase in nitrogen oxides (NOx) emissions (1-2 tons/day).

- Estimates of the emission reductions are based only on the volume of current SU 2000 sales. If all premium gasolines in these markets had the same composition as SU 2000E, the reduction of emissions would be over 400 tons/day.

- On a per vehicle basis, reductions in hydrcarbon and CO emissions range between 5-18% for hydrocarbons and 7-14% for CO. (These estimates compare SU 2000E to other gasolines containing no MTBE at the legal limit RVP in a "typical" car.)

- Complete modeling data by city are attached for further reference.

SU 2000E HIGHLIGHTS

SUMMERTIME REID VAPOR PRESSURE (RVP) COMPARISONS *

CONSOLIDATED METROPOLITAN STATISTICAL AREA:	LEGAL LIMIT RVP	SU 2000E RVP
Los Angeles		
April through October	9.0 psi	8.0 psi
New York	9.0	8.5
Chicago,		
May/June, Sept. 1-15	10.5	8.5
July/August	9.5	8.5
Houston	9.5	8.5
Milwaukee	10.5	8.5
Baltimore	9.0	8.3
Philadelphia, includes Delaware and S. New Jersey	9.0	8.5
San Diego		
April through October	9.0	8.0
Hartford	9.0	8.5
Washington, DC	10.5	8.4
- Maryland	9.0	8.4
- Virginia	10.5	8.4

* Includes May 1 through September 15 unless otherwise noted. All Reid Vapor Pressure values are expressed in pounds per square inch, psi.

SU 2000E HIGHLIGHTS

SUMMERTIME EMISSION CHANGES, TONS/DAY, FOR EXISTING SHELL PREMIUM CUSTOMERS *

METROPOLITAN AREA:	HYDROCARBONS	CARBON MONOXIDE	NITROGEN OXIDES	TOTAL
Los Angeles	-3.9	-24.6	+0.4	-28.1
New York	-2.1	-7.6	+0.3	-9.4
Chicago	-3.1	-8.6	+0.3	-11.4
Houston	-2.0	-9.3	+0.1	-11.2
Milwaukee	-0.2	-0.6	+0.0	-0.8
Baltimore	-0.4	-1.5	+0.1	-1.8
Philadelphia	-0.8	-2.7	+0.1	-3.4
San Diego	-0.6	-5.2	+0.1	-5.7
Hartford	-0.6	-2.0	+0.1	-2.5
Washington, DC	-2.4	-4.1	+0.1	-6.4
Total	**-16.1**	**-66.2**	**+1.6**	**-80.7**

* Results are based on 5.5% MTBE and RVP of SU 2000E compared to the legal limit using the MOBILE4 and EMFAC models.

SUMMERTIME VEHICLE EMISSION CHANGES LIKELY IF A CUSTOMER CHANGES TO SU 2000E FROM ANOTHER GASOLINE WITH NO MTBE AND AN RVP AT THE LEGAL LIMIT:

METROPOLITAN AREA:	PERCENT CHANGE		
	HYDROCARBONS	CARBON MONOXIDE	NITROGEN OXIDES
Los Angeles	-9.9	-13.0	+1.6
New York	-5.9	-6.6	+1.8
Chicago	-11.7	-9.5	+1.9
Houston	-9.9	-11.7	+0.9
Milwaukee	-20.4	-16.1	+1.9
Baltimore	-6.4	-6.6	+1.7
Philadelphia	-6.4	-6.7	+1.8
San Diego	-10.6	-13.1	+1.5
Hartford	-5.8	-6.7	+1.8
Washington, DC	-18.0	-11.5	+1.8

SHELL OIL COMPANY

SU 2000E(TM) PREMIUM UNLEADED GASOLINE

BACKGROUNDER

What: Shell Oil Company is introducing SU 2000E, an environmentally enhanced premium unleaded gasoline.

SU 2000E is specially formulated for each metropolitan area. The summertime RVP will range from 8.0 to 8.5 psi, depending on the area.

SU 2000E is expected to meet most, if not all, California Air Resources Board proposed 1992 Standards today.

Why: To continue Shell's tradition of providing a quality premium unleaded gasoline that meets our customers' requirements in a safe and environmentally acceptable manner.

How: Reduce RVP while maintaining high octane by using MTBE as a blending component.

Benefit: Lower hydrocarbon vapor and carbon monoxide emissions.

Same high octane and detergent additive package as SU 2000(R).

Where: Distributed in:

-- New York City metropolitan area
-- Hartford, Connecticut
-- Chicago
-- Houston
-- Los Angeles
-- Metro Philadelphia (southern New Jersey and Delaware)
-- Baltimore
-- Milwaukee
-- San Diego
-- Washington, D.C.

The nine cities identified by President Bush as having the most severe ground-level ozone problems plus Washington, D.C.

Production: Shell Refineries at:

-- Wilmington (Los Angeles area)
-- Deer Park (Houston area)
-- Wood River (St. Louis area)
-- Norco (New Orleans area)

Total volume of SU 2000E available: Over one billion gallons per year.

EHH9007803

When: On April 11, 1990 SU 2000E will replace SU 2000 at Shell gasoline service stations in the listed areas.

Other Additives: SU 2000E contains Shell's proprietary detergent additive, the same additive ingredient in SU 2000, to help minimize deposits in modern automotive engines.

Technical Glossary: Hydrocarbon vapor emissions are released during the operation of vehicles, and during the transportation, storage, and delivery of gasoline.

Carbon monoxide is released from the automobile tailpipe, as a result of incomplete combustion of gasoline.

Ground-level ozone is formed partially when hydrocarbon vapor emissions and nitrogen oxides combine in the presence of heat and sunlight.

RVP (Reid Vapor Pressure) is a measurement of the volatility (ability to vaporize) of gasoline. Within limits, a lower RVP rated gasoline reduces evaporation. The benefits, however, below 8 psi are minimal.

Federal EPA standards restrict the maximum RVP of gasoline, especially in summer when warm weather speeds evaporation.

The RVP rating for SU 2000E is at least .5 to 1 psi lower than mandated levels in the ten affected areas, depending on location and time of year (see enclosed chart).

MTBE (methyl tertiary-butyl ether) is a clean-burning oxygenate with high octane and low volatility. SU 2000E contains a minimum of 5.5% MTBE.

psi stands for pounds per square inch. It is a measure of pressure.

SUMMERTIME RVP COMPARISONS *

	LEGAL LIMIT	SU 2000E(TM)
HARTFORD, CT	9.0	8.5
NEW YORK CITY	9.0	8.5
SO. NEW JERSEY	9.0	8.5
DELAWARE	9.0	8.5
BALTIMORE	9.0	8.3
WASHINGTON, D.C.	10.5	8.4
• MARYLAND	9.0	8.4
• VIRGINIA	10.5	8.4
HOUSTON	9.5	8.5
CHICAGO (MAY, JUNE, SEP. 1-15)	10.5	8.5
(JULY, AUGUST)	9.5	8.5
MILWAUKEE	10.5	8.5
LOS ANGELES SAN DIEGO (APRIL THROUGH OCTOBER)	9.0	8.0

*INCLUDES MAY 1 THROUGH SEPTEMBER 15 UNLESS OTHERWISE NOTED.
ALL RVP NUMBERS ARE EXPRESSED AS POUNDS PER SQUARE INCH.

###

EHH9007803

SAI/MODELING DESCRIPTION

Shell contracted with Systems Applications Inc., located in San Rafael, California, to conduct the modeling studies for determining the emission and air quality changes associated with the introduction of SU 2000E(TM). SAI is one of the leading contractors in the United States for conducting air modeling work. They conducted similar studies for ARCO associated with the introduction of EC-1 gasoline, and they have the air modeling contract for the joint auto/oil industry fuels research program.

SAI used EPA's MOBILE4 program to estimate the emission changes expected from the use of SU 2000E for all cities outside California. For Los Angeles and San Diego, the California Air Resources Board's EMFAC program was used. The MOBILE4 program was developed by the EPA to estimate emission of hydrocarbons, carbon monoxide and nitrous oxides from motor vehicles. The EMFAC model was developed by CARB and approved by EPA to give essentially the same information as MOBILE4, but it is tailored for California cities which have older cars and more stringent emissions controls on new cars.

Peak ozone changes resulting from the use of SU 2000E were estimated for each city by using the Empirical Kinetic Modeling Approach (EKMA). The variables associated with the introduction of SU 2000E were the changes in RVP and MTBE content of the gasoline in each city. This model is useful as a tool in predicting changes in ozone concentrations but not for determining absolute values of ozone levels.

3/30/90

EMISSION CHANGES WITH SU 2000E™
SUMMER 1990

	EXISTING SHELL PREMIUM CUSTOMERS EMISSION CHANGES, TONS/DAY				VEHICLE EMISSION EFFECT[1] PERCENT		
CITY	HC	CO	NO_X	TOTAL	HC	CO	NO_X
LOS ANGELES	-3.9	-24.6	+0.4	-28.1	- 9.9	-13.0	+1.6
SAN DIEGO	-0.6	- 5.2	+0.1	- 5.7	-10.6	-13.1	+1.5
NEW YORK	-2.1	- 7.6	+0.3	- 9.4	- 5.9	- 6.6	+1.8
PHILADELPHIA	-0.8	- 2.7	+0.1	- 3.4	- 6.4	- 6.7	+1.8
HARTFORD	-0.6	- 2.0	+0.1	- 2.5	- 5.8	- 6.7	+1.8
CHICAGO	-3.1	- 8.6	+0.3	-11.4	-11.7	- 9.5	+1.9
HOUSTON	-2.0	- 9.3	+0.1	-11.2	- 9.9	-11.7	+0.9
MILWAUKEE	-0.2	- 0.6	+0.0	- 0.8	-20.4	-16.1	+1.9
BALTIMORE	-0.4	- 1.5	+0.1	- 1.8	- 6.4	- 6.6	+1.7
WASHINGTON D.C.	-2.4	- 4.1	+0.1	- 6.4	-18.0	-11.5	+1.8
TOTAL	-16.1	-66.2	+1.6	-80.7			

- RESULTS ARE BASED ON 5.5% MTBE AND RVP OF SU 2000E VS LEGAL LIMIT.
- RESULTS ARE BASED ON EPA MOBILE4 OR CARB EMFAC MODELS.

1) VEHICLE EMISSION CHANGES LIKELY IF CUSTOMER MOVES TO SU 2000E FROM ANOTHER GASOLINE WITH 0% MTBE AND RVP AT LEGAL LIMIT

BHCR9001119-1