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**A Report to the Joint Standing Committee  
On Natural Resources**

**2001  
Maine Fuels Report**

February 2002

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Prepared by:  
Maine Department of Environmental Protection  
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# 2001 Maine Fuels Report

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Prepared for: The Joint Standing Committee on  
Natural Resources

Prepared by: The Maine Department of  
Environmental Protection Bureau of  
Air Quality  
17 State House Station  
Augusta, ME 04333-0017  
(207) 287-2437

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## **Executive Summary**

The Department of Environmental Protection submits this report to the legislature in accordance with Title 38 M.R.S.A., Chapter 4, §585-H: Protection and Improvement of Air enacted by the Maine Legislature in 2000. This report summarizes the components of gasoline arriving at the terminals in Maine.

Chapter 4 requires monitoring and reporting of levels of methyl-tertiary butyl ether (MTBE) in shipments of gasoline to storage terminals in the State of Maine. The Legislature established the goal to eliminate MTBE in gasoline sold in the State by January 1, 2003.

Maine began participating in the federal Reformulated Gasoline (RFG) program in January 1995. Subsequently, MTBE began appearing in public and private water supplies more frequently and at higher concentrations than prior to RFG. Maine petitioned United States Environmental Protection Agency (EPA) to opt-out of the RFG program based on the risk to ground water posed by MTBE. EPA approved the petition provided several conditions were met including implementing a replacement fuel with volatile organic compound reductions equivalent to RFG. The Maine Board of Environmental Protection adopted Chapter 119, Motor Vehicle Fuel Volatility Limit, which required 7.8 Reid Vapor Pressure gasoline in the seven southern counties from May first to September 15<sup>th</sup> of each year. Having met the conditions, the effective date for withdrawal from the RFG program was March 10, 1999. In May of 2001, the Department submitted a fuels waiver request for 7.8 RVP fuel under the authority of 211 (c) of the Clean Air Act. Final approval is expected late winter 2002.

The Department anticipated that MTBE levels would drop to levels for gasoline sold in Maine prior to participation in the RFG program. MTBE levels were typically 2 to 3 percent by volume in regular grade gasoline sold in Maine prior to implementation of Phase I of the federal RFG program in 1995.

At the request of the legislature, the Department collects data on gasoline sold in Maine to determine the MTBE levels in gasoline. In addition, the Department shall report the progress made to achieve the goal of eliminating MTBE in gas sold in Maine by January 2003. In 2000, the terminals reported the average of all shipments of gasoline sold in the seven southern Maine counties to be less than 0.39 percent MTBE by volume. This is over a 96 percent reduction in MTBE compared to RFG levels of eleven percent by volume. In 2000 there was a significant reduction in MTBE, oxygen, sulfur, and benzene levels in the fuels as compared to RFG, but an increase in aromatics.

In 2001, the MTBE levels rose from .39 percent to 2.51 percent by volume MTBE. The 2001 levels of MTBE volume percent were 6 times greater than the levels reported in the 2000 data. Sulfur and benzene also increased from 2000 and aromatics reported a slight decrease (Table 1).



However, levels of MTBE have dropped significantly since the State withdrew from the federal RFG program and implemented a “low volatility” gasoline program in 1999. The current 7.8 RVP gasoline with no restrictions on oxygen levels has resulted in MTBE levels equal to or below typical conventional gasoline (2 to 3% by volume). The Department is committed to continue tracking not only the levels of MTBE but also other components in gasoline including sulfur, benzene, and aromatics.

In addition, in 1999 a Northeast Regional Fuels Task Force was established at the behest of the New England Governors Association to look at regional solutions to address the MTBE issue. This Task Force’s objectives are to maximize the air quality benefits and public health benefits of reformulated gasoline, reduce the amount of MTBE in the gasoline supply to protect water resources, promote a regionally consistent clean fuels program, and minimize impact of fuel quality changes on gasoline supply and price. The Task Force will also work with EPA to encourage congressional action to lift the oxygen mandate from RFG and provide an adequate solution over current levels of MTBE in gasoline. Absent changes in federal law, states are effectively prohibited from eliminating the oxygenate requirement. California’s petition to eliminate the oxygenate requirement in fuels was denied by EPA earlier this year.

Chapter 4 also requires the Department to promote and actively participate in regional efforts to develop alternatives for MTBE as a gasoline additive. The Department is actively involved with NESCAUM, other regional agencies and States in searching for alternatives to MTBE. NESCAUM published a report in July 2001, which assessed the potential public health, environmental, regulatory, and economic impacts associated with ethanol as an alternative octane enhancer.

**Table 1**  
**Summary of 2001 Fuels Data**

<b>Weighted Average for:</b>	<b>RVP (psi)</b>	<b>Oxygen (wt %)</b>	<b>MTBE (% vol)</b>	<b>Other Oxy. (% vol) T.A.M.E.</b>	<b>Other Oxy. (% vol) E.T.B.E.</b>	<b>Benzene (% vol)</b>	<b>Aromatics (% vol)</b>	<b>Sulfur (ppm)</b>
1st Quarter	12.95	0.12	0.62	0.87	0.00	0.75	25.51	122
2nd Quarter	7.97	0.48	1.72	0.95	0.30	0.90	30.65	150
3rd Quarter	7.76	0.71	3.75	0.11	0.27	0.78	26.93	170
4th Quarter	11.11	0.58	3.24	0.64	0.00	1.15	27.10	156
Ozone Season	8.05	0.68	3.16	1.04	0.23	0.90	29.01	173
Full Year	10.02	0.51	2.51	0.86	0.22	0.92	28.10	154



## Background

The federal reformulated gasoline (RFG) program was designed to reduce emissions of motor vehicle pollutants. To comply with the RFG program, gasoline must achieve a set of emission performance standards and meet a minimum oxygen content requirement. Refiners have opted to comply with the oxygen requirement by selling RFG containing methyl tertiary-butyl ether (MTBE) at 11 percent by volume. In comparison, conventional gasoline has MTBE in amounts of a few percent by volume or less, while some premium blends can contain as much as 9 percent MTBE.

Methyl tertiary-butyl ether (MTBE) is a gasoline additive that replaced the use of lead as an octane enhancer since 1979. MTBE is a member of a group of chemicals commonly known as fuel oxygenates. Oxygenates are added to fuel to increase its oxygen content. MTBE is used in gasoline throughout the United States to reduce carbon monoxide and ozone levels caused by auto emissions. In the Northeast more than one billion gallons of MTBE is sold annually.

In 1991 Maine volunteered to phase into the RFG program and Maine began selling RFG in January of 1995. States with voluntary RFG programs were required to decide by December 30, 1997, whether they wanted to remain in the program, otherwise procedures required them to stay in the program through 2003.

With the distribution of RFG in southern Maine there was concern over the potential threat to ground water quality. MTBE is very water soluble and persistent in ground water. MTBE is considered by the United States Environmental Protection Agency (EPA) as a possible carcinogen, Class C, and has a very low odor and taste detection threshold.

In 1997, the Maine Bureau of Health, reported MTBE in 7% of Maine public water supplies. These incidents of groundwater contamination prompted Governor King to direct a ground water investigation to determine the extent of MTBE in public and private water supplies. Maine did not want to commit to continued participation in the RFG program through the year 2003 until the ground water testing was completed. *The Presence of MTBE and Other Gasoline Compounds in Maine's Drinking Water* reported in 1998, MTBE detected in approximately 15% of the public water supplies and 951 private wells sampled in Maine.

Therefore, in October 1998, Maine petitioned EPA under 40 CFR 80.72(a) to opt-out of the RFG program based on the unacceptable risk to ground water posed by MTBE. EPA approved the petition provided several conditions were met including implementing a replacement fuel with volatile organic compound reductions equivalent to RFG. Having met the conditions, the effective date for withdrawal from the RFG program was March 10, 1999.

It was anticipated that if RFG levels for MTBE (eleven percent by volume) were not required; then the levels of MTBE would drop to the levels for conventional gas sold in

Maine prior to participation in the RFG program. MTBE would not be totally eliminated as the industry continues to rely on MTBE as an octane enhancer.

At the request of the legislature, the Department collects data on gasoline sold in Maine to determine the MTBE levels in gasoline and the progress made to achieve the goal of eliminating MTBE in gas sold in Maine by January 2003. The Department is committed to continue tracking not only the levels of MTBE but also other components in gasoline including sulfur, benzene, and aromatics.

The State of Maine is required to promote and actively participate in regional efforts to develop alternatives to the use of MTBE as a gasoline additive. NESCAUM completed a study in July of 2001 of the potential to public health, the environment, and regulatory and economic impacts for ethanol as an oxygenate.

In 1999, a Northeast Regional Fuels Task Force was established at the behest of the New England Governors Association to look at regional solutions to address the MTBE issue. This Task Force's objectives are to maximize the air quality benefits and public health benefits of reformulated gasoline, reduce the amount of MTBE in the gasoline supply to protect water resources, promote a regionally consistent clean fuels program, and minimize impact of fuel quality changes on gasoline supply and price. The Task Force will also work with EPA to encourage congressional action to lift the oxygen mandate from RFG and provide an adequate solution over current levels of MTBE in gasoline.

## Legislative Requirement

38 M.R.S.A. §585-H, enacted by the Legislature in 2000, requires MTBE monitoring and reductions. Specifically:

*“The department shall monitor shipments of gasoline to storage terminals in this State and compile annual reports showing the levels of methyl tertiary butyl ether, referred to as “MTBE”, in gasoline brought into this State.*

*The Department shall promote and actively participate in regional efforts by state regulatory agencies in the Northeast to develop alternatives to the use of MTBE as a gasoline additive. In these efforts, the department shall work toward the goal of the elimination of MTBE in gasoline sold in the State by January 1, 2003 in a manner that:*

- 1. Market constraints. Adequately accounts for market constraints related to supply and pricing; and*
- 2. Lowest environmental impact. Based on thorough analysis and evaluation of alternatives to the use of MTBE, ensures the lowest possible total environmental impact.*

*The department shall annually, no later than February 1<sup>st</sup> of each year, present a report to the joint standing committee of the Legislature having jurisdiction over natural resources matters on the levels of MTBE in gasoline brought into this State and the progress made in achieving the goal of eliminating MTBE in gasoline sold in the State by January 1, 2003. The committee may report out to any session of any Legislature legislation relating to MTBE use in gasoline.”*



## Data Collection

In addition to the requirements of 38 MRSA, Chapter 119, § 585-H: Motor Vehicle Fuel Volatility Limit requires the following records to be kept at the bulk gasoline terminals:

*“Any owner or operator of a bulk gasoline terminal shall maintain records on the Reid Vapor Pressure, oxygen content, oxygenate, benzene, aromatics, and sulfur of any gasoline that is delivered to or distributed from such terminal. Such records shall be maintained for at least three years and shall be available for inspection during normal business hours, and copies shall be provided to the Commissioner or his representative upon request.”*

The Department requested the information listed above from each bulk gasoline terminal carrying automotive gasoline. In cooperation with the Maine Petroleum Association, the Department developed a quarterly reporting form for the terminals to fill out and submit to the Department (Appendix A). In addition, the Department requested the date of delivery, the number of barrels delivered, and any other significant information.

The following bulk gasoline terminals carry automotive gasoline and reported gasoline data to the Department:

<u>Terminal</u>	<u>Location</u>
Gulf	Portland
Irving	Bucksport
Mobil	Portland
Motiva	Portland
Webber	Searsport
Cold Brook Energy	Hampden

Cold Brook Energy generally receives its fuel from the Bangor Pipeline, but will receive occasional deliveries via barge. This year the terminal received one shipment by barge. No data was obtained from any trucking of fuel into the State.

The first full year of fuels information was reported in February 2000. Quality assurance/quality control issues with the data improved in 2001 in that we received questionable data from only one shipment.





## 211 (c) Waiver

Following the 1990 Clean Air Act Amendments, Governor John McKernan, Jr., opted Maine's nonattainment counties<sup>1</sup> into the federal reformulated gasoline program (RFG) on June 26, 1991. The sale of reformulated gasoline began on January 1, 1995.

On October 13, 1998 Governor King sent a letter to EPA requesting permission to opt-out of the RFG program. EPA approved the request to opt-out, with March 10, 1999 as the effective date, based upon three conditions being met by the Department. Those conditions were as follows: (1) Maine identifies a replacement fuel measure or other measure to provide VOC reductions equivalent to those yielded by RFG; (2) Maine provides a schedule for implementing the replacement measure; and (3) Maine provides an explanation of the impact to the State Implementation Plan<sup>2</sup>.

The Maine Board of Environmental Protection subsequently amended Chapter 119 Motor Vehicle Fuel Volatility Limit, a conventional low volatility fuel regulation. This regulation required all gasoline that is distributed or marketed by bulk gasoline terminals, or is directly imported to gasoline service stations or bulk gasoline plants in York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Knox and Lincoln counties to have a Reid Vapor Pressure no greater than 7.8 psi during the period between May 1, 1999 and September 15, 1999. Subsequently, the regulation required a Reid Vapor Pressure no greater than 7.2 psi during the period between May 1, 2000 and September 15, 2000, and continuing every year thereafter.

On April 20, 2000 the Maine Board of Environmental Protection amended Chapter 119, Motor Vehicle Fuel Volatility Limit. The amendment repealed the requirement that gasoline sold in the seven southern counties must have a Reid Vapor Pressure of 7.2 psi or less during the summer months. The basis for the repeal was due to a limited number of refiners making 7.2 RVP fuel. This could result in a potential supply disruption. In the event of a major supply disruption, the most likely "replacement" fuel would be RFG with its required oxygen levels i.e. 11% MTBE by volume. Due to continued concerns of potential groundwater contamination from MTBE, an oxygenate used in RFG, the risk of increased levels of MTBE in gasoline shipped to Maine was not acceptable. The current 7.8 RVP gasoline with no restrictions on oxygen levels has resulted in MTBE levels equal to or below typical conventional gasoline (2 to 3% by volume).

However, Maine is prohibited from adopting a non-identical state control under section 211(c)(4) of the Clean Air Act (CAA). EPA has promulgated nationally applicable federal standards for the RVP levels of motor vehicle gasoline under sections 211(c) and 211(h) of the CAA. Section 211(c)(4)(A) of the CAA prohibits non-identical state

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<sup>1</sup> Hancock and Waldo counties were subsequently opted-out of the RFG program on December 28, 1994.

<sup>2</sup> On January 22, 1999 EPA extended the effective date of Maine's withdrawal from the RFG program until March 10, 1999 "in order to provide time for EPA and the State to reach agreement on such replacement program."

regulation of fuel characteristics or components for which EPA has adopted a control or prohibition. In accordance with Section 211(c)(4)(C), EPA may approve a non-identical state fuel control as a State Implementation Plan (SIP) provision, provided the state demonstrates that the measure is necessary to achieve the national primary or secondary ambient air quality standards that the plan implements. EPA can approve a state fuel requirement as necessary only if no other measure exists that would bring about timely attainment, or if other measures exist but are unreasonable or impracticable.

Maine submitted to EPA in accordance with Section 211 (c), a fuels waiver request that was accepted on May 29, 2001. EPA subsequently published in the Federal Register on December 6, 2001 a proposal to approve the waiver and request comments. The comment period ended on January 9, 2002 with no comments received. Final approval of the waiver is expected late this winter.

## MTBE and Other Oxygenates

The oxygenate data sorted by the date of delivery is listed by each quarter (Appendix B), for ozone season (Appendix C) and the entire year's data by terminal (Appendix D).

During calendar year 2001, MTBE was present in almost all gasoline shipments containing oxygenates, solely or in formulations containing one or more of the following oxygenates: Tertiary Amyl Methyl Ether (TAME) and Ethyl Tertiary Butyl Ether (ETBE). MTBE was the primary oxygenate reported in gasoline with TAME as secondary. One exception to this was a shipment of gasoline that contained only ETBE. In some cases, there was a combination of up to three different oxygenates in one shipment of gasoline delivered to the bulk terminals. This is apparently a common occurrence in gasoline, according to the Maine Petroleum Association.

As a reference, Reformulated Gasoline (RFG) required a minimum oxygen level of 2 percent by weight in gasoline. For MTBE this equates to 11 percent by volume. In general conventional gasoline prior to RFG commonly contained about 3 to 5 percent by volume MTBE in regular grades and as much as 9 percent by volume in premium blends.

During the year 2000, gasoline contained 0.39 percent by volume MTBE and a .09 percent weighted average oxygen level (Table 2). The MTBE volume percent increased 6 times from 0.39 to 2.51 in 2001.

**Table 2**

Weighted Ave for:	Oxygen Wt %	MTBE Vol %	TAME Vol %	ETBE Vol %	TBA Vol %	Methanol Vol %	t-Butanol Vol %
2000 Data	0.09	0.39	0.21	0.22	0.40	0.13	0.09

Weighted Ave for:	Benzene Vol %	Aromatics Vol %	Sulfur ppm
2000 Data	0.58	30.55	124.86

Table 3 summarizes the MTBE content in Maine fuel reported during 2001.

**Table 3**

Number of shipments of gasoline	334
Number of shipments with missing or questionable data	1
Number of shipments with no oxygenate	41
Number of shipments with MTBE only	203
Number of shipments with MTBE plus other oxygenates	89
Number of shipments with an other oxygenate but no MTBE	1
Number of shipments with MTBE only with oxygen levels greater than 2% by weight	24
Number of shipments with oxygen levels greater than 2% by weight containing oxygenates other than MTBE alone	5

For all shipments of gasoline:	
MTBE	2.51 % by volume
Weighted average oxygen level	0.51 % by weight

Figure 1 depicts the levels of MTBE in gasoline by quarter. The level of MTBE in gasoline rose during the second and third quarter. This may be due in part to a limited supply of 7.8 RVP fuel. In place of the 7.8 RVP fuel, a blend comparable to reformulated gas was shipped to Maine. While this blend met the 7.8 RVP requirement, higher levels of MTBE were in the gasoline.

Figure 2 is a scatter-diagram of the percent volume of MTBE by delivery date and Figure 3 depicts the volume percent of MTBE by shipment. Figure 4 is a scatter-diagram of the percent weight oxygen by delivery date and Figure 5 shows the percent weight oxygen levels by shipment.

Table 4 summarizes the other (non-MTBE) oxygenates in the Maine fuel reported during 2001.

**Table 4**

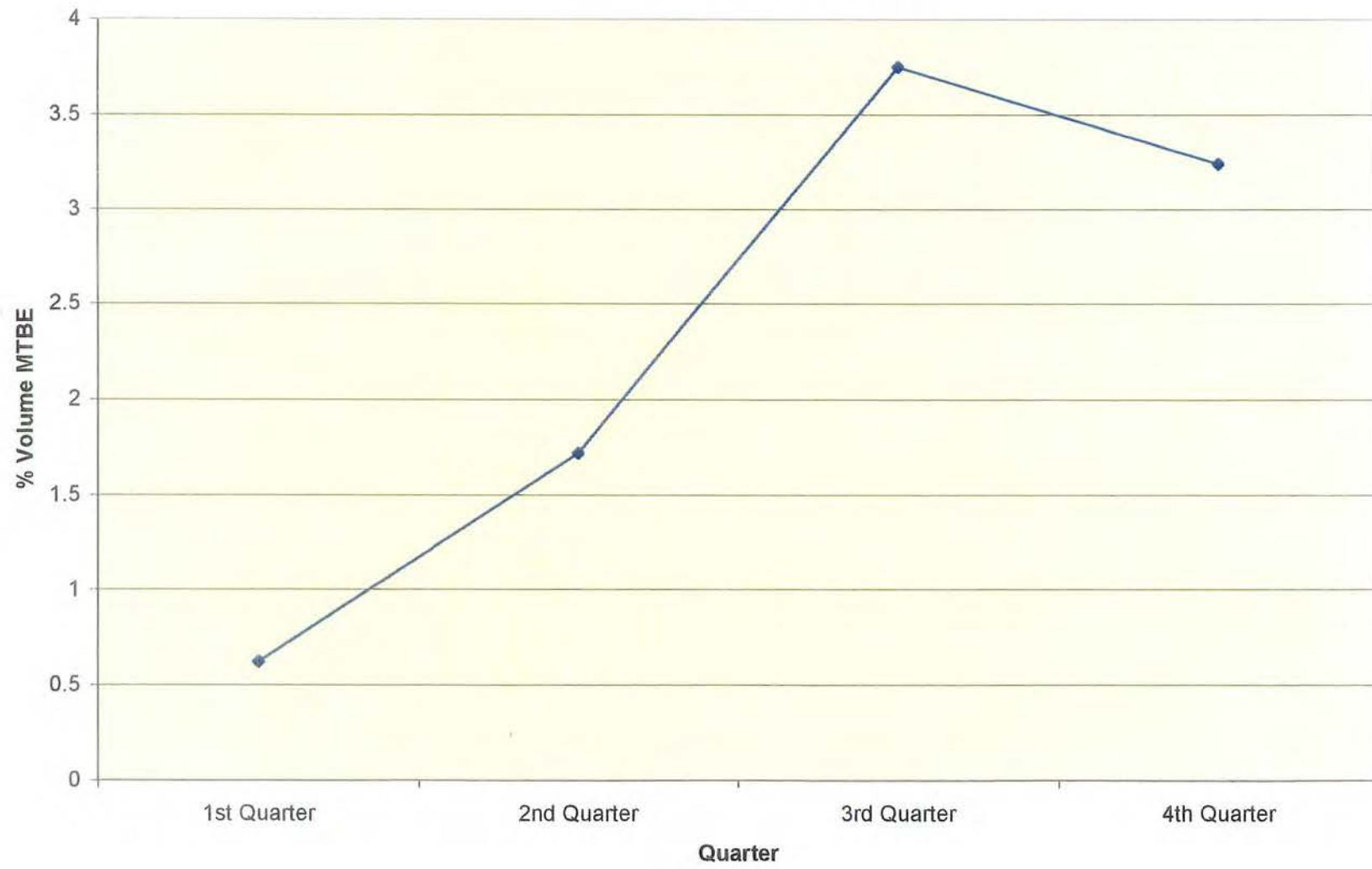
	<b>Number of Shipments</b>	<b>Percent Oxygenate (by volume)</b>
TAME	83	0.86
ETBE	7	0.22

Overall, the levels of MTBE have dropped since the state withdrew from the federal RFG program and implemented a “low volatility” gasoline program starting in 1999.<sup>3</sup>

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<sup>3</sup> RFG was required only in the seven southern Maine counties.

**Figure 1**  
**% Volume MTBE by Quarter**



**Figure 2**  
**MTBE (vol %) by Delivery Date**

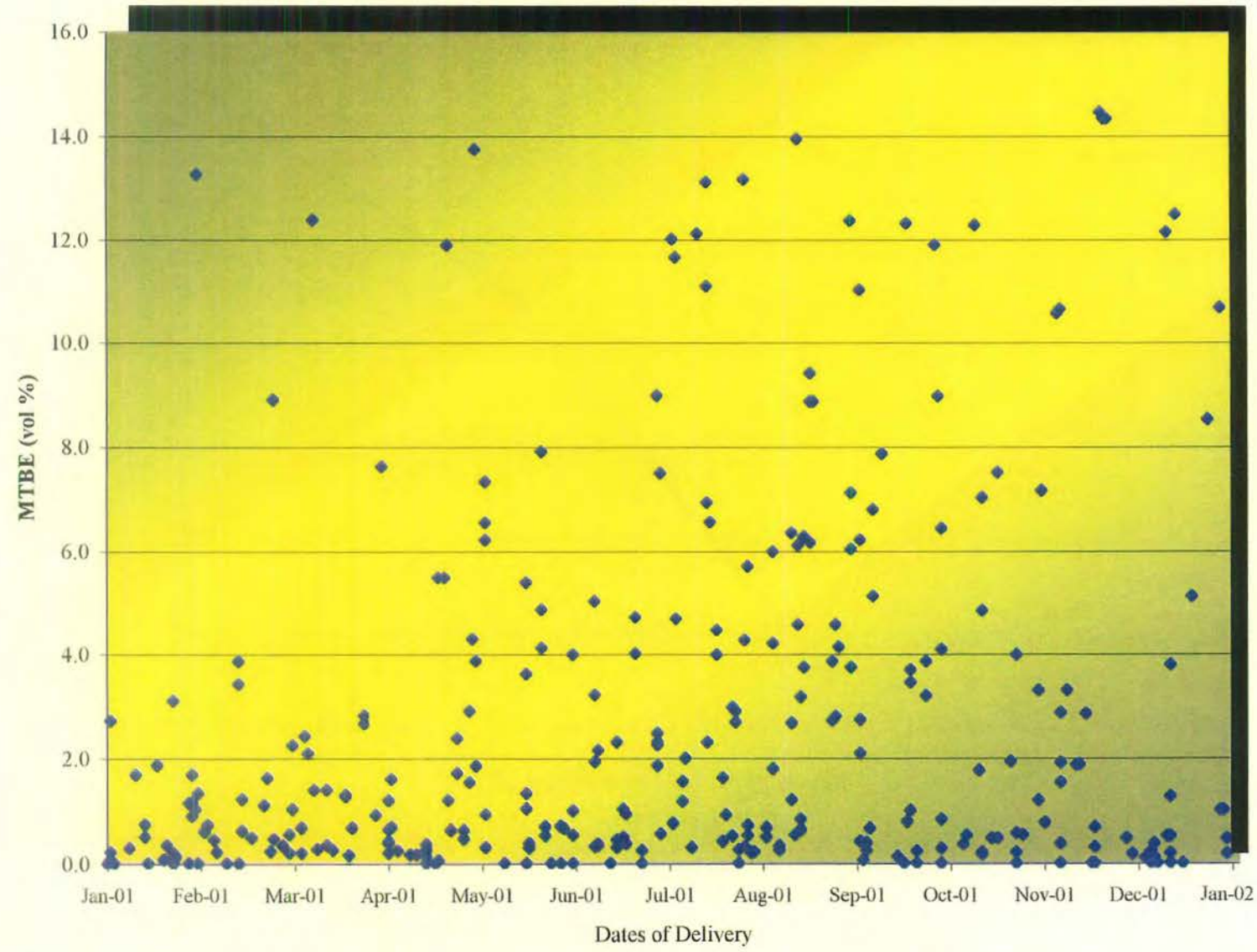
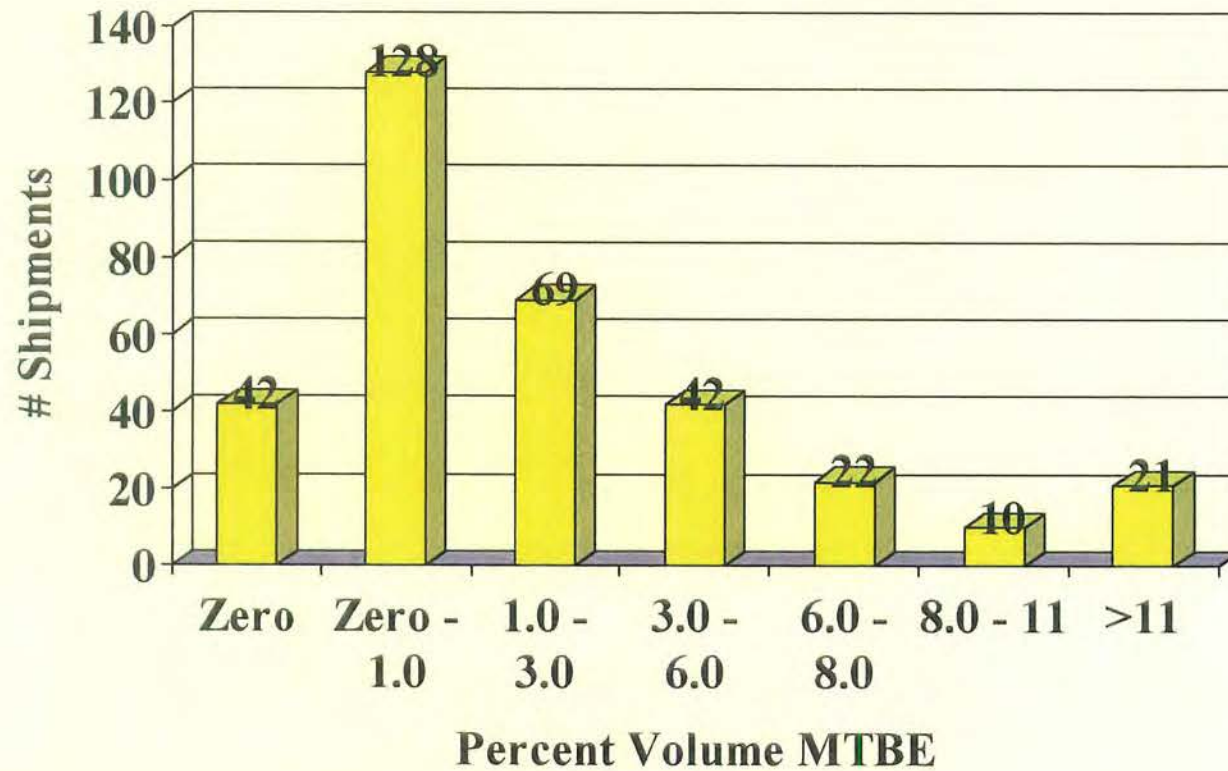


Figure 3

### Per Cent Volume MTBE by Number of Shipments





**Figure 4**  
**Oxygen (wt %) by Delivery Date**

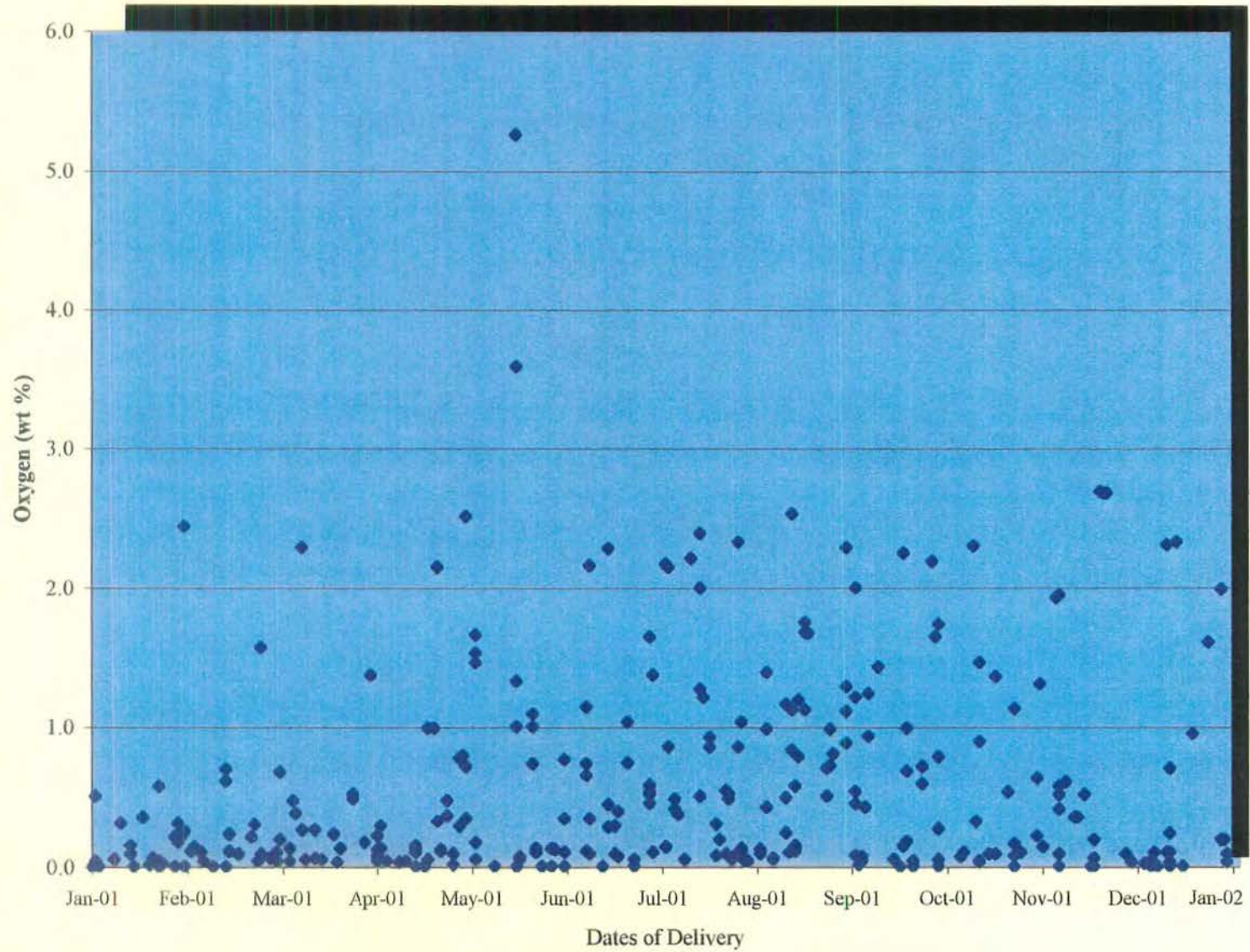
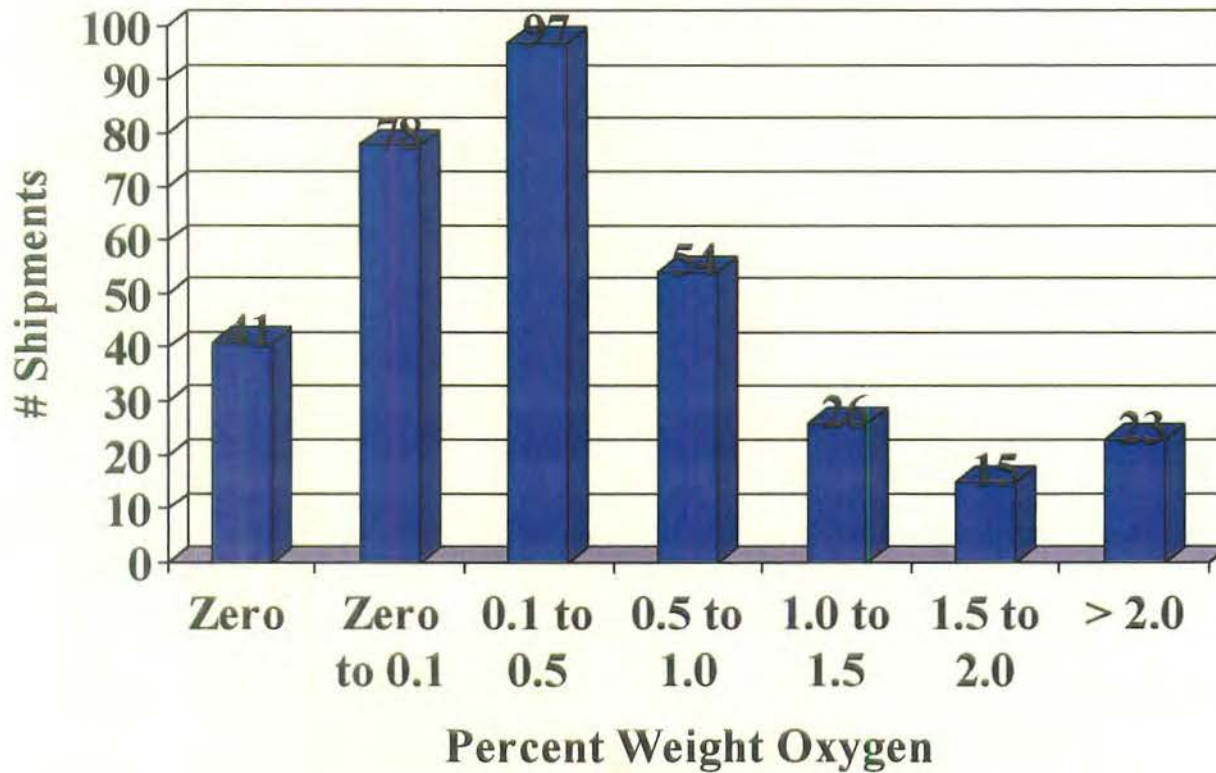


Figure 5

### Per Cent Weight Oxygen by Number of Shipments





## Other Gasoline Components

### Sulfur, Benzene, and Aromatics

Table 5 lists the statewide weighted averages of benzene, aromatics and sulfur in the 2001 fuel compared to 2000 fuel and Phase 1 and Phase 2 Reformulated Gasoline (RFG).

**Table 5**

	<b>2001 Wt. Ave.</b>	<b>2000 Wt. Ave.</b>	<b>Ave. Phase I RFG</b>	<b>Ave Phase II RFG</b>
Sulfur	154 ppm	125 ppm	170 ppm	150 ppm
Benzene	0.92 % (by vol.)	0.58 % (by vol.)	0.8% (by vol.)	0.8 % (by vol.)
Aromatics	28.10 % (by vol.)	30.55 % (by vol.)	26.3 % (by vol.)	24.0 % (by vol.)

*Note: Phase 1 RFG started in 1995. Phase 2 RFG started in 2000. Maine opted-out of the RFG program in 1999.*

The sulfur levels in 2001 have remained low with an average level of 154 ppm. National average levels for sulfur obtained from EPA for 2000 (their most recent figure) is reported to be 272 ppm. Again in 2001, six percent of the shipments reported, or approximately two percent of the volume of gasoline, had sulfur levels over 400 ppm. Figure 6 is a scatter-diagram of the ppm sulfur by delivery date and Figure 7 shows the ppm of sulfur by shipment.

The overall average level of benzene in gasoline is higher in 2001 than the RFG average benzene content. Benzene was reported in 71 out of 334 shipments, or 21.2% of the shipments, at levels over 1 % by volume with maximum levels as high as 4.53% by volume. RFG is required to have a 1 percent benzene cap. Figure 8 is a scatter-diagram of the percent volume benzene by delivery date and Figure 9 shows the percent volume benzene levels by shipment.

The concentration of aromatics in gasoline for 2001 remained higher than Phase I and Phase II RFG but decreased slightly from 2000. One reason MTBE is added to gasoline is to increase the octane of the fuel. When MTBE is not used or reduced, then aromatics are commonly used to increase octane in gasoline. Therefore, conventional gas with lower MTBE levels will report higher levels of aromatics. The increase in aromatics results in increased emissions in air toxics primarily from combustion of the gasoline as opposed to evaporation. Figure 10 is a scatter-diagram of the percent volume aromatics by delivery date and Figure 11 shows the percent volume aromatic levels by shipment.

A summary of the other fuel components is sorted by date of delivery and quarter (Appendix B), by ozone season (Appendix C), and entire year's data by terminal (Appendix D).

**Figure 6**  
**PPM Sulfur by Delivery Date**

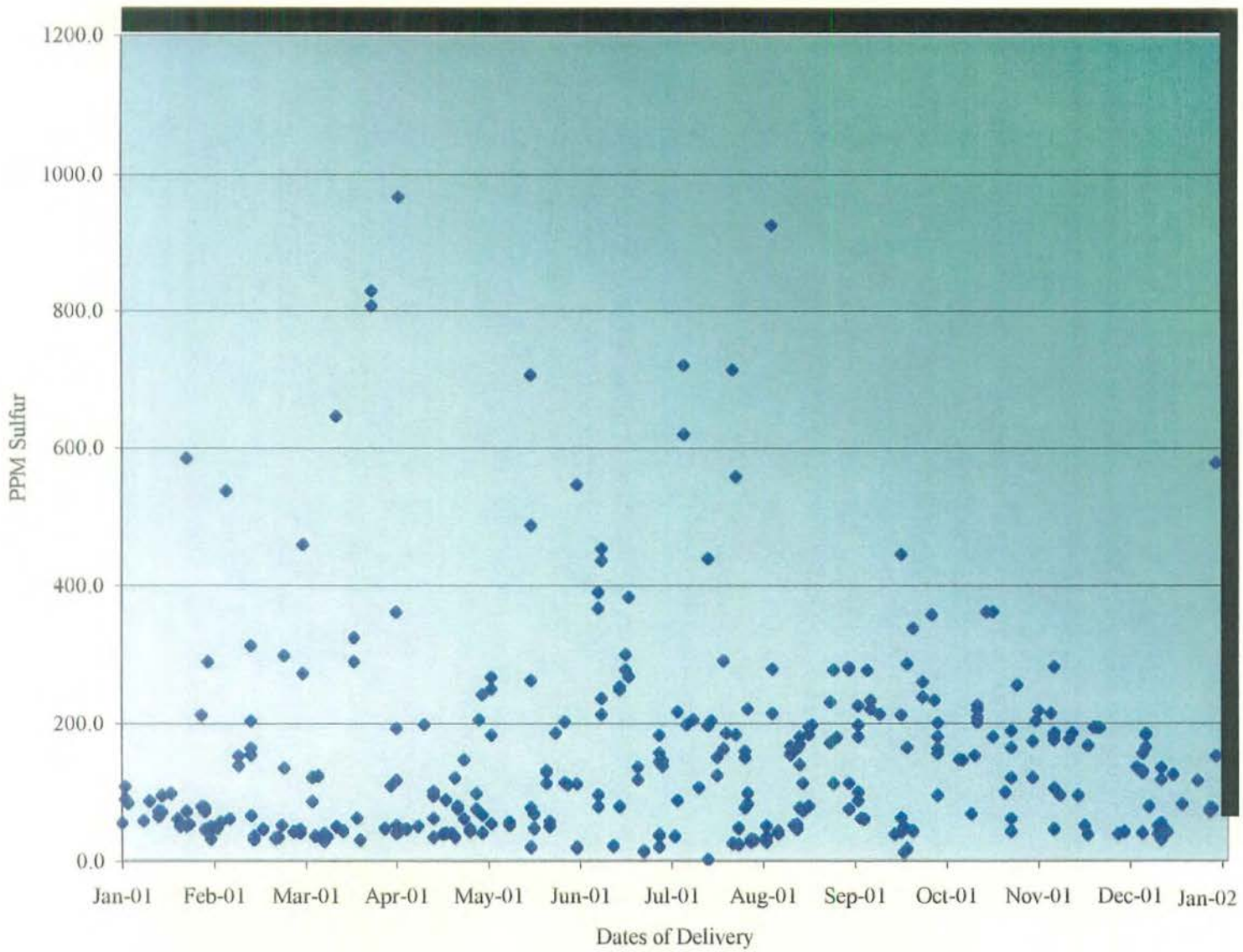
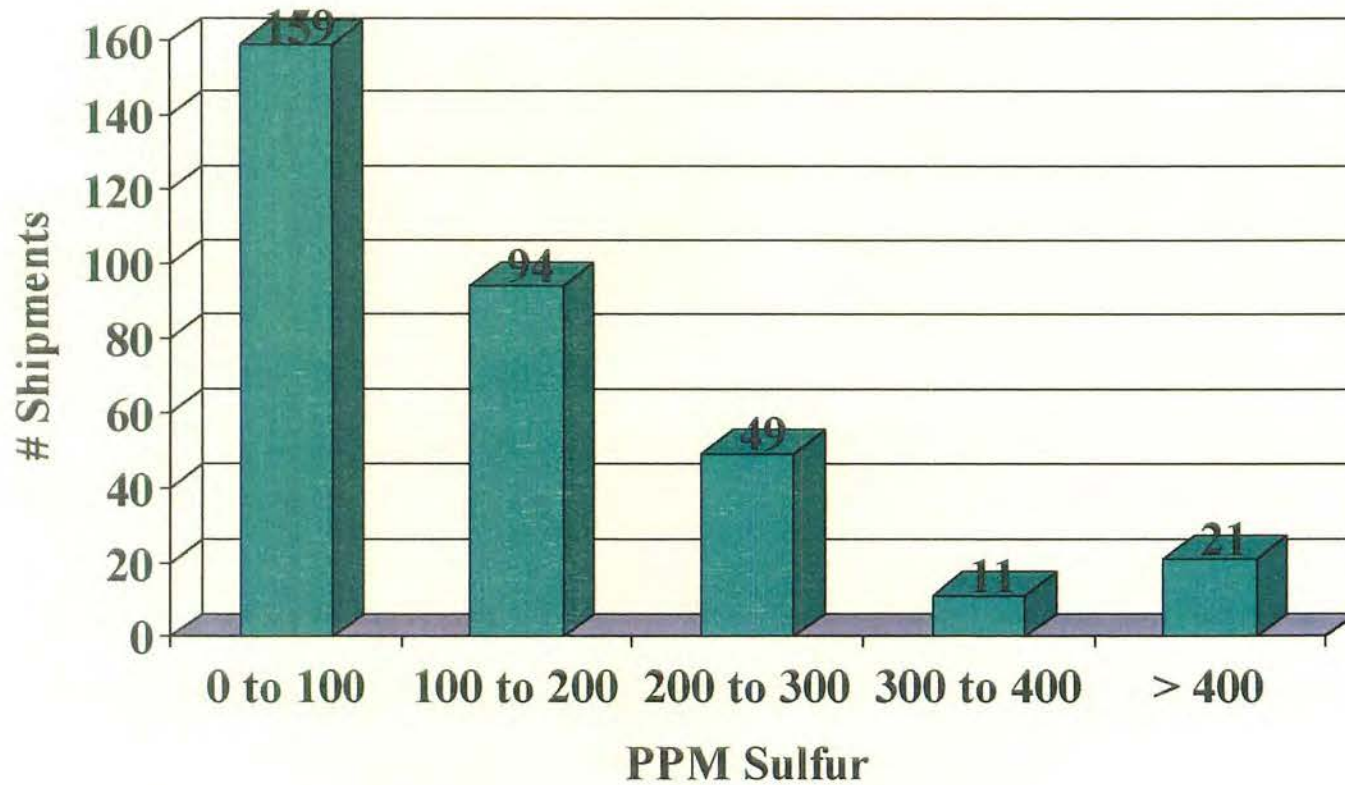


Figure 7

### PPM Sulfur by Number of Shipments



**Figure 8**  
**Percent Volume Benzene by Delivery Date**

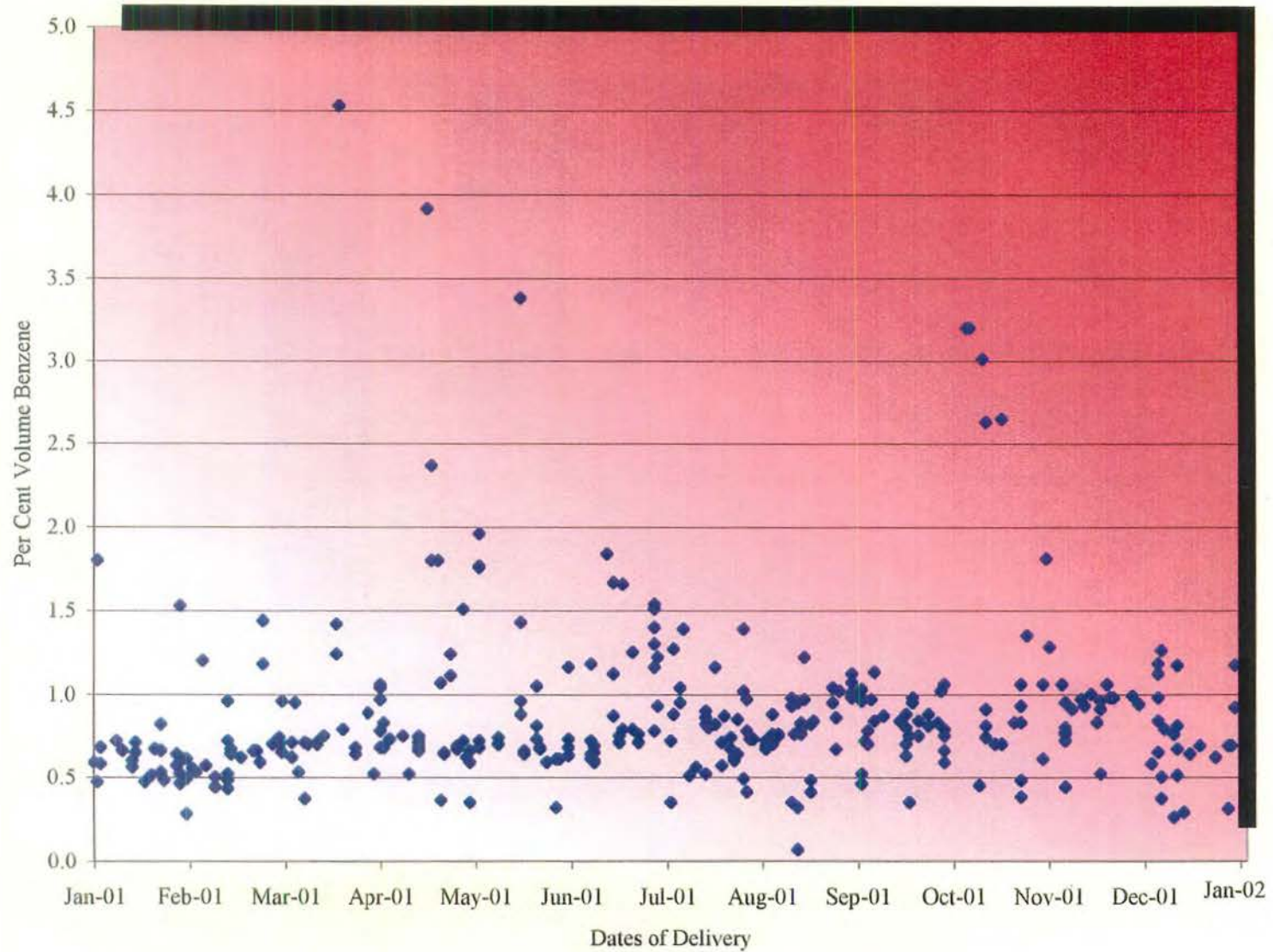
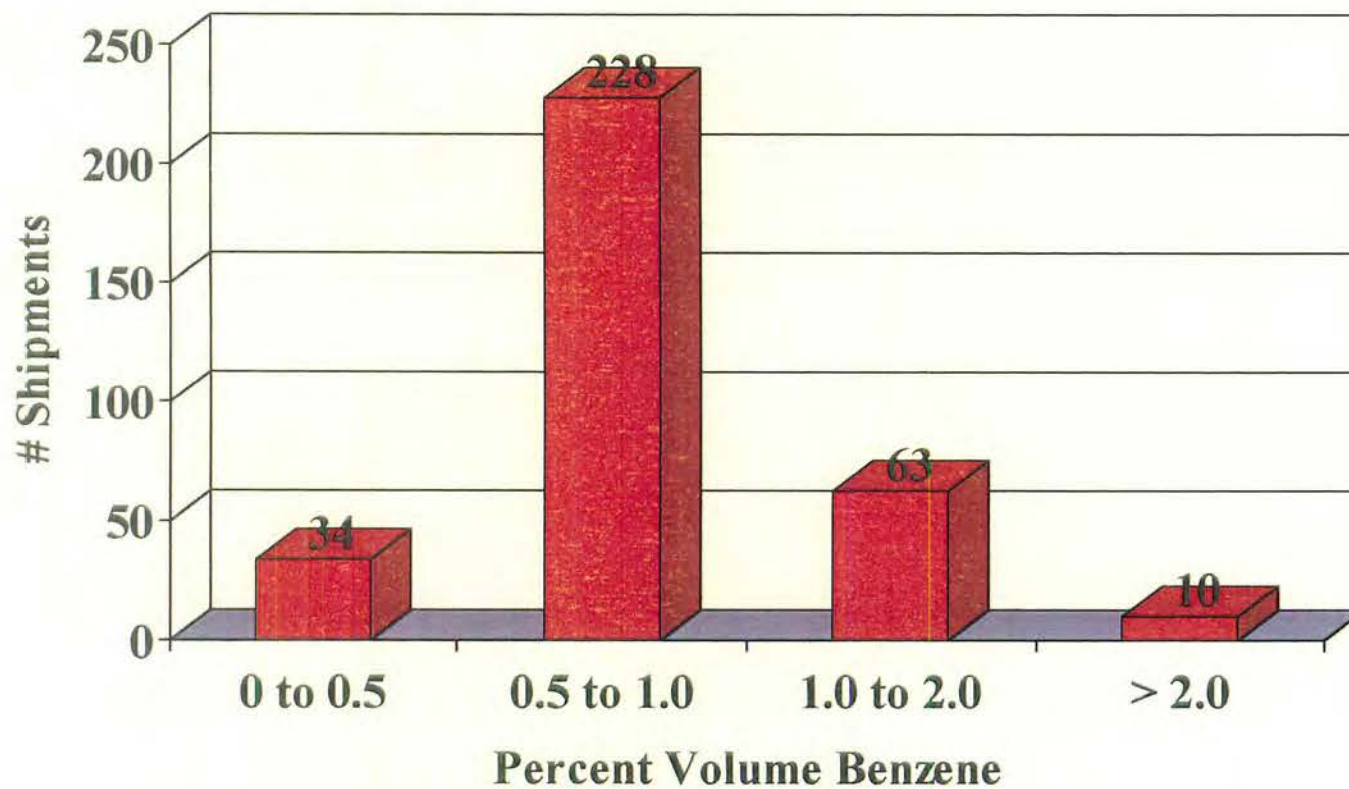


Figure 9

### Per Cent Volume Benzene by Number of Shipments





**Figure 10**  
**Percent Volume Aromatics by Delivery Date**

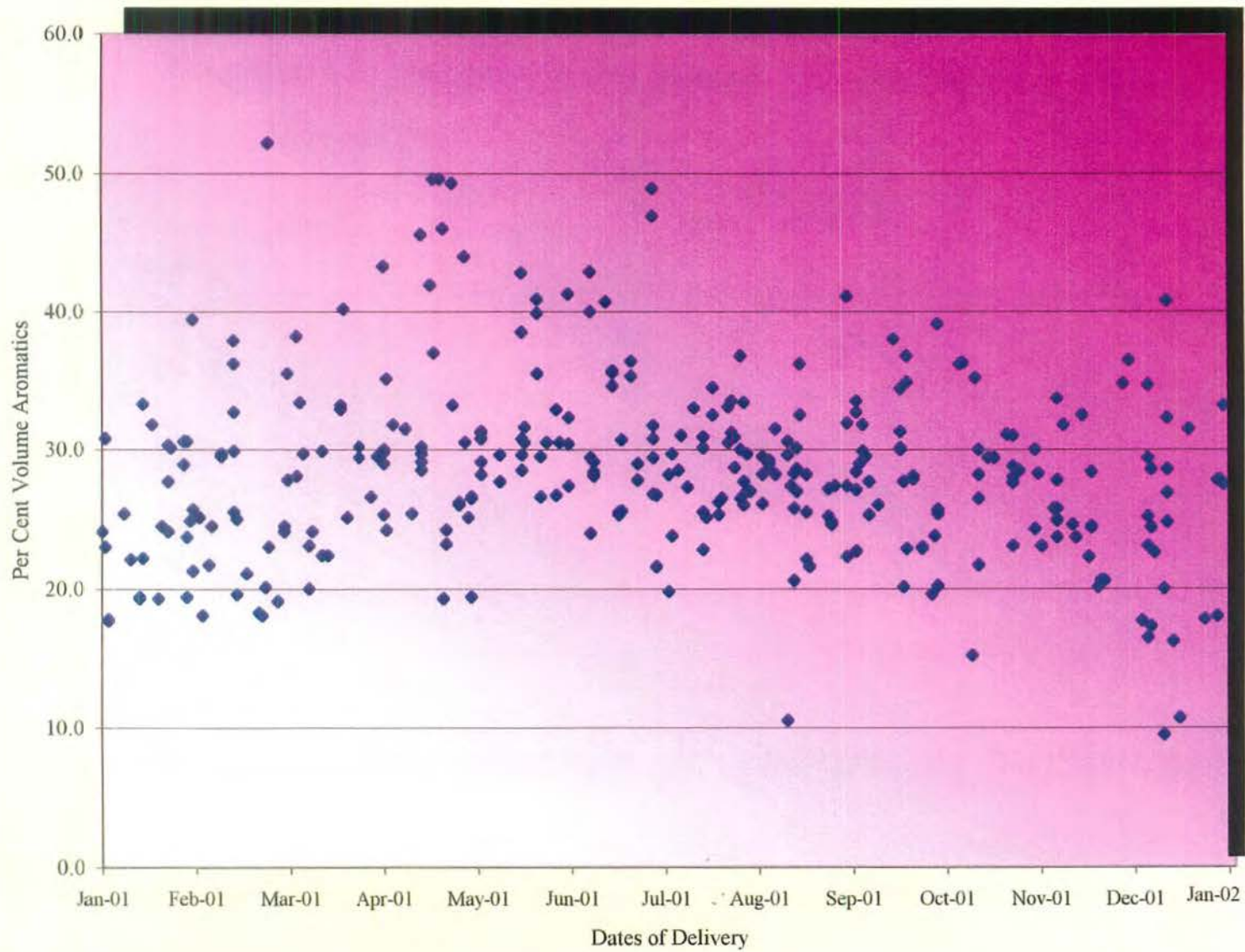
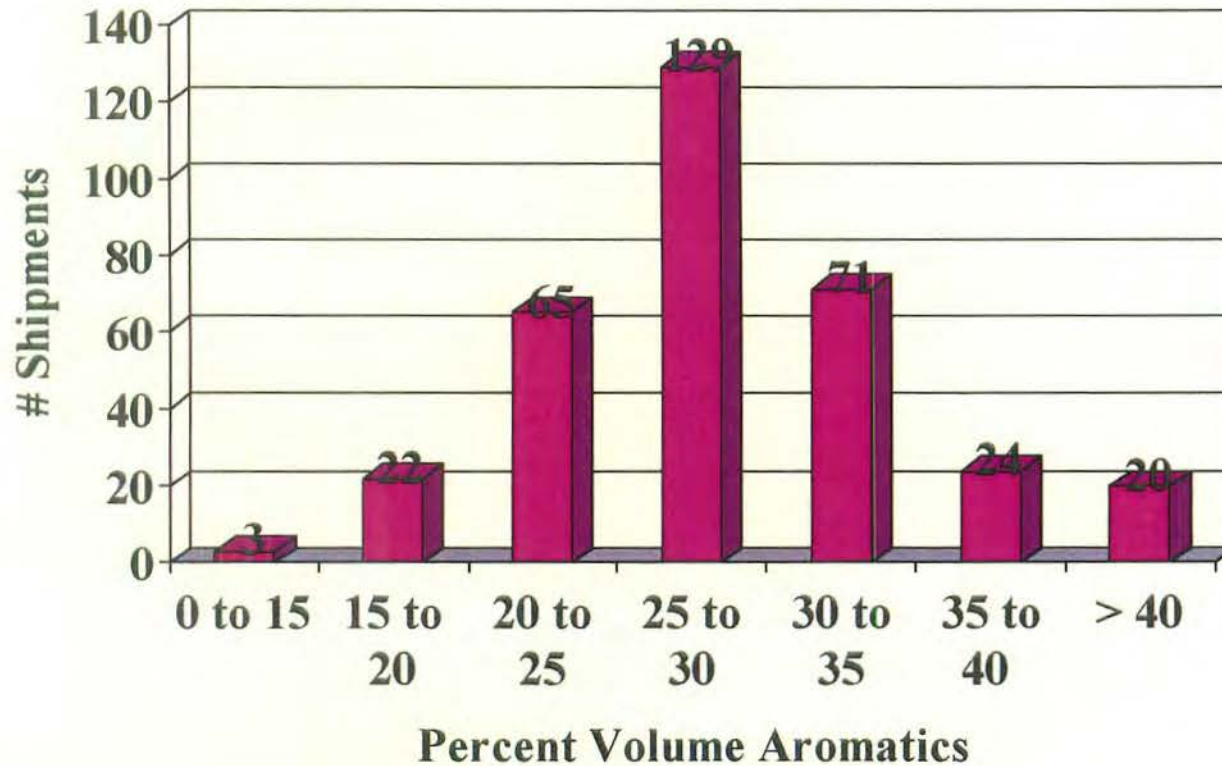


Figure 11

## Per Cent Volume Aromatics by Number of Shipments





## Reid Vapor Pressure

Chapter 119 Motor Vehicle Fuel Volatility Limit requires that the Reid Vapor Pressure (RVP) of gasoline sold in Maine from May 1 to September 15 of each year shall not exceed 9.0 pounds per square inch (psi). The Fuel Volatility Limit further limits the RVP of all gasoline sold in York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Knox and Lincoln counties shall not exceed 7.8 psi from May 1 to September 15 of each year.

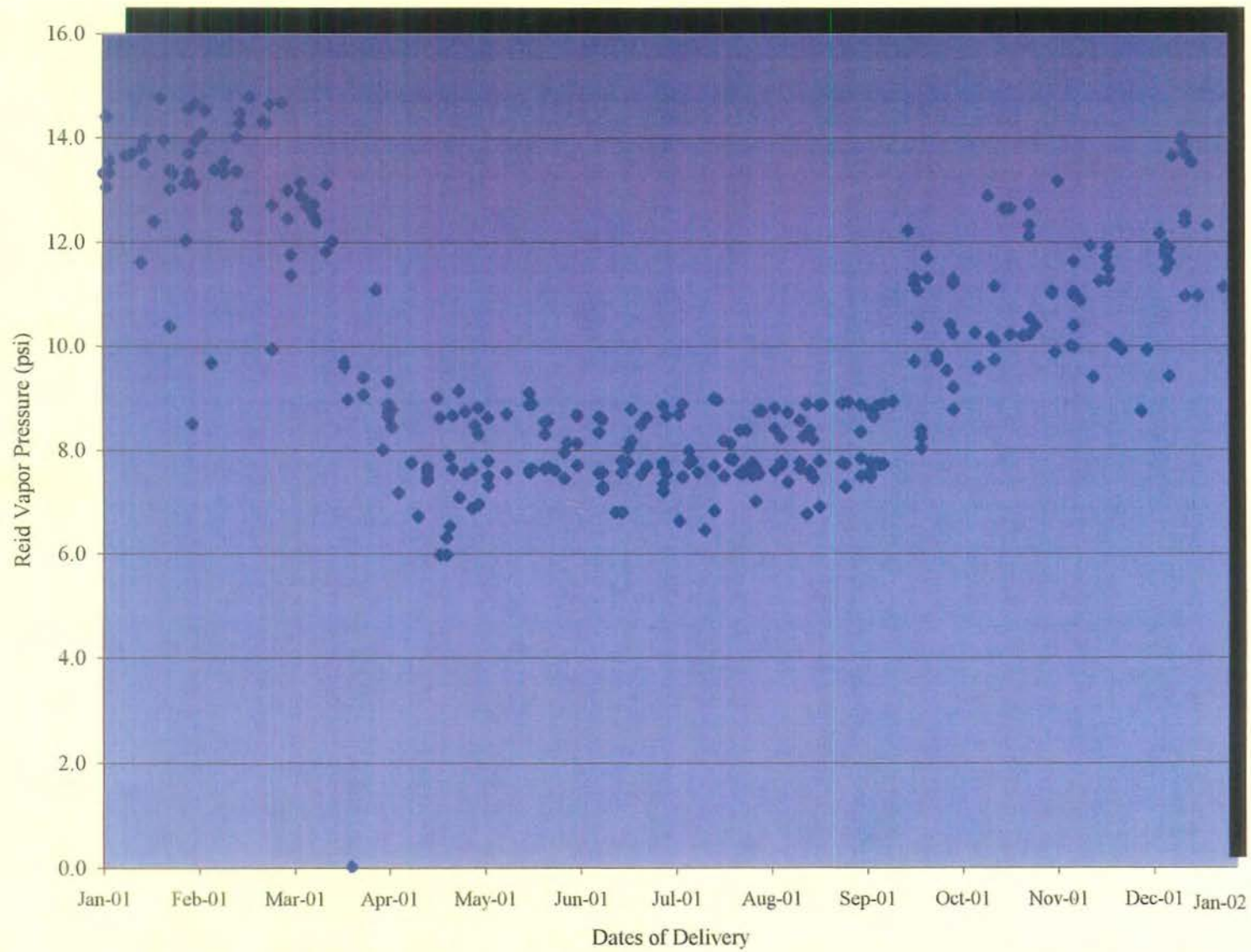
The ozone season is from May 1 to September 15<sup>th</sup> of each year, which correlates to the period when 7.8 RVP is required in Maine's seven southern counties. Low volatility gas is required during the ozone season due to volatile organic compounds, which are a precursor to ozone formation.

The average of all ozone season fuel sold in Maine beginning in May through Mid-September is shown below in Table 6. A summary of the RVP is sorted by the date of delivery by quarter (Appendix B), by ozone season (Appendix C), and the entire year's data by terminal (Appendix D).

<b>RVP Reported</b>	<b>RVP Average</b>
Ozone Season, 7 counties	7.53 psi
Ozone Season, statewide	8.01 psi

Figure 12 is a scatter-diagram of the Reid Vapor Pressure by delivery date.

**Figure 12**  
**Reid Vapor Pressure (psi) by Delivery Date**



## **Overview of Federal Action on RFG/MTBE**

Over the past several years, a flurry of congressional and administrative actions have been initiated to address the problem of MTBE groundwater contamination while preserving the air quality and public health benefits of RFG. This discussion focuses on activities in three areas that will form the foundation for future federal action:

- 1) Federal legislative efforts;
- 2) California's petition for a waiver of the oxygen mandate in RFG;
- 3) U.S. EPA's effort to ban MTBE under the Toxic Substances Control Act (TSCA).

## **Congressional Action**

During the 106<sup>th</sup> Congress (1999-2000), well over a dozen bills were introduced seeking to address the problem of MTBE contamination of groundwater. The challenge is to develop a legislative approach that is acceptable to both oil interests and ethanol interests and is protective of the environment and public health. While considerable progress was made, Congress failed to strike the balance between ethanol, oil, and environmental interests needed to craft a comprehensive legislative solution.

Prospects may be more positive in 2002: the Senate Democratic leadership's energy bill (S. 1766) includes several major provisions on MTBE and ethanol, and has been scheduled for early floor consideration. However, proposals such as a national renewable fuels mandate remain controversial, and legislative action will likely involve extended negotiation both within the Senate and between House and Senate energy conferees. Final enactment of any new policies into law is unlikely before the fall of 2002.

The Northeast states have played a significant role in advancing federal legislative efforts. Frustrated by the lack of legislative activity in the months following the September 1999 conclusion of the U.S. EPA's Blue Ribbon Panel on Oxygenates and Gasoline; the eight Northeast states' air pollution control programs joined together to support a series of principles for congressional action. On January 19, 2000, Northeast States for Coordinated Air Use Management (NESCAUM) released the following recommendations:

- 1) Repeal the 2 percent oxygen mandate for reformulated gasoline (RFG) in the Clean Air Act;
- 2) Phase down and cap MTBE content in all gasoline;
- 3) Clarify state and federal authority to eliminate MTBE or other oxygenates if necessary to protect public health or the environment;
- 4) Maintain the full air quality benefits achieved to date by the federal RFG program;
- 5) Promote consistency in fuel specifications through the timely implementation of effective federal requirements;
- 6) Provide adequate lead-time for the petroleum infrastructure to adjust in order to ensure adequate fuel supply and price stability.

These principles were endorsed by the American Lung Association (ALA), the Natural Resources Defense Council (NRDC), and the American Petroleum Institute (API). Thus began an unusual coalition effort among states, environmentalists, and oil companies and refineries to secure federal legislation. Notably absent from this alliance were ethanol producers, who were unwilling to accept the basic premise of repealing the oxygen mandate. However, it was generally accepted that the ethanol industry would have to have to join in a compromise before legislation would pass in either house of Congress.

The congressional committees with jurisdiction over MTBE and RFG are the Senate Environment and Public Works Committee (currently chaired by Senator James Jeffords, I-VT) and the House Energy and Commerce Committee (chaired by Rep. W.J. "Billy" Tauzin, R-LA). In the 106<sup>th</sup> Congress, a number of representatives introduced legislation representing conflicting approaches to the MTBE/ethanol issue. The state-API-ALA alliance (Alliance) worked with Rep. Jim Greenwood (R-PA) to craft legislation (H.R. 3449) that fairly embodied the Alliance's legislative principles. However, the diversity of interests represented in the full Energy and Commerce Committee suggested that prospects for advancing legislation were stronger in the Senate. Notably, on August 4, 1999, the Senate approved an amendment to the FY 2000 agricultural appropriations bill, offered by Senator Barbara Boxer (D-CA), which expressed the interest of the Senate that MTBE should be phased out.

During this session, Senators Tom Daschle (D-SD) and Richard Lugar (R-IN) introduced legislation backed by much of the ethanol community that lifted the oxygen mandate and replaced it with a more flexible national sales requirement for renewable fuels. Instead of mandating the sale of ethanol only in states participating in the RFG program, the Daschle/Lugar approach allowed oil companies to decide where it was most viable economically to sell ethanol throughout the nation. Earlier that year, the Clinton Administration had offered its own principles for legislative action, which closely matched the Northeast approach in many respects but supported the Daschle/Lugar position that the oxygen mandate should be replaced with a national alternative before it was repealed. Governors Shaheen (D-NH) and King (I-ME) wrote to Senator Daschle expressing cautious support for the concept if properly designed.

The Northeast States and the environmental community worked with Senator Robert Smith (R-NH), then chair of the Environment and Public Works Committee, in an effort to harmonize the Daschle/Lugar approach with legislation introduced by Smith that effectively reflected the views of the Northeast States and their partners. Unfortunately, most oil companies rejected all legislative proposals that required the sale of ethanol, thus ending their Alliance involvement for the time being. Similarly, while Smith's approach was strongly supported by the majority of small ethanol producers and by Governors from a host of ethanol-producing states, large multi-international ethanol producers opposed lifting the oxygen mandate, even in exchange for a national program. Observers surmised that large ethanol producers took this position because allowing ethanol to be sold nationwide would increase competition from small producers. Whereas only the large companies possessed the infrastructure and capital to ship hundreds of millions of

gallons of ethanol from the Midwest to the Northeast, California and Texas, areas that would have to use ethanol in lieu of MTBE if the oxygen mandate was retained.

Legislation establishing a national renewable fuels program would have required nearly unanimous support from ethanol interests and environmentalists, along with acceptance from some sectors of the oil industry. In an effort to create such a broad-based coalition, the eight Northeast States joined with the twenty-four state Governors' Ethanol Coalition (GEC) to advance a joint position. On July 19, 2000, in a letter signed by Governors representing thirty-two states urged Senator Smith to introduce legislation that phased out MTBE within four years; lifted the oxygen standard and replaced it with a national renewable fuels program; and maintained the full air quality benefits of the RFG program.

Shortly thereafter, Senator Smith introduced S. 2962, the Federal Reformulated Fuels Act of 2000, which effectively represented the positions advocated by the Northeast States and their environmental and Midwest colleagues. With the obvious exception of the renewable fuels requirement, S. 2962 also maintained most of the original provisions promoted by the Northeast States' original alliance with API. On September 28, 2000, the Environment and Public Works Committee reported out S. 2962. As reported, the bill would have banned MTBE within four years, allowed states to waive the oxygenate requirement, stimulated the use of ethanol and clean vehicles, increased funding to clean up contaminated ground water, and broadened EPA's authority to regulate fuel additives and emissions. S. 2962 was uniformly and actively supported by the Northeast States, environmental organizations, and virtually all ethanol/renewable fuels interests, but was actively opposed by most oil companies and all MTBE producers. Opposition from the oil industry and lack of time made it impossible to move the bill any farther during the 106<sup>th</sup> Congress.

Sen. Smith re-introduced legislation on MTBE in the 107<sup>th</sup> Congress and his bill (S. 950) were reported out of the Environment and Public Works Committee on December 20, 2001. Like Smith's previous bill, S. 950 banned MTBE use within four years, gave EPA greater authority to regulate fuel additives and emissions, and authorized new funding to clean up MTBE leaks. It also provided funds to assist merchant MTBE producers in converting production facilities to produce cleaner additives.

S. 950 has been almost entirely incorporated in S. 1766, omnibus energy legislation introduced by Senators Daschle and Jeff Bingaman (D-NM).<sup>4</sup> In addition, S. 1766 contains a national renewable fuels mandate, starting at two billion gallons in calendar year 2003 and increasing to five billion gallons in 2012. Refiners who produce more than the required amount of renewable fuel can earn tradable credits good for one year. Some state officials on the east and west coasts remain concerned about whether their states can absorb the quantities of ethanol-blended fuel that are expected to be produced under this

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<sup>4</sup> The sole exception is that S. 1766 only repeals the current one-pound Reid Vapor Pressure waiver in section 211(h) of the Clean Air Act in states east of the Mississippi, whereas S. 950 repeals the waiver nationwide. This waiver facilitates the use of ethanol as a fuel additive by partially discounting its higher volatility relative to other oxygenates.



mandate without sacrificing air quality. However, a year-round nationwide renewable fuels requirement is generally viewed as more flexible than the current oxygen mandate under the RFG program, and thus as a positive starting point.

Sen. Daschle has stated a commitment to bring S. 1766 to the Senate floor by mid-February, so this bill is the presumptive vehicle for legislative action in the 107<sup>th</sup> Congress. The House counterpart, H.R. 4 (passed in August 2001) requires EPA to study various handling and administrative options for improving the cost and availability of RFG, and authorizes funds to clean up MTBE contamination from leaking underground storage tanks, but does not contain a renewable fuels mandate or modify the CAA oxygen mandate. An amendment exempting California from the oxygen mandate, offered by Rep. Christopher Cox (R-CA), was rejected 300-125.

### **California Request to EPA for a Waiver of the Oxygen Mandate**

In March 1999, California Governor Gray Davis ordered the phase-out of MTBE under Executive Order D-5-99. California, like all states with “severe” or “extreme” ozone nonattainment areas or wintertime CO nonattainment areas, must use oxygenated gasoline. The Clean Air Act oxygenate requirements coupled with the elimination of MTBE will result in a *de facto* ethanol mandate in California, unless it obtains a waiver of the oxygen mandate.

As in the Northeast, California refiners and distributors have relied almost exclusively on MTBE to satisfy the Clean Air Act oxygenate requirement. The industry’s reliance on MTBE arose primarily from the fact that ethanol can not easily be transported by pipeline because it mixes with water and becomes unusable. Hence, moving hundreds of millions of gallons of ethanol from the middle of the country where it is produced to the coasts where it is required poses substantial logistical challenges. In addition, ethanol is highly volatile when mixed with gasoline. To offset the pollutant impacts of the resulting mixture, refiners must blend ethanol with a more expensive lower-volatility base fuel than is required for MTBE blends.

Ethanol’s volatility and transportation complexities also have potentially substantial environmental impacts. Under §211(k)(2)(b) of the Clean Air Act, the Administrator is authorized to waive the oxygen requirement, “if the requirement will prevent or interfere with attainment...in a nonattainment area.” Citing this authority, Governor Davis wrote to Administrator Browner on April 12, 1999 formerly requesting a waiver on the grounds that the oxygenate requirement was interfering with California’s ability to attain both the ozone and PM-10 NAAQS. Over the next two years, California submitted thousands of pages of technical support for its request. The state contended that mandatory use of ethanol would increase NO<sub>x</sub> emissions compared to levels California could achieve if it were given flexibility to continue to develop its own fuel specifications. These NO<sub>x</sub> increases, it asserted, would undermine ozone and PM-10 nonattainment efforts. California’s request also addressed the increased evaporative emissions that could be expected from ethanol use and their impact on ozone formation.

On June 12, 2001, EPA denied California's waiver request. The agency agreed with California that NOx emissions would be lower if the oxygen requirement were waived, but found based on its own modeling that a waiver (a) would increase carbon monoxide (CO) emissions, and (b) could either increase or decrease volatile organic compound (VOC) emissions, largely based on the degree to which gasoline blends with and without ethanol were likely to be commingled (mixed) in vehicle fuel tanks. As a result of this uncertainty, the agency held that California had not clearly demonstrated that a waiver would help it comply with the ozone NAAQS. The agency did not address the issue of interference with the PM-10 NAAQS.

California sharply contested EPA's analysis, arguing that the agency had ignored the state's detailed analysis showing that ethanol would increase air pollution. In August 2001 California filed a suit against the Agency in the 9<sup>th</sup> U.S. Circuit Court of Appeals in San Francisco, in which it asked the court to require EPA to waive the oxygen requirement. As of late January 2002, briefs were expected to be filed within as little as several weeks, and Northeast States were considering filing an *amicus curiae* brief in support of California.

The outcome of California's lawsuit will have a significant impact on other states that find themselves in similar predicaments. In the Northeast, New York and Connecticut (both mandatory RFG states) have banned MTBE and are preparing requests for waivers of the oxygen mandate. Maine has opted out of the RFG program, and New Hampshire has filed a similar request, although it cannot leave the program before 2004 unless EPA gives it special relief.<sup>5</sup> There is growing interest in the Northeast in developing a regional clean fuel that does not contain MTBE but maintains the environmental benefits of the federal RFG program; however, unless states can obtain relief from the CAA oxygen requirement, large populated portions of the region will be unable to use such a fuel. Accordingly, either legislative relief at the national level (such as that proposed in S. 1766) or a favorable ruling in California's lawsuit against EPA will be needed before the Northeast can develop a regional solution to the RFG/MTBE/ethanol problem.

### **Federal MTBE Ban under the Toxic Substances Control Act (TSCA)**

On March 24, 2000, the U.S. EPA published an Advanced Notice of Proposed Rulemaking (ANPRM) to "Initiate Rulemaking under the Toxic Substances Control Act to Eliminate or Limit the Use of MTBE as a Fuel Additive in Gasoline." Authority for such an action is found in section 6 of the Act (15 USC 2605). The standard for action under TSCA is extremely high and the process is quite cumbersome. As a point of comparison, EPA's effort to use the same authority to ban asbestos was unsuccessful. The EPA action under TSCA should be understood as an effort by the Agency to demonstrate that it is leaving no stone unturned in working to address MTBE. The use of

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<sup>5</sup> Outside of the Northeast, states that had moved to ban or restrict use of MTBE as of late 2001 included Iowa, Minnesota, Nebraska, South Dakota, Colorado, Michigan, Arizona, Washington, and Illinois. Ethanol-blended RFG is used primarily in the Chicago and Milwaukee areas; additionally, Minnesota has adopted a year-round minimum oxygen content requirement that is effectively an ethanol mandate, since the state has banned other oxygenates.

an ANPRM as opposed to a Notice of Proposed Rulemaking is consistent with the desire to make a statement rather than a law. The resort to TSCA section 6 is also a clear statement of the inadequacy of EPA's authority under the Clean Air Act and Clean Water Act to address the problem. It would be unwise to rely solely upon EPA action under TSCA to address concerns about MTBE. As of early 2002, EPA had not announced further action on this rulemaking.

### **Ethanol as an Alternative to MTBE**

The Department in conjunction with the other New England States and the New England Interstate Water Pollution Control Commission has investigated the role of Ethanol as a replacement to MTBE. Attached is a July 2001 copy of the Summary and Recommendations section of the *Health, Environmental, and Economic Impacts of Adding Ethanol to Gasoline in the Northeast States* report (Appendix E).

# APPENDIX A



Fuel Data Report for \_\_\_\_\_

Location: \_\_\_\_\_

		RVP	Oxygen	MTBE	Other Oxygenate(s) in Fuel		BENZ	ARO	SULF		
	Date of transfer	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	( % Vol)	(% Vol)	(% Vol)	(ppm)	Barrels	Notes
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# **APPENDIX B**





1st Quarter Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	(% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Gulf	01/01/01	89	14.57	0.00	0.00			0.49	21.7	48	63921
Exxon-Mobil	01/01/01	87	13.50	0.08	0.43			0.58	25.4	60	167533
Gulf	01/02/01	88	8.67	0.00	0.00			0.37	27.5	962	40668
Exxon-Mobil	01/02/01	87	14.57	0.07	0.40			0.49	21.7	48	23239
Motiva	01/03/01	87	14.40	0.06	0.30			0.55	20.4	46	74205
Motiva	01/03/01	87	13.42	0.07	0.39			0.51	21.7	110	23915
Irving	01/04/01	89	14.90	0.03	0.16			0.53	23.1	69	64656
Exxon-Mobil	01/05/01	87	13.31	0.00	0.00			0.59	24.1	53	144165
Exxon-Mobil	01/06/01	93	13.05	0.50	2.72			1.80	30.8	88	31092
Webber	01/06/01	88	14.40	0.04	0.22			0.47	23.0	106	60,243
Motiva	01/07/01	87	13.32	0.00	0.00			0.58	17.8	83	72493
Motiva	01/07/01	87	13.54	0.00	0.00			0.68	17.7	82	26973
Exxon-Mobil	01/12/01	87	13.65	0.05	0.29			0.72	25.4	56	155673
Irving	01/14/01	89	13.69	0.31	1.69			0.66	22.1	85	16841
Gulf	01/17/01	88	11.60	0.15	0.74			0.60	19.4	62	40434
Exxon-Mobil	01/17/01	87	13.79	0.09	0.51			0.56	19.3	70	103058
Motiva	01/18/01	87	13.95	0.00	0.00			0.71	22.2	69	9552
Motiva	01/18/01	87	13.50	0.00	0.00			0.65	33.3	93	75171
Exxon-Mobil	01/21/01	93	12.39	0.35	1.86			0.47	31.8	96	66494
Exxon-Mobil	01/23/01	87	14.75	0.01	0.07			0.51	19.3	59	124952
Irving	01/24/01	88	13.95	0.06	0.34			0.67	24.5	48	52123
Exxon-Mobil	01/26/01	87	13.36	0.04	0.20			0.53	24.1	49	124361
Motiva	01/26/01	87	10.36	0.57	3.10			0.66	27.7	585	20268
Motiva	01/26/01	93	13.01	0.00	0.00			0.82	30.3	70	40040
Gulf	01/27/01	87	13.30	0.02	0.12			0.48	30.1	51	40601
Motiva	01/31/01	87	13.13	0.00	0.00			0.57	28.9	77	58100
Motiva	01/31/01	87	12.02	0.21	1.15			0.64	30.6	212	53665
Exxon-Mobil	02/01/01	87	14.54	0.22	1.16			0.52	19.4	43	17122
Webber	02/01/01	87	13.32	0.17	0.90			1.53	23.7	76	51,254
Webber	02/01/01	93	13.70	0.31	1.69			0.46	30.6	70	16,458
Gulf	02/02/01	87	8.50	0.22	1.03			0.61	24.9	290	99529
Gulf	02/03/01	93	13.10	0.00	0.00			0.28	39.4	47	40231
Irving	02/03/01	89	13.93	0.25	1.33			0.61	25.7	30	30532
Irving	02/03/01	94	14.66	2.44	13.27			0.49	21.3	43	21595

1st Quarter Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	in Fuel (% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	02/05/01	87	14.07	0.11	0.60			0.55	25.1	46	125290
Irving	02/06/01	89	14.52	0.14	0.73			0.53	18.1	54	53340
Cold Brook Energy	02/08/01	87	9.67	0.10	0.45			1.20	21.7	537	22346
Exxon-Mobil	02/09/01	87	13.38	0.04	0.22			0.57	24.5	59	114936
Motiva	02/12/01	87	13.53	0.00	0.00			0.44	29.5	137	18623
Motiva	02/12/01	87	13.31	0.00	0.00			0.50	29.7	151	35376
Exxon-Mobil	02/16/01	93	12.55	0.69	3.86	T.A.M.E.	0.35	0.52	25.5	153	34034
Motiva	02/16/01	87	13.34	0.00	0.00			0.48	37.9	203	14773
Motiva	02/16/01	93	12.36	0.61	3.43	T.A.M.E.	2.75	0.96	36.2	64	38988
Motiva	02/16/01	87	12.30	0.00	0.00			0.72	32.7	313	80468
Motiva	02/16/01	87	14.00	0.00	0.00			0.43	29.9	163	4621
Irving	02/17/01	88	14.46	0.23	1.22			0.67	19.6	29	19272
Exxon-Mobil	02/17/01	87	14.27	0.11	0.61			0.64	25.0	34	126053
Gulf	02/20/01	87	14.77	0.09	0.49			0.62	21.1	44	91380
Irving	02/24/01	88	14.30	0.21	1.10			0.66	18.3	31	26468
Irving	02/25/01	88	14.27	0.30	1.63			0.66	18.1	32	22110
Exxon-Mobil	02/26/01	87	14.64	0.04	0.23			0.59	20.1	50	109758
Gulf	02/27/01	93	9.94	1.57	8.91			1.44	52.2	134	9966
Gulf	02/27/01	87	12.70	0.09	0.47			1.18	23.0	299	70021
Exxon-Mobil	03/02/01	87	14.66	0.06	0.33			0.70	19.1	40	110038
Irving	03/04/01	88	12.45	0.10	0.55			0.74	24.1	43	22422
Exxon-Mobil	03/04/01	87	12.98	0.04	0.20			0.70	24.5	39	149537
Motiva	03/05/01	93	11.35	0.67	2.25	T.A.M.E.	1.65	0.96	35.5	273	16339
Motiva	03/05/01	87	11.75	0.19	1.03			0.65	27.8	459	44109
Motiva	03/08/01	87	12.89	0.13	0.68	T.A.M.E.	0.42	0.71	28.1	120	54066
Motiva	03/08/01	87	13.14	0.04	0.20			0.62	38.2	84	35999
Exxon-Mobil	03/09/01	93	12.84	0.47	2.43	T.A.M.E.	0.28	0.95	33.4	34	51575
Motiva	03/10/01	93	12.68	0.38	2.09	T.A.M.E.	0.55	0.53	29.7	122	40427
Irving	03/12/01	88	12.71	0.26	1.40			0.71	23.1	37	26849
Irving	03/12/01	94	12.50	2.29	12.39			0.37	20.0	27	19974
Exxon-Mobil	03/13/01	87	12.37	0.05	0.27			0.70	24.1	33	124865
Irving	03/16/01	88	13.10	0.06	0.34			0.71	22.4	47	67635
Webber	03/16/01	87	11.81	0.26	1.40			0.70	29.9	645	59872
Exxon-Mobil	03/18/01	87	12.01	0.05	0.25			0.75	22.4	41	125505

1st Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s) in Fuel		BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	(% Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Motiva	03/22/01	87	9.60	0.23	1.30			1.42	33.2	290	42097
Motiva	03/22/01	87	9.70	0.23	1.27			1.24	32.9	325	37580
Gulf	03/23/01	87	8.97	0.03	0.16			4.53	40.2	60	98909
Exxon-Mobil	03/24/01	87	12.00	0.13	0.68			0.79	25.1	28	108723
Motiva	03/28/01	87	9.06	0.51	2.82			0.68	30.2	829	67315
Motiva	03/28/01	87	9.40	0.48	2.67			0.64	29.4	807	32293
<b>Weighted Ave.</b>			<b>12.95</b>	<b>0.12</b>	<b>0.62</b>	<b>T.A.M.E.</b>	<b>0.87</b>	<b>0.75</b>	<b>25.5</b>	<b>122.53</b>	

2nd Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s)	in Fuel	BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	( % Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Exxon-Mobil	04/01/01	87	11.08	0.17	0.92			0.89	26.6	45	66919
Exxon-Mobil	04/03/01	93	8.00	1.37	7.64	T.A.M.E.	0.32	0.52	29.5	107	31131
Exxon-Mobil	04/05/01	87	8.67	0.07	0.39			0.78	25.3	50	45212
Motiva	04/05/01	87	8.63	0.04	0.20	T.A.M.E.	0.18	1.04	29.0	116	50475
Motiva	04/05/01	87	8.73	0.22	1.20			0.97	29.8	362	29656
Motiva	04/05/01	87	8.88	0.08	0.42	T.A.M.E.	0.18	1.06	30.0	192	39569
Motiva	04/05/01	93	9.31	0.12	0.65	T.A.M.E.	0.32	0.68	43.3	38	26002
Gulf	04/06/01	88	8.78	0.29	1.60			0.68	35.1	967	40370
Irving	04/06/01	88	8.45	0.13	0.69			0.83	24.2	42	34646
Exxon-Mobil	04/08/01	87	7.17	0.04	0.24			0.73	31.8	44	148423
Exxon-Mobil	04/12/01	87	7.75	0.03	0.17			0.75	31.5	48	147967
Gulf	04/14/01	88	6.72	0.04	0.17	T.A.M.E.	0.08	0.52	25.4	198	100752
Exxon-Mobil	04/17/01	87	7.56	0.00	0.00			0.66	28.5	60	148677
Motiva	04/17/01	87	7.44	0.13	0.25	T.A.M.E.	0.00	0.68	30.2	92	24820
Motiva	04/17/01	87	7.44	0.13	0.25	T.A.M.E.	0.00	0.75	29.1	99	40067
Motiva	04/17/01	87	7.41	0.10	0.12	T.A.M.E.	0.00	0.74	29.7	92	43937
Motiva	04/17/01	93	7.66	0.15	0.36	T.A.M.E.	0.23	0.71	45.6	32	15000
Gulf	04/20/01	89	9.00	0.00	0.00			3.92	41.9	37	6791
Exxon-Mobil	04/21/01	93	5.97	0.99	5.50	T.A.M.E.	0.30	1.80	49.6	38	34752
Motiva	04/21/01	87	8.62	0.05	0.05			2.37	37.0	87	49550
Gulf	04/23/01	93	6.30	0.99	5.50			1.80	49.6	38	50181
Exxon-Mobil	04/23/01	93	5.97	0.99	5.50	T.A.M.E.	0.30	1.80	49.6	38	14990
Webber	04/24/01	93	7.88	0.32	1.20			1.07	46.0	32	16741
Webber	04/24/01	87	6.52	2.15	11.90			0.36	19.3	119	57376
Exxon-Mobil	04/25/01	87	7.64	0.12	0.64			0.64	23.2	74	47266
Exxon-Mobil	04/25/01	87	8.66	0.11	0.62			0.65	24.2	77	53232
Motiva	04/27/01	87	9.14	0.36	1.72	E.T.B.E.	0.16	1.24	33.2	146	69696
Motiva	04/27/01	93	7.08	0.47	2.39	T.A.M.E.	0.15	1.11	49.3	59	30157
Exxon-Mobil	04/29/01	87	7.54	0.09	0.47			0.69	26.0	44	53283
Exxon-Mobil	04/29/01	87	8.74	0.01	0.62			0.67	26.2	41	55245
Exxon-Mobil	05/01/01	93	6.87	0.29	1.54	T.A.M.E.	0.21	1.51	44.0	73	34523
Exxon-Mobil	05/01/01	93	7.61	0.77	2.91	T.A.M.E.	1.57	0.72	30.5	96	31160
Webber	05/02/01	87	8.47	0.79	4.30			0.62	25.1	205	30220

2nd Quarter Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	in Fuel (% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Gulf	05/03/01	87	8.30	0.71	3.87	E.T.B.E. T.A.M.E.	0.17 1.85	0.59	26.5	242	79933
Irving	05/03/01	87	8.81	0.34	1.85			0.66	26.6	65	33938
Irving	05/03/01	93	6.95	2.51	13.75			0.35	19.4	39	19752
Gulf	05/06/01	87	7.30	1.66	7.34			1.76	31.2	182	25085
Exxon-Mobil	05/06/01	87	7.49	0.17	0.93			0.72	29.1	52	56608
Exxon-Mobil	05/06/01	87	8.62	0.05	0.30			0.68	28.2	52	89407
Motiva	05/06/01	87	7.79	1.53	6.56	T.A.M.E.	1.76	1.96	31.3	250	50000
Motiva	05/06/01	87	7.79	1.46	6.23	T.A.M.E.	1.66	1.77	30.8	267	157480
Exxon-Mobil	05/12/01	87	7.56	0.00	0.00			0.74	29.6	50	44853
Exxon-Mobil	05/12/01	87	8.70	0.00	0.00			0.70	27.7	54	79377
Irving	05/19/01	88	9.09	0.00	0.00			3.38	42.8	18	89700
Motiva	05/19/01	87	7.56	1.00	1.04	T.A.M.E.	0.27	0.88	29.6	262	68377
Motiva	05/19/01	87	7.61	3.59	3.63	T.A.M.E.	1.01	0.96	30.8	705	36216
Motiva	05/19/01	87	7.56	5.26	5.41	T.A.M.E.	1.36	1.43	38.5	75	47883
Motiva	05/19/01	87	8.88	1.33	1.33	T.A.M.E.	1.79	0.88	28.5	487	81202
Exxon-Mobil	05/20/01	87	7.62	0.07	0.39			0.64	30.5	45	55053
Exxon-Mobil	05/20/01	87	8.89	0.05	0.29			0.66	31.6	66	92457
Exxon-Mobil	05/24/01	93	7.64	1.09	4.87	T.A.M.E.	1.44	1.05	39.9	111	29486
Exxon-Mobil *	05/24/01	93	8.53	1.00	7.92	T.A.M.E.	0.79	0.73	35.5	128	16830
Exxon-Mobil *	05/24/01	93	8.30	0.73	4.12			0.81	40.9	130	16830
Exxon-Mobil	05/25/01	87	7.67	0.13	0.70			0.67	29.5	48	66472
Exxon-Mobil	05/25/01	87	8.55	0.10	0.53			0.68	26.6	55	80682
Gulf	05/27/01	88	7.60	0.00	0.00			0.59	30.5	185	59862
Exxon-Mobil	05/30/01	87	7.45	0.00	0.00			0.32	26.7	202	111982
Exxon-Mobil	05/30/01	87	7.96	0.13	0.71			0.61	32.9	112	79012
Gulf	05/31/01	87	8.15	0.12	0.67			0.61	30.5	109	40827
Exxon-Mobil	06/03/01	87	7.70	0.00	0.00			0.73	30.4	17	66186
Exxon-Mobil	06/03/01	87	8.68	0.10	0.54			0.63	27.4	18	80196
Webber	06/03/01	87	8.66	0.76	4.00			1.16	32.3	546	41866
Webber	06/03/01	93	8.12	0.34	1.00			0.68	41.3	110	14857
Exxon-Mobil	06/10/01	93	7.56	1.14	5.04	T.A.M.E.	1.44	1.18	42.9	94	36112
Exxon-Mobil	06/10/01	93	8.34	0.65	3.22	T.A.M.E.	0.48	0.72	40.0	77	24665
Exxon-Mobil	06/10/01	87	7.55	0.11	0.32	T.A.M.E.	0.29	0.61	29.4	367	34374

2nd Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s)	in Fuel	BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	( % Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Exxon-Mobil	06/10/01	87	8.64	0.73	1.94	T.A.M.E.	2.30	0.64	24.0	390	54981
Exxon-Mobil	06/11/01	87	7.24	0.09	0.36	T.A.M.E.	0.19	0.60	29.1	453	25707
Exxon-Mobil	06/11/01	87	7.29	0.09	0.36	T.A.M.E.	0.19	0.59	28.1	436	29508
Motiva	06/11/01	87	7.56	0.34	0.34	T.A.M.E.	0.27	0.65	28.4	213	59522
Motiva	06/11/01	87	8.59	2.16	2.16	T.A.M.E.	2.14	0.69	28.2	236	20107
Gulf	06/15/01	89	6.79	0.00	0.00			1.84	40.7	20	72573
Motiva	06/17/01	87	6.79	0.28	0.30			1.67	35.7	77	72969
Motiva	06/17/01	87	7.56	0.44	0.45	T.A.M.E.	0.22	0.87	35.6	253	17786
Motiva	06/17/01	87	7.79	2.28	2.31	T.A.M.E.	1.75	1.12	34.6	249	13862
Exxon-Mobil	06/19/01	87	7.76	0.29	1.03	T.A.M.E.	0.63	0.71	25.5	300	89581
Exxon-Mobil	06/19/01	87	8.02	0.09	0.50			0.75	25.3	278	89055
Gulf	06/20/01	88	8.17	0.07	0.37			0.79	25.6	268	44333
Motiva	06/20/01	87	8.78	0.39	0.94	T.A.M.E.	1.43	1.66	30.7	383	74834
Exxon-Mobil	06/23/01	93	7.52	1.03	4.73	T.A.M.E.	1.16	1.25	35.3	117	24164
Exxon-Mobil	06/23/01	93	8.49	0.74	4.02	T.A.M.E.	0.79	0.79	36.4	135	24402
Exxon-Mobil	06/25/01	87	7.69	0.05	0.25			0.76	29.0	12	66271
Exxon-Mobil	06/25/01	87	8.63	0.00	0.00			0.71	27.8	13	80468
Gulf	06/30/01	93	7.20	0.53	2.31			1.54	48.9	35	13493
Gulf	06/30/01	87	7.69	0.58	2.26			1.40	30.8	143	30473
Exxon-Mobil	06/30/01	87	7.75	0.45	2.49			0.78	29.4	19	21964
Motiva	06/30/01	93	7.70	0.57	2.48	T.A.M.E.	0.66	1.51	46.9	36	20459
Motiva	06/30/01	87	7.34	0.51	1.86	T.A.M.E.	0.38	1.30	31.7	156	27658
Webber	06/30/01	87	8.85	1.65	8.99			1.16	26.8	182	80937
<b>Weighted Ave.</b>			<b>7.97</b>	<b>0.48</b>	<b>1.72</b>	<b>T.A.M.E.</b>	<b>0.95</b>	<b>0.90</b>	<b>30.65</b>	<b>150</b>	
						<b>E.T.B.E.</b>	<b>0.30</b>				
*Product came from two different tanks. Barrels are combined to total 33,660.											
To include in the calculations, the total was split evenly between the two deliveries											

## 3rd Quarter Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	in Fuel (% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	07/01/01	87	7.53	0.10	0.56			0.93	21.6	144	65991
Exxon-Mobil	07/01/01	87	8.67	1.37	7.51			1.22	26.7	136	79780
Irving	07/05/01	87	8.68	0.14	0.76			0.72	28.2	34	43969
Irving	07/05/01	93	6.63	2.17	12.02			0.35	19.8	34	22777
Exxon-Mobil	07/06/01	87	7.48	0.85	4.70			0.88	29.7	217	111572
Exxon-Mobil	07/06/01	87	8.87	2.15	11.67			1.27	23.8	86	111162
Motiva	07/08/01	87	7.75	0.41	1.18	T.A.M.E.	0.43	1.04	28.5	619	7507
Motiva	07/08/01	87	7.98	0.48	1.56	T.A.M.E.	0.63	0.95	28.5	719	45888
Gulf	07/09/01	87	7.79	0.37	2.00			1.39	31.0	198	39208
Gulf	07/11/01	88	7.56	0.05	0.30			0.51	27.3	205	89303
Motiva	07/13/01	93	6.45	2.21	12.12	T.A.M.E.	0.24	0.56	33.0	105	49657
Gulf	07/16/01	94	6.82	2.00	11.10			0.52	30.9	0	39305
Exxon-Mobil	07/16/01	87	7.69	2.39	13.12			0.86	22.8	196	71935
Exxon-Mobil	07/16/01	87	8.99	1.27	6.95			0.82	25.5	197	106739
Motiva	07/16/01	87	7.69	0.50	2.31	T.A.M.E.	0.39	0.90	30.1	439	59012
Irving	07/17/01	87	8.96	1.21	6.57			0.80	25.1	203	47180
Exxon-Mobil	07/19/01	93	7.49	0.92	4.48	T.A.M.E.	0.82	1.16	32.5	150	35666
Exxon-Mobil	07/19/01	93	8.18	0.85	4.00	T.A.M.E.	0.87	0.82	34.5	123	30767
Exxon-Mobil	07/21/01	87	7.82	0.08	0.42			0.71	25.3	162	76233
Exxon-Mobil	07/21/01	87	8.12	0.30	1.63			0.57	26.2	291	101233
Gulf	07/22/01	88	7.81	0.19	0.92			0.87	26.5	185	39962
Irving	07/24/01	87	8.38	0.09	0.52			0.74	30.5	24	55242
Motiva	07/24/01	87	7.54	0.54	2.98			0.67	33.1	713	59469
Motiva	07/25/01	87	7.59	0.52	2.91			0.60	31.2	183	78027
Motiva	07/25/01	87	7.54	0.48	2.70			0.62	33.5	558	30698
Exxon-Mobil	07/26/01	87	7.64	0.05	0.00	ETBE	0.29	0.64	28.7	46	89219
Exxon-Mobil	07/26/01	87	8.37	0.05	0.26			0.85	30.9	22	78809
Gulf	07/28/01	87	7.59	0.10	0.31			1.02	26.5	158	64766
Exxon-Mobil	07/28/01	93	7.75	2.33	13.18			0.49	30.0	76	38615
Exxon-Mobil	07/28/01	93	7.51	0.85	4.28	T.A.M.E.	0.52	1.39	36.8	149	24166



3rd Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s)	in Fuel	BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	( % Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Motiva	07/29/01	87	7.57	0.13	0.72			0.97	26.0	221	34569
Motiva	07/29/01	93	7.01	1.03	5.72			0.41	27.7	96	29767
Motiva	07/29/01	93	7.64	0.10	0.53			0.78	33.4	81	14722
Exxon-Mobil	07/30/01	87	7.54	0.04	0.20			0.73	29.7	29	110290
Exxon-Mobil	07/30/01	87	8.75	0.04	0.22			0.73	27.0	26	54028
Gulf	07/31/01	87	8.75	0.04	0.22			0.73	27.0	28	24812
Irving	08/04/01	87	8.41	0.09	0.50			0.67	29.5	48	44848
Exxon-Mobil	08/04/01	87	7.60	0.12	0.68			0.69	28.2	26	56801
Exxon-Mobil	08/04/01	87	8.80	0.09	0.50			0.72	26.1	33	65717
Motiva	08/06/01	87	7.70	0.98	4.22	T.A.M.E.	1.36	0.76	29.2	214	39899
Motiva	08/06/01	87	7.77	1.39	6.00	T.A.M.E.	1.83	0.70	29.0	279	59818
Webber	08/06/01	88	8.24	0.42	1.80	T.A.M.E.	0.60	0.88	28.6	925	49928
Exxon-Mobil	08/08/01	87	7.37	0.06	0.33			0.75	31.5	38	65757
Exxon-Mobil	08/08/01	87	8.72	0.05	0.25			0.76	28.2	41	78568
Gulf	08/12/01	88	7.76	0.24	1.21			0.35	10.5	153	58528
Exxon-Mobil	08/12/01	87	7.64	0.49	2.68			0.93	30.6	155	56722
Exxon-Mobil	08/12/01	87	8.56	1.16	6.36			0.98	29.6	166	76428
Gulf	08/13/01	87	8.25	0.10	0.54			0.76	27.4	50	41963
Irving	08/14/01	87	8.87	1.12	6.13			0.95	28.3	162	88630
Irving	08/14/01	87	8.31	0.83	4.58			0.07	25.8	51	4963
Irving	08/14/01	93	6.76	2.53	13.96			0.32	20.6	44	15060
Motiva	08/15/01	87	7.59	0.57	3.18			0.83	27.0	180	20337
Motiva	08/15/01	87	7.54	0.15	0.83			0.82	28.6	75	67622
Motiva	08/15/01	87	8.37	0.11	0.63			0.76	28.5	139	53692
Motiva	08/15/01	87	7.54	0.12	0.65			0.79	30.1	168	37147
Exxon-Mobil	08/16/01	93	7.46	0.78	3.75	T.A.M.E.	0.69	1.22	36.2	111	28158
Exxon-Mobil	08/16/01	93	8.20	1.19	6.29	T.A.M.E.	0.35	0.97	32.5	71	30727
Exxon-Mobil	08/18/01	87	7.78	1.75	9.42			0.48	25.5	183	88686
Exxon-Mobil	08/18/01	87	8.85	1.68	8.88			0.82	22.1	195	88746
Motiva	08/18/01	93	6.90	1.12	6.18			0.41	28.2	78	3945
Gulf	08/19/01	87	8.87	1.67	8.87			0.84	21.6	197	44639
Exxon-Mobil	08/25/01	87	7.74	0.70	3.86			0.95	27.2	231	76094
Exxon-Mobil	08/25/01	87	8.90	0.50	2.73			1.04	25.2	171	88415

3rd Quarter Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	in Fuel (% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Motiva	08/26/01	87	7.73	0.72	2.80	T.A.M.E.	1.44	0.86	24.6	277	59916
Motiva	08/26/01	93	7.28	0.98	4.58	T.A.M.E.	0.97	0.67	24.8	111	305
Webber	08/27/01	87	8.92	0.80	4.15	E.T.B.E.	0.23	1.02	27.4	179	35044
Exxon-Mobil	08/31/01	87	7.83	1.29	7.14			1.07	27.4	281	76549
Exxon-Mobil	08/31/01	87	8.86	2.29	12.38			1.01	22.3	278	89066
Exxon-Mobil	08/31/01	93	8.34	1.11	6.05	T.A.M.E.	0.15	1.12	31.9	73	16191
Exxon-Mobil	08/31/01	93	7.49	0.88	3.75	T.A.M.E.	1.40	0.98	41.1	111	43807
Motiva	09/03/01	87	7.50	0.53	2.74	T.A.M.E.	0.20	1.03	28.4	180	47252
Motiva	09/03/01	87	7.75	1.21	6.23	T.A.M.E.	0.54	0.98	27.1	225	22608
Motiva	09/03/01	87	7.47	0.45	2.09	T.A.M.E.	0.47	0.46	32.7	98	35164
Motiva	09/03/01	87	8.76	2.00	11.03			0.96	22.7	197	34329
Motiva	09/03/01	93	7.57	0.08	0.42			0.52	33.5	86	14756
Irving	09/04/01	87	8.64	0.01	0.06			0.72	29.0	60	44624
Exxon-Mobil	09/05/01	87	7.74	0.07	0.40			0.78	31.8	58	34583
Exxon-Mobil	09/05/01	87	8.83	0.04	0.24			0.70	29.9	59	44811
Gulf	09/06/01	88	7.71	0.42	0.67	T.A.M.E.	1.77	0.97	29.5	277	58394
Exxon-Mobil	09/07/01	87	7.73	0.93	5.14			1.13	27.7	233	100818
Exxon-Mobil	09/07/01	87	8.89	1.24	6.81			0.84	25.3	221	77178
Motiva	09/10/01	87	8.93	1.43	7.88			0.87	26.0	213	44910
Exxon-Mobil	09/15/01	93	12.22	0.05	0.12	T.A.M.E.	0.18	0.84	38.0	37	25091
Exxon-Mobil	09/17/01	87	11.30	0.00	0.00			0.80	30.1	40	44416
Motiva	09/17/01	87	11.20	0.00	0.00			0.88	30.0	212	78109
Motiva	09/17/01	87	9.70	0.00	0.00			0.70	31.3	445	21010
Motiva	09/17/01	93	9.70	0.00	0.00			0.63	34.4	61	477
Irving	09/18/01	87	11.07	0.15	0.79			0.75	27.7	47	30044
Irving	09/18/01	93	10.35	2.25	12.32			0.35	20.1	10.7	22073
Exxon-Mobil	09/19/01	93	8.02	0.68	3.46	T.A.M.E.	0.42	0.98	34.9	164	63428
Webber	09/19/01	93	8.24	0.18	1.00			0.98	36.8	16	10693
Webber	09/19/01	88	8.37	0.99	3.70	T.A.M.E.	1.90	0.95	22.9	287	48748
Gulf	09/21/01	87	11.70	0.00	0.00			0.75	27.9	338	54525
Exxon-Mobil	09/21/01	87	11.30	0.04	0.23			0.84	28.1	41	101718
Irving	09/24/01	87	9.82	0.71	3.86			0.88	23.0	238	108354
Exxon-Mobil	09/24/01	87	9.72	0.59	3.20			0.81	22.9	260	130546
Gulf	09/27/01	87	9.52	2.19	11.91			0.83	19.6	358	77054

3rd Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s)	in Fuel	BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	( % Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Exxon-Mobil	09/28/01	87	10.41	1.65	8.98			1.02	23.8	233	123221
Gulf	09/29/01	87	10.24	0.00	0.00			0.66	25.4	162	75240
Exxon-Mobil	09/29/01	93	8.77	0.78	4.09	T.A.M.E.	0.31	1.06	39.1	93	45000
Motiva	09/29/01	87	11.28	0.05	0.28			0.75	25.6	180	46696
Motiva	09/29/01	87	9.20	1.74	6.45	T.A.M.E.	3.66	0.79	20.2	200	7845
Motiva	09/29/01	87	11.20	0.27	0.83	T.A.M.E.	0.77	0.59	25.7	155	44691
<b>Weighted Ave.</b>			<b>7.76</b>	<b>0.71</b>	<b>3.75</b>	<b>T.A.M.E.</b>	<b>0.11</b>	<b>0.78</b>	<b>26.93</b>	<b>170</b>	
						<b>E.T.B.E.</b>	<b>0.27</b>				
<b>Data in calls this color represents fuel with ETBE but no MTBE.</b>											

## 4th Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s) in Fuel		BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	(% Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Exxon-Mobil	10/06/2001	87	10.24	0.07	0.36			3.20	36.2	146	146694
Irving	10/07/01	87	9.57	0.10	0.53			3.20	36.3	145	77000
Irving	10/10/01	93	12.87	2.30	12.29			0.45	15.2	66	30000
Exxon-Mobil	10/11/2001	87	10.16	0.32	1.77			3.01	35.2	152	171867
Webber	10/12/2001	87	10.08	1.46	7.04			2.63	30.0	226	66648
Motiva	10/12/2001	87	11.15	0.04	0.21	T.A.M.E.	0.25	0.81	28.2	208	42882
Motiva	10/12/2001	87	9.73	0.89	4.85	T.A.M.E.	2.77	0.74	21.7	201	14979
Motiva	10/12/2001	87	11.15	0.03	0.17	T.A.M.E.	0.15	0.91	26.5	219	72.516
Motiva	10/15/2001	87	12.64	0.09	0.48			0.70	29.4	362	75090
Exxon-Mobil	10/17/2001	87	10.21	1.36	7.52	T.A.M.E.	0.98	2.65	29.4	180	172406
Exxon-Mobil	10/21/2001	93	10.19	0.53	1.94			0.83	31.1	98	67739
Gulf	10/23/2001	87	12.31	0.00	0.00			1.06	27.6	119	49781
Motiva	10/23/2001	87	12.11	0.08	0.21	T.A.M.E.	0.24	0.93	28.0	164	52245
Motiva	10/23/2001	87	10.21	1.13	3.99	T.A.M.E.	2.41	0.83	23.1	188	21845
Motiva	10/23/2001	93	10.53	0.16	0.57	T.A.M.E.	0.37	0.48	31.0	59	29981
Exxon-Mobil	10/25/2001	87	10.37	0.10	0.54			1.35	28.5	255	111257
Webber	10/30/2001	88	11.04	0.22	1.20			1.06	24.3	173	10280
Webber	10/30/2001	93	11.01	0.63	3.30	T.A.M.E.	0.20	0.61	30.0	120	21624
Exxon-Mobil	10/31/2001	87	9.87	1.31	7.18			1.81	28.3	203	131241
Gulf	11/01/2001	88	13.16	0.14	0.77			1.28	23.1	218	53971
Exxon-Mobil	11/05/2001	87	10.00	1.93	10.57			1.06	25.8	214	167699
Exxon-Mobil	11/06/2001	93	10.39	0.57	2.88	T.A.M.E.	0.30	0.77	33.7	104	28070
Motiva	11/06/2001	87	11.63	0.00	0.00			0.72	25.0	185	78662
Motiva	11/06/2001	87	11.04	0.41	1.54	T.A.M.E.	0.81	0.80	24.9	175	20465
Motiva	11/06/2001	87	10.97	0.51	1.92	T.A.M.E.	1.00	0.76	23.7	181	52957
Motiva	11/06/2001	93	10.98	0.09	0.37	T.A.M.E.	0.10	0.44	27.8	44	25007
Irving	11/06/01	87	9.98	1.95	10.66			0.95	25.8	282	100500
Gulf	11/08/2001	88	10.88	0.60	3.30			0.91	31.8	94	39805
Exxon-Mobil	11/11/2001	87	11.93	0.35	1.88			0.97	24.6	176	147283
Gulf	11/12/2001	87	9.40	0.35	1.89			0.93	23.7	185	58922

## 4th Quarter Data by Date of Delivery

			RVP	Oxygen	MTBE	Other Oxygenate(s) in Fuel		BENZ	ARO	SULF	
Terminal	Date of transfer	Octane	(psi)	(% wt O <sub>2</sub> )	(% Vol)	(Other Oxy. Name)	(% Vol)	(% Vol)	(% Vol)	(ppm)	Barrels
Exxon-Mobil	11/14/2001	93	11.25	0.51	2.85	T.A.M.E.	0.23	1.00	32.5	93	55287
Gulf	11/16/2001	93	11.70	0.00	0.00			0.83	22.3	49	14753
Motiva	11/17/2001	87	11.89	0.00	0.00			0.96	24.5	166	75456
Motiva	11/17/2001	87	11.49	0.19	0.69	T.A.M.E.	0.34	0.91	24.4	167	22452
Motiva	11/17/2001	93	11.26	0.06	0.31			0.52	28.4	36	10038
Exxon-Mobil	11/19/2001	87	10.02	2.69	14.47			1.06	20.1	194	168222
Irving	11/20/01	87	9.99	2.68	14.34			0.98	20.6	193	53750
Webber	11/21/2001	87	9.92	2.68	14.34			0.98	20.6	193	47122
Exxon-Mobil	11/27/2001	87	8.74	0.09	0.48			0.99	34.8	37	174204
Irving	11/29/01	87	9.92	0.03	0.18			0.94	36.5	40	93000
Exxon-Mobil	12/03/2001	87	12.16	0.02	0.10			0.58	17.7	135	172983
Gulf	12/05/2001	94	11.46	0.00	0.00			0.84	16.5	39	14743
Gulf	12/05/2001	88	11.81	0.00	0.00			1.12	34.7	155	64047
Motiva	12/05/2001	93	11.73	0.03	0.16			0.65	29.4	39	24828
Motiva	12/05/2001	87	11.94	0.02	0.13			1.18	23.1	127	19013
Motiva	12/05/2001	87	11.86	0.04	0.23			0.98	25.2	130	21842
Motiva	12/06/2001	87	11.59	0.10	0.37	T.A.M.E.	0.20	0.37	24.4	182	34359
Motiva	12/06/2001	87	11.86	0.02	0.10			1.26	28.6	184	71886
Irving	12/06/01	87	9.41	0.02	0.11			0.50	17.3	164	67000
Gulf	12/07/2001	87	13.65	0.00	0.00			0.79	22.6	77	133143
Gulf	12/10/2001	94	13.99	2.31	12.16			0.26	9.5	37	9633
Gulf	12/10/2001	88	13.91	0.10	0.52			0.76	20.0	49	40148
Exxon-Mobil	12/11/2001	87	10.95	0.00	0.00			0.67	32.3	117	168144
Motiva	12/11/2001	87	13.71	0.24	1.27			0.81	24.8	53	60572
Motiva	12/11/2001	93	12.50	0.70	3.80			0.51	40.8	29	19748
Motiva	12/11/2001	87	12.37	0.03	0.19			1.17	28.6	134	13310
Motiva	12/11/2001	87	13.68	0.10	0.52			0.81	26.9	49	81194
Irving	12/13/01	93	13.52	2.33	12.50			0.29	16.2	40	22000
Webber	12/15/2001	87	10.96	0.00	0.00			0.64	10.7	124	47122
Exxon-Mobil	12/18/2001	93	12.31	0.95	5.12	T.A.M.E.	0.20	0.69	31.5	80	66388
Exxon-Mobil	12/23/2001	87	11.12	1.61	8.53			0.62	17.8	115	169424
Exxon-Mobil	12/27/2001	93	9.29	1.99	10.69			0.31	18.0	70	39916
Exxon-Mobil	12/27/2001	87	12.50	0.19	1.01			0.69	27.8	74	218699

4th Quarter Data by Date of Delivery

			<b>RVP</b>	<b>Oxygen</b>	<b>MTBE</b>	<b>Other Oxygenate(s) in Fuel</b>	<b>BENZ</b>	<b>ARO</b>	<b>SULF</b>		
<b>Terminal</b>	<b>Date of transfer</b>	<b>Octane</b>	<b>(psi)</b>	<b>(% wt O<sub>2</sub>)</b>	<b>(% Vol)</b>	<b>(Other Oxy. Name)</b>	<b>( % Vol)</b>	<b>(% Vol)</b>	<b>(% Vol)</b>	<b>(ppm)</b>	<b>Barrels</b>
Gulf	12/28/2001	88	12.50	0.19	1.01			0.69	27.8	74	46683
Motiva	12/29/2001	87	11.97	0.03	0.18			1.17	27.5	151	21186
Motiva	12/29/2001	87	9.49	0.09	0.47			0.92	33.2	578	79429
Gulf	10/17/2001	88	12.64	0.09	0.48			0.70	29.4	362	117143
Gulf	10/23/2001	94	12.72	0.00	0.00			0.38	28.8	41	9792
<b>Weighted Average</b>			<b>11.11</b>	<b>0.58</b>	<b>3.24</b>	<b>T.A.M.E.</b>	<b>0.64</b>	<b>1.15</b>	<b>27.10</b>	<b>156</b>	
<b>Total Years Ave.</b>			<b>10.02</b>	<b>0.51</b>	<b>2.51</b>	<b>T.A.M.E.</b>	<b>0.86</b>	<b>0.92</b>	<b>28.10</b>	<b>154</b>	
						<b>E.T.B.E.</b>	<b>0.22</b>				



# APPENDIX C





Ozone Season Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	05/01/01	93	6.87	0.29	1.54	T.A.M.E.	0.21	1.51	44.0	73	34523
Exxon-Mobil	05/01/01	93	7.61	0.77	2.91	T.A.M.E.	1.57	0.72	30.5	96	31160
Webber	05/02/01	87	8.47	0.79	4.30			0.62	25.1	205	30,220
Gulf	05/03/01	87	8.30	0.71	3.87	E.T.B.E. T.A.M.E.	0.17 1.85	0.59	26.5	242	79933
Irving	05/03/01	87	8.81	0.34	1.85			0.66	26.6	65	33938
Irving	05/03/01	93	6.95	2.51	13.75			0.35	19.4	39	19752
Gulf	05/06/01	87	7.30	1.66	7.34			1.76	31.2	182	25085
Exxon-Mobil	05/06/01	87	7.49	0.17	0.93			0.72	29.1	52	56608
Exxon-Mobil	05/06/01	87	8.62	0.05	0.30			0.68	28.2	52	89407
Motiva	05/06/01	87	7.79	1.53	6.56	T.A.M.E.	1.76	1.96	31.3	250	50000
Motiva	05/06/01	87	7.79	1.46	6.23	T.A.M.E.	1.66	1.77	30.8	267	157480
Exxon-Mobil	05/12/01	87	7.56	0.00	0.00			0.74	29.6	50	44853
Exxon-Mobil	05/12/01	87	8.70	0.00	0.00			0.70	27.7	54	79377
Irving	05/19/01	88	9.09	0.00	0.00			3.38	42.8	18	89700
Motiva	05/19/01	87	7.56	1.00	1.04	T.A.M.E.	0.27	0.88	29.6	262	68377
Motiva	05/19/01	87	7.61	3.59	3.63	T.A.M.E.	1.01	0.96	30.8	705	36216
Motiva	05/19/01	87	7.56	5.26	5.41	T.A.M.E.	1.36	1.43	38.5	75	47883
Motiva	05/19/01	87	8.88	1.33	1.33	T.A.M.E.	1.79	0.88	28.5	487	81202
Exxon-Mobil	05/20/01	87	7.62	0.07	0.39			0.64	30.5	45	55053
Exxon-Mobil	05/20/01	87	8.89	0.05	0.29			0.66	31.6	66	92457
Exxon-Mobil	05/24/01	93	7.64	1.09	4.87	T.A.M.E.	1.44	1.05	39.9	111	29486
Exxon-Mobil *	05/24/01	93	8.53	1.00	7.92	T.A.M.E.	0.79	0.73	35.5	128	16830
Exxon-Mobil *	05/24/01	93	8.30	0.73	4.12			0.81	40.9	130	16830
Exxon-Mobil	05/25/01	87	7.67	0.13	0.70			0.67	29.5	48	66472
Exxon-Mobil	05/25/01	87	8.55	0.10	0.53			0.68	26.6	55	80682
Gulf	05/27/01	88	7.60	0.00	0.00			0.59	30.5	185	59862
Exxon-Mobil	05/30/01	87	7.45	0.00	0.00			0.32	26.7	202	111982
Exxon-Mobil	05/30/01	87	7.96	0.13	0.71			0.61	32.9	112	79012
Gulf	05/31/01	87	8.15	0.12	0.67			0.61	30.5	109	40827

Ozone Season Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	in Fuel ( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	06/03/01	87	7.70	0.00	0.00			0.73	30.4	17	66186
Exxon-Mobil	06/03/01	87	8.68	0.10	0.54			0.63	27.4	18	80196
Webber	06/03/01	87	8.66	0.76	4.00			1.16	32.3	546	41866
Exxon-Mobil	06/10/01	93	8.34	0.65	3.22	T.A.M.E.	0.48	0.72	40.0	77	24665
Exxon-Mobil	06/10/01	87	7.55	0.11	0.32	T.A.M.E.	0.29	0.61	29.4	367	34374
Exxon-Mobil	06/10/01	87	8.64	0.73	1.94	T.A.M.E.	2.30	0.64	24.0	390	54981
Exxon-Mobil	06/11/01	87	7.24	0.09	0.36	T.A.M.E.	0.19	0.60	29.1	453	25707
Exxon-Mobil	06/11/01	87	7.29	0.09	0.36	T.A.M.E.	0.19	0.59	28.1	436	29508
Motiva	06/11/01	87	7.56	0.34	0.34	T.A.M.E.	0.27	0.65	28.4	213	59522
Motiva	06/11/01	87	8.59	2.16	2.16	T.A.M.E.	2.14	0.69	28.2	236	20107
Gulf	06/15/01	89	6.79	0.00	0.00			1.84	40.7	20	72573
Motiva	06/17/01	87	6.79	0.28	0.30			1.67	35.7	77	72969
Motiva	06/17/01	87	7.56	0.44	0.45	T.A.M.E.	0.22	0.87	35.6	253	17786
Motiva	06/17/01	87	7.79	2.28	2.31	T.A.M.E.	1.75	1.12	34.6	249	13862
Exxon-Mobil	06/19/01	87	7.76	0.29	1.03	T.A.M.E.	0.63	0.71	25.5	300	89581
Exxon-Mobil	06/19/01	87	8.02	0.09	0.50			0.75	25.3	278	89055
Gulf	06/20/01	88	8.17	0.07	0.37			0.79	25.6	268	44333
Motiva	06/20/01	87	8.78	0.39	0.94	T.A.M.E.	1.43	1.66	30.7	383	74834
Exxon-Mobil	06/23/01	93	7.52	1.03	4.73	T.A.M.E.	1.16	1.25	35.3	117	24164
Exxon-Mobil	06/23/01	93	8.49	0.74	4.02	T.A.M.E.	0.79	0.79	36.4	135	24402
Exxon-Mobil	06/25/01	87	7.69	0.05	0.25			0.76	29.0	12	66271
Exxon-Mobil	06/25/01	87	8.63	0.00	0.00			0.71	27.8	13	80468
Gulf	06/30/01	93	7.20	0.53	2.31			1.54	48.9	35	13493
Gulf	06/30/01	87	7.69	0.58	2.26			1.40	30.8	143	30473
Exxon-Mobil	06/30/01	87	7.75	0.45	2.49			0.78	29.4	19	21964
Motiva	06/30/01	93	7.70	0.57	2.48	T.A.M.E.	0.66	1.51	46.9	36	20459
Motiva	06/30/01	87	7.34	0.51	1.86	T.A.M.E.	0.38	1.30	31.7	156	27658
Webber	06/30/01	87	8.85	1.65	8.99			1.16	26.8	182	80,937
Exxon-Mobil	07/01/01	87	7.53	0.10	0.56			0.93	21.6	144	65991
Exxon-Mobil	07/01/01	87	8.67	1.37	7.51			1.22	26.7	136	79780
Irving	07/05/01	87	8.68	0.14	0.76			0.72	28.2	34	43969
Irving	07/05/01	93	6.63	2.17	12.02			0.35	19.8	34	22777

Ozone Season Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	07/06/01	87	7.48	0.85	4.70			0.88	29.7	217	111572
Exxon-Mobil	07/06/01	87	8.87	2.15	11.67			1.27	23.8	86	111162
Motiva	07/08/01	87	7.75	0.41	1.18	T.A.M.E.	0.43	1.04	28.5	619	7507
Motiva	07/08/01	87	7.98	0.48	1.56	T.A.M.E.	0.63	0.95	28.5	719	45888
Gulf	07/09/01	87	7.79	0.37	2.00			1.39	31.0	198	39208
Gulf	07/11/01	88	7.56	0.05	0.30			0.51	27.3	205	89303
Motiva	07/13/01	93	6.45	2.21	12.12	T.A.M.E.	0.24	0.56	33.0	105	49657
Gulf	07/16/01	94	6.82	2.00	11.10			0.52	30.9	0	39305
Exxon-Mobil	07/16/01	87	7.69	2.39	13.12			0.86	22.8	196	71935
Exxon-Mobil	07/16/01	87	8.99	1.27	6.95			0.82	25.5	197	106739
Motiva	07/16/01	87	7.69	0.50	2.31	T.A.M.E.	0.39	0.90	30.1	439	59012
Irving	07/17/01	87	8.96	1.21	6.57			0.80	25.1	203	47180
Exxon-Mobil	07/19/01	93	7.49	0.92	4.48	T.A.M.E.	0.82	1.16	32.5	150	35666
Exxon-Mobil	07/19/01	93	8.18	0.85	4.00	T.A.M.E.	0.87	0.82	34.5	123	30767
Exxon-Mobil	07/21/01	87	7.82	0.08	0.42			0.71	25.3	162	76233
Exxon-Mobil	07/21/01	87	8.12	0.30	1.63			0.57	26.2	291	101233
Gulf	07/22/01	88	7.81	0.19	0.92			0.87	26.5	185	39962
Irving	07/24/01	87	8.38	0.09	0.52			0.74	30.5	24	55242
Motiva	07/24/01	87	7.54	0.54	2.98			0.67	33.1	713	59469
Motiva	07/25/01	87	7.59	0.52	2.91			0.60	31.2	183	78027
Motiva	07/25/01	87	7.54	0.48	2.70			0.62	33.5	558	30698
Exxon-Mobil	07/26/01	87	7.84	0.05	0.00	E.T.B.E.	0.29	0.84	28.7	48	89219
Exxon-Mobil	07/26/01	87	8.37	0.05	0.26			0.85	30.9	22	78809
Gulf	07/28/01	87	7.59	0.10	0.31			1.02	26.5	158	64766
Exxon-Mobil	07/28/01	93	7.75	2.33	13.18			0.49	30.0	76	38615
Exxon-Mobil	07/28/01	93	7.51	0.85	4.28	T.A.M.E.	0.52	1.39	36.8	149	24166
Motiva	07/29/01	87	7.57	0.13	0.72			0.97	26.0	221	34569
Motiva	07/29/01	93	7.01	1.03	5.72			0.41	27.7	96	29767
Motiva	07/29/01	93	7.64	0.10	0.53			0.78	33.4	81	14722
Exxon-Mobil	07/30/01	87	7.54	0.04	0.20			0.73	29.7	29	110290
Exxon-Mobil	07/30/01	87	8.75	0.04	0.22			0.73	27.0	26	54028
Gulf	07/31/01	87	8.75	0.04	0.22			0.73	27.0	28	24812

Ozone Season Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Irving	08/04/01	87	8.41	0.09	0.50			0.67	29.5	48	44848
Exxon-Mobil	08/04/01	87	7.60	0.12	0.68			0.69	28.2	26	56801
Exxon-Mobil	08/04/01	87	8.80	0.09	0.50			0.72	26.1	33	65717
Motiva	08/06/01	87	7.70	0.98	4.22	T.A.M.E.	1.36	0.76	29.2	214	39899
Motiva	08/06/01	87	7.77	1.39	6.00	T.A.M.E.	1.83	0.70	29.0	279	59818
Webber	08/06/01	88	8.24	0.42	1.80	T.A.M.E.	0.60	0.88	28.6	925	49928
Exxon-Mobil	08/08/01	87	7.37	0.06	0.33			0.75	31.5	38	65757
Exxon-Mobil	08/08/01	87	8.72	0.05	0.25			0.76	28.2	41	78568
Gulf	08/12/01	88	7.76	0.24	1.21			0.35	10.5	153	58528
Exxon-Mobil	08/12/01	87	7.64	0.49	2.68			0.93	30.6	155	56722
Exxon-Mobil	08/12/01	87	8.56	1.16	6.36			0.98	29.6	166	76428
Gulf	08/13/01	87	8.25	0.10	0.54			0.76	27.4	50	41963
Irving	08/14/01	87	8.87	1.12	6.13			0.95	28.3	162	88630
Irving	08/14/01	87	8.31	0.83	4.58			0.07	25.8	51	4963
Irving	08/14/01	93	6.76	2.53	13.96			0.32	20.6	44	15060
Motiva	08/15/01	87	7.59	0.57	3.18			0.83	27.0	180	20337
Motiva	08/15/01	87	7.54	0.15	0.83			0.82	28.6	75	67622
Motiva	08/15/01	87	8.37	0.11	0.63			0.76	28.5	139	53692
Motiva	08/15/01	87	7.54	0.12	0.65			0.79	30.1	168	37147
Exxon-Mobil	08/16/01	93	7.46	0.78	3.75	T.A.M.E.	0.69	1.22	36.2	111	28158
Exxon-Mobil	08/16/01	93	8.20	1.19	6.29	T.A.M.E.	0.35	0.97	32.5	71	30727
Exxon-Mobil	08/18/01	87	7.78	1.75	9.42			0.48	25.5	183	88686
Exxon-Mobil	08/18/01	87	8.85	1.68	8.88			0.82	22.1	195	88746
Motiva	08/18/01	93	6.90	1.12	6.18			0.41	28.2	78	3945
Gulf	08/19/01	87	8.87	1.67	8.87			0.84	21.6	197	44639
Exxon-Mobil	08/25/01	87	7.74	0.70	3.86			0.95	27.2	231	76094
Exxon-Mobil	08/25/01	87	8.90	0.50	2.73			1.04	25.2	171	88415
Motiva	08/26/01	87	7.73	0.72	2.80	T.A.M.E.	1.44	0.86	24.6	277	59916
Motiva	08/26/01	93	7.28	0.98	4.58	T.A.M.E.	0.97	0.67	24.8	111	305
Webber	08/27/01	87	8.92	0.80	4.15	E.T.B.E.	0.23	1.02	27.4	179	35044

Ozone Season Data by Date of Delivery

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	08/31/01	87	7.83	1.29	7.14			1.07	27.4	281	76549
Exxon-Mobil	08/31/01	87	8.86	1.29	12.38			1.01	22.3	278	89066
Exxon-Mobil	08/31/01	93	8.34	1.11	6.05	T.A.M.E.	0.15	1.12	31.9	73	16191
Exxon-Mobil	08/31/01	93	7.49	0.88	3.75	T.A.M.E.	1.40	0.98	41.1	111	43807
Motiva	09/03/01	87	7.50	0.53	2.74	T.A.M.E.	0.20	1.03	28.4	180	47252
Motiva	09/03/01	87	7.75	1.21	6.23	T.A.M.E.	0.54	0.98	27.1	225	22608
Motiva	09/03/01	87	7.47	0.45	2.09	T.A.M.E.	0.47	0.46	32.7	98	35164
Motiva	09/03/01	87	8.76	2.00	11.03			0.96	22.7	197	34329
Motiva	09/03/01	93	7.57	0.08	0.42			0.52	33.5	86	14756
Irving	09/04/01	87	8.64	0.01	0.06			0.72	29.0	60	44624
Exxon-Mobil	09/05/01	87	7.74	0.07	0.40			0.78	31.8	58	34583
Exxon-Mobil	09/05/01	87	8.83	0.04	0.24			0.70	29.9	59	44811
Gulf	09/06/01	88	7.71	0.42	0.67	T.A.M.E.	1.77	0.97	29.5	277	58394
Exxon-Mobil	09/07/01	87	7.73	0.93	5.14			1.13	27.7	233	100818
Exxon-Mobil	09/07/01	87	8.89	1.24	6.81			0.84	25.3	221	77178
Motiva	09/10/01	87	8.93	1.43	7.88			0.87	26.0	213	44910
Exxon-Mobil	09/15/01	93	12.22	0.05	0.12	T.A.M.E.	0.18	0.84	38.0	37	25091
<b>Weighted Ave.</b>			<b>8.05</b>	<b>0.68</b>	<b>3.16</b>	<b>T.A.M.E.</b>	<b>1.04</b>	<b>0.90</b>	<b>29.01</b>	<b>173</b>	
						<b>E.T.B.E.</b>	<b>0.23</b>				
*Product came from two different tanks. Barrels are combined to total 33,660.											
To include in the calculations, the total was split evenly between the two deliveries.											
Data in cells this color represents fuel with ETBE but no MTBE.											



# APPENDIX D





## All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	(% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Cold Brook Energy	02/08/01	87	9.67	0.10	0.45			1.20	21.7	537	22346
Exxon-Mobil	01/01/01	87	13.50	0.08	0.43			0.58	25.4	60	167533
Exxon-Mobil	01/02/01	87	14.57	0.07	0.40			0.49	21.7	48	23239
Exxon-Mobil	01/05/01	87	13.31	0.00	0.00			0.59	24.1	53	144165
Exxon-Mobil	01/06/01	93	13.05	0.50	2.72			1.80	30.8	88	31092
Exxon-Mobil	01/12/01	87	13.65	0.05	0.29			0.72	25.4	56	155673
Exxon-Mobil	01/17/01	87	13.79	0.09	0.51			0.56	19.3	70	103058
Exxon-Mobil	01/21/01	93	12.39	0.35	1.86			0.47	31.8	96	66494
Exxon-Mobil	01/23/01	87	14.75	0.01	0.07			0.51	19.3	59	124952
Exxon-Mobil	01/26/01	87	13.36	0.04	0.20			0.53	24.1	49	124361
Exxon-Mobil	02/01/01	87	14.54	0.22	1.16			0.52	19.4	43	17122
Exxon-Mobil	02/05/01	87	14.07	0.11	0.60			0.55	25.1	46	125290
Exxon-Mobil	02/09/01	87	13.38	0.04	0.22			0.57	24.5	59	114936
Exxon-Mobil	02/16/01	93	12.55	0.69	3.86	T.A.M.E.	0.35	0.52	25.5	153	34034
Exxon-Mobil	02/17/01	87	14.27	0.11	0.61			0.64	25.0	34	126053
Exxon-Mobil	02/26/01	87	14.64	0.04	0.23			0.59	20.1	50	109758
Exxon-Mobil	03/02/01	87	14.66	0.06	0.33			0.70	19.1	40	110038
Exxon-Mobil	03/04/01	87	12.98	0.04	0.20			0.70	24.5	39	149537
Exxon-Mobil	03/09/01	93	12.84	0.47	2.43	T.A.M.E.	0.28	0.95	33.4	34	51575
Exxon-Mobil	03/13/01	87	12.37	0.05	0.27			0.70	24.1	33	124865
Exxon-Mobil	03/18/01	87	12.01	0.05	0.25			0.75	22.4	41	125505
Exxon-Mobil	03/24/01	87	12.00	0.13	0.68			0.79	25.1	28	108723
Exxon-Mobil	04/01/01	87	11.08	0.17	0.92			0.89	26.6	45	66919
Exxon-Mobil	04/03/01	93	8.00	1.37	7.64	T.A.M.E.	0.32	0.52	29.5	107	31131
Exxon-Mobil	04/05/01	87	8.67	0.07	0.39			0.78	25.3	50	45212
Exxon-Mobil	04/08/01	87	7.17	0.04	0.24			0.73	31.8	44	148423
Exxon-Mobil	04/12/01	87	7.75	0.03	0.17			0.75	31.5	48	147967
Exxon-Mobil	04/17/01	87	7.56	0.00	0.00			0.66	28.5	60	148677
Exxon-Mobil	04/21/01	93	5.97	0.99	5.50	T.A.M.E.	0.30	1.80	49.6	38	34752
Exxon-Mobil	04/23/01	93	5.97	0.99	5.50	T.A.M.E.	0.30	1.80	49.6	38	14990
Exxon-Mobil	04/25/01	87	7.64	0.12	0.64			0.64	23.2	74	47266
Exxon-Mobil	04/25/01	87	8.66	0.11	0.62			0.65	24.2	77	53232

All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	04/29/01	87	7.54	0.09	0.47			0.69	26.0	44	53283
Exxon-Mobil	04/29/01	87	8.74	0.01	0.62			0.67	26.2	41	55245
Exxon-Mobil	05/01/01	93	6.87	0.29	1.54	T.A.M.E.	0.21	1.51	44.0	73	34523
Exxon-Mobil	05/01/01	93	7.61	0.77	2.91	T.A.M.E.	1.57	0.72	30.5	96	31160
Exxon-Mobil	05/06/01	87	7.49	0.17	0.93			0.72	29.1	52	56608
Exxon-Mobil	05/06/01	87	8.62	0.05	0.30			0.68	28.2	52	89407
Exxon-Mobil	05/12/01	87	7.56	0.00	0.00			0.74	29.6	50	44853
Exxon-Mobil	05/12/01	87	8.70	0.00	0.00			0.70	27.7	54	79377
Exxon-Mobil	05/20/01	87	7.62	0.07	0.39			0.64	30.5	45	55053
Exxon-Mobil	05/20/01	87	8.89	0.05	0.29			0.66	31.6	66	92457
Exxon-Mobil	05/24/01	93	7.64	1.09	4.87	T.A.M.E.	1.44	1.05	39.9	111	29486
Exxon-Mobil *	05/24/01	93	8.53	1.00	7.92	T.A.M.E.	0.79	0.73	35.5	128	16830
Exxon-Mobil *	05/24/01	93	8.30	0.73	4.12			0.81	40.9	130	16830
Exxon-Mobil	05/25/01	87	7.67	0.13	0.70			0.67	29.5	48	66472
Exxon-Mobil	05/25/01	87	8.55	0.10	0.53			0.68	26.6	55	80682
Exxon-Mobil	05/30/01	87	7.45	0.00	0.00			0.32	26.7	202	111982
Exxon-Mobil	05/30/01	87	7.96	0.13	0.71			0.61	32.9	112	79012
Exxon-Mobil	06/03/01	87	7.70	0.00	0.00			0.73	30.4	17	66186
Exxon-Mobil	06/03/01	87	8.68	0.10	0.54			0.63	27.4	18	80196
Exxon-Mobil	06/10/01	93	7.56	1.14	5.04	T.A.M.E.	1.44	1.18	42.9	94	36112
Exxon-Mobil	06/10/01	93	8.34	0.65	3.22	T.A.M.E.	0.48	0.72	40.0	77	24665
Exxon-Mobil	06/10/01	87	7.55	0.11	0.32	T.A.M.E.	0.29	0.61	29.4	367	34374
Exxon-Mobil	06/10/01	87	8.64	0.73	1.94	T.A.M.E.	2.30	0.64	24.0	390	54981
Exxon-Mobil	06/11/01	87	7.24	0.09	0.36	T.A.M.E.	0.19	0.60	29.1	453	25707
Exxon-Mobil	06/11/01	87	7.29	0.09	0.36	T.A.M.E.	0.19	0.59	28.1	436	29508
Exxon-Mobil	06/19/01	87	7.76	0.29	1.03	T.A.M.E.	0.63	0.71	25.5	300	89581
Exxon-Mobil	06/19/01	87	8.02	0.09	0.50			0.75	25.3	278	89055
Exxon-Mobil	06/23/01	93	7.52	1.03	4.73	T.A.M.E.	1.16	1.25	35.3	117	24164
Exxon-Mobil	06/23/01	93	8.49	0.74	4.02	T.A.M.E.	0.79	0.79	36.4	135	24402
Exxon-Mobil	06/25/01	87	7.69	0.05	0.25			0.76	29.0	12	66271
Exxon-Mobil	06/25/01	87	8.63	0.00	0.00			0.71	27.8	13	80468
Exxon-Mobil	06/30/01	87	7.75	0.45	2.49			0.78	29.4	19	21964
Exxon-Mobil	07/01/01	87	7.53	0.10	0.56			0.93	21.6	144	65991
Exxon-Mobil	07/01/01	87	8.67	1.37	7.51			1.22	26.7	136	79780

All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	07/06/01	87	7.48	0.85	4.70			0.88	29.7	217	111572
Exxon-Mobil	07/06/01	87	8.87	2.15	11.67			1.27	23.8	86	111162
Exxon-Mobil	07/16/01	87	7.69	2.39	13.12			0.86	22.8	196	71935
Exxon-Mobil	07/16/01	87	8.99	1.27	6.95			0.82	25.5	197	106739
Exxon-Mobil	07/19/01	93	7.49	0.92	4.48	T.A.M.E.	0.82	1.16	32.5	150	35666
Exxon-Mobil	07/19/01	93	8.18	0.85	4.00	T.A.M.E.	0.87	0.82	34.5	123	30767
Exxon-Mobil	07/21/01	87	7.82	0.08	0.42			0.71	25.3	162	76233
Exxon-Mobil	07/21/01	87	8.12	0.30	1.63			0.57	26.2	291	101233
Exxon-Mobil	07/25/01	87	7.64	0.05	0.00	E.T.B.E.	0.29	0.64	28.7	46	89219
Exxon-Mobil	07/26/01	87	8.37	0.05	0.26			0.85	30.9	22	78809
Exxon-Mobil	07/28/01	93	7.75	2.33	13.18			0.49	30.0	76	38615
Exxon-Mobil	07/28/01	93	7.51	0.85	4.28	T.A.M.E.	0.52	1.39	36.8	149	24166
Exxon-Mobil	07/30/01	87	7.54	0.04	0.20			0.73	29.7	29	110290
Exxon-Mobil	07/30/01	87	8.75	0.04	0.22			0.73	27.0	26	54028
Exxon-Mobil	08/04/01	87	7.60	0.12	0.68			0.69	28.2	26	56801
Exxon-Mobil	08/04/01	87	8.80	0.09	0.50			0.72	26.1	33	65717
Exxon-Mobil	08/08/01	87	7.37	0.06	0.33			0.75	31.5	38	65757
Exxon-Mobil	08/08/01	87	8.72	0.05	0.25			0.76	28.2	41	78568
Exxon-Mobil	08/12/01	87	7.64	0.49	2.68			0.93	30.6	155	56722
Exxon-Mobil	08/12/01	87	8.56	1.16	6.36			0.98	29.6	166	76428
Exxon-Mobil	08/16/01	93	7.46	0.78	3.75	T.A.M.E.	0.69	1.22	36.2	111	28158
Exxon-Mobil	08/16/01	93	8.20	1.19	6.29	T.A.M.E.	0.35	0.97	32.5	71	30727
Exxon-Mobil	08/18/01	87	7.78	1.75	9.42			0.48	25.5	183	88686
Exxon-Mobil	08/18/01	87	8.85	1.68	8.88			0.82	22.1	195	88746
Exxon-Mobil	08/25/01	87	7.74	0.70	3.86			0.95	27.2	231	76094
Exxon-Mobil	08/25/01	87	8.90	0.50	2.73			1.04	25.2	171	88415
Exxon-Mobil	08/31/01	87	7.83	1.29	7.14			1.07	27.4	281	76549
Exxon-Mobil	08/31/01	87	8.86	2.29	12.38			1.01	22.3	278	89066
Exxon-Mobil	08/31/01	93	8.34	1.11	6.05	T.A.M.E.	0.15	1.12	31.9	73	16191
Exxon-Mobil	08/31/01	93	7.49	0.88	3.75	T.A.M.E.	1.40	0.98	41.1	111	43807
Exxon-Mobil	09/05/01	87	7.74	0.07	0.40			0.78	31.8	58	34583
Exxon-Mobil	09/05/01	87	8.83	0.04	0.24			0.70	29.9	59	44811

## All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) (Other Oxy. Name)	in Fuel (% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Exxon-Mobil	09/07/01	87	7.73	0.93	5.14			1.13	27.7	233	100818
Exxon-Mobil	09/07/01	87	8.89	1.24	6.81			0.84	25.3	221	77178
Exxon-Mobil	09/15/01	93	12.22	0.05	0.12	T.A.M.E.	0.18	0.84	38.0	37	25091
Exxon-Mobil	09/17/01	87	11.30	0.00	0.00			0.80	30.1	40	44416
Exxon-Mobil	09/19/01	93	8.02	0.68	3.46	T.A.M.E.	0.42	0.98	34.9	164	63428
Exxon-Mobil	09/21/01	87	11.30	0.04	0.23			0.84	28.1	41	101718
Exxon-Mobil	09/24/01	87	9.72	0.59	3.20			0.81	22.9	260	130546
Exxon-Mobil	09/28/01	87	10.41	1.65	8.98			1.02	23.8	233	123221
Exxon-Mobil	09/29/01	93	8.77	0.78	4.09	T.A.M.E.	0.31	1.06	39.1	93	45000
Exxon-Mobil	10/06/01	87	10.24	0.07	0.36			3.20	36.2	146	146694
Exxon-Mobil	10/11/01	87	10.16	0.32	1.77			3.01	35.2	152	171867
Exxon-Mobil	10/17/01	87	10.21	1.36	7.52	T.A.M.E.	0.98	2.65	29.4	180	172406
Exxon-Mobil	10/21/01	93	10.19	0.53	1.94			0.83	31.1	98	67739
Exxon-Mobil	10/25/01	87	10.37	0.10	0.54			1.35	28.5	255	111257
Exxon-Mobil	10/31/01	87	9.87	1.31	7.18			1.81	28.3	203	131241
Exxon-Mobil	11/05/01	87	10.00	1.93	10.57			1.06	25.8	214	167699
Exxon-Mobil	11/06/01	93	10.39	0.57	2.88	T.A.M.E.	0.30	0.77	33.7	104	28070
Exxon-Mobil	11/11/01	87	11.93	0.35	1.88			0.97	24.6	176	147283
Exxon-Mobil	11/14/01	93	11.25	0.51	2.85	T.A.M.E.	0.23	1.00	32.5	93	55287
Exxon-Mobil	11/19/01	87	10.02	2.69	14.47			1.06	20.1	194	168222
Exxon-Mobil	11/27/01	87	8.74	0.09	0.48			0.99	34.8	37	174204
Exxon-Mobil	12/03/01	87	12.16	0.02	0.10			0.58	17.7	135	172983
Exxon-Mobil	12/11/01	87	10.95	0.00	0.00			0.67	32.3	117	168144
Exxon-Mobil	12/18/01	93	12.31	0.95	5.12	T.A.M.E.	0.20	0.69	31.5	80	66388
Exxon-Mobil	12/23/01	87	11.12	1.61	8.53			0.62	17.8	115	169424
Exxon-Mobil	12/27/01	93	9.29	1.99	10.69			0.31	18.0	70	39916
Exxon-Mobil	12/27/01	87	12.50	0.19	1.01			0.69	27.8	74	218699
Gulf	01/01/01	89	14.57	0.00	0.00			0.49	21.7	48	63921
Gulf	01/02/01	88	8.67	0.00	0.00			0.37	27.5	962	40668
Gulf	01/17/01	88	11.60	0.15	0.74			0.60	19.4	62	40434

All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	(% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Gulf	01/27/01	87	13.30	0.02	0.12			0.48	30.1	51	40601
Gulf	02/02/01	87	8.50	0.22	1.03			0.61	24.9	290	99529
Gulf	02/03/01	93	13.10	0.00	0.00			0.28	39.4	47	40231
Gulf	02/20/01	87	14.77	0.09	0.49			0.62	21.1	44	91380
Gulf	02/27/01	93	9.94	1.57	8.91			1.44	52.2	134	9966
Gulf	02/27/01	87	12.70	0.09	0.47			1.18	23.0	299	70021
Gulf	03/23/01	87	8.97	0.03	0.16			4.53	40.2	60	98909
Gulf	04/06/01	88	8.78	0.29	1.60			0.68	35.1	967	40370
Gulf	04/14/01	88	6.72	0.04	0.17	T.A.M.E.	0.08	0.52	25.4	198	100716
Gulf	04/20/01	89	9.00	0.00	0.00			3.92	41.9	37	6791
Gulf	04/23/01	93	6.30	0.99	5.50			1.80	49.6	38	50181
Gulf	05/03/01	87	8.30	0.71	3.87	E.T.B.E. T.A.M.E.	0.17 1.85	0.59	26.5	242	79933
Gulf	05/06/01	87	7.30	1.66	7.34			1.76	31.2	182	25085
Gulf	05/27/01	88	7.60	0.00	0.00			0.59	30.5	185	59862
Gulf	05/31/01	87	8.15	0.12	0.67			0.61	30.5	109	40827
Gulf	06/15/01	89	6.79	0.00	0.00			1.84	40.7	20	72573
Gulf	06/20/01	88	8.17	0.07	0.37			0.79	25.6	268	44333
Gulf	06/30/01	93	7.20	0.53	2.31			1.54	48.9	35	13493
Gulf	06/30/01	87	7.69	0.58	2.26			1.40	30.8	143	30473
Gulf	07/09/01	87	7.79	0.37	2.00			1.39	31.0	198	39208
Gulf	07/11/01	88	7.56	0.05	0.30			0.51	27.3	205	89303
Gulf	07/16/01	94	6.82	2.00	11.10			0.52	30.9	0	39305
Gulf	07/22/01	88	7.81	0.19	0.92			0.87	26.5	185	39962
Gulf	07/28/01	87	7.59	0.10	0.31			1.02	26.5	158	64766
Gulf	07/31/01	87	8.75	0.04	0.22			0.73	27.0	28	24812
Gulf	08/12/01	88	7.76	0.24	1.21			0.35	10.5	153	58528
Gulf	08/13/01	87	8.25	0.10	0.54			0.76	27.4	50	41963
Gulf	08/19/01	87	8.87	1.67	8.87			0.84	21.6	197	44639
Gulf	09/06/01	88	7.71	0.42	0.67	T.A.M.E.	1.77	0.97	29.5	277	58394
Gulf	09/21/01	87	11.70	0.00	0.00			0.75	27.9	338	54525
Gulf	09/27/01	87	9.52	2.19	11.91			0.83	19.6	358	77054
Gulf	09/29/01	87	10.24	0.00	0.00			0.66	25.4	162	75240

All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name) (% Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Gulf	10/17/01	88	12.64	0.09	0.48		0.70	29.4	362	117143
Gulf	10/23/01	87	12.31	0.00	0.00		1.06	27.6	119	49781
Gulf	10/23/01	94	12.72	0.00	0.00		0.38	28.8	41	9792
Gulf	11/01/01	88	13.16	0.14	0.77		1.28	23.1	218	53971
Gulf	11/08/01	88	10.88	0.60	3.30		0.91	31.8	94	39805
Gulf	11/12/01	87	9.40	0.35	1.89		0.93	23.7	185	58922
Gulf	11/16/01	93	11.70	0.00	0.00		0.83	22.3	49	14753
Gulf	12/05/01	94	11.46	0.00	0.00		0.84	16.5	39	14743
Gulf	12/05/01	88	11.81	0.00	0.00		1.12	34.7	155	64047
Gulf	12/07/01	87	13.65	0.00	0.00		0.79	22.6	77	133143
Gulf	12/10/01	94	13.99	2.31	12.16		0.26	9.5	37	9633
Gulf	12/10/01	88	13.91	0.10	0.52		0.76	20.0	49	40148
Gulf	12/28/01	88	12.50	0.19	1.01		0.69	27.8	74	46683
Irving	01/04/01	89	14.90	0.03	0.16		0.53	23.1	69	64656
Irving	01/14/01	89	13.69	0.31	1.69		0.66	22.1	85	16841
Irving	01/24/01	88	13.95	0.06	0.34		0.67	24.5	48	52123
Irving	02/03/01	89	13.93	0.25	1.33		0.61	25.7	30	30532
Irving	02/03/01	94	14.66	2.44	13.27		0.49	21.3	43	21595
Irving	02/06/01	89	14.52	0.14	0.73		0.53	18.1	54	53340
Irving	02/17/01	88	14.46	0.23	1.22		0.67	19.6	29	19272
Irving	02/24/01	88	14.30	0.21	1.10		0.66	18.3	31	26468
Irving	02/25/01	88	14.27	0.30	1.63		0.66	18.1	32	22110
Irving	03/04/01	88	12.45	0.10	0.55		0.74	24.1	43	22422
Irving	03/12/01	88	12.71	0.26	1.40		0.71	23.1	37	26849
Irving	03/12/01	94	12.50	2.29	12.39		0.37	20.0	27	19974
Irving	03/16/01	88	13.10	0.06	0.34		0.71	22.4	47	67635
Irving	04/06/01	88	8.45	0.13	0.69		0.83	24.2	42	34646
Irving	05/03/01	87	8.81	0.34	1.85		0.66	26.6	65	33938
Irving	05/03/01	93	6.95	2.51	13.75		0.35	19.4	39	19752
Irving	05/19/01	88	9.09	0.00	0.00		3.38	42.8	18	89700

All Data by sorted by Terminal

Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Irving	07/05/01	87	8.68	0.14	0.76			0.72	28.2	34	43969
Irving	07/05/01	93	6.63	2.17	12.02			0.35	19.8	34	22777
Irving	07/17/01	87	8.96	1.21	6.57			0.80	25.1	203	47180
Irving	07/24/01	87	8.38	0.09	0.52			0.74	30.5	24	55242
Irving	08/04/01	87	8.41	0.09	0.50			0.67	29.5	48	44848
Irving	08/14/01	87	8.87	1.12	6.13			0.95	28.3	162	88630
Irving	08/14/01	87	8.31	0.83	4.58			0.07	25.8	51	4963
Irving	08/14/01	93	6.76	2.53	13.96			0.32	20.6	44	15060
Irving	09/04/01	87	8.64	0.01	0.06			0.72	29.0	60	44624
Irving	09/18/01	87	11.07	0.15	0.79			0.75	27.7	47	30044
Irving	09/18/01	93	10.35	2.25	12.32			0.35	20.1	10.7	22073
Irving	09/24/01	87	9.82	0.71	3.86			0.88	23.0	238	108354
Irving	10/07/01	87	9.57	0.10	0.53			3.20	36.3	145	77000
Irving	10/10/01	93	12.87	2.30	12.29			0.45	15.2	66	30000
Irving	11/06/01	87	9.98	1.95	10.66			0.95	25.8	282	100500
Irving	11/20/01	87	9.99	2.68	14.34			0.98	20.6	193	53750
Irving	11/29/01	87	9.92	0.03	0.18			0.94	36.5	40	93000
Irving	12/06/01	87	9.41	0.02	0.11			0.50	17.3	164	67000
Irving	12/13/01	93	13.52	2.33	12.50			0.29	16.2	40	22000
Motiva	01/03/01	87	14.40	0.06	0.30			0.55	20.4	46	74205
Motiva	01/03/01	87	13.42	0.07	0.39			0.51	21.7	110	23915
Motiva	01/07/01	87	13.32	0.00	0.00			0.58	17.8	83	72493
Motiva	01/07/01	87	13.54	0.00	0.00			0.68	17.7	82	26973
Motiva	01/18/01	87	13.95	0.00	0.00			0.71	22.2	69	9552
Motiva	01/18/01	87	13.50	0.00	0.00			0.65	33.3	93	75171
Motiva	01/26/01	87	10.36	0.57	3.10			0.66	27.7	585	20268
Motiva	01/26/01	93	13.01	0.00	0.00			0.82	30.3	70	40040
Motiva	01/31/01	87	13.13	0.00	0.00			0.57	28.9	77	58100
Motiva	01/31/01	87	12.02	0.21	1.15			0.64	30.6	212	53665
Motiva	02/12/01	87	13.53	0.00	0.00			0.44	29.5	137	18623
Motiva	02/12/01	87	13.31	0.00	0.00			0.50	29.7	151	35376



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Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Motiva	02/16/01	87	13.34	0.00	0.00			0.48	37.9	203	14773
Motiva	02/16/01	93	12.36	0.61	3.43	T.A.M.E.	2.75	0.96	36.2	64	38988
Motiva	02/16/01	87	12.30	0.00	0.00			0.72	32.7	313	80468
Motiva	02/16/01	87	14.00	0.00	0.00			0.43	29.9	163	4621
Motiva	03/05/01	93	11.35	0.67	2.25	T.A.M.E.	1.65	0.96	35.5	273	16339
Motiva	03/05/01	87	11.75	0.19	1.03			0.65	27.8	459	44109
Motiva	03/08/01	87	12.89	0.13	0.68	T.A.M.E.	0.42	0.71	28.1	120	54066
Motiva	03/08/01	87	13.14	0.04	0.20			0.62	38.2	84	35999
Motiva	03/10/01	93	12.68	0.38	2.09	T.A.M.E.	0.55	0.53	29.7	122	40427
Motiva	03/22/01	87	9.60	0.23	1.30			1.42	33.2	290	42097
Motiva	03/22/01	87	9.70	0.23	1.27			1.24	32.9	325	37580
Motiva	03/28/01	87	9.06	0.51	2.82			0.68	30.2	829	67315
Motiva	03/28/01	87	9.40	0.48	2.67			0.64	29.4	807	32293
Motiva	04/05/01	87	8.63	0.04	0.20	T.A.M.E.	0.18	1.04	29.0	116	50475
Motiva	04/05/01	87	8.73	0.22	1.20			0.97	29.8	362	29656
Motiva	04/05/01	87	8.88	0.08	0.42	T.A.M.E.	0.18	1.06	30.0	192	39569
Motiva	04/05/01	93	9.31	0.12	0.65	T.A.M.E.	0.32	0.68	43.3	38	26002
Motiva	04/17/01	87	7.44	0.13	0.25	E.T.B.E.	0.24	0.68	30.2	92	24820
Motiva	04/17/01	87	7.44	0.13	0.25	E.T.B.E.	0.24	0.75	29.1	99	40067
Motiva	04/17/01	87	7.41	0.10	0.12	E.T.B.E.	0.22	0.74	29.7	92	43937
Motiva	04/17/01	93	7.66	0.15	0.36	T.A.M.E.	0.23	0.71	45.6	32	15000
Motiva	04/21/01	87	8.62	0.05	0.05			2.37	37.0	87	49550
Motiva	04/27/01	87	9.14	0.36	1.72	E.T.B.E.	0.16	1.24	33.2	146	69696
Motiva	04/27/01	93	7.08	0.47	2.39	T.A.M.E.	0.15	1.11	49.3	59	30157
Motiva	05/06/01	87	7.79	1.53	6.56	T.A.M.E.	1.76	1.96	31.3	250	50000
Motiva	05/06/01	87	7.79	1.46	6.23	T.A.M.E.	1.66	1.77	30.8	267	157480
Motiva	05/19/01	87	7.56	1.00	1.04	T.A.M.E.	0.27	0.88	29.6	262	68377
Motiva	05/19/01	87	7.61	3.59	3.63	T.A.M.E.	1.01	0.96	30.8	705	36216
Motiva	05/19/01	87	7.56	5.26	5.41	T.A.M.E.	1.36	1.43	38.5	75	47883
Motiva	05/19/01	87	8.88	1.33	1.33	T.A.M.E.	1.79	0.88	28.5	487	81202
Motiva	06/11/01	87	7.56	0.34	0.34	T.A.M.E.	0.27	0.65	28.4	213	59522
Motiva	06/11/01	87	8.59	2.16	2.16	T.A.M.E.	2.14	0.69	28.2	236	20107

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Motiva	06/17/01	87	6.79	0.28	0.30			1.67	35.7	77	72969
Motiva	06/17/01	87	7.56	0.44	0.45	T.A.M.E.	0.22	0.87	35.6	253	17786
Motiva	06/17/01	87	7.79	2.28	2.31	T.A.M.E.	1.75	1.12	34.6	249	13862
Motiva	06/20/01	87	8.78	0.39	0.94	T.A.M.E.	1.43	1.66	30.7	383	74834
Motiva	06/30/01	93	7.70	0.57	2.48	T.A.M.E.	0.66	1.51	46.9	36	20459
Motiva	06/30/01	87	7.34	0.51	1.86	T.A.M.E.	0.38	1.30	31.7	156	27658
Motiva	07/08/01	87	7.75	0.41	1.18	T.A.M.E.	0.43	1.04	28.5	619	7507
Motiva	07/08/01	87	7.98	0.48	1.56	T.A.M.E.	0.63	0.95	28.5	719	45888
Motiva	07/13/01	93	6.45	2.21	12.12	T.A.M.E.	0.24	0.56	33.0	105	49657
Motiva	07/16/01	87	7.69	0.50	2.31	T.A.M.E.	0.39	0.90	30.1	439	59012
Motiva	07/24/01	87	7.54	0.54	2.98			0.67	33.1	713	59469
Motiva	07/25/01	87	7.59	0.52	2.91			0.60	31.2	183	78027
Motiva	07/25/01	87	7.54	0.48	2.70			0.62	33.5	558	30698
Motiva	07/29/01	87	7.57	0.13	0.72			0.97	26.0	221	34569
Motiva	07/29/01	93	7.01	1.03	5.72			0.41	27.7	96	29767
Motiva	07/29/01	93	7.64	0.10	0.53			0.78	33.4	81	14722
Motiva	08/06/01	87	7.70	0.98	4.22	T.A.M.E.	1.36	0.76	29.2	214	39899
Motiva	08/06/01	87	7.77	1.39	6.00	T.A.M.E.	1.83	0.70	29.0	279	59818
Motiva	08/15/01	87	7.59	0.57	3.18			0.83	27.0	180	20337
Motiva	08/15/01	87	7.54	0.15	0.83			0.82	28.6	75	67622
Motiva	08/15/01	87	8.37	0.11	0.63			0.76	28.5	139	53692
Motiva	08/15/01	87	7.54	0.12	0.65			0.79	30.1	168	37147
Motiva	08/18/01	93	6.90	1.12	6.18			0.41	28.2	78	3945
Motiva	08/26/01	87	7.73	0.72	2.80	T.A.M.E.	1.44	0.86	24.6	277	59916
Motiva	08/26/01	93	7.28	0.98	4.58	T.A.M.E.	0.97	0.67	24.8	111	305
Motiva	09/03/01	87	7.50	0.53	2.74	T.A.M.E.	0.20	1.03	28.4	180	47252
Motiva	09/03/01	87	7.75	1.21	6.23	T.A.M.E.	0.54	0.98	27.1	225	22608
Motiva	09/03/01	87	7.47	0.45	2.09	T.A.M.E.	0.47	0.46	32.7	98	35164
Motiva	09/03/01	87	8.76	2.00	11.03			0.96	22.7	197	34329
Motiva	09/03/01	93	7.57	0.08	0.42			0.52	33.5	86	14756
Motiva	09/10/01	87	8.93	1.43	7.88			0.87	26.0	213	44910

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Terminal	Date of transfer	Octane	RVP (psi)	Oxygen (% wt O <sub>2</sub> )	MTBE (% Vol)	Other Oxygenate(s) in Fuel (Other Oxy. Name)	( % Vol)	BENZ (% Vol)	ARO (% Vol)	SULF (ppm)	Barrels
Motiva	09/17/01	87	11.20	0.00	0.00			0.88	30.0	212	78109
Motiva	09/17/01	87	9.70	0.00	0.00			0.70	31.3	445	21010
Motiva	09/17/01	93	9.70	0.00	0.00			0.63	34.4	61	477
Motiva	09/29/01	87	11.28	0.05	0.28			0.75	25.6	180	46696
Motiva	09/29/01	87	9.20	1.74	6.45	T.A.M.E.	3.66	0.79	20.2	200	7845
Motiva	09/29/01	87	11.20	0.27	0.83	T.A.M.E.	0.77	0.59	25.7	155	44691
Motiva	10/12/01	87	11.15	0.04	0.21	T.A.M.E.	0.25	0.81	28.2	208	42882
Motiva	10/12/01	87	9.73	0.89	4.85	T.A.M.E.	2.77	0.74	21.7	201	14979
Motiva	10/12/01	87	11.15	0.03	0.17	T.A.M.E.	0.15	0.91	26.5	219	72,516
Motiva	10/15/01	87	12.64	0.09	0.48			0.70	29.4	362	75090
Motiva	10/23/01	87	12.11	0.08	0.21	T.A.M.E.	0.24	0.93	28.0	164	52245
Motiva	10/23/01	87	10.21	1.13	3.99	T.A.M.E.	2.41	0.83	23.1	188	21845
Motiva	10/23/01	93	10.53	0.16	0.57	T.A.M.E.	0.37	0.48	31.0	59	29981
Motiva	11/06/01	87	11.63	0.00	0.00			0.72	25.0	185	78662
Motiva	11/06/01	87	11.04	0.41	1.54	T.A.M.E.	0.81	0.80	24.9	175	20465
Motiva	11/06/01	87	10.97	0.51	1.92	T.A.M.E.	1.00	0.76	23.7	181	52957
Motiva	11/06/01	93	10.98	0.09	0.37	T.A.M.E.	0.10	0.44	27.8	44	25007
Motiva	11/17/01	87	11.89	0.00	0.00			0.96	24.5	166	75456
Motiva	11/17/01	87	11.49	0.19	0.69	T.A.M.E.	0.34	0.91	24.4	167	22452
Motiva	11/17/01	93	11.26	0.06	0.31			0.52	28.4	36	10038
Motiva	12/05/01	93	11.73	0.03	0.16			0.65	29.4	39	24828
Motiva	12/05/01	87	11.94	0.02	0.13			1.18	23.1	127	19013
Motiva	12/05/01	87	11.86	0.04	0.23			0.98	25.2	130	21842
Motiva	12/06/01	87	11.59	0.10	0.37	T.A.M.E.	0.20	0.37	24.4	182	34359
Motiva	12/06/01	87	11.86	0.02	0.10			1.26	28.6	184	71886
Motiva	12/11/01	87	13.71	0.24	1.27			0.81	24.8	53	60572
Motiva	12/11/01	93	12.50	0.70	3.80			0.51	40.8	29	19748
Motiva	12/11/01	87	12.37	0.03	0.19			1.17	28.6	134	13310
Motiva	12/11/01	87	13.68	0.10	0.52			0.81	26.9	49	81194
Motiva	12/29/01	87	11.97	0.03	0.18			1.17	27.5	151	21186
Motiva	12/29/01	87	9.49	0.09	0.47			0.92	33.2	578	79429
Webber	01/06/01	88	14.40	0.04	0.22			0.47	23.0	106	60,243





# APPENDIX E



# HEALTH, ENVIRONMENTAL, AND ECONOMIC IMPACTS OF ADDING ETHANOL TO GASOLINE IN THE NORTHEAST STATES



 **NEWPCC**  
New England Interstate Water  
Pollution Control Commission

 **NESCAUM**  
Northeast States for  
Coordinated Air Use  
Management

**VOLUME 1**  
**SUMMARY AND RECOMMENDATIONS**

**JULY 2001**



# HEALTH, ENVIRONMENTAL, AND ECONOMIC IMPACTS OF ADDING ETHANOL TO GASOLINE IN THE NORTHEAST STATES

**VOLUME 1**

## ***SUMMARY AND RECOMMENDATIONS***

**JULY 2001**

*Prepared by:*

**New England Interstate  
Water Pollution Control Commission  
(NEIWPC)**

Boott Mills South  
100 Foot of John Street  
Lowell, MA 01852

(978) 323-7929

Ronald F. Poltak,  
*Executive Director*

**Northeast States for Coordinated  
Air Use Management  
(NESCAUM)**

129 Portland Street  
Boston, MA 02114

(617) 367-8540

Jason S. Grumet,  
*Executive Director*



# SUMMARY AND RECOMMENDATIONS

## OVERVIEW

The federal reformulated gasoline (RFG) program was designed to reduce emissions of motor vehicle pollutants. To comply with the RFG program, gasoline must achieve a set of emission performance standards and meet a minimum oxygen content requirement. Approximately three-quarters of all gasoline currently sold in the Northeast market is RFG. By and large, refiners have opted to comply with the oxygen requirement by selling RFG containing methyl tertiary-butyl ether (MtBE) at 11 percent by volume, which translates to more than one billion gallons of MtBE sold annually in the Northeast. While the use of MtBE in gasoline has increased dramatically since 1995 due to the minimum oxygen requirement in the RFG program, this additive has been used as an octane enhancer in some gasoline for many years.

The RFG program has provided substantial reductions in the emissions of smog-forming pollutants, benzene and other hazardous air pollutants from motor vehicles. However, substantial evidence exists showing that the unique chemical and physical properties of MtBE pose an unacceptable risk to our region's potable water supply. In response to this threat, the Northeast states are seeking ways to dramatically reduce or eliminate MtBE from the region's gasoline supply. The challenge facing policymakers is to maintain the air quality benefits of the RFG program while reducing the threat that MtBE poses to the region's critical water resources.

MtBE and ethanol are the only two oxygenates currently produced in quantities sufficient to meet the demand created by the RFG program. Therefore, under current federal law, eliminating MtBE represents a de facto mandate for ethanol in RFG. Because MtBE and ethanol are valuable high-octane components, the use of ethanol in gasoline is likely to increase dramatically as MtBE is phased-out in the Northeast, even without the oxygen requirement.

To better understand the consequences of potentially introducing hundreds of millions of gallons of ethanol into the region's gasoline pool, the New England Governors' Conference Committee on the Environment asked the New England Interstate Water Pollution Control Commission (NEIWPCC) and the Northeast States for Coordinated Air Use Management (NESCAUM) to assess the potential public health, environmental, regulatory and economic impacts associated with such a shift. Of primary concern are air quality impacts, the potential impact of ethanol on water resources, infrastructure requirements, and the economic costs of a shift from MtBE to ethanol. The State Environmental Commissioners further asked NEIWPCC and NESCAUM to develop recommendations to alleviate or minimize any potential adverse effects associated with a significant increase in fuel ethanol use. In response to growing interest, this study also resummaries available information on the potential for developing biomass ethanol production capacity in the Northeast. This paper highlights key findings of the NEIWPCC and NESCAUM analyses and provides research and policy recommendations for consideration by the Northeast states. The analyses behind these findings and recommendations are detailed in separate technical papers produced by NEIWPCC and NESCAUM.

This document is the latest in a series of reports issued over the last several years by the Northeast states on the topic of RFG, MtBE and ethanol. Consequently, several of the conclusions and policy recommendations contained herein are derived from and supported by these earlier analyses. Broad policy recommendations—including the need for legislative and regulatory action to eliminate MtBE, lift the oxygen mandate, prevent backsliding on air quality benefits, and ensure that a federal ethanol strategy is national in scope—were previously endorsed by the Northeast states. Similarly, the decision by some member states to ban MtBE was made prior to this report. Therefore, policy recommendations that include a continued significant role for MtBE are not considered here. Readers are encouraged to consult previous NESCAUM reports on this topic.<sup>1</sup>

This evaluation is intended to provide our member states with timely policy guidance. In order to conduct a detailed technical assessment of the environmental and economic consequences of increased ethanol use in our region, it would be necessary to conduct field experiments to document the fate and transport of ethanol in the Northeast environment and detailed economic analyses to predict the cost and fuel supply impacts of various fuel scenarios. These activities are beyond the scope of the efforts conducted to date. NEIWPC and NESCAUM recommend such studies be undertaken to refine our understanding of the issues at hand. However, the information summarized in the attached technical papers provides compelling justification for the technical findings and policy recommendations that follow. Should the policy landscape change as a result of federal or state actions that would significantly alter gasoline formulations or diminish the likely role of ethanol in favor of other fuel constituents, further analysis may be needed to properly inform the region's policymakers regarding the potential consequences of such action.

## SUMMARY OF RECOMMENDATIONS

Based on the findings of this study and previous analyses conducted by the Northeast states, NEIWPC and NESCAUM offer the following research and policy recommendations (see pages 20-23 for full set of recommendations):

1. Legislative and regulatory initiatives to remove MtBE from gasoline;
  - ▲ Congressional action to lift the oxygen mandate for RFG
  - ▲ pending effective Congressional action, USEPA should grant state requests to waive the RFG program's oxygen requirements
  - ▲ clarification of state and federal authority to regulate gasoline additives
  - ▲ regionally coordinated phase-out of MtBE
2. Legislative and regulatory action to ensure the appropriate use of ethanol;
  - ▲ any federal program requiring ethanol in gasoline should allow refiners and suppliers to meet their sales quotas nationally, on an annual average basis, and provide incentives for ethanol made from cellulosic biomass
3. U.S. Environmental Protection Agency (USEPA) initiatives to prevent adverse air quality impacts;
  - ▲ establish air toxic performance standards based on actual reductions achieved by RFG (i.e., no "backsliding")
  - ▲ repeal the one-pound RVP waiver for ethanol-blended conventional gasoline

## SUMMARY AND RECOMMENDATIONS

4. Refinery modeling to predict future fuel formulations, fuel supply impacts and the average cost impacts associated with diminished MtBE use in the Northeast, including the cost to remedy potential adverse air quality impacts related to ethanol use;
5. Controlled field studies to understand the true extent of the environmental fate and transport of ethanol and ethanol-blended gasoline in the Northeast;
6. Efforts to evaluate, upgrade and improve, where necessary, the region's gasoline storage and transport system to accommodate ethanol and ethanol blends;
7. A regionally consistent and coordinated air and water quality monitoring network for ethanol;
  - ▲ Northeast states should develop and employ standardized analytical methods for measuring ethanol in environmental water samples, including acceptable detection limits
  - ▲ states should design and deploy an air and water quality monitoring network that will, at a minimum, measure ambient ethanol concentrations at likely worst case locations
8. Airshed and human exposure modeling to evaluate the impacts from the potential change in ambient concentrations of ethanol, combustion by-products (acetaldehyde and formaldehyde) and other hazardous air pollutants associated with a substitution of ethanol for MtBE;
9. Development of a model oxygen waiver request and technical support document for states interested in pursuing a waiver of the RFG program's oxygen mandate; and
10. Further exploration of opportunities to develop an indigenous industry to produce fuel ethanol from cellulosic biomass in the Northeast.

## SUMMARY OF KEY FINDINGS

### HEALTH EFFECTS

- ▲ Gasoline is a complex mixture containing hundreds of compounds, many of which are known or suspected human carcinogens and/or contribute to ozone and fine particulate matter formation, as well as water pollution.
- ▲ Exposure to gasoline-related toxins in the air and water presents potential public health risks.
- ▲ Given current information, ethanol appears to be one of the least toxic of the major components of gasoline when considering common toxicological endpoints, such as carcinogenicity and central nervous system depression.
- ▲ Preliminary analyses indicate that direct exposure to fuel ethanol in the air and in contaminated drinking water is not expected to pose public health risks.
- ▲ The potential for other adverse impacts, including developmental effects, associated with large-scale exposure to low levels of ethanol is uncertain.
- ▲ Additional analyses to estimate ambient exposure to ethanol and its atmospheric breakdown products, including highly toxic constituents such as acetaldehyde and peroxyacetyl nitrates (PAN) are needed to assess the potential public health impacts of increased ethanol use in Northeast.

- ▲ Studies have found strong correlations between the introduction of cleaner-burning gasoline and reduced concentrations of ozone, ozone precursors and air toxics in the ambient air. The specific contribution of oxygenates in achieving these benefits is difficult to quantify at this time.
- ▲ Air toxic and ozone precursor emissions could increase from both RFG and conventional gasoline if ethanol substantially replaces MtBE in the region's gasoline supply. However, these adverse impacts can be minimized with appropriate legislative and regulatory actions at the state and federal level including adoption of anti-backsliding provisions, repeal of the oxygen mandate and the elimination of volatility waivers for conventional gasoline blended with ethanol.
- ▲ While the air quality benefits of RFG could diminish somewhat if ethanol replaces MtBE, under any scenario, the program will continue to provide important public health benefits compared to conventional gasoline.
- ▲ Ethanol-blends provide some air quality benefits compared to non-oxygenated blends including lower rates of carbon monoxide and particulate emissions, as well as greenhouse gas benefits.
- ▲ With ethanol, the carbon monoxide benefits will partially offset the adverse ozone impacts associated with increased NOx and VOC emissions.
- ▲ Low-level ethanol contamination of groundwater (i.e., less than 400 µg/L, a draft Water Comparison Value derived in this report) is not expected to substantially alter blood alcohol concentrations or produce a significant health risk. The potential health risks in sensitive subjects such as pregnant women or those who may have aldehyde dehydrogenase deficiency were considered in reaching this conclusion.
- ▲ Higher concentrations of ethanol in water may begin to increase health risks but are not expected to materially add to endogenous ethanol concentrations until there is daily exposure to at least 10 mg/L (ppm). Thus, the hazard potential of ethanol (production of irreversible fetal effects) is mitigated by the fact that relatively high environmental concentrations would be needed to reach a level of public health concern and by the fact that such concentrations are unlikely given the physical and chemical properties of ethanol.
- ▲ The hazard potential for ethanol is greater than that for MtBE in terms of the types of irreversible damage possible from repeated high-level exposures. In spite of this greater hazard potential, the draft Water Comparison Value for ethanol in drinking water appears to be at least as high, if not higher, than MtBE.

### **ENVIRONMENTAL IMPACTS**

- ▲ Gasoline spilled and leaked into the environment is a major source of water pollution. At elevated levels, gasoline and its constituents can adversely affect the quality of drinking water, pose a threat to public health and threaten aquatic life.
- ▲ Because it biodegrades quickly in the environment, ethanol poses significantly less risk to water resources than MtBE. However, the following environmental transport properties of ethanol are cause for some concern: (1) at high concentrations, ethanol can make other gasoline constituents more soluble in groundwater; (2) when present in a gasoline spill, ethanol can delay the degradation of other, more toxic components in gasoline; and (3) ethanol can cause greater lateral spread of the layer of gasoline on top of the water table.

- ▲ While ethanol is likely to have fewer adverse impacts than MtBE in small-volume gasoline spill scenarios, the relative impacts of large-volume gasoline spills are harder to generalize due to the uncertainties in quantifying the effects of ethanol on BTEX plume length, the concentration of terminal electron acceptors, and secondary effects on groundwater quality, such as increased levels of dissolved iron.
- ▲ Under acute exposure conditions, ethanol is 3.7 times less toxic to aquatic life than MtBE. Over longer periods of exposure, ethanol is thought to be similar, if somewhat less toxic, than MtBE in terms of impacts on aquatic life. However, ethanol is not expected to persist for long periods in the environment.
- ▲ The breakdown of ethanol in surface waters could potentially result in the consumption of significant quantities of dissolved oxygen in the surface water body. Depending on conditions in the surface water body and the amount of ethanol introduced, this could result in fish kills.
- ▲ Much of the technology developed to clean-up gasoline and MtBE in soil should work in remediating spills of neat ethanol and ethanol-blends. However, until these technologies are field tested, it is difficult to determine the cost and relative efficacy of the various options.
- ▲ Due to its high solubility, treatment technologies that rely on the physical separation of ethanol from water (e.g., adsorptive filters) will not be effective.
- ▲ Since ethanol is highly biodegradable, biological treatment technologies offer significant promise, although in-situ bioremediation technologies would have to be scaled-up relative to those currently used.
- ▲ It is premature to speculate on how the presence of ethanol blends will affect soil and groundwater remediation costs since several significant factors regarding the fate and transport of ethanol in the environment are unknown.

### **ETHANOL INFRASTRUCTURE**

- ▲ Due to ethanol's affinity for water, ethanol-containing gasoline cannot be transported through existing pipelines.
- ▲ Ethanol will need to be transported and stored separately from gasoline until the point where it is loaded into tanker trucks for delivery to retail stations.
- ▲ Segregated ethanol storage tanks and new blending equipment will be needed at distribution terminals.
- ▲ Designing and building this infrastructure could cost the Northeast \$30 million and take two or more years to establish.
- ▲ Infrastructure needs may present siting difficulties and regulatory issues. For example, space constraints may prove to be an important obstacle in siting new tanks at petroleum storage and distribution facilities.
- ▲ To accommodate the amount of ethanol that would be needed to meet RFG demand, barge, rail and truck facilities would need to be added or expanded at bulk terminal and port facilities in the region.
- ▲ The materials used to fabricate UST/AST systems have evolved over time to accommodate the storage of ethanol and ethanol-blend fuels. However, some existing single-walled fiberglass reinforced plastic tanks fabricated prior to January 1, 1984, as

well as some gaskets, sealants, adhesives and other component materials, may not be compatible with ethanol. The degradation of non-compatible materials may lead to new releases.

- ▲ Ethanol will enhance the suspension of water and loosen rust and deposits from the interior walls of storage systems. Water and scoured deposits could cause or contribute to premature failure of some leak monitoring systems, submersible pumps, fuel dispensers, piping, hoses, nozzles and swivels.

### **ECONOMIC IMPACTS**

- ▲ The economic consequences of replacing MtBE in gasoline with ethanol and the resulting efforts to weaken environmental standards to reduce these costs are likely to represent the greatest impact in the Northeast.
- ▲ Fuel reformulation and infrastructure needs are predicted to increase the cost of RFG in the region if ethanol replaces MtBE.
- ▲ Removing MtBE from the region's gasoline pool is likely to increase fuel costs and may create near-term volume supply shortfalls, whether the oxygen mandate is retained or not. However, costs increases and potential supply shortfalls are likely to be more severe with the mandate than without the mandate.
- ▲ Existing information suggests that producing RFG with ethanol will increase per gallon costs by 3 - 11 cents in the near-term. These cost estimates are likely to be conservative because they do not reflect the combined demand for ethanol in both the Northeast and California and they do not reflect the maintenance of full air quality benefits provided by the RFG program. Incremental cost increases are expected to decline with a longer MtBE phase-out period.
- ▲ A one-cent per-gallon increase in the cost of RFG will result in a \$120 million per year expense for Northeast consumers. If the average cost of all gasoline (both RFG and conventional) in the Northeast increases by 7 cents per gallon, total annual costs to the region would be on the order of \$1 billion. Since most RFG and ethanol is produced outside the Northeast, increased gasoline costs will result in a substantial outflow of resources from the regional economy.
- ▲ Costs could be higher than those predicted if the goal is to hold public health harmless with regard to air toxics and ozone emissions.
- ▲ Increased demand and constrained supplies are likely to result in higher near-term costs for ethanol and other valuable blendstocks, such as alkylates, in the early years of a national shift away from MtBE.
- ▲ There may be significant adverse impacts on the state highway funds, due to the structure of the federal subsidy program to encourage fuel ethanol use.
- ▲ The development of cellulosic biomass ethanol production capability in the Northeast presents a potential economic opportunity that could reduce the long-term cost and increase the economic and environmental benefits of fuel ethanol use in our region.