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Methyl Tertiary Butyl Ether (MTBE); Advance Notice of Intent To Initiate Rulemaking Under the Toxic Substances Control Act To Eliminate or Limit the Use of MTBE as a Fuel Additive in Gasoline; Advance Notice of Proposed Rulemaking

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 755

[OPPT–62164; FRL–6496–1]

Methyl Tertiary Butyl Ether (MTBE); Advance Notice of Intent to Initiate Rulemaking Under the Toxic Substances Control Act to Eliminate or Limit the Use of MTBE as a Fuel Additive in Gasoline

AGENCY: Environmental Protection Agency (EPA).

ACTION: Advance Notice of Proposed Rulemaking.

SUMMARY: Methyl Tertiary Butyl Ether (MTBE) is a chemical compound that is used as a fuel additive in gasoline. Refiners have primarily added MTBE to gasoline to meet the Clean Air Act (CAA) requirement that areas with severe problems in attaining the National Ambient Air Quality Standard (NAAQS) for ozone use Reformulated Gasoline (RFG) containing 2% oxygen by weight. Many States have also voluntarily chosen to use RFG as a means of addressing marginal, moderate, or serious ozone nonattainment, and some refiners use MTBE to boost the octane of gasoline. In addition to the RFG program, the CAA also required the establishment of a Wintertime Oxygenated Fuel (Wintertime Oxyfuel) program. Under this program, gasoline must contain 2.7% oxygen by weight during the wintertime in areas that are not in attainment for the NAAQS for carbon monoxide (CO). In some cases this requirement is met through the use of MTBE. While the use of MTBE as a fuel additive in gasoline has helped to reduce harmful air emissions, it has also caused widespread and serious contamination of the nation's drinking water supplies. Unlike other components of gasoline, MTBE dissolves and spreads readily in the groundwater underlying a spill site, resists biodegradation, and is difficult and costly to remove from groundwater. Low levels of MTBE can render drinking water supplies unpotable due to its offensive taste and odor. At higher levels, it may also pose a risk to human health. The United States Geological Survey (USGS) has found that the occurrence of MTBE in groundwater is strongly related to its use as a fuel additive in the area, finding detections of MTBE in 21% of ambient groundwater tested in areas where MTBE is used in RFG compared with 2% of ambient groundwater in areas using conventional gasoline. EPA is today providing an advance notice of its intent to initiate a rulemaking pursuant to section 6 of the Toxic Substances Control Act (TSCA) to eliminate or limit the use of MTBE as a fuel additive. EPA seeks public comment on a number of aspects of this anticipated regulatory action, including whether the Agency should take action to address any fuel additives other than MTBE.

DATES: Comments, identified by docket control number OPPTS–62164, must be received on or before May 8, 2000.

ADDRESSES: Comments may be submitted by mail, electronically, or in person. Please follow the detailed instructions for each method as provided in Unit I. of the **SUPPLEMENTARY INFORMATION**. To ensure proper receipt by EPA, it is imperative that you identify docket control number OPPTS–62164 on the first page of your response.

FOR FURTHER INFORMATION CONTACT: *For general information contact:* Barbara Cunningham, Director, Office of Program Management and Evaluation, Office of Pollution Prevention and Toxics (7401), Environmental Protection Agency, Ariel Rios Bldg., 1200 Pennsylvania Ave., NW., Washington, DC 20460; telephone number: (202) 554–1404; e-mail address: TSCA-Hotline@epa.gov.

For technical information contact: Karen Smith, Office of Transportation and Air Quality, Fuels and Energy Division (6406J), Environmental Protection Agency, Ariel Rios Bldg., 1200 Pennsylvania Ave., NW., Washington, DC 20460; telephone number: (202) 564–9674; e-mail address: smith.karen@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does this Action Apply to Me?

Entities potentially regulated by a limit or ban on the use of MTBE as a fuel additive in gasoline are those entities that refine, import, or blend gasoline with additives, or that transport, store, or sell gasoline, or otherwise introduce gasoline into commerce. Potentially regulated categories include:

Categories	NAICS codes	SIC codes	Examples of regulated entities
Industry	324110	2911	Petroleum refiners, blenders, and importers
Industry	422710	5171	Gasoline marketers and distributors
	422720	5172	

This listing is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by an action resulting from this ANPRM. Other types of entities not listed in this table could also be directly affected, particularly if future action includes limits directed at gasoline release prevention or water remediation, rather than the MTBE content of gasoline. The North American Industrial Classification System (NAICS) and Standard Industrial Classification (SIC) codes have been provided to assist you and others in determining whether or not this action applies to certain entities. To determine whether you or your business is affected by this action, you should carefully examine this ANPRM. If you have any questions regarding the applicability of this action to a particular entity, consult the technical person listed under **FOR FURTHER INFORMATION CONTACT.**

B. How Can I Get Additional Information, Including Copies of this Document or Other Related Documents?

1. *Electronically.* You may obtain electronic copies of this document, and certain other related documents that might be available electronically, from the EPA Internet Home Page at http://www.epa.gov/. To access this document, on the Home Page select ''Laws and Regulations'' and then look up the entry for this document under the ''**Federal Register**—Environmental Documents.'' You can also go directly to the **Federal Register** listings at http://www.epa.gov/fedrgstr/.

2. *In person.* The Agency has established an official record for this action under docket control number OPPTS–62164. The official record consists of the documents specifically referenced in this ANPRM, any public comments received during an applicable comment period, and other information related to this action, including any information claimed as Confidential

Business Information (CBI). This official record includes the documents that are physically located in the docket, as well as the documents that are referenced in those documents and in this ANPRM. The public version of the official record does not include any information claimed as CBI. The public version of the official record, which includes printed, paper versions of any electronic comments submitted during an applicable comment period, is available for inspection in the TSCA Nonconfidential Information Center, North East Mall, Rm. B–607, Waterside Mall, 401 M St., SW., Washington, DC. The Center is open from noon to 4 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Center is (202) 260–7099. For additional information related to this ANPRM, see the Office of Air and Radiation (OAR) Docket, A–99–01, The Blue Ribbon Panel to Review the Use of Oxygenates in Gasoline. The index for OAR docket A–99–01 can be found at http://www.epa.gov/oms/consumer/fuels/oxypanel/blueribb.htm.

3. *Fax-on-Demand*. Using a faxphone call (202) 401–0527 and select item 4005 for an index of items in this category.

C. How and to Whom Do I Submit Comments?

You may submit comments through the mail, in person, or electronically. To ensure proper receipt by EPA, it is imperative that you identify docket control number OPPTS–62164 on the first page of your response. Commenters should be aware that their comments may be placed on an Internet docket web site. This information may include the commenters name and address.

1. *By mail*. Submit your comments to: Document Control Office (7407), Office of Pollution Prevention and Toxics (OPPT), Environmental Protection Agency, Ariel Rios Bldg., 1200 Pennsylvania Ave., NW., Washington, DC 20460.

2. *In person or by courier*. Deliver your comments to: OPPT Document Control Office (DCO) in East Tower Rm. G–099, Waterside Mall, 401 M St., SW., Washington, DC. The DCO is open from 8 a.m. to 4 p.m., Monday through Friday, excluding legal holidays. The telephone number for the DCO is (202) 260–7093. If your comments are received after 3 p.m., they will be dated as received the next business day.

3. *Electronically*. You may submit your comments electronically by e-mail to: ''oppt.ncic@epa.gov,'' or mail your computer disk to the address identified above. Do not submit any information electronically that you consider to be CBI. Electronic comments must be submitted as an ASCII file avoiding the use of special characters and any form of encryption. Comments and data will also be accepted on standard disks in WordPerfect 6.1/8.0 or ASCII file format. All comments in electronic form must be identified by docket control number OPPTS–62164. Electronic comments may also be filed online at many Federal Depository Libraries.

D. How Should I Handle CBI Information That I Want to Submit to the Agency?

Do not submit any information electronically that you consider to be CBI. You may claim information that you submit to EPA in response to this document as CBI by marking any part or all of that information as CBI. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2. In addition to one complete version of the comment that includes any information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public version of the official record. Information not marked confidential will be included in the public version of the official record without prior notice. If you have any questions about CBI or the procedures for claiming CBI, please consult the technical person identified under **FOR FURTHER INFORMATION CONTACT.**

E. What Should I Consider as I Prepare My Comments for EPA?

EPA invites you to provide your views on any issue relevant to this ANPRM. EPA has identified particular subjects in Unit VI. regarding which comment would be particularly appreciated. You may find the following suggestions helpful for preparing your comments:

1. Explain your views as clearly as possible.

2. Describe any assumptions that you used.

3. Provide copies of any technical information and/or data you used that support your views.

4. If you estimate potential burden or costs, explain how you arrived at the estimate that you provide.

5. Provide specific examples to illustrate your concerns.

6. Offer alternative ways to address the concerns identified by EPA.

7. Make sure to submit your comments by the deadline in this ANPRM.

8. To ensure proper receipt by EPA, be sure to identify the docket control number assigned to this action on the first page of your response. You may also provide the name, date, and **Federal Register** citation.

II. Introduction

This ANPRM initiates an Agency rulemaking to address the threat to the nation's drinking water resources from contamination by MTBE, a widely used additive in gasoline. This rulemaking will be conducted under TSCA section 6, 15 U.S.C. 2605. It is EPA's intent to conduct this rulemaking as quickly as reasonably practicable. EPA's review of existing information on contamination of drinking water resources by MTBE indicates substantial evidence of a significant risk to the nation's drinking water supply. A comprehensive approach to such risk must include consideration of either reducing or eliminating the use of MTBE as a gasoline additive. As a result, EPA is initiating this process pursuant to the unreasonable risk provision under TSCA section 6 to eliminate or greatly reduce the use of MTBE as a gasoline additive. EPA is interested in comments on both the risk and these possible responses to it.

MTBE is a common and widely used additive in gasoline. It is an oxygenate, meaning it increases the oxygen content of the gasoline. It is also a source of octane in gasoline. It is widely used in those parts of the country where oxygenated gasoline is required, either by Federal or State law. For example, the 1990 amendments to the CAA require that Federal RFG meet a 2.0% oxygen content requirement by weight. MTBE is the primary oxygenate used by refiners to meet this requirement, which applies to over 30% of the country's gasoline. When MTBE is used to meet this requirement, the gasoline is blended so it contains about 11% MTBE by volume. In other parts of the country, MTBE is sometimes used in conventional or non-RFG as a source of octane. Significantly more MTBE is used in RFG and other oxygenated gasoline programs than is used in conventional gasoline.

Current data on MTBE levels in ground and surface waters indicate widespread and numerous detections at low levels of MTBE, with a more limited number of detections at higher levels. Given MTBE's widespread use as a gasoline additive and the large volumes of gasoline that are stored, transported, and used in all areas of the country, releases of MTBE to the nation's ground and surface waters occur in a number of ways. Leakage from the gasoline storage and distribution system is a major source of contamination, but the

contamination can also come from spills, emissions from marine engines into lakes and reservoirs, and to some extent from air deposition. MTBE is highly soluble in water, resists biodegradation, and moves rapidly with groundwater. It may end up in drinking water supplies even when there are no indications of other gasoline components. MTBE is detected in water much more often and at higher concentrations in areas of the country where Federal RFG is sold, given its dominant use by refiners as an oxygenate to meet the statutory RFG oxygen content requirement. The USGS has found detections of MTBE in 21% of ambient groundwater tested in areas where MTBE is used in RFG as compared with 2% of ambient groundwater in areas using conventional gasoline. (Ref. 1)

The presence of MTBE in drinking water sources presents two major problems. The first concern is that MTBE contamination may render water supplies unuseable as drinking water. MTBE has an offensive taste and odor which can be detected in water even at low levels. Because of the taste and odor problem, MTBE contamination has resulted in the loss of certain drinking water sources. For example, high levels of MTBE found in groundwater wells that supply Santa Monica's drinking water led that city to close its wells, forcing it to purchase drinking water from another public water supplier. In addition, MTBE detections found in groundwater wells that supply South Lake Tahoe forced the South Tahoe Public Utility District to close 8 of its 34 wells despite detections below EPA's advisory levels. An additional four wells were closed as a precautionary measure due to their proximity to the existing MTBE plumes.

The second major concern involves uncertainty regarding the level of risk to public health from the chronic exposure of large numbers of people to low levels of MTBE in drinking water. While inhalation of MTBE in high concentrations has been shown to cause cancer in laboratory animals, the Agency concluded in 1997 that there is little likelihood that MTBE in drinking water would cause adverse health effects at levels that cause taste and odor problems. (Ref. 2) There is still much uncertainty about the extent of the health risks associated with chronic, low-level exposures to MTBE in drinking water. The Agency is continuing to review and update its analysis of the potential health risks posed by MTBE.

Once MTBE contaminates a drinking water source, its chemical nature makes it difficult, expensive, and time-consuming to remediate. For example, it is much harder and more expensive to remove MTBE from drinking water than it is to remove other organic components of gasoline. Furthermore, MTBE does not biodegrade as readily as other components of gasoline. Given the numerous and diverse sources of potential release into the environment and the problems associated with cleaning it up once it is released, EPA believes a comprehensive approach to such risk must include consideration of either reducing or eliminating the use of MTBE as a gasoline additive.

As discussed earlier, in ground water MTBE is more soluble, does not adsorb as readily to soil particles, biodegrades less rapidly and moves more quickly than other components of gasoline. By comparison, unless frozen, MTBE in surface water will volatalize and find its way into the atmosphere. This accounts for the less frequent and generally lower concentrations of MTBE found in surface water.

Since the available information shows that there are numerous and widespread instances of groundwater contamination, EPA is considering the substitutes that would likely be used to replace MTBE. In oxygenated gasoline programs such as Federal RFG, the most likely substitute based on current usage is ethanol. Other ether compounds are currently used as oxygenates in relatively small quantities. MTBE does not occupy as dominant a position as an octane enhancer for conventional gasoline as it does as an oxygenate in RFG. Ethanol, alkylates, and aromatics are all widely-used as octane enhancers in conventional gasoline. Although EPA is seeking more information on alternatives to MTBE, EPA does not expect the use of ethanol, alkylates, or aromatics as fuel additives to present the same magnitude of risk to drinking water supplies as MTBE. Ethanol biodegrades more quickly than MTBE, and therefore seems less likely to contaminate drinking water as often as MTBE, or at the concentrations of MTBE. First order degradation constants for MTBE in ambient ground water have been reported by Schirmer and others (1998) and Borden and others (1997). The rate constants, k, from these studies are 0.0012 day(-1) (Schirmer and others, 1998) and 0.0010 ± 0.0007 day(-1) (Borden and others, 1997). (Refs. 3,4) These reaction rates for MTBE correspond to a half-life of about 1.6 and 1.9 years, respectively. By comparison, in a December 1999 report to the California Environmental Policy Council the authors report that under aerobic conditions, the reported half-lives of ethanol in surface waters are short. Half-lives span 6.5 to 26 hours for ethanol. Anaerobic biodegradation in oxygen-limited environments is also expected to proceed at rapid rates. Reported half-lives for ethanol biodegradation under anaerobic conditions range from 1 to 4.3 days. (Ref. 5) Unlike MTBE, alkylates and aromatics are expected to behave in soil and water more like other components typically found in gasoline; as a result, they too would be unlikely to contaminate drinking water as often as MTBE or at the concentrations of MTBE. Ethers other than MTBE, and alcohols other than ethanol, are not currently used widely as oxygenates; the Agency does not have much data to characterize the risks they might pose to drinking water supplies. However, the other ethers are chemically similar or related to MTBE, and they may well move through soil and water in ways and amounts similar to MTBE. EPA will closely evaluate whether compounds not currently used in significant quantities as oxygenates in RFG might be widely used as alternatives to MTBE, if MTBE use in gasoline is banned or limited, whether additional information on these compounds is necessary, and whether other measures are appropriate to assure that an elimination or limitation of MTBE in gasoline does not result in the use of alternatives that might cause a similar or greater level of risk.

The remainder of this ANPRM outlines the major elements of the problem and its potential solution. EPA invites comment from all interested parties on these and any other matters relevant to addressing the risk of MTBE to the nation's drinking water resources.

III. Background

A. What is MTBE and Why is it Used as a Fuel Additive?

MTBE is an ether compound made by combining methanol and isobutylene. The methanol is typically derived from natural gas; isobutylene can be derived as a byproduct of the petroleum refinery process. Since the 1970's, MTBE has been used in the United States as an octane-enhancing replacement for lead, primarily in mid- and high-grade gasoline at concentrations as high as 7% (by volume). Now, however, MTBE is mainly used as a fuel oxygenate at higher concentrations (11% to 15% by volume) as part of the Federal RFG and Wintertime Oxyfuel programs. These programs were initiated by EPA in 1995 and 1992, respectively.

The CAA mandates that RFG be sold in the 10 largest metropolitan areas with

the most severe summertime ozone levels, including Baltimore, Chicago, Hartford, Houston, Los Angeles, Milwaukee, New York, Philadelphia, Sacramento, and San Diego. The CAA also allows any other area classified as a marginal, moderate, or serious ozone nonattainment area to opt into the RFG program. Currently, 17 States and the District of Columbia voluntarily participate in the RFG program. These areas are located in California, Connecticut, Delaware, District of Columbia, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Missouri, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Texas, Virginia, and Wisconsin. The total number of areas participating in the RFG program may change from year to year, depending on potential opt-ins.

EPA regulations adopted pursuant to the CAA require that RFG achieve reductions in mass emissions of volatile organic compounds (VOCs) and toxic air emissions of at least 15% during Phase I of the RFG program (1995 through 1999), and reductions in such emissions of 27% and 22%, respectively, during Phase II of the RFG program (2000 and on). Phase II RFG also requires a 6.8% reduction in oxides of nitrogen (NO_X). RFG must also meet certain mandatory content standards, including limitations on benzene and a restriction of heavy metal content. To address its unique air pollution challenges, California has adopted similar, but more stringent requirements for California RFG.

The CAA specifies that RFG must contain 2% oxygen by weight. Although a number of oxygenates could be used to meet this requirement, in practice over 87% of RFG contains MTBE as the primary oxygenate; approximately 12% of RFG contains ethanol. Two percent oxygen by weight is equivalent to approximately 11% MTBE by volume. When ethanol is used as an oxygenate, it is usually blended at 10% by volume, which is equivalent to 3.5% oxygen by weight. A small percentage of refiners use tertiary amyl methyl ether (TAME) as the primary oxygenate in RFG; more frequently TAME is present in RFG as a secondary oxygenate together with MTBE. Other oxygenates are available to refiners, such as ethyl tertiary butyl ether (ETBE), tertiary butyl alcohol (TBA), and diisopropyl ether (DIPE), but are not being used in significant quantities (or at all) at this time.

Reformulated gasoline represents over 30% of the total retail gasoline sold in the United States. According to the Department of Energy (DOE), over 126 billion gallons of gasoline were supplied for U.S. markets in 1998, with 41.5 billion gallons of that volume being reformulated gasoline. (Ref. 6) In addition to the RFG program, certain areas in California and elsewhere in the nation that have not attained the NAAQS for CO are required under the CAA to implement the Wintertime Oxyfuel program. The CAA requires Wintertime Oxyfuel to contain no less than 2.7% oxygen (by weight) during the winter, when CO levels are highest. There are 17 areas across the country that currently implement the Wintertime Oxyfuel program. Ethanol is the primary oxygenate used to meet this oxygen requirement. Currently, Los Angeles is the only area implementing the Wintertime Oxyfuel program with MTBE. When MTBE is used to meet the Wintertime Oxyfuel requirements, it is added to gasoline at a concentration of approximately 15% by volume.

MTBE is also used in conventional gasoline to boost the octane of gasoline. Octane is a measure of a fuel's resistance to uncontrolled combustion (engine knock). The DOE estimates that approximately 12,000 barrels of MTBE are used per day as an octane enhancer in conventional gasoline. (Ref. 7) This is less than 5% of the total MTBE use in gasoline. MTBE is typically present in gasoline as an octane enhancer at 3–7% by volume. Alternative octane enhancers are also used, including ethanol, alkylates, and aromatic compounds.

A number of States have taken actions designed to limit the use of MTBE in gasoline. In March 1999, Governor Gray Davis of California issued an executive order requiring the California Air Resources Board to develop a timetable for the removal of MTBE from gasoline sold in California as soon as possible, but by no later than December 31, 2002. Maine opted out of the RFG program in March 1999. In July of 1999, New Hampshire enacted a law directed at reducing the use of MTBE in gasoline, including a requirement that the State request a waiver from EPA of RFG oxygen content requirements until 2002. Five other States have initiated proposed limited use, bans or phase-outs of MTBE, including Arizona, Kansas, Missouri, New York, and South Dakota.

B. What Risks Does MTBE Pose to Drinking Water Supplies?

1. *Chemical properties.* In comparison to other components of concern in gasoline, including benzene, toluene, ethylbenzene, and xylenes (collectively referred to as ''BTEX''), the available information shows MTBE may pose additional problems when it escapes into the environment through gasoline releases. MTBE is capable of traveling through soil rapidly, is very soluble in water (much more so than BTEX), and is highly resistant to biodegradation (much more so than BTEX). MTBE that enters groundwater moves at nearly the same velocity as the groundwater itself. As a result, it often travels farther than other gasoline constituents, making it more likely to impact public and private drinking water wells. Due to its affinity for water and its tendency to form large contamination plumes in groundwater, and because MTBE is highly resistant to biodegradation and remediation, gasoline releases with MTBE can be substantially more difficult and costly to remediate than gasoline releases that do not contain MTBE (Unit III.E.). This is a substantial concern in the United States, where approximately 40–46% of the population uses groundwater as a source of drinking water.

2. *Taste and odor.* MTBE has a very unpleasant turpentine-like taste and odor that at low levels of contamination can render drinking water unacceptable for consumption. A number of studies have been conducted on the concentrations of MTBE in drinking water at which individuals can detect the taste and odor of the chemical. (Refs. 8,9,10) Human sensitivity to taste and odor varies widely. In controlled studies, some individuals were able to detect very low concentrations of MTBE, while others do not taste or smell the chemical even at much higher concentrations. In controlled studies individuals have detected odor and taste at concentrations of MTBE as low as 2.5 parts per billion (ppb) for odor and 2 ppb for taste.[1]

In December 1997, EPA's Office of Water released a non-regulatory advisory for MTBE in drinking water. The EPA advisory is not a mandatory standard for action and is not Federally enforceable, but provides guidance for communities that may be exposed to drinking water contaminated with MTBE. According to the advisory, keeping MTBE concentrations in the range of 20–40 µg/L or below would likely avert unpleasant taste and odor effects, recognizing that some people may detect the chemical below this concentration range.

The State of California has chosen to establish a secondary drinking water standard of 5 µg/L to ensure the potability of drinking water for more

[1] Throughout this ANPRM, various studies are cited which may refer to the presence of MTBE in water in either micrograms per liter (µg/L) or ppb. These units are approximately interchangeable assuming the density of the water is constant. In reality, to the extent that the water density may vary from study to study, equivalence of these units may not be exact.

sensitive individuals. EPA is planning to upgrade its MTBE advisory to a national secondary drinking water standard and will review its 1997 advisory levels at that time. Secondary drinking water standards address the aesthetic qualities that relate to public acceptance of drinking water and are provided as non-enforceable guidance to the States.

3. *Human health effects.* The majority of the human health-related research conducted to date on MTBE has focused on adverse effects that may result through inhalation of the chemical. At high doses by the inhalation route, MTBE has caused non-cancer health effects as well as tumors in two strains of rat and one strain of mouse in a variety of organs. However, there have been no human or animal health effects studies concerning the ingestion of MTBE in drinking water. In one study, animals were given a daily (all at once) dose of MTBE in olive oil. There were carcinogenic effects at a high level of exposure. Because the animals were not exposed through drinking water, uncertainties remain concerning the degree of risk associated with typical human exposure.

EPA classified MTBE as a ''possible'' human carcinogen under its 1986 cancer risk assessment guidelines on the basis of results of inhalation cancer tests and has suggested that it be regarded as posing a potential carcinogenic hazard and risk to humans, although no quantitative estimate of the cancer potency of MTBE has been established by EPA because of limitations in the available data. (Refs. 11,12) While MTBE has been characterized as an animal carcinogen, both the International Agency for Research on Cancer and the Department of Health and Human Services have indicated that there are not enough data to classify MTBE with regard to human carcinogenicity under their classification schemes. (Refs. 13,14) It should be noted that conclusions in the Office of Science and Technology Policy's 1997 Interagency Assessment of Oxygenated Fuels and in a 1996 report by the Health Effects Institute generally support EPA's view on potential carcinogenic hazard. (Ref. 15) The Interagency Assessment stated, in regard to inhalation risks, that ''it is not known whether the cancer risk of oxygenated gasoline containing MTBE is significantly different from the cancer risk of conventional gasoline.'' The estimated upper bound cancer units risks of MTBE are similar to or slightly lower than those of fully vaporized conventional gasoline, which has been listed by EPA as a probable human carcinogen based on animal carcinogenicity data. However, because of lack of health data on the nonoxygenated gasoline vapors to which humans are actually exposed, it is not possible to have a reasonably good estimate of population cancer risk to conventional gasoline.

As a result of substantial scientific uncertainties, a review committee of the National Academy of Sciences (NAS) recommended that additional studies be conducted on MTBE and that questions about the bolus dosing study be resolved before the study is used for risk assessment purposes. (Ref. 16) A number of ongoing studies by EPA, the Chemical Industry Institute of Toxicology (CIIT) and other organizations should provide EPA with information to assess health risks via different routes of MTBE exposure. These studies should allow for extrapolation from the inhalation studies to an assessment of risks associated with ingestion of drinking water. In addition, further study of potential health effects of MTBE and other fuel additives are underway by the petroleum industry as required under CAA section 211.

EPA reviewed available health effects information on MTBE in its 1997 drinking water advisory guidance and determined that there was insufficient information available on MTBE health effects and exposure to allow EPA to establish a national primary drinking water regulation. The drinking water advisory document indicated there is little likelihood that MTBE concentrations between 20 and 40 µg/L would cause adverse health effects. Nevertheless, California and New Hampshire have proposed health-based primary drinking water standards of 13 µg/L for MTBE.

C. How Widespread is the MTBE Contamination?

Each year approximately 9 million gallons of gasoline (the equivalent of a full supertanker) are released to the environment in the United States from leaks and spills, according to an estimate by the Alliance for Proper Gasoline Handling. (Ref. 17) MTBE may be present in a substantial portion of these releases. Because of MTBE's solubility in water and resistance to degradation, it is being detected with increasing frequency in both groundwater and surface water. The potential for harm posed by MTBE releases can perhaps best be understood by reviewing some well-documented case studies. The releases of MTBE that occurred in these situations could have occurred, and could be repeated, virtually anywhere in the United States. Larger-scale studies document the widespread detection of MTBE in the nation's water supplies.

1. *Examples of MTBE contamination.* The City of Santa Monica, California, has historically relied on seven wells from the Arcadia and Charnock well fields to provide approximately 50% of the drinking water to the town's 87,000 residents. In August of 1995, the City found MTBE in water derived from the Charnock Wellfield. By April of 1996, MTBE levels had risen dramatically in all wells, with concentrations reaching up to 610 ppb. All five of the city's Charnock wells were shut down in 1996. The Southern California Water Company (SCWC), which had withdrawn drinking water from the Charnock well field, also closed its two production wells to avoid drawing contamination into the wells. The SCWC Charnock wells had provided a portion of the drinking water for 10,000 residences in Culver City, California. After completion of screening level investigations at 28 underground storage tanks (USTs) locations and two gasoline product pipelines, the EPA and the Los Angeles Regional Water Quality Control Board (RWQCB) identified 25 USTs as contributing contamination to the Charnock Sub-Basin, the groundwater basin which supplies water to the Charnock Wellfields. From 1997–1999, three companies potentially responsible for the contamination voluntarily conducted testing of wellhead drinking water treatment technologies, performed regional groundwater investigation activities, and reimbursed the City of Santa Monica and Southern California Water Company for water replacement costs. These companies claim to have spent over $50 million on response activities to date. Since 1996, the city and SCWC have met their municipal water demand by utilizing water purchased from the Metropolitan Water District, at a cost of over $3 million per year. Together with the Agencies' oversight cost and the costs of investigation and cleanup at all the UST locations and gasoline product pipelines, it is estimated that over $60 million in response costs have been expended in addressing the Charnock Wellfield problem to date. In September 1999, EPA and RWQCB issued orders to potentially responsible parties that require them to pay for replacement water for the affected homeowners from January 2000 until January 2005. A final cleanup is expected to cost more than $160 million.

Contamination of the Arcadia field was traced to a single gas station. The gas station was demolished,

underground tanks and lines were removed, and approximately 2,000 cubic yards of gasoline-containing soils were excavated. Cleanup crews are now working to control and remove additional sources of contamination from the area. In addition, a shallow groundwater pump and treat system was installed in October 1997 to control further migration of the contaminated groundwater. The extracted water is filtered through three carbon beds to remove the bulk of MTBE before the water is discharged into the sanitary sewer. Actions are currently underway to begin additional treatment of water from the Arcadia wells with carbon and eventually obtain a permit to serve the water as drinking water.

In Glennville, California, residential drinking wells were contaminated with MTBE at levels up to 20,000 ppb. The likely source of the contamination was an UST and associated piping at the town's only gas station. The town was forced to start using an alternative drinking water source in 1997, and still relies on alternative sources of water.

In Whitefield, Maine, an automobile gasoline leak of 20 gallons or less contaminated a bedrock drinking water well for an elementary school with MTBE to a level of 900 µg/L. According to a report by the the Northeast States for Coordinated Air Use Management (NESCAUM), the State of Maine traced the source of the spill to an area about 120 feet from the well where cars were parked on the grass. (Ref. 18)

In December 1997, a car accident in Standish, Maine, led to the release of 8 to 10 gallons of gasoline that contaminated 24 nearby private wells. Eleven wells were contaminated with MTBE to a level above 35 µg/L; two were contaminated at over 1,000 µg/L; and the well nearest the accident site contained the highest concentration of 6,500 µg/L. When the State discovered the contaminated wells in May 1998, it removed 79 cubic yards of contaminated soil. The contamination extended to the top of the underlying bedrock at a depth of 9 feet below the surface. (Ref. 19)

In the town of Windham, Maine, two public water supply wells 900 to 1,100 feet from underground gasoline tanks were contaminated to levels of 1 to 6 µg/L MTBE. According to a NESCAUM report, the tanks were state-of-the-art technology, double walled and only 10 months old when the MTBE contamination was discovered. (Ref. 20) Extensive testing showed that the tanks did not leak directly to the ground, nor were any vapor leaks found after extensive testing. NESCAUM stated that the only plausible cause of the contamination was gasoline overfills. The amount spilled was estimated to be 10 to 40 gallons.

MTBE has also been detected in surface waters of lakes and reservoirs. A University of California, Davis, study was conducted at Donner Lake, California. (Ref. 21) The lake is a source of drinking water for lakeside residents and contributes to the drinking water supply of downstream communities, such as Reno, Nevada. MTBE levels were low during winter months, at just above the 0.1 µg/L level of detection. Levels increased dramatically during the summer boating season to a high of 12.1 µg/L. Following Labor Day, boat use declined dramatically, as did MTBE levels. Volatilization between the air/water interface appeared to be the major avenue for loss of MTBE.

In Shasta Lake, a large recreational-use reservoir in northern California, MTBE concentrations were reported to range from 9–88 µg/L over the Labor Day 1996 weekend. Maximum values were associated with large boats entering a docking area or with engine exhaust from those boats. MTBE was also measured in a temporary lake constructed in southern California for a jetski event in the summer of 1996. After the 3-day event, concentrations reportedly ranged from 50–60 µg/L.

On January 28, 2000, a tanker truck rolled over on Route 110 in Lowell, Massachusetts, releasing approximately 11,000 gallons of gasoline. Most of the gasoline entered the Merrimack River. The cities of Tewksbury, Methuen, and Lawrence each have drinking water intakes on the River downstream of the spill site. Although contaminants were not detected at the drinking water treatment plants the night of the spill, later samples indicated elevated levels of MTBE. The cities of Tewksbury and Lawrence temporarily closed their drinking water treatment facilities and purchased water from alternative sources; the treatment facility in Methuen remained open. MTBE levels dropped significantly after a few days, and the facilities were advised that they could safely use their intakes.

2. *Large-scale studies.* Although scattered incidents of localized water contamination by MTBE have been reported since the early 1980s, the first report to suggest that MTBE contamination of water might be occurring on a widespread basis came as a result of the sampling of ambient groundwater conducted by the USGS National Water Quality Assessment Program (NAWQA). Ambient groundwater is groundwater where there are no known point sources of contamination prior to sampling in drinking water and non-drinking water wells. In an initial report of sampling conducted in shallow groundwater in 1993 and 1994, USGS reported that of 210 sampled wells and springs in 8 urban areas, 56 (27%) contained MTBE at a minimum reporting level of 0.2 µg/L, and 3% of the wells and springs had MTBE concentrations exceeding 20 µg/L. (Ref. 22) The maximum concentration of MTBE detected in these urban areas was over 100 µg/L.

The USGS collected data in 1995 from additional wells in urban areas and combined them with data from 1993–1994 to provide specific information on drinking water aquifers. This analysis showed MTBE detections in 12 (14%) of 83 shallow urban wells located in aquifers supplying drinking water and in 19 (2%) of 949 rural wells in aquifers used for drinking water, with a median concentration of approximately 0.50 µg/L. (Ref. 23)

Finally, in a 1999 publication in the Proceedings of the 1999 Water Resources Conference of the American Water Works Association, USGS assembled its early ambient groundwater data with additional data from urban and rural wells. (Ref. 24) For urban areas, the frequency of detection of MTBE in groundwater in areas of substantial MTBE use was about 27% (49 of 184 wells), whereas frequency of detection in non-substantial use areas was about 5%. In rural areas, the frequency of detection of MTBE in areas of substantial MTBE use was about 17% (50 of 298 wells), whereas the frequency of detection in non-substantial use areas was about 2%. Overall, USGS found detections of MTBE in 21% of ambient groundwater tested in areas where MTBE is used in RFG compared with 2% of ambient groundwater in areas using conventional gasoline. In contrast, BTEX was found in only 4% of areas where RFG or winter oxyfuels were used. (Ref. 25)

Preliminary results from a joint USGS/EPA study of 12 northeastern States (with a detection limit of 1.0 µg/L) show that MTBE was detected in 7% of drinking water supplies, with 0.8% of these detections above 20 µg/L. (Ref. 26) The study also concluded that MTBE is detected five times more frequently in drinking water from community water systems in RFG or Winter Oxyfuel areas than in non-RFG or non-Winter Oxyfuel areas. The study showed BTEX detections in 8.3% of the systems analyzed (2,097 systems). Although collectively BTEX was found at approximately the same frequency as MTBE, there is very little co-occurrence of the BTEX compounds with MTBE (less than 1% of the systems). This may indicate that MTBE separated from the

rest of the contaminants in the original gasoline plumes, but it also indicates that the increased use of MTBE since 1995 may have created a new universe of contaminated water supplies.

In 1998, the State of Maine reported on sampling conducted on 951 household drinking water wells and 793 public water supplies. (Ref. 27) The study was designed to be statistically representative of the entire State. MTBE was detected in 150 (15.8%) of the sampled household wells at a minimum reporting level of 0.1 µg/L, and 1.1% of the wells contained MTBE levels exceeding 35 µg/L. The Maine report projected that approximately 1,400–5,200 private wells across the State could be contaminated at levels exceeding 35 µg/L. For public water systems sampled, 125 (16%) showed detectable levels of MTBE, 48 (6.1%) between 1 µg/L and 35 µg/L, and no samples above 35 µg/L.

In another study reported in 1998, the American Water Works Service Company collected data from drinking water wells in 16 States. (Ref. 28) Forty-four (2%) of 2,120 samples from 17 (4%) of 450 wells tested positive for MTBE at a minimum reporting level of 0.2 µg/L, with the highest concentration at 8 µg/L.

In a 1998 industry study of 700 service stations known to have released gasoline, MTBE was detected at 83% of the sites, with about 43% of the sites having MTBE concentrations greater than 1,000 µg/L. (Ref. 29) A large percentage (76%) of station sites sampled in Florida showed MTBE contamination, even though Florida does not participate in the RFG or winter oxyfuel programs. It is assumed that MTBE was used as an octane enhancer in gasoline released from Florida service stations.

An EPA-supported survey of the 50 States and District of Columbia in 1998 found that, of the 34 States that acquire MTBE data from leaking underground storage tank (LUST) sites, 27 (79%) indicated that MTBE was present at more than 20% of their sites, and 10 (29%) reported MTBE at more than 80% of their sites. (Ref. 30) The survey also asked about contamination of drinking water wells. Of the 40 State programs that responded, 25 (51%) had received reports of private wells contaminated with MTBE. In addition, 19 (39%) of the programs reported public drinking water wells contaminated with MTBE. Five of the States responding to the survey reported that MTBE was detected in groundwater at LUST sites where the product released was not gasoline. MTBE concentrations of greater than 20 µg/L in groundwater had occurred as the result of releases of diesel fuel, jet fuel, heating oil, aviation fuel, and waste oil. Apparently, MTBE cross-contaminated other petroleum products during transport and distribution. A study of fuel releases in Connecticut (Ref. 31) provides further evidence of MTBE contamination of heating oil. In this study, 27 heating oil release sites resulted in MTBE contamination of groundwater with concentrations ranging from 1 to 4,100 µg/L. At the site with the highest concentration of MTBE in groundwater, MTBE was measured in the heating oil at a concentration of 14 milligram/Liter (mg/L).

Individual case studies suggest that, depending on the hydrogeology of the site, significant MTBE contamination of water supplies could occur and is costly and time-consuming to remedy. The large-scale studies indicate that MTBE releases have occurred in many places, with documented detections in public and private drinking water sources.

D. What are the Major Sources of MTBE Contamination and How are They Currently Regulated?

As a large industrialized nation, the United States produces, distributes, and consumes extensive quantities of gasoline, and much of that gasoline contains MTBE. The DOE estimates that in 1998, over 126 billion gallons of gasoline were sold in the United States (Ref. 32) RFG represented 41.5 billion gallons of that total, with the vast majority containing MTBE as the primary oxygenate. After production in the United States or import, gasoline may travel through thousands of miles of pipelines, or be transported by truck, to any of roughly 10,000 terminals and bulk stations. From there it may be distributed to one of 180,000 retail outlets and fleet storage facilities, or to any of hundreds of thousands of above-ground or underground tanks at farms, industrial facilities, businesses, and homes. Finally, gasoline is removed from bulk storage into individualized storage units associated with such products as cars, trucks, boats, planes, lawn mowers, brush cutters, and chain saws. Residual gasoline in transport conduits may contaminate different types of fuels (e.g., home heating oil) that is transported through the same conduits at different times. Although this does not normally cause problems, it may explain why MTBE has been found in releases of home heating oil and other fuels. There are opportunities for leaks wherever gasoline (or a product containing gasoline) is stored, and there are opportunities for spills whenever fuel is transported or transferred from one container to another. Although many Federal and State programs have been developed to minimize the potential for leaks and spills from the vast array of units and individuals handling gasoline, no system involving so much product and so many individual handlers can be foolproof. Gasoline is released to the environment every day; these releases can be expected to continue and MTBE, being more soluble and less biodegradable than BTEX, will move more quickly and at higher concentrations than the other components of gasoline, making its way to surface water and groundwater resources. This unit describes the major sources of gasoline leaks, and summarizes regulatory programs applicable to them.

1. *Underground storage tanks*. There are an estimated 760,000 USTs currently in use for petroleum storage in the United States that are subject to regulation under Subtitle I of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C . 6991a-i. These tanks have a storage capacity of approximately 6 billion gallons. In addition, there are approximately 3 to 4 million USTs storing fuel that are exempt from RCRA Subtitle I regulation including:

a. Farm and residential tanks of 1,100 gallons or less capacity holding motor fuel for noncommercial purposes.

b. Tanks storing heating oil used on the premises where it is stored.

c. Tanks on or above the floor of underground areas, such as basements or tunnels.

d. Septic tanks and systems for collecting storm water and wastewater.

e. Flow-through process tanks.

f. Tanks of 110 gallons or less capacity.

g. Emergency spill and overfill tanks.

Leaking USTs have been identified as the likely sources of a number of the more problematic releases of MTBE to the environment, including releases that have closed water supplies in Santa Monica and Glennville, California. In California alone, the minimum number of MTBE point sources from leaking UST sites is estimated at greater than 10,000.

In 1988, EPA issued regulations setting minimum standards for RCRA Subtitle I-regulated UST systems. Existing UST systems, those installed on or before December 22, 1988, had until December 22, 1998, to upgrade with spill, overfill, and corrosion protection, properly close, or meet new tank performance standards. Any UST system installed after December 22, 1988, had to meet new tank performance standards for spill, overfill,

and corrosion protection at the time of installation. Based on reports received as of the end of September 1999, EPA estimates that approximately 85% of the RCRA-regulated universe of UST systems currently meet EPA's upgrade or new tank requirements. By the end of 2000, EPA expects that approximately 90% of RCRA-regulated USTs will be in compliance, leaving approximately 70,000 substandard USTs.

The Federal regulations also require that UST systems have release detection equipment to identify releases to the environment. The regulations required that all owners and operators install and properly operate a method of release detection no later than 1993 based on the age of the UST system. While virtually all UST systems are equipped with leak detection equipment, they are not necessarily installed or operated properly. Largely as a result of problems with proper operation of leak detection equipment, EPA estimates that approximately 60% of UST systems are in compliance with the leak detection requirements. By the end of 2005, EPA expects compliance with the leak detection requirements will be 90%.

EPA provides funding (through the Leaking Underground Storage Tank Trust Fund) to States to oversee the cleanup of releases from USTs. Since the UST program began, approximately 400,000 releases from USTs have been confirmed; of that number, approximately 230,000 cleanups have been completed. While not every State is testing for MTBE at UST release sites, those that do have found MTBE at most, if not all, release sites. In response to a recommendation by the Blue Ribbon Panel (the Panel), EPA recently sent a memo to all State UST programs recommending that they monitor for and report MTBE in groundwater at all leaking UST sites.

Those facilities that have a total underground oil storage capacity of more than 42,000 gallons, and which are located such that they could reasonably be expected to discharge oil into navigable waters or adjoining shorelines, are subject to EPA requirements for the development of Spill Prevention, Control and Countermeasure (SPCC) Plans pursuant to Clean Water Act (CWA) section 311(j)(1)(C). An SPCC plan is a detailed, facility-specific description of how the facility will comply with EPA regulatory requirements for secondary containment, facility drainage, dikes or barriers, sump and collection systems, retention ponds, curbing, tank corrosion protection systems, and liquid level devices (40 CFR 112.1–112.7). To avoid duplicative regulation under the RCRA and CWA section 311 programs, EPA proposed in 1991 to exempt from SPCC requirements those completely buried tanks that are subject to RCRA Subtitle I requirements. EPA expects to issue a final rule dealing with this and other modifications to the SPCC program later in 2000.

It is important to understand that even after USTs are in full compliance with the RCRA and CWA section 311 requirements, some releases are expected to occur as a result of improper installation or upgrading, improper operation and maintenance, and accidents.

2. *Above-ground storage tanks.* EPA regulates under the CWA section 311 SPCC program approximately 440,000 facilities with above-ground storage tanks (ASTs) that are located so as to be reasonably expected to discharge oil to surface waters or adjoining shorelines. A facility is regulated if it has an AST with a capacity of more than 660 gallons, or multiple ASTs with a combined capacity of more than 1,320 gallons. ASTs are also subject to EPA's more general requirements for the reporting of oil spills to navigable waters, 40 CFR part 110, and EPA's prohibition on the discharge to navigable waters of oil in quantities that will:

a. Violate applicable water quality standards.

b. Cause a sheen on the waters.

c. Cause a sludge or emulsion to be deposited beneath the surface of the water or adjoining shoreline (40 CFR 110.3).

Despite EPA's regulatory programs, almost 20,000 oil spills to navigable water (from all sources, including tank trucks, barges, etc.) are reported each year. About half, or 10,000 spills, occur annually to the inland zone over which EPA has jurisdiction, while the other half occurs in the coastal zone over which the Coast Guard exercises jurisdiction.

3. *Pipelines.* Excluding intrastate pipelines and small gathering lines associated with crude oil production fields, there are approximately 160,000 miles of liquids pipelines in the United States. These pipelines transport approximately 525 billion gallons of crude oil and refined products annually. The Department of Transportation (DOT) estimates that, over a recent 5-year period (1994–1998), an average of 29 gasoline spills occurred annually from pipelines, with the total volume of gasoline released from pipelines averaging 1.03 million gallons per year. While there are little or no data on the extent of MTBE releases from pipelines, MTBE is expected to be present in some portion of the refined product in the pipelines.

In California, pipeline release data are currently being compiled by the Office of the State Fire Marshal, which regulates approximately 8,500 miles of pipelines. Since 1981, there have been approximately 300 pipeline releases within the State Fire Marshal's Jurisdiction. (Ref. 33)

Pipelines are regulated by the DOT, Research and Special Programs Administration (RSPA). Under authority of the Pipeline Safety Act of 1992, 49 U.S.C. 60101 *et seq.*, DOT has established minimum safety standards for pipelines carrying hazardous liquids, including petroleum and petroleum products (49 CFR part 195). Under authority of CWA section 311, DOT also requires response planning for pipelines that, because of their location, could reasonably be expected to cause substantial harm to the environment by discharging oil into or on the navigable water, adjoining shorelines, or the exclusive economic zones (49 CFR part 194).

4. *Other releases.* Releases from automobile accidents, tank truck spills, consumer disposal of ''old'' gasoline, and spills during fueling operations have been identified as sources of contamination of drinking water wells. The incidents in Maine, described in Unit III.C.1. are examples of how relatively small spills can result in contamination of nearby drinking water supplies. Home heating oil storage tanks have also been identified as potential sources of MTBE contamination, as MTBE might be present from mixing the heating oil with small volumes of gasoline in the bulk fuel distribution or tank truck delivery systems. Other data on releases of this type are not available, and EPA is not aware of any efforts currently underway to further characterize these sources of MTBE contamination.

EPA regulatory programs do not address small episodic releases of gasoline unless they result in a discharge to surface waters. For those releases, the spill must be reported, and the responsible party may be penalized for any violation of EPA's oil discharge prohibition. In the many cases involving accidental spills, however, these requirements are not effective in preventing releases.

5. *Watercraft.* Gasoline-powered watercraft have contributed to the contamination of lakes and reservoirs with MTBE. The two-stroke engines commonly used for certain watercraft can discharge up to 30% of each gallon of gasoline as unburned hydrocarbons. (EPA issued a final rule to reduce the

amount of air emissions from new gasoline-powered watercraft and outboard motors which will be phased-in beginning in 1998, and completed in the 2006 model year. This rule is also expected to reduce the release of unburned hydrocarbons from new engines into surface waters. This rulemaking published in the **Federal Register** of October 4, 1996 (61 FR 52088) (FRL–5548–8), which applies only to new engines, will reduce hydrocarbon emissions by 75%. The State of California requires that EPA's new standards be fully implemented by 2001). As described in Unit III.C.1., concentrations of MTBE in lakes with significant recreational boating tend to peak in the boating season at levels that can be a concern for taste and odor, and possibly human health, and decrease fairly rapidly after the boating season has ended. Volatilization at the air/water surface is considered the dominant mechanism for this removal process.

Although most discharges of pollutants from point sources (e.g., pipes and other discrete conveyances) to surface waters must be authorized under CWA section 402 by a National Pollutant Discharge Elimination System (NPDES) permit, discharges from properly functioning marine engines are currently subject to a regulatory exemption from this requirement (40 CFR 122.3 (a)).

6.*Storm water runoff.* Storm water runoff becomes contaminated with MTBE from the dissolution of residual MTBE from parking lots and roadways, as well as from atmospheric washout during precipitation events. The USGS has characterized MTBE concentrations in runoff in many areas and has found such contamination typically to be lower than 2 ppb. (Ref. 34) The National Science and Technology Council's 1997 Interagency Assessment of Oxygenated Fuels Report describes storm water runoff as exhibiting concentrations of 0.2–8.7 ppb in 7% of the samples tested in 16 cities from 1991 to 1995. (Ref. 35) Most detections in this study were in the Denver area, where implementation of the Wintertime Oxyfuel program began in 1988. Based on predictive modeling, concentrations in rainwater (in μg/L) are expected to be equivalent to the surrounding air concentrations (in ppb, volume). MTBE air concentrations tend to be less than 1 ppb in urban areas, leading to predicted rainwater levels of 1 μg/L or less. However, rainwater around localized areas of high MTBE air concentrations (e.g., parking garages) could contain correspondingly higher levels of MTBE. Storm water may be discharged to surface water or percolate to groundwater, and thus serves as a continuing source of low-level MTBE contamination of these potential drinking water sources.

Clean Water Act NPDES permit requirements apply to certain discharges of storm water which may contain MTBE. Though many discharges of storm water are not subject to permit requirements, NPDES permits are required for industrial storm water discharges, discharges from municipal separate storm sewer systems, and storm water discharges specifically designated by EPA or authorized NPDES States. Although MTBE is not typically targeted in these permits, the best management practices and planning requirements usually specified are likely to reduce MTBE discharges through storm water.

As this summary demonstrates, there are a number of programs in place to minimize or mitigate the effects of gasoline releases. However, in light of the volume of gasoline used and the myriad opportunities for leaks, spills, and accidents, substantial releases of gasoline are likely to continue to occur in the future.

E. How Practical is it to Cleanup Drinking Water Supplies to Remove MTBE?

Because spills of conventional gasoline typically move slowly through groundwater, and are biodegraded over time, many are left in place to undergo bioremediation at no cost other than temporarily replacing the water supply. However, MTBE moves rapidly with groundwater, is not readily degraded in the groundwater environment, and can render groundwater unpotable at low levels. Therefore, spills involving MTBE require much more aggressive management and remediation than do spills of conventional gasoline.

MTBE's chemical properties also make it difficult or costly to remediate using conventional ''active'' processes. Two common treatment techniques are air stripping and use of granular activated carbon (GAC). In air stripping, contaminated groundwater is passed through an aeration tower that effectively removes the chemicals from the water and releases it into the air. Where necessary, the chemical is then removed from the air into a solid medium that can be disposed of. MTBE does not readily partition from water to the vapor phase. Air stripping of MTBE is most effective when higher air to water ratios, or higher temperatures are used than would be required for other more volatile compounds. In a GAC system, water is passed through one or more beds of carbon; contaminants in the water are sorbed onto the carbon, which can either be disposed of or ''refreshed'' by driving out the contaminants (usually by heating). However, the relatively low sorption of MTBE to solid particles means that the GAC must be used in greater quantities, driving up treatment costs. As a practical matter, therefore, MTBE-contaminated groundwater is difficult and costly to remediate.

F. What Action did EPA's Blue Ribbon Panel Recommend?

In November 1998, EPA established a the Panel to investigate air quality benefits and water quality concerns associated with the use of oxygenates, including MTBE, in gasoline. The Panel was established under EPA's Clean Air Act Advisory Committee, a policy committee established to advise EPA on issues related to implementing the CAA Amendments of 1990.

The Panel members consisted of leading experts from the public health, environmental and scientific communities, automotive and fuels industry, water utilities, and local and State governments. The Panel met six times from January to June 1999, with the charge to:

1. Examine the role of oxygenates in meeting the nation's goal of clean air.
2. Evaluate each product's efficiency in providing clean air benefits and the existence of alternatives.
3. Assess the behavior of oxygenates in the environment.
4. Review any known health effects.
5. Compare the cost of production and use and each product's availability—both at present and in the future.

Further, the Panel studied the causes of groundwater and drinking water contamination from motor vehicle fuels, and explored prevention and cleanup technologies for water and soil. In September 1999, the Panel released its report, entitled *Achieving Clean Air and Clean Water, The Report of the Blue Ribbon Panel on Oxygenates in Gasoline.* The Report is available in the docket to this ANPRM, and is also available on http://www.epa.gov/oms/consumer/fuels/oxypanel.blueribb.htm.

The Panel recommended a package of reforms to ensure that water supplies are better protected while the substantial reductions in air pollution that have resulted from RFG are maintained. The Panel enumerated 16 suggestions for Federal, State, and Congressional action, including the following:

- Recommended a comprehensive set of improvements to the nation's water protection programs, including over 20 specific actions to enhance UST, safe

drinking water, and private-well protection programs.

• Agreed broadly that use of MTBE should be reduced substantially (with some members supporting its complete phase out), and recommended action by Congress to clarify Federal and State authority to regulate and/or eliminate the use of MTBE and other gasoline additives that threaten drinking water supplies.

• Recommended that Congress act to remove the current CAA requirement that 2% of RFG, by weight, consist of oxygen, to ensure that adequate fuel supplies can be blended in a cost-effective manner while quickly reducing usage of MTBE.

• Recommended that EPA take action to ensure that there is no loss of current air quality benefits associated with the use of MTBE.

While the Panel indicated that its recommendations should be implemented as a complete package, it also stated that ''the majority of these recommendations could be implemented by Federal and State environmental agencies without further legislative action, and we would urge their rapid implementation.''

Although the Panel agreed broadly on its recommendations, two members, while in general agreement with the Panel, had concerns with specific provisions: The MTBE industry representative disagreed with the recommendation to limit the use of MTBE, and the ethanol industry representative disagreed with the recommendation that the CAA requirement that oxygenates be used in RFG be eliminated. Some Panel members believed that MTBE use should be banned altogether.

EPA agrees with the concerns raised in the report of the Panel regarding the continued use of MTBE as a fuel additive, and will consider its recommendations further as it proceeds through a TSCA section 6 rulemaking to limit or ban MTBE's use in gasoline.

IV. Section 6 of the Toxic Substances Control Act

A. What is the Scope of TSCA Section 6 Authority?

Section 6 of TSCA, 15 U.S.C. 2605, provides EPA with broad authority to issue rules to regulate the manufacture, processing, distribution in commerce, use, and/or disposal of chemical substances in the United States where such regulation is necessary to prevent unreasonable risks to health or the environment. The Agency and courts have interpreted the ''unreasonable risk'' standard to be a risk-benefit standard, allowing regulation where risks to health or the environment posed by a particular activity or activities involving a chemical outweigh the benefits associated with such activity or activities. TSCA section 6 lists a number of possible forms that such regulation may take, including:

1. Regulating the manufacturing, processing, or distribution in commerce of a chemical substance, including a complete ban of any such activity or limiting the amounts of the chemical substances that may be manufactured, processed, or distributed in commerce.

2. Regulating the manufacturing, processing, or distribution in commerce of a chemical substance for a particular use or uses, including banning any such activity for a particular use or uses of the chemical substance; limiting the concentration of the chemical substance that may be used in any such activity; or limiting the amounts of the chemical substance that may be manufactured, processed, or distributed in commerce for such particular use or uses.

3. Requiring that the chemical substance be accompanied by such warning statements and/or instructions for use with respect to its use, distribution in commerce, and/or disposal as the Administrator finds necessary.

4. Requiring manufacturers and/or processors of a chemical substance to make and retain such records of the manufacturing process as the Administrator finds necessary and/or to monitor or conduct tests which are reasonable and necessary to assure compliance with a rule under TSCA section 6.

5. Prohibiting or regulating any manner or method of commercial use of a chemical substance.

6. Prohibiting or regulating the disposal of a chemical substance.

7. Requiring manufacturers or processors of a chemical substance to provide warnings to distributors or users of the substance and to replace or repurchase such substance.

TSCA section 6(a) directs the Agency to apply the least burdensome of the identified regulatory options to the extent necessary to mitigate the unreasonable risk. The statute also makes clear that the Agency may select a combination of the options, and may limit the geographic application of a rule under TSCA section 6(a).

In promulgating any rule under TSCA section 6(a), TSCA section 6(c) requires the Agency to publish a statement addressing:

1. The effect of the chemical substance being regulated on health and the magnitude of exposure of humans to the substance.

2. The effects of such substance on the environment and the magnitude of exposure of the environment to the substance.

3. The benefits of such substance for various uses and the availability of substitutes for such uses.

4. The reasonably ascertainable economic consequences of the rule, after consideration of the effect on the national economy, small business, technological innovation, the environment, and public health.

TSCA section 6(c) also provides that if the Administrator determines that the risk of injury to health or the environment could be eliminated or reduced to a sufficient extent through actions taken under another statute administered by EPA, she may not promulgate a rule under TSCA section 6 unless the Administrator finds, in her discretion, that it is in the public interest to protect against such risk under TSCA. In making this finding, the Administrator must consider all relevant aspects of the risk; a comparison of the estimated costs of complying with actions taken under TSCA and any other statute that adequately addresses the risk; and the relative efficiency of actions under TSCA and such other statute to address the risk.

Any rulemaking under TSCA section 6 includes the opportunity for any interested person to request an informal hearing. Such hearings could be limited to the right to present an oral statement, or could include the right to present and cross-examine witnesses if the Administrator determines that there are disputed issues of material fact necessary to be resolved and that cross-examination of witnesses is both appropriate and required for full and true disclosure with respect to such issues.

B. How Would EPA Apply TSCA Section 6 to Risks Associated with MTBE?

As discussed earlier, the use of MTBE as an additive in gasoline has resulted, and if unchanged is likely to continue to result, in the widespread release of MTBE into the environment; MTBE is difficult to contain and prevent from reaching sources of drinking water once it is released into the environment; and it has the potential to render drinking water unpotable at low levels and unsafe at higher levels. EPA's review of existing information on contamination of drinking water resources by MTBE indicates substantial evidence of a significant risk to the nation's drinking water supply. A comprehensive

approach to such risk must include consideration of either reducing or eliminating the use of MTBE as a gasoline additive. As a result, EPA is initiating this process pursuant to the unreasonable risk provision under TSCA section 6 to eliminate or greatly reduce the use of MTBE as a gasoline additive. EPA is interested in comments on both the risk and these possible responses to it. In accordance with the requirements of TSCA section 6, EPA will consider whether there are other appropriate mechanisms to address the problems presented by the use of MTBE as a gasoline additive. Thus, the outcome of this rulemaking could be a total ban on the use of MTBE as a gasoline additive. Consistent with TSCA section 6, EPA will carefully consider regulatory alternatives to a ban. These could include limiting the amount of MTBE that could be used in gasoline, limiting use of MTBE in particular geographic areas or during particular times of year; limiting the types of facilities in which MTBE can be stored; limiting the manner in which MTBE is transported; etc. Any final outcome must, however, provide adequate protection against any unreasonable risk associated with MTBE.

As part of a rulemaking under TSCA section 6, the Agency must also consider whether action under another statute administered by EPA, such as the CAA, RCRA, CWA, or SDWA, could effectively address the risks posed by MTBE and, if so, whether it is in the public interest to regulate the risk under TSCA instead of such other statute. It is worth noting in this regard that although a number of Agency programs could address some of the risks posed by MTBE (such as, for example, the regulation of USTs under RCRA), TSCA appears to provide the best tool for assessing and addressing the risks posed by MTBE.

As part of the consideration of other programs and identification of the least burdensome mechanism to provide adequate protection against the risks of MTBE, the Agency expects to consider a number of possible strategies for mitigating those risks, including preventing MTBE in gasoline from getting into groundwater, cleaning up water contaminated with MTBE, and removing MTBE from gasoline in whole or in part. While the Agency's assessment in this regard is preliminary at this point, the available evidence suggests that dealing with the problem before MTBE is added to gasoline may be the best solution for mitigating any unreasonable risks associated with MTBE. Given the large quantities of gasoline that are used and transported in the United States, and the number of different possible avenues for release into the environment (including leaks from storage tanks and pipelines; spills resulting from loading/unloading gasoline at tanks, gasoline pumps, or pipelines; spills resulting from transportation accidents; un-combusted gasoline from boat engines; emissions from automobile exhaust), it may not be practicable to prevent significant quantities of MTBE from getting into surface water or groundwater once the chemical is added to gasoline. Similarly, given the importance of groundwater as a drinking water source in the United States and the large number of wells and groundwater sources that have been and could be contaminated with MTBE and the costs and difficulties of cleaning contaminated drinking water sources, a risk-mitigation strategy centering on cleaning up water may not be the preferred strategy under TSCA section 6 for mitigating any unreasonable risks associated with MTBE. Consequently, EPA believes that a comprehensive approach must include consideration of either reducing or eliminating the use of MTBE as a gasoline additive.

In conducting this rulemaking under TSCA section 6, the Agency will also consider the costs and impacts of alternatives to MTBE. In oxygenated gasoline programs like Federal RFG, the most likely substitute based on current usage is ethanol. Other ether compounds are currently used as oxygenates in small quantities. MTBE does not occupy as dominant a position as an octane enhancer for conventional gasoline as it does as an oxygenate in RFG. Ethanol, alkylates, and aromatics are alternative octane enhancers in conventional gasoline. Although EPA is seeking more information on alternatives to MTBE, EPA does not expect ethanol, alkylates, or aromatics to present the same magnitude of risk to drinking water supplies as MTBE. Ethanol biodegrades more quickly than MTBE, and therefore is less likely to contaminate drinking water as often as MTBE, or at the levels of MTBE. Alkylates and aromatics are expected to behave in soil and water more like other components typically found in gasoline than MTBE; they too would be unlikely to contaminate drinking water as often as MTBE or at the levels of MTBE. Other ether compounds are not currently used widely as oxygenates, and the Agency does not have much data to characterize the risks they might pose to drinking water supplies. However, they are chemically similar to MTBE, and they may well move through soil and water in ways and amounts similar to MTBE. EPA will closely evaluate the likelihood that compounds not currently used in significant quantities as oxygenates in RFG might be widely used as alternatives to MTBE, whether additional information on these compounds is necessary, and whether other measures are appropriate to assure that an elimination or limitation of MTBE in gasoline does not result in the use of alternatives that might cause similar risks to drinking water. It appears that eliminating or limiting the use of MTBE as a fuel additive will result in increased costs in producing gasoline of approximately $1.9 billion per year if the oxygen mandate remains in place.

V. Alternative Gasoline Additives to MTBE

In conducting a rulemaking under TSCA section 6, EPA must consider the alternatives to MTBE. If the use of MTBE as a fuel additive is limited or banned by EPA, refiners will have to look to other chemicals as substitutes. To meet the oxygenate requirements of RFG, ethanol and other ethers are the most likely alternatives, while ethanol, alkylates, and aromatics will most likely replace MTBE as an octane enhancer. This unit assesses these chemicals and their potential to replace MTBE in gasoline.

A. What Oxygenates Other Than MTBE Could be Used to Meet RFG Requirements?

If the use of MTBE is limited or banned and the CAA oxygenate requirement remains in place, refiners will have to use a substitute oxygenate to meet the RFG requirements. Ethanol and other ethers are the most likely oxygenate alternatives.

1. *Ethanol.* Ethanol is an oxygenate that is produced from agricultural products such as corn. Ethanol and MTBE have been the primary oxygenates used to meet the RFG oxygen content requirements because of their availability, blendability, and ability to deliver air quality benefits. Ethanol is currently the primary oxygenate in about 12.5% of RFG, and it is the main oxygenate in the Midwest RFG areas.

Despite its current use in RFG, ethanol is not yet manufactured in sufficient volume to meet total current national oxygenate demands. Current U.S. ethanol production capacity is estimated at 120,000 b/d (barrels per day), which is equivalent in oxygen content to approximately 230,000 b/d of MTBE. In order for ethanol alone to fulfill the nationwide oxygen requirement in all RFG and oxygenated

fuels areas, the Panel estimated that at least an additional 67,000 b/d of ethanol would be needed. Because of the higher oxygen content of ethanol, a smaller volume of ethanol (5.7%) needs to be added to a gallon of RFG to satisfy the CAA oxygen content requirement than MTBE (11% by volume).

This shortfall in ethanol supply could be fulfilled by a combination of increasing production capacity at existing facilities and by building new facilities. The ethanol industry estimates that the current expansion of existing ethanol-from-corn production facilities may increase production capacity by as much as 40,000 b/d. (Ref. 36) Additionally, the industry estimates that new ethanol production facilities currently being planned could provide another 25,000 b/d. Ethanol production from biomass processing is currently approximately 4,000 b/d. Thus, while there is an insufficient supply of ethanol to meet current oxygenate demand, the ethanol industry projects that future ethanol production should be able to adequately meet the oxygenate demand and replace MTBE given appropriate time. The Department of Agriculture (USDA) has concluded that ethanol can fully meet all oxygenate requirements within 4 years. (Ref. 37)

Refiners that currently use MTBE in meeting the oxygenate requirement would need to modify their operations to produce an appropriate blendstock to which ethanol can be added. Terminals, responsible for actually adding the ethanol to the gasoline, would also have to modify their facilities. For example, terminals would have to add storage facilities for ethanol. Due to these initial logistical concerns, refiners have stated that an immediate ban on MTBE could have a negative impact on the nation's fuel supply.

In addition to initial capital costs, use of ethanol as a replacement for MTBE would have several long term impacts on the price of gasoline. When added to gasoline, ethanol increases the Reid Vapor Pressure (RVP) of the gasoline by about 1.0 pound per square inch. RVP is a measure of the gasoline's volatility. An RVP increase results in an increase in emissions of VOCs from motor vehicles. To compensate for this increase, and to reduce the risk of VOCs evaporating into the air, refiners must blend ethanol gasoline with a low-RVP blendstock. This low-RVP blendstock is more expensive to produce or purchase.

In order to make RFG with MTBE, refiners blend MTBE into gasoline. After mixture, the RFG is transported to distribution terminals by pipeline. Since ethanol is soluble in water, which is commonly found in pipelines, and will separate from gasoline, ethanol is usually blended at the distribution terminal. Because ethanol is produced primarily in the Midwest, though, it must be transported to terminals by either an ethanol-only pipeline, rail, marine or truck shipping or some combination of these options. It is possible that greater transportation connections between ethanol producers and terminals will have to be developed. The USDA study indicates that given a 3 to 5 year transition period, there does not appear to be a transportation impediment to the use of ethanol as a substitute for MTBE. (Ref. 38)

Economic impacts are not likely to be shared equally among petroleum refiners/marketers. Each refinery processes different types of crude, supplies different mixes of products (e.g., some refineries do not manufacture any RFG), and use widely varying technologies. Areas of the country that rely heavily on MTBE as an oxygenate will experience a more pronounced economic effect in the event of an oxygenate replacement or removal (e.g., Texas, California, and Northeast RFG markets use MTBE, whereas the Chicago and Milwaukee RFG markets use ethanol). In addition, markets farthest from the Midwest may experience a greater effect due to increased transportation costs.

The economic impact of using ethanol as an alternative to MTBE will be reflected primarily in the price of gasoline. A 1999 study by the DOE concluded that a phased elimination of MTBE as an additive for oxygenation in RFG in 4 years would result in an increase in the price of RFG of between 2.4 cents per gallon and 3.9 cents per gallon. (Ref. 39) A California Energy Commission (CEC) study estimated that the price of gasoline in California would increase anywhere from 1.9 cents per gallon to 2.5 cents per gallon in the long term (6 years) if ethanol was substituted for MTBE. (Ref. 40) A Chevron/Tosco analysis estimated that gasoline prices in California would increase 1.9 cents per gallon in the long term (6 years) if ethanol was substituted for MTBE. (Ref. 41)

Pure ethanol is highly soluble in water, and hypothetically should travel in groundwater at about the same rate as MTBE. Ethanol is not expected to persist in groundwater, though, because it biodegrades easily. Thus, ethanol itself does not appear to pose as great a danger to groundwater supplies as MTBE.

Ethanol's ability to biodegrade does present another potential issue of concern. Laboratory data and hypothetical modeling indicate that based on physical, chemical, and biological properties, ethanol will likely preferentially biodegrade in groundwater compared with other gasoline components. As a result, the levels of BTEX in water may decline more slowly, and BTEX plumes may extend further than they would without ethanol present. However, BTEX does not migrate as quickly as MTBE. Thus, even with the presence of ethanol, BTEX plumes would not be expected to travel as far as MTBE plumes. Although there are limited data regarding the movement of ethanol and BTEX, a recent USGS report cites several examples of MTBE plumes migrating further than BTEX plumes. (Ref. 42) At some sites, MTBE has migrated much further than other common gasoline components and those long travel distances increase the probability that MTBE will be detected in a drinking water well and that treatment may be required.

The health effects of ingested ethanol have been extensively investigated. Given that ethanol is formed naturally in the body at low levels, inhalation exposure to ethanol at the low levels that human are likely to be exposed are generally not expected to result in adverse health effects. (Ref. 43) Ingestion of ethanol in relatively large quantities, increases the risks for several forms of human cancer. (Ref. 44) However, it is highly unlikely that the public will be exposed to large quantities of ethanol from drinking water contamination.

When used as an oxygenate, ethanol blends of RFG achieve all Phase I goals of the RFG program. Ethanol is the primary oxygenate in Chicago and Milwaukee, and those areas have easily exceeded all Phase I performance requirements for VOCs, NO_X and air toxics. Thus, use of ethanol as an oxygenate nationwide would not appear to compromise compliance with air quality requirements; refiners seem able to produce RFG using ethanol that complies with RFG emissions standards. The Panel did note, however, that Chicago and Milwaukee, while exceeding the Phase I requirements, do not appear to achieve as great a reduction in air toxics as do other RFG areas. It is unclear whether MTBE is responsible for this greater reduction in air toxics or other aspects of the formulation. Starting in the year 2000, all RFG areas will be subject to more stringent standards for VOC, NO_X and toxics reductions, regardless of which oxygenate is used.

2. *Other ethers.* A variety of other ethers (ETBE, DIPE, TAME) are

currently used in gasoline, though in limited quantities; these ethers provide approximately 5% of the oxygenate used in RFG. These other ethers have found only limited use because they are more expensive than MTBE. For example, greater volumes of ETBE and TAME are necessary to achieve the 2.0% weight standard compared to MTBE. Use of ETBE also requires large quantities of ethanol as feedstock. Production supplies of other ethers are also limited. The current production capacity in this country of TAME is approximately 23,000 b/d. Increasing ETBE production would require refitting MTBE plants, primarily in the Gulf South. Transportation issues could be similar to those involving increased use of ethanol. CEC estimates that gasoline prices will increase 2.4 cents per gallon if ETBE is used to replace MTBE. (Ref. 45) This estimate is specific to California.

Given their similarity to MTBE, other ethers are likely to display similar chemical properties—high solubility in groundwater, poor sorption in soil, and slower biodegradation compared to BTEX. MTBE has become a concern in large part because of its chemical properties. MTBE can travel farther than other gasoline constituents and can create larger contamination plumes, making it more likely to impact drinking water supplies. Other ethers are likely to demonstrate the same properties and thus could well raise similar water contamination concerns as MTBE. No studies have been reported on the carcinogenicity of ETBE, TAME, or TBA.

B. What Compounds Other Than MTBE Could be Added to Gasoline to Boost Octane?

In addition to its use as an oxygenate, MTBE is also used as an octane enhancer in conventional gasoline. However, while MTBE is the dominant oxygenate additive in RFG, it is not the predominant octane enhancing additive in conventional gasoline. More conventional gasoline contains ethanol as an octane enhancer than contains MTBE for that purpose. In 1997, approximately 12,000 b/d of MTBE were used for octane enhancement purposes. If MTBE is banned or its use as an octane enhancer is limited, refineries will have to look to other alternatives to replace this source of octane. There are a limited number of octane-rich components that refiners can choose to produce needed octane. Ethanol, alkylates, and aromatics are the three most likely available alternatives to MTBE for use as an octane enhancer in conventional gasoline. Ethanol as an additive is discussed in Unit V.A.1.

1. *Alkylates.* Alkylates are a mix of high octane, low vapor pressure compounds that are produced from crude oil through a catalytic cracking process. Because of their desirable properties, alkylates are popular components for use in gasoline.

In order for a refiner to use alkylates as an octane enhancer, the refiner must possess an alkylation unit. According to an industry estimate, an alkylation unit can cost up to $80 million for a refinery that produces 10,000 b/d of alkylate. (Ref. 46) Refiners that do not currently use alkylates would have to make a substantial initial capital investment in order to do so. In addition, refiners would need to adjust other component streams to accommodate the change in vapor pressure characteristics associated with a fuel containing high alkylate content.

Supply of alkylates could be a key economic consideration. There are currently not enough domestic alkylates available to make up for the loss in MTBE volume. While increasing alkylate production is possible, it appears that refiners in California have limited possibilities for such an increase. Alkylate production on the East Coast and Gulf Coast also appears to be close to capacity. Given this situation, it may take refiners some number of years to modify facilities to produce enough alkylates to replace the octane enhancement currently provided by MTBE.

It is unclear, however, how much alkylate is needed to replace MTBE as an octane enhancer. Only 12,000 b/d of MTBE are currently used for octane enhancement in conventional gasoline. MTBE has a higher octane value than alkylates, and a simple linear comparison of these values would conclude that 14,350 b/d of alkylates would be necessary to replace MTBE. This linear comparison would not take into account several factors important in determining the amount of alkylates used, such as the blend of gasoline. Refineries can be expected to react in different ways to these factors to maximize production and economic feasibility and to meet performance standards.

Alkylates are less soluble in water, and they will not likely pose the same degree of risks to water resources as MTBE. Alkylates would be expected to behave more like other components of gasoline (BTEX) than like MTBE if released into the environment. Alkylates thus do not appear to pose a significant threat to drinking water resources.

According to NESCAUM, increased use of alkylates in gasoline blends will not increase toxic emissions. (Ref. 47) However, the available human and aquatic toxicity data on alkylates are limited.

2. *Aromatics.* Aromatics are hydrocarbons which can include benzene, toluene, and xylene. Toluene is the primary aromatic used for octane enhancing. NESCAUM estimates that current toluene production capacity may be sufficient to produce enough toluene to replace MTBE by volume. (Ref. 48) The aromatics are significantly less likely to end up in drinking water sources in significant quantities after release to the environment than is MTBE.

Aromatics contain compounds that are known to have a range of potential human health effects. Benzene is a known human carcinogen, and xylene is a major contributor to smog. Toluene is associated with some toxic by-products, though it is less toxic than benzene.

VI. Specific Requests for Comment, Data, and Information

Interested persons are invited to comment on any issue raised in this ANPRM. The Agency is particularly interested in receiving additional information and/or comments addressing the following issues:

A. EPA Action

As explained in this ANPRM, EPA is initiating this process pursuant to TSCA section 6 to consider eliminating or limiting the use of MTBE in gasoline. EPA requests comment (including comments addressing the health, environmental, and/or cost implications) on:

1. Whether some use of MTBE as a gasoline additive should be allowed to continue and, if so, the level or type of use that should be allowed to continue?

2. How much lead time, if any, would be necessary to enable refiners to eliminate MTBE from RFG while continuing to meet the current levels of compliance with RFG standards for VOC, NO_X, and toxic emissions without unacceptable impacts on the price or supply of fuel?

3. How much lead time, if any, would be necessary to enable refiners to eliminate MTBE as an octane enhancer in conventional gasoline without unacceptable impacts on the price or supply of fuel?

4. Whether EPA should obtain additional information on, or reduce, eliminate, or cap the use of any other gasoline additives in addition to MTBE?

5. Whether MTBE presents significantly greater risk to public health

and/or water quality than alternative gasoline additives.

B. Releases of Gasoline Containing MTBE, Contamination of Water Resource by MTBE, and Remediation Technologies

1. As explained in this ANPRM, the Agency identified numerous and widespread instances of MTBE contamination of groundwater. In order to ensure that EPA has the most recent and accurate data available, EPA requests information regarding incidents of both releases of gasoline containing MTBE and the detection of MTBE in groundwater, surface waters, or drinking water supplies. Comments should include, to the extent possible, the amounts, locations, sources, and types of MTBE releases, and the levels and sources of water resource contamination from MTBE.

2. EPA is interested in additional information concerning the toxicity of MTBE, the levels at which its taste or odor can be detected in water, the levels at which its taste or odor makes water unacceptable to consumers, and any other properties of MTBE that may be relevant to a rulemaking under TSCA section 6.

3. EPA's summary of current MTBE contamination problems suggests that there is significant risk of additional future contamination of water resources by MTBE from gasoline. In order to more comprehensively characterize this risk EPA is requesting comment regarding the likely future occurrence of MTBE contamination in groundwater, surface water, and/or drinking water.

4. EPA is requesting information regarding the relative contribution of different sources (such as USTs, spills, storm water runoff, air deposition, and marine engines) to present and future MTBE contamination of groundwater, surface water, and drinking water.

5. EPA is requesting information regarding the cost and efficacy of technologies for remediating soil and drinking water sources that have been contaminated with MTBE. EPA is particularly interested in examples of remediation efforts that have addressed MTBE contamination, and cost and efficacy comparisons with remediation efforts for other components of gasoline (such as BTEX).

C. Alternatives to MTBE

1. EPA is requesting information on potential substitutes, including those not identified in this ANPRM, that might replace MTBE either as an oxygenate in RFG or an octane enhancer in conventional gasoline. In addition to identifying a potential substitute, any information addressing the following would be helpful:

a. The basis for the belief that the substitute might replace MTBE in significant quantities.

b. The behavior of the substitute in soil and water, with an emphasis on the quantities of the substitute that might find their way into drinking water sources if the substitute is added to gasoline.

c. Toxicity, taste or odor properties, current exposure levels, or any other properties or considerations of the substitute that may be relevant to a rulemaking under TSCA section 6.

2. EPA is interested in information based on actual releases of oxygenates and other gasoline additives other than MTBE to the environment; including degree of contamination, the spread of any contaminant plumes, and the cost and efficacy of the technologies available to remediate such contamination. Comments should include, to the extent possible, the amounts, locations, sources and types of releases, and the levels and sources of water resource contamination from these oxygenates and additives, as well as from other gasoline constitutents.

3. EPA is interested in information regarding any possible impacts on health or the environment that might result from the elimination or limitation of use of MTBE as a gasoline additive and the use of alternative compounds in MTBE's place, including not only whether alternative additives may have a greater or lesser impact than MTBE on drinking water sources, but also whether increased use of such alternatives might have other beneficial or negative consequences on human health or the environment (such as air quality or water quality impacts).

D. Economic Considerations

1. EPA is requesting comment on the cost impacts of an elimination or limitation of MTBE in gasoline, in the absence of a change in the RFG requirements. EPA is particularly interested in comments that address:

a. The cost implications of an immediate elimination of MTBE from gasoline nationwide.

b. The cost implications of an immediate nationwide limit on MTBE content in gasoline to pre-RFG levels or levels generally associated with the use of MTBE for purposes of octane enhancement.

c. The cost implications of a phase out of MTBE from gasoline nationwide, resulting in complete elimination in a period of 3 to 4 years or 5 to 6 years.

d. The cost implications of a nationwide phase down of MTBE content in gasoline, over 3 to 4 years, resulting in a limit on MTBE content equivalent to pre-RFG levels or levels generally associated with the use of MTBE for purposes of octane enhancement.

2. EPA is requesting comment regarding any information that was not considered by the Blue Ribbon Panel on the availability of alternative oxygenates and octane enhancers, the time it would take for production of alternatives to meet national demand, and the potential impacts on fuel supply and price.

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VIII. Regulatory Assessment Requirements

A. Executive Order 12866

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the EPA must determine whether a regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Executive Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

1. Have an annual effect on the economy of $100 million or more, or adversely affects in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

2. Creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency;

3. Materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

4. Raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

A draft of this ANPRM was reviewed by OMB prior to publication, as required by E.O. 12866. Any changes made in response to OMB suggestions or recommendations will be documented in the public record.

B. Federalism

Executive Order 13132, entitled ''*Federalism*'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.'' Under Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. The EPA also may not issue a regulation that has federalism implications and that preempts State law unless the EPA consults with State and local officials early in the process of developing the proposed regulation.

If EPA complies by consulting, Executive Order 13132 requires EPA to provide to OMB, in a separately identified unit of the preamble to the rule, a federalism summary impact statement. The federalism summary impact statement must include a description of the extent of EPA's prior consultation with State and local officials, a summary of the nature of their concerns and the EPA's position supporting the need to issue the regulation, and a statement of the extent to which the concerns of State and local officials have been met. Also, when EPA transmits a draft final rule with federalism implications to OMB for review pursuant to Executive Order 12866, EPA must include a certification from the agency's Federalism Official stating that EPA has met the requirements of Executive Order 13132 in a meaningful and timely manner.

EPA has determined that the requirements of Executive Order 13132 do not apply to this ANPRM, and therefore the Executive Order does not apply to this ANPRM.

C. Small Business Concerns

Section 603 of the Regulatory Flexibility Act (RFA), 5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996, Public Law 104–121, requires the Administrator to assess the economic impact of proposed rules on small entities, including small businesses. The Agency accordingly requests comment on the potential economic impact on small business of the limitation or elimination of MTBE as an oxygenate or octane enhancer in gasoline. EPA does not anticipate, at this point, that the potential action discussed in this ANPRM will have a significant economic impact on small business. Comments on the potential economic impact of such an action on small businesses will help the Agency meet its obligations under the RFA, as amended by SBREFA, and will provide information to assist the Agency in its efforts to minimize any significant economic impact of such an action for potentially affected small businesses.

D. Children's Health Protection

Executive Order 13045, entitled ''*Protection of Children from Environmental Health Risks and Safety Risks*'' (62 FR 19885, April 23, 1997) applies to any rule that:

1. Is determined to be ''economically significant'' as defined under E.O. 12866.

2. Concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children.

If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

While E.O. 13045 does not require EPA to evaluate the health or safety risks of actions discussed in an ANPRM, the Agency is, nonetheless, soliciting comment on such risks. The potential action discussed in this ANPRM might involve issues related to health or safety risks. To the extent that this is the case, the potential action would be intended to minimize or eliminate any such risks for all people who utilize groundwater resources, including children. We request comment on whether there are health or safety considerations related to the potential action discussed in this ANPRM that may disproportionately affect children.

List of Subjects in 40 CFR Part 755

Environmental protection, Air pollution, Fuel additives, Hazardous substances, Water resources.

Dated: March 20, 2000.

Carol M. Browner,

Administrator.

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