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COMMENTS

A CONTROVERSY FUELED BY METHYL TERTIARY BUTYL ETHER (MTBE)

Anthony Cognito

I. Introduction

Over the past few decades, Maryland has been faced with a controversial issue pertaining to methyl tertiary butyl ether (MTBE) groundwater contamination.¹ In 1979, MTBE was added to gasoline in an attempt to reduce smog-producing air pollutants.² While its chemical properties have been scientifically proven to reduce air pollutants, this “environmentally friendly” chemical eventually became a topic of great debate as MTBE was leaking through underground storage tanks and contaminating groundwater sources.³ Many states thereafter filed lawsuits against gasoline refining companies for their role in adding MTBE, and most of them have received remarkably high settlements in return.⁴ The State of Maryland is one such state that has been impacted by the adverse effects of MTBE, but has not yet filed a lawsuit.⁵ The issue that Maryland government officials now face is whether they have a compelling case to pursue a lawsuit.⁶ In short, the answer is yes they do.

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1. Timothy B. Wheeler, *Frosh Seeks Outside Help for Well Pollution Lawsuit*, THE BALTIMORE SUN (May 26, 2015, 7:15 PM), <http://www.baltimoresun.com/features/green/blog/bs-bz-mtbe-counsel-20150526-story.html>.
 2. Carrie L. Williamson, “*But You Said We Could Do It!*”: *Oil Companies’ Liability for the Unintended Consequence of MTBE Water Contamination*, 29 ECOLOGY L.Q. 315, 316 (2002).
 3. Thomas McGarity, *MTBE: A Precautionary Tale*, 28 HARV. ENVTL. L. REV. 281, 281 (2004).
 4. U.S. Energy Information Administration, *Status and Impact of State MTBE Bans*, DEP’T OF ENERGY, <http://www.eia.gov/oiaf/servicerpt/mtbeban/> (last modified Mar. 27, 2003, 4:24 PM).
 5. Wheeler, *supra* note 1.
 6. *Id.*

II. Background

A. *The Legislative History of MTBE*

i. The Clean Air Act

Before the introduction of MTBE in gasoline, the petroleum industry used tetra-ethyl lead in gasoline to reduce “engine knocking,” to ensure cars ran smoothly, and to burn fuel more efficiently.⁷ The petroleum industry first introduced the use of tetra-ethyl lead in the early twentieth century and continued to use it until the Environmental Protection Agency (EPA) ordered a gradual phase out in 1970.⁸ Congress empowered the EPA to order this gradual phase out because of the danger that tetra-ethyl lead presented to public health.⁹ Furthermore, the automobile manufacturing industry began installing catalytic converters, which were not compatible with tetra-ethyl lead and ultimately destroyed the converter.¹⁰ Recognizing the dangers of the poisonous additive, Congress banned the use of tetra-ethyl lead by passing the Clean Air Act (CAA) in 1970.¹¹

The CAA was enacted to “protect and enhance the quality of the Nation’s air resources so as to promote the public health and welfare.”¹² Under the CAA, the National Ambient Air Quality Standards (NAAQS) was the primary mechanism for regulatory control of air pollutants.¹³ The standards were divided into two parts: primary and secondary.¹⁴ Primary standards were set to regulate air pollutants that affected “sensitive populations,” including asthmatics, children, and the elderly.¹⁵ Secondary standards were set to regulate air pollutants that affected public welfare, such as animals, vegetation, and crops.¹⁶

ii. The 1990 Amendment to the Clean Air Act – Reformulated Gasoline

In addition to the NAAQS, Congress amended the CAA in 1990 by enacting the Reformulated Gasoline Program.¹⁷ Reformulated gasoline (RFG) typically contains an oxygenate, which increases the oxygen level of the gasoline, allowing the gasoline to burn cleaner.¹⁸

7. McGarity, *supra* note 3, at 283.

8. *Id.* at 294.

9. *Id.*

10. *Id.*

11. Daniel Velez, *Toxic Torts: Issues of Mass Litigation, Case Management, and Ethics*, 26 WM. & MARY ENVTL. L. & POL’Y REV. 477, 480-81 (2001).

12. 42 U.S.C.A. § 7401(b)(1) (West 2015).

13. National Ambient Air Quality Standards (NAAQS), ENVTL. PROT. AGENCY (2015), available at <http://www.epa.gov/air/criteria.html>.

14. *Id.*

15. *Id.*

16. *Id.*

17. David Littell, *MTBE Or Not MTBE - Why Is That The Question?*, 14 NAT. RESOURCES & ENV’T 247 (2000).

18. *Id.*

Congress required that the RFG satisfy a minimum of 2% oxygen by weight.¹⁹ Congress did not, however, mandate the addition of a specific oxygenate, leaving it to the discretion of the experts in the petroleum industry.²⁰ According to the EPA, there are a number of oxygenates that could be used to fulfill this 2% oxygen by weight requirement, but refiners most often use MTBE.²¹ Additionally, the CAA mandated that RFG be sold in the ten largest metropolitan areas with the most severe summertime ozone levels.²²

B. A Brief Description of MTBE's Defining Characteristics

MTBE is the most widely used gasoline additive because of its ability to reduce the amount of air pollutants emitted by automobiles.²³ MTBE has three main chemical properties, all of which pertain to its effectiveness and its dangerousness.²⁴

First, MTBE falls within a group of chemicals known as oxygenates.²⁵ As the name entails, when blended with gasoline, oxygenates increase the oxygen content of gasoline, promoting a more complete burning of gasoline.²⁶ Consequently, MTBE reduces the amount of harmful by-products released by engine combustion, such as carbon monoxide, volatile organic compounds and nitrogen oxide.²⁷

The second chemical characteristic of MTBE relates to its solubility.²⁸ MTBE is comprised of hydrophilic molecules, which means that it is chemically attracted to water and readily attaches to water molecules.²⁹ As such, MTBE has been characterized as a very soluble chemical, which is capable of traveling rapidly in groundwater.³⁰ This is a unique characteristic of MTBE in comparison with other components of gasoline.³¹ The sole, but significant, problem with the solubility of

19. *Id.*

20. Williamson, *supra* note 2, at 319.

21. *Id.* at 319-20.

22. *Id.* (cities including Baltimore, Chicago, Hartford, Houston, Los Angeles, Milwaukee, New York, Philadelphia, Sacramento, and San Diego).

23. MTBE Advanced 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, 65 Fed. Reg. 16094, 16,094 (Mar. 24, 2000) (to be codified at 40 C.F.R. pt. 755) [hereinafter MTBE Advance Notice of Intent].

24. *Id.*

25. *Id.* at 16,095.

26. *Id.*

27. Littell, *supra* note 17, at 247.

28. John C. McMeekin II and Peter J. Nesson, *Is MTBE a Health Threat? Defending Underground Storage Tank Litigation*, 44 NO. 8 DRI FOR DEF. 35 (2002).

29. National Groundwater Association, *MTBE*, <http://www.wellowner.org/water-quality/mtbe/>.

30. McGarity, *supra* note 3, at 287 (citing MTBE Advanced Notice of Intent, 65 Fed. Reg. at 16,097).

31. *Id.*

MTBE is that once MTBE enters water, it is difficult to extract from the water source.³²

Conversely, the petroleum industry positively views this unique characteristic because it makes transportation of reformulated gasoline easier and more efficient.³³ Due to MTBE's solubility distinction, MTBE blends well into gasoline and does not separate like other oxygenates.³⁴ This allows oil refiners to add MTBE at gasoline production facilities before transportation, which is more cost efficient than having to add an oxygenate additive at the time of sale.³⁵

A third characteristic of MTBE is its resistance to biodegradation.³⁶ To determine if a chemical is biodegradable, one must first determine if it is volatile.³⁷ Volatility is defined as a substance's tendency to vaporize.³⁸ In an EPA report, MTBE was characterized as highly volatile, which means it evaporates rapidly from soil surface. However, when MTBE is underground it is not volatile and, therefore, does not readily biodegrade as quickly as other gasoline constituents. As such, this chemical property is a cause of great concern considering that the leaking of underground storage tanks is the most common mechanism of contamination.³⁹ In sum, gasoline that does not contain MTBE is capable of natural biodegradation, but gasoline containing MTBE neither naturally nor readily biodegrades.

Overall, MTBE is effective because it is classified as an oxygenate, which reduces the amount of harmful byproduct. However, the harm it causes also needs to be taken into consideration. The latter two chemical properties of MTBE, high solubility and low biodegradability, make MTBE a very dangerous and impactful chemical once it comes into contact with water. Due to MTBE's affinity for water and its high resistance to biodegradation, gasoline releases with MTBE are substantially more difficult and costly to remediate than gasoline releases that do not contain MTBE.

32. *Id.*

33. Littell, *supra* note 17, at 248.

34. *Id.*

35. *Id.*

36. McGarity, *supra* note 3, at 287.

37. *Id.*

38. Methyl Tertiary Butyl Ether (MTBE), ENVTL. PROT. AGENCY, <http://archive.epa.gov/mtbe/web/html/water.html>.

39. Underground Storage Tanks (UST), ENVTL. PROT. AGENCY, <http://www.epa.gov/oust/mtbe-a/md-2005-lustline.pdf>.

III. Analysis

A. *The Benefits of MTBE Do Not Outweigh the Risks*

i. The Numbers Speak for Themselves

In 1990, MTBE was declared to be “the fastest growing chemical in the world.”⁴⁰ By 2000, more than 30% of the gasoline sold in the United States was reformulated and about 87% of the gasoline contained MTBE.⁴¹ More specifically, when MTBE was used in gasoline as the oxygenate, the gasoline blend was 11% MTBE by volume.⁴² This percentage by volume is significantly higher than other oxygenates, such as ethanol, which was 5.7% by volume.⁴³

Concerning contamination, the EPA has reported that 5-10% of the water supply in areas that use oxygenated gasoline is contaminated with MTBE.⁴⁴ The EPA also reported that 21% of ambient groundwater tested in areas that use MTBE gasoline had MTBE contamination, compared to only 2% in areas that do not use the additive.⁴⁵ In Maryland, the Maryland Department of the Environment sampled 1,023 public water systems in 2011 and detected MTBE in 35 systems.⁴⁶ The Department also identified 673 private wells with more than trace amounts of MTBE and, through tracking and testing, continues to find new cases of MTBE contamination.⁴⁷

Overall, these statistics certainly are alarming, and it is imperative that state legislatures take steps towards banning the use of MTBE entirely. This is especially true because 40-46% of the United States population uses groundwater as a source of drinking water.⁴⁸ So what does all this empirical data mean for us, as humans, who consume this MTBE ridden drinking water?

40. McGarity, *supra* note 3, at 281 (quoting *Dramatic Gains for MTBE*, CHEMICAL WK., Mar. 14, 1990, at 50).

41. MTBE Advanced Notice of Intent, *supra* note 23, at 16097.

42. Methyl Tertiary Butyl Ether (MTBE): MTBE in Fuels, ENVTL. PROT. AGENCY (2006), <http://www.epa.gov/mtbe/gas.htm>.

43. MTBE Advanced Notice of Intent, *supra* note 23, at 16096 (noting ethanol has a higher oxygen content which translates to smaller volume to satisfy the CAA 2% oxygen content requirement).

44. ENVTL. PROT. AGENCY, REP. NO. 420-R-99-021, ACHIEVING CLEAN AIR AND CLEAN WATER: THE REPORT OF THE BLUE RIBBON PANEL ON OXYGENATES IN GASOLINE 1 n.1 (1999) [hereinafter EPA Blue Ribbon Panel Report], available at <http://www.epa.gov/oms/consumer/fuels/oxypanel/r99021.pdf>.

45. MTBE Advanced Notice of Intent, *supra* note 23, at 16096.

46. MARYLAND DEPARTMENT OF ENVIRONMENT, MTBE Fact Sheet, http://www.mde.state.md.us/programs/Land/OilControl/FactSheetsPublications/Pages/Programs/LandPrograms/Oil_Control/FactsheetsPublications/index.aspx.

47. *Id.* (Contamination Levels over 10 ppb trigger an investigation for a public water supply. For private well, treatment is recommended for wells with levels at 20 ppb or higher. Higher levels may be asked to replace wells. MDE continues to assist local governments to develop wellhead protection programs to reduce the risk of contaminating public supplies).

48. MTBE Advanced Notice of Intent, *supra* note 23, at 16097.

ii. Possible Health Risks Attributed to MTBE

Human exposure to MTBE poses a potential threat of cancer.⁴⁹ Although no human epidemiological data exists, animal studies conducted on mice and rats have demonstrated that MTBE is carcinogenic when inhaled or consumed.⁵⁰ Additional studies on the carcinogenicity of formaldehyde and TBA, the two primary metabolites of MTBE, found that “MTBE is an animal carcinogen with the potential to cause cancer in humans.”⁵¹ Based on these studies, the EPA has concluded that MTBE is a “possible” human carcinogen and has suggested that MTBE “be regarded as posing a potential carcinogenic hazard and risk to humans.”⁵² As such, the EPA has listed MTBE on its list of air pollutants that it deems hazardous.⁵³ To date, more research is being conducted to determine future health risks on human exposure to MTBE.⁵⁴ There have been no reports of individuals having health complications as a result of exposure to MTBE,⁵⁵ which suggests that consumption of MTBE contaminated water does not affect human health, at least short-term. The health effect of long-term exposure for humans has yet to be determined.⁵⁶

While the health effects and risks are debatable and inconclusive, one thing is for certain; water contaminated with MTBE smells and tastes awful.⁵⁷ The taste and odor of MTBE contaminated water has been described as “turpentine-like,” which is very unpleasant and easily recognizable.⁵⁸ To make matters worse, a very low concentration of MTBE in water can be detected upon drinking, rendering large quantities of groundwater undrinkable.⁵⁹ In response to this issue, the EPA’s Office of Water released a non-regulatory advisory for MTBE contaminated drinking water in 1997.⁶⁰ It advised that if MTBE concentrations were kept within a range of 20-40 parts per billion that the unpleasant taste and odor could be averted.⁶¹

49. McGarity, *supra* note 3, at 287.

50. *Id.*

51. *Id.* at 288.

52. MTBE Advanced Notice of Intent, *supra* note 23, at 16098.

53. The Clean Air Act, Sec. 112 Subsection 6: Hazardous Air Pollutant, *available at* <http://www.epw.senate.gov/enlaws/cleanair.pdf> (the term “hazardous air pollutant” means any air pollutant listed pursuant to subsection (b)).

54. *Supra* note 44; *see also* Keller, Arturo et al., Health & Environmental Assessment of MTBE: Report to the Governor and Legislature of the State of California as Sponsored by SB 521.

55. MTBE Advanced Notice of Intent, *supra* note 23, at 16098.

56. *See* Keller, Arturo A., *Health and Environmental Assessment of MTBE: The California Perspective*, <http://people.eri.ucsb.edu/~keller/papers/offline/Abstract20.pdf>.

57. MTBE Advanced Notice of Intent, *supra* note 23, at 16097.

58. *Id.*

59. Williamson, *supra* note 2, at 320 (noting that MTBE can be detected at a low concentration of 5 parts per billion).

60. MTBE Advanced Notice of Intent, *supra* note 23, at 16097.

61. *Id.*

B. *Ethanol – The Primary Alternative to MTBE*

The primary alternative to MTBE for the RFG requirement is ethanol.⁶² Proponents of ethanol argue that even though ethanol, like MTBE, is soluble in water, it is easily biodegradable.⁶³ Therefore, ethanol travels in groundwater at the same rate as MTBE, but it does not persist in groundwater to the same degree as MTBE.⁶⁴

Although the replacement of MTBE with ethanol seems like a no brainer, there are numerous disadvantages to ethanol. One significant practical disadvantage of ethanol is its availability.⁶⁵ Ethanol is not manufactured in sufficient volume to meet total current national oxygenate demands.⁶⁶ Statistically speaking, to replace MTBE in gasoline, ethanol production would have to increase from 120,000 barrels per day to approximately 187,000 barrels per day.⁶⁷ Another practical problem is the inability of transporters to ship ethanol-blended gasoline in pipelines.⁶⁸ Because ethanol is very soluble in water and because water is typically found in pipelines, the ethanol tends to separate from the gasoline and dissolve into the water during transport.⁶⁹ Consequently, blenders must transport ethanol separately to distribution terminals at the end of gas pipelines for blending closer to the gasoline's final destination.⁷⁰ A final practical disadvantage of replacing MTBE with an ethanol alternative is the long-term impact on gasoline prices.⁷¹ Ethanol increases the vapor pressure of gasoline, which subsequently increases emissions. To reduce these emissions, refiners would need to blend in additional substances that are expensive and difficult to produce.⁷²

In conclusion, although ethanol seems like the best oxygenate alternative to MTBE, it presents some practical problems. These practical problems, namely cost to produce and transport, must be weighed against the potential health risks previously discussed. Therefore, residents near contaminated water sources are faced with the decision of paying higher gas prices or running the risk of drinking MTBE contaminated water.⁷³

62. McGarity, *supra* note 3, at 289.

63. *Id.*

64. *Id.*

65. MTBE Advanced Notice of Intent, *supra* note 23, at 16104-5.

66. *Id.*

67. EPA Blue Ribbon Panel, *supra* note 41, at 64.

68. MTBE Advanced Notice of Intent, *supra* note 23, at 16104.

69. *Id.* at 16105.

70. *Id.*

71. *Id.*

72. *Id.*

73. Timothy B. Wheeler, *Frosh Seeks Outside Help For Well Pollution Lawsuit*, THE BALTIMORE SUN, May 26, 2015, <http://www.baltimoresun.com/features/green/blog/bs-bz-mtbe-counsel-20150526-story.html> (Maryland replaced MTBE with ethanol in the summer of 2006).

C. *Plans of Action and Liability*

i. Plans of Action

The biggest issue facing cleanup programs is funding.⁷⁴ Specifically, it has been reported that over \$29 billion is needed to clean up MTBE contamination in the United States.⁷⁵ One way in which the EPA has addressed this issue is through the implementation of the Leaking Underground Storage Tank (LUST) Trust Fund.⁷⁶ The LUST funds are derived from federal sales tax on gasoline, and are used when no viable owner or operator can be found.⁷⁷ In essence, the LUST Fund is using the consumer's money spent on gasoline to pay for the cleanup of MTBE contaminated waters.⁷⁸ This approach, while an effective use of gasoline sales tax, is not fair for the consumer if taxes are inflated to remediate MTBE cleanup. It is not the consumer's fault, and therefore not their responsibility to remediate.

ii. Determining Liability

The leading source of MTBE groundwater contamination is believed to be leakage from deteriorated underground storage tanks.⁷⁹ This source of contamination is regulated under Subtitle IX of the Resource Conservation and Recovery Act ("RCRA").⁸⁰ The RCRA requires underground storage-tank owners to demonstrate that they have funds of at least \$1 million to cover the cost of a single leak.⁸¹ However, because of the chemical properties of MTBE, namely the "rapid and pervasive spread" of MTBE, it is difficult to attribute the source of contamination to a specific underground storage tank.⁸²

Underground storage tank leakages aside, the responsibility must fall on someone for the addition of MTBE into gasoline. For the most part, the number one suspect and target of blame is the petroleum industry.⁸³ These accusations of fault are well supported by evidence of negligence. It is widely contended that the industry knew of the emerging dangers MTBE posed to groundwater as early as 1986, yet it did nothing to discontinue its use.⁸⁴ The evidence used for support is

74. Velez, *supra* note 11, at 488.

75. Seema Metha, *MTBE Cleanup Cost \$29 Billion, Study Says*, LOS ANGELES TIMES (Oct. 14, 2001) available at <http://articles.latimes.com/2001/oct/14/local/me-57152>.

76. 26 U.S.C. § 9508 (2005).

77. 26 U.S.C. § 4081(a)(2)(B) (2005).

78. Derek Nagel, *Not Quite Off The Hook: Why There Should Be A Legislative Solution For Mtbe Contamination Without A Safe Harbor For Mtbe Producers*, 1 ENV'T'L & ENERGY L. & POL'Y J. 319, 330 (2007).

79. 42 U.S.C.A. § 6991 (10) (2005).

80. *Id.*

81. 42 U.S.C.A. § 6991b(d) (2005).

82. Nagel, *supra* note 78, at 330.

83. *Id.* at 336-37.

84. John Hinck, *Testing the Waters in MTBE Litigation*, 37 TRIAL 44 (2001).

presented through various memorandums, both written and circulated by oil refiners, regarding the dangers of MTBE.⁸⁵ The significance of these memorandums is that they undermine the industry's waiver of liability and use of a safe-harbor provision.

Congress has proposed legislation containing a safe-harbor provision to relieve the petroleum industry of liability from potential lawsuits.⁸⁶ Proponents of a safe-harbor provision contend that there are two reasons behind enacting legislation with a safe-harbor provision. The first is that the industry should not be at fault if the EPA mandates the addition of MTBE into gasoline.⁸⁷ In other words, the petroleum industry is simply following EPA regulations so they should not be the entity responsible for bearing the financial burden of remediating MTBE contamination. Second, a safe-harbor provision would shield the petroleum industry from frivolous lawsuits.⁸⁸ Conversely, opponents of a safe-harbor privilege contend that passing such legislation would set a dangerous precedent whereby industries would not be penalized for making misrepresentations when acting in compliance with a government agency's regulation.⁸⁹

In sum, determining liability is difficult because the chemical properties of MTBE hinder the ability to locate the origin of contamination. Nevertheless, because the petroleum industry knows of the dangers of MTBE and have neglected to inform lawmakers, an easy case could be made against the petroleum industry.

iii. Theories of Liability

There are multiple product liability theories that states have established in filing lawsuits against the petroleum industry for their role in adding MTBE.⁹⁰ Under products liability theory, a manufacturer has a duty to warn against latent dangers resulting from foreseeable uses of its product of which it knew or should have known.⁹¹ Moreover, in order to hold a producer, manufacturer, or seller liable for injury caused by a particular product, there must be proof that the defendant being sued is the entity that actually was in some way responsible for the product.⁹² As it relates to this issue however, because identifying a specific defendant is difficult, collective theories of liability have

85. *Id.* at 46.

86. Energy Policy Act of 2005, H.R. 6, 109th Cong. § 1502 (2005).

87. *Id.*

88. Nagel, *supra* note 78, at 343.

89. *Id.* at 334.

90. *In re Methyl Tertiary Butyl Ether ("MTBE") Prod. Liab. Litig.*, 175 F.Supp. 2d 593 (S.D.N.Y. 2001) (including (1) market-share liability; (2) alternative-liability theory of collective liability; (3) enterprise liability theory of collective liability; (4) joint and several liability; and (5) strict liability theory).

91. *Id.* at 625.

92. *Id.* at 618-19.

successfully been invoked by states to impose liability upon all of the defendants.⁹³

IV. Conclusion

Although the State of Maryland has replaced MTBE with ethanol, considering the chemical properties detailed above, MTBE will continue to reside in our drinking waters. Its high solubility and low biodegradability makes MTBE difficult to remediate. While its oxygenating properties have been proven to be the best additive for engine combustion and reduction of harmful emissions, states, including Maryland, have banned MTBE use because of its ability to contaminate water sources.

Maryland's step to ban the use of MTBE was significant, but there is still more work that needs to be done to remediate this issue. Therefore, it is necessary that the state legislature devise a plan to clean up and extract MTBE from contaminated wells and underground water supplies. Furthermore, some action, under collective liability theories, needs to be taken against the oil refiners who add MTBE to gasoline knowing the potential dangers it presents. The human health effects of exposure to MTBE are still unknown, so there is a possibility that long-term exposure will have residual effects on human health. In sum, let's kick out "the fastest growing chemical in the world"⁹⁴ as quickly as we let it in.

93. *Id.* at 620-23 (including New York, California, Florida, and Illinois).

94. *See supra* note 40.