is some disagreement among air quality studies as to how much the use of MTBE in gasoline reduces automobile air emissions.
- ALTERNATIVE OXYGENATES: If other oxygenates are added to gasoline in the place of MTBE to lower vehicle emissions, the cost and currently limited availability of these alternatives, such as ethanol, are likely to increase the cost of gasoline. In addition, replacements for MTBE must be evaluated carefully for their potential health effects and their fate and transport characteristics in the subsurface."

This introductory material is followed by seven more chapters entitled as follows:

- History and overview of fuel oxygenates and MTBE
- Physical and chemical properties of MTBE
- Toxicity, health effects, and taste and odor thresholds of MTBE
- Transport and fate of MTBE in the environment
- Detection and treatment of MTBE in soil and groundwater
- MTBE: a perspective on environmental policy
- Conclusions and recommendations

The main sources of MTBE in the environment are leaking (gasoline) underground storage tanks (USTs), pipelines, and refueling facilities. Such leaks can seriously contaminate drinking water sources. For example, MTBE contamination from several leaking USTs has resulted in the shutdown of Santa Monica's (California) water supply wells and caused high cleanup costs.

The chapter that interested me most was the sixth chapter, entitled "Detection and treatment of MTBE in soil and groundwater." Analytical methods for detecting MTBE in (drinking) water, (ambient) air, body fluids and soil vapor are described.

Following this chapter's analytical section is the "Treatment of MTBE in groundwater." Discussed are MTBEs removed by activated carbon adsorption, air stripping, and chemical oxidation using Fenton's reagent. The final paragraph of this chapter is not encouraging (lending examples to the conclusion that MTBEs use should be avoided): "The results of the treatability studies indicate that MTBE is difficult and costly to remove from groundwater, when compared to the traditional treatment costs and difficulties experienced with the removal of hydrocarbons found in gasoline, such as benzene. If cost were no object, there appears to be potential for use of oxidants, air strippers, and carbon adsorption for the aboveground treatment."

The bulk of the book (130 pages) is given to Appendices:

- Appendix A: Glossary of technical terms and acronyms used in this book
- Appendix B: Conversions for international system (SI metric) and United States units
- Appendix C: Material safety data sheets: MTBE and gasoline
- Appendix D: Summary of MTBE state-by-state cleanup standards
- Appendix E: Geologic principles and MTBE
- Appendix F: MTBE: subsurface investigation and cleanup
- Appendix G: Synthesis, properties, and environmental fate of MTBE and oxygenate chemicals
- Appendix H: Plume geometries for subsurface concentrations of MTBE
- Appendix I: Toxicity of MTBE: human health risk calculations

- Appendix J: MTBE web sites
- Appendix K: Summary of MTBE remediation technologies

The final section is a 22 page (300 item) list of papers, books, etc.

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Trace Elements in Soil: Bioavailability, Flux, and Transfer
I.K. Iskandar, M.B. Kirkham (Eds.), Lewis Publishers, Boca Raton, FL, USA, 2000, 287 pp., US$ 89.95, ISBN 1-56670-507-X

Trace elements in soil, the topic of this excellent research report, have taken a new importance in recent years as chemicals, sewage sludge and past disposal activities have focused attention on them. It is a topic in which I have a personal interest, having done research on sewage sludge metal availability myself.

It thus is no surprise that I quote from Chapter 8, "Accumulation, Redistribution, Transport and Bioavailability of Heavy Metals in Waste-Amended Soils," where researchers F.X. Han, W.L. Kingery and H.M. Selim of Mississippi State University wrote:

> Heavy metals accumulate in agricultural soils amended with various agricultural and industrial wastes. There is some evidence of metal transport in long-term waste-amended soils, but most data show limited mobility of heavy metals in waste-amended soil profiles. The bioavailability of heavy metals and their mobility in soils are largely determined by their distribution among various solid-phase components. Heavy metals in soils amended with various wastes are redistributed and transferred with time from the labile forms to the more stable forms, and the redistribution processes are dependent upon the source and process of waste, level of waste input, nature of metal, time scale, and soil properties, such as pH, Eh, texture, and moisture regime.

The above quote is from only one chapter of 14 in the text written by 45 contributors from 11 different countries. The material focuses on the impact of industrial development and past disposal practices on the concentrations and fate of trace elements as important environmental contaminants in the atmosphere and aquatic and terrestrial systems.

The book is divided into two sections:

1. Bioavailability of trace elements; five chapters; 87 pages.
2. Fluxes and Transfer Partitioning of Trace Elements; nine chapters; 190 pages.

Regarding bioavailability, the editor wrote

> Bioavailability is a fundamental aspect in organisms for assimilation of nutrients and contaminant compounds, both inorganic and organic. Yet, it has remained a complex process to understand for nutritionists, toxicologists, environmental scientists, policy makers, and regulators. The parameters that measure or predict bioavailability remain diffused, inconsistent, and, at times, unreliable due to variations in organisms (i.e. species,