



# MtBE



# PROJECT



Pete Wilson  
Governor

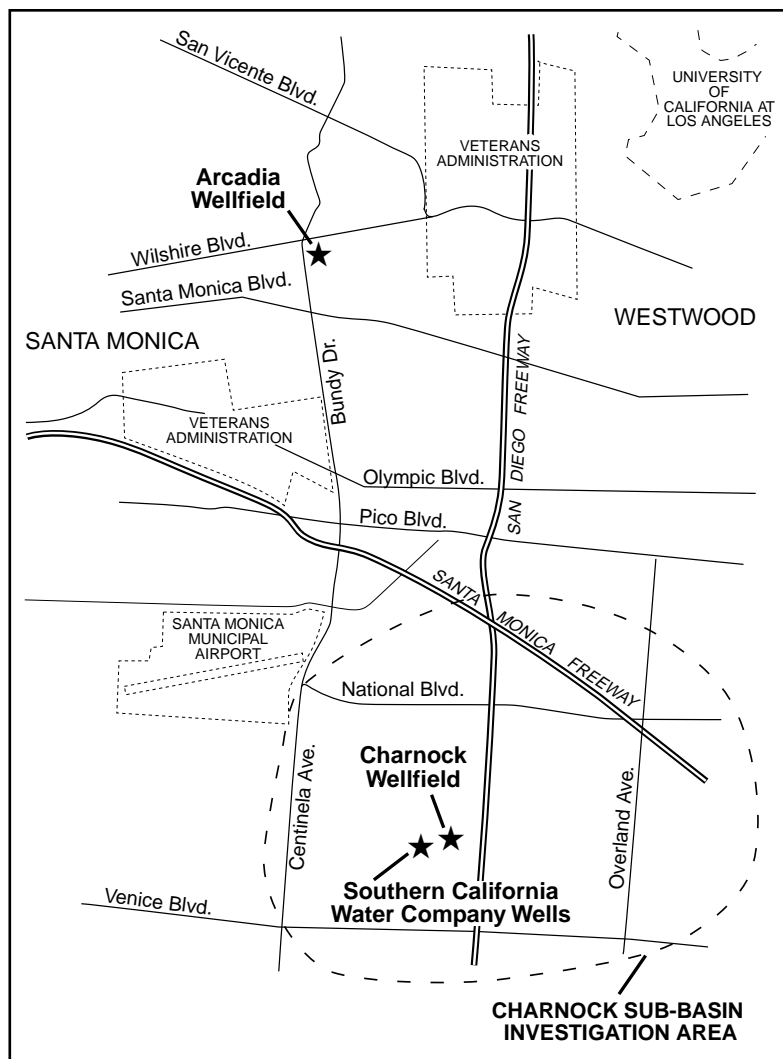
Los Angeles Regional Water Quality Control Board  
U. S. Environmental Protection Agency • Region 9 • July 1998

## Santa Monica, CA

This fact sheet is being distributed in the City of Santa Monica and nearby sections of the City of Los Angeles and Culver City to provide information on the gasoline additive MtBE and its impact on Santa Monica's and Southern California Water Company's drinking water wellfields. It summarizes the efforts being made to address the MtBE problem in these areas. Developed by the Los Angeles Regional Water Quality Control Board (Regional Board) and the U.S. Environmental Protection Agency (EPA), this informational fact sheet was designed to give a brief overview of the current situation and future activities as well as provide a list of people who can be contacted for further information.

## What is MtBE?

Methyl tertiary butyl ether (MtBE) is a gasoline additive that boosts the oxygen content in fuel (an oxygenate), resulting in less air-polluting carbon monoxide being released from vehicle exhaust systems. It has been used as an octane booster in the United States since the late 1970s. However, usage increased in the 1990s as a result of federal Clean Air Act Amendment requirements for reformulated gasoline. Reformulated gasoline was designed to not only reduce carbon monoxide but also lower ozone and smog by reducing components such as benzene (a known human carcinogen) and sulfur. Federal law requires that reformulated gasoline, which includes oxygenates such as MtBE, be sold throughout the year in regions with high smog levels such as Southern California. In recognition of the clean air benefits derived from its use, reformulated gasoline has been in use year-round throughout the State since 1996.



Location map showing Arcadia Wellfield and Charnock Sub-basin Investigation Area

## Why is MtBE used?

Although federal requirements for oxygenates do not specify the use of MtBE, it has become the additive of choice in most regions of the country requiring oxygenated fuel. Some of the reasons for MtBE's preferred usage are: it is relatively inexpensive to produce, it has a high octane rating, it has a low evaporation rate



and it can readily mix with other gasoline components. Additionally, MtBE has a dilution effect on undesirable components (benzene and other aromatics, sulfur and olefins) and can be pumped through existing gasoline distribution lines.

However, the chemical properties of MtBE, an ether, are significantly different from those of other typically-investigated constituents found in gasoline (benzene, toluene, ethylbenzene and xylenes-- otherwise known as BTEX). One main difference is that MtBE travels much faster and farther through soil and groundwater than other components of gasoline. And, although quite volatile in its pure form (it vaporizes easily), MtBE, unlike BTEX, is not very volatile once mixed with groundwater. Another difference from other gasoline components is that MtBE does not biodegrade readily. These are some of the reasons MtBE has become a problem in the groundwater of the West Los Angeles/Culver City areas.

### **How did MtBE get into Santa Monica's drinking water and other California water supplies?**

Drinking water in California comes from either groundwater or surface water. The primary source of MtBE contamination in groundwater is from leaking underground storage tanks (USTs). Other sources of pollution include above-ground storage tanks and pipelines. Recreational boating is thought to be the primary source of MtBE in surface water (rivers, lakes or reservoirs).

### **Where does Santa Monica's water supply come from?**

A major portion of Santa Monica's water has come from groundwater supplies. Seven production wells in two of the City's wellfields have been contaminated with MtBE (see map front page). **Water from these two wellfields is not currently being served as drinking water to residents.** Drinking water for Santa Monica

is coming from other Santa Monica wells and the Metropolitan Water District of Southern California (MWD). MWD's water comes from the Colorado River and/or Sierra Nevada snowmelt. **All drinking water presently being supplied to Santa Monica is clean and safe.** Some of the companies who may be responsible for the MtBE pollution are currently paying for all of Santa Monica's replacement water.

### **What is being done to solve the MtBE problem in the Santa Monica area?**

There are two distinct areas affected by MtBE that are being addressed on a site-specific basis. These are the Arcadia Wellfield and the Charnock Sub-basin.

#### *Arcadia Wellfield Area*

The **Arcadia Wellfield**, located in West Los Angeles, has two domestic supply production wells. This wellfield has been affected by MtBE from underground gasoline storage tank system leaks at a former gas station at Wilshire Boulevard and Bundy Drive. MtBE has been found in shallow groundwater monitoring wells near the drinking water production wells at concentrations up to 100,000 micrograms per liter (parts per billion or ppb). During August 1995, MtBE pollution was detected by the City in water samples obtained from production wells in the Arcadia Wellfield at concentrations less than 20 ppb. Arcadia Well No. 5 was shut down by the City on August 27, 1996; the highest concentration of MtBE detected in this well was 86.5 ppb. Arcadia Well No. 4 was shut down by the City on October 17, 1996; the highest concentration of MtBE detected in this well was 19.6 ppb. The City previously operated the Arcadia Wellfield with an average pumping rate of approximately 250 gallons per minute (gpm) but has since ceased all production as a result of the MtBE pollution. The reported maximum capacity of the Arcadia Wellfield (Arcadia Wells No. 4 and 5) is approximately 600 gpm.

Under the regulatory authority of the Regional Board and with assistance from EPA, the responsible party, Mobil Oil, was directed to investigate and clean up this area. However, due to compliance issues, the Regional Board issued a Cleanup and Abatement Order directing Mobil to conduct additional investigations and cleanup on an expedited schedule. These activities have been ongoing since late 1996. Following demolition of the former gas station, excavation of approximately 2,000 cubic yards of gasoline-containing soils and the removal of all underground storage tanks and lines, cleanup crews are now working to control and remove the remaining sources of contaminated soil and groundwater from the surrounding area. A low-flow groundwater pump and treat system was installed in October 1997 to control further migration of contaminated groundwater. This interim cleanup system extracts contaminated groundwater and filters it through three carbon beds which remove the MtBE before the water is discharged into the sanitary sewer. A final technical report containing the results of all assessment work completed at the Arcadia Wellfield was submitted to the Regional Board and EPA on June 18, 1998. A Remedial Action Plan and Treatment Feasibility Study is due by July 21, 1998. It is expected that complete cleanup of this area will take several years.

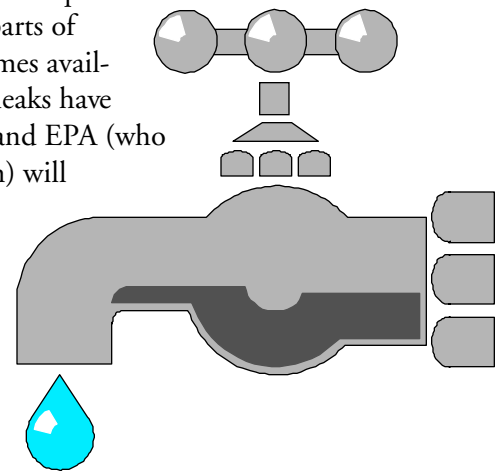
### Charnock Sub-basin Investigation Area

The second area affected by MtBE is known as the Charnock Sub-basin, located in the Mar Vista area of West Los Angeles. The Charnock Sub-basin Investigation Area includes two municipal production wellfields. The Charnock Wellfield is operated by the City of Santa Monica and includes five production wells; a second wellfield, operated by the Southern California Water Company, has two production wells. MtBE has been found in drinking water wells at the Charnock Wellfield at concentrations up to 610 ppb (Well No. 19 on March 25, 1996). MtBE has not been detected in production wells oper-

ated by the Southern California Water Company. However, both wellfields were shut down to control the potential spread of MtBE in the Charnock Sub-basin.

A thorough area-wide investigation is currently underway in the Charnock Sub-basin to determine the sources contributing to the groundwater contamination. Potential sources include 26 underground storage tank sites and two intrastate gasoline pipelines. Sites of current and former gasoline service stations within the Charnock Investigation Area are being investigated for leaking underground tank systems that would result in contamination of soil and/or groundwater. Oil companies that operate intrastate petroleum pipelines (Shell and Chevron) are checking them to determine if they are leaking and possibly contributing to the groundwater contamination problem. Pipeline testing completed to date does not show that this is the case. Monitoring wells and borings have been installed to characterize the multi-aquifer groundwater basin in certain parts of this area. As information becomes available on where MtBE gasoline leaks have occurred, the Regional Board and EPA (who are overseeing the investigation) will then direct the responsible parties to remove and/or repair any problem tank systems or petroleum pipelines; they will also be directed to clean up any contaminated soil and groundwater that may be affecting the drinking water wells.

While there are many companies that may be responsible for the MtBE contamination in the Charnock area, three of them (Shell, Chevron and Exxon) have voluntarily been conducting pilot tests of treatment technologies which may be capable of removing the contamination from the groundwater. These companies have proposed constructing a treatment plant so that the wellfield may resume providing drinking water as soon as possible. However, the companies must first



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propose a specific plan to be reviewed by the agencies and other interested parties. In addition, water will only be served to the public if a permit is granted by the California Department of Health Services. Permitting, design, construction and testing processes are likely to take one to two years.

### **What is California doing about underground storage tanks?**

The State of California has developed an aggressive underground storage tank replacement program to avoid future fuel leaks. State regulations require that all underground storage tanks installed before 1984 be removed, replaced or upgraded to meet current standards by December 22, 1998. About 52% of the approximately 60,000 active USTs in California now meet State upgrade requirements.

### **At what level is MtBE harmful in drinking water?**

A Maximum Contaminant Level (the maximum level allowable for a contaminant in drinking water) has not been set by either EPA or the State of California Department of Health Services (DHS) for MtBE. There are no studies of effects to humans from long-term exposure to MtBE. Studies available for hazard assessment have primarily involved laboratory animals.

EPA's current Drinking Water Advisory recommends a level of 20 to 40 ppb or below. These levels are thought to provide a large margin of safety from potential toxic effects of MtBE and minimize concerns related to taste and odor of drinking water for the average consumer. The 20 to 40 ppb range is 20,000 to 100,000 times lower than concentrations associated with observed cancer and noncancer effects in animals. However, existing data do not allow for accurate estimation of cancer risk at low levels of exposure. When adequate data become available, EPA's Office of Water will publish another Advisory that will include such quantitative estimates for health risks.

The State of California Office of Environmental Health Hazard Assessment (OEHHA) has issued an Interim Action Level for MtBE in drinking water at 35 ppb. This is similar to a "health advisory" level which, if exceeded, advises the water supplier to find another source of drinking water or provide public notification. Recently, OEHHA released for public review and comment a Public Health Goal (PHG) of 14 ppb for MtBE in drinking water. If adopted, this health-based number would form the basis for a primary drinking water standard in California. The taste and odor threshold, or point of sensory detection, for MtBE in water is variable and reportedly ranges from 2.5 ppb to 134 ppb.

On October 8, 1997, Governor Pete Wilson signed two MtBE-related bills. Assembly Bill 592 (Kuehl), in part, requires DHS to adopt primary and secondary drinking water standards for MtBE. The secondary standard will be adopted by DHS this Fall and must not exceed what is termed a "consumer acceptance level" for MtBE. The primary drinking water standard for MtBE must be established by DHS by July 1, 1999.

Senate Bill 521 (Mountjoy) enacted the MtBE and Environmental Protection Act of 1997. This bill, in part, requires collection and reporting of MtBE data (and other oxygenates) to water purveyors throughout the state on a quarterly basis. It also requires a study by the University of California to assess the health effects and environmental risk and benefit of MtBE and other oxygenates. The bill also prohibits UST closures without MtBE testing data. In addition, no public water systems or their customers will be responsible for remediation or treatment costs.

### **Research**

Additional research on the health effects of MtBE and related environmental issues is necessary, and this is being conducted by EPA, other federal and state agencies and private entities. Research projects include work on environmental monitoring/occurrence, source characterization, fate and transport, exposure,

toxicity and remediation. EPA's Office of Water issued the Drinking Water Advisory on MtBE to provide information and guidance because no national regulations currently exist. To obtain a copy of the Advisory (EPA-822-F-97-009), call the National Center for Environmental Publications and Information at (800) 490-9198.

## Regulatory Authority

The Regional Board and EPA are using separate authorities to address the MtBE pollution problems impacting the Arcadia Wellfield and the Charnock Sub-basin. The Regional Board is using authority under the Porter-Cologne Water Quality Control Act, Section 13267. EPA is using authority under the Safe Drinking Water Act, Section 1431, 42 U.S.C. 300i and

the Resource Conservation and Recovery Act, Section 7003, 42 U.S.C. Section 6973.

The Regional Board and EPA entered into a Memorandum of Understanding on April 24, 1997 to address the impact of MtBE contamination on Santa Monica's drinking water wellfields. The goal of this cooperative effort between both agencies is to promptly restore and protect the use of the valuable water resources at both wellfields. ■

## FOR MORE INFORMATION

The following agencies and personnel are directly involved in the Santa Monica MtBE project. If you have questions or concerns about the situation, please do not hesitate to contact any of us:

### Los Angeles Regional Water Quality Control Board

101 Centre Plaza Drive, Monterey Park, CA 91754

Project Manager: David Bacharowski (213) 266-7546  
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Public Relations: Karen Caesar (213) 266-7569  
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### Southern California Water Company

Denise Kruger  
P.O. Box 9016  
San Dimas, CA 91773  
(909) 394-3600

### U.S. Environmental Protection Agency, Region 9

75 Hawthorne St., San Francisco, CA 94105

Project Manager: Steven C. Linder, P.E. (415) 744-2036  
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### Community Involvement

Coordinator: Vicki Rosen (415) 744-2187  
Rosen.Vicki@epamail.epa.gov

You may also call the above EPA staff on EPA's  
toll-free line: (800) 231-3075

### Additional Information Available on the Internet at these WEB Sites

Regional Board: <http://www.swrcb.ca.gov/~rwqcb4/ust.htm>

State Board: <http://swrcb.ca.gov>

Calif. Dept. of Health Services: <http://www.dhs.cahwnet.gov/org/ps/ddwem/ddwemindex.htm>

MtBE Risk Assessment: <http://www.calepa.cahwnet.gov/oehha>

EPA: <http://www.epa.gov>

Health Advisory: <http://www.epa.gov/ost/tools/MtBEaa.pdf>

Research Strategy: <http://www.epa.gov/ncea/oxywater.htm>

Air Research: <http://www.epa.gov/omswww/omsfuels.htm>

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