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METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

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May 19, 1997

To: Board of Directors (Special Committee on Water Quality, Desalination, and Environmental Compliance--Information)
(Engineering and Operations Committee--Information)

From: *for* General Manager

Edward J. Messing

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Director of Water Quality

Mark Beuhler

Subject: Methyl Tert-Butyl Ether (MTBE) Action Plan Update

RECOMMENDATION

For information only.

EXECUTIVE SUMMARY

Methyl tert-butyl ether (MTBE) is a major component in gasoline, and both groundwater and surface drinking water sources have been contaminated with MTBE. To address the many emerging issues related to MTBE, Metropolitan initiated an MTBE Action Plan in February, 1997. This letter will update your Board on MTBE Action Plan activities, especially regarding plans to seek funding from the petroleum and petrochemical industries and solicitation of partners to financially leverage our activities.

DETAILED REPORT

The use of MTBE in gasoline was approved by the U.S. Environmental Protection Agency as a means to improve air quality, but it provides a contamination threat to groundwater and surface water drinking water supplies. Groundwater contamination is most commonly associated with leaking underground fuel tanks (LUFTs) and petroleum product pipelines. Surface water contamination in our service area is attributed to exhaust emissions from recreational water craft and poor fuel handling practices. In addition, little information is available on treatment technologies to remove MTBE at low to moderate concentrations (<1,000 ug/L) in water.

MTBE is being addressed by Metropolitan and our Member Agencies on several fronts as summarized below.

Monitoring

Metropolitan started monitoring local surface water supplies for MTBE in June of 1996 and will continue through 1997 to better characterize the typical concentrations and seasonality of MTBE in surface water. MTBE concentrations in Lake Perris started to increase in March, 1997, and levels near the water surface at the outlet tower have reached 17 ug/L as of May, 1997. MTBE levels at Lakes Havasu, Skinner, Mathews, Castaic, and Silverwood near their respective outlet structures are less than 5 ug/L. We will be especially interested in the MTBE levels observed during the summer of 1997. To ensure a statewide database on MTBE in reservoirs, Metropolitan is working with other utilities to collect a uniform MTBE occurrence database this summer for use in legislative and regulatory input.

Taste and Odor

Metropolitan is conducting flavor profile analyses to determine the taste and odor threshold and the characteristics of the taste and odor. These analyses are in progress, and the threshold level should be established within the next six weeks. Also, these taste and odor studies are being coordinated with similar studies by other California water utilities to maximize their impact on MTBE legislation and regulations.

Legislative and Regulatory

Five bills have been introduced in the California State Legislature that are directly or indirectly related to MTBE. A summary of the bills and their status was the subject of a separate letter to your Board dated May 6, 1997. Metropolitan is working with its Member Agencies and the Association of California Water Agencies (ACWA) on language for these bills to ensure a uniform approach by the water community on MTBE legislation to the extent possible.

Reservoir Modeling

Professor Michael Anderson at the University of California, Riverside is developing a mathematical model to predict the concentrations of MTBE in the Eastside Reservoir. Preliminary model results have been submitted for Metropolitan's review and will be presented to the Board at a later date.

Groundwater Mapping and Database

Metropolitan staff will be performing a regional assessment of groundwater resource vulnerability to MTBE impacts. This will include a mapping of MTBE sources, such as

petroleum pipelines and LUFTs, and the location of drinking water production wells. We will be working with our Member Agencies in gathering MTBE occurrence data and other local information into a database. It is anticipated that this effort will require outside consultant support, and the cost and schedule are currently being determined. The funding mechanism for the consultant will have to be determined.

Treatment Technology

The state of knowledge regarding effective treatment technologies for MTBE removal from drinking water is limited. The City of Santa Monica (City), whose groundwater supplies have been shutdown due to MTBE contamination, has developed a program to evaluate treatment technologies on bench and pilot scales. The treatments to be tested include the following: (1) adsorption using resins and granular activated carbon; (2) advanced oxidation processes such as ozone, hydrogen peroxide, and ultraviolet light; (3) reverse osmosis; (4) biologically activated carbon; (5) air stripper off-gas treatment; and (6) combinations of these technologies.

Metropolitan is working closely with the City on development of the experimental plan. Metropolitan's facilities will be used to conduct the research efforts in advanced oxidation processes and some of the reverse osmosis technologies. Metropolitan's surface waters will also be tested along with the City's well water to estimate the removal efficiency of the treatment methods, their cost effectiveness, and possible by-products.

The treatment evaluations are envisioned to proceed in two phases. The first phase will focus on Santa Monica's and Metropolitan's waters. This research will be fast-tracked with completion expected in about 18 months. Because MTBE is a potential contamination threat to other Member Agencies using groundwater, the first phase will also consider the applicability of treatment technologies to manifolded groundwater systems and to individual wellhead treatment. The second phase of testing will be broadened into a research partnership to include other ground and surface waters within Southern California, Northern California, and possibly other locations across the nation. This phase is expected to extend over two to three years if external funding can be obtained.

Funding Strategy

The City of Santa Monica and Metropolitan have approached the petroleum and petrochemical industry representatives for funding of the treatment study effort. The rationale for funding from the petroleum representatives is that because MTBE contamination results solely from petrochemical handling and usage, the water community should not have to pay for the cost of developing treatment options. Petroleum industry representatives, such as the Western States Petroleum Association, the Oxygenated Fuels Association, the American Petroleum Institute, and possibly individual companies will be asked for their direct funding participation. So far, their response to the concept of funding a research partnership has been

encouraging. The use of a neutral third-party research organization, such as the National Water Research Institute, to handle the project administration is also strongly recommended. Other potential partners include Orange County Water District, Northern California water utilities, AWWA Research Foundation, ACWA, and others.

The estimated timeline and costs for the MTBE Action Plan are shown in Figure 1 and Table 1, respectively. The estimated costs of budgeted Metropolitan activities for the Action Plan is about \$1.4 million over the next 2½ years. Expenses for FY 1996/97 and FY1997/98 have already been budgeted; however, expenses for FY 1998/99 would be subjected to Board approval of that year's budget. Staff efforts will be tracked as a separate cost account to facilitate potential reimbursement of project cost. Treatment evaluation costs for Santa Monica's water and possibly other potential partners may range between \$1.5 to 5 million, all of which will depend on obtaining outside funding.

JMB/MDB/mi

Attachments

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Figure 1 Schedule for the MTBE Action Plan

MTBEACT-PRE E/MTBE 5/20/97

Objective	Tasks	1996	1997	1998
General	Meetings, Presentations, Task Force, Literature Reviews, Board Letters	[Shaded bar spanning from start of 1996 to end of 1998]		
	MTBE Occurrence in Sourcewater Resvrs	[Shaded bar spanning from start of 1996 to end of 1998]		
Monitoring Program	Model MTBE Occurrence in Eastside Res		[Shaded bar in 1997]	
	Threshold Odor Number Test		[Shaded bar in 1996]	
Taste and Odor	Threshold Determination		[Shaded bar in 1997]	
	Characteristic Identification		[Shaded bar in 1997]	
	Objection Level Determination		[Shaded bar in 1997]	
	Statistical Analysis & Report			[Shaded bar in 1998]
	Monitor Bills and Amendments			[Shaded bar spanning from start of 1997 to end of 1998]
Legislative and Regulatory	Delegation Visits		[Shaded bar in 1997]	
	Board Presentation		[Shaded bar in 1997]	
	Regulatory Input		[Shaded bar in 1997 labeled "USEPA Letter"]	[Shaded bar in 1998 labeled "Primary and Secondary Standard Input"]
	Assess Impacts	[Shaded bar spanning from start of 1996 to end of 1998]		
Groundwater Impacts and MTBE Sources	Collect Data from CDHS & Member Agys	[Shaded bar spanning from start of 1996 to end of 1998]		
	Mapping and Database Preparation		[Shaded bar spanning from start of 1997 to end of 1998]	
	Preliminary AOP Study		[Shaded bar in 1997]	
Treatment Evaluations	Phase I Study with Santa Monica		[Shaded bar spanning from start of 1997 to end of 1998]	
	Phase II Study/Research Partnership			[Shaded bar labeled "Through 1999/2000"]

Table 1
MTBE Action Plan Current Budgeted Costs

MTBECST-PRE E.MTBE 5/20/97

Objective	1996/97	1997/98	1998/99	Total
General	\$42,000	\$64,000	\$30,000	\$136,000
MWD Monitoring Program	\$206,000	\$201,000	\$201,000	\$608,000
Taste and Odor	\$33,000	\$28,000	--	\$61,000
Legislative/Regulatory	\$14,000	\$28,000	\$6,000	\$48,000
Groundwater Impacts¹	\$20,000	\$40,000	\$40,000	\$100,000
Treatment²	\$100,000	\$360,000³	Note 3	\$460,000
Total	\$415,000	\$721,000	\$277,000	\$1,413,000

1. Funds for database development are not budgeted.
2. Includes \$130,000 for in kind treatment evaluation services to the city of Santa Monica.
3. Additional treatment process evaluation costs will depend on receipt of outside funding.