

December 22, 1998

**To:** Board of Directors (Engineering and Operations Committee--Action)

**From:** General Manager \_\_\_\_\_

**Submitted by:** Chief Engineer \_\_\_\_\_

Director of Water Quality \_\_\_\_\_

**Subject:** Authorize Types of Motorboats on the Reservoir of the Eastside Reservoir Project

**RECOMMENDATION**

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It is recommended that the Board of Directors approve motorboating operations on the reservoir that ensure that emissions of methyl tertiary-butyl ether (MTBE) into the water will be less than reportable levels (no more than 1.5 parts per billion) and provide that only MTBE-free fuel at the Eastside Reservoir will be sold and requiring its use for all motorboats.

**EXECUTIVE SUMMARY**

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This Board Letter responds to the Board’s action on October 13, 1998, directing staff to study and report on motorboating on the Eastside Reservoir with respect to the presence of MTBE in drinking water.

The California Department of Health Services (CDHS) has adopted a secondary (aesthetic) standard for MTBE that will limit its concentration in drinking water to 5 parts per billion (ppb). Expectations are that CDHS’s secondary standard will go into effect in mid February 1999. The state-required detection limit for reporting purposes is 3 ppb. Metropolitan will accept no reportable MTBE in the Eastside Reservoir and has therefore set the limit at 1.5 ppb to make sure that we and our member agencies do not have to inform our consumers annually that MTBE, a potential carcinogen, is in our water. The 1.5 ppb level is also similar to background levels of MTBE observed in our Colorado River source water. The primary concern is to limit water quality degradation due to boating activity.

On November 10, 1997, your Board approved the draft Recreation Master Plan, which included significant boating on the reservoir. Independent economic projections—based on boating demand surveys, reservoir characteristics, and experiences at other reservoirs in the state—are that about 131,000 annual motorboats on the reservoir will ensure a profitable reservoir boating enterprise.

Metropolitan is now applying for \$22 million in grants and loans from the California Department of Boating and Waterways (DBAW) to construct the necessary marinas and launching ramps.

The outlook is favorable. A significant reduction in the number of boats on the reservoir would jeopardize DBAW's approval of the grants and loans, since DBAW must determine that Metropolitan has an economically viable marina and boat-launching enterprise to repay the loans. Not providing for boating on the reservoir would reverse public commitments made by the Board since 1991.<sup>1</sup>

Staff examined and evaluated five options to limit emissions of MTBE into the water to no more than 1.5 ppb. The table below summarizes the five options and their ability to remain below the 1.5 ppb MTBE level and satisfy economic objectives.

### Motorboating Options

OPTIONS	Stay Below 1.5 ppb MTBE	Satisfy Economic Objectives
<b>1</b> Sell only MTBE-free fuel at the reservoir and require its use in all motorboats. <b>Recommended Option</b>	Yes	Yes
<b>2</b> Allow an unrestricted boating engine mix.	No	No
<b>3</b> Prohibit two-stroke carbureted (conventional) engines, but permit more efficient direct-injection two-stroke engines and four-stroke inboard engines.	Yes	No
<b>4</b> Prohibit all two-stroke engines, carbureted and direct injection, but permit four-stroke inboard engines.	Yes	No
<b>5</b> Prohibit the use of all gasoline-powered boating.	Yes	No

**Option 1, sell only MTBE-free fuel at the reservoir and require its use in all motorboats,** is recommended because it is the only option that meets the MTBE goal and maintains an economically viable operation. Implementing this option will require either obtaining alternative oxygenated fuels or obtaining a variance from the U.S. Environmental Protection Agency (USEPA) to use non-oxygenated fuel.

Over the next few years (perhaps before the Eastside Reservoir is open to recreation), MTBE is likely to be banned from gasoline sold in California, thereby eliminating the MTBE problem in California's drinking water reservoirs. In addition, state and federal emission standards for new marine engines will, over time, significantly reduce the MTBE problem. This report to the Board, however, only addresses the potential problem as it exists today for the Eastside Reservoir. Depending on future regulatory and legislative action, the Board may want to later reassess the policy it establishes as a result of this Board letter.

<sup>1</sup> Starting in October 1991 with Board certification of the project's Final Environmental Impact Report and continuing with Board approval of the draft Recreation Master Plan in November 1997.

## DETAILED REPORT

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### Background

Starting in 1997, the discovery of MTBE in groundwater aquifers and surface waters emerged as a major public health concern resulting in new regulations and proposals for additional action. An oxygenate used as an additive in most of California's reformulated gasoline, MTBE makes gasoline burn more cleanly and completely—thereby emitting less carbon monoxide into the air. The California Air Resources Board (CARB) requires the use of reformulated gasoline with an oxygenate in non-winter months in air quality attainment areas and year-round in non-attainment areas (that include most of Southern California). MTBE has become refineries' additive of choice. Other oxygenates that might be used instead of MTBE include other ethers and ethanol.

When present at certain levels in drinking water, MTBE may cause objectionable taste and odor. Over the years, MTBE detection levels have ranged from 2.5 to 680 ppb for taste and 2 to 19 ppb for odor. Recent studies show that substantial numbers of individuals can detect odor from MTBE at 5 ppb.

MTBE in water responds very differently from other emitted gasoline components, and treatment to remove MTBE is both costly and inefficient. Other gasoline components,<sup>2</sup> compared with MTBE, are less water soluble and more volatile and would most likely remain near the water surface and dissipate rapidly.

Studies to date conclude that emissions from boats powered by carbureted two-stroke gasoline engines are the major contributors of MTBE to lakes and reservoirs. They discharge as much as 25 to 30 percent unburned fuel into the water.

### Regulatory Activity

The California Department of Health Services (CDHS) has adopted a secondary drinking water standard for MTBE of 5.0 ppb. This standard is based on the taste and odor impacts of MTBE. A primary health-based standard is currently being developed. More detailed information of MTBE regulatory activity is provided in the Board letter titled "MTBE Update", dated December 15, 1998.

If MTBE is present in our drinking water at levels above 3.0 ppb, it must be reported annually by Metropolitan and our member agencies in the recently required Consumer Confidence Reports.

SEPA adopted exhaust emission standards for spark-ignition marine engines<sup>3</sup> in 1996, to be phased in between 1998 and the model year 2006. On December 11, 1998, the California Air Resources Board (CARB) adopted more stringent emission standards and test procedures for new spark-ignited marine engines to be manufactured beginning in 2001. The standards will be phased in over the next ten years and be more restrictive than the USEPA standards. While the primary purpose of the new standards is to reduce emissions from marine engines into the air, the effect will also be to reduce emissions of unburned fuel into the water. The benefit to air and water quality will be gradual, since the increasingly stringent standards apply only to new

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<sup>2</sup> For example: benzene, toluene, ethylbenzene, and xylenes.

<sup>3</sup> Spark-ignition outboard engines include carbureted, fuel injected and direct-injected two-stroke, and carbureted and fuel injected four-stroke configurations.

manufactured engines. In response to the new emission standards, marine engine manufacturers are now selling “clean” four-stroke engines and new “clean” two-stroke engines with direct fuel injection (as opposed to carburetion).

**Other MTBE Control Efforts.** The *MTBE Public Health and Environmental Protection Act of 1997* (SB 521) directed the University of California to conduct research on the effects of MTBE. On November 12, 1998, the University of California delivered its report to the Governor and Legislature, recommending a phase-out of MTBE over several years from the state’s clean-air gas program.

Three water districts and one other agency (all in Northern California) have adopted policies to minimize or eliminate MTBE in reservoirs and lakes that provide drinking water supplies.

In April 1998, the Santa Clara Valley Water District (SCVWD) approved an ordinance to restrict (but not ban) motorboating on Anderson, Calero, and Coyote reservoirs—effective in the summer of 1998. During the recreation season (May through October), SCVWD restricted the number of boats allowed on the three reservoirs. SCVWD adjusted boating restrictions among the three reservoirs based on water quality monitoring results. SCVWD’s goal is to maintain MTBE in its reservoirs below 5 ppb.

The East Bay Municipal Utility District (EBMUD) is moving towards “zero emissions” from motorboats on its San Pablo Reservoir by 2002 (that is, no gasoline-powered engines). In the interim starting in January 2000, EBMUD will only allow zero-emission two-stroke marine engines, inboard gasoline-powered engines, and four-stroke gasoline-powered engines or their equivalent. EBMUD has already eliminated two-stroke engines from its rental fleet. EBMUD has deferred decisions on its Pardee and Camanche reservoirs pending further monitoring data.

The Contra Costa Water District (CCWD) has banned all gasoline-powered boats from its new Los Vaqueros Reservoir.

The Tahoe Regional Planning Agency (TRPA) will prohibit the discharge of unburned fuel from carbureted two-stroke engines into Lake Tahoe, regional waterways, and the Truckee River, starting in June 1999. TRPA will consider modifying its prohibition to comply with the CARB regulation summarized above. In addition, the South Lake Tahoe City Council has set an April 1999 deadline for removing MTBE from all gasoline sold in the area.

### **Staff Analysis**

Staff recommends an MTBE limit of 1.5 ppb into the water to prevent unacceptable contamination. This limit was based on the secondary standard being advanced by CDHS, the analytical reporting limit required by CDHS, and the use of a safety factor to allow for precision differences in water quality sampling. The 1.5 ppb level is also similar to background levels of MTBE observed in our Colorado River source water.

The economic objective is to provide a viable reservoir boating enterprise to implement previous Board actions on the project’s recreation plan. Independent economic projections indicate that

about 131,000 annual motorboats on the reservoir by 2010 will ensure a profitable reservoir boating enterprise. This translates into an economic goal of 549 boats on a peak summer day.<sup>4</sup>

Staff examined and evaluated five options to limit emissions of MTBE into the water to no more than 1.5 ppb and provide an economically viable reservoir boating enterprise:

**Option 1.** Sell only MTBE-free fuel at the reservoir and require its use in all motorboats (**the recommended option**).

**Option 2.** Allow motorboating based on an unrestricted boat engine mix. In other words, all motorboats coming to the reservoir would be launched without any restrictions. The rental fleet, however, would consist entirely of boats powered by four-stroke engines.

**Option 3.** Prohibit two-stroke carbureted (conventional) engines, but permit more efficient direct-injection two-stroke engines and four-stroke inboard engines.

**Option 4.** Prohibit all two-stroke engines, carbureted and direct injection, but permit four-stroke inboard engines.

**Option 5.** Prohibit all gasoline-powered boating.

Implementing options 1-4 would include additional measures:

- Water quality monitoring during the May - October recreation season for volatile organic chemicals (including MTBE). Reservoir operators would use the monitoring results to adjust, as appropriate, motorboating restrictions to comply with the 1.5 ppb goal for MTBE.
- Fueling controls at the marinas to avoid fuel spills and tank overtopping.
- Production and distribution of brochures to all boaters to educate them on the boating restrictions, MTBE control measures, and actions that boaters can take to protect water quality and the environment.

The analytical model previously used to predict MTBE concentrations in the Eastside Reservoir<sup>5</sup> was used as a basis for estimating impacts from options 1-4. It was not necessary to use the model to analyze Option 5 (banning all gasoline-powered boats) since it would result in no gasoline emissions.<sup>6</sup>

The chart below displays, at a maximum MTBE level of 1.5 ppb, the daily number of market-projected motorboats that would be on the reservoir on a peak summer day for different boat engine mixes and fuel types. Option 1 would not exceed the MTBE level of 1.5 ppb and would satisfy the economic objective. Options 2 – 4 would not exceed the maximum MTBE level and would not satisfy the economic objective.

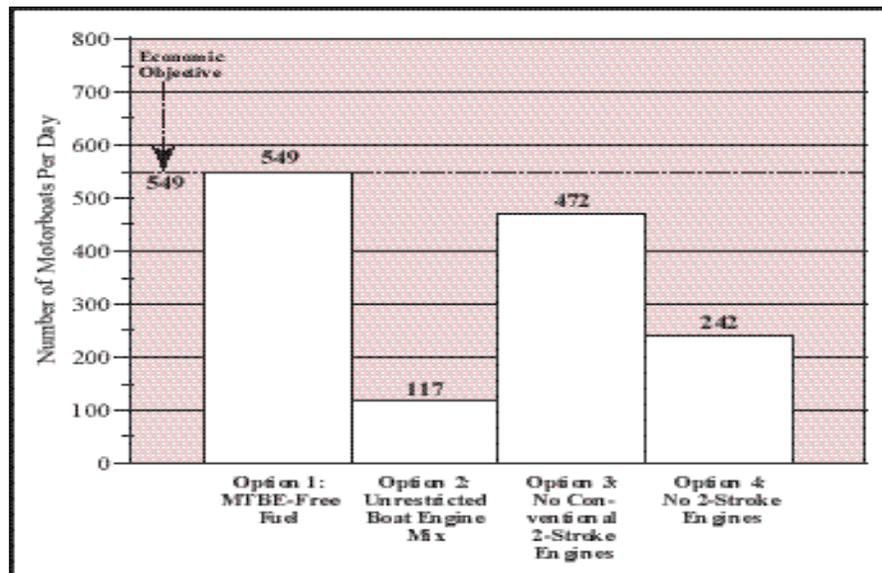
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<sup>4</sup> Based on demand, the number of boats expected to be on the reservoir.

<sup>5</sup> Anderson (1997) for the July 1998 report, Potential Body-Contact Recreation at the Eastside Reservoir Project: The Potential Public Health, Financial, Economic, Environmental, Liability, and Legal Impacts from Body-Contact Recreation.

<sup>6</sup> The full report, Predicted Impacts of Boating on MTBE Concentrations in the Eastside Reservoir, is available.

### Number of Market-Projected Motorboats Per Summer Day at Maximum MTBE Level of 1.5 ppb (2010)



### JUSTIFICATION FOR RECOMMENDATION

Staff recommends **Option 1**: sell only MTBE-free fuel at the reservoir and require its use in all motorboats because it is the only option that would not exceed the MTBE level of 1.5 ppb and would satisfy the economic objective. This option would require:

- Using a “fuel-can exchange program,” to require that all two-stroke engines fueled from portable cans use non-MTBE fuel in marina-supplied cans.
- Use only non-MTBE fuel in the rental fleet, consisting entirely of boats powered by four-stroke engines.
- Require all marina-berthed boats to use non-MTBE fuel purchased at the reservoir.
- Require launched boats with inboard fuel tanks to come to the reservoir with their tanks no more than one-quarter full and then filling their tanks with non-MTBE fuel purchased at the reservoir.

Implementing this option would also require obtaining a variance from USEPA to use non-MTBE fuel. This action appears to be feasible given the general movement towards eliminating MTBE in California’s reformulated gasoline and studies that demonstrate that MTBE is no longer necessary to achieve California’s air quality goals.

Obtaining non-MTBE fuel is feasible since both Chevron and Tosco are now producing MTBE-free fuel in Northern California. One of these refiners has stated that it can deliver MTBE-free fuel to the reservoir site. In the future, refineries in Southern California may also produce MTBE-free fuel.

Since MTBE is the problem, requiring the use of non-MTBE fuel is the most effective way to meet Metropolitan's MTBE and economic goals.

**Option 2**, allowing an unrestricted boat engine mix, would require limiting the number of boats per day to 117 to meet the MTBE goal. Net revenues would be 86 percent less than required to meet the economic goal. This option would eliminate the possibility of DBAW grants and loans for the marinas, resulting in no facilities for recreation boating on the reservoir.

**Option 3**, prohibiting only the use of two-stroke carbureted (conventional) engines, would meet the MTBE goal. However, the market-projected 472 boats per day for this option in 2010 would be 14 percent less than the economic goal. It will take many years before the more efficient direct-injection two-stroke engines enter the recreational fleet and meet the economic goal. In the interim, the net revenues would be 43-percent less than Option 1 in 2003 and 28-percent less in 2005. This option could jeopardize DBAW grants and loans for the marinas, perhaps resulting in no facilities for recreation boating on the reservoir.

**Option 4**, prohibiting all two-stroke engines, would also achieve the MTBE goal. However, the net revenues from the market-projected 242 boats per day for this option would be less than half those of Option 1 through the year 2010. This option, even more than Option 3, could jeopardize DBAW grants and loans for the marinas, almost certainly resulting in no facilities for recreation boating on the reservoir.

**Option 5**, prohibiting all gasoline-powered boating, would result in zero MTBE emissions. This option would limit motorboating to electric power. Privately owned electric-powered boats comprise a very small portion of currently owned boats. Profitability of the reservoir boating enterprise depends on the number of privately owned boats launched daily. Implementation of Option 5 would be unprofitable, likely resulting in no construction of facilities for any recreation boating on the reservoir.

## CEQA COMPLIANCE/ENVIRONMENTAL DOCUMENTATION

Metropolitan is currently preparing a *Subsequent Environmental Impact Report* (SEIR) for the entire recreation plan that includes evaluation of recreation boating and necessary on-shore facilities to accommodate such boating. The SEIR will address the Board's action, as appropriate.

DGM/JR/hjg