MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

October 11, 1993

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

From: General Manager

Subject: Taste-and-Odor (T&O) Research and Control Efforts at Metropolitan

Report

The taste-and-odor (T&O) quality of the drinking water delivered to Metropolitan's customers is a key factor impacting the public's perception as to whether or not the water is safe to drink. In order to optimize Metropolitan's T&O efforts, the Water Quality Division has begun a comprehensive proactive program to control T&O-producing algae in Metropolitan's source waters through the development of a Taste-and-Odor Research and Control Action Plan. This action plan, in combination with the implementation of ozone/PEROXONE at Metropolitan's filtration plants, will ensure that T&O issues do not undermine the public's confidence in the safety of their drinking water.

Specifically, this action plan incorporates biological and ecological characteristics of the T&O-producing algae with operational management strategies to minimize T&O problems in an efficient and environmentally compatible manner. Consequently, it is anticipated that this approach will allow Metropolitan to minimize the use of algicides in its source water reservoirs.

T&O problems at Metropolitan are unique in that the two primary algae species, which produce the earthy/musty-smelling compounds 2-methylisoborneol (MIB) and geosmin, are generally benthic (grow on the bottom of the lake) rather than planktonic (grow in the water column). About five years ago, the shallow water blue-green species Oscillatoria curviceps was succeeded in Lake Mathews by Phormidium, a low-light adapted species that forms dense dark-brown mats at depths between 30 to 80 feet. This shift in species has greatly increased the extent of the copper sulfate treatment area and associated costs for this treatment. Major shifts in algae are typical in reservoirs managed for operational purposes and can be expected to occur in the future. Figure 1 illustrates MIB levels in Lake Mathews from 1980 through 1993.

Historically, Metropolitan has used large amounts of copper sulfate to treat T&O algae since this is the only technology that has been effective for controlling benthic algae in Metropolitan's reservoirs (Figure 2). In recent years, Metropolitan's finished water would not have been acceptable to the public over extended periods of time without these treatments. Ozone/PEROXONE technology, being evaluated at Metropolitan to allow compliance with new disinfection and disinfection by-product regulations, has the additional benefit of oxidizing MIB and geosmin. However, this technology is not scheduled to be on-line until between 1998 and 2002. In addition, the use of copper in aquatic environments for algae control may be banned or curtailed in the future because of its toxic effects on fish and other aquatic life. Also, copper sulfate is not effective for planktonic algae due to its rapid growth, as demonstrated by the T&O episode that occurred in Castaic Lake in September/October 1993 (Figure 3). Therefore, this action plan is necessary to aggressively seek more suitable and environmentally compatible alternatives to using copper sulfate for treating algae problems in Metropolitan's source waters.

Board Committee Assignments:

This letter is referred to the Engineering and Operations Committee because of its authority to study, advise, and make recommendations with regard to the production and treatment of water pursuant to Administrative Code 2431 (c); and

The Special Committee on Water Quality and Environmental Compliance because of its authority with regard to Federal and State water quality regulations pursuant to Administrative Code 2551 (a) and (b).

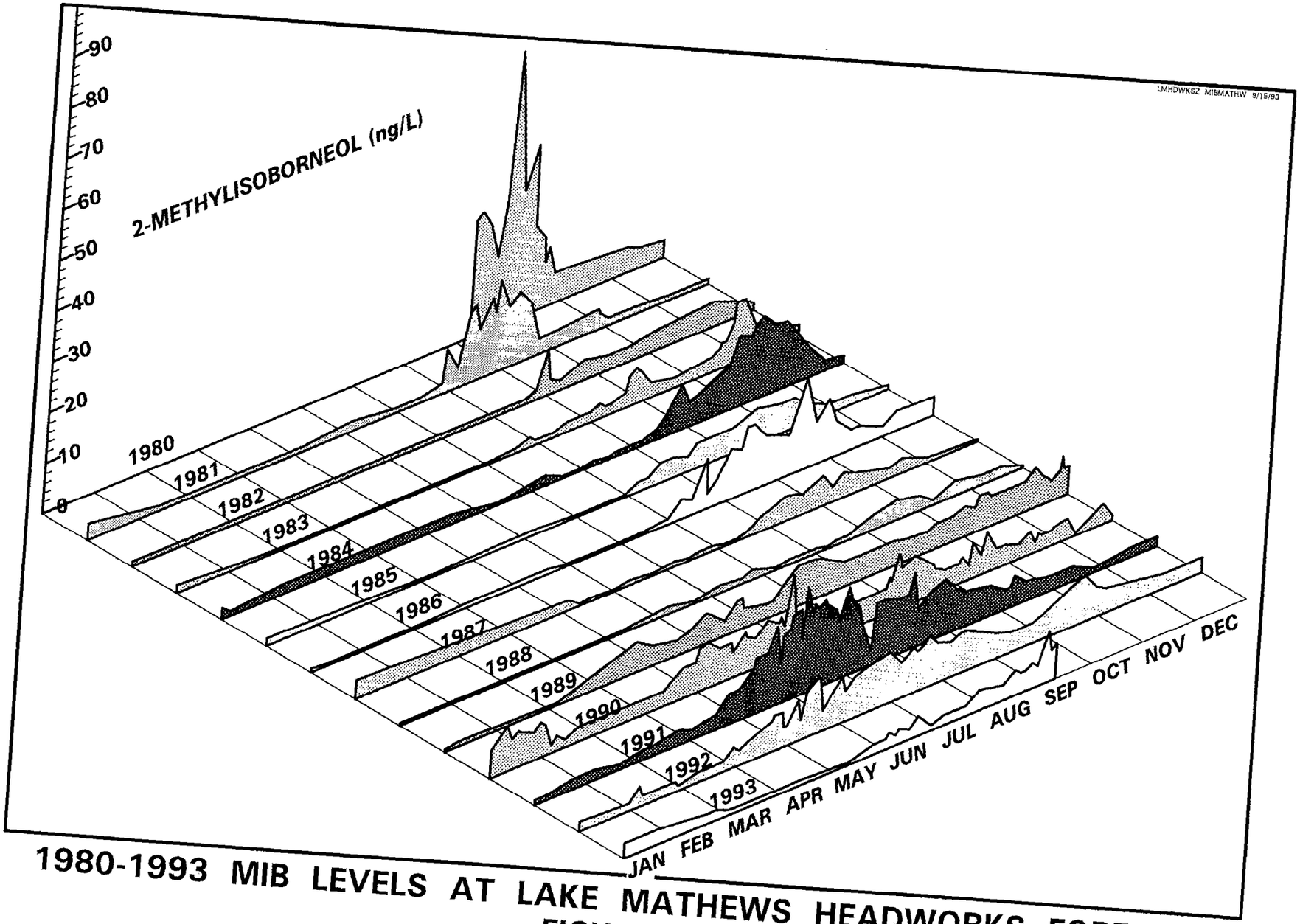
Recommendation

For information only.

John R. Wodraska

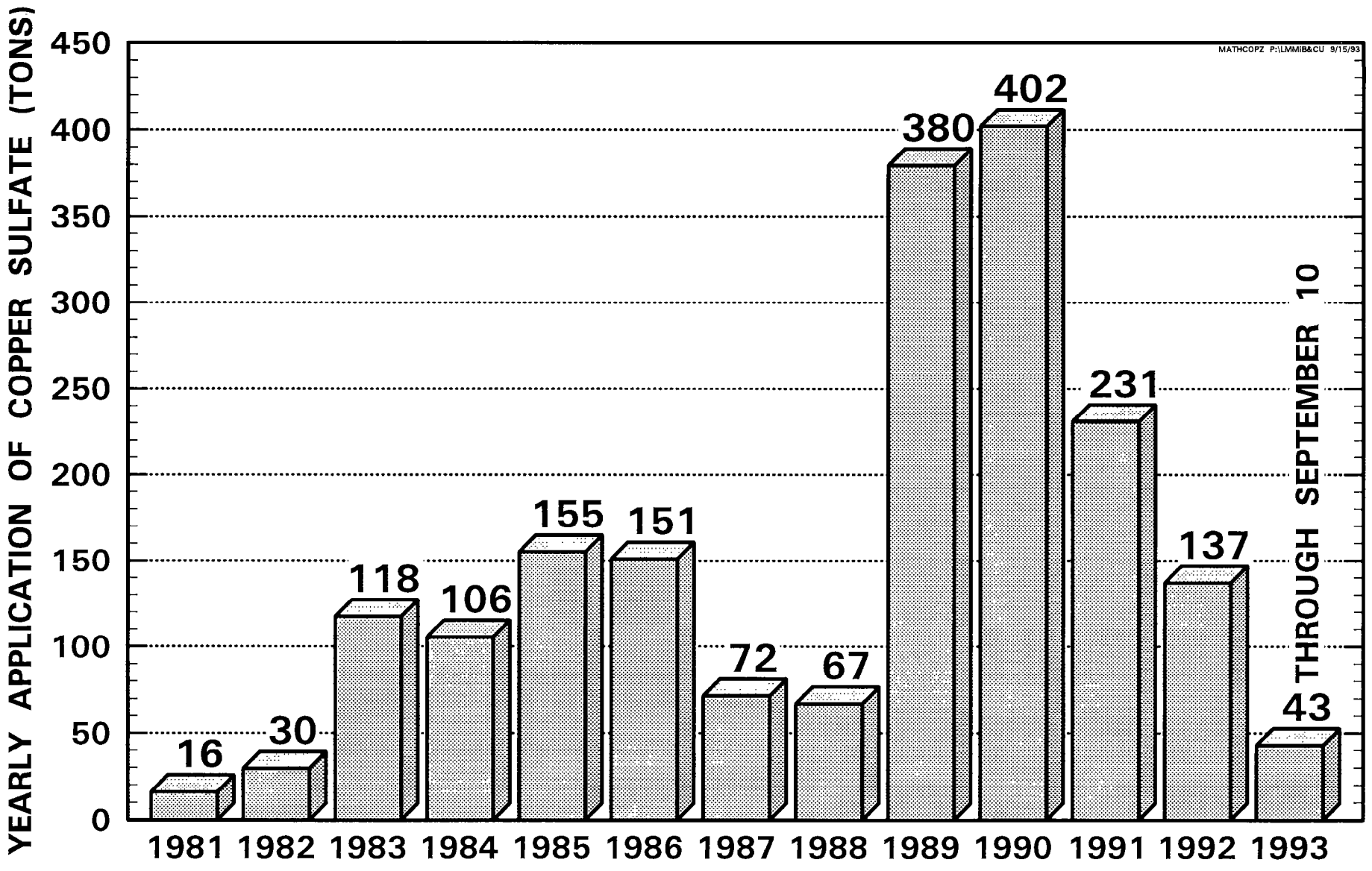
WDT/pa

Attachments



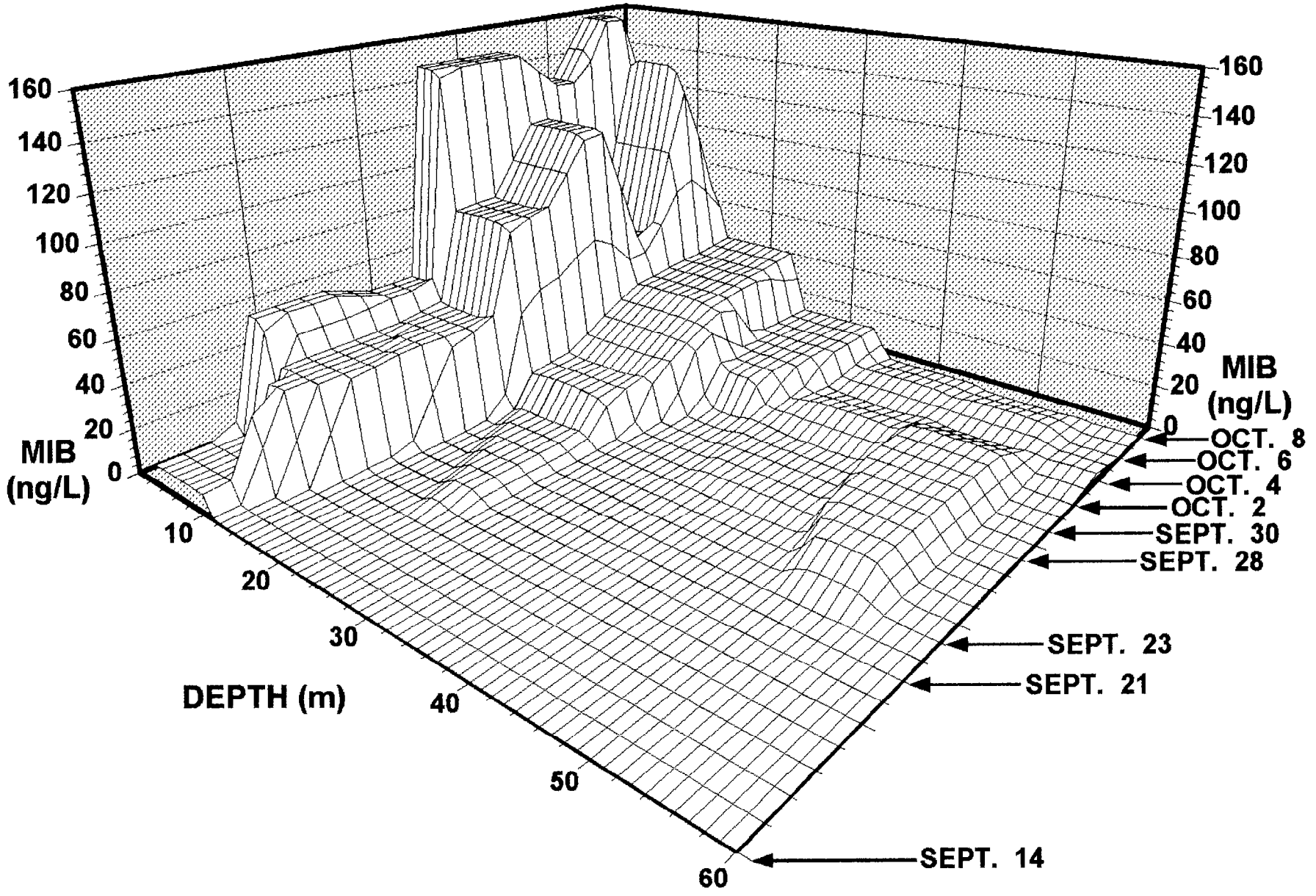
1980-1993 MIB LEVELS AT LAKE MATHEWS HEADWORKS FOREBAY

FIGURE 1



1981-1993 APPLICATIONS OF COPPER SULFATE (TONS) TO LAKE MATHEWS

FIGURE 2



MIB DEPTH PROFILES AT CASTAIC LAKE OUTLET TOWER, SEPTEMBER 14 - OCTOBER 8, 1993

FIGURE 3