

**MWD**

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

August 25, 1992

*To:* Board of Directors (Engineering & Operations Committee--Information)  
*From:* General Manager  
*Subject:* Granular Activated Carbon Regeneration Study

### Report

Currently, the United States Environmental Protection Agency (USEPA) is planning to negotiate the water quality regulations for disinfectants/disinfection by-products (D/DBP) with water utilities. The D/DBP rule may include a more stringent maximum contaminant level (MCL) for total trihalo-methanes (THMs), as well as MCLs for individual THM species, and other DBPs. Granular activated carbon (GAC) treatment technology, classified by the USEPA as best available technology (BAT) for removal of synthetic organic chemicals, will be considered as one of the treatment processes to meet future D/DBP requirements.

In 1986, as part of its THM Action Plan, Metropolitan initiated a two-year pilot study evaluating the use of GAC at its filtration plants for THM formation control. This study expressly did not consider issues such as environmental documentation and feasibility of GAC regeneration in Southern California. In November of 1990, the Board authorized the GAC regeneration study, focusing on air quality and regulatory issues associated with GAC regeneration in the Los Angeles metropolitan area. Malcolm Pirnie, Inc., a national leader in GAC regeneration expertise was contracted to conduct this study.

The technology of GAC regeneration was found to be reasonably well understood and straightforward. The major issue identified is how to handle the combustion by-products which result from the fuel burned to heat the carbon during regeneration, much like the air quality issues faced by fuel-burning power plants. The study assumed that Metropolitan would install BAT to control air emissions, although we cannot be sure that such technology will be viable in the future as air quality regulations become more stringent.

The study identifies a number of very significant issues concerning GAC regeneration, including the ability of GAC regeneration furnaces to meet air quality requirements, the management of spent GAC (including whether it would be classified as a hazardous waste), the cost and space constraints associated with retrofitting existing filtration plants with GAC, and the potential reaction of the public to the construction of GAC furnaces in their neighborhoods (this is the "NIMBY" or Not-in-my-Backyard issue).

Based upon current air quality regulations, off-site (regional) GAC regeneration is not feasible, due to the cost and environmental impact of vehicles and facilities necessary to transport spent GAC from the filtration plants to off-site regeneration furnaces. The estimated capital cost for on-site GAC adsorption and regeneration facilities for Metropolitan's water treatment plants, at a total projected design capacity of 3,295 million gallons per day, for the year 2010, are \$1.3 billion to \$3.2 billion in 1992 dollars. Annual operation and maintenance costs for adsorption and regeneration range from \$12 million to \$180 million. Unit costs would range from \$92 to \$310 per acre-foot in escalated dollars. The range of costs reflects meeting different potential DBP regulations. Therefore, GAC adsorption with on-site regeneration is an extremely expensive alternative for limiting THMs. Also, it is possible that more stringent air quality regulations, NIMBY issues, or other factors may make construction of GAC regeneration furnaces in Southern California impossible, making GAC infeasible.

Concurrent studies on the DBPs associated with GAC treatment of water with high bromide levels (such as Metropolitan's State project water) show that the toxicological risks associated with brominated DBPs, while lower in concentration, may be equivalent to the DBP risks associated with conventional filtration followed by free chlorine due to the greater carcinogenicity of the brominated DBPs. This is significant because it means that even if Metropolitan retrofits its filtration plants with GAC at a capital cost of \$1.3 billion to \$3.2 billion, the overall health risk to the public may not be significantly reduced.

The results of this study will be an important component in the regulatory negotiation scheduled to begin this fall for DBPs, as well as a factor in attempts to modify the

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definition of GAC as "BAT" for control of synthetic organic compounds. It is also of particular significance for Southern California due to the unique air quality constraints imposed by this region and their impact on GAC regeneration feasibility.

Board Committee Assignments

This letter was referred for information to:

The Engineering and Operations Committee because of its authority with regard to facilities for the production, exchange, sale, storage, and treatment of water pursuant to Administrative Code 2431(c).

Recommendation

For information only.



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