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METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

9-5

March 13, 1997

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

From: *for* General Manager

Ed Meo

Submitted by: Mark D. Beuhler
Director of Water Quality

Mark Beuhler

Subject: *Cryptosporidium* Action Plan Update

RECOMMENDATION

For information only.

EXECUTIVE SUMMARY

Metropolitan's *Cryptosporidium* Action Plan, approved by your Board in September 1995, includes source water monitoring, methods development, treatment evaluations, and public outreach. This letter describes progress made in treatment studies, detection methods, and public outreach.

DETAILED REPORT

On September 12, 1995, your Board approved a *Cryptosporidium* Action Plan to address issues related to *Cryptosporidium* in the water supply. The Action Plan focuses on source water monitoring, improving analytical methods and treatment techniques, and providing public outreach/education. This letter describes highlights of the Action Plan results for treatment evaluations, detection methods, and public outreach during the past several months.

Optimizing Coagulation/Filtration Processes for *Cryptosporidium* Removal

Pilot-scale studies were conducted to optimize the removal of *Cryptosporidium* oocysts by coagulation/filtration processes. Key water treatment parameters examined during this study included optimal metal coagulant/organic polymer combinations and doses, pre-oxidation with either chlorine or ozone, coagulation pH depression, and comparisons of dual- and tri-media filtration. Under optimized pilot-scale conditions, greater than 3 log₁₀ (99.9%) oocyst removal was observed in State Water Project water. Additional tests will be conducted in the coming months on the optimization of Colorado River Water and a blend of both waters.

Evaluation of *Cryptosporidium* and Surrogate Removal

The correlations between *Cryptosporidium* removal and the removal of potential surrogates were evaluated in bench- and pilot-scale studies. Of the potential surrogates examined (particle counts, turbidity, and aerobic spore formers), only the removal of aerobic spore formers exhibited a significant correlation with the removal of *Cryptosporidium* oocysts in jar tests conducted with washwater reclamation plant water, and in pilot plant tests using State Water Project water. Aerobic spore formers are microbial surrogates that are similar in size to *Cryptosporidium* oocysts, are also resistant to chlorine disinfection, but are present in higher concentrations and are much easier to detect than *Cryptosporidium*.

Detection Method Development

Significant progress is being made to develop, optimize, and evaluate a method for measuring the infectivity of waterborne *Cryptosporidium parvum* (the species of *Cryptosporidium* that infects humans). In this procedure, oocysts are inoculated onto mammalian cells grown in the laboratory and incubated, allowing those organisms capable of causing infection to complete various stages of their life cycle. The infectious organisms are then detected by genetic methods. The results to date demonstrate that the infectivity method combined with genetic detection and enumeration of infectious organisms is a promising approach.

Public Outreach Video

A video entitled "What You Should Know About *Cryptosporidium*" has been prepared to educate member agencies' board members, city council members, and customers about *Cryptosporidium*. The video can be tailored for each member agency with the ability to add an introduction to preface the video. For example, a general manager may describe the water sources in their service area and their proactive efforts to address *Cryptosporidium* before the start of the video. Metropolitan's staff will provide the facilities to tape the individualized segment and complete the customized video.

International Symposium on Waterborne *Cryptosporidium*

The first International Symposium on Waterborne *Cryptosporidium* was held on March 2-5, 1997 in Newport Beach. The Symposium was sponsored by Metropolitan, the American Water Works Association, American Water Works Association Research Foundation, the United States Department of Agriculture, the National Water Research Institute, and the International Life Sciences Institute. Over 425 experts from 18 countries attended the meeting to exchange the latest information on detection methods, treatment, communications, occurrence, epidemiology, risk assessment, and future research needs. The General Manager was a guest speaker at the Opening General Session. Metropolitan staff presented papers on methods detection, optimizing treatment for *Cryptosporidium* removal, modeling the impacts of body-contact recreation, and surrogate evaluations.

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