

**WEST BASIN MUNICIPAL WATER DISTRICT****JULY 2, 2002 – Water Resources**

McDonald, Liitle

**JULY 22, 2002 – Board Meeting**

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## ACTION CALENDAR

WATER QUALITY  
N-NITROSODIMETHYLAMINE FATE AND TRANSPORT

SUMMARY:

As the abundance of reliable, safe drinking water sources grows more uncertain, utilities and municipalities are turning to the use of recycled water as a way to supplement water supply. Common uses for recycled water include irrigation, industrial cooling/boiler feed, and groundwater recharge. The source of recycled water is municipal wastewater effluent. However, concerns have arisen about the potential health effects and environmental effects associated with the presence of contaminants typically found in wastewater effluent.

Of particular concern is the contaminant n-Nitrosodimethylamine (NDMA). NDMA is a probable human carcinogen but has no state or federal drinking water standard. The State of California has established an Action Level for NDMA of 10 parts per trillion (ppt). One ppt is equivalent to 1 inch in 15,800,000 miles. Action Levels (ALs) are health-based advisory levels established by the Department of Health Services for chemicals in drinking water that lack maximum contaminant levels (MCLs). An AL is the level of a contaminant in drinking water that is considered not to pose a significant health risk to people ingesting that water on a daily basis.

NDMA is also found naturally in food, tobacco, and personal care products at concentrations comparable to those detected in recycled water. NDMA can be found in recycled water from industrial discharges and is also formed during wastewater chlorination.

A lawsuit is currently pending against the City of San Jose, California on this very subject. The City of San Jose Program called for an expansion of a tertiary treated recycled water pipeline that would serve a local power plant and provide water for irrigation projects en route. Parties who filed the lawsuit have claimed that the recycled water contains harmful levels of NDMA, and if used for irrigation, would contaminate groundwater and pose a risk to public health and safety as well as the environment.

To assure the safety of recycled water it is important to fully understand the fate and transport of NDMA during reuse applications, including non-potable irrigation and groundwater recharge.

**Fate and Transport Study**

A collaborative 2-year research project is set to begin shortly that will address the issues surrounding the fate and transport of NDMA in recycled water used for spray irrigation and groundwater recharge both by surface spreading and direct injection. The project approach will utilize both controlled laboratory experiments and field tests to identify the physical, chemical, and biological mechanisms that impact the fate and transport of NDMA in applied recycled water.

**Literature Review**

The project will begin with a thorough literature review on data from previous studies conducted on NDMA. The team will further review results and conclusions from the literature review and document evidence on NDMA attenuation as well as any uncertainties in the data. If any additional data is required, it will be incorporated into the project plan.

### **Laboratory Experiments**

Laboratory experiments will be conducted to quantify the physical removal of NDMA, the chemical transformation of NDMA, and the microbial degradation of NDMA.

### **Field Tests**

Predictions from laboratory experiments will be tested by controlled experiments in turf grass plots, by comparison with soil column studies, and by data collected at field sites where water reuse is practiced.

### **Project Objective and Goals**

The primary objective of this project is to understand the fate and transport of NDMA in soil and groundwater when recycled water is used for spray irrigation and indirect and/or direct groundwater recharge.

This research project will help fill an immediate information gap by providing information relative to the fate and transport mechanisms of NDMA in the following underground environments:

- In-channel (lined and unlined)
- Turf/root system
- Soil matrix
- Vadose zone
- Aquifer

### **Benefits to the West Basin Municipal Water District**

West Basin Municipal Water District (WBMWD) currently practices direct groundwater recharge through injection of known volumes of recycled water containing NDMA. Evidence suggests removal or degradation downgradient in the aquifer. The research team will review existing data from this groundwater recharge practice and one project goal is to describe the removal mechanism. In addition, this project is considered a possible field site for the project, allowing research to be conducted locally without the extrapolation of results from other field sites.

Results from this study will also allow WBMWD staff to technically understand the fate and transport of NDMA, particularly understanding the reduction of NDMA underground in the West Coast Basin.

### **Final Report**

Results from the literature review, laboratory experiments, and field tests will be integrated into a final report to present the study results.

**Collaborative Effort**

Participating utilities that have committed project support pending appropriate board approval are the City of San Jose, California, County Sanitation Districts of Los Angeles County, Irvine Ranch Water District, Long Beach Water Department, Orange County Water District, Santa Clara Valley Water District, and West Basin Municipal Water District.

Those that have also been invited to participate include the City of Scottsdale, Arizona and the Water Replenishment District of Southern California.

It is estimated that the study will be conducted during a 2-year period at an approximate \$500,000 funding level.

Anticipated funding commitments based upon appropriate board approval are as follows:

<b>Organization</b>	<b>Funding Commitment</b>
County Sanitation Districts of Los Angeles County	\$40,000
Irvine Ranch Water District	\$40,000
Long Beach Water Department	\$25,000 as in-kind
Santa Clara Valley Water District	\$40,000
Water Reuse Research Foundation*	\$150,000
West Basin Municipal Water District	\$40,000
<b>Total</b>	<b>\$335,000</b>

\* On June 4, 2002, the Water Reuse Research Foundation (WRF) approved a \$150,000 funding level commitment to the project.

The City of San Jose, California and the Orange County Water District have given verbal commitment to the project but a commitment letter has not been received yet. Both organizations are expected to contribute \$40,000.

In addition, funding participation is also being sought through NWRI, CUWA, AwwaRF, and WERF.

Discussions regarding the project will be managed by the WRF. The participating utilities support that the project coordination will be provided by WBMWD.

Research participants include Professor David Sedlak (University of California, Berkeley), Professor Peter Fox (Arizona State University), Phyllis Stanin (Todd Engineers), Professor Jay Gan (University of California, Riverside), and Professor Lisa Alvarez-Cohen (University of California, Berkeley).

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

COMMITTEE STATUS:

This item will be reviewed by the West Basin Water Resources Committee on July 2, 2002 and recommended approval at the July 22, 2002 Board meeting.

RECOMMENDED MOTION:

Authorize the General Manager to contribute \$40,000 to the NDMA Fate and Transport Study.

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