

WEST BASIN MUNICIPAL WATER DISTRICT

NOVEMBER 17, 2005 – Water Resources
Little, Baker

NOVEMBER 28 2005 – Board Meeting

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INFORMATION CALENDAR

NDMA FATE AND TRANSPORT

SUMMARY:

In 2002, the Board authorized a contribution of \$40,000 for a research project entitled "Investigation of n-Nitrosodimethylamine (NDMA) Fate and Transport". This \$546,000 research project has recently been completed, and the final report was submitted to the WaterReuse Foundation for production and printing last month.

The project investigated the potential for NDMA in wastewater effluent to enter potable water supplies when wastewater effluent is used for landscape irrigation or groundwater recharge. Conducted between 2002 and 2005, the project team reviewed existing data on NDMA fate and transport from local sites and conducted laboratory and field experiments to determine the fate of NDMA and NDMA precursors under the conditions encountered in landscape irrigation and groundwater recharge systems.

Overall, results from the study indicate that NDMA and NDMA precursors in wastewater effluent may be removed during landscape irrigation or groundwater recharge under certain conditions.

In landscape irrigation systems, NDMA can volatilize from the soil through a small crevice within the first few hours of application. NDMA also may undergo biodegradation when above the permanent groundwater level, if the retention time is sufficient and if the appropriate microbial community is present.

In groundwater recharge systems, NDMA removal is enhanced by the presence of continually changing organic carbon in the wastewater effluent. Where water is subjected to advanced treatment prior to direct injection into groundwater, the potential for biodegradation is lower due to the breakdown of organic carbon being removed during the treatment process. However, partial degradation of NDMA was inferred from field data collected at West Basin, where water was subjected to reverse osmosis prior to injection.

West Basin provided data for the project from Barrier operations, including plant operations, source water, and Barrier Monitoring Well data. Evaluation of the fate and transport of NDMA was focused on Well 17B, since that Well has been determined to be receiving 100% blend water from injection. The project concluded that the relatively low-concentrations of NDMA in Well 17B (average 10 ng/L) are probably not due to mixing or dispersion alone. Therefore, it was concluded that this may indicate that some degradation of NDMA occurs between the blend water sampling point and the Monitoring Well. However, the conclusion is uncertain, given the high-variability of NDMA in source waters and the uncertainty in a quantitative mixing model.

Additional research is suggested to follow-on to this project, investigating the potential for higher concentrations of NDMA to reach groundwater through transport in cracks and fractures, investigating the role of labile organic carbon in the degradation of NDMA and related organic compounds in water reuse systems, and investigating further the role of NDMA precursors.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

COMMITTEE STATUS:

This item was reviewed by the Water Resources Committee on November 17, 2005 and was agendaized to the November 28, 2005 Board meeting as information for discussion.

RECOMMENDED MOTION:

This item is for information only.

LIST OF EXHIBITS:

None.

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