

ROSAMOND COMMUNITY SERVICES DISTRICT

CHLORAMINE USAGE IN THE ANTELOPE VALLEY

A Report to State Water Quality Control Board,
Lahontan

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Implementation of chloramine disinfectants in AVEK's treated surface water will have multiple negative effects on the Antelope Valley consumers now and in the future.

ANTELOPE VALLEY CHLORAMINES

The Antelope Valley-East Kern Water Agency (AVEK) plans to convert their water disinfection process from free chlorine to chloramine treatment in middle to late 2009. AVEK, the third largest DWR State Water Contractor, provides treated surface water to customers of the Antelope Valley. The current water produced with free chlorine treatment has not been able to keep the trihalomethanes (THMs) below the EPA mandated 80 ppm in the eastern extremities of AVEK's North Loop Pipeline delivered to north valley communities like Boron, North Edwards, California City, and Mojave. AVEK's Board of Directors decided over 3 years ago, with a split vote of 4 to 3, to use chloramines as a longer lasting disinfection process. After considering a number of methods to extend the disinfectant treatment effect, chloramines were selected over granular activated carbon (GAC). Now, with each of AVEK's four water treatment plants nearing upgrade completion, the transition to chloramine use is in the predictable near future.

Rosamond Community Services District (RCSD) does not agree with the usage of chloramines in the Antelope Valley. Neither do Mojave, California City, Quartz Hill, Palmdale Water District, and Acton. There are a growing number of Antelope Valley residents who do not want chloramines added to their drinking water. AVEK supplies water to Lancaster and western portions of Palmdale, as well as a larger portion of the Antelope Valley south of the Avenue A Kern County-Los Angeles County boundary. AVEK continues to tell all persons that care to listen, that no one objected to the potential chloramine use when AVEK first announced their decision to convert, over 3 years ago. The BOD of RCSD objected vehemently at the announcement of the planned conversion to chloramines, and are even more vociferous about the issue now. But RCSD is not alone in speaking out against chloramines. Here are some of the reasons RCSD will not be purchasing chloraminated water from AVEK.

1. Chloramines are formed by adding ammonia to hypochlorous acid, or highly chlorinated water. In order to form the required monochloramines, the initial chlorine level must be elevated from its typical 0.5 to 1.5 ppm up to 4 to 7 ppm for 1 part of ammonia. The pH balance is critical for formation of monochloramine with pH levels above 8 required. Lower pH levels allow excess chlorines to form, creating dichloramines and trichloramines, which create nitrification. Nitrification in pipelines requires complete purging of the affected water and replacement with chlorinated water to clean out the nitrates. Chloraminated water can then be reintroduced.
2. Chloramines treatments are less effective than free chlorine treatments in killing cryptosporidiums and other harmful bacteria. Water supply systems that use chloramines nearly full time periodically purge their water systems of the chloramines and clean them with free chlorinated water. The annual expense and loss of hundreds of millions of gallons of treated water (existing within the pipelines and the purge chlorinated water) continues to be a financial and physical drain on municipal water supply systems. Why incur the unnecessary expense and inconvenience in the first place?
3. Chloramines are hazardous to humans, animals, and some plants. The usual argument for chloramine use and denying the health hazard issues is, "Over 25% of the U.S.A. use chloramines, and no one has reported any bad side effects. Show us the proof!" Increasingly large numbers of people are noticing various reactions to chloraminated water use. Skin rashes on various parts of the body, development of asthma or asthma-like lung conditions, and body pH levels unbalanced to the point of listlessness and general malaise are typical reactions. We have heard from people living in various parts of the Antelope Valley who moved from chloramine using areas of Los Angeles because of the above problems and other abnormalities. Adults and children are affected equally. Once they no longer ingested chloramines, or washed in it, used it for cooking, or inhaled its vapors, they returned to their normal health. There are

no unique physical reactions to chloramines, rather they vary with each individual's chemistry and body make up. Many people never notice the difference of whether their potable water supply is chloraminated or not. Physicians for the most part have refused to diagnose effects of chloramines as results of chloramine contact and consumption because not enough is known about adverse reactions to ammonia in the public water supply. Yet there are increasing numbers of chloraminated affected persons refusing to accept the physicians' opinions because the physicians' diagnoses does not acknowledge the problems could be answered by telling the patient to drink and use nonchloraminated water.

4. "Chloramine usage is approved by the EPA." This is the most frequently used argument offered by chloramine advocates. To blindly point to the Federal Environmental Protection Agency and say the EPA is always right, is asking for trouble. The EPA is a scientifically based health organization that is directed by political appointees. The Governor of the State of California had to literally ban usage of Methyltert Butyl Ether (MtBE) in 1999 in order to stop the toxic material from further contaminating groundwater supplies via previously EPA approved usage as a gasoline additive. The EPA did not reverse their approval of MBE usage until 2000. In another example, the EPA study of effects of heavy particulate matter from the atmosphere causing over 15,000 premature deaths per year had to be contested and ultimately downgraded to less than 1,000 deaths per year. An "error in methodology" was blamed, but the U.S. industry had to begin dealing with the particulate problem solutions until a private research firm proved the EPA wrong. The reduced level of arsenic in drinking water of 10 ppb is in itself a political decision. The transition from President Clinton to President George W. Bush saw the nationally directed maximum contaminant levels of arsenic raised briefly from 10 back to 50 ppb. A vocal minority decried the decision enough that President Bush reinstated the 10 ppb. There were a few politicians and pseudo scientists, California's own Senator Barbara Boxer being one, who

advocated reducing the arsenic level to 4 ppb. We water purveyors are still trying to adjust to the 10 ppb mcl.

5. Probably the most important issue of chloramine usage is that the ammonia and nitrate compounds do not go away. Chlorine rapidly dissipates when it is associated with high levels of organic material, such as in wastewater. Ammonia does not. Field tests show that water injected into underground aquifers containing high levels of chlorine will dissipate the chlorine rapidly, usually within 2 to 3 days. The hydrogen component of the NH_3 compound of ammonia also dissipates rapidly. The nitrogen does not dissipate, but combines with oxygen and other elements to form nitrous and nitrogen compounds. Nitrogen compounds accumulate in the soils and eventually contaminate the underground water supplies with high levels of nitrates. I listened to this Board a little over a year ago direct Los Angeles County Sanitation Districts to line their future open air storage ponds with heavy visqueen plastic to store tertiary treated water. Tertiary water produced from treated waste water, is chemically as good as potable drinking water. This Board listened to the uneducated public outcry of "don't poison our groundwater," and decided to require pond lining installation. Yet the secondary treated water, that is not treated to the high levels of tertiary water, can be stored in unlined basins. Why? Because the fear of increasing nitrate levels in the soils and groundwater levels is paramount to all Antelope Valley residents and the issue under discussion was the potential, no given proof, but the POTENTIAL of nitrates contamination. We will have a problem with the Antelope Valley's water supply that will never end if and when chloraminated potable water has been used and turned into recycled wastewater, and the nitrates are injected into the groundwater. Keep in mind that the EPA's definition of "injected" includes water spreading as well as direct injection and ASR type wells.

6. Another one of the emerging issues is the effect of the ammonia compounds on existing and especially new piping systems and individual components. Washington D. C. is an excellent example of chloramine water leaching lead from residential piping systems. Dr. Marc Edwards, Charles E. Via Jr. Department of Civil & Environmental Engineering, Virginia Polytechnic Institute & State University and colleagues point out that more water purification plants in the United States are using chloramine to treat water. At the same time, builders are plumbing more houses with plastic pipe, rather than copper, to cut costs. Past studies have found that ammonia formed in chloramine-treated water can trigger a series of events that corrode brass faucet components and connectors commonly used in PVC plumbing systems. Corrosion of brass (made with copper, zinc and lead) releases those metals into water pipes and makes faucets prone to failure. In the new study, researchers sampled water from polyvinyl chloride (PVC), copper, lead, and other pipe material under a range of experimental conditions. They found that corrosive conditions were often worst in plastic pipes, which could be expected to cause higher metal leaching of zinc and lead from brass faucets used in homes and buildings. Increasing reports of lead in the drinking water of Los Angeles schools are being blamed on everything except the real probable cause: the chloramines.
7. **N-Nitrosodimethylamine (NDMA)**, also known as **dimethylnitrosamine (DMN)**, is a semi-volatile organic chemical that is highly toxic and is a suspected human carcinogen. The US Environmental Protection Agency has determined that the maximum admissible concentration of NDMA in drinking water is 7 ng L^{-1} . The EPA has not yet set a regulatory maximum contaminant level (MCL) for drinking water. At high doses, it is a "potent hepatotoxin that can cause fibrosis of the liver" in rats.^[2] The induction of liver tumors in rats after chronic exposure to low doses is well-documented. Its toxic effects on humans are inferred from animal experiments but not well-established experimentally. NDMA is an industrial by-product or

waste product of several industrial processes. It first came to attention as a groundwater contaminant in California in 1998 and 1999 at several sites that produced rocket fuel. Of more general concern, water treatment via chlorination or chloramination of organic nitrogen-containing wastewater can lead to the production of NDMA at potentially harmful levels. Further, NDMA can form or be leached during treatment of water by anion exchange resins. NDMA's contamination of drinking water is of particular concern due to the minute concentrations at which it is harmful, the difficulty in detecting it at these concentrations, and to the difficulty in removing it from drinking water. It does not readily biodegrade, adsorb, or volatilize. As such, it cannot be removed by activated carbon and travels easily through soils. Relatively high levels of UV radiation in the 200 to 260 nm breaks the N-N bond and can thus be used to degrade NDMA. Additionally, reverse osmosis is able to remove approximately 50% of NDMA.

8. Kern County Supervisor Don Maben has called for a moratorium of chloramine usage in the Kern County portion of the Antelope Valley. Los Angeles County Supervisor Mike Antonovitch has recently instituted a 120-day moratorium on the implemented usage of chloramines in the Antelope Valley so the issue can be studied further. Increasing numbers of AV communities and individuals are coming forward to voice their dissent with the AVEK decision to use chloramines. We do not want the minority, in this case 4 of the 7 Directors of the AVEK Board of Directors, to decide that it is in the best interest of the majority of the 300,000 plus or minus residents of the Antelope Valley to use chloraminated water.

Conclusion: We are requesting the Lahontan BOD to stop the usage of chloramines in our drinking water before our whole valley is contaminated and ruined. At the very least, conduct hearings and investigate the emerging technology and information about the adverse effects of chloramines on humans. As more public water treatment systems convert to chloramine

disinfection, more of the consumer public will be adversely affected. If we can't rid California of chloramines, then at least let's not ruin the Antelope Valley.

THE END