

## All about Arsenic

Nationwide, arsenic treatment has proved to be an expensive and complex technology – and it is coming to the Indian Wells Valley.

On January 23 of this year, the Environmental Protection Agency (EPA) lowered the acceptable level of arsenic in drinking water from 50 parts per billion (ppb) to 10 ppb. To give a sense of this proportion, Indian Wells Valley Water District director and renowned geophysicist Dr. Pierre Saint-Amand likens this amount to dissolving a baby aspirin in an Olympic-sized swimming pool.

Because arsenic is a naturally occurring element like calcium or magnesium, we breathe it and drink it and even eat it every day in trace quantities. In fact, there is some evidence that tiny amounts of arsenic are actually required by the human body for optimum health. However, scientists and medical researchers agree that arsenic can begin to build up in human tissue over time and that too much arsenic can adversely affect the proper function of almost every organ – lung, liver, kidney and bladder, etc. In fact, arsenic is now officially classified as a carcinogen.

But how much arsenic is too much and what build up time frame is involved are still two hotly debated questions across the scientific community.

According to EPA data, groundwater sources like aquifers usually contain higher levels of arsenic than lakes or rivers. Under a variety of conditions, arsenic may be leached from underground rock formations and seep into water supplies. The EPA also advises that arsenic levels in potable water have proved to be generally higher in the western U.S. than in other parts of the country.

Under EPA guidelines, wells in public water systems are only officially sampled for arsenic every three years. Since our last EPA sampling took place in 2004, our next series of sampling will not begin until late in 2007. Water from any wells subsequently found non-compliant in three quarterly tests will have to undergo treatment.

About two years ago, four District wells sampled for arsenic were found to have concentrations of the substance above the new EPA standard of 10 ppb, though comfortably beneath the old limit of 50 ppb.

The Water Board and District staff, along with engineering consultants Krieger & Stewart, have spent the ensuing months evaluating a variety of arsenic reduction methods for cost, viability, longevity and accuracy. During an arsenic workshop in October of last year, Krieger and Stewart representatives Dave Scriven and Chuck Krieger presented a broad overview of the arsenic treatment challenges here in the Indian Wells Valley and discussed the various types of arsenic removal technology.

Krieger and Scriven explained that there are a number of pros and cons associated with any arsenic removal technology and therefore each must be researched thoroughly before implementation. Some aspects of the technologies that demand consideration are what kinds of waste materials are produced and the difficulty and/or expense of disposal; the amount of chemical additives required for the procedure; and the cost of constructing, operating and maintaining any necessary additional infrastructure, pipelines and pumping mechanisms.

Scriven and Krieger's consensus based on the particular characteristics of our water was that the IWVWD should employ a combination of methods including coagulation and filtration (which involves collecting arsenic ions into bundles before filtering them out) along with blending water from some of the wells with higher levels of arsenic with the treated water – a multi-pronged approach.

Krieger and Scriven believe that coagulation/filtration is likely to be the least expensive technological alternative for the District but the final selection of a process will depend on the outcome of pilot testing.

Even so, estimates of costs for construction of treatment plants along with additional necessary pipeline and pumping mechanisms will approach \$4.2 million. Additionally, operation over a 30 year period will cost about another \$4 million.

The District is currently actively involved in a full scale arsenic removal demonstration project with Basin Water that should be completed within a few months. And, with an eye to future preparedness, District staff and consulting firm Krieger & Stewart have been working together to develop a protocol for additional pilot testing that could be submitted to companies with proven arsenic extraction technology.

Even though California's recent efforts to further lower acceptable arsenic levels to 5ppb have been put on hold for now, arsenic treatment here in the Ridgecrest area is a given. It is not a matter of "if" – but "when."

With this in mind, the Directors and staff of the IWVWD will continue to explore viable arsenic treatment options so that we will be prepared for every eventuality and can continue to offer clean, safe water to our customers at the lowest possible price in the near future and for decades beyond.