Ozone Disinfection for Drinking Water
Miramar and Alvarado Water Treatment Plants

Frequently Asked Questions

What is ozone?

Ozone is a molecule made of three oxygen atoms that occurs naturally in the earth and that can also be manmade. In the upper atmosphere, it helps protect the earth's surface from the harmful ultraviolet rays of the sun. When ozone decomposes, it does so rapidly to form oxygen.

What are some of the uses of ozone?

Ozone is used as a disinfectant for killing microorganisms in the air and water. Many spas and hot tubs use ozone to keep the water free of algae and harmful bacteria. Ozone is also used for industrial and manufacturing purposes, as well as a bleaching and deodorizing agent.

Why is the City changing to ozone disinfection at these two drinking water treatment plants?

Ozone was chosen because it is a proven cost-effective disinfectant that improves the taste of the treated water and decreases unwanted disinfection by-products.

The Alvarado and Miramar water treatment plants were built in 1950 and 1960, respectively, and are currently being upgraded to meet increased water demands, along with stricter federal and state water regulations, with the ultimate goal of improving water quality. Historically, chlorine has been effectively used at these water treatment plants to disinfect the drinking water. However, with advancements in water treatment, it has been determined that ozone disinfection is cost effective and will result in improved water quality.

When is the change taking place?

The Miramar Water Treatment Plant will begin testing and using the new ozone system in February 2010. During the testing period, the plant will continue to use chlorine as the disinfectant. This initial testing and start-up period will continue into April. After the start-up is complete and the system is operating correctly, ozone will become the primary disinfection method used at the plant. The existing chlorine disinfection equipment will remain in place to provide the source of chlorine to form chloramines for the distribution system, and in case it is needed in the future as a back up to ozone.

The Alvarado Water Treatment Plant will begin testing and using its new ozone system in late spring 2010, with full operation estimated to begin in June 2010. As with Miramar,

the existing chlorine disinfection equipment will remain in place to provide the source of chlorine to form chloramines for the distribution system, and in case it is needed in the future as a back up to ozone.

Is ozone better than chlorine to disinfect drinking water?

Chlorinated water is still very safe to drink. However, ozone is more effective than chlorine in disinfecting the water. Ozone disinfection produces less disinfection by-products which will enable these facilities to meet more stringent drinking water standards and regulations. Ozone also removes more trace organic compounds than chlorine which will result in better tasting and smelling water.

Will customers notice a difference in ozonated water?

Some people who drink water disinfected by ozone report that the water tastes and smells better. After ozone is used as the disinfection method, it quickly breaks down back into oxygen. All ozone is removed from the water before it leaves the treatment plant. Ozone doesn't leave any taste or odor in the water. Some chloramine (chlorine) will continue to be used in order to keep the water disinfected in the distribution system's pipes (See "Will chlorine still be used at the drinking water plants?" below).

Where else is ozone used to disinfect drinking water?

Water treatment plants in Europe, and to a limited extent in the United States, have been using ozone to disinfect drinking water for more than 100 years. Ozone has gained popularity in the United States as a disinfectant in recent years, and there are two other water treatment plants that currently use ozone for disinfection in the San Diego area.

Does ozone treated water meet the state and federal drinking water standards?

Ozone disinfection is designed to meet all the state and federal drinking water standards, and will also be able to meet stricter standards if they are mandated by the United States Safe Drinking Water Act. Each year, the City publishes a Consumer Confidence Report which gives the annual water quality testing results at all three drinking water plants. This report is available at **www.sandiego.gov/water/quality/pdf//waterqual08.pdf**

How is ozone used at a drinking water plant?

All of the ozone treatment occurs inside sealed ozone contactors at the plant. Oxygen is delivered to the plant by truck and stored in large tanks. The oxygen is then exposed to an electrical charge in a sealed ozone generator. Once the ozone has been produced, the ozone gas is diffused (bubbled) through the water in a contact chamber in the process of disinfection. Also see "Our Water Treatment Process" at **www.sandiego.gov/water/quality/treatmentprocess.shtml**

Will chlorine still be used at the drinking water plants?

The Safe Drinking Water Act requires that drinking water systems add a certain amount of chlorine or chloramines, a mixture of chlorine and ammonia, to keep the water disinfected in the public distribution system. Chloramines will continue to be added as a final treatment step in order to provide a disinfectant "residual" to keep the water disinfected in the distribution system's delivery pipes and tanks for customer use. Even though the treatment plants will use much less chlorine with the ozone process, the chloramine level in the distribution system will actually remain the same as before the use of ozone. Ozone does not go into the distribution system.

What happens if there is a problem with the ozone disinfection equipment?

If a problem occurs with the ozone disinfection equipment, it will shut down automatically and the chlorine disinfection equipment will start. Plant operators are on duty 24 hours a day and closely monitor the water treatment process, which utilizes sophisticated technology and has multiple back-up systems. If a problem occurs with the ozone system, there will be no danger to the water quality and it will be fully disinfected before it leaves the water treatment plant.

What is the ozone safety alarm system?

The ozone treatment system has many alerts and alarms to notify plant operators of problems or potential problems. The ozone alarms will be heard inside the plant buildings and because plant operators are often outside of the buildings monitoring outdoor operations, the alarm has a loud "horn" that can also be heard outdoors. The "horn" volume is lowered as much as possible within mandated requirements to lessen any disturbance to residents nearby. Plant operators will turn off the horn as quickly as possible.

Is there any danger to the community if the ozone gets out of the plant?

It is very unlikely that a release of ozone into the atmosphere will occur. However, if this occurs, the ozone system automatically shuts down and ozone reverts back to oxygen molecules, which are normally present in the breathable atmosphere. There will not be a plume of dangerous gas created by a release of ozone into the atmosphere. Local emergency response teams are prepared to address any incidents at any City water treatment facilities.