Hydrogen Sulfide Removal with Ozone

Hydrogen sulfide (H2S) is sometimes found in ground water. It has the odor of rotten eggs and has a threshold of 0.0011 mg/l. It can also cause water to have characteristic and unpleasant tastes. While aeration can be used to strip some of the hydrogen sulfide from the water, this converts a water problem to an air pollution problem if further treatment is not applied.

Hydrogen sulfide is easily and rapidly oxidized by ozone, ultimately to form sulfate. The initial oxidation is to form elemental sulfur which is seen as a light colored colloidal suspension. Further oxidation dissolves the elemental sulfur to sulfite and continued oxidation produces sulfate. As a result, more ozone is required to produce sulfate from hydrogen sulfide than is required to produce sulfur.

The theoretical dose to oxidize ozone to sulfate is 3:1, but in practice the ratio is 4:1. This will leave a small ozone residual in the water, 0.2-0.3 ppm. This residual can be used to ensure that the hydrogen sulfide is fully removed. In the case of variable hydrogen sulfide concentration, following the residual will allow for adjustment in the ozone dosage rate to maintain complete removal of the ozone. A dissolved ozone monitor with PID controller integrated with ozone generator power control can be used for this purpose.

Off gas from the ozonation process can strip hydrogen sulfide from water. Ozone in the off gas is often removed using an ozone destruct catalyst. If H2S is present in the off gas the ozone destruct catalyst can be poisoned. This means that the way the off gas is handled needs to take this issue into consideration.

Ozone has been used by the City of Orlando to remove H2S from their ground water for a number of years. Commercial beverage companies using similar water sources have also adopted ozone for controlling this problem. Integrated ozone water treatment systems are relatively easy to install, operate and maintain for this application.

http://www.spartanwatertreatment.com/hydrogen-sulfide-removal.html