Treat hydrogen sulfide and other hazardous chemicals cost effectively

Ultra-S3 is an effective oxidizing system that has been used successfully in the United States and abroad for more than a decade. It has been used in landfills, waste water treatment facilities, waste water retention ponds, food processing plants, chemical plants, paper mills, and sewage lines. It is cost-effectively and will treat many recalcitrant chemicals such as hydrogen sulfide (H_2S), benzene, methyl tert-butyl ether (MTBE), toluene, trichloroethylene, and many others.

Why Ultra-S3?

+ Efficient - rapid reaction that results in oxidation of contaminants to primarily CO_2 and H_2O
+ Easy - requires minimal capital infrastructure investment
+ Cost-effective - compares very favorably to other competitive treatment solutions on the market.
+ Safe - classified as non-hazardous under the Toxic Substance Control Act of 1976 (TSCA).
+ ROI - prolongs infrastructure life.
+ Targeted - Ultra-S3 targets problem compounds without destroying environmentally beneficial microbes.

How does it work?

1. An oxidant, generally hydrogen peroxide (H_2O_2) and the Ultra-S3 are injected separately into waste stream or over target area.
2. When combined with an oxidant, Ultra-S3 produces hydroxyl radicals that are capable of treating a variety of recalcitrant organic compounds.
3. Hydroxyl radicals are highly efficient oxidizers. These hydroxyl radicals break down difficult chemical bonds to remediate organic compounds to non-detectable levels.

A Proven Process – Case Study

Ultra-S3 and its chemical components have been submitted to and listed with the Toxic Substance Control Act of 1976 (TSCA) and is classified as non-hazardous without any risk flags.

One Northern California wastewater treatment plant used Ultra-S3 to eliminate a serious hydrogen sulfide (H_2S) problem. Although H_2S is pungent in low concentrations, it paralyzes the olfactory nerve at levels above 100 ppm to render workers oblivious to the danger.

The wastewater in this plant had hydrogen sulfide levels of 7–10 ppm, which produced concentrations in the sewer air averaging 102 ppm and peaking at 250 ppm. The objective of the S3 treatment was to reduce the H_2S concentration in the air to an acceptable level (less than 10 ppm).

The end result? Ultra-S3 reduced the hydrogen sulfide concentration in the air to less than 1 ppm with only 3 minutes of contact time.

Equipment Requirements for Ultra-S3 system:

UltraTech can help source components 2-4 if needed

1. Ultra-S3 (available from UltraTech distributor)
2. Hydrogen Peroxide or other oxidant
3. Peristaltic pumping system
4. Optional water-proof housing

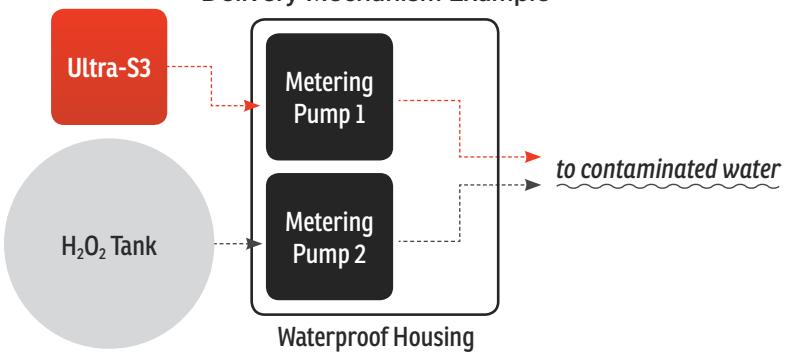
Steps Prior to Testing:

1. Identify pH of the polluted water. Ideal pH range is between 7.2-8.4.
2. Identify flow rate (gallons per day).
3. Identify concentration of pollutant (ppm).
4. Identify desired concentration of pollutant after treatment (ppm). This number is typically 0 ppm.

Keys to Success:

1. Neutral pH is optimal (7.2-8.4).
2. User MUST provide adequate mixing to allow hydroxyl radicals to contact and oxidize the target compound.
3. Mixing may be achieved by using a physical stirring mechanism, injecting chemistry in numerous locations and/or aeration.

Delivery Mechanism Example

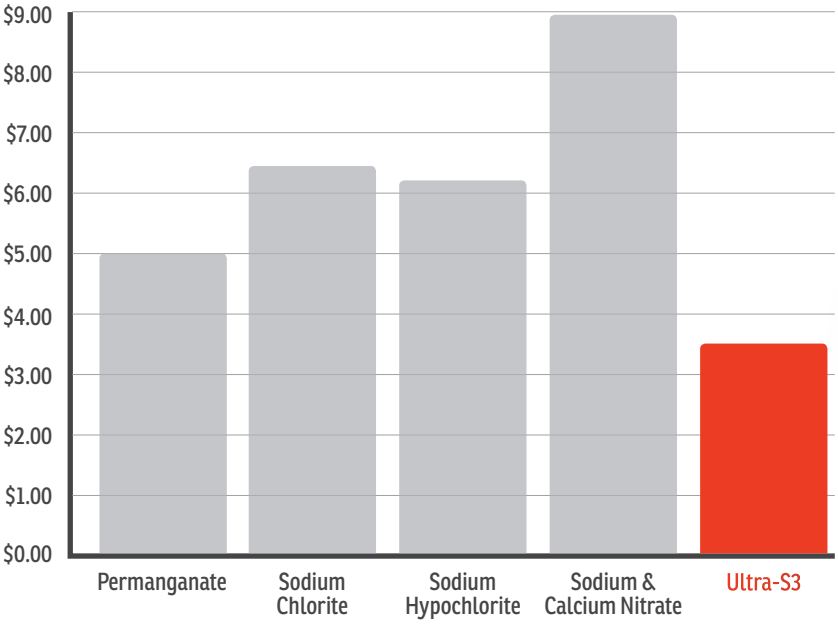


Efficiency of Ultra-S3 vs. Other Oxidants

Oxidant	Relative Oxidation (Potential Power)
Ultra-S3	2.10
Ozone (03)	1.50
Hydrogen Peroxide	1.30
Permanganate	1.20
Chlorine Dioxide	1.10
Chlorine Gas	1.00
Oxygen (02)	0.90
Iodine	0.54

*Source: http://www.epa.gov/oust/pubs/tum_ch13.pdf**
**Compound name "Hydroxyl Radical" = Ultra-S3*

Economical Comparison $/lb of Sulfide Treated



Part#	Description
4502	Ultra-S3 - 55 Gallon Drum
4506	Ultra-S3 - 275 Gallon Tote

ULTRATECH INTERNATIONAL, INC. | ATG ADVANCED TECHNOLOGY GROUP

ULTRA-S3™

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