



# TERRA

## OILFIELD SERVICES

INDUSTRY CHEMICAL TREATMENT LEADERS



24900 Pitkin Road Suite 200 Spring, TX 77384 • 281.288.5600 • [terraofs.com/](http://terraofs.com/)



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Hello,

It is my greatest pleasure to introduce you to the water treatment services that TERRA has been proudly offering since 2014. From working with others in the industry, we know that providing high-quality, cost-effective water treatment and recycling services is of the utmost importance. We strive to customize our services to your company's needs so that you receive consistent, effective outcomes.

With TERRA Oilfield Services, you will have a seasoned partner—our experienced site workers and field supervisors will ensure that any of your operations using our employees will run seamlessly. This support team will diligently supervise and monitor your projects and assist with operations throughout the duration of our working relationship to ensure success for your future projects.

Terra Oilfield Services is offering its services at the most competitive rates in the industry and we hope that the following information will convince you of our sincerity to achieving excellence in all our endeavors.

Please feel free to contact us with any questions or concerns that you may have-- we look forward to developing a close working relationship with you and your company to achieve our mutual interests.

Sincerely,

*Stan Peach - President*

Stan.Peach@terraofs.com

**PLEASE DIRECT ANY QUESTIONS TO:**

Jason Harris

Vice President of Water Recycling and Treatment

210-740-6182

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## SERVICE OVERVIEW



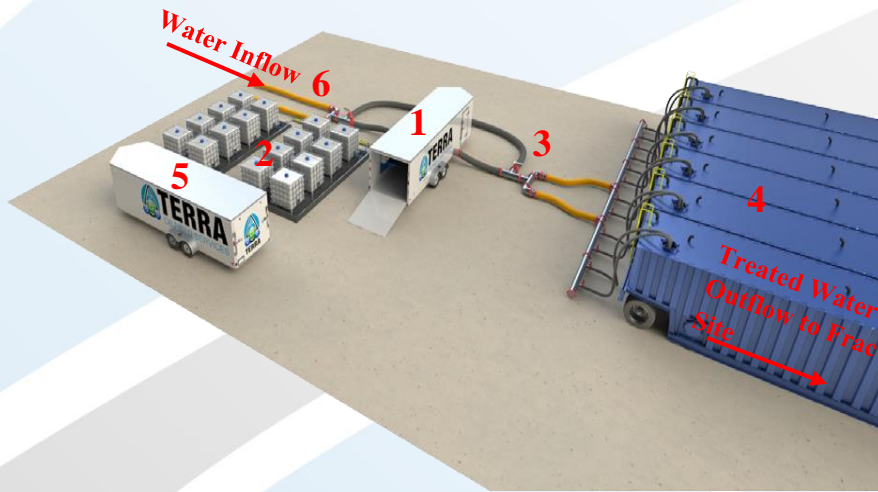
Chemical oxidizers have been used in the oilfield for remediation of H<sub>2</sub>S and bacteria for decades. TERRA's proprietary ClO<sub>2</sub> generator has been proven to be a cost-effective treatment for the immediate elimination of bacteria and other contaminants. Contamination of source water is a far-reaching concern for production operations that, if left untreated, can cause cascading, long-term problems for fracing and production operations.

Terra OFS uses a proprietary and patent pending ClO<sub>2</sub> generator system that is extremely safe and effective. When combining ClO<sub>2</sub> along with our blend of biocides, our cost-effective process completely oxidizes H<sub>2</sub>S while also penetrating microorganism protective layers to effectively neutralize water contaminants. Our system design ensures that, no matter the quality or quantity of source water, all water will be passed through our ClO<sub>2</sub> generator, allowing for more flexible treatment strategies that ensure that the treated water meets your quality standards.

In addition to biocides, we offer a scale inhibitor to prevent scale build-ups during production. If left unchecked, buildups can cause blockage in production operations, which can lead to damaged equipment and loss of production. Our treatment system ensures that such impediments to production are prevented before the source water even enters the well bore.

## EQUIPMENT AND PROPOSED LAYOUT

### TREATMENT SYSTEM MODEL



1. Chemical Injection Trailer and Lab
2. Chemical containment totes
3. Static Mixer/Manifold
4. Frac Tanks
5. Safety Trailer
6. Lay-flat Hose

The above model is a typical site layout—our pad footprint is minimal so as to provide the greatest amount of safety for the least amount of space occupied.

### CLO<sub>2</sub> GENERATOR

1. Chlorine dioxide injection manifold
2. Chlorine dioxide generator
3. Power disconnects for ClO<sub>2</sub> generator and boost pump
4. ClO<sub>2</sub> atmospheric gas detector (with alarm)
5. ClO<sub>2</sub> residual level monitor (typically monitors frac tank residual ClO<sub>2</sub> levels)



Interior of our chemical injection trailer. All water is pumped through our ClO<sub>2</sub> generator for on-the-fly water treatment that scales to the volume of flow. From there, the water is then pumped to the blender where additional long-term biocides are added.

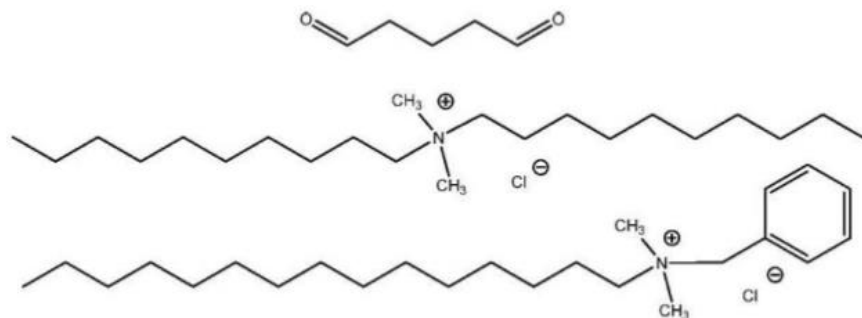
## CLO2 SAFETY MEASURES

- Generator's paddle wheel sensor will not allow the precursor chemical pumps to run unless there is 2.1 GPM of water moving through the generator
- Polycarbonate containment surrounds generator
- Chemical feed lines are all double walled and run through safety ramps
- Gas leak detector in generator trailer
- Unit designed to operate autonomously
- Intelligent, simple two precursor-chemical design ensures dependable and safe field operations.
- Precursor-chemicals are HCl & NaClO<sub>2</sub> thereby eliminating the need to use of sulfur.



## OUR CHEMICALS

### GLUT-QUAT



- Aquacide 12:3 is an EPA registered synergistic blend of glutaraldehyde, didecyl dimethyl ammonium chloride and n-alkyl (50%C14, 40%C12, 10%C16) dimethylbenzyl ammonium chloride in a water/ethanol solution
- Designed and optimized for control of sulfate-reducing bacteria (SRB) that contribute to souring, the production of sulfide, and abiotic corrosion in Oil Field and Cooling Water systems, Gas Production and Transmission Pipelines and systems.

## SCALE INHIBITOR

Appearance at 25°C	Clear Liquid
pH	6.0–8.0
Density (lbs/gal)	9.2
Specific Gravity	1.1
Solubility	Soluble in Water

- Prevents Calcium Carbonate, calcium sulfate, magnesium sulfate, barium sulfate, and other oilfield scales from forming
- Provides outstanding scale inhibition both during and after stimulation treatments.