



Campus Energy Conference 2022

Allowing ClO₂ to Live Up to its Promise

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Your Presenters:

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SOTI
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Allowing ClO₂ to Live Up to its Promise

- Mobile, high capacity, high purity chlorine dioxide generators
- World Class Service Company teamed with Primary EPA Registrant with best in class technology
- Technology has been validated globally across industry
- Collaborations with government agencies completed and currently underway
- Peer-reviewed publications
- Extensive lab and field technical experience
 - Ph.D.-level Scientists, Engineers, Operators, and Technicians



SOTI a brief Application history

- Generator platform has a 30+ year history of deployment in municipal water treatment, food processing and energy/oilfield sector
- Platform largely recognized for biological response technology to anthrax in 2001 Due to its high capacity and mobility along with record of safety and performance
- Why not apply this technology in large closed loop cooling systems?

A Familiar Chemical Used in a New Way

Chlorine dioxide has been around in industry for 60+ years

SOTI gave it an upgrade that makes it ideal for heat exchange systems

Mobile high capacity generators

- Low capex installations**
- Highly reliable equipment**
- No corrosive or hazardous precursors stored on site**
- Trained and certified application technician**

A Familiar Chemical Used in a New Way

- **DiKlor is Chlorine dioxide produced is chlorine free and neutral pH**
 - mitigates corrosion issues
- **Wide capacity range, minimizes treatment time, effective in clean and highly contaminated systems**
- **New application platform allows chlorine dioxide to live up to its promise**
- **Short treatment period – lasting results**
- **Now examples from Chem-Aqua**

Princeton University

- Treating primary and secondary loops
- First application to develop 0.4 to 0.8 ppm ClO_2 at “farthest” point
- Subsequent applications to develop > 4.0 ppm ClO_2 at farthest point
- Current plan is monthly applications
- Typical time on site < 6.0 hours

MCCO: Cleveland

- Treating 1,400,000 chilled water loop
- Challenge: high pressure loop made conventional ClO_2 application “problematic” and dangerous
- Typical delivery is 2500 to 3500 gallons
- Target application rate to develop > 1.0 ppm ClO_2 at farthest point 1 hour after dosing
- Typical time on site < 5 hours

Well Known Midwestern University

- Treating 1,500,000 to 1,800,000 gallon geoexchange system
 - Hot loop, chilled loop and well field
- Chem-Aqua bioDART[®] confirmed extensive biofouling
- HPC's were above 1,700,000 cfu's/ml
- Monthly application of approximately 1800 gallons
- Develops ClO₂ residual of >3.0 ppm ClO₂ system wide
- HPC's now consistently <1,000 cfu's/ml system wide
- Typical time on-site < 4.0 hours

Product Platforms

High-purity DiKlor® Reactors and Generation Systems

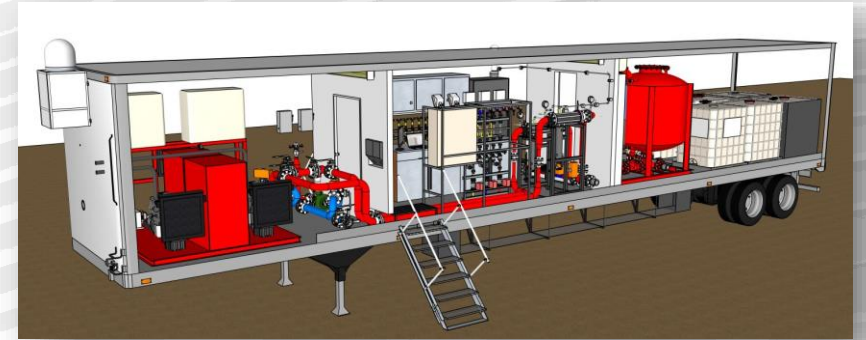
- Produce chlorine dioxide free of corrosive impurities

DiKlor® Storage Systems – Replenish™ Technology

- On-site storage of liquid solution without the need for operation, generator maintenance or precursor chemicals

High-Efficacy DiKlor® Liquid Treatment

- DiKlor® is applied at high concentrations, ideal for application in areas where biofilm or organic material may hinder disinfection



Biofilm and biosolids elimination

- Chlorine dioxide has proven excellent in municipal water and energy industry for the elimination of biofilm and biosolids resulting in:
 - MIC or Microbiologically induced corrosion
 - Film and solids formation that results in increased pressure drop through system and thus higher operating costs
 - Film formation that results in heat transfer loss and thus reducing process efficiency
- Using this technology the drinking water industry gets better water quality and longer filter runs
- In the energy industry downtime due to under deposit corrosion is minimized along with efficiency gains in pressure drop and heat exchange
- Biofilm product contamination in food industry



bioWALL Advantages

Benefits to end user when bioWALL treats chiller-loop over substitute biocides:

- 1. No infrastructure footprint**
 - No dedicated purchase/maintenance of generator, pumps, containment for a specific location or region
- 2. No on-site storage of hazardous chemicals**
- 3. Significant generator/containment-area cost avoidance**
 - Chemicals, pumps, and containments housed on Replenish truck, minimizing footprint
- 4. Significant labor savings: bioWALL generates and doses 5-10 times faster**
- 5. This becomes significant with bulk water treatment, sometimes reducing operations from 24 hours plus to less than 5**

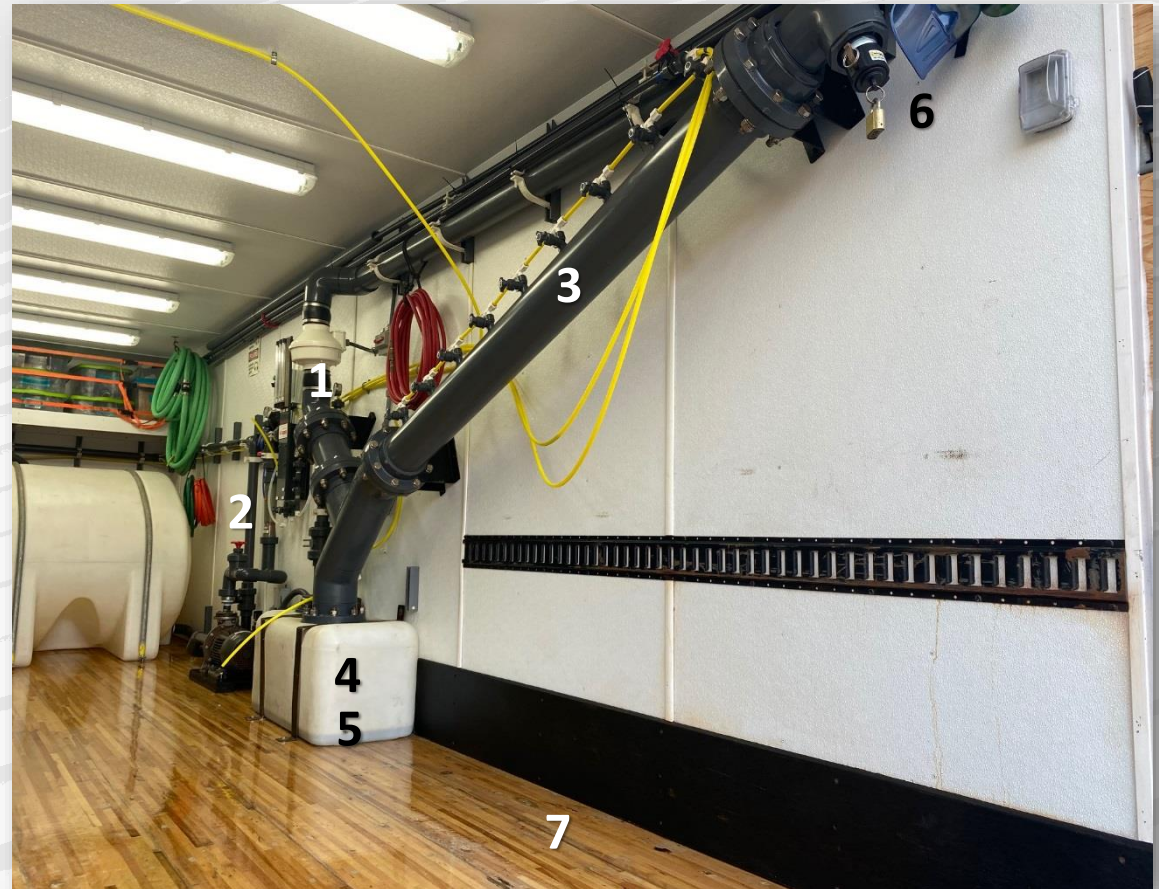
Replenish™



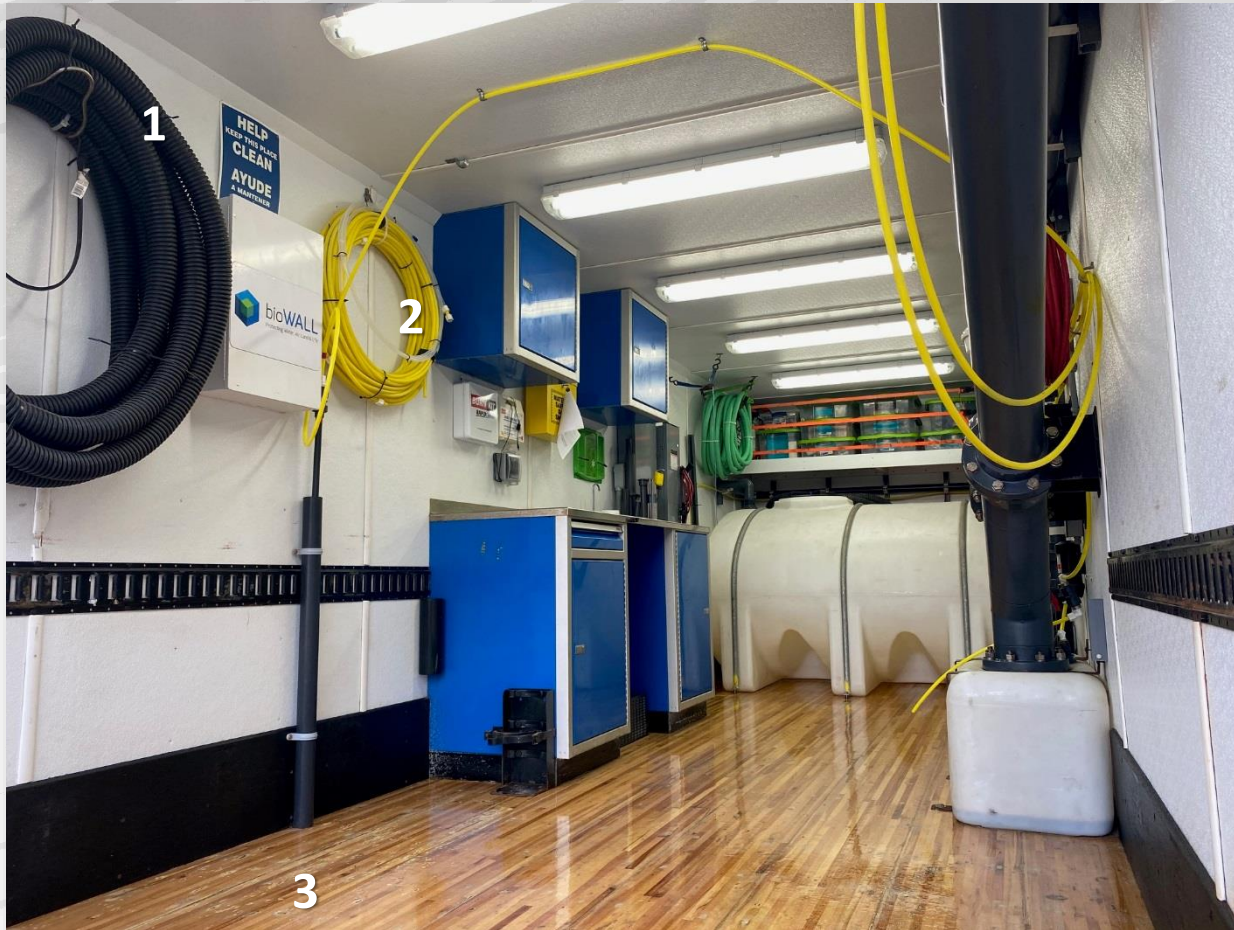
1. PM Parts and Spares Storage
2. Discharge Lines – cut and crush resistant 200 PSIg WP (actual use < 100 PSIg)
3. Safety Supplies
4. Potable Water Reservoir
5. PM / QA-QC Workbench
6. Replenish Bay Heating (maintains operational temperatures)

Replenish™

1. Multi-Range Diklor Reactor and controls (discharge through floor)
2. Pump Systems
3. Sodium Erythorbate scrubber system
4. Reservoir
5. Scrubber
6. Rear roofline discharge hose connection
7. Hypochlorite and Chlorite Storage



Replenish™



1. Scrubber and Tank Vent line storage
2. Acid Stinger Storage
3. HCl (secondary Steel containment) scrubber solution and Spill Kit storage

Replenish™/Dispensing

Operations Sequence

1. Arrive at client location
2. Initiate SabreTrax™ record keeping
3. Perform JSA
4. Review site fill requirements
5. Perform site preventative maintenance and training
6. Verify Replenish™ Tank volume and DiKlor® concentration
7. Hook up Potable Water Supply (on-board supply can be used)
8. Hook up fill line/outlet & injection pump
9. Hook up headspace scrubber line
10. Fill Replenish™ tank or directly apply DiKlor® as needed
11. Flush generation loop to Replenish™ Tank
12. Perform and log QA/QC results
13. Upload SabreTrax™ log to server for: HSE, QA/QC, auto billing
14. Unhook and demobilize
15. Typical time on site – 1 to 4 hours
16. Fill rate – 9 to 50 gpm 3000 mg/l ClO_2

Arrive at Client Location

Paperwork/Physical Work

Unhook & Demobilize

Replenish™



1. Remote Telemetry
 - Level
 - Pump functions
 - Alarm Conditions
2. Auto Dilute Fill Station
3. Tank 400-5000 gal
4. Fill Line
5. Vent Line

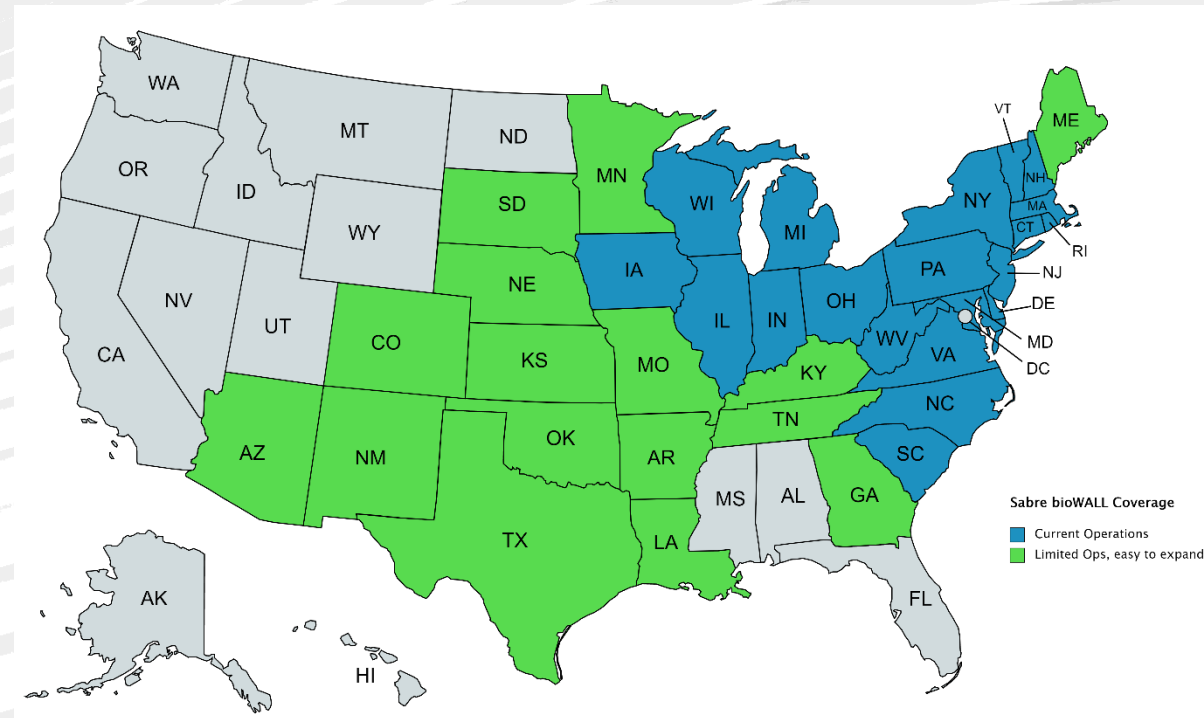
FAQ's

1. Is there a survey form that lists the equipment and access needed for safe, successful pump off?
There is an onsite survey conducted by bioWALL personnel. Refer to installation checklist.
2. What is the maximum distance that the finished ClO_2 product can be pumped?
In the O&G industry, ClO_2 is used in produced water treatment and downhole stimulation, often requiring miles of travel within a system under less than ideal conditions. bioWALL should be able to accommodate pumping a building from outside, with the ability to flush the lines before disconnecting with fresh water.
3. Are there any weather issues/concerns?
Our units are equipped for cold weather operations. Tankage and water access must be secured against winter conditions, but bioWALL routinely makes deliveries throughout the winter months to the upper Northeast and upper Midwest.
4. What is the typical time frame for delivery from the date of order placement?
Typically 3 weeks, depending on availability of specific components (pump, tank, etc.).

FAQ's

6. Tank specifications for the safe storage of the ClO₂ solution -- material of construction.
1.8 or greater SG tank composed of polypropylene.
7. Does bioWALL have recommended safety training of our sales rep and customer?
Clients should always be aware of any chemicals onsite. Training mainly consists of a review of day to day functionality, the MSDS, and corrective actions/response measures in the event of a malfunction.

Logistical Area of Coverage as 2021



NOTE: We plan to have full NA Coverage by early 2023

For Additional Information, Please Contact

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Questions?





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Thank You!