

CASE STUDY

Eliminating Hydrogen Sulfide in Produced Water

ThunderOx
for Sour Water Treatment



MAKING HEAVY INDUSTRY CLEANER,
SUSTAINABLE, MORE PROFITABLE.

OVERVIEW

An oil and gas company in Lea County, New Mexico, faced a critical operational challenge: treating produced water containing ~200 ppm hydrogen sulfide. Several risks associated with high levels of H₂S in this system include:

- Hazardous exposure risks due to lethal H₂S headspace levels (>20,000 ppm)
- Escalating costs from chemical scavengers and maintenance
- Corrosion of pipelines, tanks, and infrastructure
- Contractual non-compliance with custody transfer limits (>10 ppm dissolved H₂S)

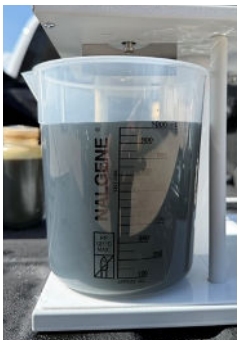
The operator was spending a substantial amount of money per month on chemical treatments while struggling to consistently meet midstream specifications. High H₂S concentrations triggered surcharges and risked total shut-in of water transfer, threatening both safety and production uptime.

The operator requires a safe, reliable, and cost-effective treatment method capable of reducing H₂S in produced water to <10 ppm in real time while integrating with existing infrastructure.

DEFINING THE SOLUTION: ThunderOx Sulfide Elimination System

Approach

1. **Source Identification** – Testing across five central tank batteries revealed that one facility, located immediately upstream of water custody transfer, was responsible for the majority of H₂S in the gathering system.
2. **Chemistry & Process Design** – Streamline performed a ThunderOx demand study in the field to determine baseline water characteristics and chemical loading requirements. This testing included typical water parameters like pH, ORP, dissolved, and atmospheric sulfide.



Untreated Produced Water

Sample Point	Temp C°	pH	ORP	Dissolved H ₂ S (ppm)	Headspace H ₂ S (ppm)
Tank 1	42.2	5.7	-316	187	>20,000
Tank 2	45.2	5.4	-277	196	>20,000

Using a calculated loading ratio, Streamline applied the ThunderOx Sulfide Elimination System and tested dissolved H₂S concentration after 5 minutes of mixing:



Treated Produced Water

Sample Point	pH	Dissolved H ₂ S (ppm)
Tank 1	6.3	0.55
Tank 2	6.5	0.26

APPLYING THE SOLUTION: ThunderOx Sulfide Elimination System

The operator chose the ThunderOx Sulfide Elimination System from Streamline to directly target dissolved H_2S . ThunderOx selectively targets sulfides to create an efficient liquid redox reaction that does not form iron sulfide as a byproduct.

Operational Results

- Average daily volume treated: 5,500 BBL/day
- Untreated H_2S (avg): 122 ppm
- Treated H_2S (avg): 1.7 ppm
- Midstream transfer point: consistently < 1 ppm



Performance:

Rapid Treatment – Using peristaltic injection pumps and chemical storage tanks, the ThunderOx system consistently achieves reduction of dissolved H_2S to an average of 1.7ppm at point of treatment and below 1 ppm at the custody transfer point.

Automation & Monitoring – Streamline implemented a SCADA system with bi-directional pump control and remote tank monitoring, enabling real-time dosing adjustments. A Streamline field operator spends only one hour per day on site for sampling and inspection, significantly reducing manpower requirements.

Operational and Economic Impacts

- **H₂S Reduction.** Reduced H₂S from ~200 ppm to <1 ppm, achieving complete treatment of dissolved sulfides and eliminating midstream surcharges.
- **Cost Savings.** Replaced expensive hemiformal-based scavenger treatment, saving the operator more than 80% of their previous monthly chemical spend.
- **Operational Efficiency.** Rapid <5-minute reaction time with automated dosing reduced manpower needs to one operator hour per day.
- **Infrastructure Integration.** No new infrastructure required; solution was installed into existing facility equipment.

Advantages of the ThunderOx System

- **Highly selective for H₂S.** ThunderOx chemistry is highly selective for H₂S treatment through ion exchange.
- **More efficient.** Because ThunderOx targets H₂S, less chemistry is needed to treat the same volume of water.
- **Regenerative.** The ThunderOx system is regenerative through a redox reaction that uses hydrogen peroxide as the oxidant source.
- **Operationally simplistic.** No special equipment is required, making the system easy to operate with minimal supervision.
- **Safe and environmentally friendly.** ThunderOx breaks the H₂S molecule down into elemental sulfur with no special disposal requirements.

CONCLUSION

The ThunderOx Sulfide Elimination System has provided the operator with a proven, scalable, and economically transformative solution for sour produced water treatment. By combining selective chemistry, rapid reaction time, and automated control, Streamline delivers a safer, more reliable, and more cost-effective process—helping the operator avoid shut-ins, reduce HSE risk.

ThunderOx has demonstrated its value in one of the harshest produced water treatment environments, reinforcing its role as a next-generation alternative to conventional scavenger-based H₂S control.

Contact us today to learn more
about green, ecologically friendly
produced water treatment solutions
from Streamline Innovations.

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