



The Results are Clear.

EK ONE™ TREATMENT

Frac-on-the-Fly Performance Study

A two-year field study of microbiological control in hydraulic fracturing source water

EnviroKlean treated 94 million barrels of frac source water on the fly across 286 wells, then measured what happened before treatment, after treatment, and again at 30, 60, and 90 days post-completion. Active microbial biomass fell 87.8% on average, every well moved from reducing to oxidizing conditions, and 96.5% still held sulfate-reducing bacteria (SRB) at no detection or trace levels three months after completion.

286

Wells Treated

212

Full Data Sets

94.0 MM

Barrels Treated

July 2022 – June 2024 | enviroklean.co | Midland, Texas



What the Study Measured

The Results are Clear.

STUDY DESIGN, SCOPE, AND THE QUESTIONS IT WAS BUILT TO ANSWER

Population

286 wells hydraulically fractured with frac-on-the-fly source water treated with the EK One™ program. 212 carried a complete pre-treatment, post-treatment, and post-completion test record.

Period

July 2022 through June 2024 — two full years of continuous commercial operations, 57 frac jobs, 7 field crews.

Primary Endpoint

cATP (cellular ATP, pg/mL) as a direct measure of active microbial biomass, paired untreated vs. treated on every well.

Bacteria Endpoints

APB and SRB by 28-day serial-dilution culture, measured at treatment and again at 30, 60, and 90 days post-completion.

Supporting Data

HACH field measurements of ORP, pH, and TDS; chemical volumes and PPM treat rates for every well.



Results at a Glance

The Results are Clear.

EIGHT HEADLINE OUTCOMES FROM 212 FULLY DOCUMENTED WELLS

Every figure here is drawn from the 212-well complete-data cohort unless noted. 100% of wells showed a cATP reduction — not one well got worse.

94.0 MM

Barrels of source
water treated

286

Wells treated across
57 frac jobs

87.8%

Average cATP
reduction

83.0%

Wells above 80%
cATP reduction

100%

Wells with a positive
ORP shift

+331 mV

Average ORP
increase

97.2%

SRB no-detect or ≤ 10
CFU/mL at treatment

96.5%

SRB control held at
90 days post-completion



Scale of the Data Set

The Results are Clear.

BARRELS TREATED PER WELL ACROSS THE 212-WELL COHORT

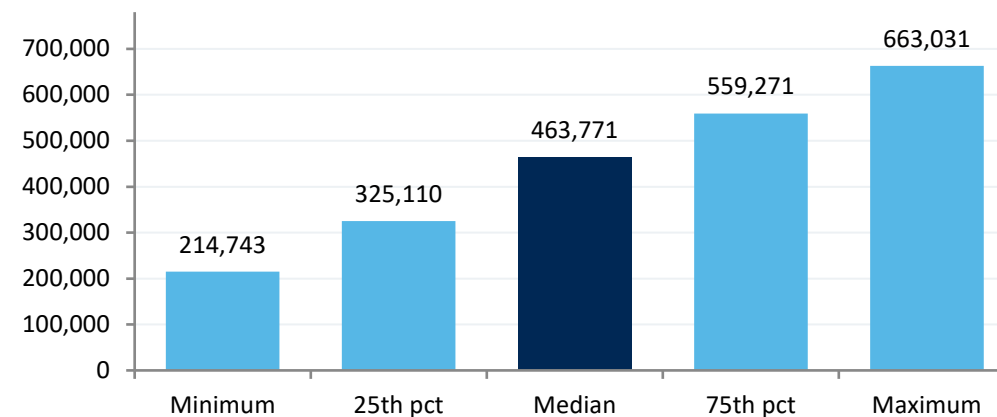
Every figure here is drawn from the 212-well complete-data cohort unless noted. 100% of wells showed a cATP reduction — not one well got worse.

Barrels Treated per Well	Value (BBL)
Wells (n)	212
Total barrels treated	93,984,926
Mean per well	443,325
Median per well	463,771
Std. deviation	124,014
Minimum	214,743
25th percentile	325,110
75th percentile	559,271
Maximum	663,031

A representative population, not a curated one.

Half the wells in the cohort fall between 325,110 and 559,271 barrels treated — a tight interquartile band around a 463,771-barrel median. The study is built on ordinary commercial completions across the full range of jobs EnviroKlean ran in the period, not on a hand-picked subset of favorable wells.

Barrels Treated per Well — Distribution



94.0 MM

Total barrels treated

443,325

Average per well



Biological Knockdown on Pad

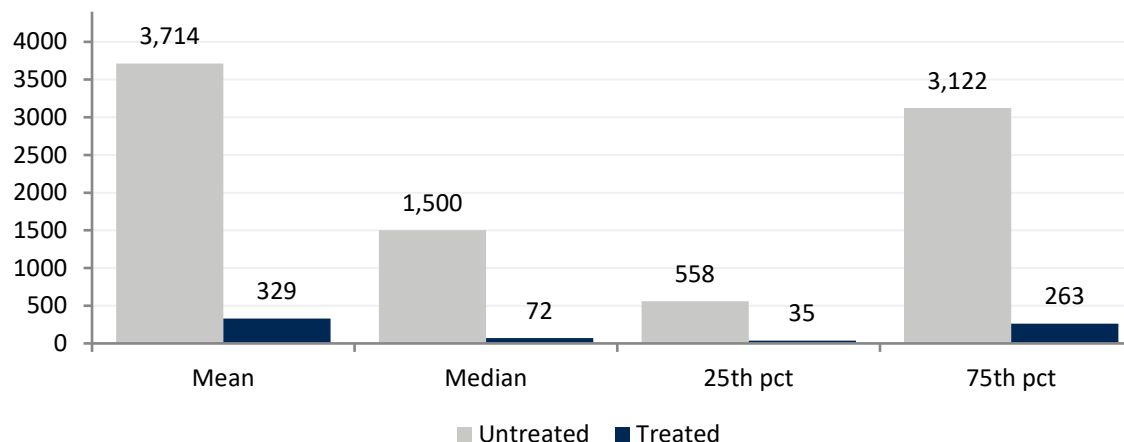
The Results are Clear.

CELLULAR ATP (PG/ML) – PAIRED MEASUREMENTS ON ALL 212 WELLS

Statistic	Untreated (pg/mL)	Treated (pg/mL)
Mean	3,714	329
Median	1,500	72
25th percentile	558	35
75th percentile	3,122	263
Maximum	59,582	3,811
Std. deviation	7,380	678

The whole distribution moves, not just the average. The treated 75th percentile (263 pg/mL) falls below the untreated 25th percentile (558 pg/mL), and the highest treated reading in the study — 3,811 pg/mL — sits below the untreated mean.

cATP (pg/mL) — Before vs. After



87.8%

Average cATP reduction
per well

93.5%

Median cATP
reduction

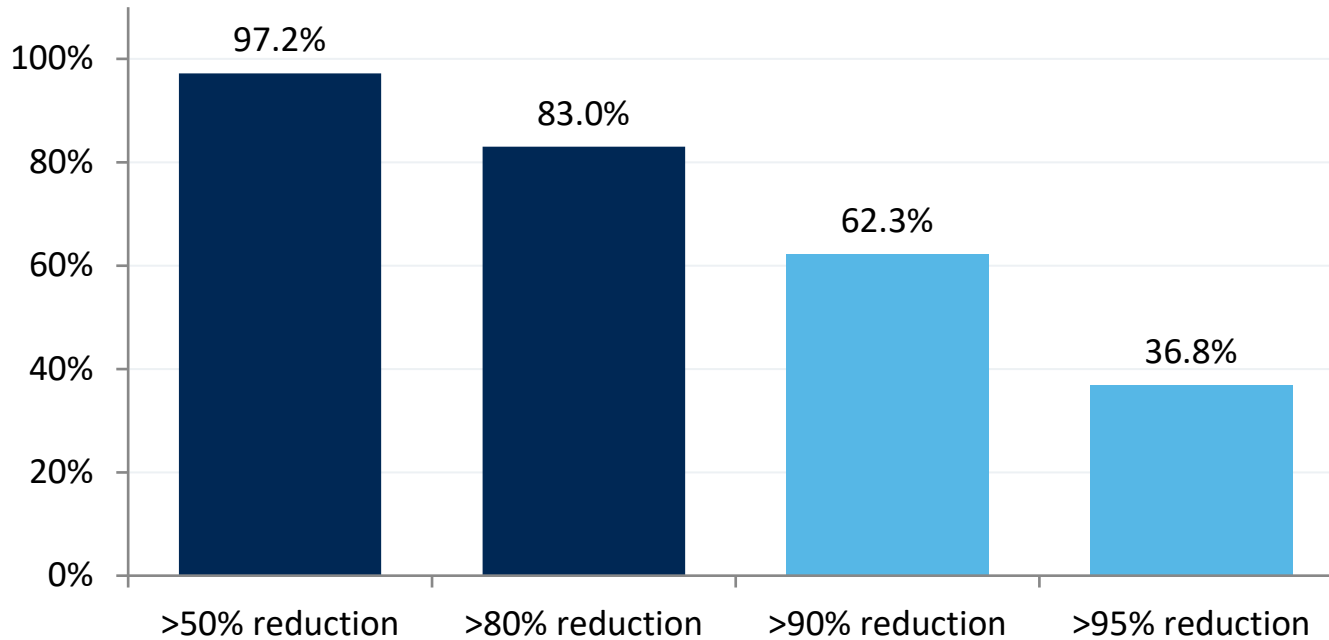
Reduction percentages are calculated per well and then averaged, not derived from the pooled means.



Consistency of Knockdown

The Results are Clear.

SHARE OF THE 212-WELL COHORT CLEARING EACH REDUCTION THRESHOLD



206 of 212 cleared 50% reduction

176 of 212 cleared 80% reduction

132 of 212 cleared 90% reduction

78 of 212 cleared 95% reduction

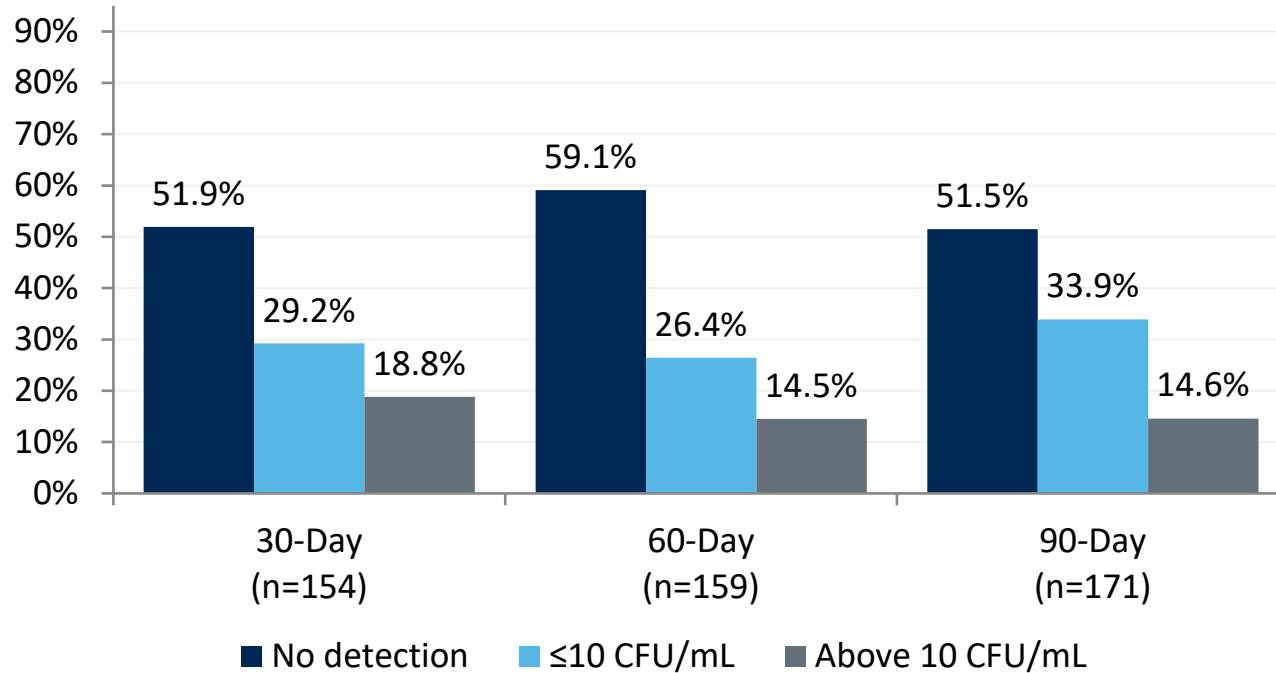
212 of 212 wells showed a cATP reduction

Four out of five wells cleared 80% reduction, and nearly two-thirds cleared 90% — across seven crews and widely varying source water.



Post-Completion APB: 30, 60, and 90 Days The Results are Clear.

ACID-PRODUCING BACTERIA (APB) DISTRIBUTION BY FOLLOW-UP INTERVAL



APB	30-Day	60-Day	90-Day
No detection	80	94	88
≤10 CFU/mL	45	42	58
11–100 CFU/mL	23	17	15
101–1,000 CFU/mL	2	5	6
>1,000 CFU/mL	4	1	4
Wells tested	154	159	171

85.4%

At no detection or ≤10 CFU/mL at 90 days post-completion

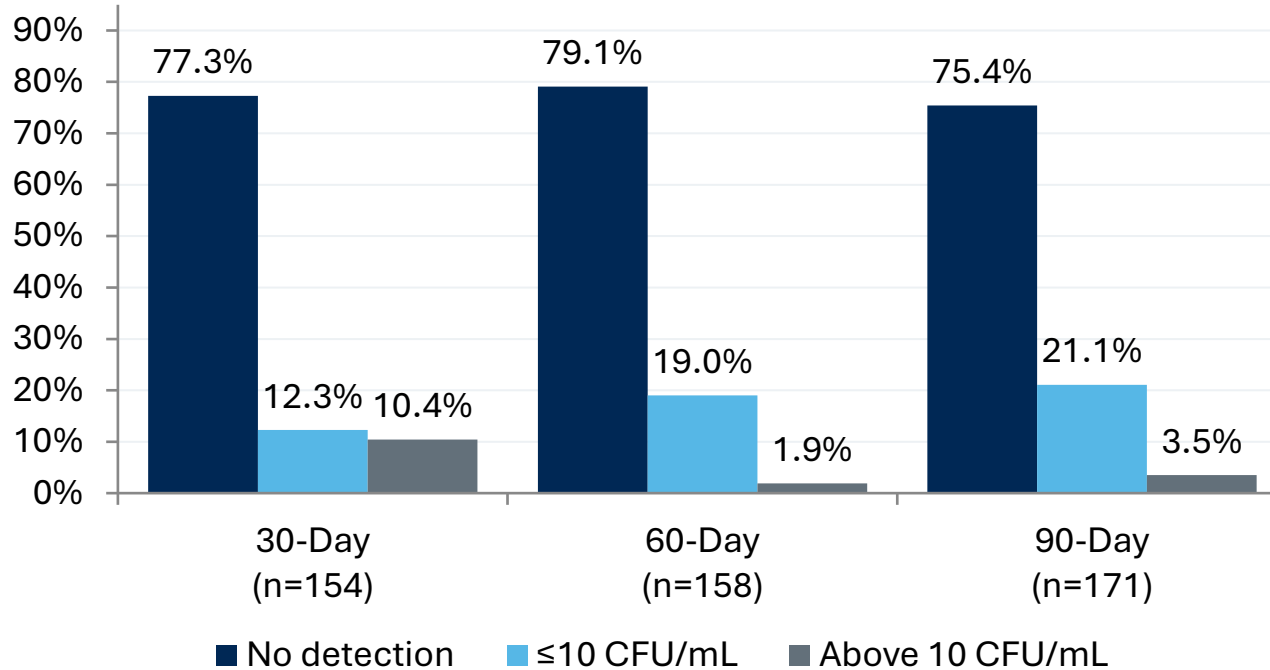
Well counts differ by interval because not every well was sampled at every follow-up. Percentages are calculated against the wells actually tested in each interval. Detailed sub-bands above 10 CFU/mL are shown in the table.



Post-Completion SRB: 30, 60, and 90 Days

The Results are Clear.

SULFATE-REDUCING BACTERIA – THE SOURING AND MIC RISK INDICATOR



SRB	30-Day	60-Day	90-Day
No detection	119	125	129
≤10 CFU/mL	19	30	36
11–100 CFU/mL	12	3	4
>100 CFU/mL	4	0	2
Wells tested	154	158	171
Under control	89.6%	98.1%	96.5%

165 / 171

At no detection or ≤10 CFU/mL at 90 days

Three quarters of wells still registered no SRB detection at all 90 days after completion. Only 2 of 171 exceeded 100 CFU/mL.

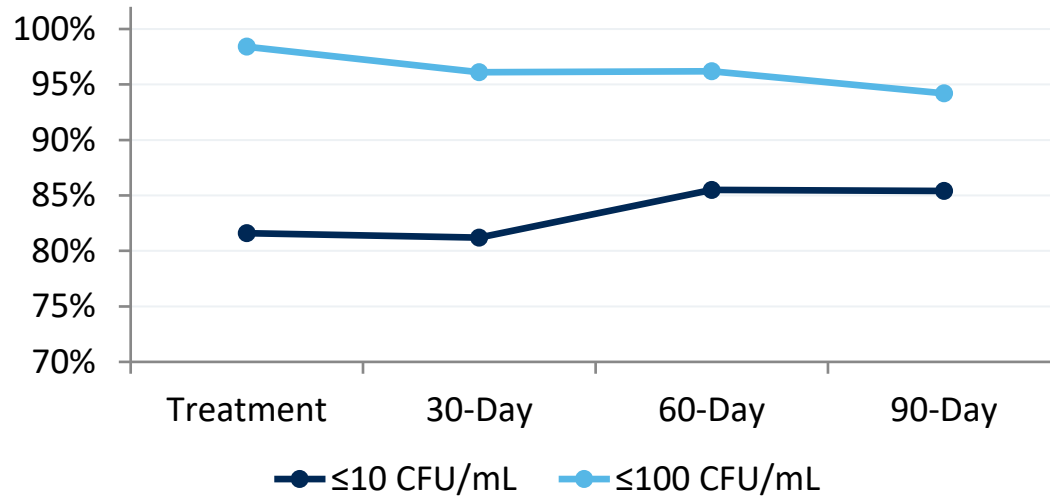


Durability of Control Through 90 Days

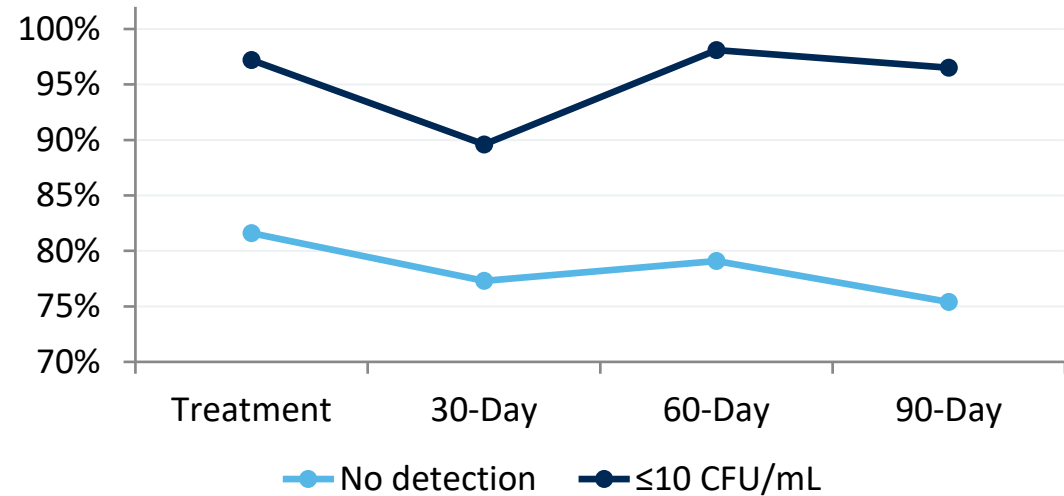
The Results are Clear.

PROPORTION OF WELLS HOLDING EACH THRESHOLD, TREATMENT THROUGH 90 DAYS POST-COMPLETION

APB Control Maintained



SRB Control Maintained



Both sets of curves flatten after 30 days rather than trending down. Control established at treatment was still in place three months later, at every follow-up interval.

85.4%

APB ≤10 CFU/mL
held at 90 days

94.2%

APB ≤100 CFU/mL
held at 90 days

96.5%

SRB ≤10 CFU/mL
held at 90 days

75.4%

SRB still at no
detection at 90 days



What the Data Supports

The Results are Clear.

DURABILITY AND OPERATIONS

Durable bacterial control

96.5% of wells maintained SRB no-detect or ≤ 10 CFU/mL at 90 days post-completion — 165 of 171 tested.
75.4% still showed no SRB detection at all.

Sustained biomass suppression

Post-completion median cATP held near 11 pg/mL at 30, 60, and 90 days, against an untreated median of 1,500 pg/mL. Mean and maximum both declined over the period.

Repeatable at commercial scale

Consistent outcomes across 7 field crews, 57 frac jobs, 200+ wells and two full years of routine operations — not a controlled pilot.

Efficient by design

8.0 gallons of EK One™ chemistry used per 1,000 barrels average, with no correlation between chemical volume and reduction achieved. Dosing responds to biological load, not to a fixed rate.

94 million barrels. 286 wells. 90 days of verified control.

87.8%

Average cATP reduction

100%

Positive ORP shift

96.5%

90-day SRB control



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**Let's build the future of
produced-water treatment together.**