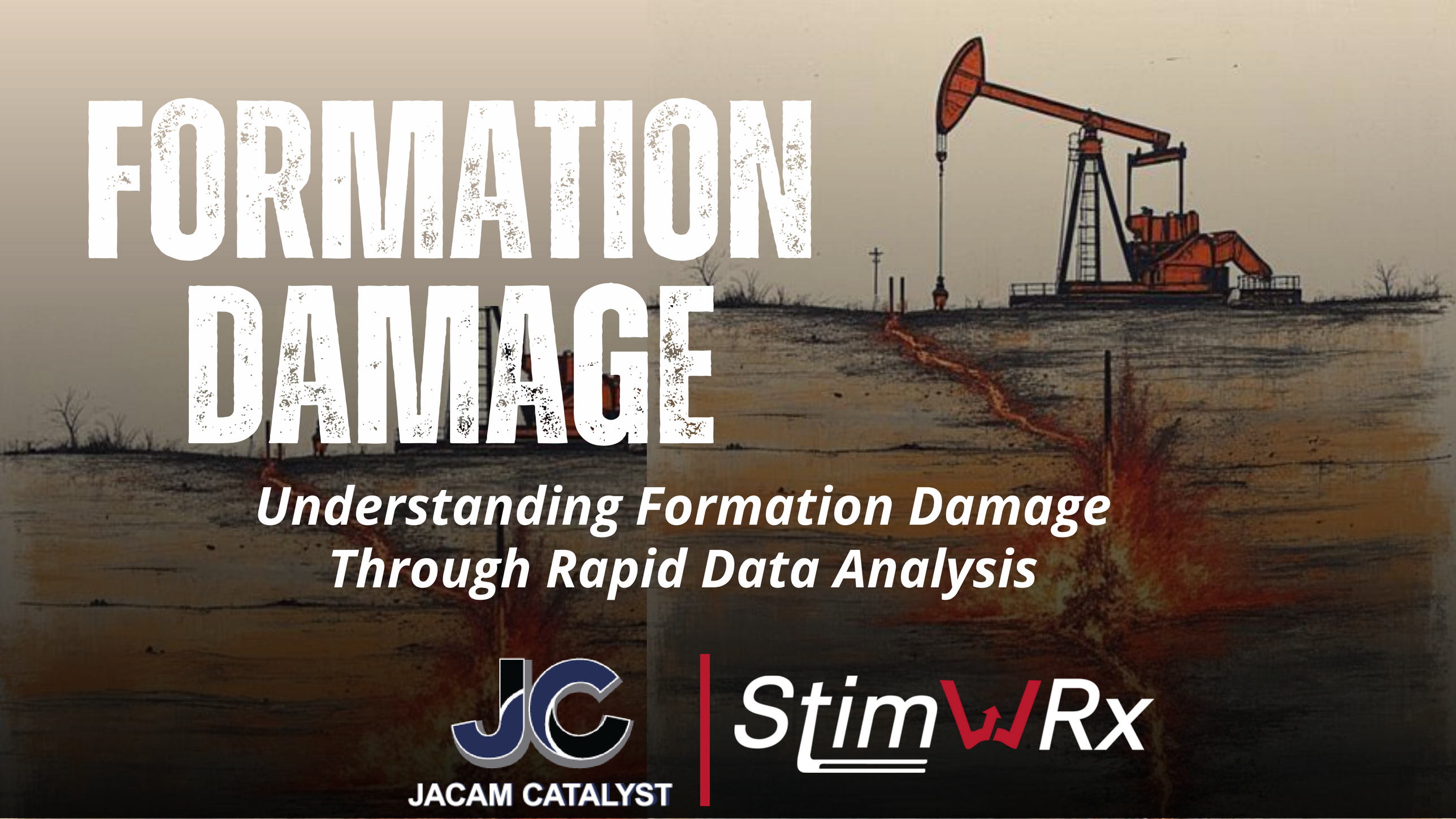


FORMATION DAMAGE

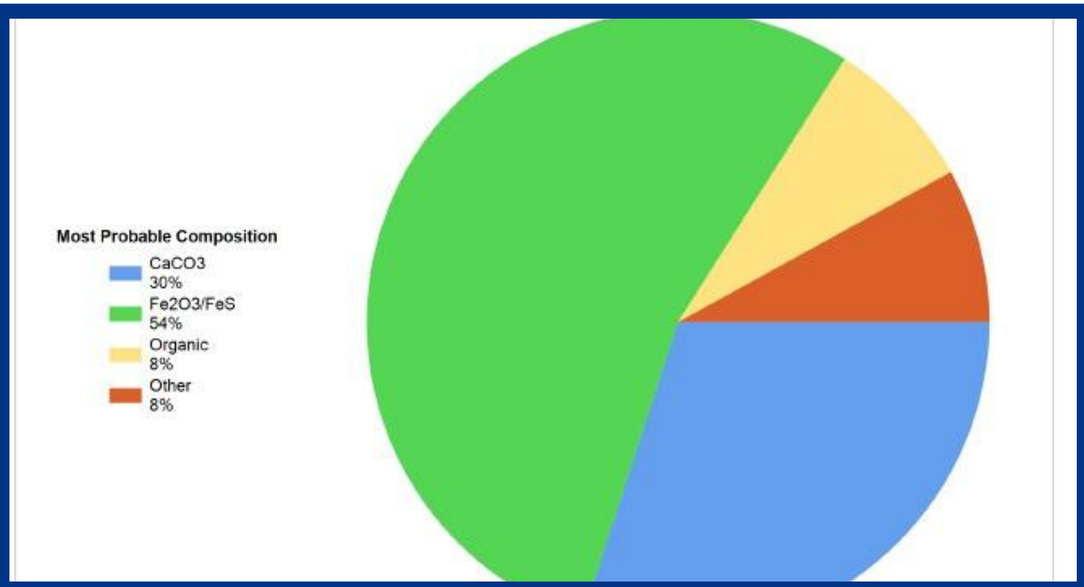
Understanding Formation Damage Through Rapid Data Analysis

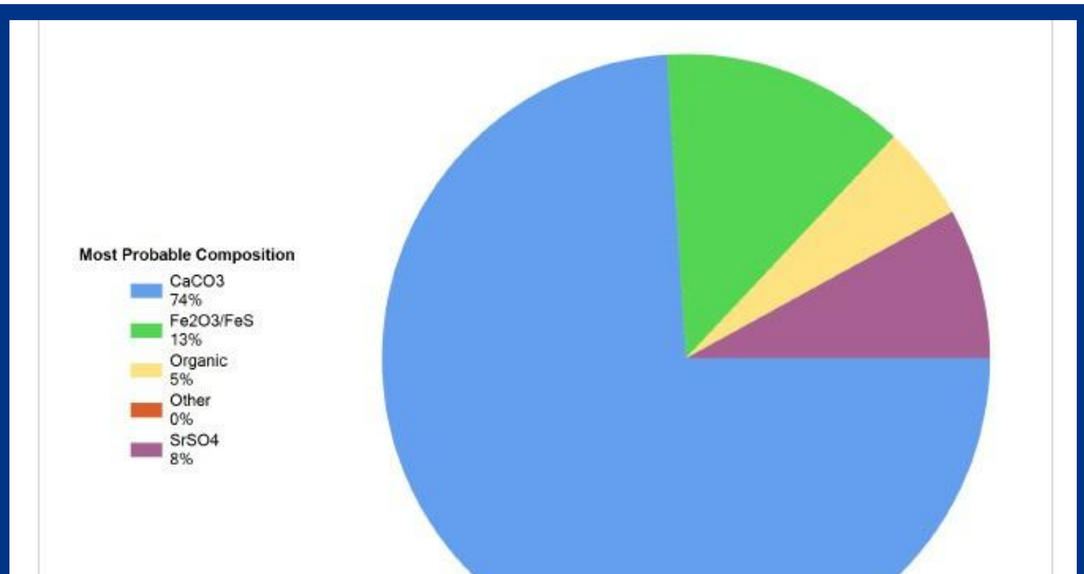
JACAM CATALYST | StimWRx

IT'S NOT ALL SAND

Misunderstanding formation damage

TRADITIONAL FORMATION DAMAGE ANALYSIS



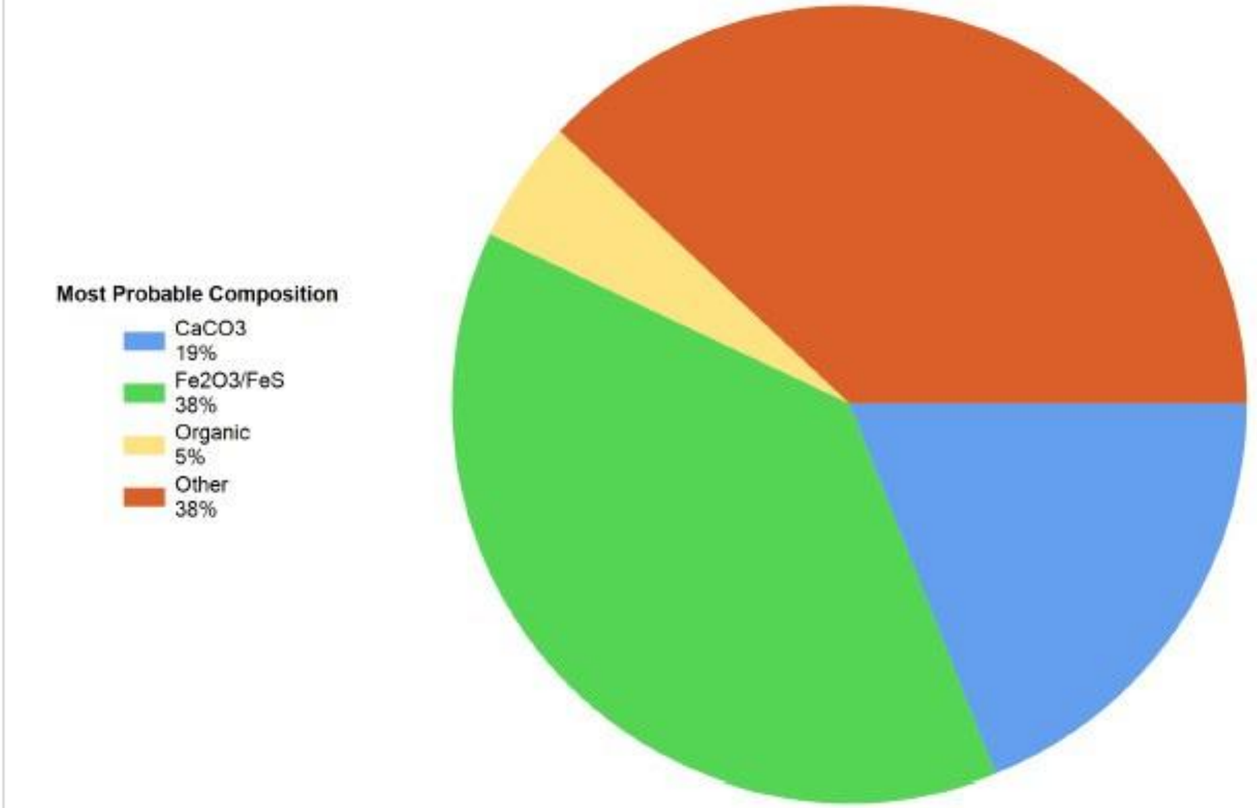


- Common trend of misdiagnosis beginning to emerge
- Visual analysis below 10% accuracy
- Tailgate below 75% accuracy

LOOKS ARE DECEIVING

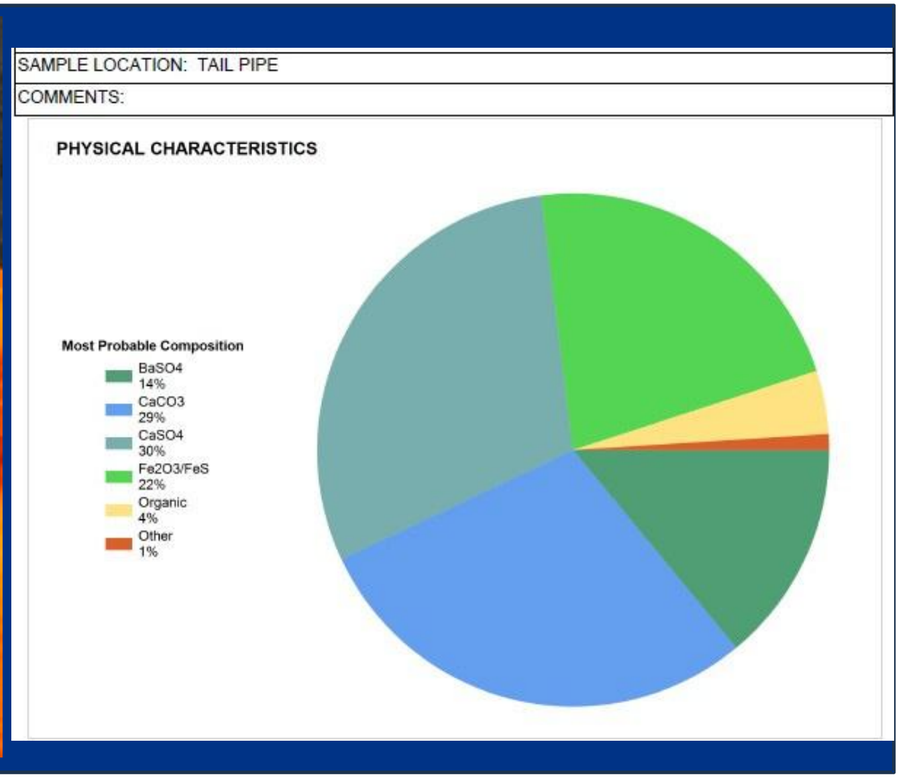
COMMENTS: Other is consistent with 28% SiO2 and 12% metallic wear particles.

PHYSICAL CHARACTERISTICS



NEVER ASSUME

- 100’s of samples analyzed in the area
- 90% of solids analyzed in region: 80-90% Iron Sulfide/10-20% organics
- Never stop analyzing
- Field Testing suspected the following solids to be paraffin

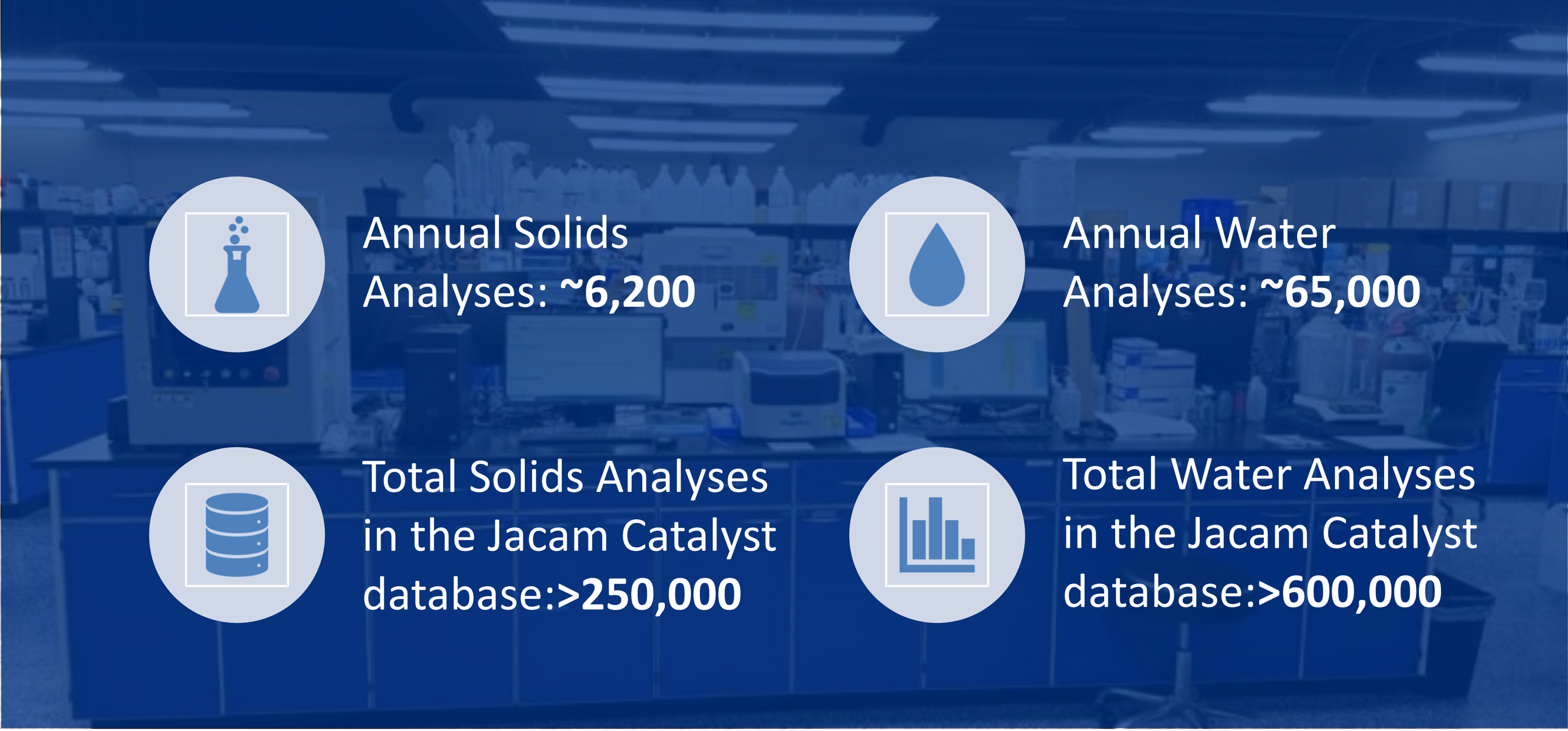


DATA DRIVEN

Rigorous and Rapid Analytical Techniques

JACAM CATALYST

StimWRx



Annual Solids Analyses: **~6,200**

Annual Water Analyses: **~65,000**

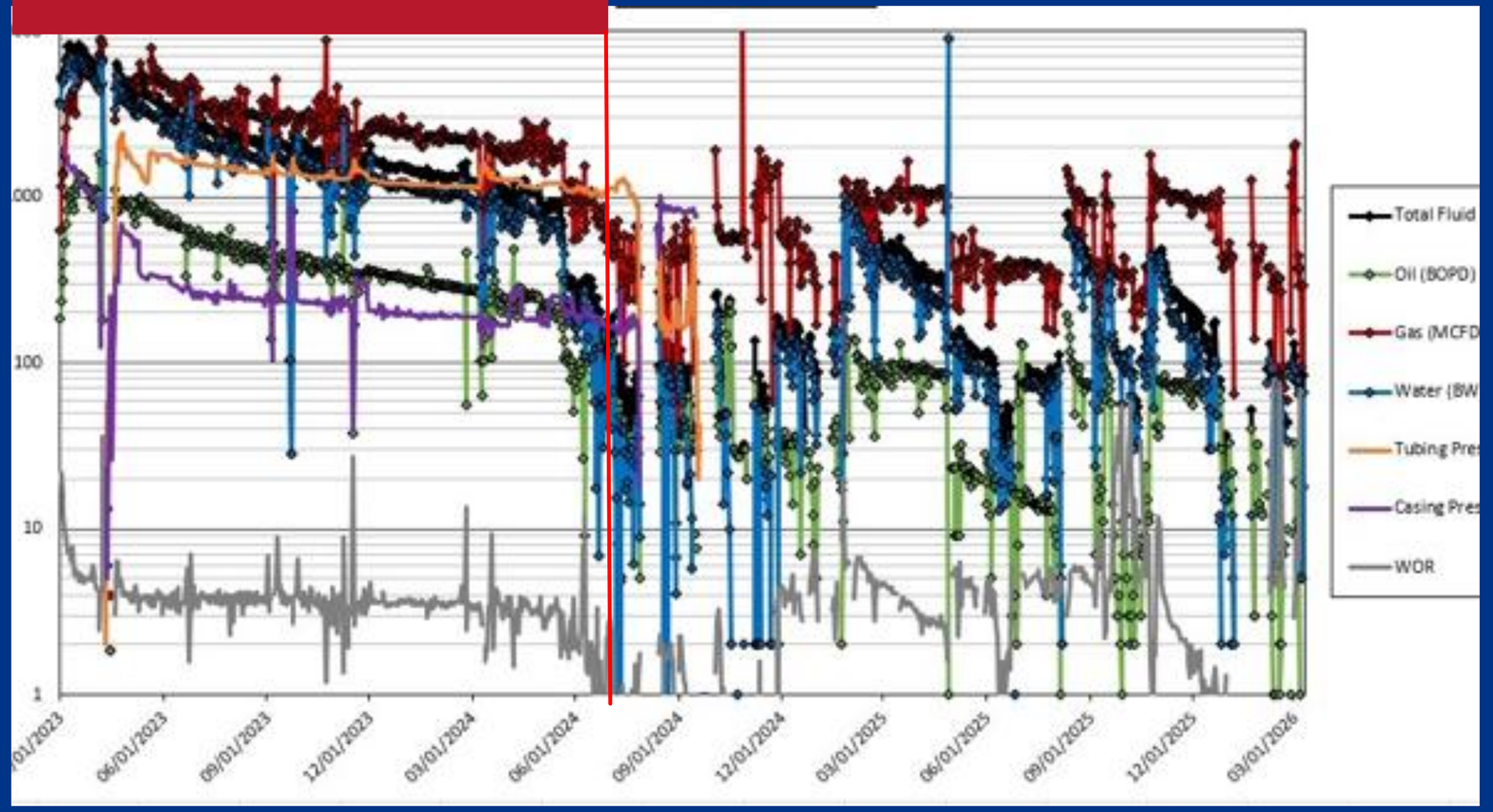
Total Solids Analyses in the Jacam Catalyst database:**>250,000**

Total Water Analyses in the Jacam Catalyst database:**>600,000**

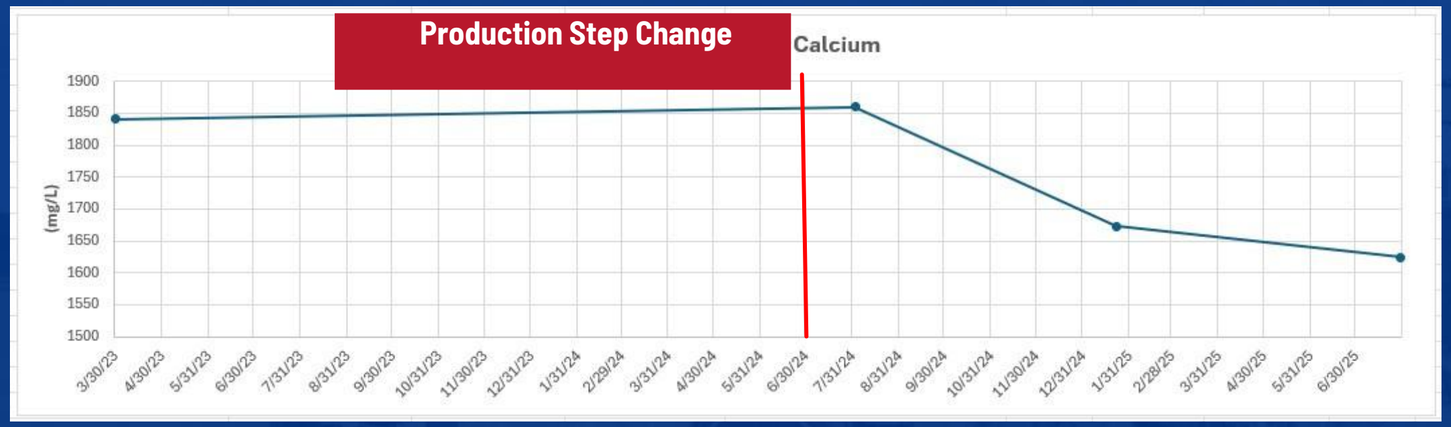
DATABASE

- Cross-referencing production trends to the data
- Accurately predict formation damage
- Derisk investment

Production Step Change



CANDIDATE WELL

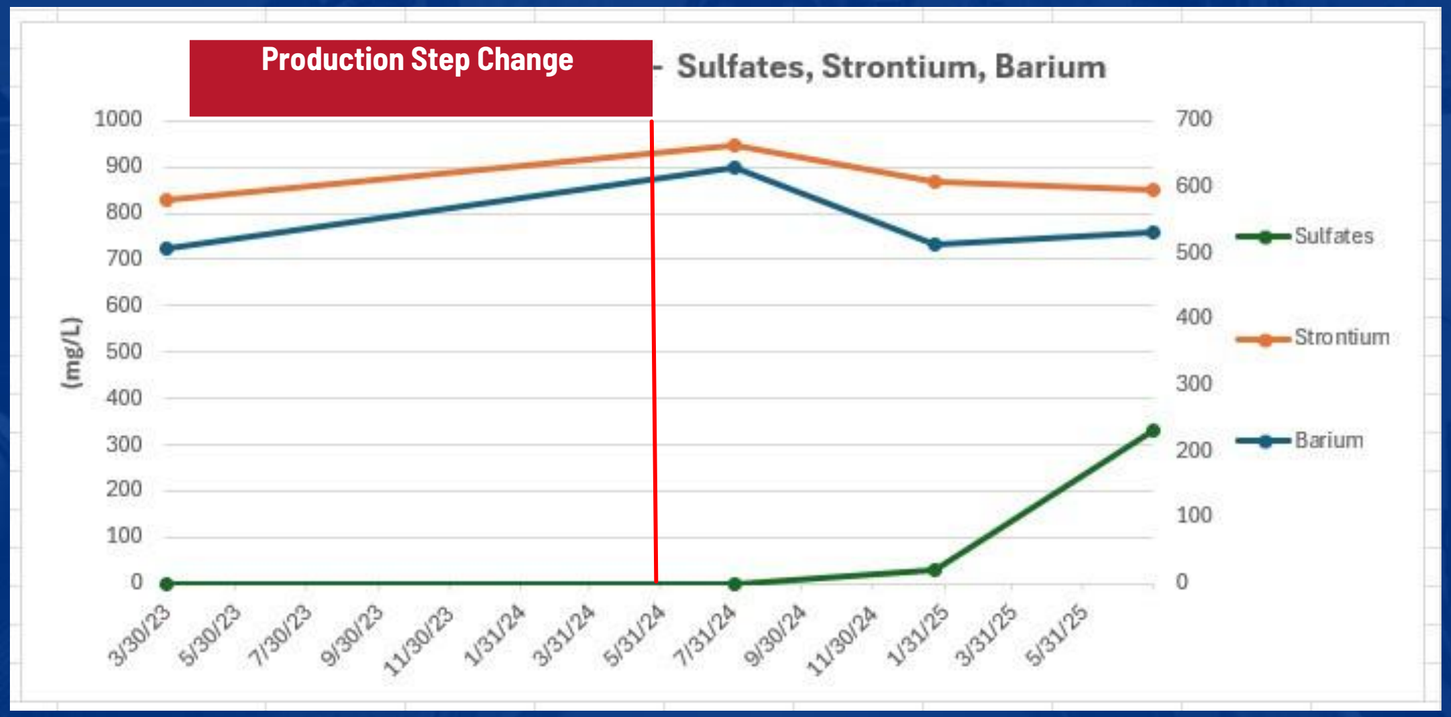


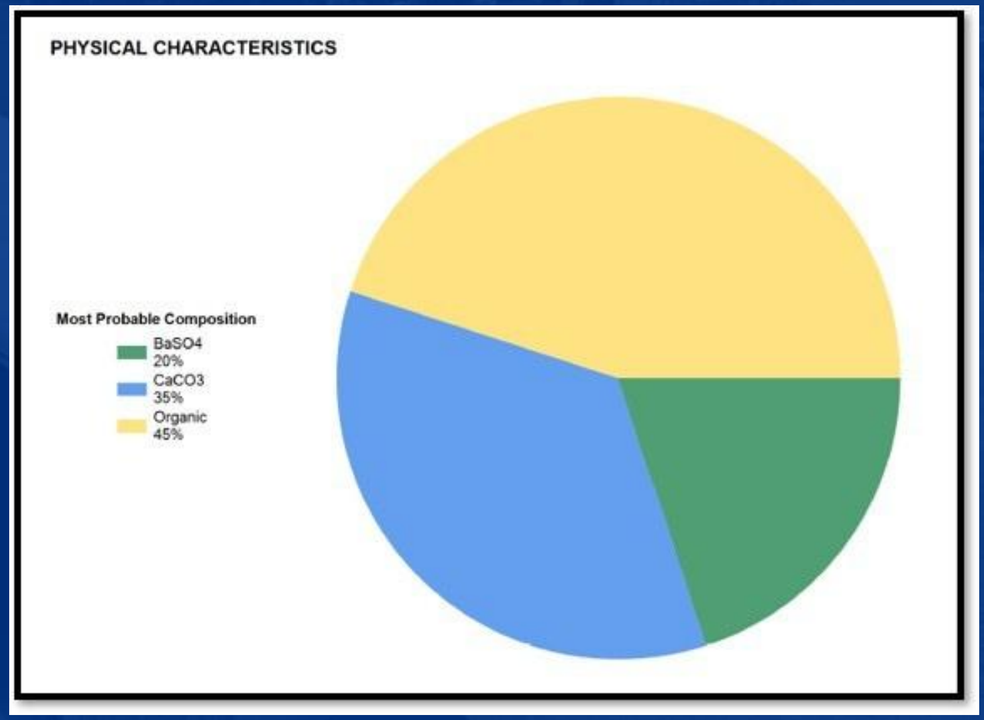
Data Trends After Production Step Change

-Calcium, Strontium, and Barium all begin to drop on the CWA post step change in production.

-Sulfates are too low to be of concern

-Data indicates multiple damage mechanisms beginning to form





CROSS-REFERENCING DATA

ENHANCED CHEMISTRIES

Matching the blend to the data

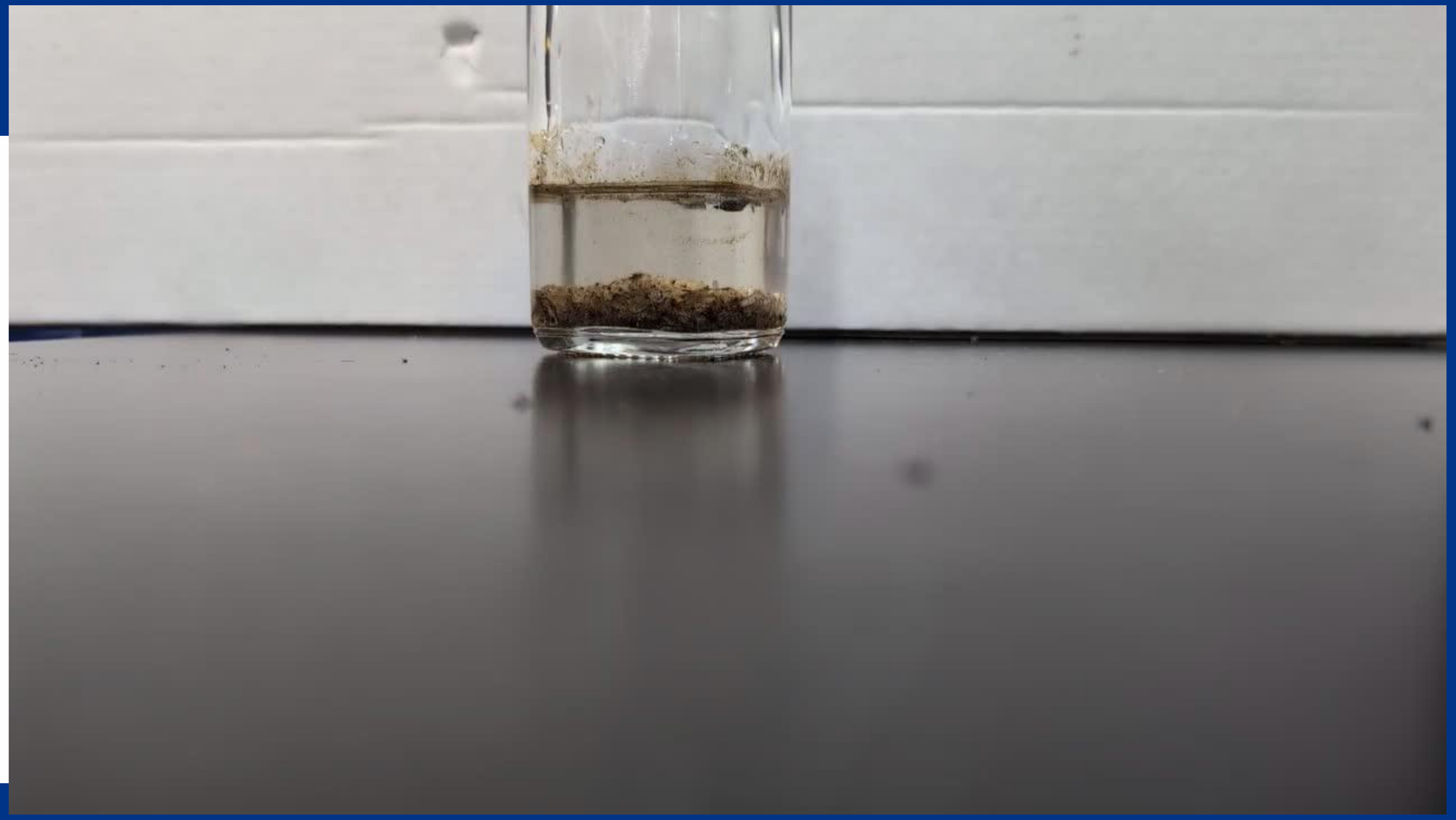
JACAM CATALYST

StimWRx

- Altering chemistries to match changing environments
- Synergistic stabilized blends that match the reservoir conditions
- Stability in hostile environments

ADAPTABILITY

- Formation damage continues to evolve
- Chemistries need to evolve with the damage



MATCHING CHEMISTRY WITH DAMAGE

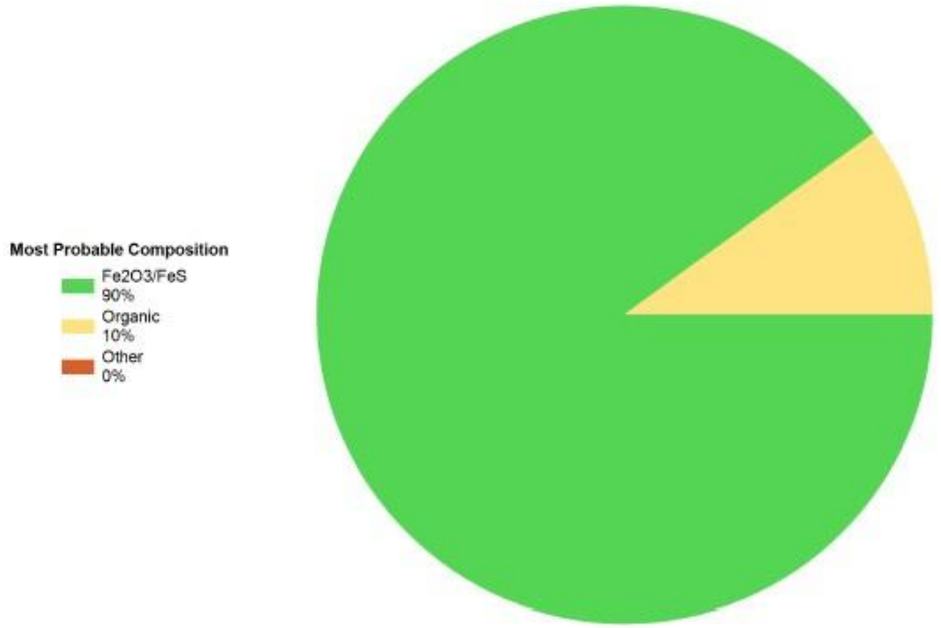
DATA-BASED DESIGNS

Applying The Medicine Where The Pain Is

Solids Analysis - XRD/XRF

COMPANY:	SAMPLE DATE: 1-23-2026
LEASE:	RECEIVE DATE: 1-23-2026
ACCOUNT MANAGER: Steven Priest	ANALYSIS DATE: 1-23-2026
LOCATION: WINKLER, TX	ANALYST:
PHYSICAL EXAM:	
SAMPLE LOCATION:	
COMMENTS: Sample Point: Venturi Cleanout	

PHYSICAL CHARACTERISTICS



Homogeneity of formation damage doesn't exist in reservoirs.

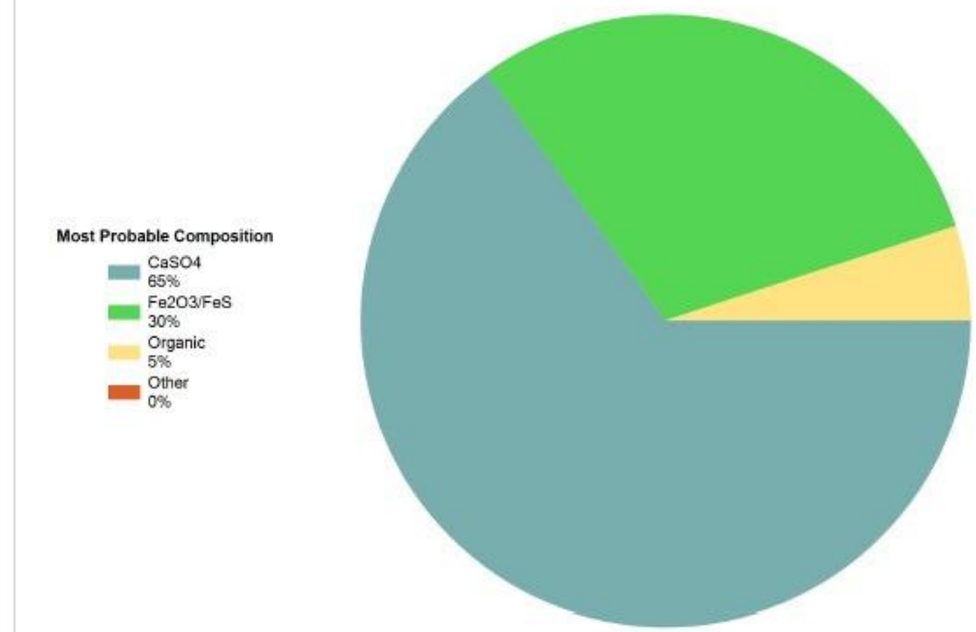
Multiple challenges can exist in a single well.

Solids are from a mechanical cleanout at two different points in the producing interval

Solids Analysis - XRD/XRF

COMPANY:	SAMPLE DATE: 1-28-2026
LEASE:	RECEIVE DATE: 1-28-2026
ACCOUNT MANAGER: Steven Priest	ANALYSIS DATE: 1-28-2026
LOCATION: WINKLER, TX	ANALYST:
PHYSICAL EXAM:	
SAMPLE LOCATION: CLEAN OUT RETURNS	
COMMENTS:	

PHYSICAL CHARACTERISTICS



ONE WELL MULTIPLE CHALLENGES

Multi-step designs can prevent formation damage from recurring

Section #3: Application Procedure

1. Follow all of your company's health and safety policies.
2. Tie into tubing to pump down tubing under packer. Pressure test surface lines to 500 psi over maximum operating pressure.
3. Pump WRXSOL-HIFE-PLUS down tubing.
4. Pump STIMWRX-DVG down tubing.
5. Pump WRXSOL-HIFE-PLUS down tubing.
6. Pump STIMWRX-DVG down tubing.
7. Pump WRXSOL-HIFE-PLUS down tubing.
8. Pump STIMWRX-DVG down tubing.
9. Pump WRXSOL-HIFE-PLUS down tubing.
10. Displace with enough clean compatible H2O to ensure treament makes it into the formation.
11. Rig out and soak treatment while re-equiping well to production.
12. Return well to production and evaluate result based off of fluid levels and production rates.

- **Gypsum Converter spotted while pulling out of the hole across sections of wellbore that had gyp scale**
- **Shallow set packer run & rig moved off**

Section #3: Application Procedure

1. Follow all of your company's health and safety policies.
2. Tie into tubing and packer set @ ~1,000' to pump down tubing. Pressure test surface lines to 500 psi over maximum operating pressure.
3. **Add 990 gallons of WRX-SI into 96 bbl of H2O * 2 Vaccum Trucks. ADD 5 gallons Payzone 814 per Vac Truck.**
4. Pump WRX-SI down tubing.
5. Pump STIMWRX-DVG down tubing.
6. Pump WRX-SI down tubing.
7. Pump STIMWRX-DVG down tubing.
8. Pump WRX-SI down tubing.
9. Pump STIMWRX-DVG down tubing.
10. Pump WRX-SI down tubing.
11. Displace with enough clean compatible H2O to ensure treament makes it into the formation.
12. Rig out and soak treatment while re-equiping well to production.
13. Return well to production and evaluate result based off of fluid levels and production rates.

- **Iron Sulfide & Gyp scale remediated with high-rate diverted stimulation.**
- **High-rate diverted scale squeeze performed post stimulation.**
- **Residuals looking good 6-months post treatment with >1,000 bbl-day/H2O Production**

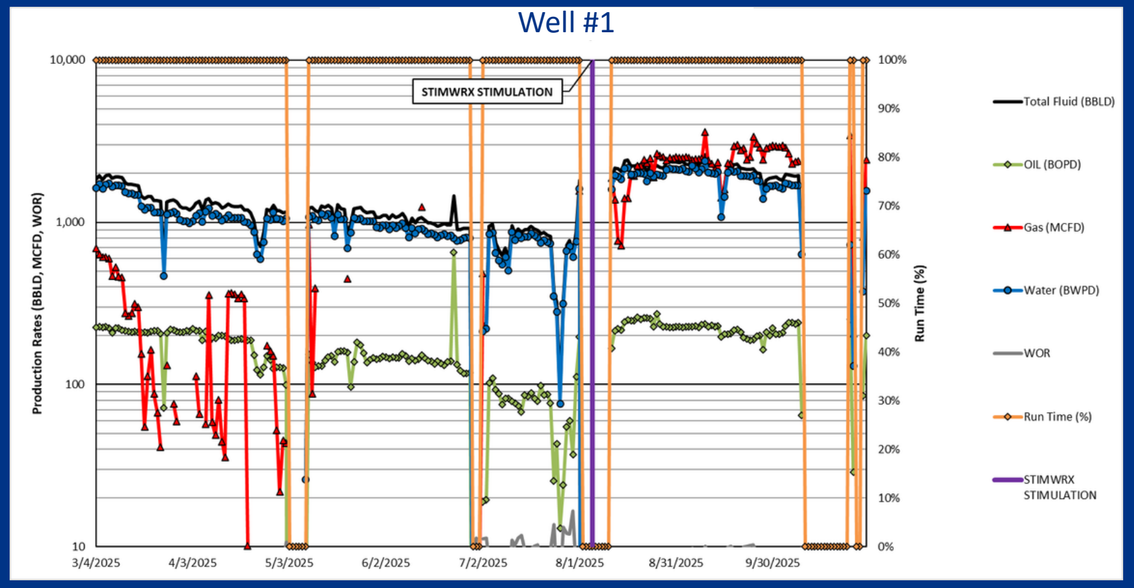
MATCHING THE DESIGN TO THE DATA

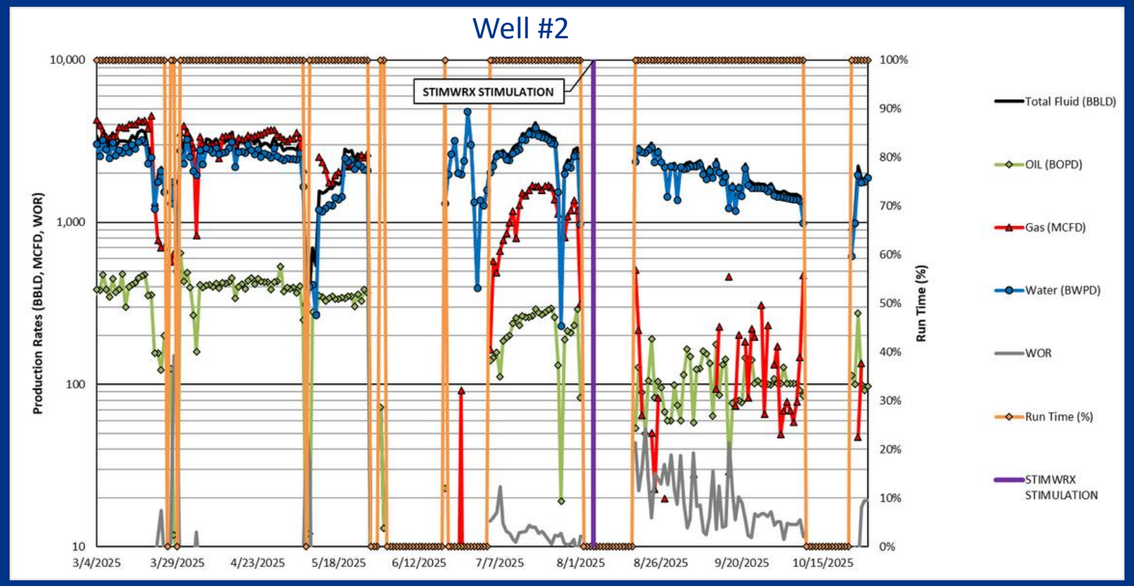
DATA DRIVEN PROGRESSION

The Feedback Loop Cycle

JACAM CATALYST

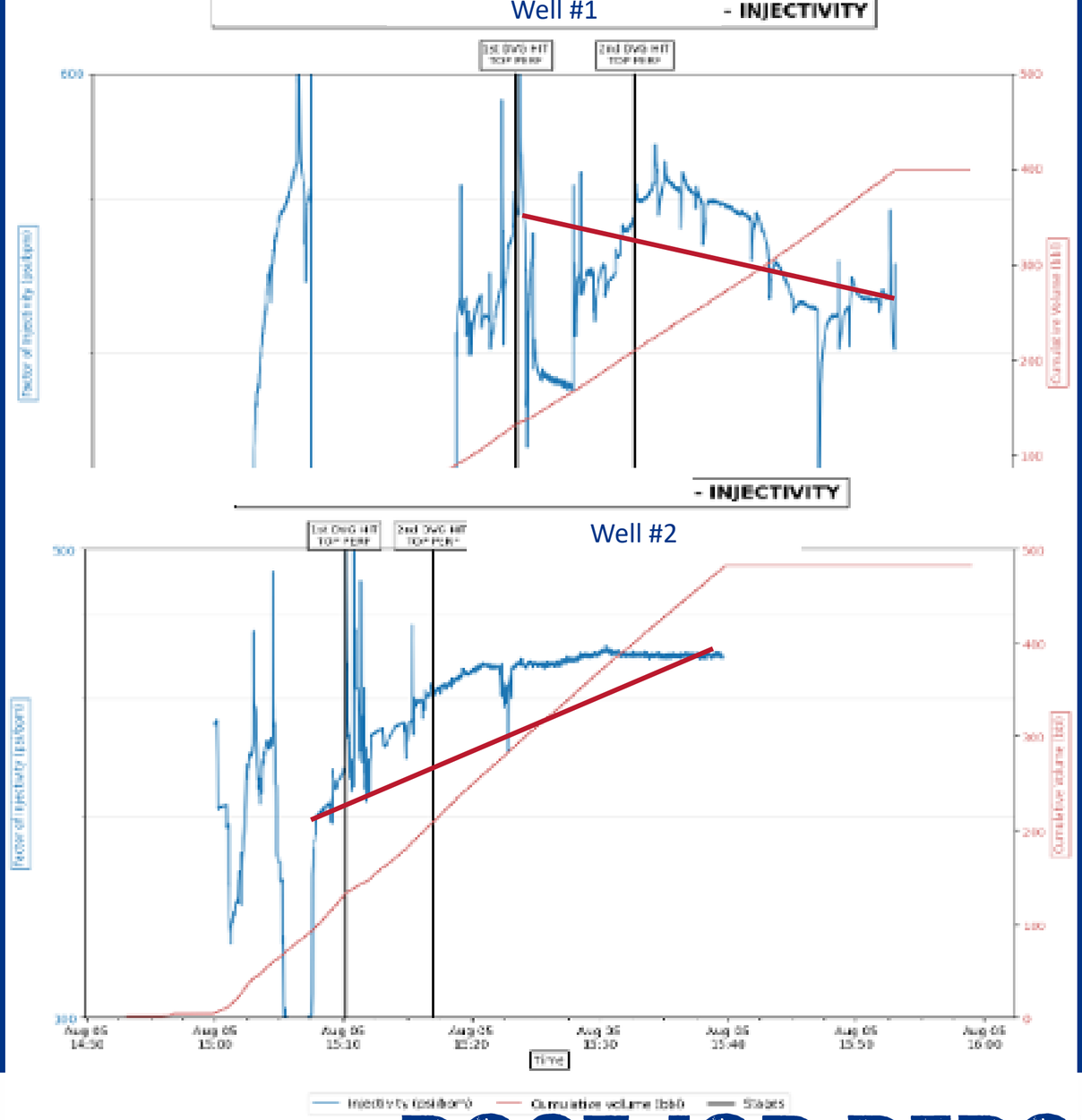
StimWRx





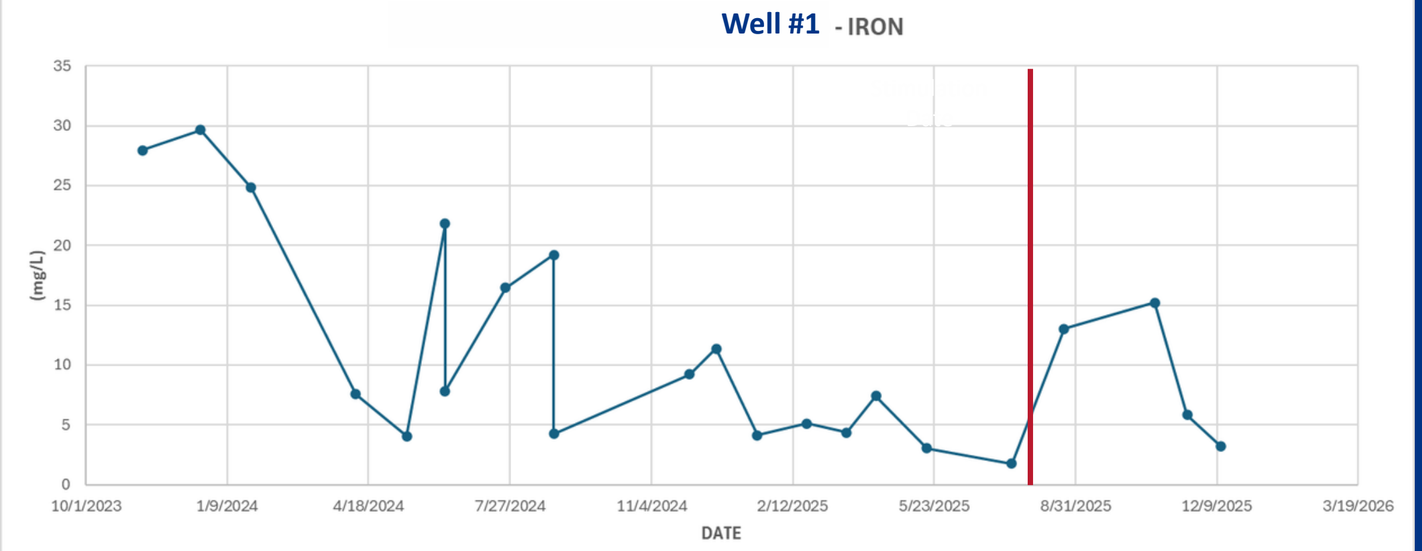
- Two wells ½ mile apart
- Identical treatments
- One Worked one didn’t
- **WHY?**

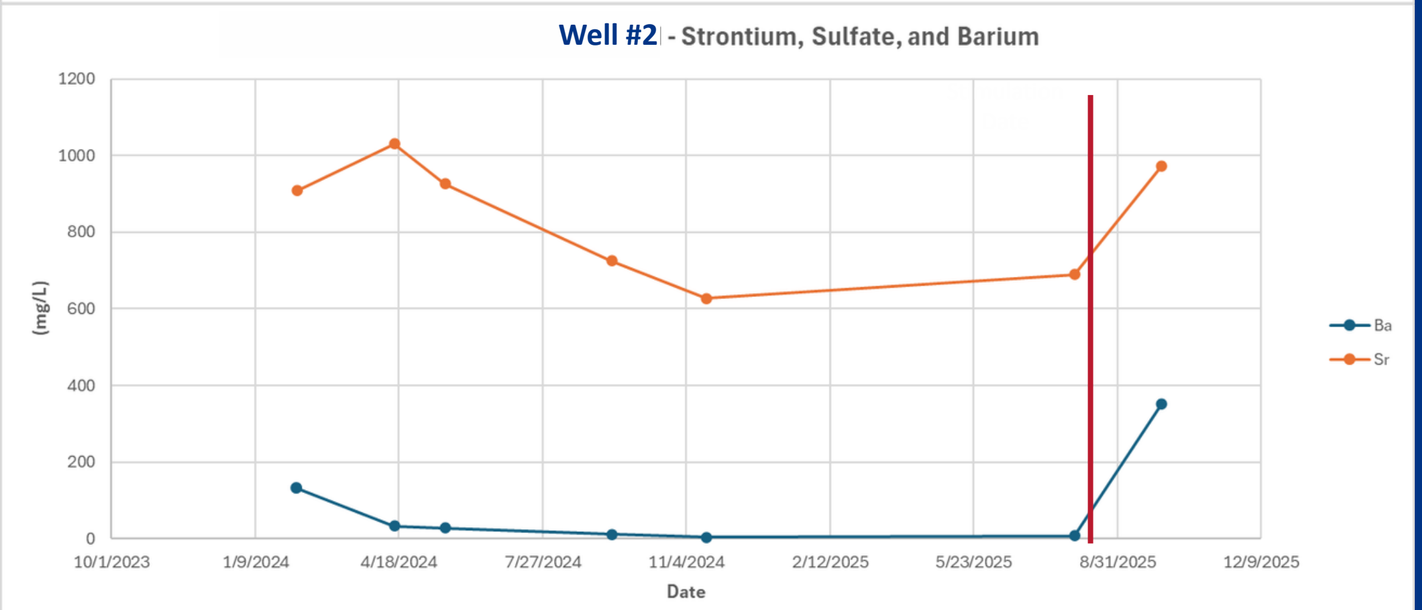
PROGRESSING FROM DATA



- Post job reports are strong indicators of success.
- Pressure responses can indicate bigger formation damage issues.
- Continuous pressure buildup can indicate wrong chemistry selection or bigger problems downhole.
- While wave or rolling injection profiles indicate damage is being remediated.

POST JOB REPORT ANALYSIS





- Post-stimulation sampling can indicate the remaining formation damage
- Understanding what's coming back allows operators to plan the next steps
- Mechanical cleanout on well #2 was all Barium Sulfate

POST STIMULATION CWA'S

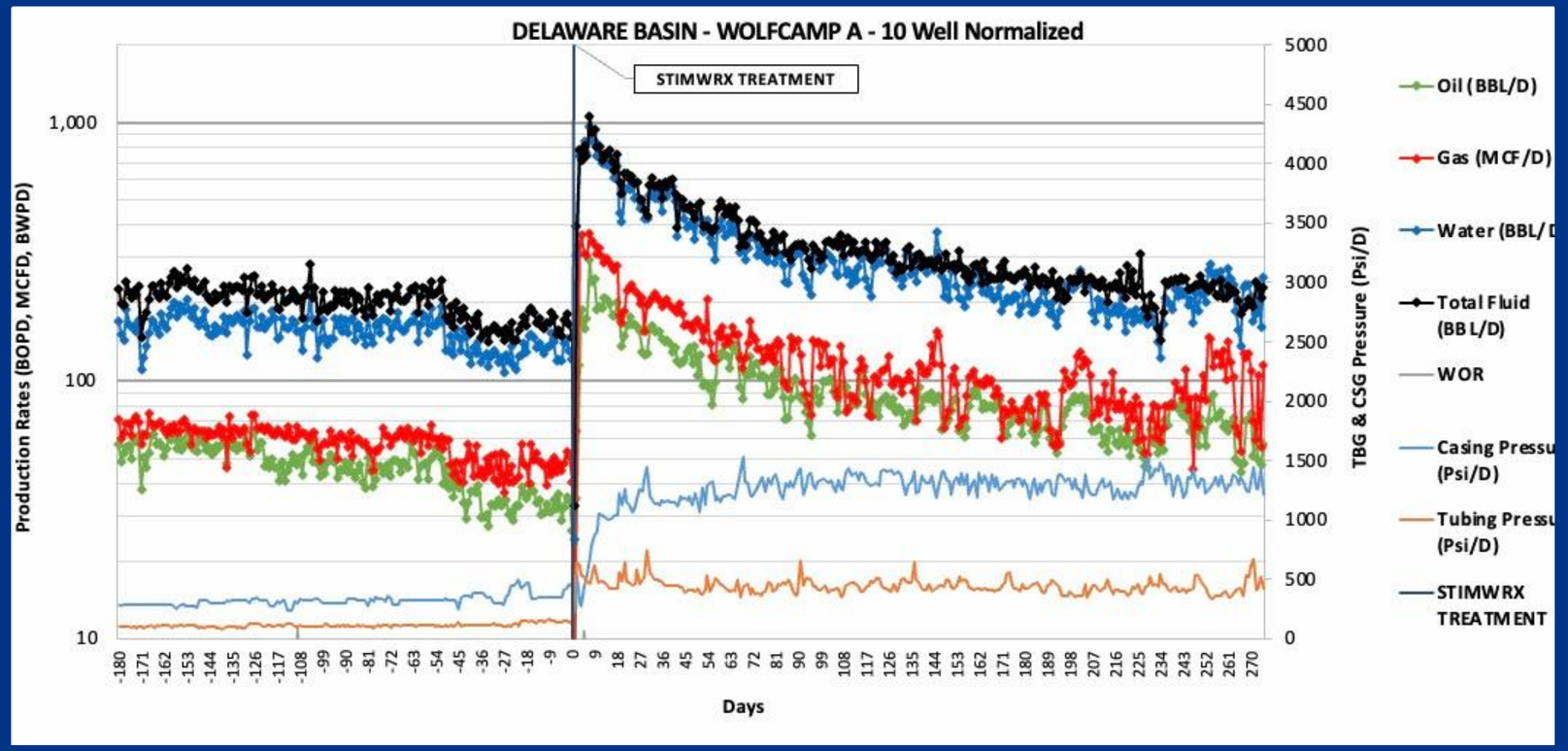
JACAM CATALYST

StimWRx

CASE STUDIES

It's not personal, it's just numbers

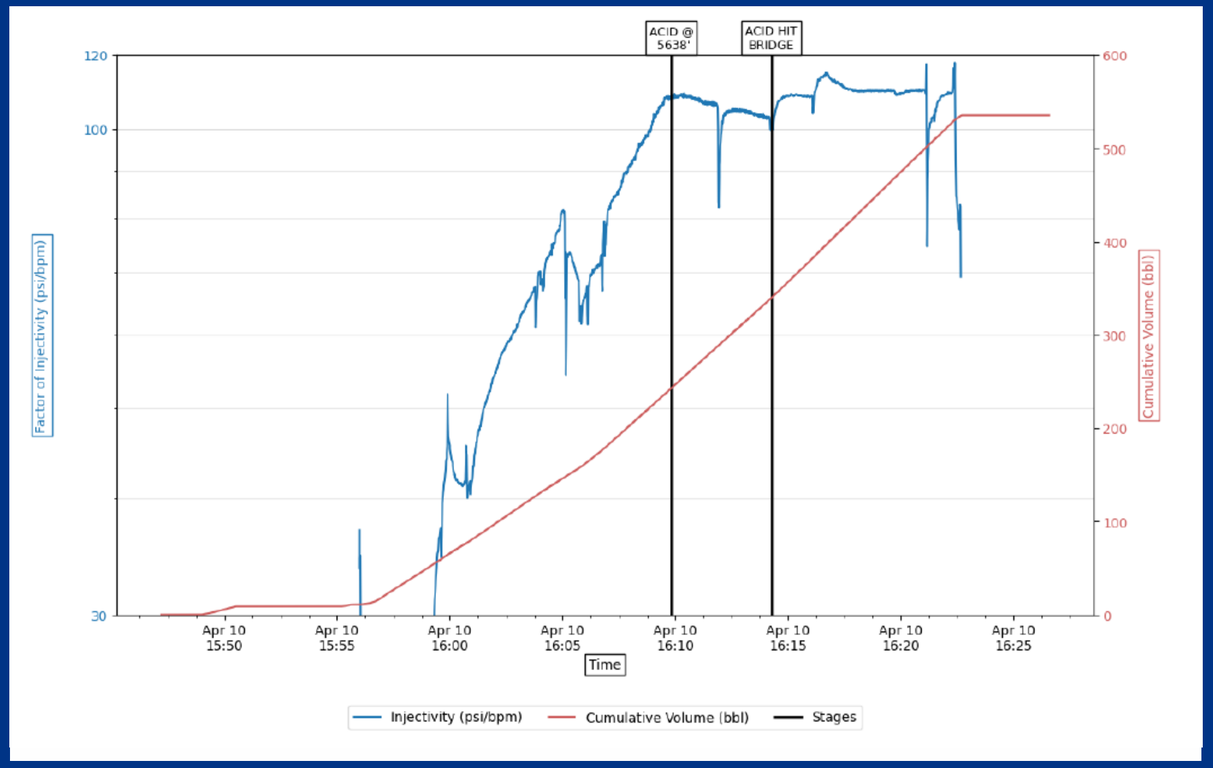
Metrics	Tubing Pressure (Psi/D)	Casing Pressure (Psi/D)	Oil (BBL/D)	Gas (MCF/D)	Water (BBL/D)	Total Fluid (BBL/D)
180 Day Pre-Stim	113.8	325.5	46.4	57.8	155.9	202.3
180 Day Post-Stim	455.1	1232.4	106.6	143.0	357.3	463.9
Incremental	341.3	906.9	60.2	85.2	201.4	261.5
% Incremental	300%	279%	130%	147%	129%	129%



All 10 wells were on ESP pre-stimulation and free-flowing post-stimulation.

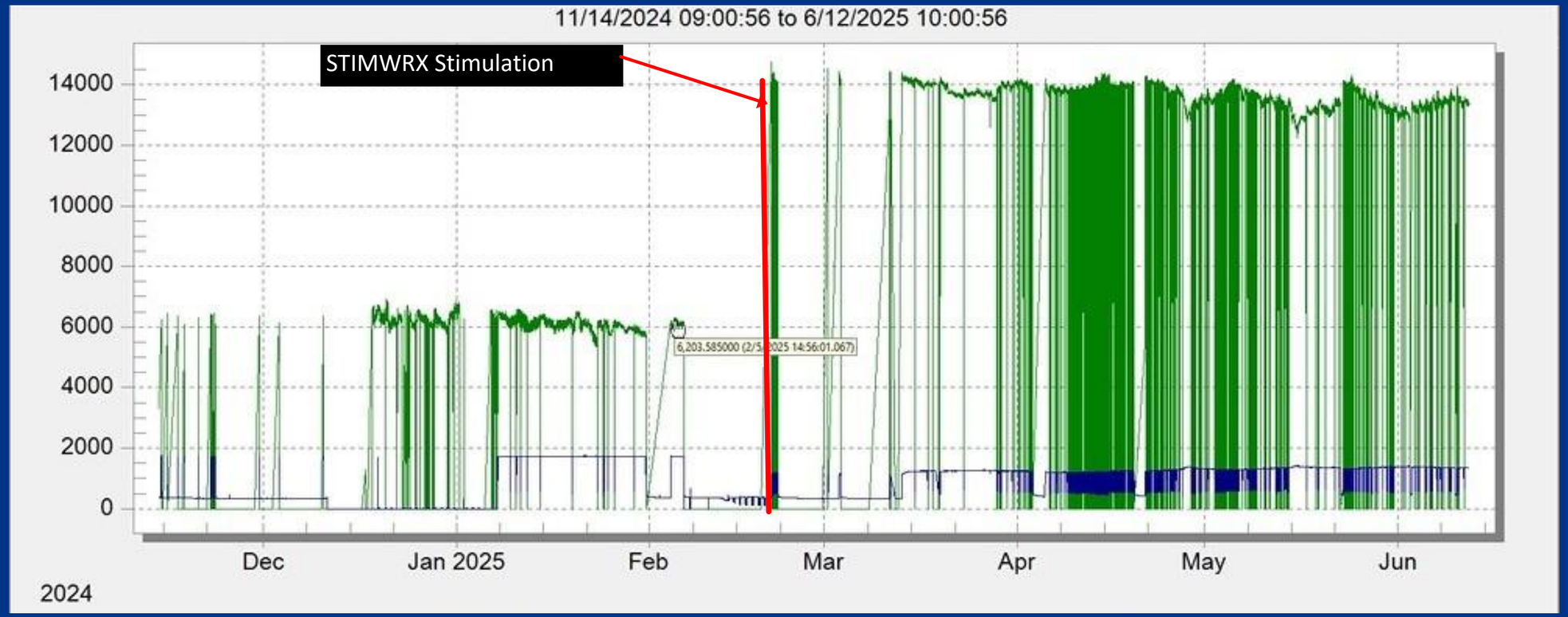
PRODUCING WELLS

PUMP REPORT					
Time	Rate (bpm)	Stage Volume (bbl)	Total Volume (bbl)	Pump Pressure (psi)	Sequence
15:52				3950	Pressure Test/Set Pop-Off
15:56	16	159	159	1000	STG 1: DVG
16:06	21.9	122	281	2300	STG 2: ULTRA-FE
16:12	23.6	247	528	2500	STG 3: FW FLUSH



- Fishing operations
- BHA stuck on clean-out
- 7,016’ of perforations open

BRIDGE



Southern Midland Basin

LEGEND

- WATER INJECTION
- WATER PRESSURE

SALTWATER DISPOSAL

Blank sample. Very stable mix of oil, water and mud.

Treated sample shows clear oil, mud and water phase. Separation time was reduced from hours to ~ 5 minutes.
*5 minute resting period.

A slight increase in oil remediation was also noted with treatment.
*15 minute resting period

PICTURE 1: Initial sample off incoming line to separator. Shows large pad of drilling mud

PICTURE 2: This picture was taken 5 minutes after the initial sample. A smaller mud interface is noted as well as a larger oil cut.

DRILLING MUD DAMAGE ON PRODUCING WELLS

Q&A

PERMIAN BASIN ENGINEERING TEAM

11999 TX-158, Gardendale, TX 79758

432-269-1967

JACAM CATALYST

HIGHEST CUSTOMER SATISFACTION AMONG TOP PROVIDERS