

Technology and Efficiency In Rural Water Systems

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TX Water Well Lic# 59593WKP

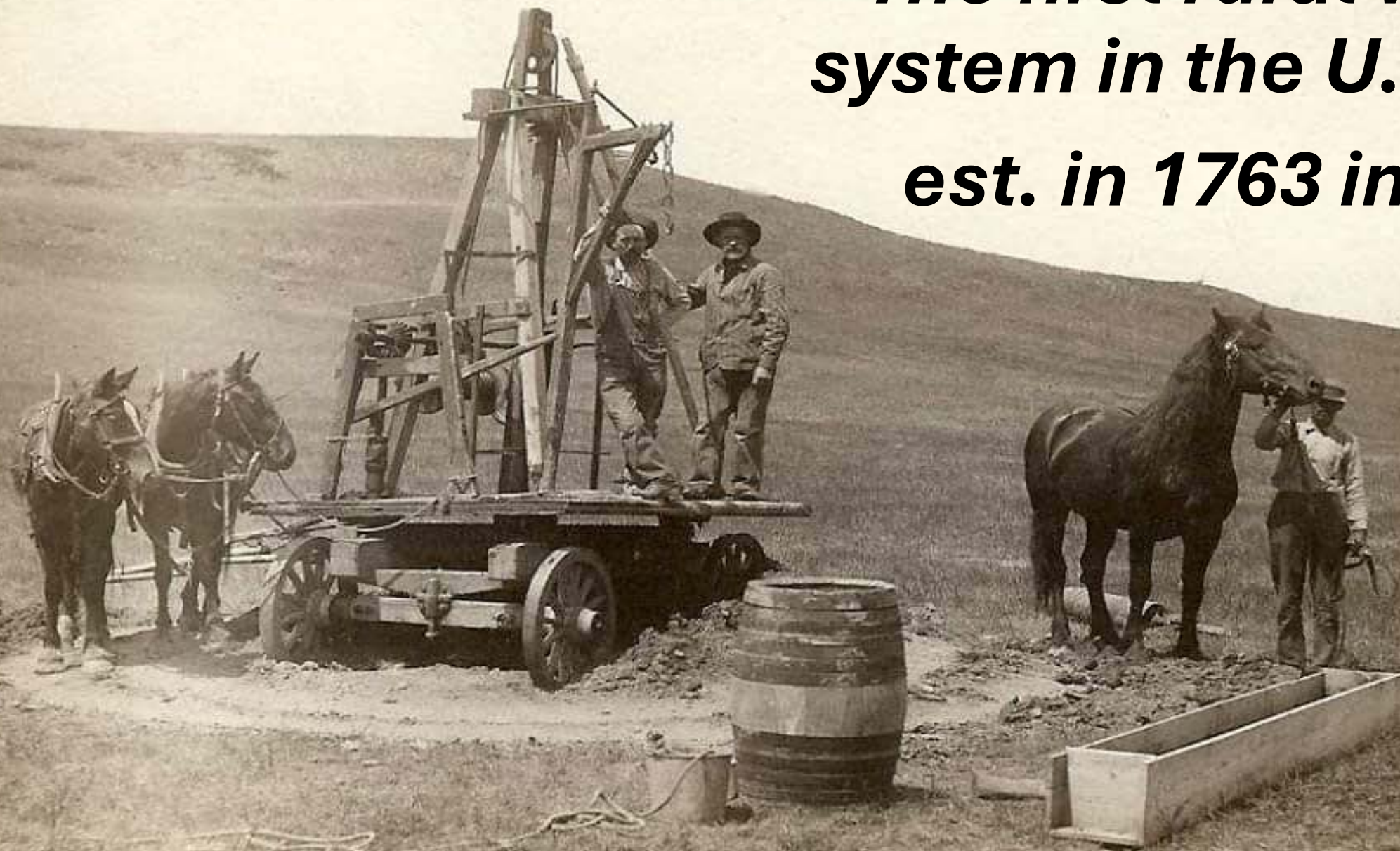




Who we are...

- Owner of Barco Well Service with 25 employees and 6,000 wells
- Texas Dept. of Licensing and Regulation Board and SME/Exam Review Committee
- Founded Resource Monitor in 2021
 - RM: 12 states, **4 Billion metered**
 - GCD Board, busiest of 174 TX GCDs
- Educator on Water Conservation and Management, NGWA, TGWA, NMGWA, CRWA, RWAAZ, MRWA

***The first rural water
system in the U.S. was
est. in 1763 in PA.***



Describe what you do- RWS Operator

- Produce and distribute water to customers who judge you not on how many minutes a day they have access to safe and clean drinking water to their homes or businesses, but by how many minutes a year that their water is not flowing perfectly and at the right pressure. Your sources often are not under your control, and you distribute your product through a system that is constructed of materials manufactured by the lowest bidder and installed by a contractor that was the lowest bidder- to sustain and protect life in your communities. Your infrastructure is subject to age, mother nature, and anyone with a boring machine, backhoe or trencher. Your customers expect to never have a rate increase and want to pay less per month for life giving water than their cell phone. Your expenses are always increasing faster than your Board will increase your budgets. You are supposed to foresee every possible problem a year in advance and add that to the budget in the form of line items. Every call is an emergency, and no one ever says thanks for what you do. You are an employee counselor, plumber, electrician and chemist and if you get it wrong, people can get sick or die. The job is pretty simple.....

Technology and Efficiency In RWS

- **Innovation and management tools**
- Common issues in water systems and wells, and how to use technology to monitor
- Financial tools and modeling for RWS's



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Understanding the Technology and Tools



Understanding the Technology and Tools to Manage

- Cellular connected smart meters
- Magnetic and Ultrasonic meters
- Battery powered for 10 years
- Updates every 6 hours, broken into 15-minute blocks

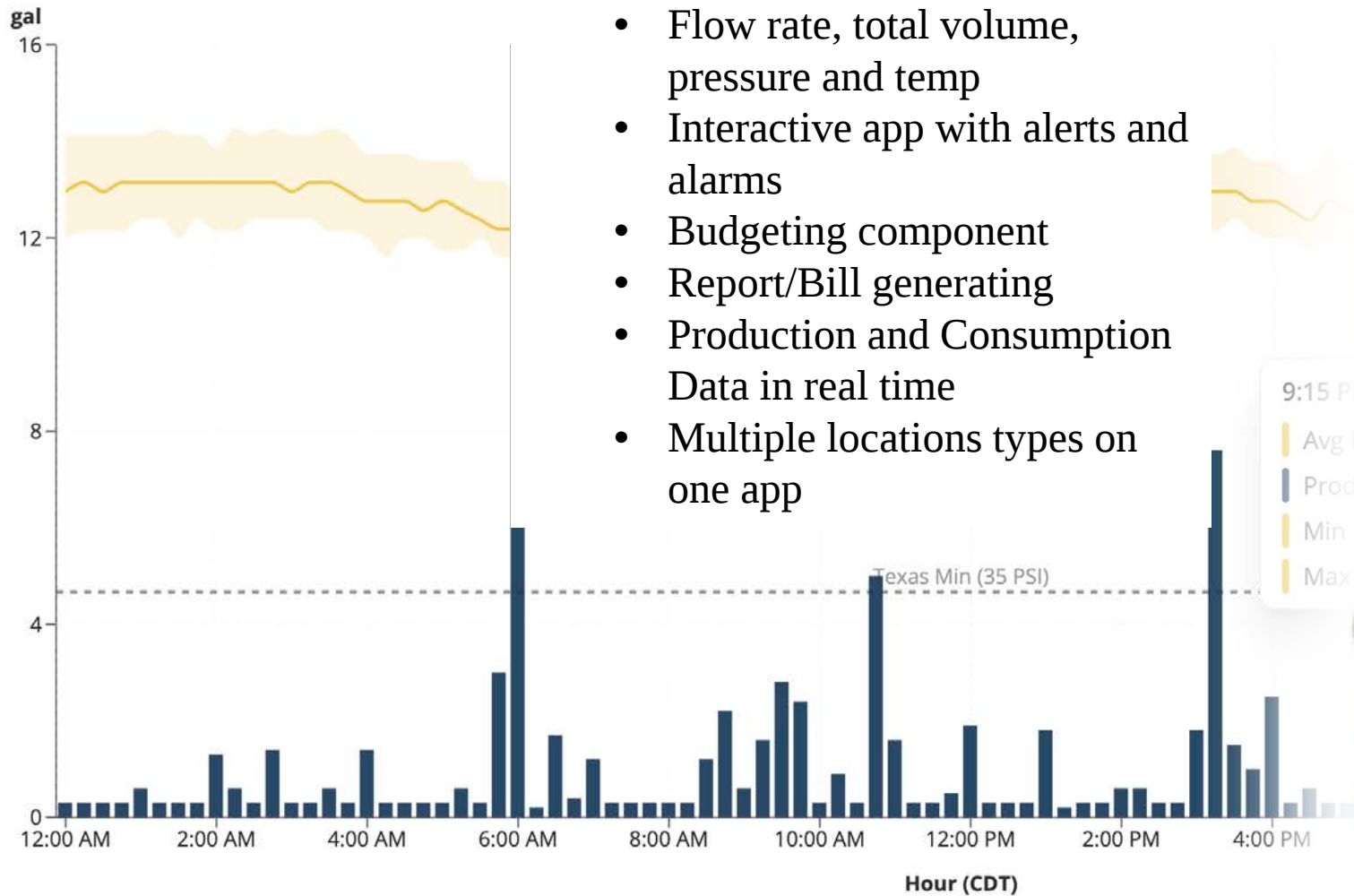


Production vs. Pressure

Water production and pressure data

■ Production

— Avg Pressure



- Flow rate, total volume, pressure and temp
- Interactive app with alerts and alarms
- Budgeting component
- Report/Bill generating
- Production and Consumption Data in real time
- Multiple locations types on one app



Groundwater Basics and Management

- Innovation and management tools
- **Common issues in water systems and wells, and how to use technology to monitor**
- Financial tools and modeling for RWS's



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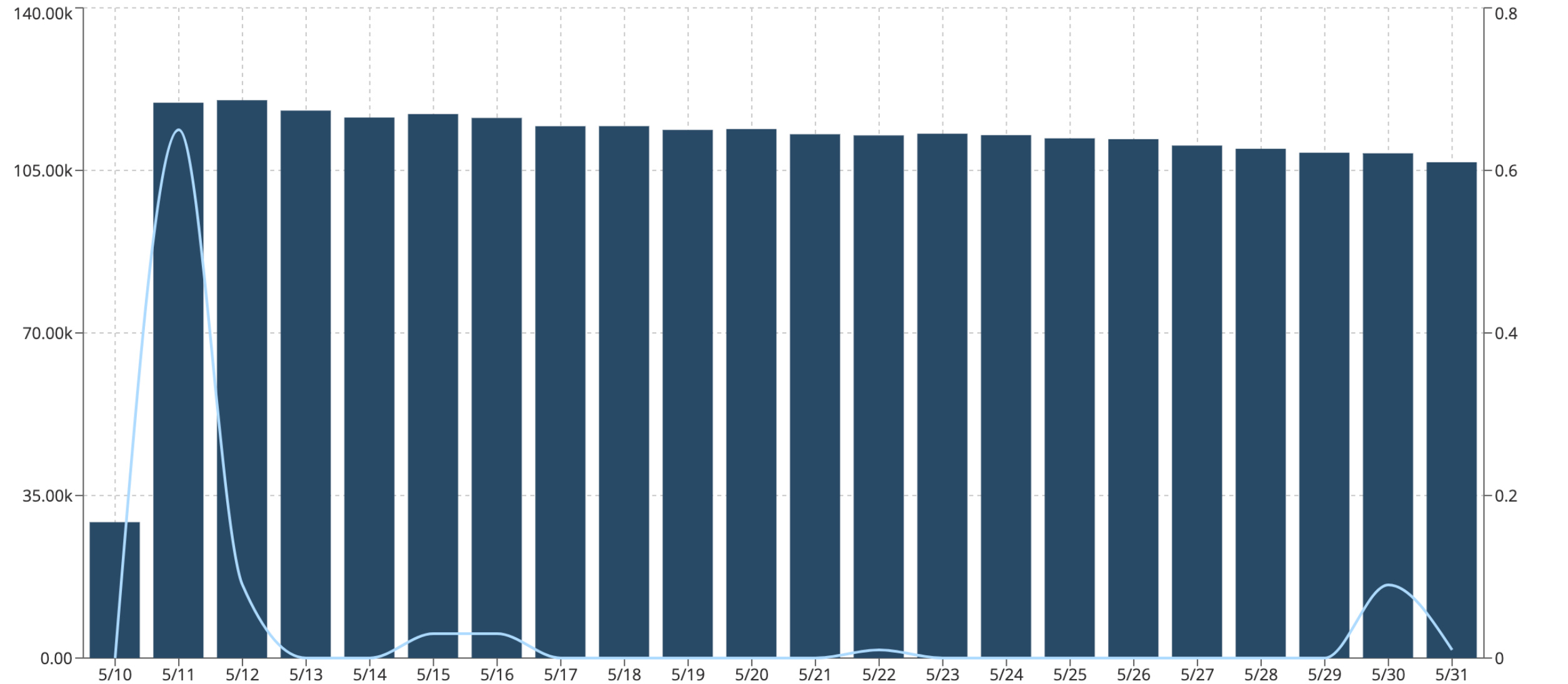
**Common
Issues For
RWS
Operators**

- Drawdown and Mineralization
- Rapid or frequent pump cycling
- System Issues
- Leaks
- Non-Revenue H₂O

Daily Production
(gallons)

Well Draw Down and Interaction

Production Precipitation Precipitation (in)



☒ Precipitation ☐ Temperature

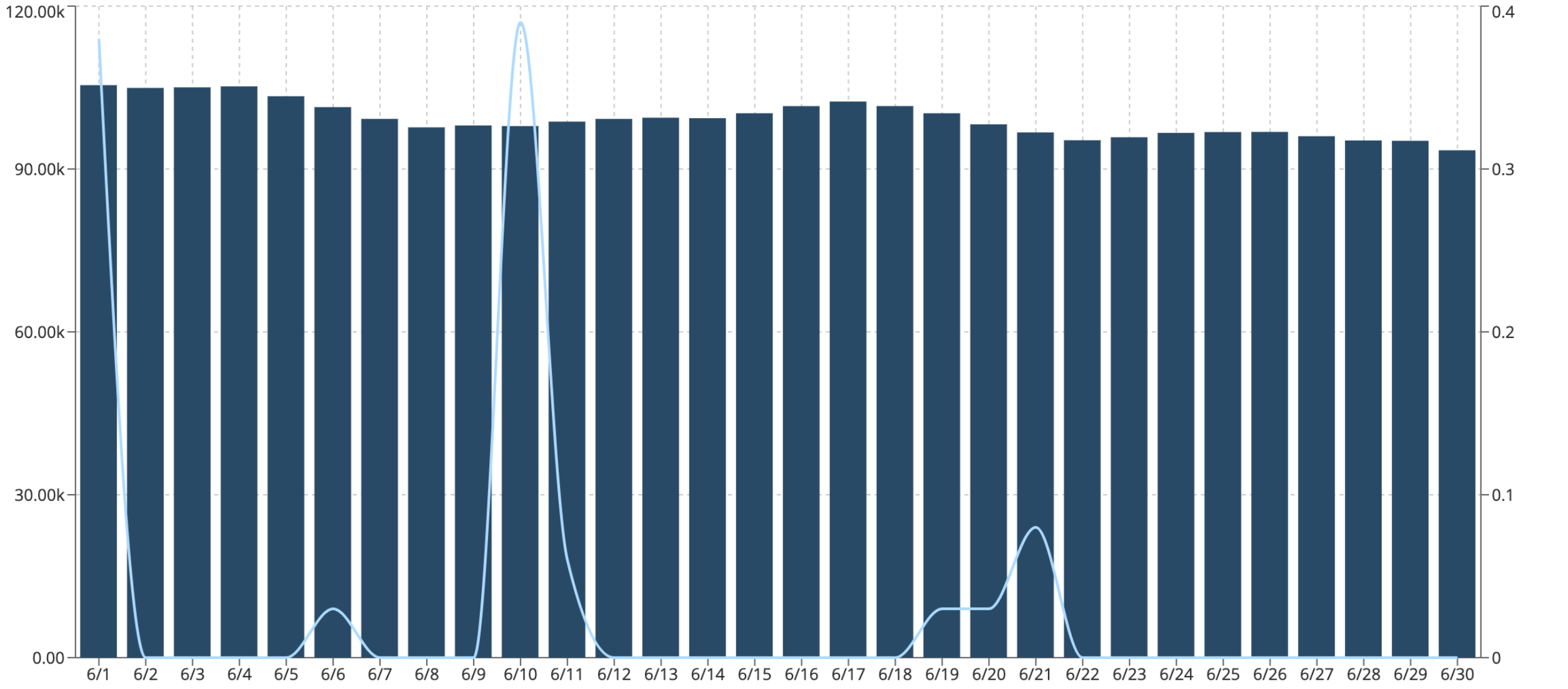
Daily Production
(gallons)

Well Draw Down and Interaction

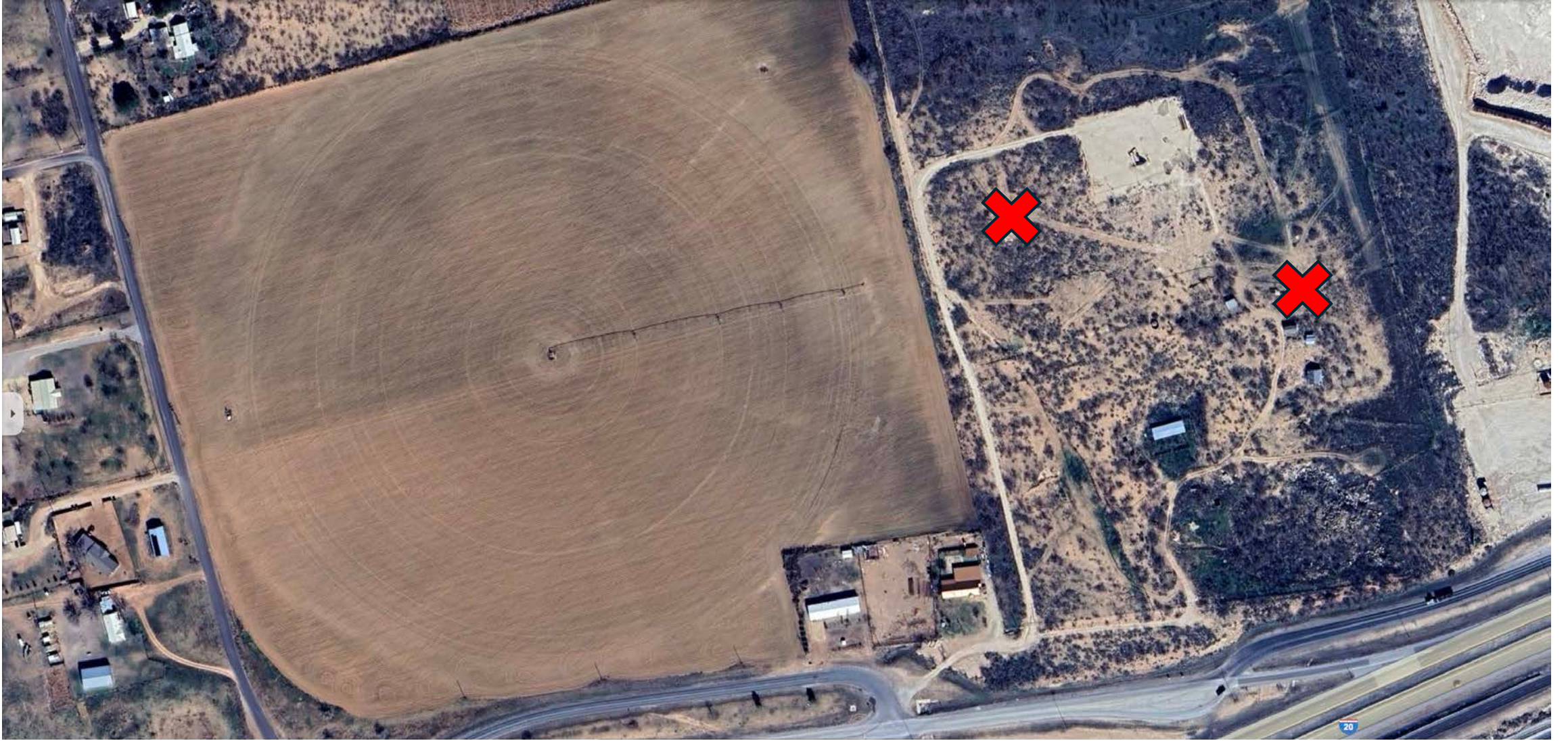
Production

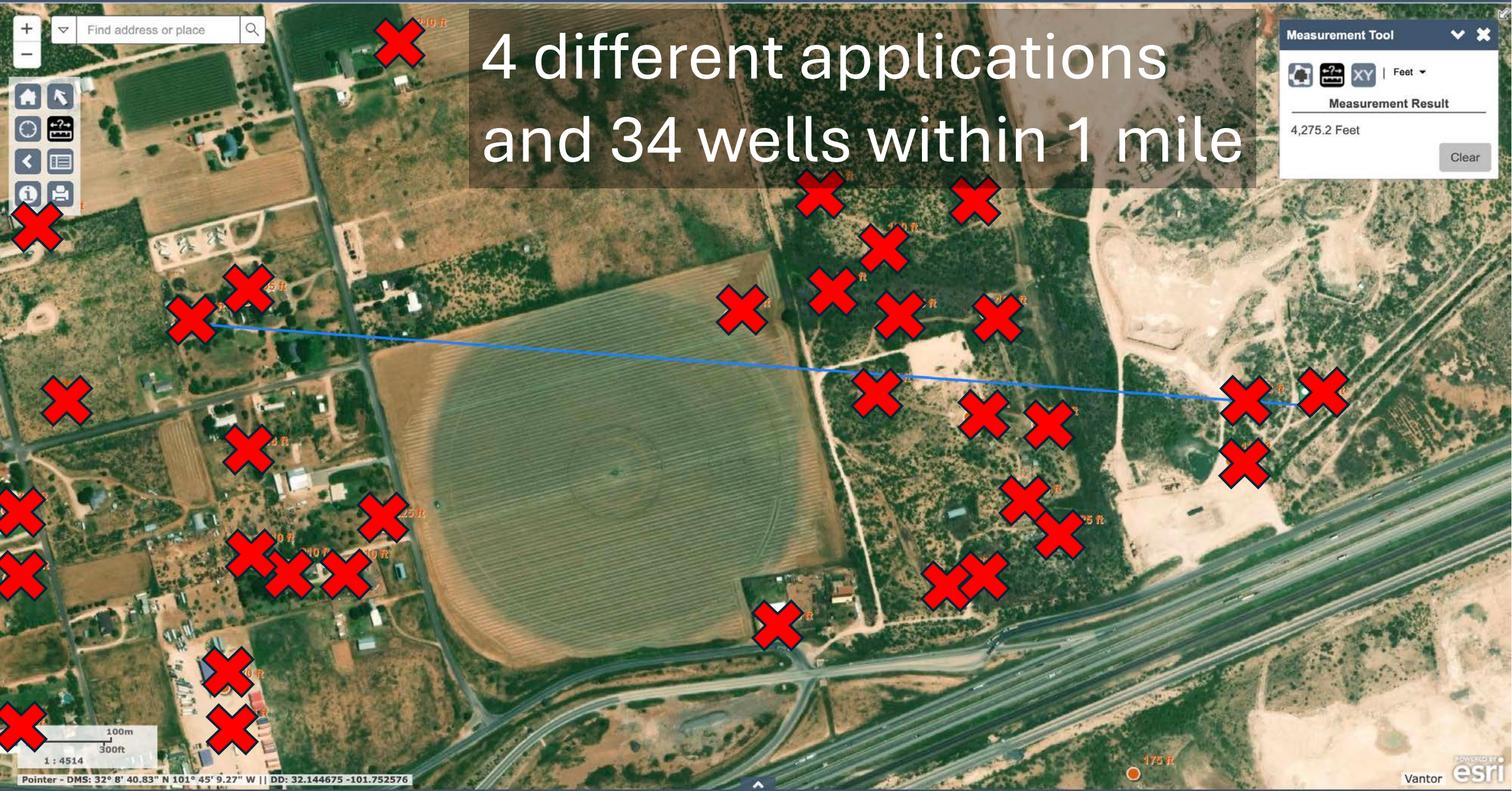
Precipitation

Precipitation (in)

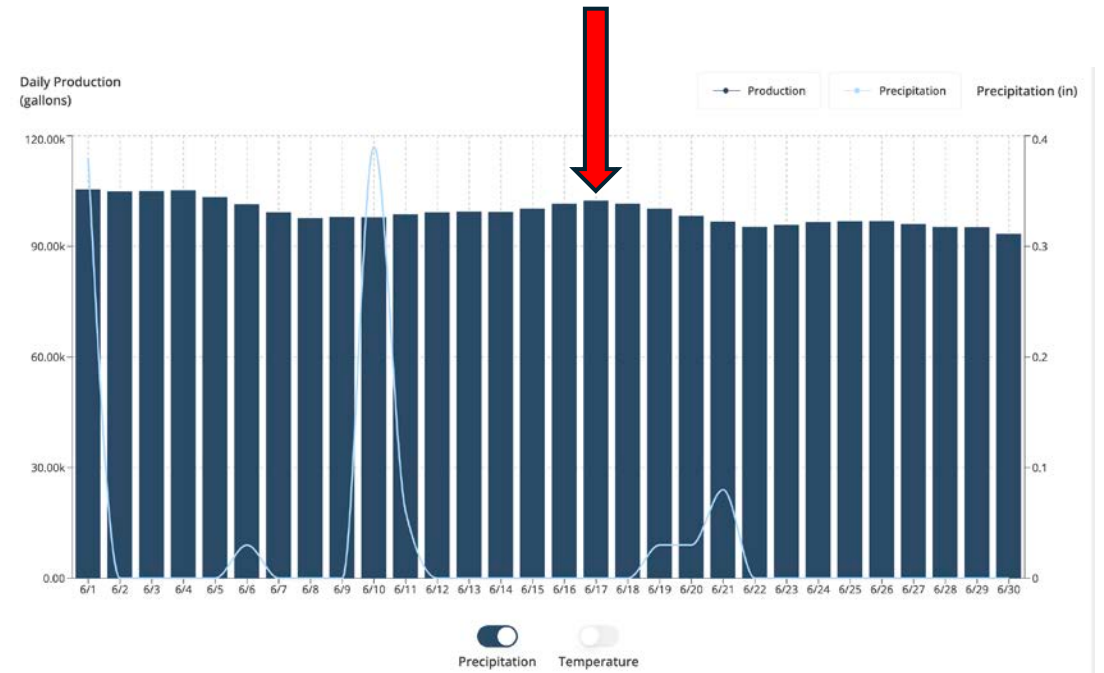
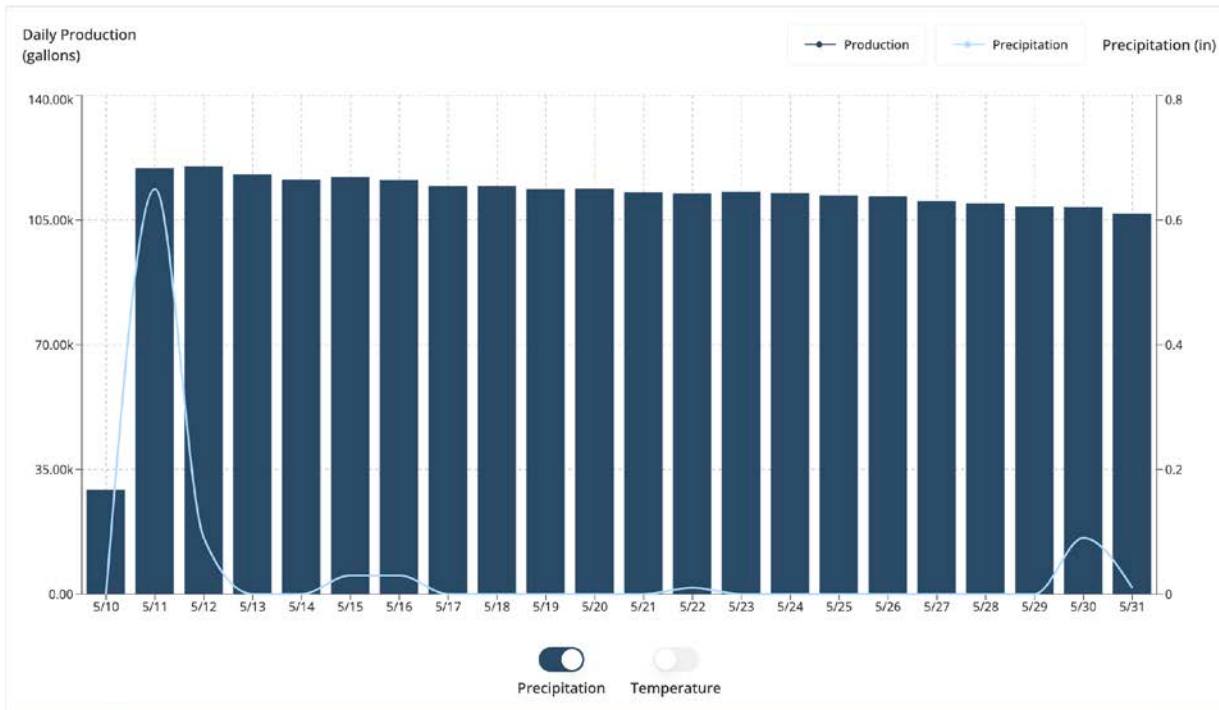


Precipitation Temperature



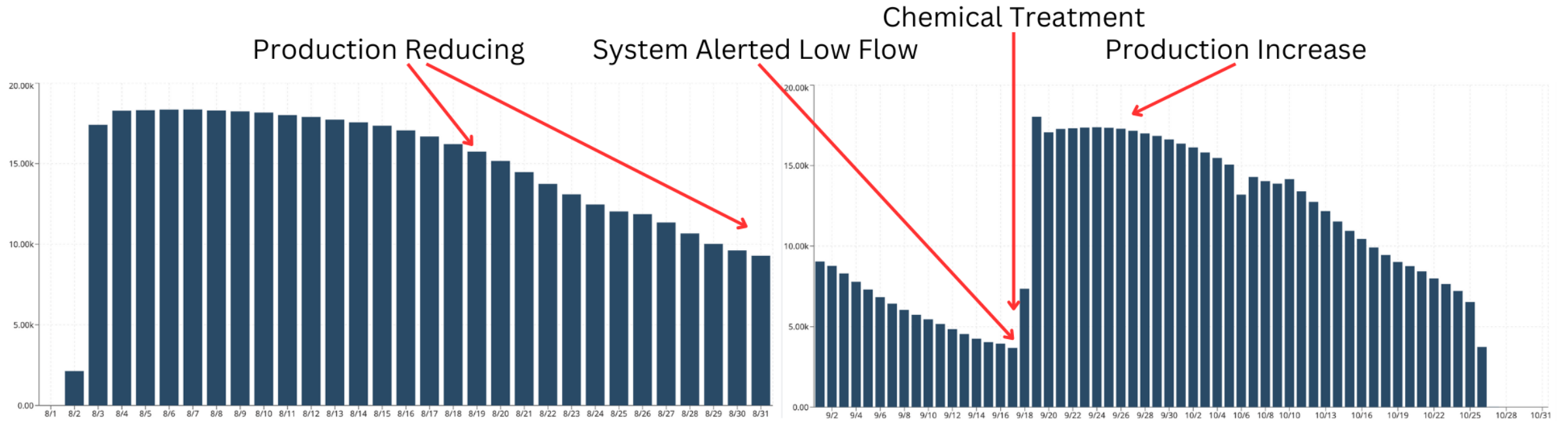


Well Interaction

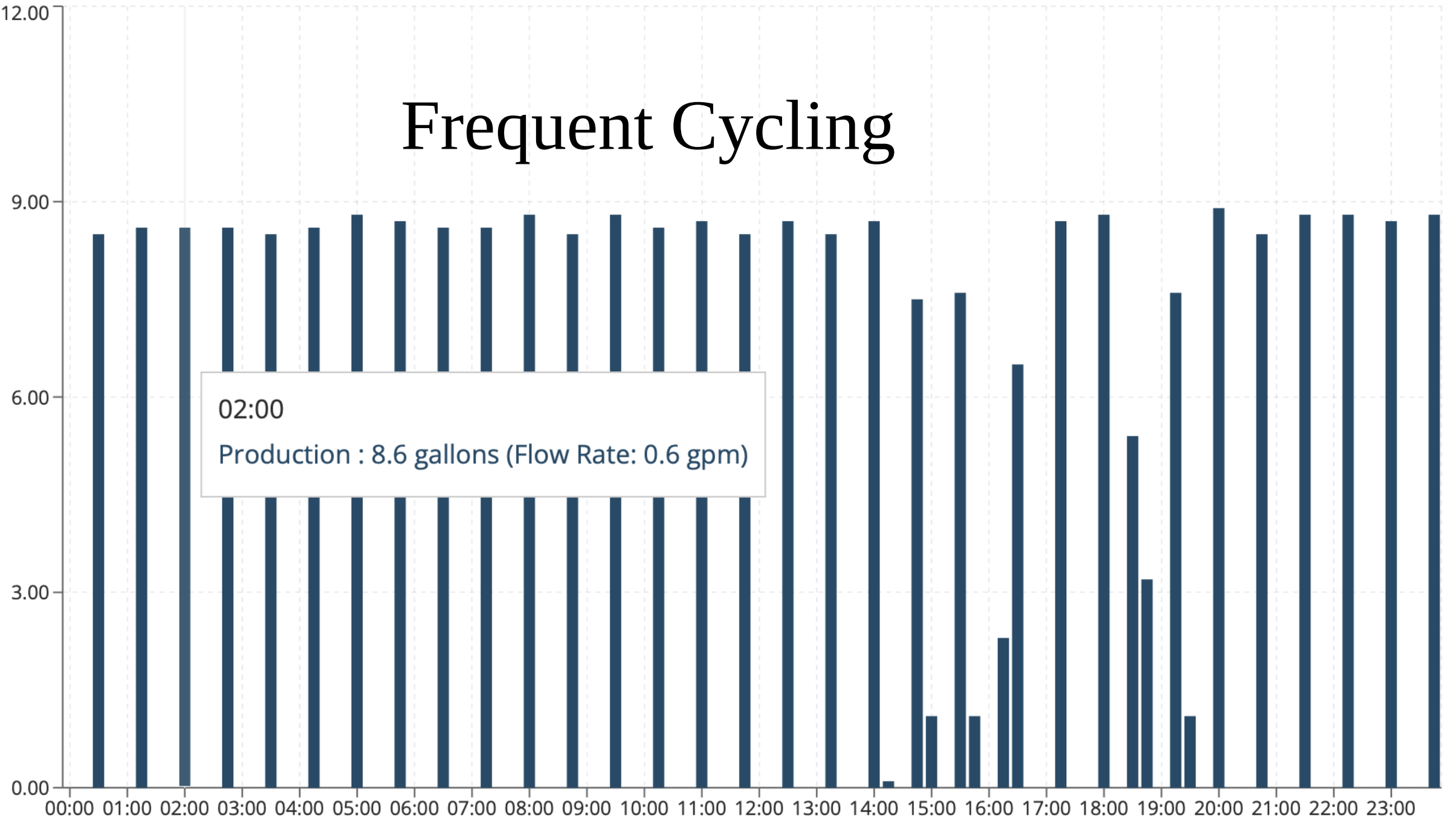




Example of Mineralization



Frequent Cycling



Excessive Pump Cycling — Well Meter ACTIVE

View in Dashboard

Started Jun 29, 2026 11:12 AM · Ongoing for 3 days

Total Pump Starts

94

Over 3 days

Daily Rate

24/day

71% above threshold (14)

Avg Run Length

35 min

Based on 15 min reporting intervals

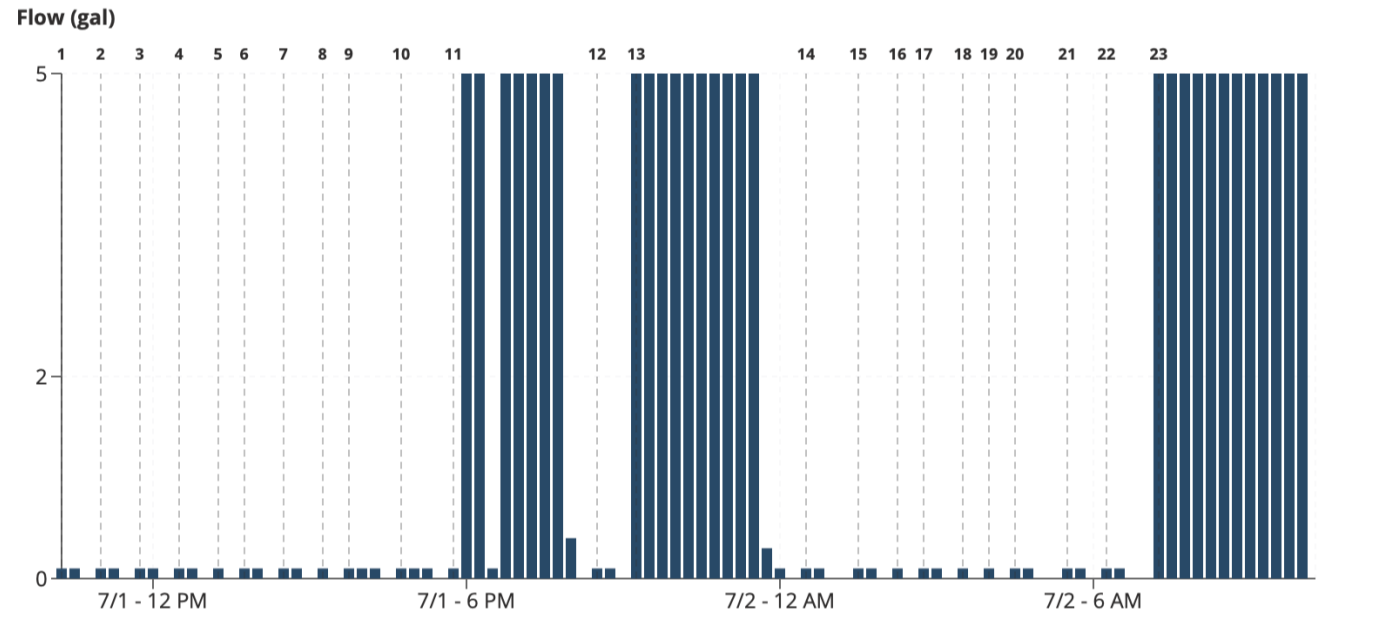
Shortest Run

≤ 15 min

Could be much shorter — exact time not available

Pump Activity

Jul 1, 10:21 AM – Jul 2, 10:21 AM · Numbered markers = pump starts
Latest 24h: **23 starts** (threshold: 14)



Pump Start 23 starts detected

What This Means

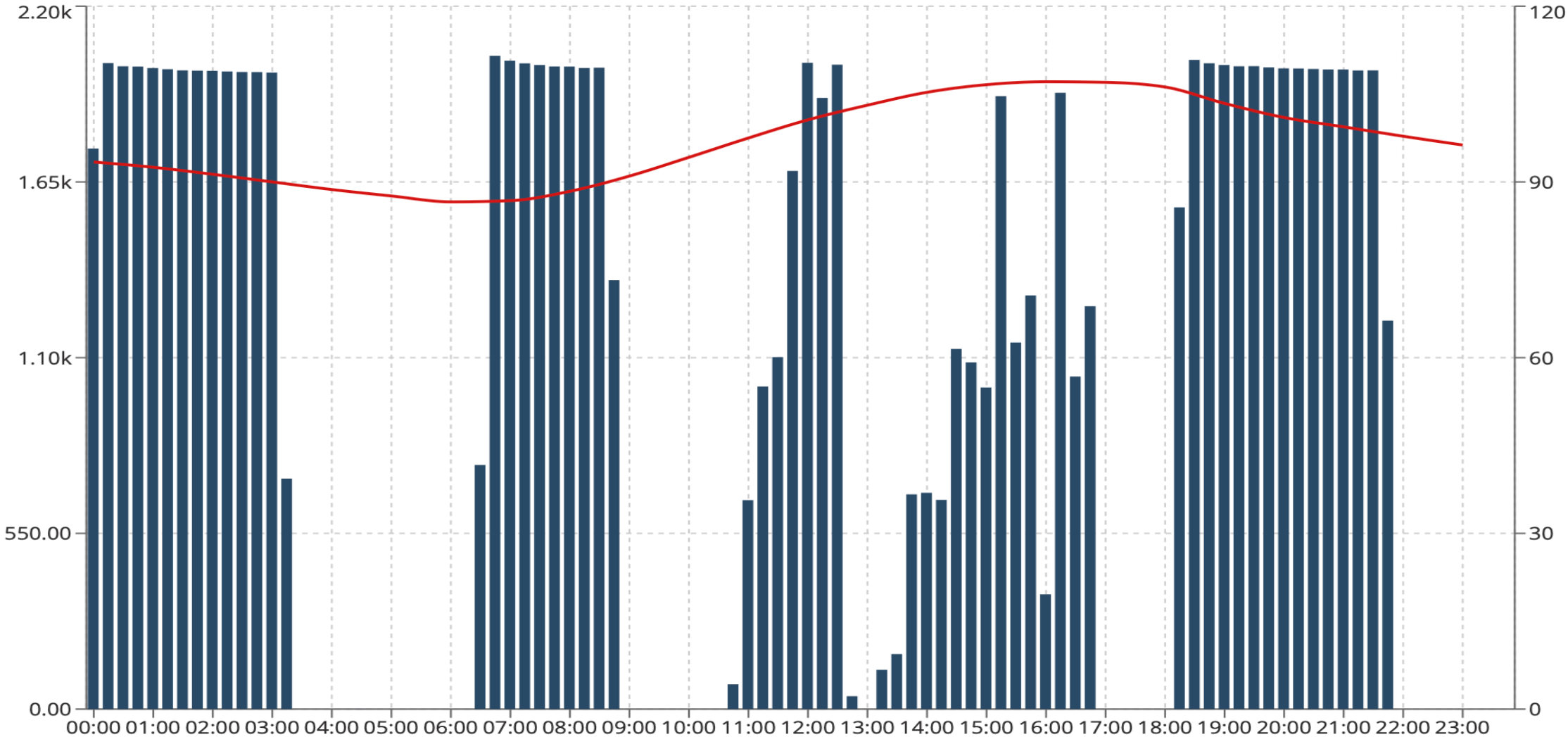


Quarter Hourly Production vs. Weather

August 10, 2025

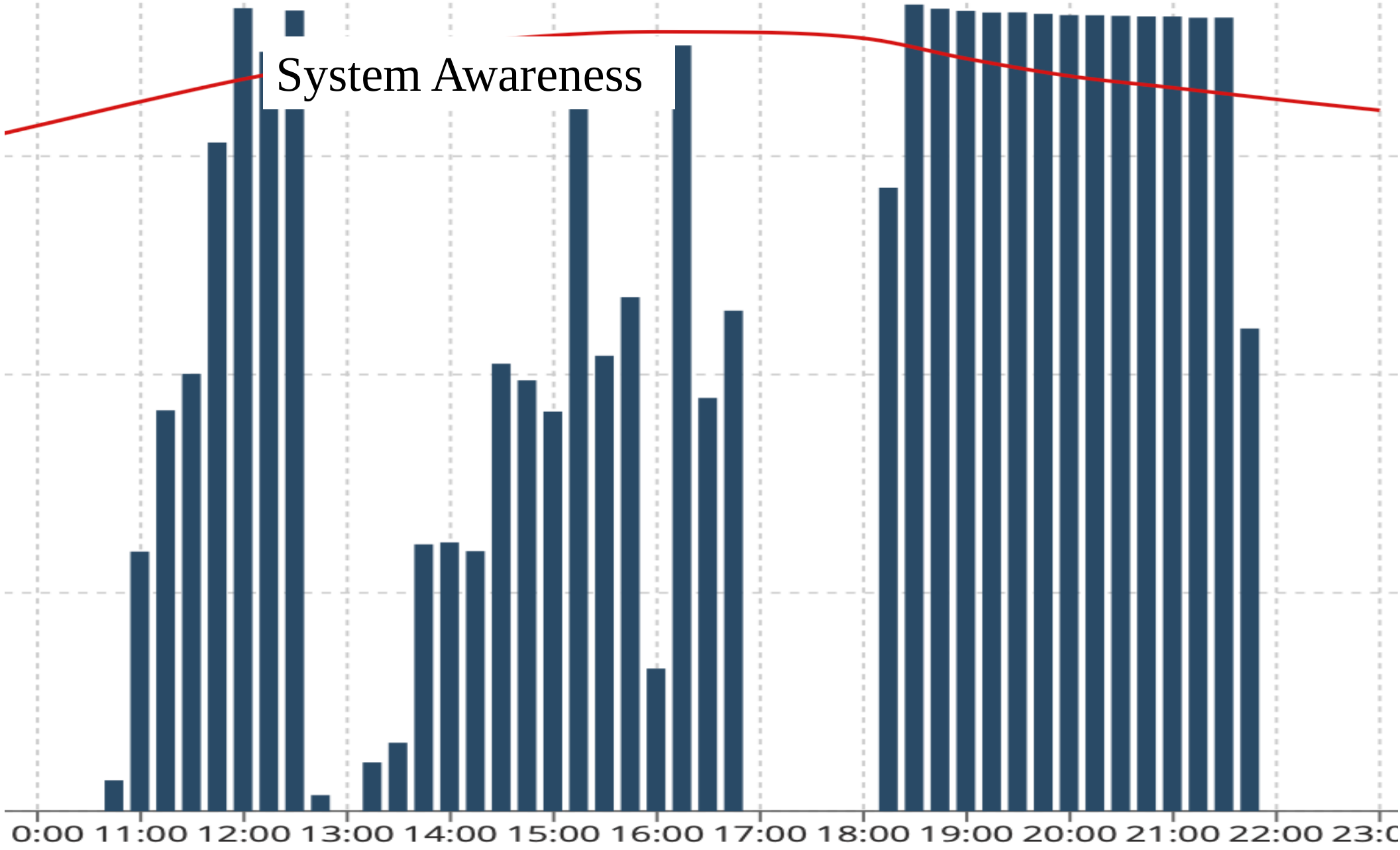
Quarter Hourly
Production (gallons)

System Issues



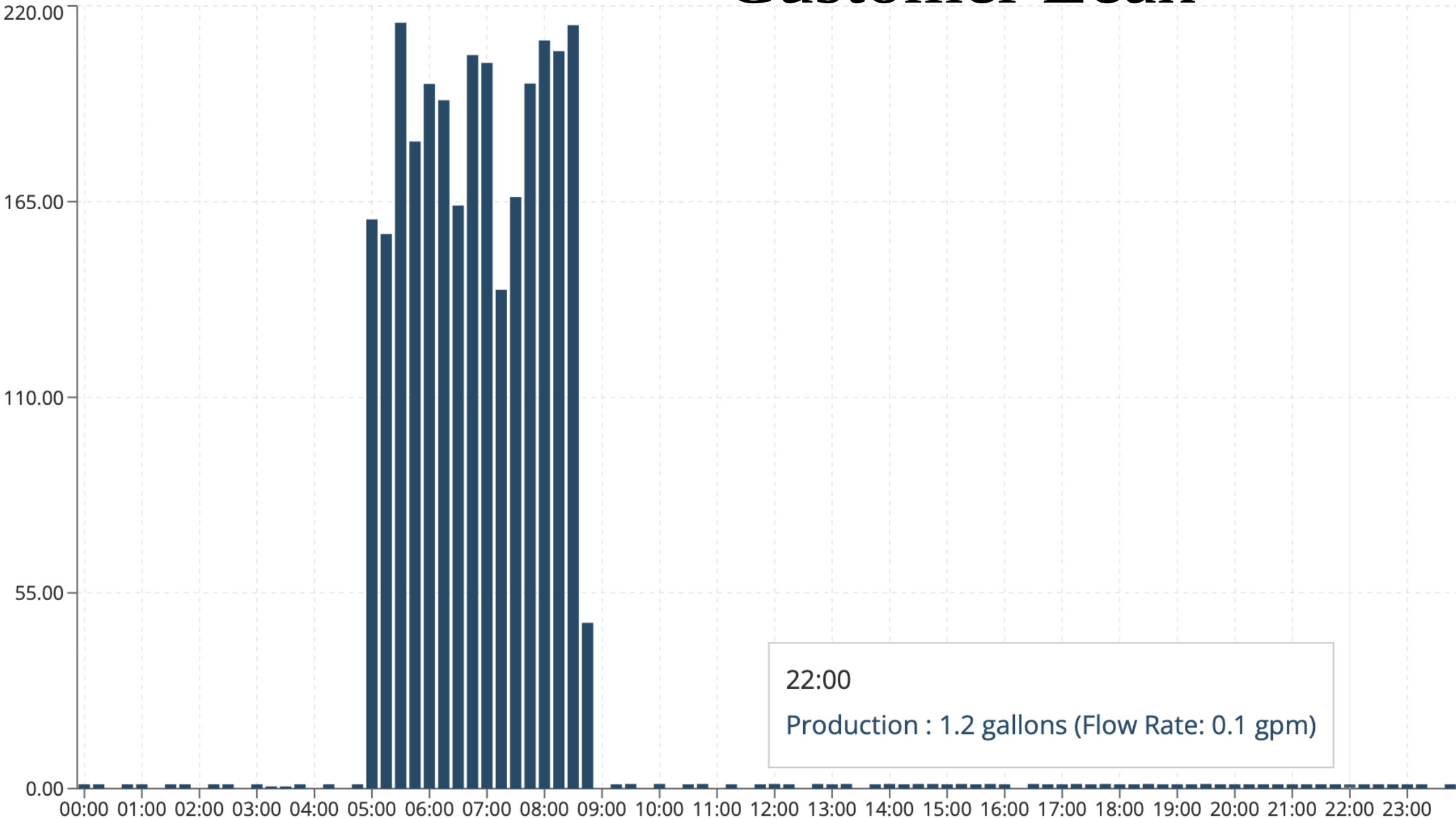


System Awareness

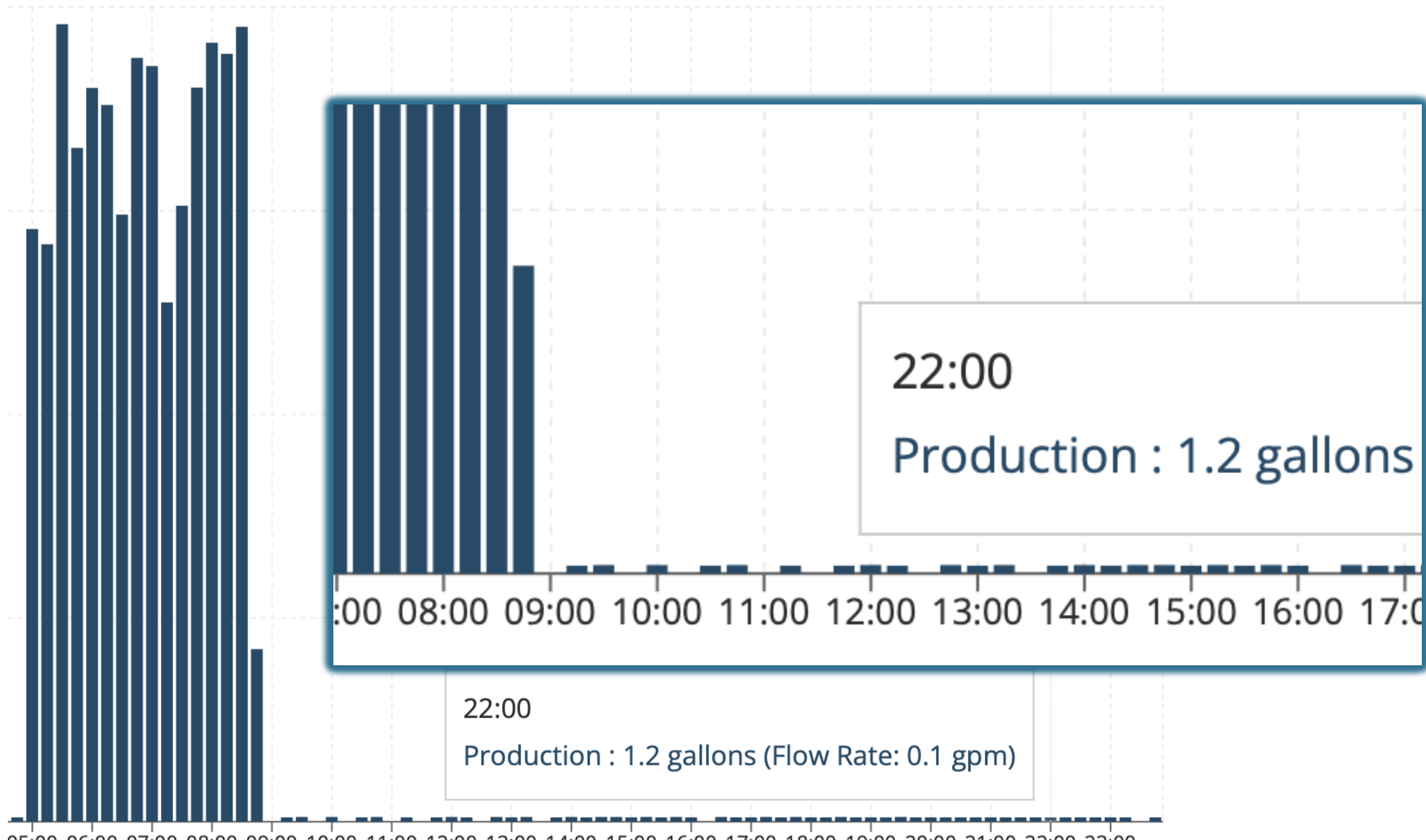


Quarter Hourly
Production (gallons)

Customer Leak



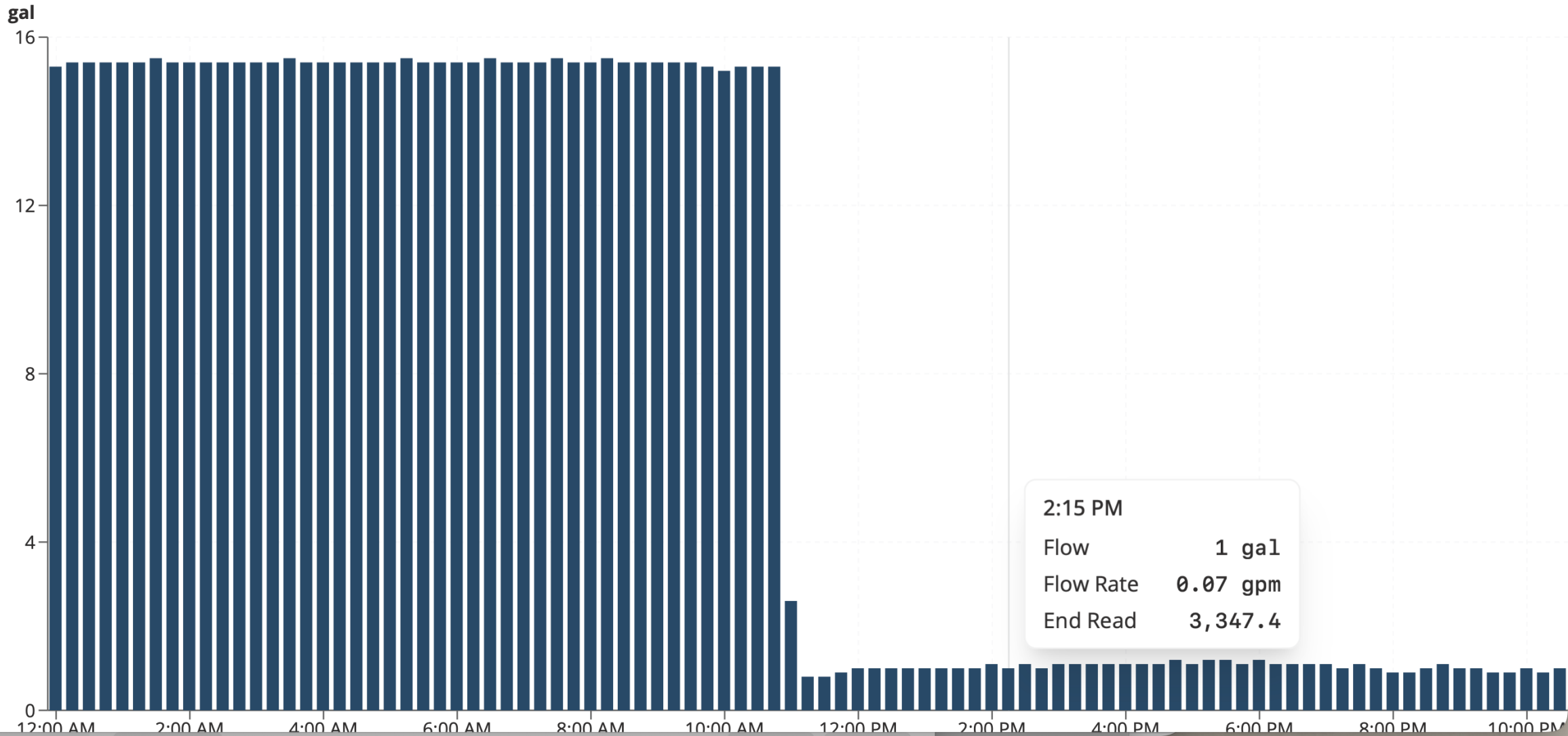
22:00
Production : 1.2 gallons (Flow Rate: 0.1 gpm)





Quarter Hourly Production

Your water usage today, shown in 15-minute intervals



Quick Math: Toilet Leak

- 1.2 gal per 15 min = 5 gal/hr * 24 = 120 gal day on 31 days = 3,720/mo
- 3,720 * 12 months ~ 44,640/ year
- 44 units at \$7/1000gal = \$308/year

Bad News: Ultrasonic vs Mechanical

@ .07-.09 gpm, mechanical metered 80 gallons in 3 weeks

Ultrasonic metered 2482 gallons in the same time period

On 200 connection system with ½ of the connections leaking, non-rev water would pay for a perpetual meter lease for every connection.

What????

Groundwater Basics and Management

- Innovation and management tools
- Common issues in water systems and wells, and how to use technology to monitor
- **Financial tools and modeling for RWS's**



RESOURCE
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Technology: knowledge, tools, systems and methods that solve problems, improve efficiency or expand human capabilities.



“Sometimes you just need a bigger hammer...and if that doesn’t work, get a bigger dude to swing the hammer....”

*James Berry, EC Tool,
Abilene, TX*

Sometimes the bigger hammer is a $\frac{3}{4}$ " meter...



Creative financing may be the hammer...

- Meters as a service MaaS-(Multiple vendors, multiple structures)
- Monthly fee for meter, connectivity and software-Fixed cost.
- No up front cost or some lenders defer payments for up to 1 year.
- Perpetual service/warranty by some vendors
- Non-Governmental Financing available – Shop multiple lenders
- “Spool up” revenue while increasing billable volume
- MaaS does not show up as debt and leaves conventional lending options open for emergency repairs

TXWSC: 2981 active connections

Case Study

- 207 miles of pipe in the ground
- 3.2 -8.8M gallons in lost water per month (non-rev)
- 8-year-old mechanical water meters
- 2 connections to municipal water at \$5/1000 gal, 1M gal/day limit
- 5 water wells
- 3 water storage tanks
- 5 pressure planes
- Base fee of \$32/mo/connection (Res)
- \$2 for insurance per connection against high bills



Meter Change out = Positive Revenue

- Recovery of 2M gal per month with more accurate meters
- Replacement meters covered under program
- No more “drive by” non-read reads
- Frees up 2 Field Techs for 7 to 9 days per month
- Daily top consumer list- address issues prior to billing
- Alerts for irregular consumption
- Customer facing application
- Billing integration- export to 3rd party that issues bills

Realized benefit of \$36-45K per month
Estimated MaaS fee of \$26,829 per month



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