Fervo’s Commercialization Plans for Enhanced Geothermal Systems (EGS)

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Agenda

Technology Overview

Project Red – Commercial Pilot Project

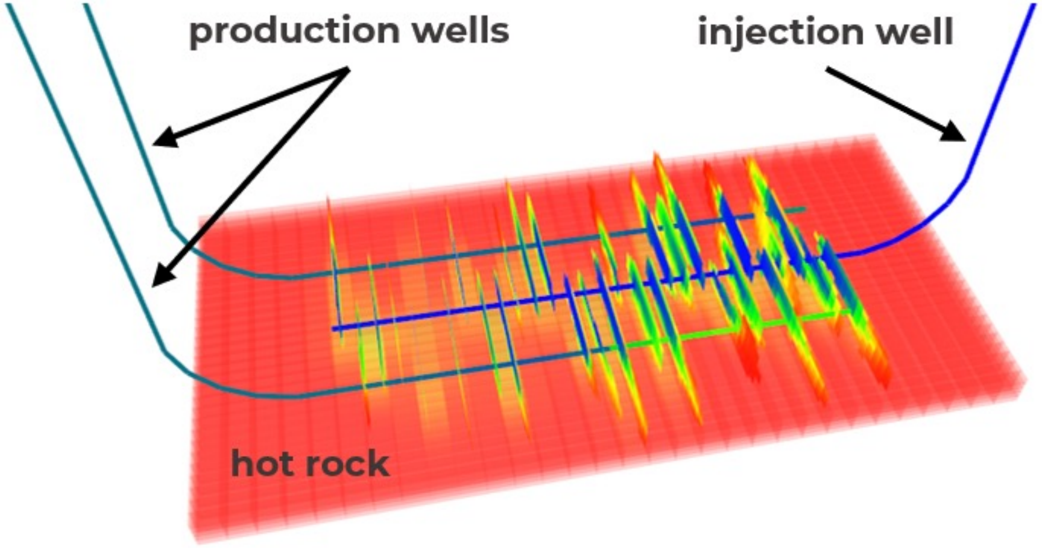
Cape Station

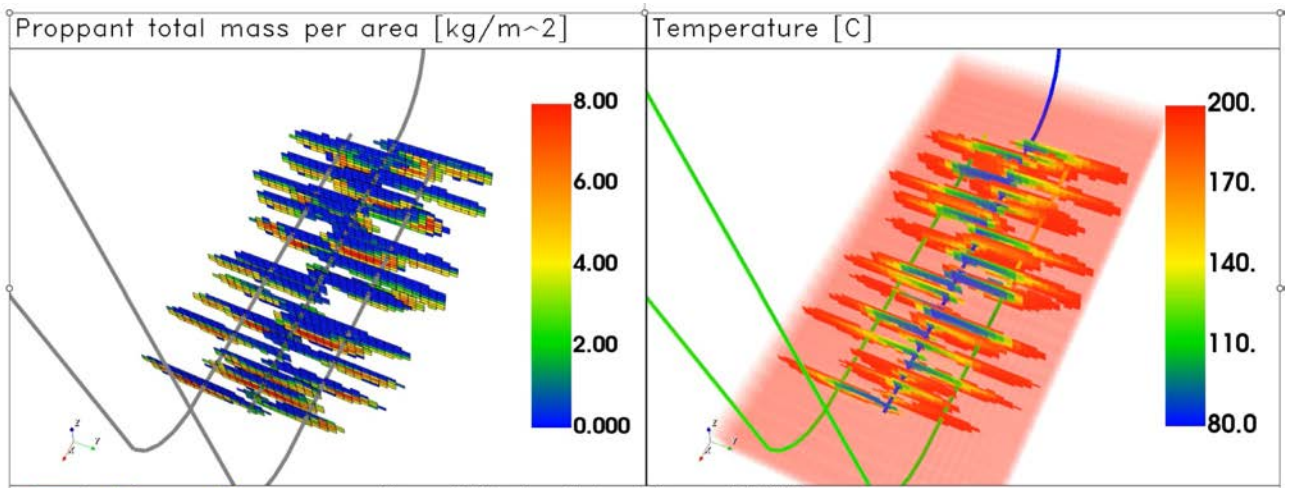
Time Permitting… FervoFlex™

Technology Overview

Fervo's approach to geothermal energy development relies on many of the same technologies that enabled the North American shale revolution, including:

- **Horizontal drilling** to increase the contact area with the geothermal reservoir
- **Multistage completions** with extreme limited entry and proppant to increase flow rates and heat transfer efficiency
- **Distributed fiber optics** for monitoring, characterization, and downhole flow control



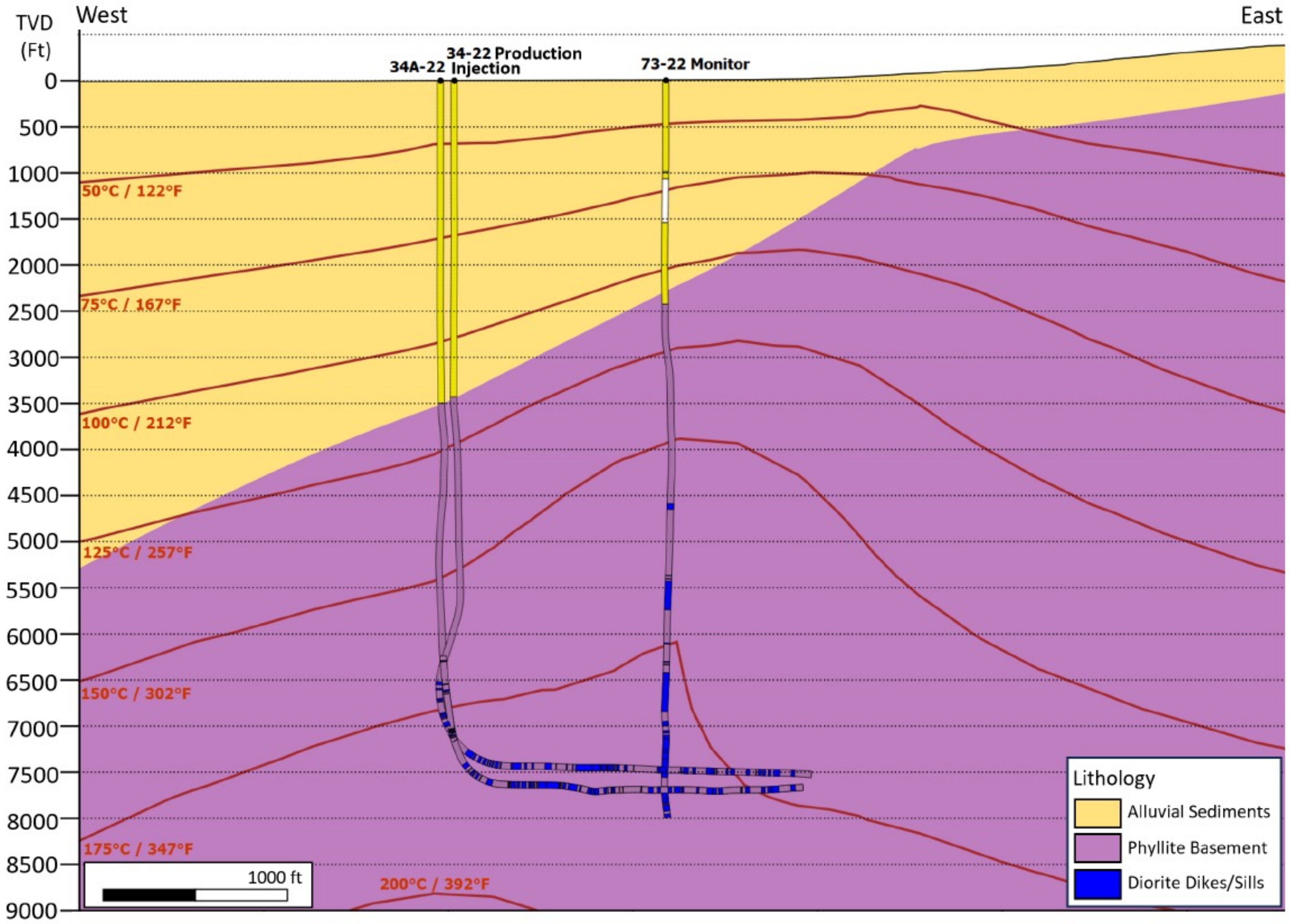


Computational model of a modular triplet well system

Commercial Pilot – Project Red

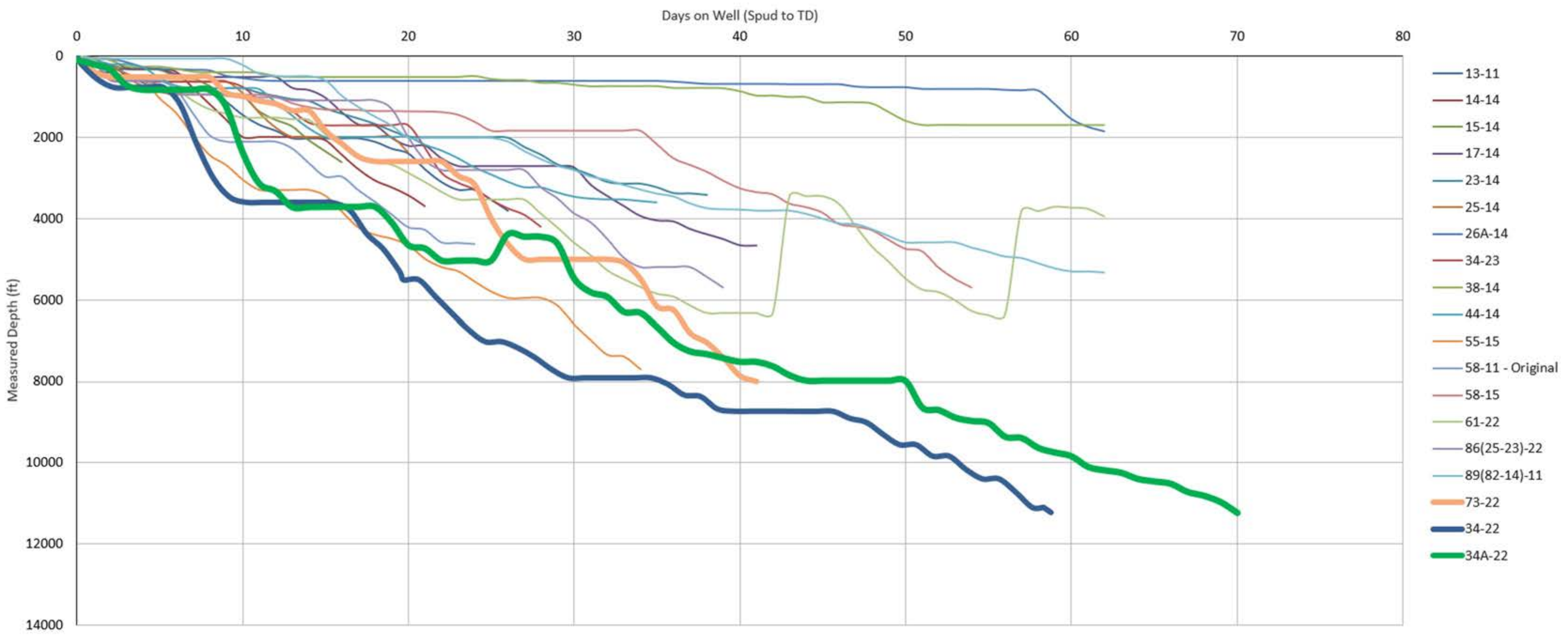
We successfully drilled the first horizontal EGS doublet

- Reservoir target was a mixed metasedimentary and igneous formation
  - Phyllite, quartzite, diorite, granite
  - Max temp = 376 °F (191 °C)
- Laterals were landed fully horizontally
  - Achieved build rates of 10 deg. / 100 ft
  - 9 7/8" production hole size w/ 7" casing
  - Permanent fiber optic cables
- The two horizontal wells were drilled from the same pad with complex 3D build
  - Critical de-risking for multi-well pad drilling



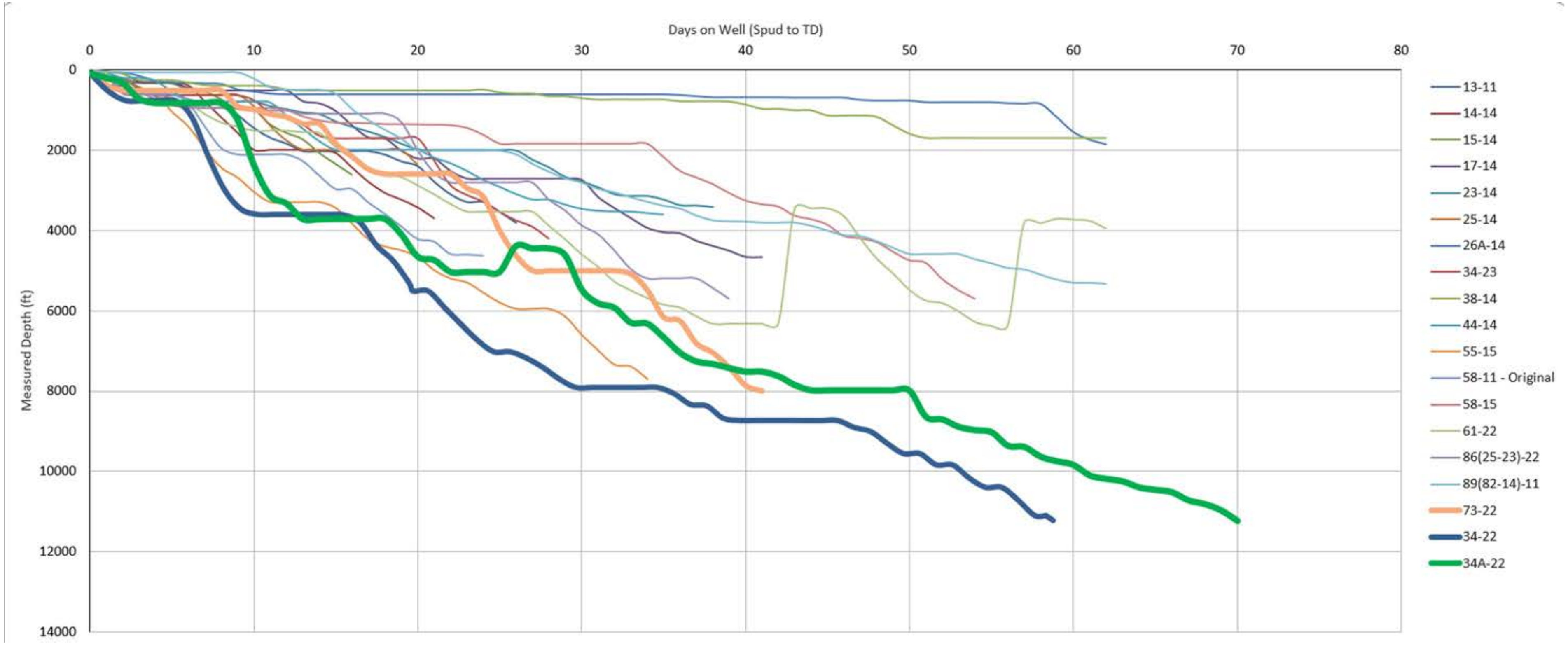
Drilling performance

- ❖ We achieved top-quartile drilling speeds relative to other wells across the field
- ❖ Despite these wells being significantly more complex in terms of well construction
  - Larger hole sizes, more casing strings, larger build rates, and horizontal drilling



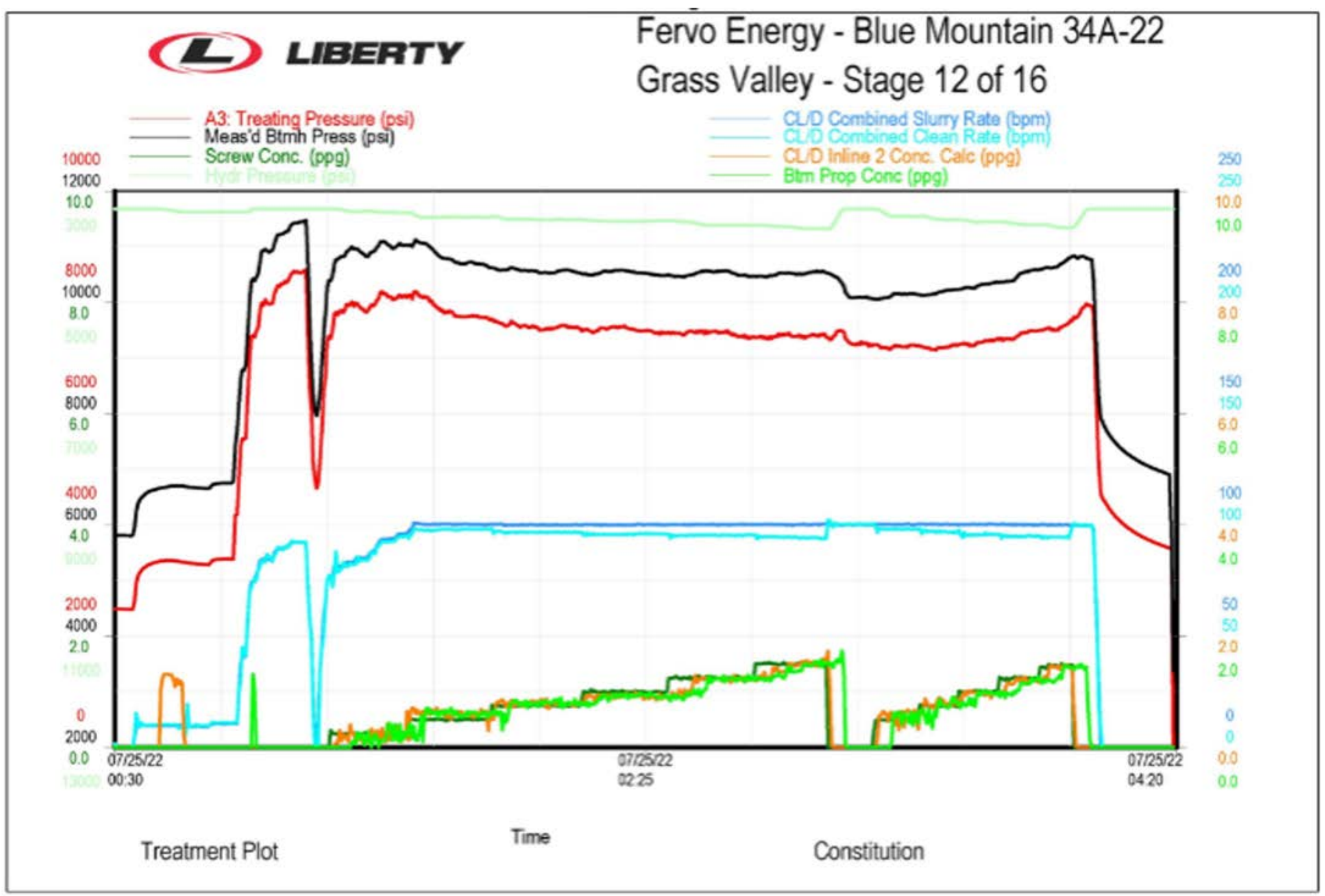
Drilling performance

- ❖ The horizontal wells were drilled with both PDC and roller cone bits
- ❖ Directional drilling was performed entirely with standard mud motors + bent sub
- ❖ Achieved an 18% reduction in drilling days between the first and second horizontal wells
  - 72 days → 59 days



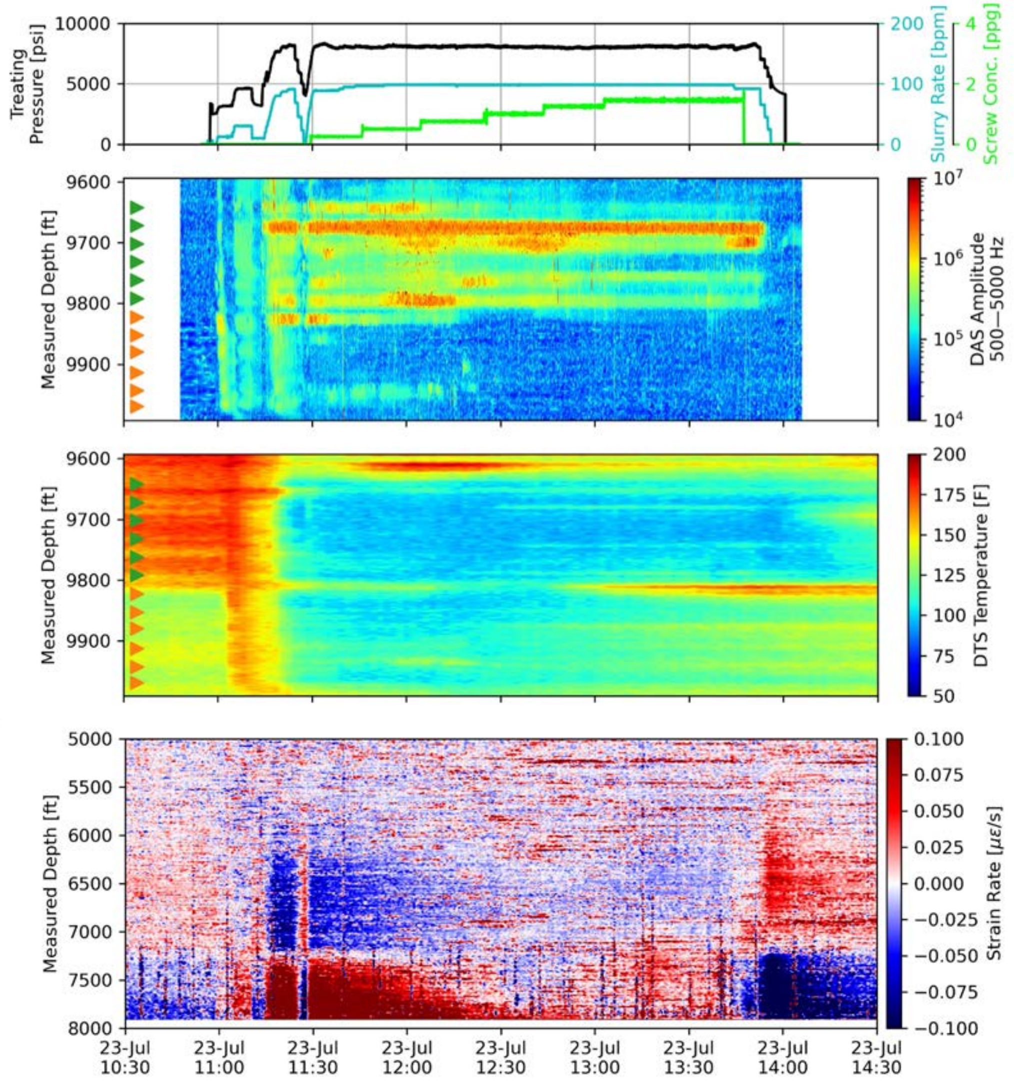
Multistage hydraulic stimulation treatment

- We performed a multistage, plug-and-perf stimulation treatment on both laterals
  - 16 stages on the injection well
  - 20 stages on the production well
  - 30 ft cluster spacing / 6 clusters per stage / 180 ft stage length



- Standard proppant material
  - 500k lbs of proppant per stage
  - 40/70 mesh and 100 mesh proppant
  - 100 bpm target pump rate

Created over 100+ fracture flow paths along both wells



Achieved industry-standard rates, volumes, and proppant loading concentrations while treating stages in metasedimentary and granitic lithologies

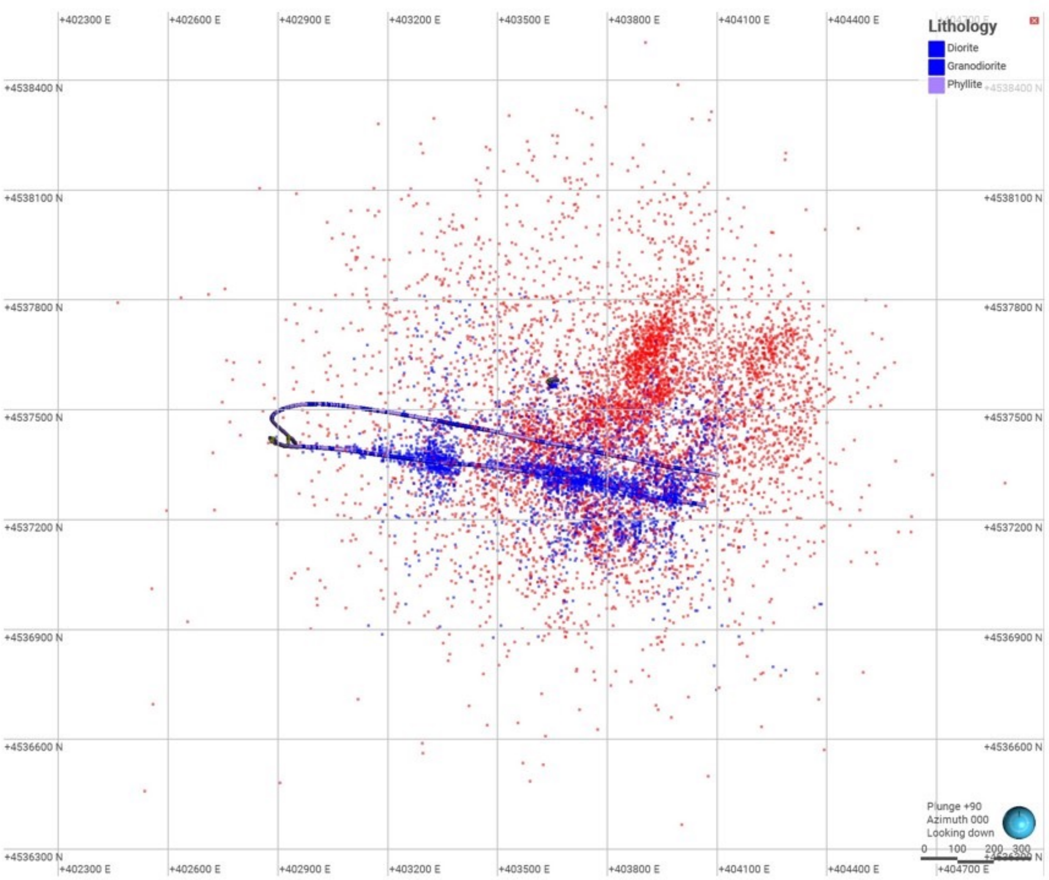
In-well DAS in horizontal treatment well confirmed 100% cluster initiation with average 73% cluster efficiency

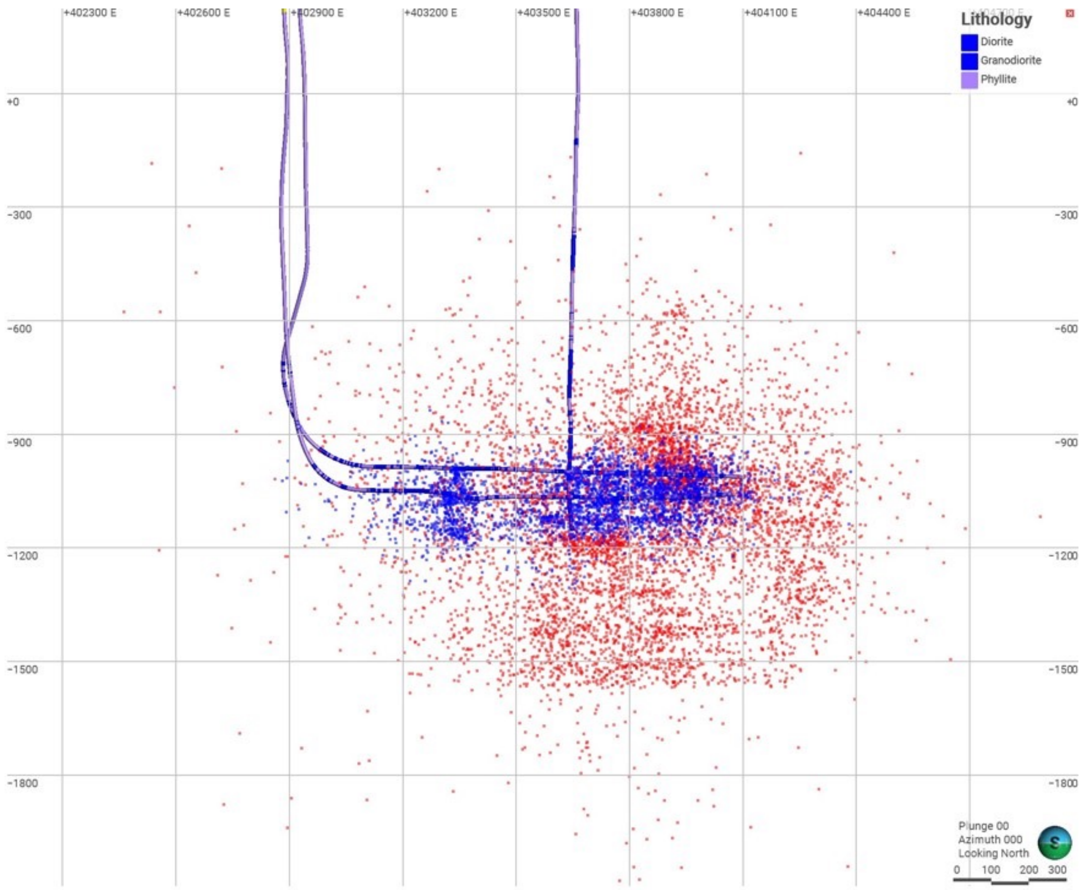
In-well DTS in horizontal treatment well confirmed relatively good zonal isolation plug integrity

Low-frequency DAS response in offset vertical well was used to calibrate frac length and height

Stimulated reservoir volume

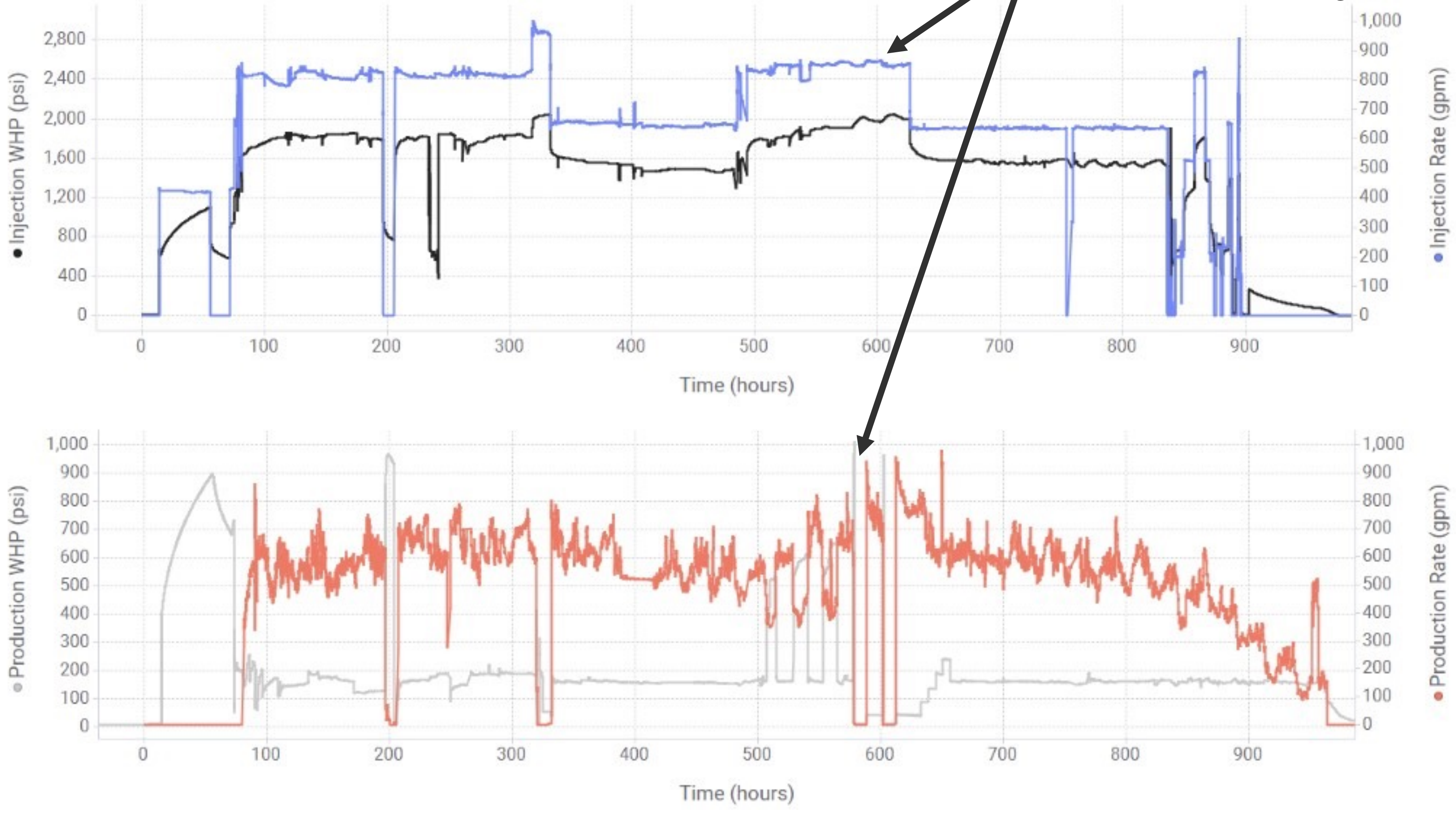
- SRV dimensions derived from DAS-microseismic: 3000 ft x 1600 ft x 1000 ft
- Heat-in-place estimates support 5+ MWe of production capacity from the system



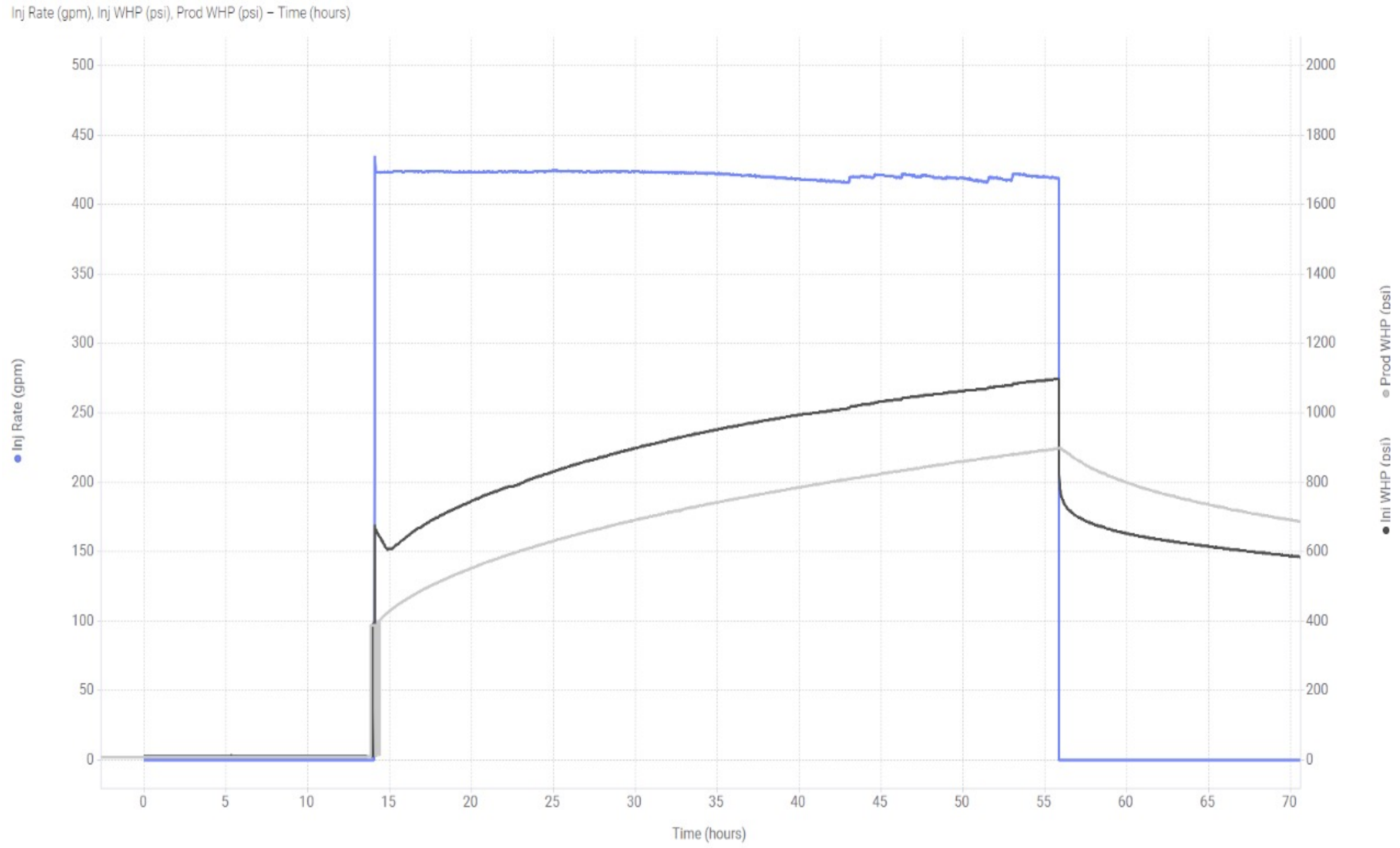


Commercial-scale production rates achieved

Sustained flow rates of 25k – 30k bbl/day



Fracture conductivities in granite are higher than shales



$$q = \frac{nkwh}{\mu}\frac{\Delta p}{\Delta L}$$

150 psi pressure drop across the reservoir

15,000 bbl/day flow rate

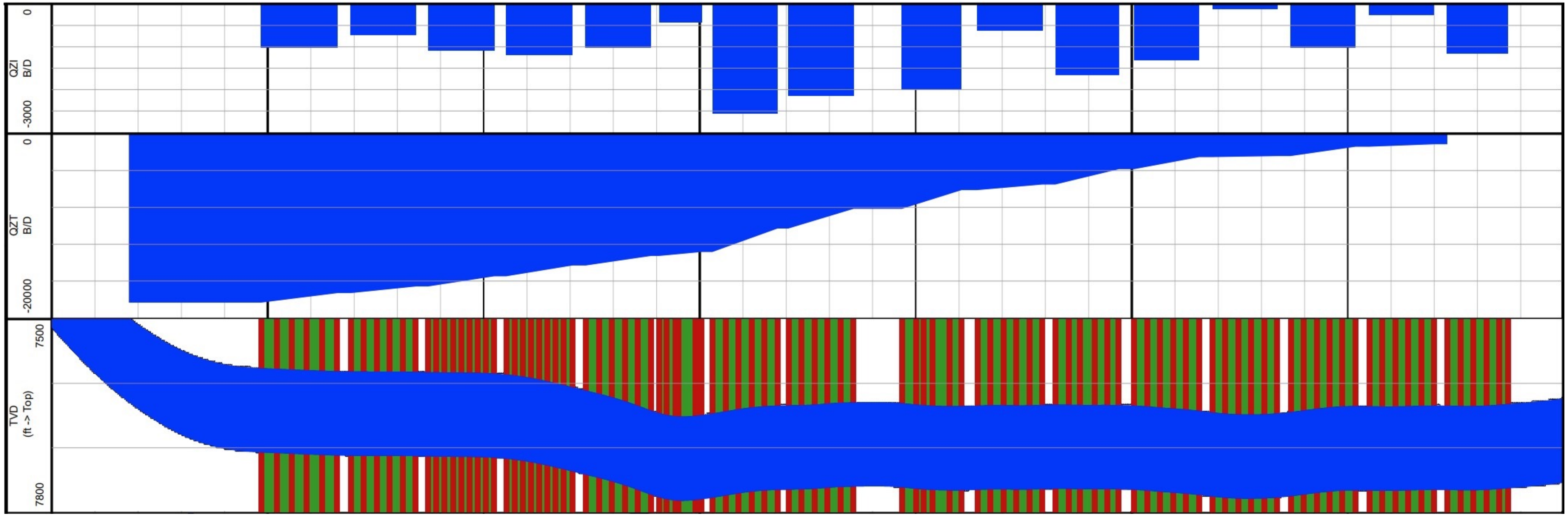
100 discrete fracture flow zones

Implies fracture conductivities of 300 – 400 md-ft

…compared to 10 – 100 md-ft for conductivities in shale

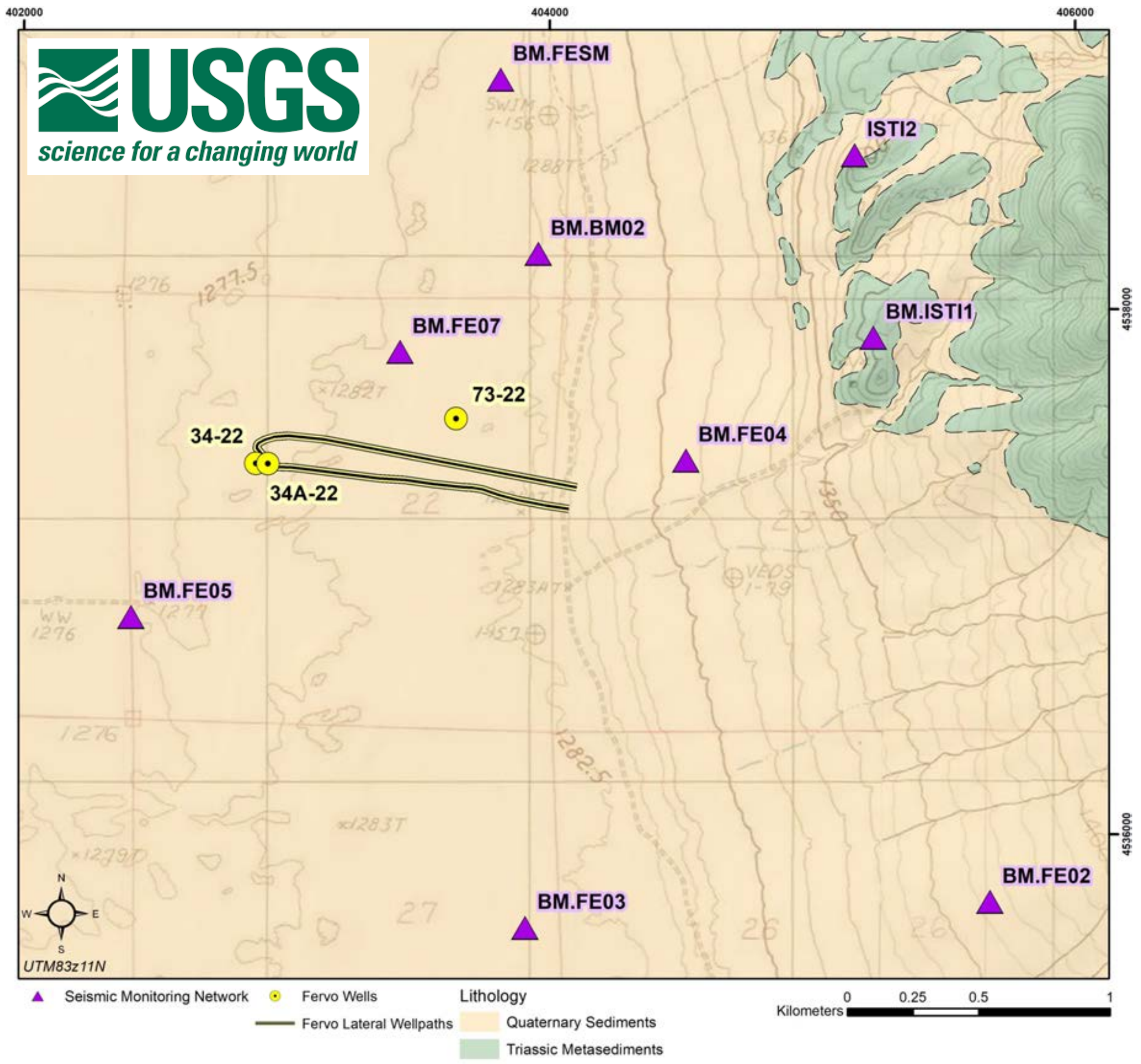
Uniform flow distribution along the laterals

- Flow distribution profile measured with a spinner log along the lateral under steady-state flow conditions
  - No heel bias
  - No dominant flow paths / thermal short circuit pathways



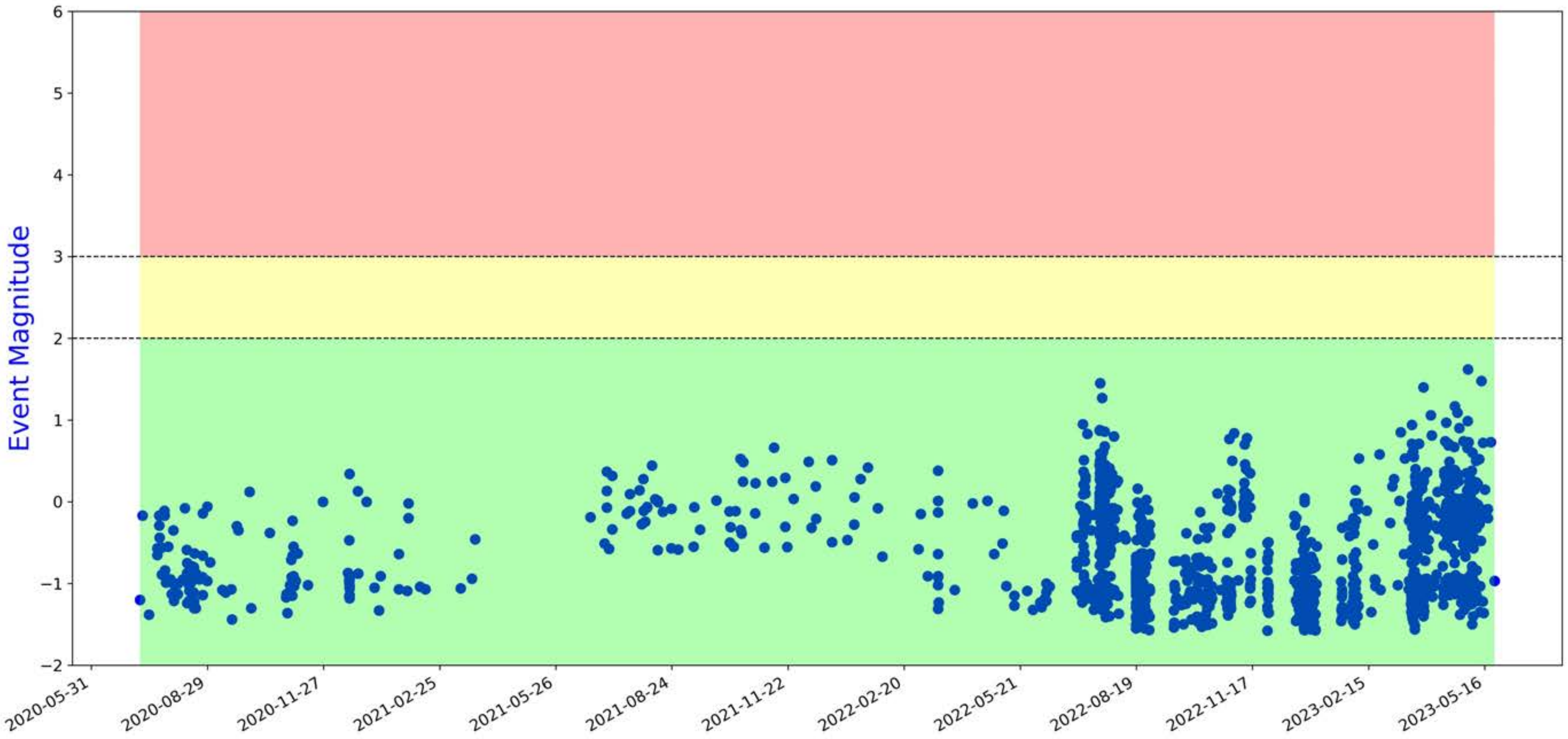
Induced seismicity mitigation

- We implemented a rigorous induced seismicity mitigation plan
  - Followed protocol established by US Department of Energy
- Installed a local seismic monitoring network
  - Designed and operated in partnership with the US Geological Survey
  - 8 broadband seismometers
  - 2 strong motion sensors (one at the site and one in the nearest town)
- All data is publicly available



No incidents over 3 years of operations

- Actively monitored in real-time from July 2020 to present (3+ years of continuous monitoring)
- Monitoring covered all major active operations, including drilling, stimulation, and well testing
- All observed seismicity remained in the Green level (M < 2) with no incident



Cape Station

- Fervo's first full-scale greenfield development capable of producing 400+ MW
  - Ph 1 (90 MW) by 2026
  - Ph 2 (310 MW) by 2028
- Cape Station EA FONSI received Feb 2023
- Abundant data from FORGE and offset wells
- Dynamic data collection: fiber & microseismic to characterize SRV, fracture morphology, inflow allocation
- Crossflow testing and history matching
- Data driven optimization results in faster standardization and cost reduction
- 3+ wells per pad & batch drilling

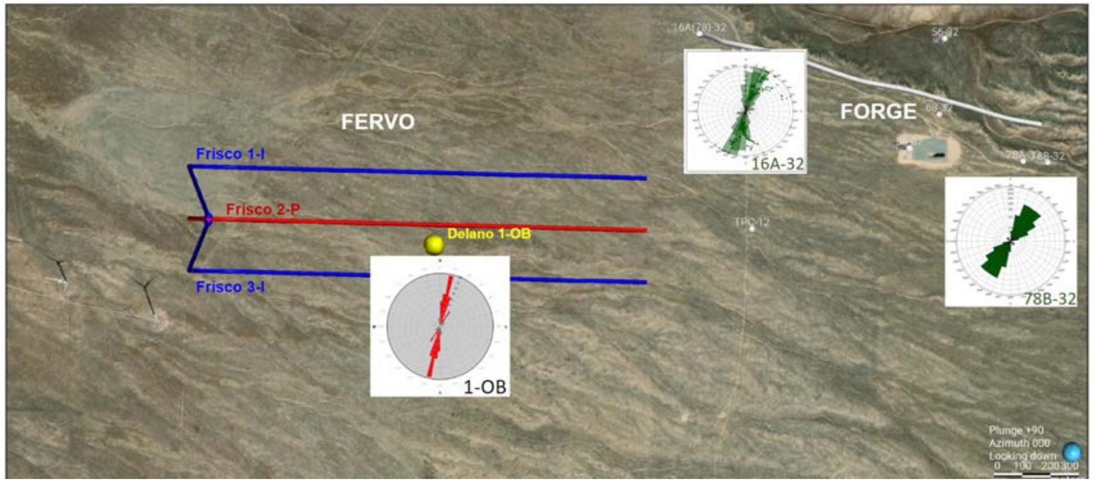
Cape Station

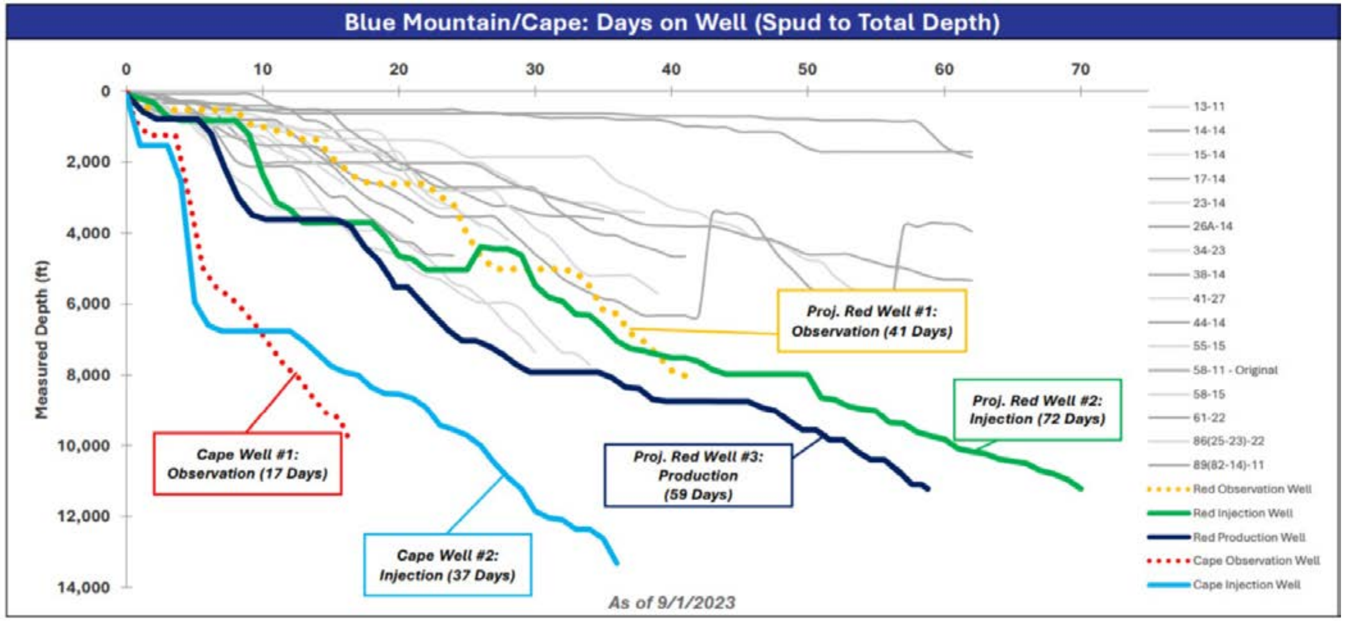
❖ Appraisal Campaign:

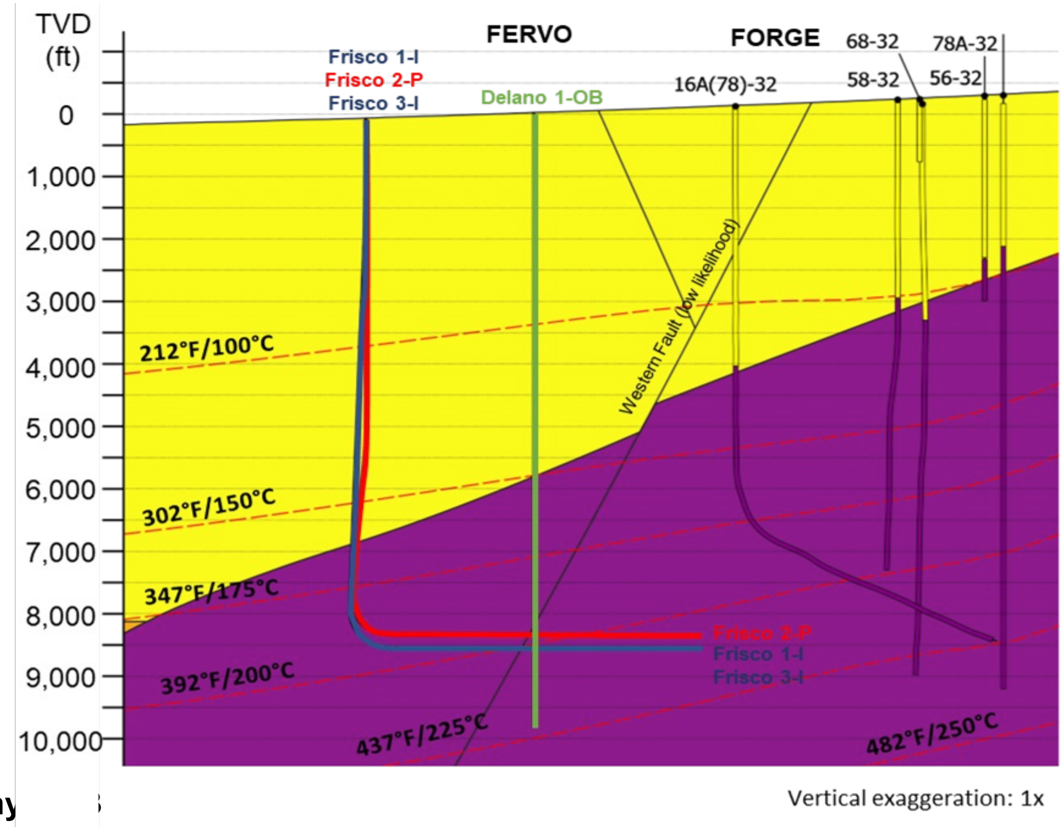
- Delano 1-OB: WL logs, permanent fiber, ERD gauge

9,647 ftMD / 444°F / Shmax 10°

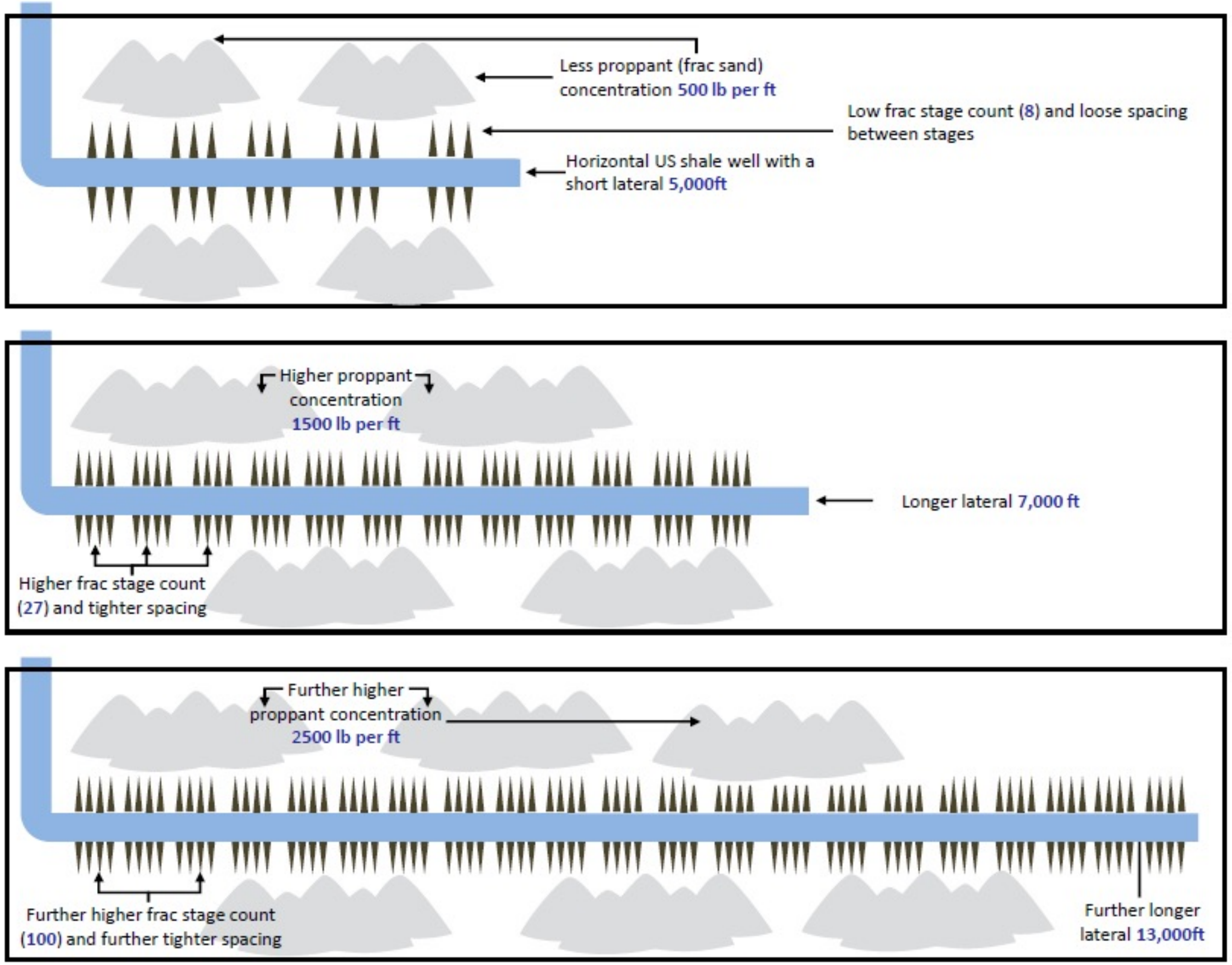
- Frisco 1-I, 2-P & 3-I: vertical and lateral sections logged with WL and ThruBit (297°F max, equilibrated temp ~420°F), high flow rates lead to effective cooling







Pathway to Scale

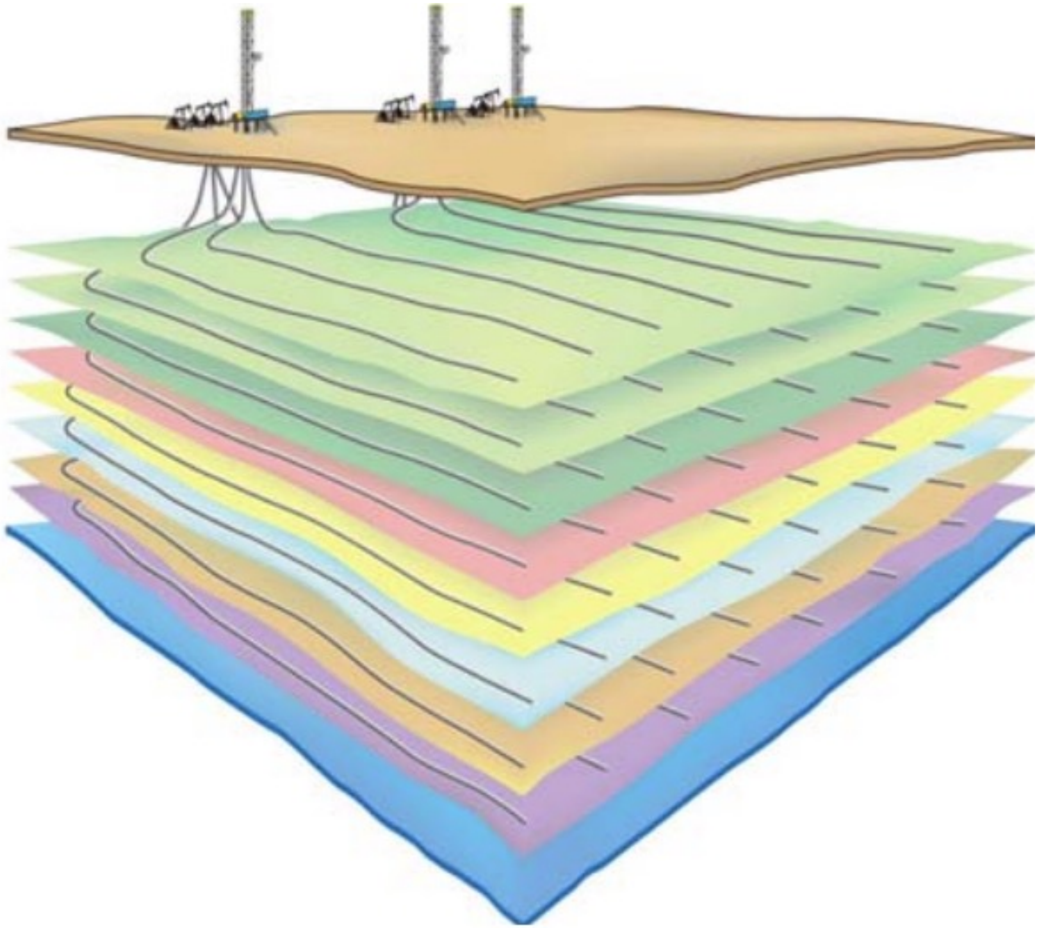


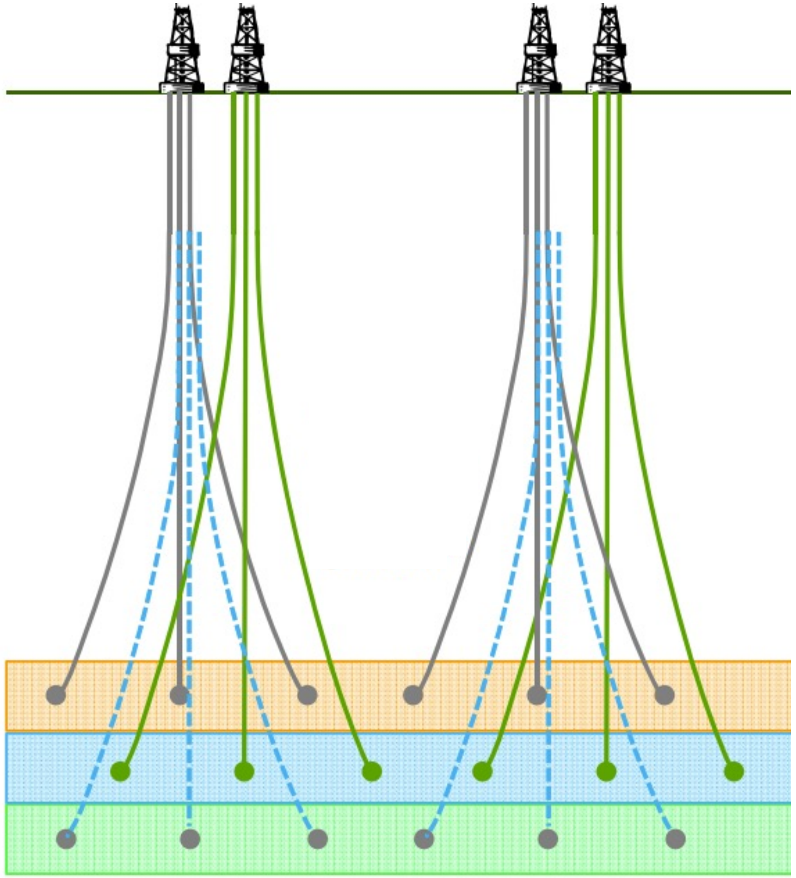
- Increased lateral length
  - 3000 ft → 5000 ft → 7500 ft → 10,000+ ft
  - Flow capacity and heat transfer surface area scale linearly with lateral length
- Increase surface and intermediate casing diameters
  - 7” → 9 5/8” → 10 ¾” → 13 3/8”
  - Eliminate wellbore friction and unlock 45k bbl/day flow rates

Pathway to Scale

❖ Innovative well patterns and stacked pay development

- Increase power output per acre by 3x-5x to dramatically increase and resource base and acreage value





Pathway to Scale

- Having successfully constructed the Project Red commercial pilot, we have demonstrated that no fundamental technical barriers remain to deploying next-generation geothermal technologies in high-temperature, hard rock settings

- The pathway to scale is straightforward, and requires no new technology leaps

- With no significant fundamental technical risks remaining, the focus must now be on consistency, replicability, and cost reduction

ACKNOWLEDGEMENTS

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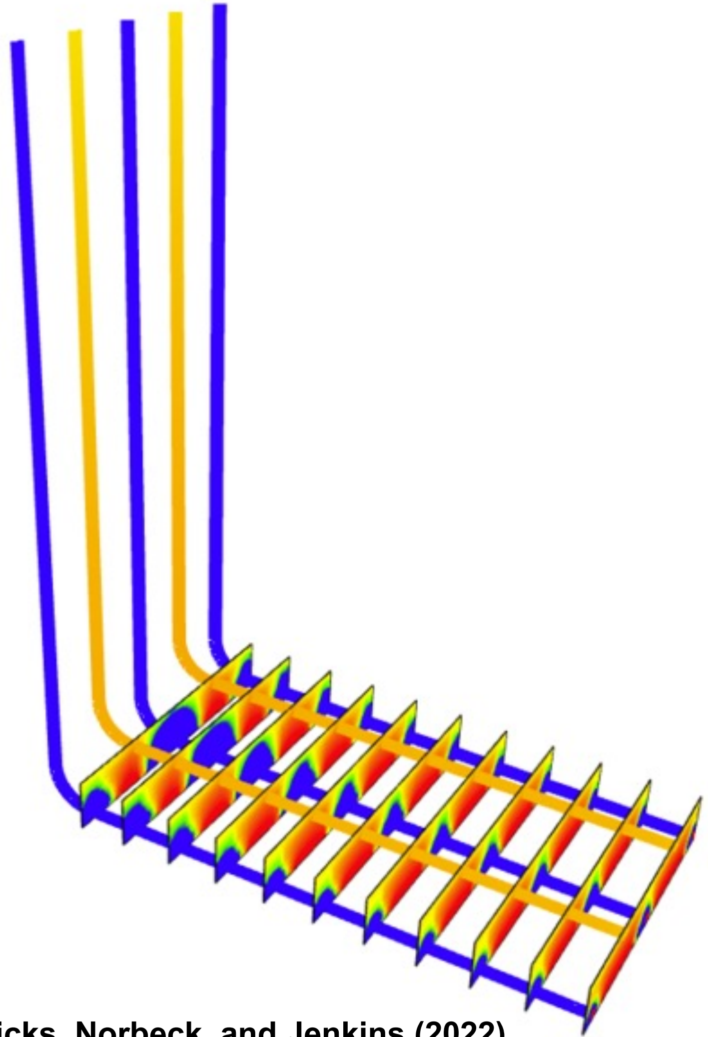
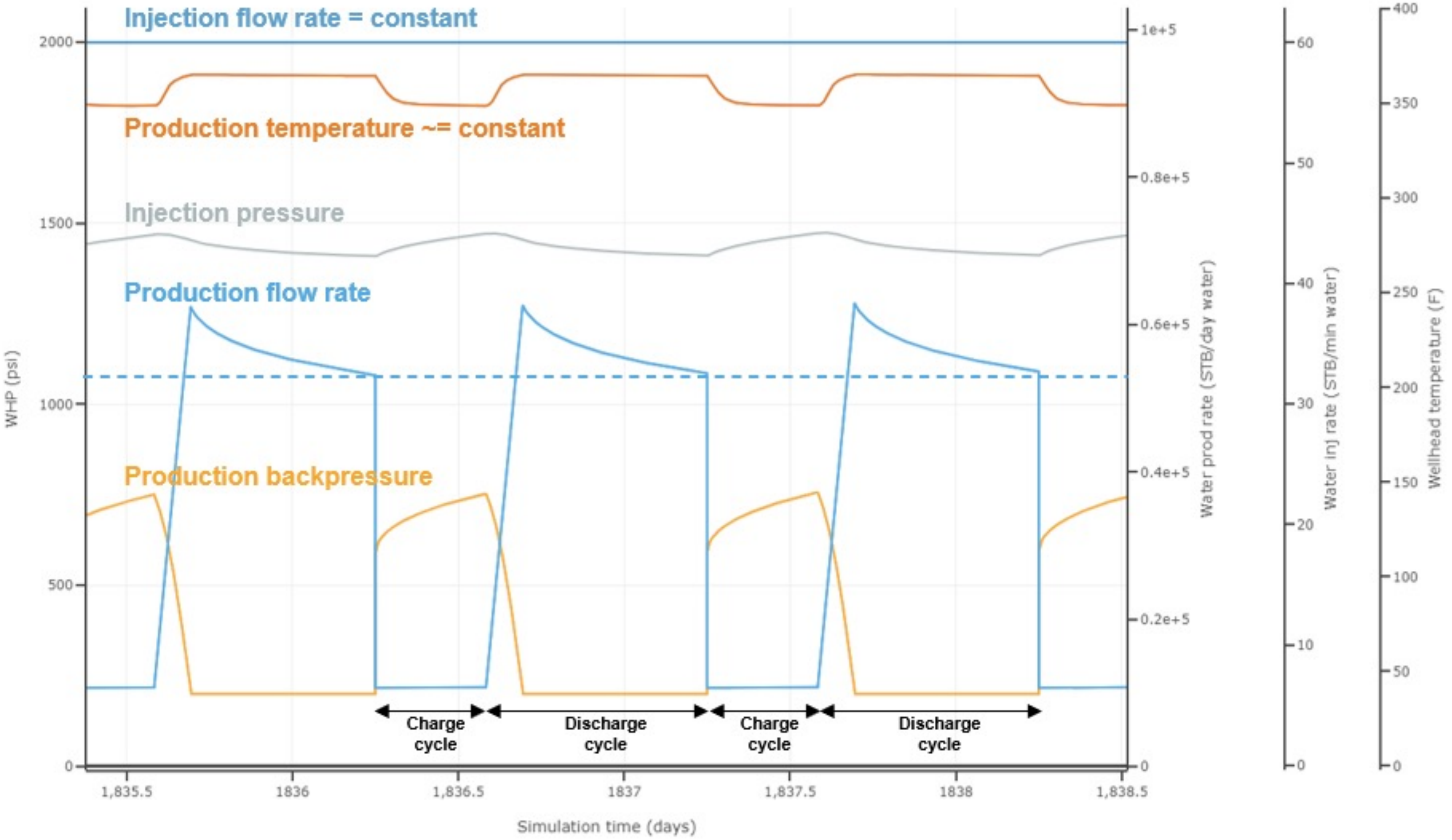
FervoFlex™ Technology Validated



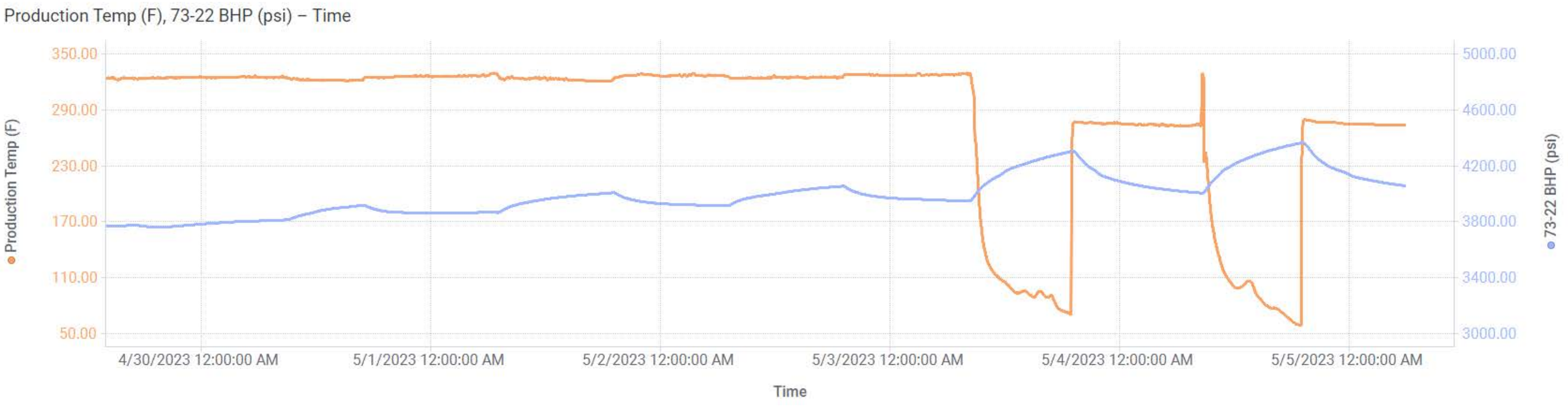


Ricks, Norbeck, and Jenkins (2022)

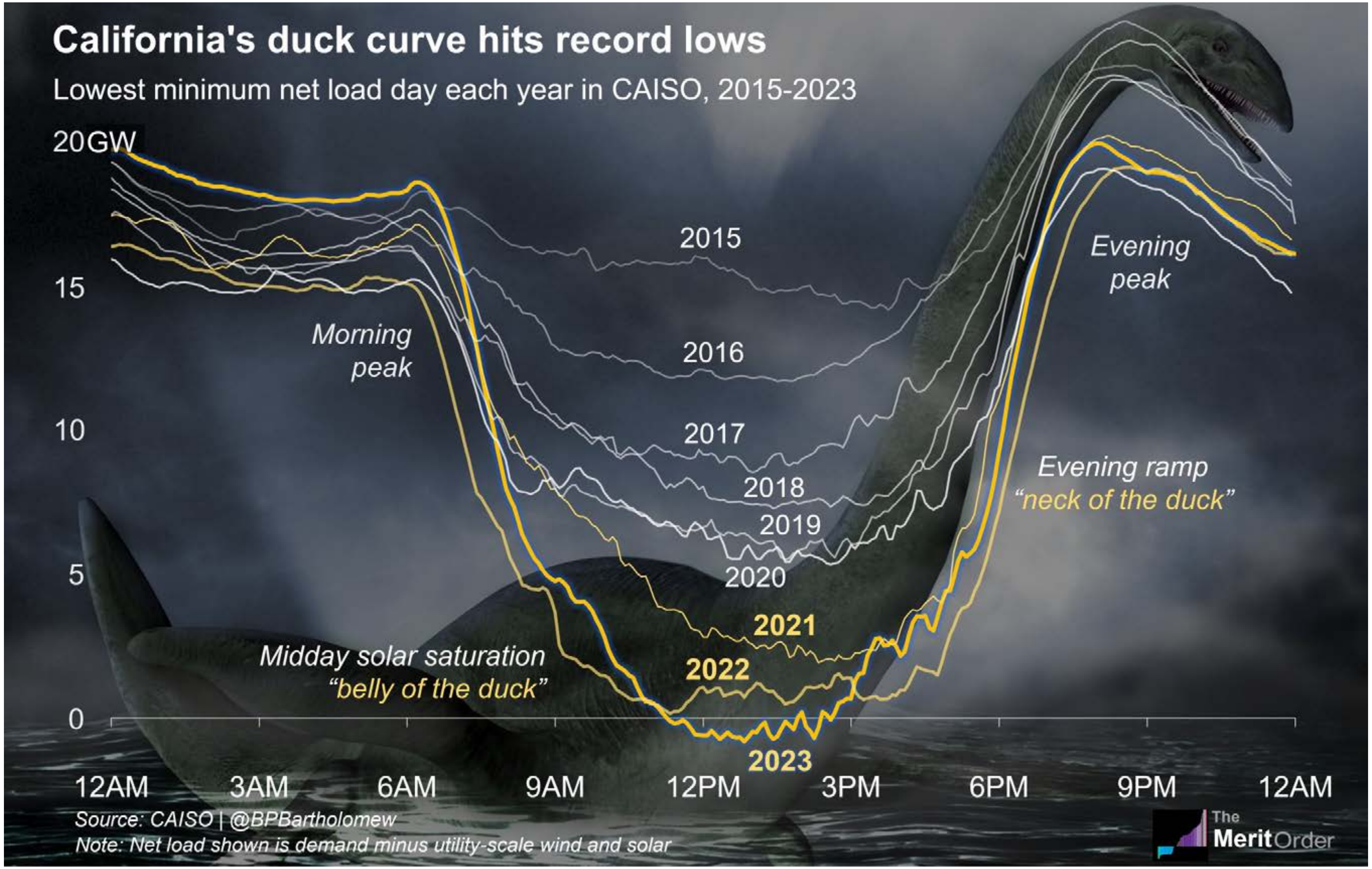
FervoFlex™ Technology Validated

- **We performed five FervoFlex™ cycles**
  - 3 cycles where production was curtailed to a fraction of steady-state
  - 2 cycles where production was completely curtailed

- **Validated our ability to reliably flex our generation and consumption curves to deliver highly dispatchable power profiles**
  - Demonstrated ability to be a net energy consumer during the day
  - Reservoir charge cycle resulted in flush production phase during evening peak load hours



FervoFlex^{TM} Technology Validated



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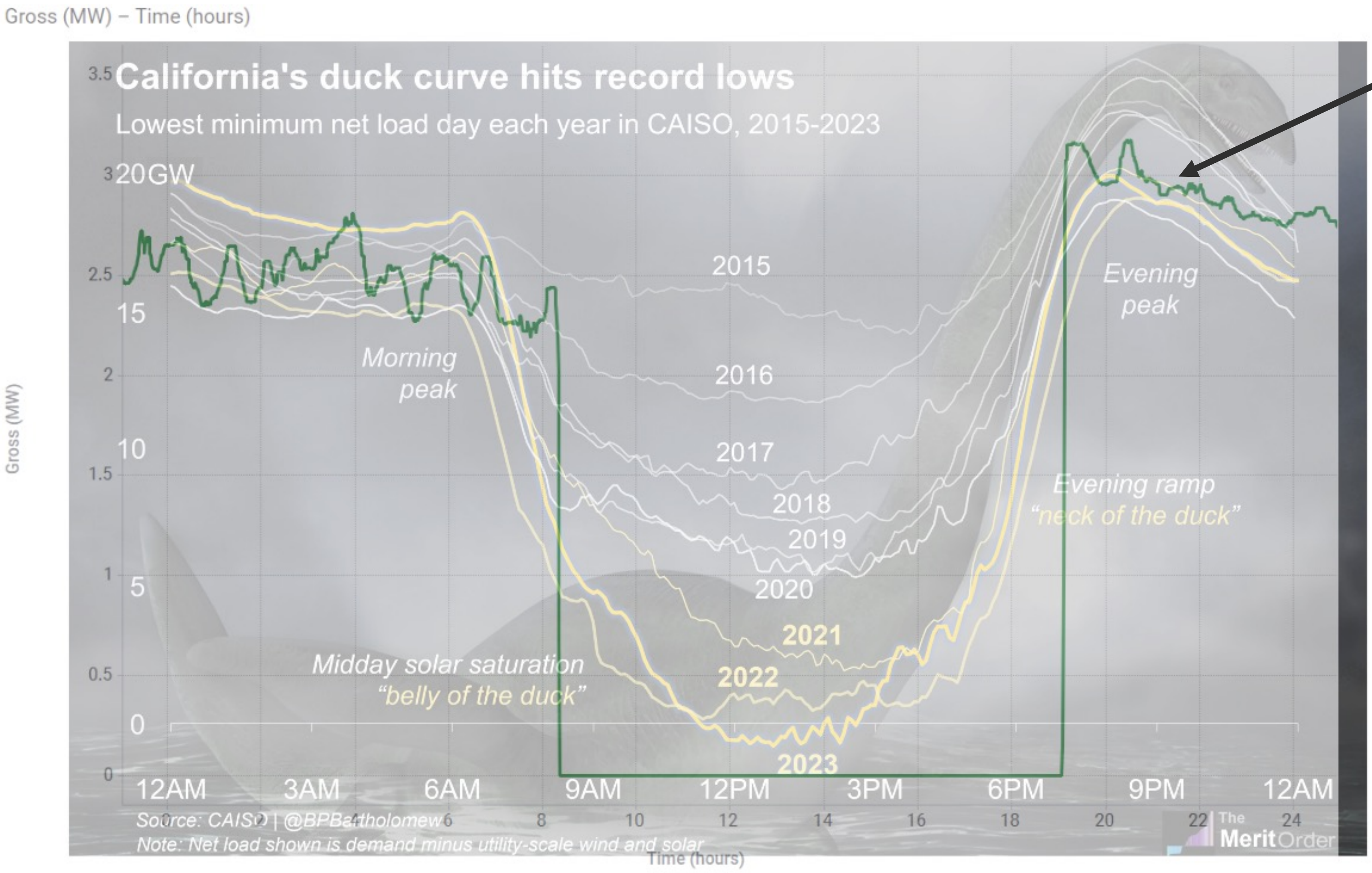

Actual Fervo production curve from May 4, 2023

You can’t drill horizontally in geothermal reservoirs.

Even if you could drill horizontally…

You can't case and cement geothermal wells because you'll shut off the natural fractures.

Even if you could case and cement the well…

You can't initiate tensile fractures in geothermal rocks.

Even if you could create new tensile fractures…

You can’t place proppant in geothermal formations.

Even if you could place proppant…

You still can’t get high enough flow rate.

Even if you can get a high flow rate…

Uneven flow distribution will create thermal short-circuits.

Even if the system works…

How will you manage induced seismicity?

Record-setting performance for an EGS system

"Achieving flow rates of 1000 gpm is a world record for a fully-stimulated EGS system."

– Professor Roland Horne, Stanford University

Methods/Approach

- Stimulation treatment, design of experiments, and data acquisition system is designed to target characterizing the following Reservoir Performance Metrics

Reservoir Performance Metrics

Limited Entry Perforation Friction: Designed vs. Actual		
No-Go Outcome	Target Outcome	Reach Outcome
Actual LEP is more than 1000 psi under designed LEP	Actual LEP is within +/- 750 psi of designed LEP	Actual LEP is within +/- 250 psi of designed LEP

Treatment Pressure		
No-Go Outcome	Target Outcome	Reach Outcome
> 9500 psi	6000 – 8000 psi	< 6000 psi

Flow Allocation in a Multicluster Treatment Stage		
No-Go Outcome	Target Outcome	Reach Outcome
Flow allocation efficiency factor < 30%	Flow allocation efficiency factor between 50% to 70%	Flow allocation efficiency factor > 80%

SRV Size and Offset Well Spacing		
No-Go Outcome	Target Outcome	Reach Outcome
Offset well spacing < 150 ft	500 ft – 750 ft	> 1000 ft

Near-well fracture conductivity		
No-Go Outcome	Target Outcome	Reach Outcome
< 50 md-ft	250 – 500 md-ft	> 1000 md-ft

Fracture surface area		
No-Go Outcome	Target Outcome	Reach Outcome
< 50,000 ft^2/cluster	200,000 ft^2/cluster	> 500,000 ft^2/cluster

Final outcome

Mandatory- may utilize multiple slides