

The Energy Venture Investment *Summit*



THURSDAY, FEBRUARY 17
3:30 PM (MT)

HYDROACOUSTICS INC.



HAYNES BOONE





Oil Recovery Tool (ORT) Overview Enercom Investment Summit

February 2022

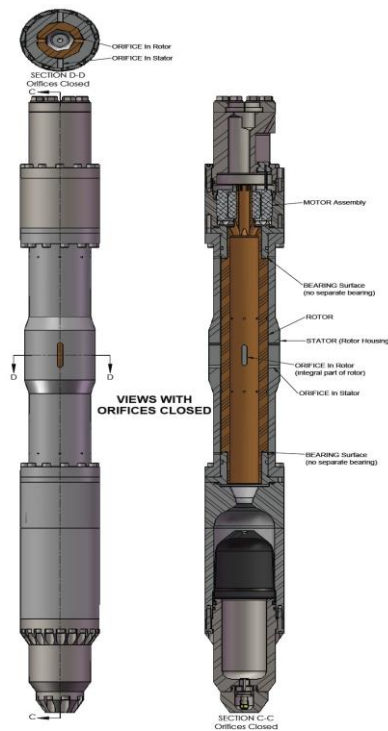
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Agenda

- Hydroacoustics Background
- Oil Recovery Tool System
 - Very Low Frequency (VLF) Technology Principles
 - ORT Overview
 - Field Tests
 - Operational Procedure
 - Permian Basin Current Results
 - Value Proposition
 - Next Steps



HAI Engineering Team

John Benton, Msc, P.E., Chief Development Officer

- ❖ BSc and MSc in Petroleum Engineering from the Colorado School of Mines. More than 35 years of worldwide experience in the oil and gas industry in positions progressing from technical engineering to senior leadership. Significant experience with operations and reservoir engineering projects throughout North America, Europe, South America and Indonesia. John has led business units for both large and small companies, including majors and independents. John also served 8 years as a Commissioner with the Colorado Oil and Gas Conservation Commission, chairing the Commission for the last 2 years of his term.

Rochester Engineering Team

- ❖ **Mark Ozimek, VP and Director of Engineering.** B.S. in Mechanical Engineering from the Rochester Institute of Technology 2009. Eleven years at Hydroacoustics, with a unique knowledge and experience in the design, assembly and testing of the company's acoustic devices.
- ❖ **James Rall, VP and Director of Purchasing and Manufacturing.** A.A.S. in Electro-Mechanical Technology from Alfred State College 1983. Fourteen years experience at Hydroacoustics, purchasing from local machine shops and national vendors. Facility Security Officer (SECRET facility level clearance).
- ❖ **Eugene Sisto, Mechanical Engineer.** B.S. from the Rochester Institute of Technology 1991. Five years of experience in the design, assembly and testing of the Oil Recovery Tool.
- ❖ **Benjamin Whiting, Mechanical Engineer.** B.S. from the University of North Dakota 2016. Four years of experience working on the marine seismic project.
- ❖ **Ricardo Quintanilla, Computer and Software Engineer.** IT Manager and Assistant Facility Security Officer. B.S. from Rochester Institute of Technology 2015. Seven years of experience in the design, assembly and testing of the company's acoustic devices.
- ❖ **Kenneth Wittlief, Electrical Engineer.** B.S. from SUNY Buffalo 1984. Twelve years of experience in the design and testing of the company's acoustic devices.
- ❖ **Timothy Swaney, Electronics Technician.** Associate Degree from the Central Technical Institute 1974. Forty-three years experience in the assembly and testing of the company's acoustic devices.

HAI's 50-Year History

- Formed based on acoustic research initiated at Harvard University and further developed at General Dynamics Corporation
- Amassed 40+ years of experience in the development of low-frequency acoustic generation equipment in harsh environments
- Provides proven acoustic technology for subsea applications to the U.S. Department of Defense and private industry
- HAI has received over 88 U.S. patents and 26 foreign patents and applications over the past 40 years
- Leverages its background in acoustic technology to create HAI's Oil Recovery Tool (ORT), a robust, reliable and replicable improved oil recovery (IOR) technology



Innovative Products and Services

Hydroacoustics (HAI) creates value by applying four decades of acoustic experience to today's challenges.

ENERGY



- Marine Seismic Mapping Technology

- Oil Recovery Tool (ORT)
- Venturi dual flow meter (replacement for Coriolis mass flow meters)

ENVIRONMENT



- Marine Seismic Mapping Technology

- Brownfield cleanup using Acoustic Remediation Technology (ART)

DEFENSE



- Transducer procurement & refurbishment

- Next Generation Transducers

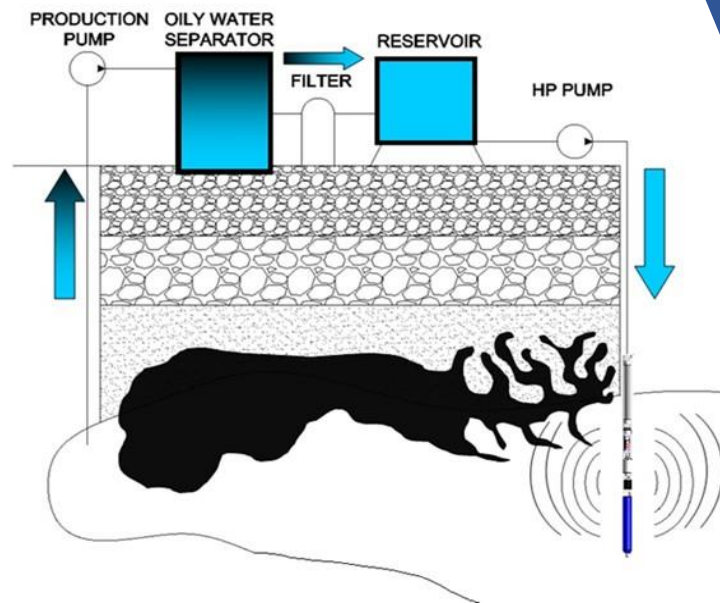
Current Revenue

Growth Opportunities



Oil Recovery Tool System

Very Low Frequency (VLF) Stimulation



- Enhances oil recovery at the pore space and molecular level
 - Creates a pulsed pressure wave at less than 100 hertz that induces the coalescence of small, individual oil droplets trapped in pore spaces into larger droplets
 - Pushes coalesced oil away from the stimulated well in which device is placed toward surrounding producing wells
 - Improves injectivity through increasing water relative permeability near the injection wellbore

- History
 - Interest in seismic stimulation since the 1950's with post-earthquake changes in oil production
 - Anecdotal production improvement seen in shallow wells close to vibrating surface equipment
 - Limited research into seismic stimulation mid-1990's
 - Development and testing of improved recovery devices in 2000's
 - Approved as an enhanced recovery technique in Texas

VLF Stimulation Theory

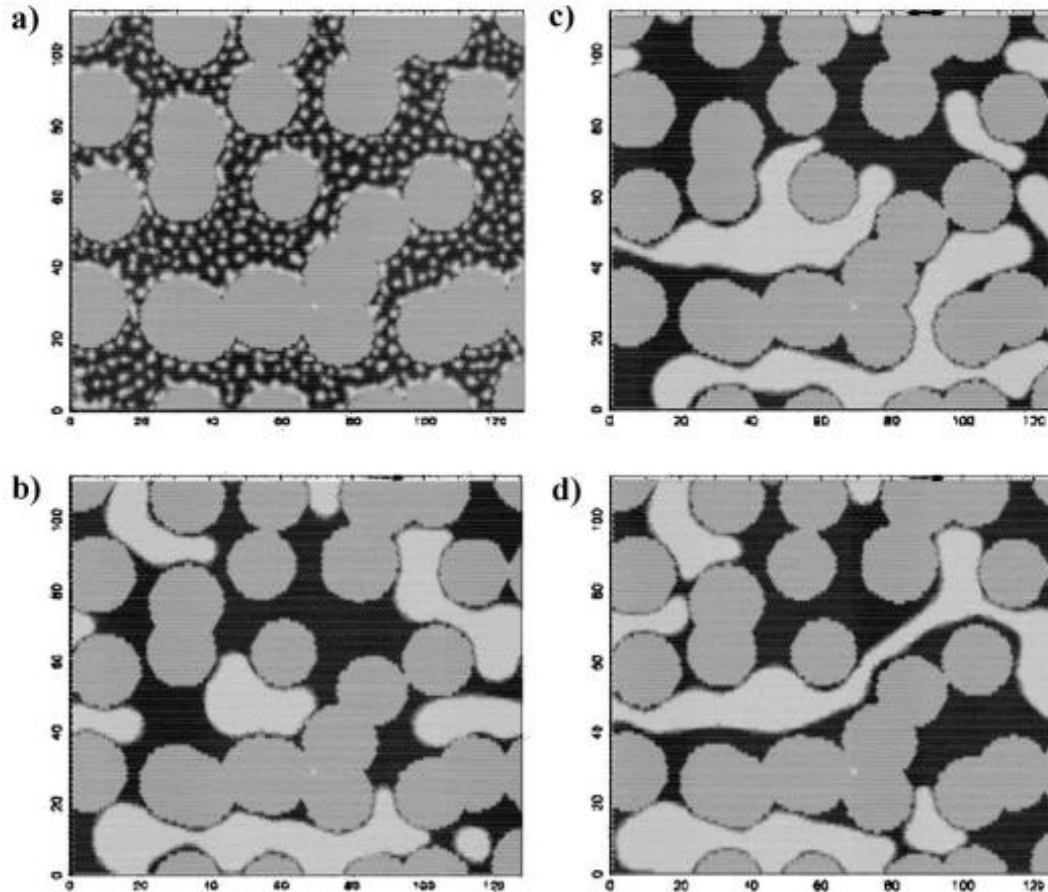


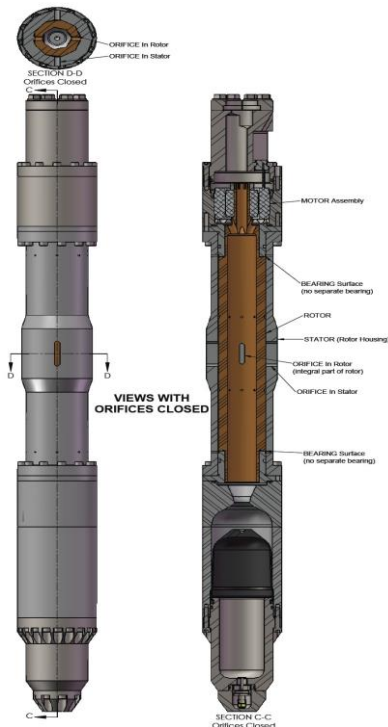
Figure 3. Snapshots during the four stages of the seismic-stimulation simulation. The fluid flow is from left to right. Solid grains are shown as gray, oil as light gray, and water as black. (a) The initial phase separation. (b) Force F_0 has caused the droplets to get stuck, and there is no flow of oil. (c) The stimulation is turned on $F_a > 0$, and the droplets coalesce. (d) A new steady state emerges as $F_a = 0$. There is now a flow through the system-spanning droplet.

- Pride et al, Geophysics Vol. 73 No. 5 October 2008
 - “Seismic Stimulation For Enhanced Oil Recovery”
 - Utilized lattice-Boltzmann model to simulate process
 - Multiple simulations produced similar results; trapped oil was mobilized
 - Injection into formation not required to mobilize oil
- Oil and Gas Journal August 2016
 - “Seismic Stimulation Advances EOR Technology”
 - Demonstrated efficacy of technology, although device utilized had reliability issues

Oil Recovery Tool (ORT) Fundamentals

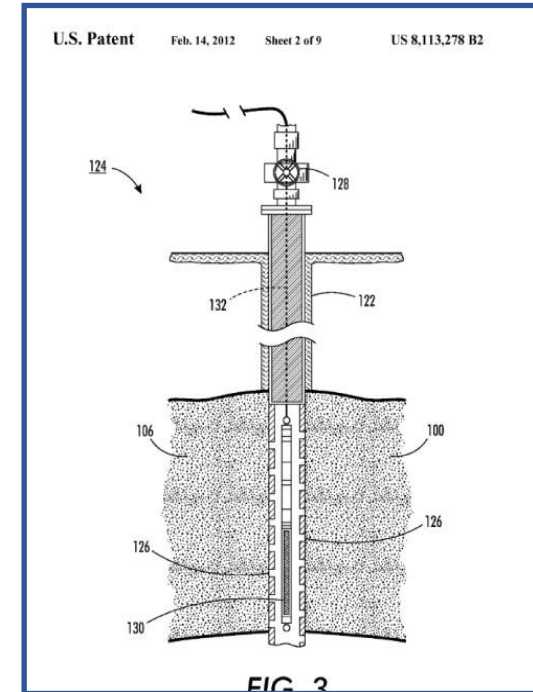
- HAI's ORT unit adds a new option to improving oil recovery:
 - Patented design
 - Operates independently, or in conjunction with, existing well stimulation and improved recovery technologies
 - Initial test of current design in 2018
 - Currently operating in mature Permian Basin waterflood

- ORT acoustic stimulation process equipment includes:
 - Downhole Tool – the acoustic generation unit is deployed into a wellbore at prescribed depths
 - CDT module – Control, Diagnostic and Telemetry module operates and monitors the system and sends alerts and data to a remote receiving station via satellite uplink and/or the Internet
 - Optional Toppide Power Supply – includes power distribution, a high-pressure pump and water filtration system – drives the ORT unit with high-pressure water



ORT Development History

- Current ORT Patent & Filings
 - The ORT acoustic device has been under development in Rochester for 14 years
 - The first ORT patent was granted in 2009 (Patent US 8,113,278 B2)
 - A subsequent follow-on patent application was filed in 2019
 - International patent applications for the ORT are in the process of being filed in 27 foreign jurisdictions under the Patent Cooperation Treaty of 1970 (PCT) by HAI's patent attorneys
- Initial test of current design in 2018
 - Two fields in New York
 - Material improvement in oil production
- Successful test deployments with rigorous data collection and analysis
- Multiple tool refinements
- Deployed in West Texas in 2021
 - 30-35% increase in daily oil production
 - 300% increase in injectivity into test injection well
- Options to adapt tool for various wellbore dimensions and reservoir conditions



ORT Benefits



- Simple and durable
 - Adaptable to injection wells or producing wells
- Increases field-level oil recovery
 - Increases oil cut
 - Extends field life, thereby adding booked reserves
- Low-risk investment
- Environmentally sound
 - Small carbon footprint
 - Minimal physical and visual impact
- Reduces the need for costly production enhancement processes
- Scalable from small to large well bores

Early Deployments

- ORTS utilizes proven technology with a reliable tool built to withstand the rigors of a challenging operating environment
- Total fluid flow increased on the order of 5X (500%)
- Oil cut, as a percentage of total fluids, increased by a factor of 3 (300%)
- Application of the ORT improves production from even severely depleted formations
- Data collected 6 weeks after conclusion of stimulation demonstrates continued treatment efficacy

Subsequent Deployment

- Similar results pattern seen in earlier deployment
- Oil cut up over 3.5X (350%)
- Total oil production (4 wells) up by almost 90% – matches the pattern developed in earlier deployment over the same duration of stimulation
- Injectivity, measured as barrels of water injected into the formation, increased by over 26%

Current Deployment

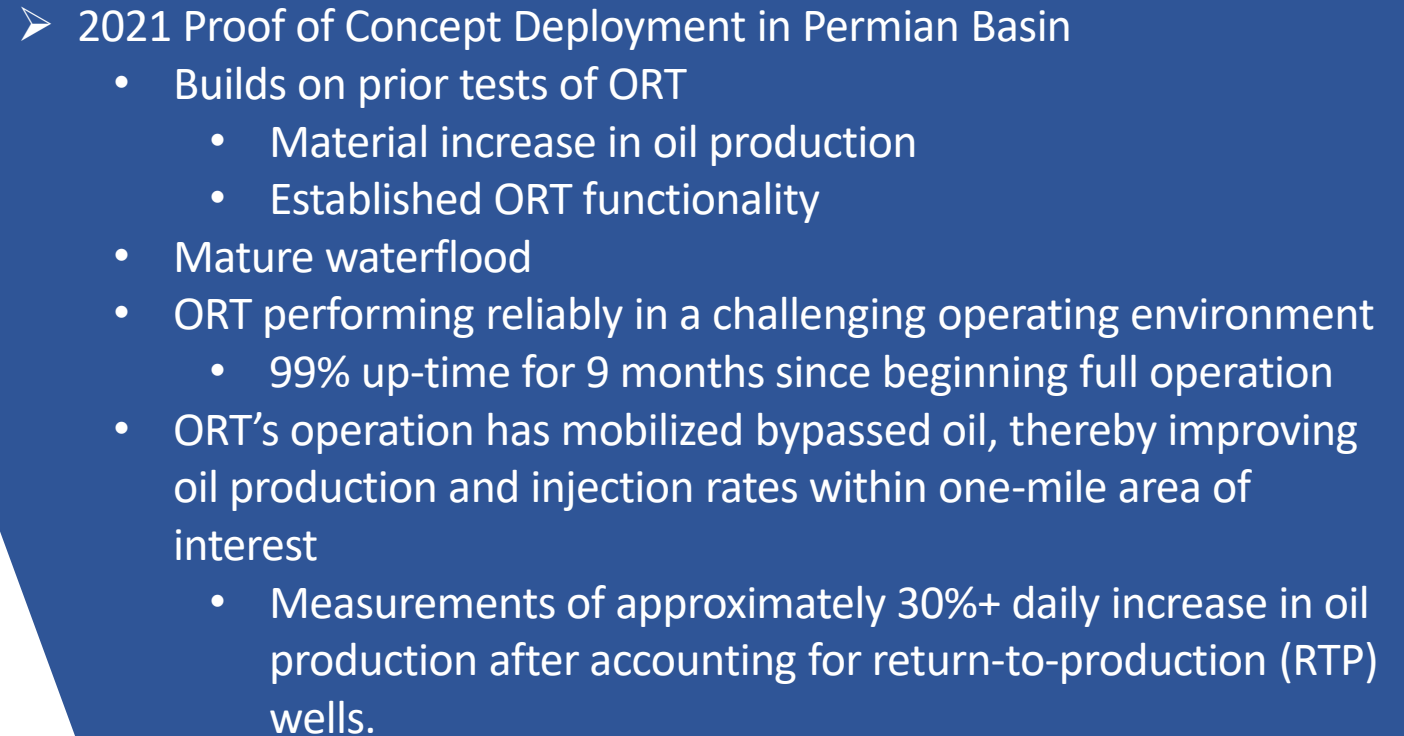
- Continuous operation in a mature Permian Basin Waterflood since May 2021
- Initial field response identified June 2021
- Deployment in progress with promising results

Field Test Summary

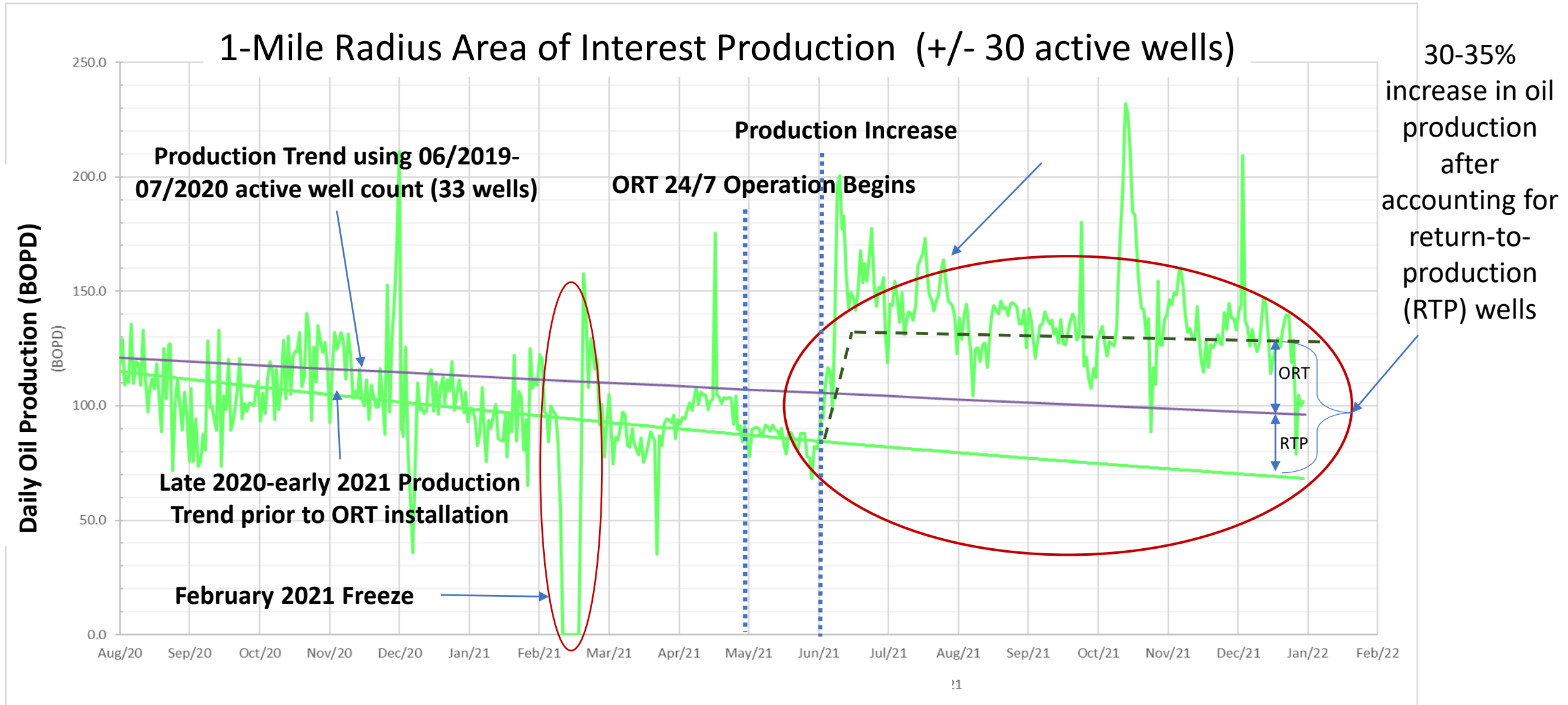
Operational Procedure

- Prior to deployment
 - Data collection and analysis
 - Field layout and spacing
 - Wellbore diagram(s)
 - Surface facilities layout and site visit
 - Recent well work
 - Historical per well fluid production and injection data
 - Reservoir conditions, rock & fluid properties
 - Water and power sources
- Deployment
 - Deployment procedure
 - Field installation and testing
- Testing
 - Remote monitoring
 - Data collection and analysis
 - Daily per-well fluid production and injection rates
 - Fluid levels
 - Tool performance
- Post-test
 - Performance analysis
 - Changes in productivity, injectivity, oil cut, WOR





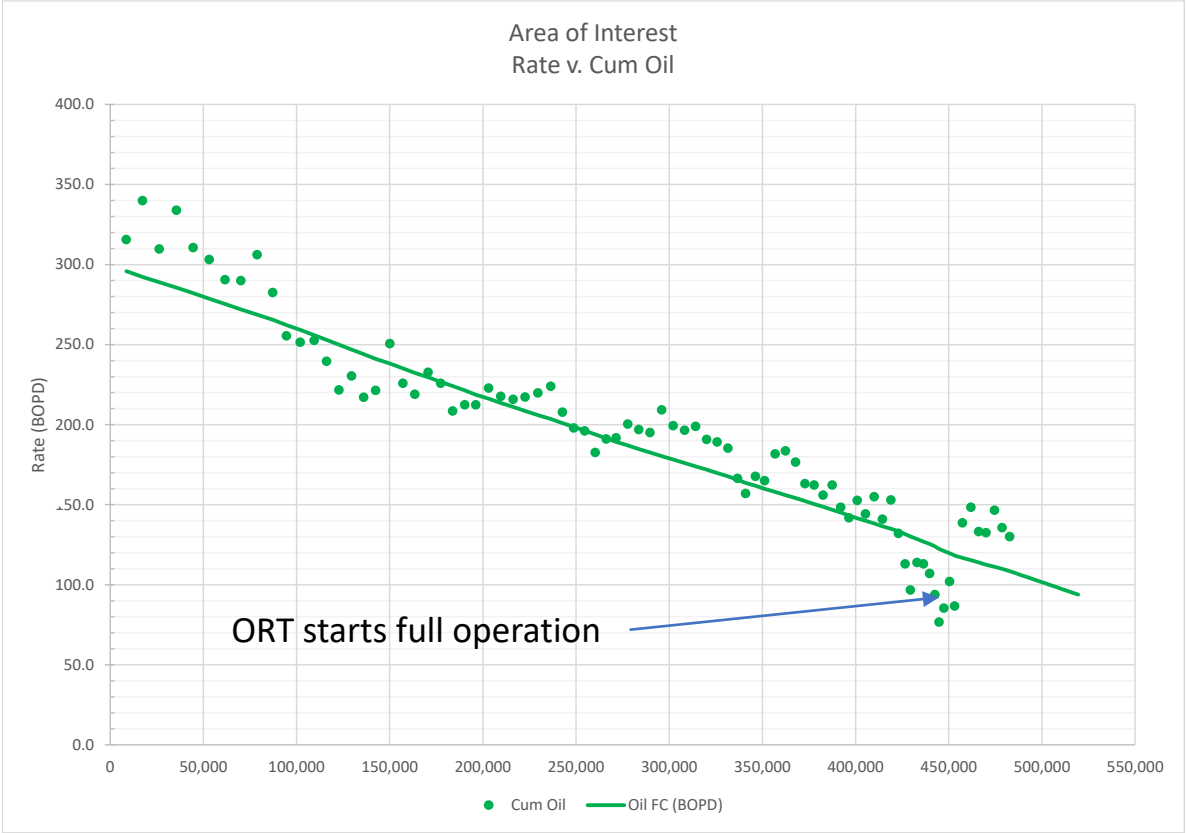
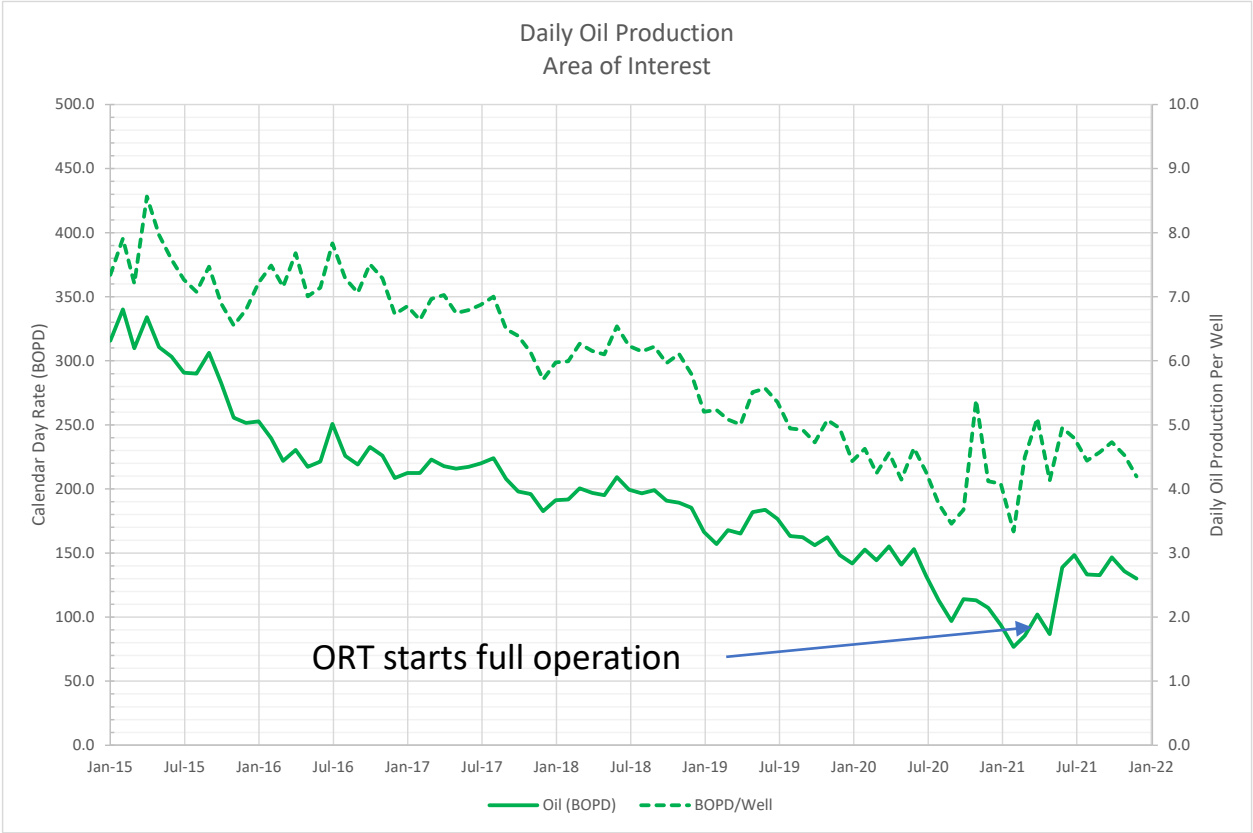
Permian Basin 2021 (in progress): Oil Recovery Data



Source: E&P field production data from 08/05/2020 to 12/31/2021

Permian Test Response to ORT

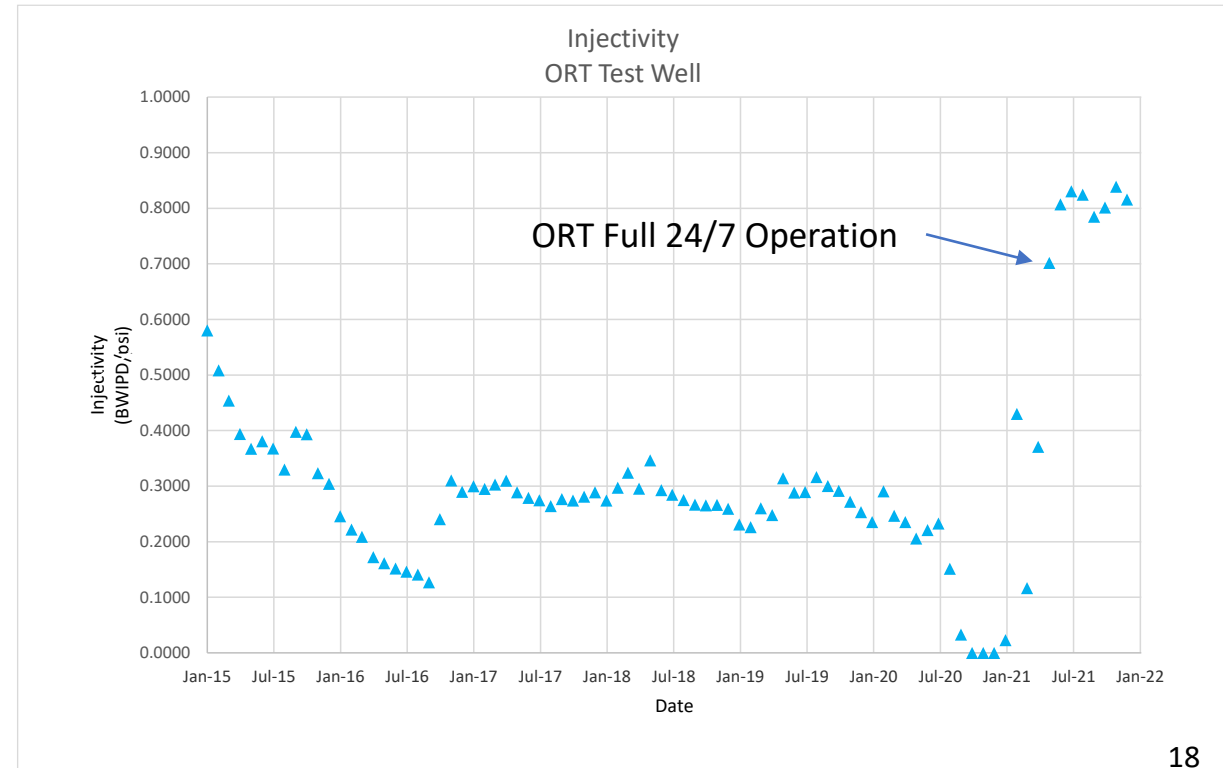
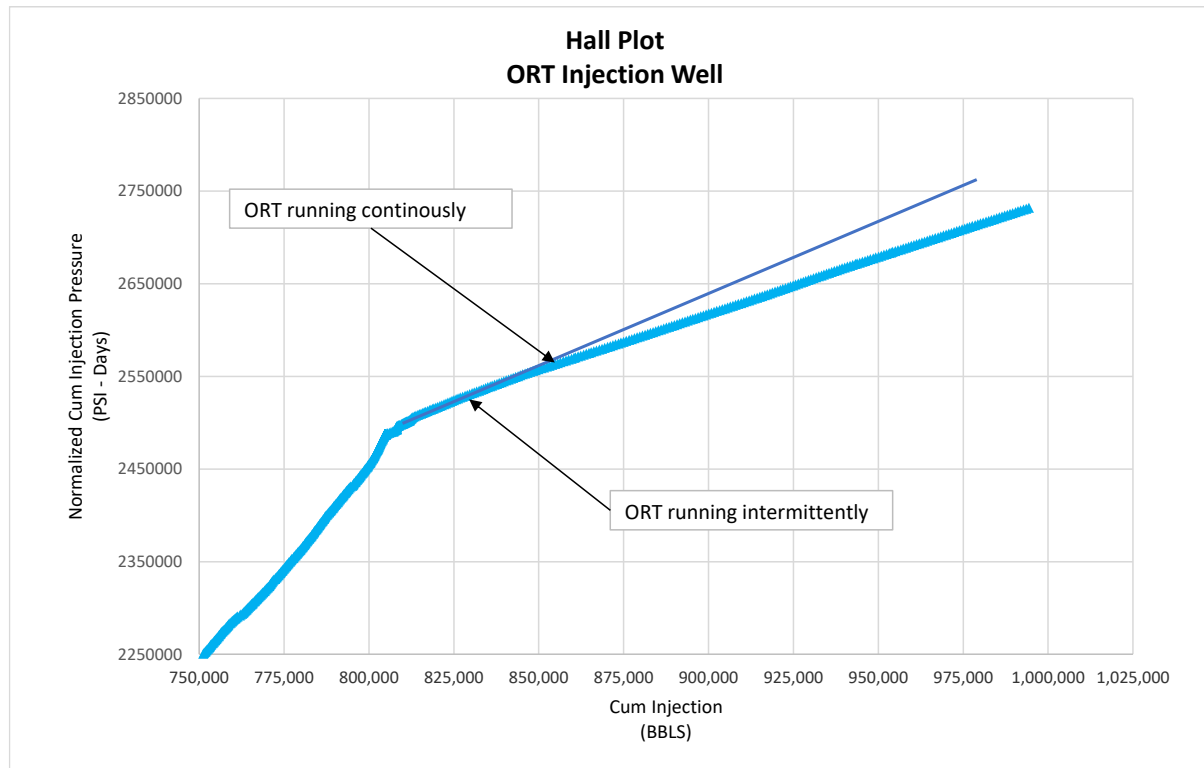
Measurements of approximately 30%+ daily increase in oil production after accounting for return-to-production (RTP) wells.



ORT performing with 99%+ up-time since the start of full operation.

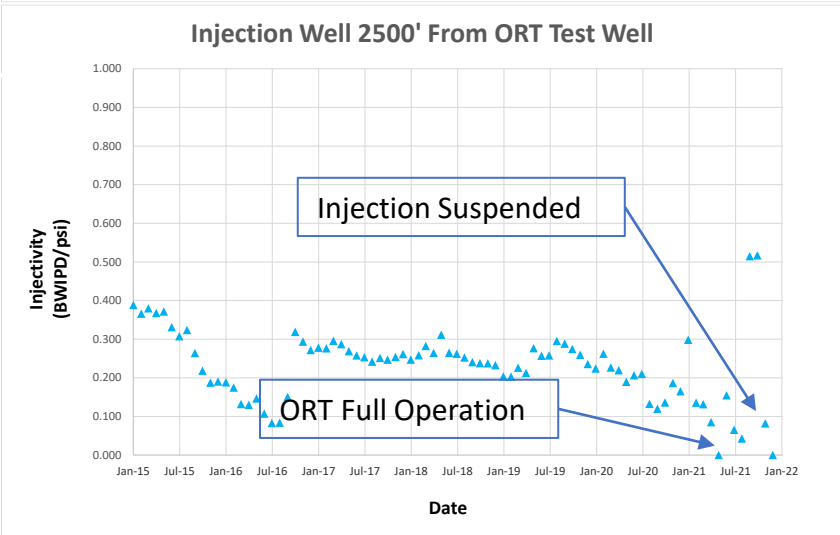
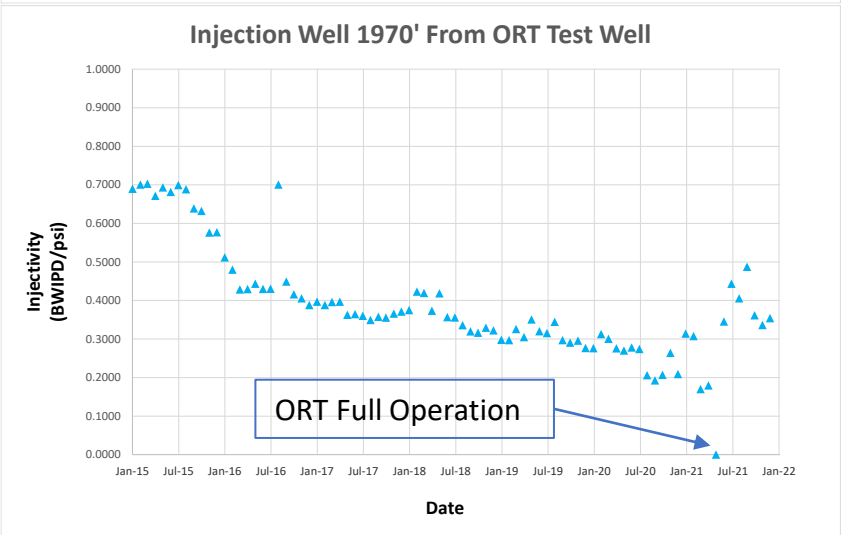
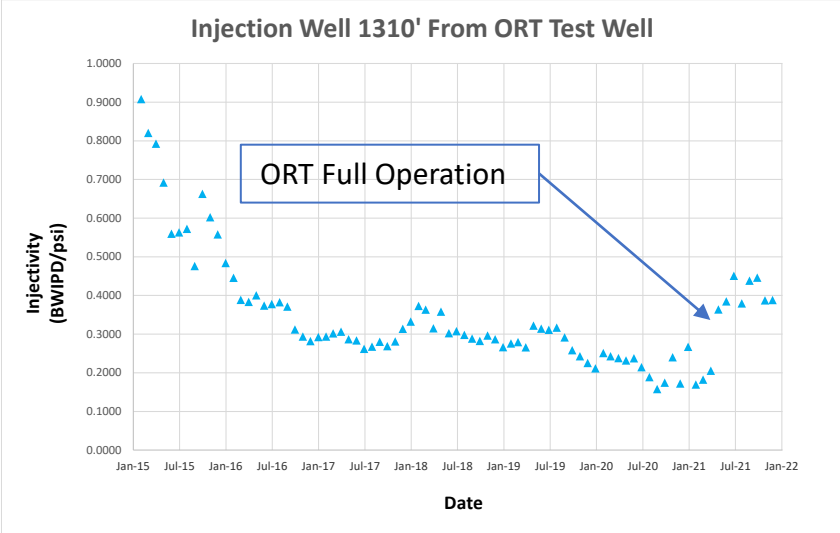
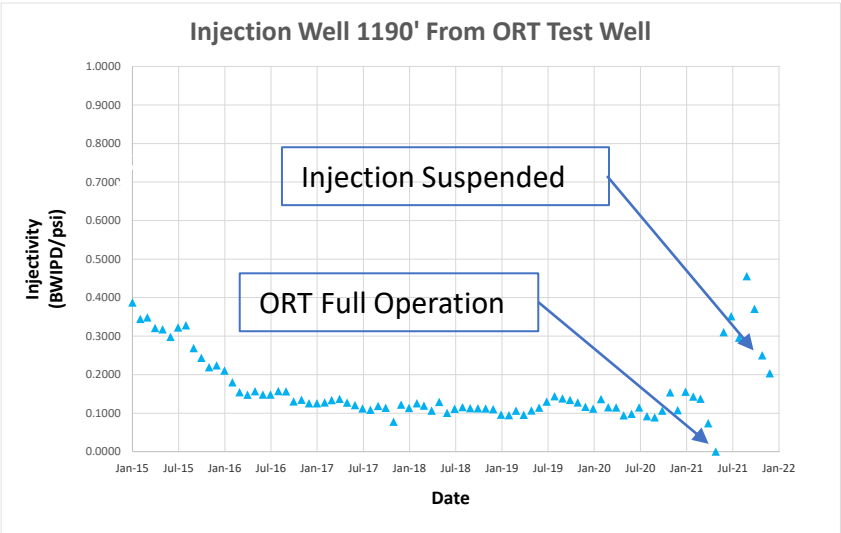
Injection Well Performance

- ❖ Injectivity plots for ORT test well
 - ❖ 300% improvement in injectivity compared to 2020
 - ❖ 2020 averaged 230 BW injected per day at 950 psi
 - ❖ Current average 800 BW injected per day at 940 psi
 - ❖ Three, and possibly a 4th injection well within one-mile area of interest have also experienced improved injectivity since test started



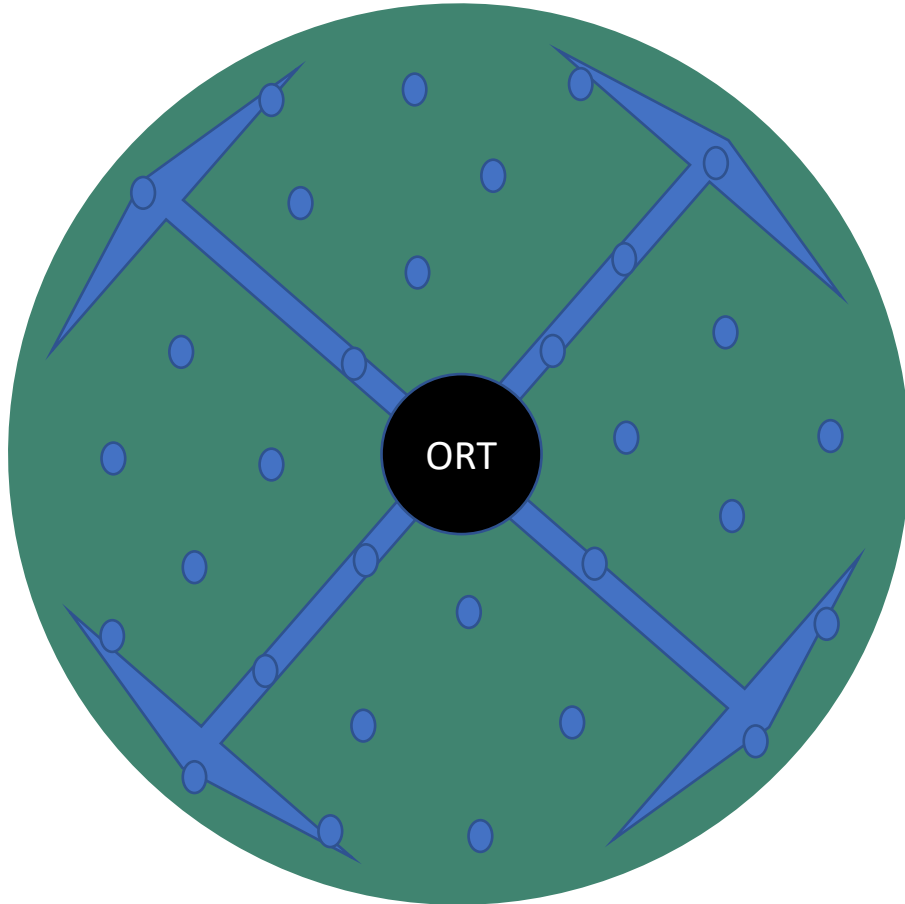
Injection Charts

❖ Injectivity plots (BPD per psi) for 4 additional injection wells in Area of Interest



Significant Uplift Potential Per Unit Installed

Single device area of influence ~ 1280 acres
(30 wells influenced per device at 40-acre spacing)



Potential Uplift Per ORT Unit \cong 81 BOPD

➤ Assumptions

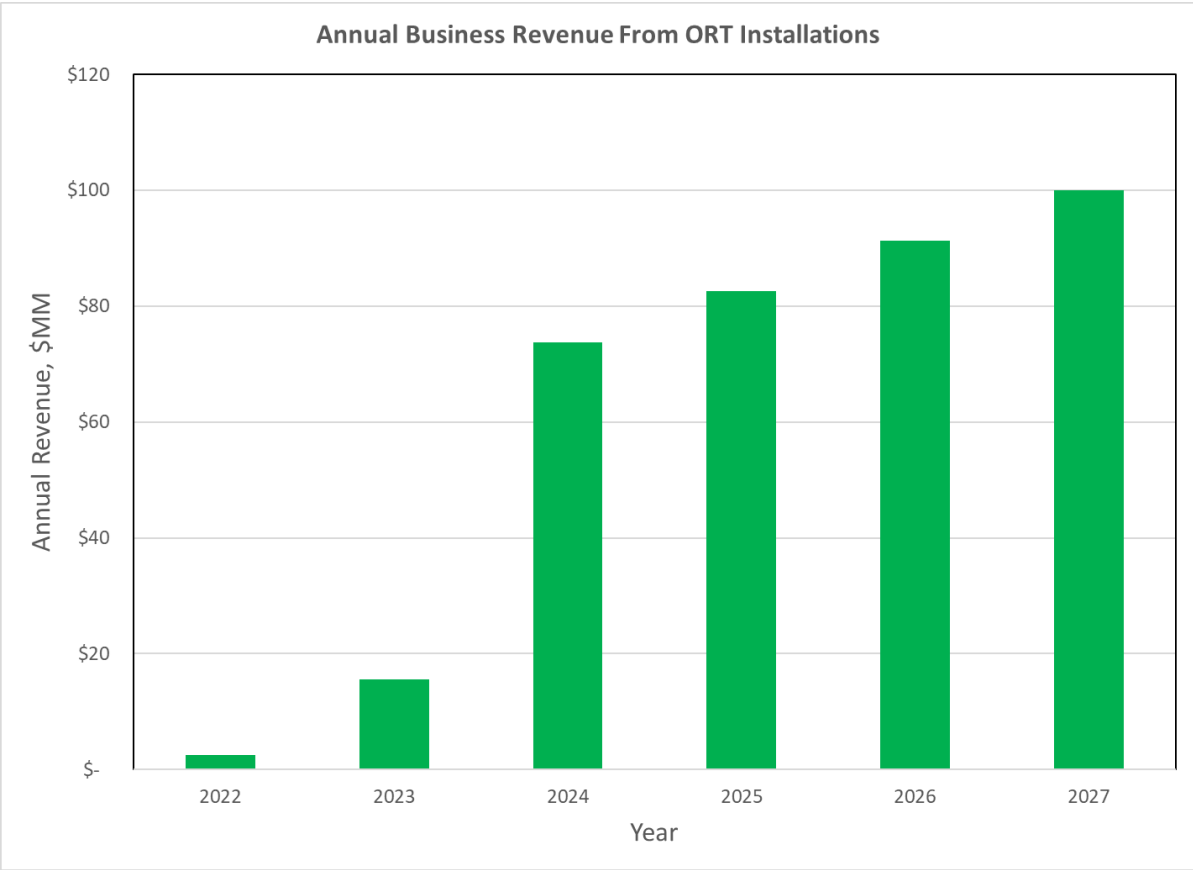
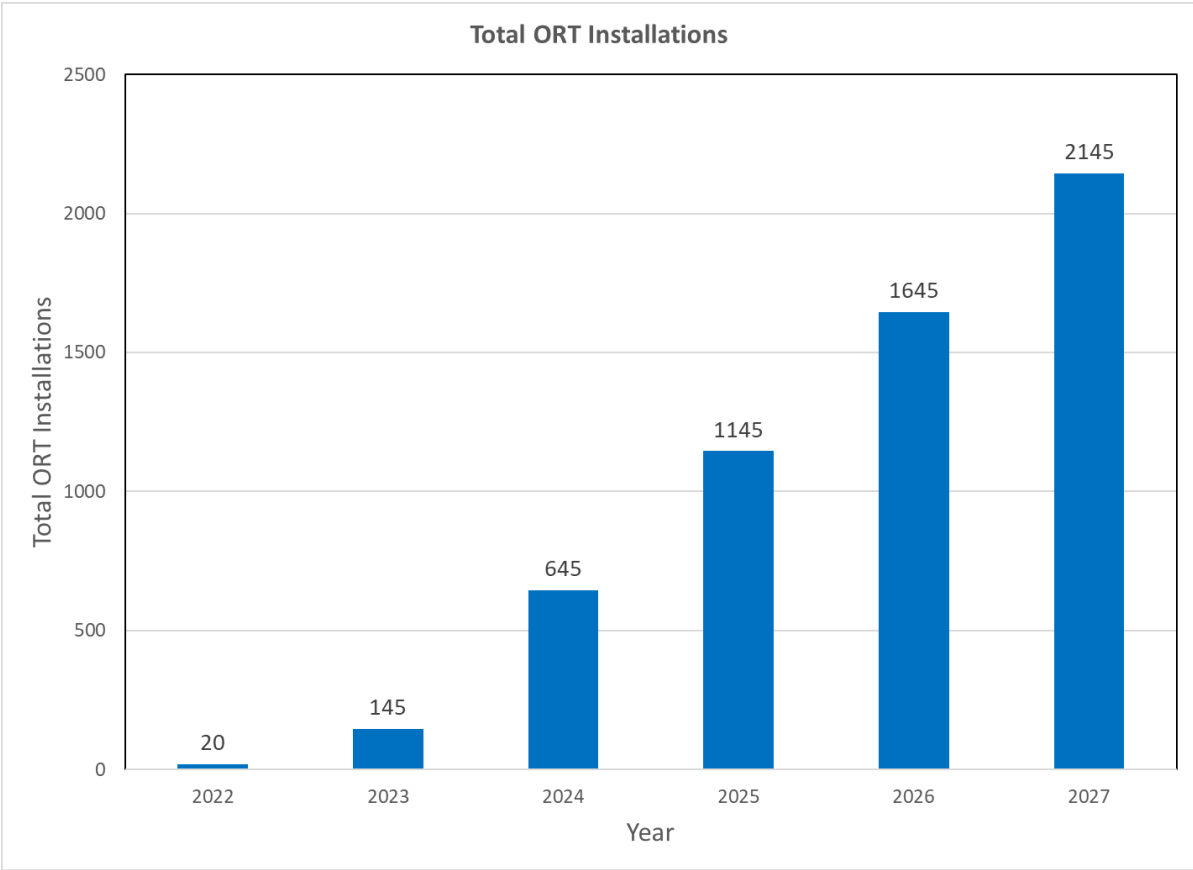
- 30% uplift from base production (Texas Deployment)
- Area of influence = 1280 acres (Texas Deployment)
- Average US production = 9 BOPD per well (Enverus)
- Estimated spacing = 40 acres per well
- Producing wells influenced per ORT installation = 30
- Average net uplift per ORT = 81 BOPD
 - Assumes average 30% increase per well
 - Net Uplift 65 BOPD after 20% royalty

➤ For Upstream Business

- Installation cost per ORT = \$330,000
- Refit installation cost per ORT = \$180,000
- Average capital efficiency = \$5100/BOPD
- Refit cost per barrel of uplift = \$0.19
- FD&A = \$3.17/BO over 9-year installation period
- Average daily net production increase = 221,000 BOPD

Note that the information contained in the forecast constitutes forward-looking statements which involve risks and uncertainties. Past performance is not indicative of future results. The Company's actual results may differ significantly from the forecast for various reasons, including failure to achieve any of the assumptions underlying such forecast or any number of risk factors including the inability to raise sufficient capital. The Company expressly disclaims any obligations or undertaking to release any updates or revisions to the forecast.

HAI - ORT Growth Projection (5-Yr Unit Sales & Revenue)

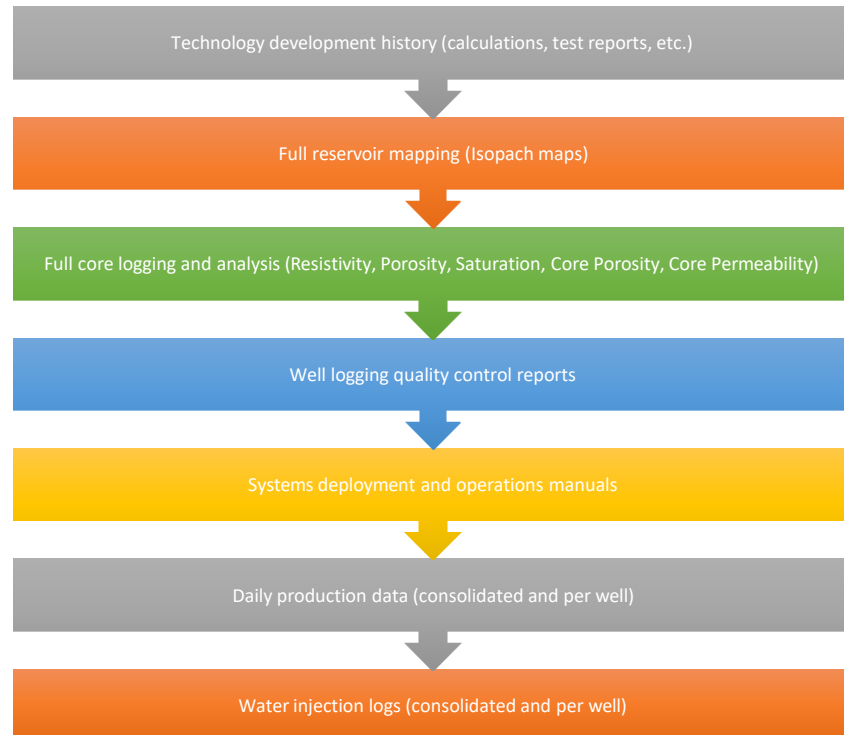


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Next Steps

- ORTS Deployment in both horizontal and vertical applications
 - Horizontal Applications – Identify proof of concept site and partner
 - Fully developed horizontal asset
 - Deploy ORT in offsetting vertical well
 - Deployment in first 24 months of production (majority of reservoir above Bubble Point)
 - Vertical Applications - Identify early adopters interested in extending lives of mature fields
 - Mature asset
 - Secondary or tertiary recovery operation
 - Producing GOR < 2000 SCF/BBL
 - Operating Pressure at depth = 3500 psi
 - operating temperature: 212Deg F, 100Deg C
 - Access to minimum 600 BPD filtered water
 - Total suspended solids <= 200 microns
 - Average Porosity >= 12%
 - Recovery Factor <= 35% of OOIP
 - Permeability >= 5 millidarcies
 - Dykstra-Parsons heterogeneity coefficient >= 0.3
- Growth capital raise \$10-20MM targeted for 2022

Additional Information Available For Review (With NDA Execution)



Contact Information

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