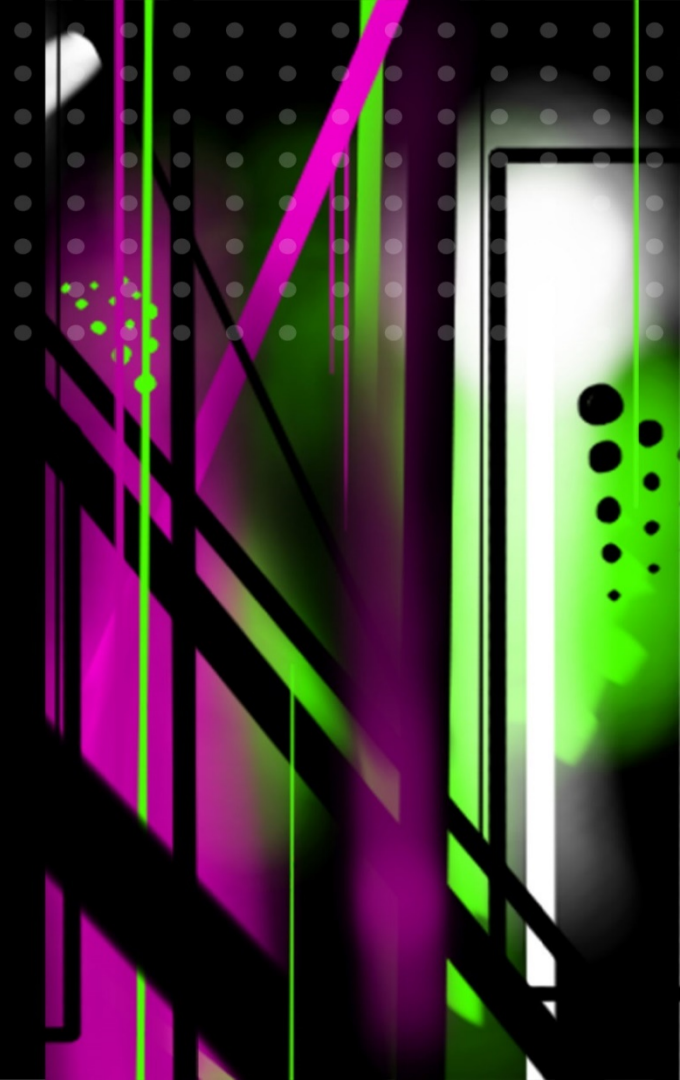


# Digital Intelligent Artificial Lift

Technology Readiness & Production Results

EuALF 2021 | 8<sup>th</sup> February 2021 | Graham D. Makin

**silverwell**  
ARTIFICIAL LIFT INTELLIGENCE



# Gas Lift Production Optimization is Difficult

Discussion Group at Gas Lift Workshop

- Is my well completely unloaded?
- Is the well multi-point injecting?
- What is my lift depth?
- Am I optimized on gas lift?
- Can I lift deeper?
- Is my multiphase model matched to well performance?
- How much will I have to intervene?
- Do I have enough gas?
- What should be my lifting life-cycle?

## Opportunity

5% to 20% production uplift

40% dual-string

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OPEX Reduction

ROI in days/months

HSE Risk Avoidance

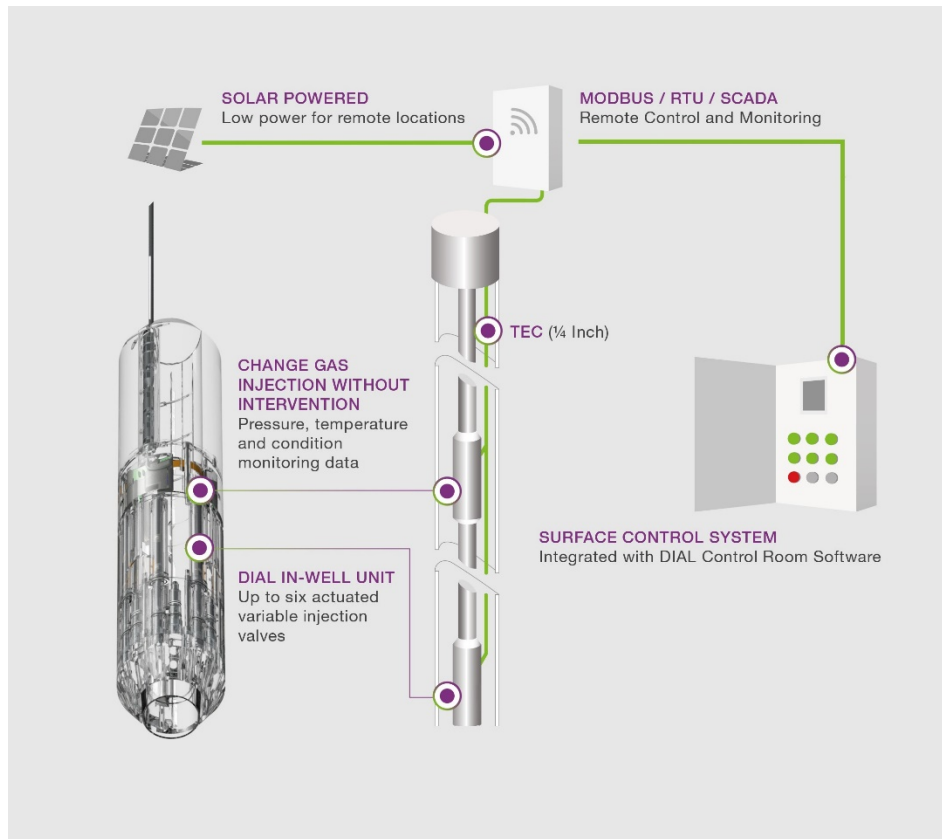
Logistics Efficiencies

Gas Savings

Increased Recovery

# Digital Intelligent Artificial Lift - DIAL

Features	Benefits
<ul style="list-style-type: none"> <li>• Variable orifice size at any depth</li> <li>• Deeper injection</li> <li>• No deviation limitation</li> <li>• No well intervention</li> <li>• Pressure and temperature data</li> <li>• Remote monitoring and control</li> <li>• Intelligent field-wide management</li> </ul>	<p>Eliminate intervention</p> <p>Reduce OPEX</p> <p>Mitigate instabilities</p> <p>Enhance recoveries</p> <p>Optimize production</p> <p>Reduce HSE risk</p>



# Data Visualization & Analysis

## Unload & Optimization Phases - Pathway to Automation

Search "Silverwell" on Vimeo for video DIAL-It-In Software.  
<https://vimeo.com/447160697>

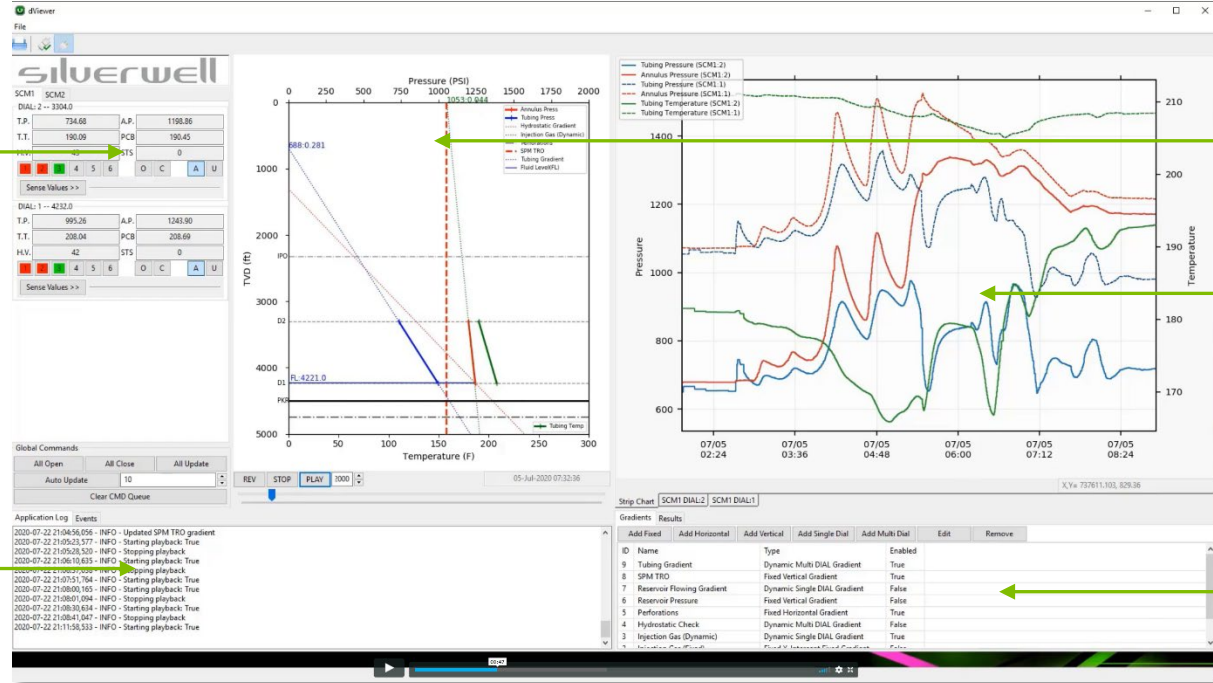
### Control Panel

Digital values & valve status for each DIAL unit in the string.

Control valves using this interface.

### Comments & Events Panel

List of events that occurred during logging operation.



### Profile Panel

Cross-plot with pressure and temperature versus depth for each DIAL unit in the string.

### Strip Chart Panel

Plot of data from each DIAL unit versus time.

Separate & combined plots available.

### Analysis Panel

Enables user to set up various analysis.

When combined provide results such as annular fluid level during unload phase, and sandface pressure and drawdown during optimization phase.

# Permian Basin Unconventional

SPE-201140-MS Pilot Application of Remotely Operated Gas Lift Valves in Permian Basin Unconventional Wells | Visser & Tomislav | Chevron

**Wells** | 2 of a 5 well program

**Application** | 2-7/8" Tubing, Unconventional Onshore

**Completion** | 5 - 6 DIAL Units per well

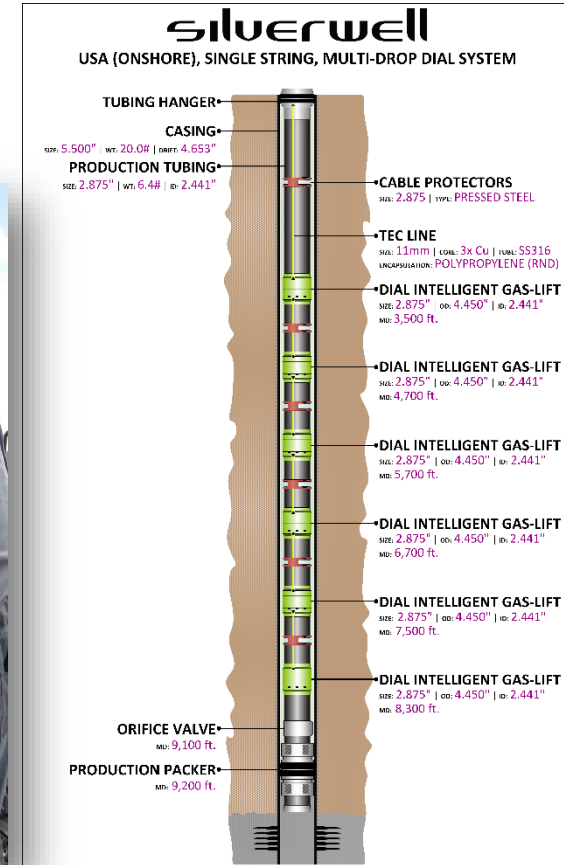
**Install** | February & June 2019

**Depth** | 9,000ft.

**Formation** | 60C / 1600 – 2500Psi

**Production** | ~300 – 1000 Barrels/Day

- Improved well performance:
  - 26% uplift compared to theoretical IPO design
  - 850 ft to 1,500 ft deeper injection
  - Eliminate multi-pointing
  - Properly sized injection port
  - Remote monitoring & control
  - Well performance analysis improved – deeper injection quicker
  - Injection rate control switched downhole



# UAE Onshore

SPE-197824-MS | World's First Digital Gas Lift Application in Dual Completion Technical & Economic Consideration for Successful Implementation | Tiar et al | ADNOC Onshore / Silverwell

**Wells** | One of two well program

**Application** | 3-1/2" Tubing Single String

**Completion** | 3 DIAL Units (2 gas lift & 1 sensing)

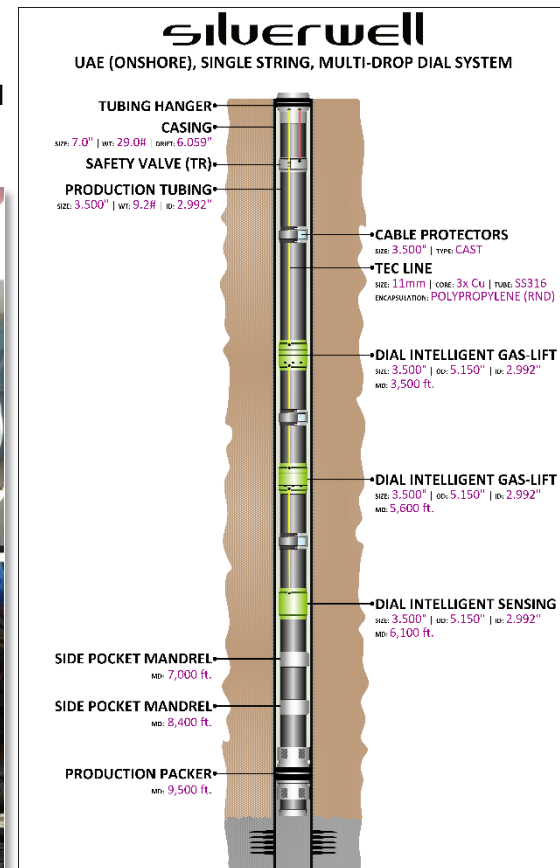
**Install** | October 2019

**Depth** | 7,000ft.

**Formation** | 125 C | 4,800 psi

**Production** | ~1,000 – 3,000 Barrels/Day

- Fast and controlled well unloading – visibility of unload status & smooth transition.
- DIAL data calibrates well model – no FGS intervention.
- Multi-rate tests – optimized DIAL unit setting for maximum rate – no intervention.
- DIAL enables ADNOC unmanned/autonomous field vision – BHFP as optimization set-point.
- 2 onshore wells + 1 offshore well planned in 1st half of 2021.



# Malaysia Offshore

Wells | Five (Two Dual & three single)

Application | 3-1/2" Tubing - Offshore

Completion | 2 - 6 DIAL Units per well

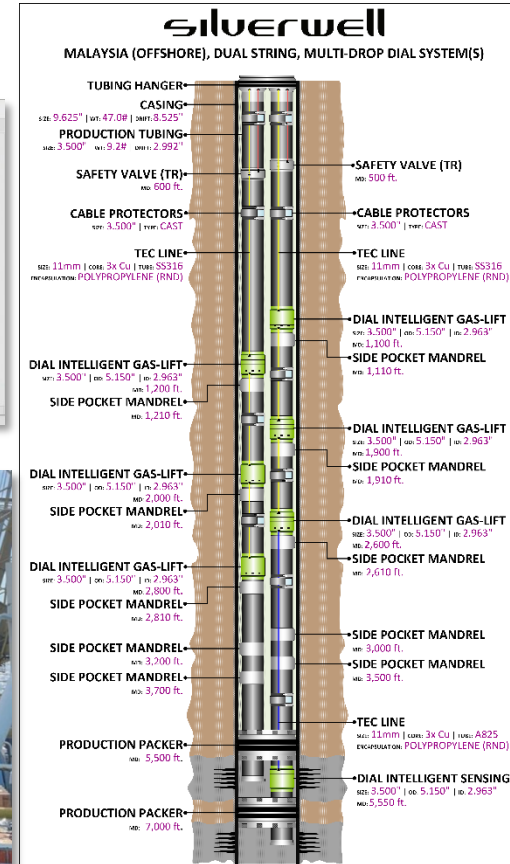
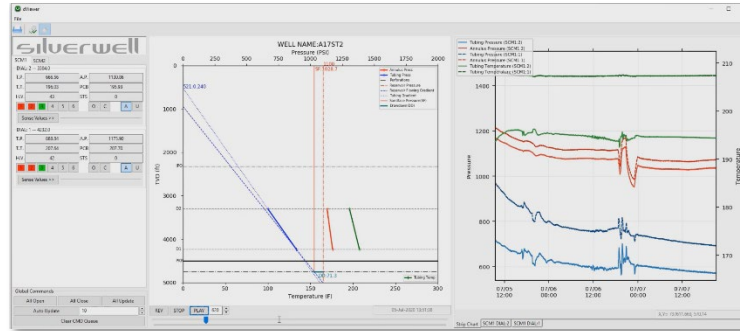
Install | May 2020 - Ongoing

Depth | 8,000ft.

Formation | 125 C / 1800 – 3500Psi

Production | ~500 – 1,500 Barrels/Day

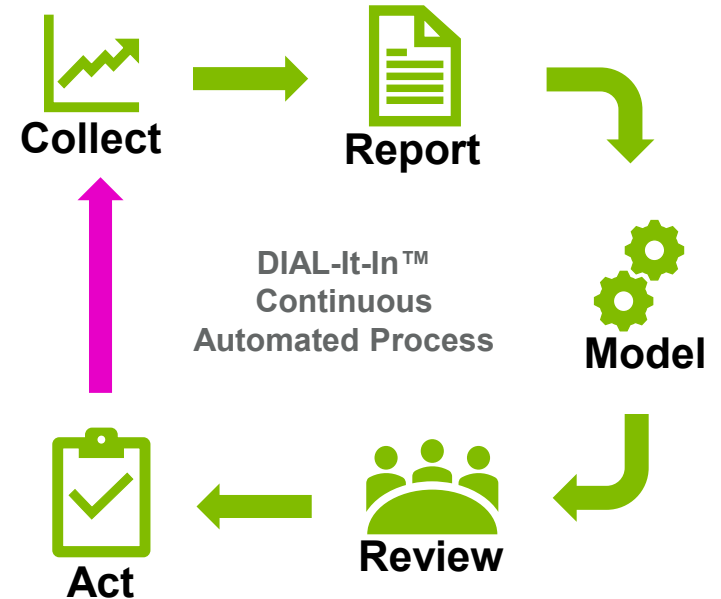
- First dual-string DIAL wells – high deviation.
- 100% Malaysian - COVID-19 restrictions.
- Silverwell remote technical support.
- Visualization software – Wells unloaded and brought online remotely from Houston & Dubai by Silverwell.
- Business case with \$38Mn NPV enhancement on a dual well.



# Eliminate production uncertainty, instabilities and operational costs with continuous, intervention-free, artificially lifted well optimization.

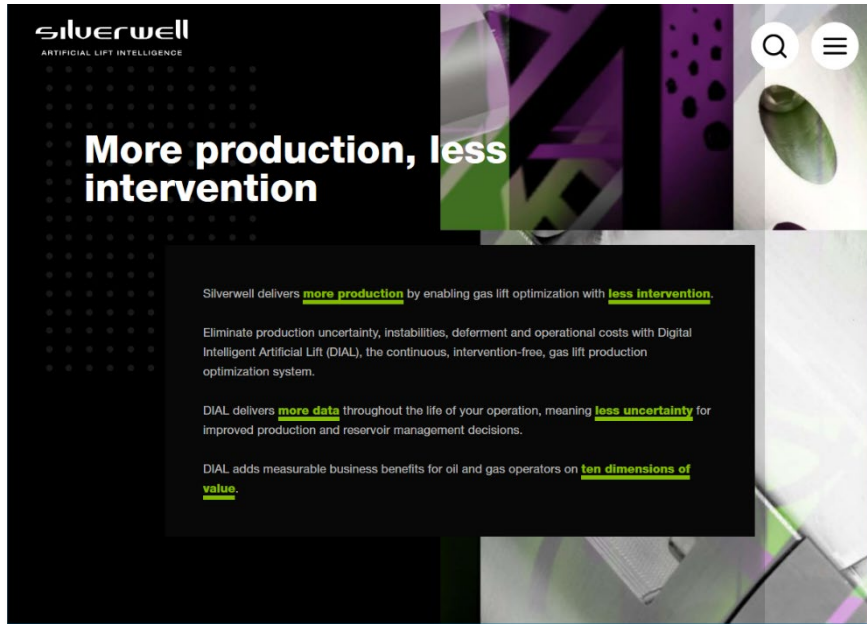
- More production** Increased well production from enhanced lift efficiency
- Less intervention** Reduced well down-time from intervention-free operation
- More data** Increased insight from multiple in-well sensors
- Less uncertainty** Better management decisions from integrated gas lift system

## Gas Lift Optimization From Months to Minutes





# For More Information



The screenshot shows a website header with the Silverwell logo and tagline 'ARTIFICIAL LIFT INTELLIGENCE'. The main heading is 'More production, less intervention'. Below this, there are three paragraphs of text:

Silverwell delivers more production by enabling gas lift optimization with less intervention.

Eliminate production uncertainty, instabilities, deferment and operational costs with Digital Intelligent Artificial Lift (DIAL), the continuous, intervention-free, gas lift production optimization system.

DIAL delivers more data throughout the life of your operation, meaning less uncertainty for improved production and reservoir management decisions.

DIAL adds measurable business benefits for oil and gas operators on ten dimensions of value.

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+1 (832) 316-7190



**Thank you !  
Questions ?**

**Graham D Makin**

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