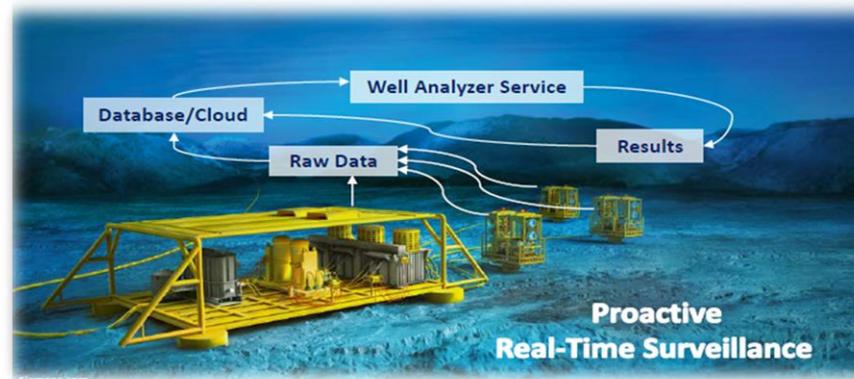# Well Analyzer

Pro-Active

Automated Real-Time Surveillance **(ARTS)**

Well/Reservoir Evaluation Software Package

Gas Injector

Offshore Australia

Oilfield Data Services, Inc.

✓ Oil & Gas Reservoir Testing and Evaluation
✓ Real-Time Pressure Transient Analysis
✓ Hydrocarbon Volume Determination
✓ Well(s) Performance Tracking

✓ Multiphase Rate & BHP Calculations
✓ Optimize Gas Lift / Oil Production Rates
✓ Life Of Well Surveillance/Analysis
✓ Automated PVT Calibration

Oilfield Data Services, Inc.
+1 (713) 521 - 4571 | info@oilfielddataservices.com
Visit: www.odsi-energy.com

ODSI Well Analyzer
Digital Operator Support Real-Time Automated System
Real-Time Reporting on Well/Field KPI's

The Well Analyzer RTS Concept:

Experienced Surveillance Engineers

+

Automation

VFM/PVT

Virtual Metering

Auto Real-Time PVT Tuning & Calibration

Flow Assurance

Wax, Hydrates, Asphaltenes, Scale, Corrosion, Emulsion Detection & Mitigation

Production & Reservoir Performance Optimization

Auto Real-Time PTA & Reporting

Scale, Asphaltene detection in reservoir & wellbore

In-place and recoverable hydrocarbon volume monitoring

In-place and recoverable hydrocarbon volume monitoring

Field Development & NPV Optimization

Short- and long-term asset and NPV Optimization

Drilling Decisions – Optimal Well Placement

Asset Modeling, Monitoring & Diagnostics

Raw sensor data → Data Communication → Intermediate Data Repository → Real-Time Data Management

Photo credit: www.energyglobalnews.com

Visit: www.odsi-energy.com

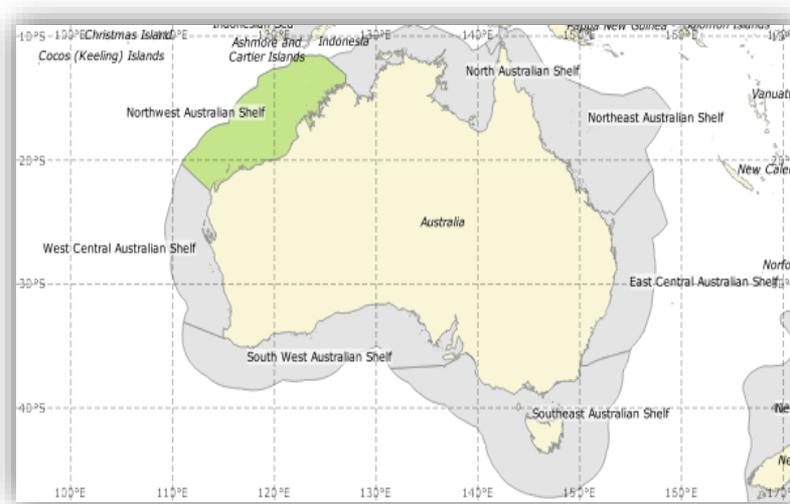✓ Well(s) Performance Tracking   ✓ Automated PVT Calibration

Well Analyzer Automated Real-Time System (ARTS) Features

- Automated Rate Calculations and PVT Adjustments

- Conversion to BHP/Datum Depth

- Automated Pressure Transient Interpretation of <u>Build-ups (PBUs)</u> and <u>Drawdowns (DDs)</u>

- Time-Lapse Skin, Perm, Mobility-Thickness, P* and P.I. or I.I.

- Continuous calculations of observed in-place, hydraulically connected, mobile and recoverable HC Volumes

  - Static& Flowing MBAL, Decline Analysis

Gas Injector – Onshore Australia

- Gas Storage
  - Well Equipped with tree and downhole gauges
  - Occasional Gas Chromatograph Data
  - Production and Injection Cycles
  - "Mined" completion (feet of underreaming at completion)

✓ Oil & Gas Reservoir Testing and Evaluation
✓ Real-Time Pressure Transient Analysis
✓ Hydrocarbon Volume Determination
✓ Well(s) Performance Tracking

✓ Multiphase Rate & BHP Calculations
✓ Optimize Gas Lift / Oil Production Rates
✓ Life Of Well Surveillance/Analysis
✓ Automated PVT Calibration

Oilfield Data Services, Inc.
+1 (713) 521 - 4571 | info@oilfielddataservices.com
Visit: www.odsi-energy.com

Gas Injector Deliverables

P/T surveillance

- Wellbore integrity
- OOZI
- Breach of OB

PTA (Fall off & Injection Tests Analysis & Reporting)

- Skin
- Permeability
- Injectivity Index
- Completion Efficiency
- Reservoir pressure

Fracture Monitoring

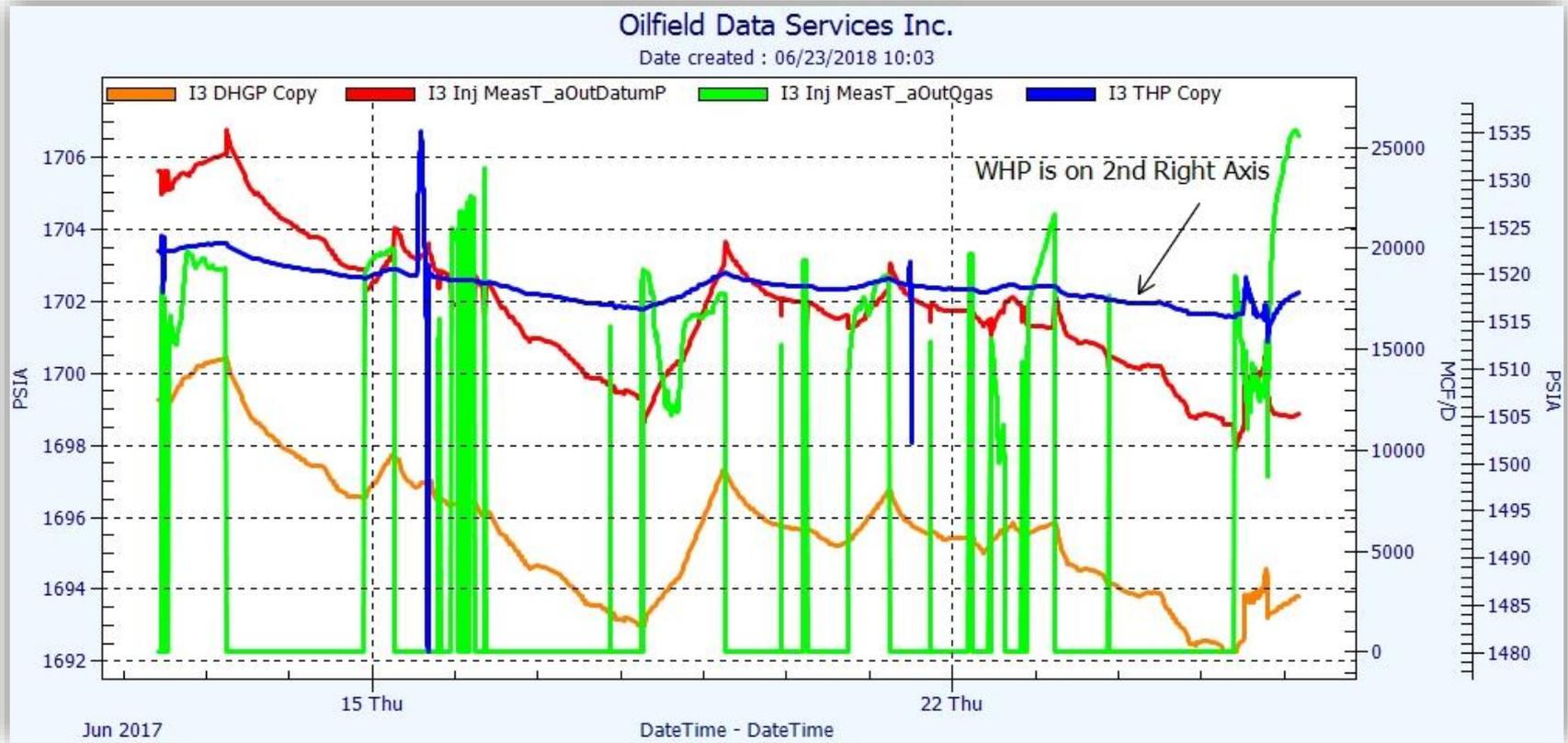- 'Alarm/Notifications' if BHP gets close to fracture gradient pressure

Virtual Metering/Spot Gas Rates

- Backup if meter fails
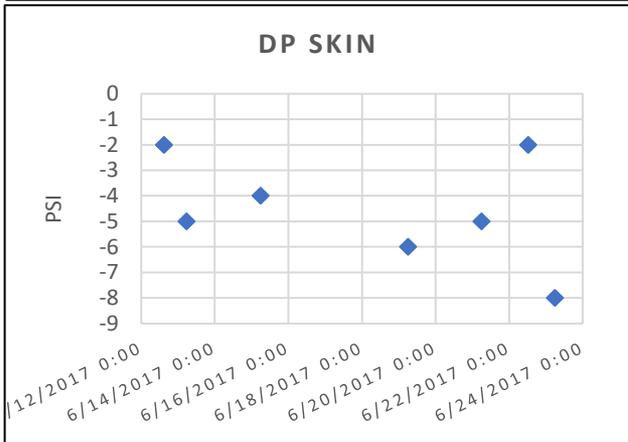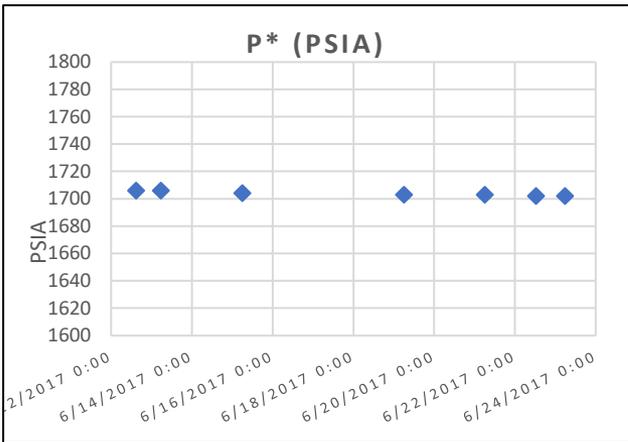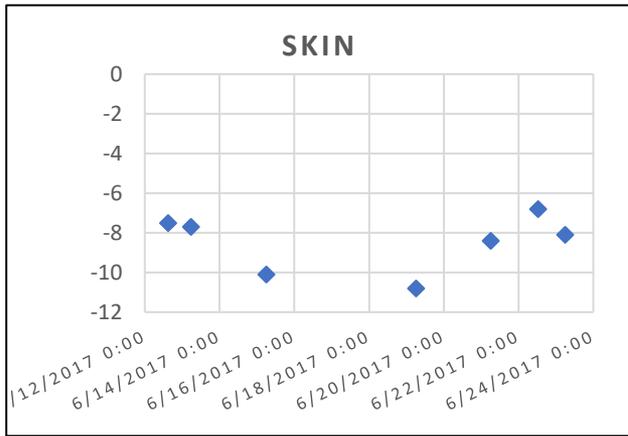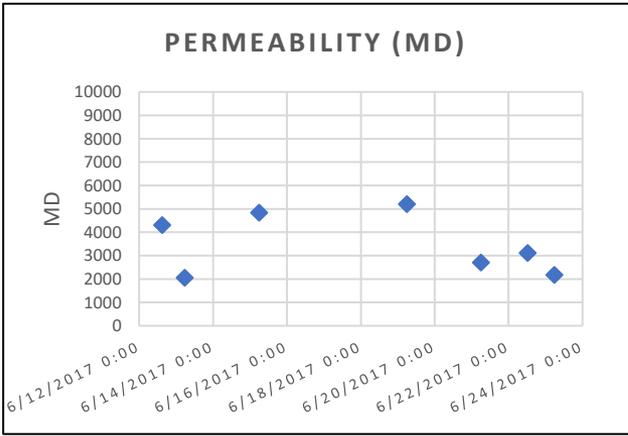
Composition/PVT Changes

BHP Conversion

✓ Oil & Gas Reservoir Testing and Evaluation
✓ Real-Time Pressure Transient Analysis
✓ Hydrocarbon Volume Determination
✓ Well(s) Performance Tracking

✓ Multiphase Rate & BHP Calculations
✓ Optimize Gas Lift / Oil Production Rates
✓ Life Of Well Surveillance/Analysis
✓ Automated PVT Calibration

Oilfield Data Services, Inc.
+1 (713) 521 - 4571 | info@oilfielddataservices.com
Visit: www.odsi-energy.com

Gas Injector Surveillance

- Gas rates from dP wellbore
- Venturi Meter Backup
- P/T Surveillance
- Auto-PTA
  - Injectivity and Reservoir Pressure Tracking

Oilfield Data Services, Inc.
+1 (713) 521 - 4571 | info@oilfielddataservices.com
Visit: www.odsi-energy.com

Gas Injector Surveillance – Diagnostic Auto PTA

- **Each Fall off and Injection test** are analyzed for diagnostic PTA parameters in real-time

- A **report** is generated for each test

- **Historic PTA** tables and plots are updated every time there is a new test

- **'Notification/Alarm'** tags are outputted if skin/perm reaches a certain 'reg flag' value (customized per well)
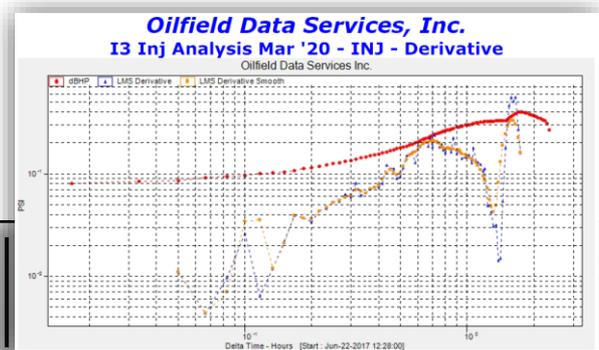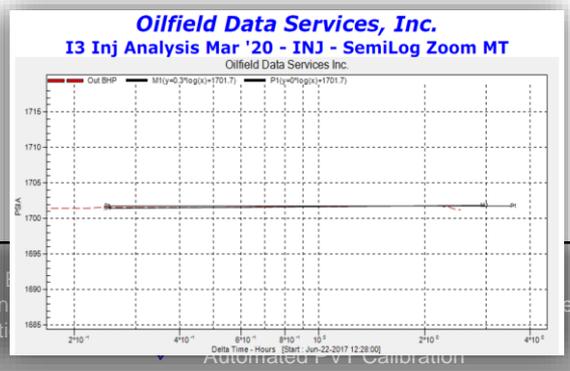
Gas Injector Surveillance Results & Conclusions

- Even though the well flows at relatively low gas rates at times, the Auto-PTA still provided valid results

- No observed OOZI

- No observed breach/frac'ing during injection

- Measured vs. Calculated Rates were quite close

- Slight increase in GG (wetter gas injected) around June 22-23

- Auto-PTA worked for both Injection and Falloff Cycles

- Auto-PTA worked for Production and Build-up Cycles

Well Analyzer Automated Real-Time System (ARTS) Features

- Automated Rate Calculations and PVT Adjustments

- Conversion to BHP/Datum Depth

- Automated Pressure Transient Interpretation of <u>Build-ups (PBUs)</u> and <u>Drawdowns (DDs)</u>

- Time-Lapse Skin, Perm, Mobility-Thickness, P* and P.I. or I.I.

- Continuous calculations of observed in-place, hydraulically connected, mobile and recoverable HC Volumes

  - Static& Flowing MBAL, Decline Analysis