Wireline Efficiency in Unconventional Plays – The Argentinean Experience

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SLAP 47
Agenda

- Background
- Challenges
- Solutions
- Results
- Way Forward
- Conclusions
Background

Argentina has great potential for unconventional resources

- Vaca Muerta: Jurassic Sedimentary formation with high organic carbon content, present in the Neuquen Basin. The shale thickness reaches 450 m in center of the basin.
Operational Conditions

Traditional – conventional Vs Unconventional – Shale

BEFORE
- ✓ Low Well Head Pressure
- ✓ Multiple runs
- ✓ Low volume / Low cost
- ✓ Short jobs. (1-2 days)
- ✓ All equip. prepared from the base
- ✓ Only WL truck + crane
- ✓ Clean fluid (no sand)
- ✓ Low risk
- ✓ Vertical wells

AFTER
- ✓ WHP: 5,000 – 8,000 psi
- ✓ Single run for Plug + multiple guns
- ✓ High Volume
- ✓ High Efficiency Required
- ✓ Multidisciplinary jobs
  Idle equipment = $$$ eliminate failures
- ✓ >50 people on location = HSE Challenge
- ✓ 365 days/year, 24/7
- ✓ Maintenance required at the wellsite
- ✓ Horizontal wells: tractor / pumpdown
Challenges – Adapting to Change

- **People**: Develop Local Expertise. Operational evolution for Shale development
- Suitable **equipment** for new operating conditions
- Suitable **technique** for conditions

Transition from getting the job done to becoming efficient
Solutions – Developing Local Expertise

Challenges Encountered

– High complexity of perforating operations
– Local personnel with no experience in shale operations
– Small Cased Hole structure

Solutions:

– Engineers traveled to USA to be exposed to shale operations to develop competency
– Experienced engineers from USA invited to Neuquen to share their knowledge
– Local ideas/knowledge merged with international experience
– Allocated resources to grow CH structure
Solutions – Acquiring **Suitable Equipment**

Challenges Encountered

- Required equipment not available in country
- Import / Export limitations in Argentina
- Participation in horizontal wells completion

**Solutions:**

- Import critical pieces that could avoid “reinventing the wheel”
- Develop local manufacturers, with international proven reliable technology
- Adapt local hardware to requirements
Suitable Equipment

- 5 1/8” 10K Pressure Equipment
- Plug & shoot hardware
- Electrical Switches
- Change detonators (smaller, easy to arm / faster)
- Large OD, heavy Weight Bars.
- Maintenance trailer on location

HORIZONTAL WELLS
- Tractor Conveyed perforating
- Pumpdown services
Walk the learning curve along with the client

Procedures, lessons learned & risk analysis

- **Wireline specific**
  
Pumpdown in horizontal wells. (skill / communication)

Rig up rig down, preparation for each stage

- **Inter-discipline**
  
  - CT best practices to prevent migration of gas - hydrates formation
  
  - Frac flushing techniques to avoid sand during the WL run
Transition from **Getting the Job** done to becoming **Efficient**

- Efficiency has to increase in order to reduce cost of shale completions and increase profitability
  - Independent Runs vs Plug and Perf
  - Mechanical Vs electronic selectivity system
    - Allows pre-arming gun string / Allows surface check before RIH / Allows confirmation
  - Streaming the process / continuous improvement
  - Importance of Integrated Services to reduce NPTs.
    - Built common sense of responsibility
    - Coordination/ Teamwork
    - Standardized procedures
Tips & tricks to boost efficiency

- Rig Up procedure
- BOP rigged up in between stages
- Man Lift
- Quick Test Sub
- Pressure Testing with Live Guns
- Inter-disciplinary communication – Simultaneous operations
- Color codes for radio silence (RED / GREEN FLAGS)
- Standardized procedures - Becoming consistent
- Dedicated crews
- Multipads
- Logistics
Way Forward

- Polymer coated cables
- Oriented perforating for horizontal comp.
- Disposable gun systems

- Zero torque casing / single tower wires
- Preferred plane frac initiation
- Modular (up to 5ft) Light Adaptor-less (no cleaning) Zero crimping at the wellsite
- Emulated requirements for faster cost-effective
- Cable load and drillstring with smaller RF versions available
- Large WHE and grease tubes
- No cable stuck in presence of sand / particles
Conclusions

Key recommendations for a successful WL unconventional project startup:

- Good project **design/preparation** between client/wireline/other disciplines. Define expectations before hand.
- **Plan equipment availability** according to operational challenges
- **Train entire crews** “hands on” before execution
- **Prepare contingency plans** before hand and discuss with client.
- **Merge international expertise with local experience** – create local procedures/lessons learned for specific conditions.
- **Execute aiming for continuous improvement** – Have a designated project leader