

Integrated Well Construction

Making your project safer, simpler, faster, better



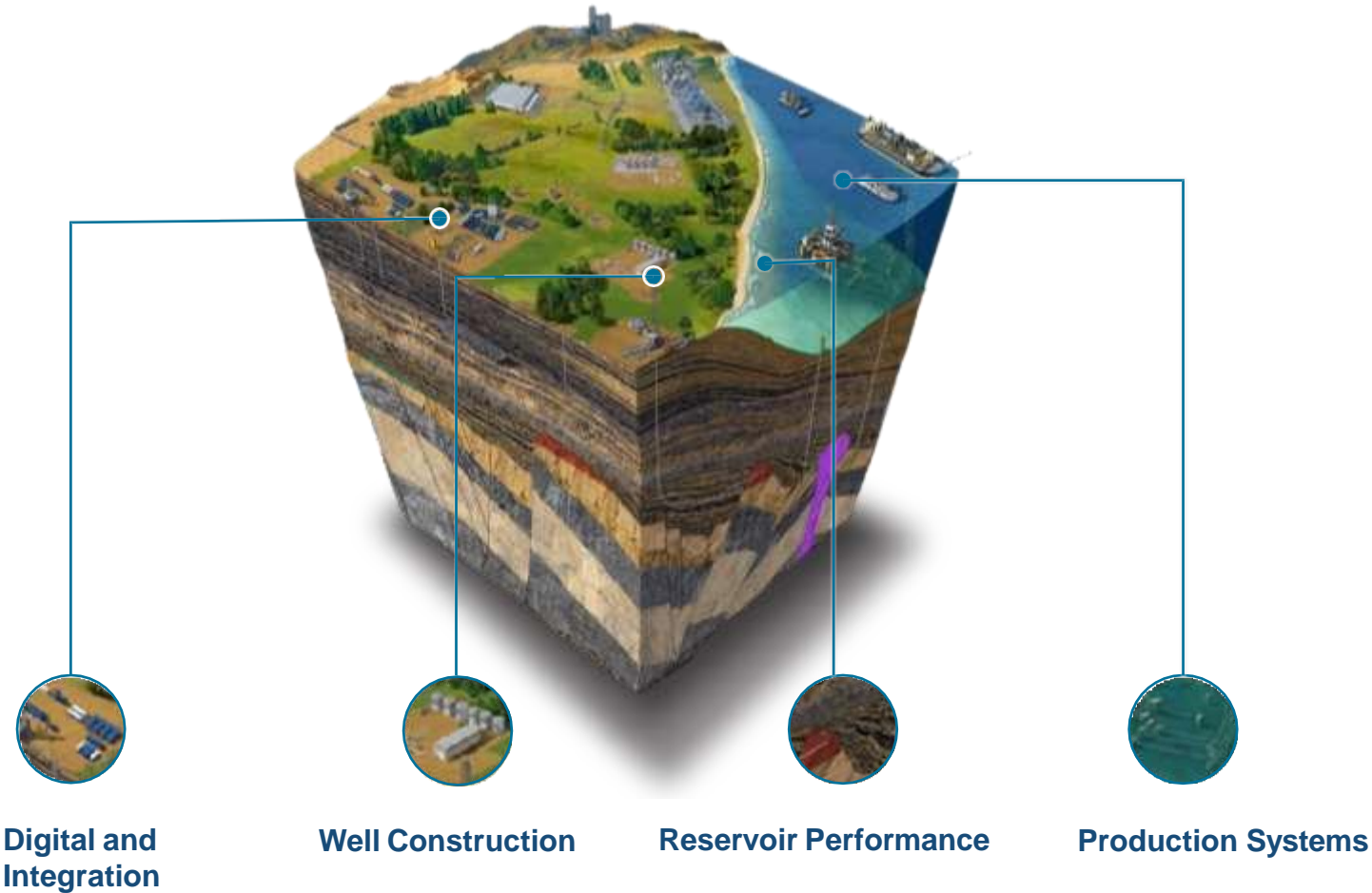
Schlumberger

Agenda

- Integrated Well Construction Offering
- Value Proposition & Customers Alignment
- Performance Results and Case Studies
- Digital impact on Integration
- Sustainability
- Additional Services Portfolio
- Why Integrated Well Construction
- Q&A



Integrating Pore to Pipeline Technologies



Digital & Integration

- Multi Client Seismic and data processing
- Digital Solutions
- Asset Performance Solutions
- Integrated Well Construction

Reservoir Performance

- Wireline
- Testing
- Stimulation and Intervention

Well Construction

- Drilling & Measurements
- Drilling Fluids
- Drill Bits
- Drilling Tools
- Well Cementing
- Rigs and Equipment

Production Systems

- Artificial Lift
- Completion Equipment
- OneSubsea[®]
- Surface
- Valves
- Processing

Integrated Well Construction

- We are Schlumberger's global **integrator** of **market-leading technologies, digital capabilities** and **well construction engineering expertise**
- We **accelerate** well construction, **optimise** performance and **reduce** your **total cost of ownership**
- We provide:
 - Well engineering
 - Onsite supervision
 - Project management - including third-party and rig services

‘MAKING
YOUR
PROJECT
SAFER,
SIMPLER,
FASTER,
BETTER’

Integrated Well Construction Experience

Integrated Well Construction

Our Experience

- >25 years of experience
- >11,500 wells drilled
- >83 Million feet drilled

Our Expertise

- Project Management
- Well Engineering
- Onsite Supervision
- Third Party Management

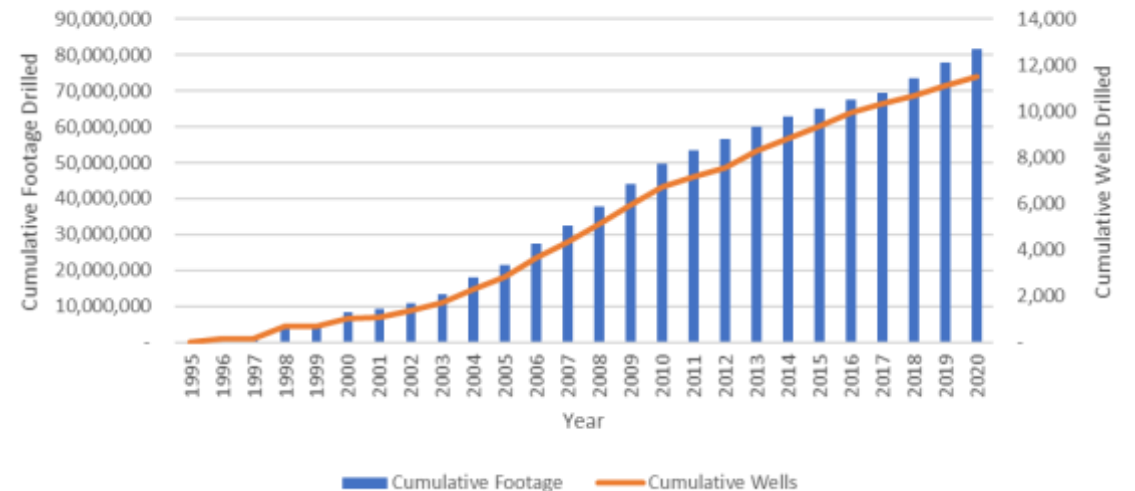
Our People

- Total of 813 with key expertise
 - 202 Well Engineers
 - 203 Wellsite Leaders
 - 105 Project Managers
- 57 Nationalities



* Source Schlumberger May 2021

Integrated Well Construction Experience



Integrated Well Construction Global Footprint

Footprint today:



+80 Active Rigs

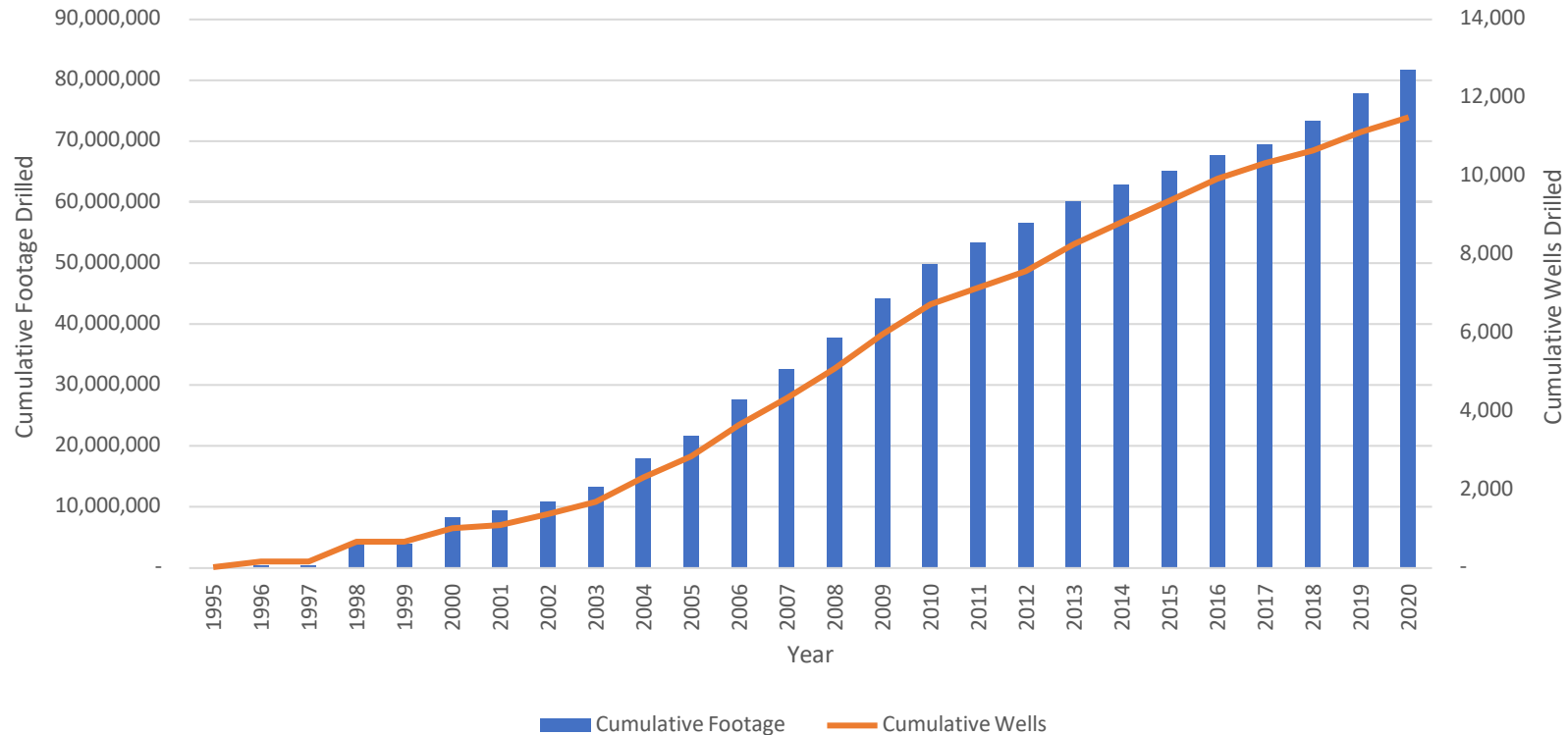


+30 Projects



15 Countries

Integrated Well Construction Experience



Our Mission

We accelerate well construction, optimize performance and reduce your total cost of ownership



Minimize NPT



Minimize ILT



Maximize meterage/day



Minimize cost/day

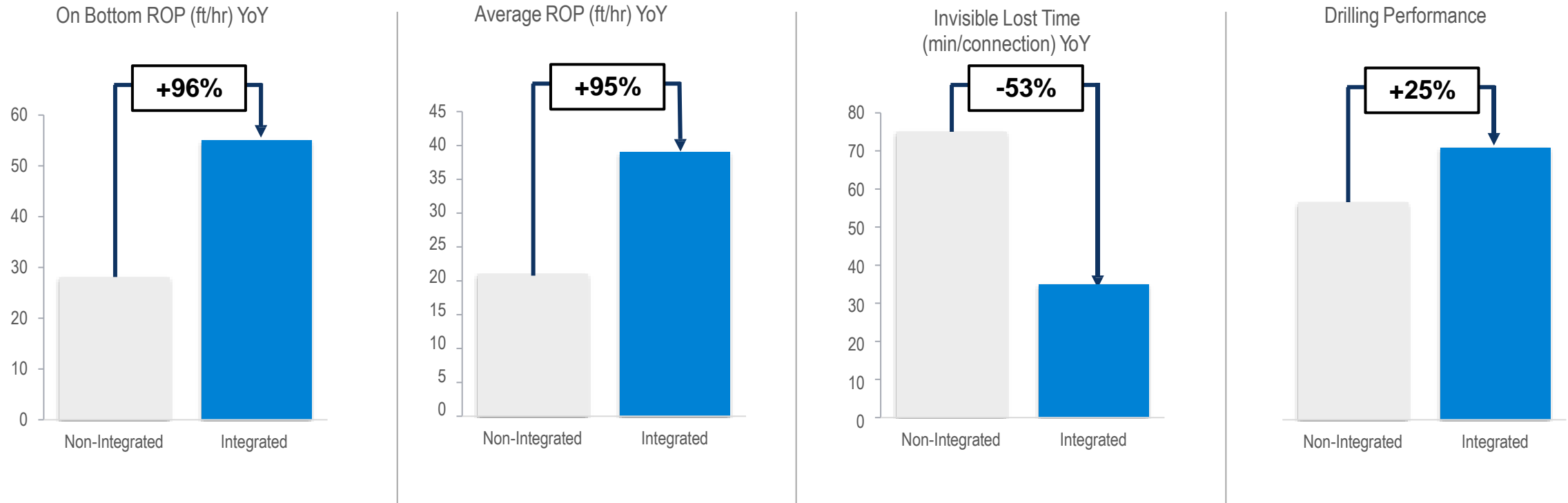


Technology optimization and adoption



Improve logistical coordination and efficiency

Unparalleled Performance – Drilling Performance Delivery



ROP doubling with ILT halved and overall 25% improvement in drilling performance

Scope of Work

Schlumberger Services



Project Management, Well Engineering & Operations Supervision



Wellheads & installation



Directional tools, MWD, LWD, geo-steering and mudlogging



Drilling fluids & drilling waste management



Bits, downhole tools & fishing services



Cementing materials & services



Open & Cased-Hole logging



Liner Hangers and Completion equipment & services



Software, IT communications systems
Realtime data transmission services



Civil Works: Drill site construction & roads



Oil Country Tubular Goods (OCTG)



Casing Accessories (centralizers, DV-tools, floating equipment)



Casing / tubular running services



Drilling rigs, rig inspection services



Logistics, transportation & wellsite waste management



Gyro & survey services



Coring services



Water wells



'Making your
project safer,
simpler, faster,
better'

Case Studies

Value delivery through fully managed turnkey project

MIDDLE EAST

Background

In a multiwell, multiyear lump-sum turnkey (LSTK) project where the drilling environment is a constant challenge, the LSTK business model aims to reduce well time and costs by integrating well engineering and fit-for-purpose technologies.

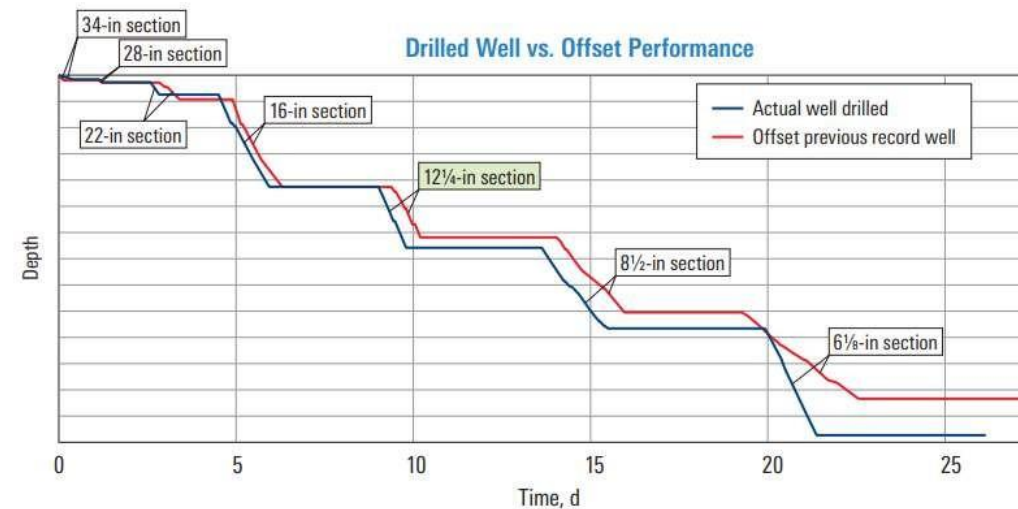
Technologies

- OptiDrill* real-time drilling intelligence service
- Bit antiballing coating (ABC) technology
- Big Bore PXN Plug
- PowerDrive Xceed* ruggedized rotary steerable system
- AxeBlade* ridged diamond element bit
- Critical Activity Risk Evaluation (CARE)

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Integrated Well Construction Achieves Record Performance in Middle Eastern Field

Teamwork and fit-for-purpose technologies enabled completion of a well in 26 days without NPT or lost-time incidents



By integrating well construction technologies, an operator drilled an entire well in 26.2 days, which was a 5.5% improvement over the previous field record. The 12 1/4-in section was the fastest drilled in the field, surpassing the previous record by 20%.

slb.com/iwc

Value delivery through AFE Assurance project

OFFSHORE NORWAY

Wells Extended-reach drilling (ERD)

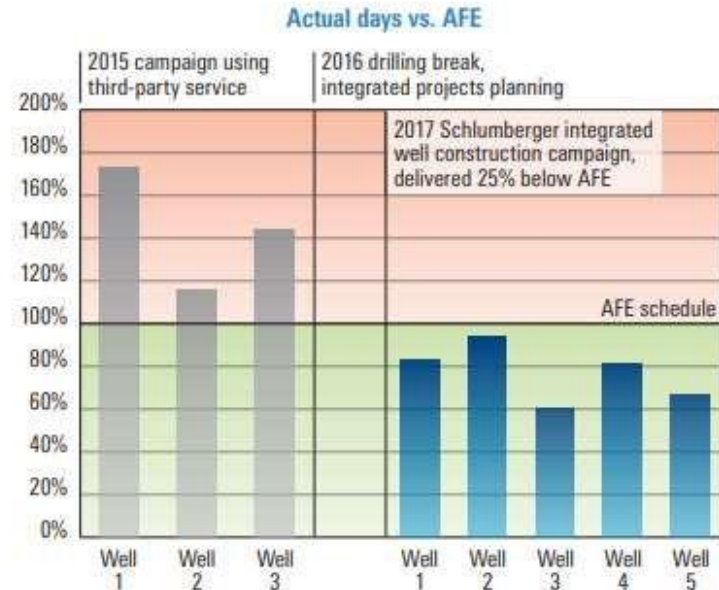
Background

An operator in Norway needed to plan and drill a field that was previously deemed uneconomical. Prior campaigns using a third party had exceeded the budget due to repeated operational complications. Schlumberger aligned with the operator to determine key success factors and implemented comprehensive technical and resource planning. To ensure operational efficiency, the job included BHA standardization, full onshore configuration, remote operations, multiskilling, high tool utilization, and technology deployment.

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ERD Wells Delivered 85 Days Ahead of Schedule

Integrated well construction boosts operational efficiency and exceeds previous daily drilling meterage by 225%



The integrated well construction campaign enabled the operator to achieve consistent, early delivery of the wells, proving that the field could be drilled and produced economically. Daily meterage increased by 225% compared with using a previous third party—exceeding the projected target by 29%. The drilling campaign was delivered 25% ahead of the AFE schedule with zero HSE incidents recorded. The field life was also extended, and the operator plans on an additional drilling campaign.

slb.com/iwc

Value delivery through Business Line Integration

North Sea

Background

- Substantially complex project
- Operator with no previous exploration experience in North Sea area
- Lack of footprint in a suspected 'dry' location

Solution

- Schlumberger Integrated package of services supported by a Project Manager
- Project manager single point of contact to simplify client/Schlumberger/Third party relationships
- Greater accountability provided by combining services and management



One Stop Shop: Service Integration Facilitates Multiple Discoveries

Schlumberger delivers an integrated service package that leads the way to new discoveries in the North Sea.

Results

- Discoveries of oil and gas in a region thought to have little prospectivity
- Operator established a footprint in the North Sea
- Zero delays on service delivery
- Zero lost time injuries
- Successful exploration with two discoveries



With certified personnel and technology being sourced from land locations all around the North sea, the Integrated Services Project Manager (ISPM) ensured resource availability at all times—every time.

Value delivery through Business Line Integration

Offshore West Africa

Challenge

- First drilling and completion operation by Energy company world-wide
- OHGP in a narrow fracture window with limited knowledge of the asset
- Logistic concerns due to global COVID travel restrictions
- High risk of surface collision due to slot position

Solution

- Integrated project management to enable efficient assembly of segment resources to deliver flawless drilling & completion service
- Leveraging lessons learned from previous in-country campaign and Schlumberger's vast experience on similar projects worldwide
- Deployment of novel ClearPAC* gravel pack technology for low friction gravel packing to successfully complete 2-wells despite client's low frac margin challenge
- Setup COVID management protocol and streamlined crew rotation plan
- Successful use of RT Annular Pressure Pump-off measurement (RT APPO*) during MPD Fingerprinting
- Mobilized RFF tools from within the region for on time project spud

Integrated Well Construction supports Energy company in First Drilling Operation

Schlumberger Integrated Well Construction handled the project management of 3-well drilling and completion campaign offshore West Africa

Results

- No major injury or spill throughout the well campaign
- Completed only two of the three wells drilled
- Third well not yet completed due to wellbore stability concern
- Good COVID management plan resulting in no personnel or equipment related issue / delay



Delivering Material Savings – A case study example

UK Offshore – North Sea

Background

- Water injector well to maintain the reservoir pressure and enhance oil production
- Massive reservoir depletion resulting in high differential pressure
- Uncertainty over the geological and reservoir model (frac pressures)
- Risk of severe mud losses
- Stuck pipe risks
- Poor cement job
- Equipment limitations to enable water injection

Solution / Technology

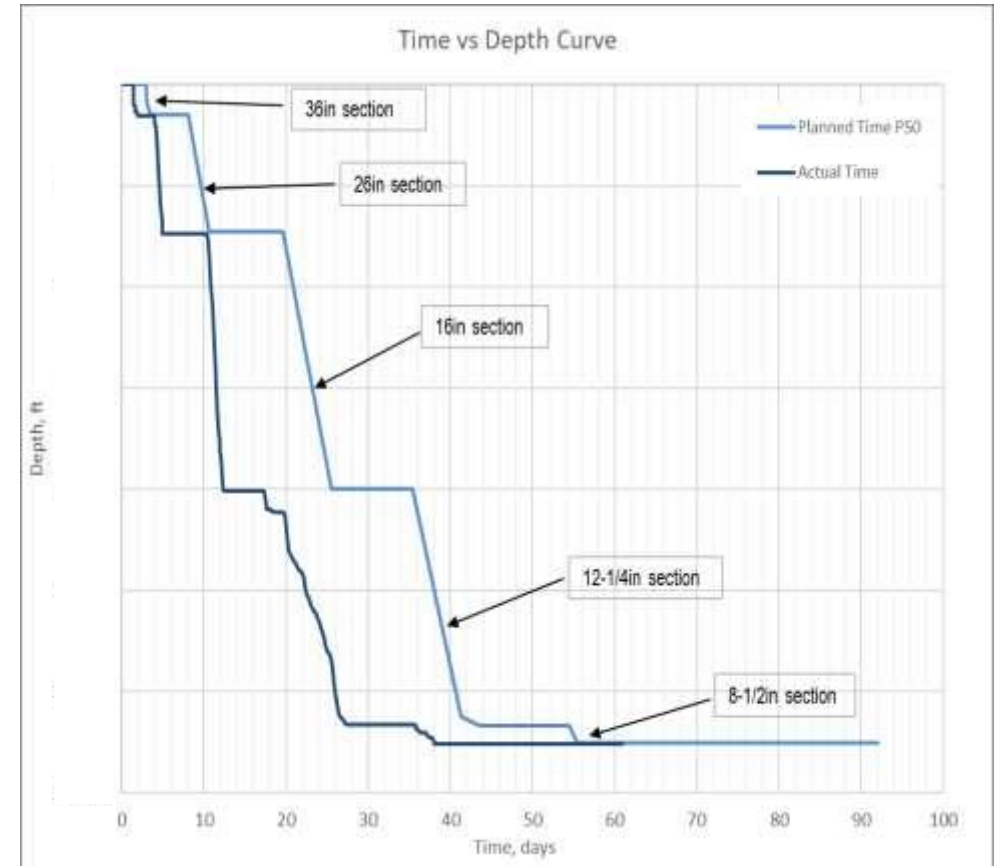
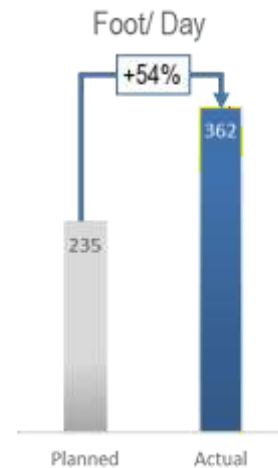
- Holistic approach through deep sub-surface study including 3D-Geomechanics
- Fit for purpose mud design and bridging package
- Decision tree developed to provide quick and on the spot decision for 2 well designs
- Contingent design to fall-back location
- Innovative business model including partnership with the other service company

Pushing Envelop of Integration and Performance

Schlumberger Integrated Well Construction saved 38.6 days from client AFE and an estimated greater than 10USD of savings

Results

- Achieved injectivity rates
- Eliminated drilling contingent 6" wellbore
- Drilled through depleted reservoir zone with ~6,000 psi overbalance without mud losses neither stuck pipe



Factory Drilling delivering performance improvement and consistency

Australia Land

Background

- 1000+ wells with 9 rigs
- Logistical challenges due to short cycle of the operation
- Environmental challenges related to water management (up to 9000 bbls/day of water)
- Lack of local industry expertise and low maturity HSE culture

Solution

- Structured and flexible logistics setup
- HSE campaigns to raise culture maturity and develop crew competency
- Close communication with stakeholders, both land owners and communities, with strict land access rules implemented
- Equipment resizing with rig modification to fit the operation
- LEAN Six-Sigma approach for operational improvement
- Rig move process streamlined leading to large time savings

Australia IOC Factory Land Drilling Success

Schlumberger Integrated Well Construction deliver quantifiable savings in excess of 15 MUSD through LEAN approach

Results

- Drilling time reduced from 7 days to an average of 3.2 days (2200-3300ft wells)
- Completion time cut from 6 days to approximately 2 days (progressive cavity pump)
- Savings of over 15 MUSD



SPE-171470-MS

Case Study: Factory Drilling Australia's Unconventional Coal Seam Gas
Clare Smith OZG, JGU Urmaz, Ahmad Zygar, JSE Rodas, Arnan Nick Kooigi & Eduardo Aguiar, Schlumberger Integrated Project Management (IPM), Brisbane, Australia

Delivery Performance Records – A Case Study Example

Middle East Land

Background

- Integrated Well Construction takes over challenging drilling field and complex wells

Solution

- Integrated Well Construction Project Management approach to tackle the field specific challenges
 - Technology deployment
 - Drilling practices
 - Risk Management
- Engineering expertise
- Fit for purpose technology

Integrated Well Construction teams with Customer to outperform historical best performance

Schlumberger Integrated Well Construction average well performance outperforms historical record and rewarded with 14 additional wells

Results

- Increased on the footage per day KPI by more than 75%
- Achieved ROP records in all hole sections
- Wells drilled faster by up to 19 days when comparing with previous drilling campaign, following solution implementation
- NPT reduction from 9 days to 0.2 days
- Contract extended for 14 additional wells



Integration to deliver factory drilling and completions project in Chad

Chad IOC Project

Background

- First fully integrated project in Chad for Schlumberger
- Challenging well delivery due to the factory drilling mode
- Challenging logistics due to the short cycle of operation and frequent rig moves
- WDI drilling contractor

Solution

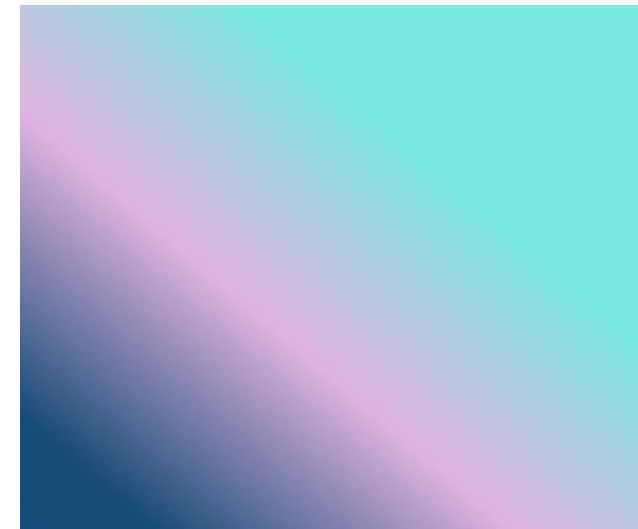
- Build on existing XOM setup
- Restructured project organization
- Improved logistics setup
- HSE leadership program
- LEAN Six-Sigma approach for operational improvement
- Rig move process streamlined

First fully Integrated Well Construction project in Chad delivers multiple field records for Exxonmobil

Schlumberger Integrated Well Construction drilled 214 wells and completed 560 wells whilst breaking multiple records along the way

Results

- Drilled 214 wells in 3 years at average on 10 days/well including rig move
- Completion of 560 wells, at an average of 4 days/well including rig move
- Broke XOM field records (747 wells drilled previously), then proceeded to break own records
- Implemented key LEAN projects
- Designed and tested downsized design before large scale implementation
- Designed Cluster drilling with 5 well per pad and 23ft spacing, with rig modification



Gas Storage – Case Study Example

Schlumberger

TECH REPORT

LOCATION

ONSHORE EUROPE

Background

A European oil company trying to develop gas injection and production wells was stymied by lack of historical data and complicated reservoir structure with different pressure regimes separated in multiple fault blocks. The company needed help with both target selection and reservoir modeling in a highly demanding regulatory environment.

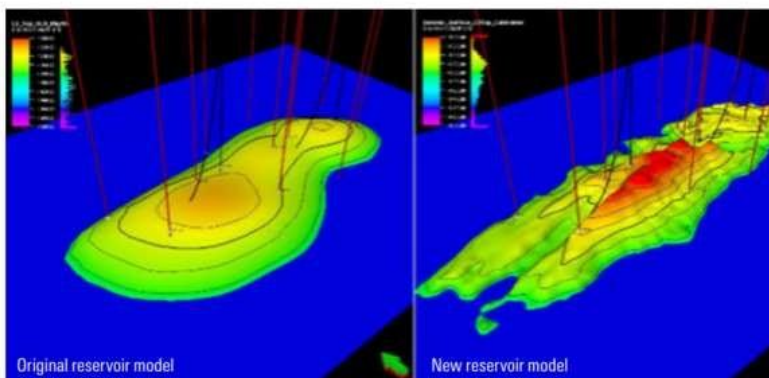
Technologies

- GeoSphere 360* 3D reservoir mapping-while-drilling service
- DIPRO* high-density divalent reservoir drill-in fluid
- FUTUR* self-healing cement system
- ABRASIJET* hydraulic pipe-cutting and perforating service
- Integrated Well Construction services

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Italy Gas Storage Project Improved Through Integrated Well Construction

Key technology deployment reduced drilling time by 21% and increased footage in 12 $\frac{1}{4}$ sections by 50% per day



Schlumberger's Integrated Well Construction team used vertical seismic profiling (VSP) and the GeoSphere 360 mapping-while-drilling service to help steer wells across the most promising intervals. These technologies improved drilling time of top holes by 21%—three days ahead of schedule on average—and resulted in more than a 50% ft/d increase in drilling of 12- $\frac{1}{4}$ " sections—averaging 9.6 days ahead of schedule. Innovations went beyond oilfield technology, extending to improvement of surface facility operations and HSE planning (air/water contamination, waste management, noise emissions).

slb.com/IWC

Geothermal Solutions— Case Study Example

TECH REPORT

LOCATION

ONSHORE INDONESIA

Background

An Indonesia developer drilling wells to feed a local geothermal power station was unable to correlate with offset wells due to the nature of the local volcanic rock. Drilling through fractures was causing wellbore instability. The operator had a limited option of downhole tools due to high temperatures exceeding 250°C.

Technologies

- PowerDrive Xceed ruggedized rotary steerable system
- Integrated Well Construction

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Schlumberger

Geothermal Drilling Improvements Produce Big Gains in Indonesia

Production from first well met target for the entire campaign while geothermal cost per megawatt was 60% lower than forecast



Schlumberger's Integrated Well Construction team deployed advanced technologies, using biphasic fluid and a continuous circulation system to limit lost circulation. PowerDrive Xceed ruggedized rotary steerable system enabled real-time well placement, keeping the wellbore in the target window. Production from the first well alone met the target for the entire campaign. Cost per megawatt produced was 60% lower than the established economic target.*

[slb.com/IWC](https://www.slb.com/IWC)

Integrated Well Construction delivering success in Libya

Libya

Background

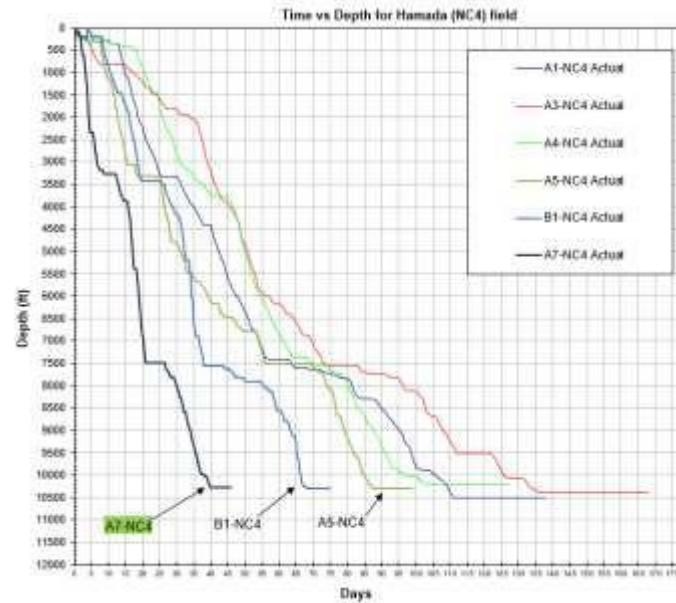
- Performance improvement needed
- Inconsistent Drilling Contractor Performance
- Limited to conventional drilling technologies

Solution

- Making innovative changes to the already established drilling program
- Improved communication with wellsite & Drilling Contractors
- Performance improvement trials and fit-for-project technology

AGOCO 2008-2010

Schlumberger Integrated Well Construction saves customer 455 days and an estimated 21.8 MUSD of savings



Continuous Performance Improvement A-7-NC4:

- 28 days faster than B1-NC4
- 47 faster than A5-NC4

Results

- Delivered 23 wells over 8 fields, utilising 7 rigs in 2 years
- Achieved 10 record drilling performance wells in 5 fields, culminating in the total of 455 days saved
- Estimated savings of 21.8 MUSD

Successful Delivery Rewarded – A Case Study Example

Middle East Land

Background

- 96 wells with 4 Land Rigs
- High deviated wells with high step out horizontal wells.
- Remote location with community challenges.
- High specifications for land rigs requirements
- Construction of locations and roads

Solution / Technology

- Modification of rigs (both new and old) to fit the specifications requirements.
- Advanced RSS and LWD and tractor for logging high deviated sections.
- Design and construction of operating base to cover customer expectations and project budget.

Integrated Well Construction Rewarded with additional scope due to Success for IOC

Following success of initially 30 wells, IOC extended scope for additional 66 wells with increased complexity

Results

- On Time spud for the Mobilization of the first rig.
- Rigs modified to improve efficiency in drilling and rig modification
- Delivered 30 successful well, resulting in scope increase to 96 wells



ERD Pad Drilling Performance Delivery

Iraq IOC Project

Background

- Well targets below farm land
- 6 directional wells from single pad location
- Longest step out 2153m
- Shallow BU rate and wellbore stability

Solution

- Integrated Well Construction
- Well Engineering and proper well planning
- Engineering analysis for suitable sizing and selection of Pad drilling rig

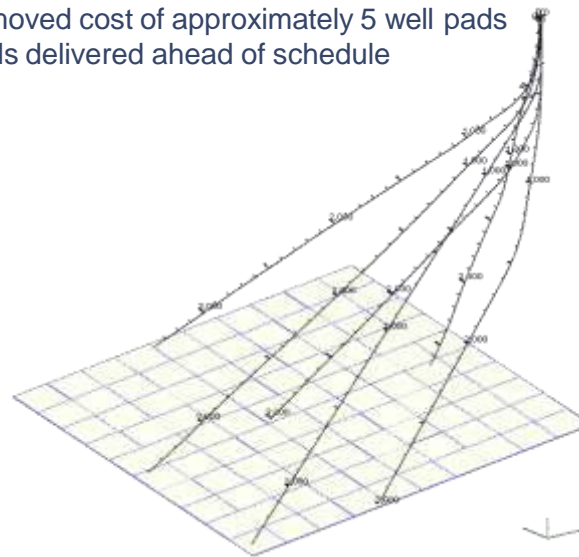


WQ-1 Pad Drilling Project

Schlumberger Integrated Well Construction saves International Oil Company 35 days through planning and engineering design

Results

- Eliminated 5 rig moves with savings of 35 days
- Saved cost of rig move logistics (transportation and lifting)
- Removed cost of approximately 5 well pads
- Wells delivered ahead of schedule



Value Delivered – Case Study Example

ONSHORE KUWAIT

Operation	Casing while drilling
Well environment	Abrasive formations with multiple faults

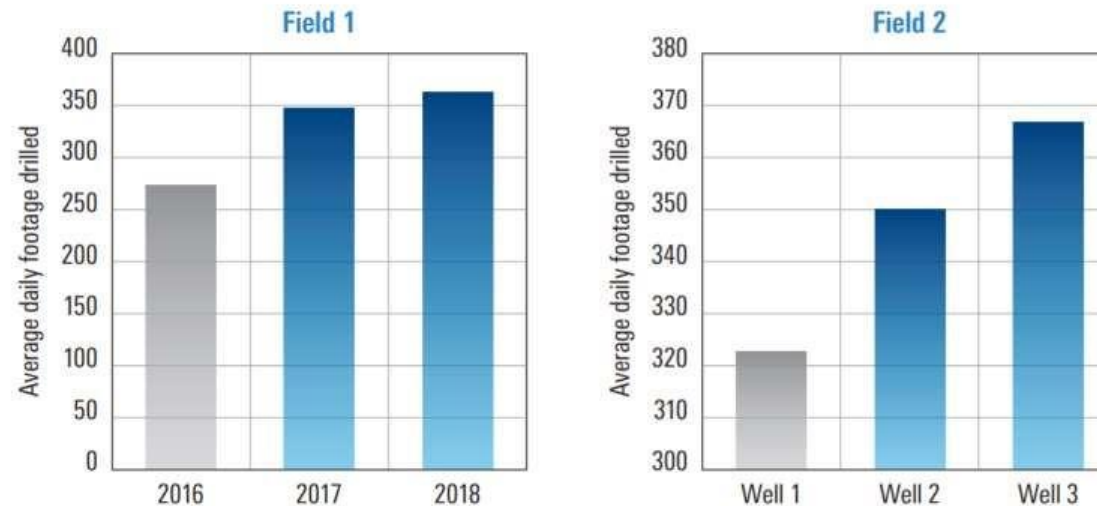
Background

An operator onshore Kuwait wanted to increase drilling efficiency across two fields with challenging drilling conditions, including abrasive formations. Schlumberger used casing-while-drilling technology as a key differentiator to increase well construction efficiency and deliver the project ahead of schedule. Enhanced processes and automation also enabled the operator to reduce flat time and improve drilling performance.

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Drilling Efficiency Increases by 62% in Two Fields with Complex Conditions

Integrated well construction delivers wells ahead of schedule and sets record number of wells drilled in the fields



The integrated campaign improved the well construction rate by 62% overall compared with the first year of the campaign. Because the wells were delivered ahead of schedule, the operator chose to drill additional wells, achieving a record number of wells drilled in the fields. A total of 225 days was saved in the second year of the project, an average of 12.7 days per well.

slb.com

Integrated Well Construction Teamwork Delivering Success in Mexico

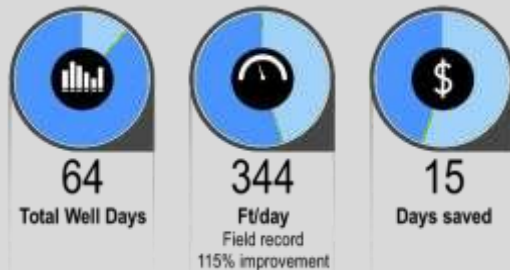
Offshore Mexico

Background

- Integrated Well Construction takes over drilling field for complex wells
- Large geological constraints
- Trajectory challenges

Solution

- Integrated Well Construction approach
- Engineering expertise
- Fit for purpose technology enabling trajectory redesign

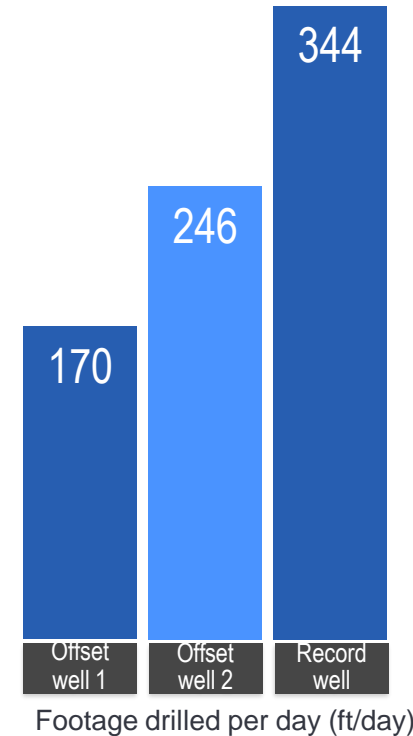


Schlumberger Integrated Well Construction drill fastest Mesozoic well in Mexico for Customer

Integration key to success in saving 15 days through drilling its fastest Mesozoic well

Results

- Delivered record beating footage per day well with 344ft/day
- Delivered well number 8 in the field, with the second by Integrated Well Construction
- Delivered the well in 64 days, with a savings of 15 days



High Volume Performance – Case Study Example

Middle East Land

Background

- 30 wells with 3 Land Rigs
- Construction of Operating Base for 300 People
- Remote location affected by community challenges
- Mobilization and spud of 2 rigs during COVID-19 first wave.
- 3 Different rig contractors operating and sharing base.

Solution / Technology

- Extensive preparation of rig to fulfill client requirements.
- DrillPlan coherent well planning solution
- DrillOps on target well delivery solution
- Engineering technical developments and engagements to fulfill cementing acceptance criteria.
- Design and construction of operating base within specs and budget
- Use of wellbore conditioning tools first time introduced in Iraq
- Engineering and technical developments collaboration on losses actions reducing project NPT
- Focused mud additives to enhance wellbore stability

Integrated Well Construction beating field records for Customer

Implementation of advanced drilling systems, high performance bits, excellence in planning and project management to achieve outstanding results.

Results

- Record wells delivered in under 20 days (vs average Offset well of 40 days)
- Implemented DrillPlan and DrillOps, enhancing planning time and engineering design quality and DrillOps delivered drilling performance improvement
- Rig Mobilization with no accidents / incidents.
- 90% of wells cementing job accepted
- 70% of the wells drilled below planned time
- New record ROP in well time delivery
- No down time due community / social issues



Continual Performance Improvement – A Case Study Example

Middle East Land

Background

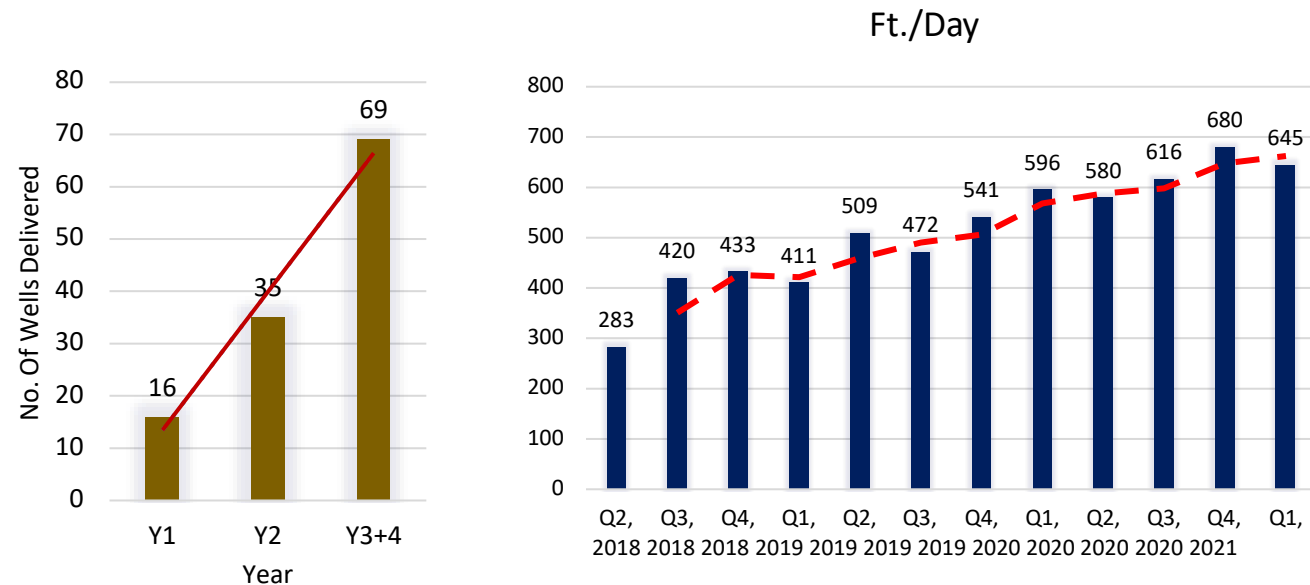
- The contract was awarded in 2018 for 100+ wells over three years with aggressive delivery times
- Historical under performing well performance

Solution

- In 2019, a comprehensive plan was developed that includes planning and risk management as a foundation of the six main pillars to ensure value for customers and Schlumberger.
 - ✓ Focus
 - ✓ People
 - ✓ NPT Elimination
 - ✓ Flat Time Reduction
 - ✓ Drilling Performance
 - ✓ Cost Reduction

Delivering Customer in the Middle East a Best in Class Performance

Integrated Well Construction delivers 120 wells over Period of 3 years and 5 rigs



Results

- All wells have been delivered ahead of schedule.
- Since Q3 2019, 80% of the wells were delivered ahead of the tight PAR.
- NPT reduced >70% and the Spud-to-TD ft/day improved almost be 90%.

Innovative Well Engineering – A Case Study Example

Middle East Land

Lump Sum Turn-Key (LSTK) project

Background

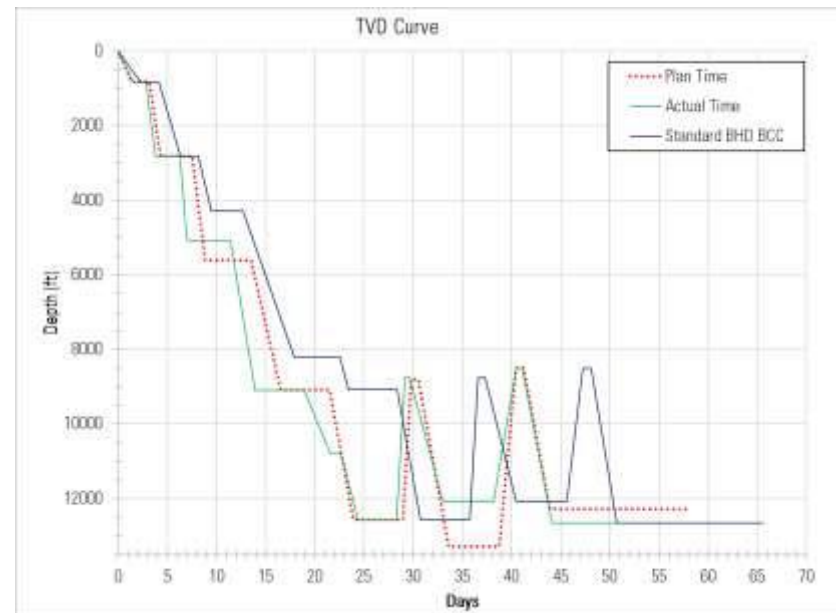
- The conventional Big Hole Design fulfils client's requirement but fails to address the rigors of the LSTK model, which is concerned heavily with operational efficiency.
- High risks of losses across fractured reservoir leading to multiple remedial jobs to establish wellbore integrity.

Solution

- Introduced a slim hole well design.
- Optimized well architecture by eliminating one complete casing string, while minimizing drilling risk.

Successful introduction of a Slim Hole Multilateral Well Design

Ingenious well design by Integrated Well Construction saves customer over \$200,000/well and 8 days of rig time.



Results

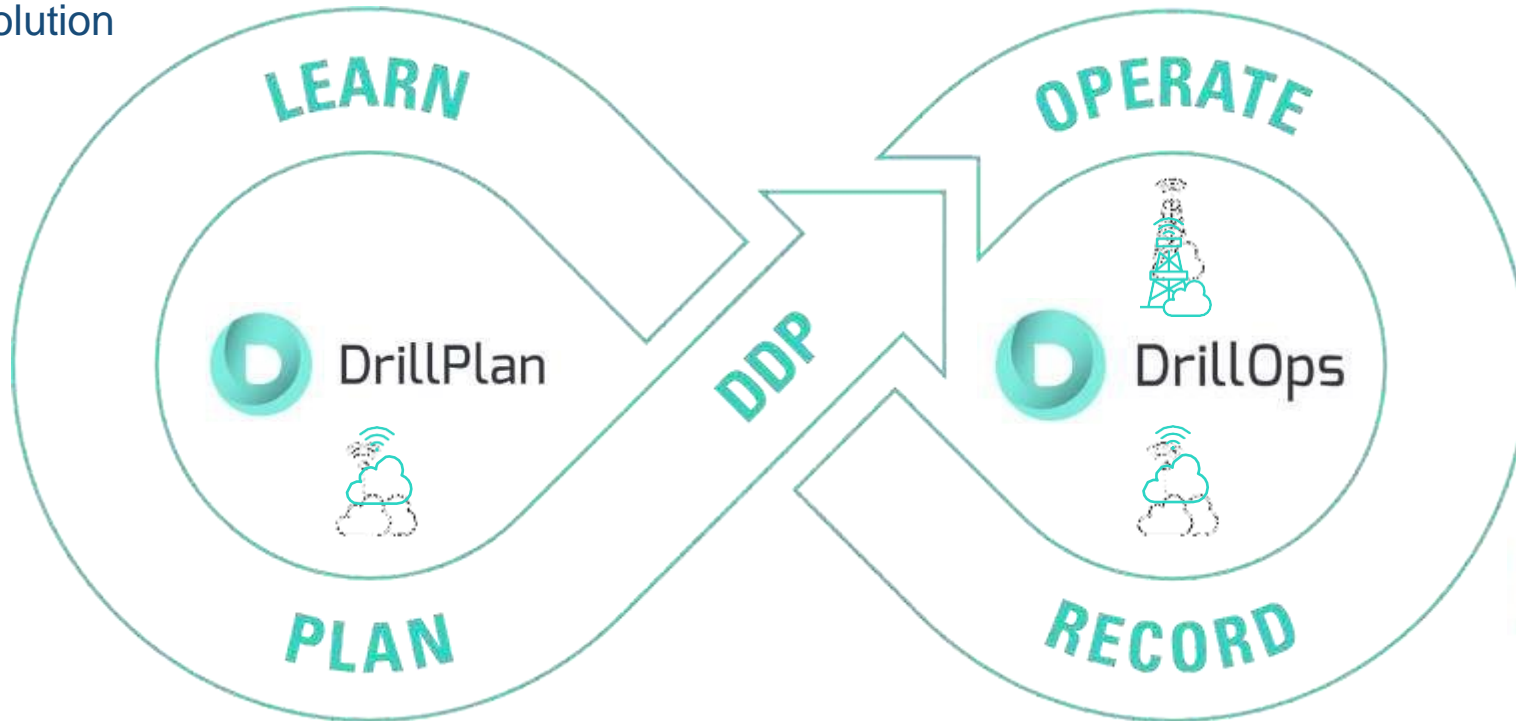
- Delivered the well 8 days ahead of standard
- A >100% ROP improvement in curve section
- Following successful execution of this design, client revised the well design for the entire field for multilateral wells.

Integration value delivered through digital



DrillPlan

Coherent well construction planning solution



Rig based
(execution)



Cloud based
(operations support)



DrillOps

On-target well delivery solution

Leveraging Digital – Surveillance & Automation

Digital solutions enabling and supporting customer operational surveillance

Automate



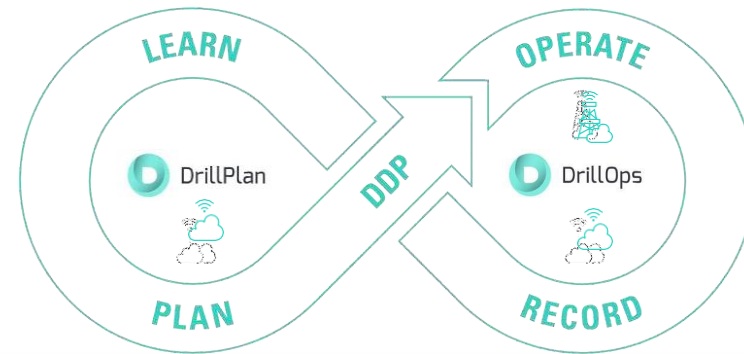
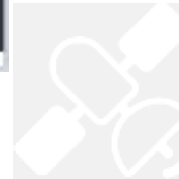
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Orchestrate

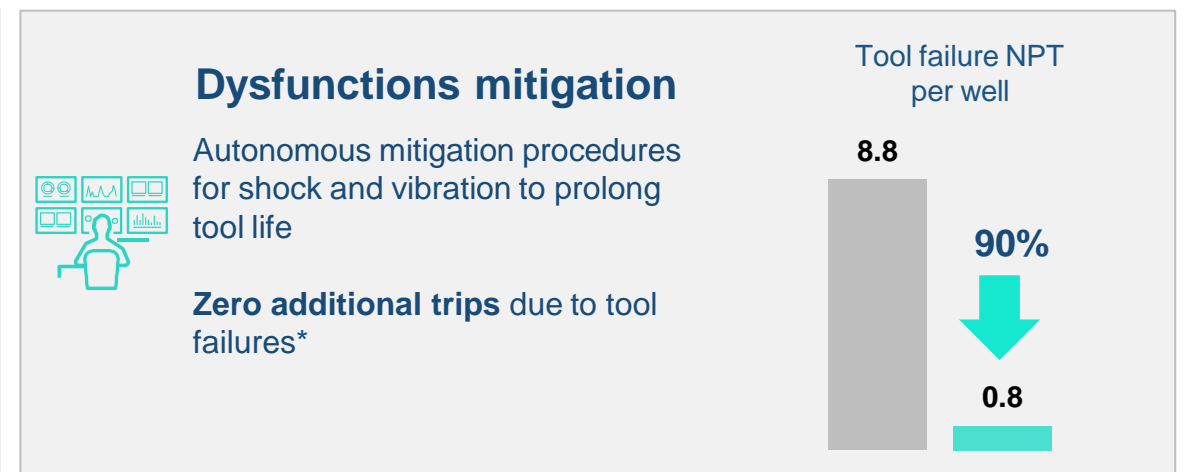
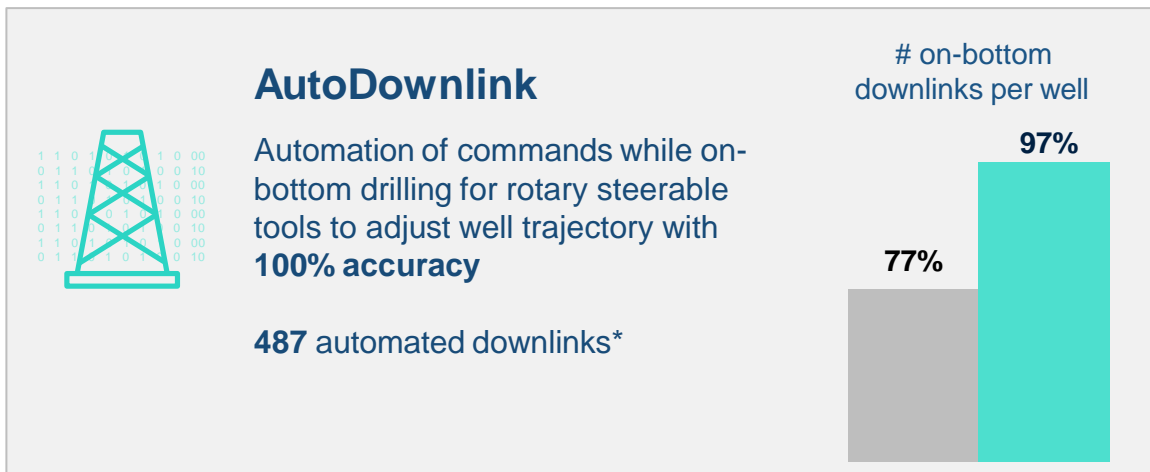
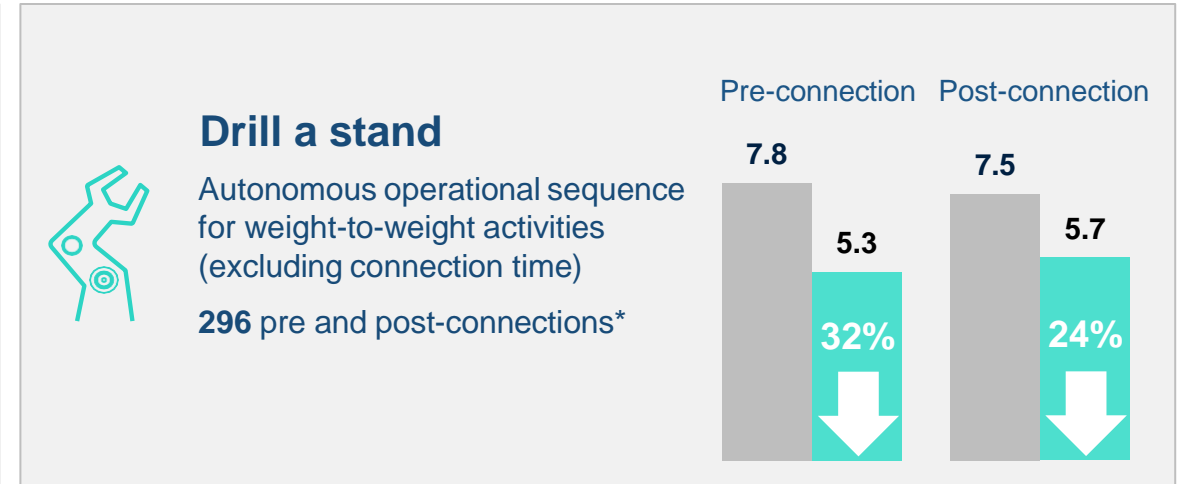
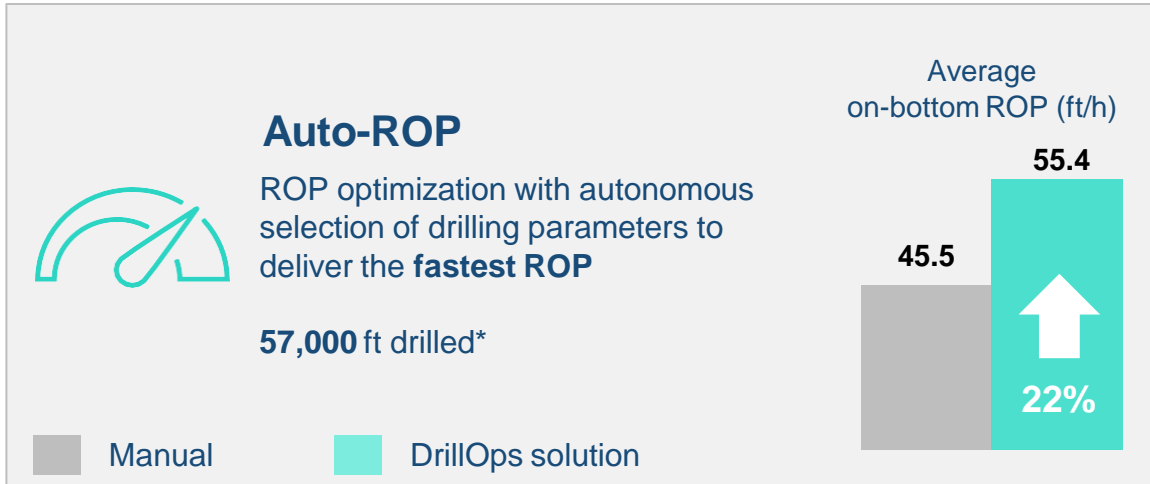


Steering Advisor



Integration Delivering Value via Digital Innovation – Case Study

Performance comparison from two Integrated Well Construction rigs with and without DrillOps



Well Construction Environmental Engineering Services

■ GHG Environmental Footprint Engineering

RAW MATERIALS & PRODUCTS

- Fuel/energy
- Cement
- Water
- Chemicals
- Food



GAS EMISSION & WASTE

- GREENHOUSE GAS (GHG)
- CONTAMINATED WATER
- CUTTINGS
- USED FLUIDS
- USED PLASTIC/PAPER/METAL
- BIO-WASTES

Foot Print Engineering Package

- Footprint simulation
- Real-time emission measurement
- Continuous improvement

Downhole Reduced Impact Package

- Time saving for low footprint
- Environment-friendly materials

Surface Reduced Impact Package

- Fuel consumption reduction
- Waste minimization

Schlumberger currently has 100+ technologies or solutions that reduce emissions or negative impacts on local biodiversity

Why Integrated Well Construction

*'MAKING
YOUR
PROJECT
SAFER,
SIMPLER,
FASTER,
BETTER'*

- **Global** operational footprint with **local expertise and experience**
- **Accelerate well construction, optimise performance and reduce your total cost of ownership**
- **Integrate** market-leading **technologies, digital capabilities** and well construction **engineering expertise**
- Close **collaboration with Drilling Contractors**
- Working with **local suppliers** with defined local content development plans

Q & A

Reference material

- Integrated Well Construction webpage <https://www.slb.com/business-solutions/integrated-well-construction>
- Digital Drilling webpage <https://www.software.slb.com/>
- Schlumberger webpage <https://www.slb.com/>
- Testimonials, case studies and tech reports available upon request