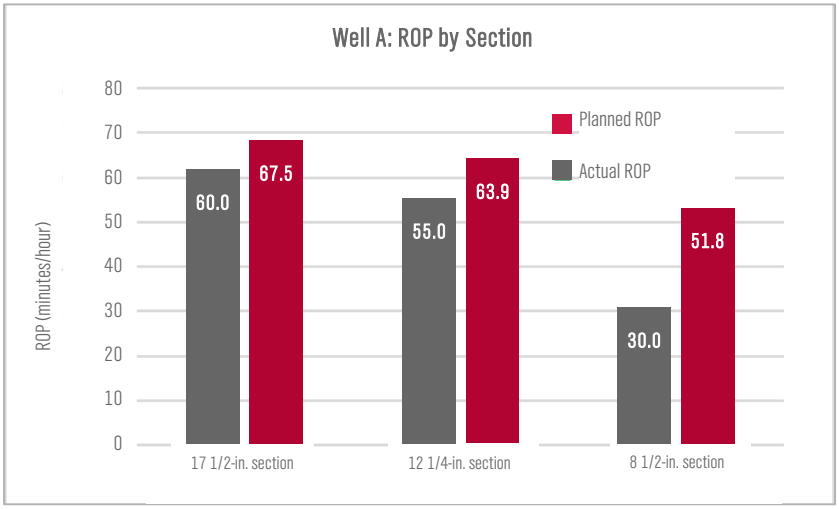
Integrated Drilling Solution Improves Well-to-Well Performance, Saves More Than 42 Days of Rig Time



Before operations began in Well A, the drilling program established estimates for rate of penetration (ROP) according to past performance. The above graph shows that the actual ROPs exceeded the planned ROPs in each section.

Objectives

- Reduce drilling time by optimizing ROP in comparison to offset wells in the Mioceno Superior formation.
- Obtain quality data on high-angle wells having a maximum angle of 54° without compromising resolution or wireline tools.

Our Approach

- Weatherford Integrated Services set out to drill and complete one well (Well A) in the Cibix field for a customer.
- The drilling program included estimates for both ROP and drilling time according to competitors' performance in this field on customer's past campaigns. Compared to these estimates, the Weatherford service team increased ROP by 37%, with an average rate of 200 ft/hr (60.9 m/hr), and saved 22 hours of rig time. In the end, all well construction operations were completed in 70 days.
- Based on the favorable results in Well A, the customer contracted the service company again in another well (Well B). The service team further seized opportunities for improvement in the second well by performing a thorough analysis of offset wells. As a result of the analysis, the team identified drilling parameters and operational conditions for optimizing ROP in this well. In addition, the customer proposed eliminating a stage to optimize time and costs, and the service team validated the proposal.
- The team deployed the Magnus® rotary steerable system for drilling and the HEL™ hostile-environment-logging system and MFR™ multi-frequency resistivity sensor for logging.

LOCATION
Comalcalco, Tabasco, Mexico

WELL TYPE
Onshore J-type, oil and gas

HOLE SIZE
Well A
- 17-1/2 × 12-1/4 × 8-1/2 × 6 in.

Well B
- 12-1/4 × 8-1/2 in.

CASING AND LINER SIZES AND TYPES
Well A
- Conductor Casing:
  20-in., 129.33-lb/ft X52
- Surface Casing:
  13 3/8-in., 54.5-lb/ft J55
- Intermediate Casing:
  - 9 5/8-in., 53.5-lb/ft TAC140
  - 9 5/8-in., 47-lb/ft P110
  - 9 5/8-in., 47-lb/ft TRC95
- Intermediate Liner:
  - 7-in., 29-lb/ft P110
  - 7-in., 29-lb/ft TRC95
- Contingency Liner:
  5-in., 18-lb/ft N80
- Tubingless:
  - 3 1/2-in., 12.95-lb/ft P110
  - 3 1/2-in., 12.95-lb/ft TRC95

Well B
- Conductor Casing:
  13 3/8-in., 54.5-lb/ft J55
- Surface Casing:
  9 5/8-in., 36-lb/ft J55
- Production Casing:
  - 7-in., 26-lb/ft P110
  - 7-in., 26-lb/ft N80

DEPTH
Well A
- 11,909 ft (3,630 m) MD
- 10,072 ft (3,070 m) TVD

Well B
- 9,843 ft (3,000 m) MD
- 8,668 ft (2,642 m) TVD

PRODUCTS/SERVICES
- Drilling services
- Drilling fluids and waste management
- Wireline services
- Tubular running services
- Well completions and cementing tools

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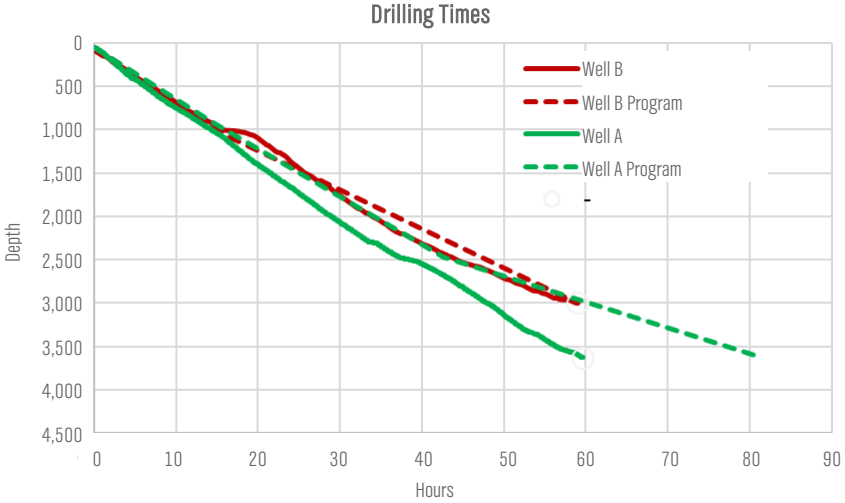
Our Approach (continued)

- Once drilling began, daily meetings with the customer took place to review parameters, evaluate performance, and reach agreements on modifications for continuous ROP improvements.
- The offset well analysis, adequate engineering, and constant performance monitoring resulted in an average ROP of 167 ft/hr (50.9 m/hr). The rate in Well B, like Well A, exceeded historical ROP performance.
- After drilling, the team ran the Compact™ well shuttle for the first time for this customer in a high-angle well in southern Mexico. The well shuttle provided quality data and reduced the time for tripping versus data acquisition despite the compromising angle.
- Next, the team used the OverDrive™ system, which integrates with the rig top drive and combines several conventional casing-running tools into one, to run casing.
- Finally, the service team coordinated completion running and cementing of Well B so that it was ultimately delivered in 27.5 days without nonproductive time or incidents.

Value to Customer

- Integrated Services enabled improving on past performance in both wells, first by drilling Well A 22 hours faster than the wells before it and second by delivering Well B 42.5 days faster than Well A. On top of that, the services eliminated one stage and the associated costs in Well B.
- The Compact well shuttle obtained quality data while avoiding tool-sticking problems, which contributed to overall performance improvements and time reductions.



The above graph illustrates drilling times in Well A (green) and Well B (red). Although the drilling program estimated 82 hours of drilling time in Well A, the actual time took 60 hours, which equates to 22 hours saved.

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