

# Well Construction Drilling Record

## SOLUTION OPTIMIZES DRILLING TIME 14.75 DAYS

ECUADOR

### CHALLENGE

- » Design and execute a main pay well
- » Manage geological risks
- » Minimize nonproductive time (NPT)

### SOLUTION

- » Halliburton Project Management
- » BHA Optimization , DES
- » Customized bits via DatCi® Process
- » PDC Geo-Tech® Bit
- » Geo-Pilot® DURO
- » ADT® Drilling Optimization Service
- » Geomechanics services
- » BOREMAX® drilling fluid
- » iCem® Service
- » Versaflex – Liner hangers

### RESULT

- » Entire Halliburton operation completed with zero NPT
- » USD3.5M in cost savings
- » Fastest Directional well with a Horizontal displacement < 1000 meters
- » Saved approximately 14.75 days

### OVERVIEW

A client turned to Halliburton to perform their 2016-2017 drilling campaign in order to maintain production in the Napo Basin of Ecuador.

In the Hollin formation, the objective was to safely and effectively deliver a production well in the main pay reservoir, within the specified budget and with effective hydraulic isolation. The total planned time for well construction was 70 days.

The project scope included basic integrated services with a coordinator managing all activity in the one field. Two wells were firm with one optional additional well based on performance. Two of these were directional and one horizontal. The rig was to be provided by a third party.

### CHALLENGE

Halliburton was challenged to design, drill, and deliver wells in the Napo Basin – and to do this safely, efficiently, on time, and within the allocated budget. The geology in the field presented significant obstacles including drilling through highly reactive shale sequences with borehole instability issues and depleted formations at critical points within the well geometry. These conditions, which tend to slow drilling with associated problems and historically increase the total well time, required proper engineering.

### SOLUTION

To reduce drilling time and well costs, the Halliburton Project Management (HPM) team developed plans and procedures from lessons learned on previous campaigns that would overcome the anticipated downhole issues. HPM created a synergy between all groups involved in the well construction, including all Halliburton product service lines and third parties. This included:

- » Developing an optimized well drilling program based on field experience and lessons learned to date
- » Reducing frequency of trips to change BHA and avoiding tight hole events
- » Increasing rate of penetration (ROP) and reducing tripping time
- » Optimizing sliding/rotary drilling using field experience and rotary steerable system technology
- » Coordinating the plan with all service lines and third parties to deliver services and materials on time

## HALLIBURTON Performance



HAL122908

**Highlights/New Technology**

- » Implementation of Critical well process including Drill Well on Paper (DWOP)
- » Drilling engineering service (DES) implementation and real-time operations monitoring in place of Applied Fluid Optimization (AFO), ADT and Geomechanics (Client Office).
- » Delivery on time of base for oil based mud – no incidents or spills reported.
- » Quick delivery of influx control device for the 6-in. hole section.
- » Good performance for the Inhibited Polymer used in the 16-in. hole section, drilled in 3.7 days.
- » Good performance of Boremax 12¼-in. section.
- » Use of RED back roller reamers and SPYRO torque (torque reducers) to improve tripping.
- » Hole exposed up to 118 hours before performing a trip – no major hole condition issues reported.
- » No sticking events related to mud condition / drilling practices recorded attributable to Halliburton.
- » Use of High Torque liner Hangers
- » Good ROPs in each section of the well
- » Well successfully completed with influx control device technology.

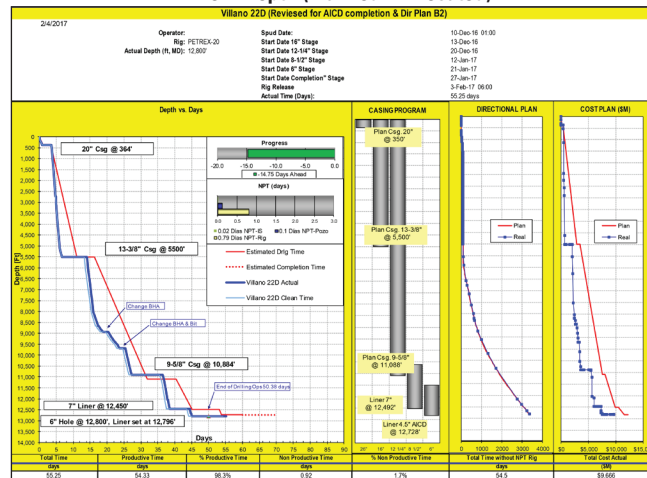
**RESULT**

Through proper planning and efficient execution, Halliburton Project Management safely delivered a J-shaped high angle well 14.75 days ahead of the planned time – a 23% decrease in drilling days to ultimately save the customer approximately \$3.5M. The plan was based on best practices and field experience gained by all the Halliburton product service lines involved in the well construction. Effective pre-planning in advance of drilling the well played a major role in having a smooth, seamless operation. This outstanding performance was a result of strong integrated services leadership, effective collaboration between the parties, and processes and execution with the right Halliburton technology application and operational support.

The well was delivered significantly ahead of planned time, while still meeting all client objectives:

- » Well completed in 55.25 days, the fastest Directional well with a Horizontal displacement < 1000 meters (3,300ft)
- » Saved approximately 8.5 days against the planned drilling time of 40 days
- » Total 14.75 days saved including completion
- » Entire Halliburton operation completed with Zero NPT
- » 1.7% overall well NPT

**Well Construction Execution Timeline  
Time X Depth (Planned X Executed)**



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