Production surveillance digital solution for supporting a mature field redeveloping in Ecuador

Juan Carlos Sandoval
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Outline

- Value Moment
- Challenge
- General information
- Revitalization of mature fields
- Data integration problem
- Landmark Solution
- Applications
- Conclusions
“Without data you’re just another person with an opinion”

W. Edwards Deming
Data Scientist
Challenge

- Client presents a group of Mature Fields with high production decline rate and increasing water cut.
- Igapo needs to find opportunities to enhance field production, maximize asset value and perform exhaustive surveillance over field operations.
- Unstructured flow of information and data in several sources and formats, combined with globally spread decision makers.
Igapo location in Ecuador
Revitalization of 4 Mature Fields in Ecuador

- Start production in 1972
  - Peak of production: 54 MBOPD
  - Cumulative Oil Production to Date: 170 MMbbls
  - Current production: 3600 BOPD with 50% BSW
  - Well status: 26 active, 31 shut in
  - 25%-28% FR actual

- Start production in 1991
  - Peak of production: 6 MBOPD
  - Cumulative Oil Production to Date: 26 MMbbls
  - Current production: 2900 BOPD with 38% BSW
  - Well status: 14 active, 2 shut in
  - 11%-14% FR actual

- Start production in 1990
  - Peak of production: 11.3 MBOPD
  - Cumulative Oil Production to Date: 57 MMbbls
  - Current production: 7900 BOPD with 85% BSW
  - Well status: 23 active, 3 shut in
  - 28%-32% FR actual

- Start production in 2002
  - Peak of production: 41 MBOPD
  - Cumulative Oil Production: 111MMbbls
  - Current production: 7000 BOPD with 90% BSW
  - Well status: 37 active, 25 shut in
  - 26%-29% FR actual
Revitalization of 4 Mature Fields in Ecuador

* Incremental Production since 2015

From 0 to 13,000 Bopd in 4 years

(*) Workover Activities:
- Re-Completion new or inactive zones
- Stimulation & Water conformance
- Fracturing

Drilling & Completion:
- Conventional “S” or “J” type wells
- Single Completions
- Intelligent Completions

Lifting:
- ESP.................70%
- JET Pump....30%

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Igapo Operation Challenge
Igapo: Multiple operations and huge information flow

- A lot of information from different sources
- Spreadsheets were the most used applications
- Majority of applications not integrated
- Unable to use Petroamazonas infrastructure
Multiple decision makers in different geographical locations

- Information requirements:
  - Investors
  - Technical teams
  - Peers and committees
  - Operational summaries
  - Production surveillance
  - Rig performance
  - KPIs

- Houston, TX
- Panama City
- Quito, Ec
- El Coca, Ec
- Field
Solution

- Landmark and Igapo co-designed a robust integrated digital architecture
- Based on DecisionSpace® Platform and DecisionSpace® Production Monitoring
- Data is collected, managed and integrated
  - Historical Data
  - Daily records
  - Real time data from well events
  - Production measurements in plain text format
  - Drilling and WO Operational reports
- Landmark Earth® cloud environment
Solution Architecture

- Production Monitoring
- Production Analysis
- Alarms and automatic notifications.
- Operational and management reports

VOF LANDMARK SOLUTION

CLIENT SITE

FTP Server

OPC Server

PETROAMazonas

MEASUREMENTS
Igapo operational dashboard
Different environments customized to meet user needs

- KPIs
- Monitoring
- Production Reports
- Executive Reports
Real Time monitoring

- Real time key parameters from 67 wells out of 106 (63%) 
- Updated every 30 seconds 
- Automated alarm system
Real Time Monitoring reduces operation times

- Coordinated activities between production engineers and field engineers
Real time operation applications

- Smart wells application enhance production

- ICV

- NETool
Inflow control Valves Operation

- Enables controlled production from 2 different reservoirs at the same time
Integrated workflow for production and reservoir analysis adds value

- VOF Landmark solution
- Nexus
- DSS
- DSG
- Nexus

Production Data

Reservoir Surveillance

Integrated Workflow

Update Dynamic Models

Reserves Forecast
Landmark Earth Appliance

- Reliable cloud environment
- 70% Increased performance versus server-client environment
- Provides a collaborative environment
  - G&G, Reservoir, Production and Drilling applications
- Data is classified and securely stored
- Information becomes an asset for the company
Conclusions

- Flexible portal customized to meet different data users needs
- The solution has been adapted as tool for planning and decision making
- Improved integration between field, offices and global team
- Reduced non productive times and minimize production loses
- Real time monitoring and automatic alarm system
- Valuable data repository: structured, safe and backed up
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