

Shaping the future of oil
exploration and
production in Africa

DrillPlan – A New Approach To Well Planning

Akinola Ogundare
Sept. 2019

Agenda



Company Profile and Organizational Goals



Well Planning Structure and Industry Challenges



DrillPlan Solutions Experience

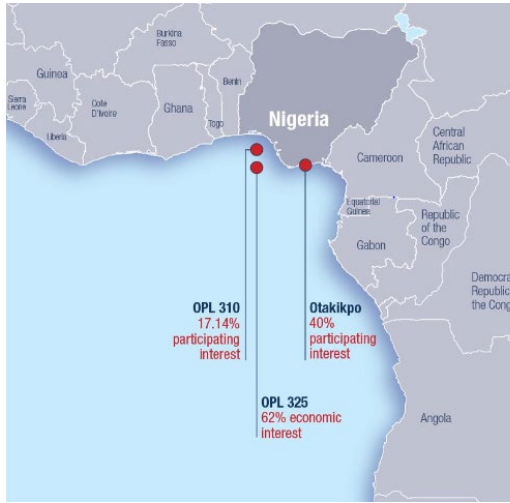


Conclusions

LEKOIL Profile & Assets Summary

VISION: To be the world's leading Exploration & Production company focused on Africa"

LEKOIL is an Africa-focused oil exploration and production company with interests currently in Nigeria and offshore Namibia



OTAKIKPO MARGINAL FIELD	(Producing)
Reserve Estimates resources estimated at 48.6mmbbls	Phase 2 Dev. 2020
48.6mmbbls	
OPL 310	(Appraisal) 2020
Ogo field gross recoverable resources identified as 774 mmboe (P50)	
774mmboe	
OPL 325	(Exploration)
OPL 276	(Exploration)

Well Planning Structure



TEAM STRUCTURE



MULTI-DOMAIN
COMMUNICATION
WORKFLOW



PROJECT TIMELINES



CHALLENGES

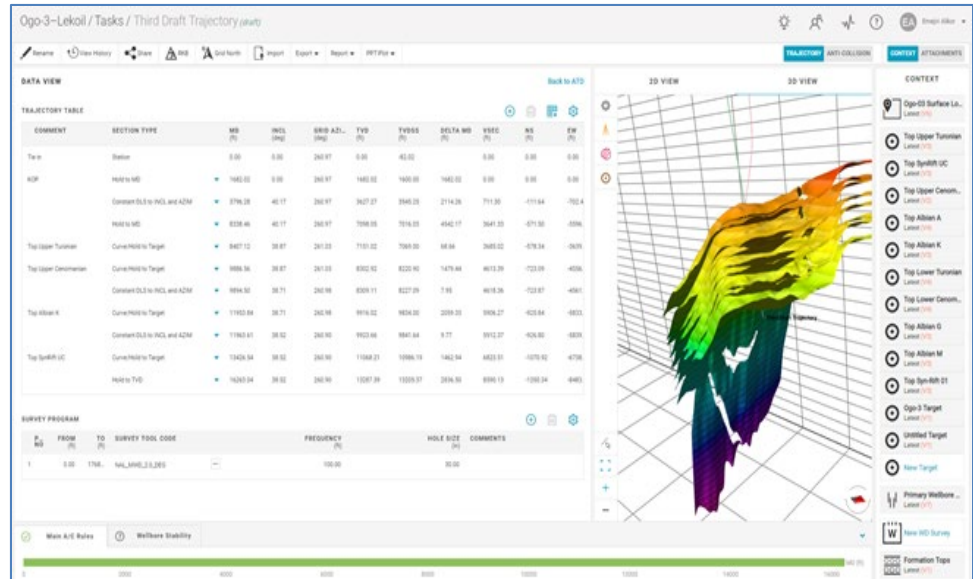
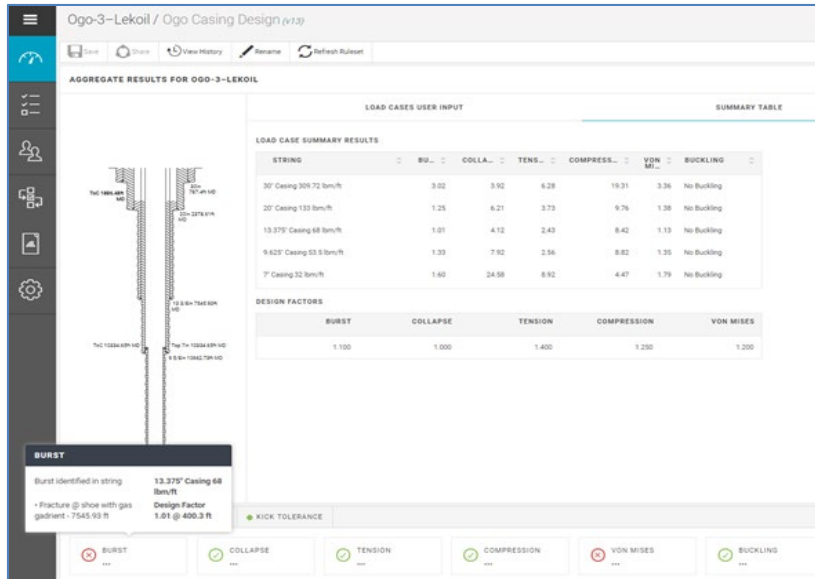


COST EFFECT

DrillPlan Solutions Experience



- Algorithm Match with Expected Result
- Collaboration Experience



DrillPlan Solutions Experience



- Systematic Well Planning Platform
- Fit-For-Purpose Process

Ogo-3-Lekoil / Tasks

Expand All Collapse All Save As Template Default (creation time)

SECTIONS GROUPS ATTACHMENTS

SUBSURFACE 80% (4/5)

- Define Target 100%
- Define Surface Location 100%
- Edit Formation Tops 100%
- Define Formation Temperature 100%
- Define Mud Weight Window 90%

DETAILED ENGINEERING 68% (15/22)

- Design Casing 88%
- 2,000HP Rig 100%
- Define Wellhead and BOP 94%
- Design Trajectory 100%
- Design Wellbore Geometry 100%
- Define Cement Job 100%
- Define Cement Job 71%
- Define Cement Job 60%
- Define Cement Job 82%
- Design BHA&Drillstring 100%
- Design BHA&Drillstring 100%
- Design BHA&Drillstring 54%
- Design BHA&Drillstring 58%
- Prepare AFE for Ogo-3 100%
- Calculate Kick Tolerance 100%
- Design Mud 100%
- Design Mud 100%
- Design Mud 100%
- Design Mud 100%

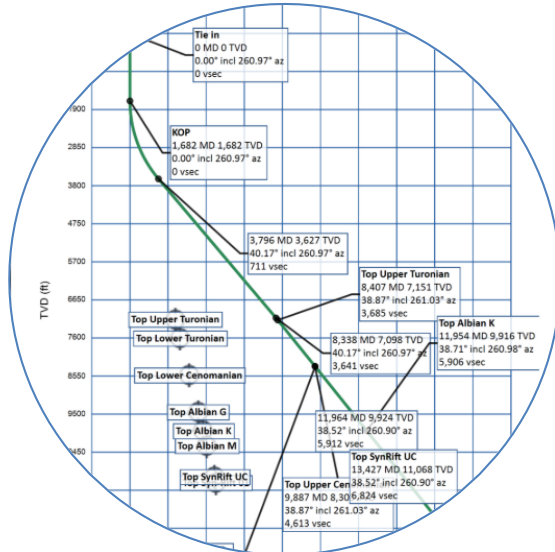
ACTIVITY

- Elevation Reference Ogo-3-Lekoil
- Mud Weight Window LEKOIL Ogo-3-Lekoil
- Mud Weight Window LEKOIL Ogo-3-Lekoil
- Mud Weight Window LEKOIL Ogo-3-Lekoil
- Mud Weight Window LEKOIL Ogo-3-Lekoil
- Untitled Drilling Fluid Ogo-3-Lekoil

DrillPlan Solutions Experience (cont'd)



- Digital Drilling Program
- Efficiency Gains
- Ease of Communication
- Audit Trail



LEKOIL

5.2 HYDRAULICS SUMMARY

The following table summarizes the hydraulics AEA (Automated Engineering Analysis) results from the current project. Any values that have a red status will be automatically highlighted in the report.

Hole Section / Run	36 in / Run 1	26 in / Run 1	16 in / Run 1	12.25 in / Run 1	8.5 in / Run 1
Total Depth	787.40 ft	2378.61 ft	7545.93 ft	10662.73 ft	16210.63 ft
Max Total Pressure	567.15 psi @ 300.00 gal/min @ 787.40 ft	634.07 psi @ 300.00 gal/min @ 2378.61 ft		2965.06 psi @ 850.01 gal/min @ 10662.73 ft	
Max Hole Cleaning Index	Poor 1.00 @ 200.00 gal/min @ 787.40 ft	Poor 1.00 @ 200.00 gal/min @ 2378.61 ft		Fair 0.71 @ 500.00 gal/min @ 10662.73 ft	
Worst Case Equivalent Static Density	10.91 lbm/gal @ 787.40 ft Analysis Bit Depth: 787.40 ft	10.00 lbm/gal @ 2378.61 ft Analysis Bit Depth: 2378.61 ft		10.17 lbm/gal @ 10662.73 ft Analysis Bit Depth: 10662.73 ft	
Worst Case Equivalent Circulating Density		10.03 lbm/gal @ 1189.58 ft Analysis Bit Depth: 1787.40 ft		10.46 lbm/gal @ 7545.93 ft Analysis Bit Depth: 7545.93 ft	
Bit Pressure Drop	17.83 psi @ 199.78 gal/min	16.18 psi @ 199.78 gal/min	N/A	N/A	N/A
RSS Pad Pressure Drop	N/A	N/A	N/A	N/A	N/A

- 1 INTRODUCTION
- 2 SIGNATORIES
- 3 WELL SUMMARY
- 4 SUBSURFACE INFORMATION
- 5 BHA PROGRAM
 - 6.1 BHA DETAILS
- 5.2 HYDRAULICS SUMMARY
- 5.3 JAR SUMMARY
- 5.4 TORQUE AND DRAG SUMMARY
- 6 MUD PROGRAM
 - 6.1 MUD PROGRAM
- 7 FORMATION EVALUATION PROGRAM
- 8 WELL TRAJECTORY
 - 8.1 TRAJECTORY TABLE
 - 8.2 VERTICAL AND PLAN VIEW
 - 8.3 SURVEY PROGRAM
 - 8.4 DIRECTIONAL AND ANTI COLLISION PLAN
- 9 CASING PROGRAM
 - 9.1 WELLBORE SCHEMATIC
 - 9.2 WELLBORE GEOMETRY
 - 9.3 CASING PROGRAM
 - 9.4 CASING PRESSURE TESTING AND LOT
- 10 CEMENT PROGRAM
- 11 COMPLETIONS PROGRAM
 - 11.1 COMPLETION SCHEMATIC
- 12 WELL BARRIER
- 13 RISKS
- 14 ACTIVITY PLAN
 - 14.1 DETAILED ACTIVITY PLAN
 - 14.2 OPERATIONAL NOTES
- 15 CONTACT LIST
- 16 APPENDIX
 - 16.1 AFE
 - 16.2 GUIDELINES
- 17 Section Information
 - 17.1 Section 36 in
 - 17.2 Section 26 in
 - 17.3 Section 16 in
 - 17.4 Section 12.25 in
 - 17.5 Section 8.5 in

DrillPlan Solutions Experience (cont'd)



- Verification and Accountability

Ogo-3-Lekoil / Team Management

TEAM MEMBERS

User Name	Access
AA Adeola Akintola	Full
EA Emejiri Alikor	Full
KE Kenechukwu Ezebialu	Full
PG Paul Galinski	Full
JH Jing Jing Huang	Full
BJ Babangida Jibrin	Full
SL Steve Li	Full
OO Oluwatoyin Ogedengbe	Full
AO Akinola Ogundare	Full
WS Waldemar Szemat	Full
PT Philip Temple	Full
TV Ting WANG	Full

CASING DESIGN

REVIEWERS
EA Emejiri Alikor

APPROVERS

AO Akinola Ogundare

RIG

REVIEWERS
EA Emejiri Alikor

APPROVERS

AO Akinola Ogundare

TRAJECTORY

REVIEWERS
BJ Babangida Jibrin

APPROVERS

AO Akinola Ogundare

WELLBORE GEOMETRY

REVIEWERS
EA Emejiri Alikor

APPROVERS

AO Akinola Ogundare

WELLHEAD AND BOP

REVIEWERS
EA Emejiri Alikor

APPROVERS

AO Akinola Ogundare

ACTIVITY

- Elevation Reference Ogo-3-Lekoil
Changed by Oluwatoyin Ogedengbe
13:56, May 21 2019
- Mud Weight Window LEKOIL Ogo-3-Lekoil
Shared by Oluwatoyin Ogedengbe
12:44, May 21 2019
- Mud Weight Window LEKOIL Ogo-3-Lekoil
Shared by Oluwatoyin Ogedengbe
12:44, May 21 2019
- Mud Weight Window LEKOIL Ogo-3-Lekoil
Shared by Oluwatoyin Ogedengbe
Updated last TVD
12:24, May 21 2019
- Mud Weight Window LEKOIL Ogo-3-Lekoil
Shared by Oluwatoyin Ogedengbe
Updated last TVD

DrillPlan Solutions Experience – Feed Back



- Offset well trajectories displayed in distinct colours
- Trajectory 2D and 3D in full screen view
- Customizable Gas gradient for Kick Tolerance per company standard
- Pop-up message to remind user to share results
- Pop-up description for DrillPlan icons
- Latency issues impact performance at peak periods
- Successful pilot trial without hiccups
- Global accessibility – access to global benchmarking database.

Conclusions

“DrillPlan has provided us one collaborative workspace that increases well construction efficiency and drives accountability”



NOVEL APPROACH
TO WELL PLANNING



INCREASED TEAM
PRODUCTIVITY



TEAM
ACCOUNTABILITY



COMPANY-WIDE
VISIBILITY



TAILORED TO SPECIFIC
ORGANIZATION NEEDS

Questions and Answers

