



***Pioneering DrillPlan Adoption in Latin America
for
Well Construction Planning in Large Oil Field in Peru***

Manuel Pablo Zúñiga-Pflücker
PetroTal Corp, President and CEO

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AGENDA

- PetroTal's Mission - Unlocking and Creating Value
- Bretaña Field Overview
- Well Design Challenges
- DrillPlan Workflows and Added Value
- Our Digital Journey
- Results and Conclusions

UNLOCKING AND CREATING VALUE

Company Overview

- London AIM and TSX-V listed Peruvian oil company
- Strong balance sheet with no debt, crude prices off Brent, favourable fiscal regime

Significant Progress to Date

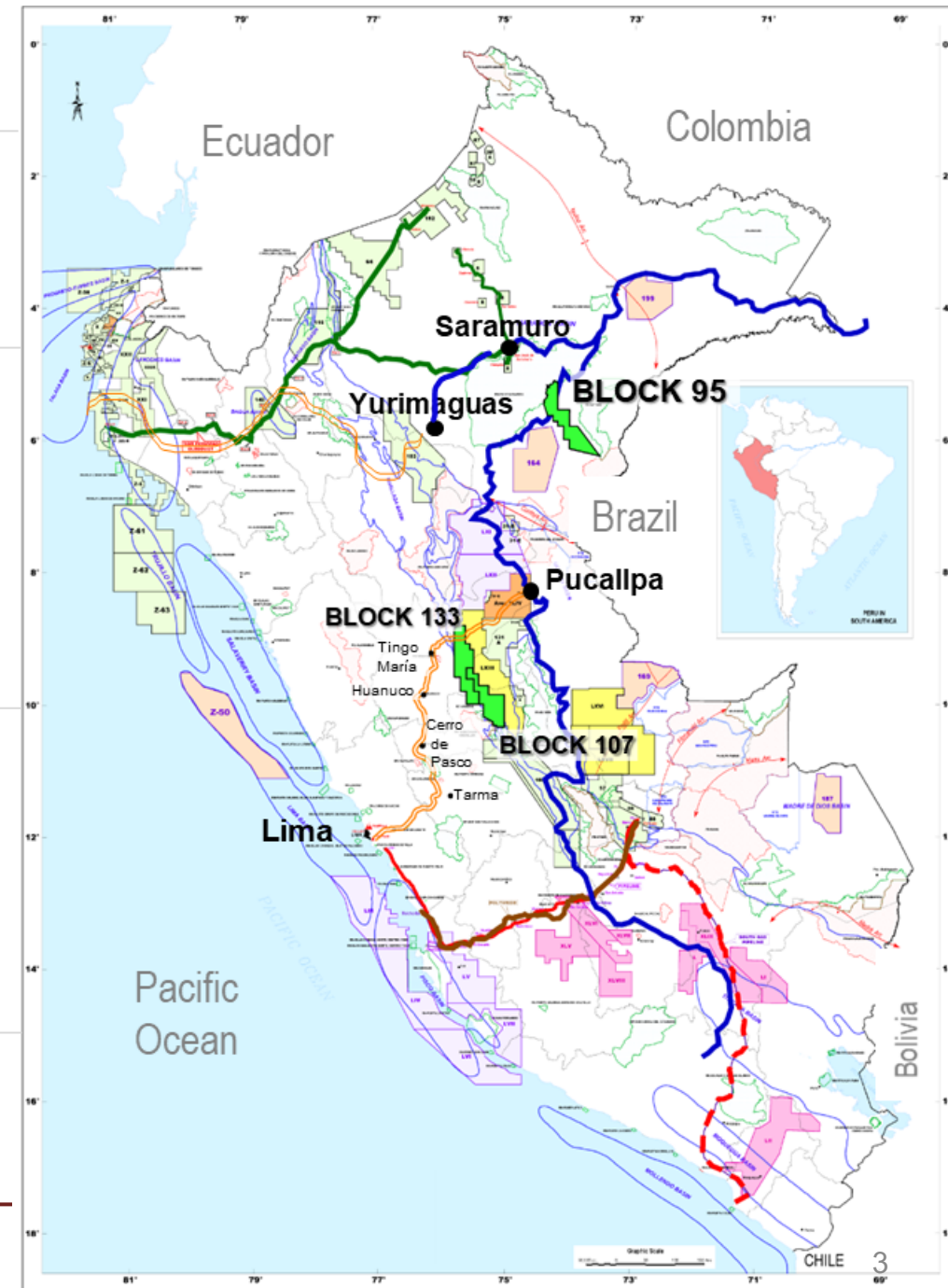
- Achieved first production at Bretaña oil field in June 2018, under budget and ahead of schedule
- Currently producing ~5,000 BOPD
- Low cost with target plateau of >10,000 BOPD
- Currently drilling BN-4H (horizontal) well

Substantial Upside Potential

- Block 95 – Bretaña Field with 330 MMBO of OOIP
- Potential to increase 2P recovery factor to 24%
- Block 107 - five leads and prospects that have an unrisks high estimate of prospective resources of 4.6 billion barrels of oil

Management Experience

- Management and technical team with in-depth expertise and proven track record in Peru



BRETAÑA DEVELOPMENT PLAN

- Bretaña is a 10,000-acre oil field with 330 MMBO of 2P OOIP
- 2P reserves of ~40 MMBO assumes a 12% Recovery Factor
- The highly permeable Vivian oil reservoir is supported by a strong aquifer
- To maximize oil recoveries, we plan to develop the field with:
 - horizontal oil wells completed with ESPs capable of producing 10,000 bfpd each
 - 20 horizontal oil wells should then produce 200,000 BFPD
 - hence, at a 10% oil cut, Bretaña should produce ~20,000 BOPD

EXISTING:

- 1XDST, 2XD, 3D, BN1
- 2WD

PROVED:

- 8 NEW HORIZ. PRODUCERS
- 2 NEW WD

PROBABLE:

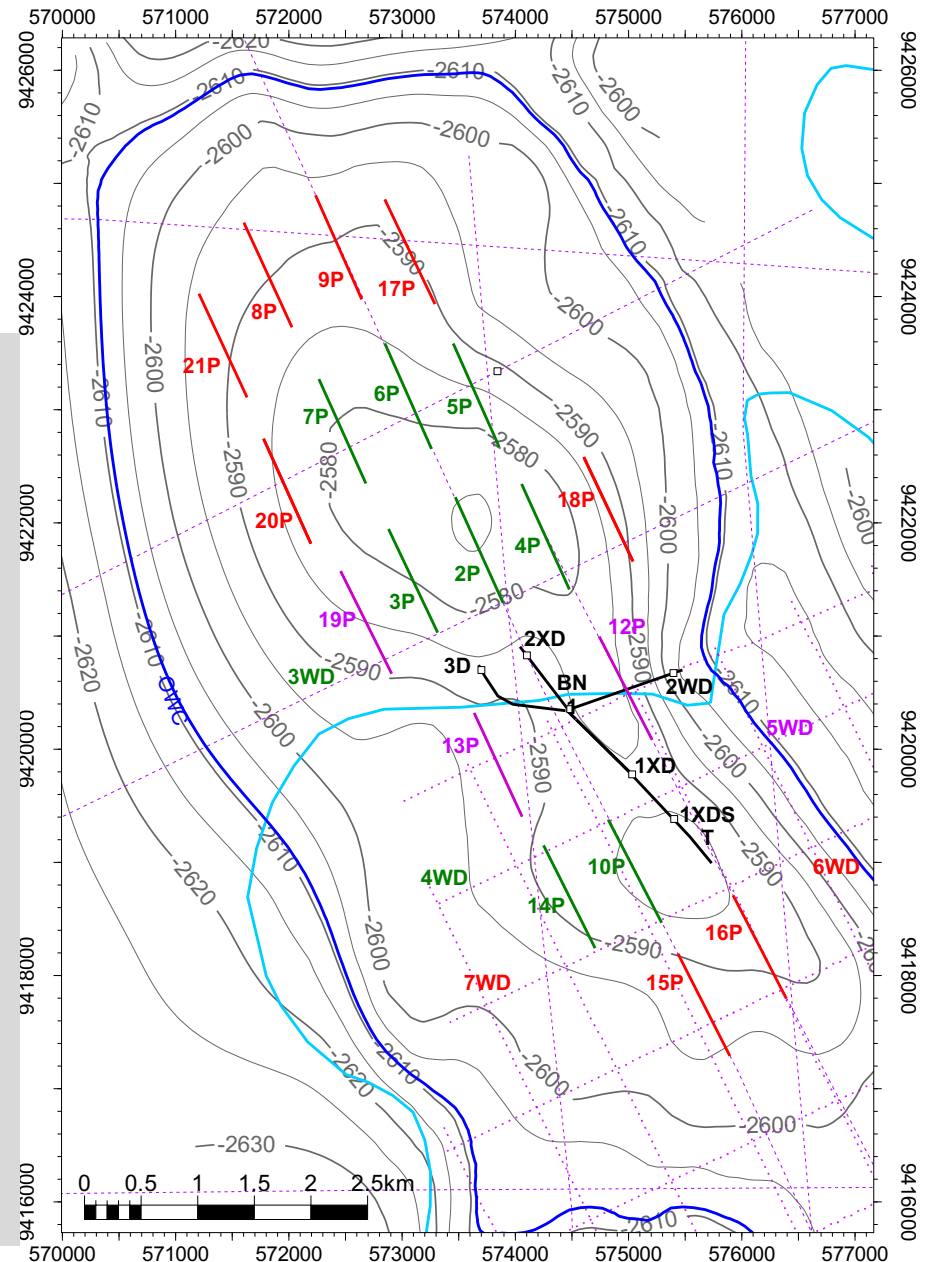
- 3 NEW HORIZ. PRODUCERS
- 1 NEW WD

POSSIBLE:

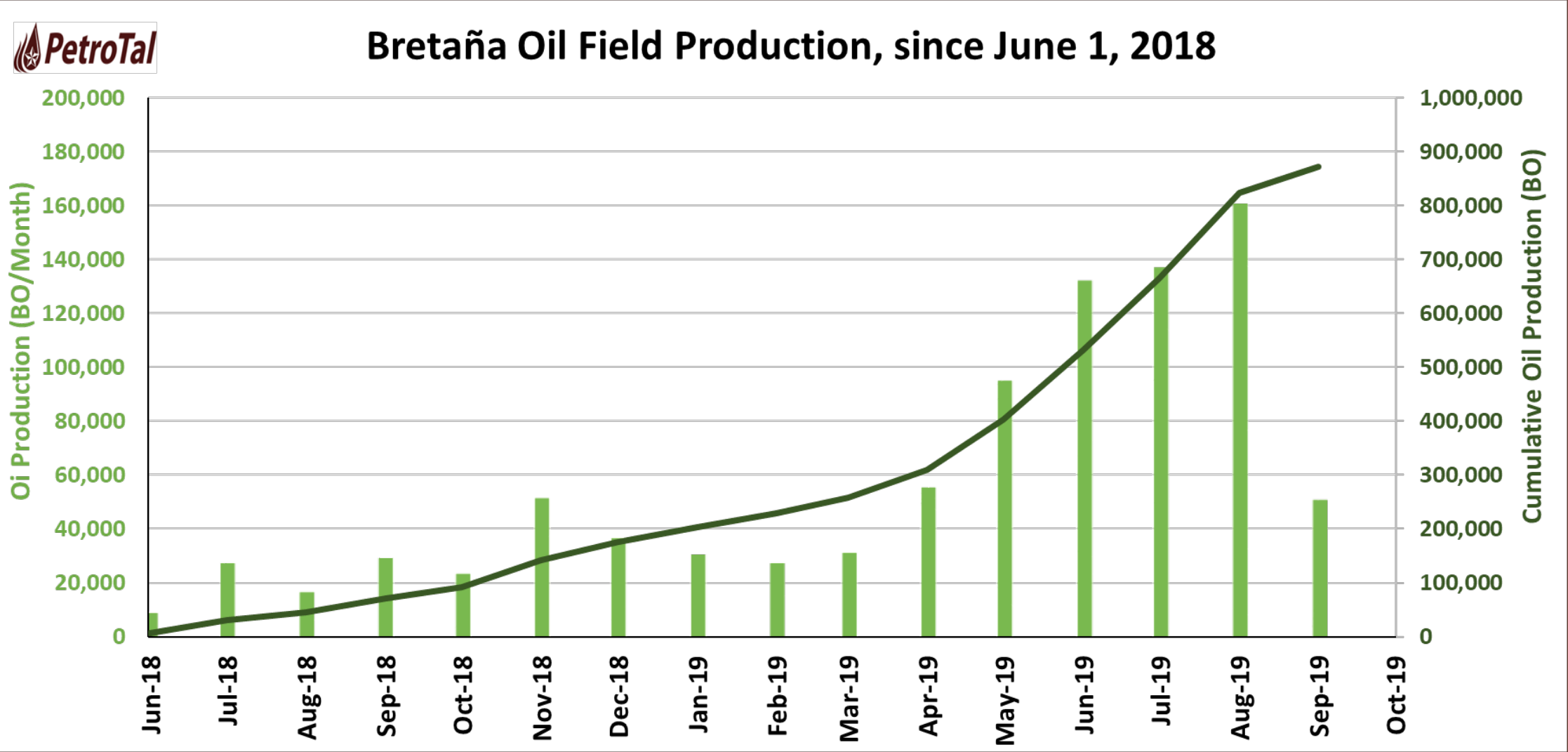
- 8 NEW HORIZ. PRODUCERS
- 2 NEW WD

3P TOTAL

- 23 PRODUCERS
- 6 WD



GROWING PRODUCTION FASTER WITH NEW HORIZONTAL WELLS



Data as of September 11, 2019

COMMITTED TO DEVELOPING THE COMMUNITIES WE SERVE

CSR Team Engaged with Local Communities

- In Block 95 at Bretaña with 2,000 inhabitants, as well as the 18 communities of the Puinahua District
- In Block 107 with the indigenous Ashaninka and Yanesha ethnic groups, as well as foreign settlers



Rebuilding Identity of Indigenous Communities

- Promoting processes to rebuild their identity
- Strengthening indigenous organizations
- Working with a network of NGOs, producers, and local and central government organizations



Investments in Sensitive Areas

- Pacaya-Samiria National Reserve
- San Matías-San Carlos Forest Reserve
- Oxampampa-Ashaninka-Yanesha Biosphere Reserve



Our Strategy

- Sustainability of the projects based on strategic relationships with the local population and NGOs
- Being active members of the committees that manage the reserved or protected areas
- Having a team with experience working in sensitive areas while caring for the environment
- To be recognized as a conscious user of the land that is committed to and respected for contributing to local development.

Four Pillars of CSR: Commitment to Employees, Communities, Environment, and Ethics

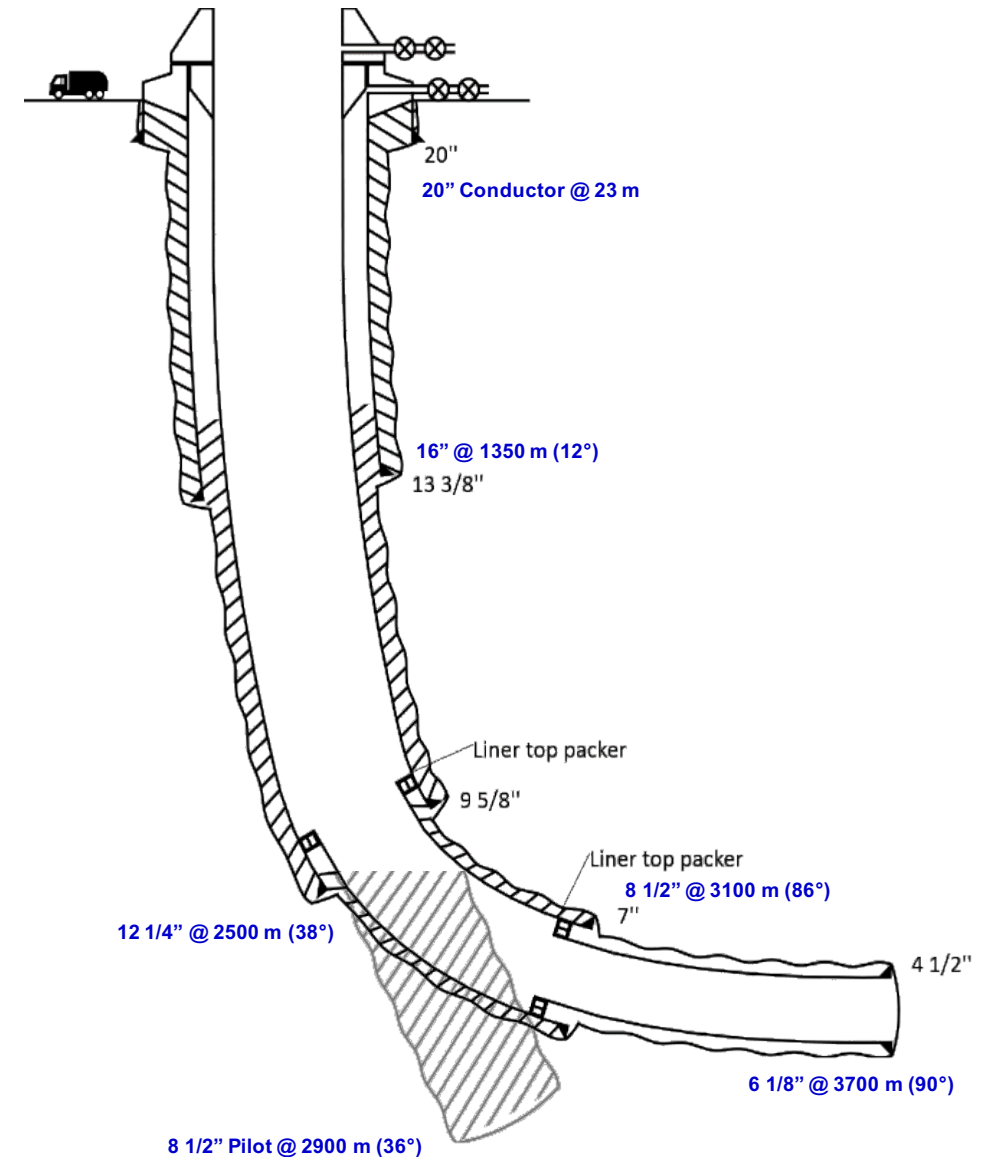
BRETAÑA OILFIELD LOCATED IN THE MARAÑÓN BASIN OF PERU



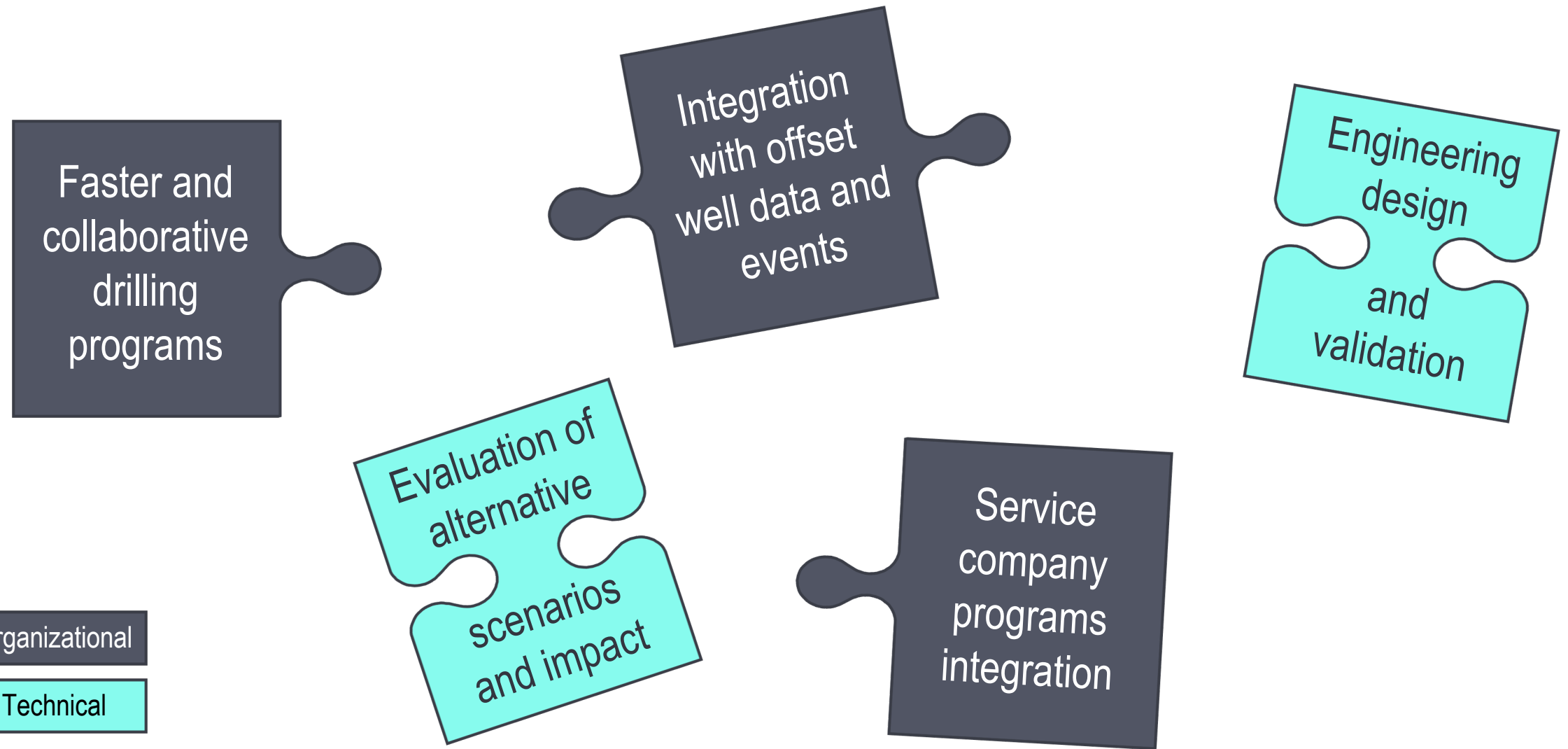
Rig drilling under the Puinahua Channel below the Pacaya-Samiria National Reserve

DRILLING CAMPAIGN WELL PROFILES

- 4-section horizontal wells (~10)
 - With and w/o pilot hole
 - Completed with 4-1/2" Liner+Screen+AI CD
 - Targeting Vivian sand reservoir
- Production driven by ESP
- 2 deviated Water Disposal wells





PETROTAL WELL DESIGN CHALLENGES



INTEGRATION AND MANAGEMENT OF DRILLING PROGRAM

- Assignment of owners and deadlines
- Place holders for service company programs
- Inputs available for all the team

Service
company
programs
integration

Defined Task	Responsible	Deliverable
 Custom Programa Liner Hanger <div><div></div>100%</div> DETAILED ENGINEERING Custom Liner Hanger Program	Owner: Cesar Fernando Bustillos Due Date: Select due date Progress: 100 % *Service company representatives	TYPE DEFINITION Task type: Custom Liner Hanger Program Comment: Espacio para carga del programa de colgador para liner de 7" Report tag: CUSTOM_LINER_HANGER_PROGRAM DELIVERABLE File: TIW programa preliminar para Corrida de Liner 7".pdf
 Define Mud Weight Window <div><div></div>100%</div> GEOLOGY Define Mud Weight Window	Owner: Jhon Carlos Acosta Gomez Due Date: Sep 2, 2019 Progress: 100 %	Mud Weight Window v1 ★ ★ ★ ★ ★ 15:50, Jul 16 2019 SHARED



COLLABORATIVE PROGRAMS

Faster and collaborative drilling programs

- DrillPlan allows creation of standard deliverables
- Inputs of different users will feed the program

TYPE DEFINITION

Task type Custom Formation Evaluation

Comment

Report tag CUSTOM_FORMATION_EVALUATION



Template file Programa_Evaluacion_Formacion_v2.xlsx

Template available for geologist to fill in formation evaluation requirements

DELIVERABLE

File Programa_Evaluacion_Filled.xlsx

.doc, .docx, .pdf, .ppt, .pptx, .xls, .xlsx, .png and .jpg can be included directly in the report. For best results use .pdf and .pptx files.

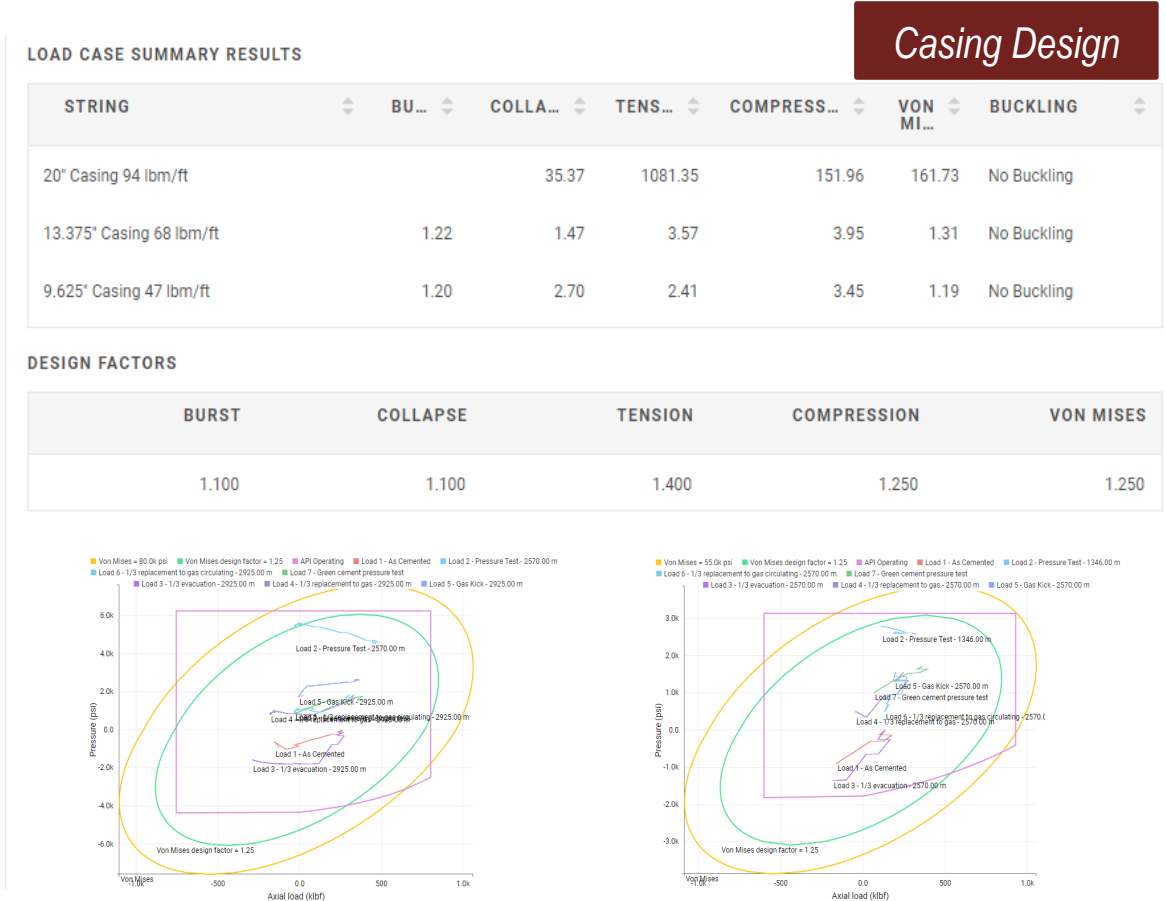
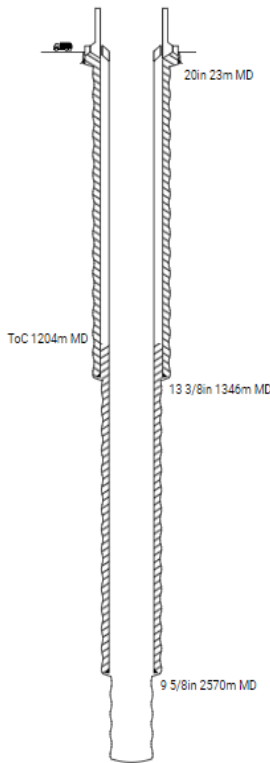
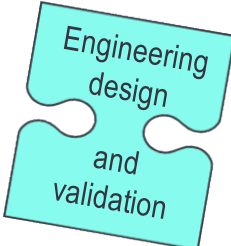
Report Insertion ☒ Insert as Figure  ☐ Insert as Document Attachment 

Deliverable can be automatically inserted in drilling program



CONNECTED ENGINEERING TOOLS

- Drilling engineer can now validate the casing design and other workflows



Hydraulics

HYDRAULICS ANALYSIS REPORT

Client: PetroTal Peru S.R.L. / Field: Bretana Norte / Well: BN 95-2-2-4H Piloto / Section: 12.25 in / Depth Range: 1346.00 - 2570.00 m

FLUID

Mud Type	Density lbm/gal	Yield Point lbf/100ft2	Plastic Viscosity cP	Other
WaterBased	9.40 - 11.00	25.00 - 29.00	20.00 - 24.00	

DRILLING PARAMETERS

Depth m	Flowrate gal/min	RPM c/min	Rate of Penetration m/h	Motor Diff. Pressure psi
1346.00 - 2500.00	1000.00 - 1050.00	30.00 - 40.00	15.00 - 20.00	200.00
2500.00 - 2570.00	1000.00 - 1050.00	30.00 - 40.00	15.00 - 20.00	200.00

WELLBORE GEOMETRY

Type	ID in	Start MD m	End MD m
Cased Hole	12.415	0.00	1346.00
Open Hole	12.250	1346.00	2570.00

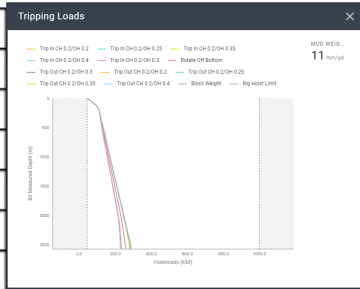
PRESSURE DROP IN BHA AT 2570.00 m

(Calculated with max. value of Flowrate, RPM, ROP, Fluid Density, Yield Point and Plastic Viscosity)

Element	Length m	ID in	OD in	Cum Len m	Pressure Drop psi
12 1/4" PDC Bit (nozzles: 1x15+4x16; TFA = 1.206m2) (nozzles)	0.00	3.25	8.00	0.00	733
12 1/4" PDC Bit (nozzles: 1x15+4x16; TFA = 1.206m2) (shank)	0.33	3.25	8.00	0.33	1
A962M7848GT (BH = 1.5"; 12 1/8" Sleeve Stab:	0.74	3.05	8.00	1.07	735

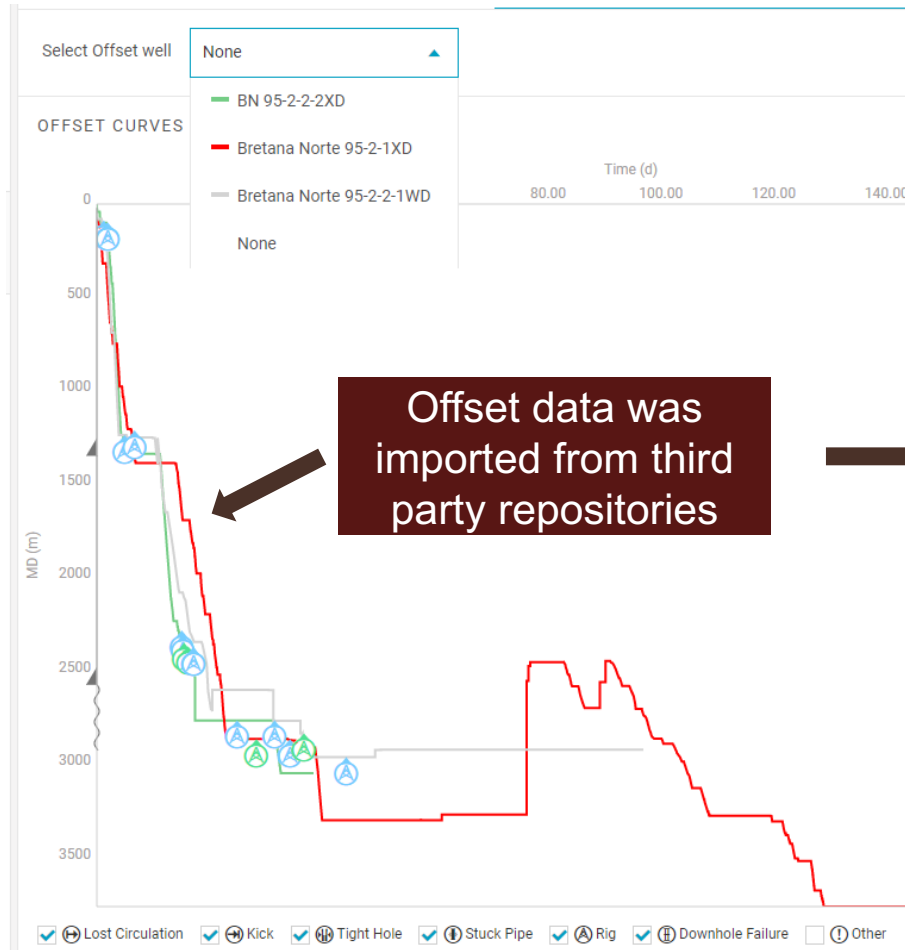
Torque & Drag

Hole Section / Run	12.25 in / Run 1
Max HookLoad	286.74 klbf @ 2570.00 m
Max Surface Torque	13.04 kft.lbf @ 2565.20 m
Von Mises Stress	49537.50 psi @ 2570.00 m
Pipe Yield Strength	135000.00 psi @ 2570.00 m
Stress Percentage	36.69 % @ 2570.00 m
Buckling	No



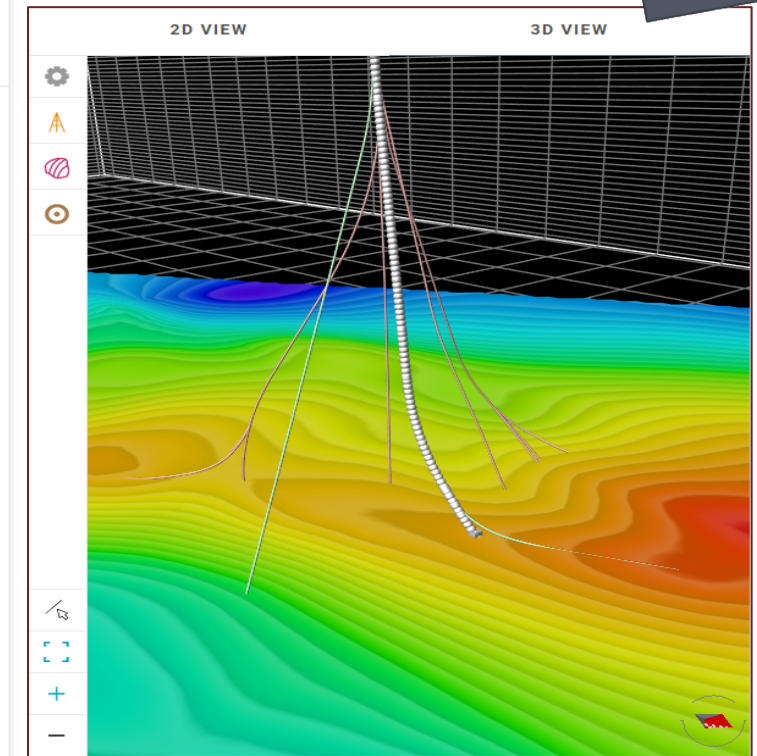
OFFSET WELL DATA AVAILABLE FOR THE DRILLING ENGINEER

Integration
with offset
well data and
events



ACTIVITY TABLE

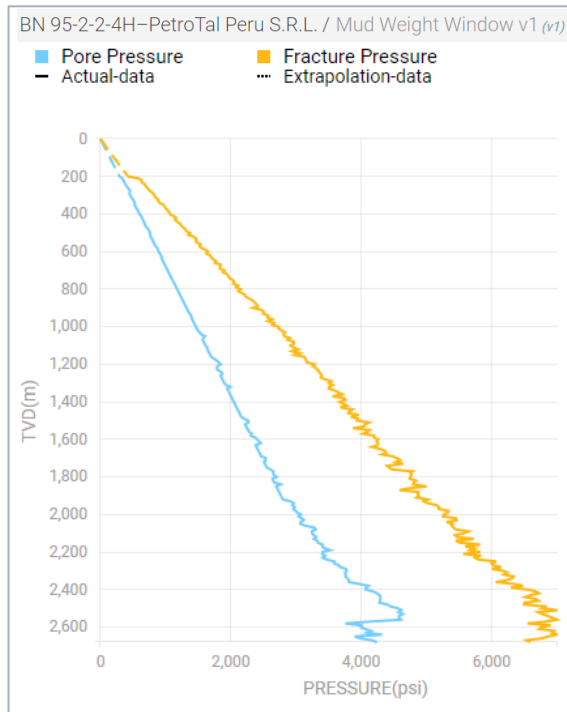
Section (in)	Name	End depth (...)	Duration (hr)
16	Trip in to depth	1335.00	3.00
16	Trip in to depth	1335.00	2.00
16	Trip in to depth	1335.00	0.50
16	Circulate to condition drilling ...	1335.00	9.00
16	Circulate to condition drilling ...	1335.00	1.50
16	Circulate to condition drilling ...	1335.00	2.00
16	Circulate to condition drilling ...	1335.00	3.50
16	Drilling run other activities	1335.00	0.50
16	Circulate to condition drilling ...	1335.00	1.00
16	Drilling run other activities	1335.00	2.50
16	Drilling run other activities	1335.00	0.50
16	Circulate to condition drilling ...	1335.00	0.50
16	Drill to depth	1337.00	0.50
16	Circulate to condition drilling ...	1337.00	0.50



INTEGRATION OF GEOMECHANICS, TRAJECTORY AND RISK

- Carried out a geomechanics study for upcoming HZ well
- Shared 1D MEM from Techlog to DrillPlan
 - Data immediately available for other workflows and trajectory risk evaluation

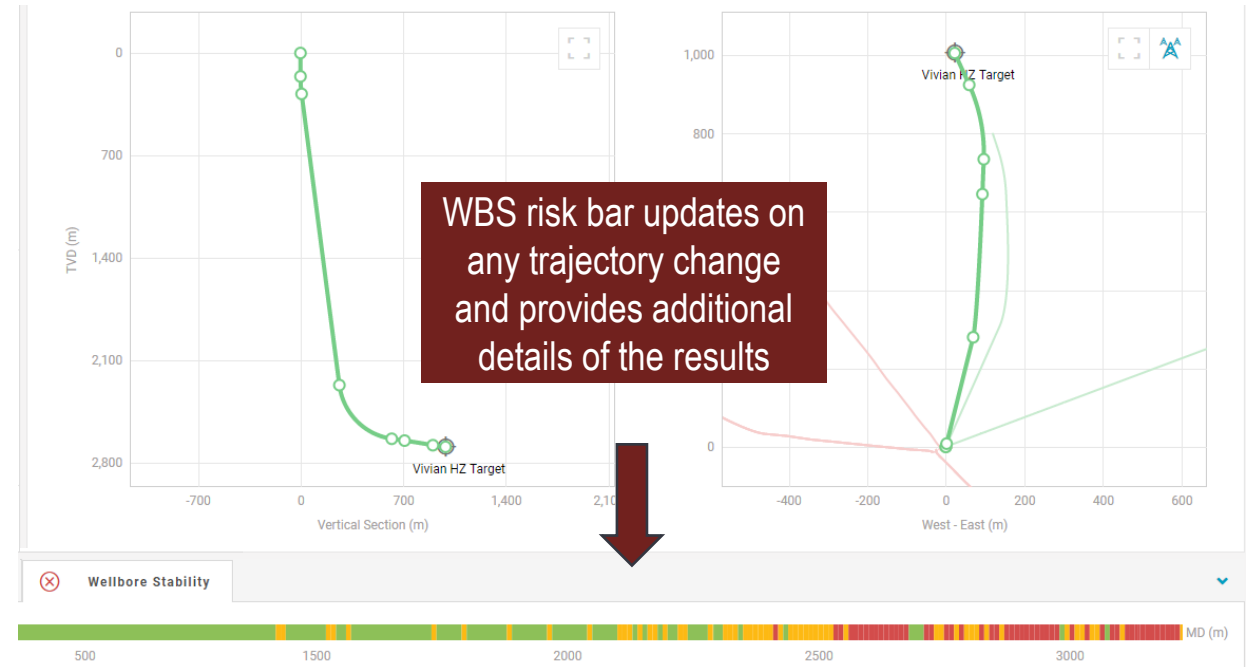
Evaluation of
alternative
scenarios
and impact



Casing Design

Kick Tolerance

Hydraulics



DRILLPLAN ADDED VALUE

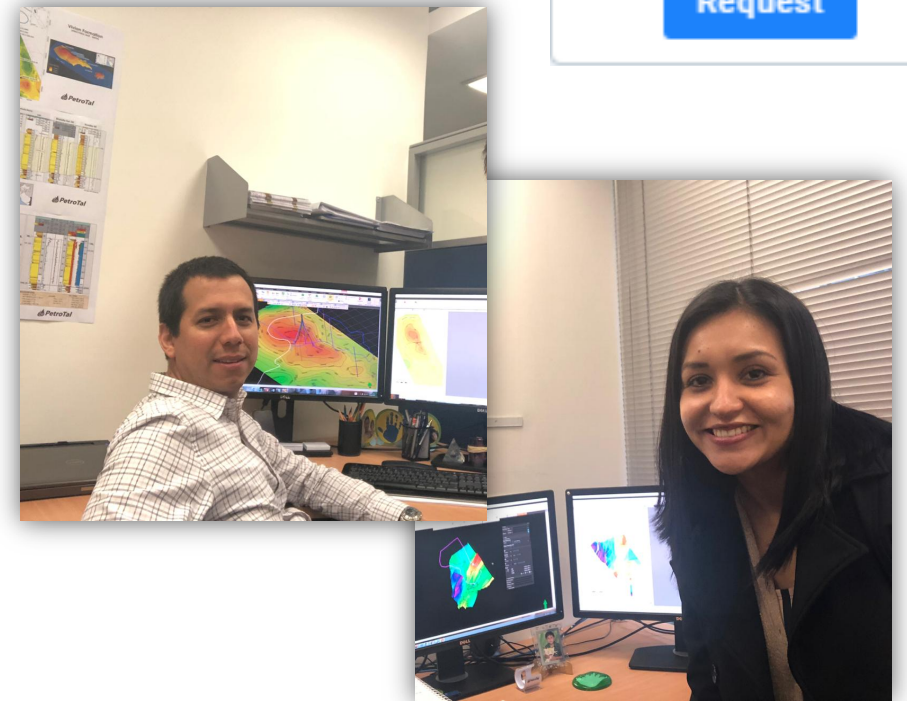
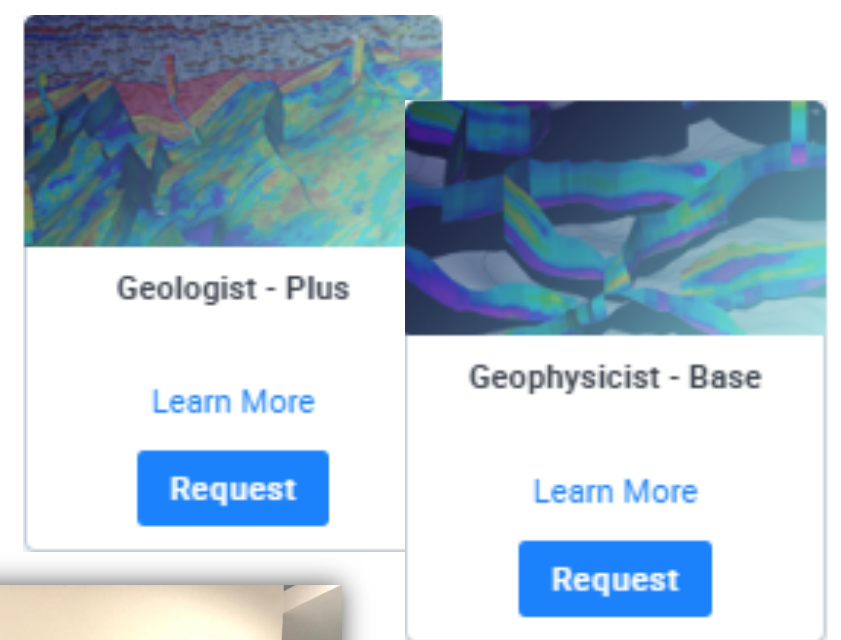


Organizational

Technical

PETROTAL STARTS A DIGITAL JOURNEY

- First DELFI adopter in Latin America
- Access to Petrotechnical Suite in DELFI through 2 domain profiles
 - Increased business agility
- Currently using cloud-based drilling activity reporting system



RESULTS AND CONCLUSIONS

- Offset well data was ingested from 2 different data repositories to support planning
- Service company programs were integrated, and engineering validated in DrillPlan for upcoming horizontal well
- Potential time saving for future well designs as ~70% of content and structure can be re-used (copy basis of design)
- DrillPlan allows efficiency in program preparation and management for reduced drilling team

