Opportunities in Petrobras Subsea Area
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NON-SEC COMPLIANT OIL AND GAS RESERVES: CAUTIONARY STATEMENT FOR US INVESTORS
We present certain data in this presentation, such as oil and gas resources, that we are not permitted to present in documents filed with the United States Securities and Exchange Commission (SEC) under new Subpart 1200 to Regulation S-K because such terms do not qualify as proved, probable or possible reserves under Rule 4-10(a) of Regulation S-X.
WE PRODUCE AROUND 2 MILLION BARRELS OF OIL PER DAY IN BRAZIL
GREEN FIELD - PRE-SALT REGION LOCATION

CAMPOS BASIN

SANTOS BASIN

- Petrobras Exploration
- Petrobras Exploration / Partnership
- Petrobras Production
- Evaluation Plan
- Transfer of Rights
PRE-SALT REGION

FPSO Cid. Angra dos Reis
5 production wells

FPSO Cid. São Paulo
4 production wells

FPSO Cid. Paraty
5 production wells

FPSO Cid. Ilhabela
3 production wells

FPSO Cid. Mangaratiba
3 production wells

FPSO Cid. Ancheta
4 production wells

P-20 (*)
1 production well

P-53 (*)
4 production wells

P-58 (*)
5 production wells

FPSO Capixaba (*)
2 production wells

FPSO Dynamic Producer
1 production well

P-48 (*)
2 production wells

EWT

Lula/Iracema

Sapinhoá

Parque das Baleias

Marlim Leste + Marlim

* Post-salt and pre-salt production
... BUT WE STILL HAVE SOME CHALLENGES TO FACE IN PRE-SALT AREA

- High Resolution Seismic: higher exploratory success
- Geological and numerical modelling: better production behavior forecast
- Reduction of well construction time (already reduced from 134 days in 2006 to 70 day in 2012)
- Selection of new materials: lower costs
- Qualification of new systems for production gathering: higher competitiveness
- Separation of CO\textsubscript{2} from natural gas in deep waters and reinjection: lower emissions and increase recovery factor
SUBSEA INTEGRITY MANAGEMENT

- Subsea numbers

- 87 Manifolds
- 4.545 km of E-H Umbilicals
- ~4,000 tools (TRT, THRT, etc.)

- 1,002 WCT’s
- 6.836 km of flexible pipe
- 756 PDG’s
Apply new technics to:

- Detect, monitor and assess damage of subsea hardware more effectively
- Reduce diving for subsea inspection
- Reduce intervention costs
- Predict intervention to reduce downtime due to failure.
BROWN FIELDS

Campos Basin Overview

- 55 platforms over 100,000 km²
- Operating since 1977
- 15 fixed structures - WD 80 to 170 m
- 40 floating units - WD 80 to 1,800 m

Main challenges

- Life extension
- Subsea decommissioning
Motivations:

• Large amount of subsea hardware in Campos Basin
• Extend the life of a field is a business case
• Thinking ahead for pre-salt fields

Challenges:

• Recover and validate operational data
• Modelling of degradation mode and calculate remaining life
• To execute in a safe and cost effective way
BROWN FIELD - SUBSEA DECOMMISSIONING

Campos Basin Scenario

- Fixed platforms with dry completion and some subsea satellite wells
- Floating production units with subsea wells
- Well connection to platform by flexibles
- Gas export lines and some oil export lines by rigid pipe but flexible risers
BROWN FIELD - SUBSEA DECOMMISSIONING

Wells

• Drilling, completion and connection during the 80’s
• Wells in Campos Basin:

Equipment and lines

• Very old equipment, various models
• Lines crossing in several points
• Planning challenging
• More ROV than diving to reduce risk
Challenges

• Recovering vessel must be able to deal with residual oil and several sizes and types of flowlines and umbilicals

• Availability of cutting, plugging and pulling tools ➔ cutting speed and oil leak prevention

• Contingency tools and procedures must be planned in advance to avoid operation discontinuities

• Regulatory frame still in progress ➔ longer interaction with regulatory bodies

• Problems vary from one project to the other ➔ dedicated design for each one

• Previous survey is necessary to allow consistent operation planning

• Final destination of recovered equipment must be defined in advance
STRATEGY FOR INNOVATION

New generation of technologies developed in Brazil by means of key partnerships
CONCLUSIONS

• Optimize subsea integrity management is a key issue to reduce the production costs, while keeping a safe operation.

• Life extension can highly contribute to the Company production curve, keeping the investment low.

• Decommissioning can not be thought as a reverse installation. New solutions are mandatory to avoid high capital expenditures.
THANK YOU

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