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SDCA
SUBDIRECCIÓN DE DESARROLLO DE CAMPOS

Deepwater Field Development

Cd. Del Carmen, Camp. May 8th. 2013

Content

- **Deepwater strategy**
- **Background**
- **Lakach Project**
- **Regional development options**
- **Technical challenges**
- **Opportunities and politics**
- **Final comments**

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Strategic opportunity

Market and atmosphere

- It is estimated that Mexico has 54.7 billion barrels of equivalent oil of prospective resources. The 48 percent is concentrated in the deep waters Gulf of Mexico.
- The international and domestic markets, will continue the growth of demand for fuels, particularly natural gas (electrical and industrial sector, mainly) and gasoline and diesel (transportation sector)
- High prices

PEP strategy

- In the last decade, the Mexican oil reserves has declined.
- The 2013-2017 Petróleos Mexicanos Business Plan and Subsidiary Entities seeks to halt and reverse this trend in reserves, maintaining a growing replacement rate.
- Accelerating the evaluation of the potential in the deep Gulf of Mexico and start production in new fields

Deep water fields development

- Perfom activities to precise deepwater potential and develop the skills and infrastructure required for its exploration and exploitation
- Pemex has been preparing and engages in the development of deepwater fields and to close the technology gap and knowledge of its staff in these kind of projects.
- The simplicity of the Lakach project compared to other deep water projects will accelerate the knowledge necessary to meet the goals of exploration and exploitation of oil and gas in deep water.

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PEP Organization Chart

- Value Generation Unit
- Especialized Services
- Technical Areas
- Support

PRESIDENT & CEO

H S E

Internal Control Office

Exploration

Technical management

Planning & Assessment

Administration & Finance

Distribution & Trading

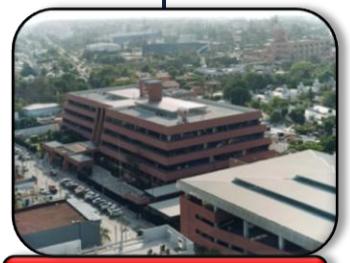
ONSHORE

OFFSHORE

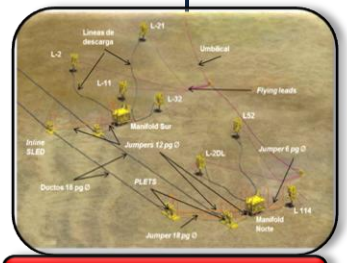
NORTH

SOUTH

NORTHEAST



SOUTHWEST



FIELD DEVELOPMENT

Maintenance & Logistics

Drilling

Services & Construction

New execution models

I T

PEMEX PEP REGIONAL OPERATION

Region	Production Oil (Mbd)	Production Gas (bcfd)
North	145	2,139
South	508	1,652
NE & SW Offshore	1,894	2,593

2012 Daily annual average Source: http://www.bdi.pemex.com/bdi January 1st 2013

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Field Development Vice presidency

- VALUE GENERATION UNIT
- ESPECIALIZED SERVICES
- TECHNICAL AREAS
- SUPPORT

VICE PRESIDENT
Field Development

- Management Control Unit
- Technical and Administrative Coordination
- Planning & Assessment
- HSE

Tsimin- Xux
Light Oil

Ayatsil – Tekel
Heavy Oil

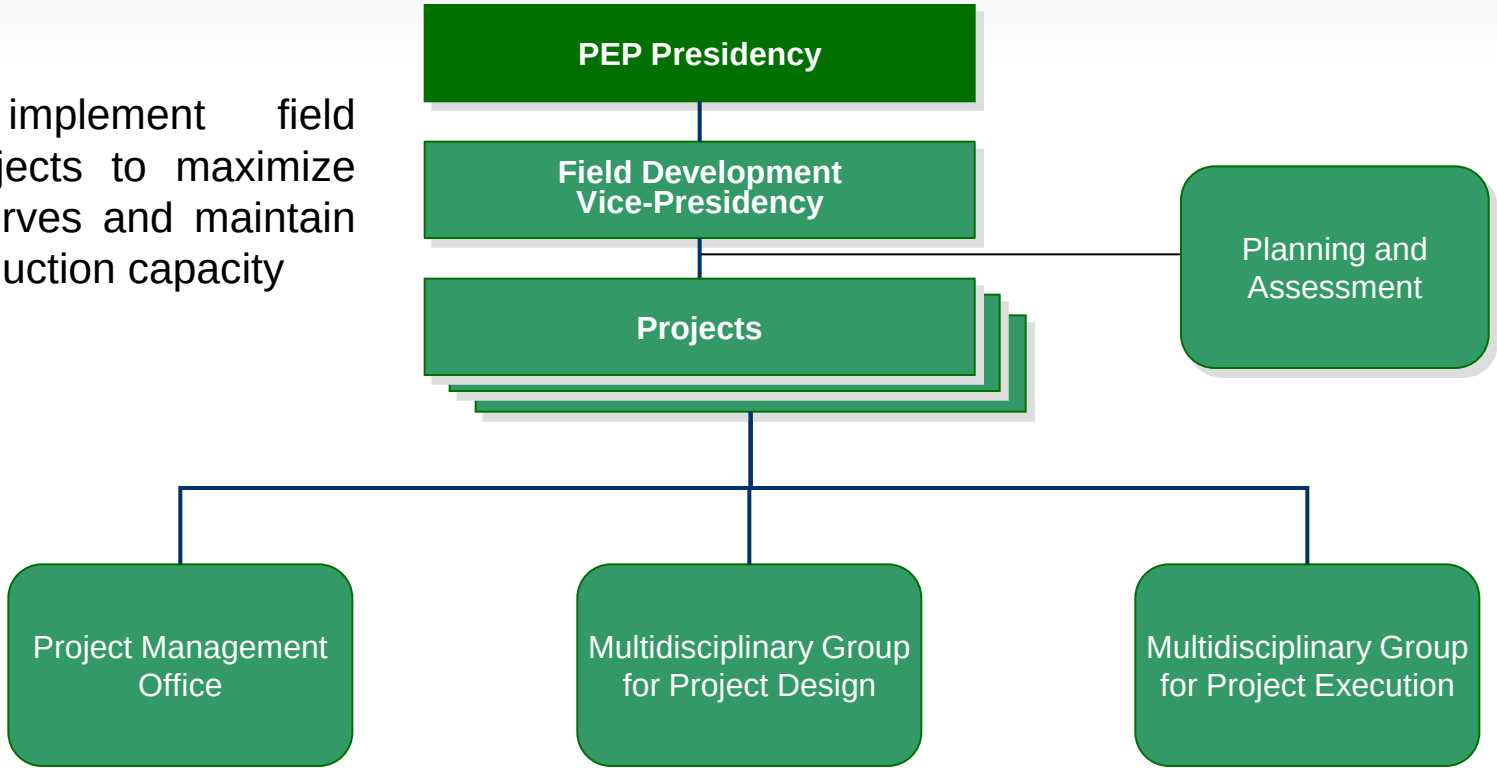
Lakach
Wet Gas(Deepwater)

- Maintenance & Logistics
- Drilling
- Services & construction
- Technical Management
- I T

PEP has an organizational structure in the Fields Development Vice-presidency and the Projects Administration Units are responding to important challenges

Objective:

Design and implement field development projects to maximize the value of reserves and maintain and increase production capacity



Focus:

- Reduce the time between discovery and production
- Projects well defined and technically robust to maximize the economic value of the reserves
- Execution hooked to design time and cost

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Background

1992
- Deep water activities started in Mexico with the seismic 2D acquisition

1996
- Deep water exploration projects authorization
  - Perdido, North Region
  - Golfo de México Sur, North East Marine Region
  - Golfo de México B, South West Marine Region

2004
- Holok-Alvarado 3D seismic survey in an area of approximately 10,000 km^2

2005
- Identification, documentation and approval of exploration location: Noxal-1, Nen-1, Kuyah-1, Lakach-1, Labay-1, Holok-1, Chelem-1 y Lalail-1

2007
- Drilling and completion of the Lakach-1 well. July 10th, 2006 to March 12th, 2007. Water depth 989 metres. Drilled depth 3,813 metres. Drilling took 124 days and completion 108 days)
- The Lakach project was sanctioned by Corelab and approved in November 2007

2010
- The appraisal well Lakach-2DL was completed, with the results obtained PEP achieve the mitigation of uncertainties and the field characterization update.
- The technical Document for Investment Projects (DTPI) was completed and was favourably sanctioned by the PEP Technical Exploitation Vice-Presidency

2011
- The certified reserves in January 1st, 2011 in 1P category was 452 MMMPC and 866 MMMPC in 2P
- Alpha Deepwater Services reviewed the project and issued a favourably opinion and recommendations
- The fields Piklis and Nen were discovered, and they allow to incorporate reserves 3P 791 MMMpc y 442 MMMpc, respectively.

2012
- The Kunah-1 well was drilled, resulting successful
- The first oil field was discovered by the Trion-1 Well.
- The Kunah-1DL appraisal well was drilled

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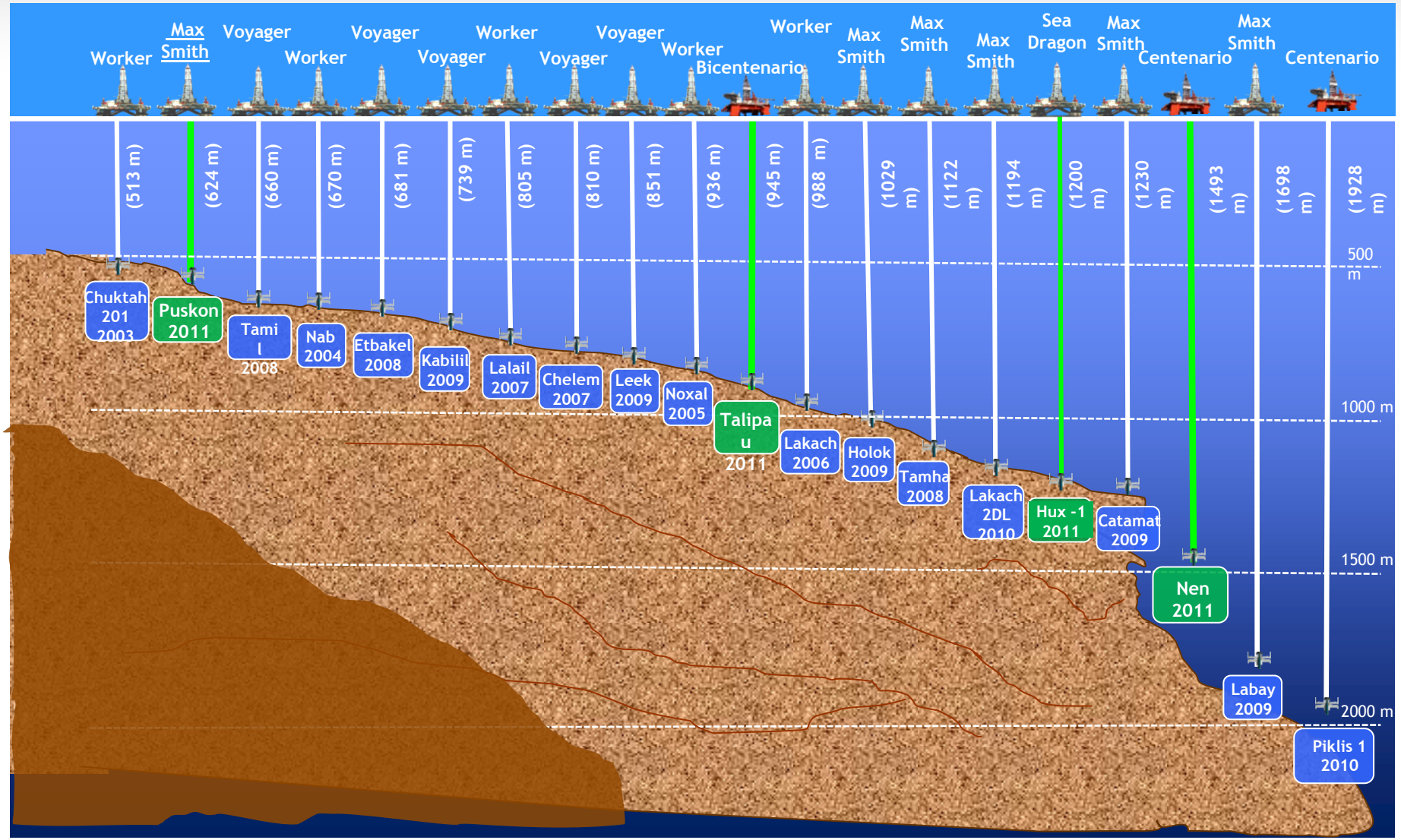
Deepwater Drilling Evolution



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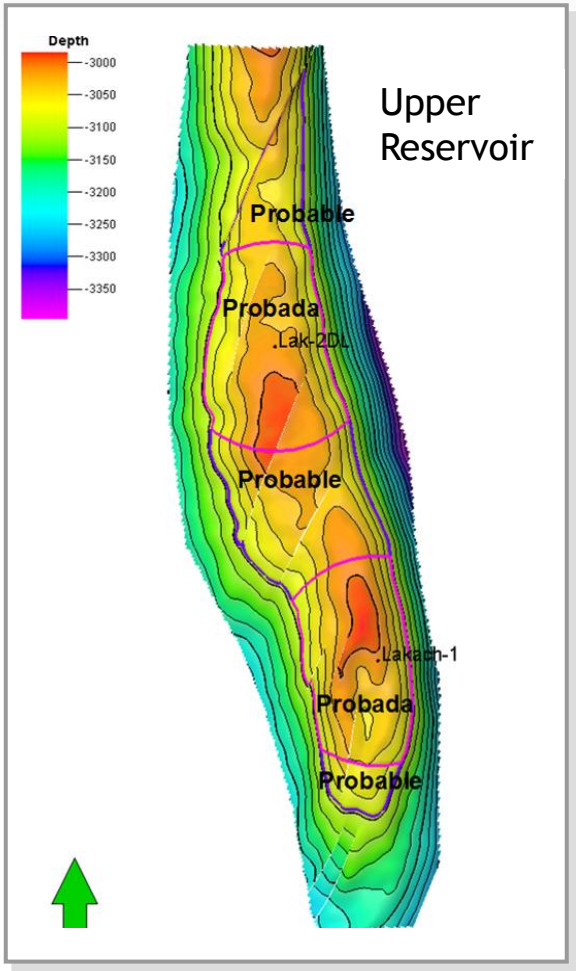
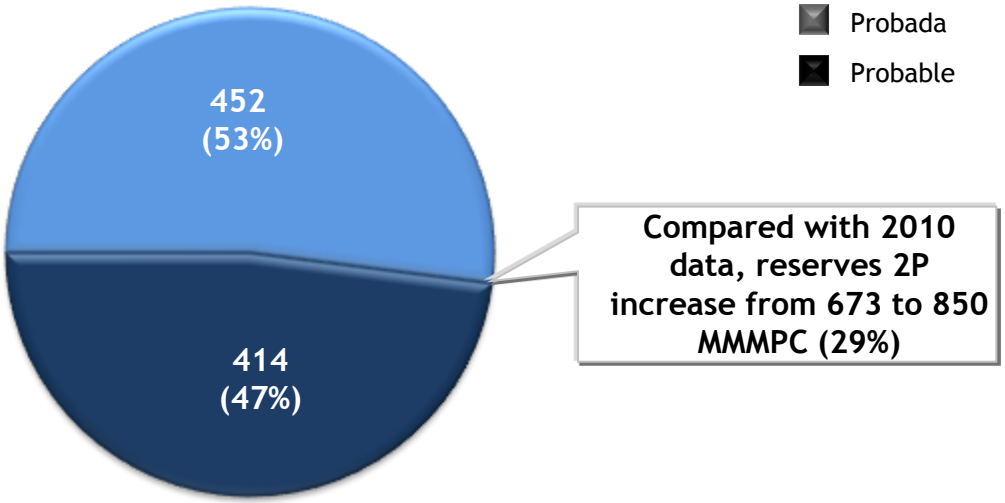
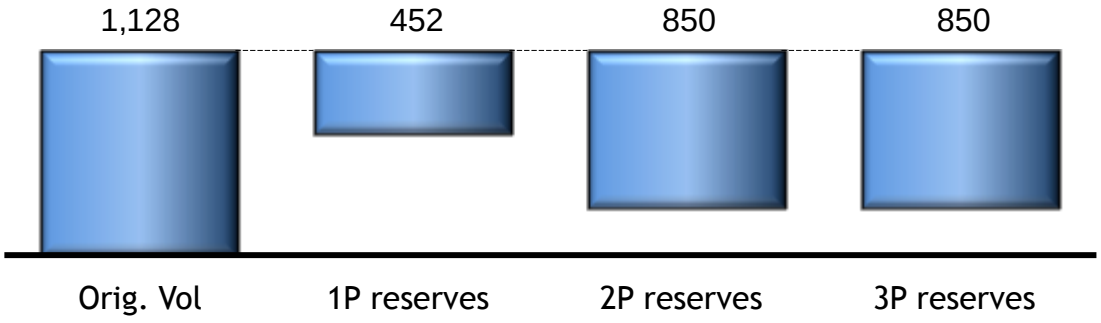
Reservas Certificadas



Reserve 2012
MMMPC

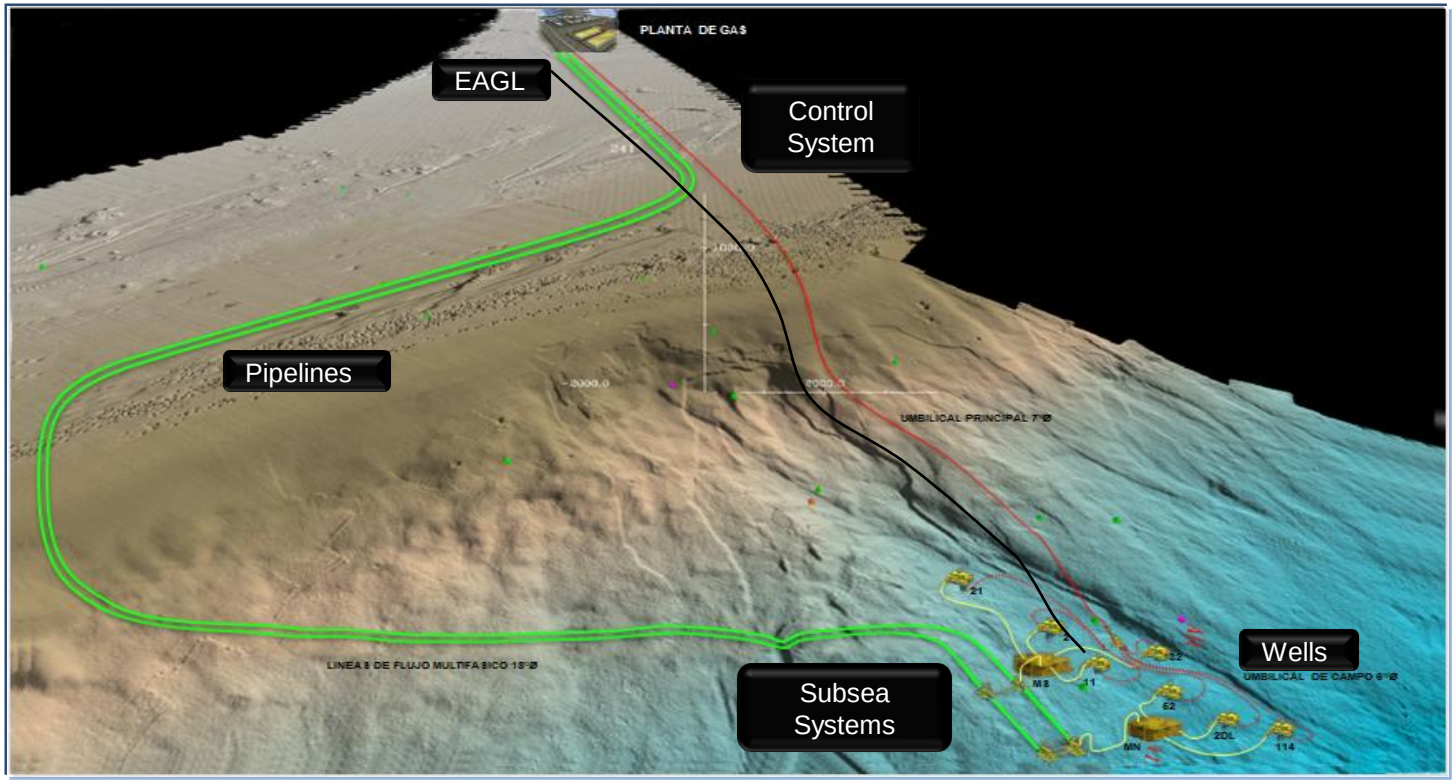


Original reserves 1P, 2P y 3P
MMMPC



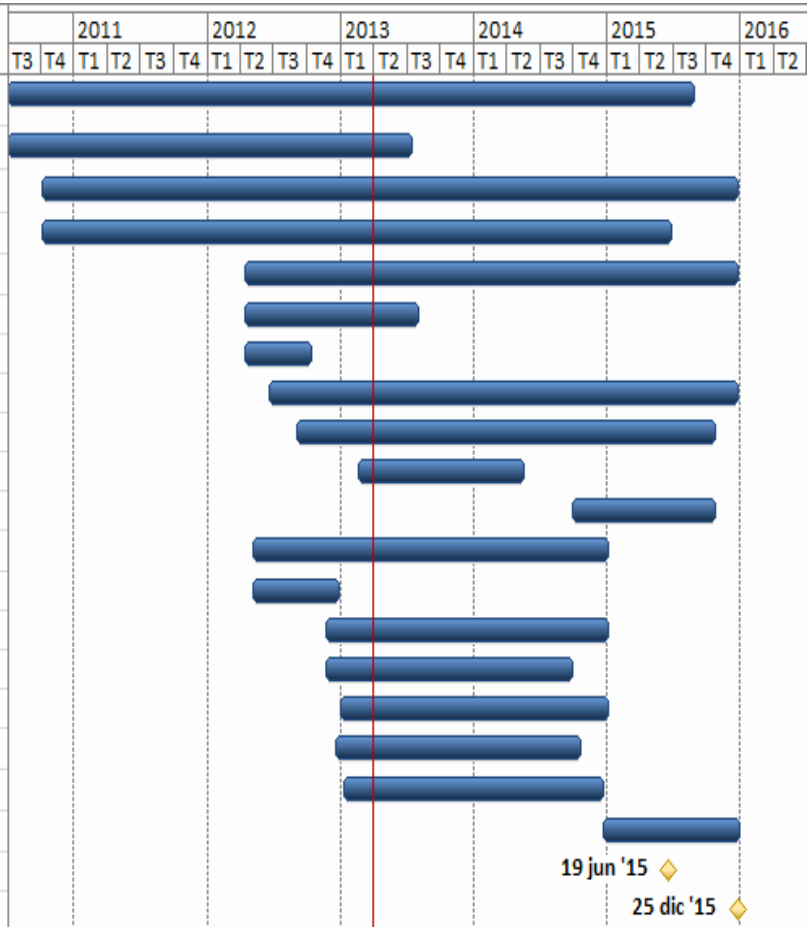
Development concept

Recover 850 Bcf of 2P reserves by drilling six development wells and recovering the appraisal well, all with subsea completions, which will be interconnected to two subsea manifolds (manifolds), production will be transported to shore by two 18“pipelines for conditioning and incorporation into the national pipeline system. This arrangement will have a control system consisting of surface control units, underwater, an umbilical and flying leads to operate the field remotely.



Execution Plan

Nombre de tarea	Duración	Inicio	Fin
Proyecto de Desarrollo Lakach	3424 días	01 mar '07	15 jul '16
VCD Lakach	2522 días	01 mar '07	25 ene '14
Ejecución del Proyecto	1922 días	11 abr '11	15 jul '16
Gestión	1723 días	11 abr '11	29 dic '15
Pozos	1354 días	16 oct '12	01 jul '16
Contratación	288 días	16 oct '12	31 jul '13
Servicios de Perforación y Terminación de Fondo de Pozo	182 días	16 oct '12	16 abr '13
Construcción	1232 días	15 feb '13	01 jul '16
Perforación y Terminación de Pozos (Centenario)	1158 días	25 feb '13	28 abr '16
Perforación de Pozos	434 días	18 ago '13	26 oct '14
Terminación de Pozos	356 días	08 may '15	28 abr '16
Sistemas Submarinos	1073 días	08 nov '12	17 oct '15
Contratación	281 días	08 nov '12	16 ago '13
Construcción	838 días	01 jul '13	17 oct '15
Contrato (5)	735 días	01 jul '13	06 jul '15
Contrato (8 - 6)	789 días	19 ago '13	17 oct '15
Planta de Arribo	672 días	16 dic '12	19 oct '14
Planta de acondicionamiento de gas	710 días	07 ene '13	18 dic '14
Comisionamiento y Arranque	**575 días**	**18 dic '14**	**15 jul '16**
Primera Producción Lakach	0 días	22 dic '15	22 dic '15
Todos los Pozos Operando	0 días	15 jul '16	15 jul '16



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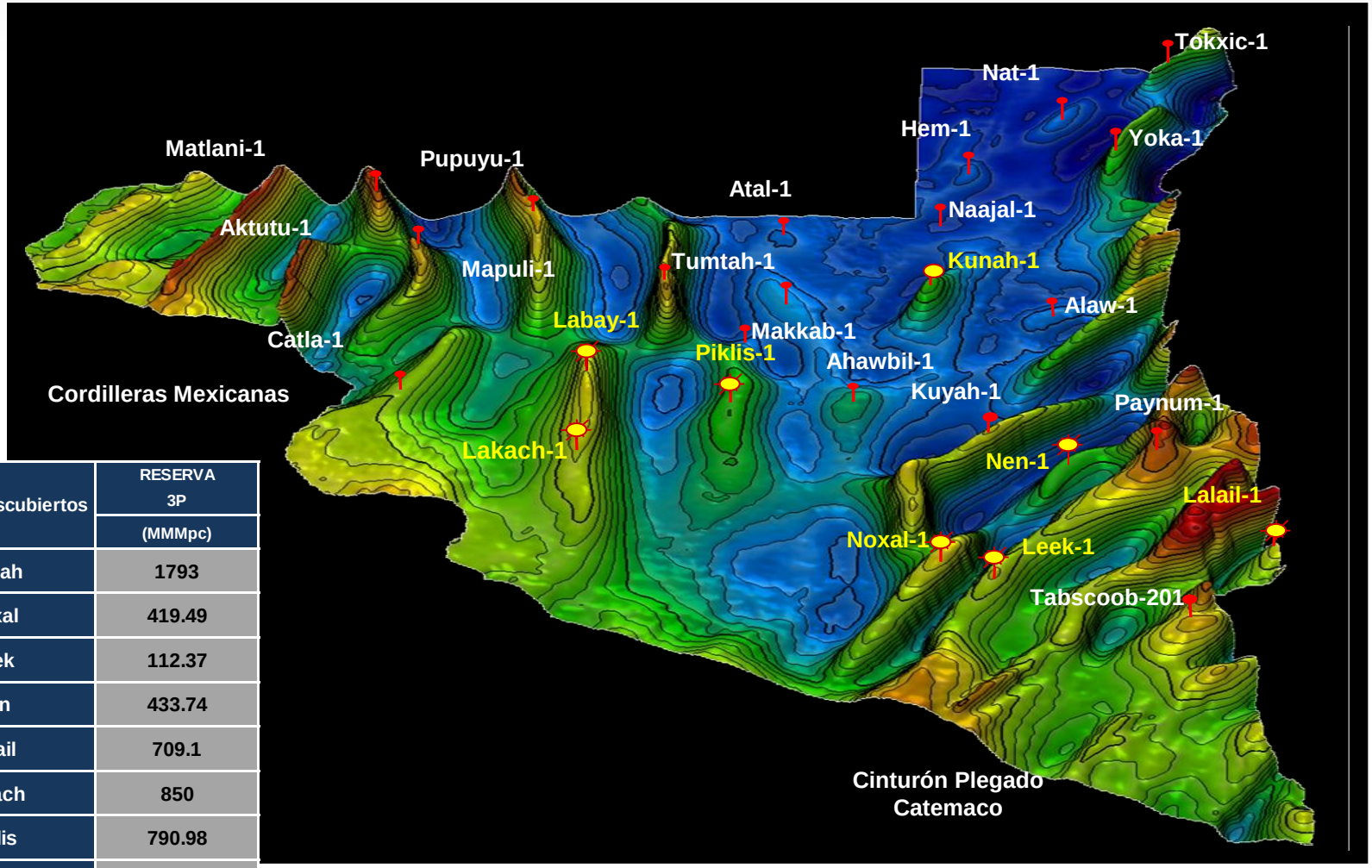
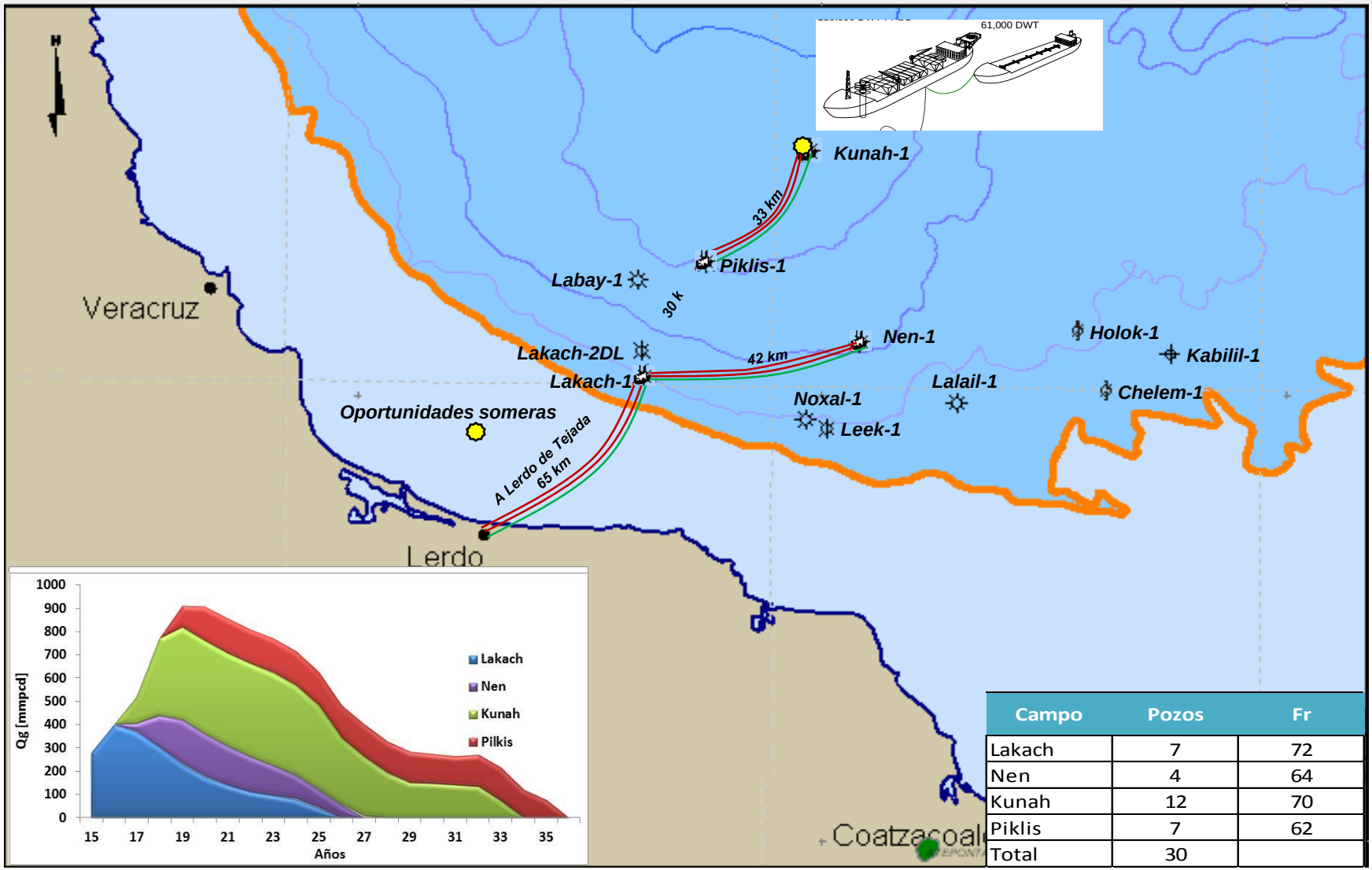
Additional Development Opportunities (gas)



Campos Descubiertos	RESERVA 3P (MMMpc)
Kunah	1793
Noxal	419.49
Leek	112.37
Nen	433.74
Lalail	709.1
Lakach	850
Piklis	790.98
Total:	5,109

Regional Development Options (Gas)



Campo	Pozos	Fr
Lakach	7	72
Nen	4	64
Kunah	12	70
Piklis	7	62
Total	30	

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Development Opportunities (Oil)

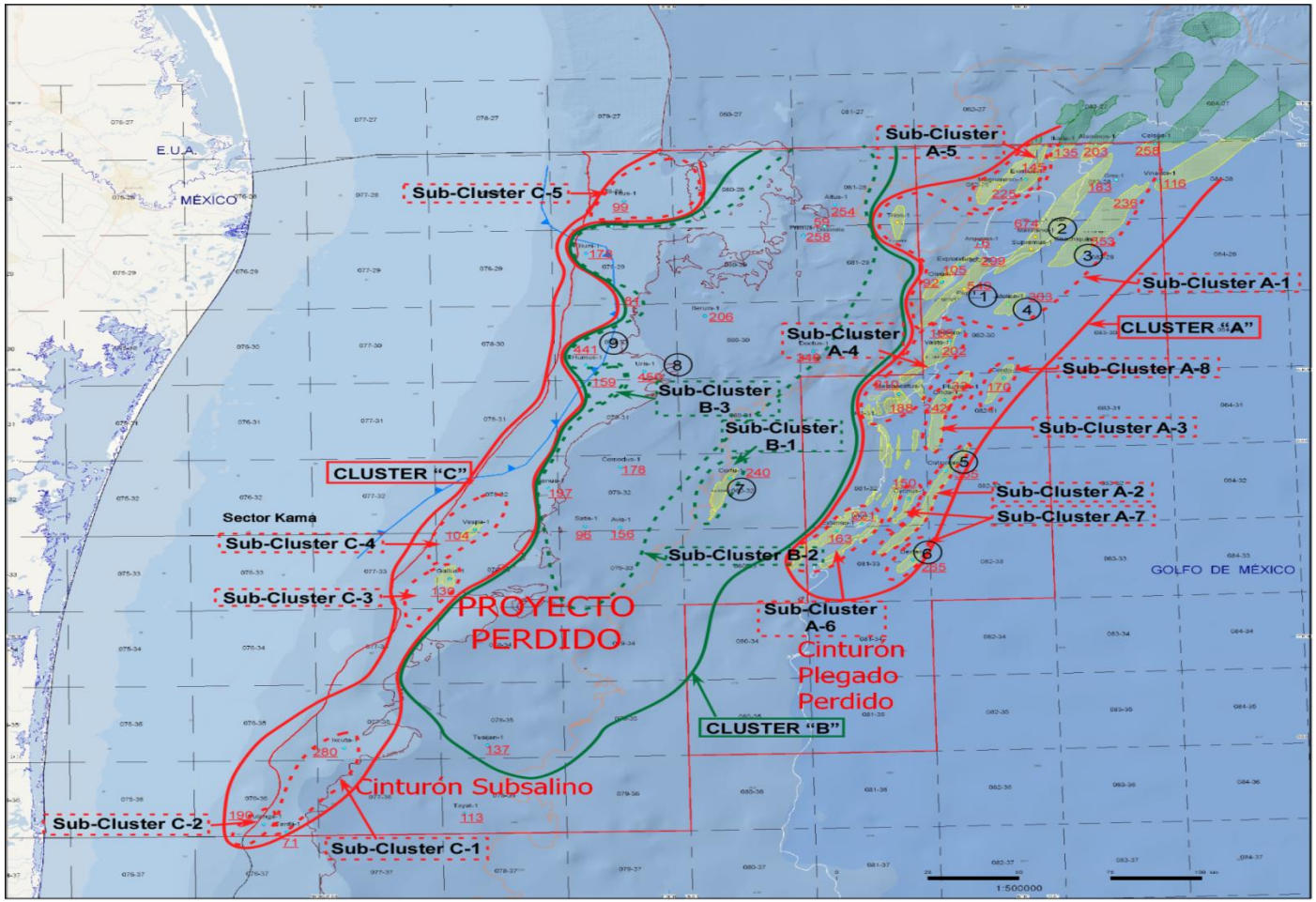
The opportunities in Perdido area can be grouped in three geological sub-regions, each sub-region with an important potential development. Cinturón Plegado Perdido is the most attractive .

Sub-regiones:

A) Cinturón Plegado Perdido (CPP)

B) Cinturón Sub-Salino (CSS)

C) Mini-Cuencas (MCS)



Potential (Oil)

	Water Depths	Fold characteristics	Primary Plays	Resource Potential	Exploratory Wells
CPP	2,700m to 3,500 m	Large anticlinal structures in paleogene rock	Oligocene, Eocene, Paleocene	2,000-5000 Mmbpce	Supremus-1 (Drilled, found oil) Maximino-1 (In progress)
CSS	1,500 to 2,700 m	In pre-salt layer	Oligocene, Eocene	~350-1600 Mmbpce	Trion-1 Well (Drilled, found oil)
MCS & CPK	500 to 1,500 m	Fold produced from late contraction	Mioceno, Oligoceno	~200-1400 Mmbpce	

The Perdido opportunities has been grouped in 11 development centers.

Clusters)

a. **Maximino Cluster:** Maximino, Cachiquin, Supremus, Magnanimo, Eximius, Grex, Saxum, Angustos

b. **Pep Cluster:** Pep, Pelagus, Afotica, Exploratus, Oleum

c. **Vasto Cluster:** Vasto, Jaibero, Doctus, Astrum, Melanocetus, Onda, Plurimus, Cordo, Formosus

d. **Humus Cluster:** Humus, Uris, Germina, Iterum, Caelum

e. **Ixcuta Cluster:** Ixcuta, Tusijan, Tantli, Tayat

f. **Plenus Cluster:** Plenus, Vespa, Gallus, Satis, Avis, Comoudus

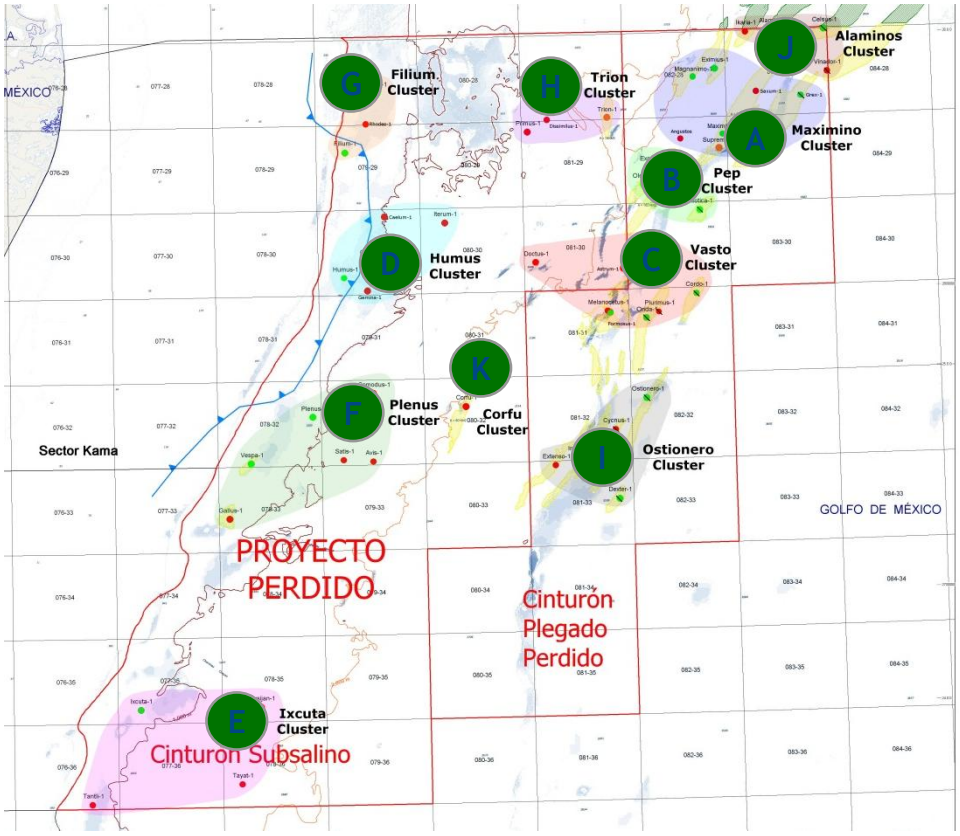
g. **Filium Cluster:** Filium, Rhodes, Titus

h. **Trion Cluster:** Trion, Altus, Primus, Dissimulus

i. **Ostionero Cluster:** Ostionero, Dexter, Extenso, Imus, Cycnus

j. **Alaminos Cluster:** Alaminos, Ikaria, Celsus, Vinador

k. **Corfu Cluster:** Corfu



Contributor Non-contributor Not simulated >10,000' WD

Source: ADL analysis

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Technical Challenges

Exploration
- Acquisition
- Seismic Processing
- Post Processing
- Interpretation

Drilling
- Improve drilling time and efficiency
- Shallow hazards
- Wellbore stability

Production
- Completion
  - Sand Control
  - Smart wells
  - Subsea trees
- Field Development
  - Temporary Abandonment
  - Real time monitoring and control
  - Pressure decline
- Transport
  - Subsea process
  - Flow assurance
  - Pipelines

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Política y Oportunidades

The Mexican economy is significantly correlated with the oil revenue, should be noted that the country's fiscal revenues depend approximately in 40% of the Petroleos Mexicanos (PEMEX).

Contributions.

It is required to disassociate PEMEX resources from the Federal Budget by means of an effective and efficient tax collection, and endowed with management autonomy with the ability to reinvest its own resources operations and capital projects under modern financial schemes, innovative and profitable. The Mexican government is considering a tax reform.

Nobody in Mexican society questions the need to modernize and give Pemex efficiency and integrity and the energy sector in general

If Pemex can not have the funds nor the technology required to exploit existing resources at great depths in the sea, the only way to achieve them is through associations with international companies that have technology, capital and sufficient experience. The Mexican Goverment is suggesting a greater openness to private investment.

The Energy Reform will be on the table for discussion in the second half of this year.

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Final comments

- PEMEX has been decided to invest in deepwater projects as one of its main strategic business lines, cause of the importance and potential in the Gulf of Mexico.
- Pemex has shaped an organizational structure to develop these projects and continue with the learning curve that allows to reduce the time from date of discovery to first production. Furthermore, the execution of the Lakach project will close the technology gap and knowledge Pemex staff.
- The Lakach field development will achieve a maximum production of 400 MMcfd of natural gas in 2016. The 1st Production is expected for the second half of 2015.
- Currently there are two poles of development already discovered, gas province (Lakach Piklis, Nen and Kunah) and the important discoveries in the northern Gulf of Mexico Perdido Area(Trion, Maximino, PEP).
- Norwegian companies have developed the knowledge to solve the technical problems of the exploitation of fields in deep and ultra deep water: PEMEX recognize them as leaders in this area.

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