Offshore Technology – Past, Present and Future

Houston Association of Professional Landmen

J. Keith Couvillion
Chevron U.S.A. Inc.

October 7, 2015

Cautionary Statement

CAUTIONARY STATEMENT RELEVANT TO FORWARD-LOOKING INFORMATION FOR THE PURPOSE OF "SAFE HARBOR" PROVISIONS OF THE PRIVATE SECURITIES LITIGATION REFORM ACT OF 1995

This presentation of Chevron Corporation contains forward-looking statements relating to Chevron's operations that are based on management's current expectations, estimates and projections about the petroleum, chemicals and other energy-related industries. Words or phrases such as "anticipates," "expects," "intends," "plans," "targets," "forecasts," "projects," "believes," "seeks," "may," "could," "schedules," "estimates," "budgets," "outlook," "on schedule," "on track" and similar expressions are intended to identify such forward-looking statements. These statements are not guarantees of future performance and are subject to certain risks, uncertainties and other factors, many of which are beyond the company's control and are difficult to predict. Therefore, actual outcomes and results may differ materially from what is expressed or forecasted in such forward-looking statements. The reader should not place undue reliance on these forward-looking statements, which speak only as of the date of this presentation. Unless legally required, Chevron undertakes no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

Among the important factors that could cause actual results to differ materially from those in the forward-looking statements are: changing crude oil and natural gas prices; changing refining, marketing and chemicals margins; actions of competitors or regulators; timing of exploration expenses; timing of crude oil liftings; the competitiveness of alternate-energy sources or product substitutes; technological developments; the results of operations and financial condition of equity affiliates; the inability or failure of the company's joint-venture partners to fund their share of operations and development activities; the potential failure to achieve expected net production from existing and future crude oil and natural gas development projects; potential delays in the development, construction or start-up of planned projects; the potential disruption or interruption of the company's production or manufacturing facilities or delivery/transportation networks due to war, accidents, political events, civil unrest, severe weather, other natural or human factors, or crude oil production quotas that might be imposed by the Organization of Petroleum Exporting Countries; the potential liability for remedial actions or assessments under existing or future environmental regulations and litigation; significant investment or product changes required by existing or future environmental statutes, regulations and litigation; the potential liability resulting from other pending or future litigation; the company's future acquisition or disposition of assets and gains and losses from asset dispositions or impairments; government-mandated sales, divestitures, recapitalizations, industry-specific taxes, changes in fiscal terms or restrictions on scope of company operations; foreign currency movements compared with the U.S. dollar; the effects of changed accounting rules under generally accepted accounting principles promulgated by rule-setting bodies; and the factors set forth under the heading "Risk Factors" on pages 22 through 24 of the company's 2014 Annual Report on Form 10-K. In addition, such results could be affected by general domestic and international economic and political conditions. Other unpredictable or unknown factors not discussed in this presentation could also have material adverse effects on forward-looking statements.

Certain terms, such as "unrisked resources," "unrisked resource base," "recoverable resources," and "oil in place," among others, may be used in this presentation to describe certain aspects of the company's portfolio and oil and gas properties beyond the proved reserves. For definitions of, and further information regarding, these and other terms, see the "Glossary of Energy and Financial Terms" on pages 58 and 59 of the company's 2014 Supplement to the Annual Report and available at Chevron.com. As used in this report, the term "project" may describe new upstream development activity, including phases in a multiphase development, maintenance activities, certain existing assets, new investments in downstream and chemicals capacity, investment in emerging and sustainable energy activities, and certain other activities. All of these terms are used for convenience only and are not intended as a precise description of the term "project" as it relates to any specific government law or regulation.

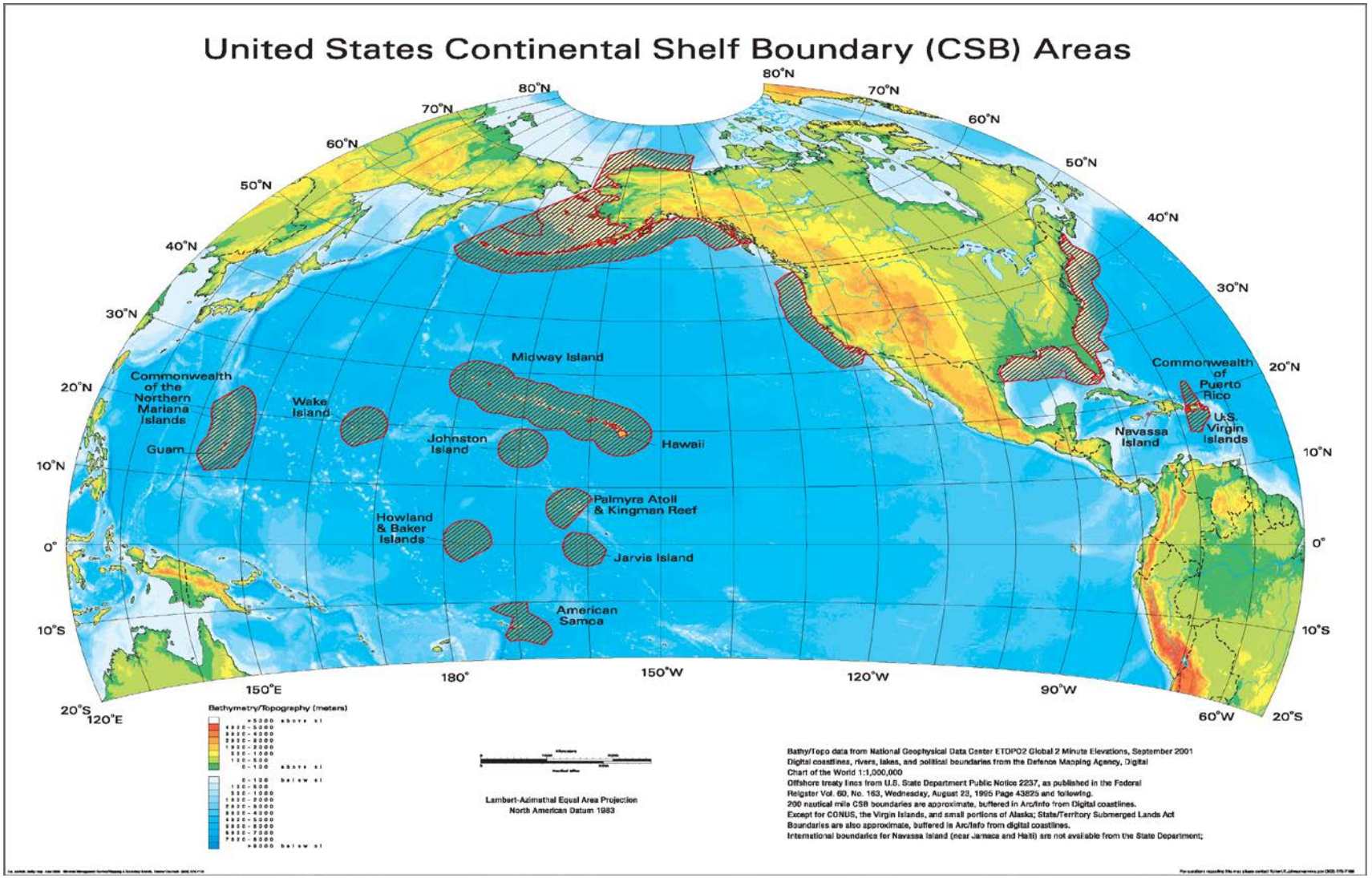
Agenda

- Offshore Defined
- Oil & Gas Lifecycle
- Seismic
- Drilling
- Facilities (Fixed, Floating & Subsea)
- New Technologies
- Questions

Photo courtesy of Transocean

U.S. Offshore Jurisdiction

Government Controlled Offshore Lands
United States - Exclusive Economic Zone
(3 Billion Acres – 4.1 Million Sq. Miles)



Source: DOI

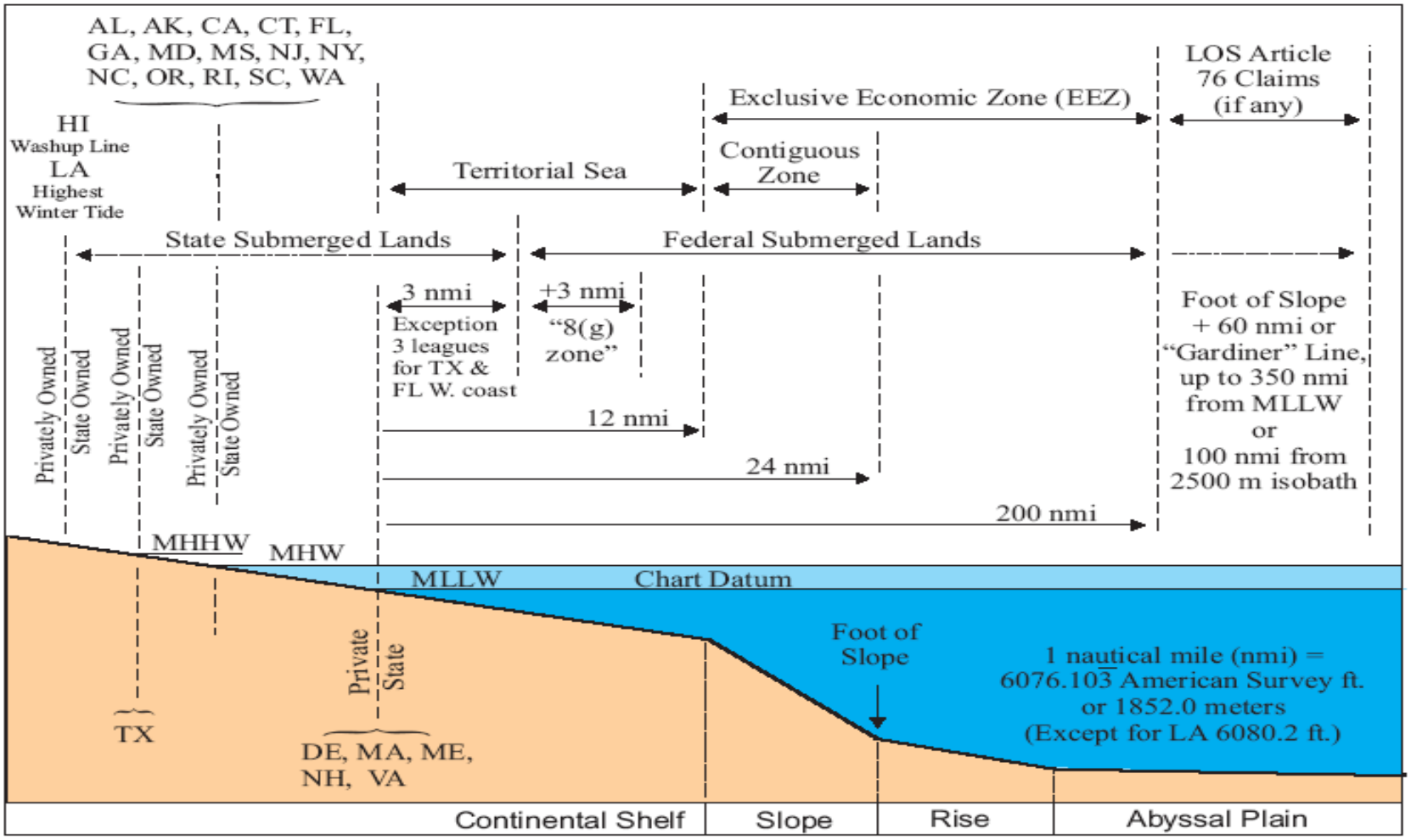
State/Federal Offshore Jurisdiction

State jurisdiction is defined as those submerged lands seaward of the coastline to a distance of approximately 3 geographical miles (4.83 km). The offshore jurisdiction of the Gulf coast of Florida and the State of Texas is 3 marine leagues (approximately 10 miles) seaward.

Federal jurisdiction is defined under accepted principles of international law. The seaward limit is defined as the farthest of 200 nautical miles (370 km) seaward of the baseline from which the breadth of the territorial sea is measured or, if the continental shelf can be shown to exceed 200 nautical miles, a distance not greater than a line 100 nautical miles from the 2,500-meter isobath or a line 350 nautical miles from the baseline.

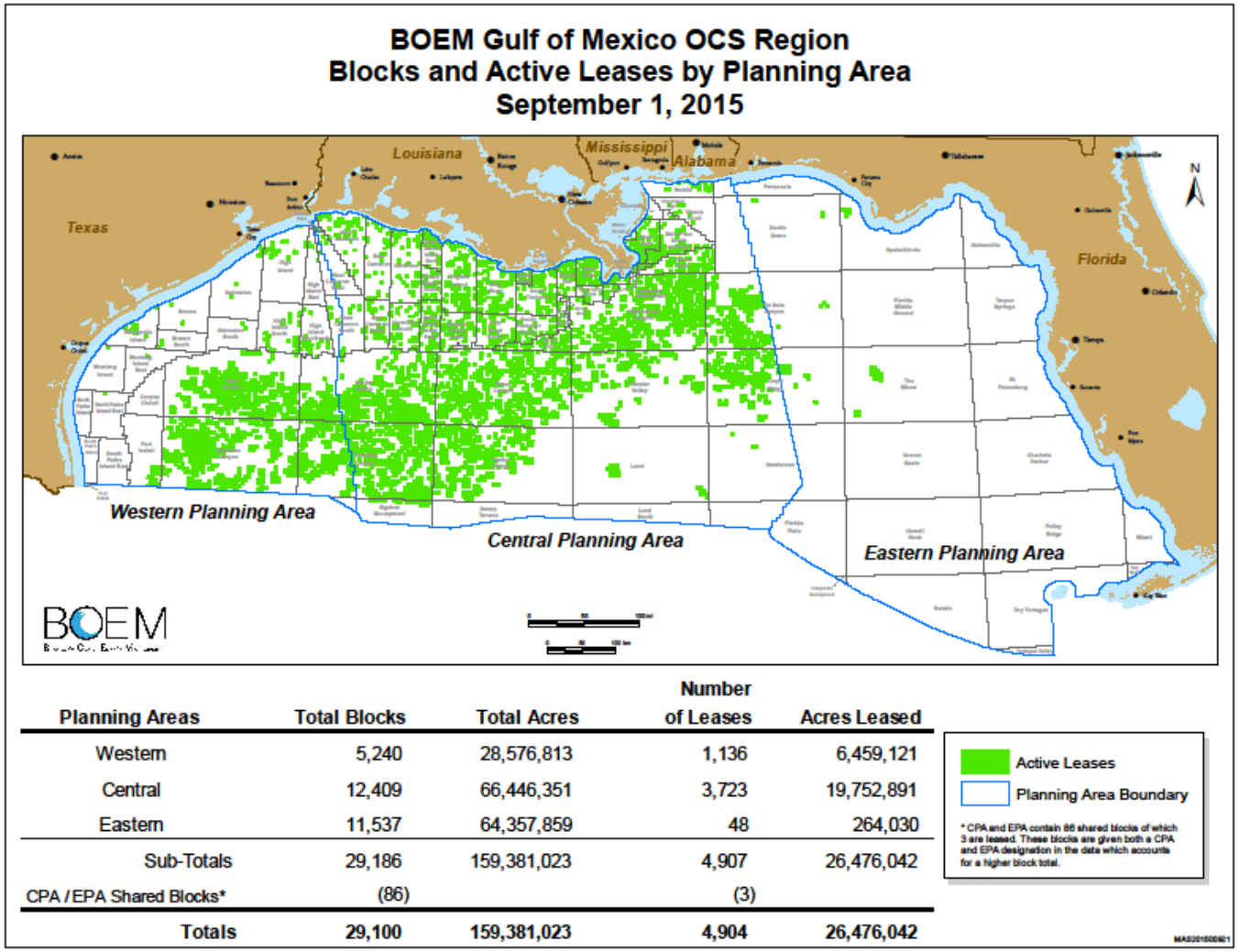
Source: Chevron

Offshore Jurisdiction



Source: DOI

Offshore Gulf of Mexico Activity Map



Planning Areas	Total Blocks	Total Acres	Number of Leases	Acres Leased
Western	5,240	28,576,813	1,136	6,459,121
Central	12,409	66,446,351	3,723	19,752,891
Eastern	11,537	64,357,859	48	264,030
Sub-Totals	29,186	159,381,023	4,907	26,476,042
CPA / EPA Shared Blocks*	(86)		(3)	
Totals	**29,100**	**159,381,023**	**4,904**	**26,476,042**

Active Leases

Planning Area Boundary

* CPA and EPA contain 86 shared blocks of which 3 are leased. These blocks are given both a CPA and EPA designation in the data which accounts for a higher block total.

Source: DOI

Offshore Oil & Gas Lifecycle

Photo courtesy of Transocean

Explore, Develop, Produce & Abandon

1. Explore & Lease

2. Drill, Discover & Appraise

3. Plan Development

4. Design

5. Fabricate & Install

6. HUC, Start Up & Ramp Up

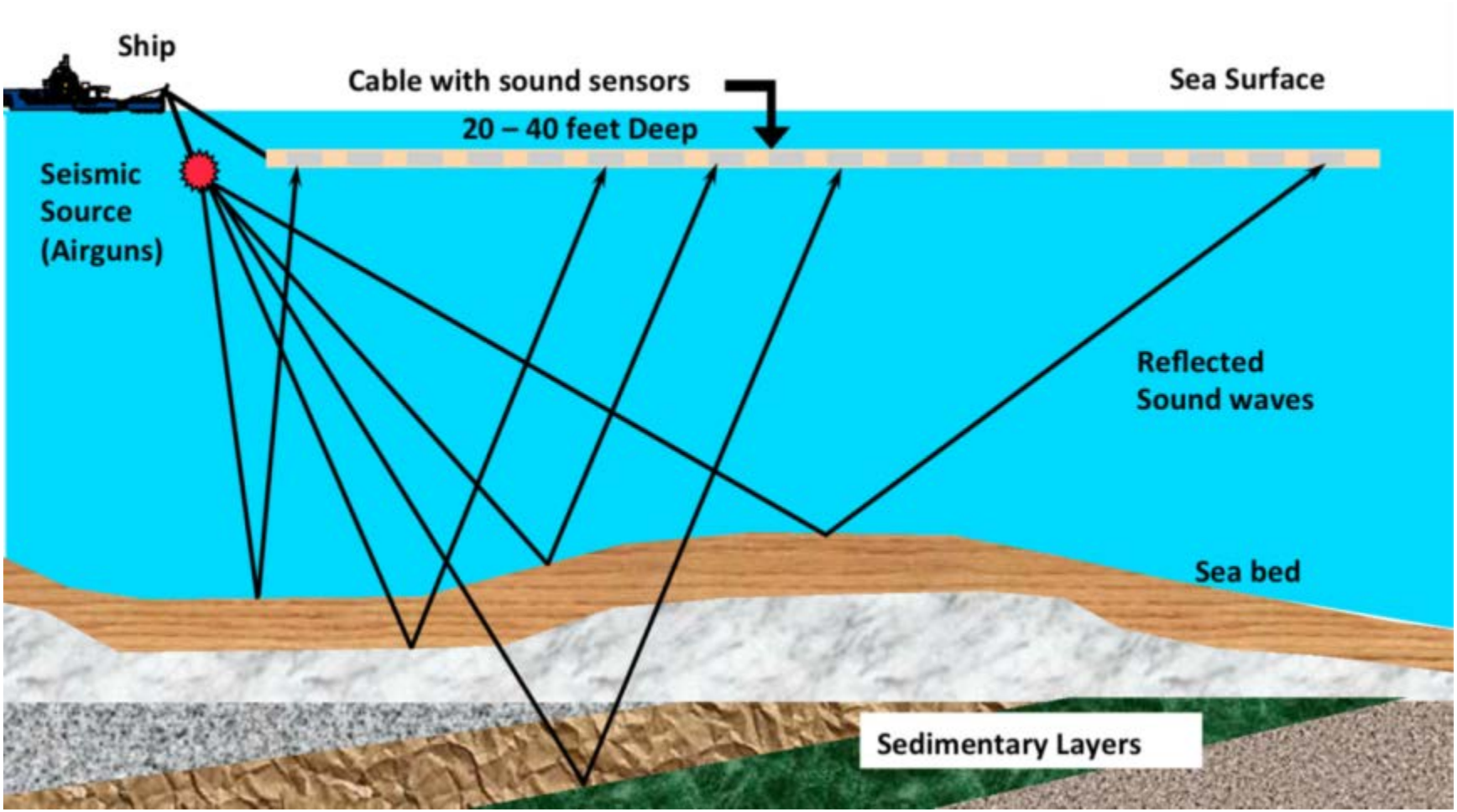
7. Production Operations

8.Plug & Abandon

Source: Chevron

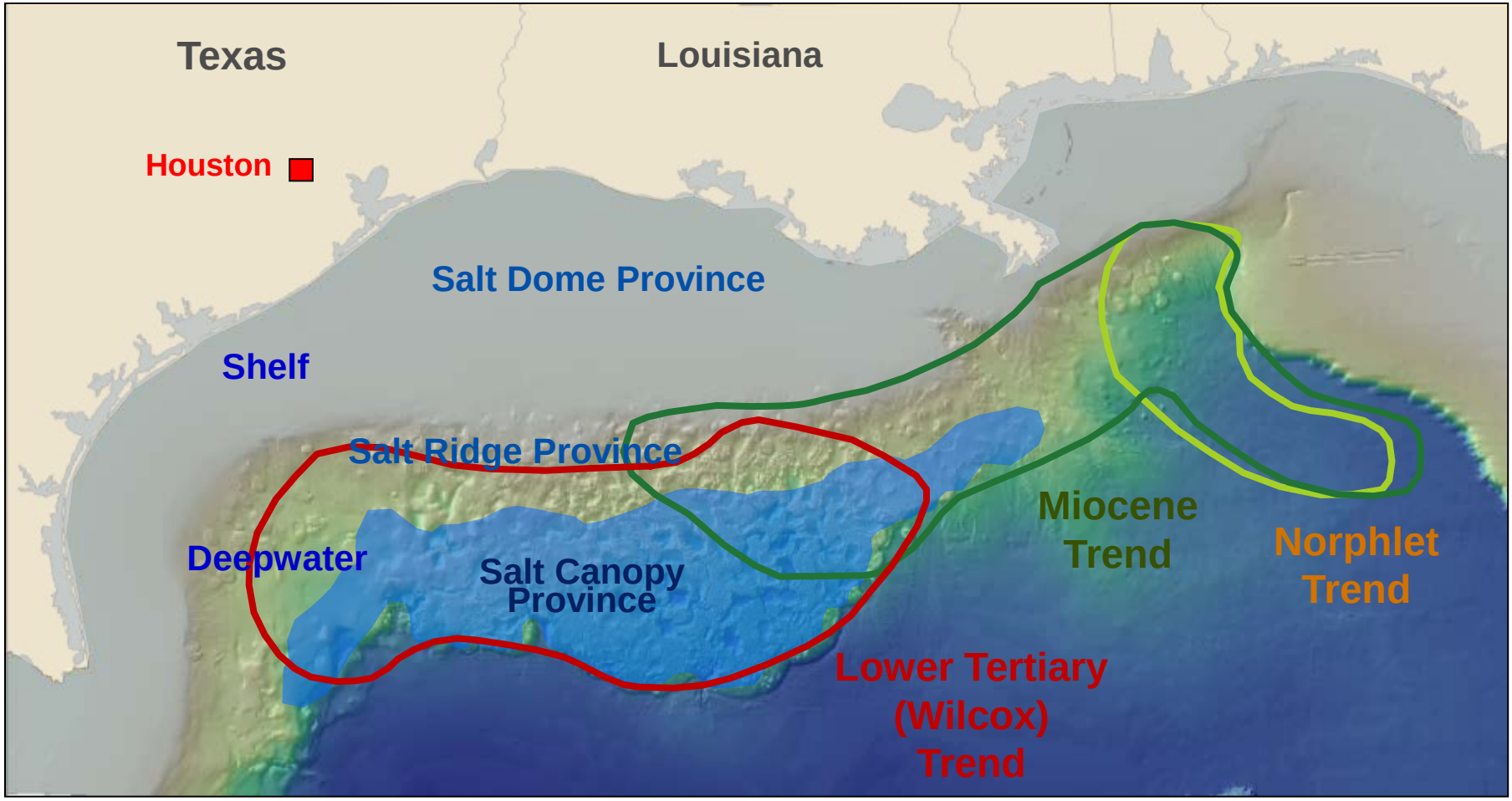
Offshore Seismic

Offshore Seismic Operations



Source: API

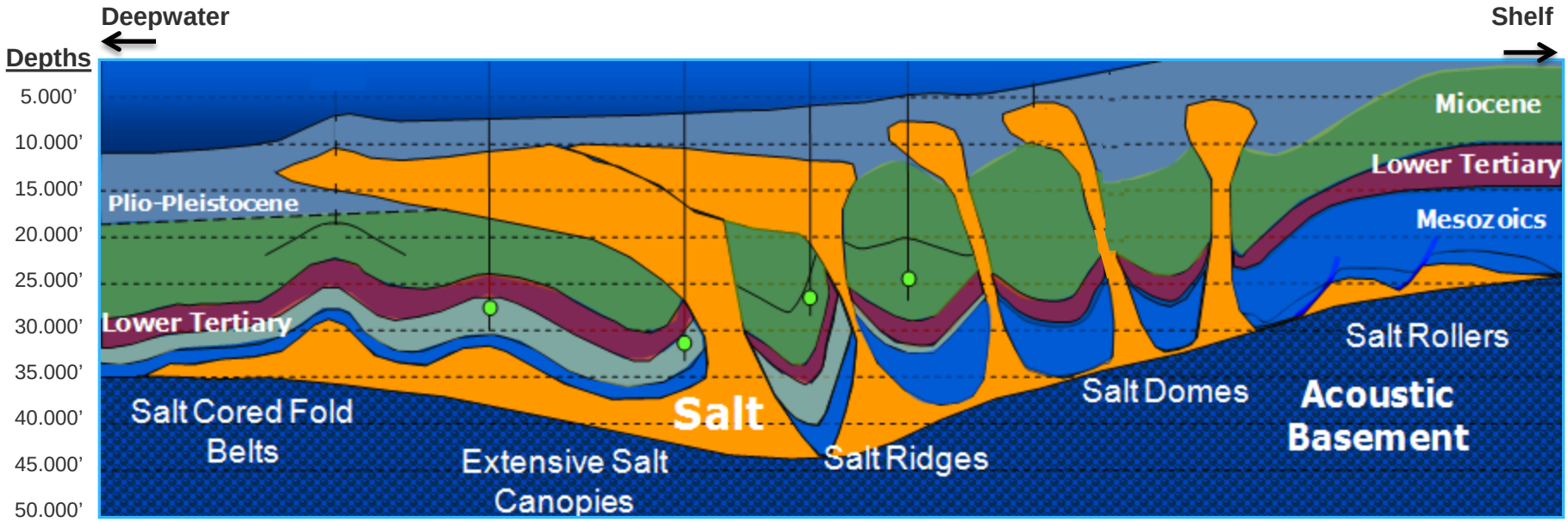
Geographic & Geologic Provinces of the Gulf of Mexico Basin



Source: Chevron

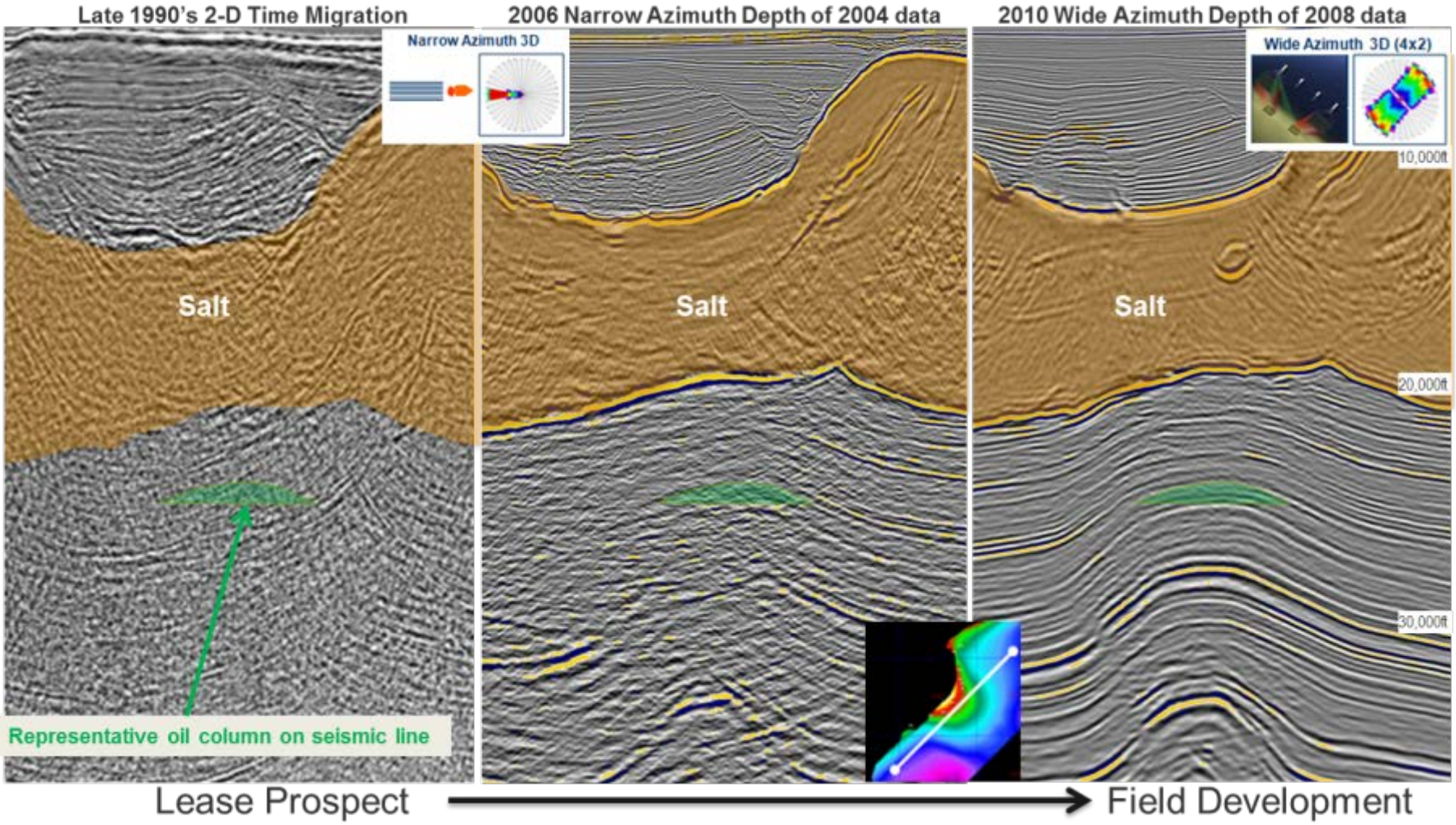
The Deepwater Gulf of Mexico
A Prolific Oil-Rich Petroleum System

- Prolific Petroleum Basin
  - 9 billion BOE produced in Deepwater alone
  - 49 billion BOE produced to date from Shelf alone
- Significant Resource Potential
  - 24 billion BOE discovered to date in Deepwater (end-2013)
  - Future deepwater discoveries estimated at ~14 billion BOE



** Source: Wood Mackenzie (October 2013)*

Seismic Imaging Technology Advances



Seismic courtesy of Western Geco

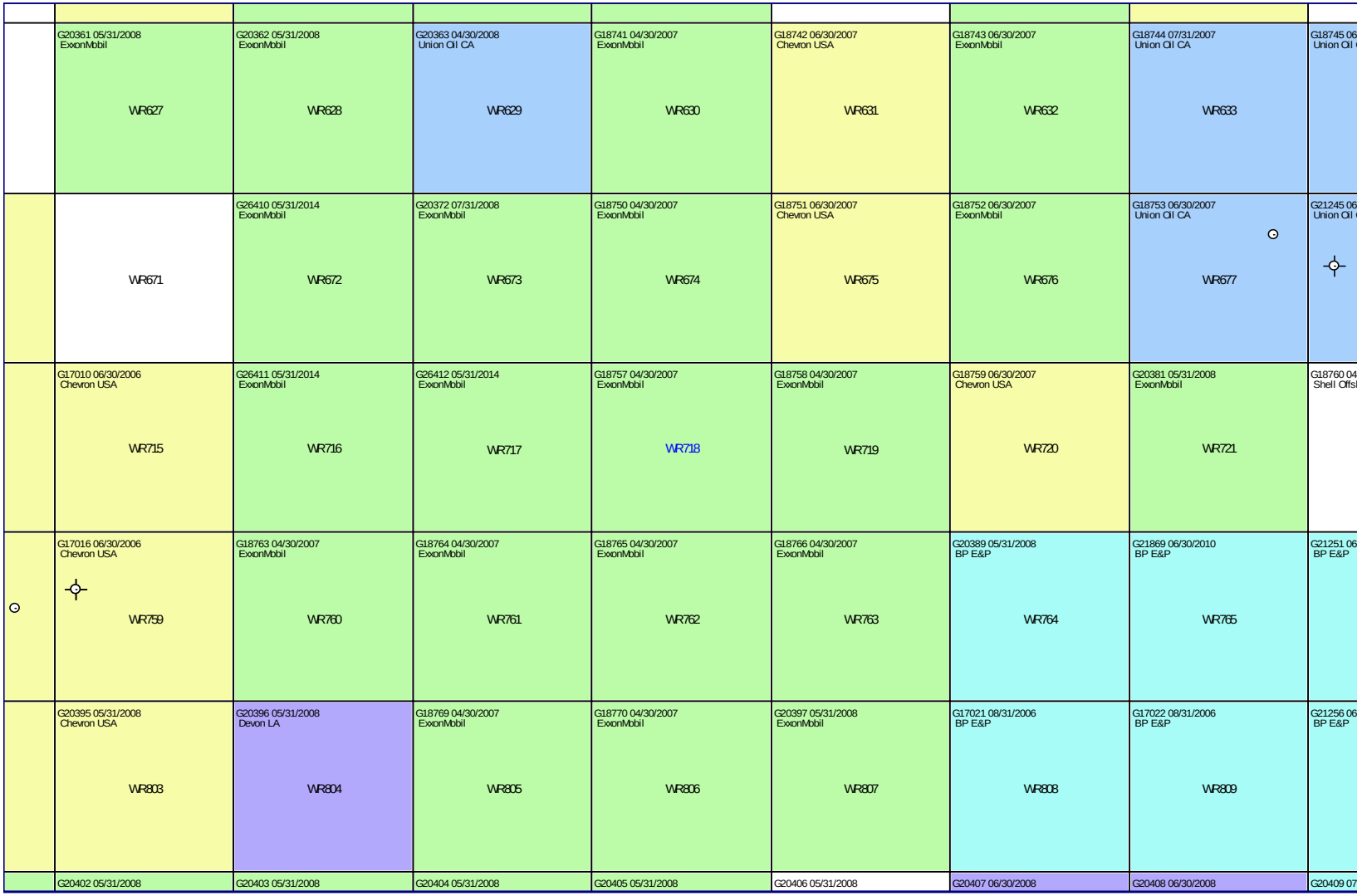
Acquiring the Lease

Offshore Lease Sales

Sale No.	Area	Year
229	Western Gulf of Mexico	2012
227	Central Gulf of Mexico	2013
233	Western Gulf of Mexico	2013
225	Eastern Gulf of Mexico	2014
231	Central Gulf of Mexico	2014
238	Western Gulf of Mexico	2014
235	Central Gulf of Mexico	2015
246	Western Gulf of Mexico	2015
226	Eastern Gulf of Mexico	2016
241	Central Gulf of Mexico	2016
237	Chukchi Sea	2016
248	Western Gulf of Mexico	2016
244	Cook Inlet	2016
247	Central Gulf of Mexico	2017
242	Beaufort Sea	2017

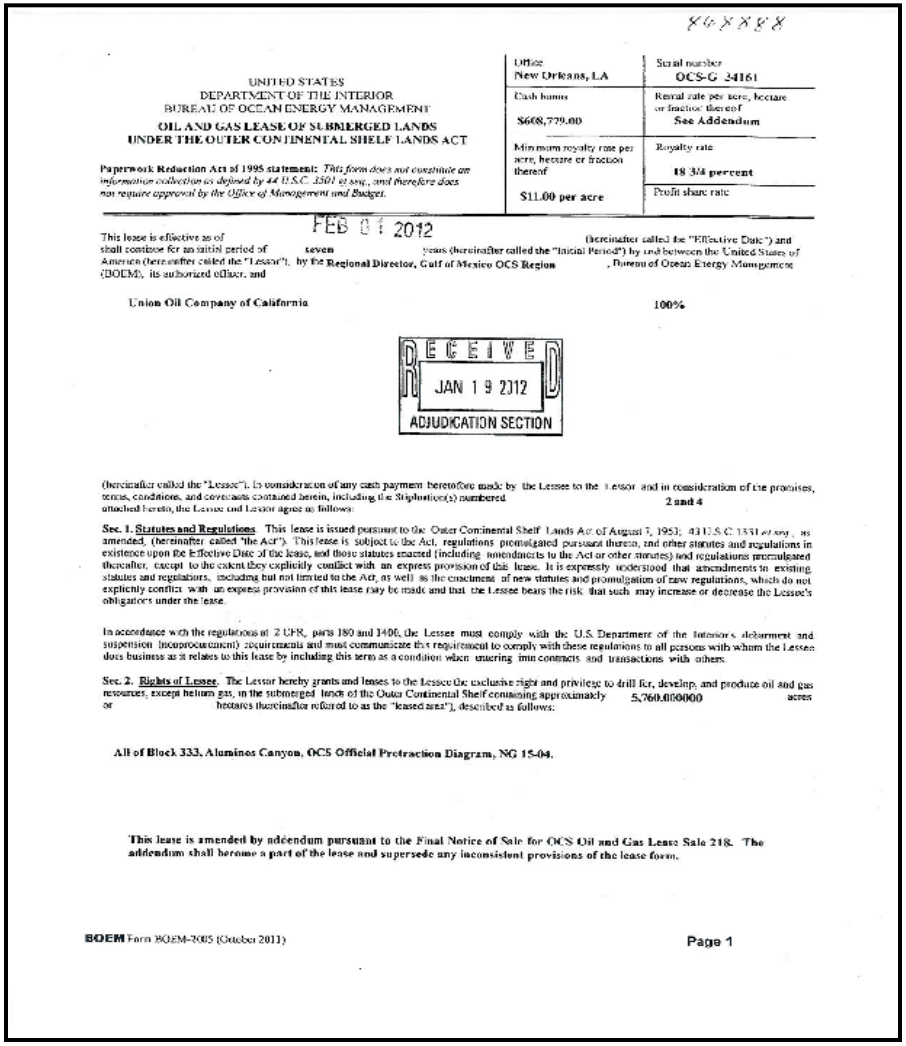
Source: Department of the Interior

Offshore Lease Blocks



Source: Chevron

Offshore Lease



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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT

OIL AND GAS LEASE OF SUBMERGED LANDS UNDER THE OUTER CONTINENTAL SHELF LANDS ACT

Office	Serial number
New Orleans, LA	OCS-G 34161
Cash bonus	Rental rate per acre, hectare or fraction thereof
$608,779.00	See Addendum
Minimum royalty rate per acre, hectare or fraction thereof	Royalty rate
$11.00 per acre	18 3/4 percent
	Profit share rate

Paperwork Reduction Act of 1995 statement: *This form does not constitute an information collection as defined by 44 U.S.C. 3501 et seq., and therefore does not require approval by the Office of Management and Budget.*

FEB 01 2012

This lease is effective as of (hereinafter called the "Effective Date") and shall continue for an initial period of seven years (hereinafter called the "Initial Period") by and between the United States of America (hereinafter called the "Lessor"), by the Regional Director, Gulf of Mexico OCS Region, Bureau of Ocean Energy Management (BOEM), its authorized officer, and

Union Oil Company of California 100%

RECEIVED
JAN 19 2012
ADJUDICATION SECTION

(hereinafter called the "Lessee"). In consideration of any cash payment heretofore made by the Lessee to the Lessor and in consideration of the promises, terms, conditions, and covenants contained herein, including the Stipulation(s) numbered 2 and 4 attached hereto, the Lessee and Lessor agree as follows:

Sec. 1. Statutes and Regulations. This lease is issued pursuant to the Outer Continental Shelf Lands Act of August 7, 1953, 43 U.S.C. 1331 *et seq.*, as amended, (hereinafter called "the Act"). This lease is subject to the Act, regulations promulgated pursuant thereto, and other statutes and regulations in existence upon the Effective Date of the lease, and those statutes enacted (including amendments to the Act or other statutes) and regulations promulgated thereafter, except to the extent they explicitly conflict with an express provision of this lease. It is expressly understood that amendments to existing statutes and regulations, including but not limited to the Act, as well as the enactment of new statutes and promulgation of new regulations, which do not explicitly conflict with an express provision of this lease may be made and that the Lessee bears the risk that such may increase or decrease the Lessee's obligations under the lease.

In accordance with the regulations at 2 CFR, parts 180 and 1400, the Lessee must comply with the U.S. Department of the Interior's debarment and suspension (nonprocurement) requirements and must communicate this requirement to comply with these regulations to all persons with whom the Lessee does business as it relates to this lease by including this term as a condition when entering into contracts and transactions with others.

Sec. 2. Rights of Lessee. The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, develop, and produce oil and gas resources, except helium gas, in the submerged lands of the Outer Continental Shelf containing approximately 5,760.000000 acres or hectares (hereinafter referred to as the "leased area"), described as follows:

All of Block 333, Alaminos Canyon, OCS Official Protraction Diagram, NG 15-04.

This lease is amended by addendum pursuant to the Final Notice of Sale for OCS Oil and Gas Lease Sale 218. The addendum shall become a part of the lease and supersede any inconsistent provisions of the lease form.

BOEM Form BOEM-2005 (October 2011) Page 1

Source: Chevron

Drilling Exploratory & Appraisal Wells

1. Explore & Lease

Photo courtesy of Transocean

2. Drill, Discover & Appraise

3. Plan Development

4. Design

5. Fabricate & Install

6. HUC, Start Up & Ramp Up

7. Production Operations

8. Plug & Abandon

Source: Chevron

Permitting & Drilling Operations

Drilling Vessels

Barge Rig
Very Shallow Water

Jack-up Rig
Water Depths up to 450’

Drilling Vessels

Photo courtesy of Transocean

Drillship

Water Depths up to 12,000’

Semi-submersible Rig

Water Depths up to 10,000’

Anchor Prospect
Green Canyon Blocks 762, 763, 806, 807

Description: Anchor is a large, well-defined exploration prospect in south-central Green Canyon. The primary objective is a three-way Wilcox closure against salt with a Miocene closure in the northwestern part of the structure. Drilling is underway in the exploratory well at a depth of 25,300'.

Wilcox Resource Potential: ??? MMBOE

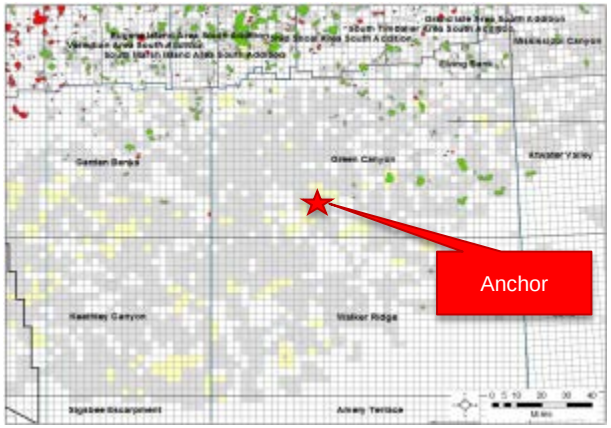
Objective Depth: 31,450' - 34,200' TVDSS

AFE: $179MM

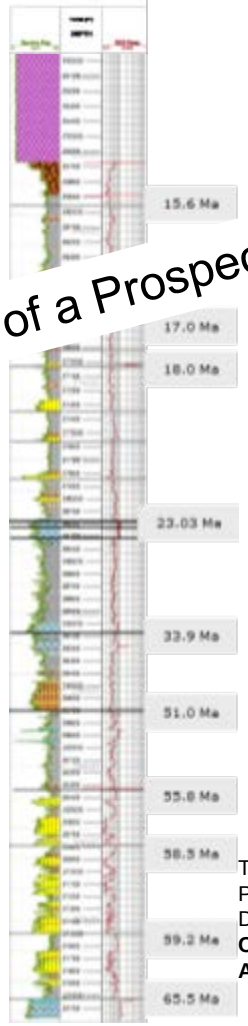
Anticipated TD: December 2014

Deal Terms: To be negotiated

Contact: John Doe 888-888-8888



Analog:
GC 847 #1
Turtle Lake



(Example of a Prospect)

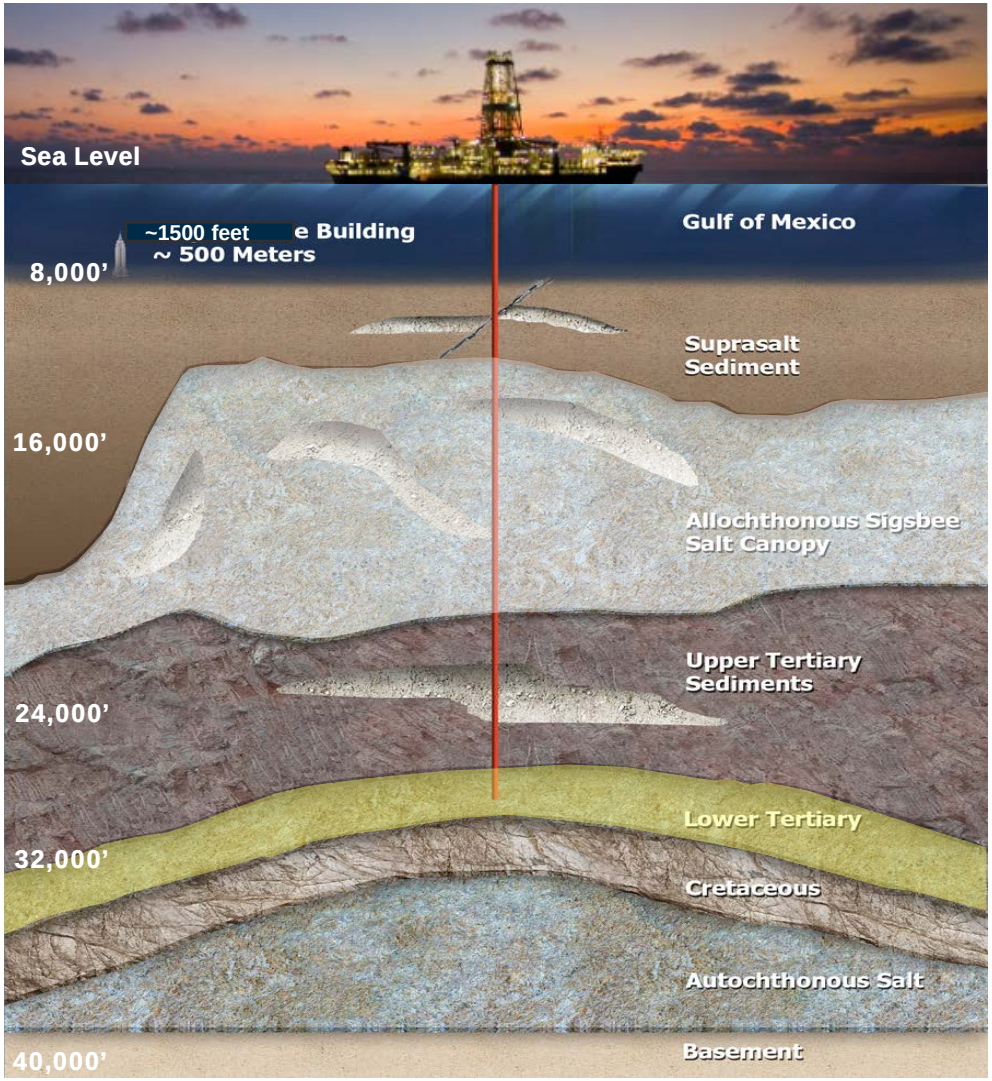
5/31/2014 Maxus Exp GC 717	5/31/2014 Murphy E&P GC 718	5/31/2014 BHP GC 719	5/31/2014 BHP GC 720
5/31/2014 Maxus Exp GC 761	4/30/2014 Chevron GC 762	5/31/2014 Chevron GC 763	2/28/2018 Cobalt GC 764
6/30/2018 Chevron GC 805	2/28/2018 Chevron GC 806	2/28/2018 Chevron GC 807	GC 808
6/30/2018 Chevron GC 849	2/28/2018 Cobalt GC 850	2/28/2018 Cobalt GC 851	2/28/2018 Statoil GC 852

GC 807

BSEE Approved Unit Boundary

Source: Chevron

Drilling Challenges in Deepwater

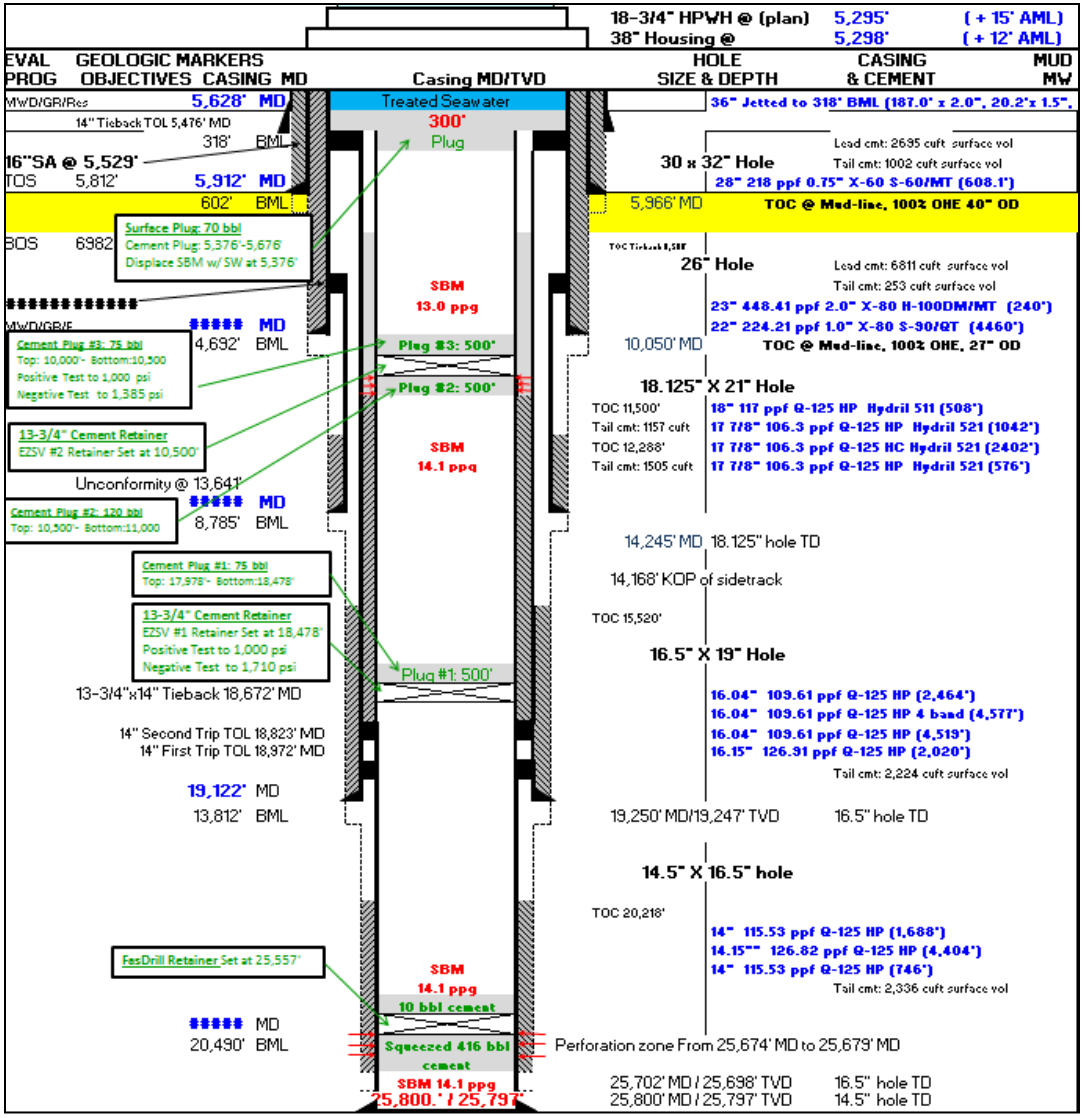


- 4,000 - 8,000' water depth
- Deep wells at 26,000' - 35,000'
- High pressure reservoirs at ~20,000 psi
- Thick reservoir intervals >1,000'
- Broad reservoirs extending from 1 block to 9 blocks
  - Reservoirs with relatively low permeability requiring advanced completions
  - Relatively lower recovery factors without advanced technologies

Source: Chevron

Deepwater Well Design

- Constructing a well takes time and requires a variety of people working on various components
- Certain wells can take up to a year to plan and design
- Internal governance processes ensure a viable well design



Source: Chevron

Pre-drilling Administrative Requirements

- Lease Bond
- Exploration Plan Bond
- Development Plan Bond
- Oil Spill Financial Responsibility
- Oil Spill Response Plan
- Containment Demonstration for Wells in >1000’ of water with Subsea BOP

Photo courtesy of Transocean

Securing Approvals and Permitting the Well

- Negotiate Joint Venture
- Execute Offshore Operating Agreement
- Operator Secure Internal Approvals
- Submit Well Proposal
- Non-Operators Secure Internal Approvals
- Conduct Operations

Required Permits/Approvals/Notifications*	Agency
Designation of Operator	BOEM
Approval for Oil Spill Financial Responsibility (OSFR)	BOEM
Oil Spill Response Plan	BOEM
Military Warning and Water Test Areas	DOD
NPDES Permit Notice of Intent (NOI)	EPA
Emergency Evacuation Plan (EEP) - DDS	USCG
Written Notice of Ancillary Activity - G&G Exploration Activity or Development G&G Activity	BOEM
Ancillary Activity - Follow-up G&G Reports	BOEM
Written Notice of Ancillary Activity - Other Survey Activity or Study	BOEM
Initial Exploration Plan (Initial EP)	BOEM
Voluntary Unitization Agreement Application	BSEE
Approval for well or bottomhole location within 500 feet of lease line	BSEE
Application for Permit to Drill (APD)	BSEE
Application for Permit to Modify (APM)	BSEE
Rig Movement Report	BSEE & USCG
ROV Survey Report	BSEE
End of Operations Report (EOR)	BSEE
Welding Plan	BSEE
Approval to Flare	BSEE
Application for Downhole Commingling	BSEE
Approval to Measure	BSEE
Well Potential Test Report	BSEE
Request for Determination of Well Producibility	BSEE

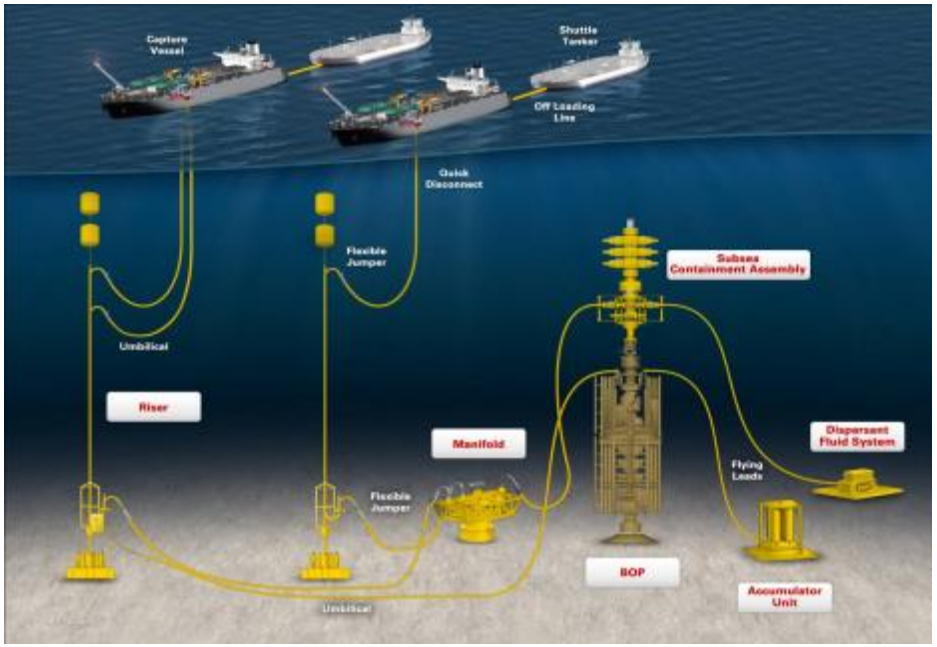
*[Coastal Zone Management Act (CZMA) Consistency – States]

Source: Chevron

Well Containment

Marine Well Containment Company

- 10 Members (Chevron, ExxonMobil, Shell, ConocoPhillips, etc…)
- Rapid response system available to capture and contain oil in the event of a potential underwater well blowout
- The system is flexible and able to begin mobilization within 24 hours and can be used on a wide range of well designs and equipment, oil and natural gas flow rates and weather conditions.
- The system (15,000 psig capping stack) is engineered to be used in deepwater depths up to 10,000' and have initial capacity to contain 60,000 barrels & 120 MMCFG per day with potential for expansion.
- Two Floating, Production, Storage and Offloading ships available for cap and flow operations.



Helix Well Containment Group

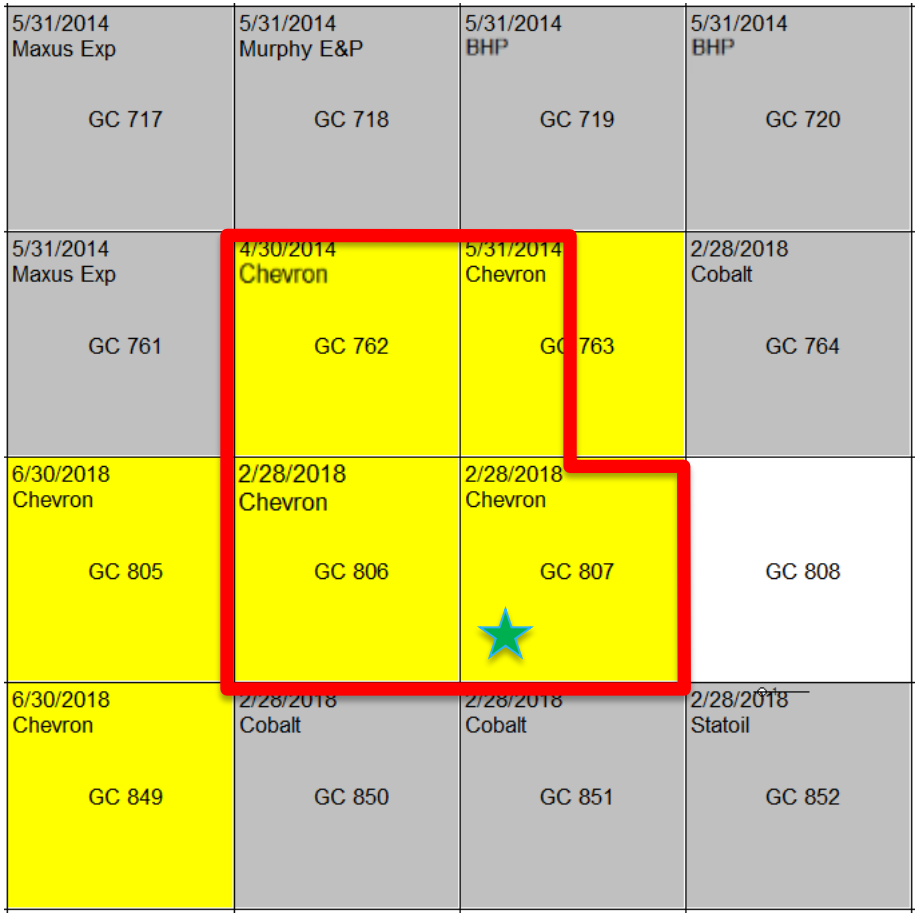
- Various Members
- Operate in up to 10,000 feet of water
- Two dual ram 10,000 & 15,000 psig capping stacks
- Intervention equipment to cap and contain a well
- Capture and process 55,000 BOPD & 95 MMCFPD

Source: Marine Well Containment Company

On Location

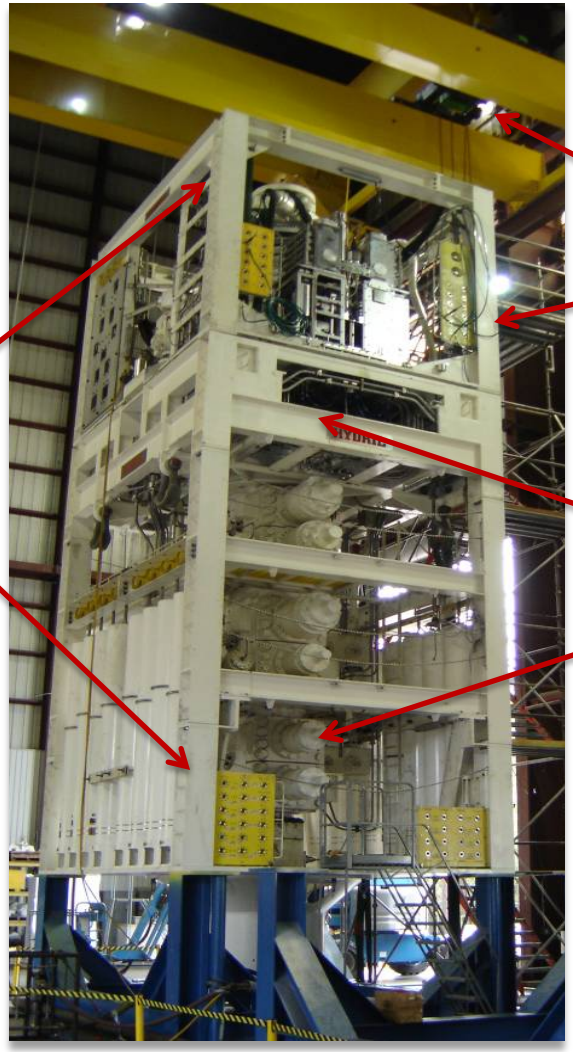
Photo courtesy of Transocean

Preparing to Drill



Source: Chevron

Subsea Blowout Preventer



Control Panels

Lower Marine Riser Package

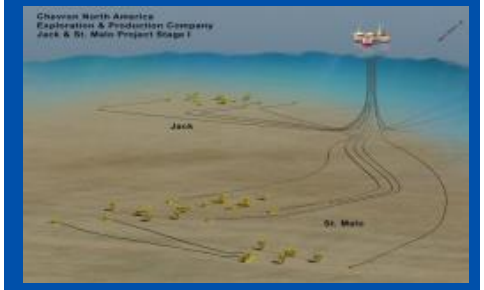
Ram Bodies

Source: Chevron

Develop a Commercial Discovery

1. Explore & Lease

2. Drill, Discover & Appraise



3. Plan Development

4. Design

5. Fabricate & Install

6. HUC, Start Up & Ramp Up

7. Production Operations

8. Plug & Abandon

Source: Chevron

Offshore Facilities

Types of Offshore Fixed and Floating Facilities

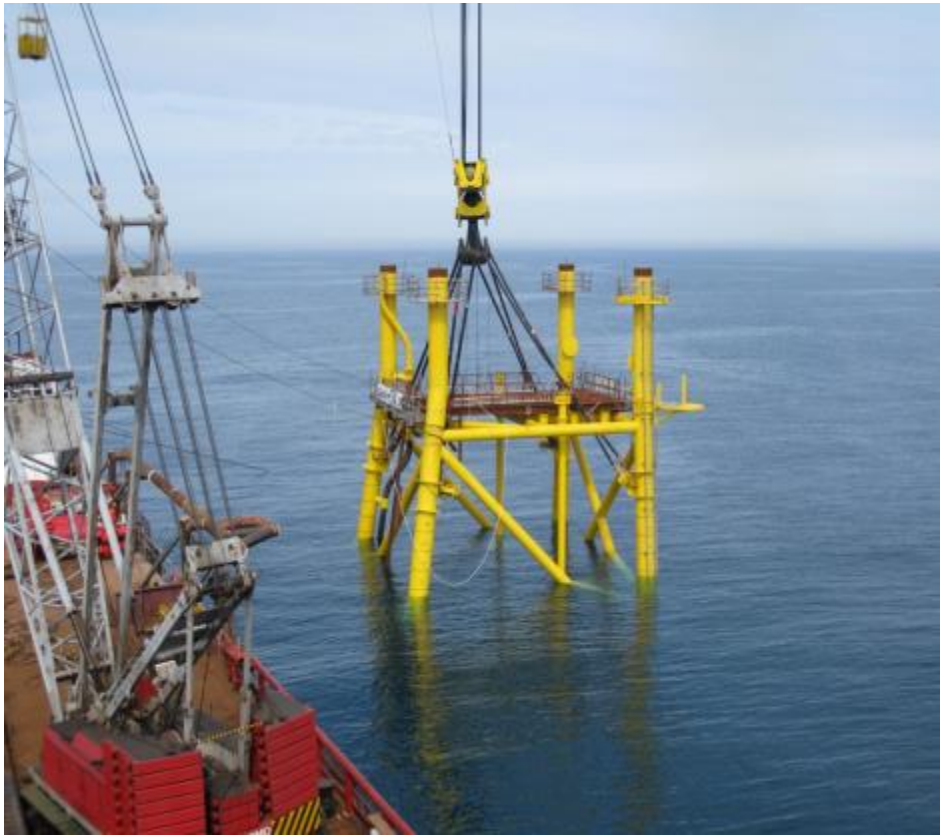
Source: API

Subsea Production System

Source: API

Shallow Water Jacket and Deck being Towed Out

4-Pile Jacket Installation



4-Pile Deck Installation

Deepwater Platform Fabrication, Transportation & Integration


Hull in Dry Dock


Hull Quayside

Hull Fabrication - Korea
Samsung Heavy Industries


Hull Transport from Korea


Hull Offloading at Kiewit

Hull Transport
Dockwise Vanguard


Production Module


Compression Module


Generation Module

Topsides Fabrication – Ingleside, TX
Kiewit Offshore Services


Flare Boom


Pipe Bridges


Module Lift with HLD


Setting Module on Hull


Relocation to Bulkhead

Topsides Module Lift & Set and
Integration & Commissioning Activities
Kiewit Offshore Services

Source: Chevron

Dockwise Vanguard Transportation Vessel

Arriving Dockside and Offloading

Arriving Dockside and Offloading

Arriving Dockside and Offloading

Arriving Dockside and Offloading

Arriving Dockside and Offloading

Arriving Dockside and Offloading

Arriving Dockside and Offloading

Hull & Topside Integration

Tow-out, Offshore Installation, Hook-up & Commissioning

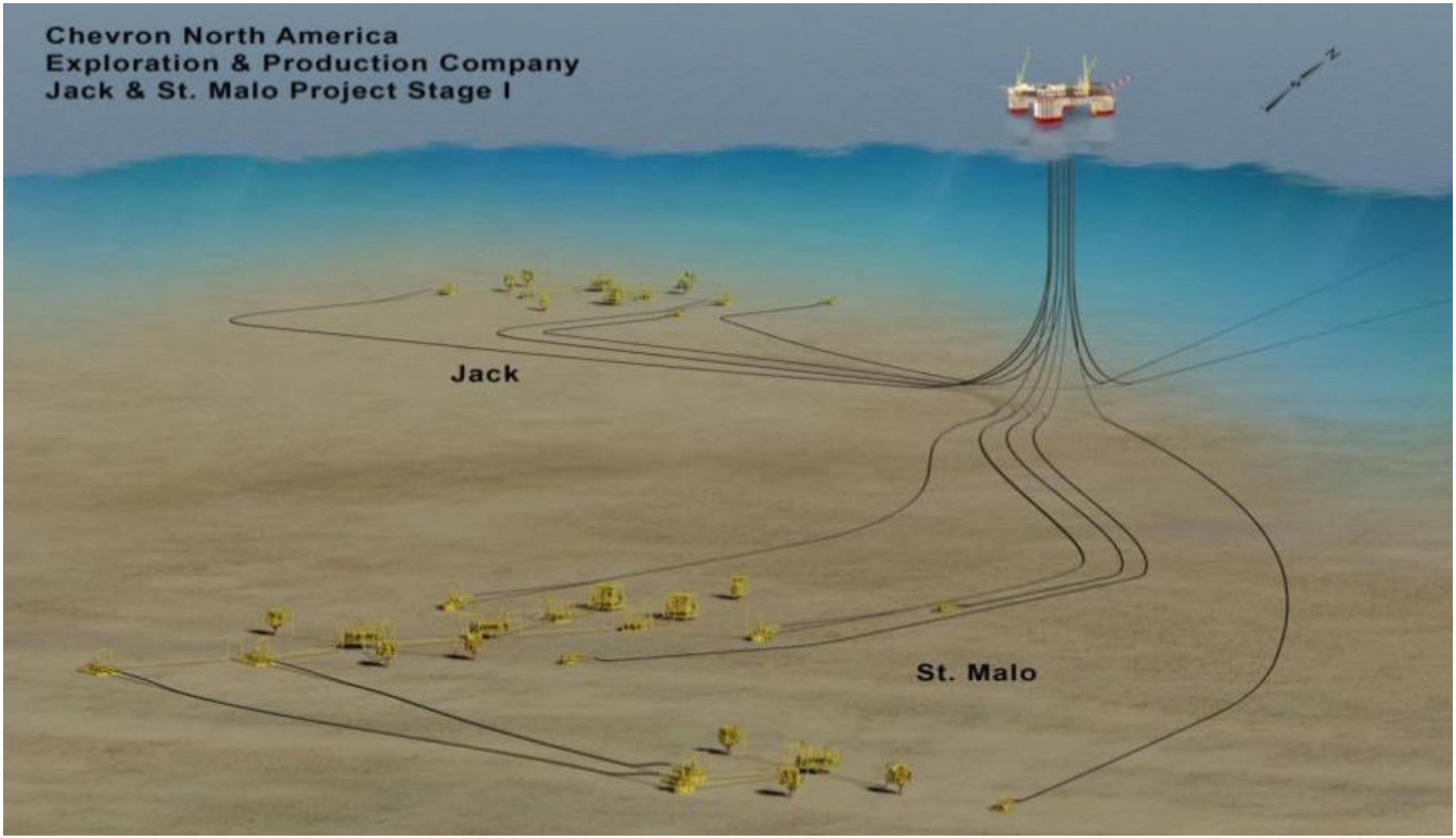
Integration Completed

Tow-out to Sea

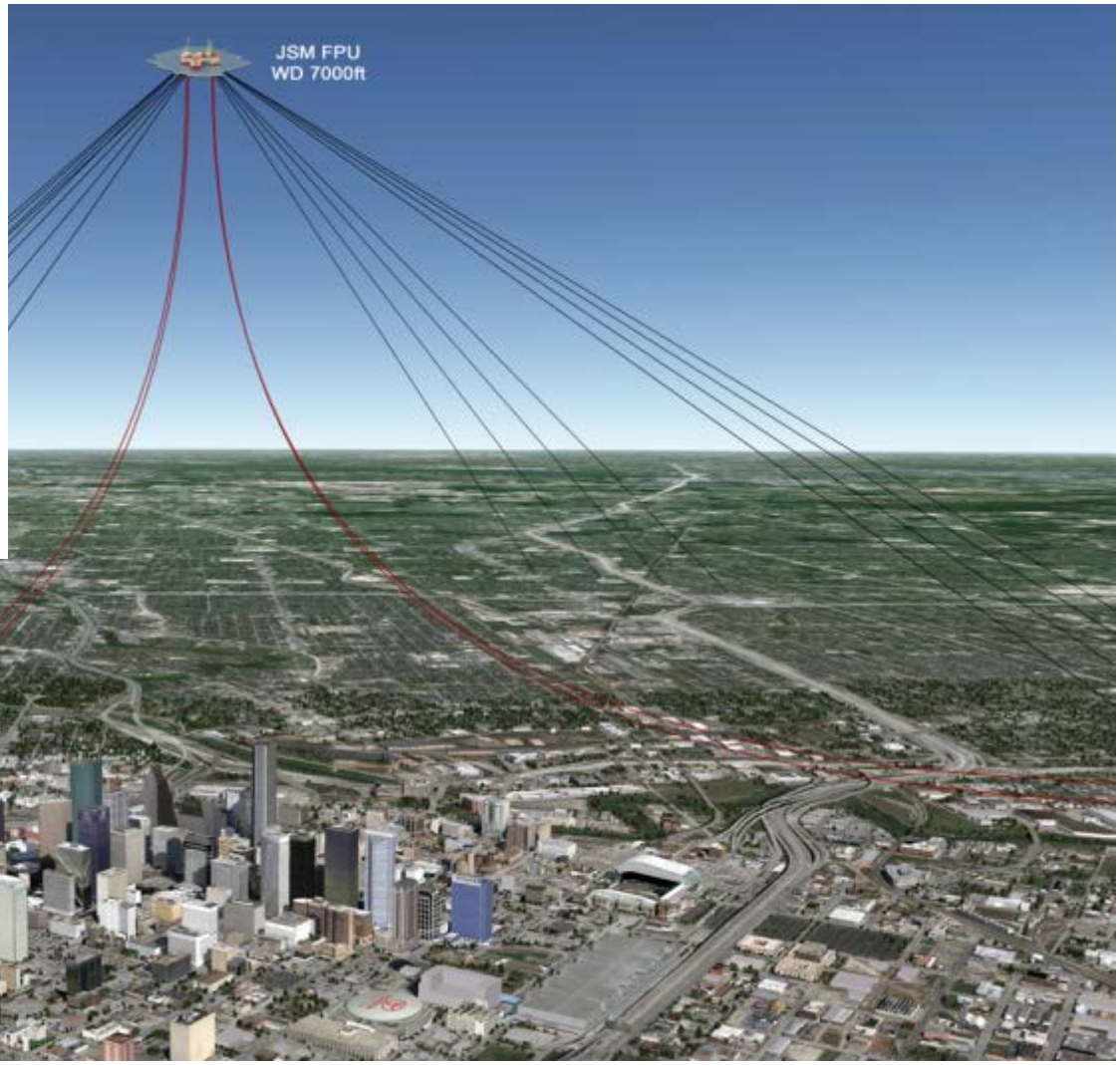
Installation,
Hook-up
&
Commission

Source: Chevron

Jack and St. Malo



Jack/St. Malo Field Layout
Houston perspective

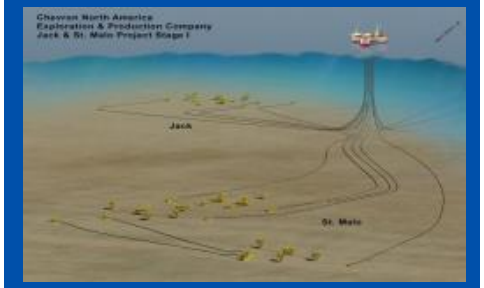


Source: Chevron

Hook-up, Commissioning and Production

1. Explore & Lease

2. Drill, Discover & Appraise



3. Plan Development

4. Design

5. Fabricate & Install

6. HUC, Start Up & Ramp Up

7. Production Operations

8. Plug & Abandon

Source: Chevron

Production Facility in the Gulf of Mexico

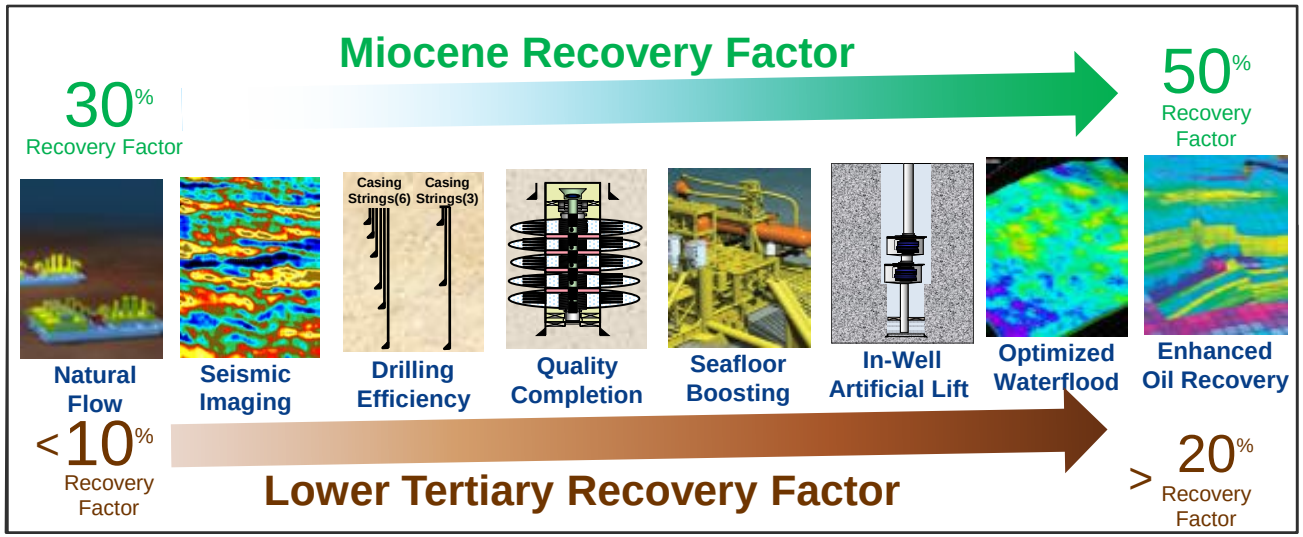
Offshore New Technologies

Thinking About the Future
Requiring Vision and Focus to Achieve Success

Fact: What is "normal today" was "impossible 10 years ago"
Belief: What is "impossible today" will be "normal 10 years from now"

Commitment to develop technology now is essential to achieve success in the future

- Set expectations that new technology will be delivered
- Strive for new breakthroughs
- Fund technology development before you need it
- Foster long term relationships with Vendors



Source: Chevron

Deepwater Enabling Technology

Subsalt Imaging

- 3D WAZ
- Coil WAZ
- Ocean bottom nodes

Drilling

- Subsea Mudlift Drilling
- Next generation drill ships
- Improved landing strings
- Next generation BOPs

Completions

- Single-trip multi-zone frac pack
- In-Well artificial lift
- Reservoir surveillance

Subsea Systems

- Seafloor boosting
- Seafloor separation
- Rigless well intervention
- 20,000 psi

Ultra-Deepwater Developments

- Out to 10,000' WD

Long Distance Tiebacks

- Flow assurance
- Long distance power and communications

Host Facilities with Small Field Tie-ins

- Spare risers
- Spare deck space

Facilities

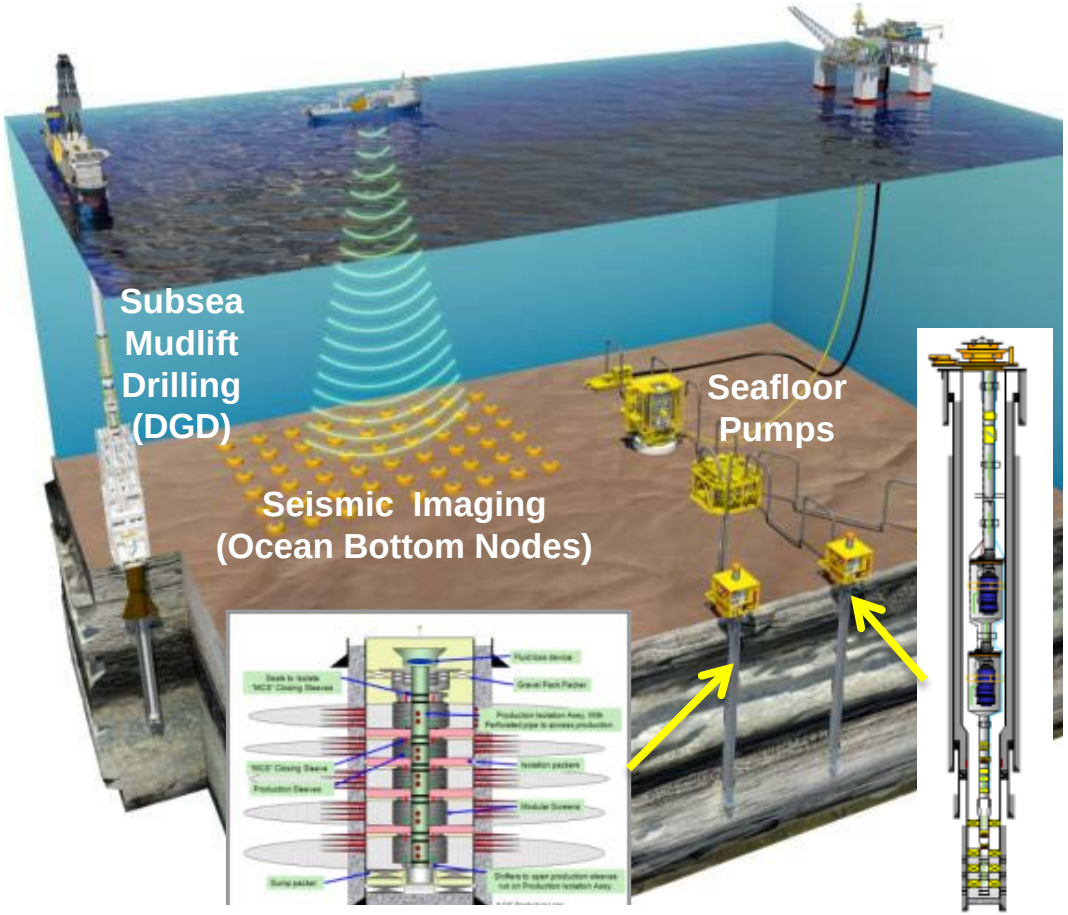
- Hull/mooring design standardization
- Compact modular processing systems

Operations

- Intelligent wells and i-field

Source: Chevron

Technology Enhances Oil & Gas Recovery



Single-trip Multi-Zone Frac Pack

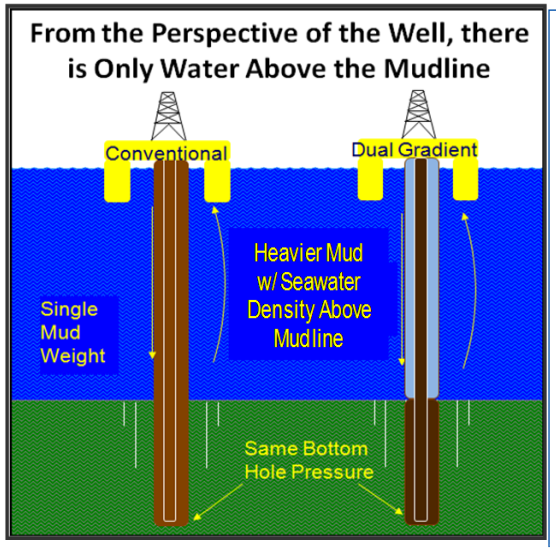
In-well Retrievable ESP

Source: Chevron

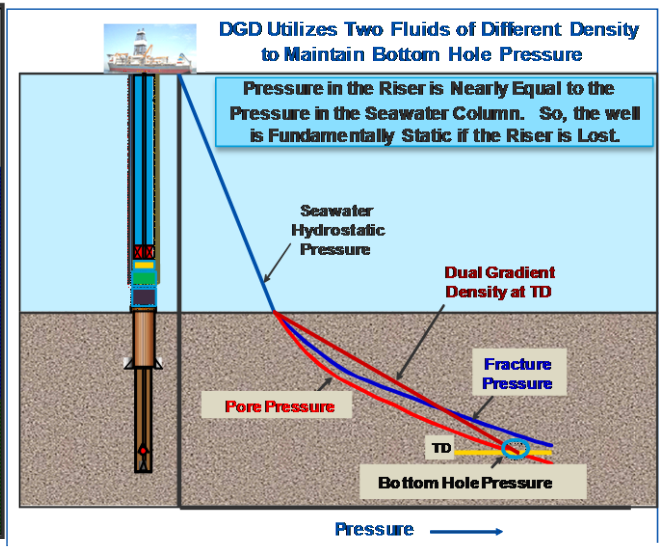
Subsea Mudlift Drilling (formerly known as Dual Gradient Drilling) Technology Overview

A Game Changer for Deep Water

- Eliminates the impact of water depth by replacing the mud in the riser with seawater density fluid. Higher density mud used below the mudline to achieve same bottom hole pressure.
- Restores "riser margin"; well is overbalanced even if riser fails. Drilling performance, well integrity and predictability are improved.
- Fewer casings, increasing potential for larger hole size at reservoir and for designer wells, like horizontal and multi-lateral wells.
- Detects and allows near-instant reaction to wellbore pressure changes, reducing NPT.

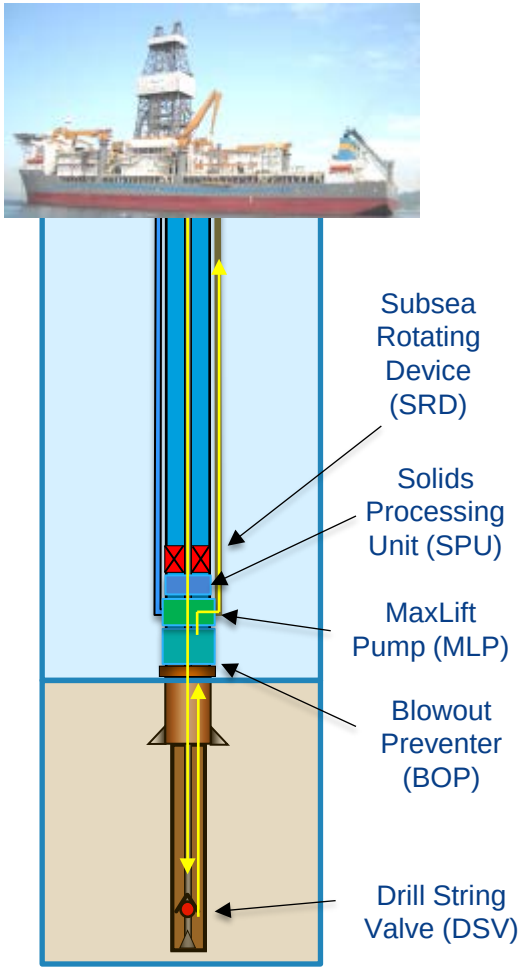


What is SMD?



Riser Margin is Restored

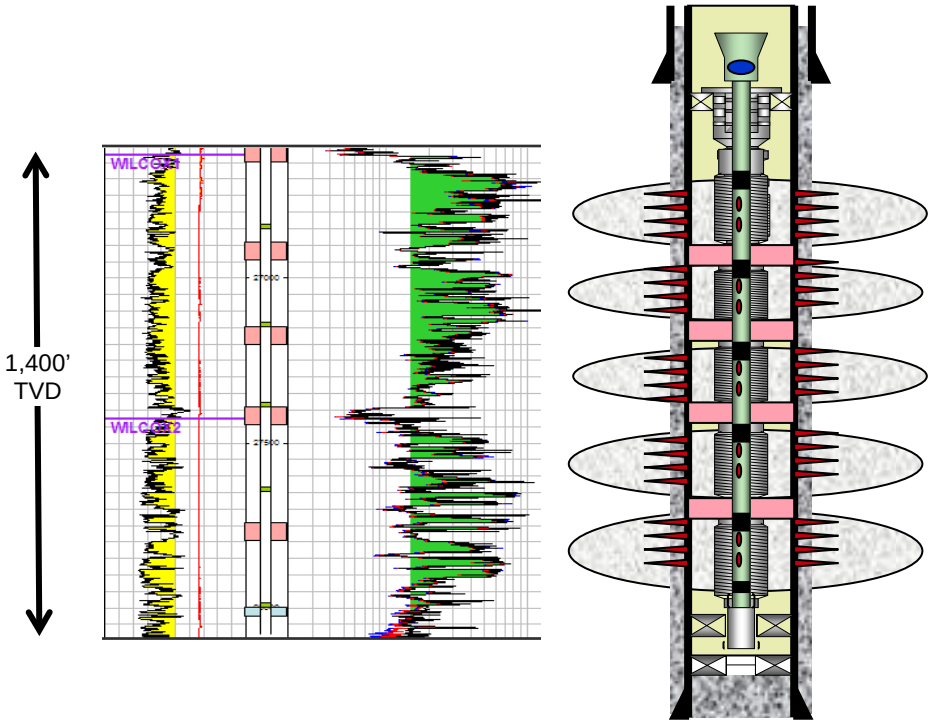
What is Required?



Source: Chevron

Quality Completions
Single Trip Multi-Zone Frac Pack Technology

Enhanced Single Trip Multi-zone(ESTMZ™*)
Designed for long lower tertiary completions



Conventional Completion (5 zone)	ESTMZ™* Cased Hole Completion (5 zone)
▪ 14 trips for completion installations including five perforation runs ▪ 64 days for sandface completion	▪ 4 trips for completion installations including one perforation run ▪ 36 days for sandface completion

**ESTMZ™ is a trademark of Halliburton*

- High production rates enabled by frac pack completion
- Thick oil sand intervals require three to five frac-packs for effective stimulation
- Reservoir pressures, interval lengths, and completion design require improved perforating gun to survive downhole conditions
- In a five zone completion, Single Trip saves 10 trips in the hole and reduces completion time by 38 days per well

Source: Chevron

Remember

What is "*normal today*" was "*impossible 10 years ago*"

What is "*impossible today*" will be "*normal 10 years from now*"

Questions