

***How to Form a  
9,000 Acre Ultra Deep Unit  
in a Few Easy Leaps***

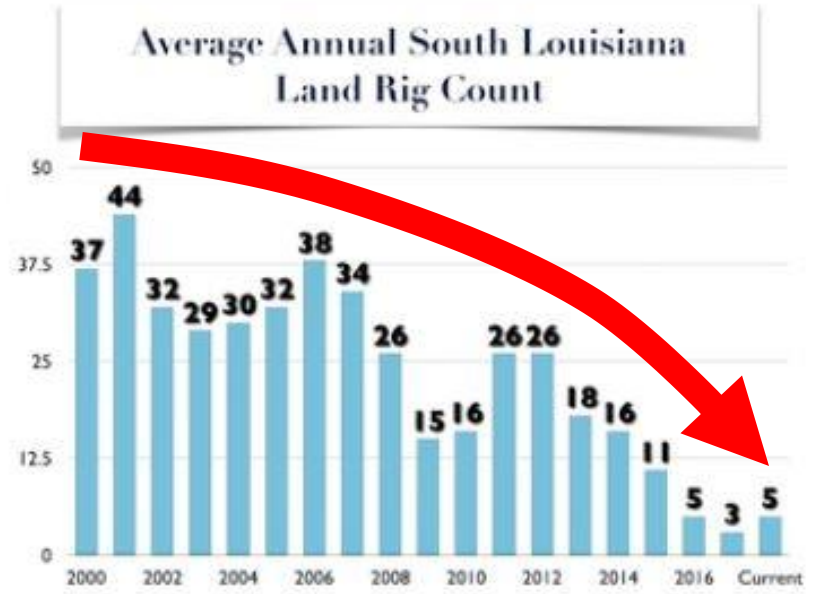
**Bryan S. Groves, Geologist**  
[www.bryangrovesgeology.com](http://www.bryangrovesgeology.com)



*1/5th*



*“.....HUH?!?!.....”*



***YOU ARE  
HERE***

*“.....free fallin’.....”*

\$\$\$\$

\$\$\$

\$\$

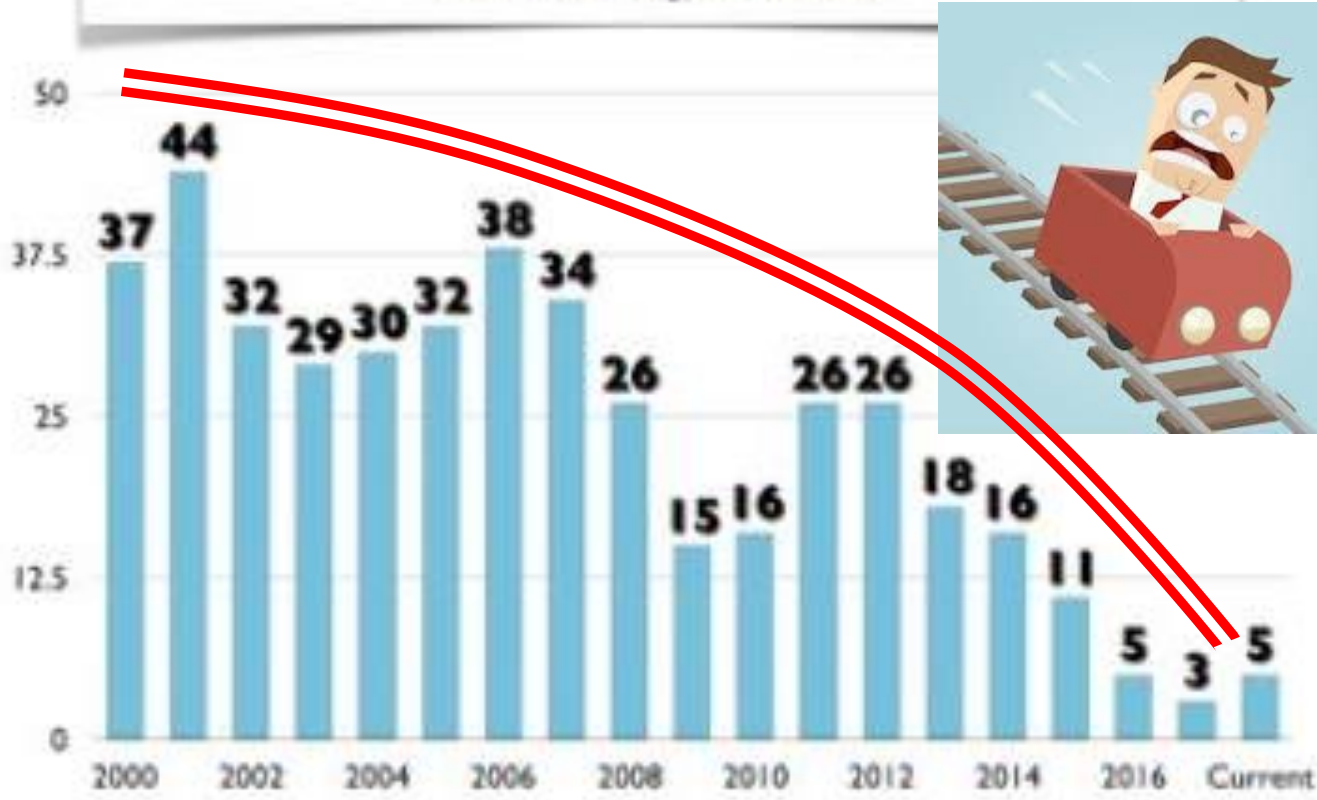
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Average Annual South Louisiana Land Rig Count



*“.....hang on.....”*



*“.....it’s getting better, RIGHT???......”*



*...yea, in TEXAS!*

*“.....it’s getting better, RIGHT???......”*



*...anywhere, BUT Louisiana...*

*...in conclusion....*



*Part*

# OVERVIEW

**1**

## Geological & Geophysical World

Bedding (Strata)

Faulting

Seismic Data (Prospect Delineation)

**2**

## Unitization – Land & Legal World

Types of Units

Interval Definitions (Sand & Zone)

LDNR Unitization Process

**3**

## Ultra Deep Unitization – Combined Worlds

Ingredients

Case Histories

# *...9,000 Acre Ultra Deep Unitization...*

GEOLOGICAL & GEOPHYSICAL WORLD

*Bedding (Strata)*

*Part 1 of 3*

# Bedding (Strata)



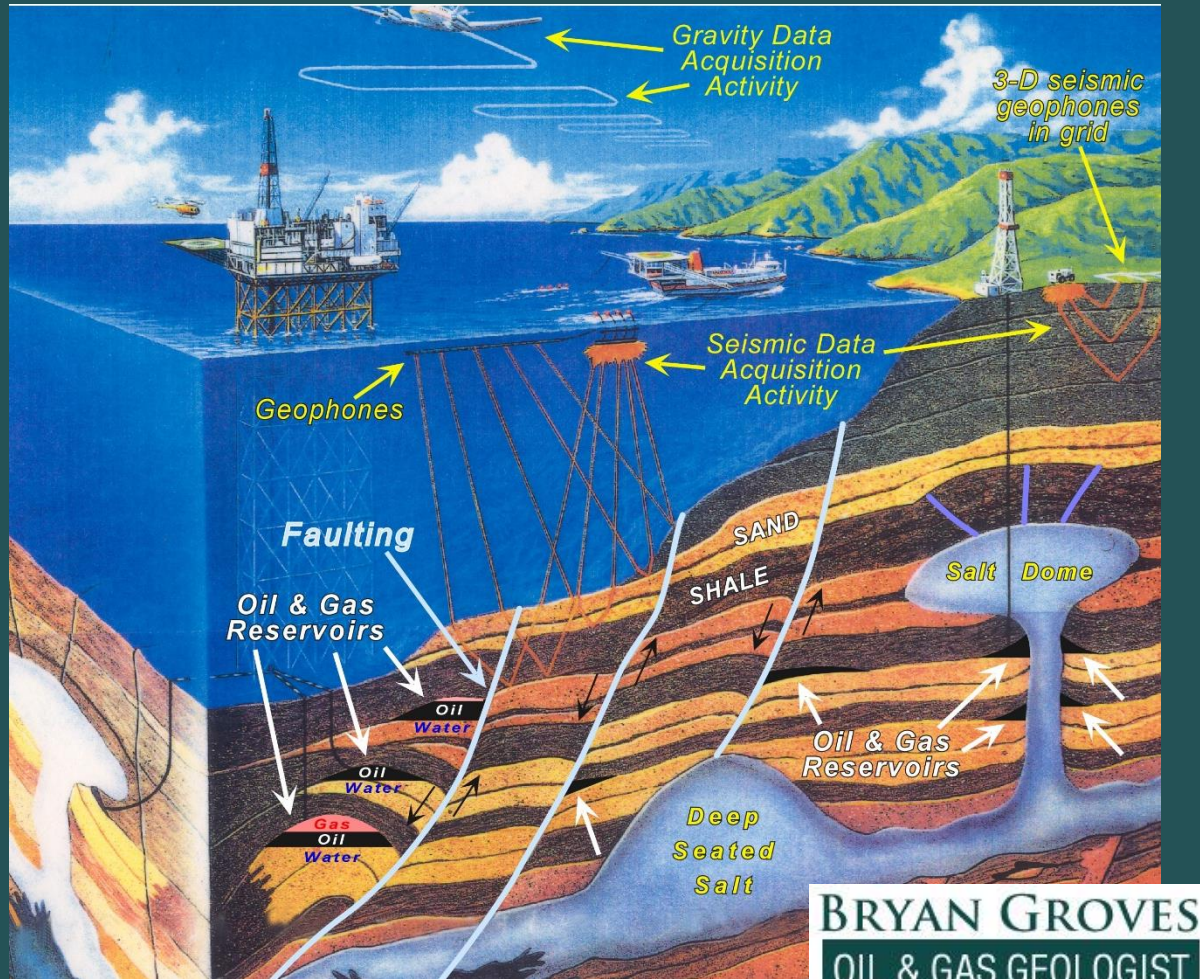
# Bedding (Strata)



# Bedding (Strata)



# Bedding (Strata)



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# *...9,000 Acre Ultra Deep Unitization...*

GEOLOGICAL & GEOPHYSICAL WORLD

*Faulting*

*Part 1 of 3*

# Faulting





# Faulting



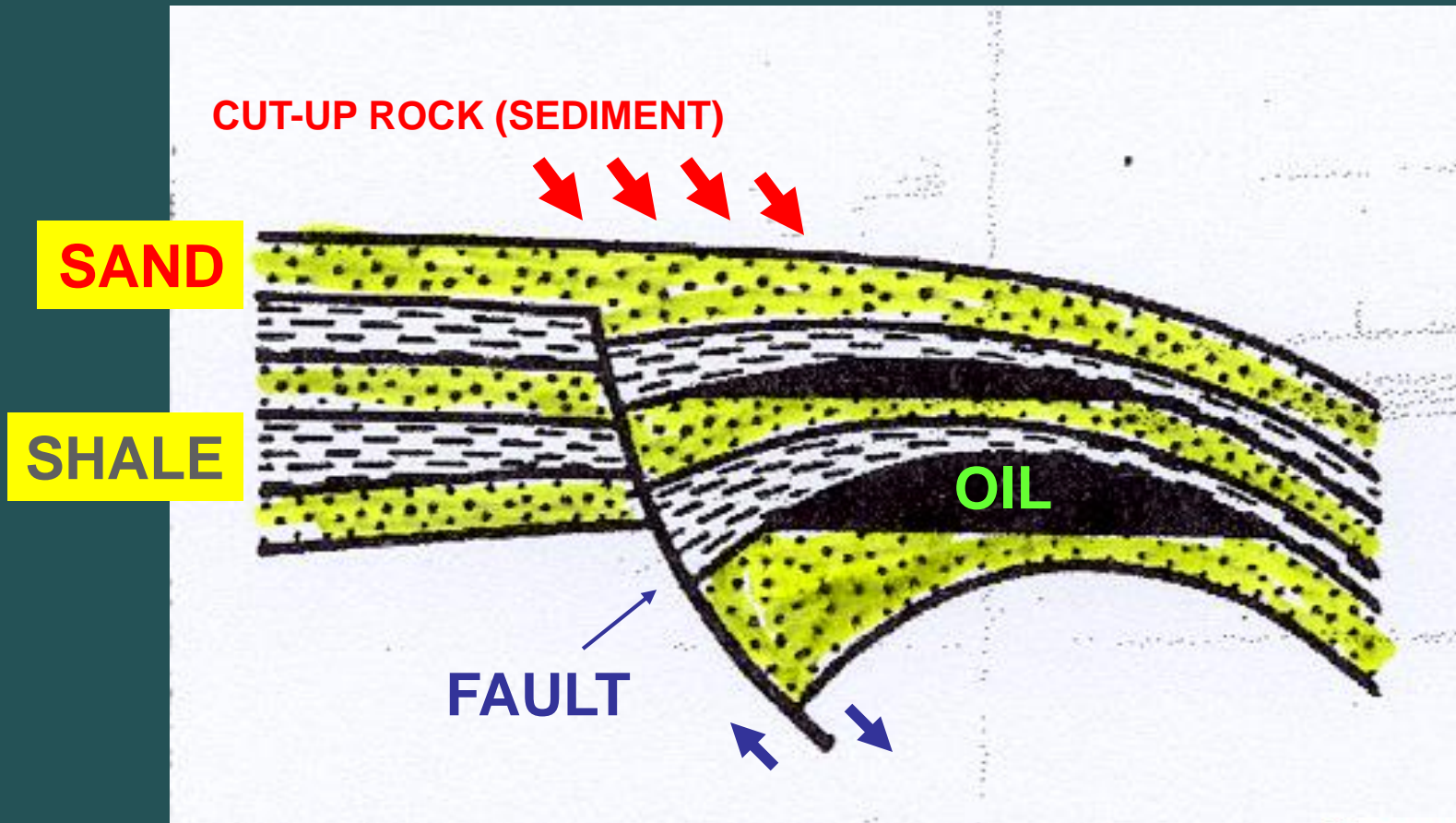
# Faulting

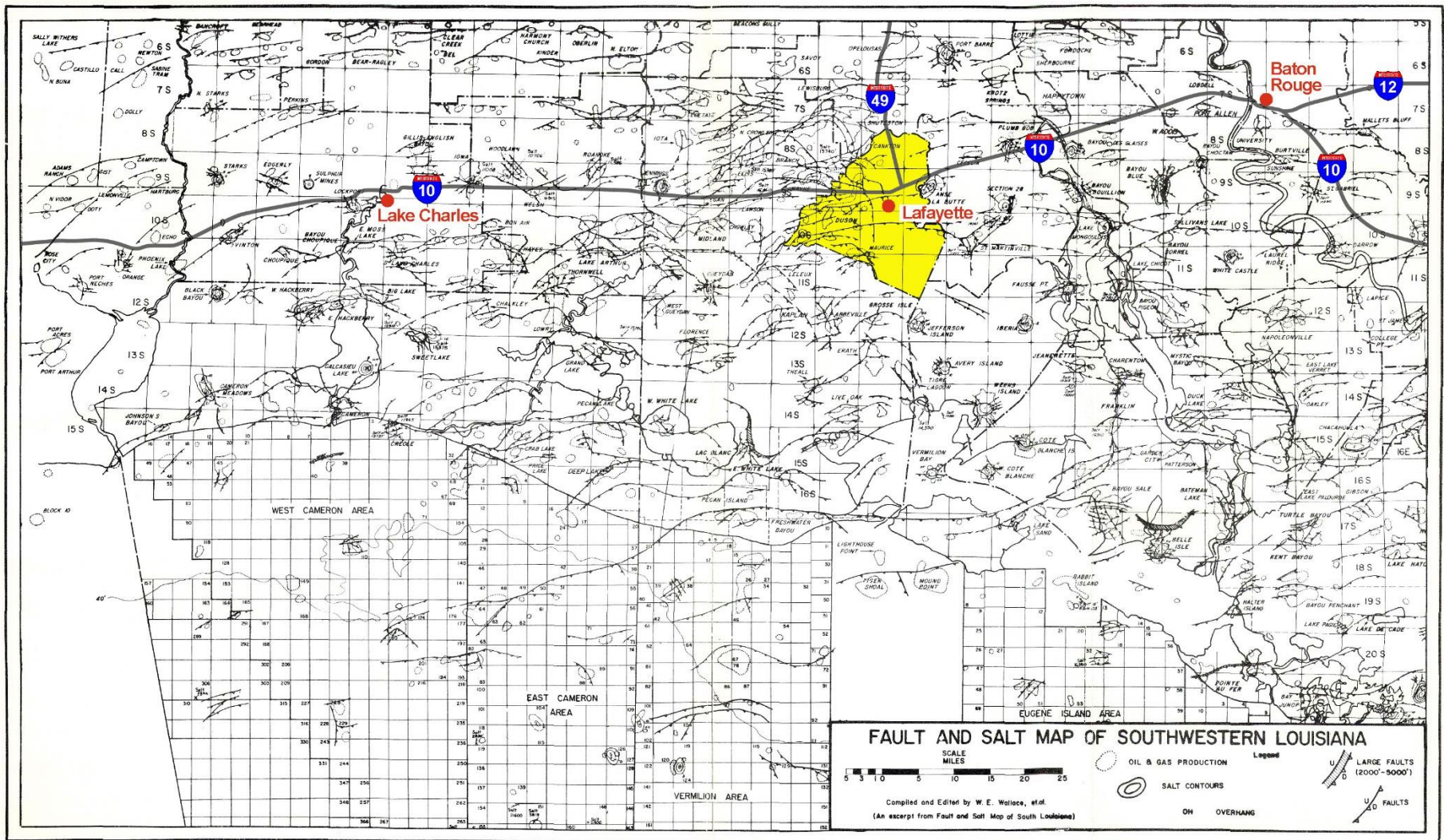


# Faulting



# Faulting





## Fault & Salt Map

From: Lafayette Geological Society

"Typical Oil & Gas Fields of Southwestern Louisiana"

Volume 3, published in 1989

Gulf Coast Mineral Institute  
Friday, October 12, 2018

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# *...9,000 Acre Ultra Deep Unitization...*

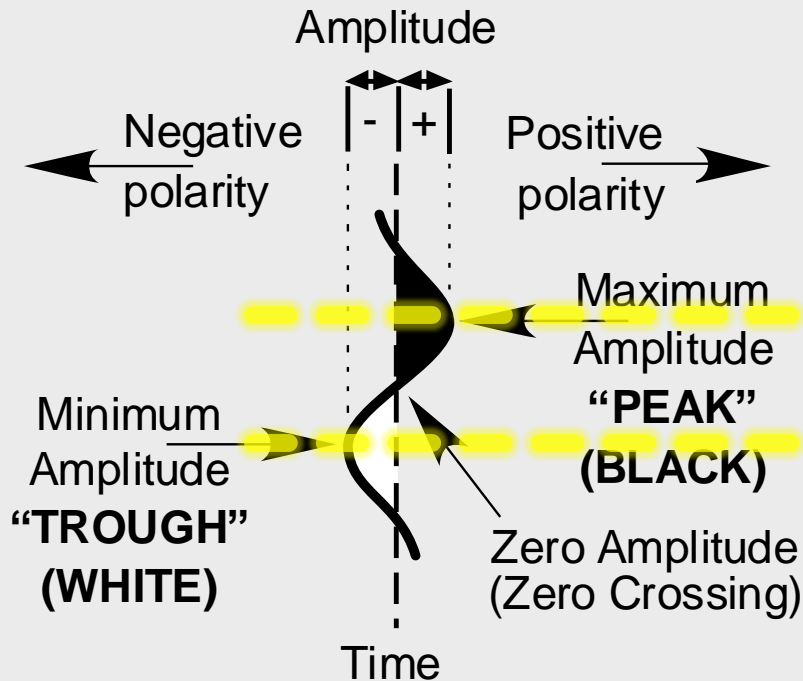
GEOLOGICAL & GEOPHYSICAL WORLD

*Seismic Data, Prospect Delineation*

*Part 1 of 3*

# Seismic Data, Prospect Delineation

## Generalized 3-D Seismic Wavelet



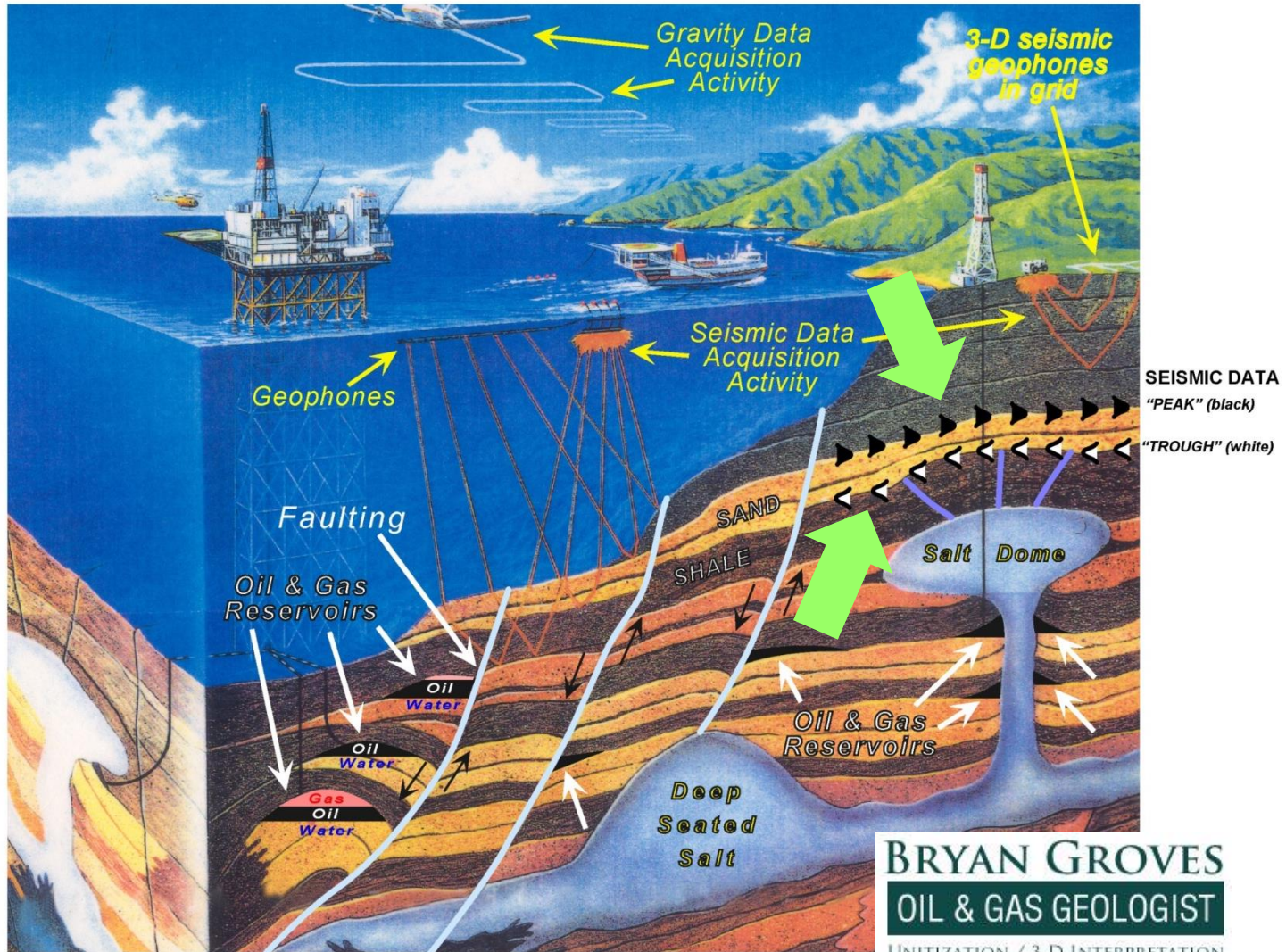
top of sand

*sand body*

base of sand

# Seismic Data, Prospect Delineation

## Typical Subsurface Geologic Features

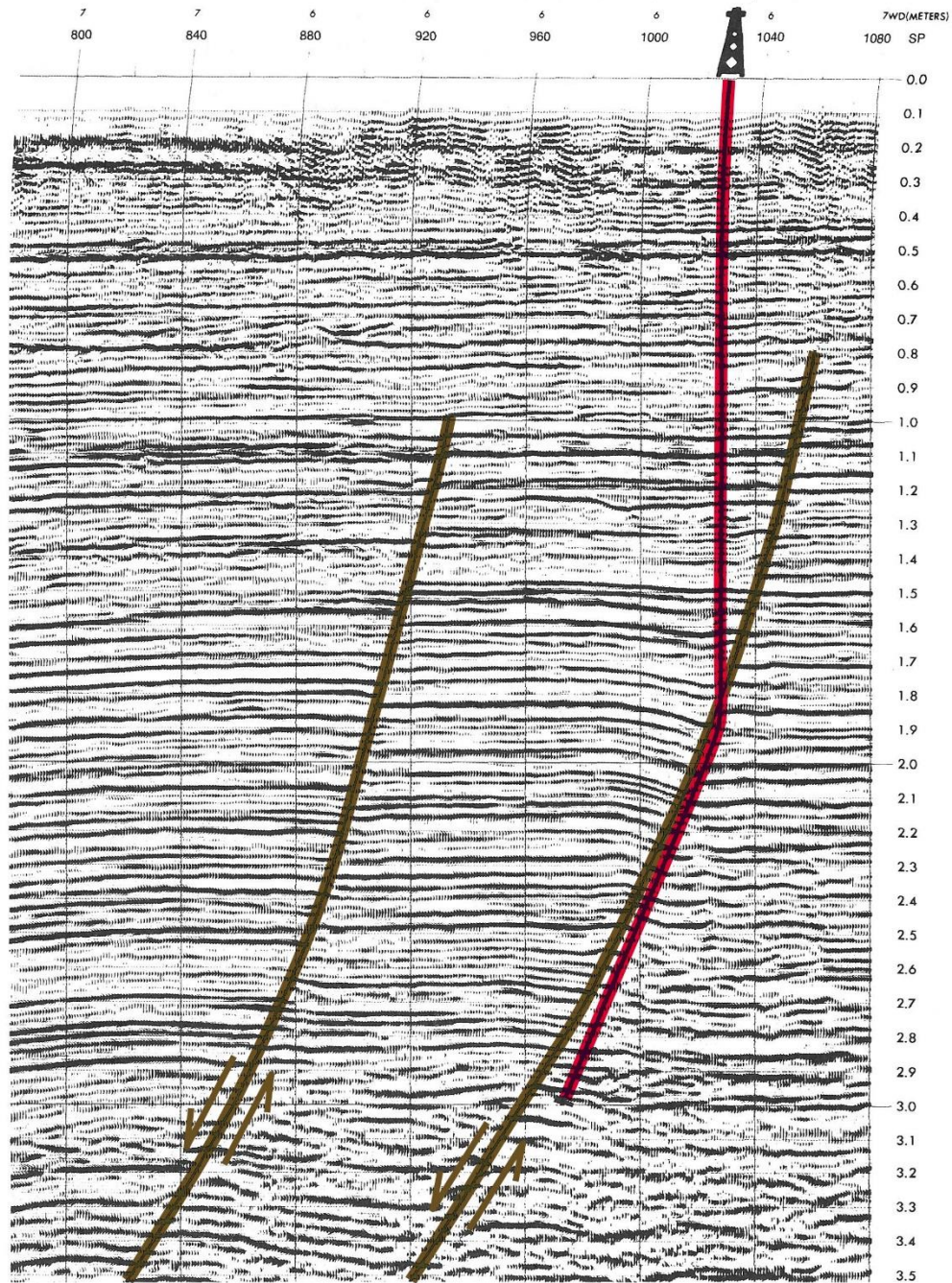


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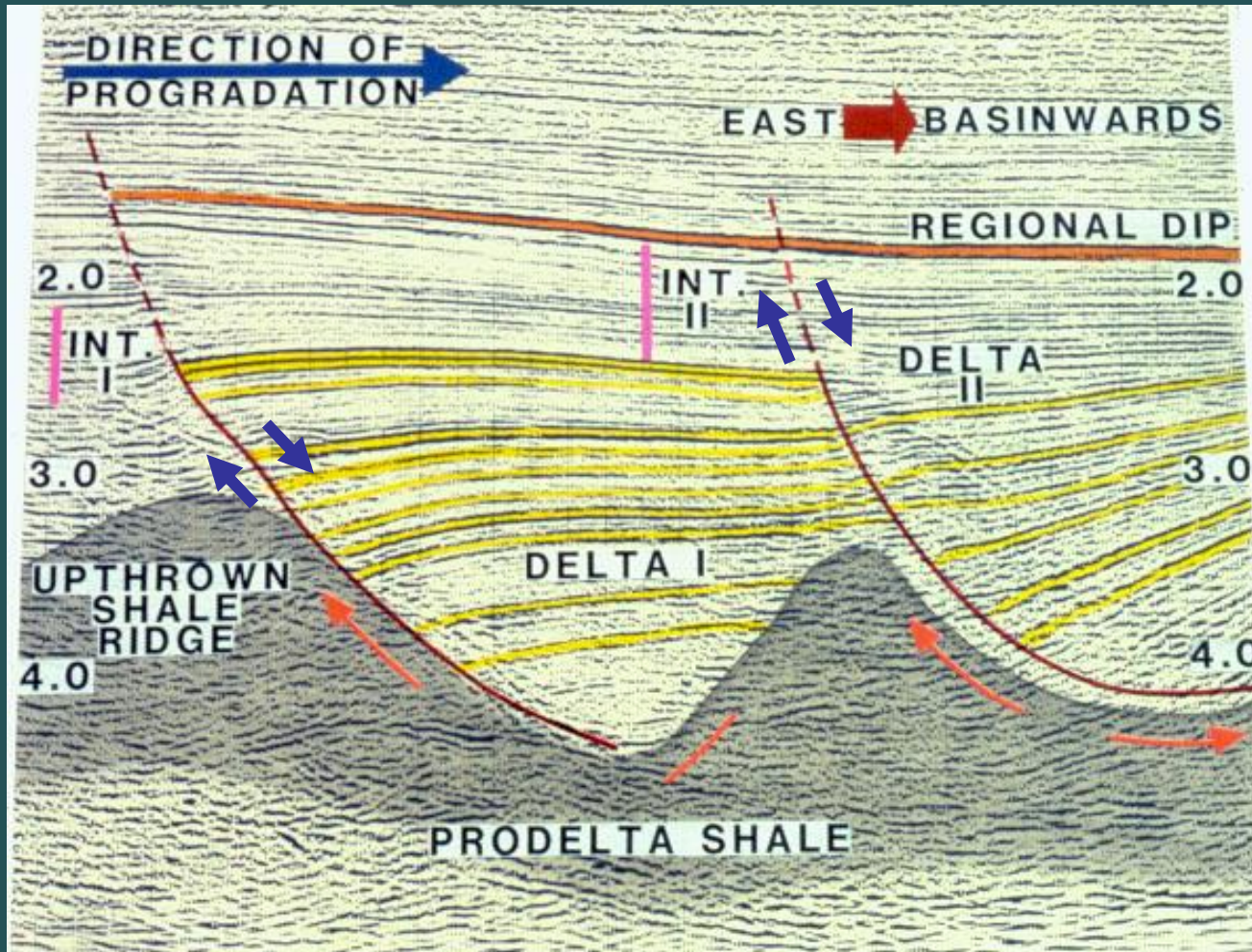
# SEISMIC DATA

SURFACE  
LOCATION  
WELL #2

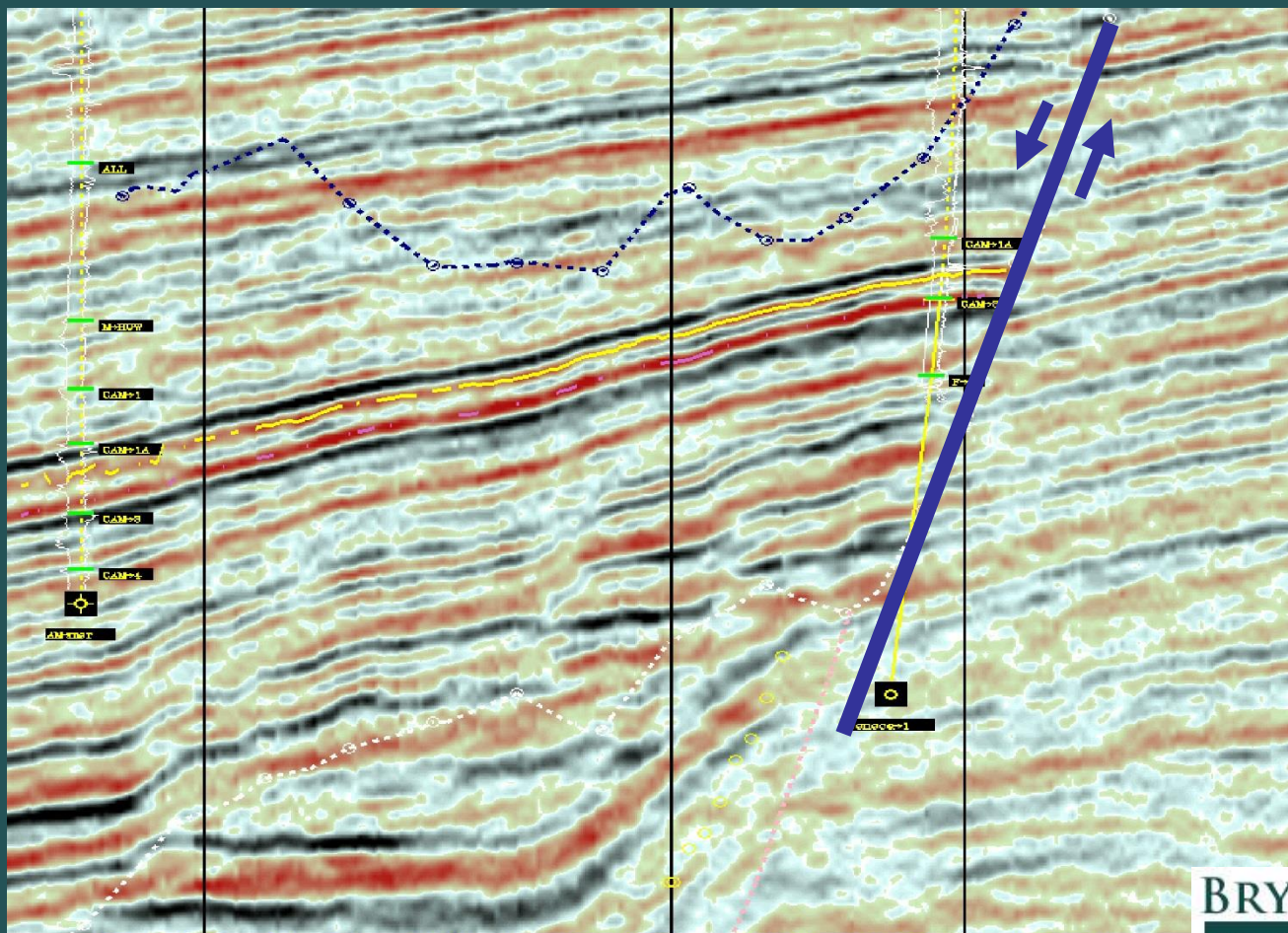


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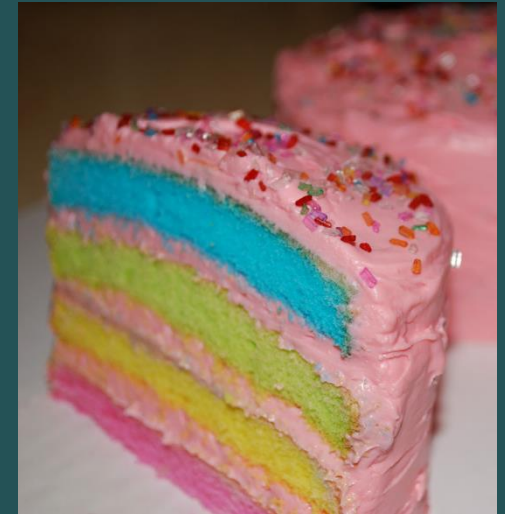
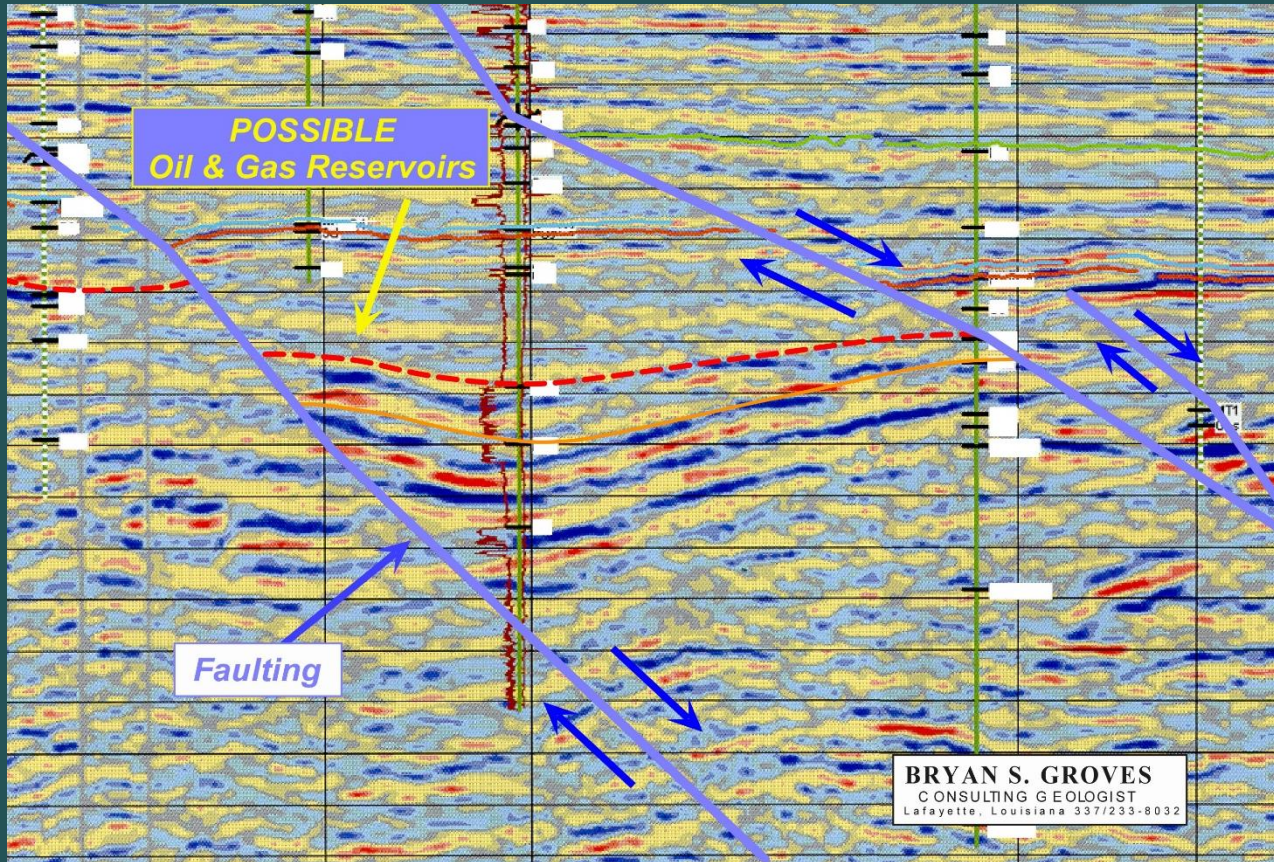
# Seismic Data, Prospect Delineation



# Seismic Data, Prospect Delineation



# Seismic Data, Prospect Delineation



# ...9,000 Acre Ultra Deep Unitization...

## GEOLOGICAL & GEOPHYSICAL WORLD

*Bedding (Strata)*

*Faulting*

*Seismic Data, Prospect Delineation*

*Part 1 of 3  
DONE!*

# Q & A

*How to Form a  
9,000 Acre Ultra Deep Unit  
in a Few Easy Leaps*

*...take a breath...*



# *...9,000 Acre Ultra Deep Unitization...*

UNITIZATION – LAND & LEGAL WORLD

*Types of Units*

*Part 2 of 3*

## *Types of Units*

- Voluntary: geographic per agreement
- Declared: per lease provisions
- Conservation: geologic or geographic per State



## *Types of Units*

- Voluntary: geographic per agreement
- Declared: geographic per lease provisions
- Conservation: geologic or **geographic** per State

**ULTRA DEEP (>22,000')**

**PRE-DRILL**

# *...9,000 Acre Ultra Deep Unitization...*

UNITIZATION – LAND & LEGAL WORLD

*Interval Definitions (Sand & Zone)*

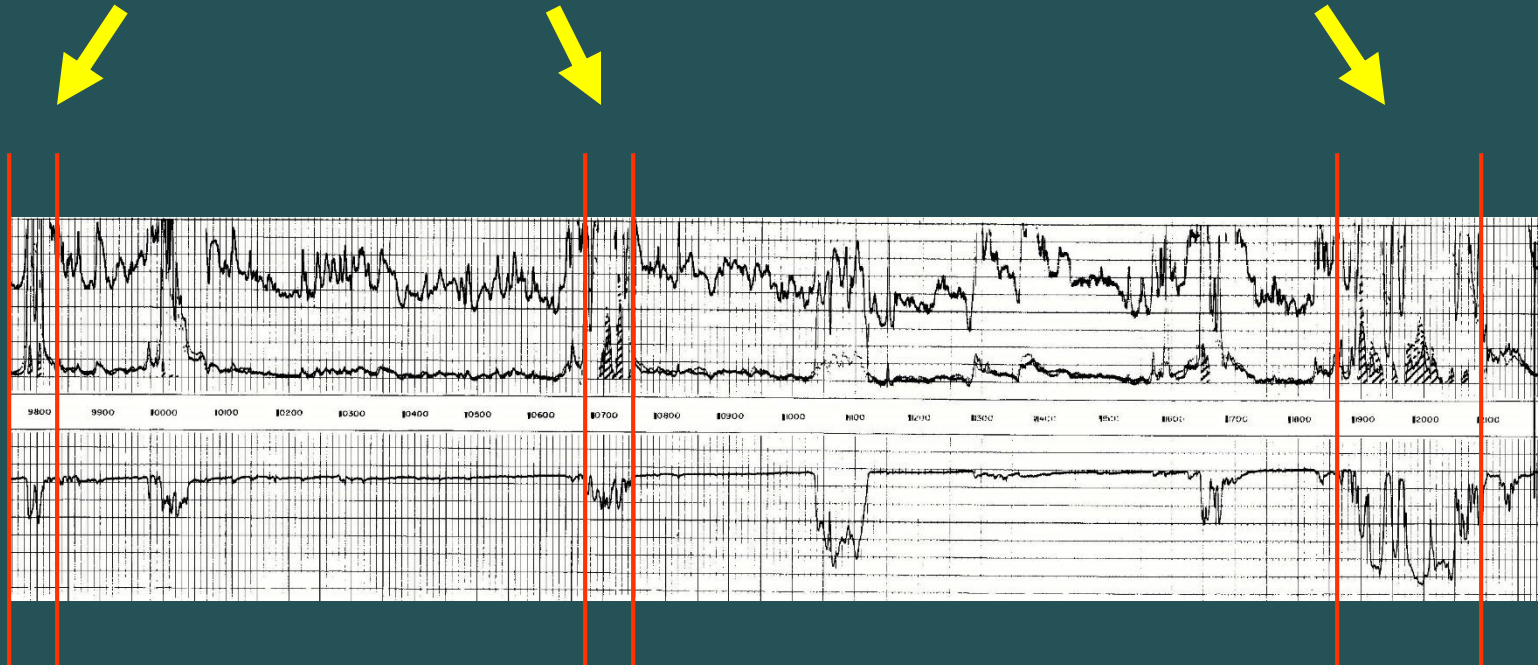
*Part 2 of 3*

## *Interval Definitions (Sand & Zone)*

- Sand definition: includes one sand body
- Zone definition: includes more than one sand body

# Interval Definitions (Sand & Zone)

Sand definition: includes one sand body

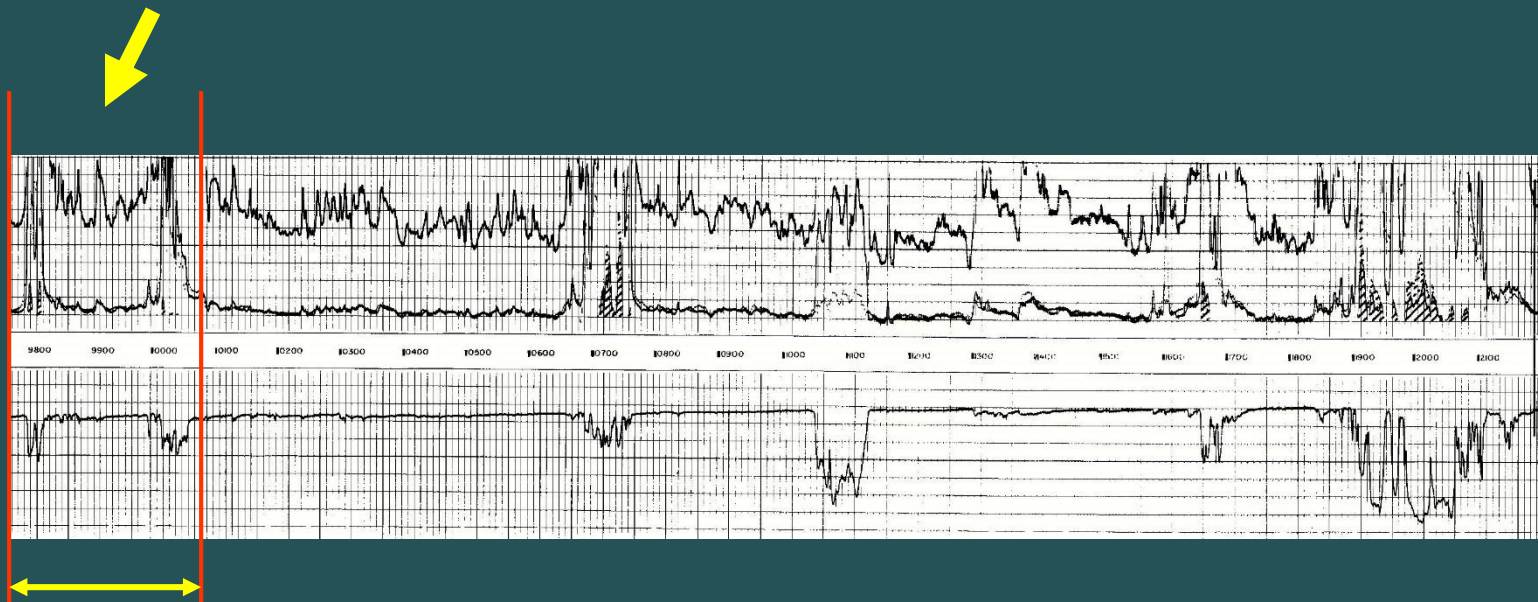


## *Interval Definitions (Sand & Zone)*

- Sand definition: includes one sand body
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## Interval Definitions (Sand & Zone)

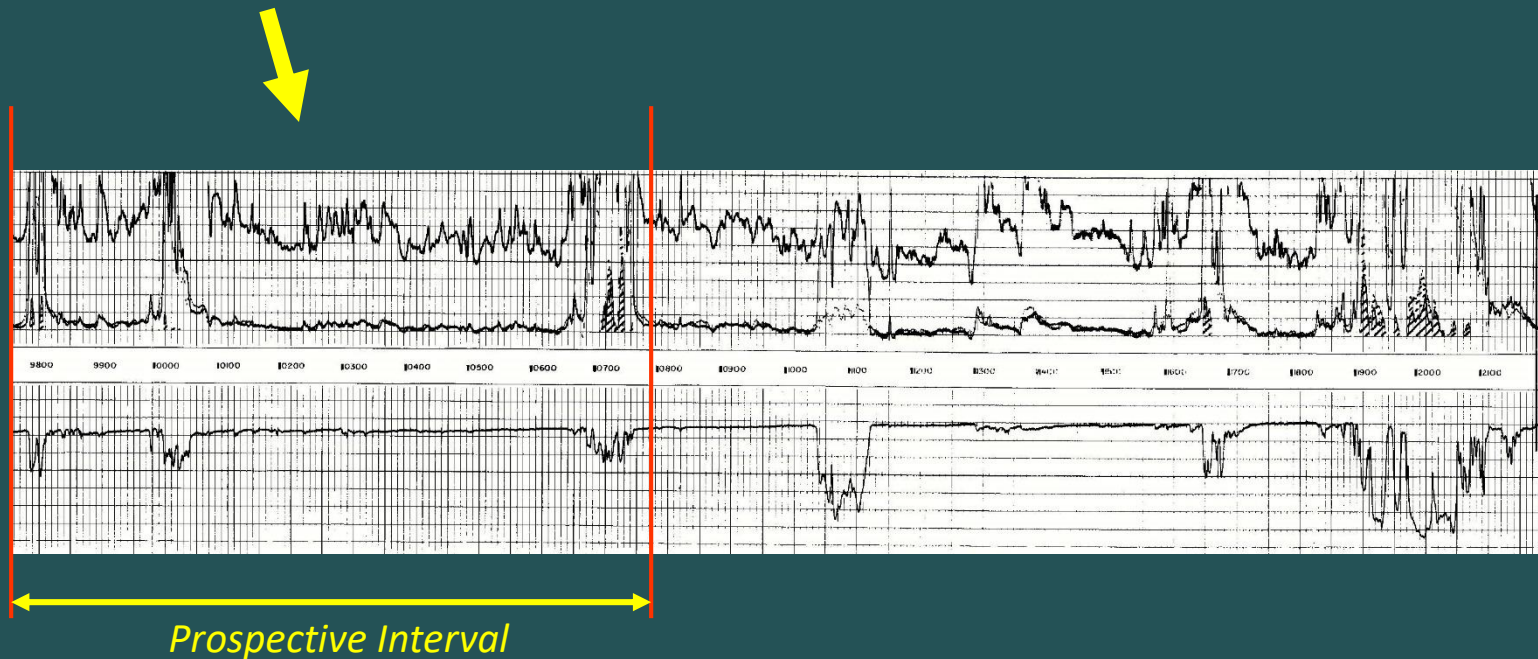
Zone definition: includes more than one sand body



*Prospective Interval*

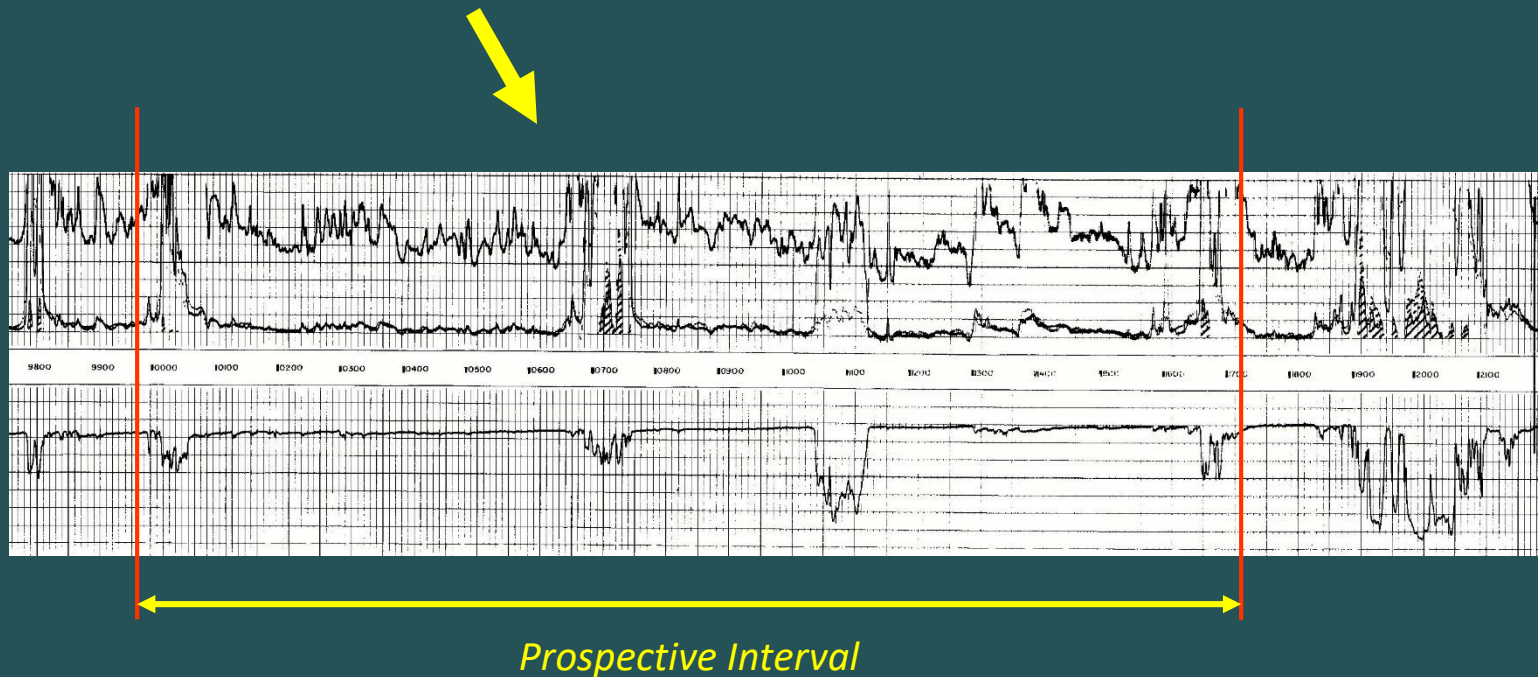
## Interval Definitions (Sand & Zone)

Zone definition: includes more than one sand body



## Interval Definitions (Sand & Zone)

Zone definition: includes more than one sand body





# *...9,000 Acre Ultra Deep Unitization...*

UNITIZATION – LAND & LEGAL WORLD

*LDNR Unitization Process*

*Part 2 of 3*

## *LDNR Unitization Process*

*(Rules of Procedure Flow Path)*

- Pre-Application Conference **Notice Letter**
- Pre-Application **Conference** (informal meeting to discuss proposed unit plans)
- **Application Letter** (docketed for hearing)
- **Hearing** (in Baton Rouge, LA)
- **Unit Order** signed by Commissioner of Conservation

# *LDNR Unitization Process*

*(Rules of Procedure Flow Path)*

- Pre-Application Conference **Notice Letter**
- Pre-Application **Conference** (informal meeting to discuss proposed unit plans)
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**ENTIRE PROCESS TAKES APPROXIMATELY 90-120 DAYS**

# LDNR Unitization Process (Rules of Procedure Flow Path)

## Louisiana Department of Natural Resources

### Oil and Gas Unitization, Typical Time Frame

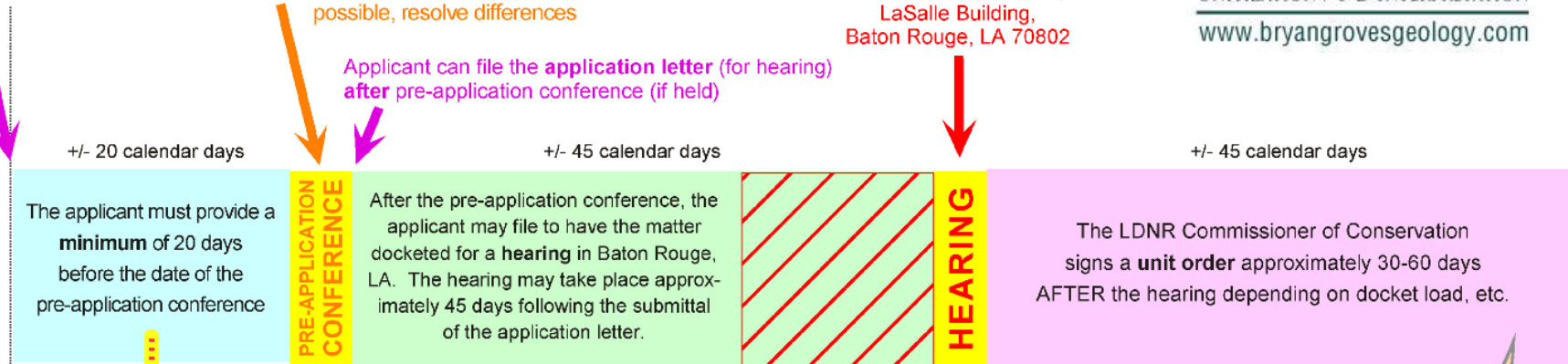
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Applicant files pre-application notice letter

If requested, the **pre-application conference** is held; this conference is an informal meeting intended to review the unit proposal(s) and, if possible, resolve differences

The **hearing** is held in the LDNR building located on 617 North Third Street, LaSalle Building, Baton Rouge, LA 70802

Applicant can file the **application letter** (for hearing) after pre-application conference (if held)



**NOTE:** If the pre-application conference is **NOT** requested (at least 10 calendar days AFTER the date of the notice letter), the applicant may file to have the matter docketed for a hearing **reducing the process by 10 days.**

The "Risk Fee Statute" (La R. S. 30:10 et seq.) can be utilized following the signing of the LDNR Commissioner's Unit Order.

# **...9,000 Acre Ultra Deep Unitization...**

UNITIZATION – LAND & LEGAL WORLD

*Types of Units*

*Interval Definitions (Prospect Delineation)*

*LDNR Unitization Process*

**Part 2 of 3  
DONE!**

# Q & A

*How to Form a  
9,000 Acre Ultra Deep Unit  
in a Few Easy Leaps*

*...take another breath...*



# **...9,000 Acre Ultra Deep Unitization...**

## ULTRA DEEP UNITIZATION – COMBINED WORLDS

### *Ingredients*

**Part 3 of 3**

# Ingredients

## La. R.S. § 30:5.1

Updated through 2016 Regular Session and First and Second Extraordinary Session Legislation. Changes and corrections from the Louisiana State Law Institute are in process.

*LexisNexis® Louisiana Annotated Statutes > Louisiana Revised Statutes > Title 30. Minerals, oil, gas and environmental quality > Subtitle 1. Minerals, oil, and gas > Chapter 1. Commissioner of conservation > Part 1. Department of conservation*

### § 30:5.1. Deep pool order; ultra deep structure units; application; procedure; allocation of costs; rules and regulations.

- A. The following shall be applicable to deep pool units:
- (1) In order to prevent waste and to avoid the drilling of unnecessary wells, and to encourage the development of deep oil and gas pools in Louisiana, the commissioner of conservation is authorized, as provided in this Subsection, to establish a single unit to be served by **one or more wells for a deep pool and to adopt a development plan for such deep unit.**
  - (2) Without in any way modifying the authority granted to the commissioner in R.S. 30:9(B) to establish a drilling unit or units for a pool and in addition to the authority conferred in R.S. 30:5, the commissioner upon the application of any interested party may enter an order requiring the unit operation of any deep pool when such unit operation will promote the development of such deep pools, prevent waste, and avoid the drilling of unnecessary wells.
  - (3) In connection with such order, the commissioner shall have the right to establish a unit for a deep pool and to unitize, force pool, and consolidate all separately owned tracts and other property ownerships within such unit. **Any order creating a unit for a deep pool shall be issued only after notice and public hearing and shall be based on findings that:**
    - (a) The order is reasonably necessary to promote the development of a deep pool and for the prevention of waste and the drilling of unnecessary wells.
    - (b) The proposed unit operation is economically feasible.
    - (c) The **geologic top** of the deep pool **was encountered** in the initial well for the pool **at a depth in excess of fifteen thousand feet true vertical depth.**
    - (d) Sufficient evidence exists to reasonably establish the limits of the deep pool.
    - (e) The plan of development for the unit is reasonable. The plan shall be revised only if approved by the commissioner after notice and public hearing.
  - (4) The order shall provide for the initial allocation of unit production on a surface acreage basis to each separately owned tract within the unit.
  - (5) No order shall be issued by the commissioner unless interested parties have been provided a reasonable opportunity to review and evaluate all data submitted by the applicant to the commissioner to establish the limits of the deep pool, including seismic data.
  - (6) The order creating the unit shall designate a unit operator and shall also make provision for the proportionate allocation to the owners (lessees or owners of unleased interests) of the costs and expenses of the unit operation, which allocation shall be in the same proportion that the separately owned tracts share in unit production. The cost of capital investment in wells and physical equipment and intangible drilling costs, in the absence of voluntary agreement among the owners to the contrary, shall be shared in like proportion. However, no such owner who has not consented to the unitization



Deep  
NOT  
Ultra Deep



shall be required to contribute to the costs or expenses of the unit operation or to the cost of capital investment in wells and physical equipment and intangible drilling costs except out of the proceeds of production accruing to the interest of such owner out of production from such unit operation. In the event of a dispute relative to the calculation of unit well costs or depreciated unit well costs, the commissioner shall determine the proper costs after notice to all interested owners and public hearing thereon.

- (7) Upon application and after notice and public hearing and consideration of all available geological and engineering evidence, the commissioner, to the extent required by such evidence, **may create, revise, or dissolve any unit provided for under this Subsection or modify any provision of any order issued hereunder.** Any such order shall provide for the allocation of unit production on a just and equitable basis to each separately owned tract within the unit.
- (8) The commissioner shall prescribe, issue, amend, and rescind such orders, rules, and regulations as he may find necessary or appropriate to carry out the provisions of this Subsection.
- (9) While this Subsection authorizes the initial creation of a **single unit** to be served by one or more wells, nothing herein shall be construed as limiting the authority of the commissioner to approve the drilling of alternate unit wells on drilling units established pursuant to R.S. 30:9(B).

**B.** The following shall be applicable to ultra deep structure units:

- (1) In order to prevent waste and to avoid the drilling of unnecessary wells, and to encourage the development of ultra deep oil and gas structures in Louisiana, the commissioner of conservation is authorized, as provided in this Subsection, to establish a single unit to be served by one or more wells for an ultra deep structure and to adopt a plan of development for such ultra deep structure unit. For purposes of this statute, a "structure" is defined as a unique geologic feature that potentially traps hydrocarbons in one or more pools or zones.
- (2) Without in any way modifying the authority granted to the commissioner by R.S. 30:9(B) to establish a drilling unit or units for a pool and in addition to the authority conferred by R.S. 30:5 and 5.2, the commissioner, upon the application of any interested party, may enter an order requiring the unit operation of any ultra deep structure when such unit operation will promote the development of such ultra deep structure, prevent waste, and avoid the drilling of unnecessary wells.
- (3) In connection with such order, the commissioner shall have the right to establish a unit no greater than nine thousand acres for an ultra deep structure and to unitize, force pool, and consolidate all separately owned tracts and other property ownerships within such unit. Any order creating a unit for an ultra deep structure shall be issued only after notice and public hearing and shall be based on findings that:
  - (a) The order is reasonably necessary to promote the development of an ultra deep structure and to prevent waste and the drilling of unnecessary wells.
  - (b) The proposed unit operation appears economically feasible.
  - (c) **The stratigraphic top of the ultra deep structure unit is encountered or anticipated to be encountered in the initial well for the structure at a depth in excess of twenty-two thousand feet true vertical depth.**
  - (d) Sufficient evidence exists to reasonably establish the limits of the ultra deep structure.
  - (e) The applicant has submitted a plan of development for the unit that is reasonable and contains the information listed under Paragraph (B)(4) of this Section. It is presumed that a reasonable plan of development will include at least one well for each three thousand acres contained in the unit.
- (4) The plan of development shall include, at a minimum, the following:
  - (a) The applicant's estimate of the number of wells it intends to drill in the unit.
  - (b) The applicant's estimated time table for drilling and completing each unit well.



Deep  
NOT  
Ultra Deep



Ultra Deep!



- (c) The applicant's anticipated target depth for each such well.
- (5) Upon application of any landowner or other interested party, or at the commissioner's discretion, the plan of development may be revised by the commissioner after notice and public hearing for good cause.
- (6) The order creating a unit for an ultra deep structure shall provide for the initial allocation of unit production on a surface acreage basis to each separately owned tract within the unit and shall also specify the stratigraphic intervals to which the unit shall be limited.
- (7) No order creating a unit for an ultra deep structure shall be issued by the commissioner unless interested parties have been provided a reasonable opportunity to review and evaluate all data, including seismic data, submitted by the applicant to the commissioner to establish the limits of the deep structure.
- (8) An order creating the unit for an ultra deep structure shall designate a unit operator.
- (9) The initial well and each subsequent well proposed or drilled pursuant to the plan of development shall be deemed a unit well. The provisions of R.S. 30:10(A)(2) shall be applicable to ultra deep structure units, including the applicable risk charge. In the event of a dispute relative to the calculation of unit well costs or depreciated unit well costs, the commissioner shall determine the proper costs after notice to all interested owners and public hearing thereon.
- (10) Upon application by any landowner or other interested party, or at the commissioner's discretion, and after notice and public hearing and consideration of available geological, engineering, and other relevant evidence, the commissioner, to the extent required by such evidence, may by order create, revise, confirm, or dissolve any unit provided for under this Subsection or modify any provision of any order issued hereunder. Any such order shall provide for the allocation of unit production on a just and equitable basis to each separately owned tract within the unit. The applicant shall, in all cases, have the burden of proof that the existing unit or order should be revised, confirmed, dissolved, or amended in the manner proposed in the application. If the commissioner determines that the unit operator has not substantially complied with the plan of development, the unit operator shall be required to show cause why the unit should not be reduced in size.
- (11) The provisions of Subsection A of this Section shall not be applicable to any unit well drilled in a unit established pursuant to this Subsection.
- (12) The commissioner shall prescribe, issue, amend, and rescind such orders, rules, and regulations as he may find necessary or appropriate to carry out the provisions of this Subsection.
- (13) While the provisions of this Subsection authorize the initial creation of a single unit to be served by one or more wells, nothing herein shall be construed as limiting the authority of the commissioner to approve the drilling of alternate unit wells on drilling units established pursuant to R.S. 30:9(B).

## History

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Acts 1999, No. 1094, § 1, eff. Aug. 15, 1999; Acts 2012, No. 743, § 1, eff. Aug. 1, 2012.

Annotations

## Notes

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### Amendment Notes

2012 Amendments. —

LSLI 2007 Amendments. —



*Ultra Deep!*



# Ultra Deep Unitization – Combined Worlds

(Paraphrased & Abbreviated from the Ultra Deep Statue)

## *Ingredients*

- Proposed Interval Definition (zone definition)
- Proposed Unit (max. 9,000 acres, one well per 3,000 acres)

---

- Plan of Development (drilling & operation's plans timing, costs, etc.)
- Economic Feasibility (Reserves & Economics)
- Designate an Operator
- Delineation/Demonstration of Geologic Structure (3-D Seismic Data)

“...anticipate the top of geologic structure in excess of 22,000 feet...”

# **...9,000 Acre Ultra Deep Unitization...**

## ULTRA DEEP UNITIZATION – COMBINED WORLDS

### *Case Histories*

**Part 3 of 3**

# Ultra Deep Unitization – Combined Worlds

## *Case Histories*

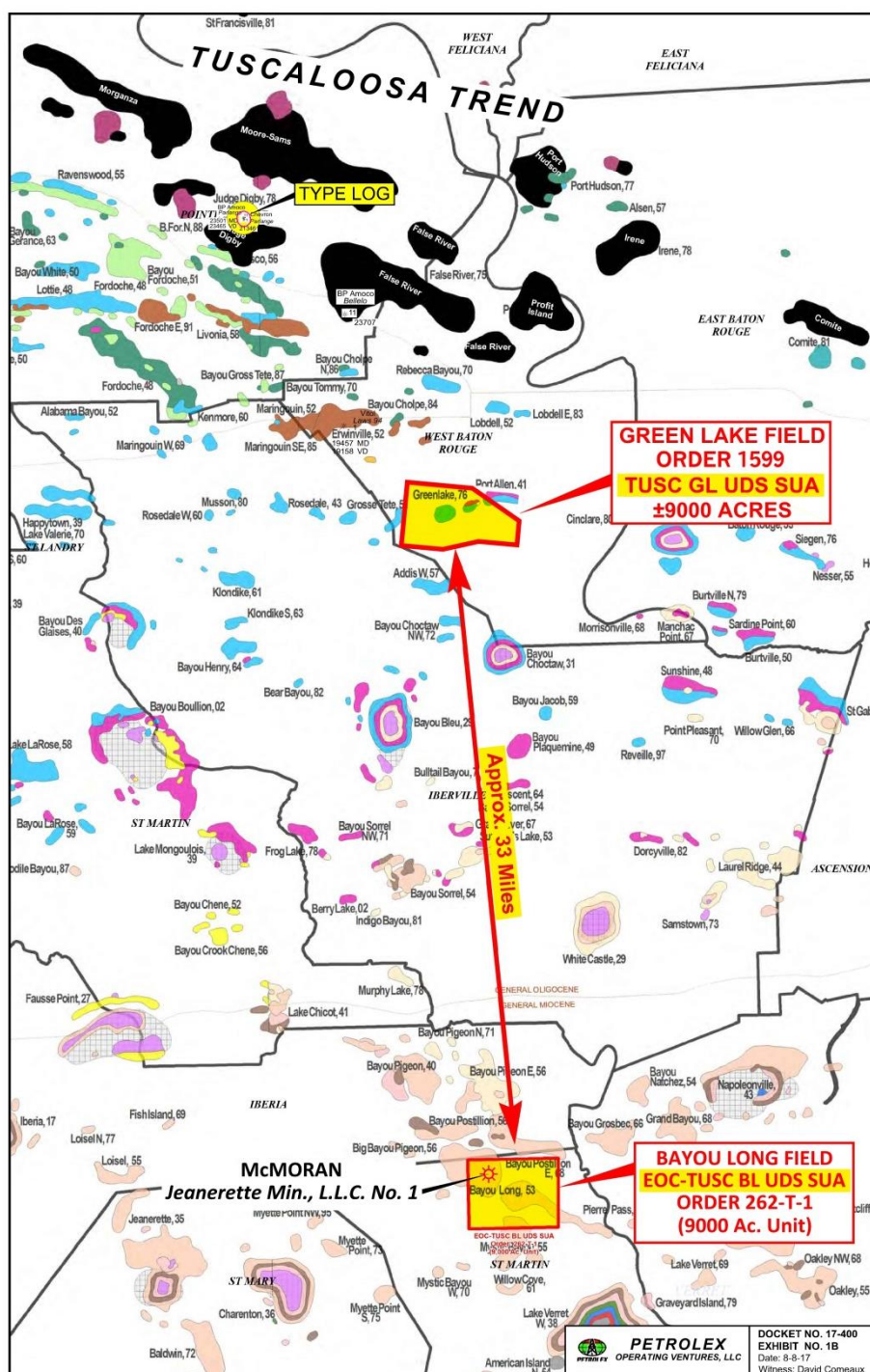
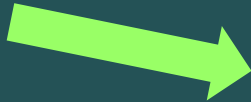
### **Case 1: Bayou Long Field, St. Martin Parish, LA (Drilled & Producing)**

Docket No. 13-292 - October 8, 2013 (2<sup>nd</sup> hearing)

### **Case 2: Green Lake Field, West Baton Rouge Parish, LA (Not Drilled)**

Docket No. 17-400 - August 8, 2017

**Case 2**  
**Green Lake Field**



**Case 1**  
**Bayou Long Field**  
**"Highlander"**



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***Part 3 of 3***

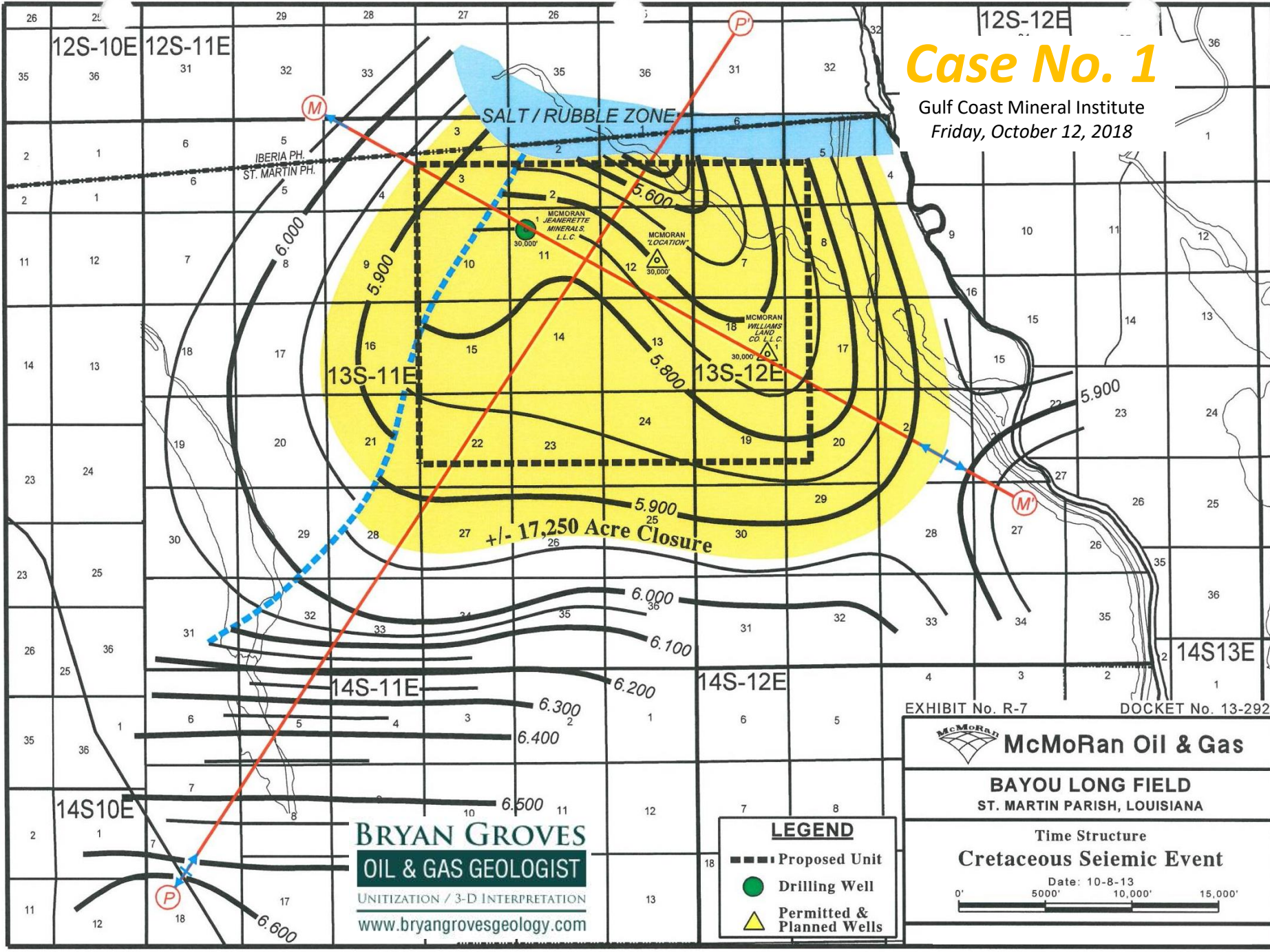
***Case 1  
Bayou Long Field  
“HIGHLANDER”***



12S-12E

# Case No. 1

Gulf Coast Mineral Institute  
Friday, October 12, 2018



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**LEGEND**

- Proposed Unit
- Drilling Well
- ▲ Permitted & Planned Wells

EXHIBIT No. R-7      DOCKET No. 13-292

**McMoRan Oil & Gas**

**BAYOU LONG FIELD**  
 ST. MARTIN PARISH, LOUISIANA

Time Structure  
**Cretaceous Seismic Event**

Date: 10-8-13

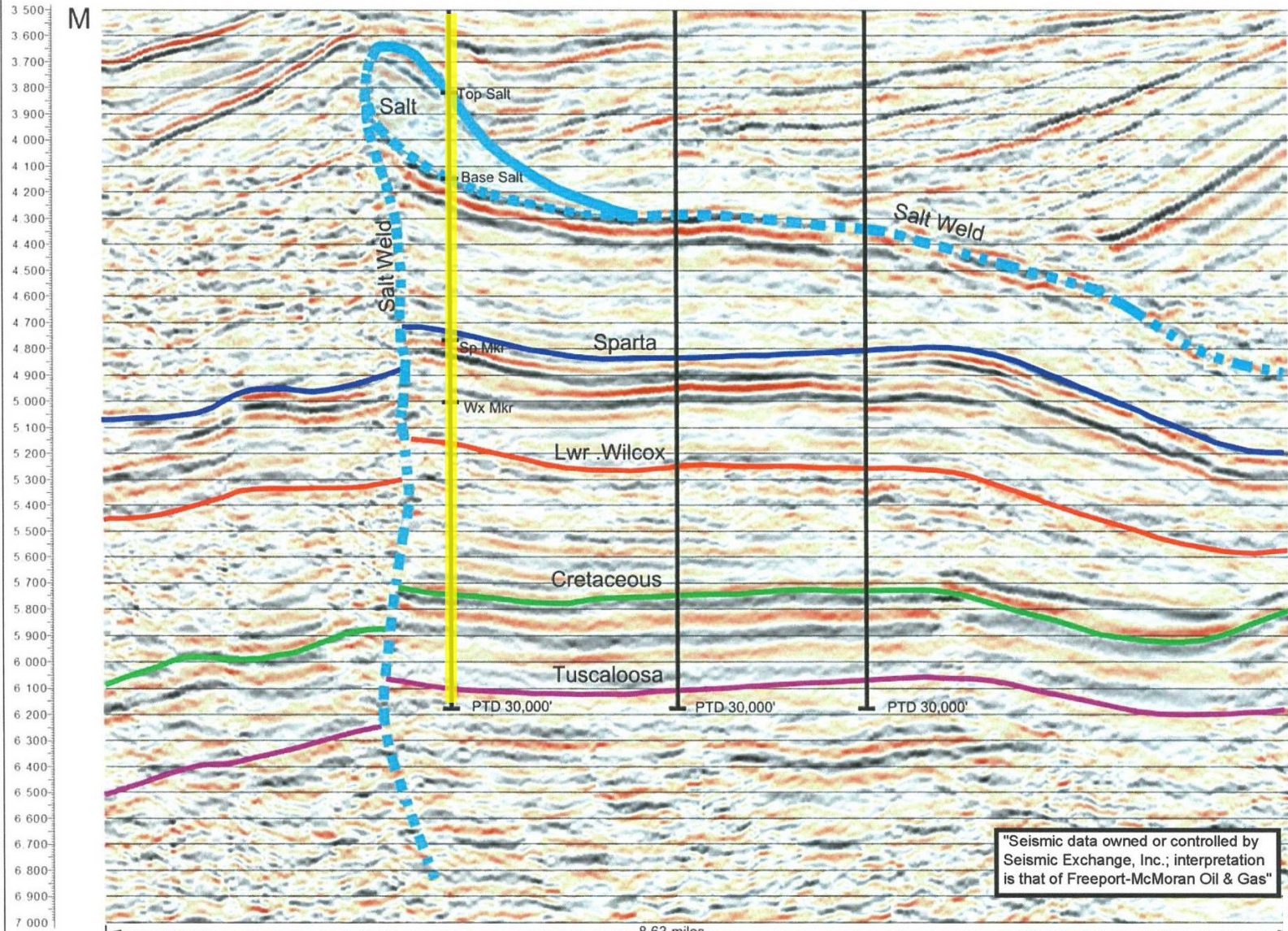
0'      5000'      10,000'      15,000'



NW

SE

# Case No. 1



"Seismic data owned or controlled by Seismic Exchange, Inc.; interpretation is that of Freeport-McMoran Oil & Gas"

EXHIBIT No. R-4  
DATE: 10-8-13

DOCKET No. 13-292 Gulf Coast Mineral Institute  
Friday, October 12, 2018

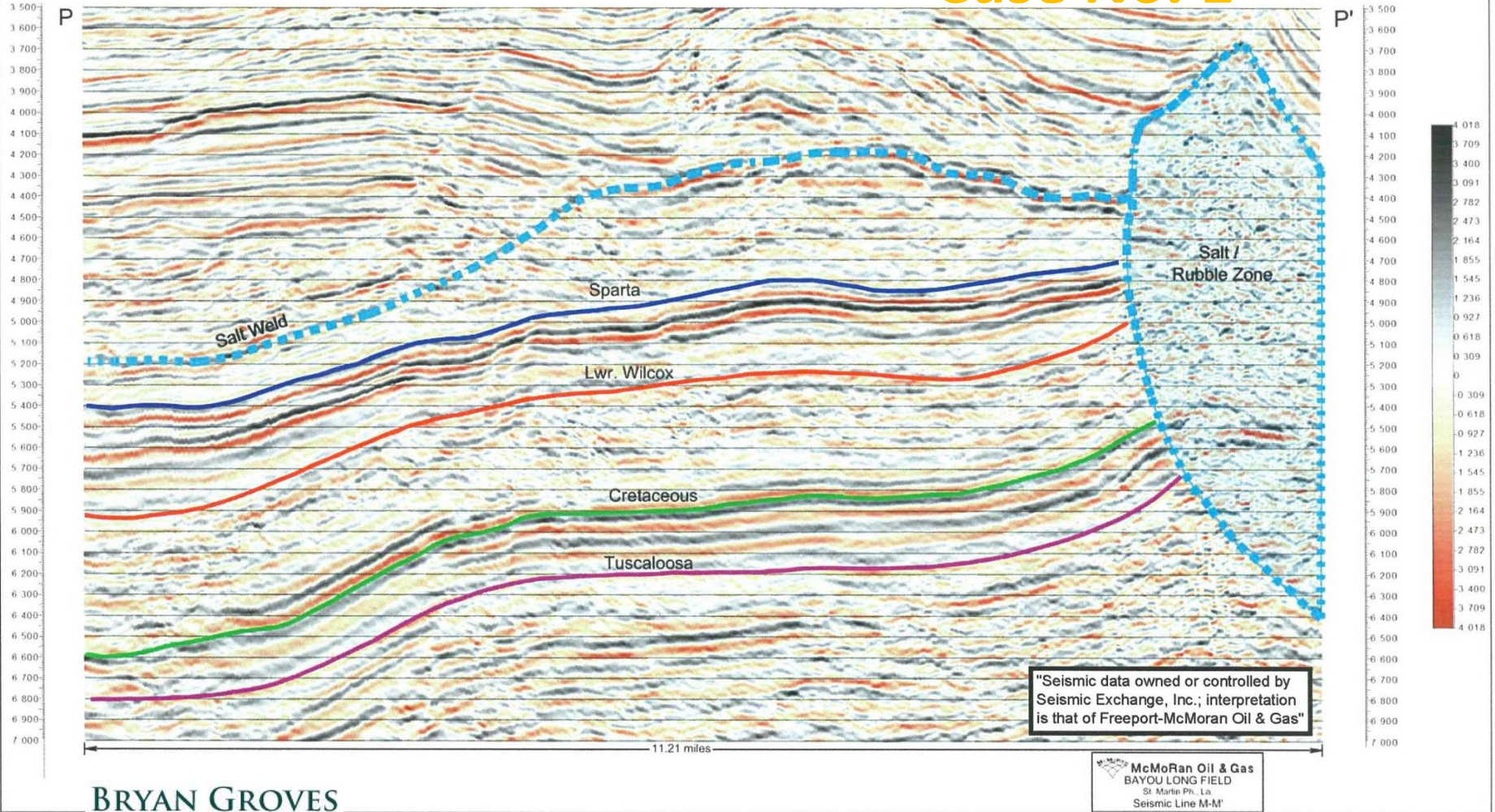
**McMoran Oil & Gas**  
BAYOU LONG FIELD  
St. Martin Ph., La.  
Seismic Line M-M'

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OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
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SW

# Case No. 1

NE



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Gulf Coast Mineral Institute  
 Friday, October 12, 2018

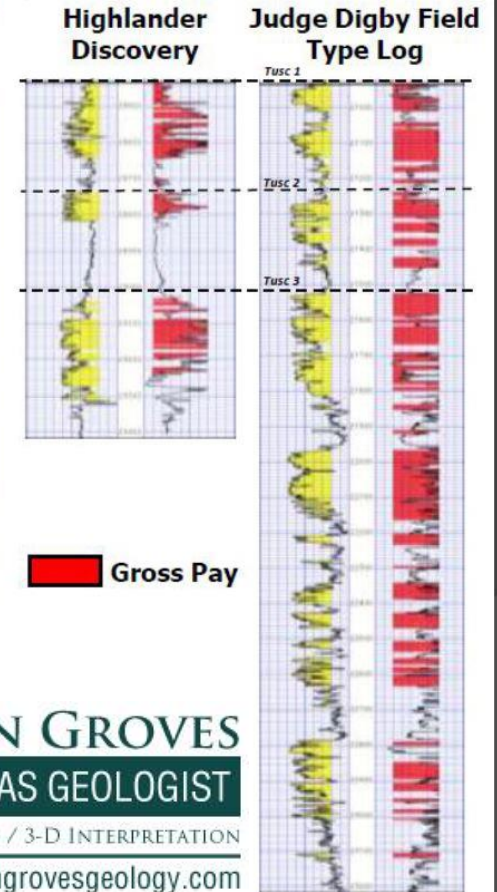
EXHIBIT No. R-5  
 DATE: 10-8-13

DOCKET No. 13-292

# Inboard Lower Tertiary/ Cretaceous Activities



## Favorable Reservoir Characteristics



- Highlander – Advancing Completion Activities; Anticipate Flow Testing in 2H 2014
- Blackbeard West #2 – Completion in Progress
- Extensive Inventory of Large, High-Quality Prospects

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# Case 1 Bayou Long Field "HIGHLANDER"

OGJ PRESS RELEASE  
February 23, 2015

**BRYAN GROVES**  
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Gulf Coast Mineral Institute  
Friday, October 12, 2018

**OIL & GAS JOURNAL** WASHINGTON PULSE MAGAZINE PAST ISSUES

Home General Interest Exploration & Development Drilling & Production Refining & Processing

Home » More Exploration and Development News » Highlander well in South Louisiana flows 75 MMcfd

Association presidents want more access in next 5-year OCS plan | BP lets contract for Great Australian Bight exploration program

## Highlander well in South Louisiana flows 75 MMcfd

HOUSTON, Feb. 23  
02/23/2015  
By OGJ editors

Production testing by [Freeport-McMoRan Oil & Gas](#), a subsidiary of Freeport-McMoRan Inc., on the Highlander discovery onshore South Louisiana indicated a flow rate of 75 MMcfd—37 MMcfd net to the company—on a 42/64th choke with 10,300 psi flowing tubing pressure.

The discovery lies in the Inboard Lower Tertiary-Cretaceous trend, and the test was performed in the Cretaceous-Tuscaloosa section.

"This additional test data confirms the highly favorable reservoir characteristics of this discovery," the company said.

Freeport-McMoRan added that it expects to immediately start production using company facilities in the immediate area. The company also plans to install additional amine processing facilities to accommodate the higher rates.

The Highlander discovery well was drilled to a total depth of 29,400 ft in first-quarter 2014. Wireline log and core data from the Wilcox and Cretaceous sand packages indicated favorable reservoir characteristics with 150 ft of net pay.

In December Freeport-McMoRan tested the well at a rate of 43.5 MMcfd on a 22/64th choke with 11,880 psi flowing tubing pressure. A second well has been identified and future plans are being evaluated in the area.

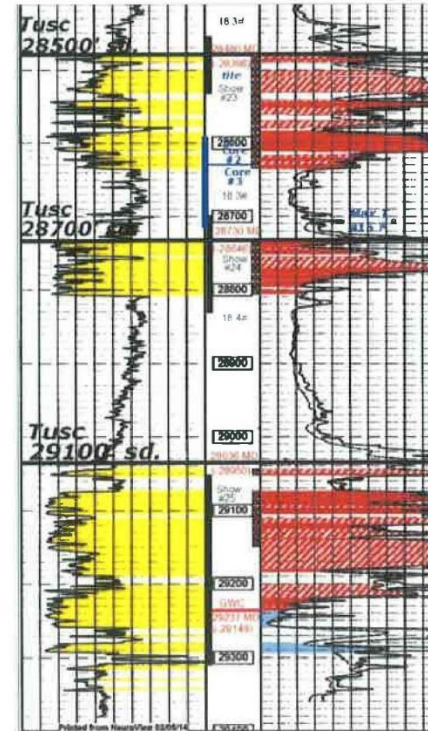
The company has identified multiple prospects in the Highlander area, where it holds more than 50,000 gross acres ([OGJ Online, Oct. 19, 2012](#)).

Freeport-McMoRan is operator of the Highlander well with 72% working interest and 49% net revenue interest. Other interest owners are Energy XXI Ltd. 18% and WA Moncrief Jr. 10%. The Gulf Coast Ultra Deep Royalty Trust holds 3.6% overriding royalty interest in the area.

after K. McMichael

# Jeanerette Minerals L.L.C. No. 1

**SN:** 245356  
**Spud:** 9-19-12  
**Comp:** 12-23-14 (WH-1)  
**Perfs:** 28,480'-635'; 28,730'-808'  
 29,044'-052'; 29,074'-150' (deepest completion in the State)  
**IP:** 43,500 MCFD; 0 BOPD; 787 BWPD  
**FTP:** 11,955 PSIG  
**CK:** 23/64"  
**SITP:** 20,790 PSIG  
**Cum:** 17.7 BCF (11/16/16)  
**Recent:** (04/09/2016)  
 48,766 MCFD, 381 BWPD (Fresh), 0 BCPD,  
 FTP 12,569 PSIG; SITP 19546 PSIG  
 CK 18/64"  
**BHP:** 24,325 PSI (highest worldwide) (1)  
**BHT:** 440° F (highest worldwide) (1)  
**Net Pay:** 127'  
**H2S:** 55-60 ppm average  
**CO2:** +/- 8%




Current: May 2017 1.4 BCF  
 Cum: 2/15 thru 5/31/17: 28.8 BCF

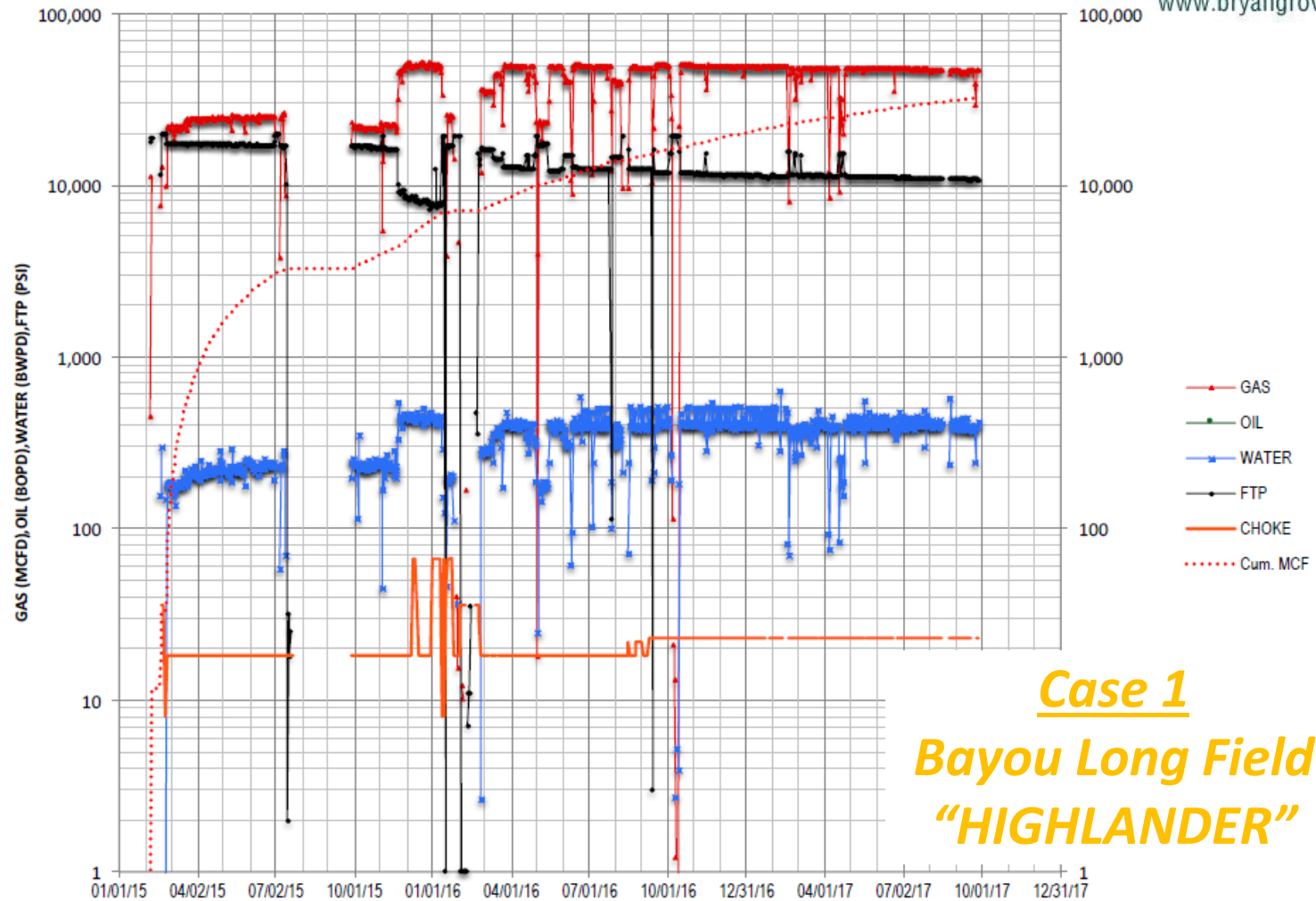
**BRYAN GROVES**  
**OIL & GAS GEOLOGIST**  
 UNITIZATION / 3-D INTERPRETATION  
[www.bryangrovesgeology.com](http://www.bryangrovesgeology.com)

 <b>PETROLEX</b> OPERATING VENTURES, LLC	DOCKET NO. 17-400 EXHIBIT NO. 1A Date: 8-8-17 Witness: David Comeaux
--	---

EXHIBIT No. G- Docket No. 17-54

 <b>McMoRan Oil &amp; Gas</b>
<b>BAYQU LONG FIELD</b> ST. MARTIN PARISH, LOUISIANA
POD Revision Type Log
Date: 1-15-17 Geology: LOUIS GILBERT & ASSOCIATES, INC.

HIGHLANDER - JEANERETTE MINERALS #1 - DAILY PRODUCTION (2-DAY LAG)

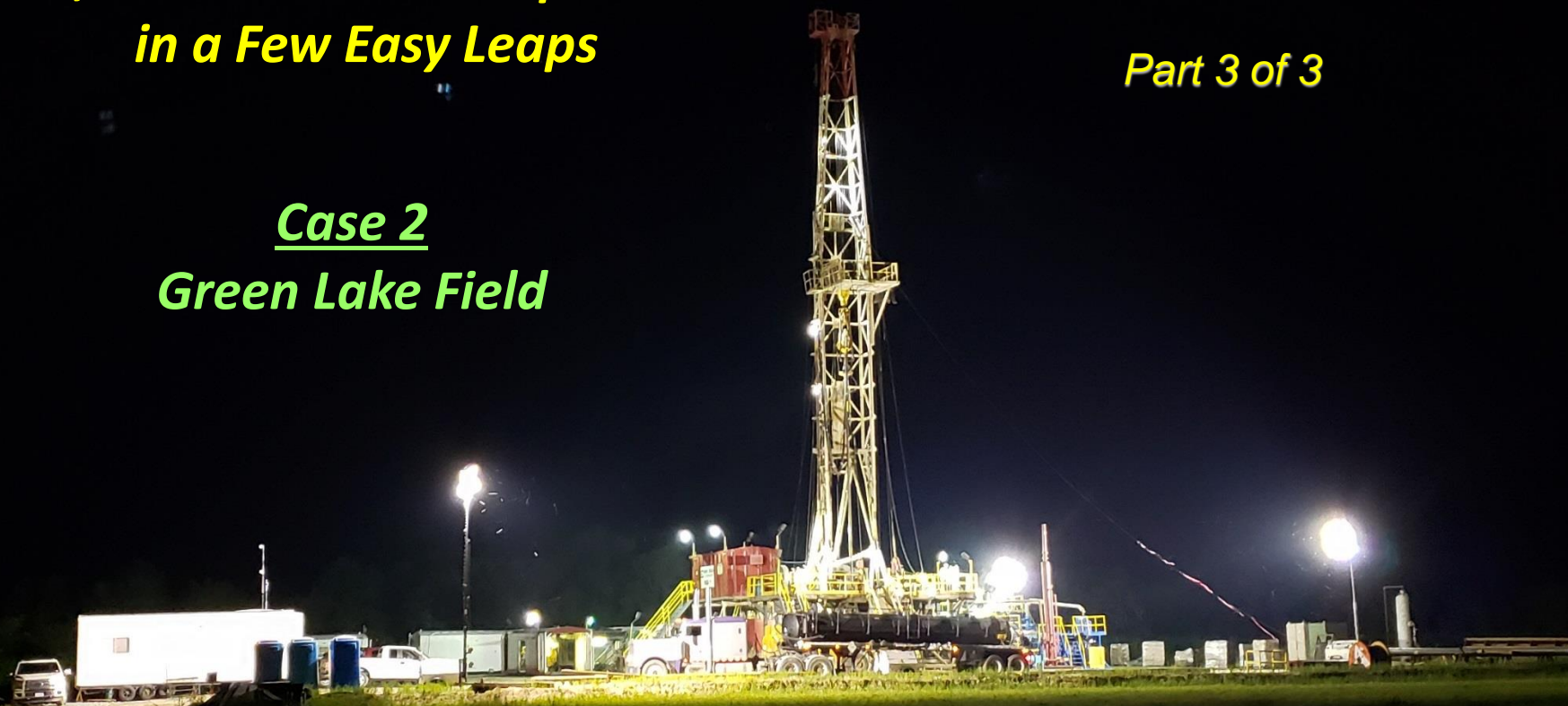


**Case 1**  
**Bayou Long Field**  
**"HIGHLANDER"**

**How to Form a  
9,000 Acre Ultra Deep Unit  
in a Few Easy Leaps**

**Part 3 of 3**

**Case 2  
Green Lake Field**



R10E

R11E

R11E R12E

T 7 S  
T 8 S

X = 1984445.904  
Y = 6441159.703

X = 2013459.039  
Y = 641292.574

X = 1983123.490  
Y = 630777.886

X = 2012136.625  
Y = 627910.757

TUSC GL UDS SUA  
(Undrilled)  
±9000 ACRES

Case 2  
Green Lake Field

DOCKET NO. 17-400 EXHIBIT NO. 6

**PETROLEX**  
OPERATING VENTURES, LLC

GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA

PROPOSED UDS UNIT  
Tuscaloosa Zone

Witness: David Comeaux

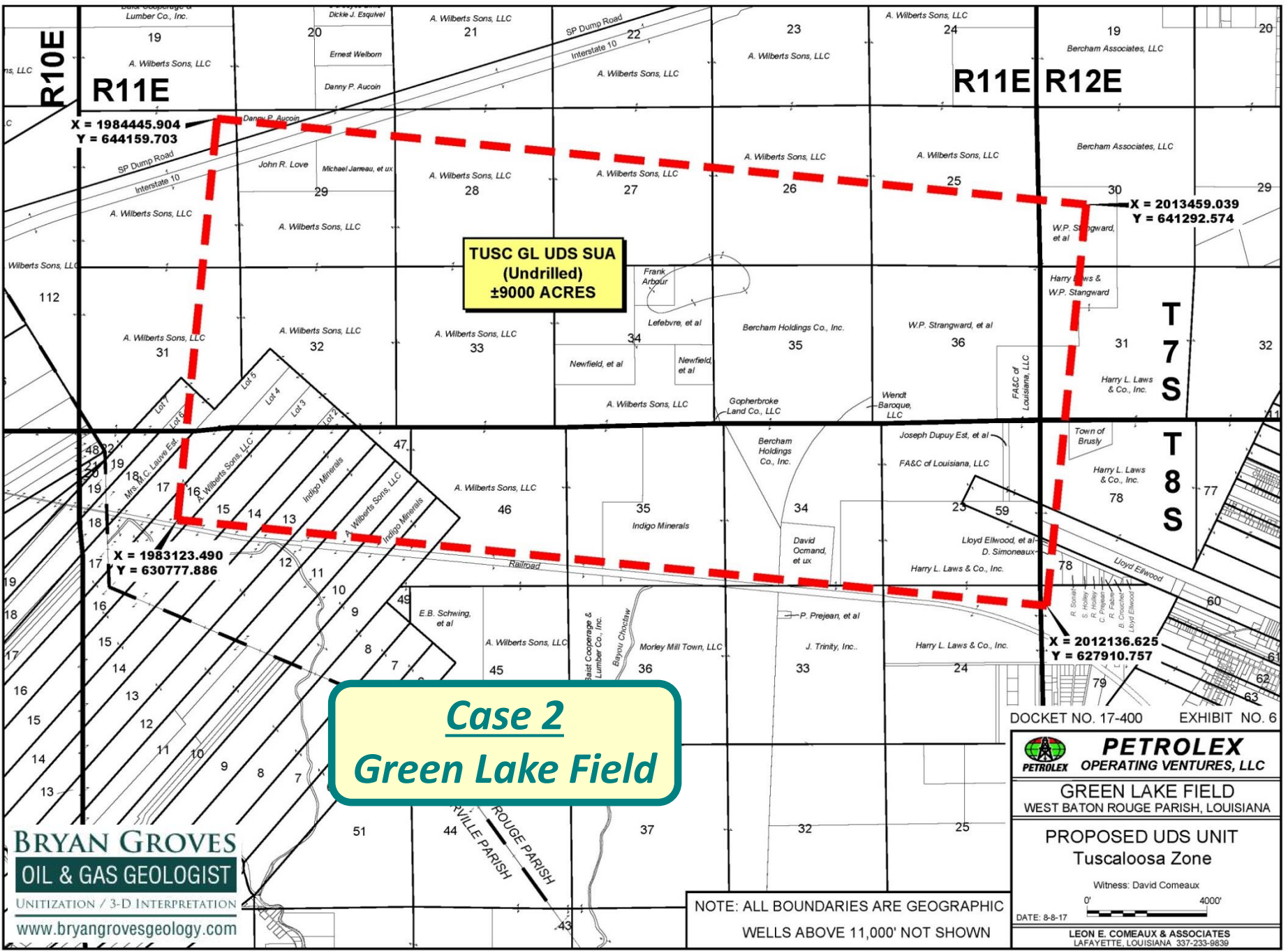
0' 4000'

DATE: 8-8-17

LEON E. COMEAUX & ASSOCIATES  
LAFAYETTE, LOUISIANA 337-233-9839

NOTE: ALL BOUNDARIES ARE GEOGRAPHIC  
WELLS ABOVE 11,000' NOT SHOWN

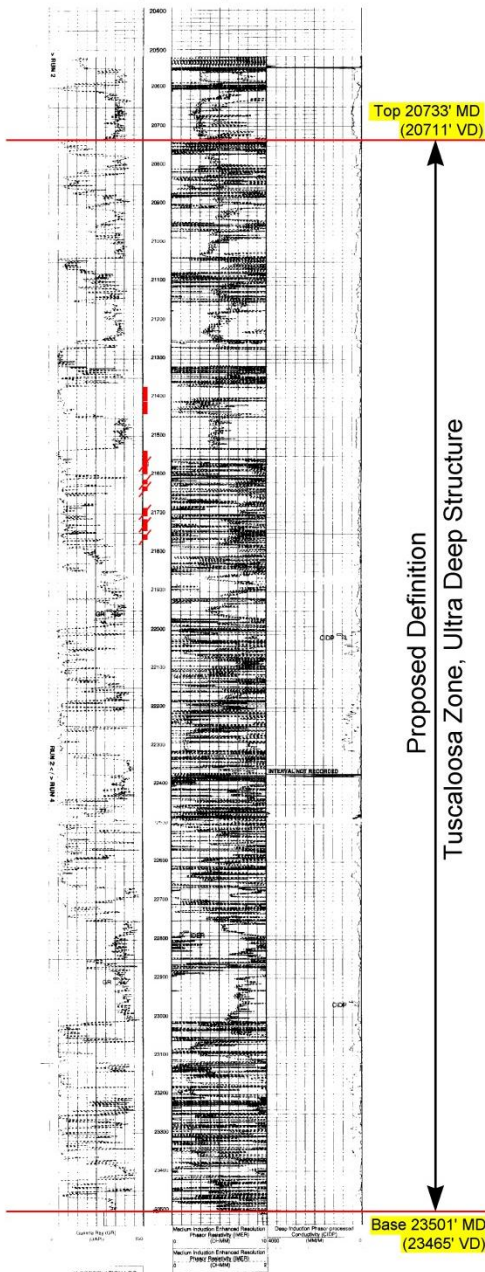
**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com





## Case 2 Green Lake Field

BP America Prod. Co.  
 W.C. Parlange No. 11 Alt.  
 Sec. 49, T5S-R9E  
 (SN: 223325)



SN 223325  
 Spudded: 8-18-99  
 Completed: 5-21-00  
 Perfs:  
 21684'-21704',  
 21716'-21744',  
 21752'-21766'  
 IP: 21,669 MCF

Add Perfs: 7-6-00  
 21536'-21596',  
 21612'-21626',  
 21632'-21640'  
 IP: 30,896 MCF + 15 BC

3-18-02  
 Spot cement plug from  
 21233'-21941'

3-19-02  
 Mill out cmt. to PBD of  
 21486'

Perfs: 4-18-02  
 21371'-21408',  
 21412'-21442'  
 IP: 15,426 MCF + 5 BC

P&A'd 4-21-08

Cum for all completions  
 23.68 BCF + 27,045 BC

DOCKET NO. 17-400 EXHIBIT NO. 3

 <b>PETROLEX</b> OPERATING VENTURES, LLC	
GREEN LAKE FIELD WEST BATON ROUGE PARISH, LOUISIANA	
TYPE LOG BP America Prod. Co. - W.C. Parlange No. 11 Alt. Sec. 49, T5S-R9E (SN: 223325)	
<b>TUSCALOOSA ZONE</b>	
DATE: 8-6-17 Witness: David Comeaux	
LEON E. COMEAUX & ASSOCIATES LAFALETTE, LOUISIANA 70503-9833	

Case 2  
**Green Lake Field**

**TUSC GL UDS SUA  
PLAN OF DEVELOPMENT**

- The first unit well, A. Wilberts Sons, LLC No. 1, is planned to be spudded in May 2018. Initial gas sales are anticipated to be in February 2020.
- Unit well two is planned to be spudded within two (2) years of the initial gas sales of unit well one. Initial gas sales for unit well two are anticipated to be in August 2023.
- Unit well three is planned to be spudded within two (2) years of the initial gas sales of unit well two.
- The anticipated total depth for each well is approximately 25,000'.
- The reserve estimate for each well is 121.5BCFe.
- Location costs will total approximately \$1.5MM per well.
- Each well will cost approximately \$47MM to drill and \$36MM to complete.



DOCKET NO. 17-400  
EXHIBIT NO. 4  
Date: 8-8-17  
Witness: David Comeaux

**Case 2**  
**Green Lake Field**

**GREEN LAKE FIELD TUSC GL UDS SUA**  
**Proposed Unit Operation Economic Feasibility Summary**

MINIMUM CASE	ESTIMATED RECOVERABLE RESERVES	ESTIMATED CAPITAL INVESTMENT	RATE OF RETURN	PAYOUT (YEARS)	PRODUCTIVE LIFE (YEARS)	ESTIMATED TAX TO STATE OF LOUISIANA
	364.5 BCF	\$310,000,000	31%	7.3	13.3	\$33,500,000

**Assumptions used in Economic Feasibility Analysis:**

- Three wells are included in this analysis.
- Minimum gas reserves of 121.5 BCFe are developed by each well.
- 75 MMCFD initial rate for each well held flat for approximately half the reserve volume, then declining exponentially to an abandonment rate of 2.5 MMCFD {See BP America (Amoco) - R.O. Martin Lbr. Co. No. 1 well in Judge Digby Field, WSN 225269, tested 10/19/01 from TUSC. perforations 20,334'-20,400'; 79,490 MCFD; 553 BCD; 17 BWD; FTP 5525 psig on a 1" choke}.
- Average cost to drill and evaluate each well is approximately \$47MM.
- Average cost to complete each well is approximately \$36MM.
- Production facility costs of approximately \$14.6MM/ well (75MMCFD capacity for one well).
- Timing based on nine months to drill each well, with each subsequent well to be spud two years following the initial gas sales of the previous well. All drilling and completion work anticipated to be done with 2 rigs.
- Operating costs of approximately \$95,000 per month.
- Annual gas price starting at \$2.75/mmbtu (One Million British Thermal Units) in 2019 and increasing to \$3.37/mmbtu in 2032, based upon Nymex strip pricing.
- Annual condensate price starting at \$50.50/bbl in 2019 and increasing to \$63.63/bbl in 2032, based upon Nymex strip pricing.
- One hundred percent (100 %) working interest.
- Severance tax exempted pursuant to Act 2 of the 1994 Regular Session after initial production of each well, then \$0.098 per thousand cubic feet, in accordance with State of Louisiana Revenue Information Bulletin 16-031 and 12.5% of the value for condensate.



**PETROLEX**  
 OPERATING VENTURES, LLC

DOCKET NO. 17-400  
 EXHIBIT NO. 5  
 Date: 8-8-17  
 Witness: David Comeaux

# Case 2

## Green Lake Field

### Reserves and Economics Summary Green Lake Field TUSC GL UDS SUA

**BRYAN GROVES**  
**OIL & GAS GEOLOGIST**  
UNITIZATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com

Year	Gross Oil Production (MBBL)	Price Oil (\$/BBL)	Gross Oil Revenue (M\$)	Gross Gas Production (MMCF)	Price Gas (\$/MCF)	Gross Gas Revenue (M\$)	Gross Revenue (M\$)	Royalty, Ad Valorem, Severance Tax, LOE and Aban (M\$)	Total Investment (M\$)	Net Cash Flow (M\$)	Cumulative NCF (M\$)	Cumulative Disc NCF@15% (M\$)
2017	0	0	0	0	0	0	0	0	20,000.00	-20000.00	-20000.00	-18759.02
2018	0	0	0	0	0	0	0	0	70,000.00	-70000.00	-90000.00	-78721.17
2019 (7)	19.3	50.50	972.63	14,846.25	2.75	40,827.19	41,799.82	12,659.10	15,800.00	13340.71	-76659.29	-69986.45
2020	32.9	50.70	1,670.06	25,391.25	2.72	69,064.20	70,734.26	21,431.03	0	49303.23	-27356.06	-37568.78
2021	38.2	51.33	1,960.54	29,441.88	2.74	80,670.76	82,631.30	26,269.79	203,740.71	-147379.20	-174735.26	-121833.31
2022	90.7	52.20	4,736.31	69,940.78	2.76	193,036.56	197,772.87	62,037.80		135735.07	-39000.19	-54348.99
2023	82.4	53.24	4,388.53	63,539.10	2.80	177,909.48	182,298.01	57,590.55		124707.46	85707.27	-434.51
2024	71.3	54.31	3,874.15	54,986.60	2.84	156,161.94	160,036.09	54,793.06		105243.03	190950.30	39130.24
2025	48.4	55.40	2,682.14	37,319.14	2.92	108,971.89	111,654.03	39,775.27		71878.77	262829.06	62627.53
2026	32.4	56.50	1,827.94	24,938.73	2.98	74,317.40	76,145.34	28,789.86		47355.48	310184.55	76088.92
2027	21.6	57.63	1,245.96	16,665.44	3.04	50,662.95	51,908.91	21,298.65		30610.26	340794.81	83655.31
2028	14.5	58.79	851.27	11,161.54	3.10	34,600.76	35,452.03	16,218.35		19233.68	360028.49	87789.46
2029	9.6	59.96	578.26	7,434.00	3.17	23,565.78	24,144.04	12,732.16		11411.88	371440.37	89922.42
2030	5.7	61.16	350.40	4,416.25	3.23	14,264.50	14,614.89	10,612.43		4002.47	375442.83	90572.93
2031	3.6	62.38	227.24	2,808.07	3.30	9,266.63	9,493.87	6,507.44		2986.43	378429.27	90995.00
2032 (9)	1.9	63.63	121.22	1,468.47	3.37	4,948.74	5,069.96	8,659.67		-3589.71	374839.56	90553.84
<b>13.33 yr</b>	<b>472.7</b>	<b>53.92</b>	<b>25,486.65</b>	<b>364,357.50</b>	<b>2.85</b>	<b>1,038,268.77</b>	<b>1,063,755.42</b>	<b>379,375.16</b>	<b>309,540.71</b>	<b>374839.56</b>	<b>374839.56</b>	<b>90553.84</b>

Gross Wells	3
Gross Gas Resources, MMCF	364,500.00
Initial Price, \$/MCF	2.75
Gross Oil Resources, MBBL	472.8
Initial Price, \$/BBL	50.50

Life (in years)	13.33
Discount %	15.00
Undiscounted Payout, Yrs	7.30
Discount Payout, Yrs	8.01
Rate of Return, %	30.9
Initial WI, %	100.00

Present Worth Percentage	Present Worth (M\$)
0.00	374,800.00
10.00	149,800.00
15.00	90,600.00

Case 2  
*Green Lake Field*

APPLICANT

**PETROLEX OPERATING VENTURES, LLC**

**Green Lake Field**

WEST BATON ROUGE PARISH, LOUISIANA

**TUSCALOOSA ZONE**

Docket No. 17-400

August 8, 2017

**3-D SEISMIC EXHIBITS & TESTIMONY**

Witness: Bryan S. Groves

prepared by

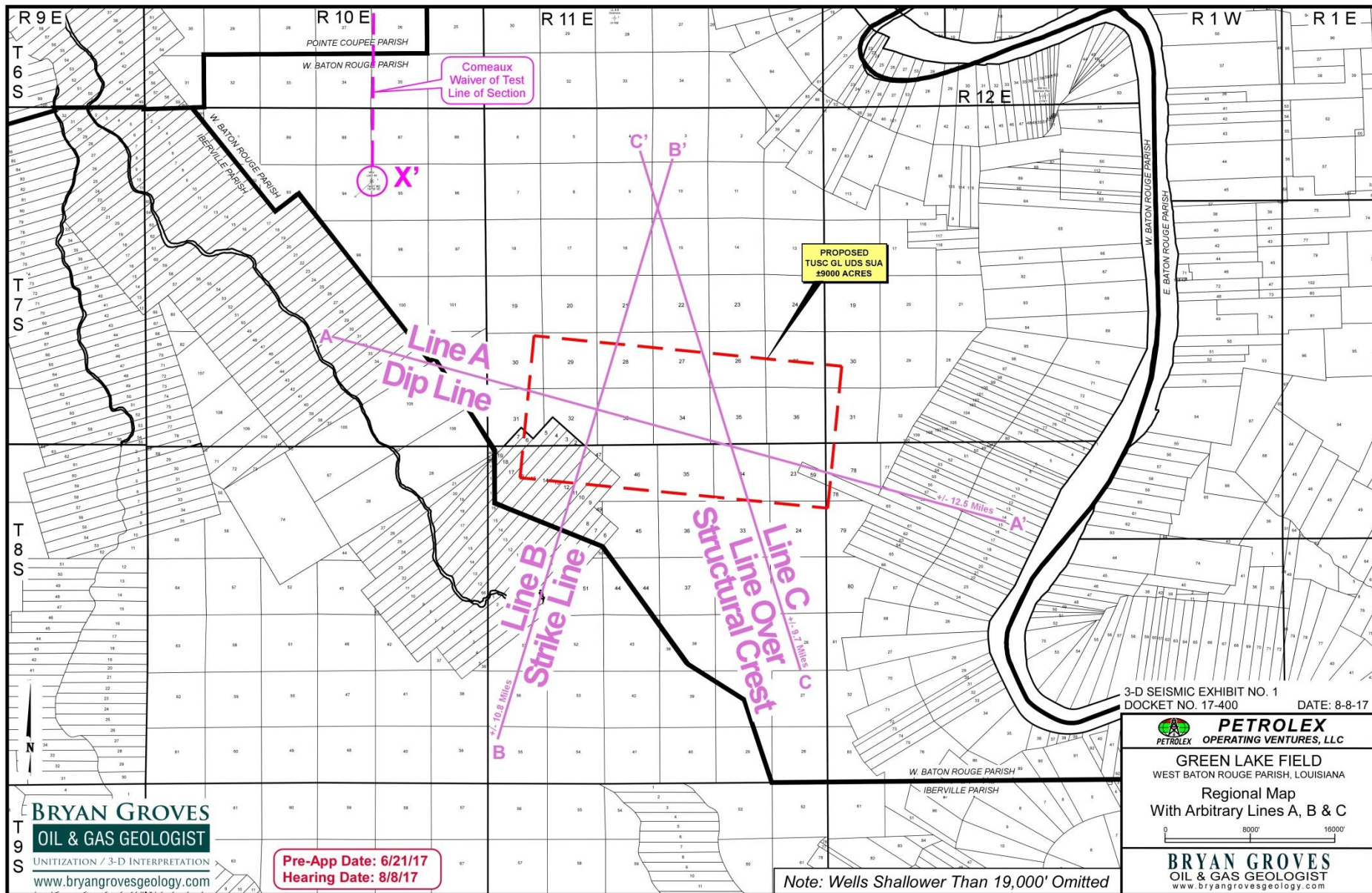
**BRYAN GROVES**

**OIL & GAS GEOLOGIST**

UNITIZATION / 3-D INTERPRETATION

[www.bryangrovesgeology.com](http://www.bryangrovesgeology.com)

# Case 2 Green Lake Field



Pre-App Date: 6/21/17  
Hearing Date: 8/8/17

Note: Wells Shallower Than 19,000' Omitted

3-D SEISMIC EXHIBIT NO. 1  
DOCKET NO. 17-400 DATE: 8-8-17

**PETROLEX**  
OPERATING VENTURES, LLC

GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA

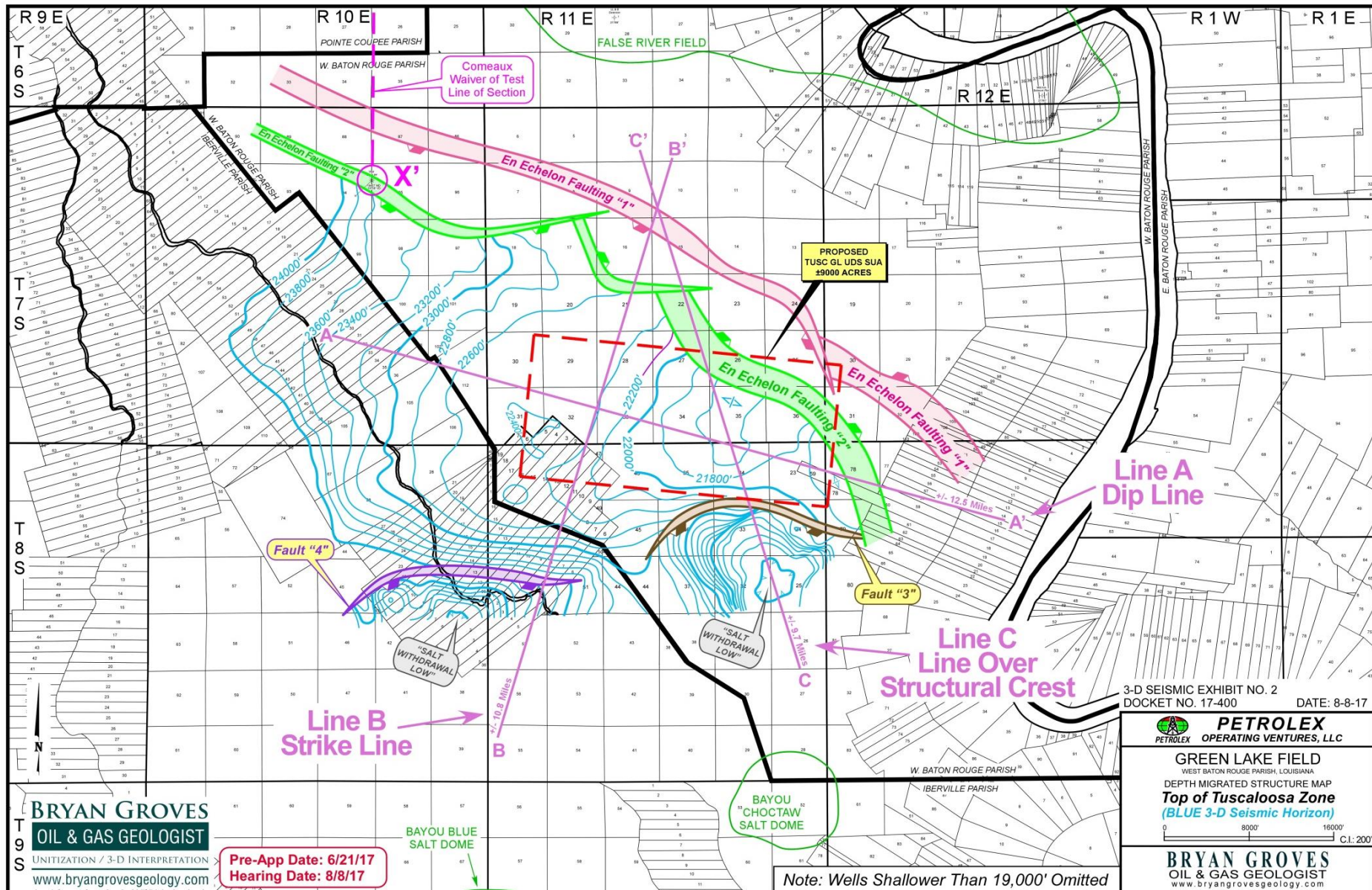
Regional Map  
With Arbitrary Lines A, B & C

0 8000' 16000'

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OIL & GAS GEOLOGIST  
www.bryangrovesgeology.com

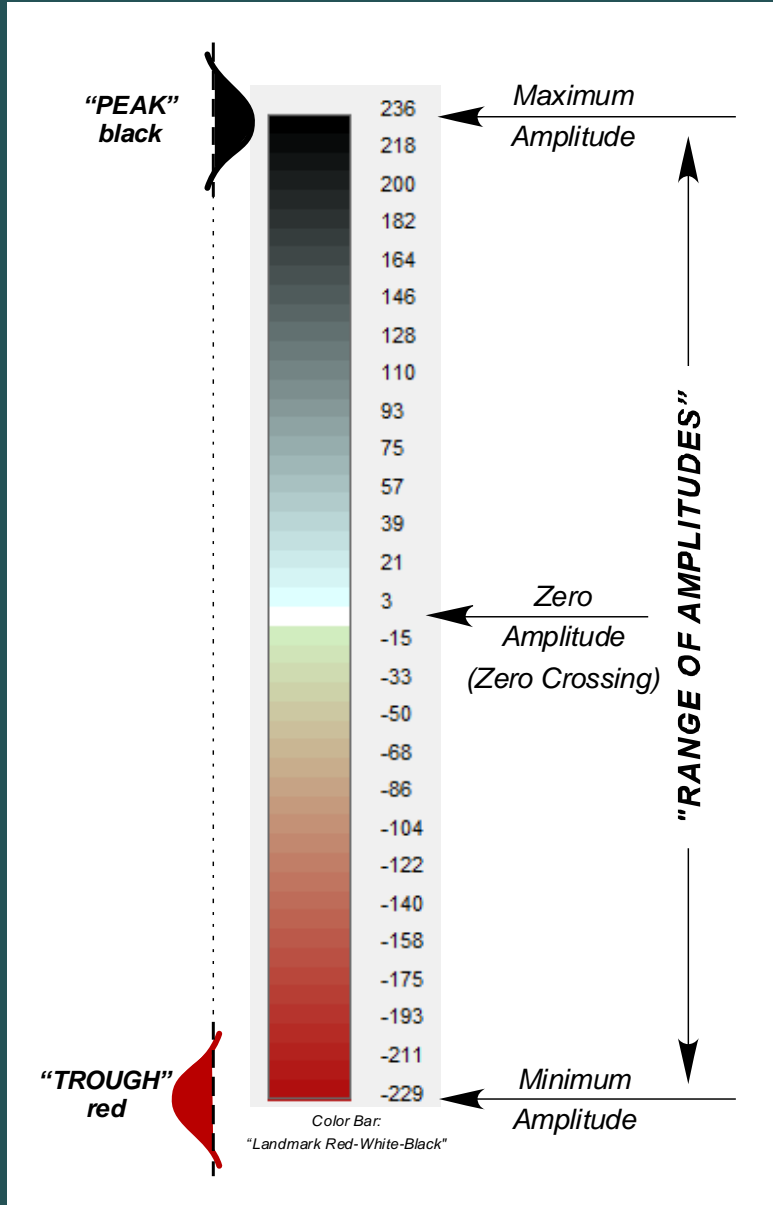
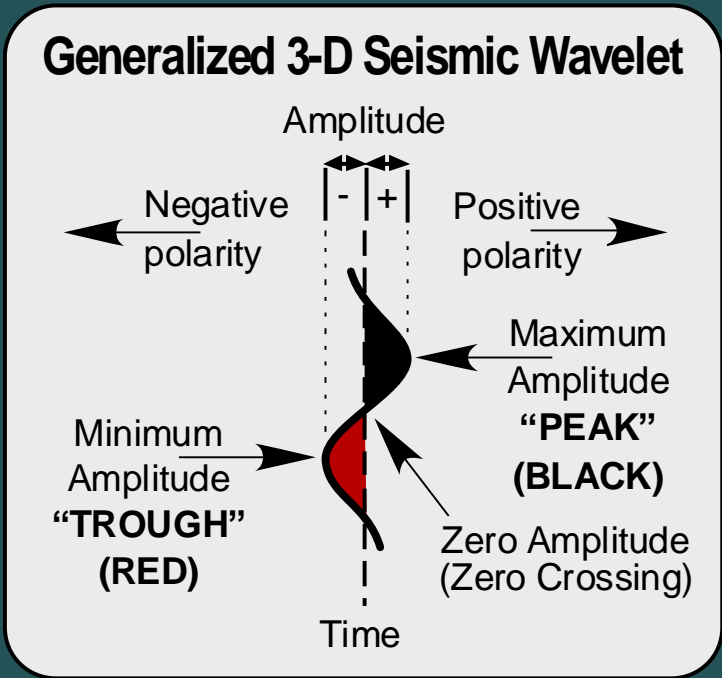
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OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
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# Case 2 Green Lake Field



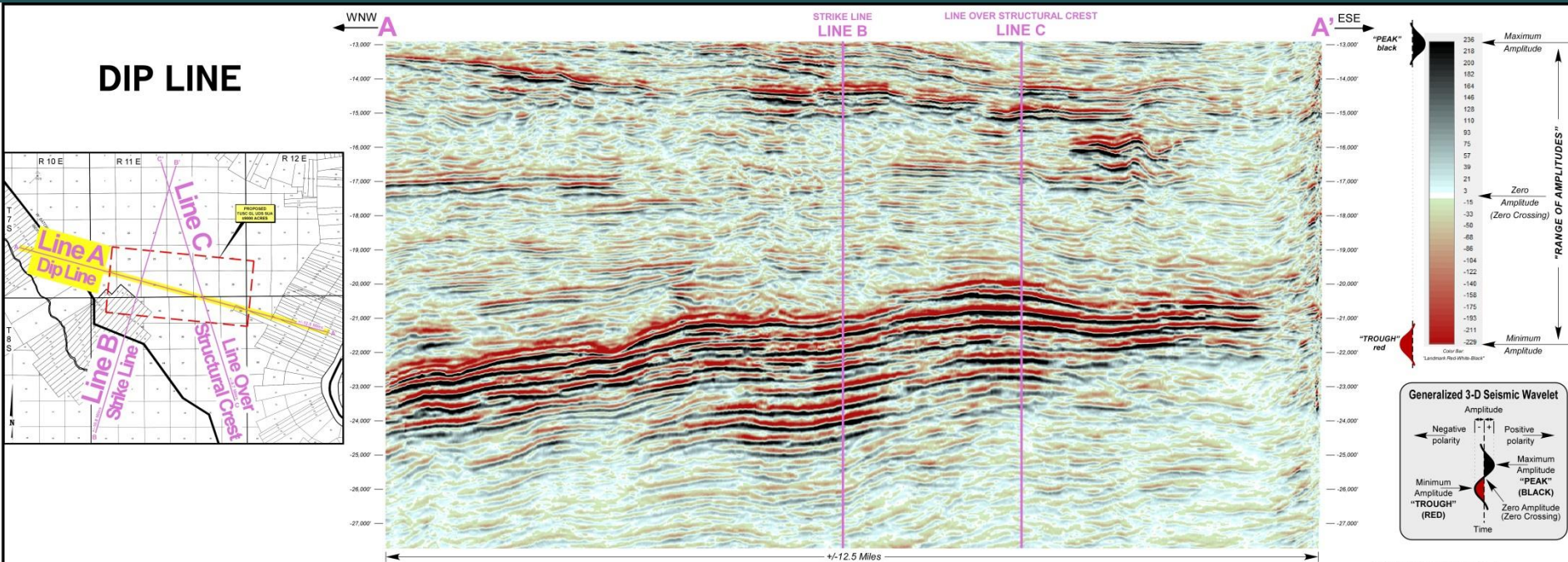
# Case 2

## Green Lake Field





# Case 2 Green Lake Field



Identical 3-D Seismic Data shown on 3-D Seismic Exhibit No. 4  
Landmark Red-White-Black Display

3-D SEISMIC EXHIBIT NO. 3  
DOCKET NO. 17-400 DATE: 8-8-17

**PETROLEX**  
OPERATING VENTURES, LLC  
GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA  
Arbitrary Line A

**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
SEISMIC INTERPRETATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com

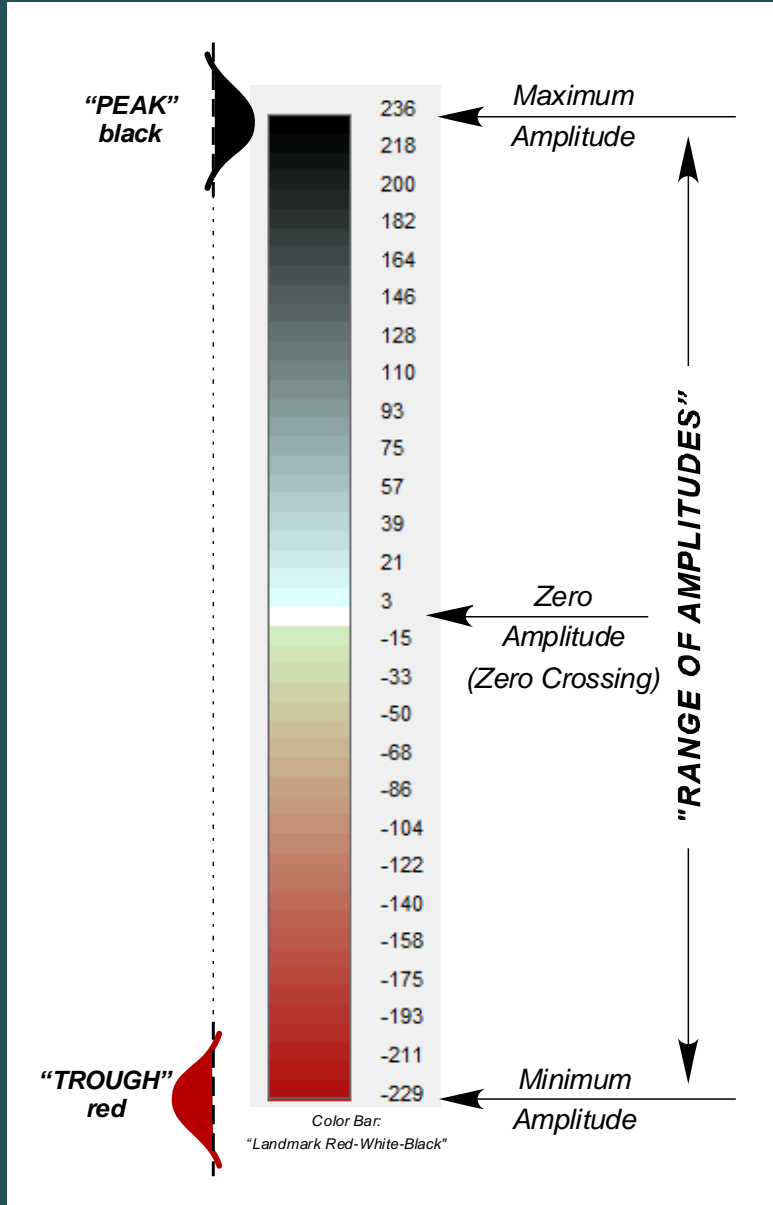
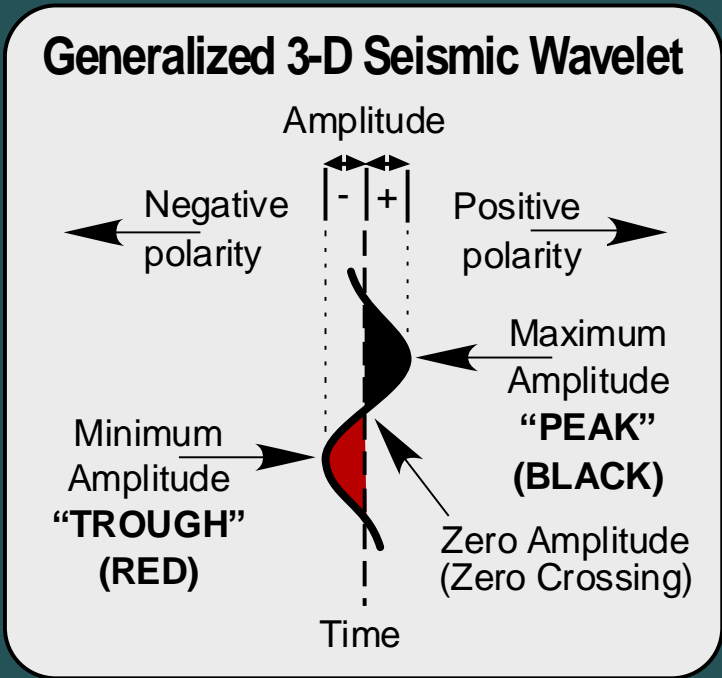
Pre-App Date: 6/21/17  
Hearing Date: 8/8/17

"Seismic data owned or controlled by  
Seismic Exchange, Inc.; interpretation is  
that of PetroleX Operating Ventures, LLC"

**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
www.bryangrovesgeology.com

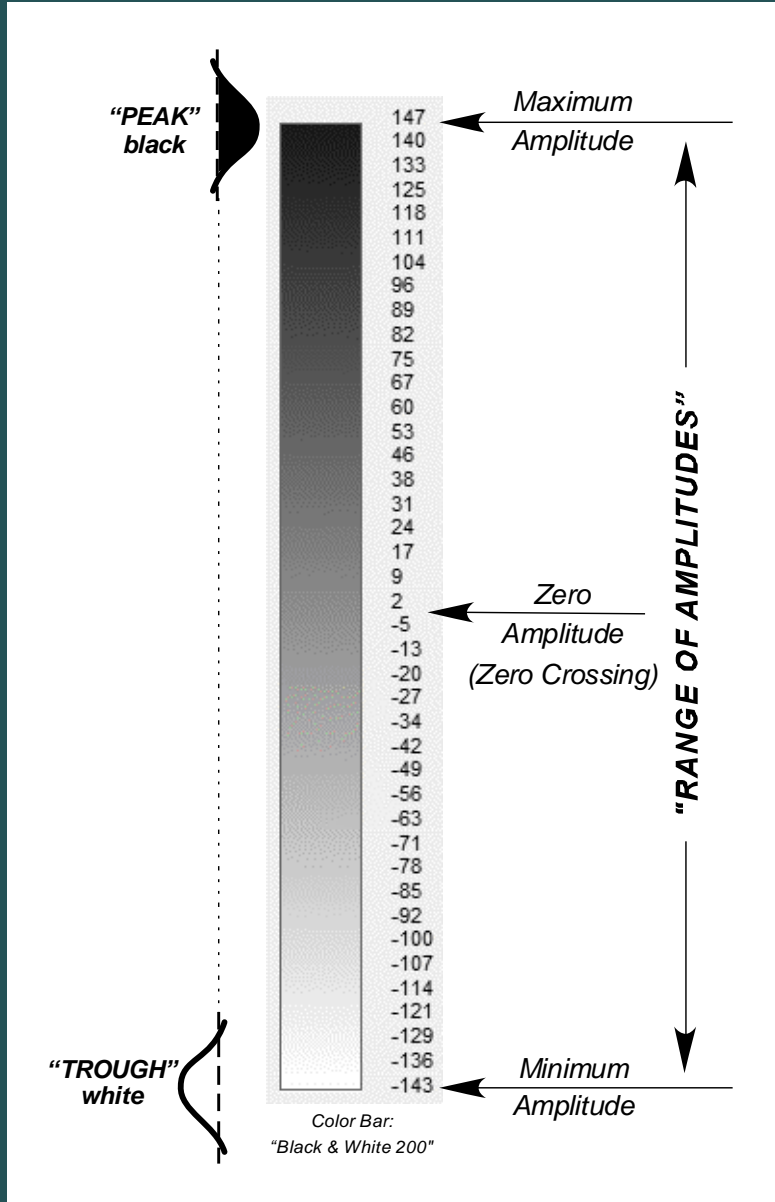
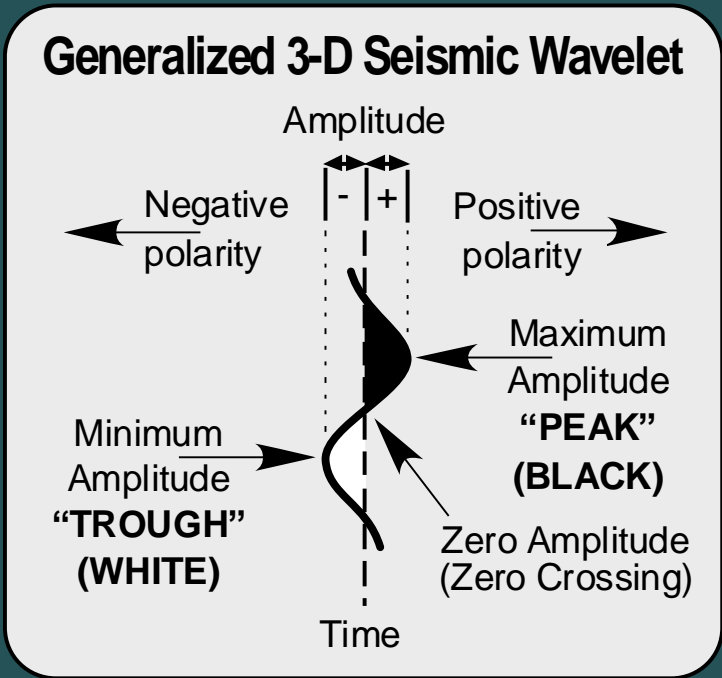
# Case 2

## Green Lake Field

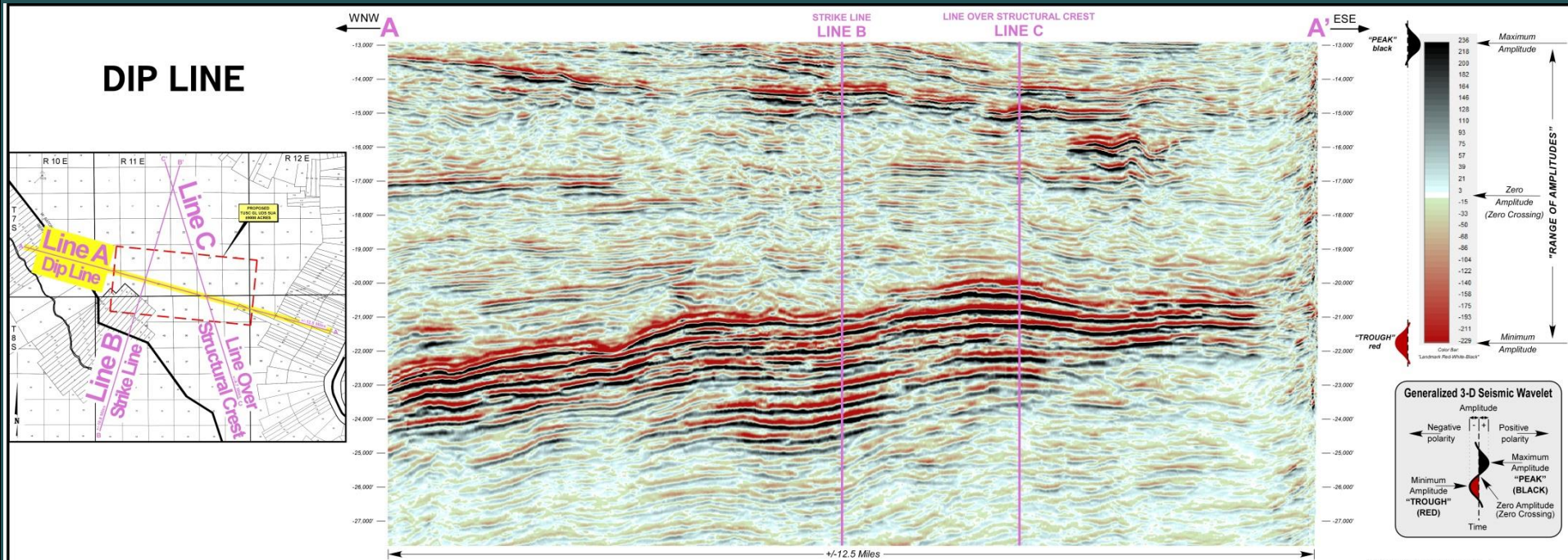


# Case 2

## Green Lake Field



# Case 2 Green Lake Field



Identical 3-D Seismic Data shown on 3-D Seismic Exhibit No. 4  
Landmark Red-White-Black Display

3-D SEISMIC EXHIBIT NO. 3  
DOCKET NO. 17-400 DATE: 8-8-17

**PETROLEX**  
OPERATING VENTURES, LLC

GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA

Arbitrary Line A

"Seismic data owned or controlled by  
Seismic Exchange, Inc.; interpretation is  
that of Petrolex Operating Ventures, LLC"

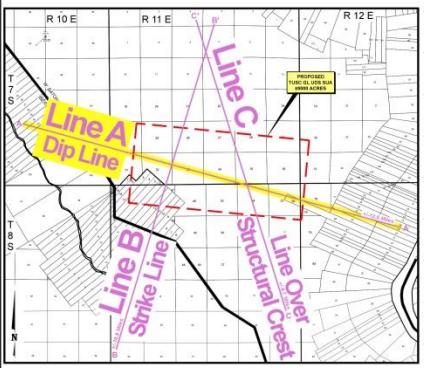
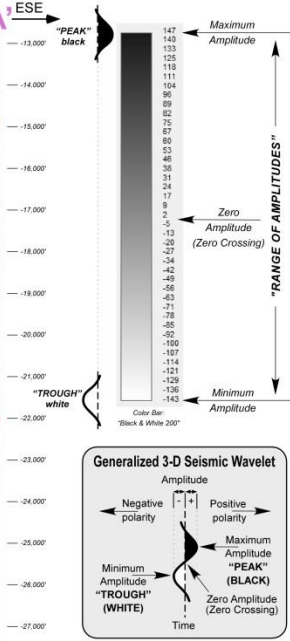
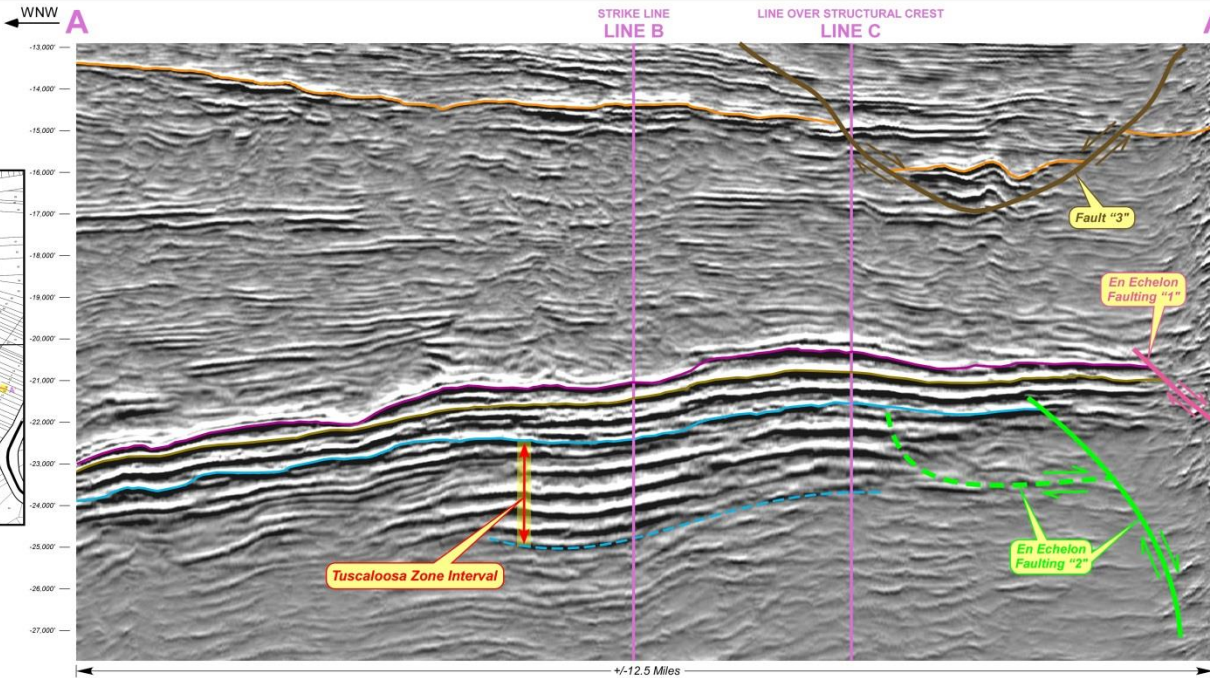
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OIL & GAS GEOLOGIST  
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OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com

Pre-App Date: 6/21/17  
Hearing Date: 8/8/17

# Case 2 Green Lake Field

## DIP LINE



- En Echelon Faulting "1" (Composite Area)
- En Echelon Faulting "2" (Composite Area)
- Fault "3"
- Fault "4"
- Top Wilcox
- Top Austin Chalk
- Base Austin Chalk
- Top Tuscaloosa Zone
- Estimated Base Tuscaloosa Zone

Identical 3-D Seismic Data shown on 3-D Seismic Exhibit No. 3  
Black & White 200 Display

"Seismic data owned or controlled by Seismic Exchange, Inc.; interpretation is that of PetroleX Operating Ventures, LLC"

3-D SEISMIC EXHIBIT NO. 4  
DOCKET NO. 17-400 DATE: 8-8-17

**PETROLEX**  
OPERATING VENTURES, LLC

GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA

Arbitrary Line A

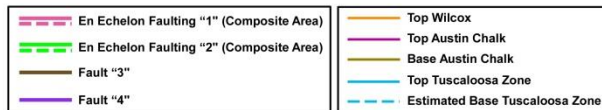
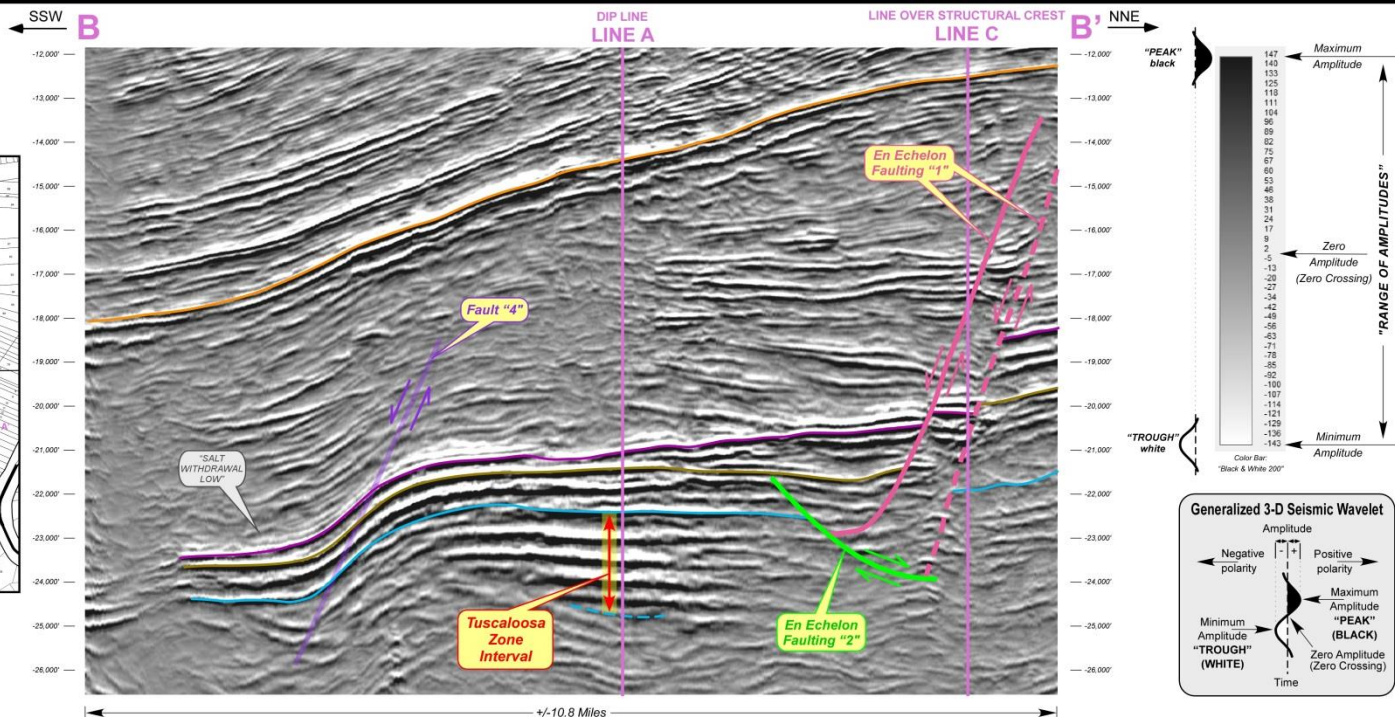
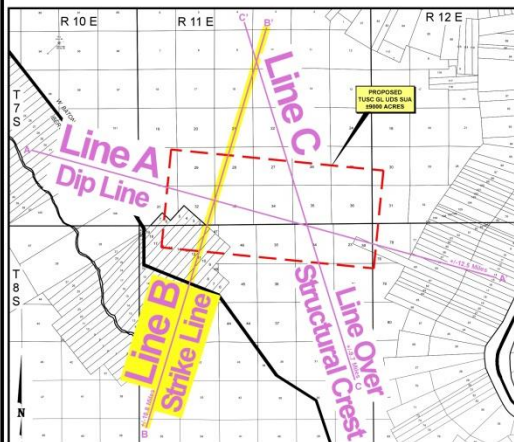
**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
www.bryangrovesgeology.com

**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com

Pre-App Date: 6/21/17  
Hearing Date: 8/8/17

# Case 2 Green Lake Field

## STRIKE LINE



Black & White 200 Display

"Seismic data owned or controlled by Seismic Exchange, Inc.; interpretation is that of PetroleX Operating Ventures, LLC"

3-D SEISMIC EXHIBIT NO. 5  
DOCKET NO. 17-400 DATE: 8-8-17

**PETROLEX**  
OPERATING VENTURES, LLC  
GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA  
Arbitrary Line B

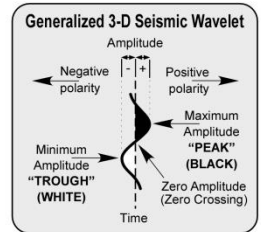
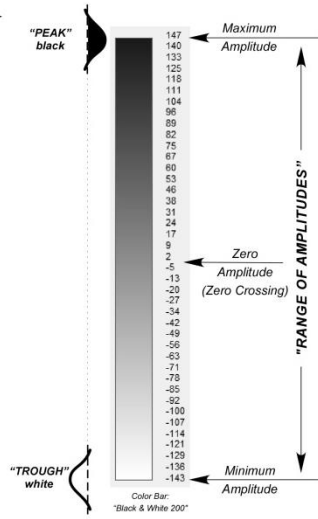
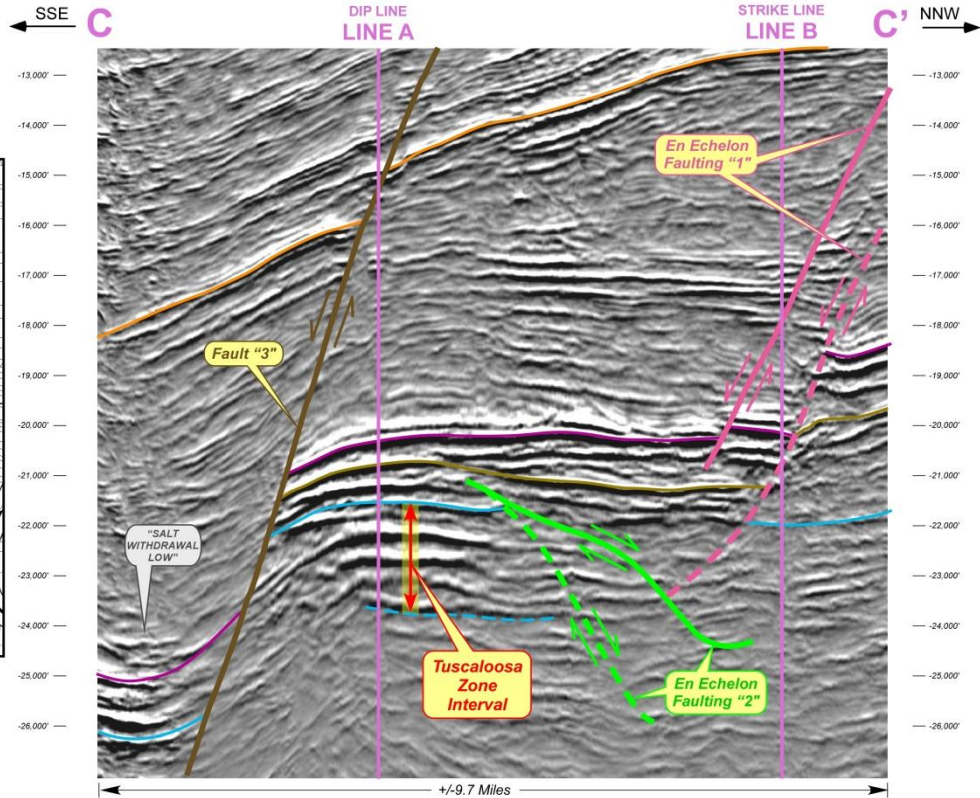
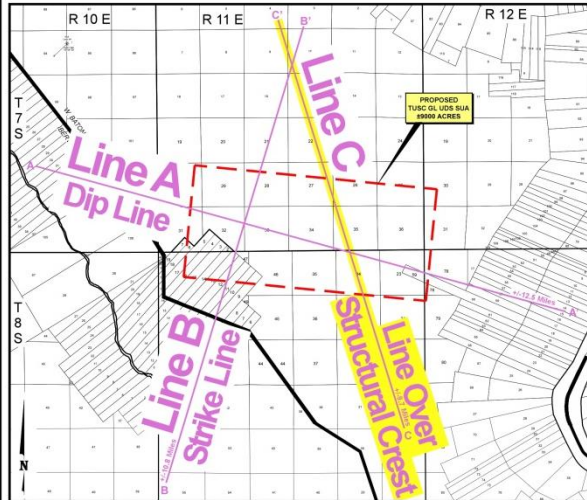
**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
www.bryangrovesgeology.com

Pre-App Date: 6/21/17  
Hearing Date: 8/8/17

**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com

# Case 2 Green Lake Field

## LINE OVER STRUCTURAL CREST



- En Echelon Faulting "1" (Composite Area)
- En Echelon Faulting "2" (Composite Area)
- Fault "3"
- Fault "4"
- Top Wilcox
- Top Austin Chalk
- Base Austin Chalk
- Top Tuscaloosa Zone
- Estimated Base Tuscaloosa Zone

3-D SEISMIC EXHIBIT NO. 6  
DOCKET NO. 17-400 DATE: 8-8-17

**PETROLEX**  
OPERATING VENTURES, LLC  
GREEN LAKE FIELD  
WEST BATON ROUGE PARISH, LOUISIANA  
Arbitrary Line C

**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
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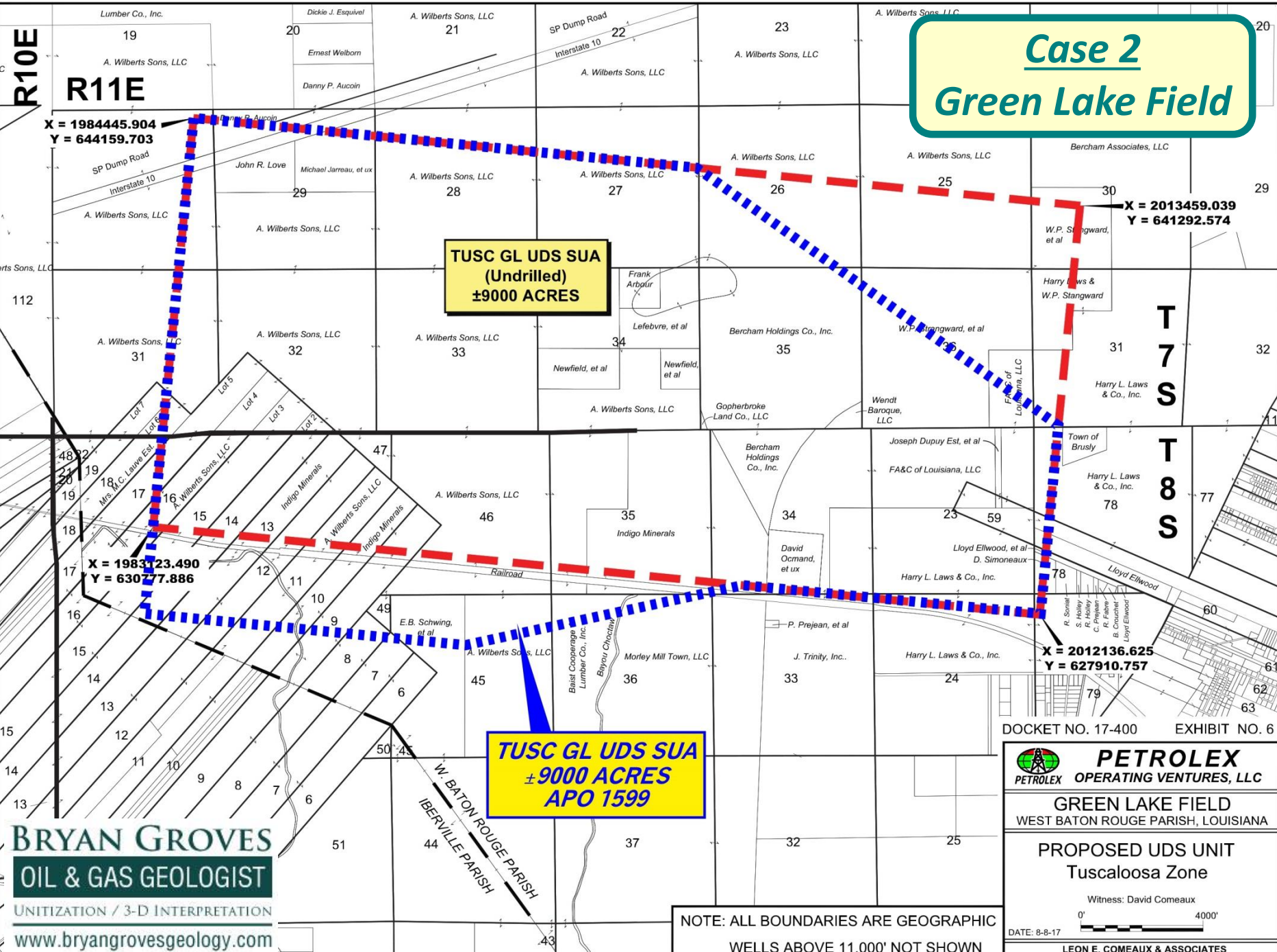
**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
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Pre-App Date: 6/21/17  
Hearing Date: 8/8/17

Black & White 200 Display

"Seismic data owned or controlled by Seismic Exchange, Inc.; interpretation is that of Petrolex Operating Ventures, LLC"

# Case 2 Green Lake Field



X = 1984445.904  
Y = 644159.703

**TUSC GL UDS SUA  
(Undrilled)  
±9000 ACRES**

X = 2013459.039  
Y = 641292.574

X = 1983123.490  
Y = 630277.886

**TUSC GL UDS SUA  
± 9000 ACRES  
APO 1599**

X = 2012136.625  
Y = 627910.757

DOCKET NO. 17-400 EXHIBIT NO. 6

**PETROLEX**  
PETROLEX OPERATING VENTURES, LLC

**GREEN LAKE FIELD**  
WEST BATON ROUGE PARISH, LOUISIANA

**PROPOSED UDS UNIT**  
Tuscaloosa Zone

Witness: David Comeaux

0' 4000'

DATE: 8-8-17

NOTE: ALL BOUNDARIES ARE GEOGRAPHIC  
WELLS ABOVE 11,000' NOT SHOWN

LEON E. COMEAUX & ASSOCIATES  
LAFAYETTE, LOUISIANA 337-233-9839

**BRYAN GROVES**  
OIL & GAS GEOLOGIST  
UNITIZATION / 3-D INTERPRETATION  
www.bryangrovesgeology.com



An oil and gas drilling rig is silhouetted against a sunset sky. The sun is a bright orange circle on the horizon, casting a glow over the scene. The rig's derrick and various cables are visible against the darkening sky. The foreground shows a flat, open landscape with some sparse vegetation.

*As an Oil & Gas Land Professional...*

*“What does this have to do with ME ?!?!”*

# **...9,000 Acre Ultra Deep Unitization...**

## ULTRA DEEP UNITIZATION – COMBINED WORLDS

*Ingredients*

*Case Histories*

**Part 3 of 3  
DONE!**

# Q & A

# WRAP UP

## Geological & Geophysical World

Bedding (Strata)

Faulting

Seismic Data (Prospect Delineation)

## Unitization – Land & Legal World

Types of Units

Interval Definitions (Sand & Zone)

LDNR Unitization Process

## Ultra Deep Unitization – Combined Worlds

Ingredients

Case Histories

*Let's Find Some Oil!*

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GEOLOGICAL & GEOPHYSICAL CONSULTING + UNITIZATION + OIL & GAS EXPLORATION

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**TAKE THE MILLION BARREL CHALLENGE**

[Click here to hunt for an actual million barrel reservoir that Bryan located. ↗](#)

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## Are You Up for a Million Barrel Challenge?

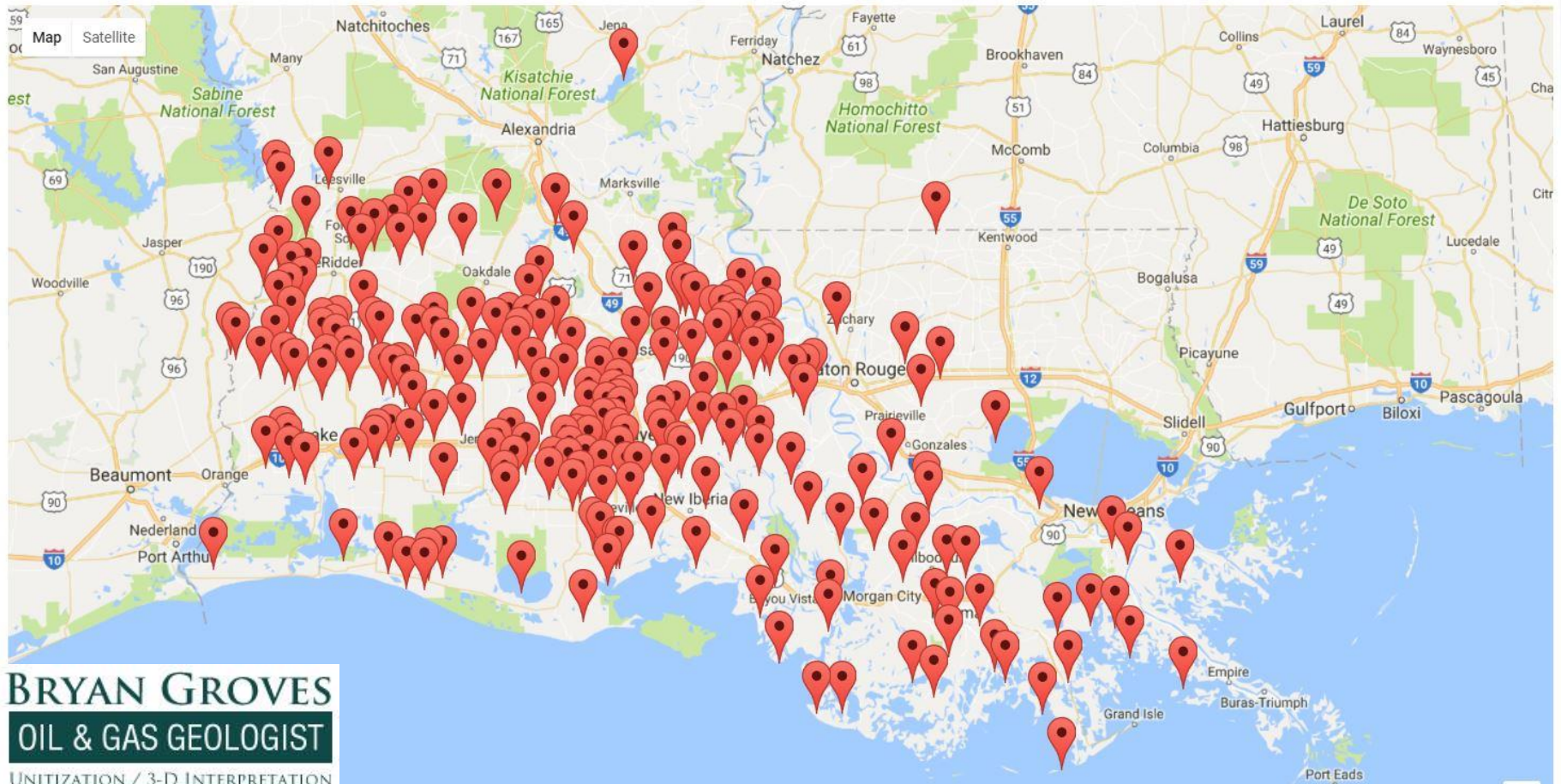
Can you find one million barrels on the seismic line below? Go ahead and give it your best shot. Just click anywhere in the image to see if you're right. Good Luck!

Like  Share You and 26 others like this.



## Map of Experience

Bryan Groves has vast geological experience across the entire state of Louisiana. His experience includes unitization, interpreting 3-D seismic data, generating drilling prospects and property and cash flow evaluations. Learn more about each project by clicking on the marked locations below.



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*Thank you to the G. C. M. I. ! ! !*

***How to Form a  
9,000 Acre Ultra Deep Unit  
in a Few Easy Leaps***

**Bryan S. Groves, Geologist**  
[www.bryangrovesgeology.com](http://www.bryangrovesgeology.com)



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