“Treasures of the T-Zone”
An Overview of Louisiana’s Transition Zone – Past, Present & Future

Houston Geological Society
February 20th, 2014

By Andy C. Clifford
Saratoga Resources, Inc.
Where is the T-Zone?

The Transition Zone is defined as an area in which water is too shallow for acquisition of marine seismic data with towed streamers, such as near the shoreline, marshes and lagoons.

Ref: http://sonris-ww.dnr.state.la.us/gis.
What is the T-Zone?

Wellheads in <20’ WD

Posted Barge Rigs

Barge Rig near Grand Bay

Saratoga’s Main Pass 52 Platform

Saratoga’s A191 Wellhead, Grand Bay

Hurricane Resistant Facilities
T-Zone Pro’s

- Giant Fields Discovered
- LLS/HLS Premium Crude Oil Pricing
- Long Life Reserves with Low Decline Rates
- Stacked Pay Zones
- Multiple Recompletion Opportunities
- Large HBP Positions Holding All Depths
- Abundant, Low Cost Leasing Opportunities
- Huge Deep and Ultra-Deep Potential
Are you brave enough to enter the T-Zone?

Limited Competition Creates Opportunities!
Only 10% of State Leases in T-Zone are Leased!

...and State lease sales are held monthly!

Ref: http://sonris-www.dnr.state.la.us/gis.
Grand Bay Field, Plaquemines Parish

- 65 Proven Stacked Pays.
- >250 MMBOE (83% Oil) Production since 1938.
- 50 BCF Shallow Potential plus 10 TCF Deep/Ultra-Deep Potential identified and mapped.
West Cote Blanche Bay Field, St. Mary Parish

- 100 Proven Stacked Pays with >4,000 Potential Zones Penetrated.
- Gulfport Drilled 167 New Wells Between 1997-2010 with 90% Success Rate.
Reprocessing of 3D data to delineate shallow gas play
Grand Bay Field

Inferior 3D Processing

Superior 3D Processing

3D Visualization

20 Prospects Defined with 50 BCF Potential
Technology Application

Chimney Analysis for Deep Gas Detection at Grand Bay
Neural network property prediction
Grand Bay Field
South LA 3D Seismic Acquisition

Deepwater GoM, West Africa

Ref: Lawless 2010
## Southern Louisiana Top 10 producers thru time

<table>
<thead>
<tr>
<th>Year</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
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</thead>
<tbody>
<tr>
<td>1990</td>
<td>Texaco</td>
<td>Texaco</td>
<td>Amoco</td>
<td>Chevron</td>
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<td>Shell</td>
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<td>Arco</td>
<td>Mobil</td>
<td>Hunt Oil</td>
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<td>1995</td>
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<td>Chevron</td>
<td>EDC</td>
<td>Flores/Rucks</td>
<td>Hess</td>
<td>Mobil</td>
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<td>2000</td>
<td>BP Amoco</td>
<td>ExxonMobil</td>
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<td>2005</td>
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<td>Chevron</td>
<td>Meridian</td>
<td>Swift</td>
<td>ExxonMobil</td>
<td>Ocean</td>
<td>Hunt Oil</td>
<td>BP</td>
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<tr>
<td>2010</td>
<td>Hilcorp</td>
<td>Swift</td>
<td>Apache</td>
<td>BP</td>
<td>Petroquest</td>
<td>Chevron</td>
<td>Phoenix</td>
<td>Gulfport</td>
<td>Manti</td>
<td>Helis</td>
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</table>

### Dominated by Majors

- **1ST Appearance**
- **Post Acquisition Bump**

### Dominated by Independents
Top producers in Southern Louisiana in 2013.

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>2013 Oil Production (BBLs)</th>
<th>2013 Gas Production (MCF)</th>
<th>Total 2013 Production (BOE)</th>
<th>% Oil</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>HILCORP ENERGY COMPANY</td>
<td>10,774,089</td>
<td>92,205,340</td>
<td>26,141,646</td>
<td>41%</td>
<td>1</td>
</tr>
<tr>
<td>APACHE CORPORATION</td>
<td>3,288,276</td>
<td>32,635,877</td>
<td>8,727,589</td>
<td>38%</td>
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<tr>
<td>CASTEX ENERGY, INC.</td>
<td>856,392</td>
<td>44,427,780</td>
<td>8,261,022</td>
<td>10%</td>
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<td>PETROQUEST ENERGY, L.L.C.</td>
<td>526,518</td>
<td>30,369,899</td>
<td>5,588,168</td>
<td>9%</td>
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<tr>
<td>TEXAS PETROLEUM INVESTMENT COMPANY</td>
<td>3,538,637</td>
<td>7,993,130</td>
<td>4,870,825</td>
<td>73%</td>
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<tr>
<td>CONTANGO OPERATORS, INC.</td>
<td>283,527</td>
<td>24,032,272</td>
<td>4,288,906</td>
<td>7%</td>
<td>6</td>
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<tr>
<td>MIDSTATES PETROLEUM COMPANY LLC</td>
<td>1,891,468</td>
<td>5,918,988</td>
<td>2,877,966</td>
<td>66%</td>
<td>7</td>
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<tr>
<td>ALTA MESA SERVICES, LP</td>
<td>1,574,130</td>
<td>7,406,397</td>
<td>2,808,530</td>
<td>56%</td>
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<td>GULFPORT ENERGY CORPORATION</td>
<td>2,375,433</td>
<td>1,368,194</td>
<td>2,603,465</td>
<td>91%</td>
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<td>SWIFT ENERGY OPERATING, LLC</td>
<td>1,999,187</td>
<td>2,094,335</td>
<td>2,348,243</td>
<td>85%</td>
<td>10</td>
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<td>CHEVRON U.S.A. INC.</td>
<td>2,096,501</td>
<td>1,062,884</td>
<td>2,273,648</td>
<td>92%</td>
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<tr>
<td>ENERGY XXI ONSHORE, LLC</td>
<td>119,767</td>
<td>12,304,298</td>
<td>2,170,483</td>
<td>6%</td>
<td>12</td>
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<td>SQUARE MILE ENERGY, L.L.C.</td>
<td>705,422</td>
<td>8,458,695</td>
<td>2,115,205</td>
<td>33%</td>
<td>13</td>
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<tr>
<td>HELIS OIL &amp; GAS COMPANY, LLC</td>
<td>1,697,806</td>
<td>1,494,336</td>
<td>1,946,862</td>
<td>87%</td>
<td>14</td>
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<tr>
<td>CENTURY EXPLORATION N. O. LLC</td>
<td>465,856</td>
<td>8,743,745</td>
<td>1,923,147</td>
<td>24%</td>
<td>15</td>
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<tr>
<td>DAVIS PETROLEUM CORP.</td>
<td>209,244</td>
<td>8,820,955</td>
<td>1,679,403</td>
<td>12%</td>
<td>16</td>
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<tr>
<td>SHORELINE ENERGY</td>
<td>843,331</td>
<td>13,778,261</td>
<td>3,139,708</td>
<td>27%</td>
<td>17</td>
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<tr>
<td>COX OPERATING, L.L.C.</td>
<td>952,135</td>
<td>1,684,516</td>
<td>1,232,888</td>
<td>77%</td>
<td>18</td>
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<tr>
<td>TANA EXPLORATION COMPANY LLC</td>
<td>853,565</td>
<td>2,048,435</td>
<td>1,194,971</td>
<td>71%</td>
<td>19</td>
</tr>
<tr>
<td>SARATOGA RESOURCES, INC.</td>
<td>733,659</td>
<td>2,217,354</td>
<td>1,103,218</td>
<td>67%</td>
<td>20</td>
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<tr>
<td>WALTER OIL &amp; GAS CORPORATION</td>
<td>167,339</td>
<td>5,001,837</td>
<td>1,000,979</td>
<td>17%</td>
<td>21</td>
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<tr>
<td>SAMUEL GARY JR. &amp; ASSOC., INC.</td>
<td>267,534</td>
<td>4,247,497</td>
<td>975,450</td>
<td>27%</td>
<td>22</td>
</tr>
</tbody>
</table>

Ref: http://sonris.co...
CUMULATIVE PRODUCTION SINCE 1977

Ref: SONRIS
Freshwater Bayou Deep

UNOCAL LA FURS INC. C-16
FRESHWATER BAYOU DEEP
VERMILION PARISH, LA
DISCOVERY WELL 1993

EXXON FEE “H” #5
FRESHWATER BAYOU DEEP
APPRAISAL WELL 1994

Log data c/o SONRIS, interpretation by SARA.
Freshwater Bayou Deep

Ref: SONRIS
Etouffee, Kent Bayou Deep

UPRC CLF #1
KENT BAYOU FIELD
TERREBONNE PARISH, LA
ETOUFFEE DISCOVERY WELL 1999

Log data c/o SONRIS, interpretation by SARA.
Etouffee, Kent Bayou Deep

Kent Bayou Production

- Oil
- Casinghead Gas
- Natural Gas

Ref: SONRIS
East Bay Production

Flores & Rucks’ East Bay field redevelopment

Ref: SONRIS
Swift’s Lake Washington Story

Ref: Swift SEC filings, SONRIS
Swift’s Lake Washington Story

Ref: Swift SEC filings, SONRIS
What’s Going On?

• Deep, Geopressured Wet Gas Exploration & Development – Apache, Castex, EXXI, Petroquest, Shoreline

• Horizontal Drilling in Old Fields – EXXI, Saratoga.

• Conventional Development – Northstar.

• Wide Azimuth 3D Around Salt Domes – Apache, EPL, EXXI, Chevron.

• Ultra-Deep Exploration – FCX.
Laphroaig Deep Discovery

- MMR WI: 37.3%
- MMR NRI: 28.5%
- Spud Date: September 24, 2010
- Drilled to 18,366'; PTD: 20,000'
  - LWD Indicated 140 Net Feet of Possible Hydrocarbons
  - Wireline Log Required to Confirm Thickness
- Gross Unrisked Potential: 150 Bcfe

Ref: McMoRan public materials.
Laphroaig Deep Discovery

Offset Well Logged 140’ as Indicated by LWD

Discovery Well Produced 33 Bcfe From 56’ Interval Through 12/31/10

Ref: McMoRan public materials.
Laphroaig Deep Discovery

McMoran ‘CM Peterson #1’ (2007)

Log data c/o SONRIS, interpretation by SARA.

Cum: 69 BCF & 890 MBC
8/1/07 to 5/1/12

IP 40.6 MMCFG & 745 BCPD
Petroquest’s La Cantera Discovery

Ref: Petroquest public materials.
La Cantera Development

Ref: Petroquest public materials.
Phoenix SL 20035 #1
Atchafalaya Bay

COMPLETED 5/1/10 AS A GAS WELL IN THE LWR CIB OP;
PERFS: 18256-18328;
IP = 10,500 MCFD, 108 BCPD; 57 BWPD
12800 FTP; 13250 SITP; 11/64" CK;
97222 GOR; 42.2 GVTY;

Log data c/o SONRIS, interpretation by SARA.
Phoenix SL 20035 #2
Atchafalaya Bay

COMPLETED 07/06/2011 AS A GAS WELL IN THE CIB OP 5 SAND;
PERFS 18240-18300’
IP = 14535 MCF/D; 25 BCPD; 21 BWPD;
FTP 12062; SITP 12600; 12/64” CHoke; 1.5% BS&W;
GOR 581400; GVTY 42.1;

Log data c/o SONRIS, interpretation by SARA.
Phoenix SL 20224 #1
Eugene Island 18

Log data c/o SONRIS, interpretation by SARA.

COMPLETED 2/5/11 AS AN OIL WELL IN THE CIB C4 RESERVOIR;
PERFS: 10704-10720';
IP = 618 BOPD; 313 MCFD; 10 BWPD;
1660 FTP; 1789 SITP; 550 CP;
15/64" CK;
506 GOR; 38.5 GVTY;
Apache SL 20255 #1
S Atchafalaya Bay

COMPLETED 10/18/12 AS A GAS WELL IN THE CIB OP 6 RES;
PERFS: 20625-683’
IP = 20000 MCFD; 208 BCPD;
12223 FTP; 14000 SITP; 2600 CP; 14/64 CK;
96153 GOR; 47 GRVTY

UNSUCCESSFULLY RECOMPLETED 7/20/13 AS A GAS WELL IN THE CIB OP 6 & CIB OP 7 RES;
PERFS CIB OP 7 (20813-20827’) PERFS CIB OP 6 (20732-20750 & 20692-20724’ & 20625-20687’)

Log data c/o SONRIS, interpretation by SARA.
Making the Case for Horizontal Drilling

**Vertical Drilling**

- **Early Life**
- **Mid Life**
- **Late Life** (40-50% recovery rates)

Typical Vertical: 200 psi drawdown leads to water coning and inefficient sweep.

**Horizontal Drilling**

- **Early Life**
- **Mid Life**
- **Late Life** (55-65% recovery rates)

Typical Horizontal: 3-5 psi drawdown leads to stable oil/water contact, enhanced recovery of original oil-in-place.

Ref: EXXI public materials.
Drilling Horizontals in the GOM

- Exxon GoM horizontal program started in 1995; 32 horizontal wells drilled in the 1990s.
- Energy XXI’s initial horizontal well was drilled in 2012; to-date, 16 horizontal wells drilled by EXXI resulted in 14 successful horizontal completions.

Ref: EXXI public materials.
Energy XXI >95 Horizontal Locations

- South Timbalier: 15-24 wells
- Grand Isle: 6-8 wells
- South Pass: 7-9 wells
- West Delta: 40-45 wells
- Main Pass: 6-11 wells

Ref: EXXI public materials.
Coning Model for Field Development
Saratoga’s Breton Sound 32 Drilling

5800’ Sand

Current O/W -5776’

Orig O/W -5780’

Rocky H-Well

Zeke Well

Pre-existing H-Wells

SARA H-Wells
The Rocky well targeted the elongated ridge, offsetting the #21 & #22 wells in the 5800’ sand. A 70° directional pilot hole was drilled followed by a sidetrack with a 750’ lateral completion. IP rate was gross 600 BOPD, 120 MCFPD on 16/64” choke, 650# FTP, net 508 BOEPD. 9/18/13 test rate of gross 422 BOPD, 47 MCFPD on 24/64” choke.
Wide Azimuth Seismic (WAZ) For Imaging Around Salt Domes

Ref: www.CGG.com.
WAZ Seismic in T-Zone

Deeper Potential to Probe – Only 4% of Wells Drilled Deeper than 15,000’ TVD

Ref: EXXI public materials.
Regional 2D seismic line showing ultra-deep potential

54 TFCE Miocene/Paleocene plus
34 TCFE Eocene/Cretaceous*

* 2012 Energy XXI Investor Day materials.
V-16 Ultra-Deep Potential

- Ultra-deep objectives in Lower Wilcox, Tuscaloosa and Lower Cretaceous carbonates between 22,000-32,000’.
- Resource potential of 2.4 Tcfe, attributable to SARA’s 4,000 acres, assuming 400’ net pay in Eocene Wilcox/Lwr Cretaceous with recovery factor of 1500 Mcf/AF.
Where is the Ultra-Deep Potential?

Legend
- Little or No Potential (too hot)
- Wilcox, Tuscaloosa & Cret. Carbonate Potential
- Cret. Carbonate Potential only
- Ultra-Deep Discovery
- Ultra-Deep Drilling

Chevron/Stone Bear's Hump Well
Chevron/MMR Lineham Creek Well
Chevron/MMR England Prospect
SARA Long John Silver Prospect
MMR/EXXI J-P Jones Prospect
MMR/EXXI Highlander Prospect
SARA Invictus Prospect
BP/Exxon Antietam Prospect

After Energy XXI
Where the Action is in the T-Zone
As of August 2013

Legend:
Development Activity
Drilling Activity
Ultra-Deep Drilling Activity

Ref: http://sonris-wwwww.dnr.state.la.us/gis.
Well Activity as of February 2014 in T-Zone

# T-Zone Pro’s and Con’s

<table>
<thead>
<tr>
<th>PRO’S</th>
<th>CON’S</th>
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<tbody>
<tr>
<td>Giant Fields Discovered</td>
<td>Expensive 3D Seismic Acquisition</td>
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<tr>
<td>LLS/HLS Premium Crude Oil Pricing</td>
<td>Relatively High Operating Costs</td>
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<tr>
<td>Long Life Reserves with Low Decline Rates</td>
<td>Large Swaths of Fee Acreage Onshore</td>
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<td>Stacked Pay Zones</td>
<td>Majors Retained Deep/Ultra-Deep Rights</td>
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<tr>
<td>Multiple Recompletion Opportunities</td>
<td>Legacy Lawsuits</td>
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<tr>
<td>Large HBP Positions Holding All Depths</td>
<td>Oyster Beds and Seed Grounds</td>
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<tr>
<td>Abundant, Low Cost Leasing Opportunities</td>
<td>Risk from tropical Storms/Hurricanes</td>
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<tr>
<td>Huge Deep and Ultra-Deep Potential</td>
<td>Water Moccasins, Mosquitoes and Gators...</td>
</tr>
<tr>
<td>Shallow Gas Opportunities</td>
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</table>
Hurricane Katrina

The *Wrong* Type of Hurricane
Hurricane Cocktail

The Right Type of Hurricane
Tropical Storms/Hurricanes

Ref: Weather Underground
50 Year Life Wells

Production profile of GPLD A-88 well, Grand Bay Field.

Weather-resistant assets and production:

- **Katrina Cat 5 (2005)**
  - 30 days downtime
  - $5.2 MM damage

- **Gustav/Ike (Cat 1) 2008**
  - 18 days downtime
  - $2.0 MM damage

- **Isaac (Cat 1) 2012**
  - 17 days downtime
  - $3.0 MM damage
SL 195QQ #199 well production profile with projected recompletions, Grand Bay Field

QQ199 WELL (1991)
CUM. 0.4 MMBOE
7 sand: 0.4 MMBOE + 3.3 MMBW 7/91-

12% decline
10 sands behind pipe in dual strings
Grand Bay – Long Life Wells

**A29 WELL (1947)**
CUM. 1.4 MMBOE
1A, 4, 19 sands: 1.2 MMBOE 6/47-6/90
3 sand: 244 MBOE + 254 MBW 9/90-

**QQ199 WELL (1991)**
CUM. 0.4 MMBOE
7 sand: 0.4 MMBOE + 3.3 MMBW 7/91-

PLUS 4, X5, 6B, 8, 8A, X9, 10B/10C, 11A/11B SAND BHP'S!
South LA Barge Rig Inventory

<table>
<thead>
<tr>
<th>Company</th>
<th>Active</th>
<th>Ready Stacked</th>
<th>Cold Stacked</th>
<th>Being Modified</th>
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<td>Parker</td>
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Ref: Rigzone 2-2014

Inventory of 41 Rigs between 8 Companies