Introduction

The purpose of this handbook is to provide rapid, reliable access to the names of the onshore petroleum producing formations, their location in North and South Louisiana, generalized characteristics of the reservoirs within the producing units, and a list of pertinent publications that can be referenced for more detailed information. Examples of selected e-logs are presented for all the producing intervals. The objective was to provide logs with stratigraphic names and with oil/gas shows where possible. The reader will observe that the producing areas of the State have been divided into a northern and a southern region. The reason for doing this is that both regions possess three fundamental differences that influence the exploration/exploitation methodologies that must be applied and thus their economics. These differences are: 1) the age and lithologies of the producing formations, 2) the hydrocarbon fluids that are produced, and 3) the depth of the reservoirs.

With respect to the first point, in North Louisiana the producing formations, with the exception of the Paleocene Wilcox, are older (Jurassic and Cretaceous in age), and contain both clastic (sandstone) and carbonate (chalk, limestone, marl) reservoirs. In South Louisiana the formations are younger (Tertiary in age) and the reservoirs are predominantly clastic in nature. Regarding the second point, the northern reservoirs produce oil and abundant gas with large areas producing free gas (e.g. Monroe Gas Field). In south Louisiana the reservoirs tend to be more oil prone. Finally, in the north the reservoirs are shallower, averaging 6000 feet in depth. In the southern parishes of the State, except for earlier shallow production associated with salt domes, they tend to be much deeper, averaging 12,000 feet in depth.

Although considered extremely important and useful information, reserve estimates and cumulative production figures by formation are not included in the handbook. During the preparation of this document it was possible to find estimates of reserves for the entire state (Figure 1). However, because of the large number of oil fields and reservoirs that exist in Louisiana that are operated by hundreds of independent producers, reserves by field and by reservoir are extremely difficult to obtain. Nevertheless, production figures are reported and can be found in the public records of the Louisiana Department of Natural Resources. Since it is beyond the scope of the handbook to provide detailed reserve and production data, a list of publications and online information systems are mentioned that will guide the reader in their search for this data.
**Brief History**

The date that is given for the initiation of the petroleum industry in Louisiana is 1866. At this time, only seven years after Colonel Drake’s oil discovery on August 28, 1859, in Pennsylvania, the first exploratory well was drilled by hand in Calcasieu Parish. However, it was not until 1901 that the first commercial production began at Jennings in South Louisiana, with the drilling of the Scott Heywood well. In North Louisiana, the first oil production began in Caddo Parish in 1906. The huge Monroe Gas Field was discovered in 1916 near Monroe and covers parts of Union, Morehouse, and Ouachita Parishes. Drilling of the first well far offshore in the Gulf of Mexico, south of Morgan City, did not occur until 1947. Details of these and other events regarding Louisiana’s petroleum history have been well documented. Perhaps the two most interesting and thorough accounts about Louisiana’s earlier developments in our industry can be found in the following publications:

*French, T. M. and M. Lam, (1986), “Oil and Gas Production Industry In Louisiana, A Short History With Long Term Projections:” Louisiana Department of Natural Resources, Energy Division, Technology Assessment Division, 42 pp.*


**Available Information Systems**

There are several online information systems containing oil and gas databases (wells, fields, production, etc.) that are easily accessible. Those considered to be the most complete for Louisiana are the following:

*Department of Natural Resources “SONRIS 2000 Integrated Applications.” Production data is from 1977 to the present. It functions well with Internet Explorer’s web browser, but with difficulty using Netscape. The web site is http://sonris-www.dnr.state.la.us*

*Central Gulf Region/Petroleum Technology Transfer Council (CGR/PTTC) web site: http://www.cgrpttc.lsu.edu. In the Tech Transfer Section, oil and gas information for Louisiana is listed with production data reported from 1977 to 1999.*

*“Louisiana Desk Top Well Reference (version 1999),” a CD that was prepared by the Louisiana Department Of Natural Resources, LSU Center For Energy Studies and LSU Basin Research Sector of the Louisiana Geological Survey. This CD can be purchased for $200 from the Central Gulf Region PTTC located at LSU.*

**Publications and Reports**

Information regarding Louisiana’s petroleum producing formations and reservoirs is well documented in numerous technical publications and reports. The most important of these, and the sources of most of the data provided herein are the following:


*Atlas of Major Central and Eastern Gulf Coast Gas Reservoirs, 1992, Sponsored by the Gas Research Institute and coordinated and edited by the Bureau of Economic Geology at The University of Texas at Austin. 88 pp.*


*Bulletins of the American Association Of Petroleum Geologists.*

**Reserve Estimates**

After more than one hundred years of petroleum activity, Louisiana today is the country’s largest producer of crude oil and condensate at 1.53 million barrels per day (MMBPD). Texas produces 1.42 MMBPD and Alaska approximately 1.0 MMBPD (Oil & Gas Journal, 06/15/2001). The natural gas resource base for the Gulf Coast States, including Louisiana, as of April 2001, was approximately 260 TCF. The oil resource base in this region was estimated to be 100 billion barrels (MMS National Assessment). Between 1960 and 2000, oil and gas reserve estimates for Louisiana have fluctuated widely. Reserve figures as high as 5.7 billion barrels of oil and 88 trillion cubic feet (TCF) of natural gas have been reported. As of the year 2000, conservative estimates of 3 billion barrels of oil and 29 TCF of gas are believed to exist in Louisiana (Figure 1). Because of the limitations with the reporting method of oil and gas produced, it is no easy task to obtain accurate estimates for cumulative production by field, or even by Parish.
LOUISIANA CRUDE OIL & NATURAL GAS RESERVES

Figure 1

CRUDE OIL RESERVES

December 31, 1999

(Million Barrels)

<table>
<thead>
<tr>
<th>Region</th>
<th>Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>108</td>
</tr>
<tr>
<td>South</td>
<td>384</td>
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<tr>
<td>Offshore</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>108</td>
</tr>
<tr>
<td>Fed. OCS</td>
<td>2,442</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>3,042</strong></td>
</tr>
</tbody>
</table>

Department of Natural Resources, Technology Assessment Division, November 2000.

NATURAL GAS RESERVES

December 31, 1999

(Billion Cubic Feet)

<table>
<thead>
<tr>
<th>Region</th>
<th>Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>3,079</td>
</tr>
<tr>
<td>South</td>
<td>5,535</td>
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<tr>
<td>Offshore</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>628</td>
</tr>
<tr>
<td>Fed. OCS</td>
<td>19,598</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>28,840</strong></td>
</tr>
</tbody>
</table>

Department of Natural Resources, Technology Assessment Division, November 2000.
Maps

Available regional maps containing field and reservoir information are the following:

- **Oil & Gas Map of Louisiana, 1981.** Published by the Department of Natural Resources and compiled by the Louisiana Geological Survey. Scale 1:380,160 (1 inch = 6 miles).

- **Geomap Company Executive Reference Maps, 1995, 1996.**
  1) Map 303, SW Louisiana, 1995. Scale: 1” = 28,000’
  2) Map 304, SE Louisiana, 1995. Scale: 1” = 28,000’
  3) Map 310, S. Arkansas & N. Louisiana, 1996. Scale: 1” = 32,000

Acknowledgements

Louisiana State University Center for Energy Studies and the Central Gulf Region Petroleum Technology Transfer Council (CGR/PTTC) provided financial support for the publication of the document. The author is especially grateful to Ron Zimmerman from the Louisiana Geological Survey’s Basin Research Energy Section for his valued personal communications and discussions held during the preparation of the manual. Although the author is responsible for the contents of the manuscript, critical review and suggestions by Barbara Kavanaugh and Ron Zimmerman were very helpful in the organization of the text and of the data presented.
NORTH LOUISIANA FORMATIONS
### NORTH LOUISIANA

#### GROUPS/FORMATIONS

<table>
<thead>
<tr>
<th>Groups/Formations</th>
<th>Facies</th>
<th>Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Producer</td>
<td></td>
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<tr>
<td>Gas Producer</td>
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</tr>
</tbody>
</table>

#### Environments

- **DELTAIC TO SHALLOW MARINE**
- **PRODELTA**
- **SHALLOW MARINE**
- **FLUVIAL-DELTAIC TO SHALLOW MARINE**
- **SHELF, REEF, LAGOON**

### EROSION & NON-DEPOSITION

<table>
<thead>
<tr>
<th>Era</th>
<th>System</th>
<th>Series</th>
<th>Groups/Formations</th>
<th>Facies Details</th>
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</thead>
<tbody>
<tr>
<td>CENOZOIC</td>
<td>TERTIARY NEogene &amp; PALEO/EOCENE MIOCENE</td>
<td>Cenomanian</td>
<td>Cockfield</td>
<td>ARENAcEous Facies Sandstone, interbedded siltstone &amp; shale</td>
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<tr>
<td></td>
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<td></td>
<td>Cook Mountain</td>
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<td>Sparta</td>
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<td>Cane River</td>
<td>Regional Seal</td>
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<td></td>
<td>Wilcox (Carrizo)</td>
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<td></td>
<td>Midway (Porters Creek)</td>
<td>Regional Seal</td>
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<td>Navarro GP.</td>
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<td>Taylor GP.</td>
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<td>Austin GP.</td>
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<td>Eagle Ford GP.</td>
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<td>Tuscaloosa GP.</td>
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<td>Washita-Fredricksburg</td>
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<td>Paluxy</td>
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<td></td>
<td>U. Glenrose:</td>
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<td>Mooringsport,</td>
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<td></td>
<td>Ferry Lake Anhydrite</td>
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<td>L. Glenrose:</td>
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<td>Rodessa</td>
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<td>James</td>
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<td>Pine Island</td>
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<td>Sligo (Pettet)</td>
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<td>Hosston (Travis Peak)</td>
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<td>Cotton Valley:</td>
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<td>Schuler</td>
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<td></td>
<td>Bossier Shale</td>
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<td></td>
<td>Haynesville/Buckner</td>
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<td>Smackover</td>
<td>Regional Source Rock</td>
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<td>Norphlet</td>
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<td>Louann Salt</td>
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<td>Werner</td>
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<td>Eagle Mills GP.</td>
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<td></td>
<td>PALEOZOICS</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- **PALEOZOICS**
- **NORTH LOUISIANA**
- **ENVIRONMENTS**
- **FACIES**
- **GROUPS/FORMATIONS**
**GROUP/FORMATION**

**WILCOX**

**PARISHES** (North Louisiana)

- Caldwell
- La Salle
- Tensas
- Catahoula
- Concordia
- Franklin
- Caldwell
- Winn

**LITHOLOGIC DESCRIPTION**

Very fine-to-fine grained sandstone interbedded with shale, carbonaceous shale, and lignite.

**DEPOSITIONAL ENVIRONMENT**

Fluvial-deltaic.

**RESERVOIR CONSIDERATIONS**

- Depth to top of pay: 2000’ – 7000’
- Net pay: 5’ – 30’
- Porosity (Ø): 15 – 35 %
- Permeability (k): 200 – 600 md
- Drive Mechanism: water drive
- API Gravity: 35º, condensate, gas

**PERTINENT PUBLICATIONS**

SERIES: UPPER CRETACEOUS

GROUP/FORMATION
NAVARRO/GAS ROCK

PARISHES
Union
Morehouse
West Carroll
East Carroll
Ouachita
Richland

LITHOLOGIC DESCRIPTION
Hard, white and gray sandy chalk.

DEPOSITIONAL ENVIRONMENT
Shallow marine to deeper shelf.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 2000’ – 2500’
Net pay: 10’ – 70’
Porosity (φ): 5 – 25 %
Permeability (k): as high as 500 md
Drive Mechanism: Water drive, gas cap
Hydrocarbon: Gas

PERTINENT PUBLICATIONS


SERIES: UPPER CRETACEOUS

GROUP/FORMATION
NAVARRO/ARKADELPHIA

PARISHES
Caddo
Bossier
Webster
Claiborne
Union
Morehouse
Ouachita

LITHOLOGIC DESCRIPTION
Light gray chalk/marl with calcareous, micaceous sandstone, and minor volcanic ash.

DEPOSITIONAL ENVIRONMENT
Shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 2200'
Net pay: 10'
Porosity (Ø): 14 % (average)
Permeability (k): 1 md
Drive Mechanism: Water, solution gas, gravity segregation
API Gravity: gas

PERTINENT PUBLICATIONS
SERIES: UPPER CRETACEOUS

GROUP/FORMATION
NAVARRO/NACATOCH

PARISHES
Caddo
Bossier
Webster
Caiborne
Union

LITHOLOGIC DESCRIPTION
Medium to fine grained unconsolidated quartz sandstone, sandy limestone, clay, marl and shale. Sandstones are glauconitic, ashy and argillaceous.

DEPOSITIONAL ENVIRONMENT
Shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 800’ – 2700’
Net pay: 15’ – 50’
Porosity (Φ): 28 % (average)
Permeability (k): 200 – 2500 md
Drive mechanism: water, solution gas
API Gravity: gas

PERTINENT PUBLICATIONS

SERIES: UPPER CRETACEOUS

SELECTED LOG

TAYLOR/Saratoga, Marlbrook
Annona, Ozan

PARISHES
Caddo
Bossier
Webster
Claiborne
De Soto
Red River
Sabine

LITHOLOGIC DESCRIPTION
Hard, gray glauconitic fossiliferous chalk, calcareous shale, marl, fine sandstone and siltstone.

DEPOSITIONAL ENVIRONMENT
Shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 1250’ – 3100’
Net pay: 10’ – 60’
Porosity (Ø): 20 – 33 %
Permeability (k): 100 – 1000 md
Drive Mechanism:
API Gravity: 42º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: UPPER CRETACEOUS

GROUP/FORMATION
AUSTIN/TOKIO

PARISHES
Caddo
Bossier
Webster
Claiborne
Union
Ouachita
Morehouse

LITHOLOGIC DESCRIPTION
Medium to coarse-grained glauconitic sandstone, carbonaceous and argillaceous in part, and alternating with chalky, shaly and silty sequences.

DEPOSITIONAL ENVIRONMENT
Shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 2700’ – 3100’
Net pay: 10’ – 12’
Porosity (ϕ): 20 – 25 %
Permeability (k):
Drive Mechanism: 200 – 450 md
API Gravity: 39º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: UPPER CRETACEOUS

GROUP/FORMATION
WOODBINE/TUSCALOOSA

PARISHES
Bienville  Richland  Franklin  Tensas  Concordia

LITHOLOGIC DESCRIPTION
Fine to medium to coarse-grained quartz arenites and fossiliferous clays. Ashy sands, red beds, gray shales, and minor chert gravels in NW Louisiana.

DEPOSITIONAL ENVIRONMENT
Fluvial-deltaic to shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 3100’ – 9250’
Net pay: 10’ – 40’
Porosity (Φ): 25 – 30 %
Permeability (k): 200 – 2000 md
Drive Mechanism: water & dissolved gas
API Gravity: 24º – 46º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: LOWER CRETACEOUS

SELECTED LOG
Sabine/Converse field

GROUP/FORMATION
WASHITA-FREDRICKSBURG
Minor scattered production below the Wash-Fred subcrop.

PARISHES
Caddo
De Soto
Sabine
Franklin
Tensas

LITHOLOGIC DESCRIPTION
Fine-grained sandstone and marine shale with minor calcareous sandstone and shale.

DEPOSITIONAL ENVIRONMENT
Shallow marine

RESERVOIR CONSIDERATIONS
Depth to top of pay: 3000’ – 6000’
Net oil sand: 10’ – 30’
Porosity (ρ): 10 – 20 %
Permeability (k): Low
Drive Mechanism: pressure depletion
API Gravity: mostly gas

PERTINENT PUBLICATIONS

SERIES: LOWER CRETACEOUS

GROUP/FORMATION
TRINITY/PALUXY
(Bostwick, Parker, Brown, Mira and Dominick sands)

PARISHES
Caddo
Bossier
De Soto
Tensas
Red River

LITHOLOGIC DESCRIPTION
Fine-grained calcareous sandstones, shales and gray limestones.

DEPOSITIONAL ENVIRONMENT
Shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 2500’ – 8500’
Net pay: 10’ – 40’
Porosity (Ø): 24 – 30 %
Permeability (k): 150 – 600 md
Drive Mechanism: water & dissolved gas
API Gravity: 32º-46º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: LOWER CRETACEOUS

GROUP/FORMATION
TRINITY/MOORINGSPORT

PARISHES
Caddo
Bossier
De Soto
Red River
Lincoln

LITHOLOGIC DESCRIPTION
Crystalline fossiliferous limestones, with sandstones, red beds, anhydrite, and shales.

DEPOSITIONAL ENVIRONMENT
Shallow marine (transgressive).

RESERVOIR CONSIDERATIONS
Depth to top of pay: 3000’ – 5000’
Net pay: 10’ – 30’
Porosity (Φ): 10 – 20%
Permeability (k): 10 – 500 md
Drive mechanism: gas expansion
API Gravity: gas

PERTINENT PUBLICATIONS


Forgotson J. M., 1956, A correlation and stratigraphic analysis of the formations of the Trinity Group of the Comanchean Cretaceous of the Gulf Coastal Plain; and genesis and petrography of the Ferry lake Anhydrite: GCAGS Trans., v. 6, p. 91-108.

SERIES: LOWER CRETAEOUS

SELECTED LOG

Caddo/Caddo Pine Island Field

GROUP/FORMATION
TRINITY/FERRY LAKE ANHYDRITE
(Minor production from fractured intervals)

PARISHES
Caddo
De Soto
Bossier

LITHOLOGIC DESCRIPTION
White to gray finely crystalline anhydrite, with minor black shale, dense limestone, and dolomite.

DEPOSITIONAL ENVIRONMENT
Restricted lagoon.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 2500’ - 3000’
Net pay: 20’ – 50’
Porosity (θ): minor fracture porosity
Permeability (k): low
Drive Mechanism: gas expansion
API Gravity: oil, gas

PERTINENT PUBLICATIONS
Forgotson J. M., 1956, A correlation and regional stratigraphic analysis of the formations of the Trinity Group of the Comanchean Cretaceous of the Gulf Coastal Plain; and the genesis and petrography of the Ferry lake Anhydrite: GCAGS Trans., v. 6, p. 91-108.


SERIES: LOWER CRETACEOUS

GROUP/FORMATION
TRINITY/RODESSA
(Reservoirs: Jeter, Gloyd, Fowler, Hill)

PARISHES
Caddo
Bossier
Webster
Claiborne
Lincoln
Bienville
De Soto

LITHOLOGIC DESCRIPTION
Oolitic and crystalline limestones, lenticular fine-grained sandy limestone, anhydrite, coquinoind limestones and gray shales.

DEPOSITIONAL ENVIRONMENT
Shallow marine (transgressive).

RESERVOIR CONSIDERATIONS
Depth to top of pay: 4100’ – 6000’
Net pay: 10’ – 30’
Porosity (\(\phi\)): 10 – 26 %
Permeability (\(k\)): 10 – 650 md
Drive Mechanism: water, gas expansion, solution gas.
API Gravity: 34°-41°, condensate, gas

PERTINENT PUBLICATIONS


SERIES: LOWER CRETACEOUS

GROUP/FORMATION
TRINITY/JAMES

PARISHES
Bossier
Webster
Claiborne
Lincoln
De Soto
Bienville
Jackson

LITHOLOGIC DESCRIPTION
Sandy and chalky fossiliferous limestones and medium to fine-grained sandstones, interbedded with gray shales.

DEPOSITIONAL ENVIRONMENT
Shallow marine reef to deep stable shelf.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 4700’ – 6000’
Net pay: 30’ – 60’
Porosity (Ø): 10 – 15 %
Permeability (k): 6 - 100 md
Drive Mechanism: Dissolved gas
API Gravity: condensate, gas

PERTINENT PUBLICATIONS


SERIES: LOWER CRETACEOUS

GROUP/FORMATION
TRINITY/PINE ISLAND (Produces from the basal Causey, Hogg and Woodruff sand reservoirs)

PARISHES
Union
Lincoln
Jackson
Ouachita

LITHOLOGIC DESCRIPTION
Calcareous black shale with interbedded fine-grained sandstone and minor crystalline limestone layers.

DEPOSITIONAL ENVIRONMENT
Lagoonal to nearshore marine

RESERVOIR CONSIDERATIONS
Depth to top of pay: 4000’ - 7000’
Net pay: 30’ – 60’
Porosity (Ø): 10 - 15 %
Permeability (k): 10 - 200 md
Drive Mechanism: water, dissolved gas.
API Gravity: 24º -30º, condensate to gas.

PERTINENT PUBLICATIONS


SERIES: LOWER CRETACEOUS

FORMATION
SLIGO/Pettet (13 reservoirs)

PARISHES
Caddo, Bossier
Webster, Claiborne,
Lincoln
De Soto, Bienville
Natchitoches, Winn

LITHOLOGIC DESCRIPTION
Crystalline to oolitic limestone, calcareous sandstone, fossiliferous shale and anhydrite layers.

DEPOSITIONAL ENVIRONMENT
Shallow marine transgressive.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 5000’ – 9000’
Net pay: 10’ – 140’
Porosity (\(\phi\)): 16 – 20 %
Permeability (k): 9 – 100 md
Drive Mechanism: water, gas expansion
API Gravity: 25º - 44º, condensate, gas

PERTINENT PUBLICATIONS
Ahrnsbrak, S. L., 1983, The Sligo Formation (Lower Cretaceous), Panther Creek Field, Claiborne Parish Louisiana-deposition, porosity, development, and diagenesis: Louisiana State University, Master’s Thesis.


SERIES: LOWER CRETACEOUS

FORMATION
HOSSTON (Travis Peak of Texas)
(Approx. 40 reservoirs)

PARISHES
Caddo, Bossier
Webster, Claiborne
Union, Lincoln
De Soto, Bienville,
Red River, Jackson
Ouachita, Caldwell

LITHOLOGIC DESCRIPTION
Alternating fine grained sandstones,
siltstones, shales, silty sands, marine
shales and limestone.

DEPOSITIONAL ENVIRONMENT
Fluvial-deltaic to shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 5000’ – 12,000’
Net pay: 20’ – 80’
Porosity (Ø): 10 – 26 %
Permeability (k): 10 – 250 md
Drive Mechanism: Gas expansion
& Depletion drive
API Gravity: 30º - 37º, condensate, gas

PERTINENT PUBLICATIONS


series: upper jurassic

selected log
webster/cotton valley field

Group/formation
COTTON VALLEY/SCHULER (45 reservoirs)

Parishes
Caddo, Bossier
Webster, Claiborne
Lincoln, Union,
Ouachita, De Soto,
Bienville, Winn

Lithologic description
Medium to fine-grained hard, fossiliferous sandstones and oolitic limestones.

Depositional environment
Shallow marine.
(Blanket sands and massive barrier bars)

Reservoir considerations
Depth to top of pay: 7200’ – 14,500’
Net pay: 10’ – 60’
Porosity (ο): 9 – 18 %
Permeability (k): 1 – 300 md
Drive Mechanism: Dissolved gas
API Gravity: 41º, condensate, gas

pertinent publications


SERIES: UPPER JURASSIC

GROUP/FORMATIONS
LOUARK/HAYNESVILLE-BUCKNER

PARISHES
Bossier
Webster
Claiborne
Lincoln

LITHOLOGIC DESCRIPTION
Fine-grained sandstones, shales, bedded anhydrite, and oolitic limestones.

DEPOSITIONAL ENVIRONMENT
Shallow marine to deep-water submarine fan.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 9700’ – 10,500’
Net pay: 30’ – 45’
Porosity (θ): 9 – 16 %
Permeability (k): 50 – 400 md
Drive mechanism: gas expansion, dissolved gas
API Gravity: 42º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: UPPER JURASSIC

GROUP/FORMATION
LOUARK/SMACKOVER (A, B, C, & Gray)

PARISHES
Bossier
Webster
Claiborne
Lincoln
Union

LITHOLOGIC DESCRIPTION
Oolitic and pisolitic limestone (mudstone, wackestone, packstone) with minor silty calcareous sandstone.

DEPOSITIONAL ENVIRONMENT
Shallow marine (beach, shoreface) to deep marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 10,000 – 12,500’
Net pay: 20 – 120’
Porosity (\(\phi\)): 11 – 22%
Permeability (k): 1 – 100 md.
Drive mechanism: dissolved gas
API Gravity: 42\(^\circ\)-53\(^\circ\), condensate, gas

PERTINENT PUBLICATIONS


Ellison, L. F., and M. Russo, 1976, South Serepta Field, (Smackover Gray Sand), Bossier and Webster Parishes, Louisiana: GCAGS Trans.: v. 26, p. 30-34.


SOUTH LOUISIANA FORMATIONS
## South Louisiana

### ERA
- **Cenozoic**

### System
- **Tertiary**
  - **Neogene**
    - Upper Miocene
    - Middle Miocene
    - Lower Miocene
- **Paleogene**
  - Upper Paleocene
  - Lower Paleocene

### Groups
- **Goliad**

### Formations
- **ANAHUAC**
  - Arenaceous Facies
  - Deltaic to Shallow Marine
- **Frio**
  - Arenaceous Facies
  - Deltaic to Slope
- **Vicksburg**
  - Arenaceous Facies
  - Sandstone & minor limestone
- **Jackson**
  - Arenaceous Facies
  - Sandstone & minor limestone
- **Cockfield**
  - Arenaceous Facies
  - Sandstone & minor limestone
- **Cook Mountain**
  - Arenaceous Facies
  - Sandstone & minor limestone
- **Sparta**
  - Arenaceous Facies
  - Sandstone & minor limestone
- **Cane River**
  - Arenaceous Facies
  - Sandstone & minor limestone
- **Wilcox (Carrizo)**
  - Arenaceous Shaly
  - Fluviat-Deltaic Prodelta

### Upper Paleocene
- **Navarro Gp.**
- **Taylor Gp.**
- **Austin Gp.**
- **Eagle Ford Gp.**
- **Tuscaloosa Gp.**

### Lower Paleocene
- **Paluxy**
  - Trinity Group: Mooringsport, Ferry Lake, Rodessa, James, Pine Island
  - Nuevo Leon Group: Sligo, Pettet, Hosston

### Paleozoic
- **Cotton Valley Group**
- **Louark Group**
- **Louann Group**

### Paleozoic
- **Paleozoic**
SERIES: PLEISTOCENE/PLIOCENE

GROUP/FORMATION
CITRONELLE/GOLIAD (30 reservoirs)

Index Fossils
1. Angulogerina
2. Lenticulina
3. Buliminella
4. Textularia x

SELECTED LOG
Terrebonne/ Caillou Island Field

PARISHES
Terrebonne
St. Martin
Iberia
Lafourche
Plaquemines

LITHOLOGIC DESCRIPTION
Interbedded sandstones and shales, in some areas interfingered with carbonate sequences.

DEPOSITIONAL ENVIRONMENT
Alluvial, deltaic to shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 1500’ – 8000’
Net pay: 10’ – 120’
Porosity (\(\phi\)): 27 – 34%
Permeability (k): 600 – 2200 md.
Drive Mechanism: Water drive
API Gravity: oil, condensate, gas

PERTINENT PUBLICATIONS


SERIES: MIOCENE

GROUP/FORMATION

Upper Miocene (Clovelly)

Index Fossils
1. Rob E.
2. Big A
3. Cris K
4. Amph E
5. Cyclam 3

PARISHES

St. Mary
Terrebonne
Lafourche
Plaquemines
Iberia
Vermilion

LITHOLOGIC DESCRIPTION

Alternating sandstones and shale.

DEPOSITIONAL ENVIRONMENT

Proximal and distal deltaic.

RESERVOIR CONSIDERATIONS

Depth to top of pay: 5000’ – 16,500’
Net pay: 10’ – 80’
Porosity (\( \Phi \)): 19 – 30 %
Permeability (k): 100 – 1000 md
Drive Mechanism: water, pressure depletion
API Gravity: Oil, condensate, gas

PERTINENT PUBLICATIONS


Smith, R. and T. T. Tieh, 1984, Deposition, compaction, and mineralogical alteration of Miocene sandstones, south Louisiana: GCAGS Trans., v. 34, p. 247-254
**SERIES: MIocene**

**GROUP/FORMATION**
Middle Miocene (Duck Lake)

**Index Fossils**
1. Big 2
2. Tex W
3. Big hum
4. Cris I
5. Cib op
6. Amph b
7. Rob 43
8. Operc

**PARISHES**
Cameron, Vermilion
Lafayette, Iberia
St. Mary, St. Charles
Jefferson Davis
Plaquemines
Lafourche,
Terrebonne

**LITHOLOGIC DESCRIPTION**
Alternating thick sandstones and shales.

**DEPOSITIONAL ENVIRONMENT**
Proximal to distal deltaic.

**RESERVOIR CONSIDERATIONS**
Depth to top of pay: 6500’ – 18,000’
Net pay: 10’ – 150’
Porosity (Φ): 20 – 35 %
Permeability (k): 300 – 1100 md
Drive Mechanism: Water drive
API Gravity: oil, condensate, gas

**PERTINENT PUBLICATIONS**


SERIES: MIocene

GROUP/FORMATION
Lower Miocene (Napoleonville)

SELECTED LOG
St. Mary/ Jeanerette Field

Index Fossils
1. Disc B
2. Rob chambersi
3. Marg A
4. Siph dav
5. Plan palm
6. Liebusella

PARISHES
Cameron
Vermilion
Iberia
St. Martin
St. Mary
Assumption
St. James
Iberville

LITHOLOGIC DESCRIPTION
Thick sandstones and alternating shales.

DEPOSITIONAL ENVIRONMENT
Proximal to distal deltaic to slope.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 10,000’ – 17,500’
Net pay: 10’ – 150’
Porosity (ϕ): 22 – 30 %
Permeability (k): 100 – 2500 md
Drive Mechanism: Water drive
API Gravity: Oil, condensate, gas

PERTINENT PUBLICATIONS

Edwards, M. B., 1994, Enhancing sandstone reservoir prediction by mapping erosional surfaces, lower Miocene

Green, H. C., 1959, Sedimentation and structure of the Planulina Abbeville trend South Louisiana, GCAGS Trans., v.
9, p. 91-103.

Sloane, B. J., 1971, Recent developments in Miocene Planulina gas trends of South Louisiana: GCAGS Trans., v. 21,

SERIES: OLIGOCENE

FORMATION
ANAHUAC (73 reservoirs)

Index Fossils
1. Disc gravelli  
2. Het  
3. Bol perc  
4. Marg idi  
5. Marg vag  
6. Marg 7 howei

PARISHES
Cameron  
Jefferson Davis  
Vermilion, Acadia  
St. Landry, Lafayette  
St. Martin, Iberia  
Iberville, Assumption  
Ascension

LITHOLOGIC DESCRIPTION
Alternating sandstones and shale.

DEPOSITIONAL ENVIRONMENT
Proximal and distal deltaic to slope.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 6600’ – 15,000’  
Net pay: 10’ – 75’  
Porosity (\(\Theta\)): 20 –30 %  
Permeability (k): 100 – 2800 md  
Drive Mechanism: Water, pressure depletion  
API Gravity: oil, condensate, gas

PERTINENT PUBLICATIONS
SERIES: OLIGOCENE

FORMATION

UPPER FRI (55 reservoirs)

Index Fossils
1. Cam A
2. Miogyp
3. Cibb hazz
4. Cris H (Hays)

PARISHES
Calcasieu
Cameron
Vermilion
Jefferson Davis
Acadia
Lafayette
St. Martin

LITHOLOGIC DESCRIPTION
Alternating sandstones and shales with occasional limestone beds.

DEPOSITIONAL ENVIRONMENT
Distal deltaic to slope.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 9800 – 17,000’
Net pay: 15’ - 200’
Porosity (Ø): 18 – 30 %
Permeability (k): 130 – 500 md
Drive Mechanism: gas cap, pressure deplet.
API Gravity: oil, condensate, gas

PERTINENT PUBLICATIONS


SERIES: OLIGOCENE

FORMATION
MIDDLE FRIO (approx. 39 reservoirs)
(Hackberry Fm.)

SELECTED LOG
Lafayette/ Duson Field

Index Fossils
1. Marg tex
2. Bol mex
3. Uvig israel

PARISHES
Calcasieu
Cameron
Vermilion
Jefferson Davis
Acadia
St. Landry
St. Martin
Pointe Coupee

LITHOLOGIC DESCRIPTION
Alternating sandstones and shales.

DEPOSITIONAL ENVIRONMENT
Distal deltaic to slope.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 7500’ – 15,000’
Net pay: 10’ – 100’
Porosity (Ø): 21 – 32 %
Permeability (k): 100 – 1200 md
Drive Mechanism: solution gas
API Gravity: 33º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: OLIGOCENE

FORMATION

LOWER FRIÓ (Approx. 34 reservoirs)

Index Fossils

1. Nonion struma
2. Nodosaria blan
3. Disc D
4. Tex selegi

PARISHES

Jefferson Davis
Acadia
Lafayette
St. Landry
Iberville
Pointe Coupee

LITHOLOGIC DESCRIPTION

Alternating sandstones and shales.

DEPOSITIONAL ENVIRONMENT

Distal deltaic to slope.

RESERVOIR CONSIDERATIONS

Depth to top of pay: 8000’ - 14,600’
Net pay: 10’ – 150’
Porosity (Ø): 15 – 33 %
Permeability (k): 100 – 2500 md
Drive Mechanism: water, solution gas
API Gravity: 34º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: EOCENE

FORMATION
COCKFIELD (Yegua of Texas)

PARISHES
Beauregard
Allen
Evangeline
St. Landry
Pointe
Coupee

LITHOLOGIC DESCRIPTION
Alternating fossiliferous sandstone and shales.

DEPOSITIONAL ENVIRONMENT
Shallow marine-shelf.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 9600’ – 11,300’
Net pay: 20’ – 40’
Porosity (Ø): 20 – 30 %
Permeability (k): 125 – 500 md
Drive Mechanism: water drive
API Gravity: Oil, condensate, gas

PERTINENT PUBLICATIONS


SERIES: EOCENE

FORMATION
SPARTA

PARISHES
Beauregard
Allen
Evangeline
St. Landry
Pointe Coupee

LITHOLOGIC DESCRIPTION
Alternating fossiliferous sandstones and shales.

DEPOSITIONAL ENVIRONMENT
Shallow marine to shelf.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 11,000’ – 12,000’
Net pay: 10’ – 30’
Porosity (Ø): 22 – 25 %
Permeability (k): 200 – 300 md
Drive Mechanism: water drive
API Gravity: 42º, condensate, gas

PERTINENT PUBLICATIONS

SERIES: PALEOCENE

GROUP/FORMATION
WILCOX (Approx. 11 reservoirs)

Index Fossils
1. Globorotalia wx
2. Cytheridea sab
3. Globorotalia pseudo

PARISHES
Beauregard
Evangeline
St. Landry
Pointe Coupee
Livingston

LITHOLOGIC DESCRIPTION
Alternating very fine to fine grained sandstone and shale.

DEPOSITIONAL ENVIRONMENT
Shallow marine.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 10,000’ – 14,000’
Net pay: 12’ – 25’
Porosity (ø): 15 – 27 %
Permeability (k): 100 – 600 md
Drive Mechanism: Dissolved gas
API Gravity: 45º, condensate, gas

PERTINENT PUBLICATIONS


SERIES: UPPER CRETACEOUS

GROUP/FORMATION
AUSTIN/AUSTIN CHALK

PARISHES
Vernon, Rapides
Avoyelles
Pointe Coupee
West/East Feliciana
East Baton Rouge
Livingston,
Tangipahoa
St. Tammany

LITHOLOGIC DESCRIPTION
Interbedded massive chalk, dark colored foraminiferal bioicrite, and bentonitic marl

DEPOSITIONAL ENVIRONMENT
Restricted to basinal ramp setting.

RESERVOIR CONSIDERATIONS
Depth to top of pay: 12,000’ – 17,000’
Net pay: 50’ – 140’
Porosity (\(\phi\)): 2- 5%
Permeability (\(k\)): 0.05 – 2 md
Drive Mechanism: water, solution gas
API Gravity: oil, condensate, and gas

PERTINENT PUBLICATIONS


SERIES: UPPER CRETACEOUS

SELECTED LOG

FORMATION
LOWER TUSCALOOSA (21 reservoirs)

PARISHES (South Louisiana)
West Baton Rouge
East Baton Rouge
Pointe Coupee
Livingston
St. Helena

LITHOLOGIC DESCRIPTION
Fine to medium grained sandstone (quartz arenite), mudstones and well-laminated shales.

DEPOSITIONAL ENVIRONMENT
Fluvial-deltaic to shallow marine (offshore bars).

RESERVOIR CONSIDERATIONS
Depth to top of pay: 16,500’ – 20,000’
Net pay: 30’ – 200’
Porosity (\(\phi\)): 12 – 25 %
Permeability (\(k\)): 35 – 800 md
Drive Mechanism: Water, gas expansion
API Gravity: oil, condensate, gas

PERTINENT PUBLICATIONS
Corcoran, M. K., C. P. Cameron, and M. A. Meyland, 1993, The Lower Tuscaloosa Formation in the Greensburg Field and Joseph Branch field areas, St. Helena Parish, Louisiana: GCAGS Trans., v. 43, p. 87-96.


Thomson, A., 1979, Preservation of porosity in the deep Woodbine/Tuscaloosa trend, Louisiana: GCAGS Trans., v.29, p. 396-403.

Author’s Biography

Donald A. Goddard is an Associate Professor at Louisiana State University’s Center For Energy Studies (CES). He serves as the Coordinator of the Central Gulf Region, Petroleum Technology Transfer Council (PTTC). In this capacity, with the help of the CGR/PTTC Producer Advisory Group (PAG), Dr. Goddard is responsible for identifying and transferring upstream technologies to Louisiana independent producers. He performs his duties as the PTTC coordinator in collaboration with LSU’s Petroleum Engineering Department (PETE), and Louisiana Geological Survey’s Basin Research Energy Section.

Prior to joining LSU’s Center For Energy Studies he worked for four years as a petroleum consultant to international companies interested in Venezuela’s upstream activities. As Assistant Professor-Research at LSU’s Basin Research Institute (1991-1996), his research involved the characterization of Tertiary reservoirs in Central Louisiana, and participated on projects in basin analysis of the Gulf Coast Region. Dr. Goddard began his career in 1965 with Gulf Oil Co. (Mene Grande) in Eastern Venezuela. He has over twenty-five years of petroleum industry experience, both in exploration geophysics and production geology, having attained managerial positions in Maraven S. A., an affiliate of Petroleos de Venezuela (PDVSA).

He obtained a B.S. degree in geology from Florida State University in 1965. Dr. Goddard later studied at the University of London where he obtained M.Sc. and PhD degrees in marine geology and geophysics. He also has a geological engineering degree from the Universidad Central de Venezuela. Dr. Goddard is a member of the American Association of Petroleum Geologists (AAPG), the Baton Rouge Geological Society (BRGS), the Venezuelan Geological Society (SVG), and the Society of Petroleum Engineers (SPE).

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