Dustin Field, Hughes County, Oklahoma

And Booch Stratigraphy, Dustin to Greasy Creek Fields

Ronald J. Woods
**Discovery Date:** March 1944

**J. T. Hall**

**#1-C.A. Griswold**

**NW SE Section 5-T9N, R12E**

**Bartlesville-Booch**

**Open Hole Completion**

**IPF 3 MCFGPD**

**Cum 3.0 BCF Gas**

**Field Total Cumulative Production:**

28.9 BCF Gas + 145 MB oil

**15 Bartlesville Wells**

Produced 3 BCF Gas

**62 Booch Wells**

Produced 16 BCF Gas, 1870’ to 2260’, average depth of 2027’

**21 Gilcrease Wells**

Produced 5.7 BCF Gas

**“Minor Producing Zones”**

Thurman, Red Fork, Wapanucka, Union Valley and Cromwell (almost always oil)
Produced 1.6 BCF gas before monthly data began.

Dustin Field Discovery
J. T. Hall #1-C.A. Griswold Open Hole Bartlesville & Booch Production
65 Years of Production!!!
Study Area in region of “Line of Flexure” (hinge line) of the Arkoma Basin.
From D. A. Busch (1959), AAPG Bul. Vol. 43, No. 12, Prospecting for Stratigraphic Traps
Dustin Field Stratigraphy Type Well

**Inola Marker** (sometimes thin limestone)

**Bartlesville** – Major Dustin Producer
Deltaic Complex
Multiple Stacked Sandstones
Multiple Events Require Multiple Mapping Units

**Savanna** – Develops Sandstones which produce.
Multiple coal seams with good shows and samples

**Brown Lime Marker**/Top of the Booch interval
Three Multiple Deltaic Events

**Middle Booch** – Significant Production in Area

**Lower Booch** – Major Dustin Producer

**Hartshorne** – Great Coal Gas Show and Structural Mapping Datum
Structure:
Top of Hartshorne
C.I.=20’

Booch Sandstone Producers highlighted with blue circle.

- Ever present faulting. Mild in comparison to other regions of the Arkoma Basin.
- Strong correlation of Booch production with structural highs.
Structure: Top of Hartshorne C.I.=20’

Bartlesville Sandstone Producers highlighted with blue circle.

- Strong correlation of Bartlesville production with structural highs.
- Multiple sandstone units in Bartlesville.
- Producing unit appears to be point bar depositional environment.
- Other units appear to be channel fill sandstone. No trap?
Structure: Top of Hartshorne C.I.=20’

Gilcrease Sandstone Producers highlighted with blue circle.

• Some production correlation to structural highs.

• Some production not associated with structure.
**Lower Booch Gross Sandstone Isopach**

**C.I. = 2’**

- Generally thin, less than 20’ thickness.
- Strong northeast/southwest thick/thin trend orientation.
- Parallel Trends range from 41 to 52 degrees east of north.
- Lower Booch absent from incised distributary channel.
- Greasy Creek Field produces from distributary channel fill sandstone.
Detailed Region of Lower Booch Gross Clean Sandstone Isopach
West

Eagle Petroleum Co.
#1-Alstate
C/NE Sec. 30-T9N, R12E
D&A

H. H. Diamond Inc.
#1-Lena Mae
NE SW Sec. 29-T9N, R12E
Booch F 100 MCFGPD

LRF Corporation
#1-Diamond
NW SE Sec. 29-T9N, R12E
Booch F 2,119 MCFGPD

Jones & Pellow
#1-Price
NE NW Sec. 32-T9N, R12E
Gilcrease Production

Cross section through
Major Trend of Lower Booch Sandstone

1500 Gal Acid, Frac-ANR Booch IPF 2,119 MCFGPD

- High Gamma-ray: 45 to 55 API
- Multiple Shale Laminations
- Generally low porosity- 8% to 12%

Booch Sandstone Thick Trend Example
Lower Booch Deposit Characters

- Elongate trends parallel to each other and parallel to basin line of flexure.
- Sandstones are Flat Base, mostly.
- Very shaley, laminated sandstone, low energy.

Alternative to interdistributary deposits: Chenier Ridges? Better fit with observed characters.
The Chenier Plain Origin

“Reprinted from Geomorphology, Vol. 88 (2007), pp 367-422, Fig. 1, Randolph A. McBride, Matthew J. Taylor, Mark R. Byrnes, Coastal morphodynamics and Chenier-Plain evolution in southwestern Louisiana, USA: A Geomorphic model, Fig. 1, Copyright (2006), with permission from Elsevier.”
Low profile, micro-tidal, storm dominated coast having ridges of transgressive (accretion), regressive (beach ridges) or laterally accreted (recurved spits). Also eolian, storm berms, natural levees, oyster reefs, tidal inlet deposits.

Fig. 8. Chenier-Plain geomorphology between Calcasieu Pass and Little Constance Bayou, Louisiana. Specific topographic profile locations (numbered arrows) are shown along paleoshorelines and the modern beach for subsequent figures.

"Reprinted from Geomorphology, Vol. 88 (2007), pp 367-422, Fig. 8, Randolph A. McBride, Matthew J. Taylor, Mark R. Byrnes, Coastal morphodynamics and Chenier-Plain evolution in southwestern Louisiana, USA: A Geomorphic model, Pages No., Copyright (2006), with permission from Elsevier."
Chenier Plain Sabine Pass in Louisiana
texascoastgeology.com
Beach ridges Cape Espenberg, Seward Peninsula in Alaska

Beach Ridges Cape Espenberg

instaar.colorado.edu
Lower Booch Gross Clean Sandstone Isopach
With Inferred Paleo-Drainage/Water Features
Revised Lower Booch Major Trend Cross Section
Booch Distributary Channel Gross Clean Sandstone Isopach C.I. = 10’

- Trend cross cuts Lower Booch trends
- Incised channel up to 180’ deep
- Thick channel fill sandstone deposits (up to 80’).
Booch Distributary Channel Gross Clean Sandstone Isopach C.I.=10′

Greasy Creek Field 743,487 Bbls. Oil

Discovered August 1961, not fully developed until 1971

For the definitive field Study: The Booch Play FDD Oklahoma Geological Survey

Robert A. Northcutt
Greasy Creek Field Booch Distributary/Incised Channel Sandstone

O. N. Sellers
#1-Sandy Unit
C/SW Sec. 4-T8N, R11E
Booch F 883 MCFGPD

Bell Oil & Gas
#1-Lucas
SE NW Sec. 4-T8N, R11E
Booch (Frac) F 1,458 MCFGPD

Bell Oil & Gas
#1-Lucas “B”
NE SW NE Sec. 4-T8N, R11E
D&A

Bell Oil & Gas
#1-Hall
SE NE Sec. 4-T8N, R11E
Booch 95,433 BO

Geoquest Energy, Inc.
#1-Wampus Cat
W2 SE NE Sec. 3-T8N, R11E
D&A

Gilcrease 301 MMCF Gas
Booch 324 MMCF Gas
Calvin 931 MMCF Gas

Booch 822 MCF Gas
Bartlesville 134 MMCF Gas

Greasy Creek Field
Total Booch Production
743,387 BO
Booch Distributary
Channel Fill Sandstone
Characters

- Low gamma ray, 30-40 API. Blocky profile. Notably cleaner than Lower Booch sandstone.
- High porosity, 16% to 21% porosity, sandstone matrix.
- Sharp basal and upper contacts.
Gilcrease Stratigraphy

Dustin Field past “line of flexure”

- Unconformity bound Atokan.
- Rapidly wedgeing across line of flexure.
- Multiple units of clastic deposits.
- Sandstone units developed at the base are called Spiro.
Isopach: Gross 3rd Gilcrease Sandstone

- Sandstone not developed in Dustin Field.
- Appears to be the dominant producing Gilcrease unit beyond the “line of flexure”.
Good sample shows. Amazing array of sandstone textures, multiple beds, multiple grain sizes and multiple compositions. “Like a sedimentary waste basket”. Theorize debris flow depositional environment.
Gilcrease Producer

Low volume, very low rate of decline.
Expansive reservoir being restricted by permeability.
Conclusions:

• Lower Booch Sandstone deposits in Dustin and surrounding area are Chenier ridges deposited by shore line accretion in sequence along the Arkoma Basin shelf edge (hinge line).

• There appears to be evidence of erosion and reworking of Lower Booch beach ridges.

• Hydrocarbon entrapment in Dustin Booch Chenier ridges is predominantly structurally controlled. There are elements of stratigraphic trapping in the surrounding region.

• Greasy Creek Booch distributary channel post dates Lower Booch Chenier ridge development (cross cuts) and contains high porosity, clean sandstone.

• Greasy Creek distributary shows no evidence of associated overbank deposits (splay, levee) in the region examined.

• Bartlesville, Booch and Gilcrease (And other Arkoma Basin sandstones as well) reservoirs are “permeability challenged”.

Thank You!

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