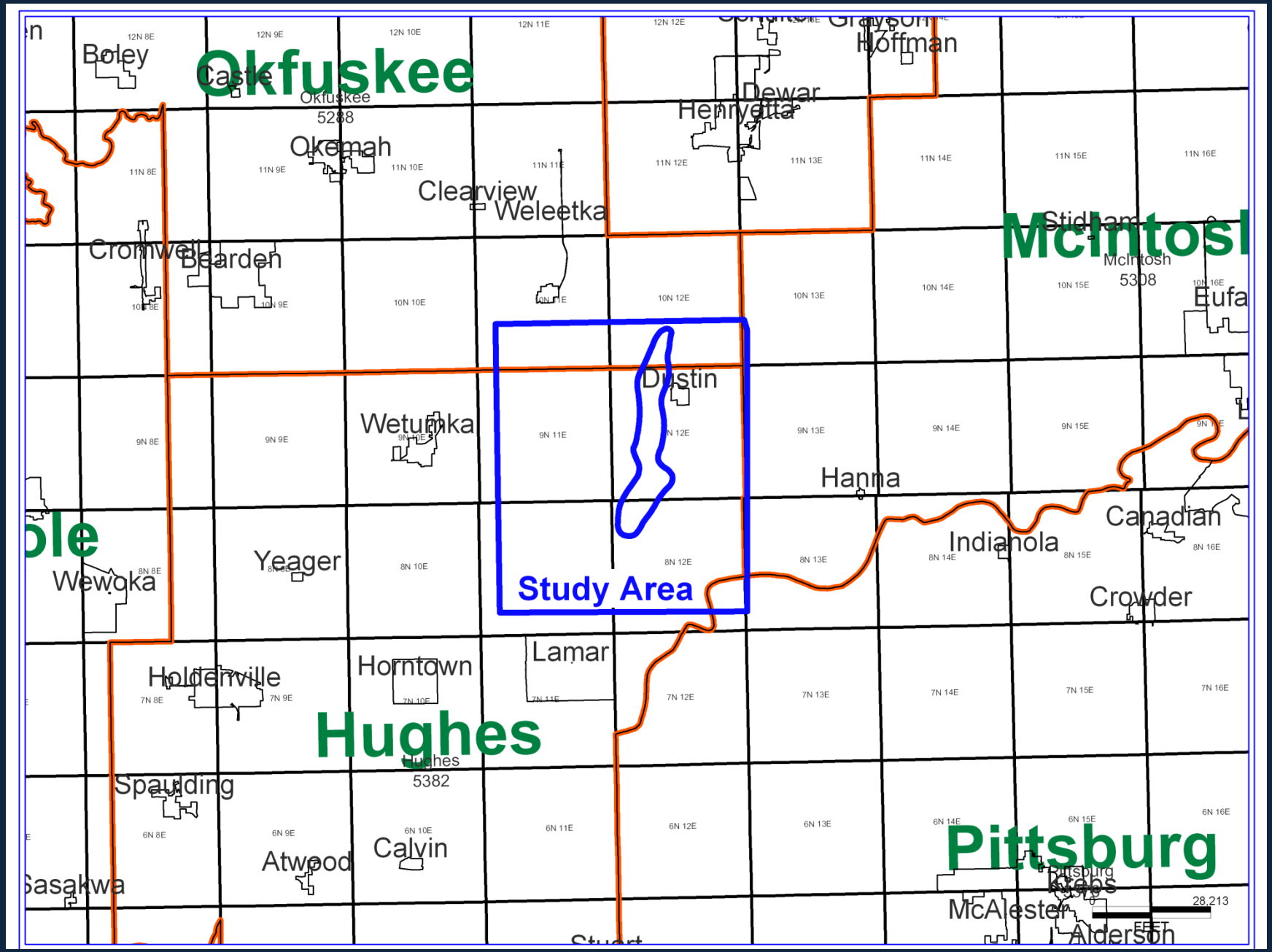
Dustin Field, Hughes County, Oklahoma

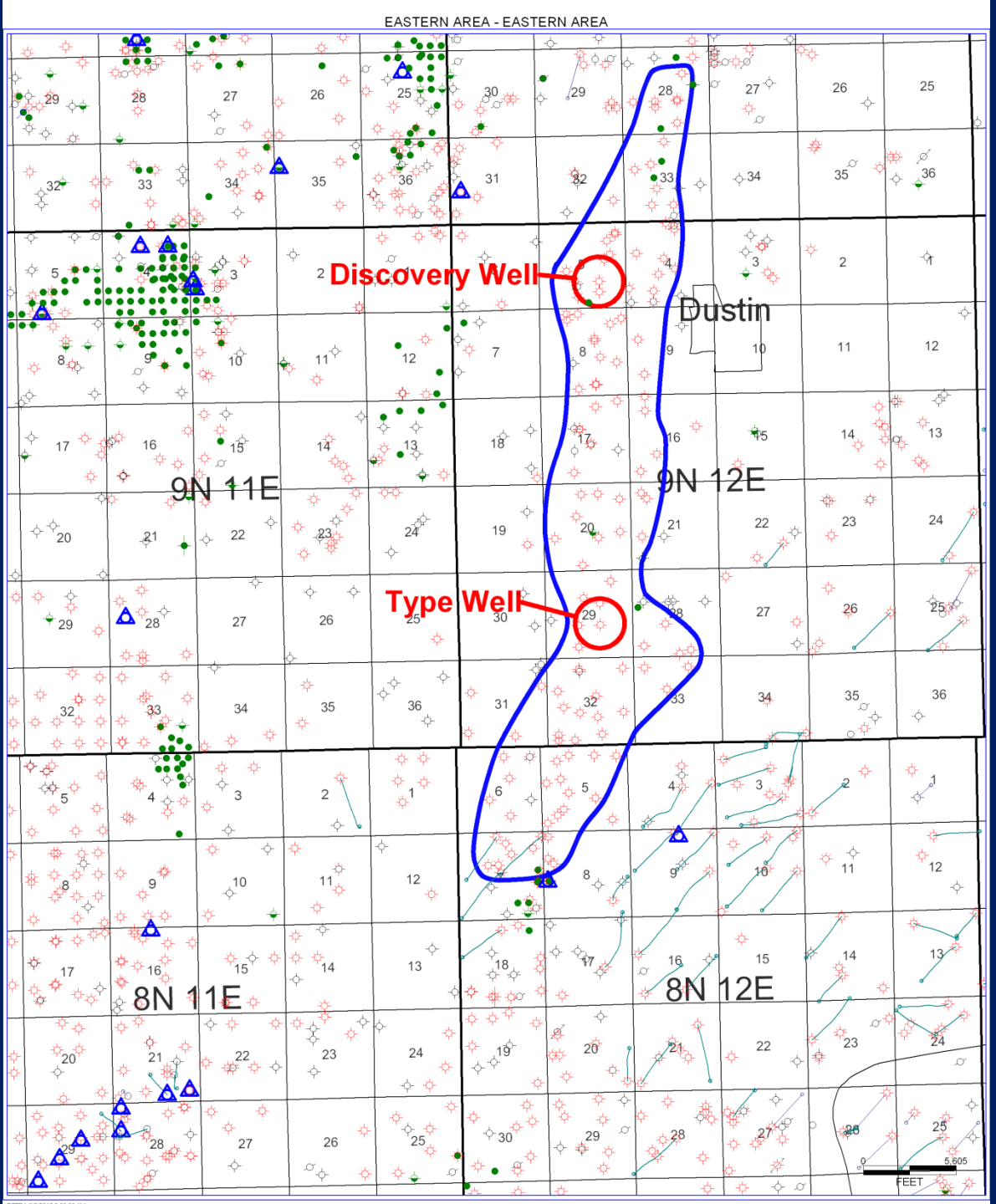
And Booch Stratigraphy, Dustin to Greasy Creek Fields

Ronald J. Woods



Northeastern Hughes County, Oklahoma


UNLEADED
279
CEE DEE'S
COUNTRY STORE
4.35



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

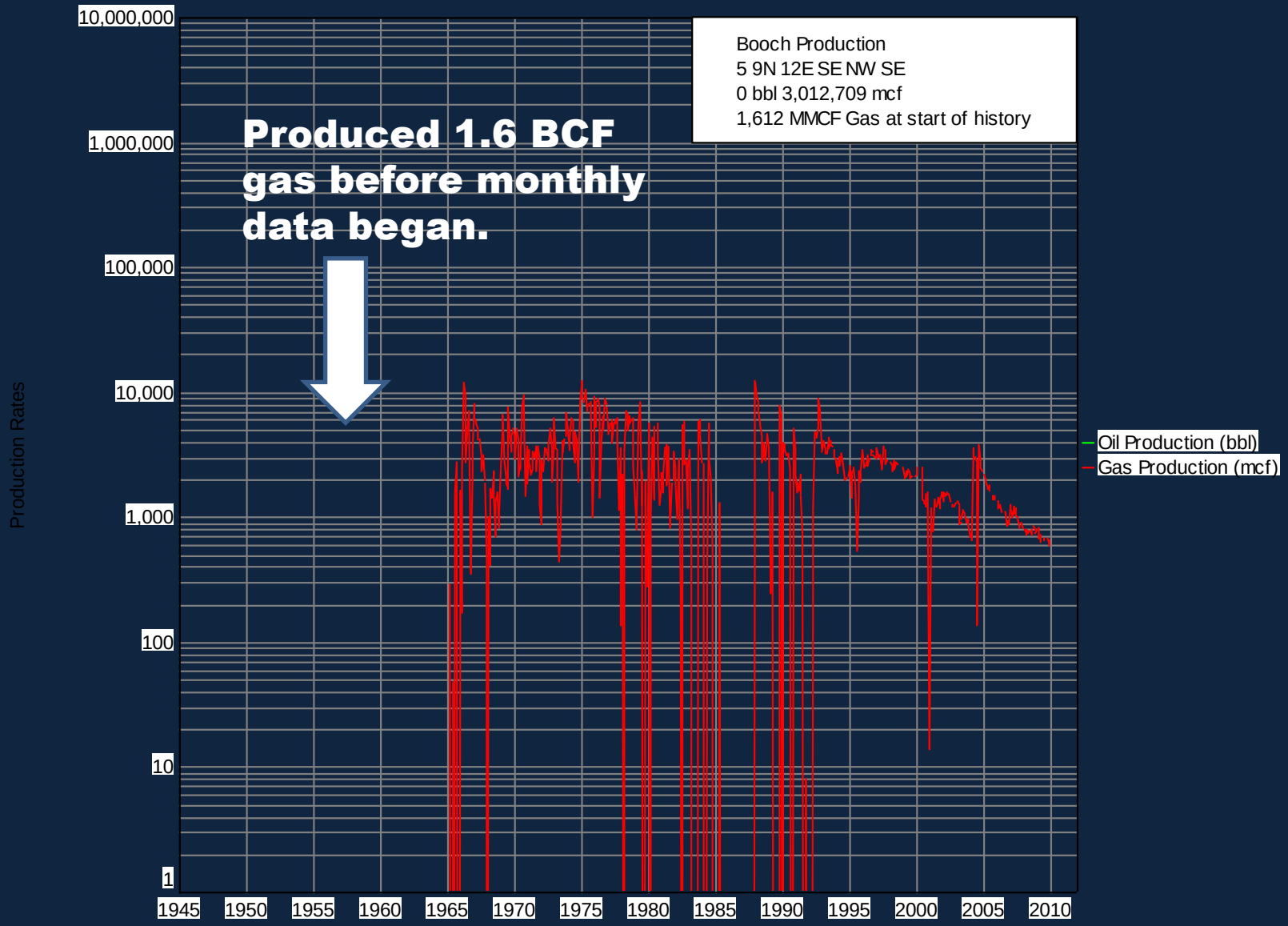
15 Bartlesville Wells
Produced 3 BCF Gas

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"

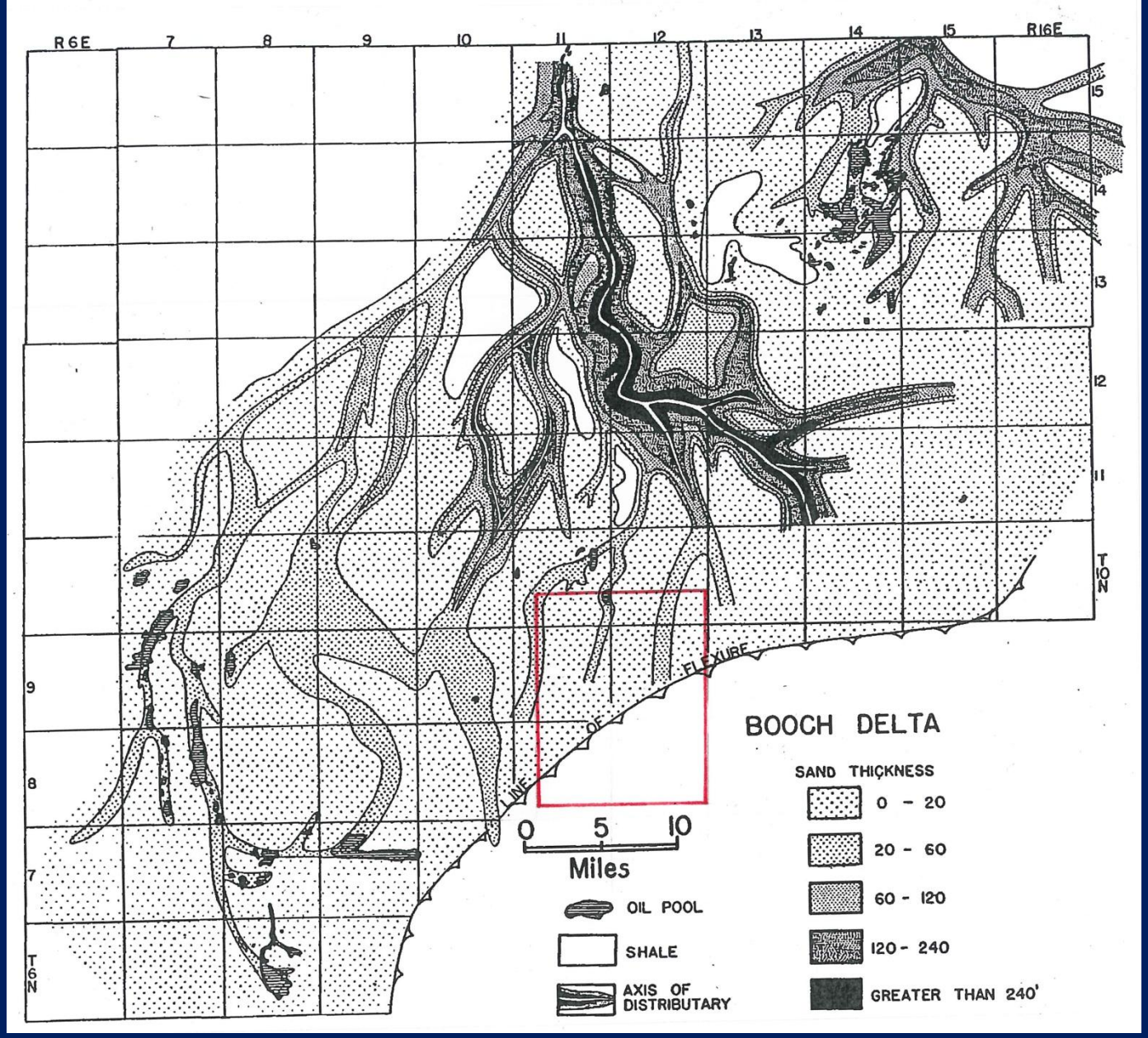
Thurman, Red Fork, Wapanucka, Union Valley and Cromwell (almost always oil)



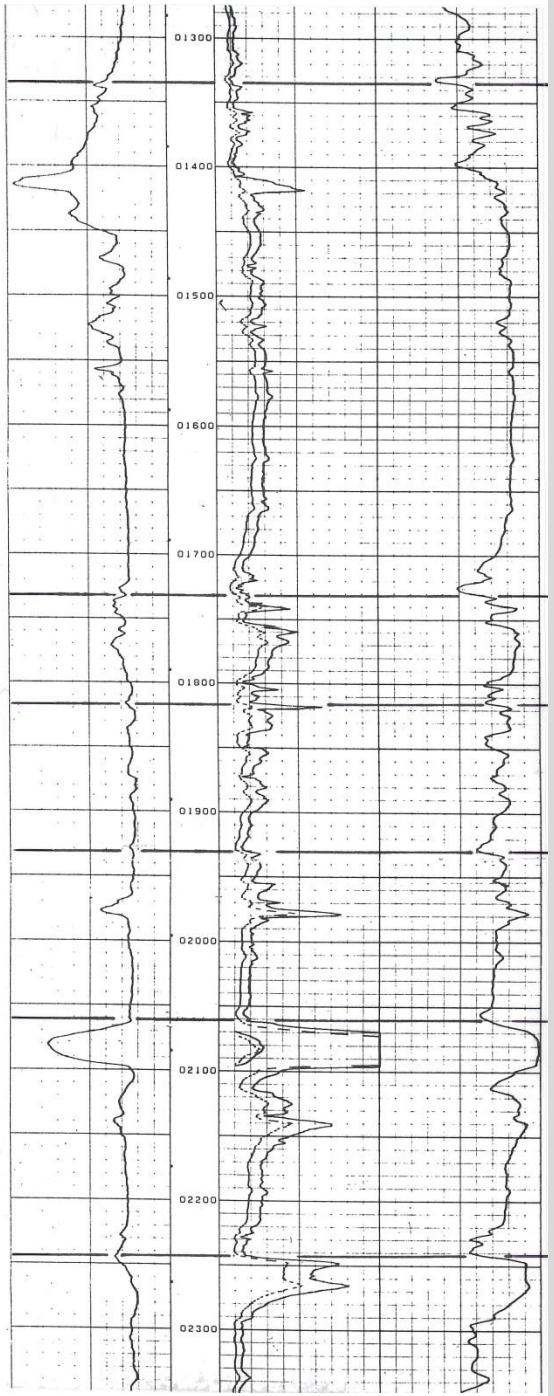
Dustin Field Discovery

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

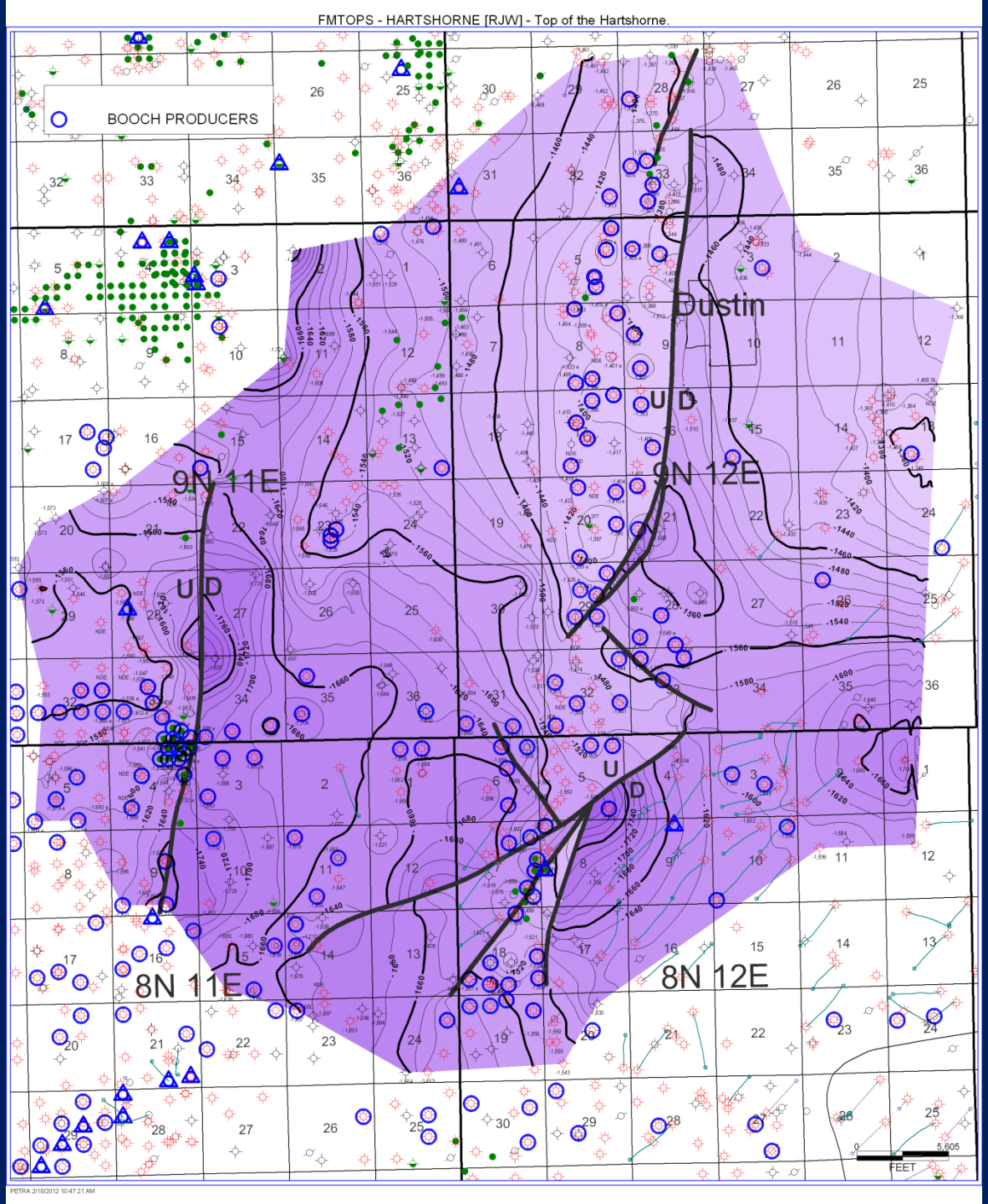
Lower Booch – Major Dustin Producer

Hartshorne – Great Coal Gas Show and Structural Mapping Datum

Structure: Top of Hartshorne C.I.=20’

Booch Sandstone Producers highlighted with blue circle.

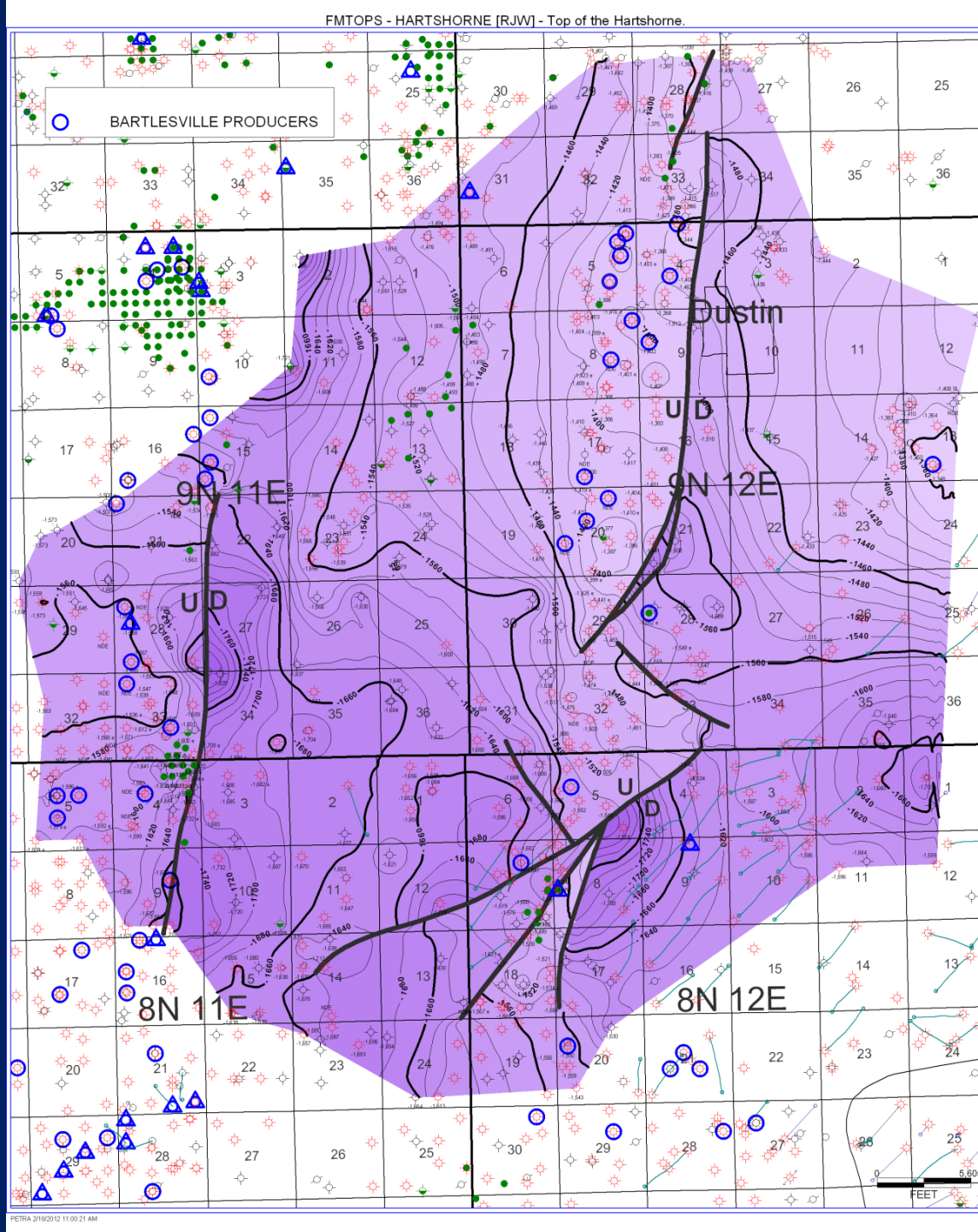
- **Ever present faulting. Mild in comparison to other regions of the Arkoma Basin.**
- **Strong correlation of Booch production with structural highs.**



Structure: Top of Hartshorne C.I.=20’

Bartlesville Sandstone Producers highlighted with blue circle.

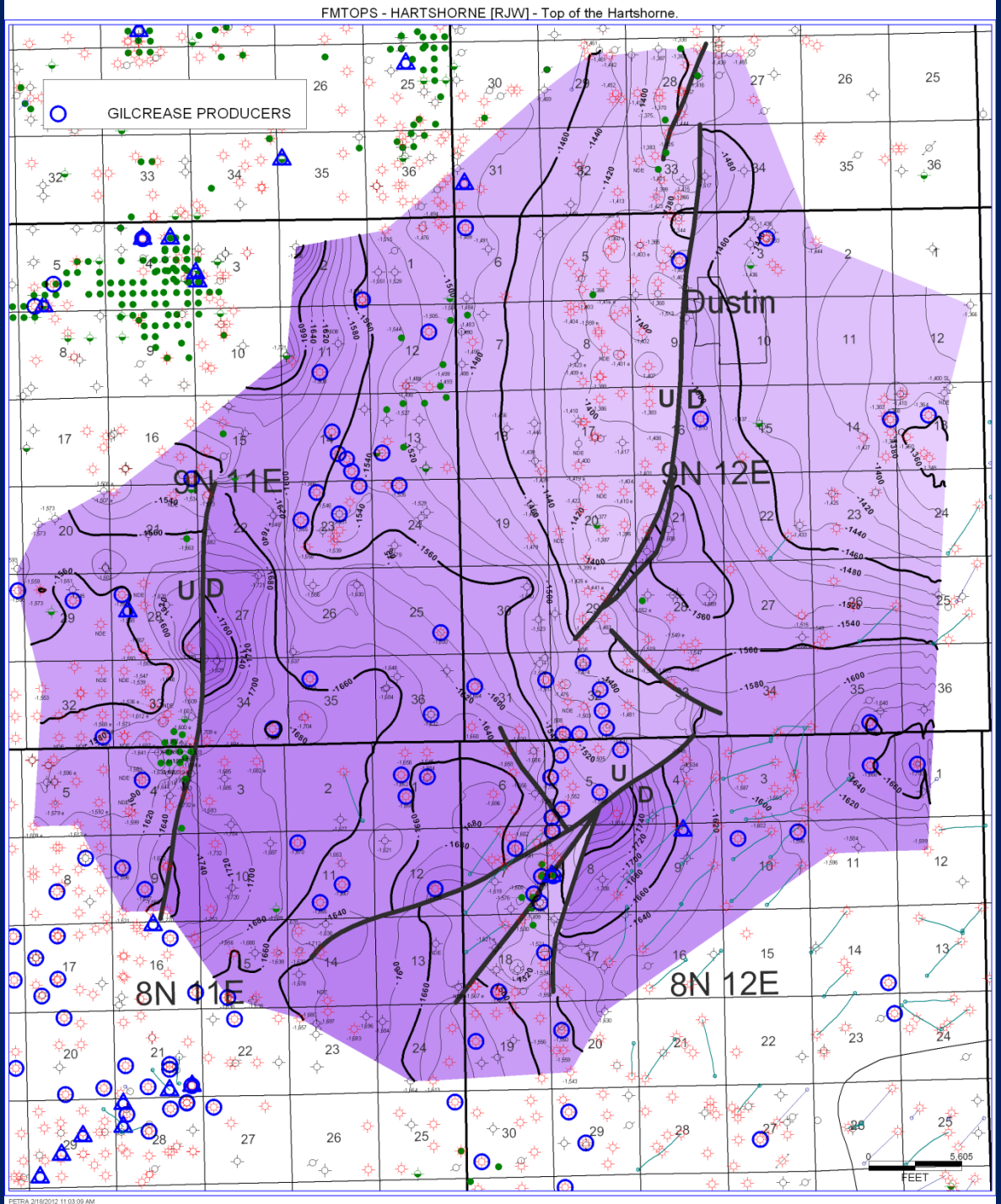
- **Strong correlation of Bartlesville production with structural highs.**
- **Multiple sandstone units in Bartlesville.**
- **Producing unit appears to be point bar depositional environment.**
- **Other units appear to be channel fill sandstone. No trap?**



Structure: Top of Hartshorne C.I.=20’

Gilcrease Sandstone Producers highlighted with blue circle.

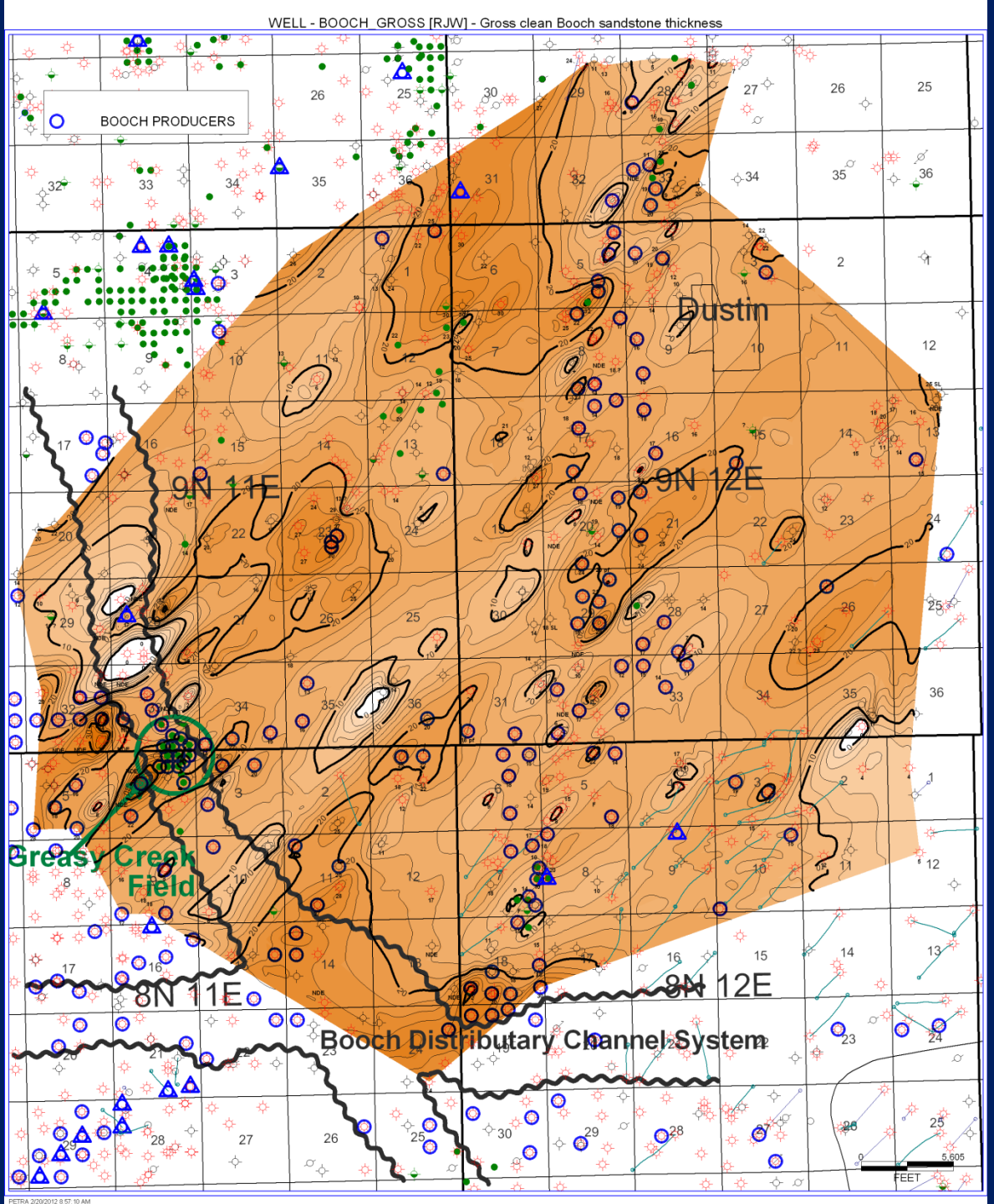
- **Some production correlation to structural highs.**
- **Some production not associated with structure.**

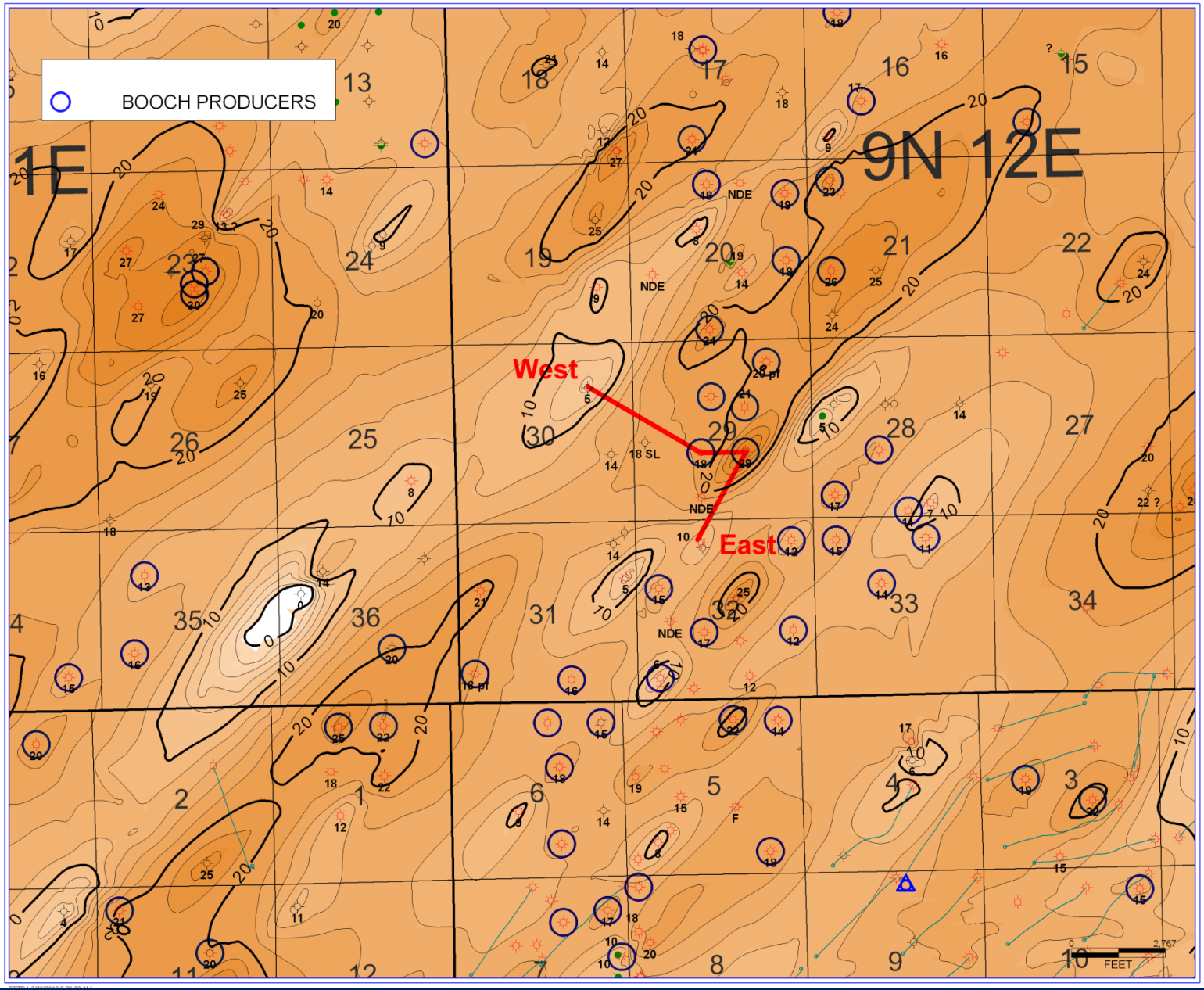


Lower Booch Gross Sandstone Isopach

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

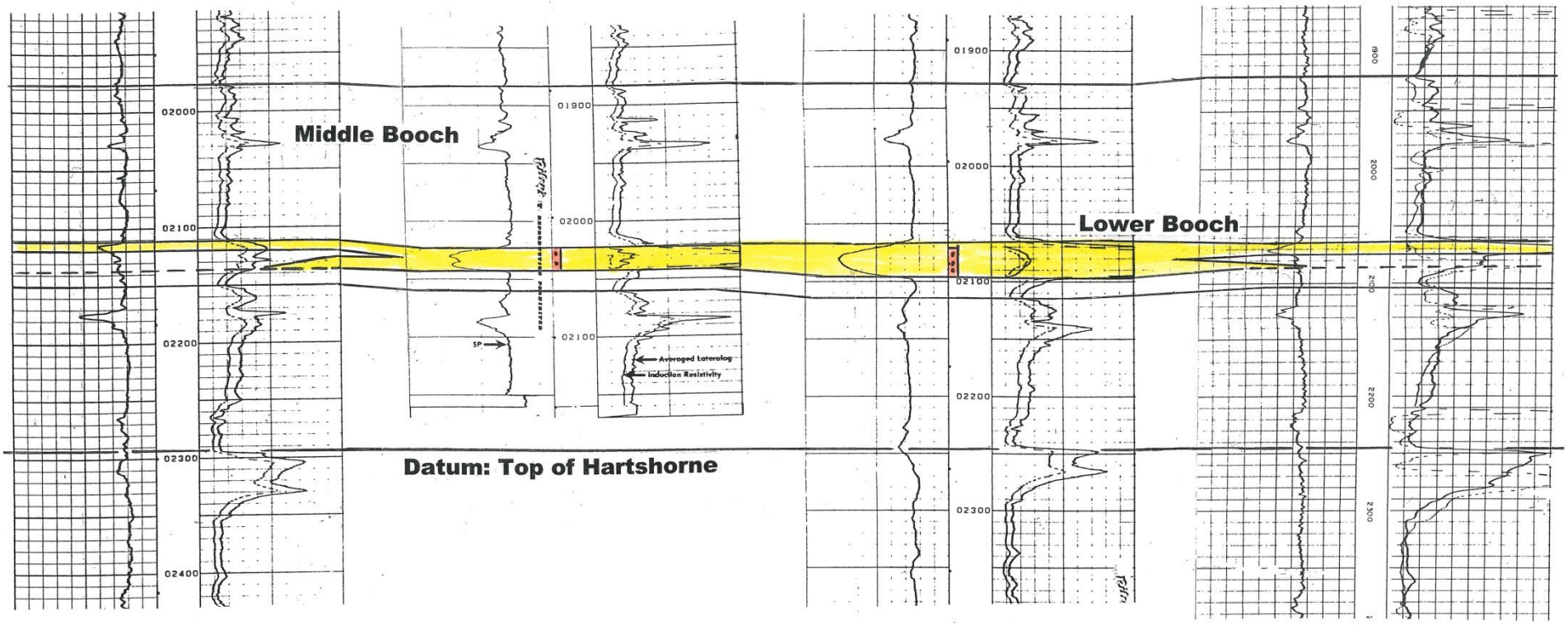
East

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

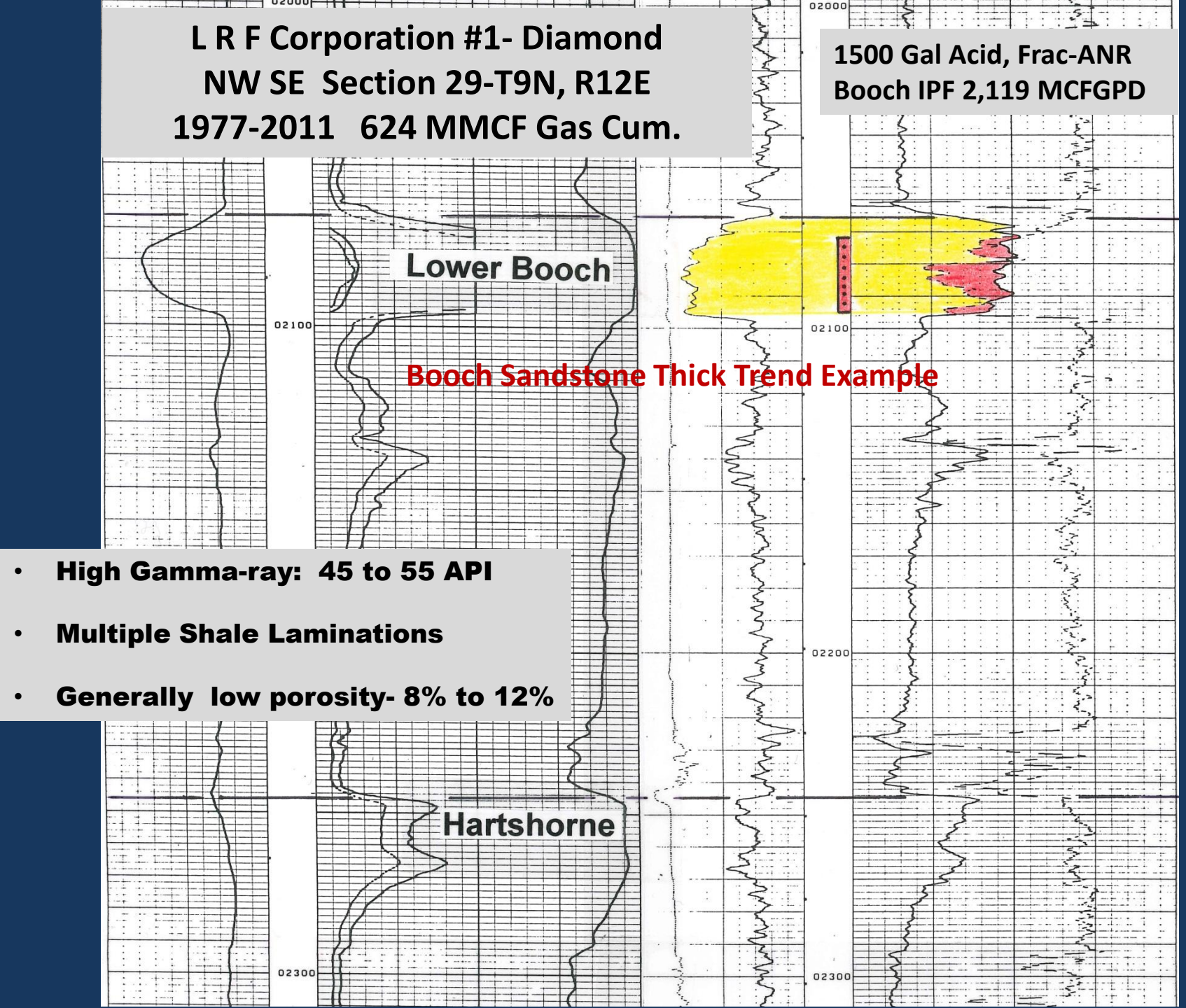
H. H. Diamond Inc.
#1-Lena Mae
NE SW Sec. 29-T9N, R12E
Booch F 100 MCFGPD

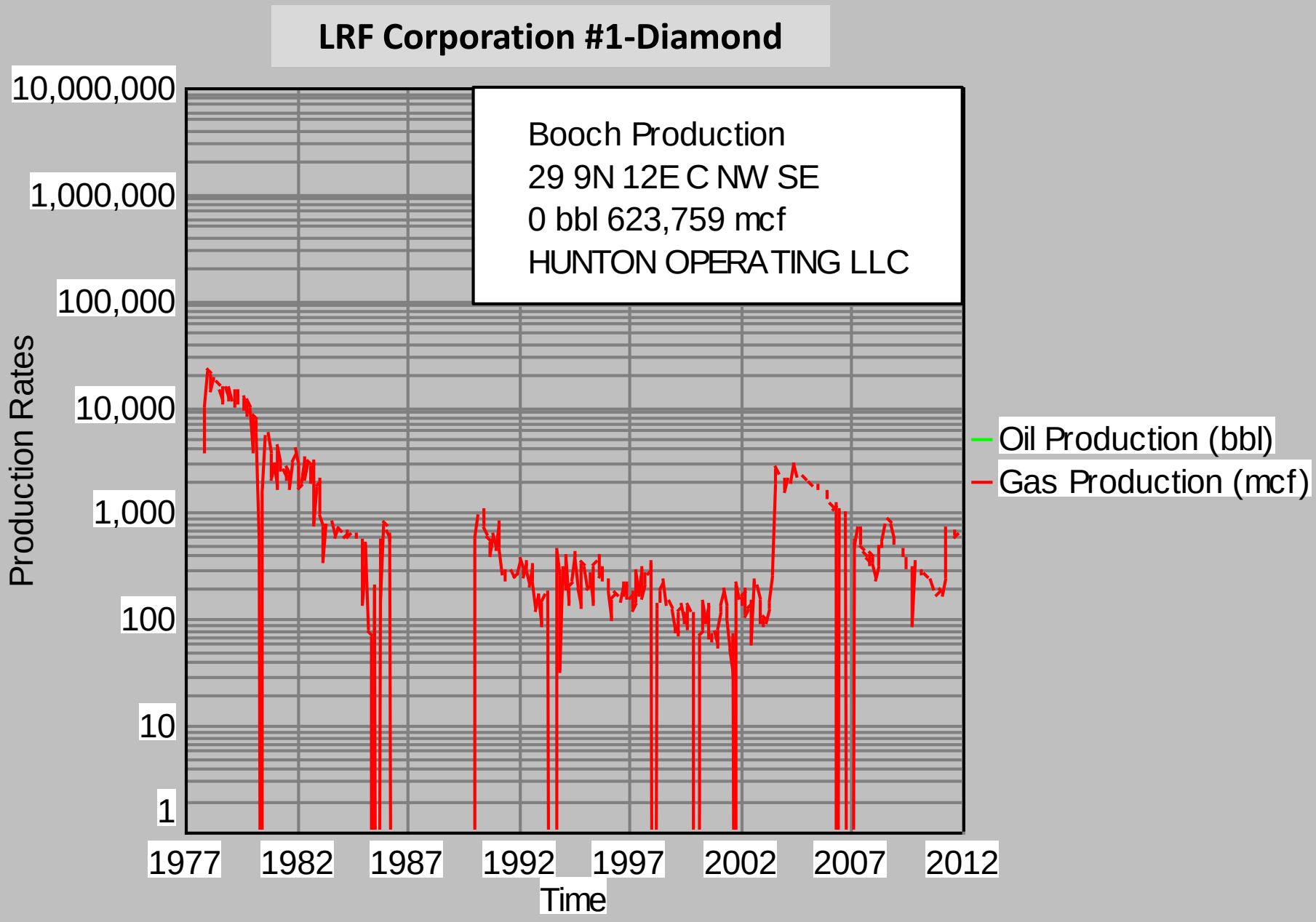
LRF Corporation
#1-Diamond
NW SE Sec. 29-T9N, R12E
Booch F 2,119 MCFGPD

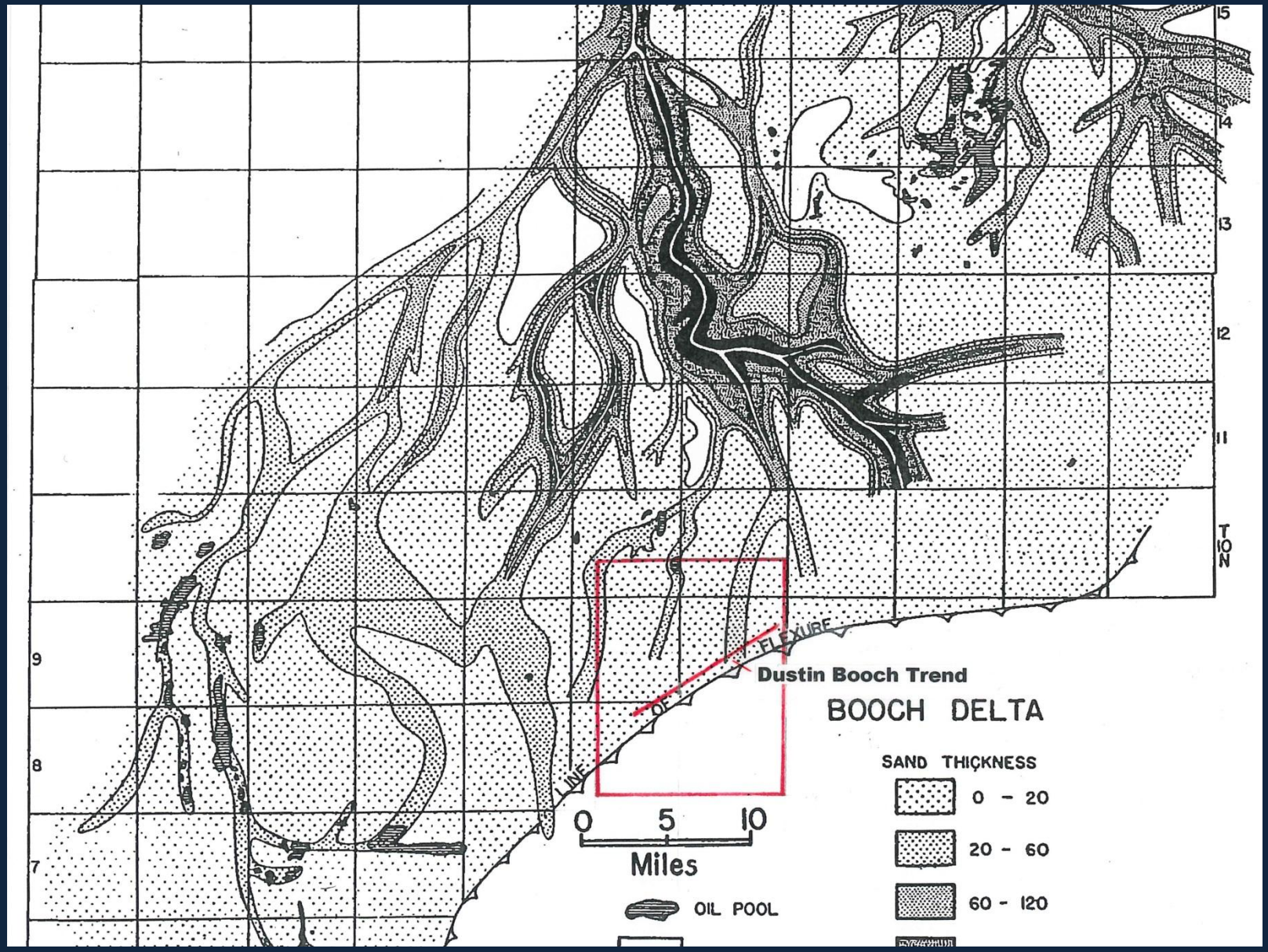
Jones & Pellow
#1-Price
NE NW Sec. 32-T9N, R12E
Gilcrease Production



Cross section through
Major Trend of Lower Booch Sandstone


L R F Corporation #1- Diamond
NW SE Section 29-T9N, R12E
1977-2011 624 MMCF Gas Cum.
1500 Gal Acid, Frac-ANR
Booch IPF 2,119 MCFGPD
Lower Booch
Booch Sandstone Thick Trend Example
Hartshorne
02000
02100
02200
02300
• High Gamma-ray: 45 to 55 API
• Multiple Shale Laminations
• Generally low porosity- 8% to 12%


LRF Corporation #1-Diamond
Booch Production
29 9N 12E C NW SE
0 bbl 623,759 mcf
HUNTON OPERATING LLC
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Production Rates
1977
1982
1987
1992
1997
2002
2007
2012
Time
Oil Production (bbl)
Gas Production (mcf)

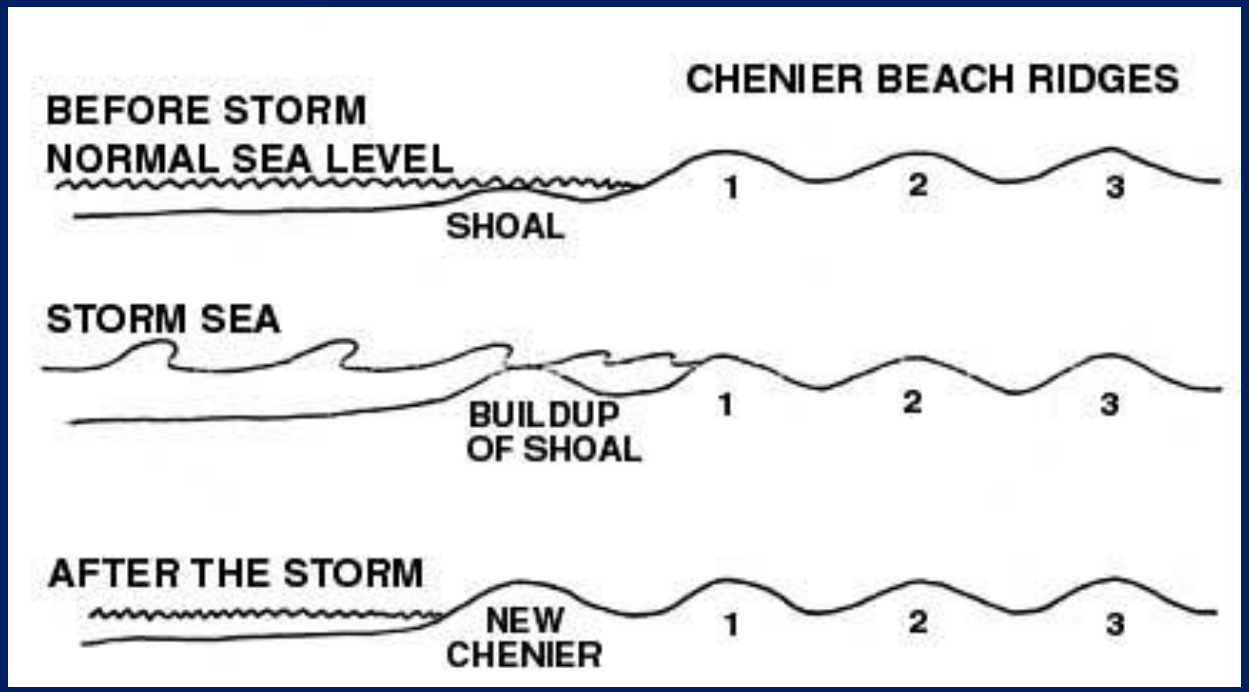


Study Area in region of "Line of Flexure" of the Arkoma Basin.
Red Line On Axis of Major Dustin Booch Trend.
From Busch (1959)

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.



www2.gi.alaska.edu Krusenstern's Chenier Plain Article #99 by *T. Neil Davis*

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."

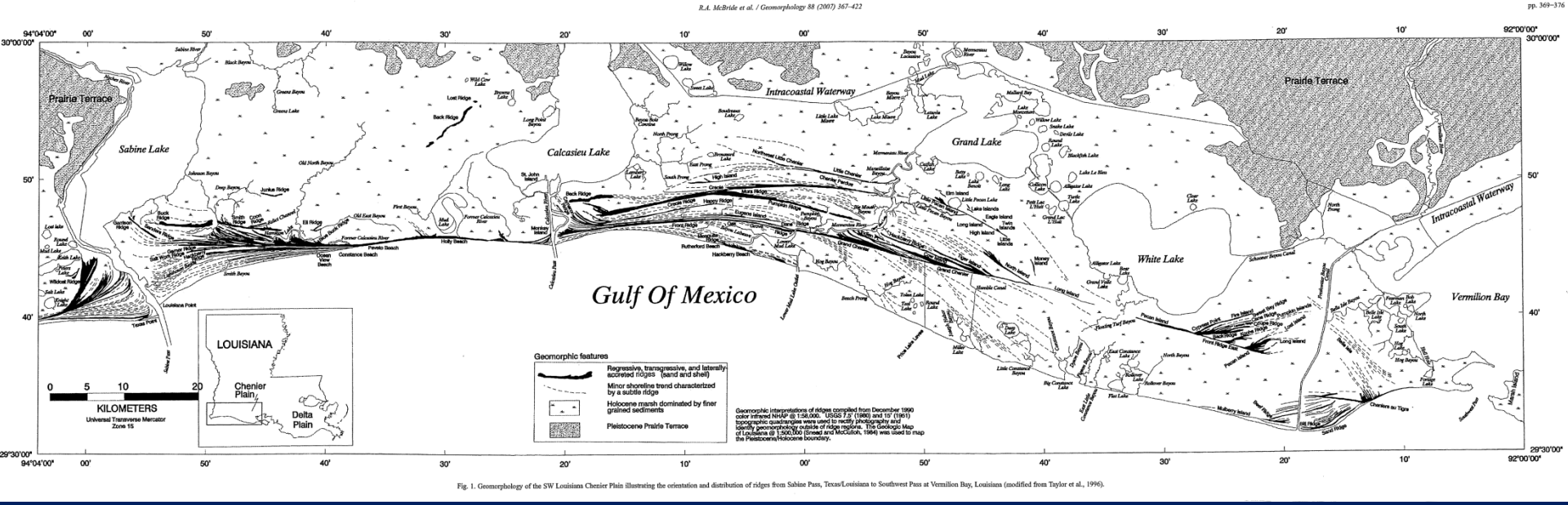


Fig. 1. Geomorphology of the SW Louisiana Chenier Plain illustrating the orientation and distribution of ridges from Sabine Pass, Texas/Louisiana to Southwest Pass at Vermilion Bay, Louisiana (modified from Taylor et al., 1996).

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.

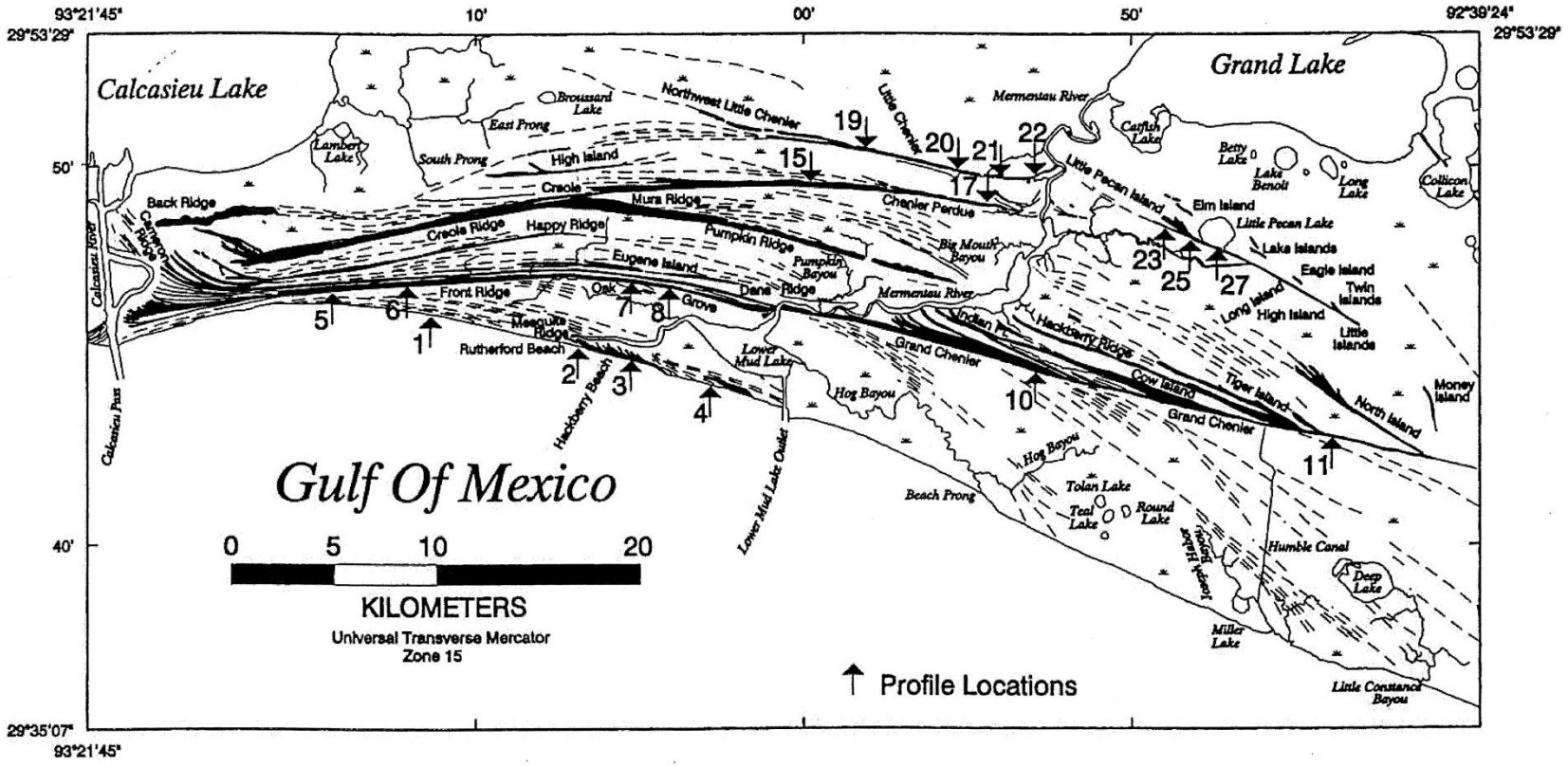


Fig. 8. Chenier-Plain geomorphology between Calcasieu Pass and Little Constance Bayou, Louisiana. Specific topographic profile locations (numbered arrows) are shown along paleoshorelines and the modern beach for subsequent figures.

R.A. McBride et al. / Geomorphology 88 (2007) 367–422

Chenier Plain Sabine Pass in Louisiana

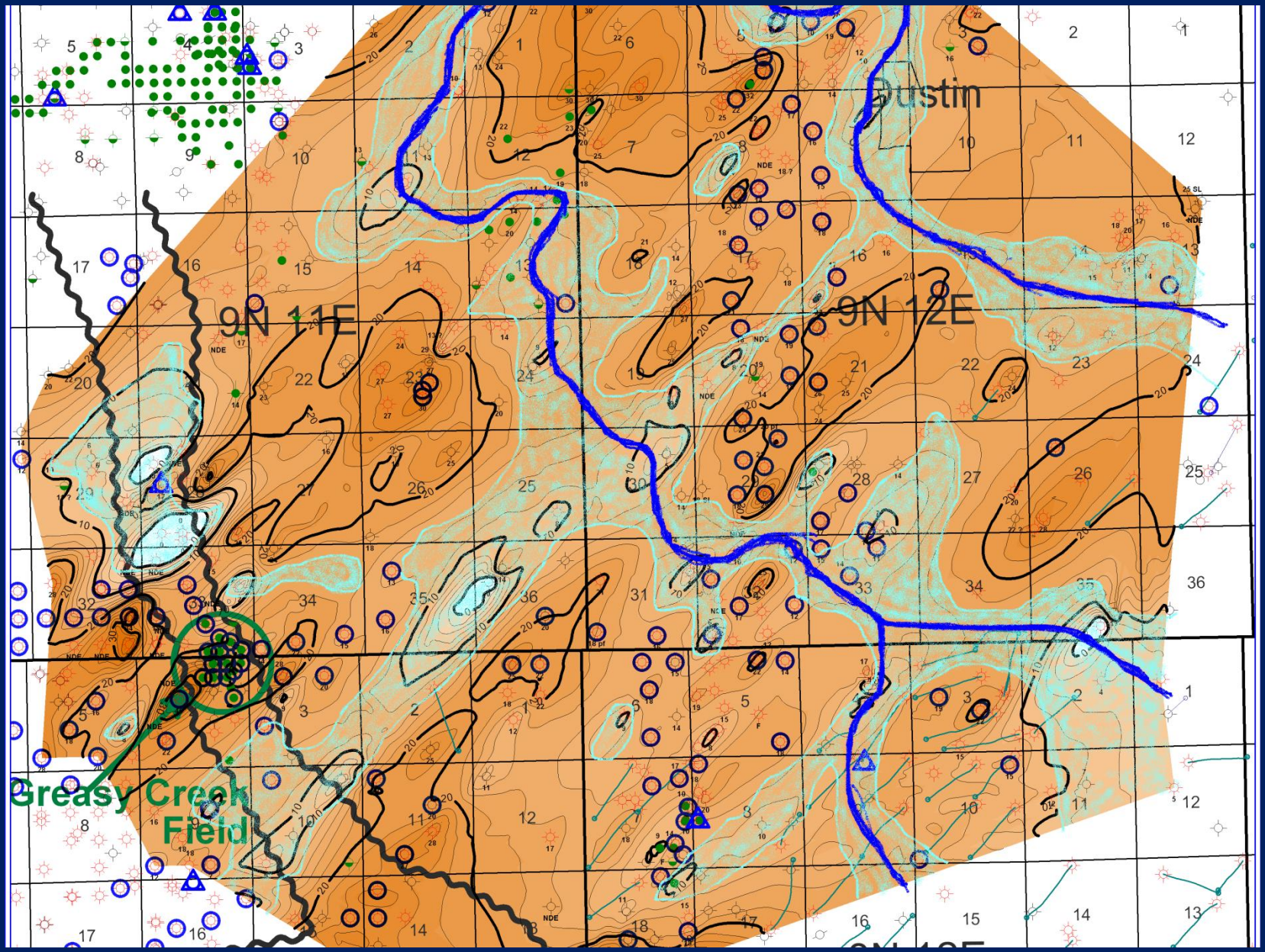
texascoastgeology.com

Beach ridges Cape Espenberg, Seward Peninsula in Alaska

www.nps.gov National Park Service, U.S. Department of the Interior

Beach Ridges Cape Espenberg

instaar.colorado.edu



Lower Booch Gross Clean Sandstone Isopach
With Inferred Paleo-Drainage/Water Features

West

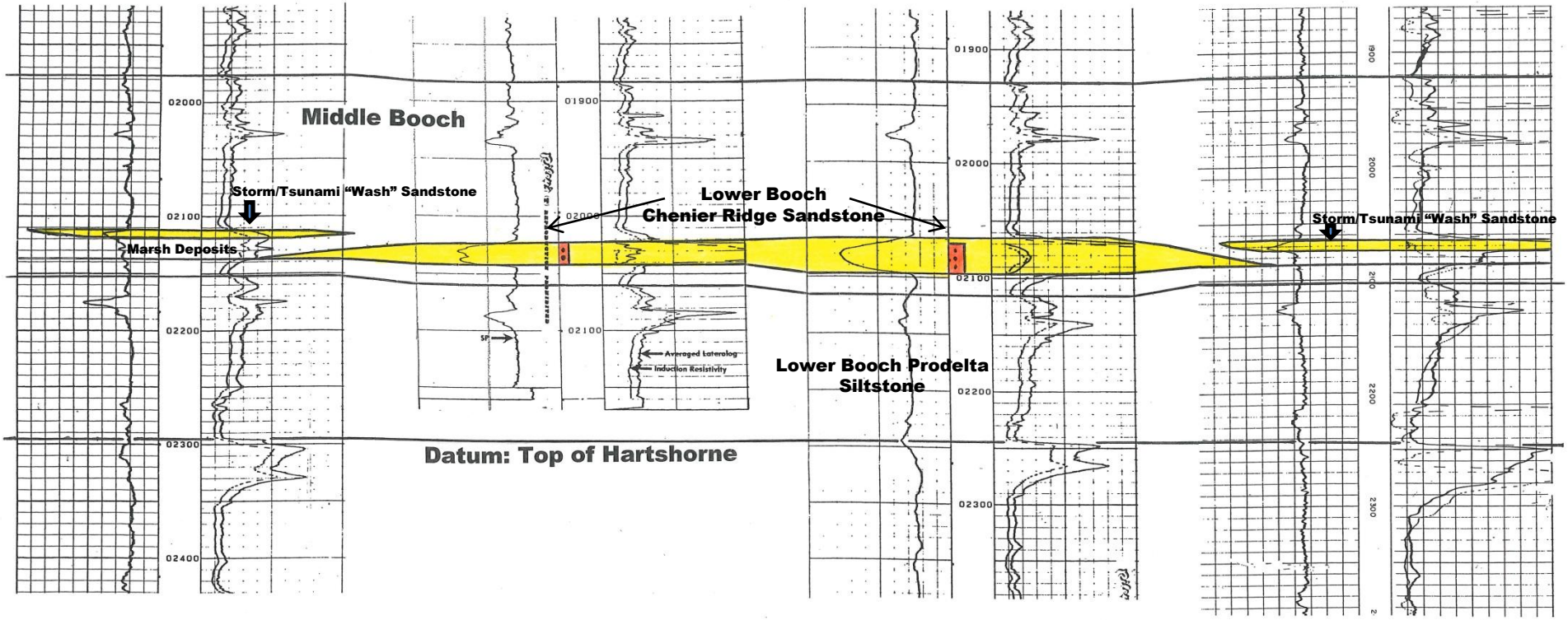
East

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

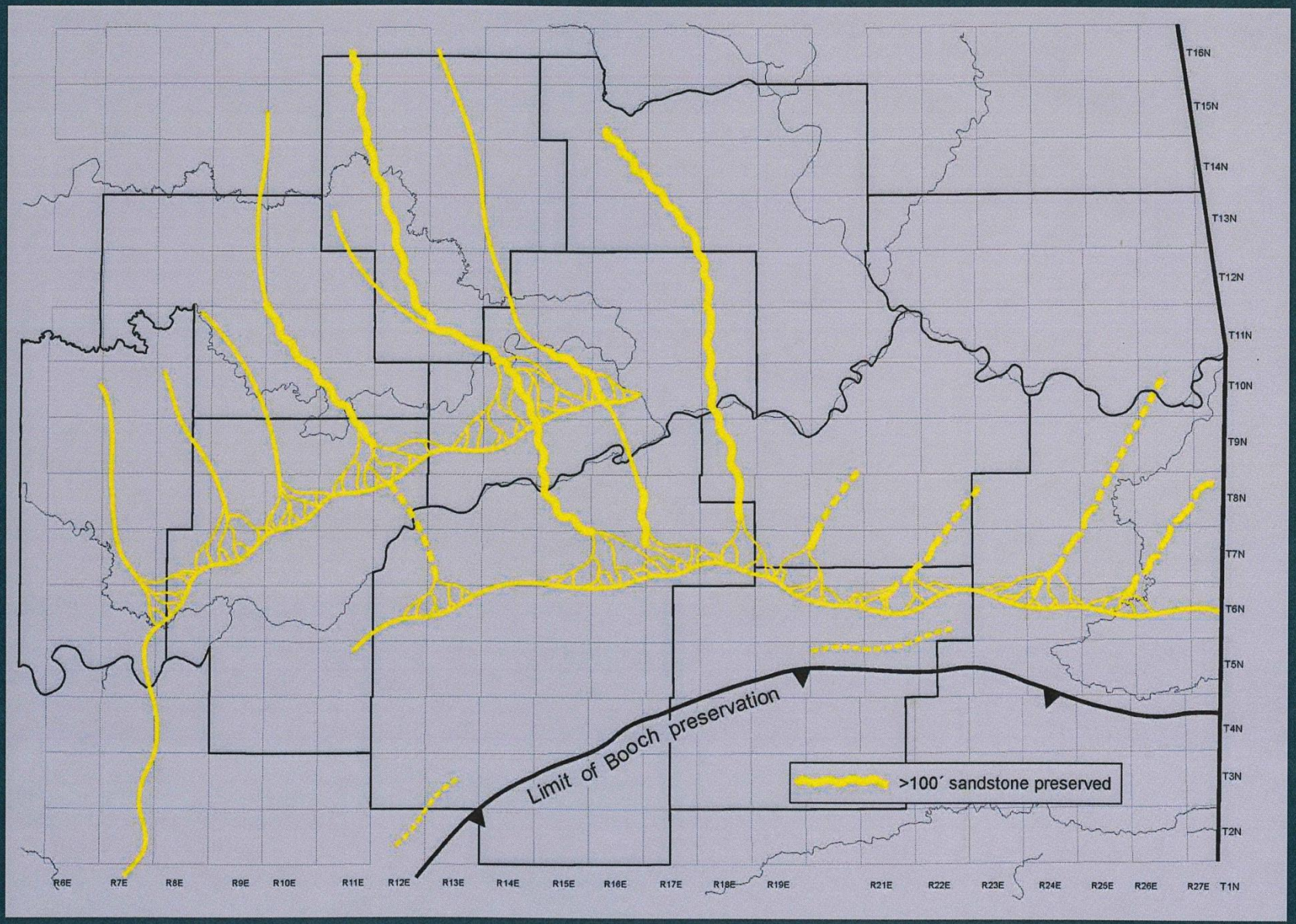
Jones & Pellow
#1-Price
NE NW Sec. 32-T9N, R12E
Gilcrease Production



Revised Lower Booch Major Trend Cross Section

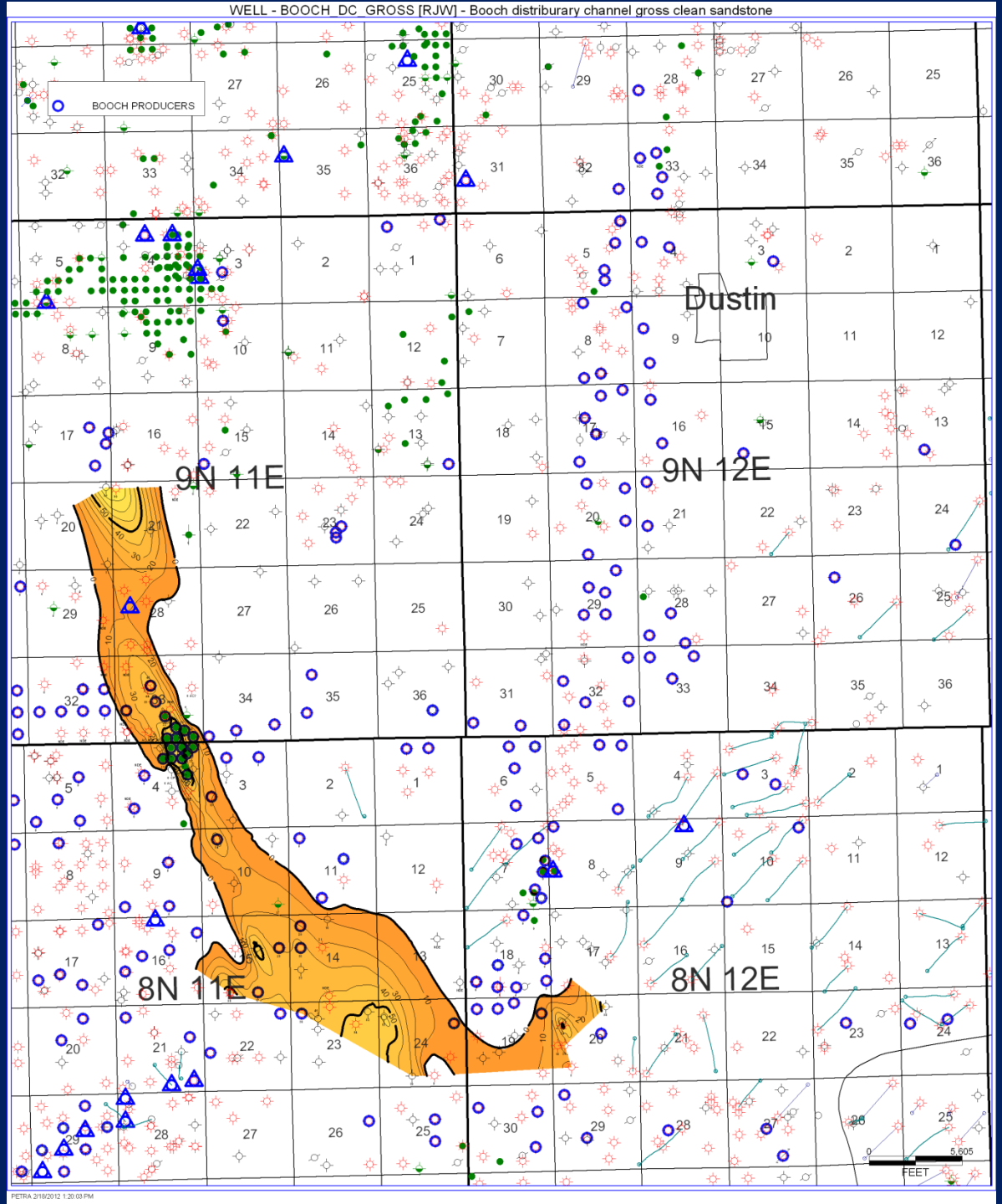
The Booch Sandstones (McAlester Formation, Krebs Group), Arkoma Basin, Oklahoma – Outcrops to Well Logs: An introduction to Oklahoma Fluvial Reservoirs **Neil H. Suneson**

Schematic Middle Booch Depositional Systems



Booch Distrubutary 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’).



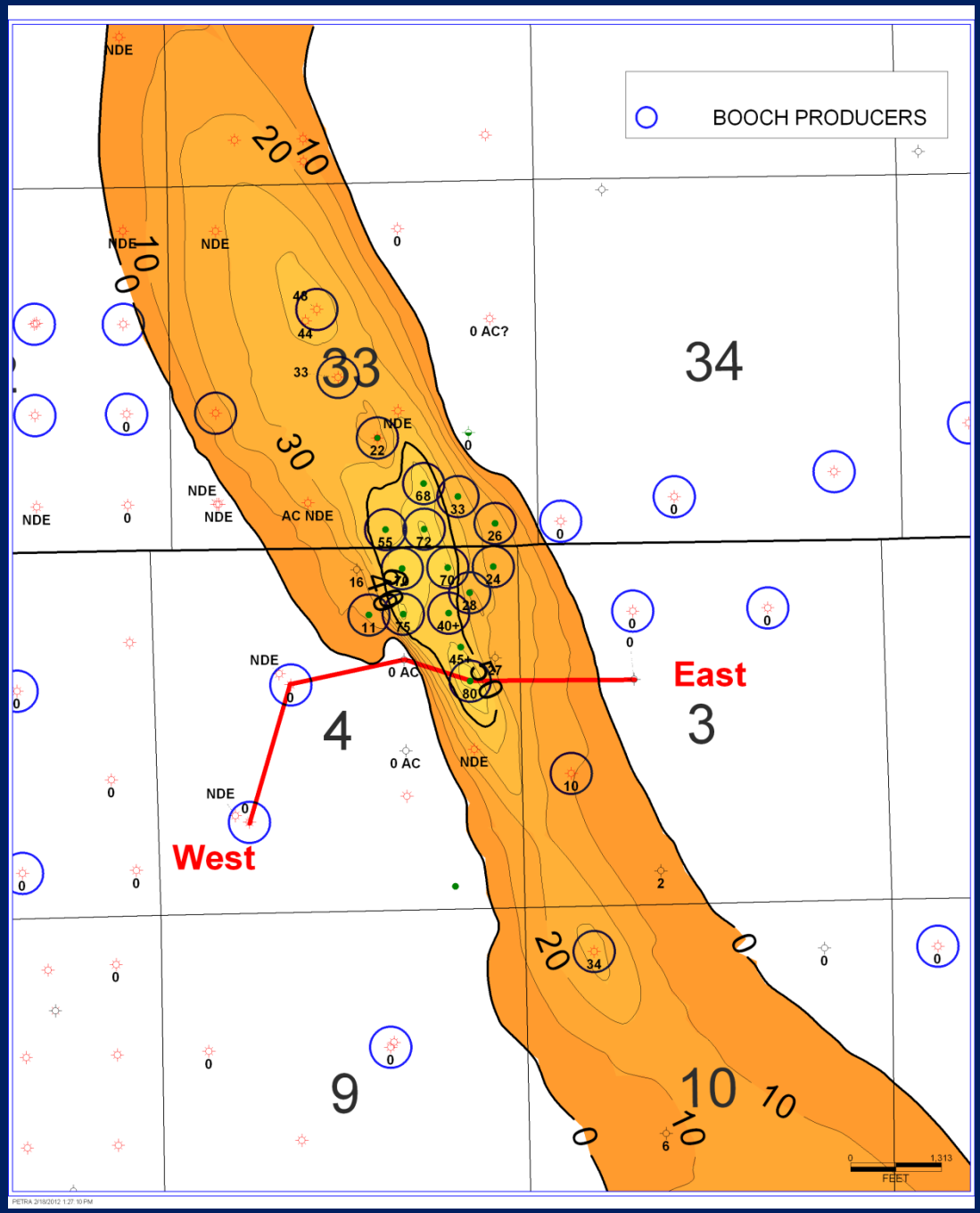
Booch Distrubutary Channel Gross Clean Sandstone Isopach C.I.=10’

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

West

Greasy Creek Field
Total Booch Production
743,387 BO

East

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

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

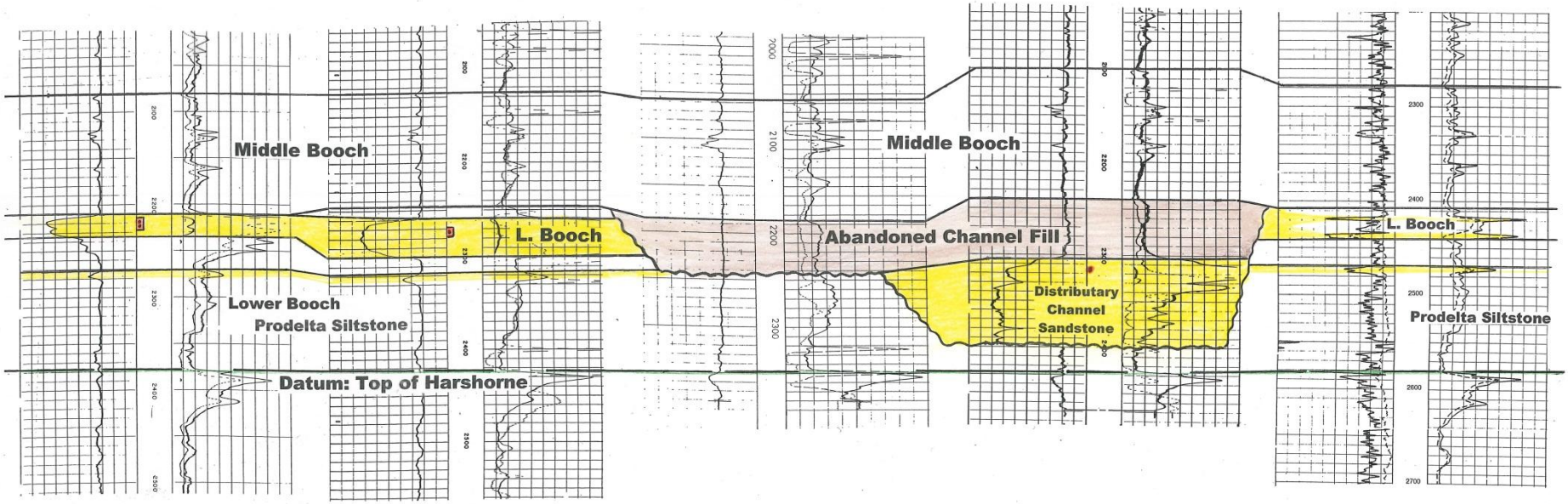
Bell Oil & Gas
#1-Lucas
SE NW Sec. 4-T8N, R11E
Booch (Frac) F 1,458 MCFGPD

Booch 822 MCF Gas
Bartlesville 134 MMCF Gas

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

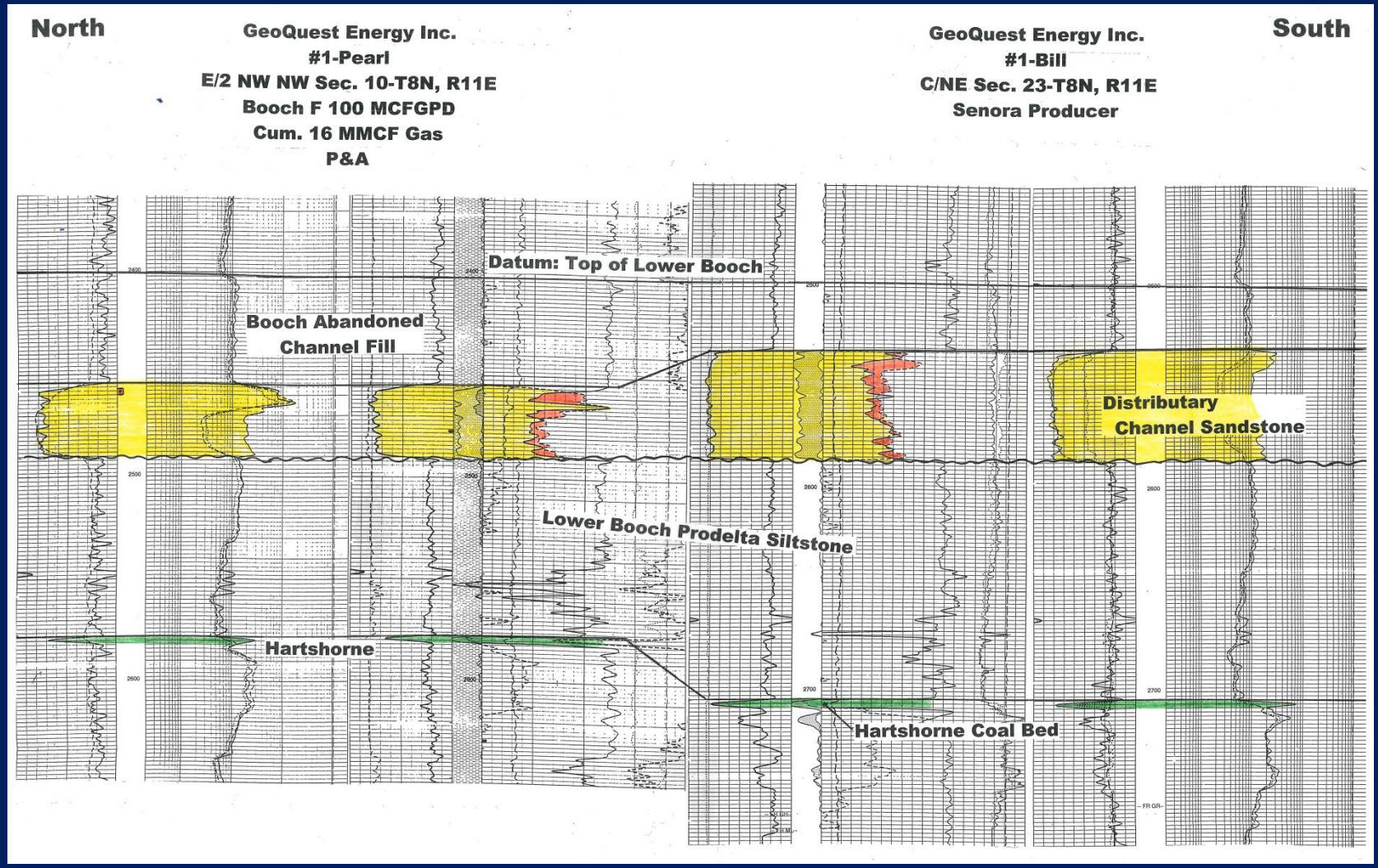
Bell Oil & Gas
#1-Hall
SE NE Sec. 4-T8N, R11E
Booch 95,433 BO

Geoquest Energy, Inc.
#1-Wampus Cat
W/2 SE NW Sec. 3-T8N, R11E
D&A



Booch Distributary Channel Fill Sandstone Characters

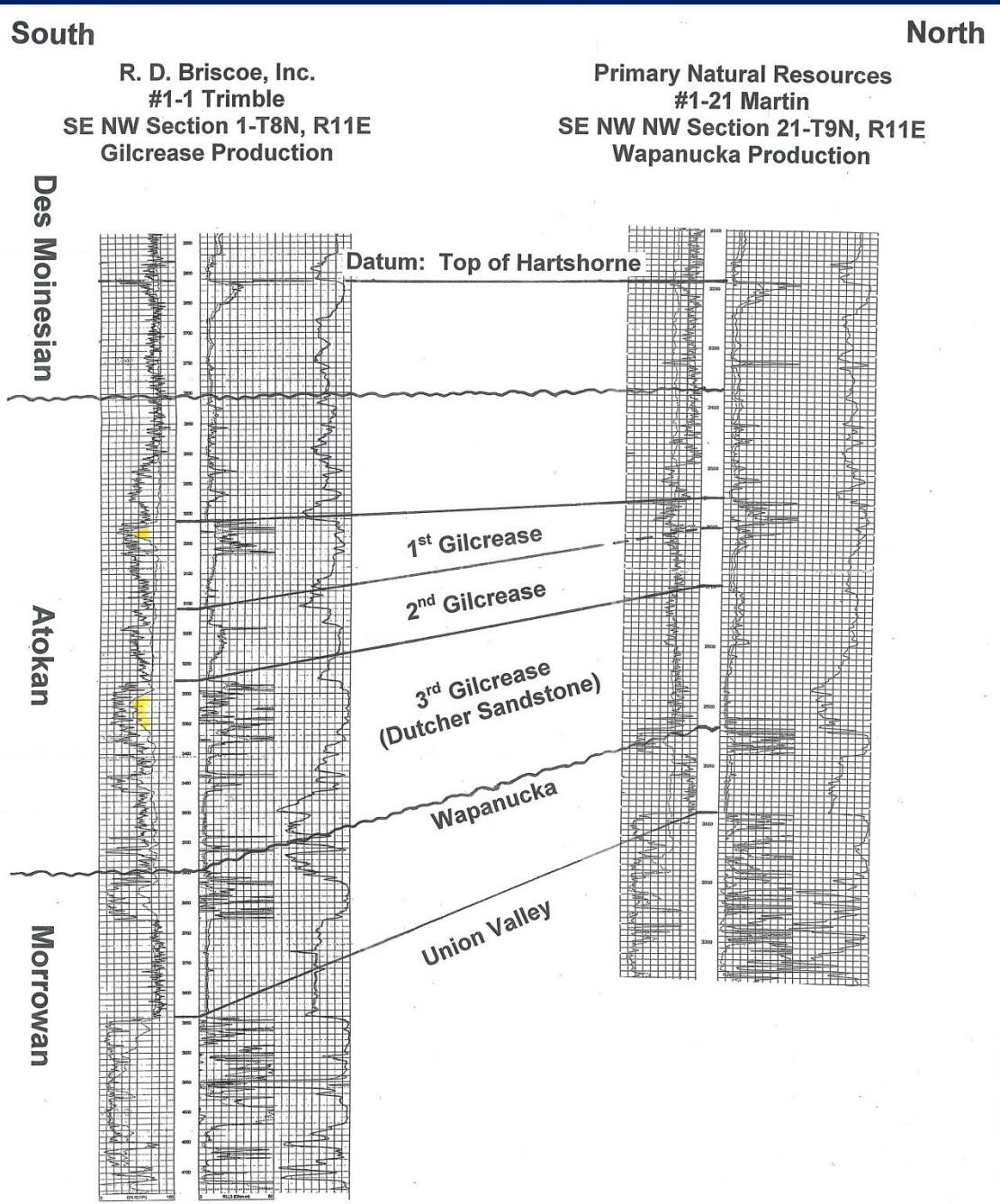
- **Low gamma ray, 30-40 API. Blocky profile. Notably cleaner than Lower Booch sandstone.**
- **High porosity, 16% to 21% porosity, sandstone matrix.**
- **Sharp basal and upper contacts.**



Gilcrease Stratigraphy

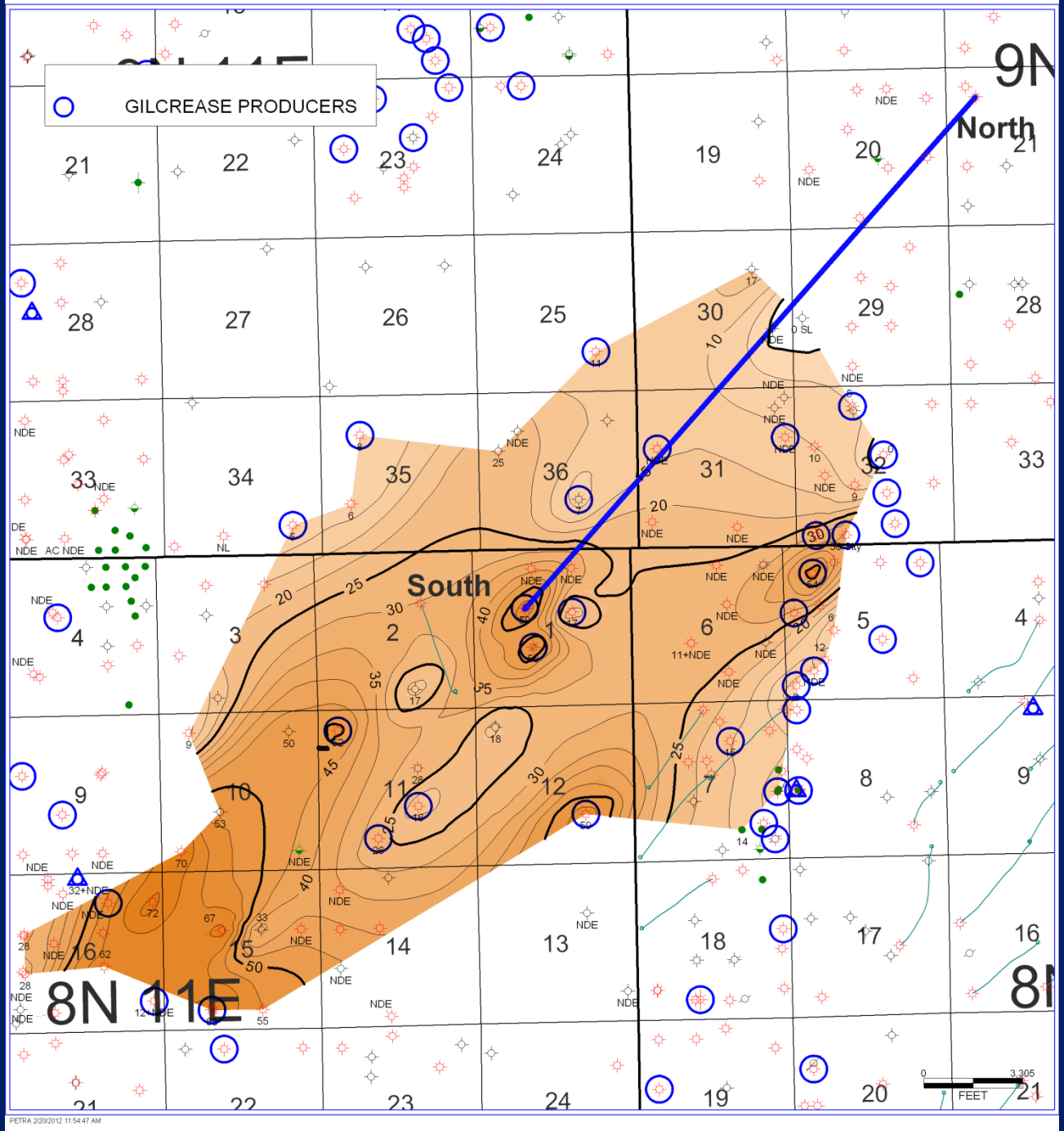
Dustin Field past "line of flexure"

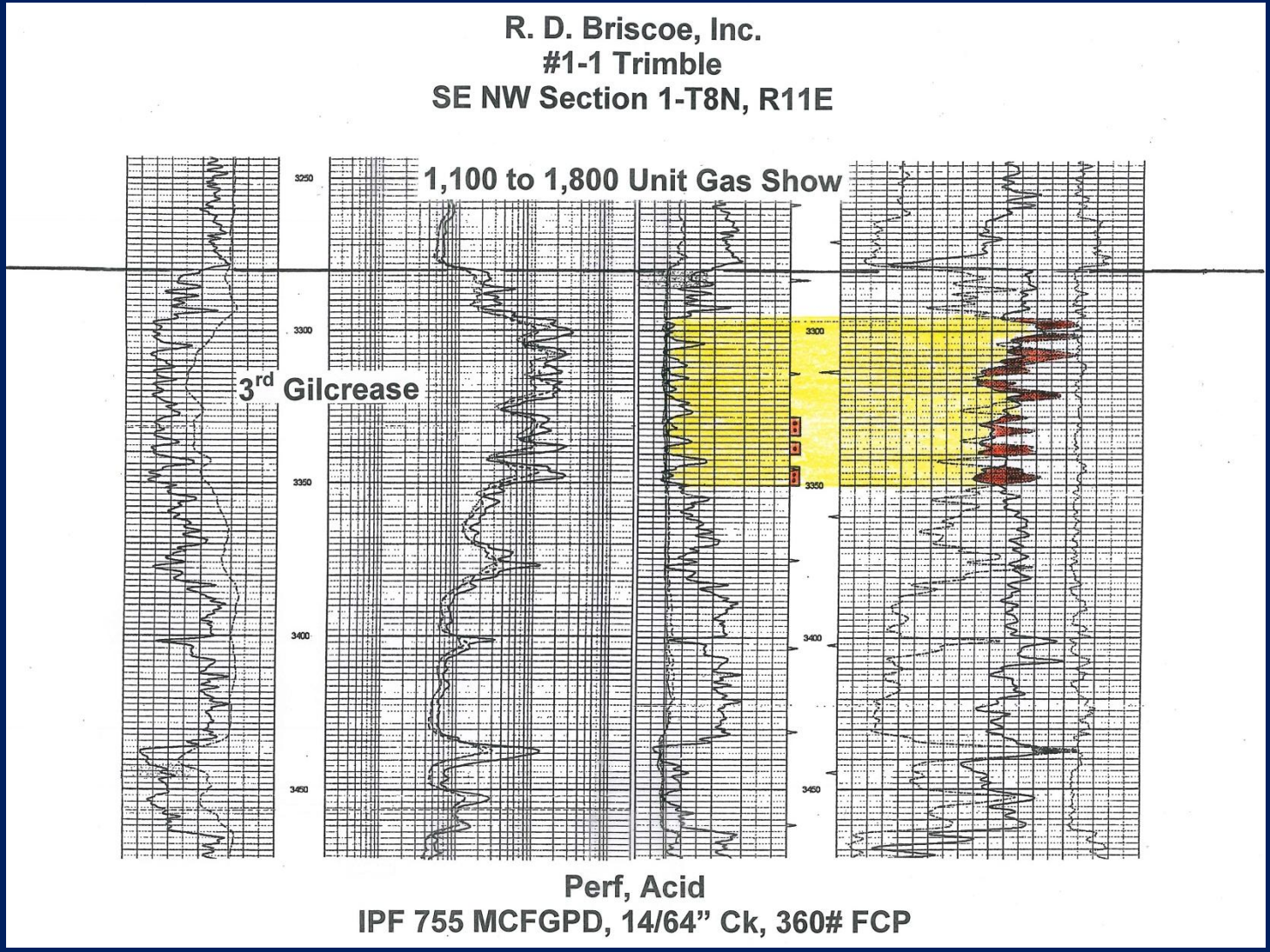
- **Unconformity bound Atokan.**
- **Rapidly wedgeing across line of flexure.**
- **Multiple units of clastic deposits.**
- **Sandstone units developed at the base are called Spiro.**



Isopach: Gross 3rd Gilcrease Sandstone

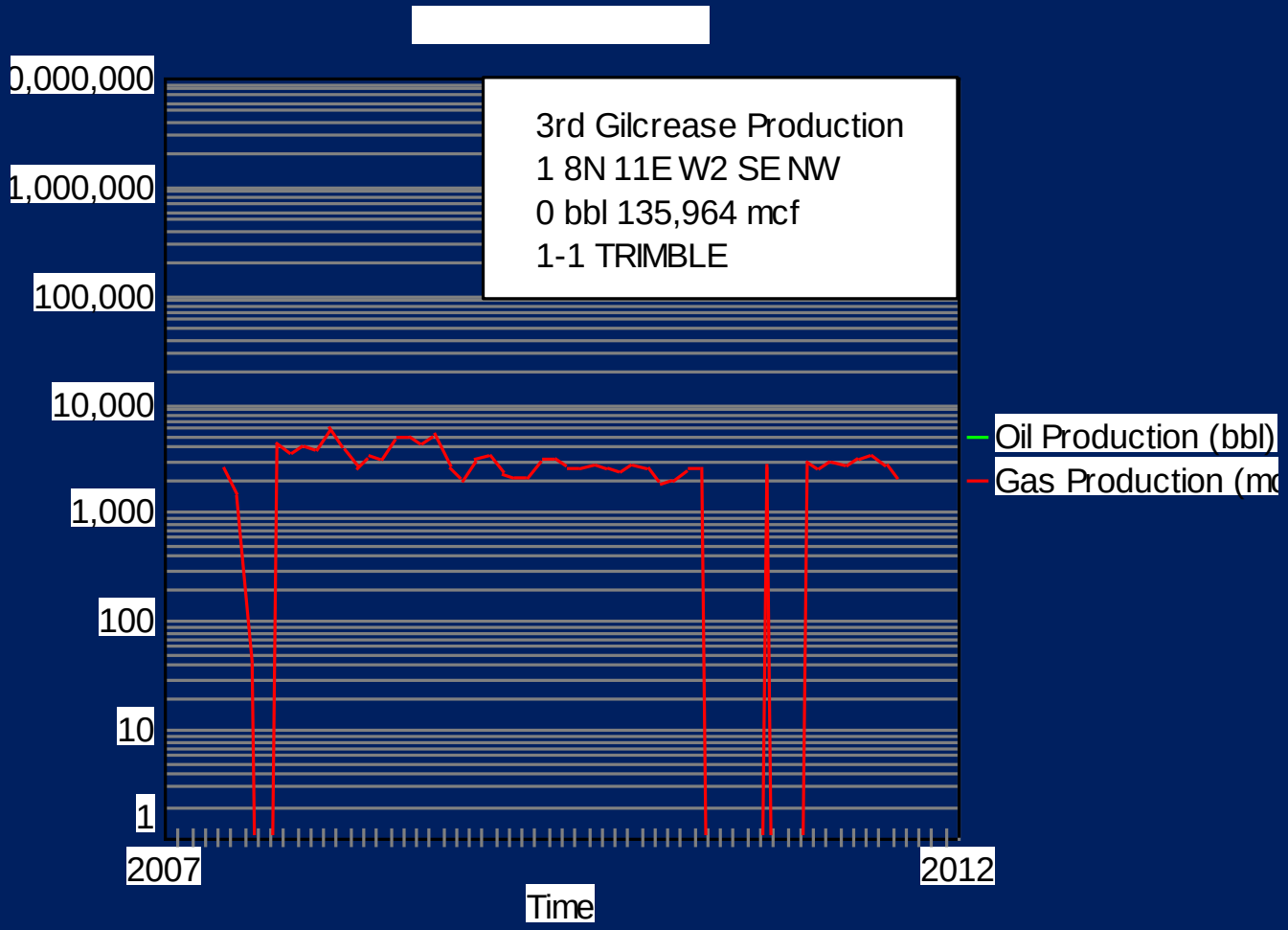
- Sandstone not developed in Dustin Field.
- Appears to be the dominant producing Gilcrease unit beyond the “line of flexure”.





3rd Gilcrease Producing Well

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 permiability.

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!

http://www.equalenergy.ca/

NYSE EQU