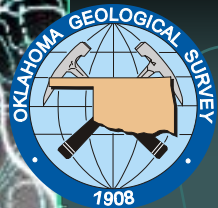
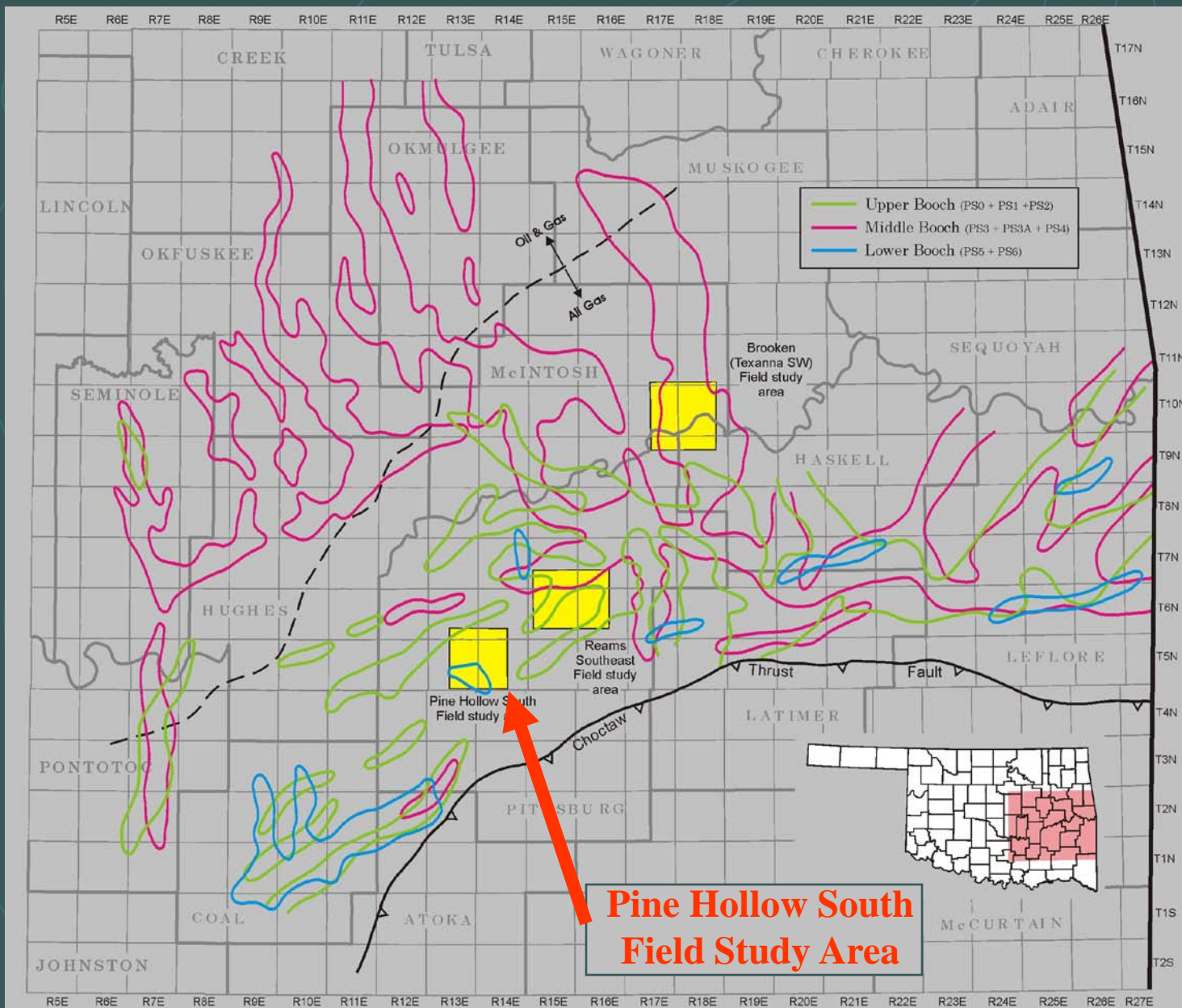


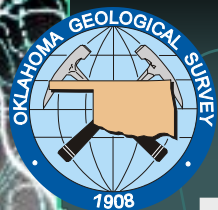
# Pine Hollow South Field Study



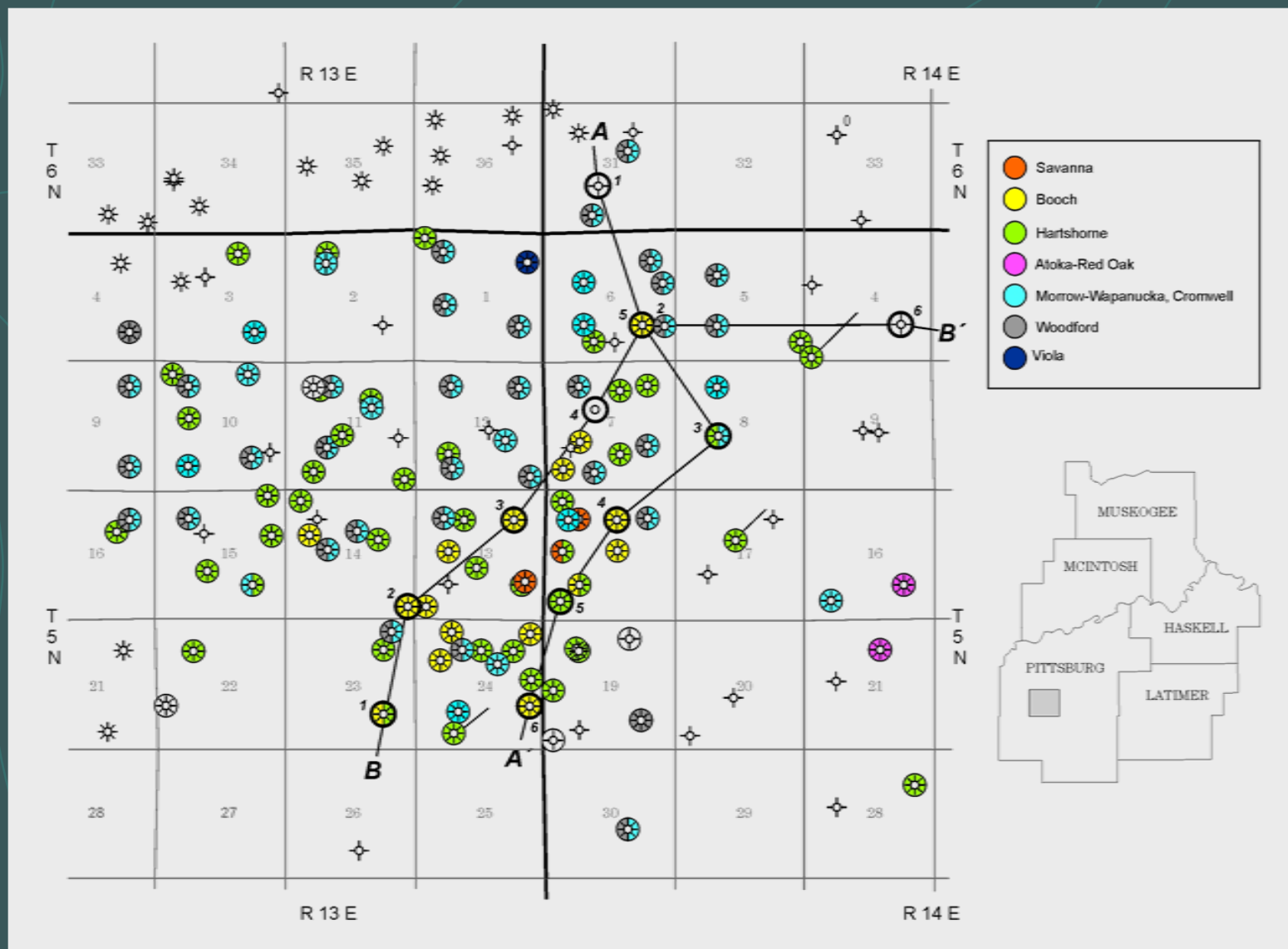
# Booch Gross Sand Isopach



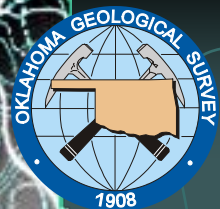
**Pine Hollow South  
Field Study Area**



# Pine Hollow South Field Study Area Production

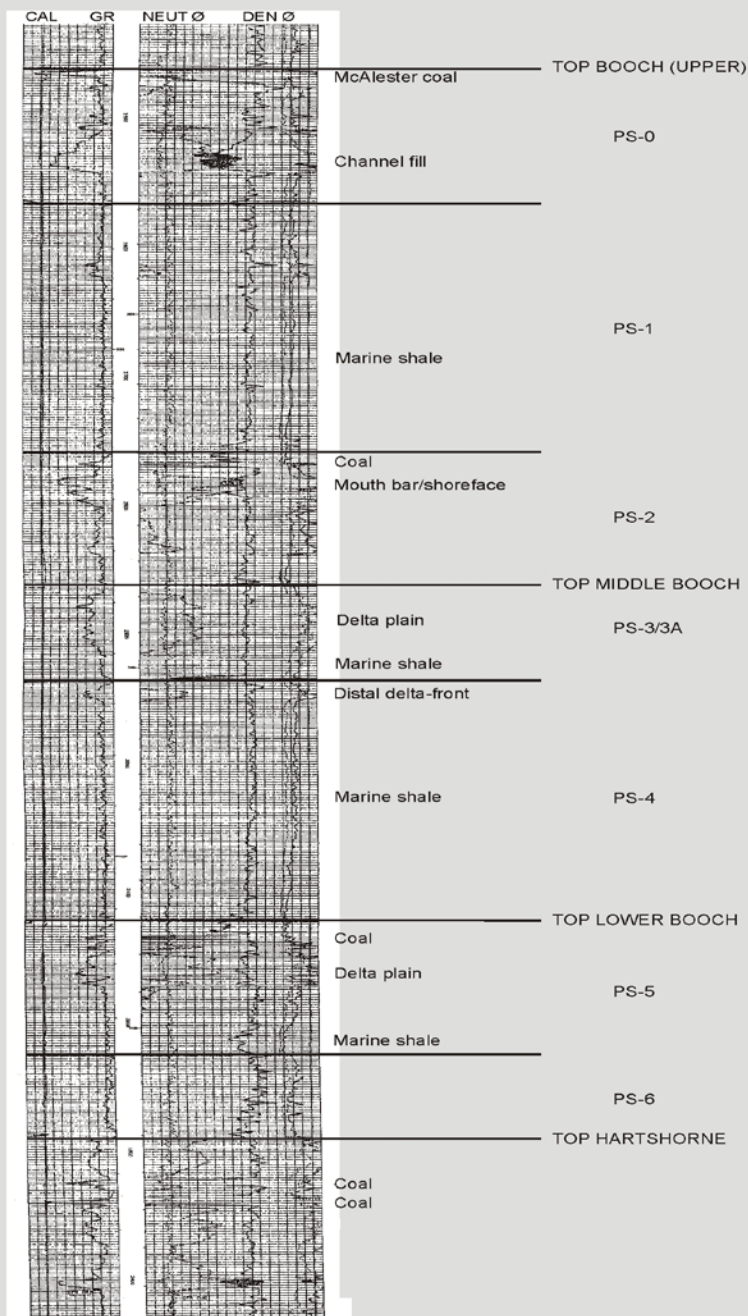




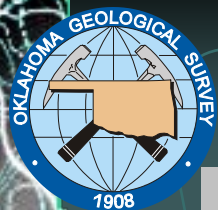


Tilford Pinson Expl. LLC.  
Grantham #1-31  
NW SE NE SW Sec. 31-6N-14E  
KBE: 628'

The Booch Gas Play

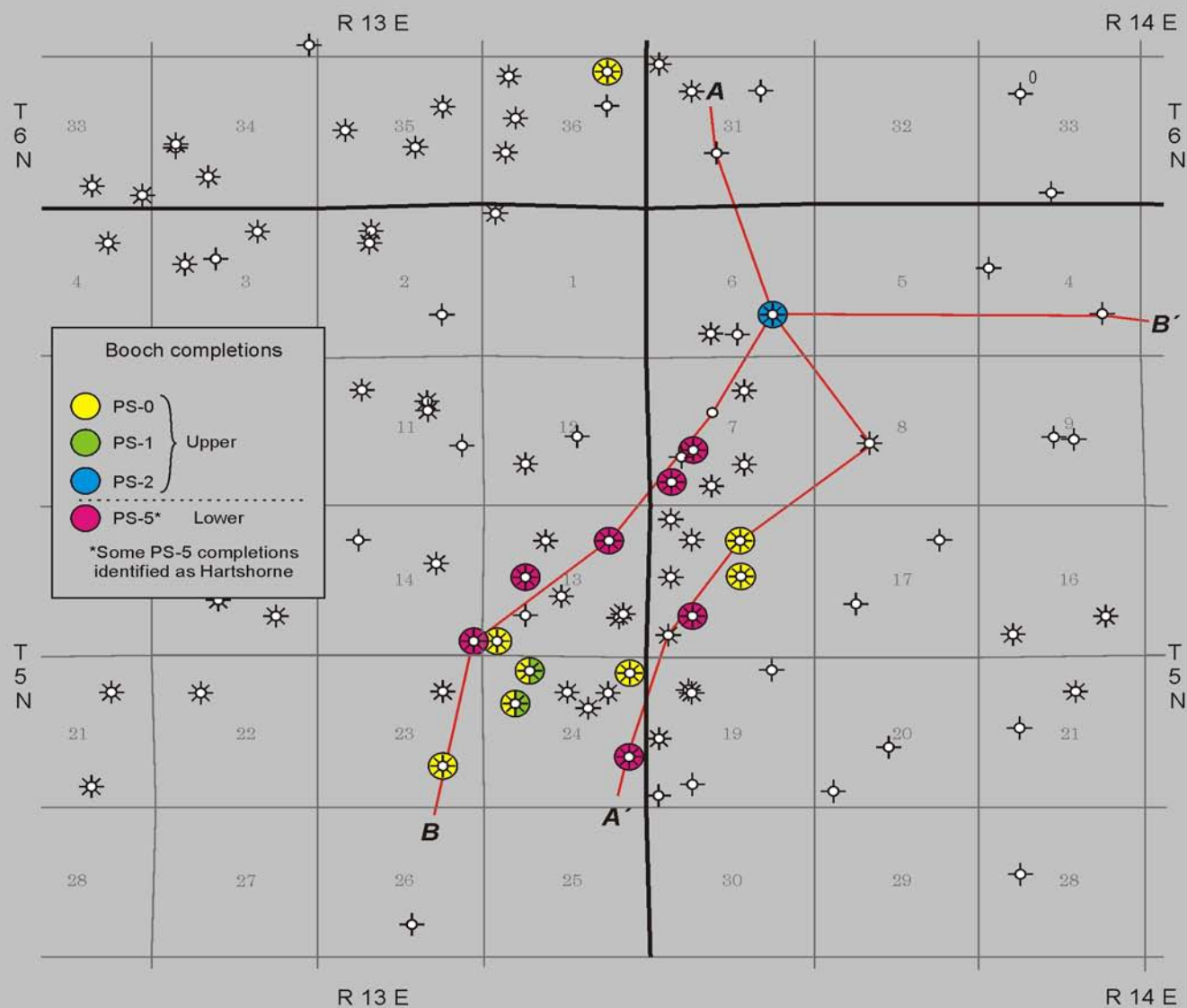


## Pine Hollow South Field Study Type Log

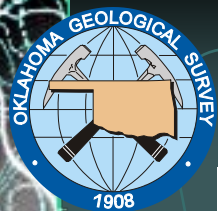


# Pine Hollow South Field Study

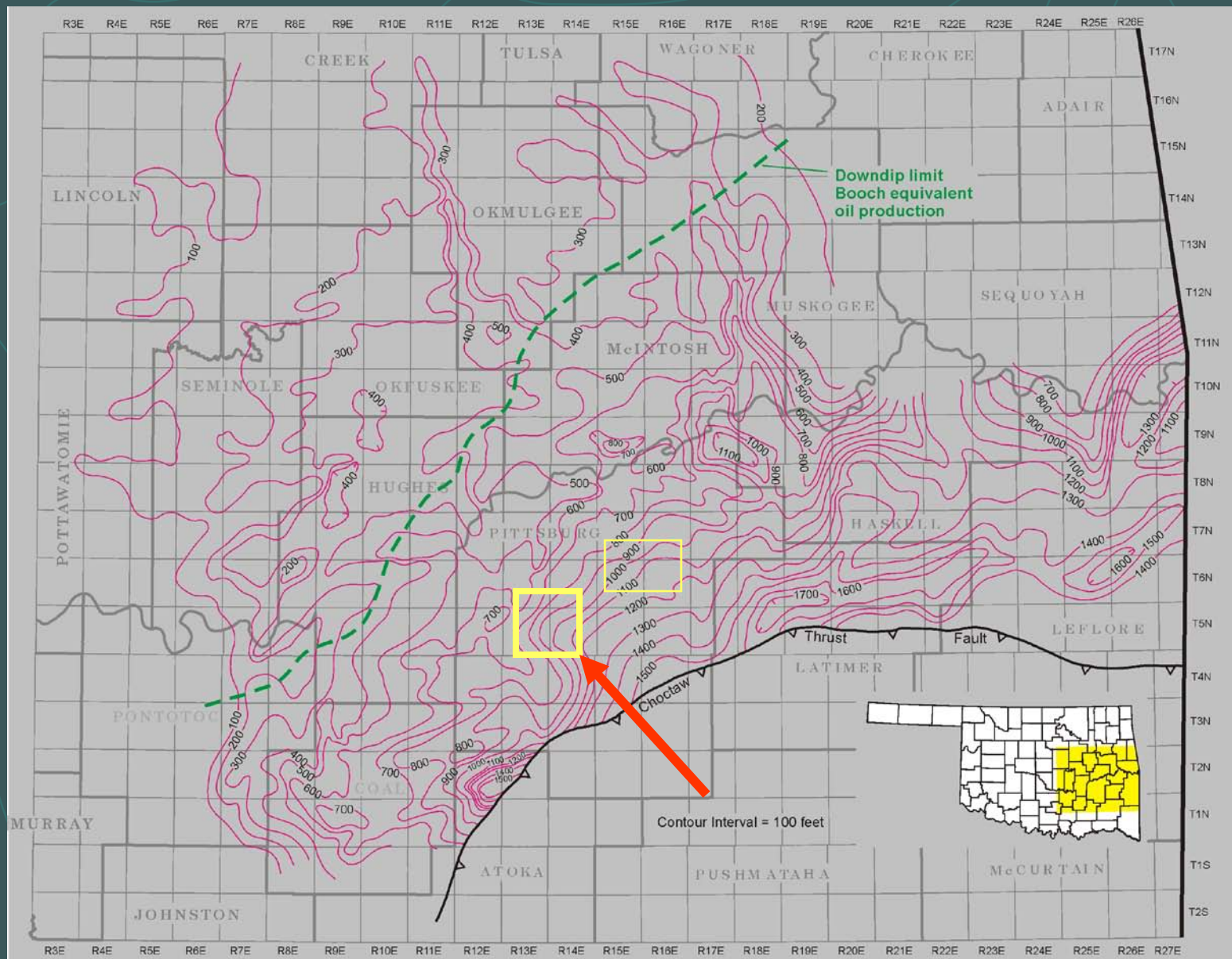
## Booch Production

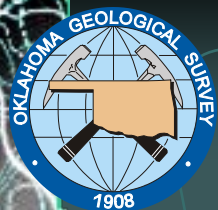






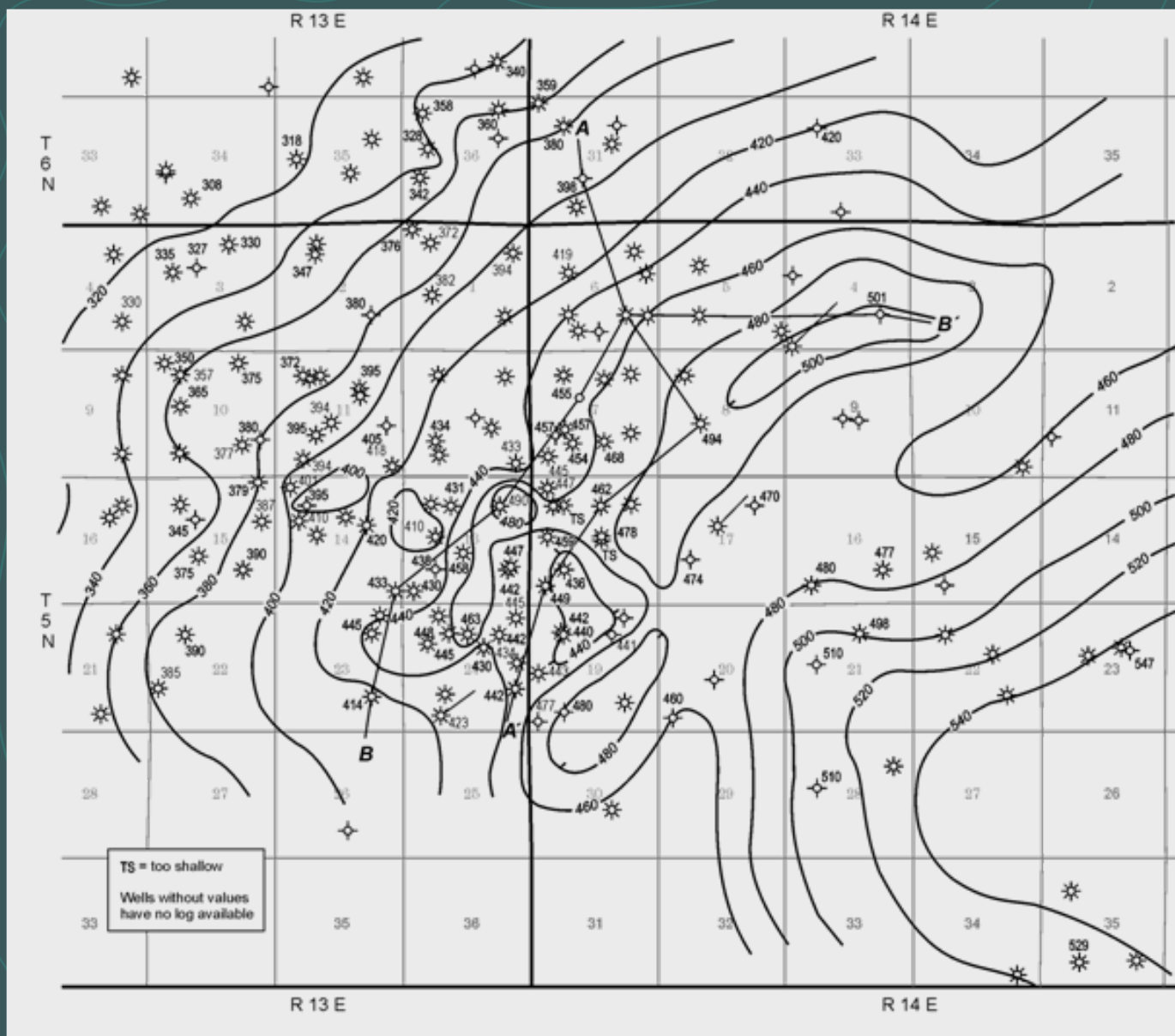
# Booch Gross Interval Isopach Showing Pine Hollow South Study Area





# Pine Hollow South Field Study

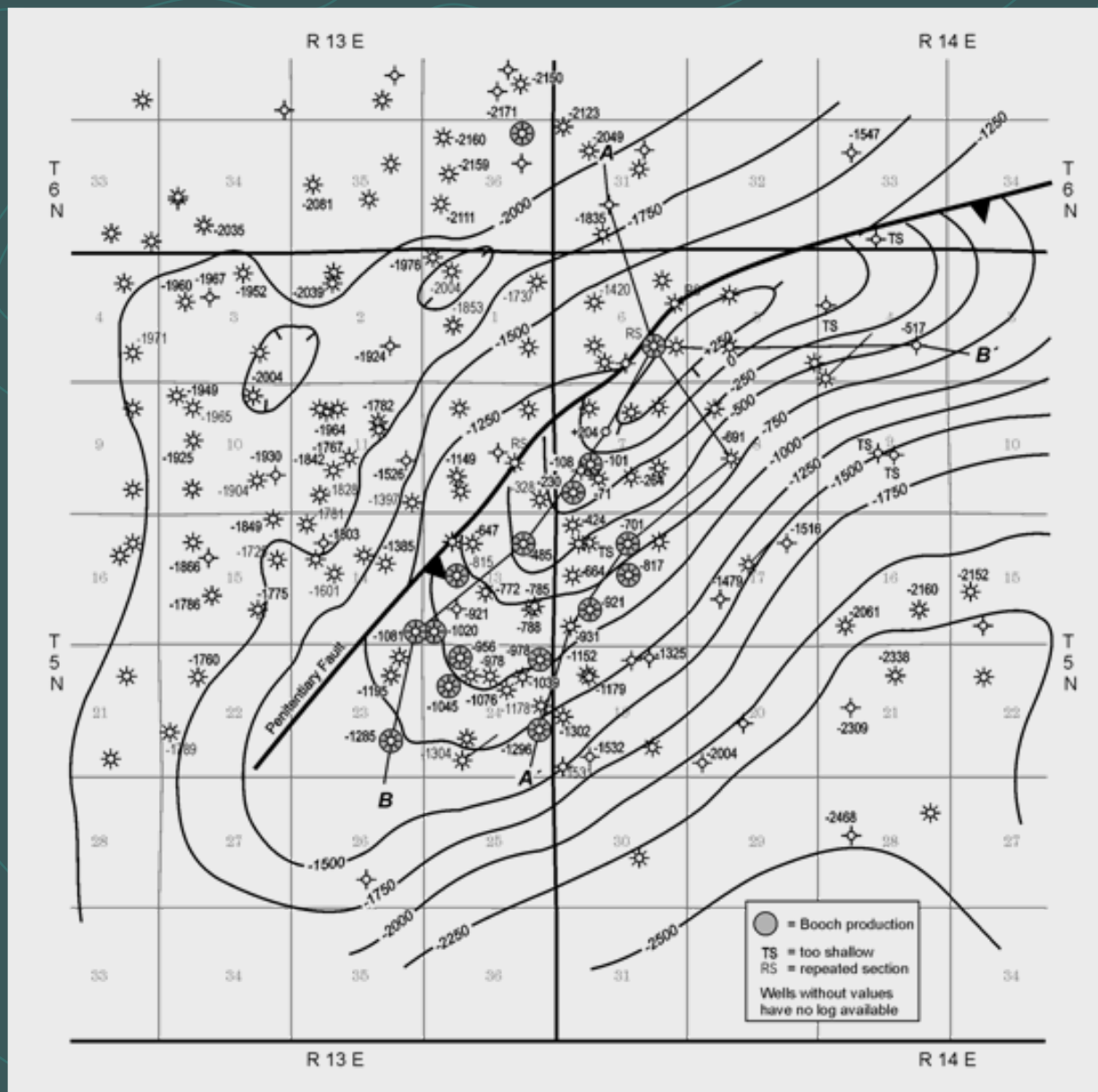
## Upper Booch Interval Isopach



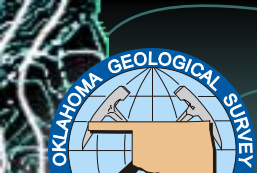


## Pine Hollow South Field Study

### Structure: Top Booch







# Pine Hollow South Field Study Stratigraphic Cross-Section A-A'

OKLAHOMA GEOLOGICAL SURVEY

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SP 2005-1, PLATES 15 and 16 of 16  
Pine Hollow South Field Stratigraphic Cross Section A-A' and B-B'  
Booch Gas Play in Southeastern Oklahoma

A  
North

A'  
South

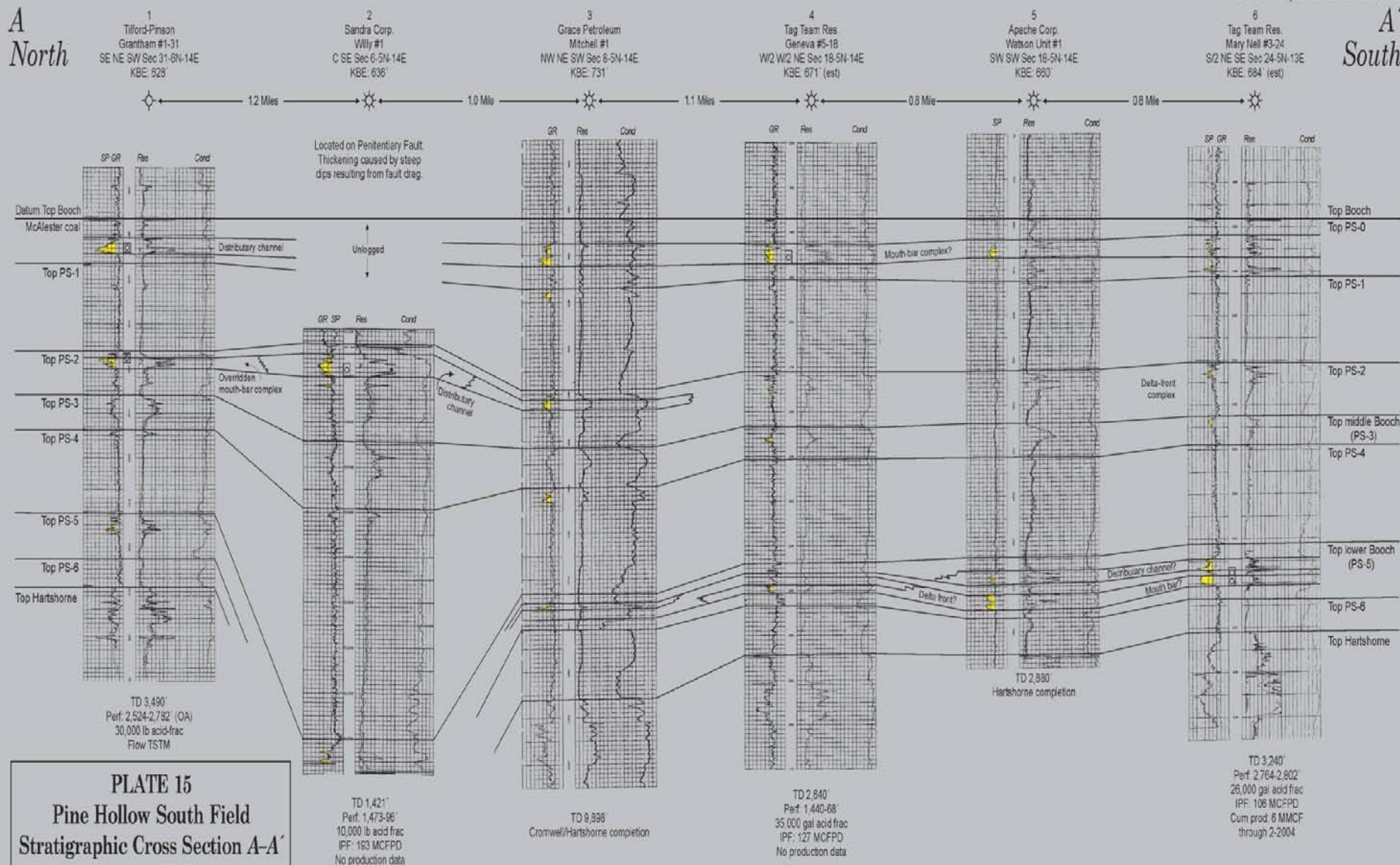


PLATE 15

Pine Hollow South Field

Stratigraphic Cross Section A-A'



# Pine Hollow South Field Study Stratigraphic Cross-Section B-B'

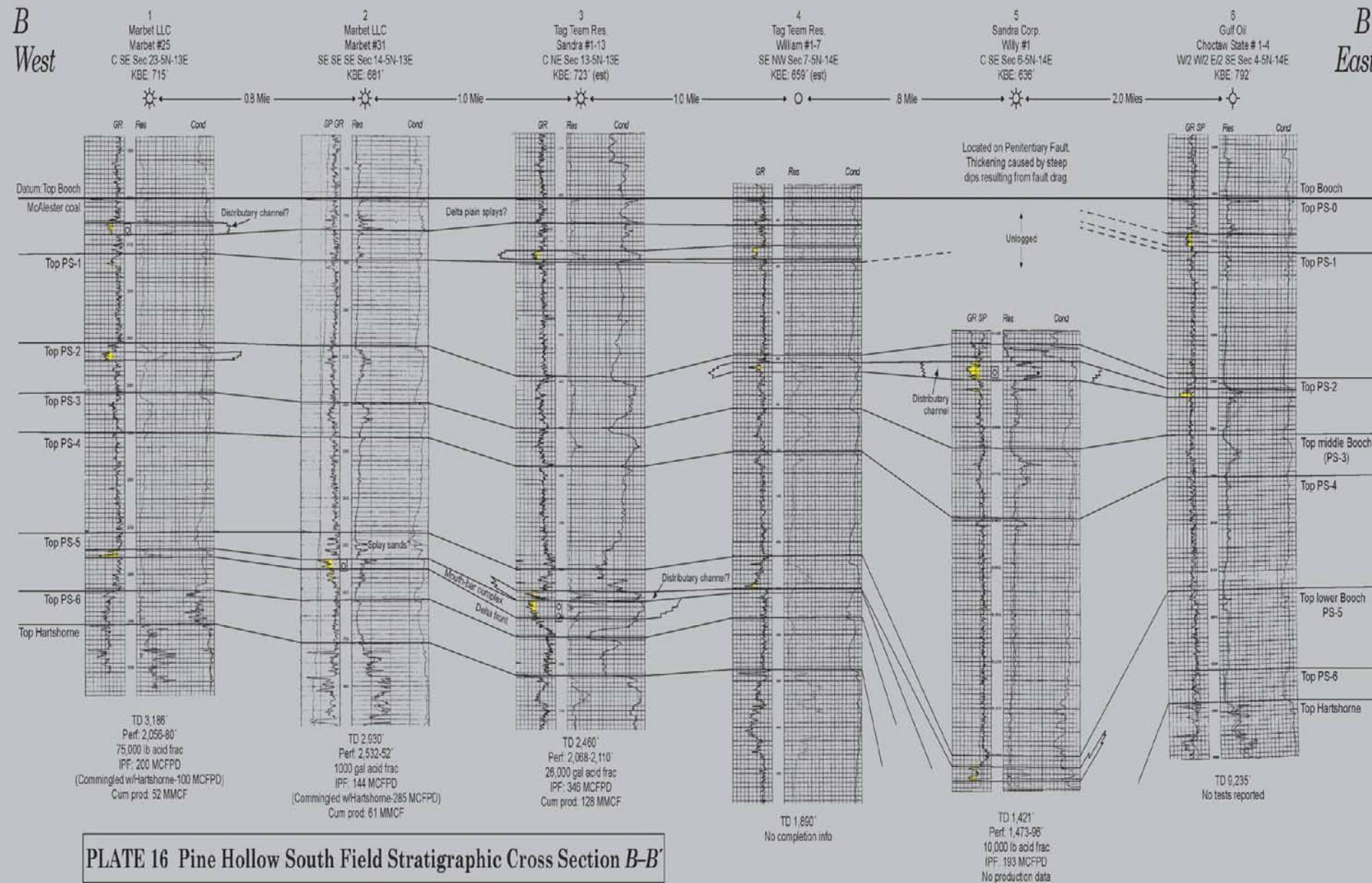
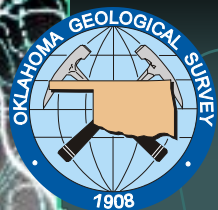
B  
WestB'  
East

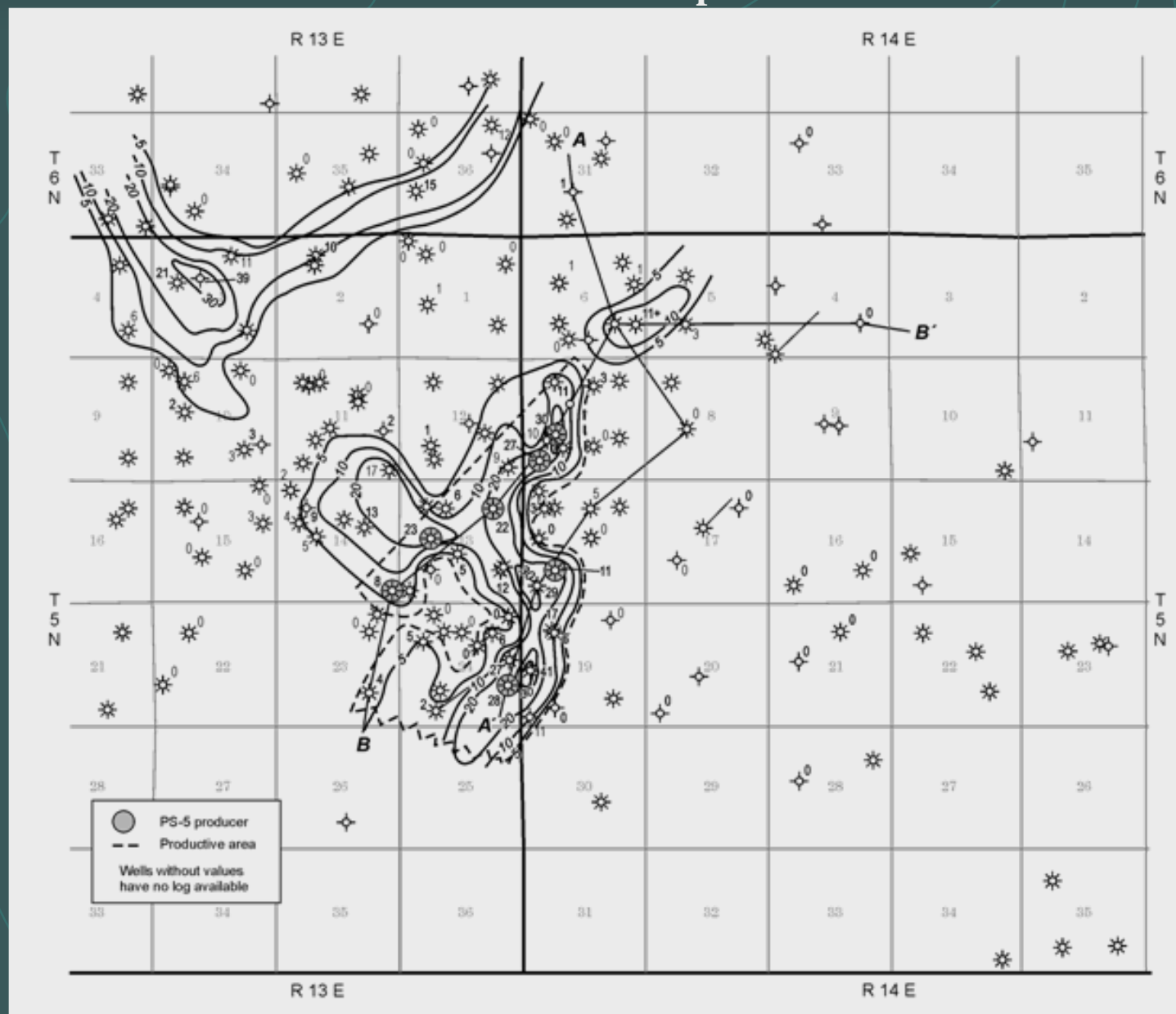
PLATE 16 Pine Hollow South Field Stratigraphic Cross Section B-B'



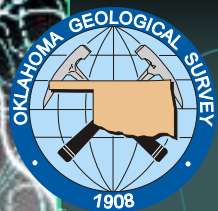


# Pine Hollow South Field Study

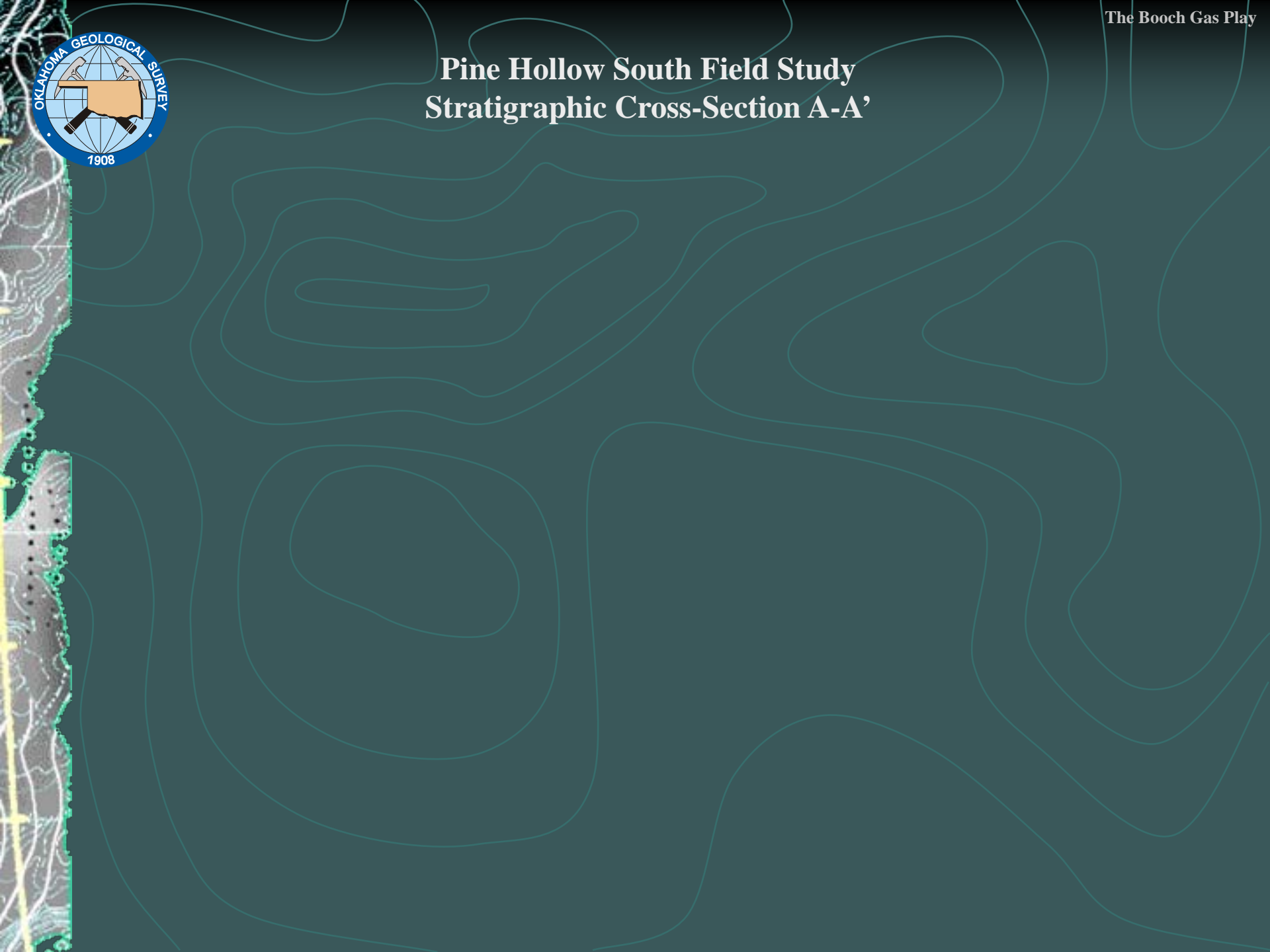
## PS-5 Net Sand Isopach





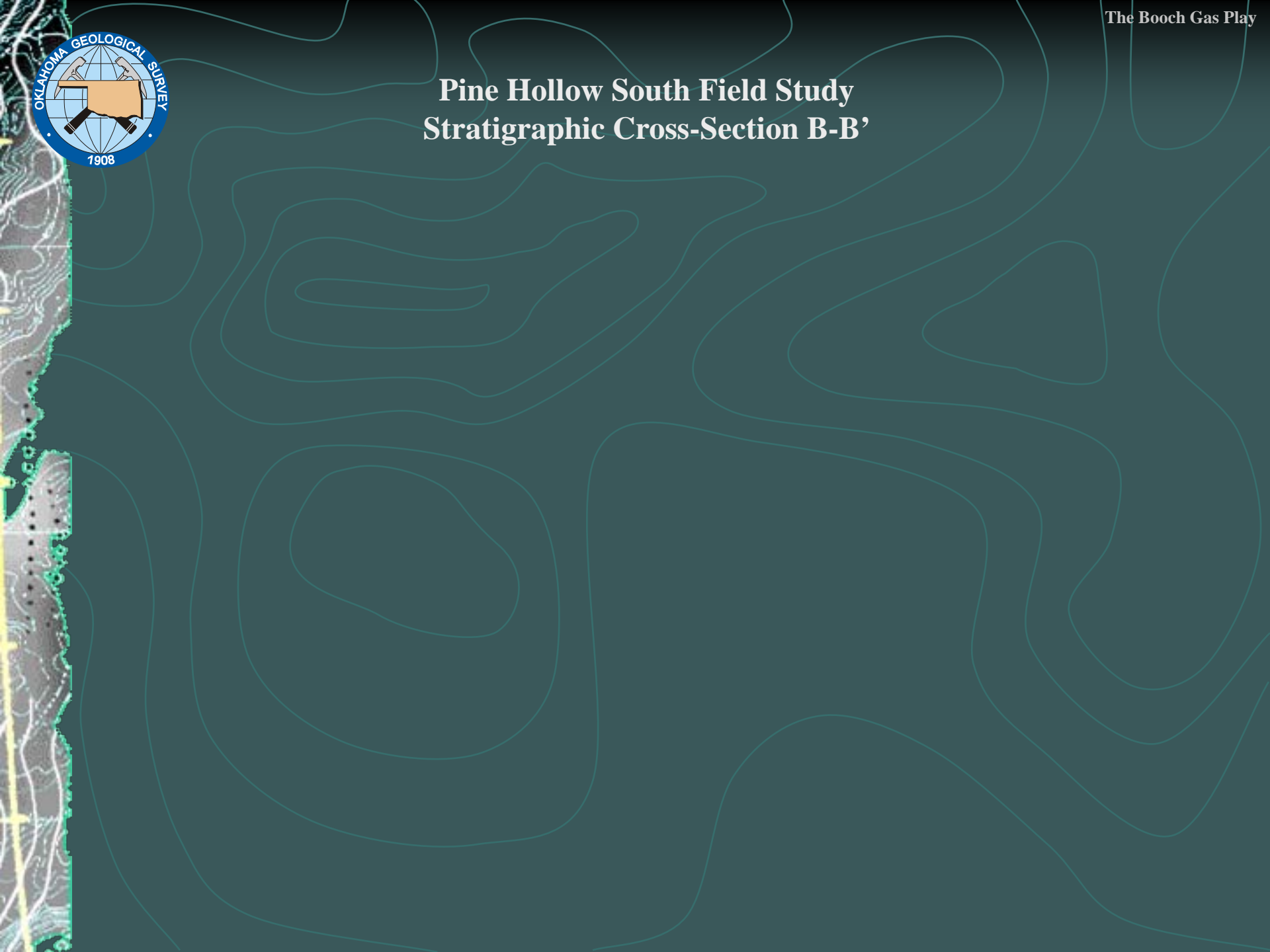


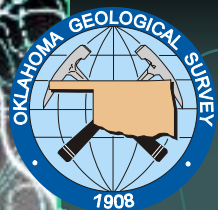
# Pine Hollow South Field Study Stratigraphic Cross-Section A-A'





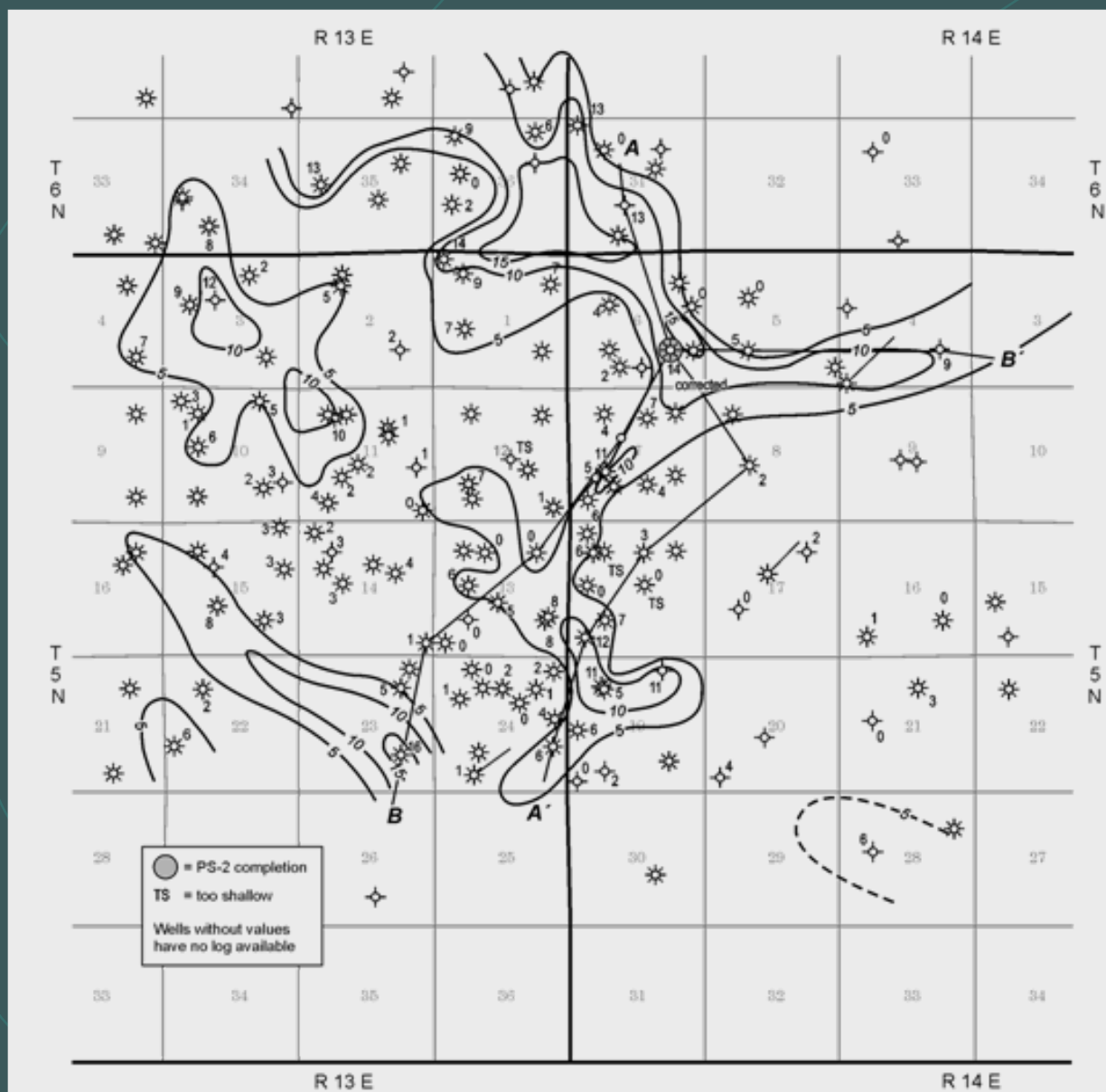
# Pine Hollow South Field Study Stratigraphic Cross-Section B-B'



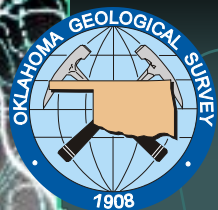


# Pine Hollow South Field Study

## PS-2 Net Sand Isopach

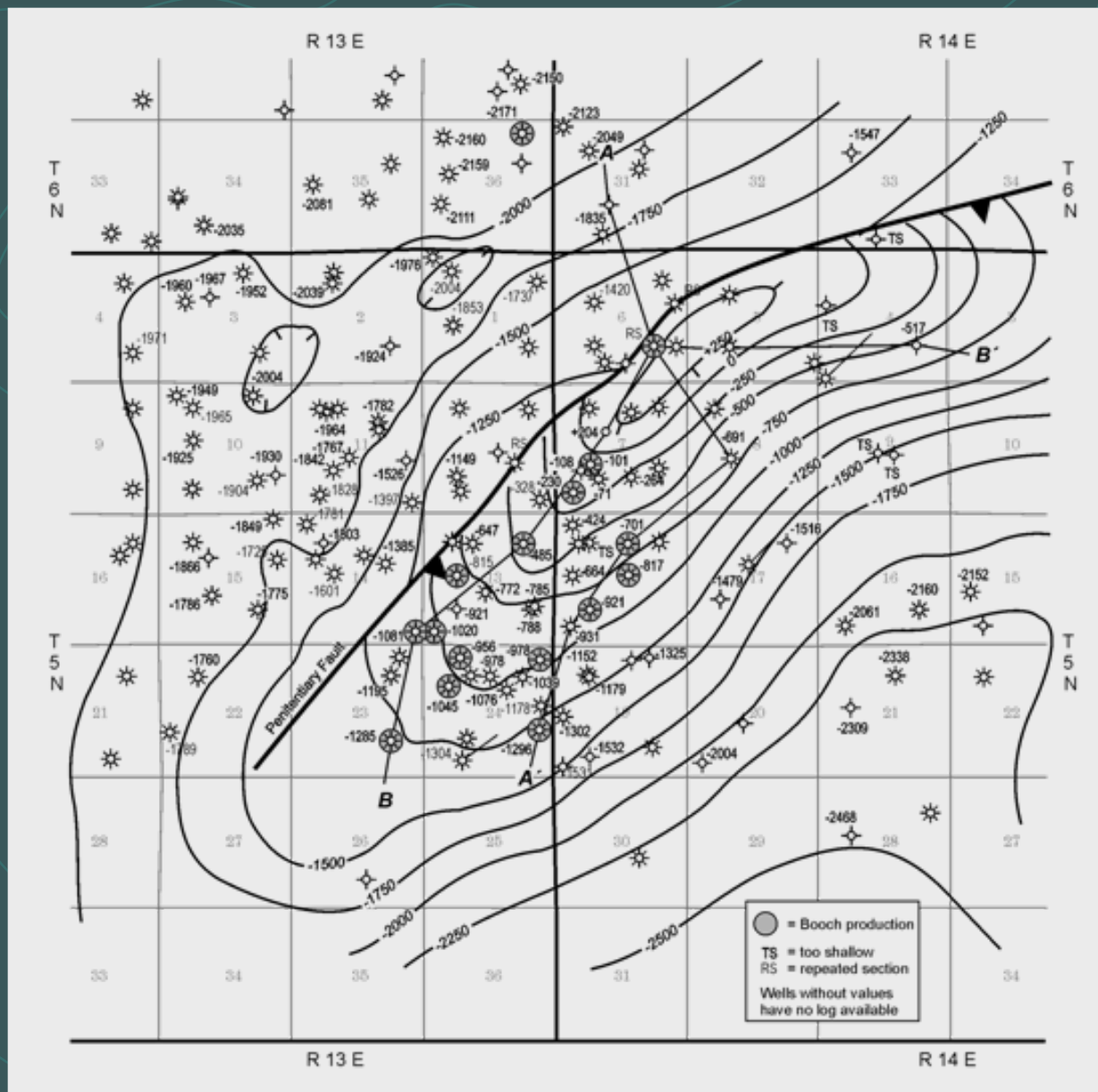






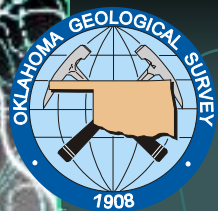
# Pine Hollow South Field Study

## Structure: Top Booch



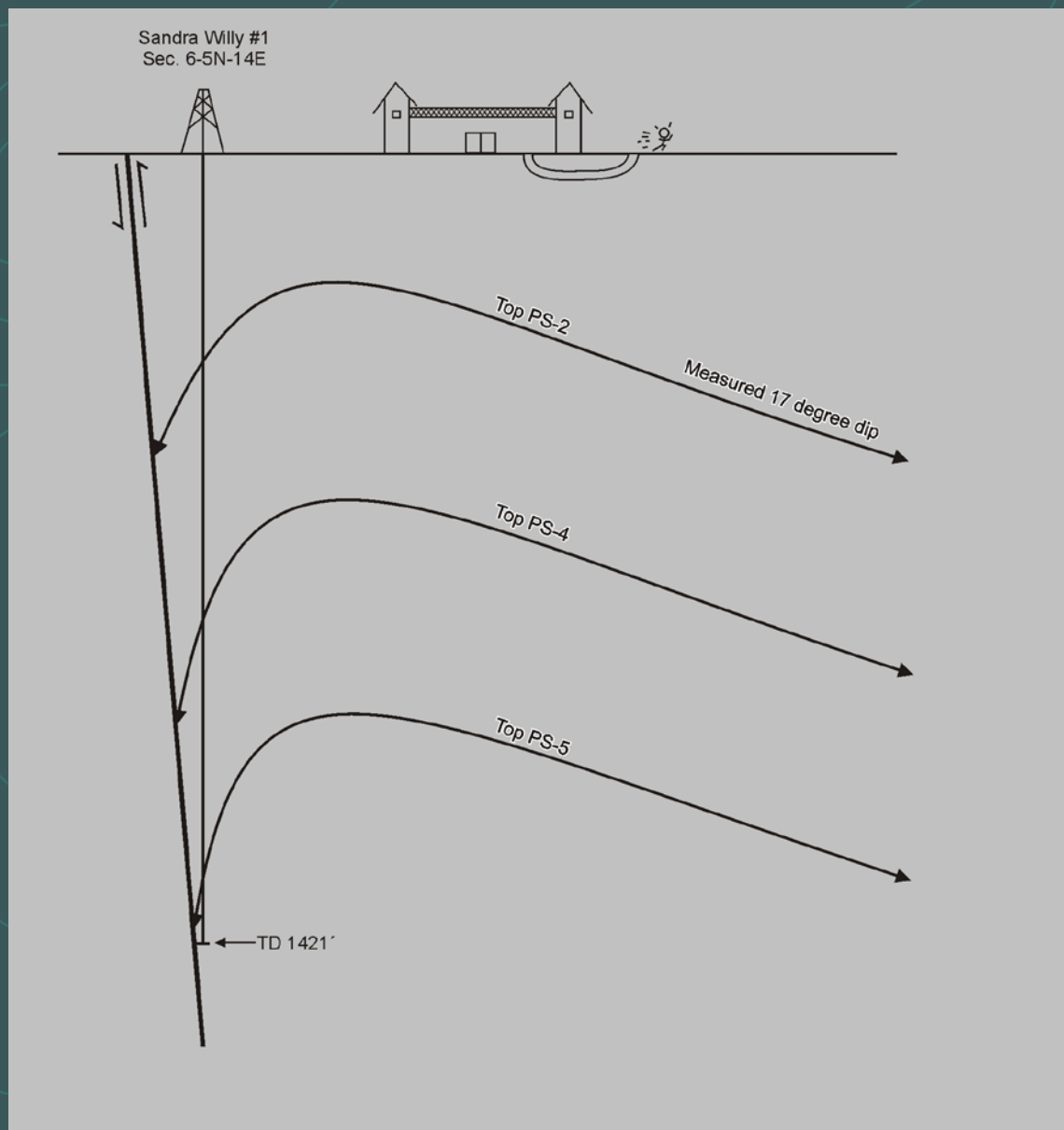


## Pine Hollow South Field Study Stratigraphic Cross-Section A-A'

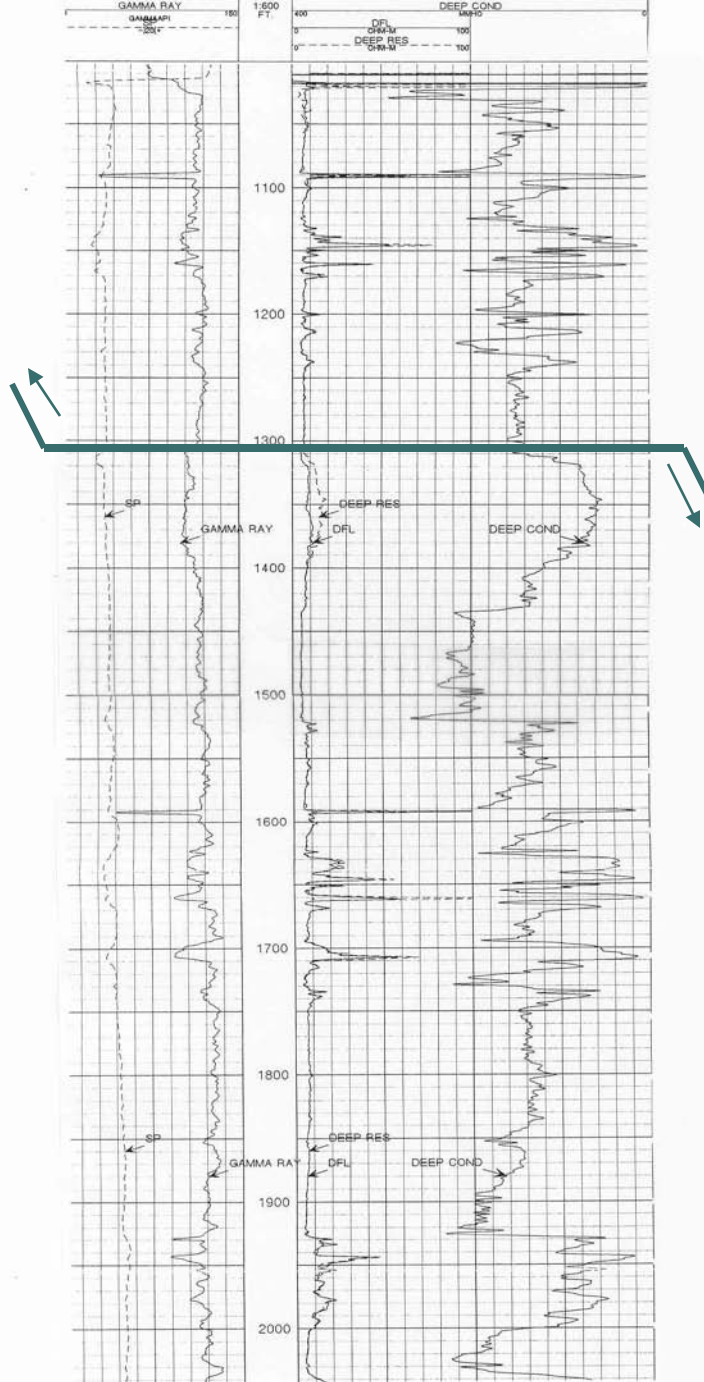
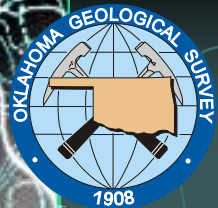


# Pine Hollow South Field Study

## Apparent Penitentiary Fault Drag





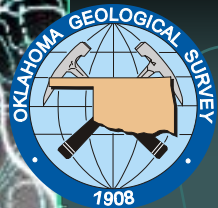


# Pine Hollow South Field Study

## Newfield Sandra # 1-12

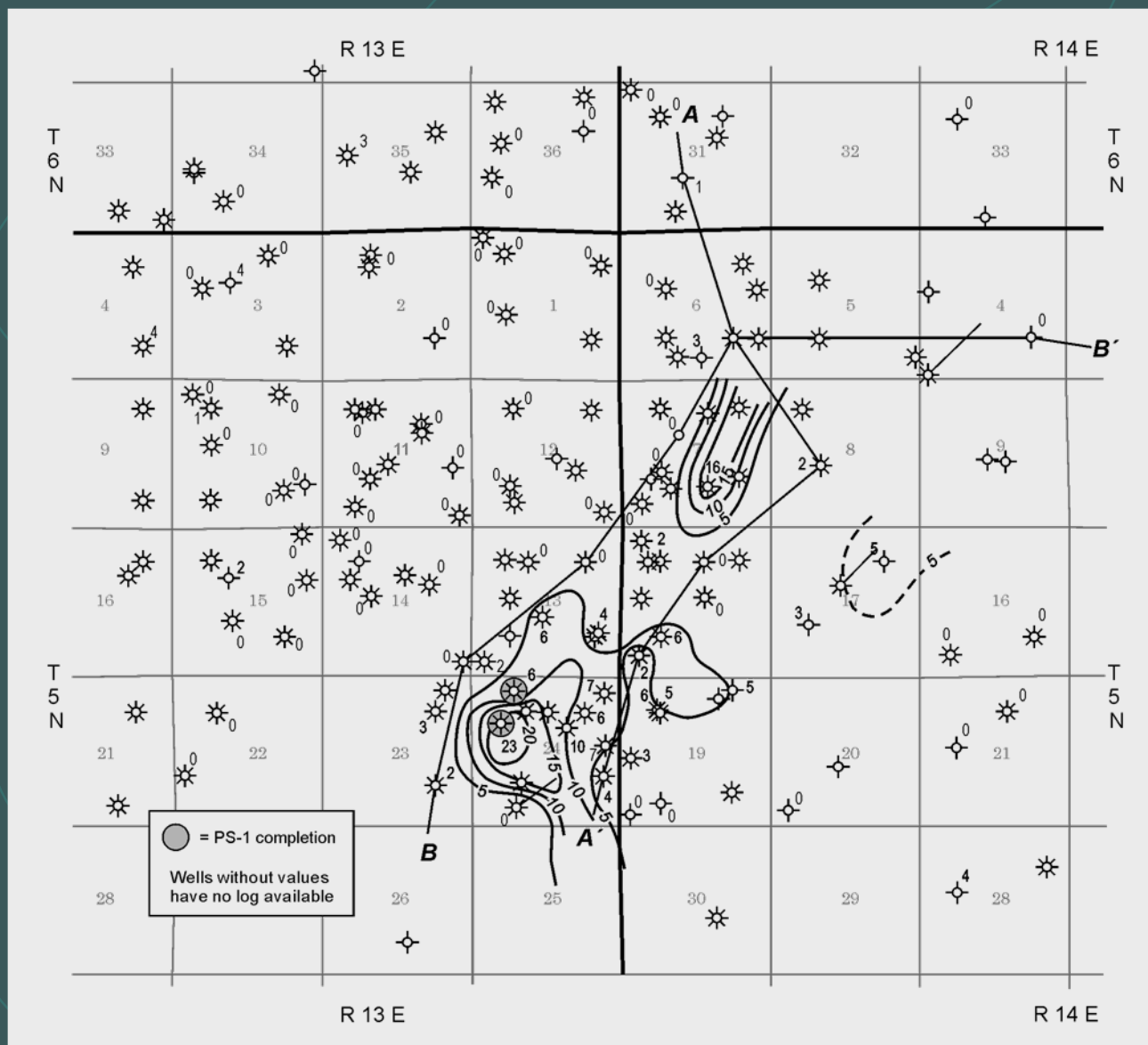
### Sec 12 5N 13E

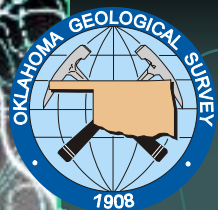
(Vertical Woodford Test)



# Pine Hollow South Field Study

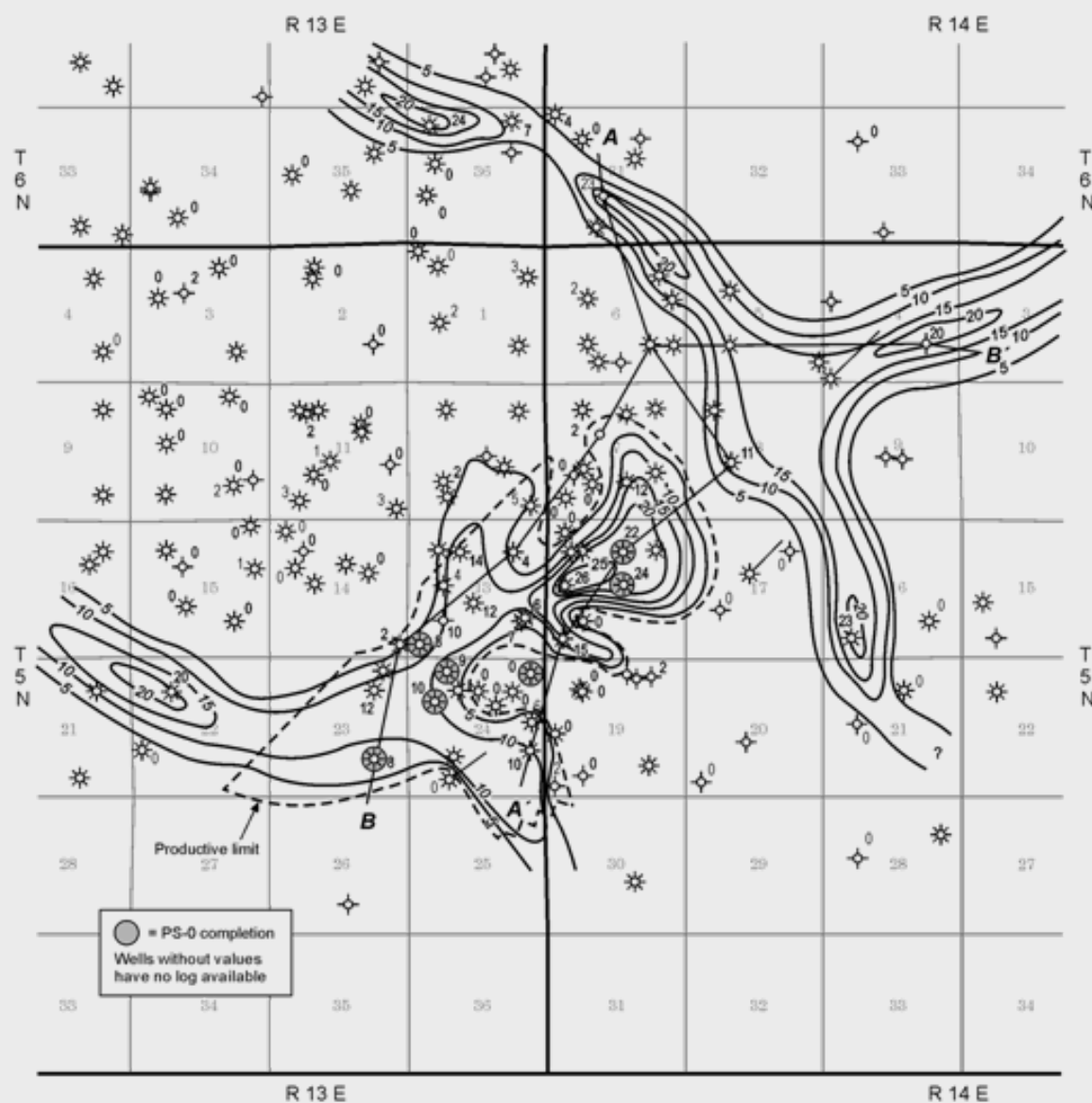
## PS-1 Gross Sand Isopach





# Pine Hollow South Field Study

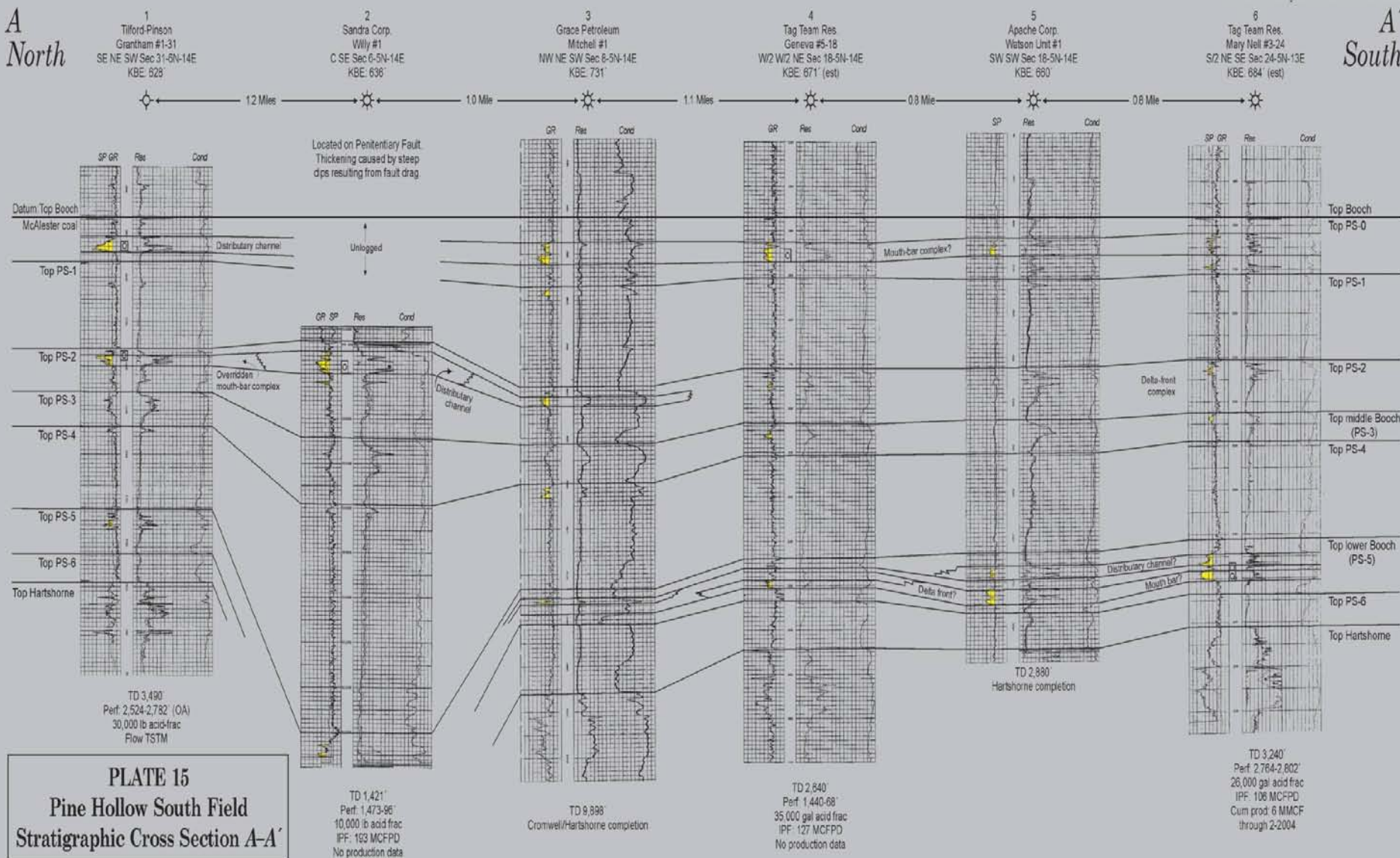
## PS-0 Net Sand Isopach

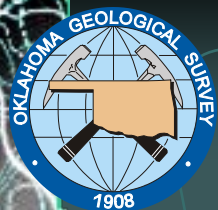




OKLAHOMA GEOLOGICAL SURVEY  
Charles J. Mankin, *Director*

SP 2005-1, PLATES 15 and 16 of 16  
Pine Hollow South Field Stratigraphic Cross Section A-A' and B-B'  
Booth Gas Play in Southeastern Oklahoma





## Pine Hollow South Field Production

**TABLE 7. — Pine Hollow South Field (Study Area) Booch Production**

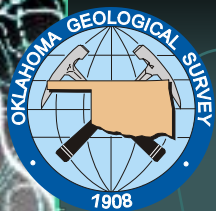
Operator name	Lease name	Well no.	Location	Status	Gas cum. (MCF)	EUR <sup>a</sup> (MMCF)			Production (MCF)			
						All Booch	PS-0	PS-5	PS no. <sup>b</sup>	YTD	Latest month	First prod. date
Tag Team Resources LLC	Frank	1	sec. 13, T5N, R13E SW SW SW	ACT	5,229	50	50		0	189	189	2002/02
Tag Team Resources LLC	Sandra	1	sec. 13, T5N, R13E C NE	ACT	130,848	225		225	5	1,569	1,569	2000/04
Marbet LLC	Marbet LLC	31	sec. 14, T5N, R13E SE SE SE	ACT	71,342	275		275	5	9,512	3,135	2002/05
Marbet LLC	Marbet LLC	25	sec. 23, T5N, R13E C SE	ACT	54,576	50	50		0, (H) <sup>c</sup>	2,345	1,114	2001/07
Tag Team Resources LLC	Nell Mary	6	sec. 24, T5N, R13E NE SW NW	ACT	349	50	50		0, 1	349	349	2003/12
Tag Team Resources LLC	Nell Mary	2	sec. 24, T5N, R13E C NE NE	ACT	29,335	125	125		0	1,439	1,439	2002/11
Tag Team Resources LLC	Nell Mary	1	sec. 24, T5N, R13E NW NE NW	ACT	27,557	150	150		0, 1	1,843	1,843	2002/11
Tag Team Resources LLC	Nell Mary	3	sec. 24, T5N, R13E S NE SE	ACT	7,962	75		75	5	941	941	2003/01
Tag Team Resources LLC	Watkins Blake	1	sec. 7, T5N, R14E S N SW	ACT	59,377	100		100	5	364	364	1991/01
Tag Team Resources LLC	Geneva	4	sec. 18, T5N, R14E SW SW NE	ACT	7,731	25	25		0	247	247	2002/03
Tag Team Resources LLC	Watson	1	sec. 18, T5N, R14E C SW	ACT	645,357	250		250	5, (H) <sup>c</sup>	13,498	1,152	1981/08
Totals					1,039,663	1,375	450	925		32,296	12,342	

NOTE: Data from IHS Energy (through February 2004). EUR — estimated ultimate recovery.

<sup>a</sup>EUR calculated using latest months production 12–5 years. Many recent wells are not yet on production, making EURs provisional.

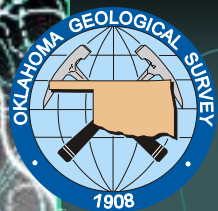
<sup>b</sup>Parasequence completed.

<sup>c</sup>H — Hartshorne. Hartshorne commingled assigns 33% to Booch zone.



## Pine Hollow South Field Study Volumetric Input

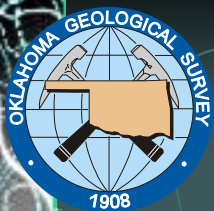
<u>Interval</u>	<u>Avg. Net Sd</u>	<u>Area (ac)</u>	<u>Avg. Por</u>	<u>Avg. Sg</u>	<u>Pore Vol (Ac. Ft.)</u>
<u>PS-0:</u>	10 ft	2,528	9%	75%	1,706
<u>PS-5:</u>	17 ft	1,952	10%	80%	2,655



## Pine Hollow South Field Study Gas Volumes

<u>Interval</u>	<u>Gas IIP</u>	<u>Cum Prod</u>	<u>E.U.R.</u>	<u>Proj. R.F.</u>
<u>PS-0:</u>	1,264	88	450	36%
<u>PS-5:</u>	2,544	485	925	36%
<u>Total:</u>	3,808	573	1,375	Avg: 36%





# Pine Hollow South Field Study

## Lessons Learned

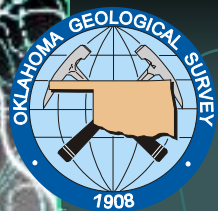
- **Evaluation Issues**

- **Keys to Viability**



# General Conclusions

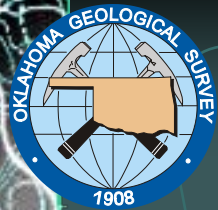




## Conclusions: Stratigraphy

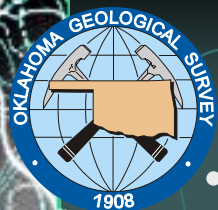
- Booch not equivalent to McAlester
- Records eight progradational cycles (all sourced from the north)
  - Lower Booch (2 cycles) most marine & poorest producer
  - Middle Booch (3 cycles) maximum progradation & best producer
  - Upper Booch (3 cycles) intermediate
- Reservoirs all sandstones (occurring at tops of cycles)
  - Best are channel-fills
  - Tidally reworked deltaics are poorer





## Conclusions: Petroleum System

- Booch marine shales and coals are the dominant source rocks
  - Gas prone
  - Somewhat immature (may explain under-filling)
- Migration
  - Most occurs from adjacent shales and coals
  - Longer distant possible via channel sands (Brooken)
  - Cross-fault from Hartshorne - Atoka and deeper possible
- Stratigraphy the key to economic entrapment



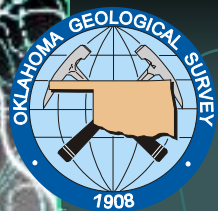
# Conclusions: Evaluation

- Challenges

- Volumetrics of limited value
- Complex reservoir geometry
- Few penetrations per accumulation
- Production allocation issues (commingling)
- Fuzzy line defining potential reservoir and pay
- Under-pressure requires early compression

- Exploration

- Many opportunities (in high-price environment)
- Drilling shallow and cheap
- Entirely subsurface play (will reward detailed analysis)
- Most reservoirs of limited aerial extent (easy to miss)
- Underlying Hartshorne excellent secondary objective



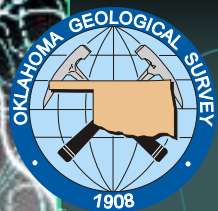
# Acknowledgements

Max Tilford

Neil Suneson

Rick Andrews





## Don't forget the Booch Field Trip March 4-5, 2009

