Tight Oil Sandstone Reservoirs, Wyoming and Colorado: Core Workshop-- Part III: Maps and Cross-Sections*

Richard Bottjer[1], Gus Gustason[2], Kevin Smith[3], and Jack Beuthin[4]

Search and Discovery Article #80594 (2017)**
Posted August 14, 2017

*Adapted from material ("Wall Hangings") prepared for Short Course (No. SC-17), sponsored by the Rocky Mountain Section, Society for Sedimentary Geology (RMS-SEPM), associated with AAPG Annual Convention and Exhibition, 2015 (ACE 2015), and held June 4, 2015. Part I (Search and Discovery Article #80592 (2017)) and Part II (Search and Discovery Article #80593 (2017)) are adaptations of the presentations at, and Guidebook for, the Short Course. Please refer to Search and Discovery Article #80591 (2017), adapted from course notes and presentations at Rocky Mountain Association of Geologists (RMAG) Symposium and Core Workshop, Denver, Colorado, March 2, 2017, a sequel (update) to the work reported herein and in Parts I and II.
**Datapages © 2017. Serial rights given by author. For all other rights contact author directly.

[1]Cirque Resources; currently Coal Creek Resources, Denver, Colorado (rjbottjer@coalcreekresources.com)
[2]Enerplus, Denver, Colorado
[3]Cirque Resources, currently Garnet Ridge Resources, Arvada, Colorado
[4]Weathford Labs, Golden, Colorado

Contents

- Powder River Basin Bubble Map with Core Locations – Max Month Avg Daily Oil Rate
- Powder River Basin with Core Locations and Tight Oil Sandstone Producers

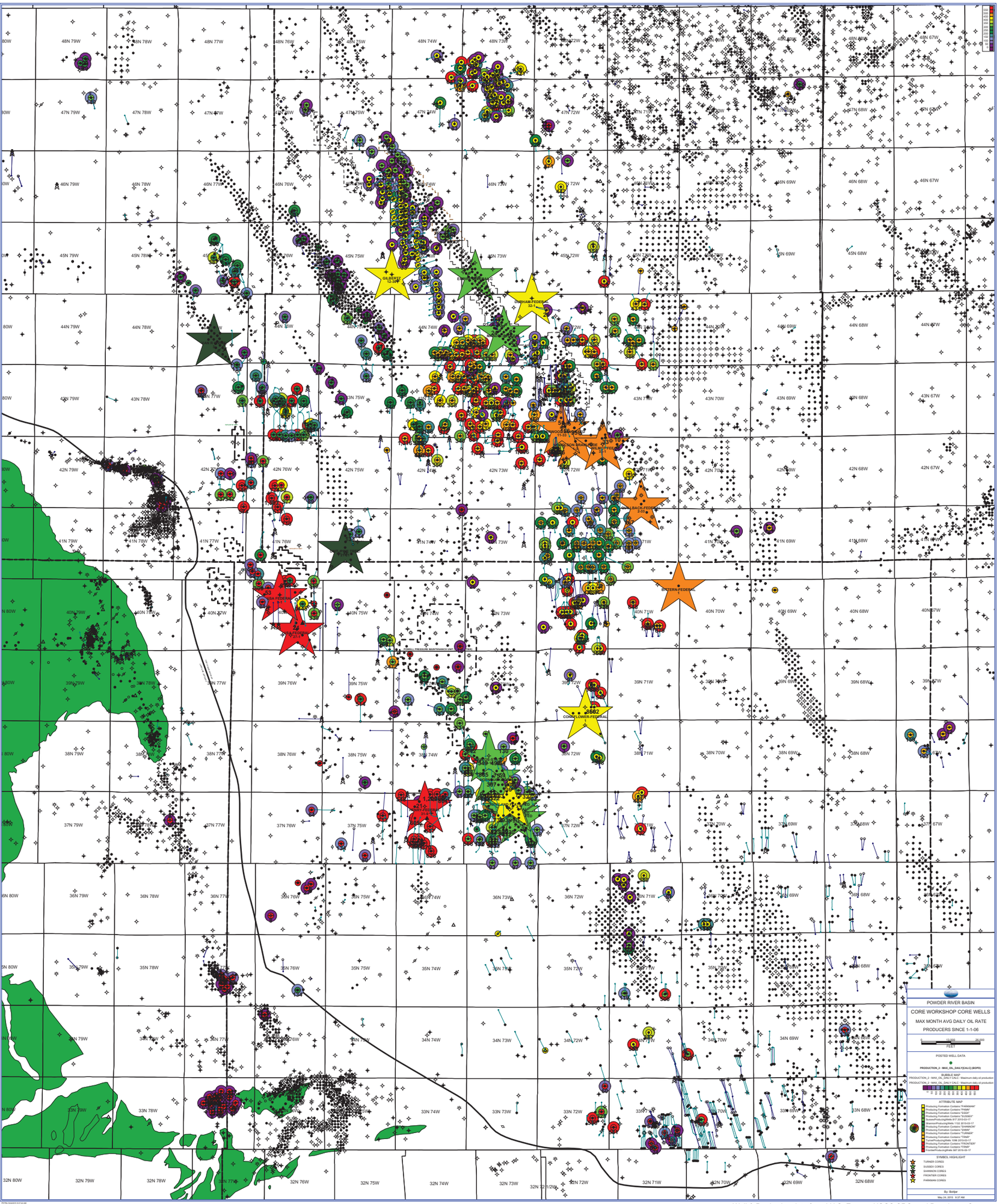
- Regional Turner Bubble Map—Max Month Avg Daily Oil Rate
- Area of Turner Cores Bubble Map-- Max Month Avg Daily Oil Rate
- Regional Bubble Map of Frontier Sandstone, with Location of Cores –Max Month Avg Daily Oil Rate
- Cross-Section of Frontier Sandstone in Three Cored Wells

- Regional Sussex Bubble Map - Max Month Avg Daily Oil Rate
- Sussex Bubble Map, Hornbuckle Area, with Location of Cored Wells - Max Month Avg Daily Oil Rate
- Cross-Section of Sussex-Cored Wells, Hornbuckle Area
- Sussex Bubble Map, House Creek Field, with Location of Cored Wells - Max Month Avg Daily Oil Rate
- Cross-Section of Sussex-Cored Wells, House Creek Field

- Regional Shannon Bubble Map - Max Month Avg Daily Oil Rate
- Shannon Bubble Map with Cored Wells - Max Month Avg Daily Oil Rate
- Cross-Section of Shannon Cored Wells

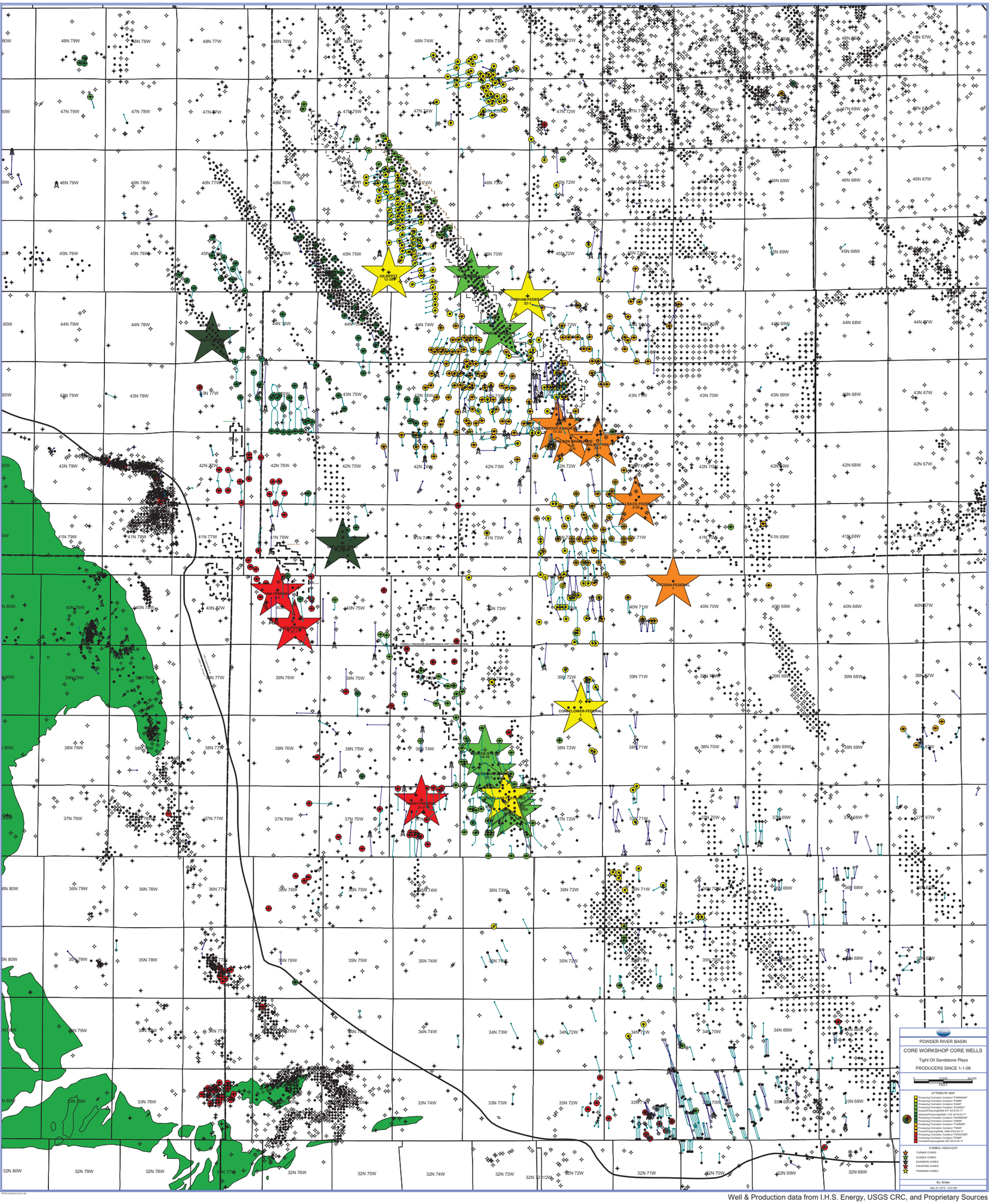
- Regional Parkman Bubble Map— Max Avg Daily Production
- Cross-Section, Parkman sandstone, Converse County, with Core Porosity and Oil Saturations.
- Cross-Section, Parkman Sandstone, Campbell County, with Core Porosity and Oil Saturations
- Correlation Section, Parkman Cored Wells, Converse County
- Correlation Section, Parkman Cored Wells, Campbell County

- Regional Map, Gallup Play, San Juan Basin - Max Avg Daily Production
- Gallup Bubble Map, with Core Locations—Max Avg Daily Production
- Correlation Section of Cored Interval, Gallup Sandstone
- Gallup-Tocito-Niobrara Regional Cross-section, with Gallup Cored Wells



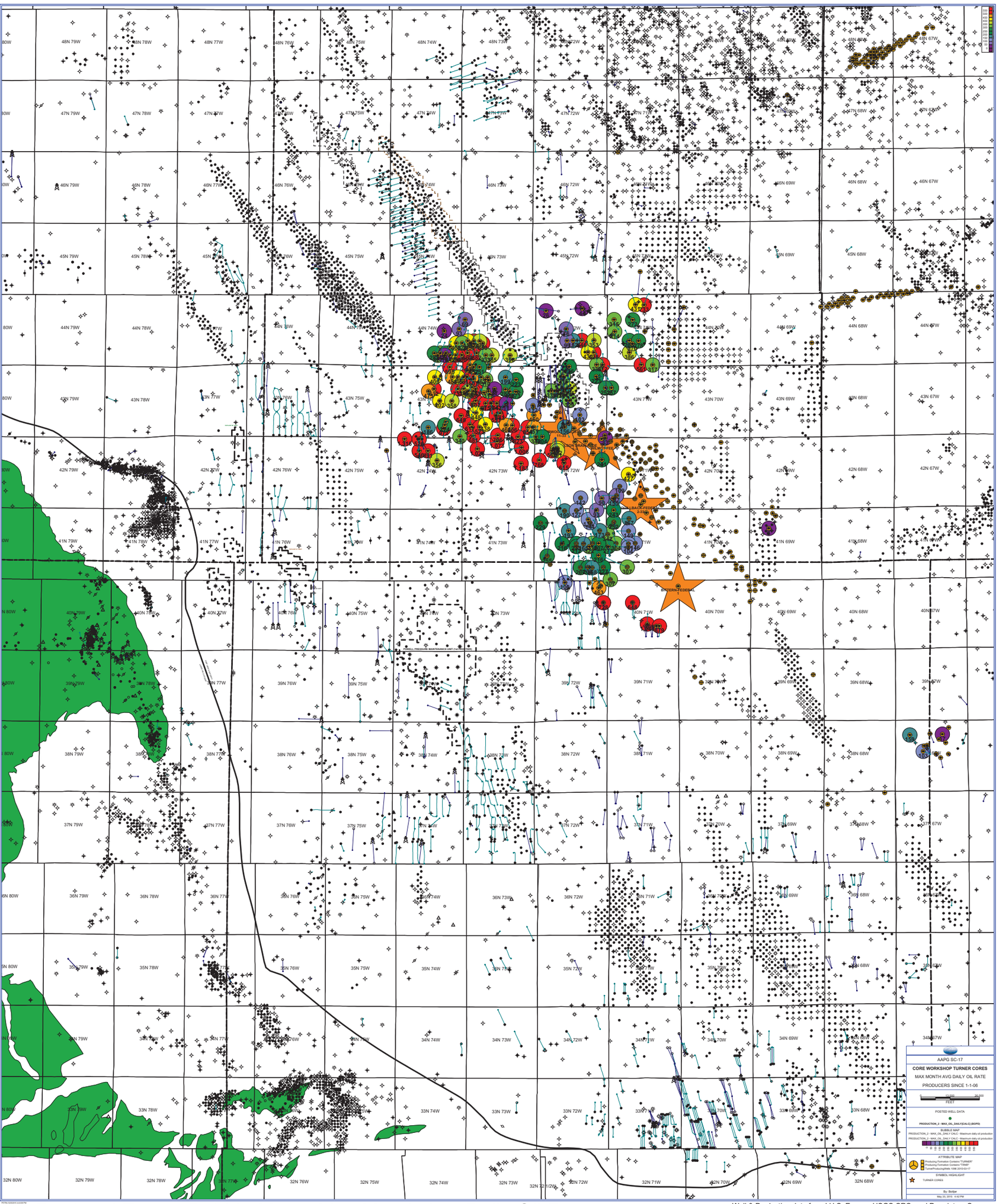
Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Powder River Basin Bubble Map with Core Locations – Max Month Avg Daily Oil Rate



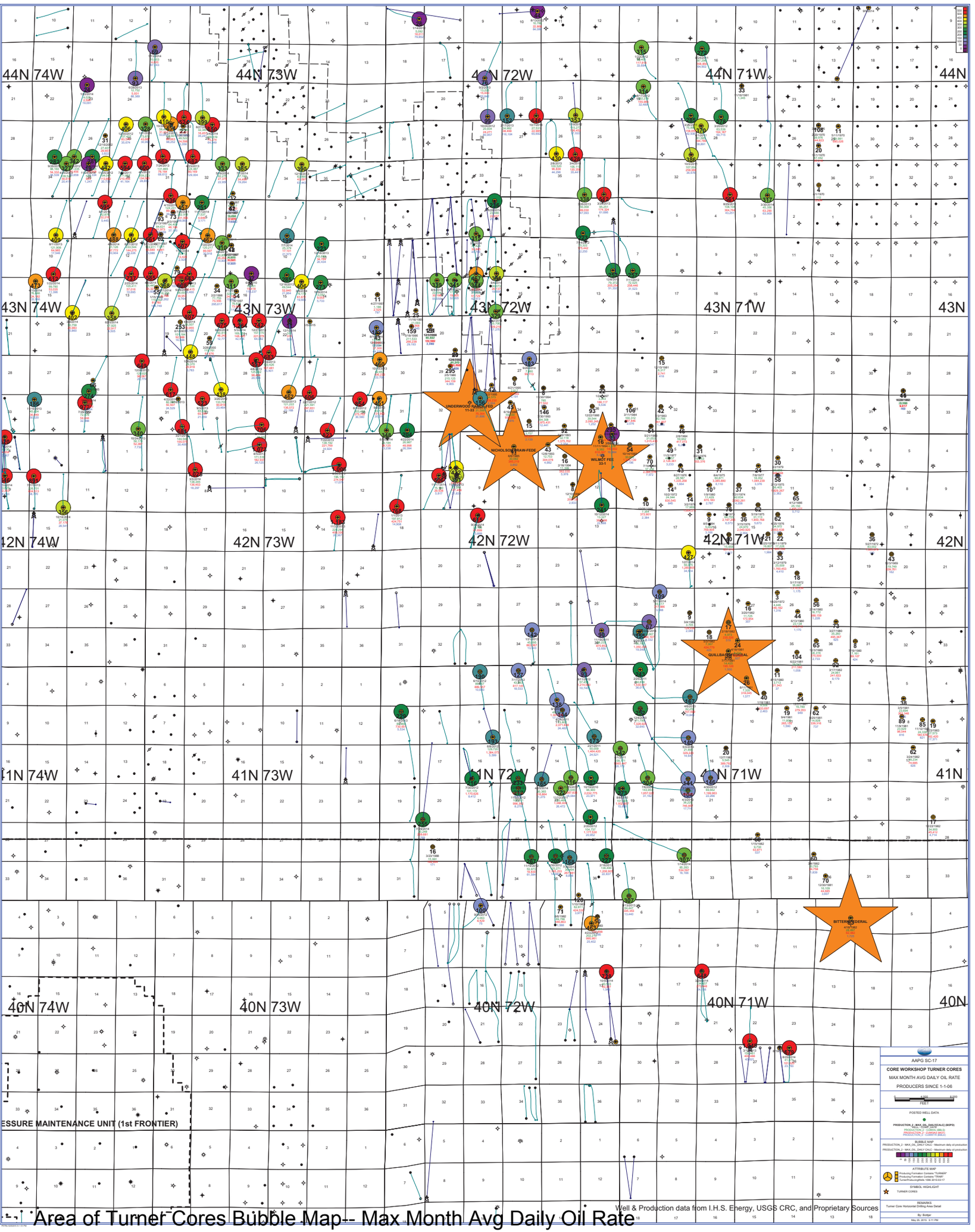
Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Powder River Basin with Core Locations and Tight Oil Sandstone Producers



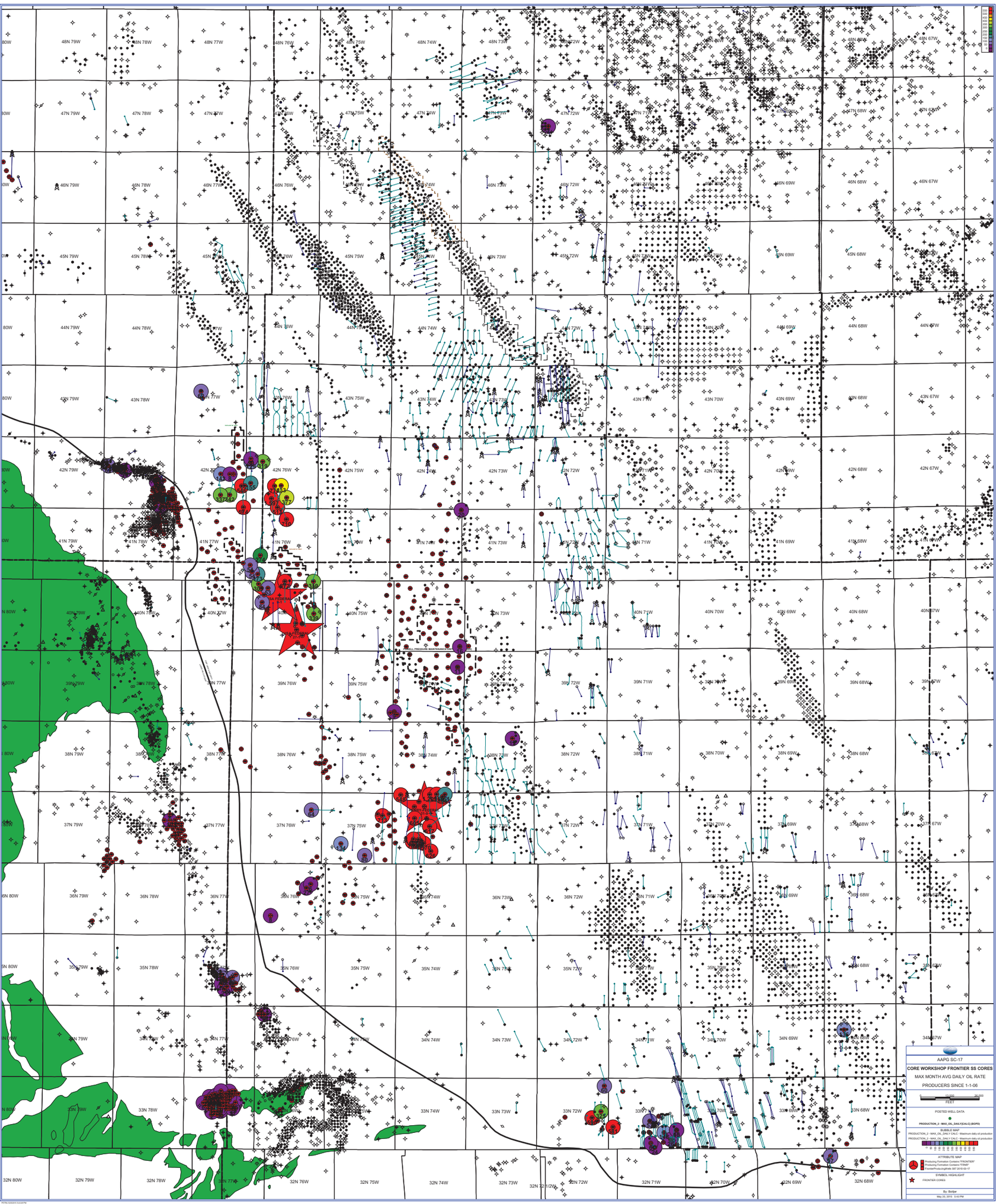
Regional Turner Bubble Map—Max Month Avg Daily Oil Rate

Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources



Area of Turner Cores Bubble Map-- Max Month Avg Daily Oil Rate

Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources



Regional Bubble Map of Frontier Sandstone, with Location of Cores –Max Month Avg Daily Oil Rate

Well & Production data from I.H.S. Energy, USGS OPC, and Proprietary Sources

WILDCAT

WOODS PETROLEUM CORP
USA FEDERAL
9-1
T40N R76W S9
NW SE NW
12/1/1985
49009225720000

<3.25MI>

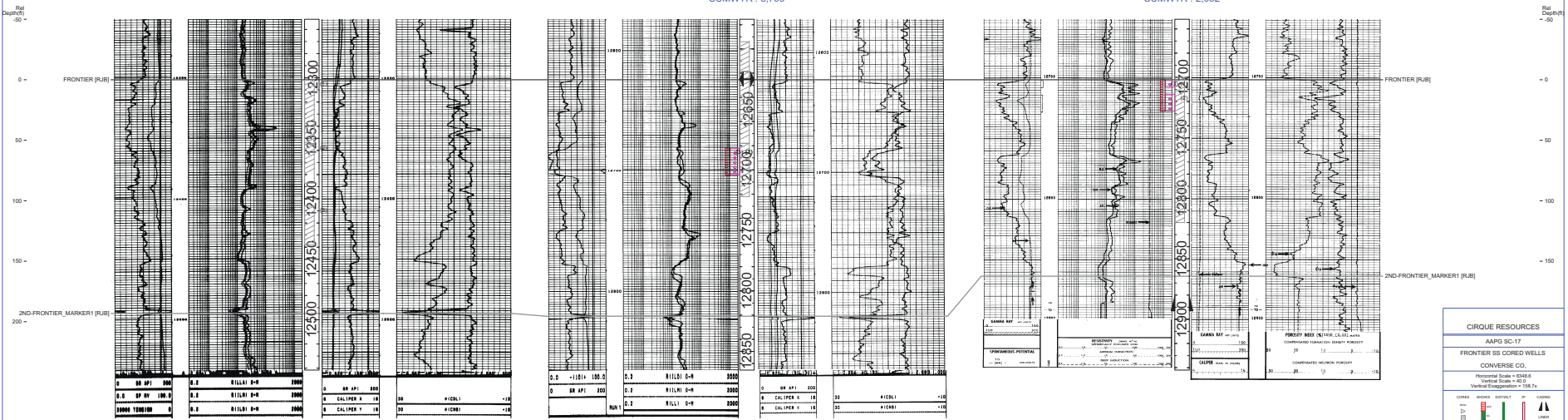
FINLEY DRAW

SM ENERGY COMPANY
WOODS PETROLEUM CORP
USA-FEDERAL
27-1
T40N R76W S27
SE NE
4/24/1984
49009223560000
FRONTIER
CUMOIL : 264,650
CUMGAS : 2,432,650
CUMWTR : 8,759

<18.39MI>

PHILLIPS CREEK

NANCE PETROLEUM CORPORATION
DIAMOND SHMROCK CORP
HENRY-FEDERAL
31-9
T37N R74W S9
E2 NW NE
7/9/1981
49009218420000
FRONTIER
CUMOIL : 206,468
CUMGAS : 685,921
CUMWTR : 2,082



(1) Core: OSTN
(2) Core: FLRN
(3) Core: FLRN

(1) Perf: 04/24/1984
(2) Perf: 04/24/1984
(3) IPF: Test Volumes
572 BPD OIL
1740 MCFD GAS
0 WATER

(1) Perf: 07/09/1981
(2) Perf: 07/09/1981
(3) IPF: Test Volumes
549 BPD OIL
944 MCFD GAS
0 WATER

CIRQUE RESOURCES

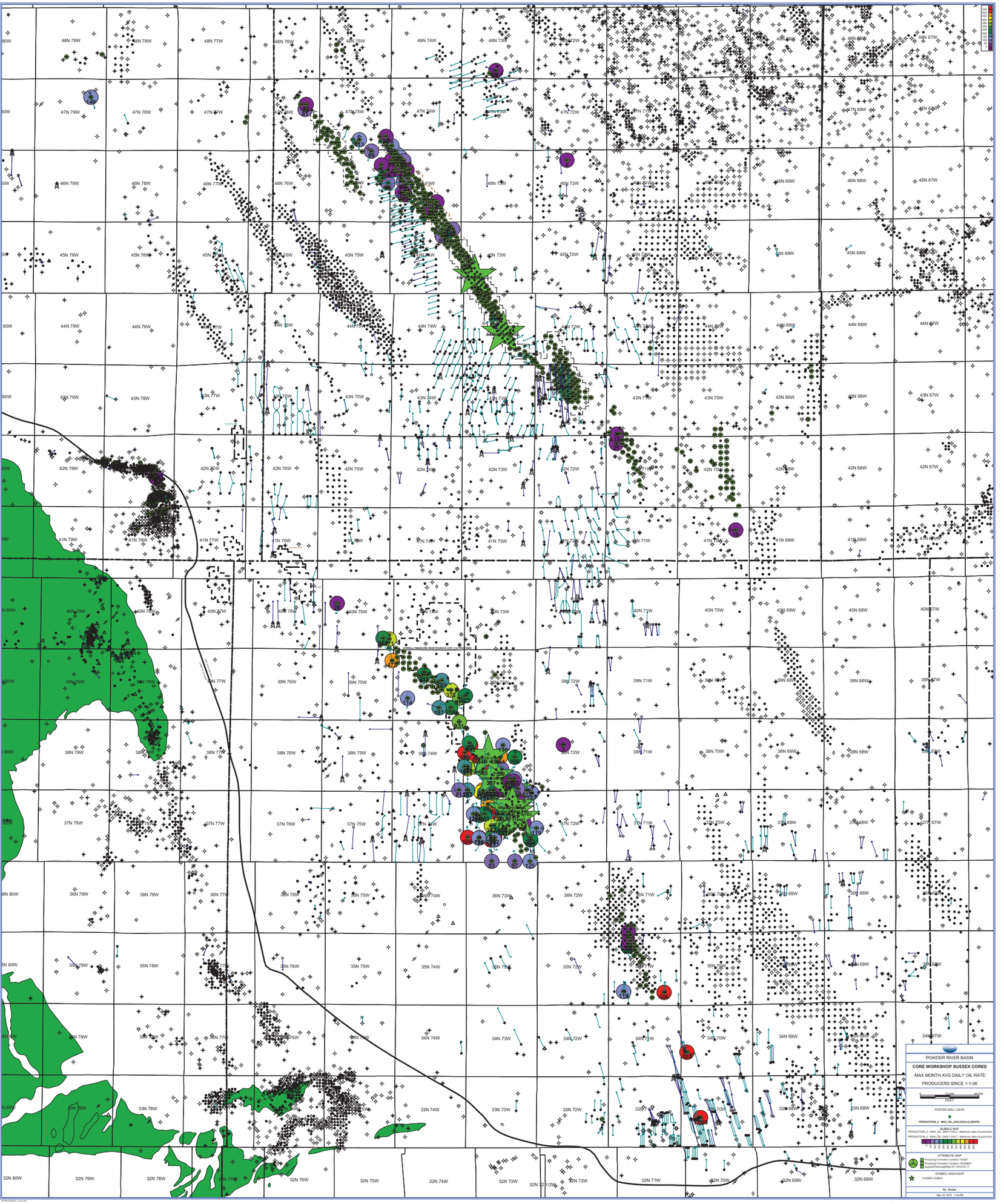
AAPG SC-17

FRONTIER SS CORED WELLS

CONVERSE CO,

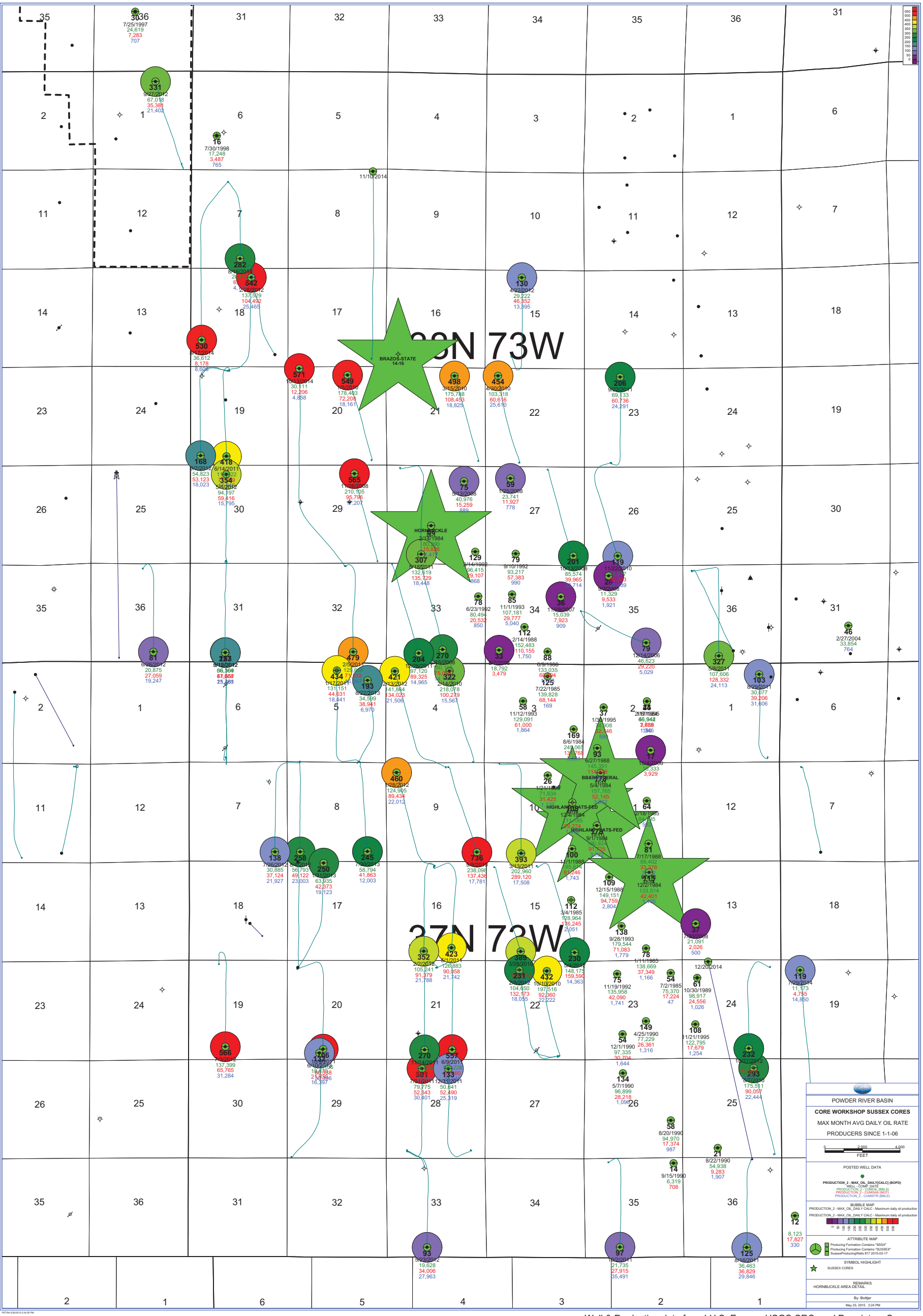
Horizontal Scale = 6348.6
Vertical Scale = 40.0
Vertical Exaggeration = 158.7x

Cross-Section of Frontier Sandstone in Three Cored Wells



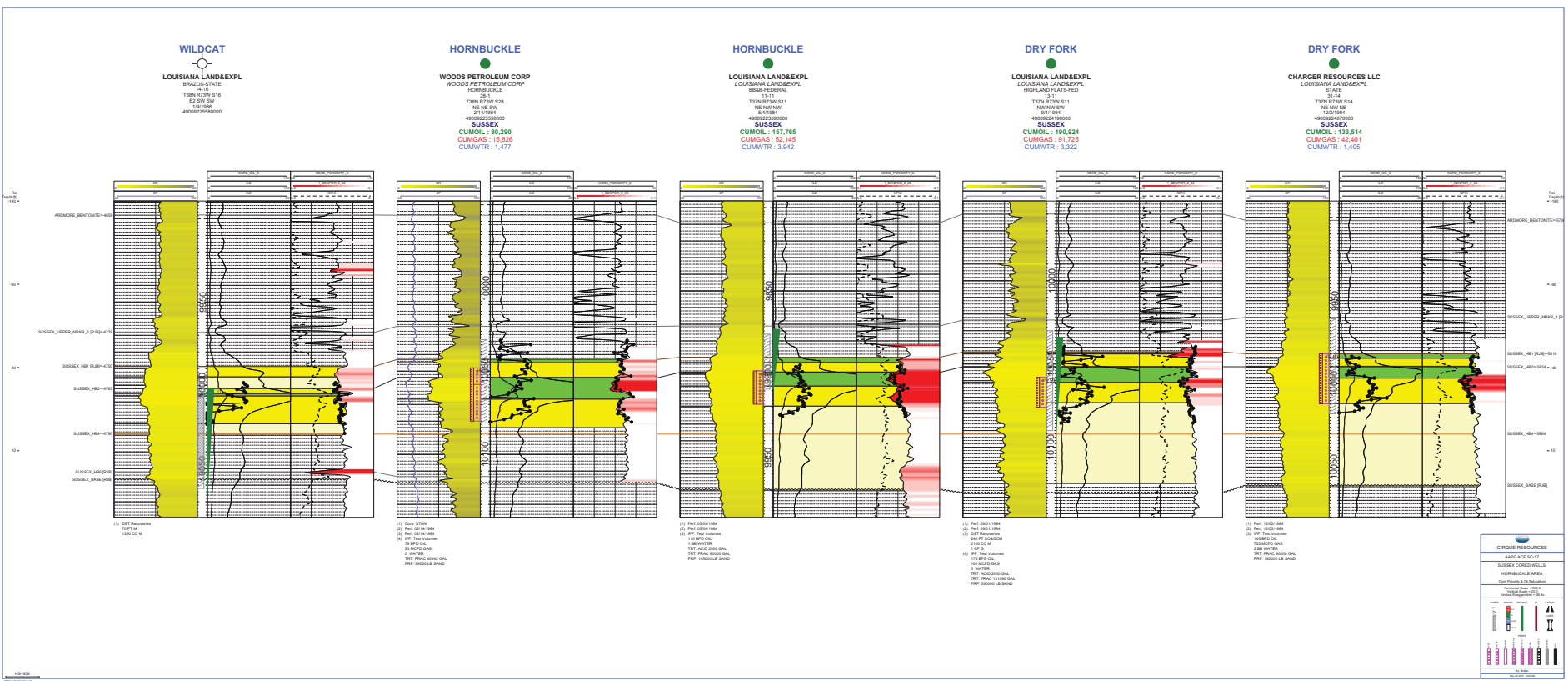
Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Regional Sussex Bubble Map - Max Month Avg Daily Oil Rate

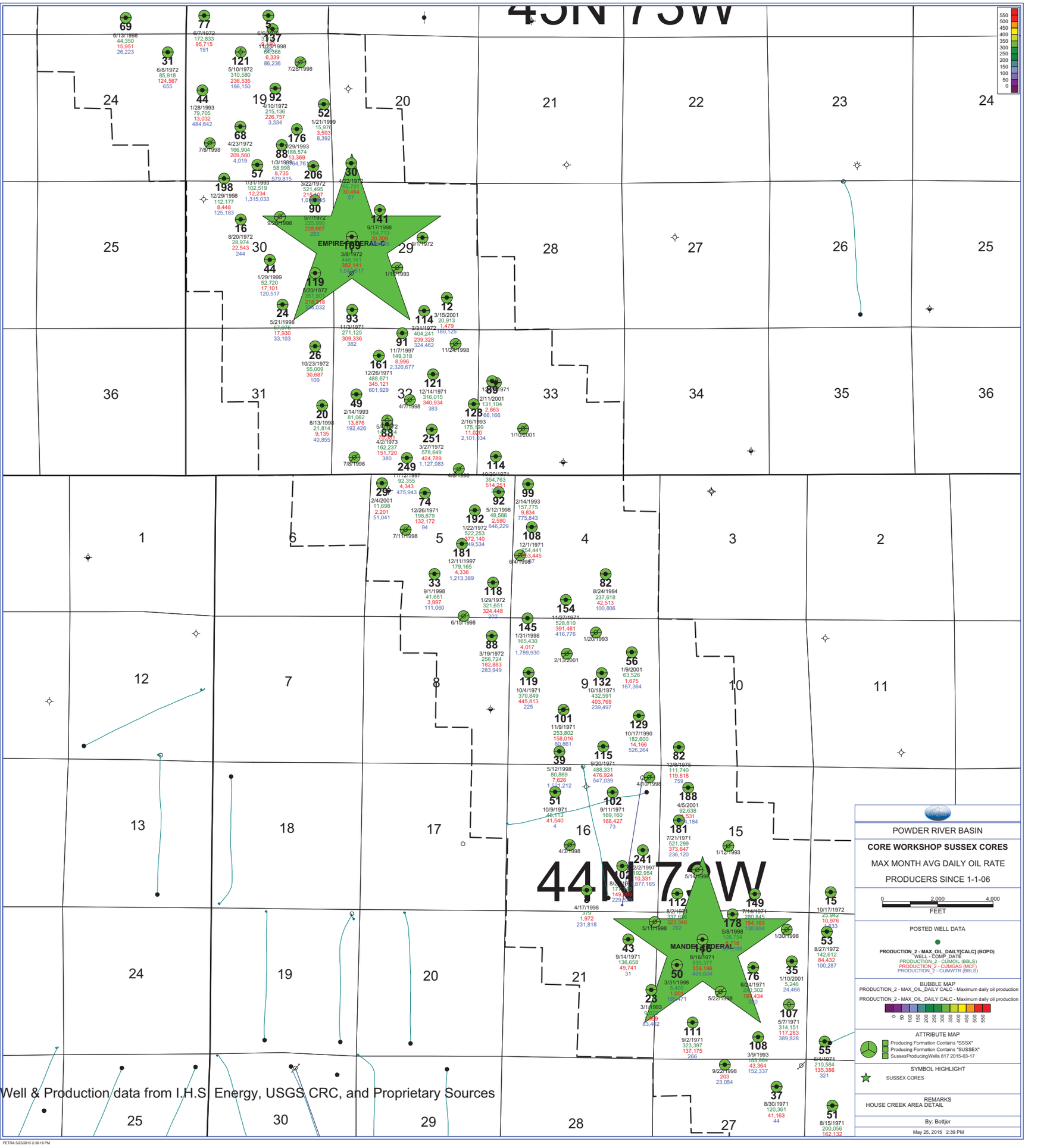


Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Sussex Bubble Map, Hornbuckle Area, with Location of Cored Wells - Max Month Avg Daily Oil Rate



Cross-Section of Sussex-Cored Wells, Hornbuckle Area



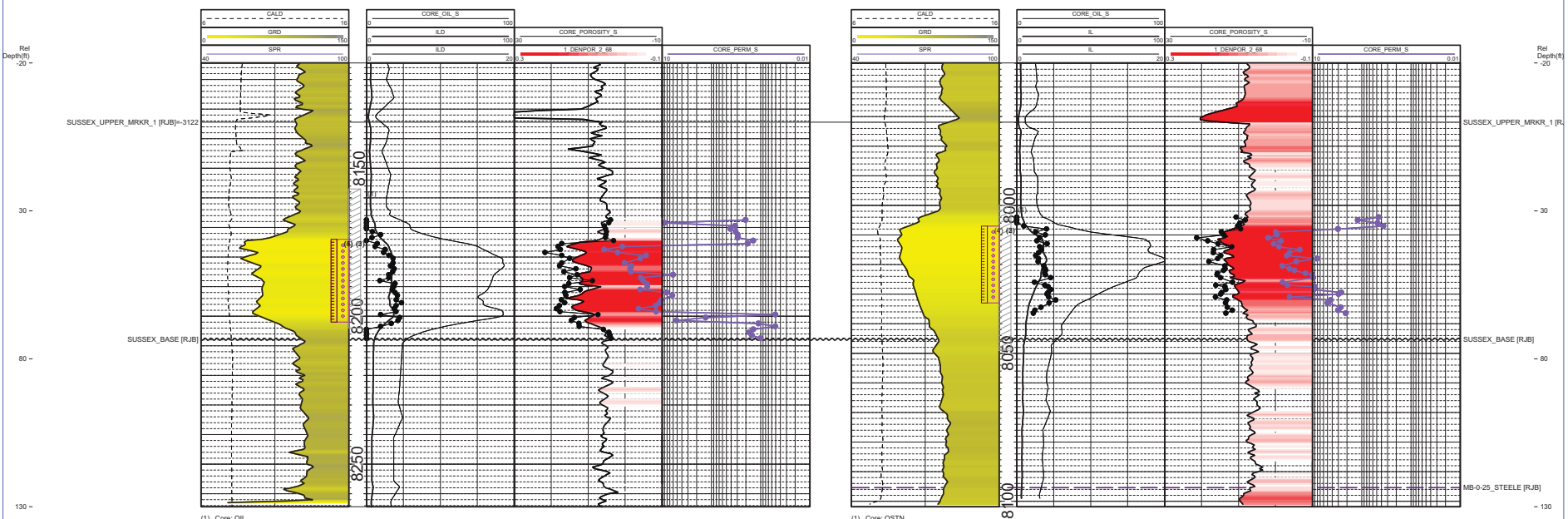
Sussex Bubble Map, House Creek Field, with Location of Cored Wells - Max Month Avg Daily Oil Rate

HOUSE CREEK

DEVON ENERGY PRODUCTION COMPANY L P
WOODS PETROLEUM CORP
MANDEL-FEDERAL
1
T44N R73W S22
SW NE NW
8/16/1971
49005227590000
SUSSEX
CUMOIL : 530,377
CUMGAS : 359,196
CUMWTR : 498,604

HOUSE CREEK

DEVON ENERGY PRODUCTION COMPANY L P
WOODS PETROLEUM CORP
EMPIRE FEDERAL-C
1
T45N R73W S29
SW NW
3/8/1972
49005229300000
SUSSEX
CUMOIL : 448,161
CUMGAS : 382,141
CUMWTR : 1,542,617



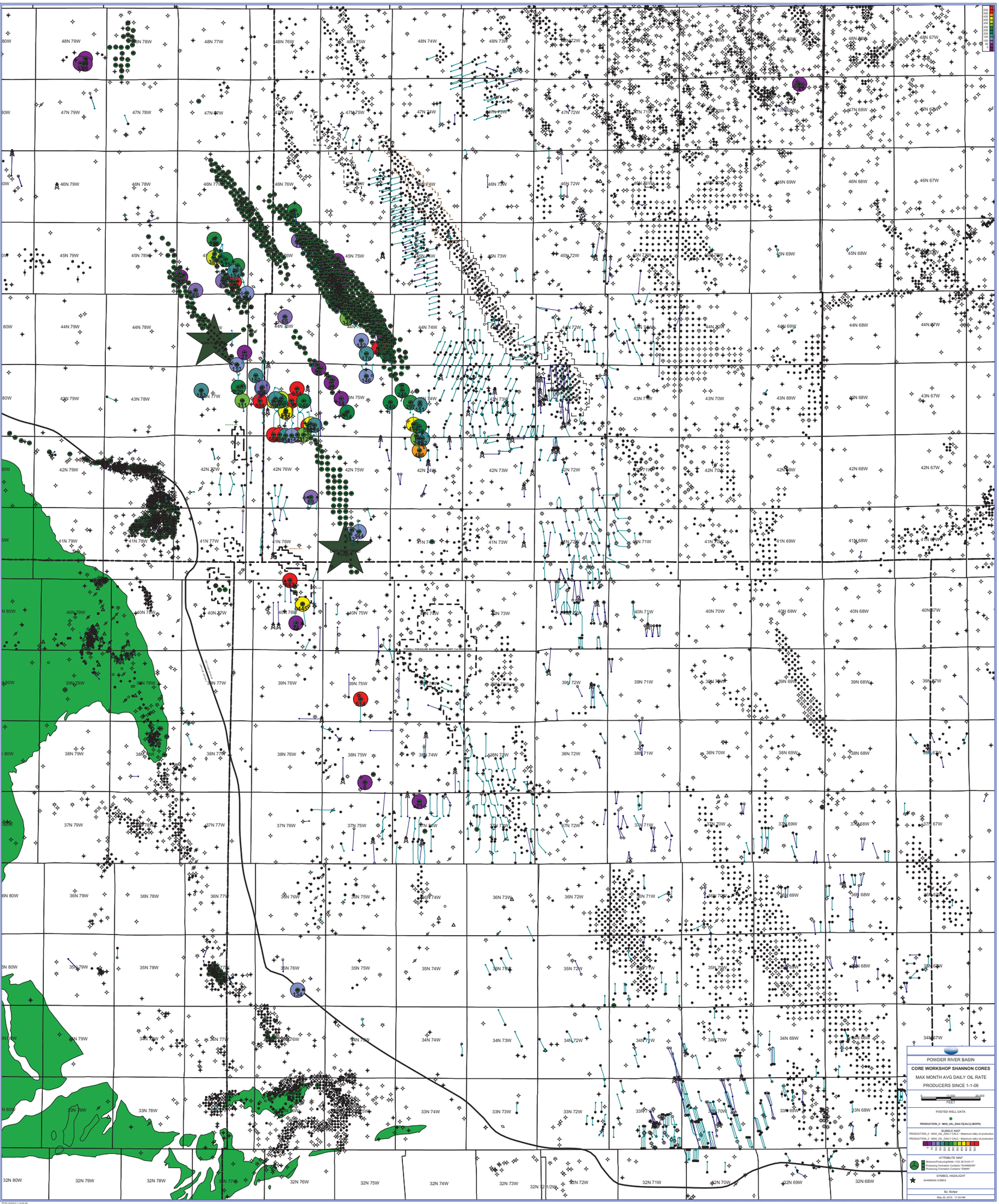
(1) Core: OIL
(2) Perf: 08/16/1971
(3) Perf: 08/16/1971
(4) IPF: Test Volumes
327 BBL OIL
0 WATER
TRT: FRAC 0
PRP: 0 SAND
(5) PDS: Test Volumes
30 BBL OIL
20 BB WATER
TRT: FRAC 30000 GAL
PRP: 15000 LB SAND

(1) Core: OSTN
(2) Perf: 03/08/1972
(3) Perf: 03/08/1972
(4) IPF: Test Volumes
389 BPD OIL
0 WATER
TRT: FRAC 1420 BBL
PRP: 30180 LB SAND BkDn: 2300

CIRQUE RESOURCES
AAPG ACE SC-17
SUSSEX CORED WELLS
HOUSE CREEK FIELD
Core Porosity & Oil Saturations
Horizontal Scale = 22724.4
Vertical Scale = 20.0
Vertical Exaggeration = 1136.2x

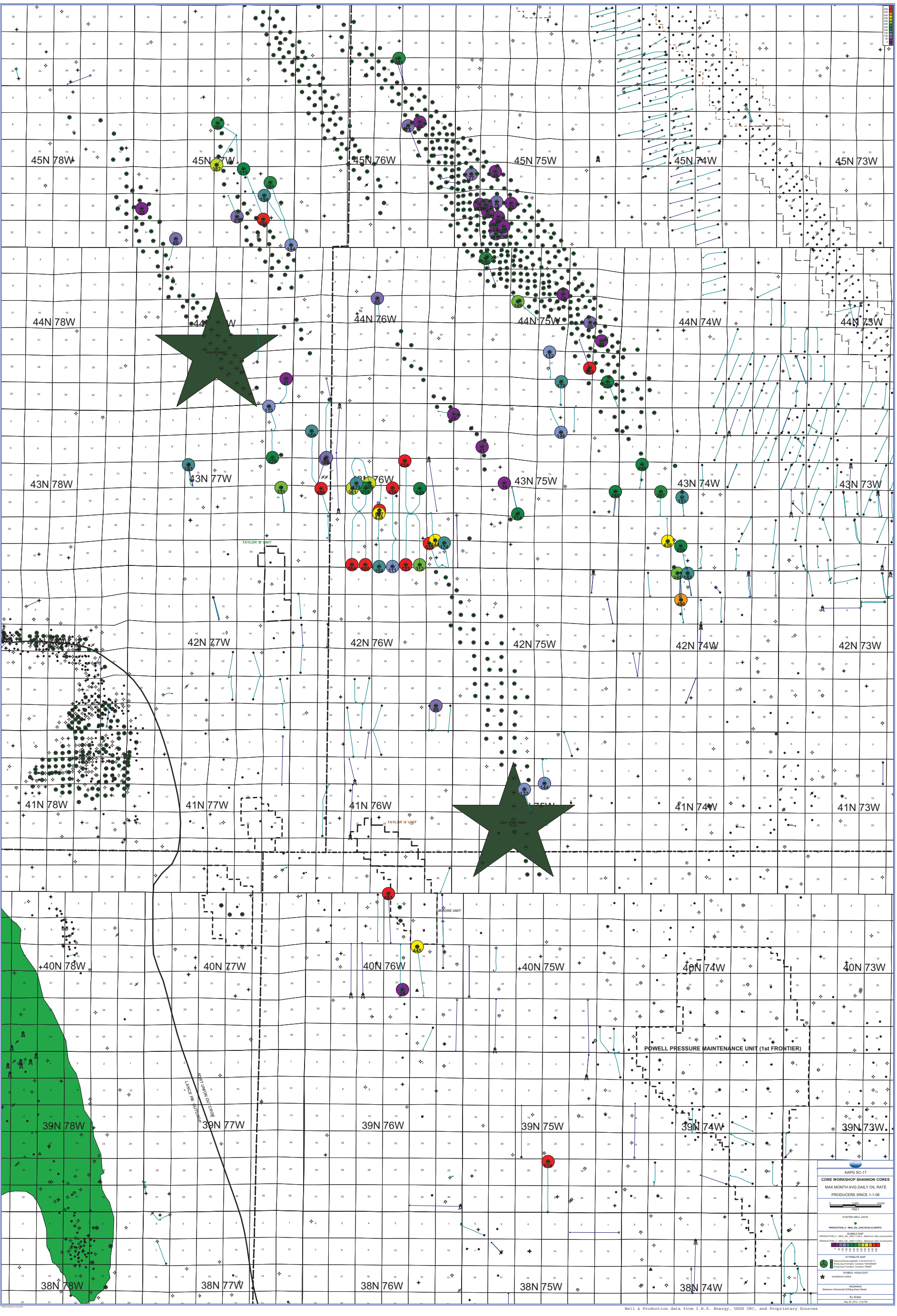
HS=22724

Cross-Section of Sussex-Cored Wells, House Creek Field



Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Regional Shannon Bubble Map - Max Month Avg Daily Oil Rate



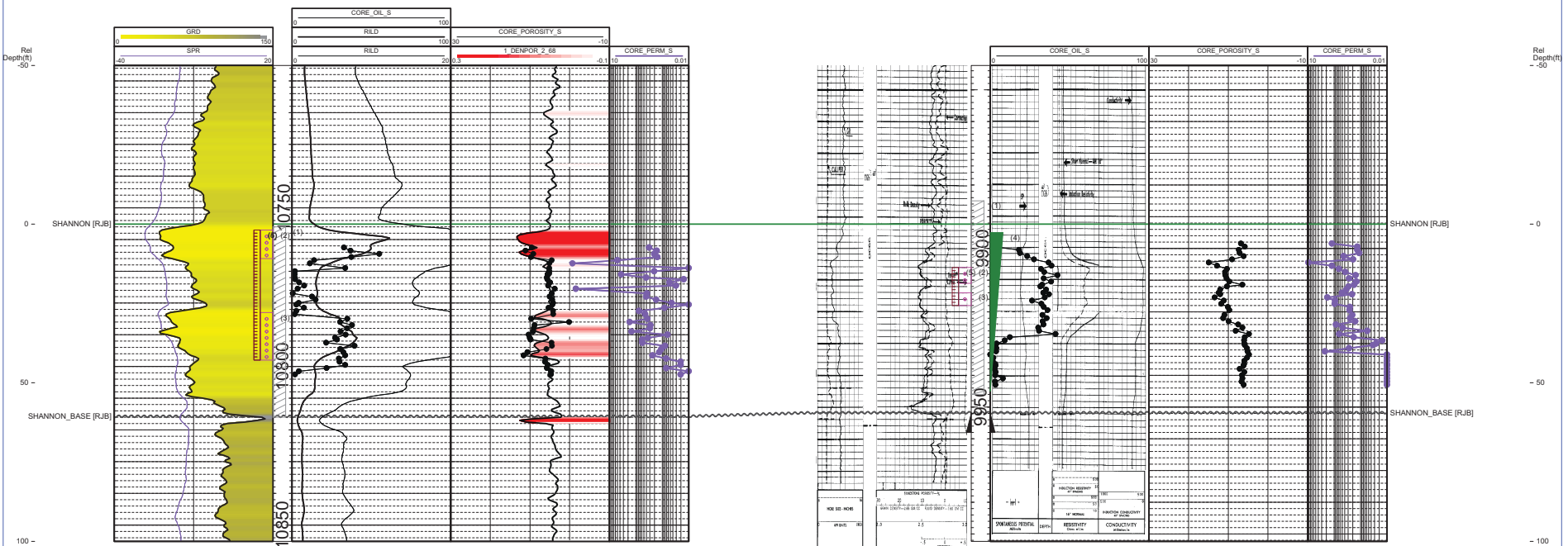
Shannon Bubble Map with Cored Wells - Max Month Avg Daily Oil Rate

PINE TREE

DEVON ENERGY PRODUCTION COMPANY L P
WOODS PETROLEUM CORP
UNIT /PINE TREE/
21-21
T41N R75W S21
SE NW NW
11/26/1980
49005256370000
SHANNON/BENTONITE/
CUMOIL : 100,296
CUMGAS : 127,602
CUMWTR : 2,792

HOLLER DRAW

WHITING PETROLEUM CORPORATION
SOUTHLAND ROYALTY CO
VAN R IRVINE
3
T44N R77W S22
SW SW
12/10/1976
49019203140000
SHANNON/BENTONITE/
CUMOIL : 57,504
CUMGAS : 66,008
CUMWTR : 912



(1) Core: * 4.0TSS,LTGY FG
* 1.0TSS,LTGY FG SH/LAM CALC
* 1.0TSS,LTGY FG SH/LAM SL/CALC, HF
* 7.0TSS,LTGY FG SH/LAM, HF
* 1.0TSS,LTGY FG SH/LAM CALC
* 7.0TSS,LTGY FG SH/LAM
* 2.0TSS,LTGY FG SH/LAM CHT
* 8.0TSS,LTGY FG SH/LAM
* 2.0TSS,LTGY FG
* 6.0TSS,LTGY FG SH/LAM
* 21.0TSH,NO ANALYSIS
(2) Perf: 11/26/1980
(3) Perf: 11/26/1980
(4) IPF: Test Volumes
105 BPD OIL
147 MCFD GAS
0 WATER
TRT: ACID 1500 GAL
TRT: FRAC 50000 GAL
PRP: 100000 LB SAND
(5) PDF: Test Volumes
118 BBL OIL
0 WATER
TRT: FRAC 873 BBL
TRT: FRAC 500 BBL
PRP: 100000 LB SAND

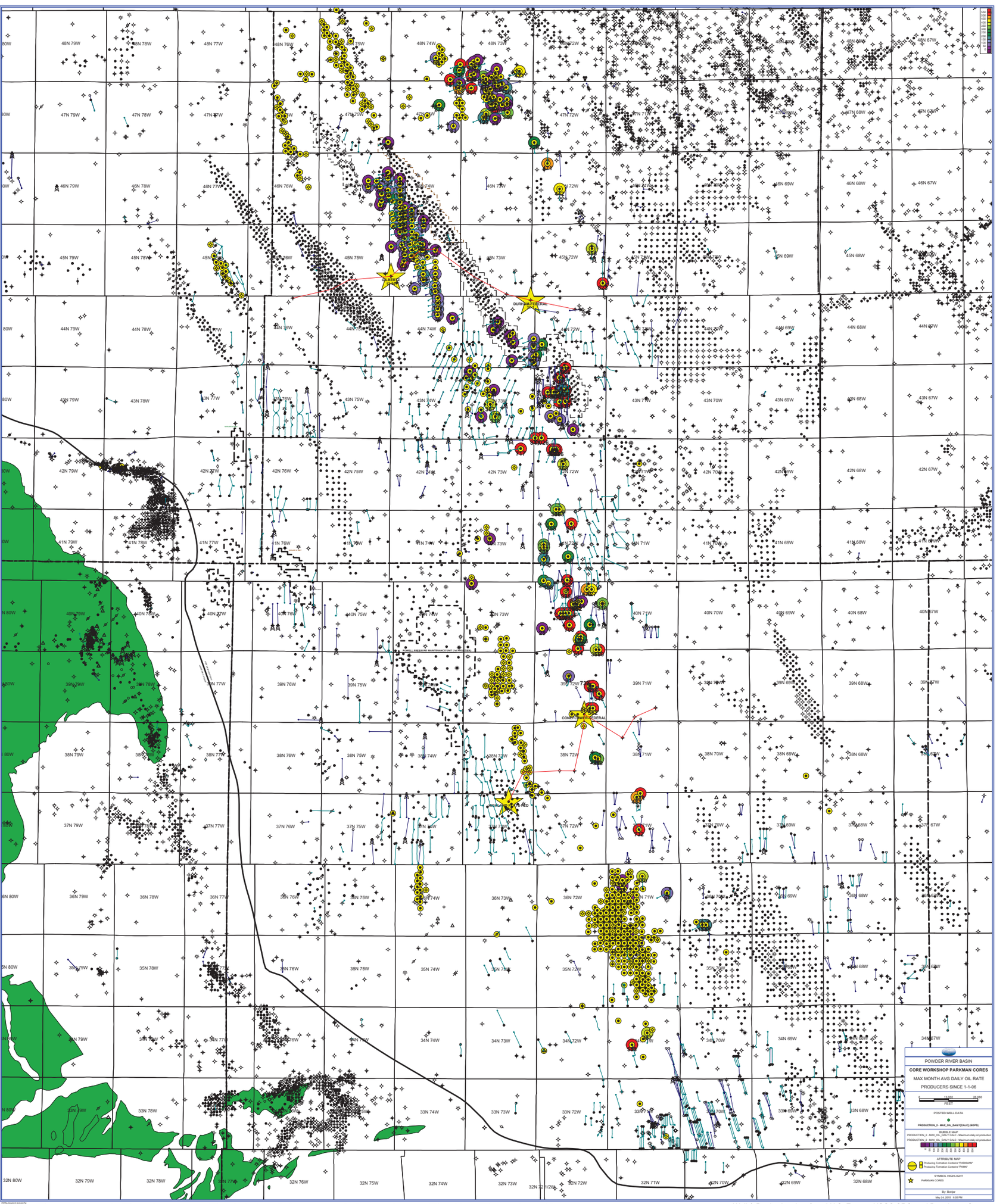
(1) Core: 10 SH 45 SB GRY VF-FG SHLY STRKS SLI CALC
(2) Perf: 12/10/1976
(3) Perf: 12/10/1976
(4) DST Recoveries
180 FT O
93 FT HO&GCM
93 FT SO&GCM
280 FT VSO&GCM
(5) IPF: Test Volumes
143 BPD OIL
96 MCFD GAS
0 WATER
TRT: FRAC 73510 GAL
PRP: 90000 LB SAND

HS=10314

AAPG ACE SC-17
TIGHT OIL SANDSTONES
SHANNON CORED WELLS
Pine Tree & Holler Draw Fields
Core Porosity & Oil Saturations
Horizontal Scale = 10314.2
Vertical Scale = 20.0
Vertical Exaggeration = 515.7x
CORES SHOWS DST/WLT IP CASING
PERFS
By: Bottjer
May 25,2015 3:30 PM

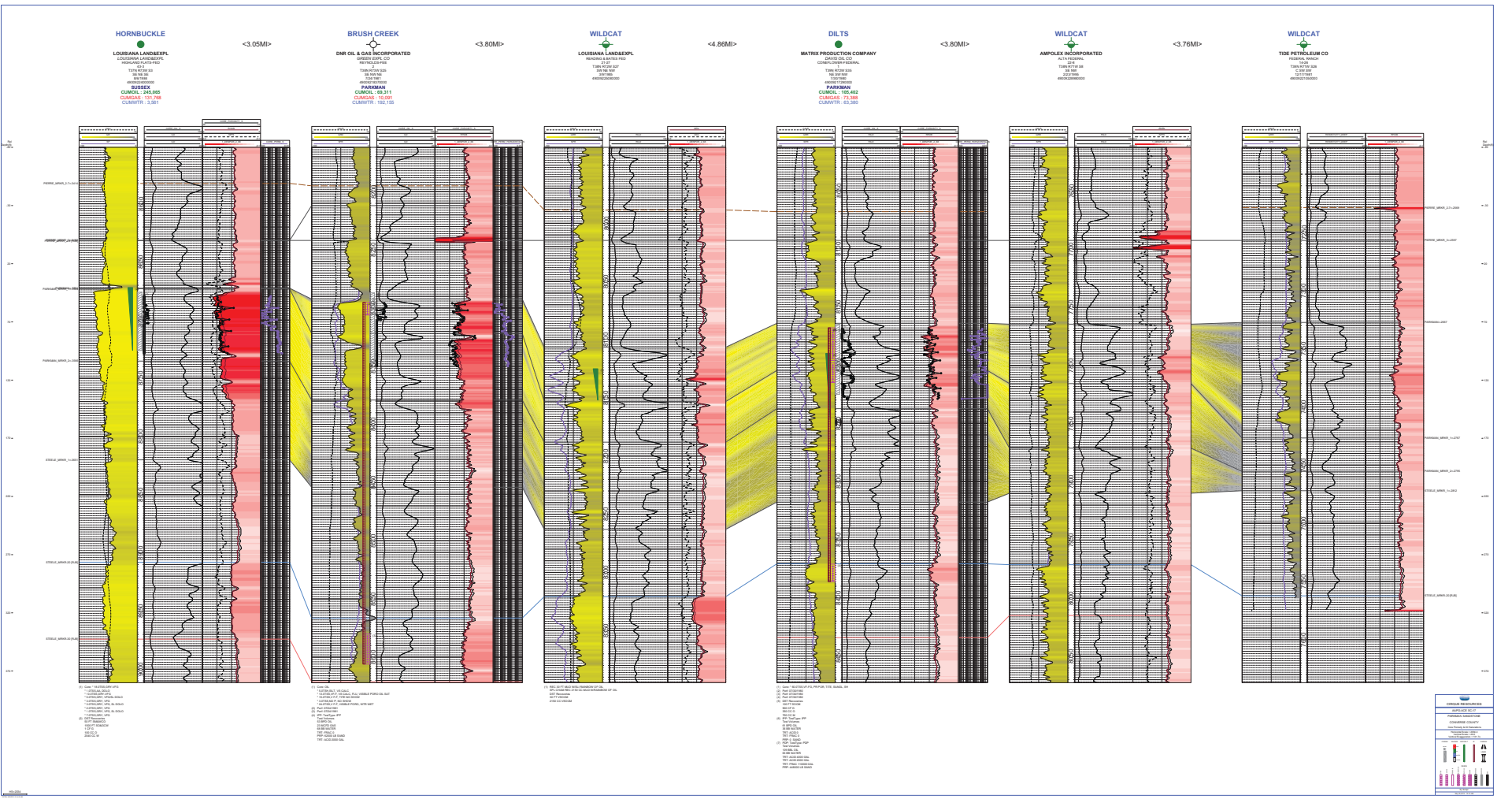
PETRA 5/25/2015 3:30:32 PM (AAPG SC17 SHANNON 299wl0excl GR-RES-PHI-shaded-COREPHI-SO_S-SP SINDETAIL XSECT-DIG-Raster 2015-05-25.CSP)

Cross-Section of Shannon Cored Wells

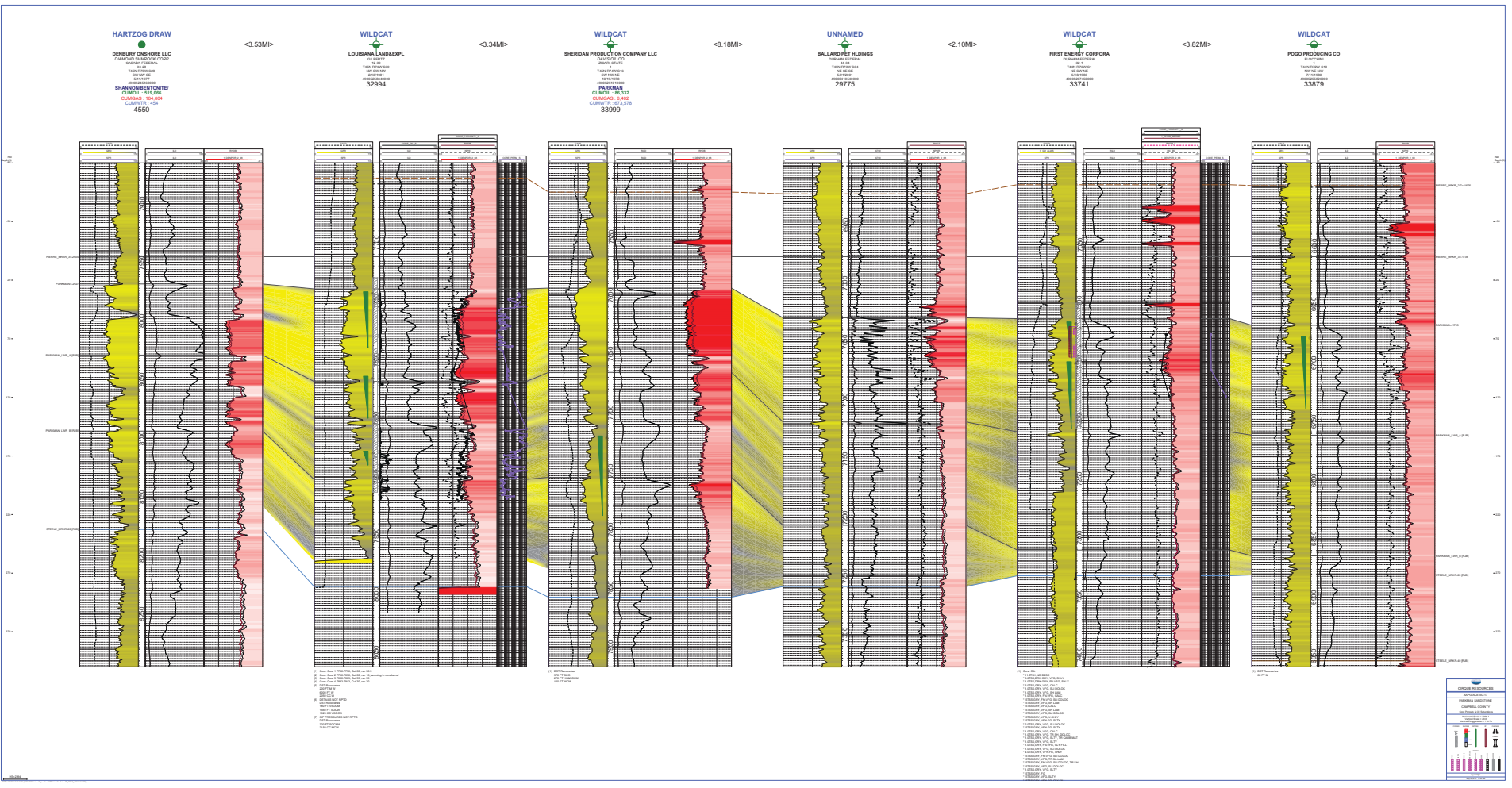


Regional Parkman Bubble Map— Max Avg Daily Production

Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources



Cross-Section, Parkman sandstone, Converse County, with Core Porosity and Oil Saturations



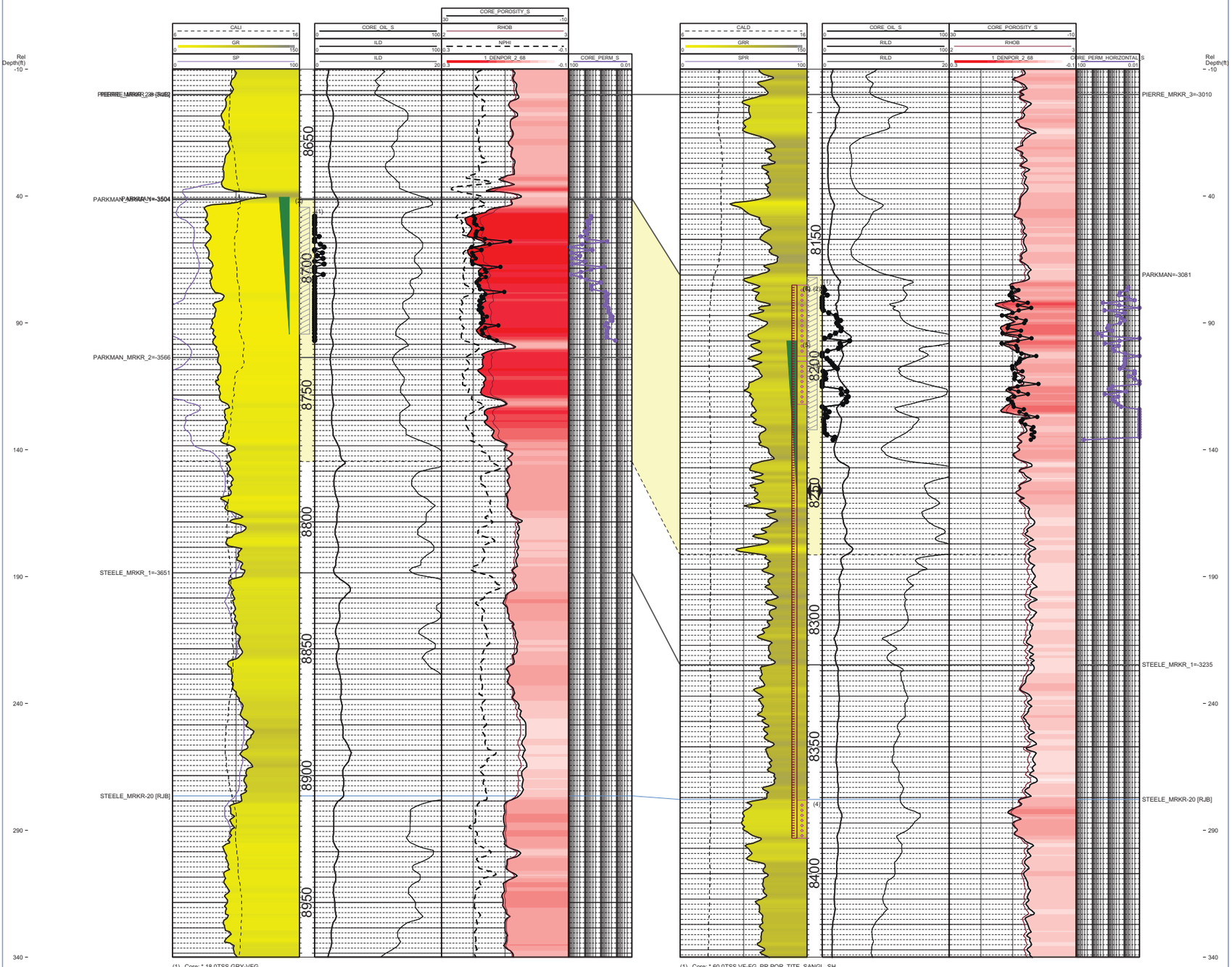
Cross-Section, Parkman Sandstone, Campbell County, with Core Porosity and Oil Saturations

HORNBUCKLE

LOUISIANA LAND&EXPL
LOUISIANA LAND&EXPL
HIGHLAND FLATS-FED
43-3
T37N R73W S3
SE NE SE
8/6/1984
49009224000000
SUSSEX
CUMOIL : 245,065
CUMGAS : 131,768
CUMWTR : 3,561
36717

DILTS

MATRIX PRODUCTION COMPANY
DAVIS OIL CO
CONEFLOWER-FEDERAL
1
T39N R72W S35
NE SW NW
7/30/1980
49009217290000
PARKMAN
CUMOIL : 105,402
CUMGAS : 73,388
CUMWTR : 63,380
36007



(1) Core: * 18.0TSS,GRY-VFG
* 1.0TSS,AA, DOLO
* 10.0TSS,GRY-VFG
* 5.0TSS,GRY, VFG/SL DOLO
* 3.0TSS,GRY, VFG
* 3.0TSS,GRY, VFG, SL DOLO
* 2.0TSS,GRY, VFG
* 1.0TSS,GRY, VFG, SL DOLO
* 7.0TSS,GRY, VFG

(2) DST Recoveries
50 FT SM&WCO
1500 FT SO&GCW
1 CF G
100 CC O
2040 CC W

(1) Core: * 60.0TSS,VF-FG, PR POR, TITE, SANGL, SH
(2) Perf: 07/30/1980
(3) Perf: 07/30/1980
(4) Perf: 07/30/1980
(5) DST Recoveries
100 FT SOCM
900 CF G
350 CC O
750 CC M
(6) IPP: Test Volumes
61 BPD OIL
36 BB WATER
TRT: ACID 0
TRT: FRAC 0
PRP: 0 SAND
(7) PDP: Test Volumes
109 BBL OIL
63 BB WATER
TRT: ACID 4000 GAL
TRT: ACID 2000 GAL
TRT: FRAC 110000 GAL
PRP: 448000 LB SAND

CIRQUE RESOURCES

AAPG ACE SC-17

PARKMAN CORED WELLS

CONVERSE COUNTY

Core Porosity & Oil Saturations

Horizontal Scale = 5150.2
Vertical Scale = 20.0
Vertical Exaggeration = 257.5x

CORES SHOWS DST/WLT IP CASING LINER PERFS

By: Bottjer
May 24,2015 5:15 PM

HS=5150

PETRA 5/24/2015 5:15:20 PM (AAPG SC17 Parkman\Maps\[CORED ConverseCo\Rockyweb\b_DMOG_ 2015-05-24.DWL

Correlation Section, Parkman Cored Wells, Converse County

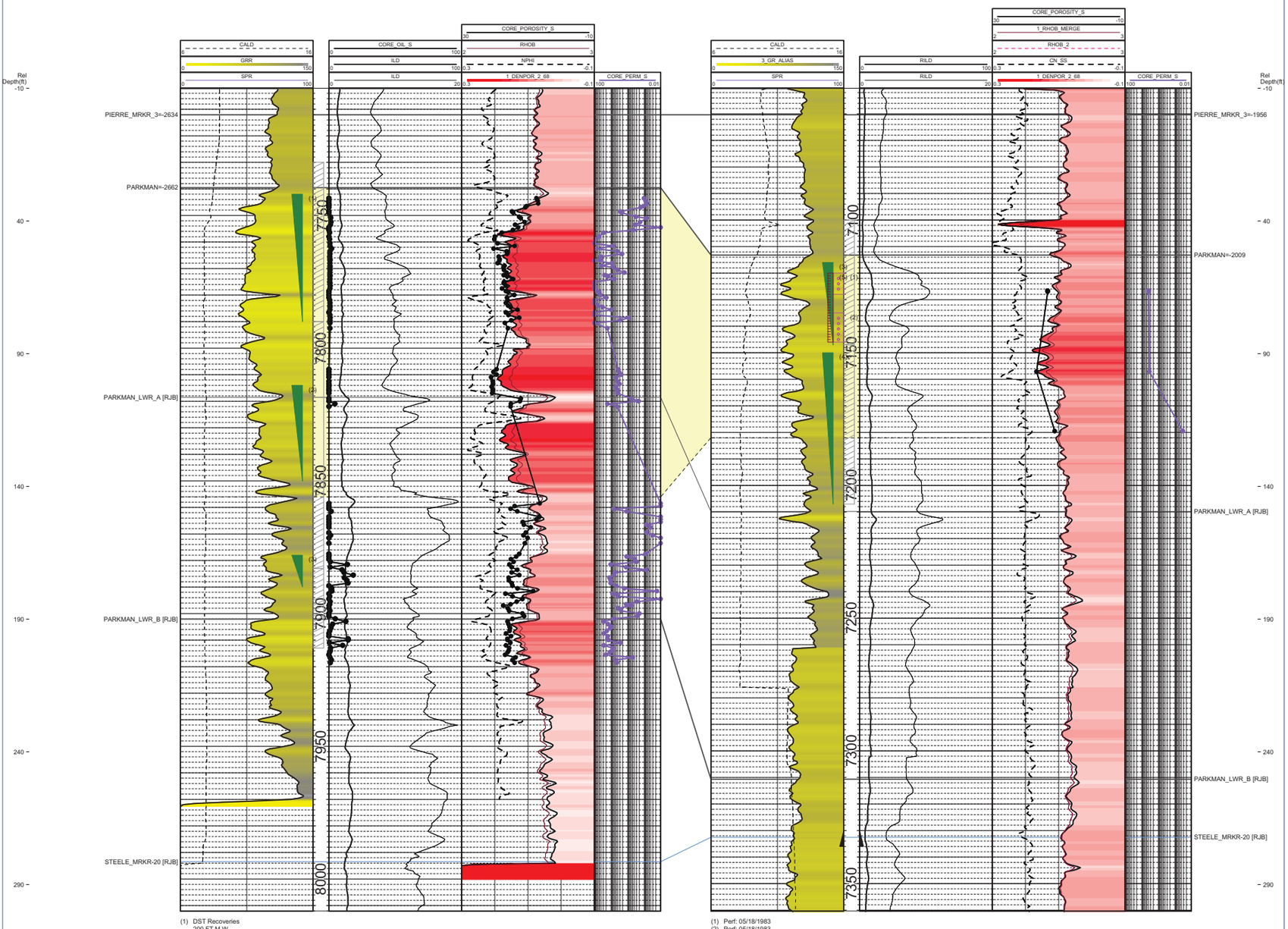
WILDCAT

LOUISIANA LAND&EXPL
GILBERTZ
12-30
T45N R74W S30
NW SW NW
2/13/1981
49005258340000
32994

<11.96MI>

WILDCAT

FIRST ENERGY CORPORA
DURHAM-FEDERAL
32-1
T44N R73W S1
NE SW NE
5/18/1983
49005267450000
33741



(1) DST Recoveries
200 FT M W
6000 FT W
2050 CC W
(2) DETAILS NOT RPTD
DST Recoveries
180 FT VSOCM
1560 FT SOCW
1925 CC VSOCW
(3) SIP PRESSURES NOT RPTD
DST Recoveries
320 FT SOCMW
2150 CC MCW

(1) Perf: 05/18/1983
(2) Perf: 05/18/1983
(3) SPL CHMB 0.6 CFT GAS.
DST Recoveries
31 FT HO&GCM
245 FT SO&GCW
660 FT G
1600 FT W
1 CF G
150 CC O
(4) DST Recoveries
100 FT MCW
1950 CC MCW
(5) PDU: Test Volumes
0 WATER
TRT: FRAC 24864 GAL
PRP: 27250 LB SAND

CIRQUE RESOURCES

AAPG-ACE SC-17

PARKMAN CORED WELLS

CAMPBELL COUNTY

Core Porosity & Oil Saturations

Horizontal Scale = 24918.9
Vertical Scale = 20.0
Vertical Exaggeration = 1245.9x

CORES SHOWS DST/WLT IP CASING

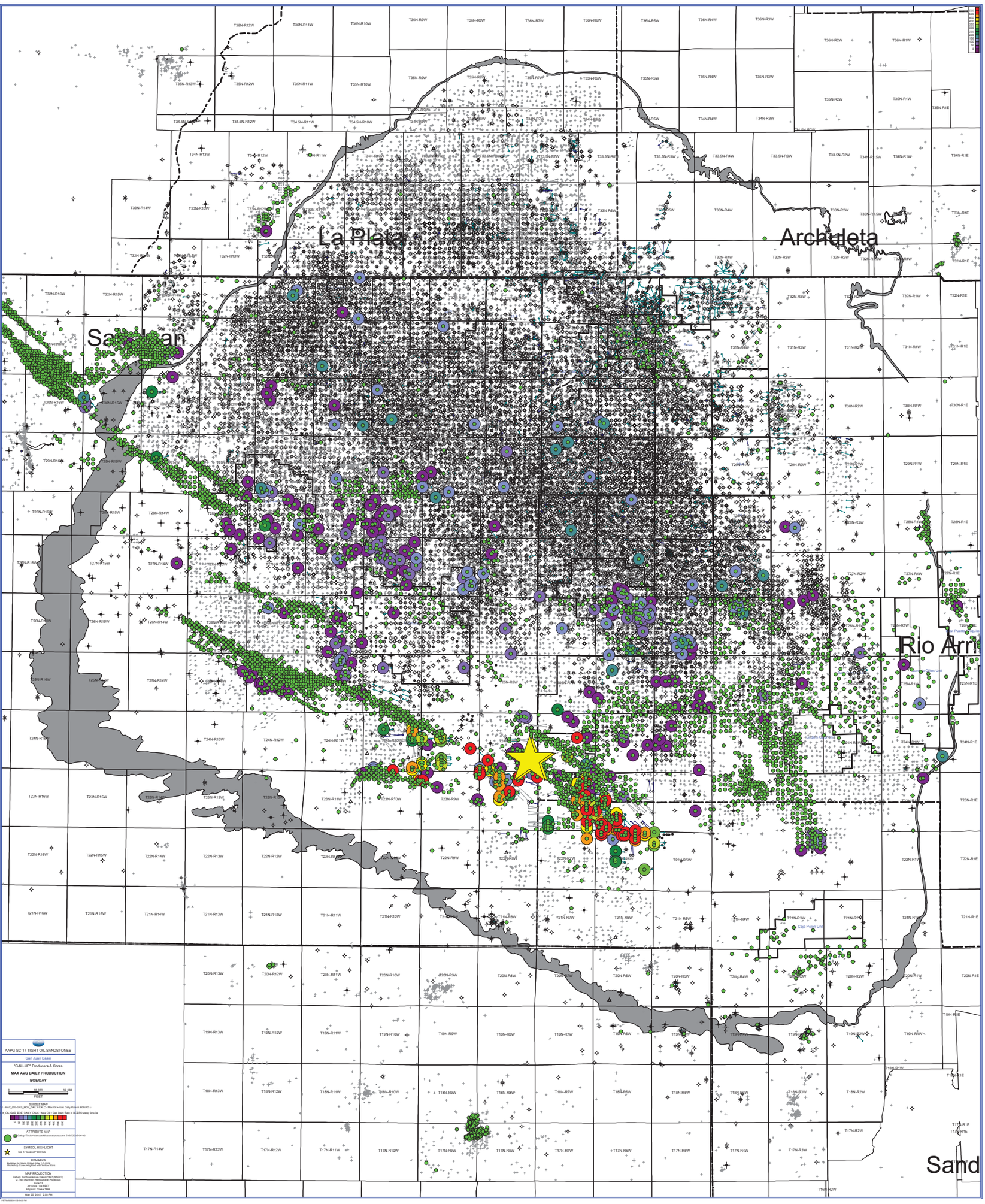
PERFS

By: Bottjer
May 24 2015 6:18 PM

HS=24919

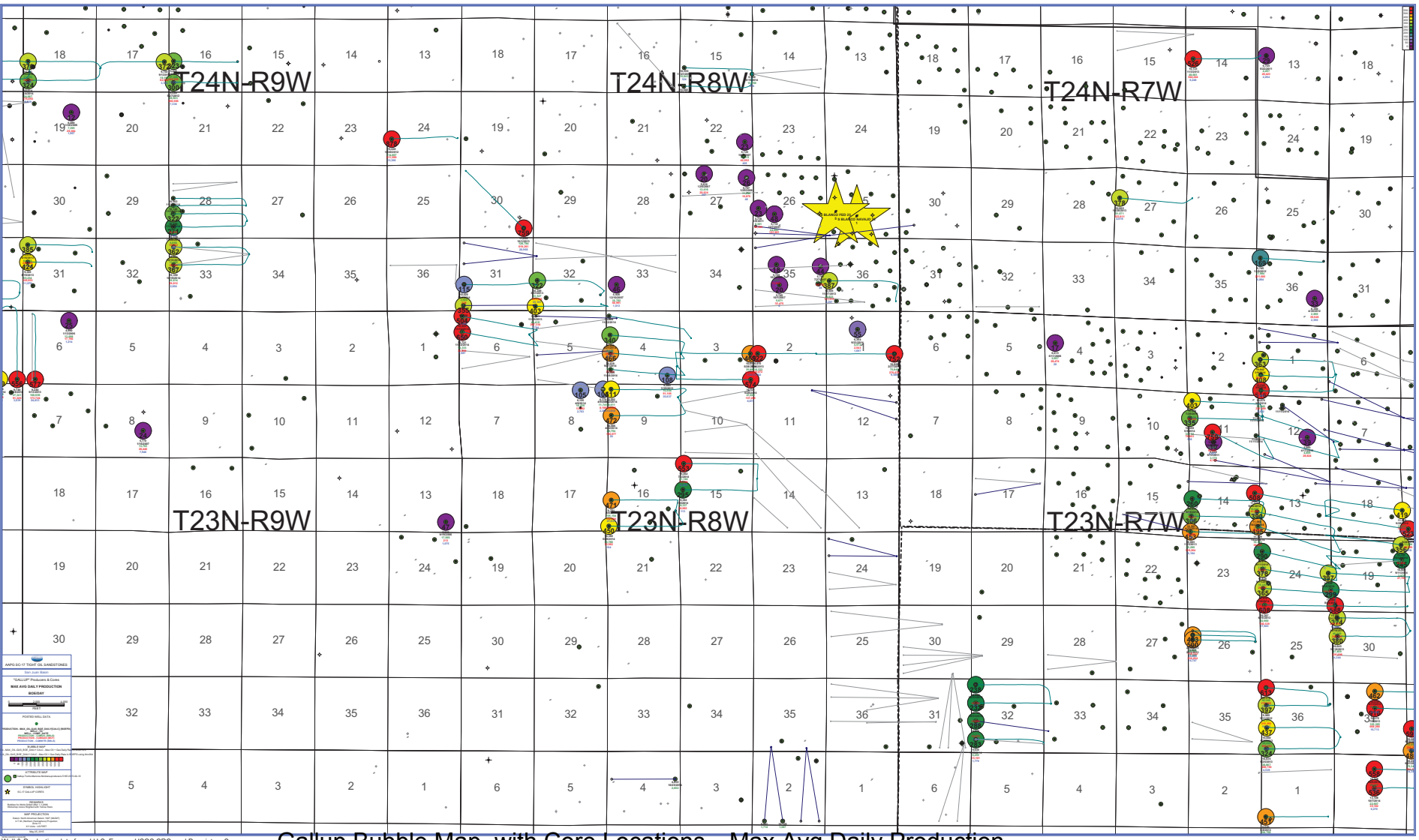
PETRA 5/24/2015 6:18:12 PM (AAPG-SC17 Parkman\Stacks\CORED Workshop\wells_SINGL_2015-05-24.CSP)

Correlation Section, Parkman Cored Wells, Campbell County



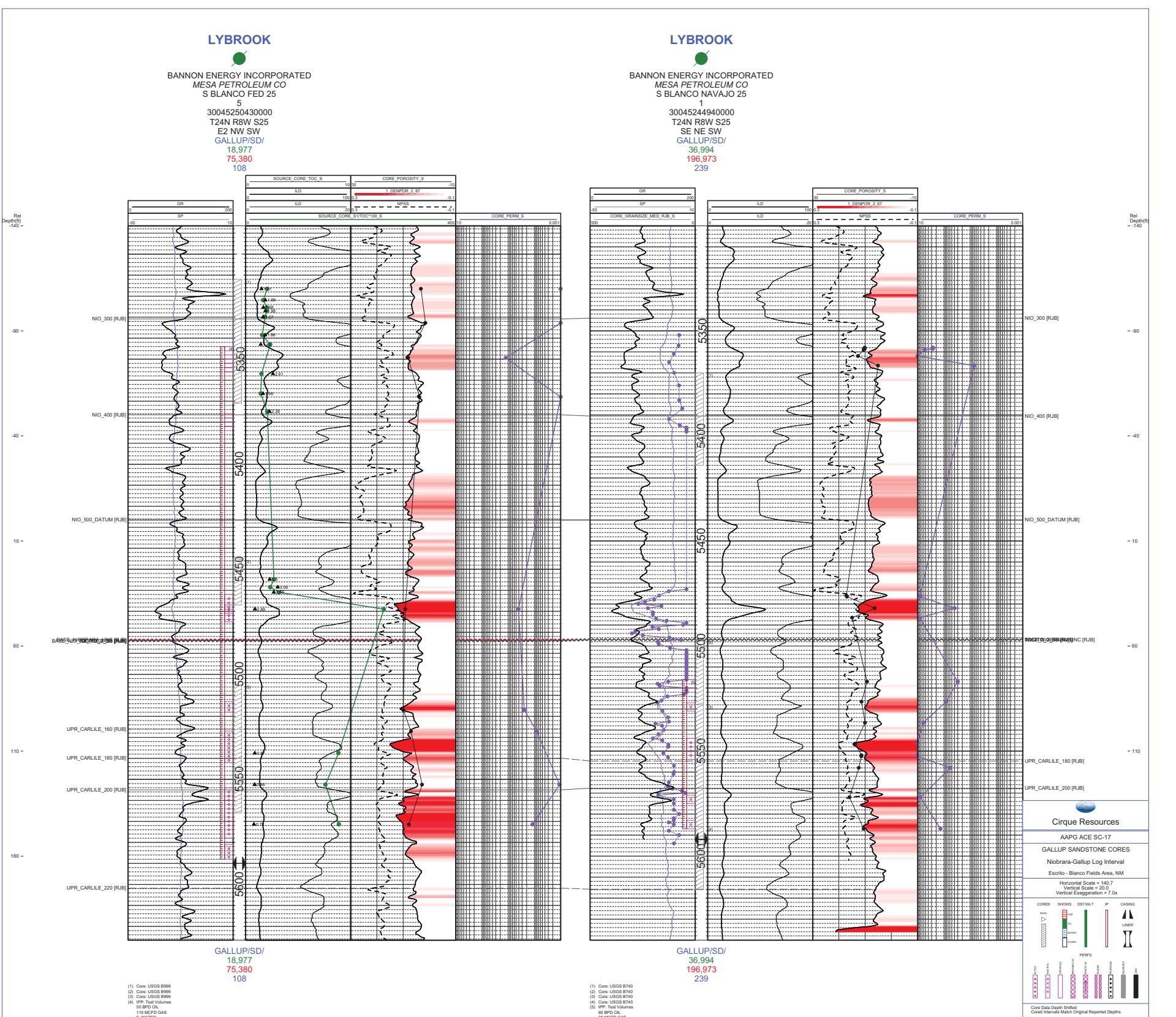
Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Regional Map, Gallup Play, San Juan Basin - Max Avg Daily Production

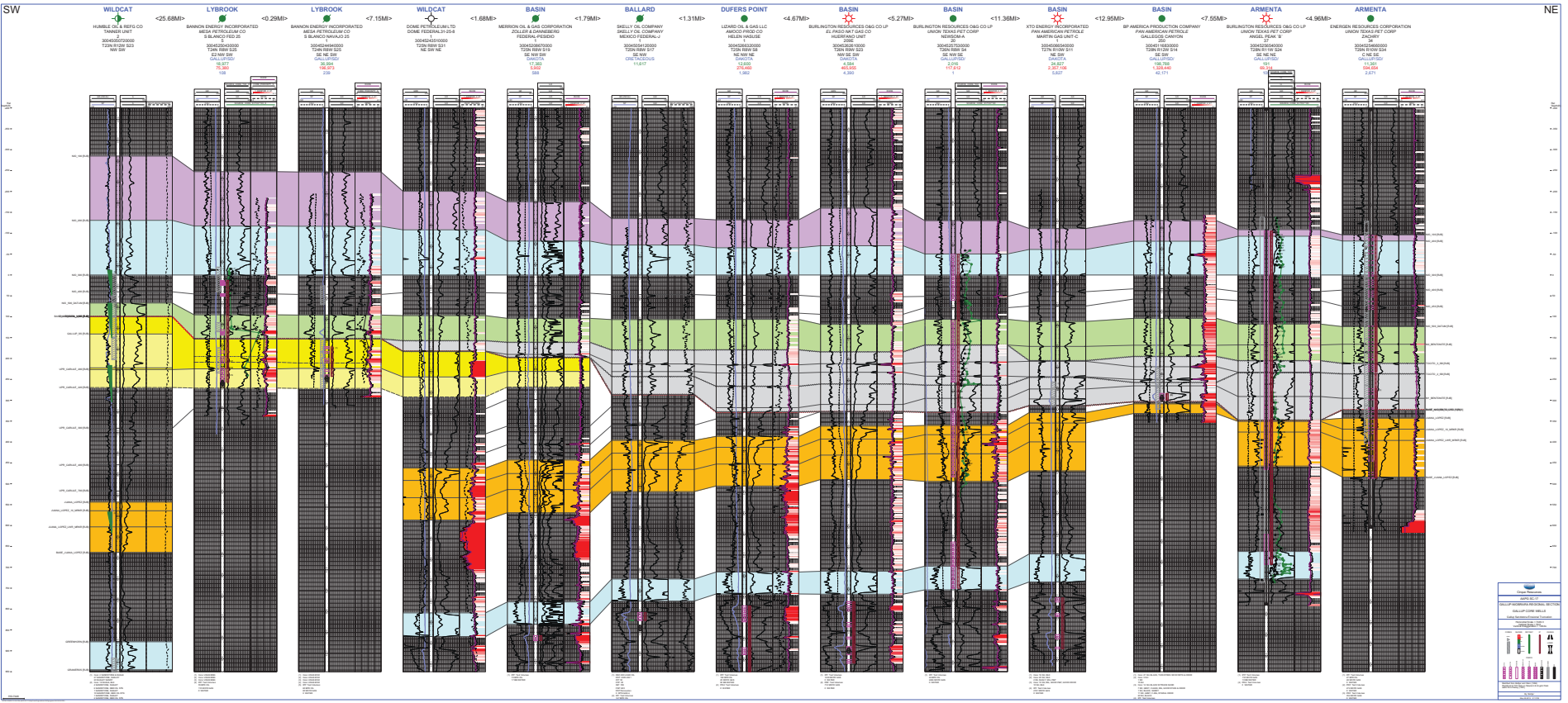


Well & Production data from I.H.S. Energy, USGS CRC, and Proprietary Sources

Gallup Bubble Map, with Core Locations—Max Avg Daily Production



Correlation Section of Cored Interval, Gallup Sandstone



Gallup-Tocito-Niobrara Regional Cross-section, with Gallup Cored Wells