

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING CALLED BY )  
THE OIL CONSERVATION COMMISSION FOR THE )  
PURPOSE OF CONSIDERING: )  
 )  
APPLICATION OF SAMSON RESOURCES COMPANY, ) CASE NOS. 13,492  
KAISER-FRANCIS OIL COMPANY, AND )  
MEWBOURNE OIL COMPANY FOR CANCELLATION )  
OF TWO DRILLING PERMITS AND APPROVAL OF )  
A DRILLING PERMIT, LEA COUNTY, )  
NEW MEXICO )  
 )  
APPLICATION OF CHESAPEAKE PERMIAN, L.P., ) and 13,493  
FOR COMPULSORY POOLING, LEA COUNTY, )  
NEW MEXICO )  
 ) (Consolidated)

OFFICIAL EXHIBIT FILE  
(2 OF 6: Chesapeake Engineering Exhibits)  
COMMISSION HEARING

BEFORE: MARK E. FESMIRE, CHAIRMAN  
JAMI BAILEY, COMMISSIONER (Present by telephone)  
WILLIAM C. OLSON, COMMISSIONER

August 10th, 2006  
December 14th and 15th, 2006  
January 2nd, 2007

Santa Fe, New Mexico

These matters came on for hearing before the Oil Conservation Commission, MARK E. FESMIRE, Chairman, on August 10th, December 14th and 15th, 2006, and January 2nd, 2007, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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**STATE OF NEW MEXICO**  
**ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT**  
**OIL CONSERVATION COMMISSION**

**IN THE MATTER OF THE HEARING  
CALLED BY THE OIL CONSERVATION  
COMMISSION FOR THE PURPOSE OF  
CONSIDERING:**

**CASE NO. 13492 (De Novo)**

**APPLICATION OF SAMSON RESOURCES COMPANY,  
KAISER-FRANCIS OIL COMPANY AND MEWBOURNE  
OIL COMPANY FOR CONCELLATION OF TWO DRILLING  
PERMITS AND APPROVAL OF A DRILLING PERMIT  
LEA COUNTY, NEW MEXICO.**

**CASE NO. 13493 (De Novo)**

**APPLICATION OF CHESAPEAKE OPERATING, INC.  
FOR COMPULSORY POOLING,  
LEA COUNTY, NEW MEXICO**

**ORDER NO. R-12343-B**

**CHESAPEAKE OPERATING, INC.'S  
ENGINEERING EXHIBITS**

**ATTACHMENT "D"**  
**Chesapeake's Petroleum Engineering Exhibits**

| Exhibit Number | Prior Ex. No. | Description                                                                          | Offer/Admit |
|----------------|---------------|--------------------------------------------------------------------------------------|-------------|
| PE-1           |               | Cover Sheet                                                                          |             |
| PE-2           |               | BHP vs. Time for 8 key wellbores                                                     |             |
| PE-3           |               | Map with initial BHP of 7354 for State WEK #1 well                                   |             |
| PE-4           |               | BHP vs. Time for State WEK #1 Well                                                   |             |
| PE-5           |               | Map with State WEL Com #1 well with initial BHP of 7080                              |             |
| PE-6           |               | BHP v time comparisons for WEK and WEL                                               |             |
| PE-7           |               | Composite of CHK geologic and Samson's map                                           |             |
| PE-8           |               | Map with State 15-1 well with initial BHP of 7636                                    |             |
| PE-9           |               | BHP vs. time comparisons of WEK and State 15-1 wells                                 |             |
| PE-10          |               | BHP vs. time comparison of WEL COM 1 and State 15-1 wells                            |             |
| PE-11          |               | Map with PQ Osudo State Com with BHP of 6627                                         |             |
| PE-12          |               | PQ Osudo State Com Well with Initial BHP of 6627                                     |             |
| PE-13          |               | BHP vs. Time comparison for WEK #1, State 15-1 & PQ Osudo State Com                  |             |
| PE-14          |               | BHP vs. time comparisons for WEL Com #1 and PQ Osudo State Com                       |             |
| PE-15          |               | Composite of CHK and Samson's geologic maps                                          |             |
| PE-16          |               | Godsey's map with highlighting CC 3 State 1 Well initial BHP of 7300 and other wells |             |
| PE-17          |               | CC 3 State 1 PBU analysis-Cartesian plot                                             |             |
| PE-18          |               | CC 3 State PBU-semi-log plot                                                         |             |
| PE-19          |               | CC 3 State PBU-Log-Log plot                                                          |             |
| PE-20          |               | Composite of CHK and Samson's geologic maps for CC 3 State #1                        |             |

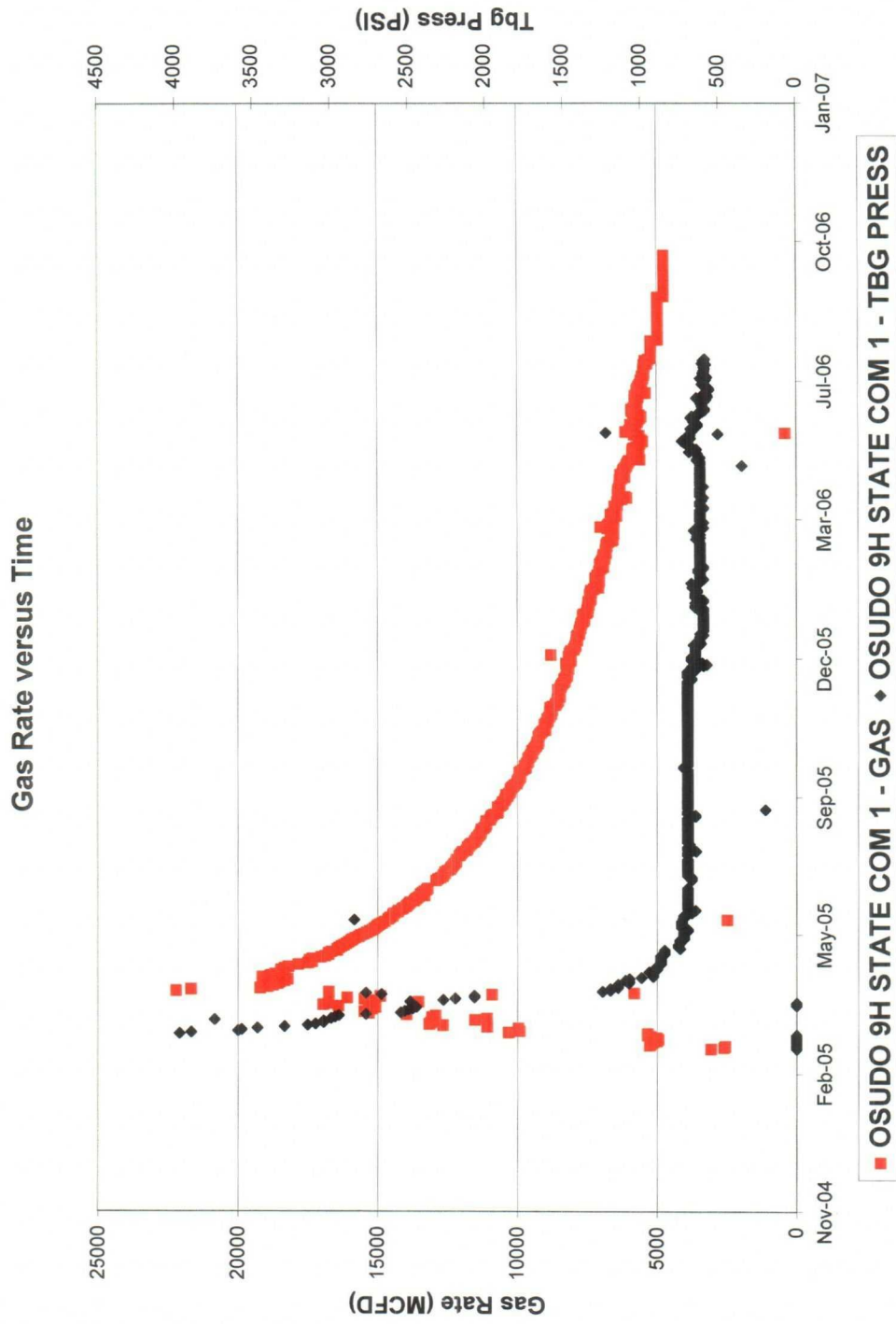
| Production Data |  |                                                                  |  |
|-----------------|--|------------------------------------------------------------------|--|
| PE-21           |  | Cover Sheet                                                      |  |
| PE-22           |  | Godsey's map with Osudo 9-1 with BHP of 6301                     |  |
| PE-23           |  | Osudo 9 production plot (Gas rate vs. time)                      |  |
| PE-24           |  | Map with Hunger Buster 3 with BHP of 6627                        |  |
| PE-25           |  | Huger Buster #3 production plot (Gas rate vs. time)              |  |
| PE-26           |  | Composite map of CHK and Samson's geologic maps                  |  |
| PE-27           |  | Godsey's map with State WEL Com 2 (dry hole)                     |  |
| PE-28           |  | Composite map of CHK and Samson's geologic maps                  |  |
| PE-29           |  | Godsey's map highlighting KF 4 State #1 with initial BHP of 6600 |  |
| PE-30           |  | KF 4 State production plot (Gas rate vs. time) WITH comments     |  |
| PE-31           |  | Compares KF 4 State and Hunger Buster production plots           |  |
| PE-32           |  | Composite of CHK and Samson's geologic maps                      |  |

| Gas Analysis (Exhibits 33-36) |               |                                                                                                               |             |
|-------------------------------|---------------|---------------------------------------------------------------------------------------------------------------|-------------|
| Exhibit Number                | Prior Ex. No. | Description                                                                                                   | Offer/Admit |
| PE-34                         |               | sample of 6 gas specific gravity data:                                                                        |             |
| PE-35                         |               | Comparisons--Osudo 9, KF State 4 & WEL Com 1 are in the same group while the PQ Osudo and WEK are in another. |             |
| PE-36                         |               | CHK's geologic map with specific gravity ID per wellbore                                                      |             |
| Volumetrics (Exhibits 37-44)  |               |                                                                                                               |             |
| PE-37                         |               | Cover sheet                                                                                                   |             |
| PE-38                         |               | Recoverable Gas in Place for each of the six 160-acre tracts in Section 4 using CHK's map.                    |             |
| PE-39                         |               | Recoverable Gas in Place for each of the six 160-acre tracts in Section 4 using Samson's map.                 |             |
| PE-40                         |               | CHK's recoverable gas vs. Samson's                                                                            |             |
| PE-41                         |               | Recoverable Gas in Place for Area A using CHK's map<br>26,002 ac-ft yields 33.9 BCF                           |             |
| PE-42                         |               | EUR for Area A using CHK's map<br>is 27.4 BCF by decline curve vs. 33.4 Volumetric Calc.                      | Eur         |
| PE-43                         |               | Recoverable Gas in Place using Samson's map (Area B)<br>24,408 ac-ft yields 33.9 BCF                          |             |
| PE-44                         |               | EUR for Area B using Samson's map<br>is 37.1 BCF by decline curve vs. 33.9 Volumetric Calc                    | EUR         |
| Back-Up Maps (Exhibits 45-48) |               |                                                                                                               |             |
| PE-45                         |               |                                                                                                               |             |
| PE-46                         |               | CHK's map with its net thickness numbers                                                                      |             |
| PE-47                         |               | CHK's map with its net thickness numbers                                                                      |             |
| PE-48                         |               | Samson map with its net thickness numbers                                                                     |             |
| Rebuttal (Exhibits 59-69)     |               |                                                                                                               |             |
| PE-59                         |               | New                                                                                                           |             |
| PE-60                         |               | New                                                                                                           |             |
| PE-61                         |               | New                                                                                                           |             |
| PE-62                         |               | New                                                                                                           |             |
| PE-63                         |               | New                                                                                                           |             |
| PE-64                         | PE-48         |                                                                                                               |             |
| PE-65                         |               | New                                                                                                           |             |
| PE-67                         |               | New                                                                                                           |             |
| PE-68                         |               | New                                                                                                           |             |
| PE-69                         |               | New                                                                                                           |             |

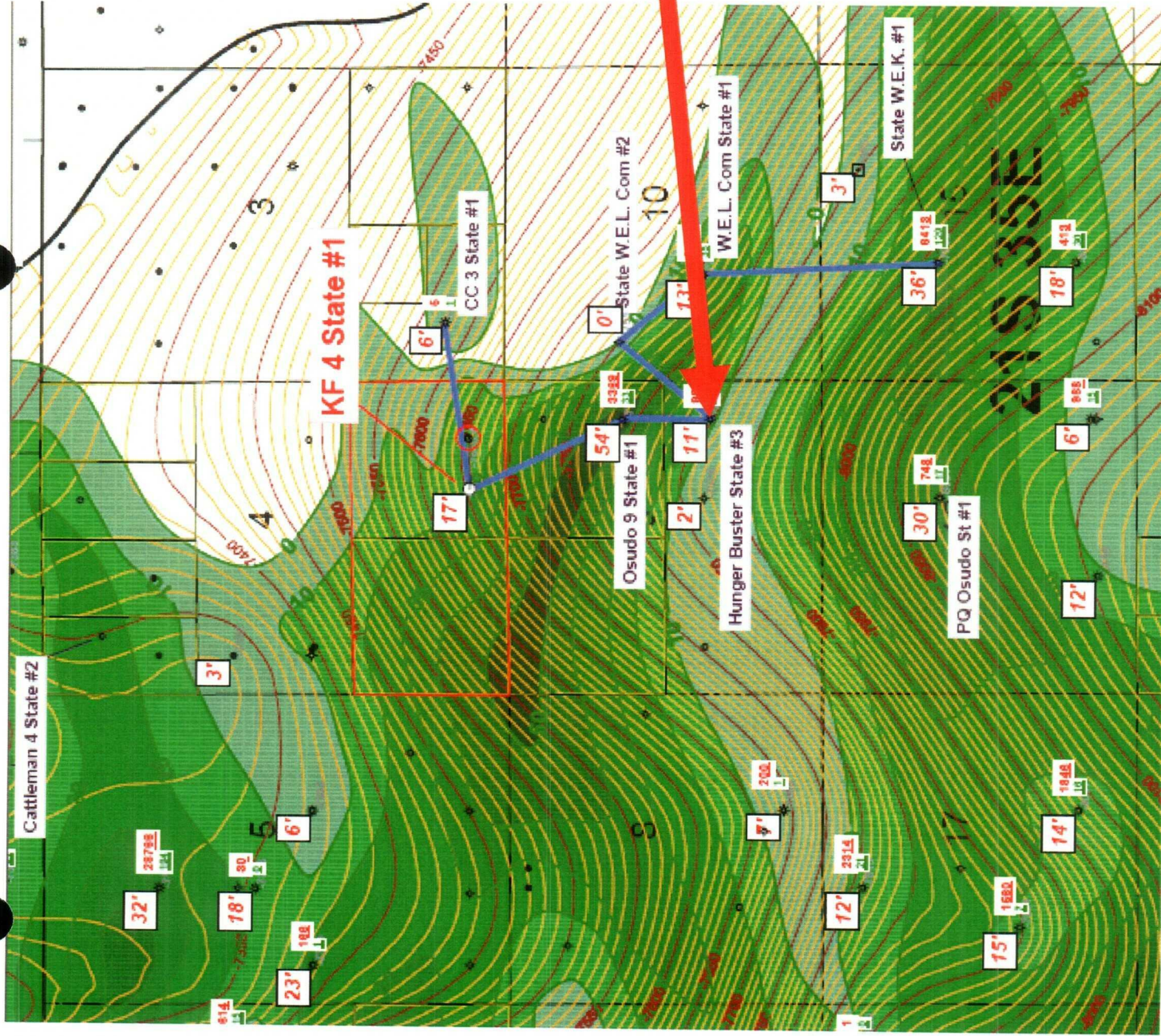
# CHK Reservoir Engineering Evidence Production Data



# Osudo 9 State Com 1 Production



The Osudo 9 State Com 1 is a very prolific well with a peak daily production rate of 22.2 MMCFD and still producing ~ 4.7 MMCFPD. The initial SBHP of 6301 PSI is below virgin reservoir pressure of ~7000 PSI which is indicative of hydraulic communication (supports CHK's Geologic interpretation of this well being in the thick of the sand development).



Hunger Buster 3 State

Initial SBHP of 6627

PSI based on mud

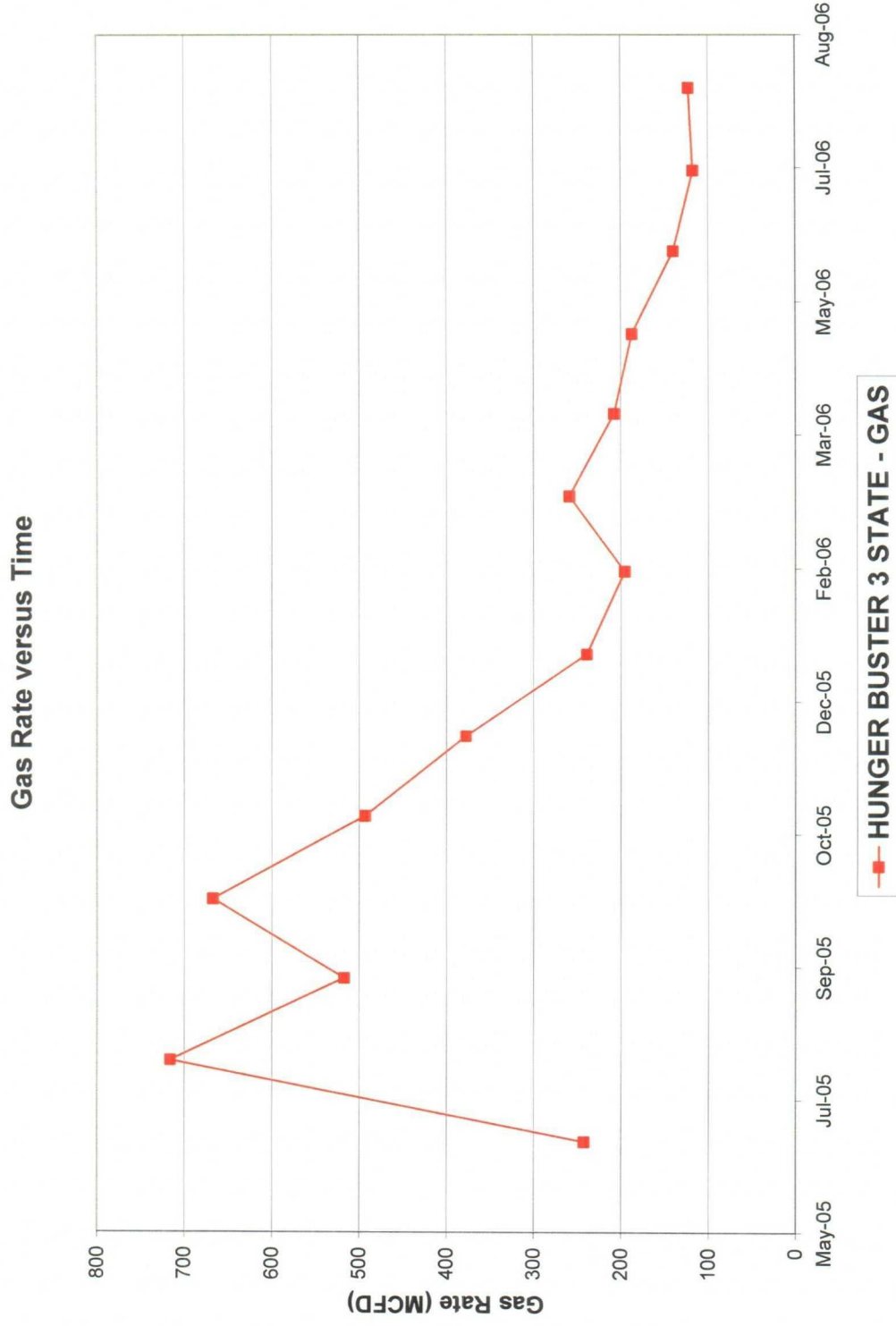
weight in Jun-05

1<sup>st</sup> Allocated Prod Date  
in Jul-05

Current Gas Cum of  
0.14 BCF

11' on edge of sand

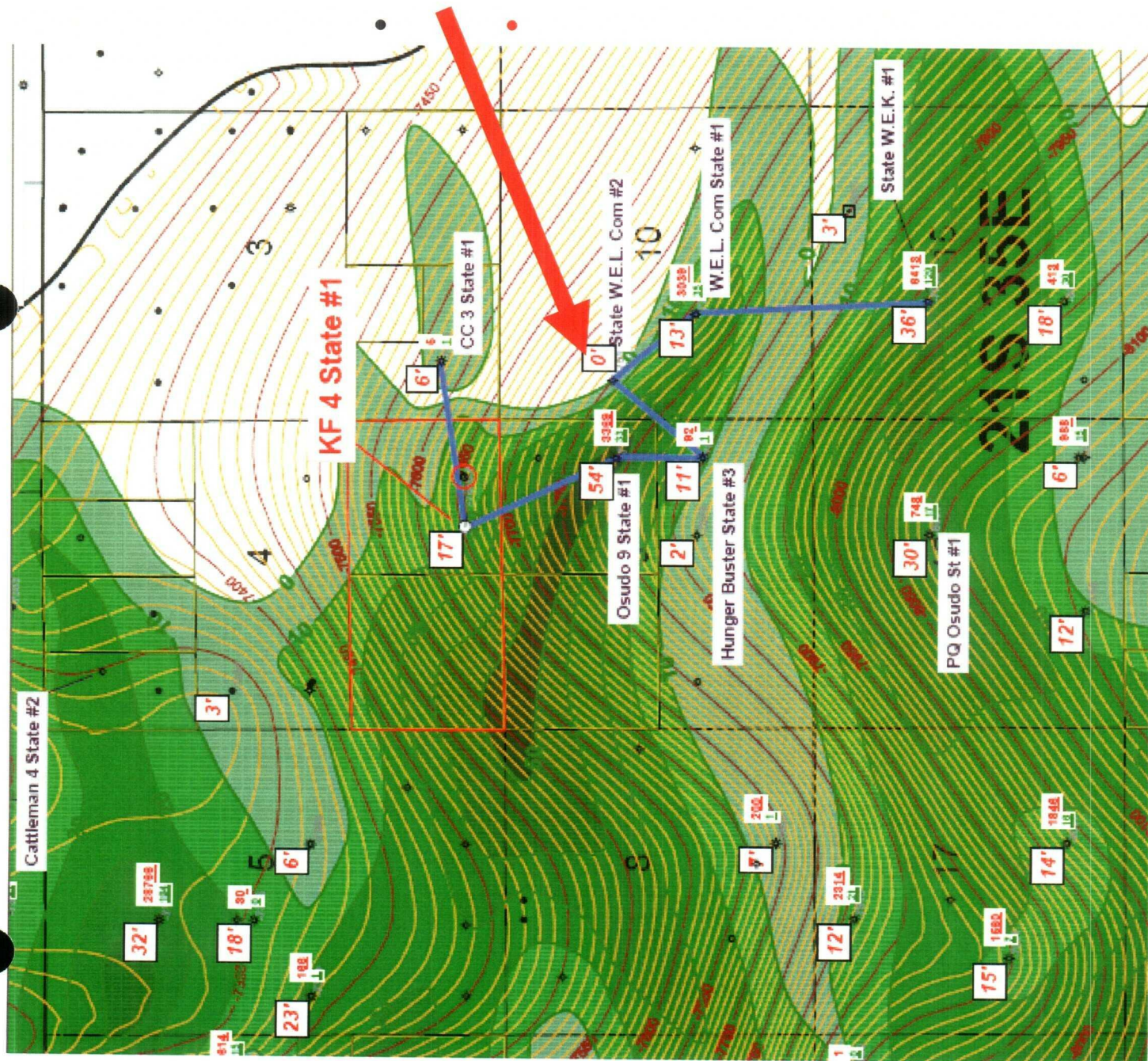
# Hunger Buster 3 State Production



The Hunger Buster 3 State is a very poor well in the area with a peak daily production rate of 0.7 MMCFD and current production of 0.1 MMCFD. Supports CHK's Geologic interpretation at this well's BHL.

## State WEL Com 2

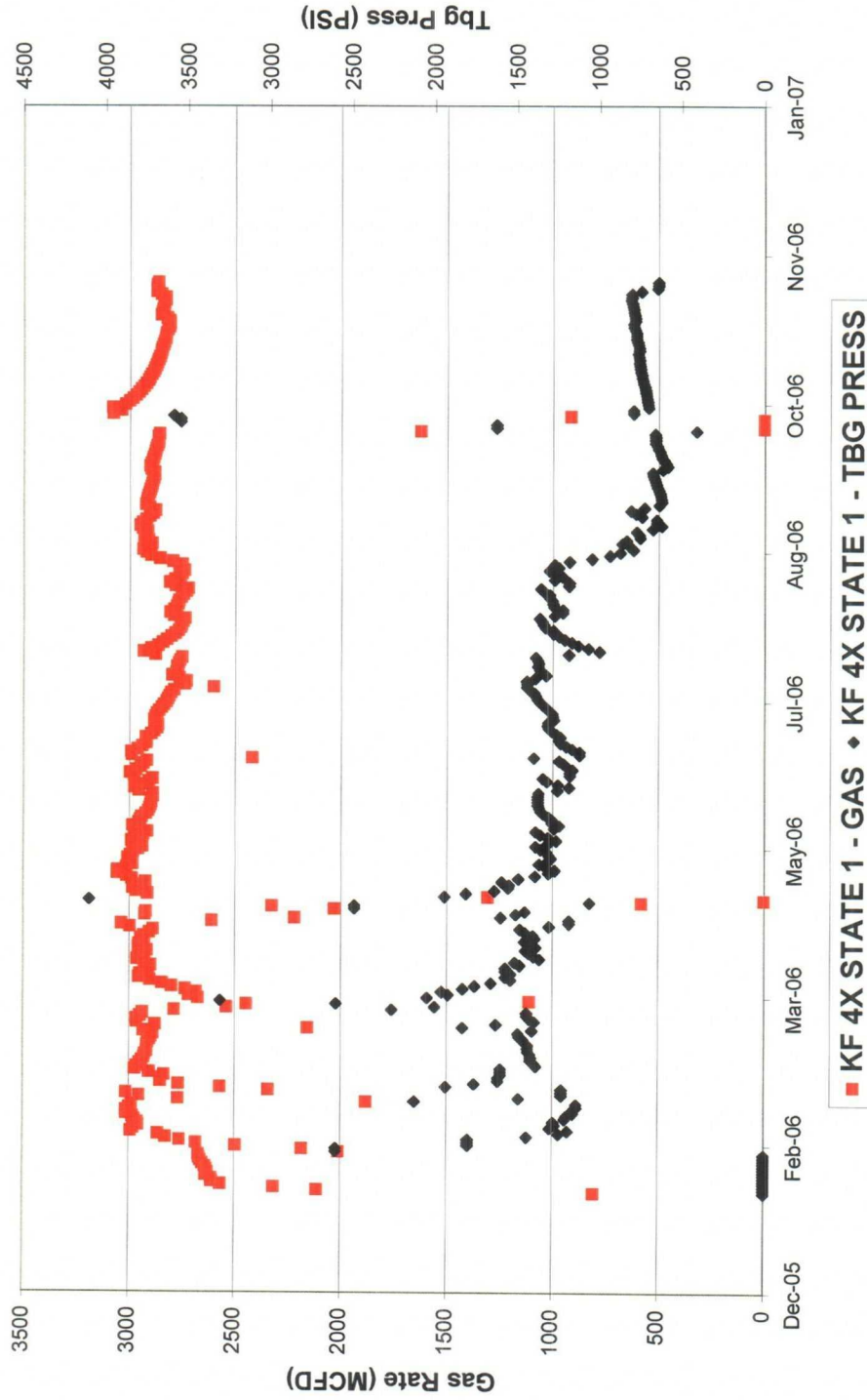
Apache operated  
“dry hole” which  
was P&A'd in Jul-05  
0' dry hole





# KF 4 State 1 Production

Gas Rate versus Time



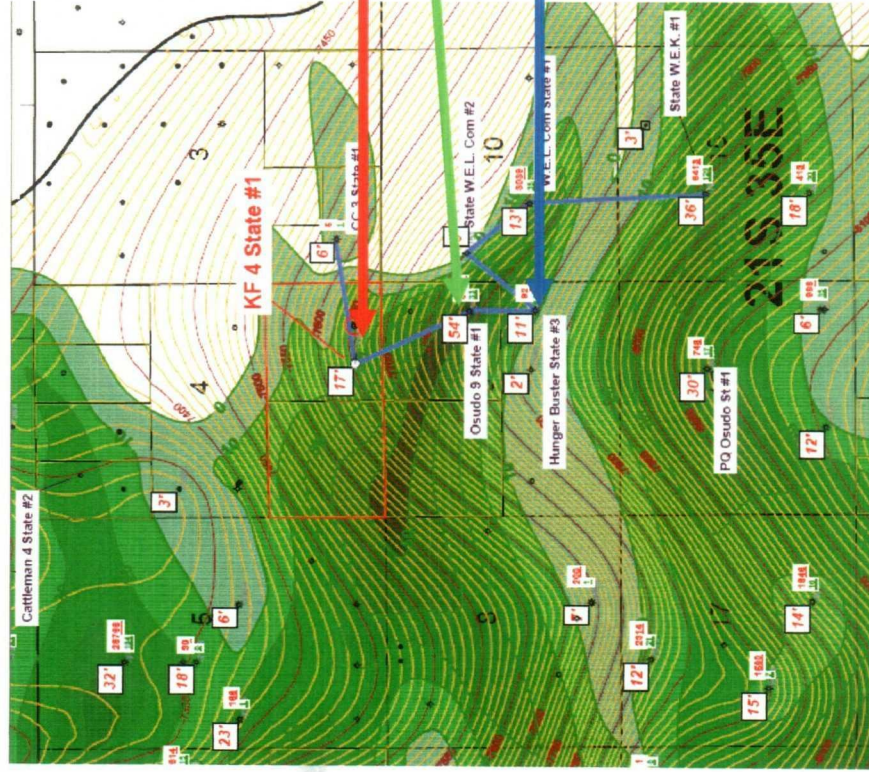
The KF 4 State 1 is a very prolific well which has a flat production profile of 2.8 MMCFD @ 640 PSI FTP. The initial SBHP of 6600 PSI is below virgin reservoir pressure of ~7000 PSI which is indicative of hydraulic communication (supports CHK's Geologic interpretation).

# CHK's Geologic Interpretation

KF 4 State 1 Calculates 17' Net Pay

versus

Hunger Buster 3 State Calculating 11' Net Pay  
on the edge of the sand development



Gas Rate versus Time



# **CHK Reservoir Engineering Evidence**

## **CC 3 State #1 Pressure Data**

## CC 3 State 1

Initial SBHP of 7300  
PSI based on mud  
weight in Oct-04

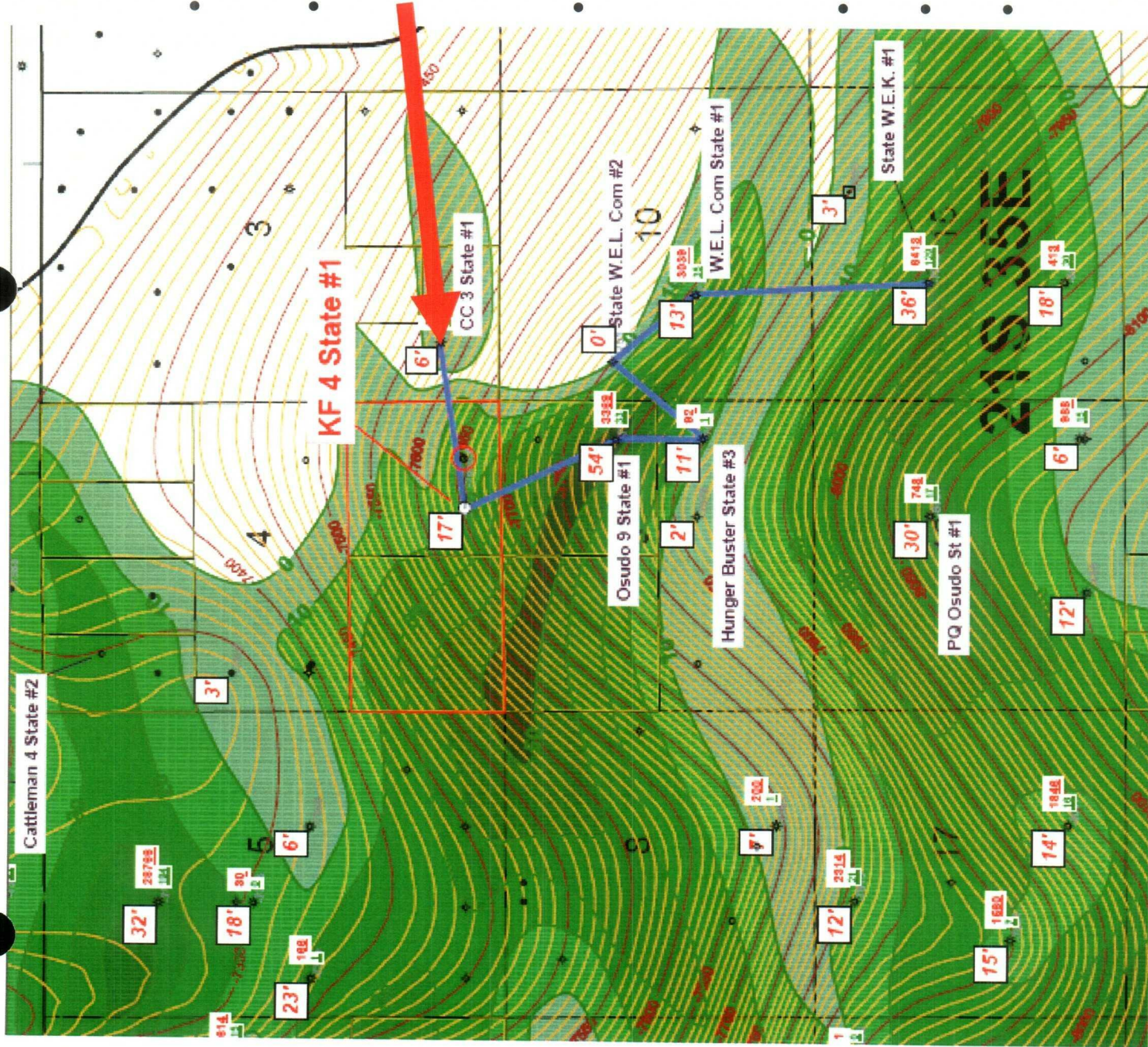
After 28.4-days of  
production (1-month  
after initial SBHP), 1264  
measured BHP of 1264  
PSI following 150-hour  
PBU – MINIMAL  
RESERVOIR SIZE

PBU Analysis  
identified three NO  
FLOW BOUNDARIES &  
a fourth CONSTANT  
PRESSURE  
BOUNDARY – 6 to 11-  
acre TANK

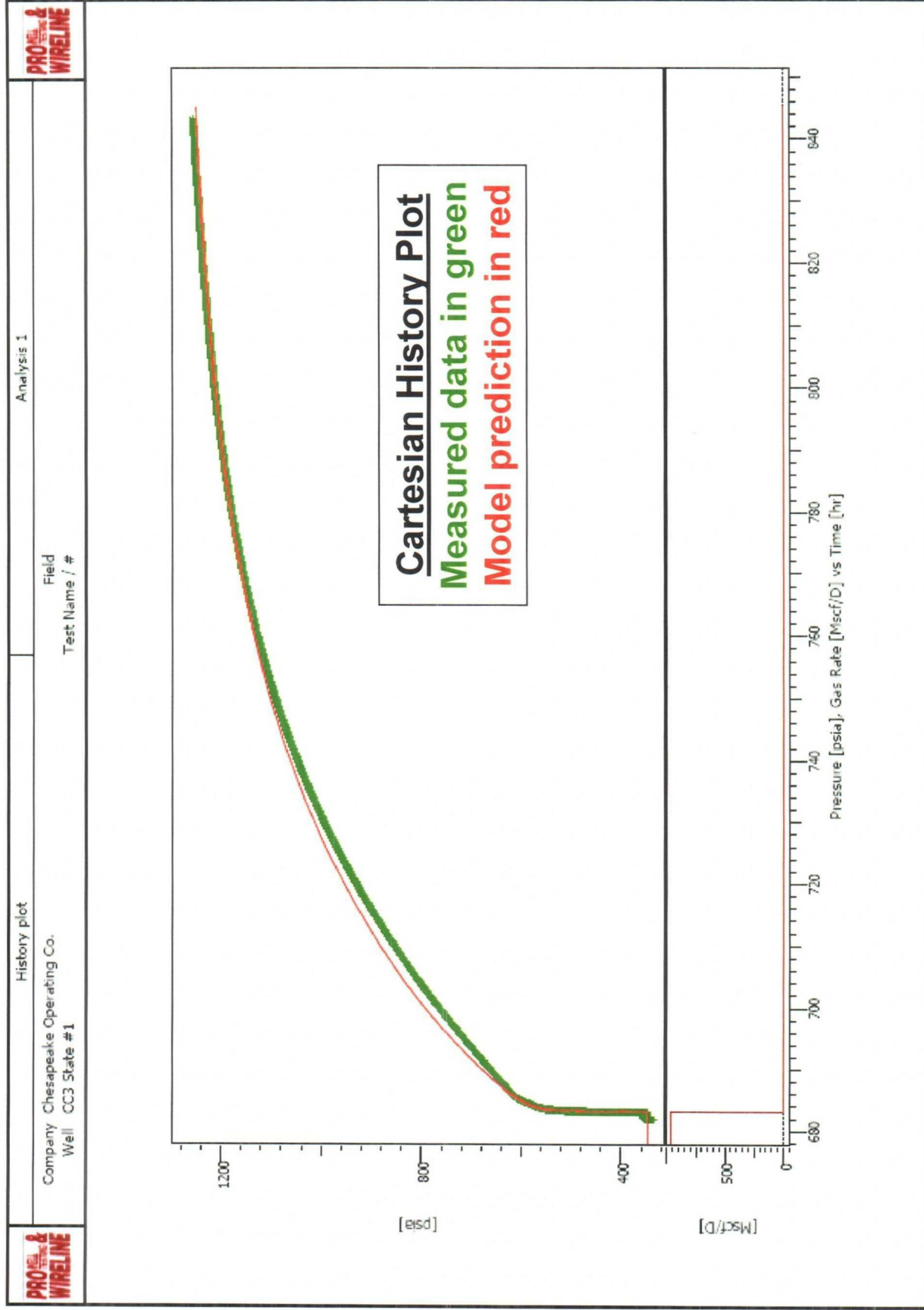
1<sup>st</sup> Allocated Prod Date  
in Jan-05

Current Gas Cum of  
0.005 BCF

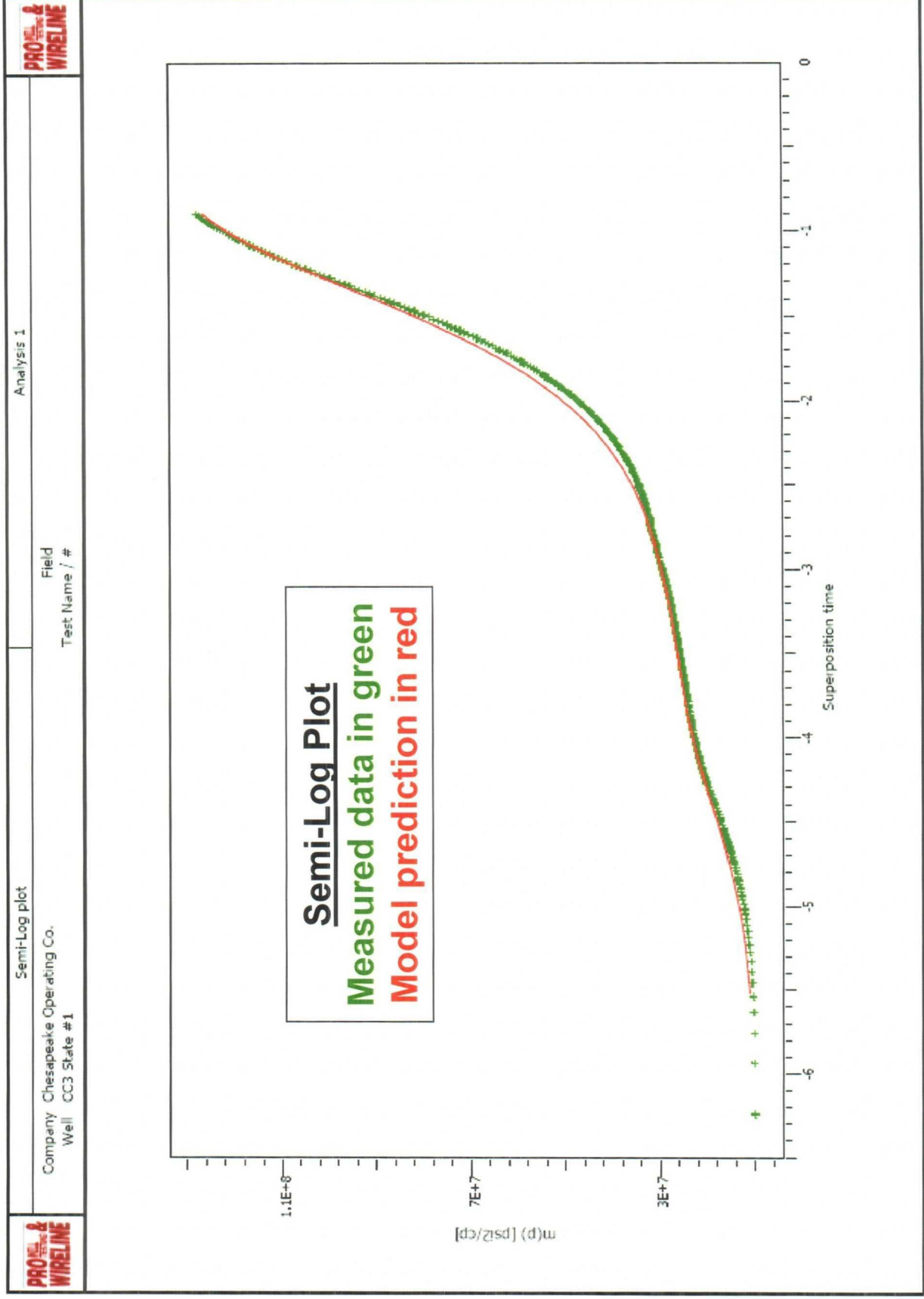
Well SI Aug-05



# CC 3 State 1 PBU Analysis – History Plot Exhibit: PE-12

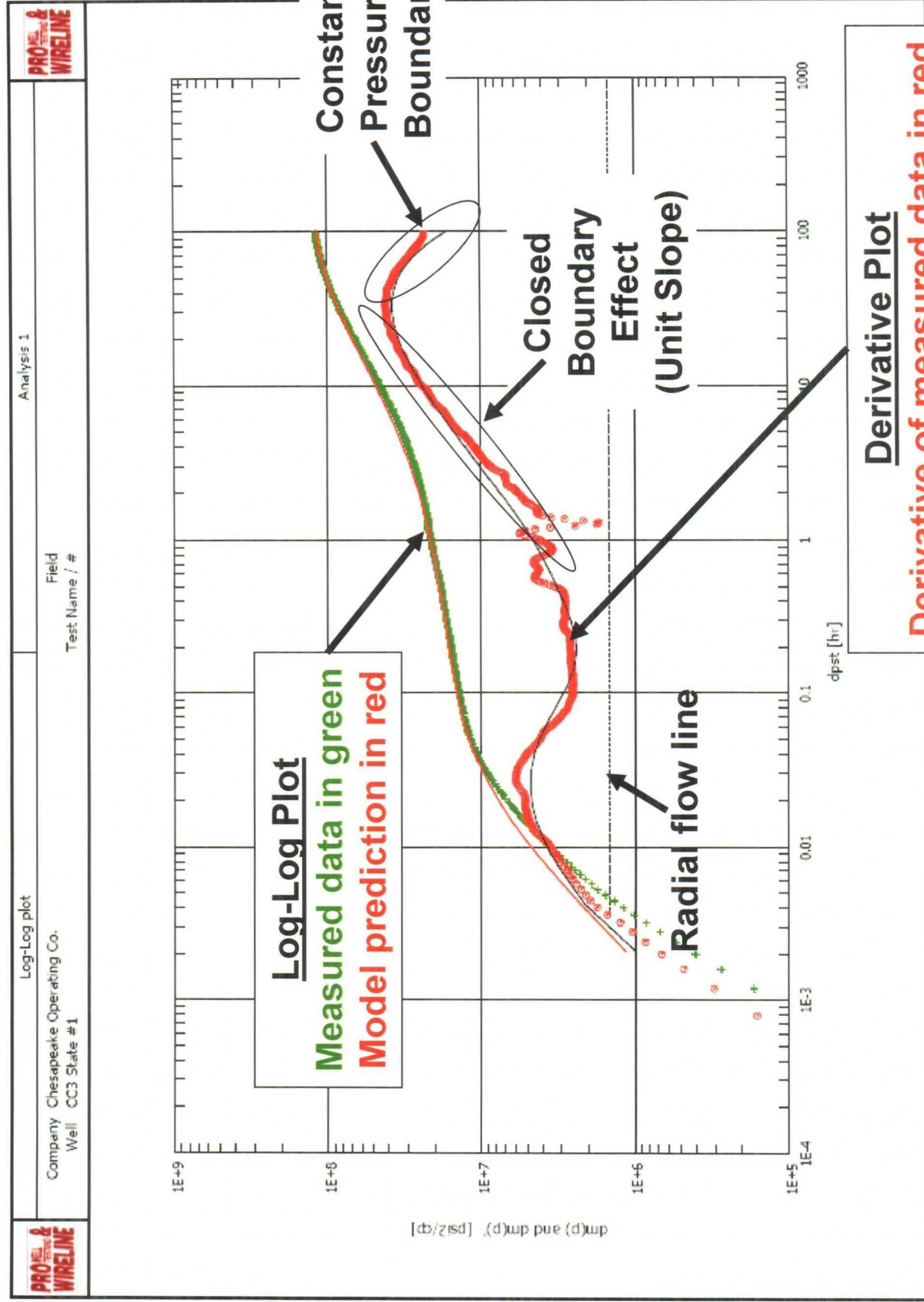


# CC 3 State 1 PBU Analysis – Semi-Log Plot Exhibit: PE-13

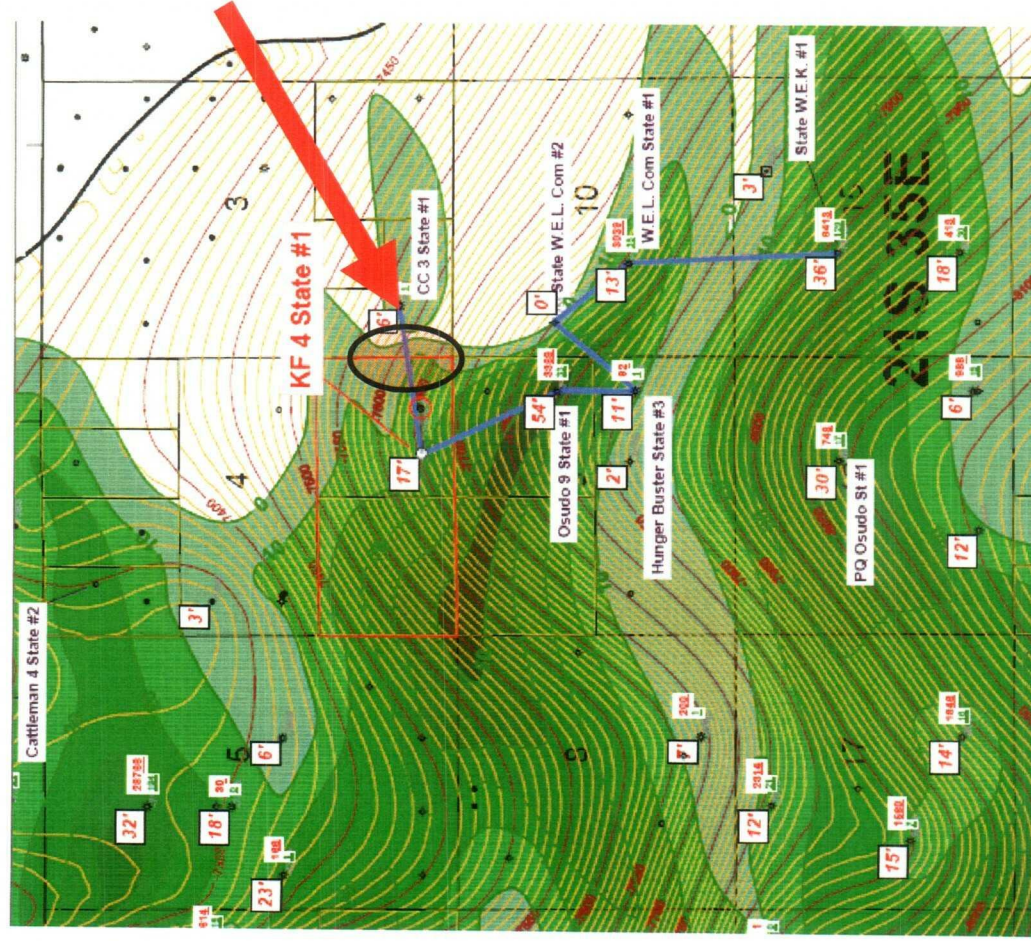


# CC 3 State 1 PBU Analysis – Log-Log Plot

Exhibit: PE-14



**CHK's Geologic Interpretation**  
**CC 3 State 1 Isolated / Compartmentalized**  
**NO PRESSURE COMMUNICATION**



Mapping is consistent with no flow boundary between the two wells----mapping thickening sand between the two wells would be inconsistent with engineering data...

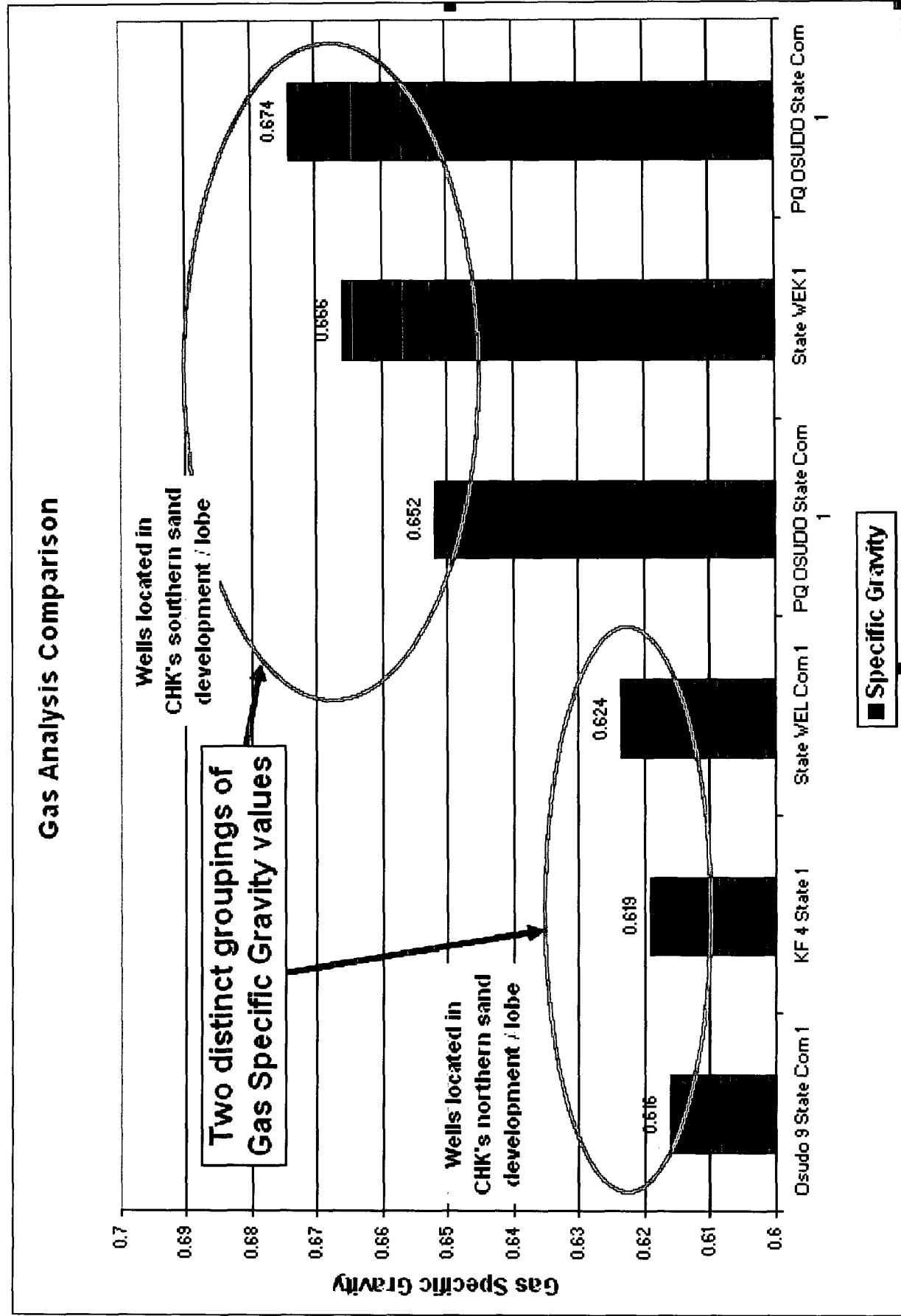
# CHK Reservoir Engineering Evidence Gas Analysis

# Gas Analysis Data

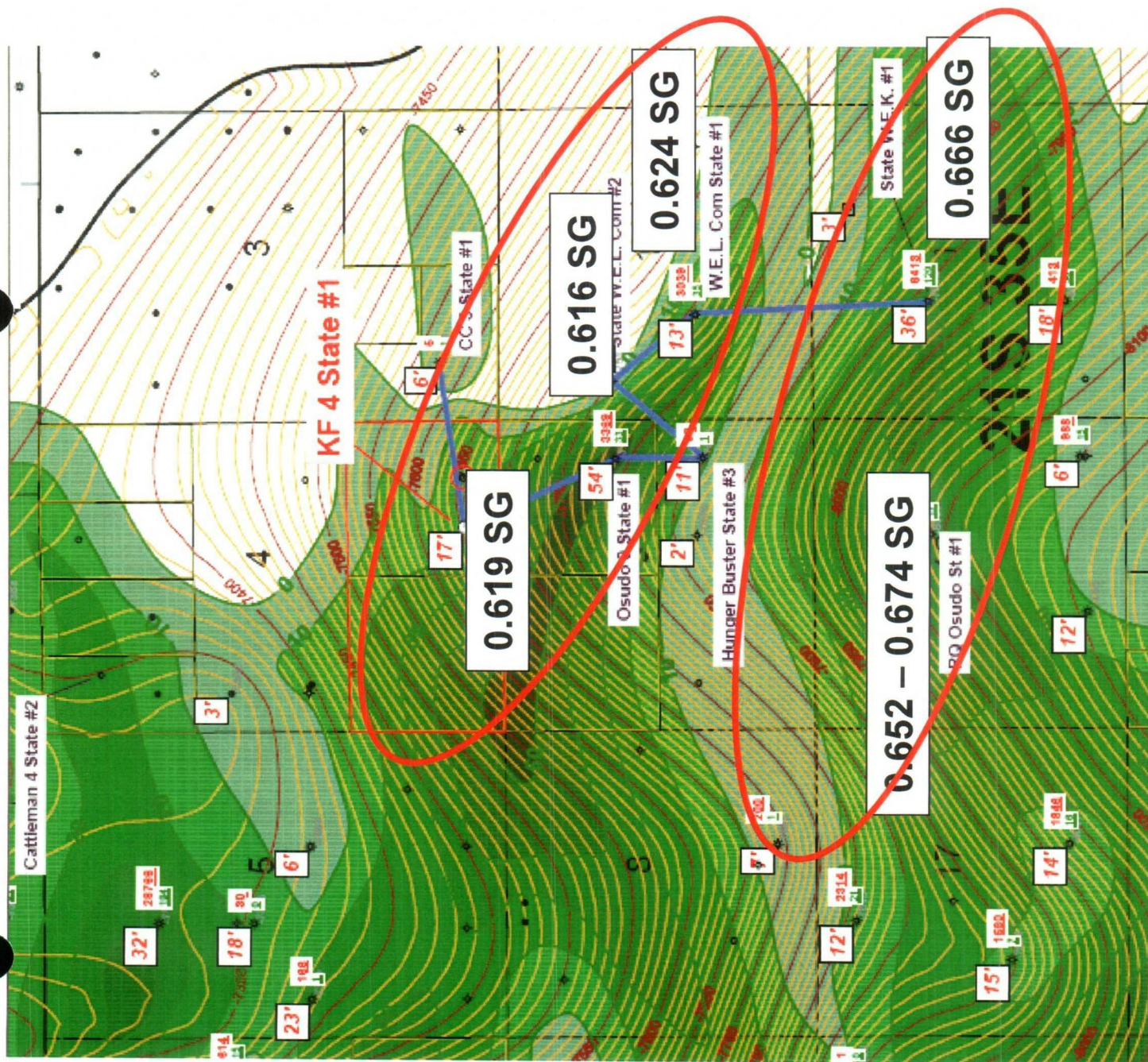
## Gas Specific Gravity Data

| Well                 | Test Date  | Gas Specific Gravity |
|----------------------|------------|----------------------|
| KF 4 State 1         | 8/10/2005  | 0.619                |
| Osudo 9 State Com 1  | 8/19/2005  | 0.616                |
| PQ OSUDO State Com 1 | 1/13/2004  | 0.652                |
| PQ OSUDO State Com 1 | 5/10/1990  | 0.674                |
| State WEK 1          | 9/13/1967  | 0.666                |
| State WEL Com 1      | 11/28/1969 | 0.6235               |

# Gas Specific Gravity



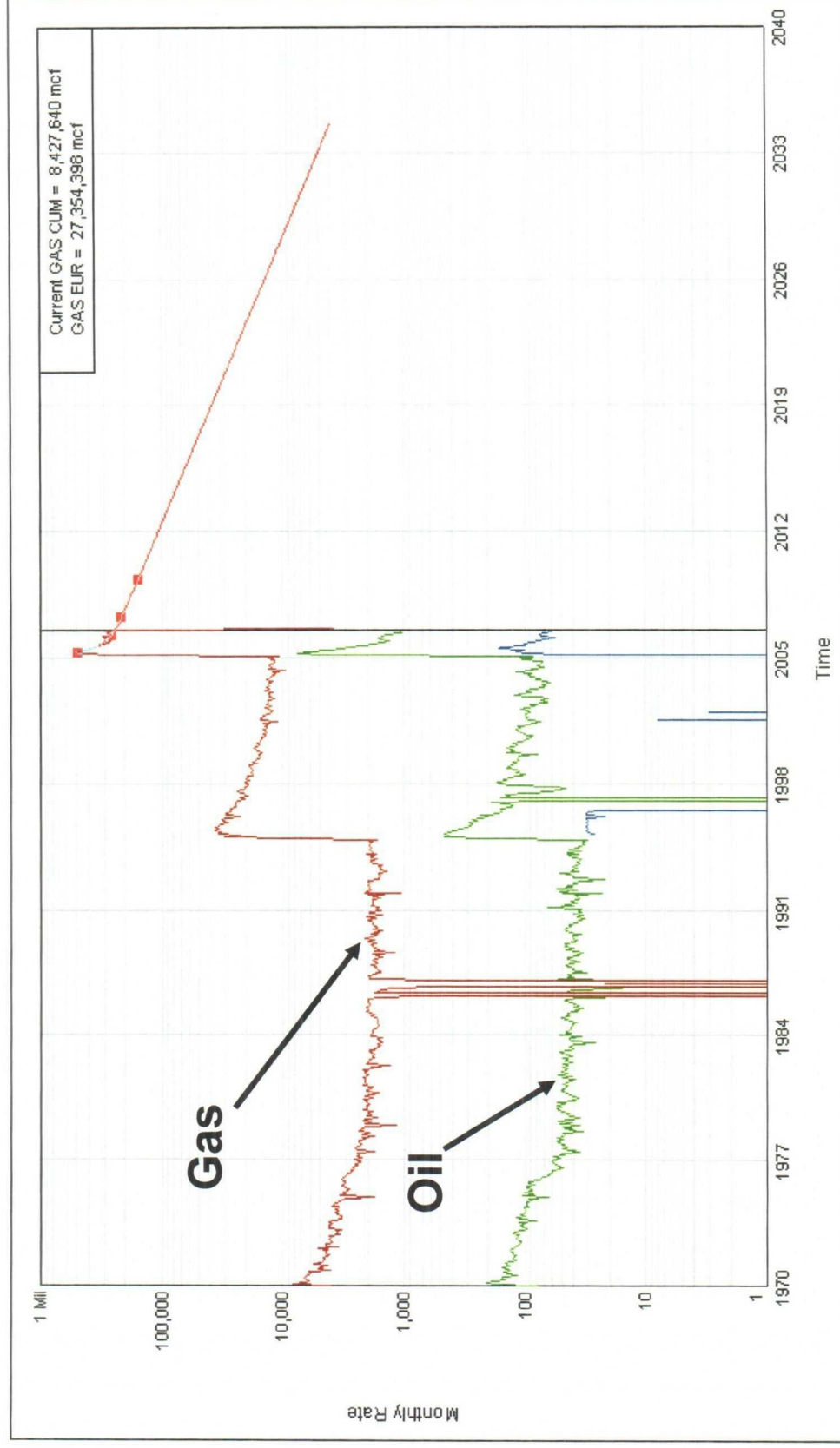
Mapping is  
consistent with  
measurable gas  
analysis trends...



# CHK Reservoir Engineering Evidence Volumetrics



# AREA A Expected Ultimate Recovery



Decline curve analysis to the wells in AREA A (from CHK's map), expected ultimate recovery of gas in AREA A 27.4 BCF versus the volumetric calculation of recoverable gas in-place of 30.2 BCF.

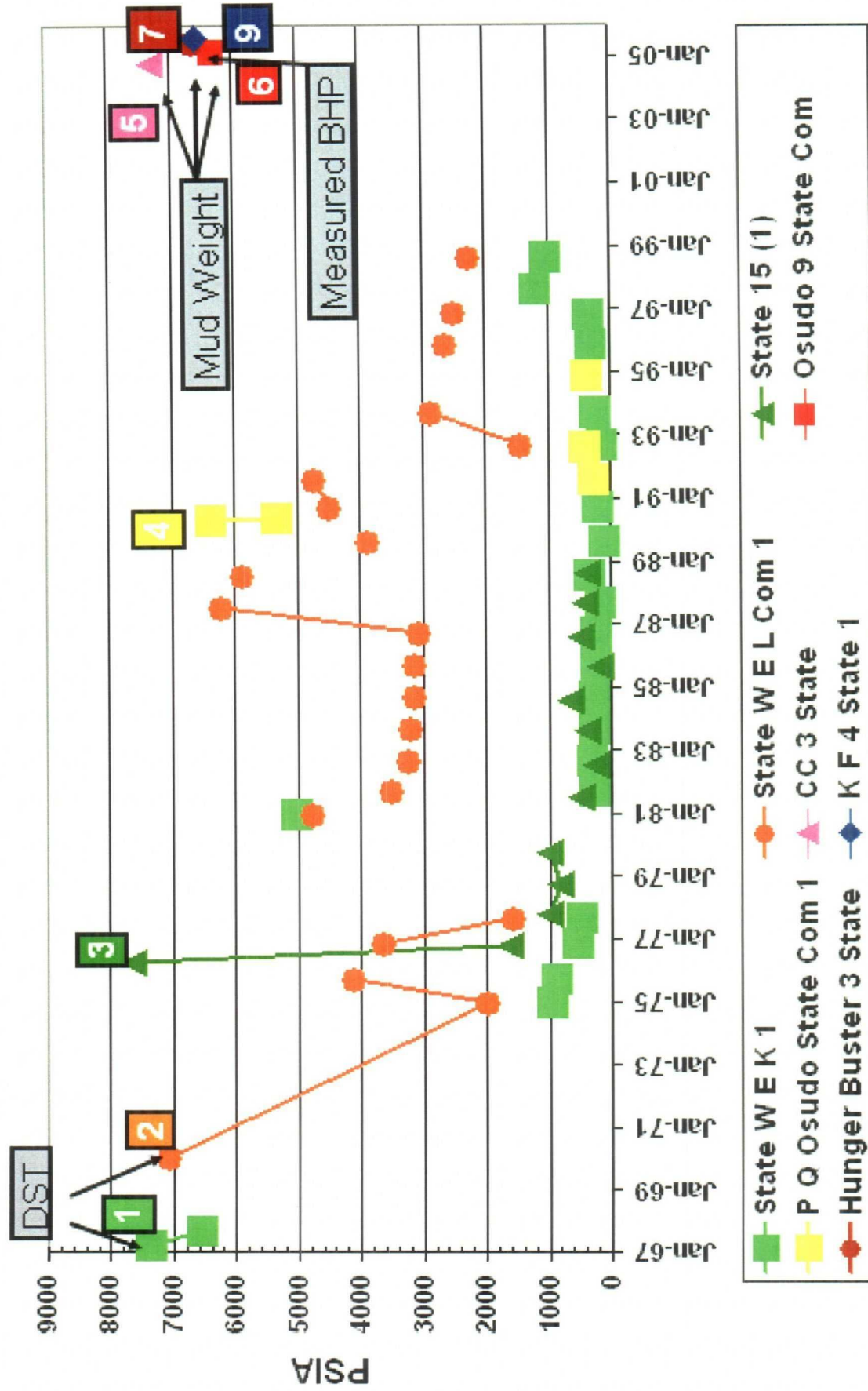
## Section 4 RGIP using CHK's Map

| CHK<br>Recoverable Gas In-Place/160 Ac<br>Shown in BCF |      |                   |      |
|--------------------------------------------------------|------|-------------------|------|
| NW/4 160 Ac                                            |      | NE/4 160 Ac       |      |
| 3.23                                                   | 0.91 |                   |      |
| Middle W/2 160 Ac                                      | 1.20 | Middle E/2 160 Ac |      |
|                                                        |      |                   |      |
| SW/4 160Ac                                             | 6.41 | SE/4 160Ac        | 2.56 |

# **CHK Reservoir Engineering Evidence Pressure/Performance Data (East-West Trend)**

# BHP versus Time

BHP Vs. Time

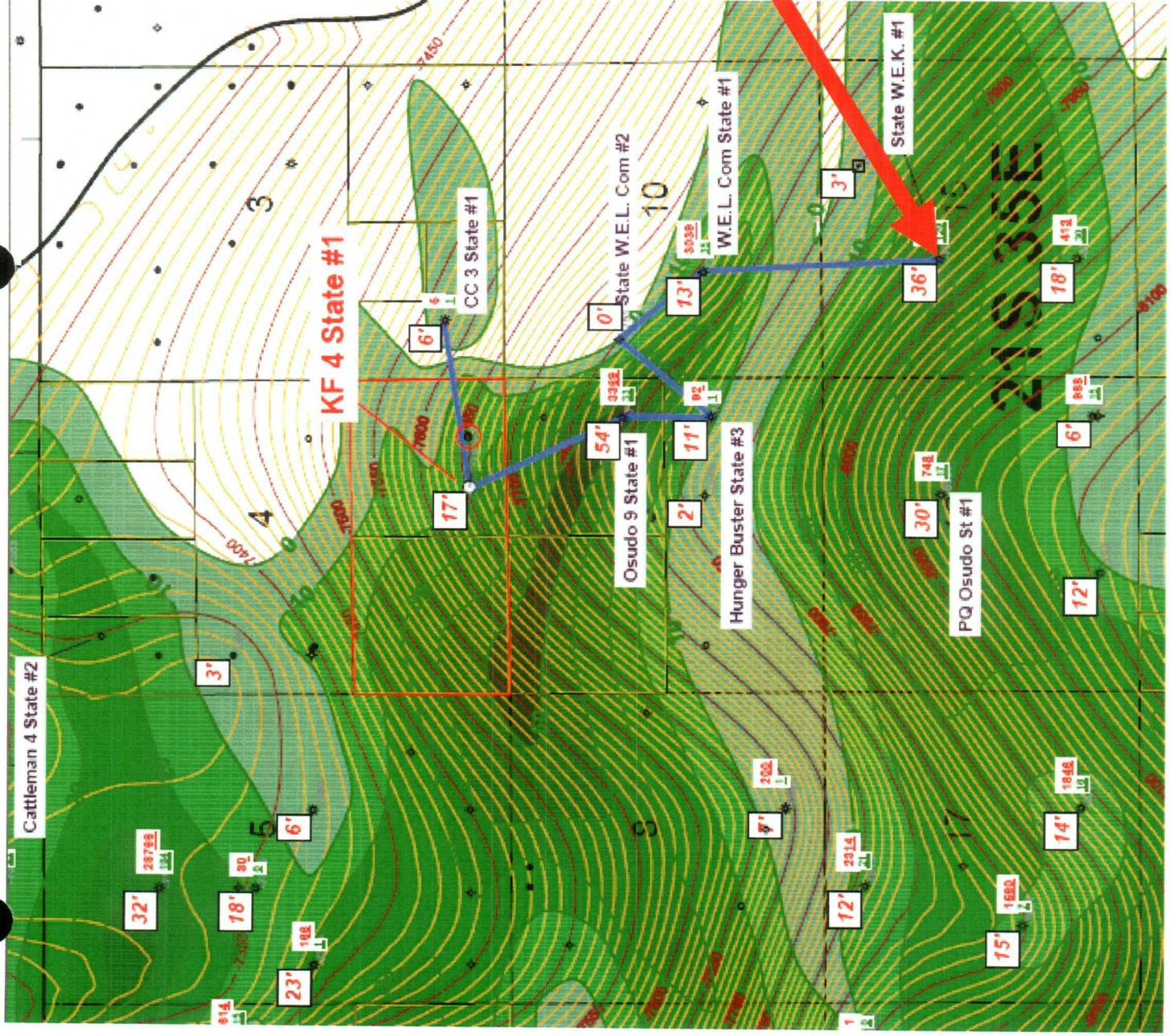


State WEK 1

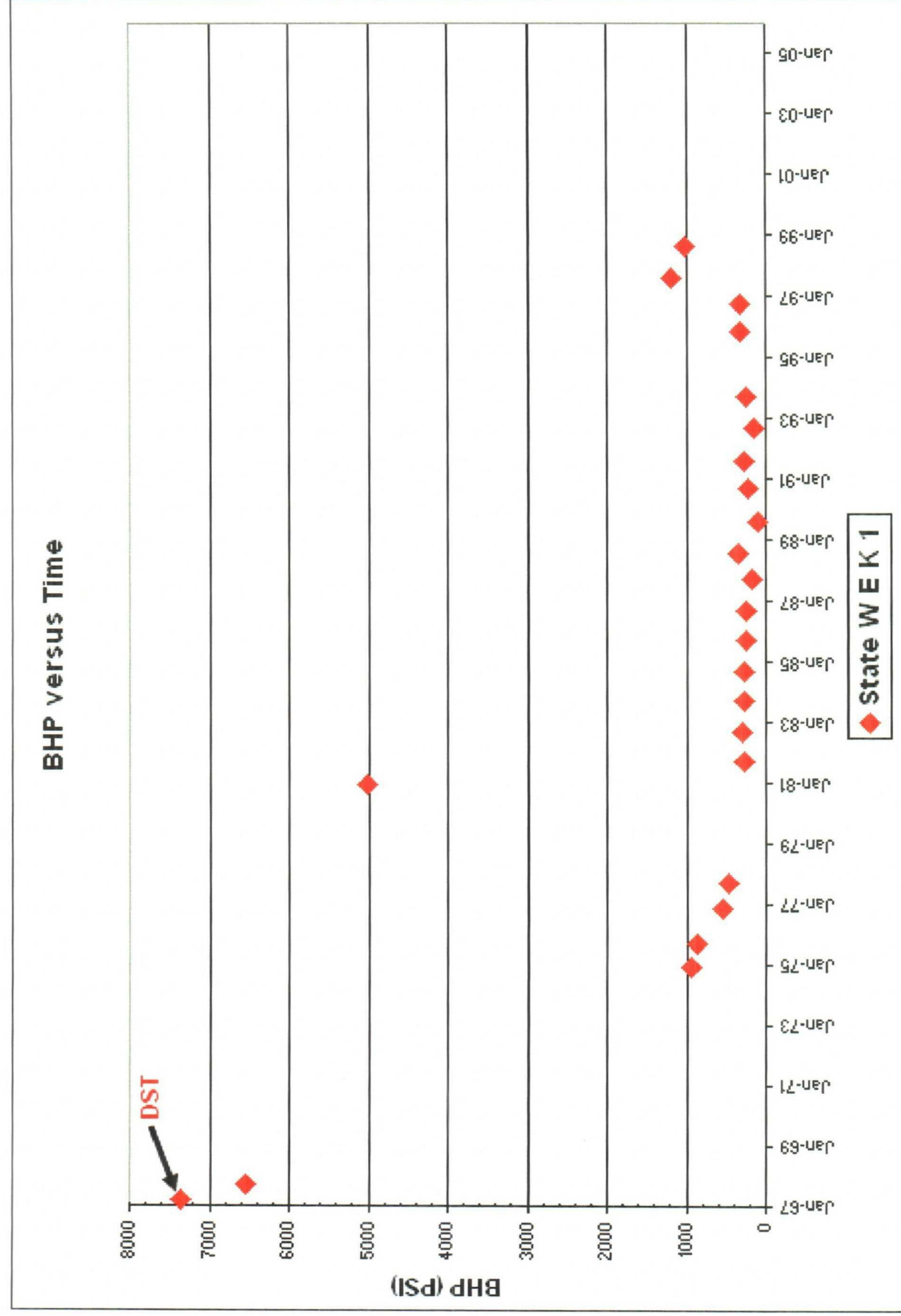
Initial SBHP of 7354  
PSI with DST in Mar-  
67

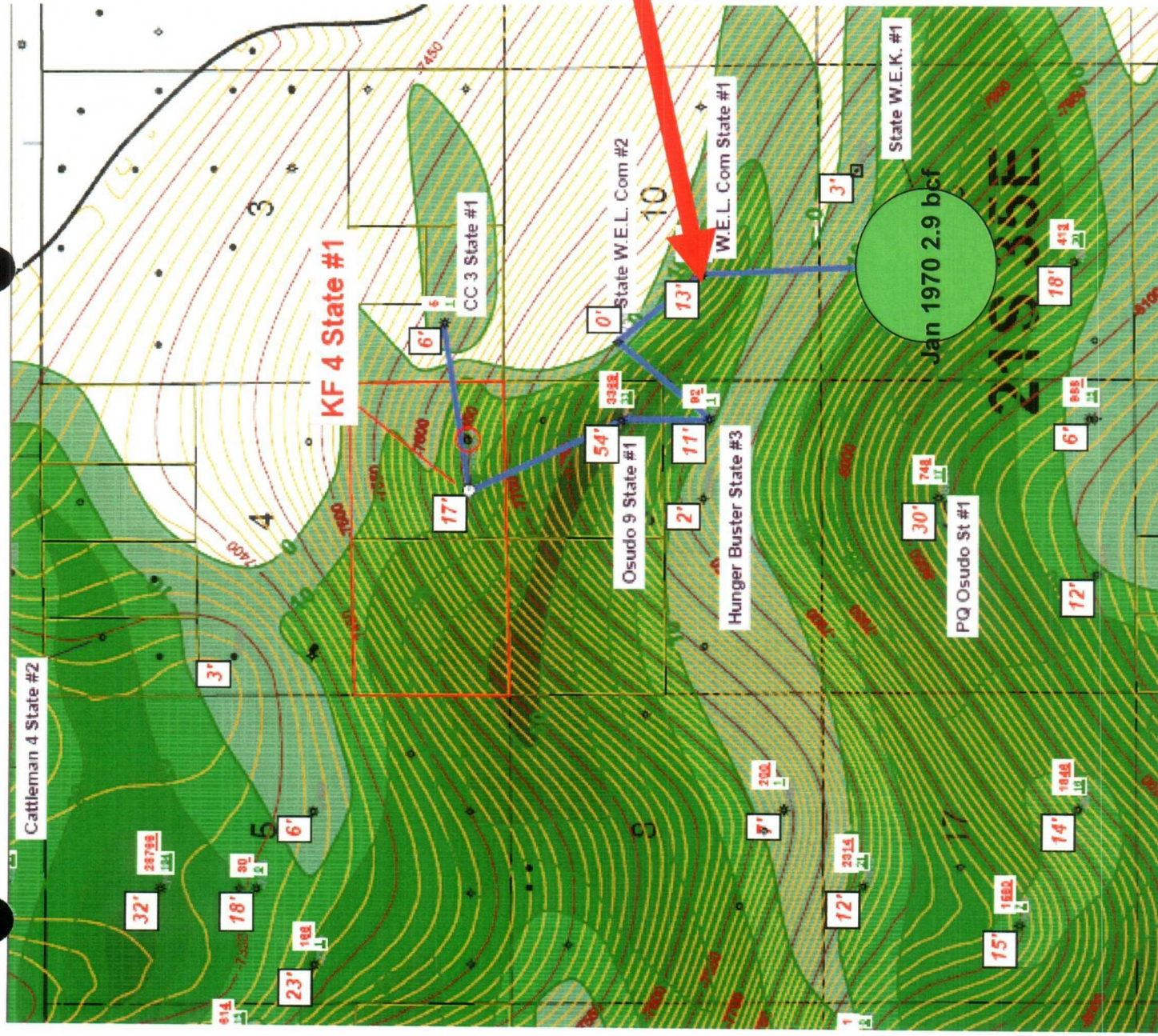
1<sup>st</sup> Allocated Prod  
Date in May-67

Current Gas Cum of  
6.4 BCF



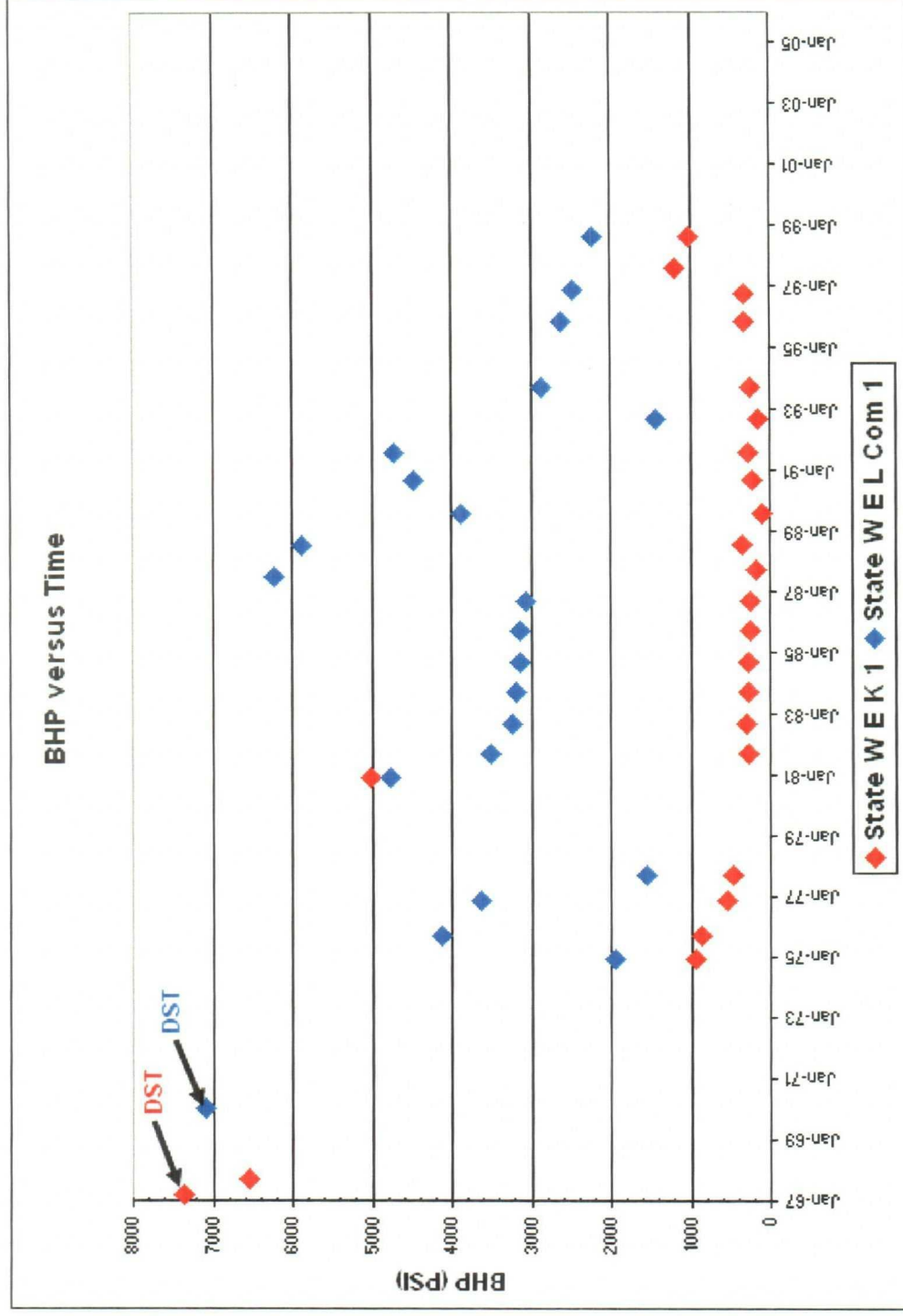
# State WEK 1 BHP versus Time





**State WEL Com 1**  
**Initial SBHP of 7080**  
**PSI with DST in Jan-70**  
**1<sup>st</sup> Allocated Prod**  
**Date in Jan-70**  
**Current Gas Cum of**  
**3.1 BCF**

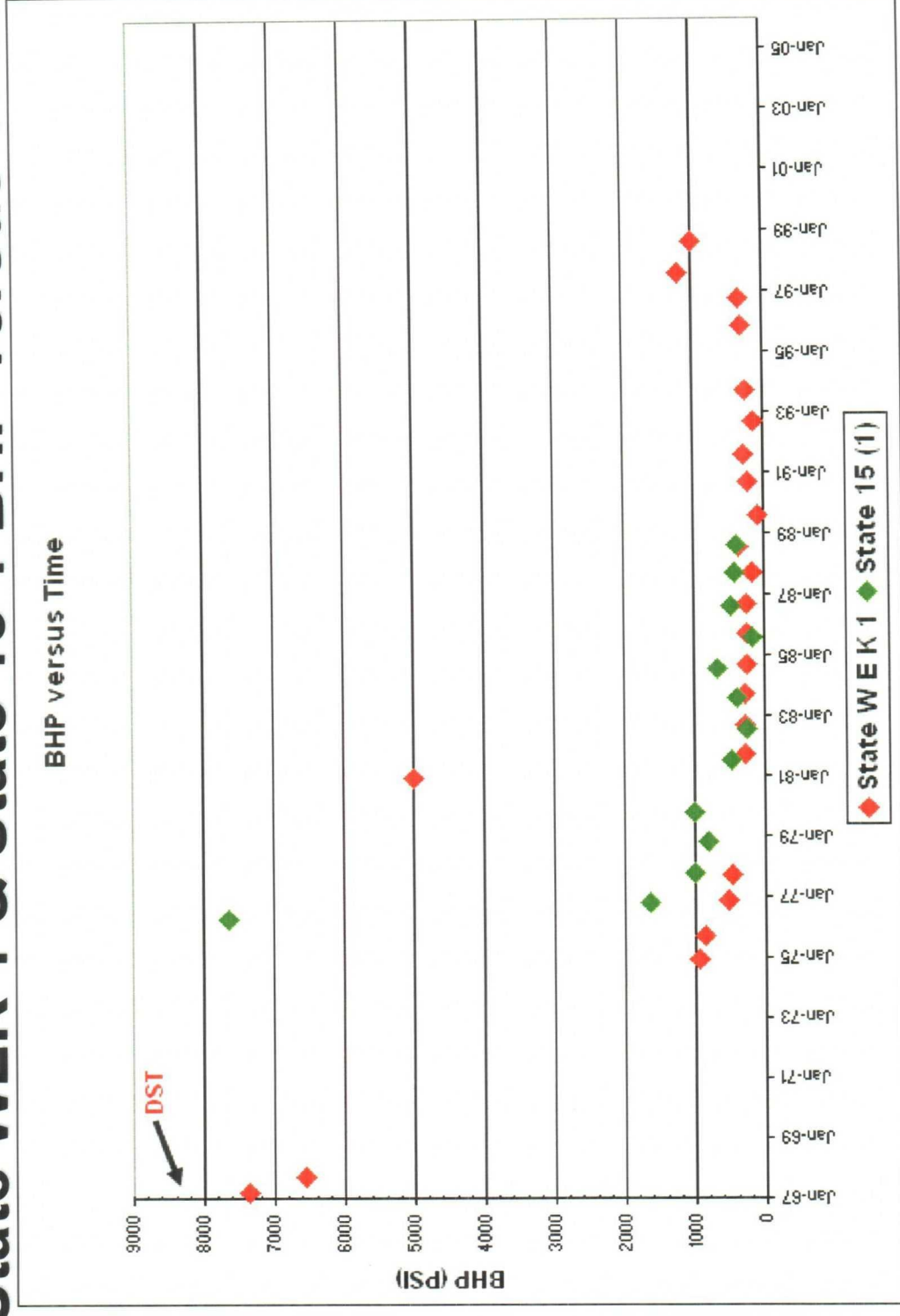
# State WEK 1 & State WEL Com 1 BHP versus Time



The State WEK 1 & State WEL Com 1 wells have very different BHP characteristics  
**NO PRESSURE COMMUNICATION**  
 (supports CHK's Geologic Interpretation)



# State WEK 1 & State 15 1 BHP versus Time

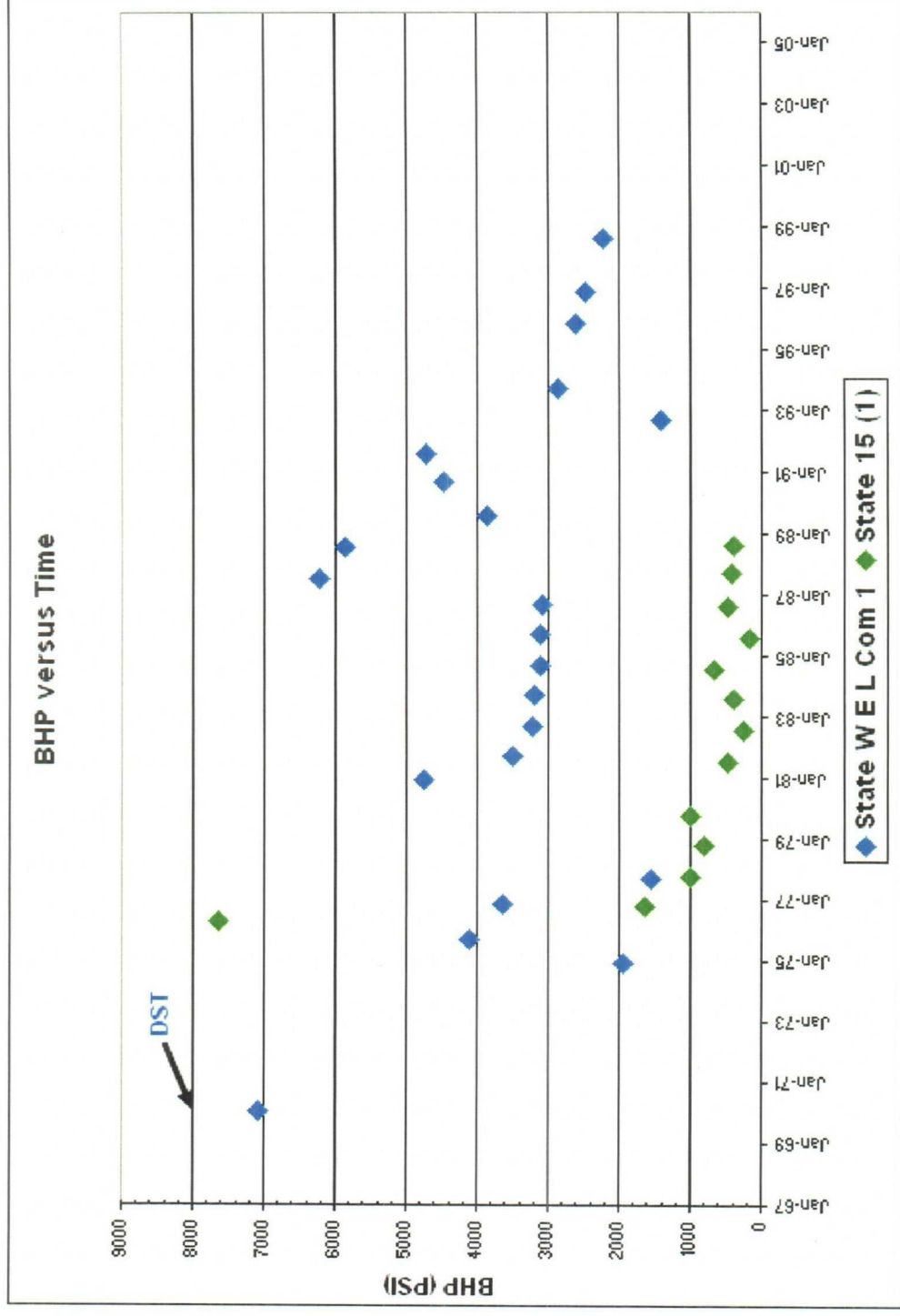


The State WEK 1 & State 15 1 wells have very

similar BHP characteristics

**PRESSURE COMMUNICATION EXISTS**  
(supports CHK's Geologic Interpretation)

# State WEL Com 1 & State 15 1 BHP versus Time

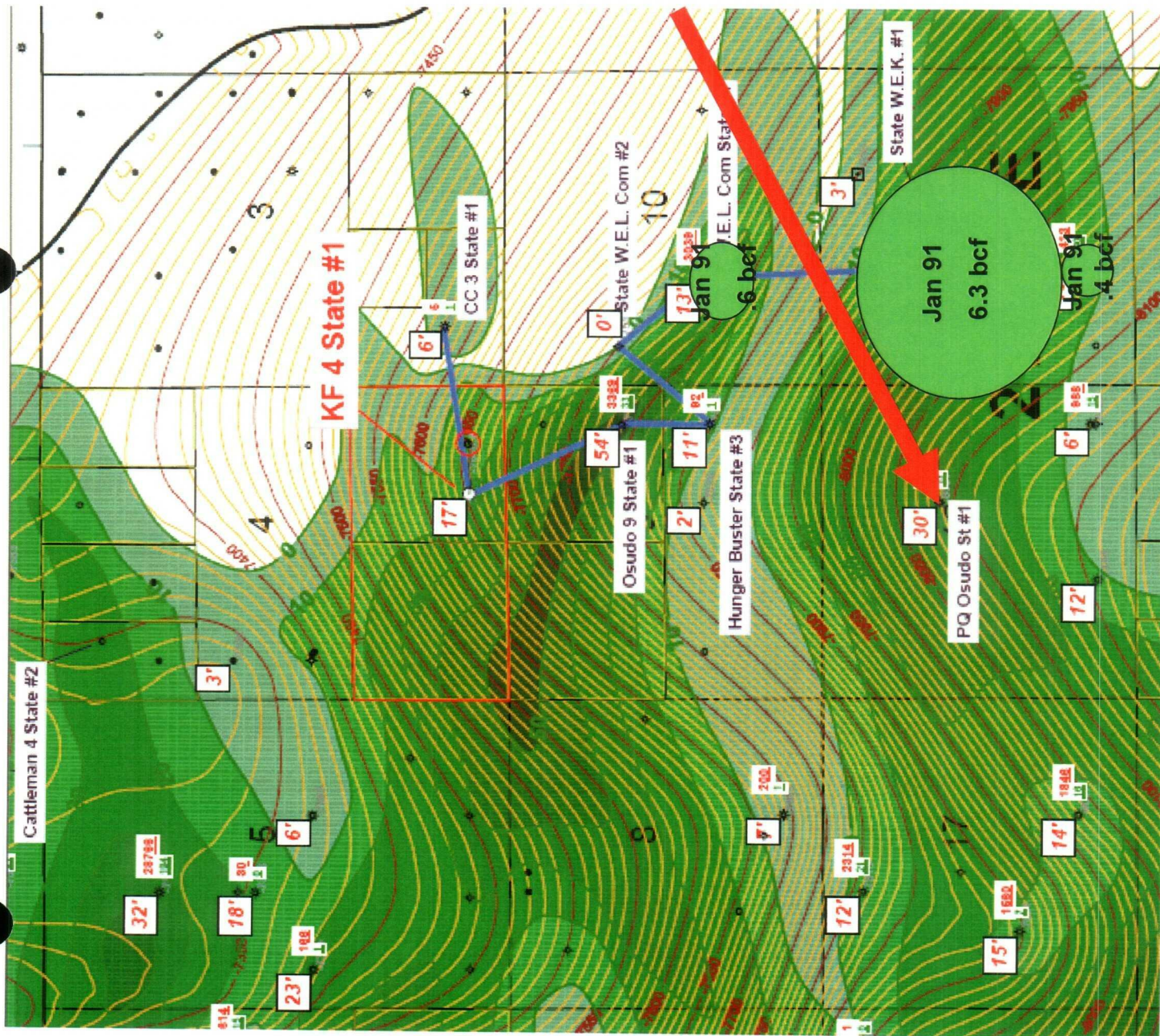


However, the State WEL Com 1 & State 15 1 wells have very different BHP characteristics

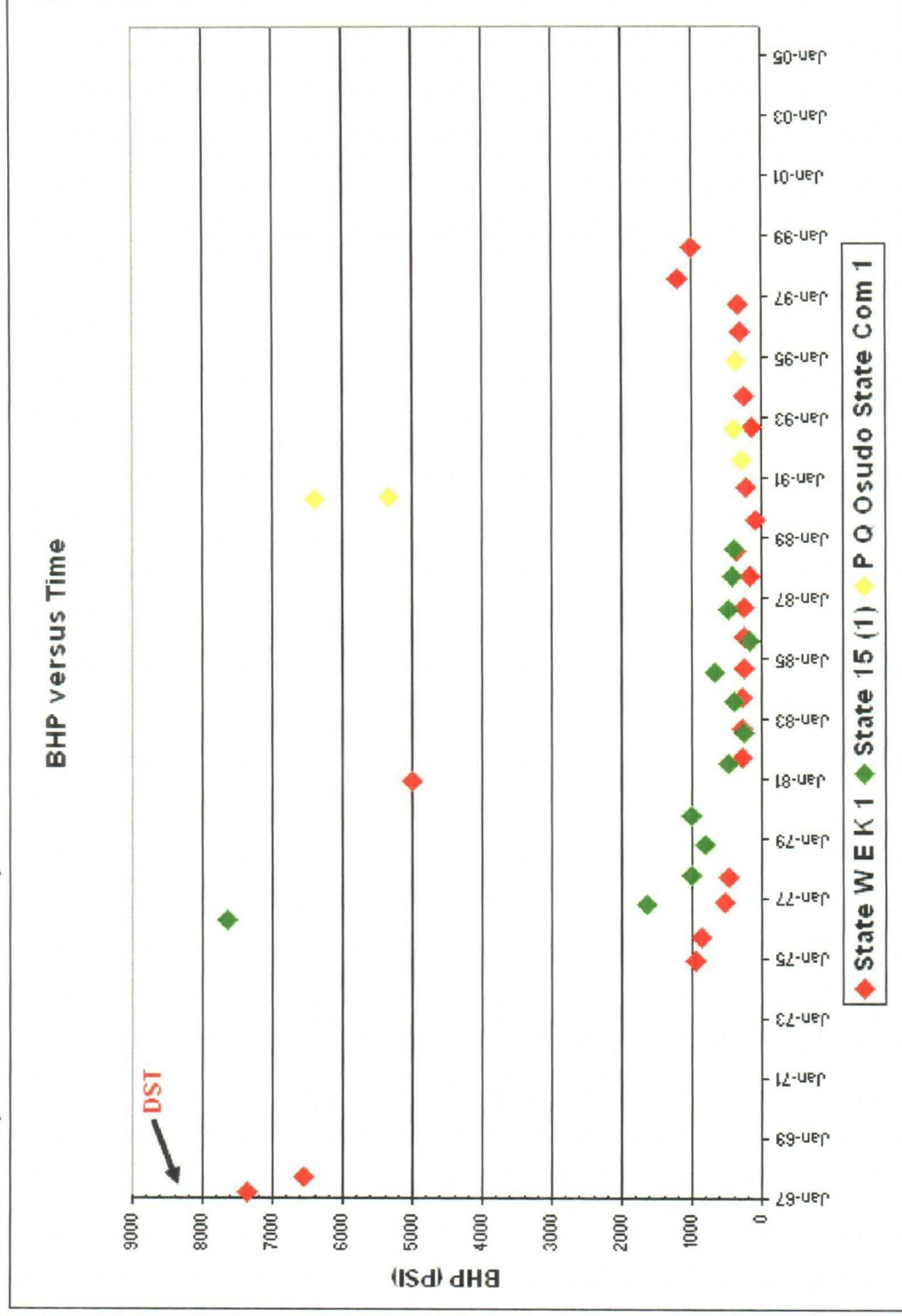
**NO PRESSURE COMMUNICATION**  
(supports CHK's Geologic Interpretation)

# PQ OSUDO State Com 1

- Initial SBHP of 6380 PSI in Feb-90 (PBU)
- 1<sup>st</sup> Allocated Prod Date in Jan-91
- Current Gas Cum of 0.8 BCF

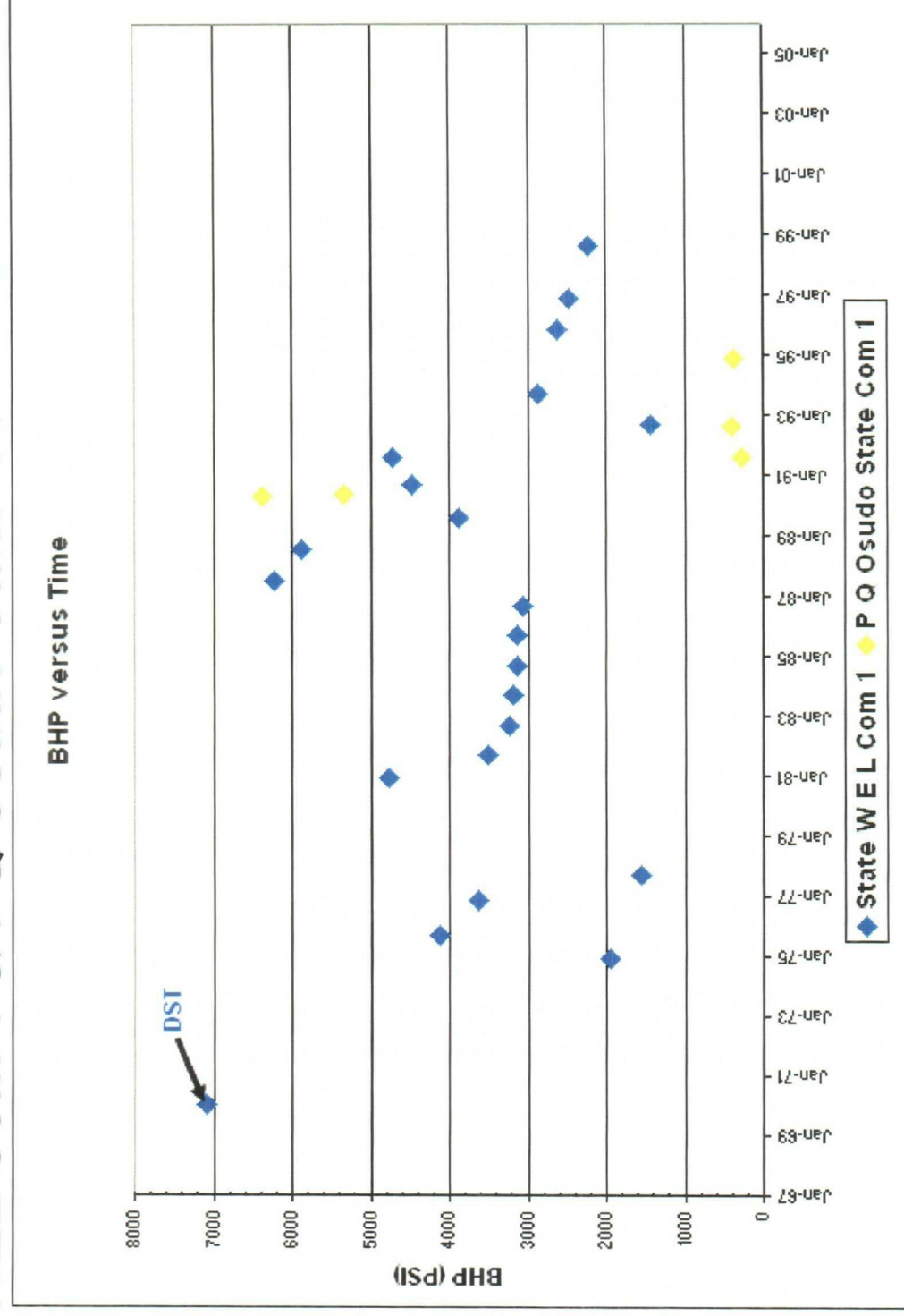


# State WEK 1, State 15 1, & PQ Osudo State Com 1 BHP versus Time



The State WEK 1, State 15 1, & PQ Osudo State Com 1 wells have very similar BHP characteristics  
**PRESSURE COMMUNICATION EXISTS**  
 (supports CHK's Geologic Interpretation)

# State WEL Com 1 & PQ Osudo State Com 1 BHP versus Time



However, the State WEL Com 1 & PQ Osudo State Com 1 wells have very different BHP characteristics

**NO PRESSURE COMMUNICATION**  
(supports CHK's Geologic Interpretation)

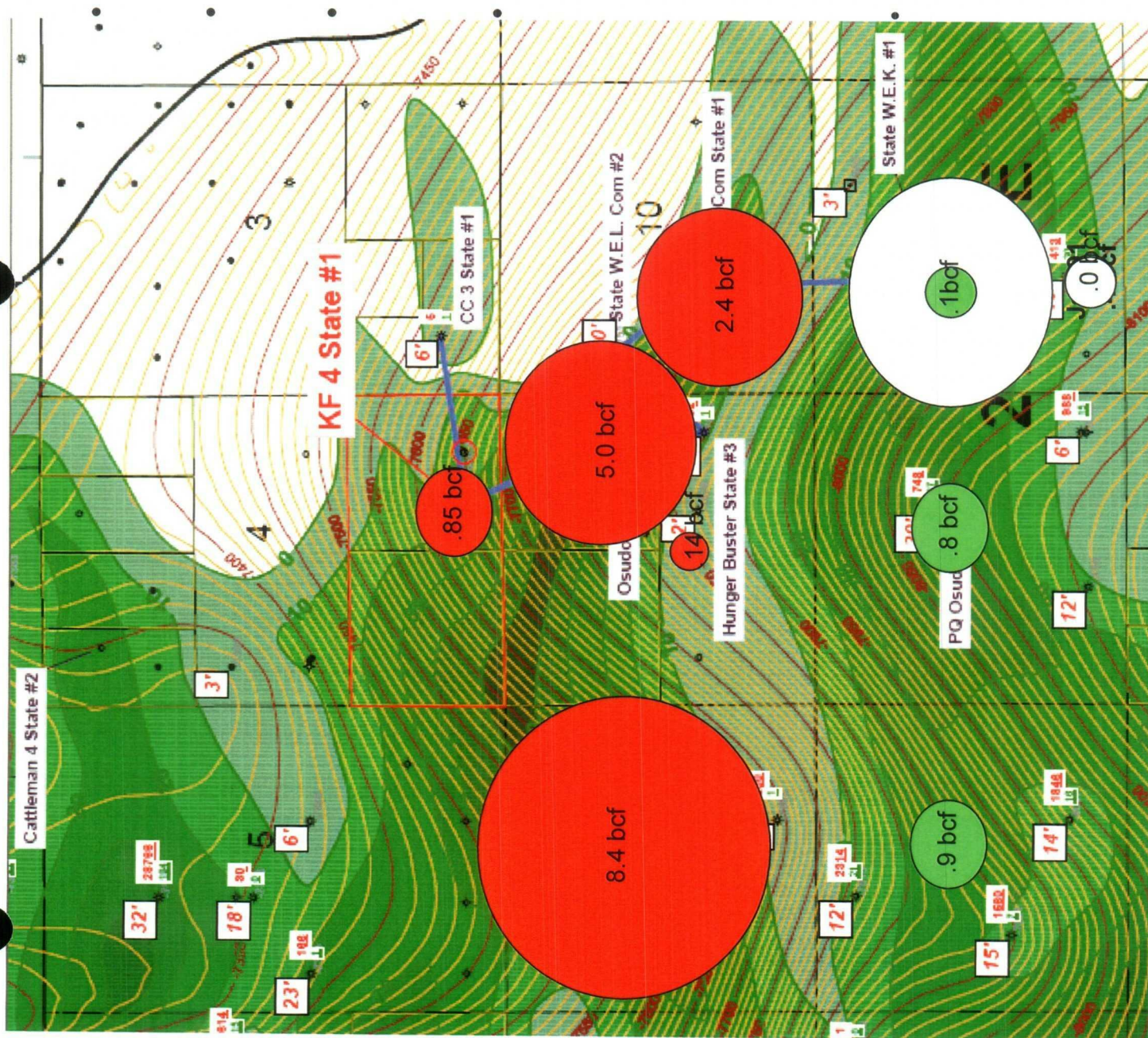
Exhibit: PE-36

Jan 91 the PQ Osudo Com #1 was completed

Since 1991 the WEK block has cum'd very little additional reserves

While the WEL Com State #1 block has continued to mature

Block performance is consistent with pressure data and CHK geologic mapping



Cum to date

- State WEK #1 6.4 bcf
- State WEL Com #1 3.1 bcf
- State 15 #1 .4 bcf
- PQ Osudo Com #1 .0 bcf
- Osudo 9 Com #1 5.0 bcf
- Hunger Buster #1 .1 bcf
- KF 4 State #1 .9 bcf

# CHK data supports laydown 320...

Exhibit: PE-37

