Successful Mature Field Re-Development at Mount Poso Oil Field, Kern County, California*

Marc Cooper[1], Eddie Behm[2], Michael Lebaron[2], and Katy Jensen-Doescher[2]

Search and Discovery Article #20314 (2015)**
Posted June 30, 2015

*Adapted from oral presentation given at Pacific Section AAPG, SEG and SEPM Joint Technical Conference, Oxnard, California, May 3-5, 2015

[1]California Resources Corporation, Los Angeles, CA (marc.cooper@crc.com)
[2]California Resources Corporation, Los Angeles, CA

Abstract

The Mount Poso Oil Field was discovered in 1926 and has produced over 300 mmbo from a three way closure against an east dipping normal fault situated along the eastern flank of the San Joaquin Valley in Kern County, California. The field was on decline in January, 2012, producing 800 bopd from 300 wells in the Miocene Pyramid Hills Formation. A combination of sixty new horizontal wells, a waterflood project, and re-development of the Oligocene Vedder Formation have since increased production to over 3,000 bopd. Production is expected to increase further with a full field expansion of the waterflood and continued re-development of the lower Vedder Formation. The Vedder Formation was under primary production from its discovery in 1926, then steam flooded from 1973-1998 with a focus on the Upper Vedder, and finally shut-in from 1998-2012. The shallower clay-rich Pyramid Hills Formation was largely bypassed until the mid-1980's, followed by workover appraisal, and then became the focus of development with vertical new drills in 1999 with the first laterals in 2005. From 2005-2012 the average well rates decreased from 4 to 2.5 bopd. In 2012 a successful horizontal well program built off the lessons learned from earlier development increasing production to 2,000 bopd by the end of the year with many 50-125 bopd IP wells. A successful Pyramid Hills waterflood was implemented by incorporating an updated geomodel, testing fluid compatibility with swelling clays, and utilizing the large inventory of existing wellbores to minimize costs. Reappraisal of the previously abandoned lower Vedder Formation since 2013 has led to thirteen new drill wells and five workovers with rates ranging from 10-280 bopd. Renewed focus and shallow reservoirs with attendant low costs have allowed multiple development techniques to be tested successfully in a short period of time at the Mount Poso Field, realizing significant production growth in a mature field.

2015 PSAAPG Annual Conference | Oxnard, CA | May 5th, 2015

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Marc Cooper (Geologist) | Eddie Behm (Reservoir Engineer) | Michael Lebaron (Production Engineer) | Katy Jensen-Doescher (Petrophysicist)

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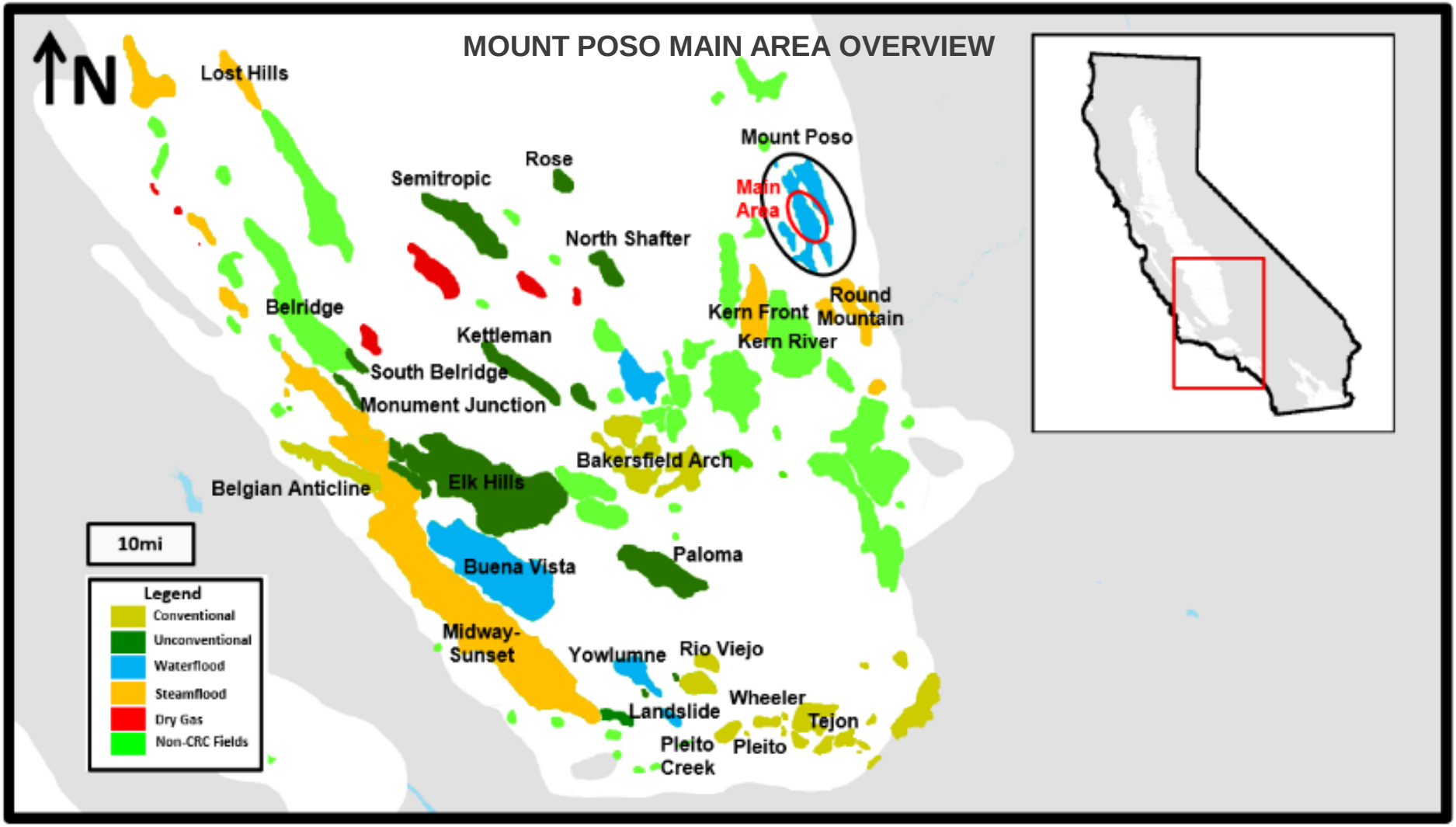
MOUNT POSO MAIN AREA OVERVIEW



Field discovered by Shell in 1926 | CRC (Oxy, 2014 spinoff) acquired in 2007

Formations: Pyramid Hill and Vedder | Depths: 1,300'-2,000'

Oil Gravity: 15-18° API | Current production: 3,000 bopd

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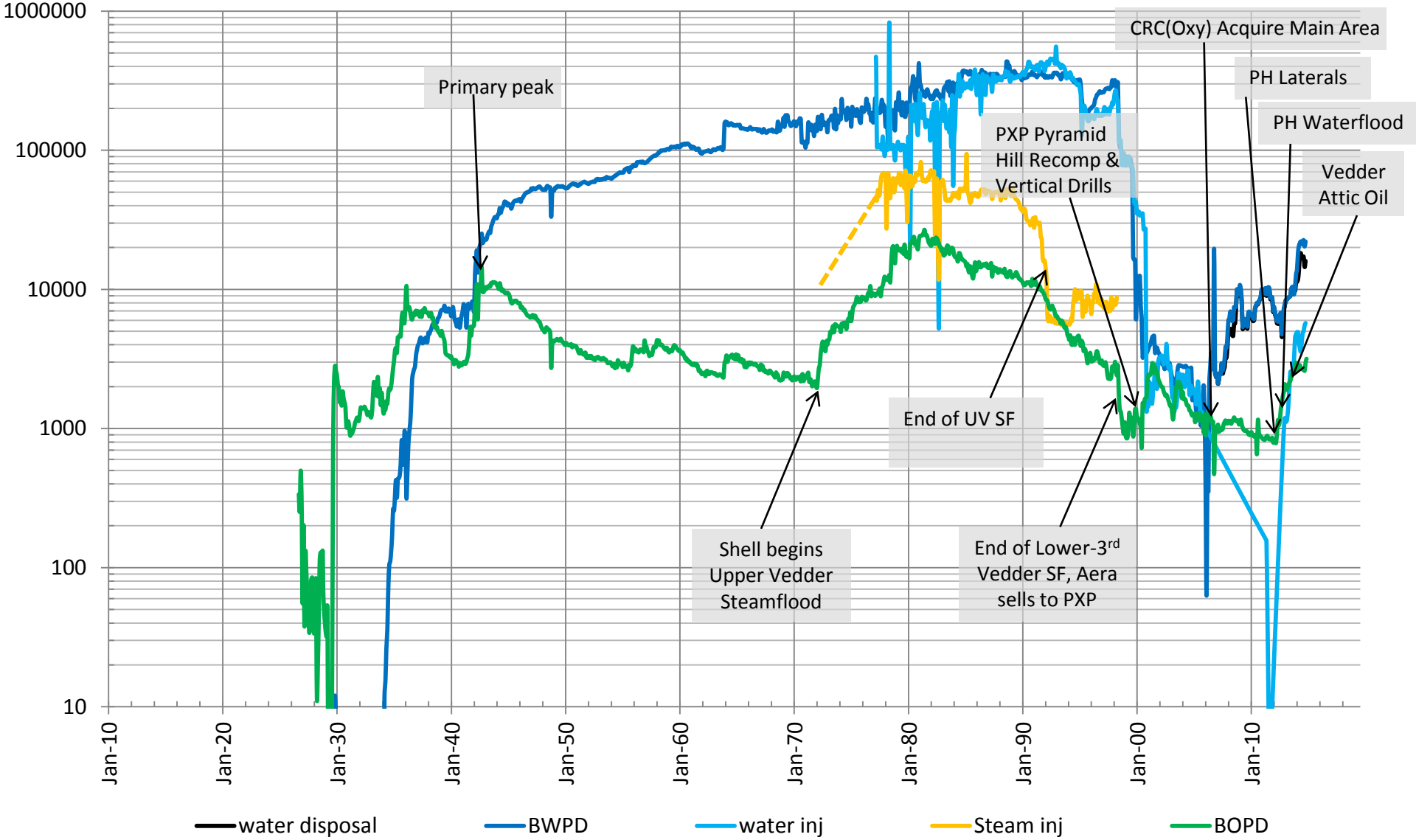
Mount Poso Main Area Production History



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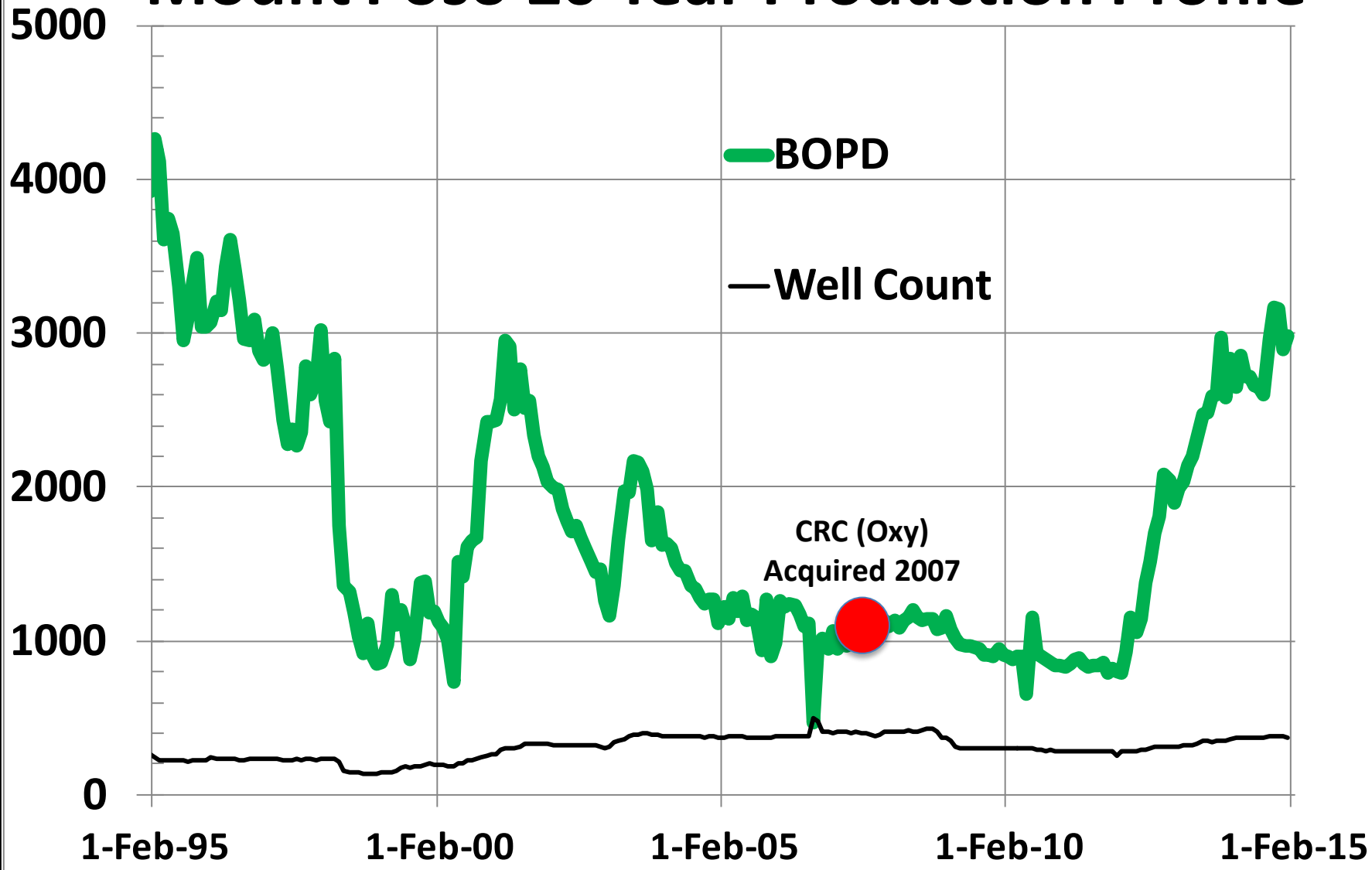
Mount Poso 20 Year Production Profile



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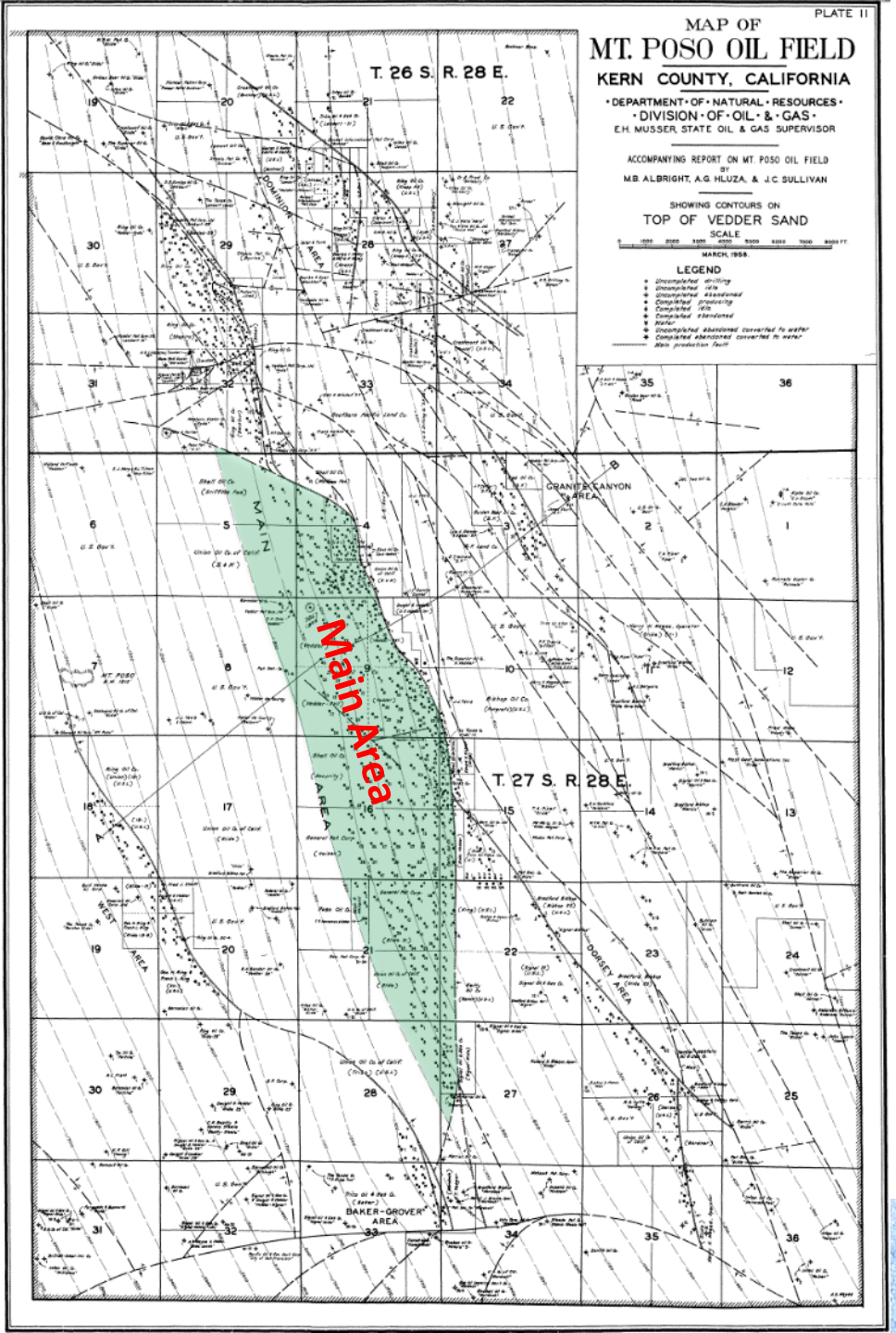

MOUNT POSO STRUCTURE & STRATIGRAPHY

- 7° WSW Regional Dip
- Normal Faults along strike
- Basement is granitic at ~3,000’
- Main Area is 3-way fault closure w/ ~400ft throw vs ~100ft in other Areas
- Only Upper Vedder pays outside Main Area
- Main Area is operated 100% by CRC and currently has >90% of production rate
- This presentation focuses on the Main Area of Mt Poso

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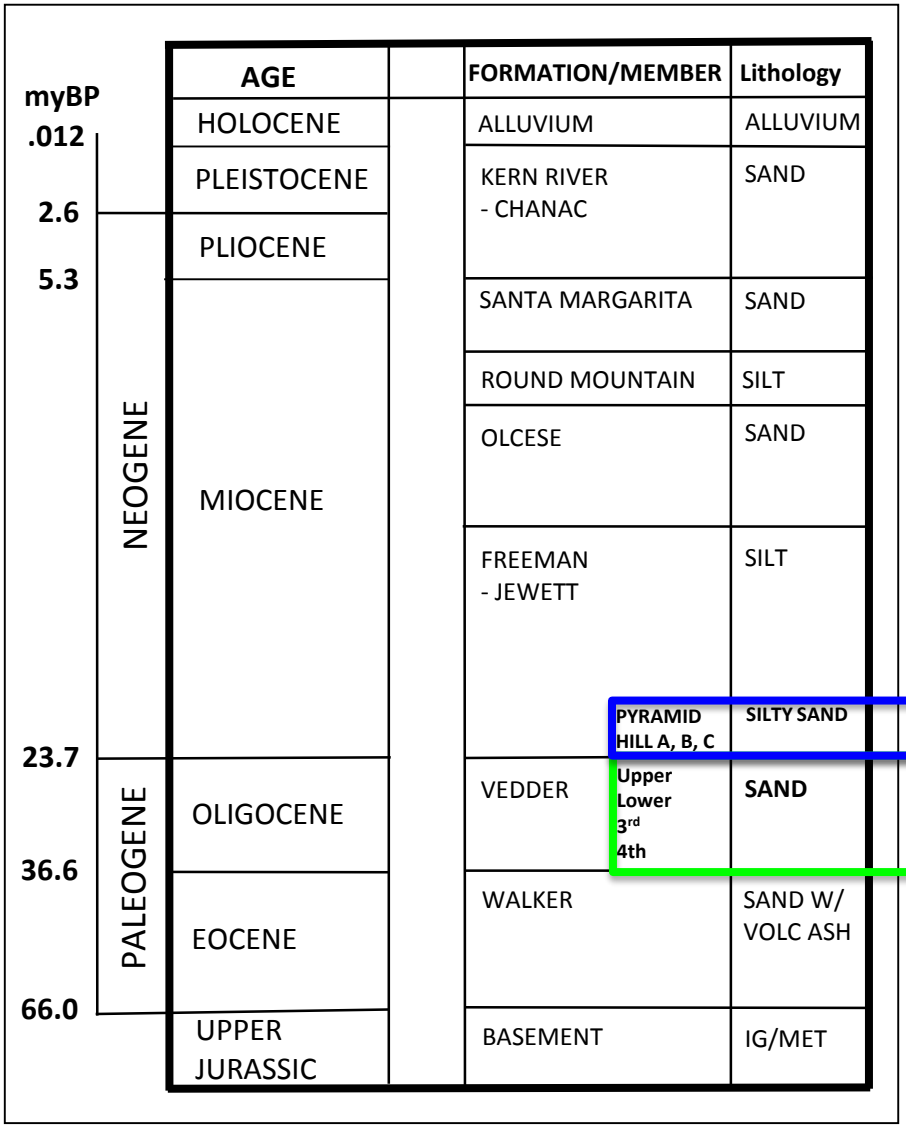
EAST SIDE SAN JOAQUIN VALLEY STRATIGRAPHIC COLUMN



Mount Poso Main Area
Current Development

Waterflood

Primary

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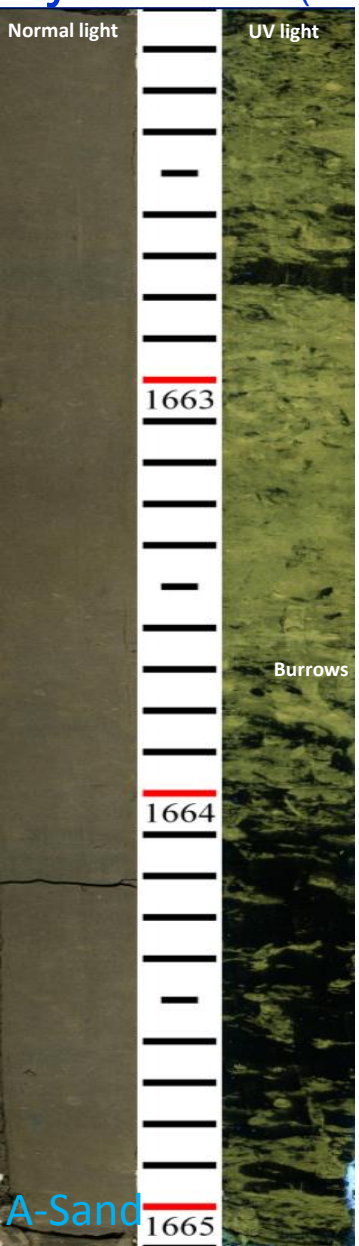
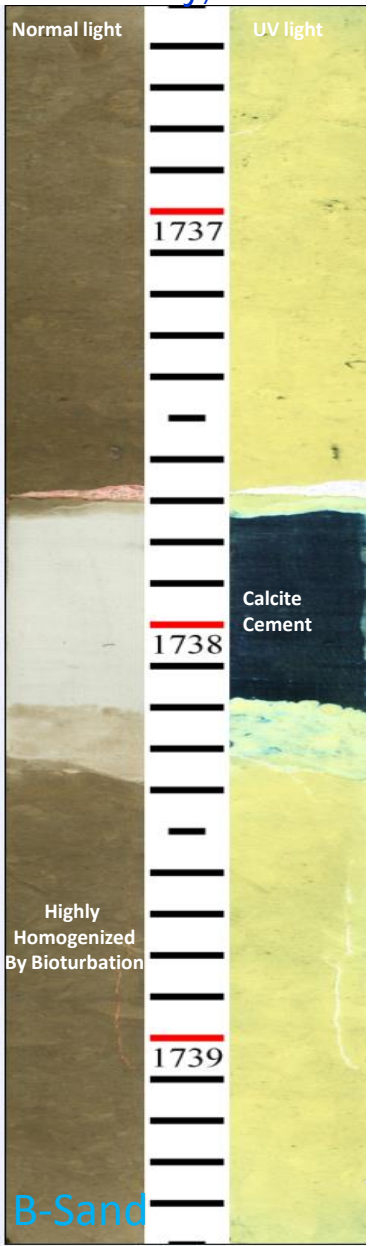
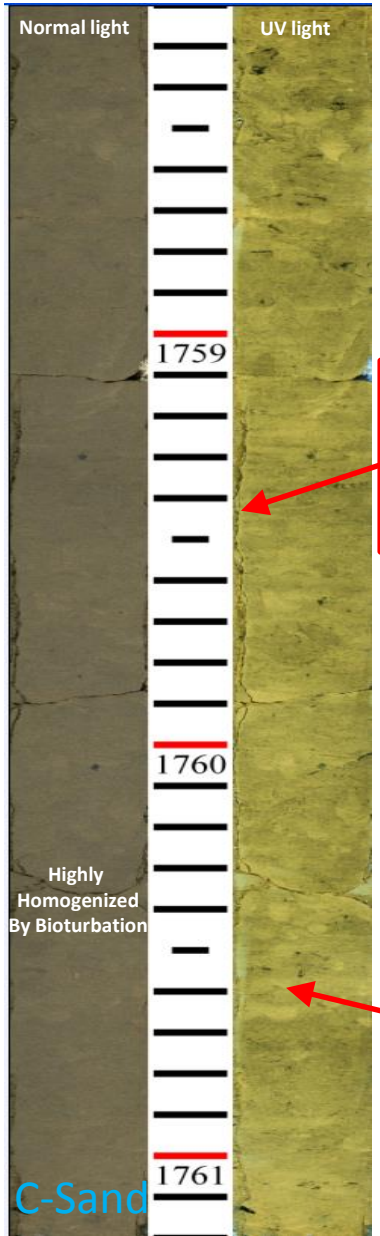
Mount Poso Upper & Lower Shoreface Depositional Environments - Security 2BH Pilot Hole Core Photos

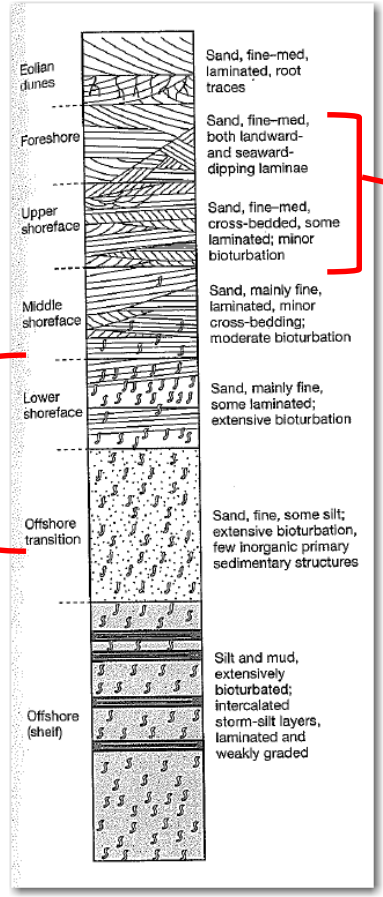
Pyramid Hill (36% Porosity, 10-100md perm)

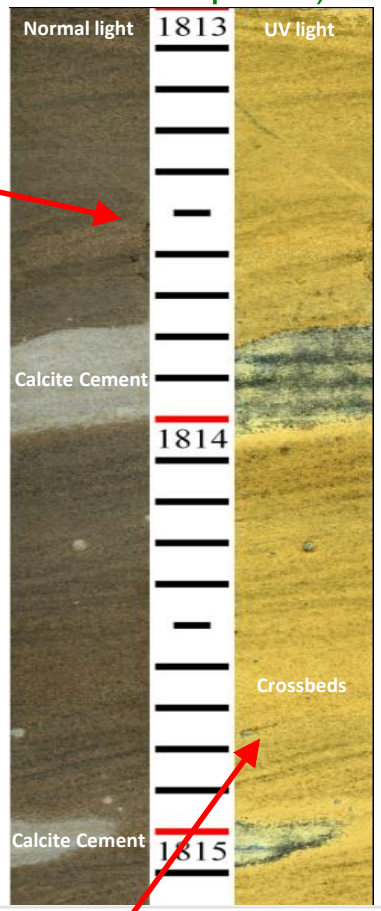
Vedder
(36% Porosity
0.5-5d perm)

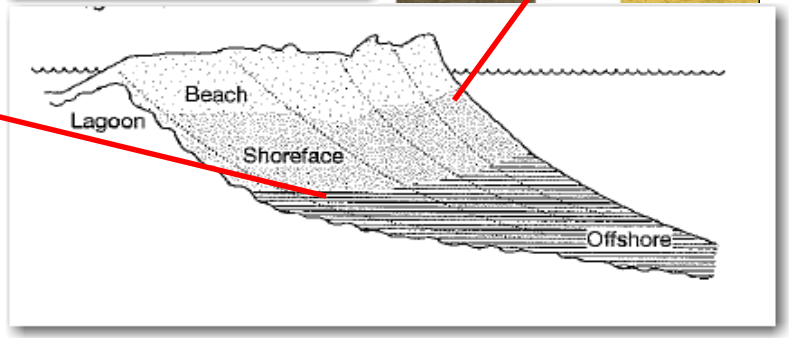




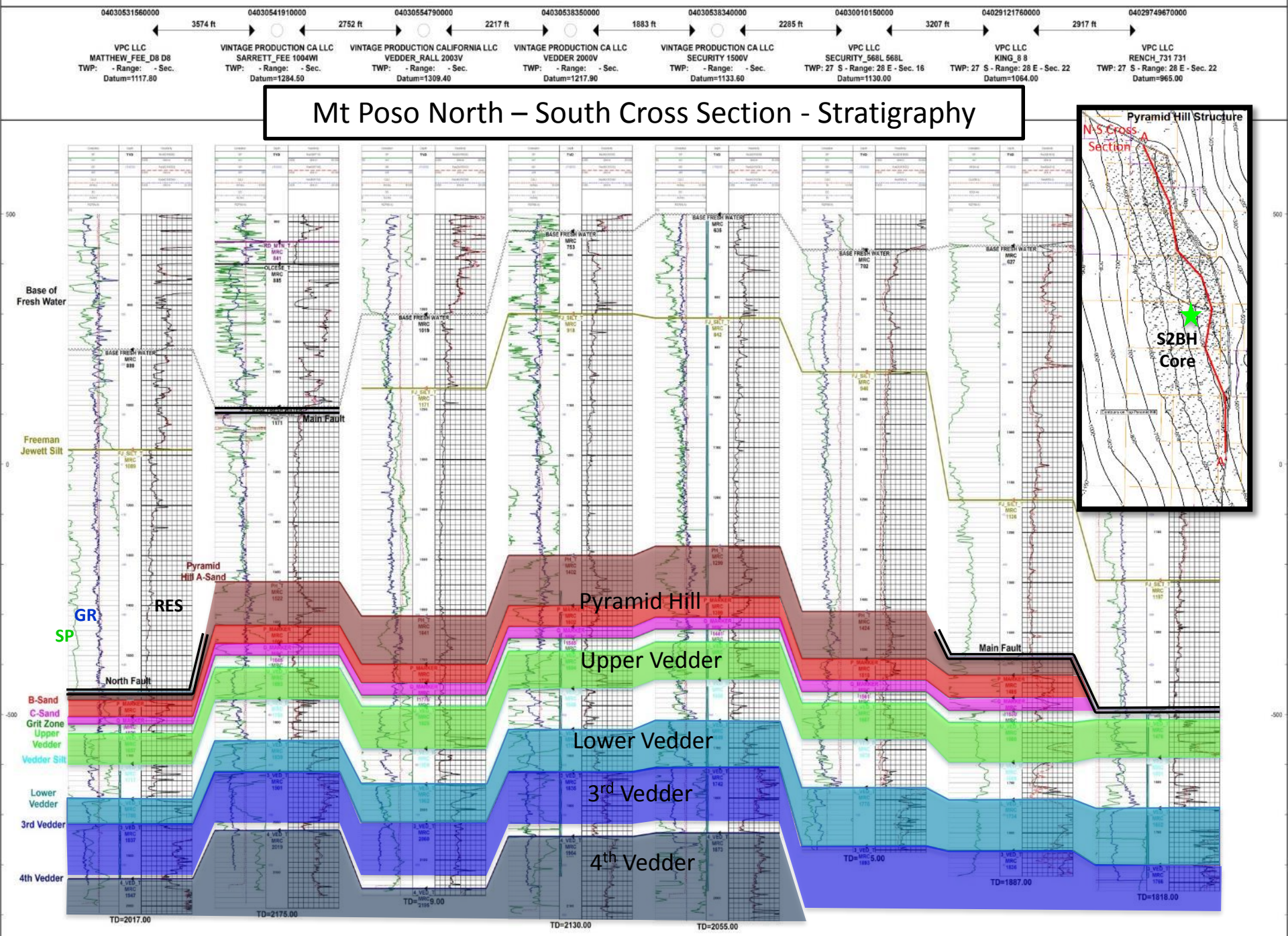




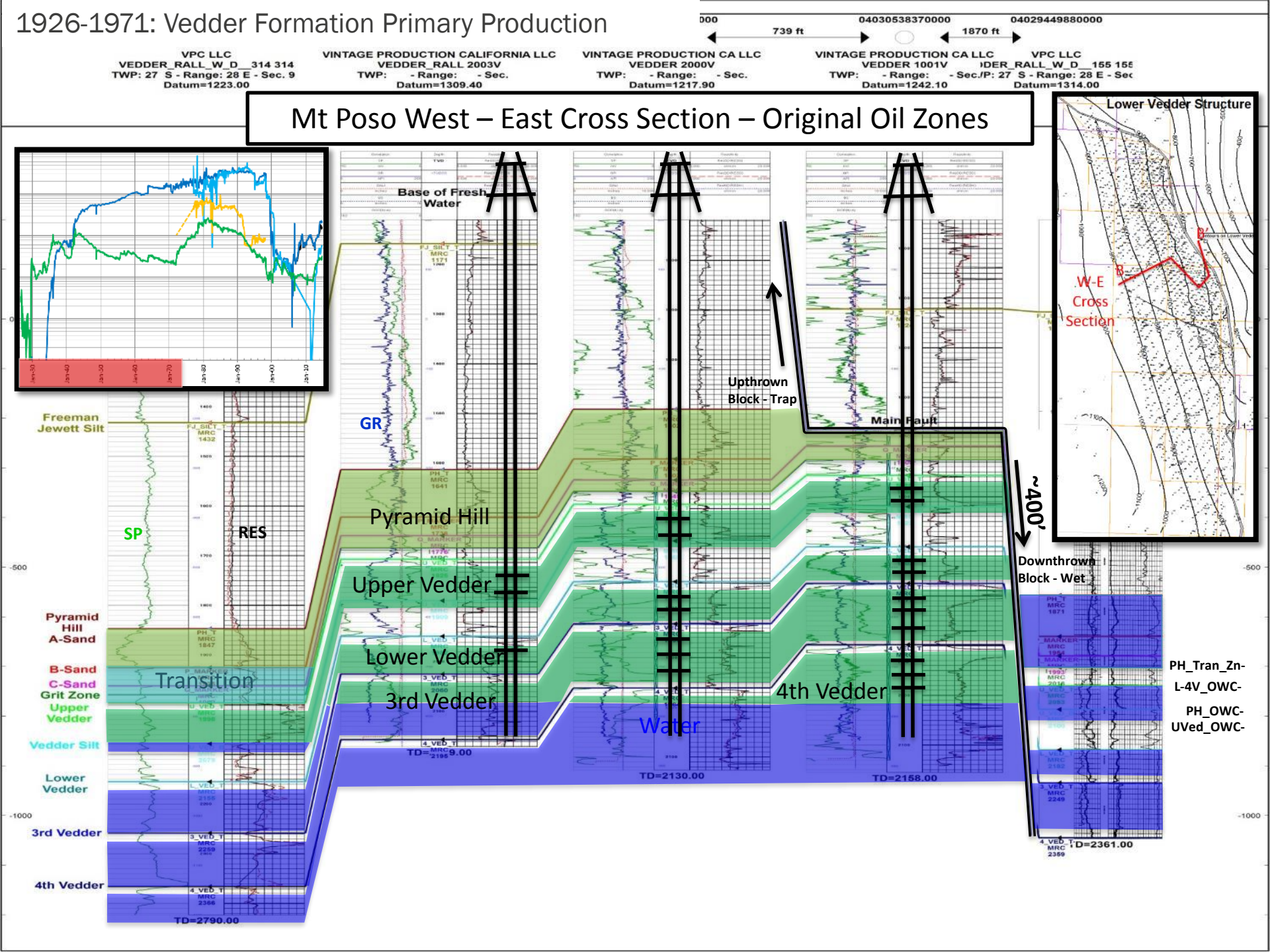




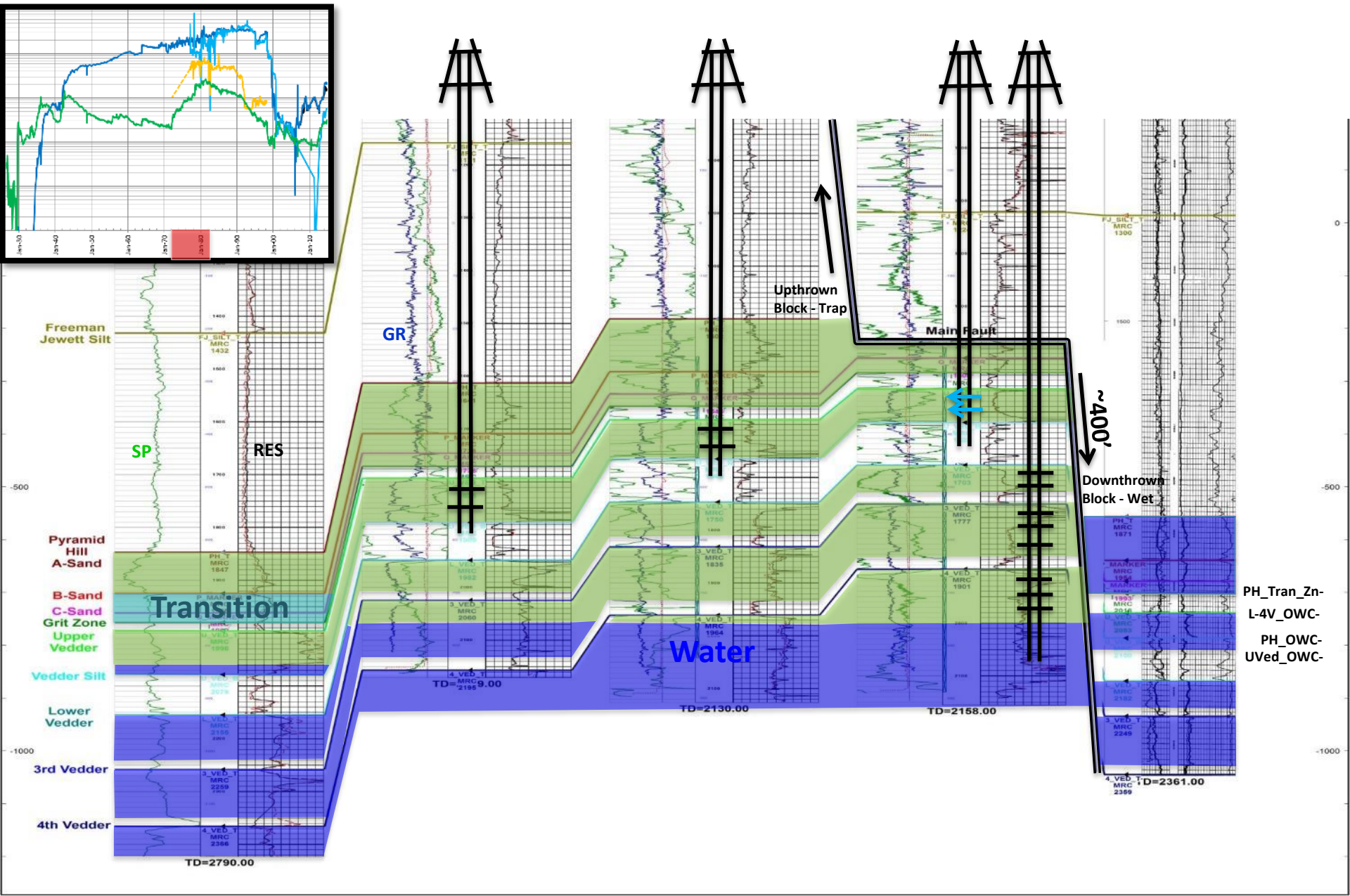
Mt Poso North – South Cross Section - Stratigraphy



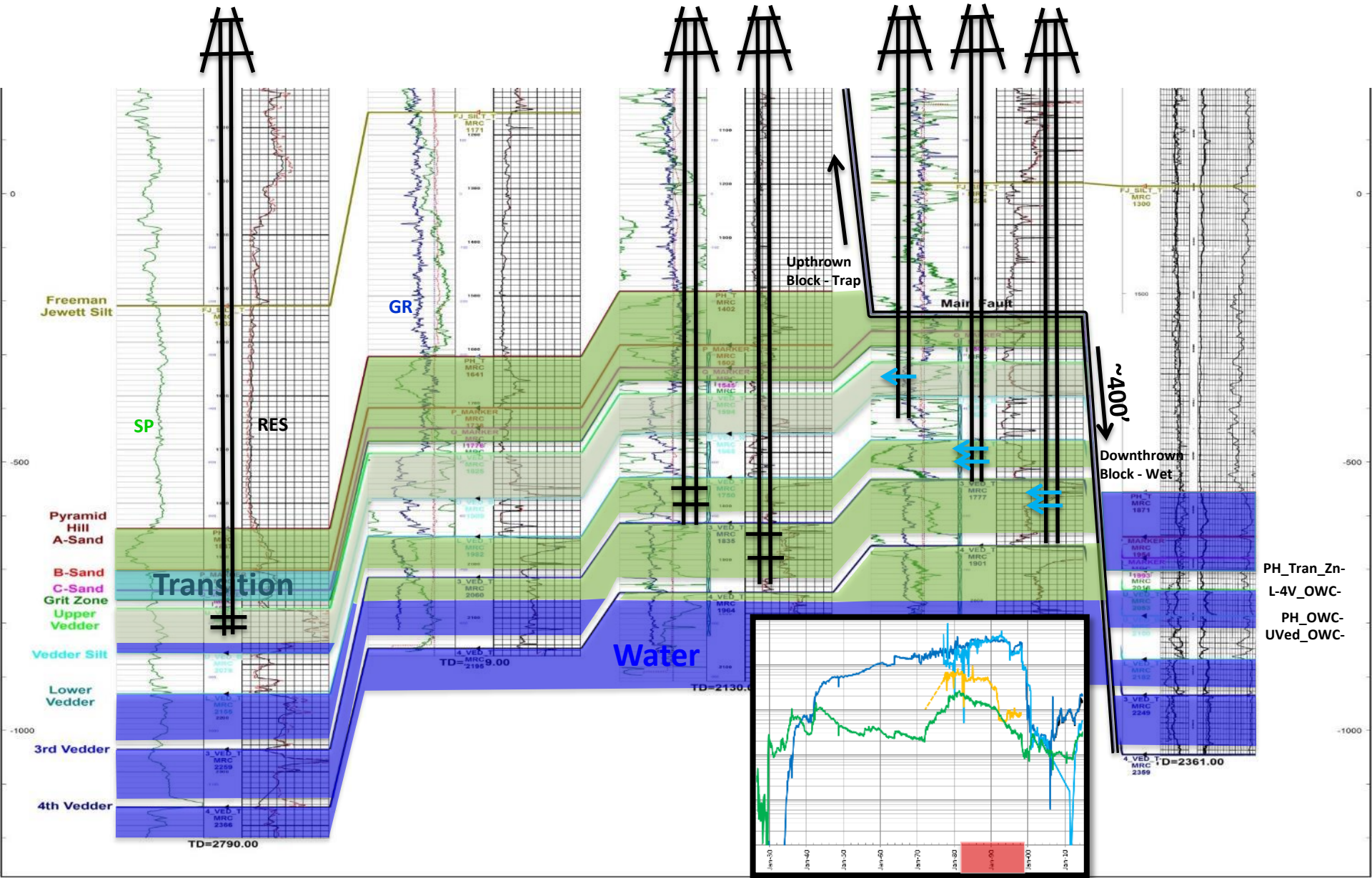
1926-1971: Vedder Formation Primary Production



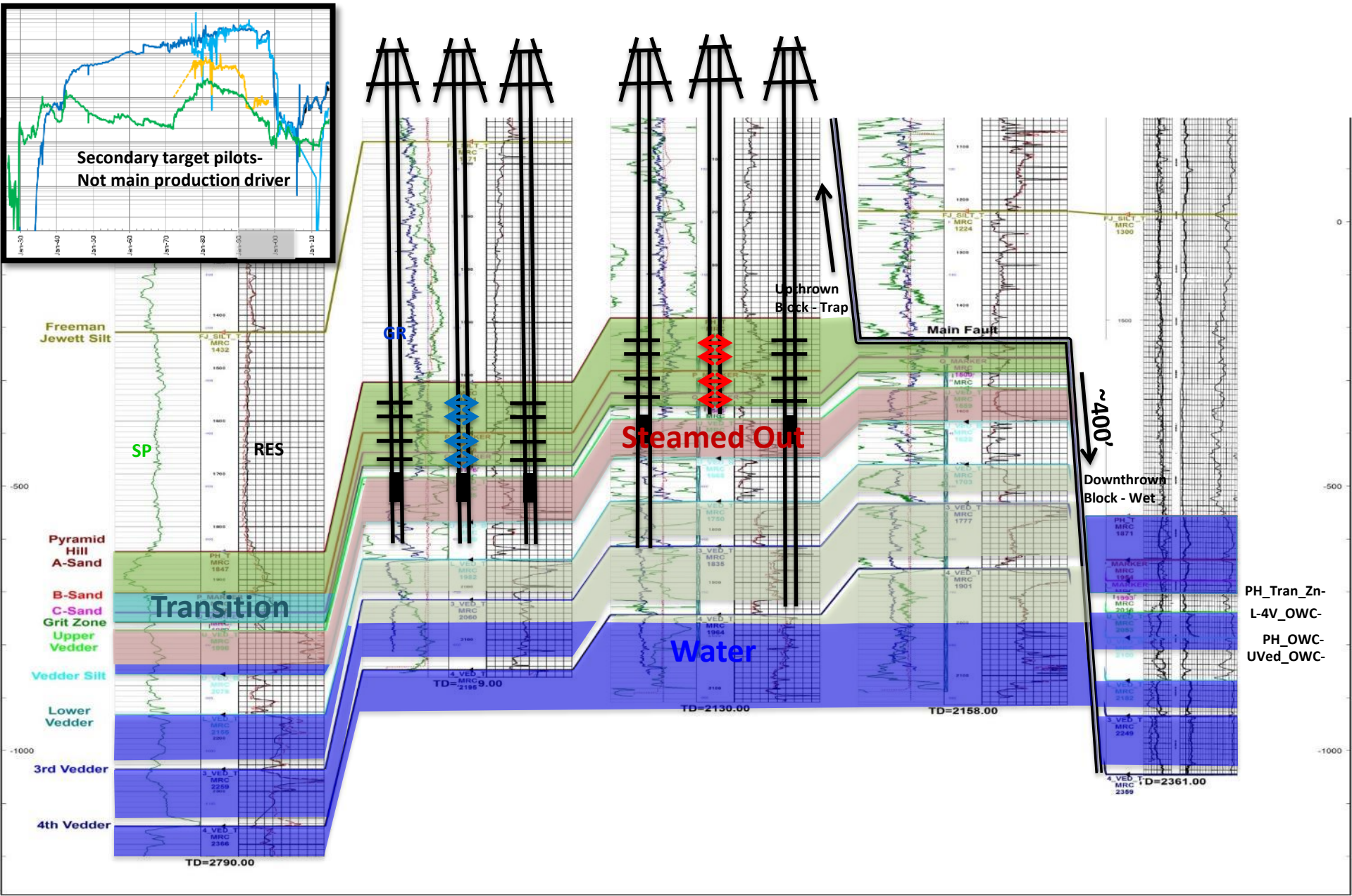
1970-80's: Upper Vedder Line Drive Steam Flood Incline to Peak



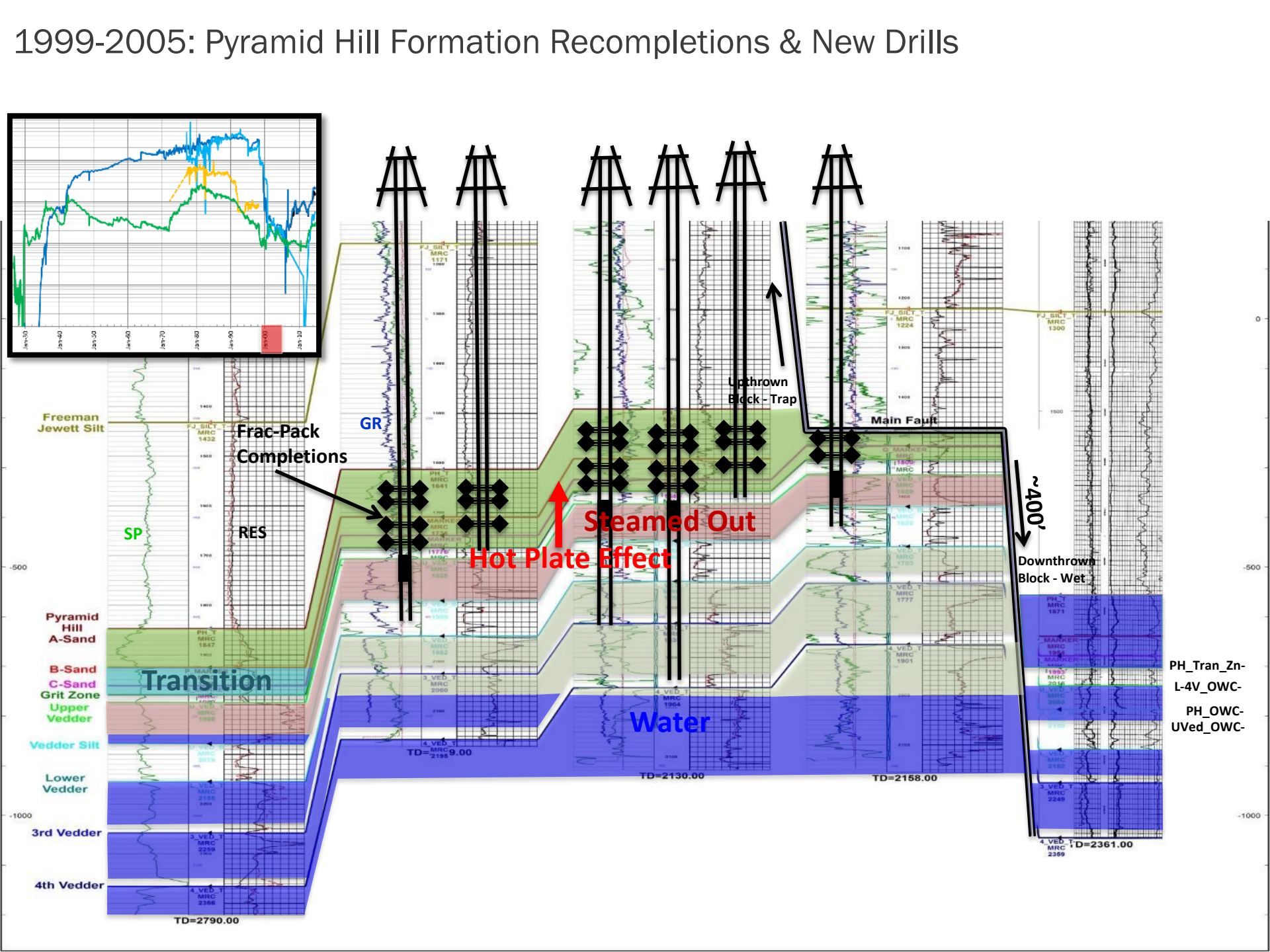
1982-1998: Vedder Steamflood Decline - Downdip Expansion & Deepening



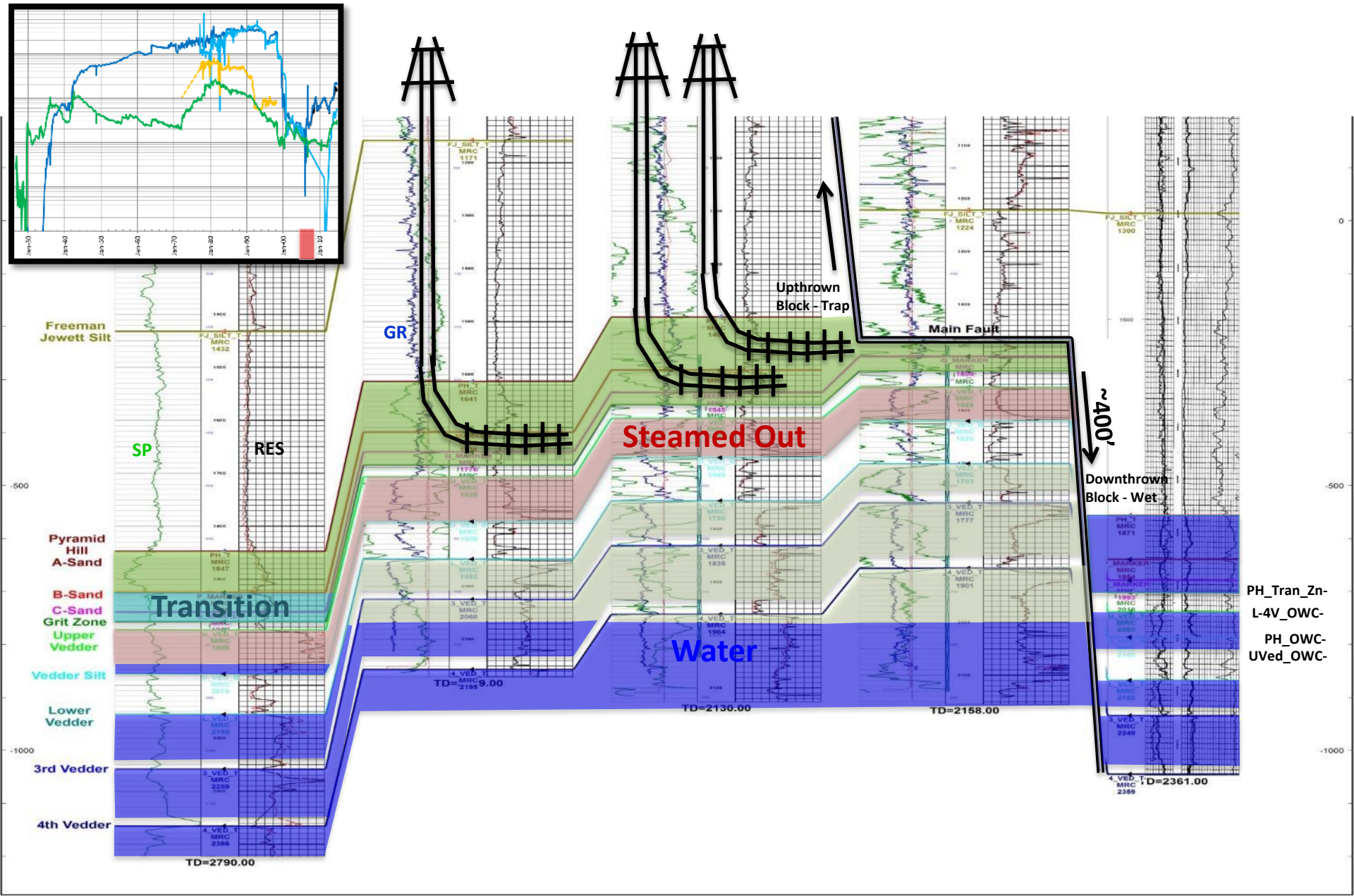
1990's: Pyramid Hill Waterflood and Fireflood Pilots



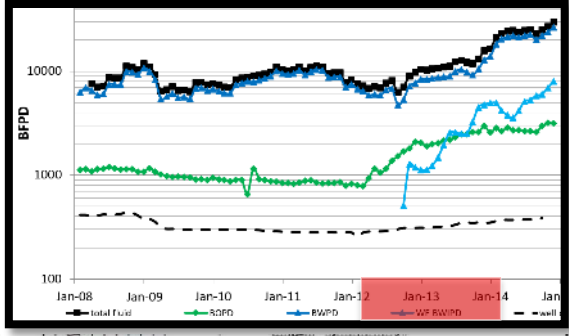
1999-2005: Pyramid Hill Formation Recompletions & New Drills



2005-2008: Pyramid Hill Lateral Drilling



2012 – 2013 (CRC): Pyramid Hill B-Sand Lateral Development



Freeman Jewett Silt

Pyramid Hill A-Sand

B-Sand

C-Sand

Grit Zone

Upper Vedder

Vedder Silt

Lower Vedder

3rd Vedder

4th Vedder

SP

RES

GR

Transition

Steamed Out

Water

Upthrown Block - Trap

Main Fault

~400'

Downthrown Block - Wet

PH_Tran_Zn-L-4V_OWC-

PH_OWC-UVed_OWC-

TD=2790.00

TD=2130.00

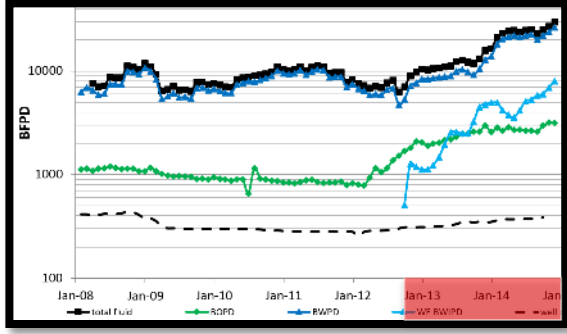
TD=2158.00

TD=2361.00

Improvements on 2005-08 Pyramid Hill Lateral Campaign

- Focusing on Pyramid Hill B-Sand
- Developing highest producing leases, Central & South Units
- Drilling w/ aerated mud to solve lost circulation & sidetracks

2012 - Present (CRC): Pyramid Hill Waterflood



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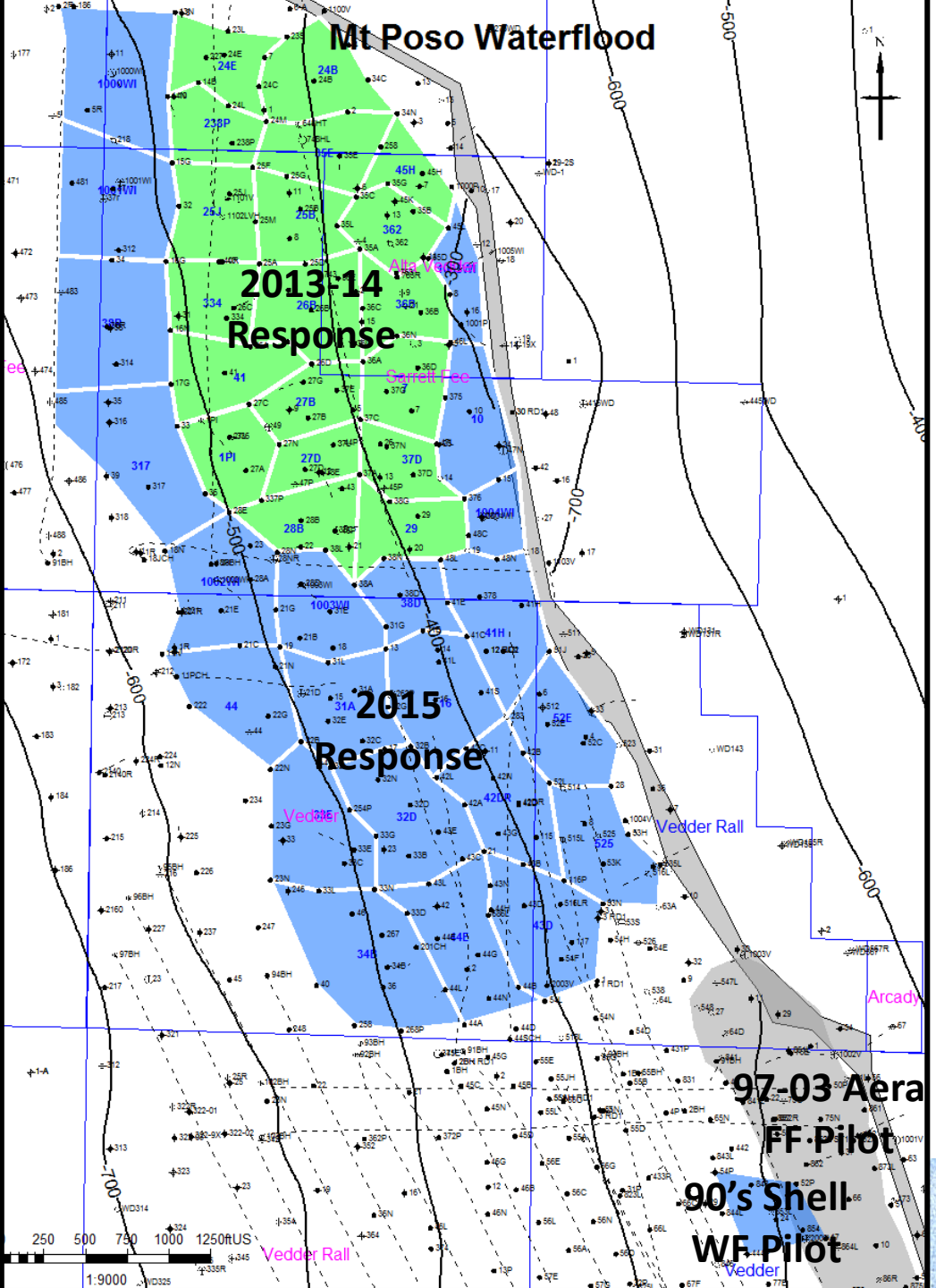

MOUNT POSO WATERFLOOD

- 41 Pattern Development
  - Mostly CTI/RTP, only 9 new drills
  - Initiated 4Q12 w/ strong response within 6mo
  - First 19 patterns responded
  - Subsequent 22 patterns recently developed & filling up
- Enhanced facilities allowed re-appraisal of Lower – 4th Vedder Formation Sands beginning in 2013

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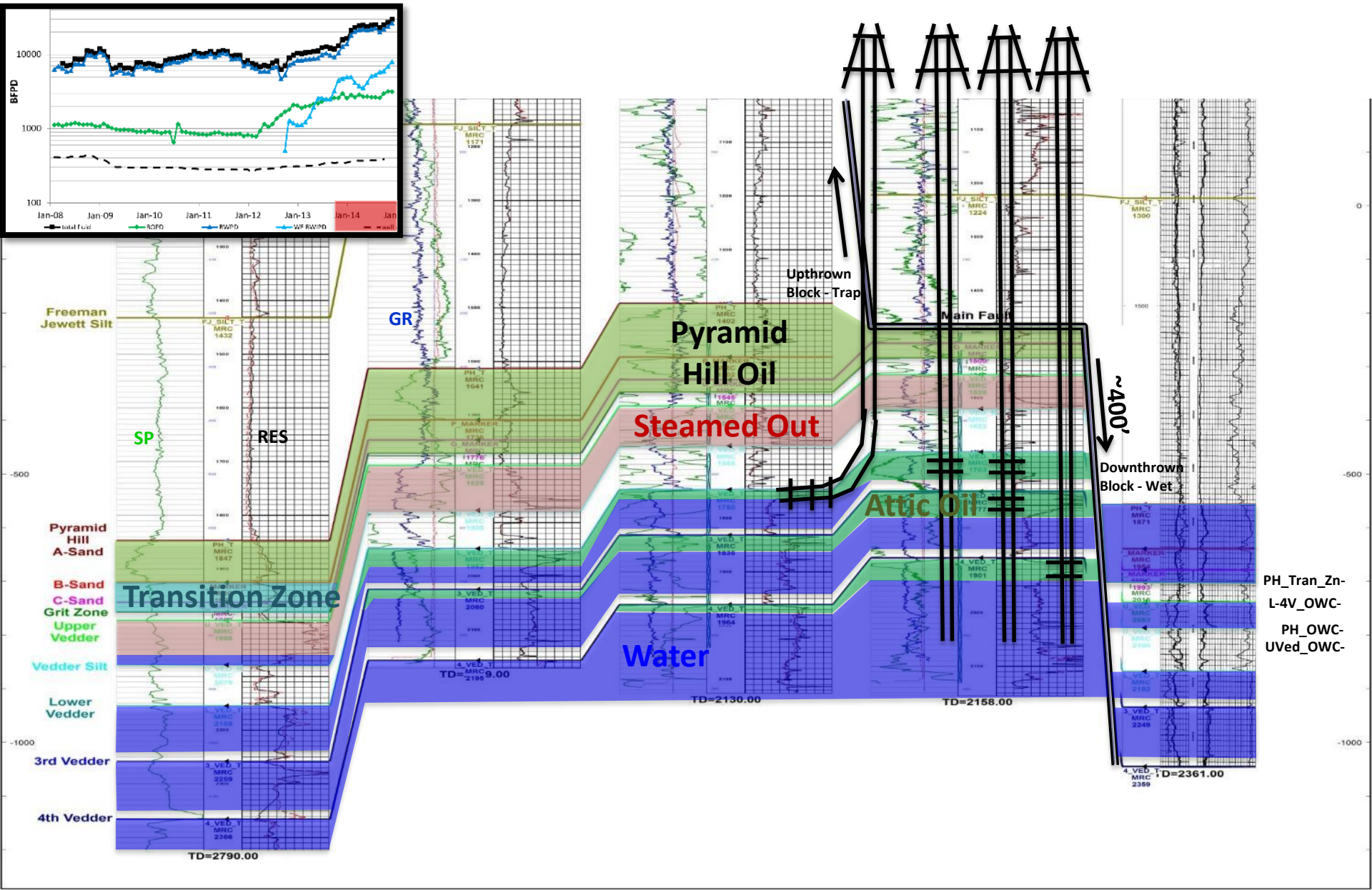
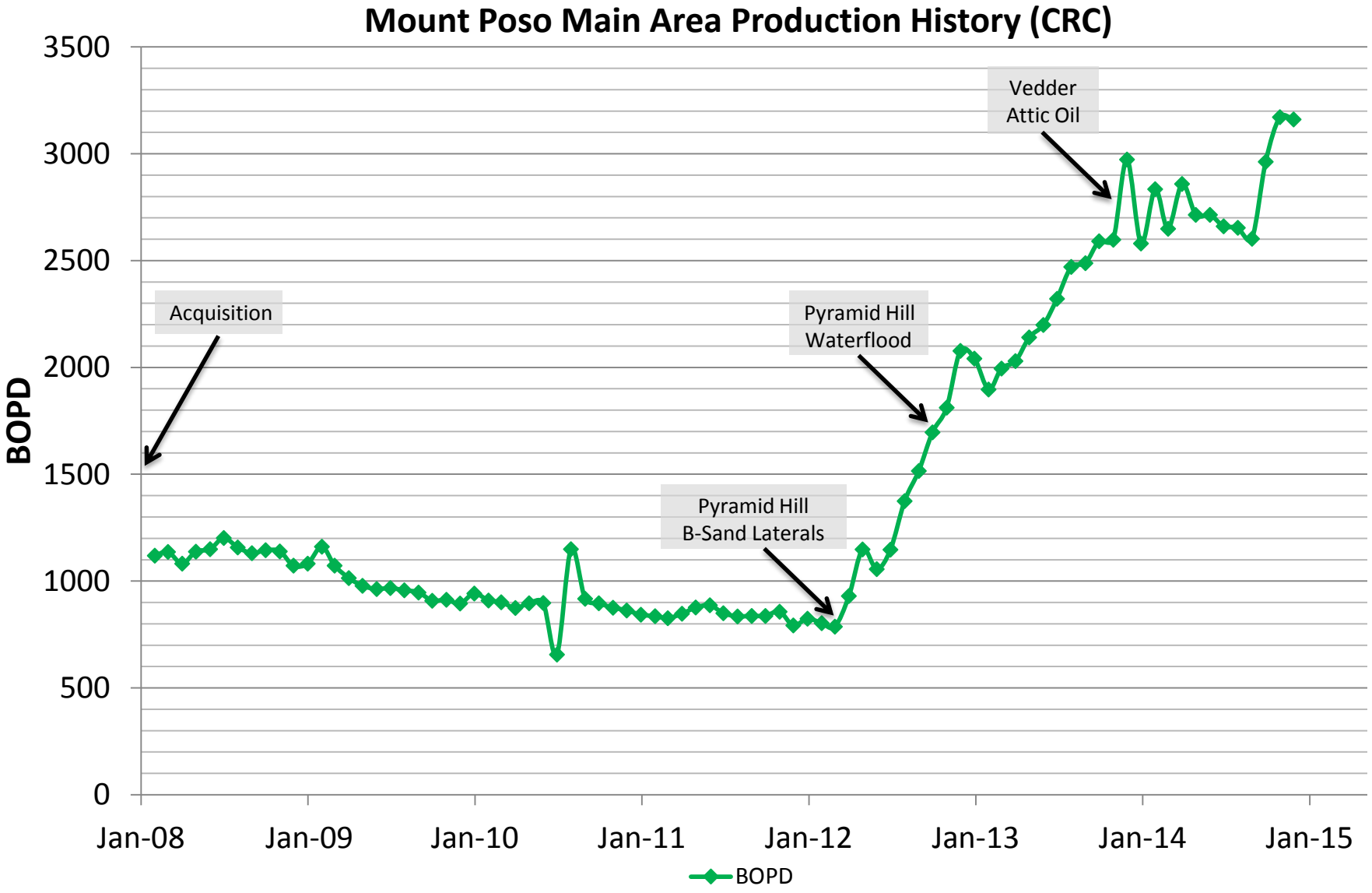
2013 – Present (CRC): Attic Oil Play in lower Vedder Sands





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CONCLUSIONS

- After over 80 years of production at Mount Poso, redevelopment increased production from 800bopd in 2012 to 3,000bopd in 2015

- Multiple opportunities successfully incorporated in redevelopment
  - Pyramid Hill B-Sand Laterals
  - Pyramid Hill Waterflood
  - Vedder Formation Attic Oil Play

- Shallow Reservoirs with low development cost benefitted rapid redevelopment strategy

- Multi-use wellbores (waterflood + attic oil targets) & facilities synergies allowed for multiple opportunities to be pursued simultaneously

- Thank you to our Mount Poso Team + CRC Leadership & for your interest

OUR VALUES

CHARACTER

Acting with integrity and honor, without exception

RESPONSIBILITY

Achieving California's high standards for safety and environmental protection

COMMITMENT

Empowering workers and promoting communities where we live and work

THANK YOU

&

QUESTIONS?