Colorado Oil and Gas Conservation Commission

Petroglyph Hearing
Staff Presentation
December 12, 2007

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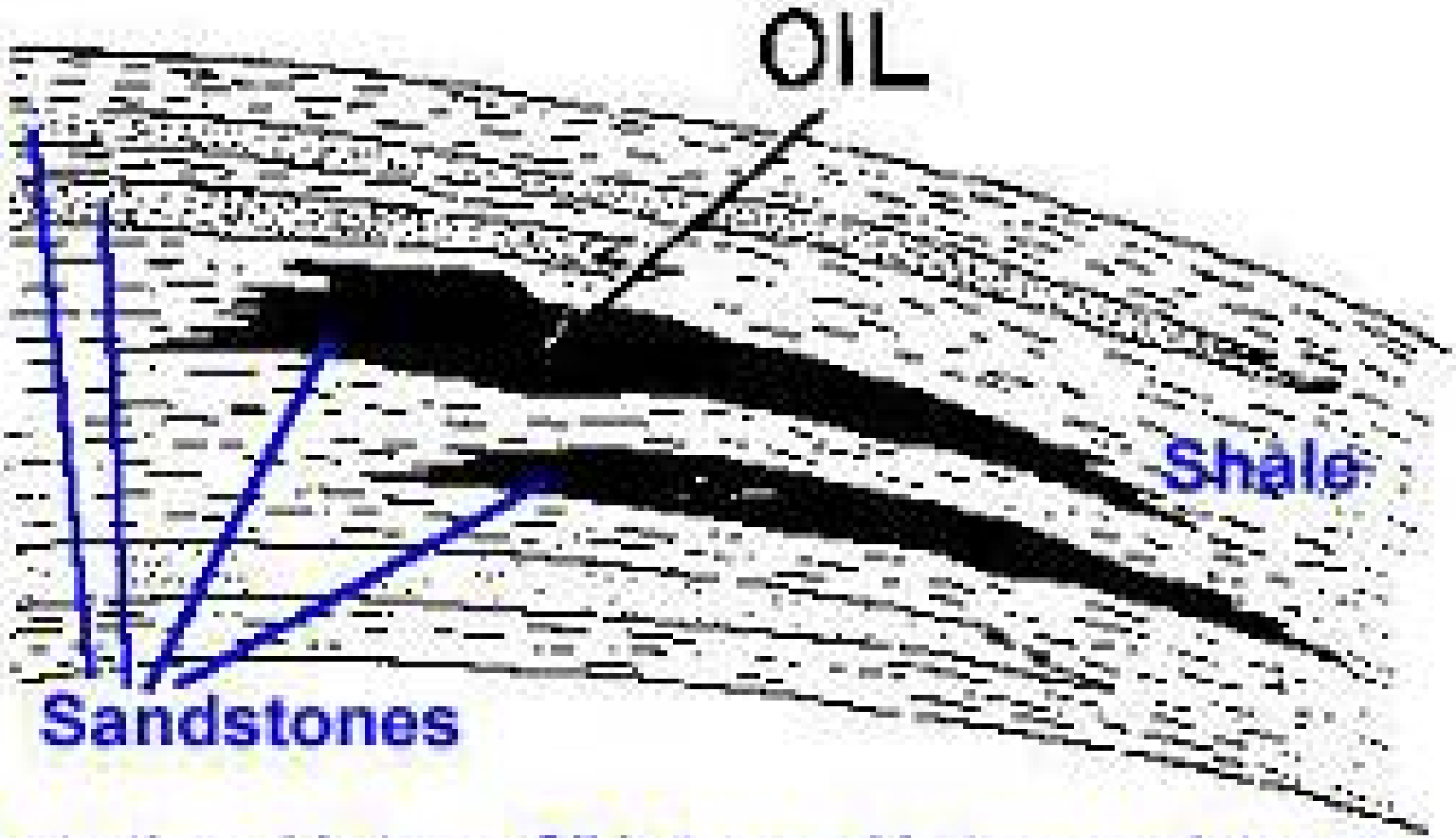
OUTLINE OF PRESENTATION

- COGCC STAFF REQUIREMENTS
- HOW COAL BED METHANE RESERVOIRS WORK
- SPECIAL PROPERTIES OF LITTLE CREEK FIELD
- SPECIAL PRODUCTION METHODS TRIED BY PETROGLYPH
- GEOLOGIC INTERPRETATIONS
- CHRONOLOGY OF EVENTS
- SUPPORTING DATA & EVALUATION

STAFF REQUIREMENTS

The Purgatoire River Field (aka Little Creek Field) should not return to production until:

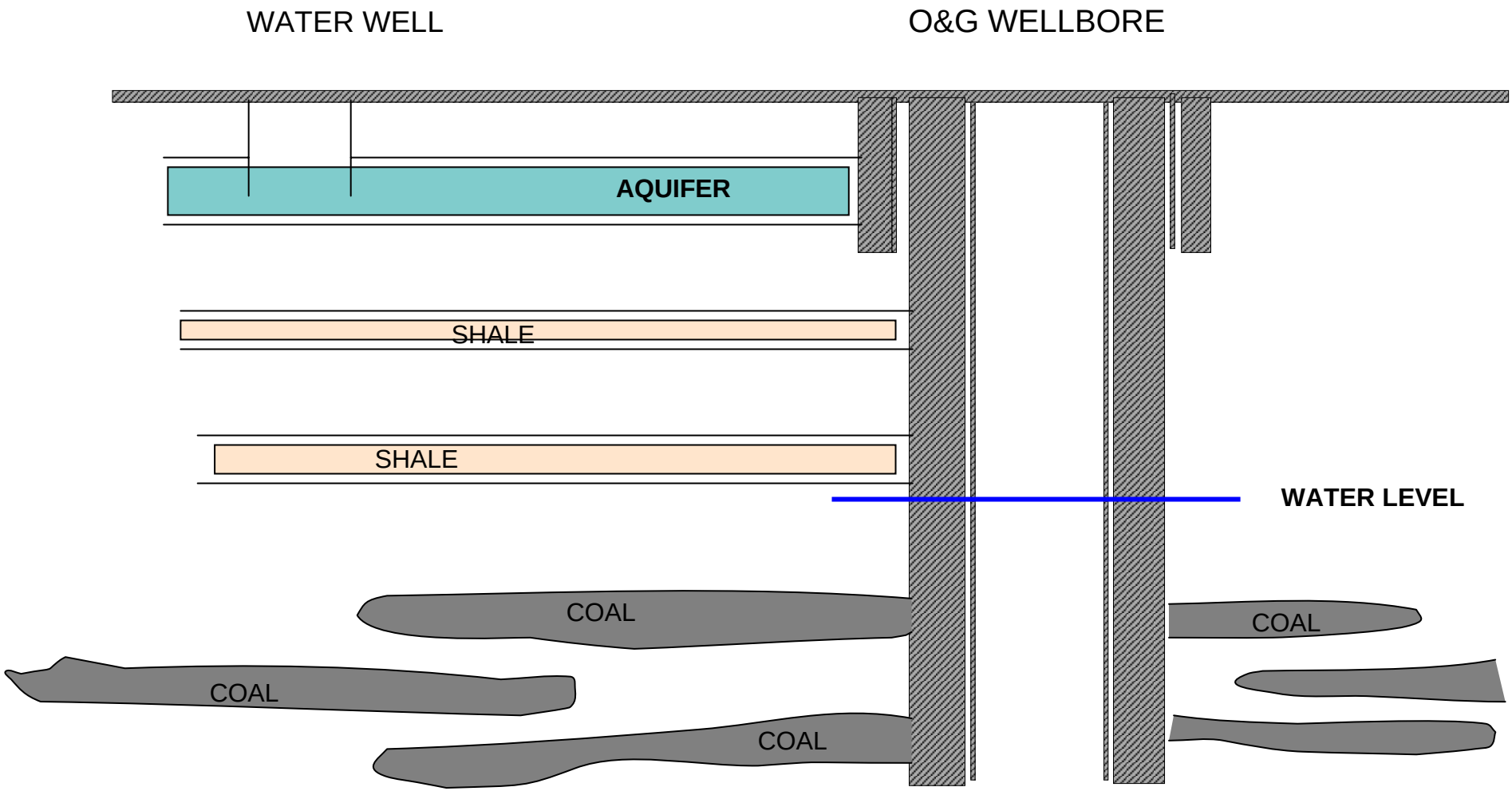
1) All aquifers, water wells, and seeps impacted by gas are addressed by a monitoring and mitigation plan.
2) The Commission agrees that all mitigation & monitoring programs are in place & functioning as expected.



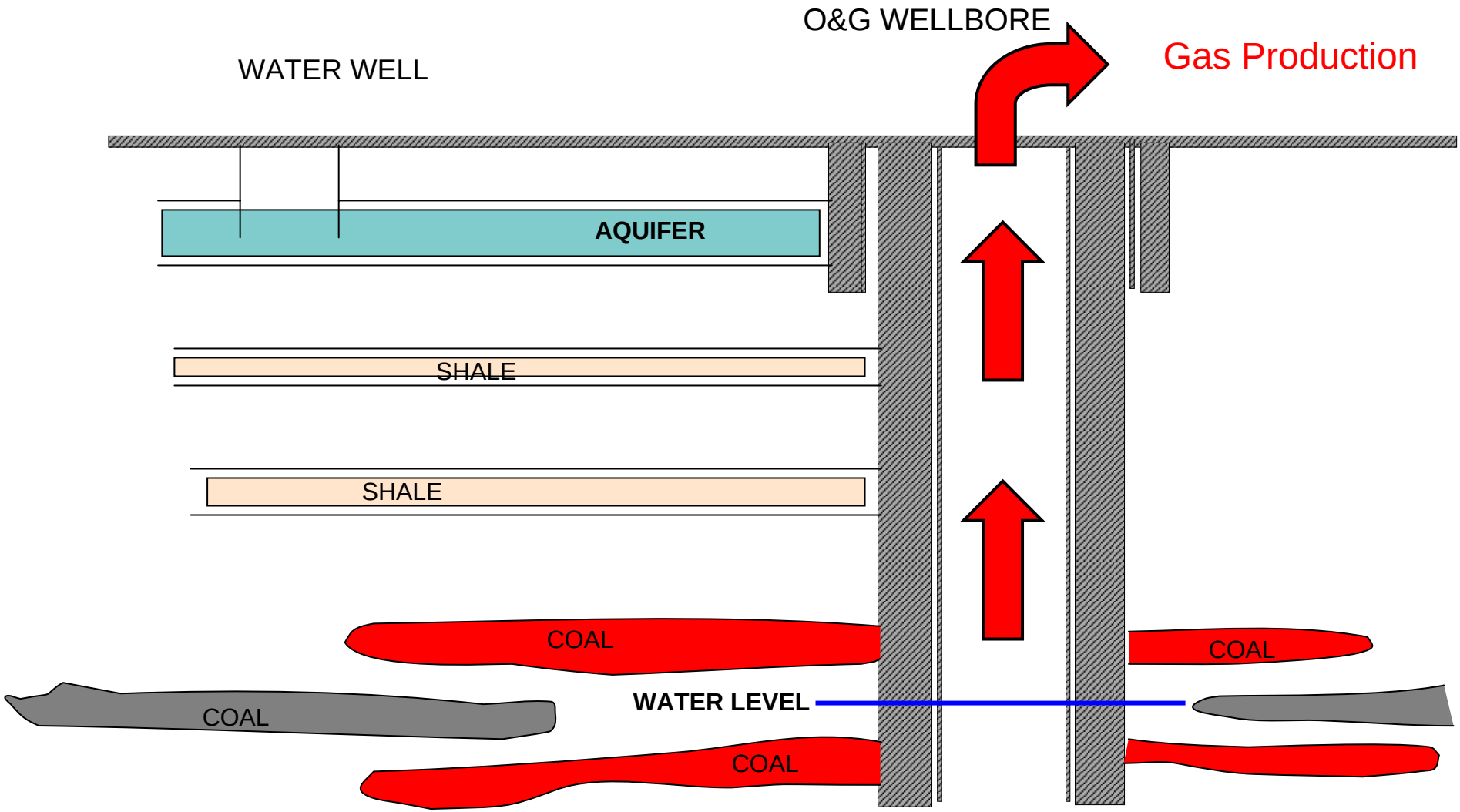
A stratigraphic trap. Oil is trapped in two sandstones which are surrounded by shale. The shale prevents the oil from escaping.

From www.cartage.org

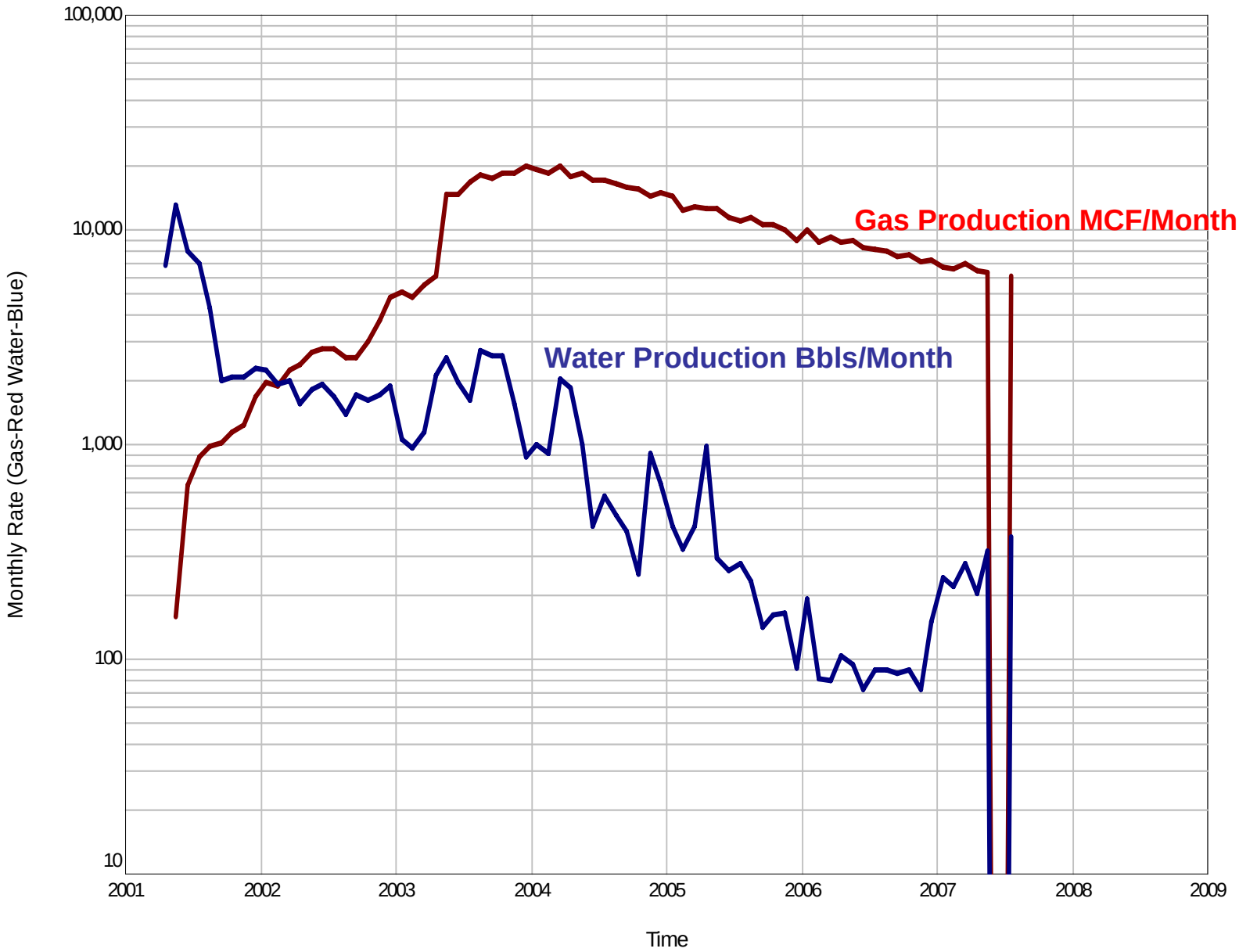
COAL BED METHANE PRODUCTION



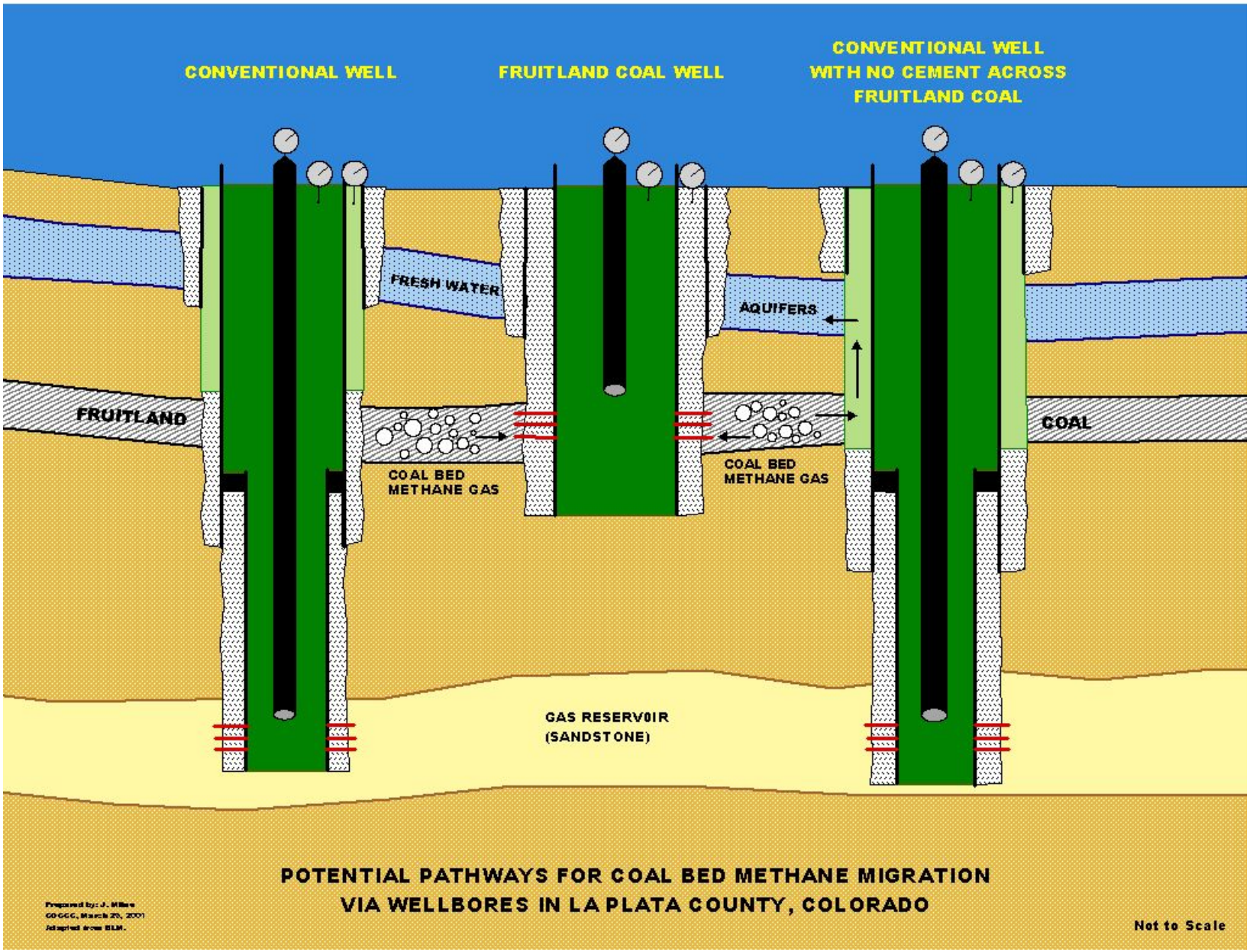
COAL BED METHANE PRODUCTION



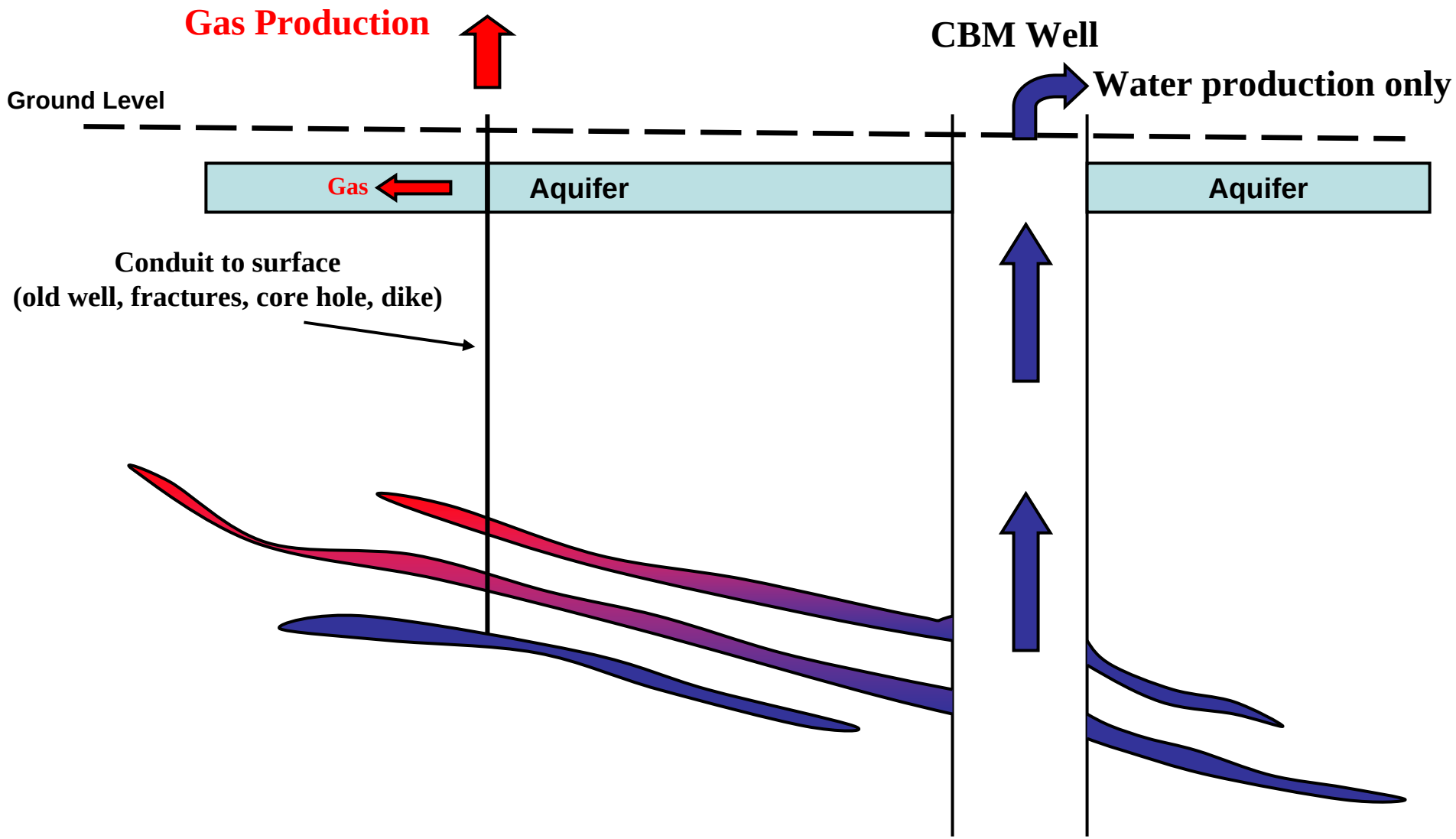
LONG CYN PCW #34-28 - LONG CANYON

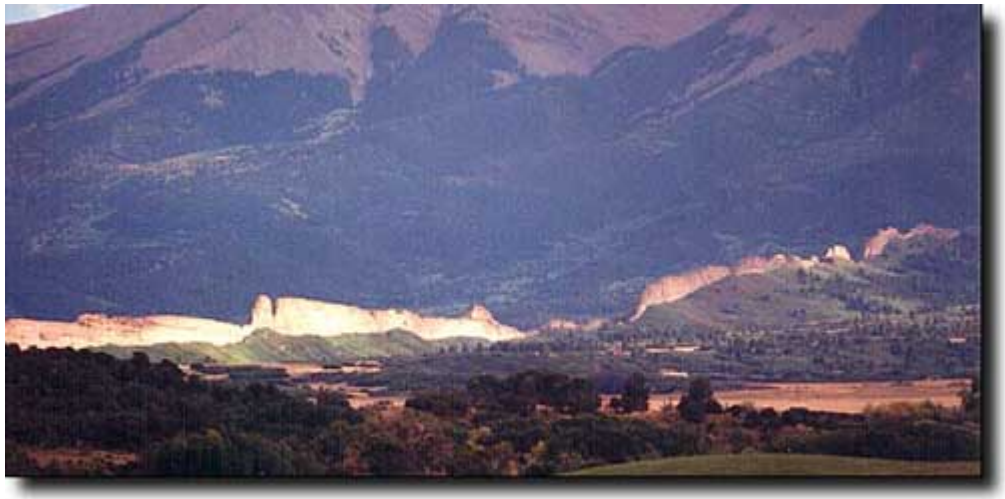


CBM & CONVENTIONAL GAS WELL COMPLETIONS



Dewatering at CBM well producing gas up-dip.



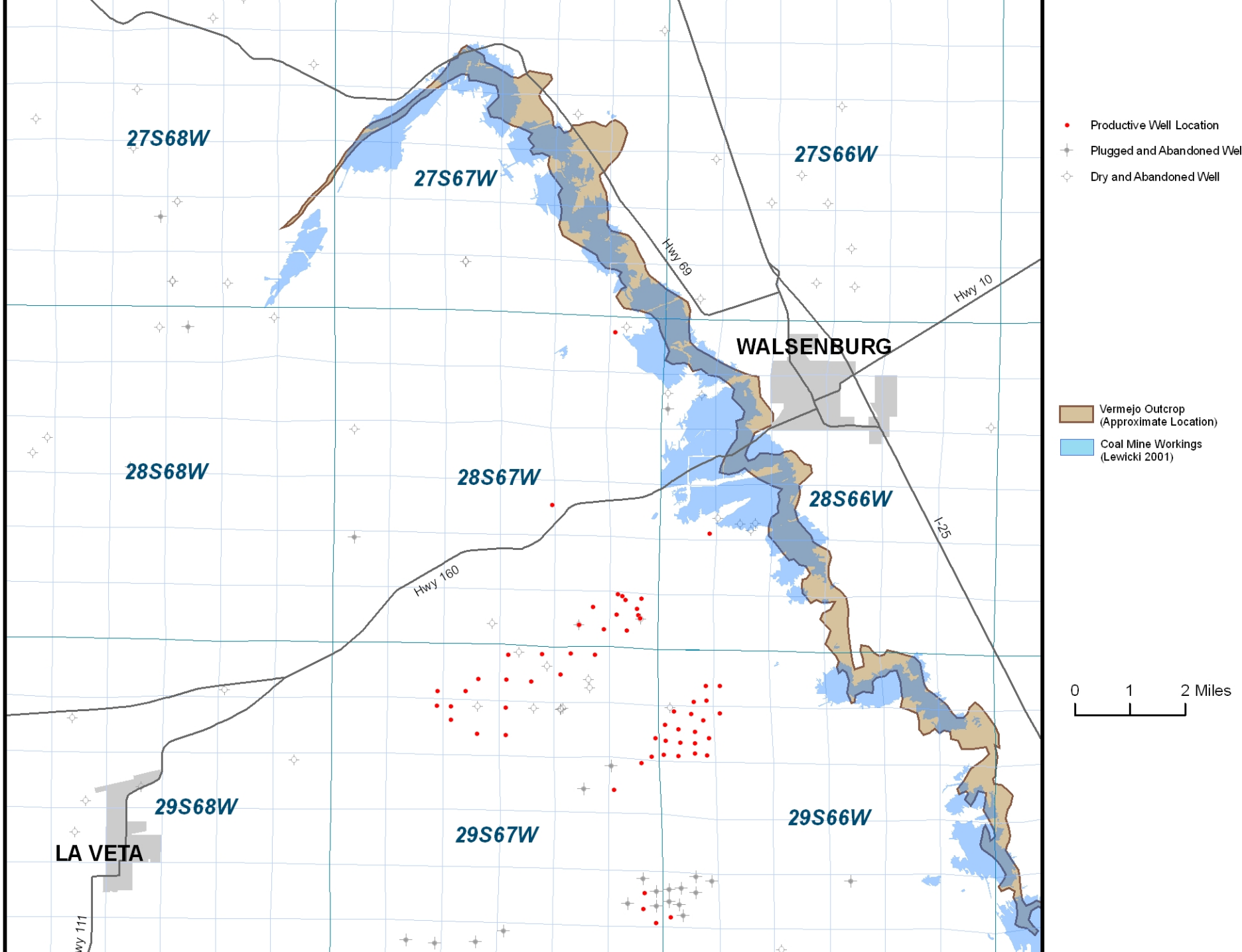


Examples of Volcanic Dikes
Huerfano County, Colorado

HEALTH, SAFETY, AND WELFARE ISSUES
CBM SEEPAGE

VENTING
CONFINED SPACE

STRESSED & DEAD VEGETATION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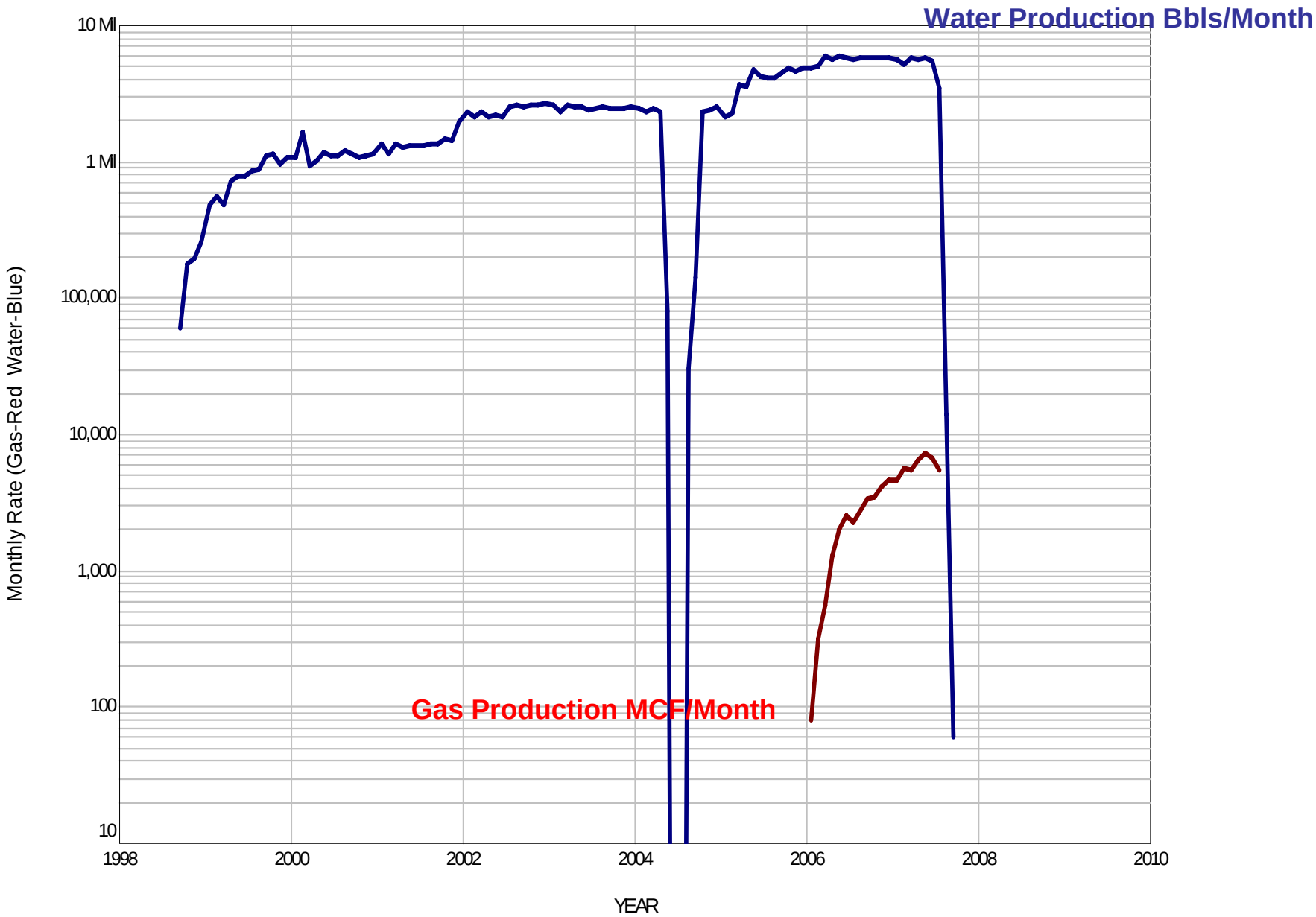
29S66W
WALSENBURG
LA VETA
Hwy 69
Hwy 10
Hwy 160
I-25
Productive Well Location
Plugged and Abandoned Well
Dry and Abandoned Well
Vermejo Outcrop
(Approximate Location)
Coal Mine Workings
(Lewicki 2001)
0
1
2 Miles

PETROGLYPH PRODUCTION



ORDER 521-1

FROM FINDINGS

4. On March 7, 2000, Petroglyph, by its attorney, filed with the Commission a verified application for an order to establish a unit for the production of coalbed methane gas and associated hydrocarbons from the Vermejo and Raton Formations. Water influx into the proposed unitized area from lands located to the northeast thereof is causing a high volume of water to be produced from said wells, with little measurable drop in reservoir pressure from the present production.

5. Petroglyph has proposed a Water Block Project designed to optimize the ability of the existing wells to dewater the coalbed methane reservoirs. It requires the drilling of approximately eleven (11) water-block wells. The water-block wells would be placed up-dip of the existing wells, and would greatly enhance the dewatering process for production from producing wells in the application lands.

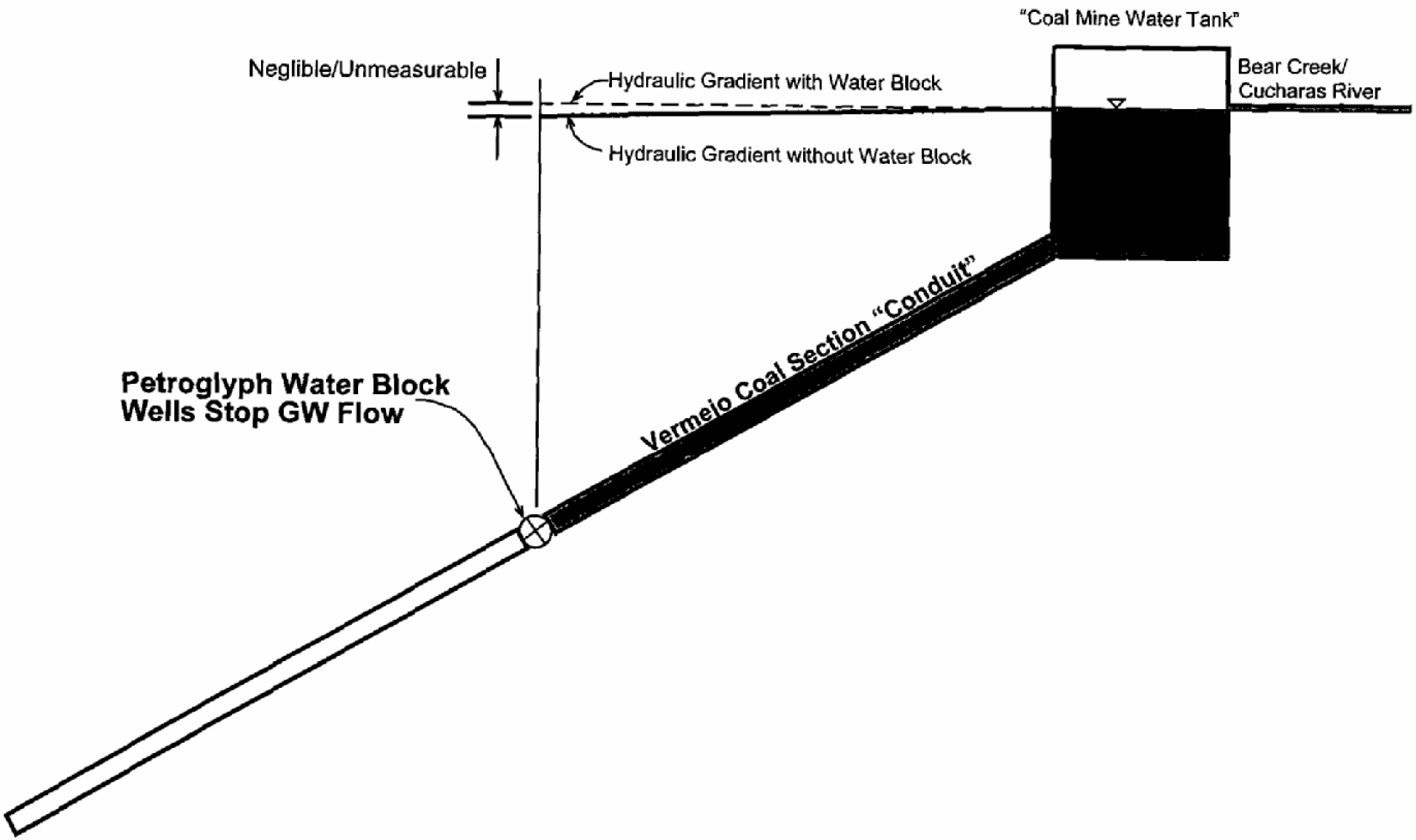


EXHIBIT 18b

Generalized Groundwater Flow With Water Block Wells

AREA OF PETROGLYPH OPERATIONS

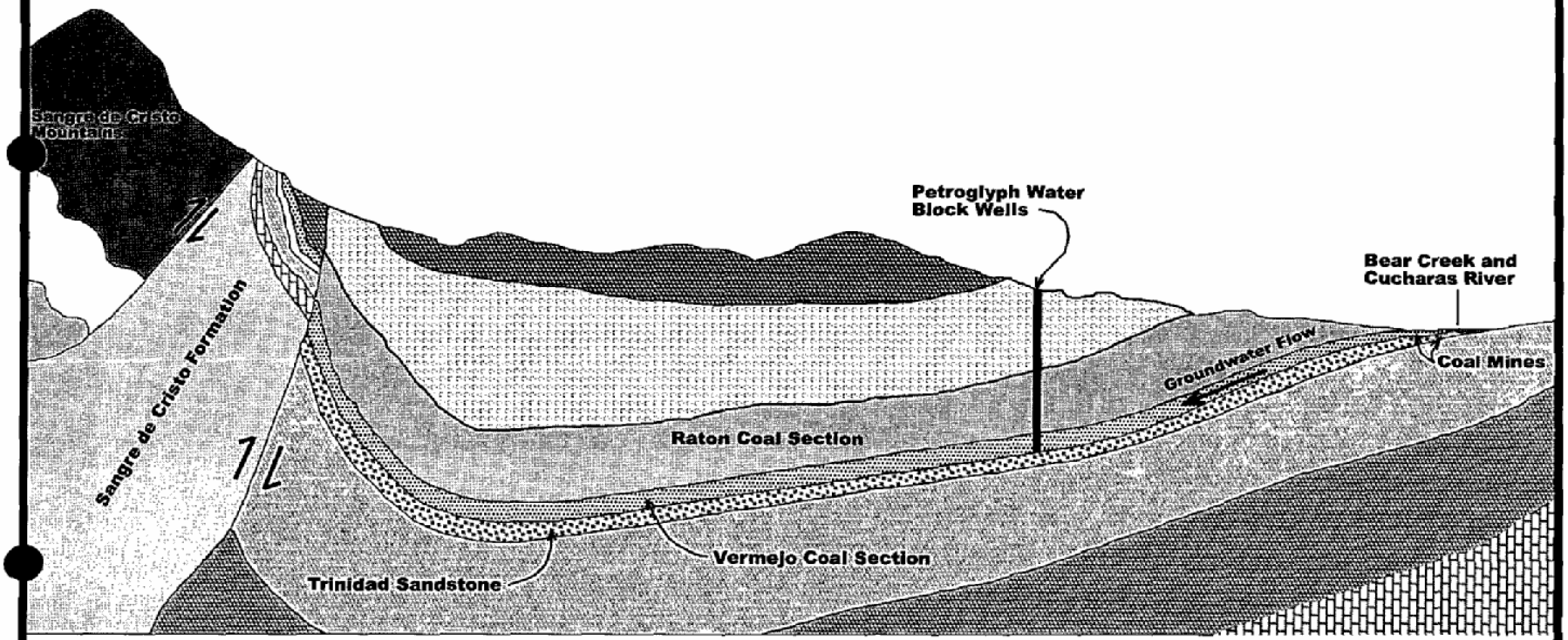
Order 521-1

- Current reservoir analysis indicates the Trinidad Sandstone located below the Vermejo Coal, is the source of the high volumes of water.

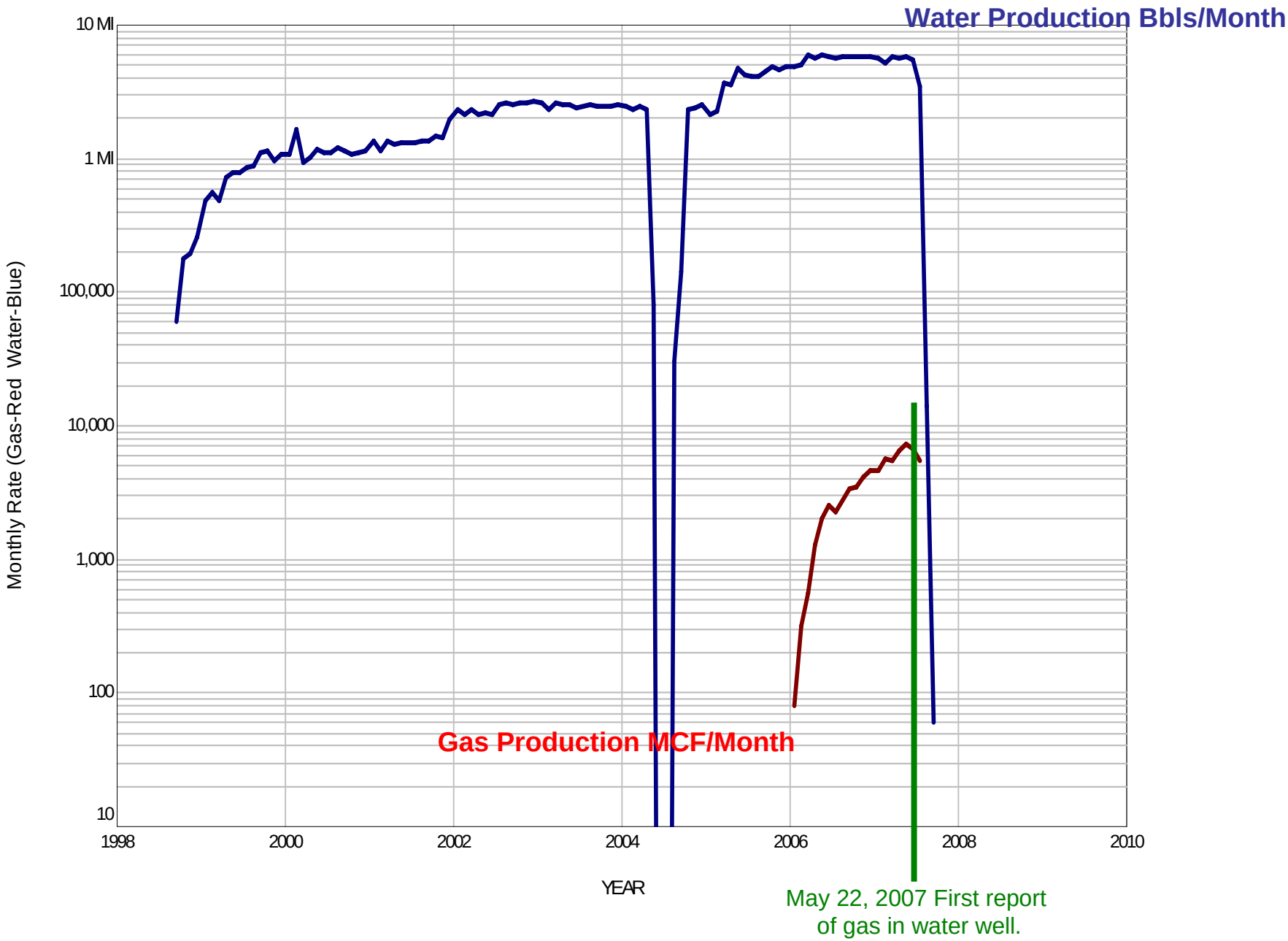
- This has been called the leaky Aquifer Model..

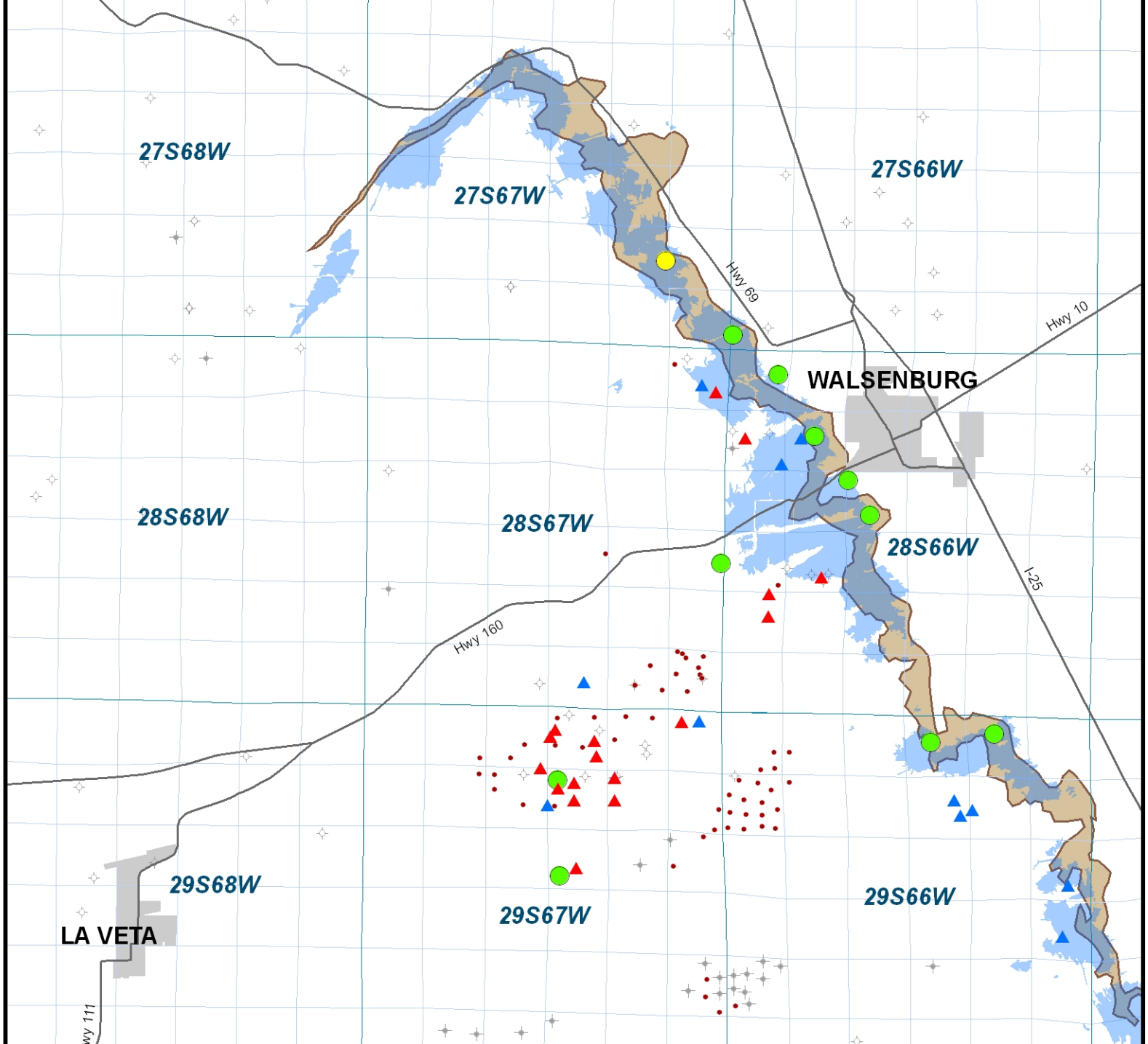
EXHIBIT 17

Generalized East -West Geologic Cross-Section through the Raton Basin



PETROGLYPH PRODUCTION

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LA VETA
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Hwy 160
I-25
Productive Well Location
Plugged and Abandoned Well
Dry and Abandoned Well
Methane Seep Location 2007
Methane Seep Location 2001
Water Wells with elevated LEL / Methane Conc.
Methane Detected > 100% LEL
Methane Detected < 100% LEL
Vermejo Outcrop (Approximate Location)
Coal Mine Workings (Lewicki 2001)
0
1
2 Miles

STAFF REQUIREMENTS

1) Because the effects of methane go beyond the proposed remediation area, Staff recommends that that all aquifers, water wells, and seeps impacted by gas are addressed by a monitoring and mitigation plan prior to restoring the field to production.

2) Because the Raton and Vermejo coals are poorly understood, Staff recommends that the Commission should agrees that all mitigation & monitoring programs are in place & functioning as expected prior to restoring the field to production.