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Effects from the PRBRC's Proposed Effluent Limits for Barium, Sulfate, and TDS

EQC PRBRC Petition Hearing
1/17/07

CBM Associates, Inc.

OBJECTIVE

- Contrast the current limits for total recoverable barium (Ba) 2000 ug/l, dissolved sulfate (SO_4) 3,000 mg/l; and, TDS (5,000 mg/l), against those proposed in the PRBRC petition: Ba = 200 ug/l; SO_4 = 500 mg/l; and, TDS = 2,000 mg/l; and
- Evaluate potential effects on oil and gas production and the availability of water due to the more restrictive proposed standards.

Data Sources

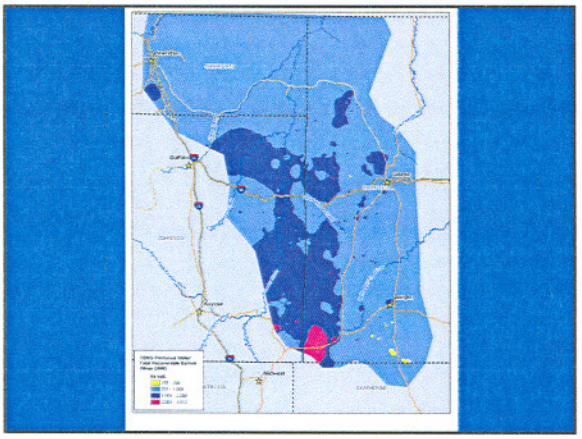
The produced water data used for CBNG production was the average of the reported values for the constituents of concern in Powder River Basin (PRB) WYPDES DMRs for the period of 1999 to 2006.

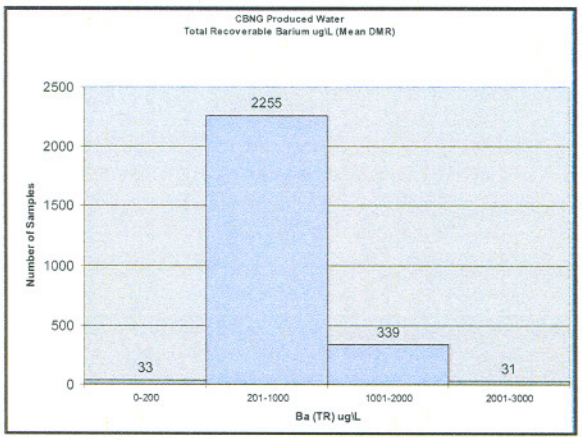
The Conventional Oil & Gas produced water data was the average of the reported values for the constituents of concern from all WYPDES DMRs for the period of 2001 to 2006 and other studies from 2003 to 2006.

Barium: CBNG Produced Water

An examination of the CBNG produced water from WYPDES DMRs for 2658 individual outfalls indicates that 99% (2625) outfalls had mean concentrations of total recoverable Ba that would exceed the proposed standard of 200 ug/l.

Under the current standard of 2000 ug/l, less than 1% of the outfalls exceed. Therefore, under the proposed effluent limit, virtually all CBNG production in the PRB would require treatment, injection, or shut-in due to barium limits.





Barium: CBNG Produced Water

Treating barium to the proposed limit at each outfall would require an individual ion exchange system similar to those currently used to treat CBNG. Conservative cost for such treatment currently ranges from $.35 to $.60 /BW (WOGCC: 2006 PRB CBNG produced water)

The conservative cumulative cost to treat PRB CBNG produced water for barium alone range from $147 to $252 million/year under the proposed standard.

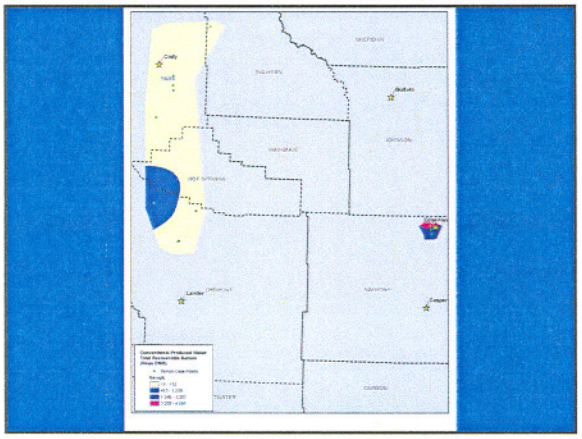
Barium: CBNG Produced Water

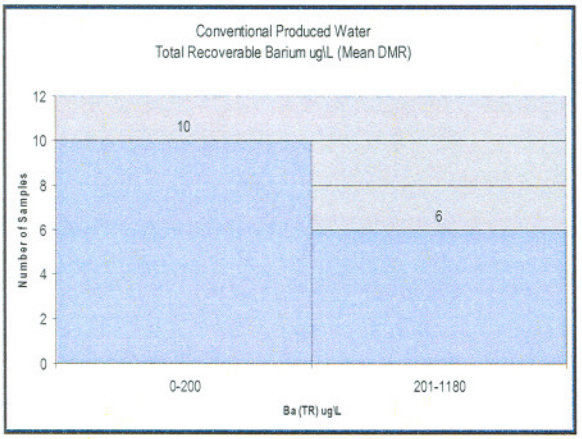
Barium treatment alone would result in an estimated cost increase that ranges from $.63 to $1.08/MCF of CBNG gas produced (WOGCC: 2006 PRB CBNG production).

This will make many producing CBNG wells and reserves uneconomic.

Barium: Conventional Oil & Gas Produced Water

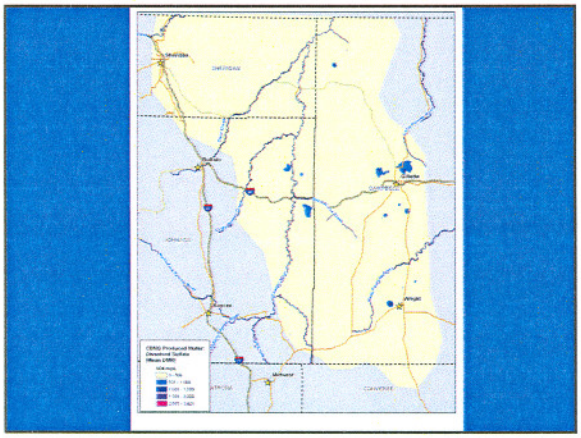
An examination of the available Ba sample data from Conventional Oil & Gas produced water from WYPDES DMRs for 16 individual outfalls indicates that 38% of all outfalls examined showed mean concentrations of total recoverable Ba that exceed the proposed limit of 200 ug/l.

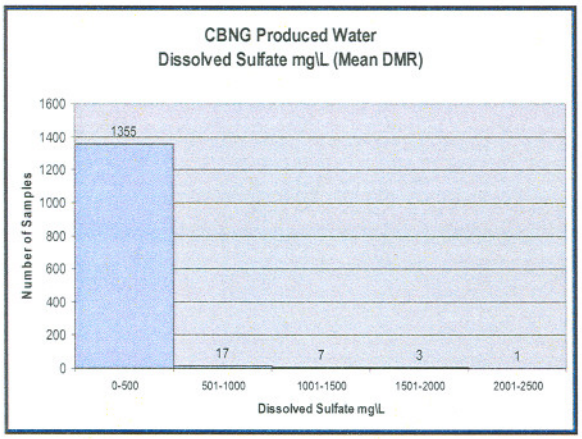




Sulfates: CBNG Produced Water

An examination of the CBNG produced water from WYPDES DMRs for 1383 outfalls indicates that 2% (28) of the currently operating outfalls would not comply under the proposed dissolved sulfate limit of 500 mg/l.

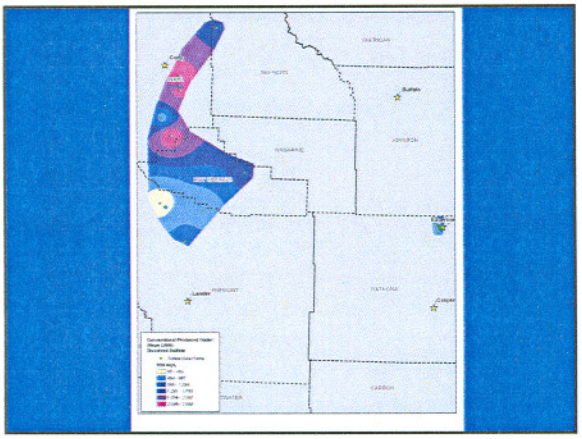


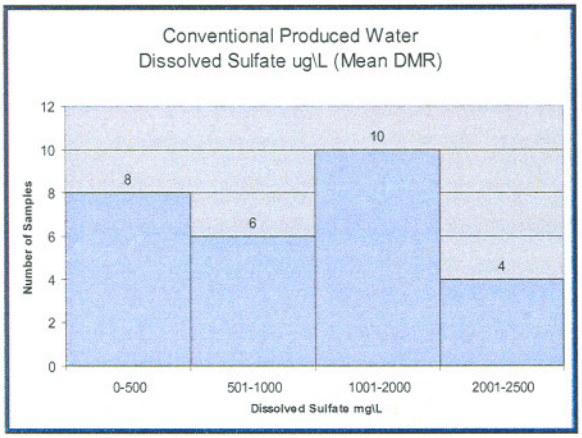


Sulfates: Conventional Oil & Gas Produced Water

Nearly 71% of conventional produced water would not meet the proposed dissolved sulfate limit of 500 mg/l. (WYPDES DMRs indicated 20 out of 28 outfalls would exceed the proposed 500 mg/l limit for SO_4)

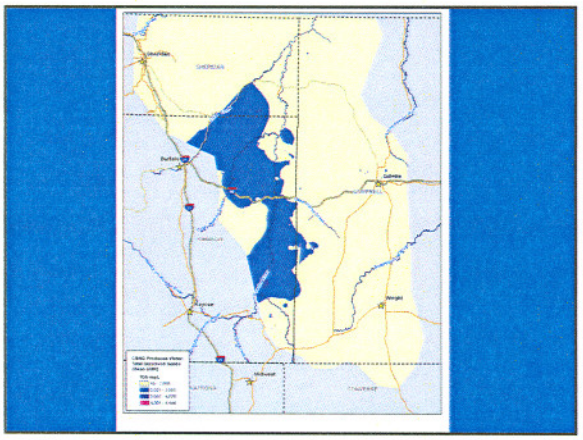
The imposition of the proposed limits would require treatment or reinjection, rendering the majority of the current oil production uneconomic.

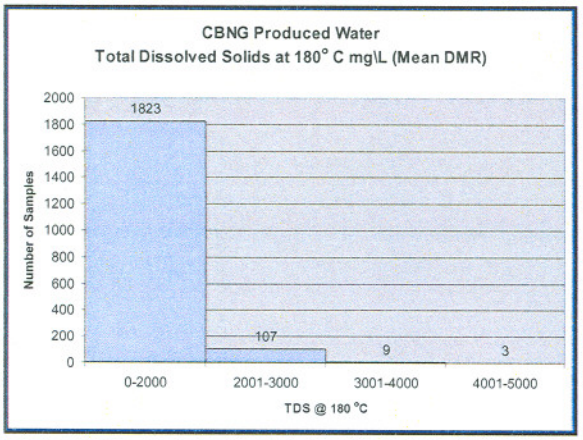




TDS: CBNG Produced Water

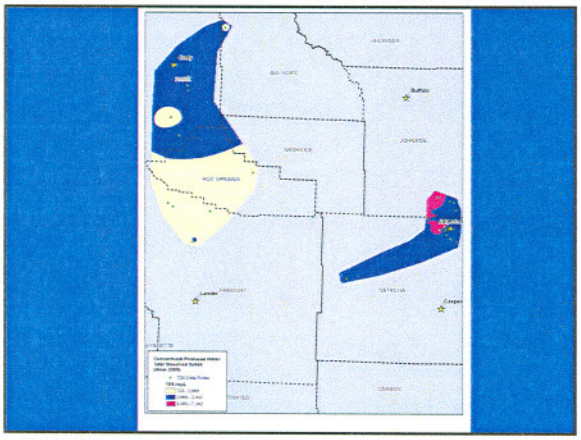
An examination of the CBNG produced water from WYPDES DMRs for 1942 outfalls indicates that 6% of the currently operating outfalls would not comply under the proposed TDS limit of 2000 mg/l.

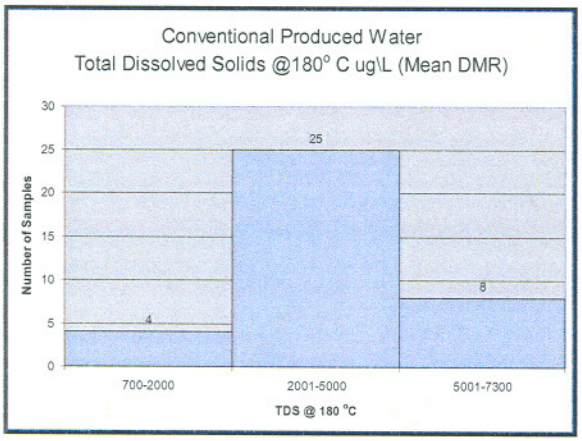




TDS: Conventional Oil & Gas Produced Water

- An examination of the Conventional Oil & Gas produced water from available WYPDES DMRs for 37 outfalls indicates that 89% of the currently operating outfalls would not comply under the proposed TDS limit of 2000 mg/l.





Questions EQC Needs to Answer

What is the risk of harm to livestock and wildlife from produced water under the existing limits?

- Where is *credible* evidence that the existing limits are not protective of livestock or wildlife?

What is the risk of harm to livestock and wildlife if produced water is removed from the State's water supply?

- The EQC needs to determine if there is measurable benefit to livestock or wildlife from a reduction of produced water.
- The loss of the beneficial use of the produced water and the habitat it provides is significant to both ranchers and sportsmen in the State of Wyoming.

Questions EQC Needs to Answer

Where is the credible evidence of measurable benefits to livestock and wildlife from the proposed limits?

Are the losses of produced water to existing livestock and wildlife uses, and the loss of oil and gas reserves, offset and justified by a credible measurable benefit from adopting the new limits?

Recommendations

End of Presentation