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Environmental Quality Council

Mr. Mark Gordon
Chairman Environmental Quality Commission
Wyoming Division of Environmental Quality
122 W. 25th Street
Herschler Building Room 1714
Cheyenne, WY 82002

Fax 307-777-6134

Subject: December 2005 Powder River Basin Resources Council Petition to Chapter 2
Agricultural Limits for Barium

Dear Mr. Gordon,

Norwest Applied Hydrology (Norwest) has performed work on coal bed methane development in the Powder River Basin since 1998. Petrox Resources (Petrox) requested Norwest's input on the Powder River Basin Resources Council (PRBRC) petition to impose a barium limit of 0.2 mg/L for agricultural uses within Chapter 2. Norwest and Petrox recommend that the EQC disregard this request on the basis of inadequate data to support a reduction in the barium limit of this magnitude for the protection of agriculture.

The National Academy of Science reference does not provide a barium limit and states "Experimental data available are not sufficient to make definite recommendations".

<http://www.epa.gov/waterscience/criteria/goldbook.pdf>

The Prairie Farm Administration of Agriculture and Agri-Food of Canada recommends that a barium limit of 300 mg/l or less on the basis of depressed weight in chickens.

http://www.agr.gc.ca/pfra/water/livestock_e.htm

This recommendation is more than an order of magnitude higher than the limit proposed by the PRBRC. The PRBRC's proposal is based on recommended water quality criteria from other states that appear to be dated and inconsistent with US recommendations on the protection of agriculture.

This could be derived in part from the fact that simple barium sulfate salt (barite), which is the chemical form found in Wyoming rivers at mid to low elevation, forms rapidly and has very low solubility between the pH range of near 1.0 to 11.6 (Brookins, 1988). This renders barium in its most common natural form as barite essentially non-bioavailable to organisms over the common range of pH's found in natural waters.

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Norwest Applied Hydrology and Petrox Resources Inc.

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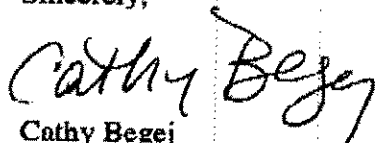
Furthermore, the Wyoming Department of Environmental Quality (DEQ) pursued a rigorous anti-degradation review in 2000. In that document, WDEQ determined that a 2 mg/l barium limit (based on the human health drinking water maximum contaminant level) was protective of all other uses, including agriculture.

The Petition's concern about the suitability of CBNG produced water for livestock use fails to recognize the more than 10 years of safe and beneficial use of CBNG produced water for livestock within the Powder River Basin. CBM operators such as Petrox have worked closely with ranchers to design reservoirs and provide an improved water supply for livestock and these ranchers have reported enhanced livestock production from their ranches. Harriet Land and Livestock, a Petrox leasehold landowner, needs the water to support his cattle operation and supports any permitting that promotes the discharge of water on his property for beneficial use. CBM discharges provide water for year-round use of rangeland formerly underutilized due to lack of water. This has helped reduce the overgrazing of vegetation along many of the intermittent and ephemeral streams and reservoirs that have in the past provided much of the water for livestock. The forage plants in these previously underutilized locations provide a better source of feed for cattle than the species located within or adjacent to stream channels. The better distribution of water supply for livestock provides an opportunity to reduce the intensity of livestock use along stream channels and thereby protect stream banks and improve riparian plant communities. Lastly, the beneficial impact of the availability of CBM water permits ranchers to energize stock watering systems. Shutting in shallow water wells, ranchers can conserve that water for future use.

In addition, Norwest and Petrox note that use standards are typically imposed in Chapter 1, which includes narrative protection of agricultural use in Section 20. The utilization of Chapter 2 to impose industry specific limits that are not applied to all water dischargers is inconsistent with the statewide protection of water quality, regardless of source. The use of the appendices in Chapter 2, a chapter devoted to the permitting conditions, processing and administrative procedures, to impose industry specific numeric limits provides a confusing format to users of the regulations.

Norwest and Petrox recommend that the Environmental Quality Council deny the PRBRC's petition to reduce barium limits for oil and gas producers based on the lack of documentation that barium presents a threat to livestock, its low solubility in natural waters, and the support of the agricultural community for this water.

Sincerely,



Cathy Begej
Senior Hydrologist
Norwest Applied Hydrology



Mike Clark
President
Petrox Resources, Inc.