BEFORE THE ENVIRONMENTAL QUALITY COUNCIL

WYOMING WATER QUALITY RULES, CHAPTER 1	)	06-3102

COMMENTS OF POWDER RIVER BASIN RESOURCE COUNCIL

Powder River Basin Resource Council, by and through its undersigned counsel, submits the following comments on the proposed Wyoming Water Quality Rules and Regulations Chapter 1, and specifically Appendix H, the Agricultural Use Protection Policy.

While PRBRC applauds DEQ's effort to improve its regulation of the impacts of CBM water discharge on agricultural use and its recognition that stream systems in Wyoming are being adversely affected by wastewater discharges from industrial activities, the proposed rule still falls short of the Environmental Quality Act (EQA) mandate to "prevent, reduce and eliminate pollution" and to "preserve and enhance the . . . water and reclaim the land of Wyoming." WYO. STAT. § 35-11-102. This rule has it backwards. DEQ should be setting effluent limitations that are protective of existing and designated uses and requiring the polluter to conform discharge to those limitations. Instead, this rule contorts effluent limitations to allow unaltered CBM discharges. The result is an increase in pollution and long term damage to the irrigable lands of Wyoming.

I. The rule recognizes scientifically defensible Tier 1 default limits deemed to be protective of agriculture, and then defeats their purpose by allowing Tier 2 and Tier 3 mechanisms for avoiding the limits.

The Tier 2 and Tier 3 mechanisms are nothing more than a dressed-up method for continuing to allow CBM discharges that violate the EQA and authorize a measurable decrease in crop or livestock production. As stated in the current Chapter 1, Section 20:

> All Wyoming surface waters which have the natural water quality potential for use as an agricultural water supply shall be maintained at a quality which allows continued use of such waters for agricultural purposes.
>
> Degradation of such waters shall not be of such an extent to cause a measurable decrease in crop or livestock production.
>
> Unless otherwise demonstrated, all Wyoming surface waters have the natural water quality for use as an agricultural water supply.

This narrative water quality standard (WQS) has, as the proposed appendix H states, two purposes:

> The first is to provide a benchmark against which a determination can be made as to whether a waterbody is impaired and requires some kind of corrective action. <u>The second is to provide a basis for establishing permit limits on regulated activities (WYPDES & Section 404 permits).</u>

App. H, at H-1, lines 23-26 (emphasis added). Thus, the standard is to allow "no measurable decrease in crop of livestock production." If, as WDEQ has determined, the default limits are protective[1] and will prevent such a measurable decrease, then those limits should be the standard and not the exception. PRBRC therefore supports the Tier 1 method as outlined in Appendix H (e)(i) with Electrical Conductivity (EC) values determined from the USDA-ARS Salt Tolerance Database and Sodium Adsorption Ratio

[1] It is important to note that the Tier 1 effluent limits in the Advisory Board draft now before this Council are <u>not</u> protective. They are based on NRCS Bridger Plant Materials Center 1996 Technical Notes No. 26, proposed by industry consultant Kevin Harvey. (Ag Use Policy n. 1). DEQ disagrees with this recommendation, and these commenters believe that even Mr. Harvey has recognized, in a meeting with DEQ's John Corra and John Wagner, that the Bridger Plant Materials Technical Note is not an adequate basis for setting effluent limits.

(SAR) limits capped at a value of 10. *See* Appendix H, n. 1 and 2. (This support is not without reservation, due to the fact the Tier 1 approach continues DEQ's one-dimensional approach to water quality regulation by looking only at effluent limits and not at other important water quality parameters – flow volume, turbidity, temperature and the hydrograph. However, Tier 1 is an improvement over the status quo.)

But DEQ's admission in the Ag Use Policy that, "in practice, the use of the default procedure will only apply where permitted discharges are of exceptionally high quality" Appendix H (e)(iv)(Reasonable Access Requirement) reveals we can take little comfort in the Tier 1 standards – they will only apply in "exceptional" circumstances. Tiers 2 and 3 will allow DEQ to contort effluent limits to allow discharges, rather than requiring discharges to conform to reasonable effluent limits that are protective of existing uses. DEQ forgets that the objective is to reduce or eliminate pollution, not to facilitate CBM production at the lowest cost to industry.

A. The Tier 2 and 3 "Refinements" are fundamentally flawed.

If, for the sake of argument, one accepts that DEQ's default limits are more stringent than necessary, and that less stringent effluent limits would be adequately protective, the Tier 2 & 3 "refinements" of EC and SAR limits, as proposed, are seriously flawed. The first problems are found in the Tier 2 process which would establish effluent limits on the basis of background water quality.

1. Tier 2 – Background Water Quality by Measured Water Data

Both Tier 2 methods for determining background water quality are irreparably defective. The first method, using measured water quality data, has three fundamental flaws: 1) it irresponsibly assumes that the pre-discharge historic water, regardless of its

quality, was put to an irrigation use; 2) it fails to account for the dynamic nature of natural water quality in ephemeral and intermittent streams; and 3) it fails to require that scientifically defensible, representative data are used to determine "background" water quality. Because DEQ is currently using the agricultural use policy in the basic form proposed to draft permits, the application for renewal and DEQ's draft permit for WPDES Permit WY0037613 on Rawhide Creek provides a good illustration of how these fundamental flaws result in inadequate protection of downstream irrigation.

a. <u>The Tier 2 measured water quality method improperly assumes all historic water was put to irrigation use.</u>

The assumption that that pre-discharge water was used for irrigation is a safe assumption only for sub-irrigated and passively irrigated lands <u>located at the point of measurement</u>, but it is a dangerous assumption for actively irrigated lands and lands distant from the point of measurement. As DEQ notes, "the most basic question is whether a proposed discharge will reach irrigated lands. If the discharge will not reach an irrigated field . . . it could not affect crop production on that field." Appendix H at H-3, lines 24-26. If DEQ believes this is the most basic question for future discharges, it must believe that to be the case for pre-discharge historic flows in ephemeral and intermittent drainages as well. If measured historic data is to be used to relax effluent limits set to protect irrigation, then DEQ must require a showing that the water represented by the pre-discharge data was actually applied to the irrigated lands. But, as demonstrated below, DEQ uses data collected on historic flows that likely never reached the irrigated lands.

WYPDES Permit WY0037613, Application for Renewal (Ex. 1) identified only one downstream irrigator on Rawhide Creek (the drainage in which the permitted CBM

wastewaters would be discharged). As part of its 2006 application for a renewal of this permit, the permittee submitted an August 9, 2000 report entitled *Devon Irrigation/Soil Suitability Investigations for Rawhide Creek*. In that report the author noted that "the landowner does monitor the salinity level in the stream throughout the season and will not release water to fields if quality is poor." (Ex. 2 at 3). In addition, the irrigated lands are located approximately 4.7 stream miles below the monitoring points that DEQ used to establish "background water quality" data.[2] Flows measured in association with the ten samples DEQ used to determine "background" EC ranged from 0.002 to 4.19 cfs. Using DEQ's own rule of thumb for instream infiltration losses of 0.1 cfs/mile, none of the sampled historic flows used to determine background EC would have reached the irrigated lands.[3] Despite the absence of any evidence that the water represented by this data set was ever applied to the irrigated lands, DEQ proposed to set the EC limit in this permit equal to the average EC of these samples. If it is DEQ's policy to relax EC and

[2] In its application, the permittee submitted water quality data taken from a variety of sources, principally samples collected in association with a coal mine located on Rawhide Creek. The "average" EC as calculated by the permittee (claiming to have used 101 data points) was 4610 μmhos/cm. (Ex. 1 Table 8b.) The application, however, listed only 94 data points (Ex. 1, Table 8a). Additionally, only 20 of these data points had measured flows associated with them. These flows ranged from 0.002 cfs to 6.7 cfs. (Ex. 1, Table 8a). DEQ, however, only considered samples taken from below the coal mine for which a flow was also measured "as it was determined that these samples would be most representative of water quality that would have been used historically by the downstream irrigator." (Ex. 3 at 3.).

[3] Table 8a in the permittee's application entitled "Pre-CBM Conductivity and Sulfate, Rawhide Creek" lists only nine samples from locations below the mine with where flow was also measured and ranged from 0.002 to 1.31 cfs. (Ex. 1, Table 8a.). DEQ apparently included an additional sample with an associated flowrate of 4.19 cfs in its calculation of average background EC (See Ex. 1, Table 8k). If this were a discharge from a CBM facility, even at this much higher flowrate, DEQ's method would assume the water would not reach irrigated lands located more than 4.2 miles from the measuring point.

SAR effluent standards when CBM discharges will not reach irrigated lands, then if for nothing more than the sake of logical consistency, it should not use data measured on water that itself never reached the irrigated lands in question to set background.

b. <u>The Tier 2 measured water quality method fails to consider the dynamic nature of water quality in ephemeral streams</u>

Water quality in an ephemeral drainage in its natural state is hydrologically dependent. Natural streamflow in an ephemeral drainage is flashy and is characterized by sharply increasing and declining flowrates. (PRBRC adopts and incorporates by reference its filings and attached Exhibits Nos. 1 – 59 in the Chapter 2 Rulemaking docket No. 05-3102, listed as Exhibit 6 hereto. Those exhibits will be referred to in these comments as "Ch. 2 Ex."). Water quality varies greatly during this rapidly changing flow regime. Ch. 2 Ex. 33 (Discharge/EC relationship graph). Typically, the concentration of dissolved solids first increases during the rising limb of the runoff hydrograph, peaks before the hydrograph peak, and quickly decreases to a nearly constant and much lower level. Ch. 2 Ex. 25.[4] DEQ's narrow focus and self-imposed constraint on controlling and limiting concentration alone means this vital connection between water quality and runoff quantity, rate and duration, is ignored to the detriment of uses in the stream. DEQ itself acknowledged the dynamic nature of water quality in ephemeral drainages in the Statement of Basis for the April 2005 renewal of permit WY0037613

[4] *See also* Ch. 2 Ex. 35, Patz, et al., *Chemistry of Coalbed Methane Discharge Water Interacting with Semi-Arid Ephemeral Stream Channels*, Journal of the American Water Resources Ass'n, October, 2004, at 1252 (stating that "[s]ignificant changes in CBM discharge water chemistry were observed in flow" of two ephemeral streams and that "[t]he CBM discharge water chemical changes observed . . . can be explained by channel sediment interactions"); Ch. 2 Ex, 2, *IENR Report* at vi (explaining that "CBM water may be of good quality at the wellhead but this quality can degrade when water picks up additional solids or salts after discharge to a streambed or storage in a reservoir designed to allow water to infiltrate through the soils.").

when it stated that "the natural water quality of Rawhide Creek may exhibit high temporal variability with respect to . . . specific conductance at any given flow. That high variability may not be accounted for in the current water quality data record for Rawhide Creek." (Ex. 4 at 3). Despite this fact, DEQ in a later renewal used only ten samples to calculate an average background EC for WYPDES Permit WY0037613 (Ex. 3 at 3). Additionally, the data submitted with the renewal application distorted the temporal variability as they were composed of multiple samples collected on the same (or consecutive) days at different points in the vicinity of the surface coal mine on Rawhide Creek.[5] While samples collected on the same day at different locations along a stream reach are valuable for determining the spatial variability of water quality, samples sets of this nature are inappropriate for determining averages where temporal variability is significant. A series of temporally dispersed single point samples cannot be representative of the overall water quality of natural, pre-discharge flows in an ephemeral drainage that exhibits high variability in quality at any given flow.

c. <u>There is no assurance that the data used in a Tier 2 measured water quality analysis is representative of actual historic water quality.</u>

The third fundamental flaw in DEQ's method of using historic water quality data to determine pre-CBM natural water quality is that it does not guarantee that only scientifically defensible, representative data are used. The only requirement is that

[5] The samples DEQ used to determine the background EC value were collected between 1981 and 1988 and two of the samples were collected on the same day at different locations in the same stream reach. Ex. 3 at 3. The 94 data points listed in the permittee's application also distort any temporal variation in historic water quality having been collected on only 56 different dates between March, 1975 and September, 1988. Typically, water quality data collected at the mine were collected on the same or consecutive days at either two or three sample locations upstream and downstream of the mine. Ex. 1, Table 8a.

background water quality based on measured data be based upon "published pre-discharge historic data." Appendix H at H-7, lines 4-5. First, "published" is undefined. DEQ must require more than just that the data are available. There should be a requirement that the data were collected and analyzed in a scientifically defensible manner. Second, as demonstrated in the above discussion of the renewal of WYPDES Permit WY0037613 there is nothing in the rule that requires the data to be representative. Representative data are especially important where they are to be used to determine water quality in highly variable ephemeral and intermittent streams.

2. Tier 2 – Background Water Quality by Back Calculation from Soil Surveys.

While quite detailed and obviously intended to give DEQ a measure of comfort that the soils that will be affected by a discharge have been thoroughly examined, the second method for determining background water quality based on an extrapolation from existing soil chemistry is fundamentally flawed because there is no requirement that the analysis be conducted on soils that have not been subjected to industrial wastewater discharges. DEQ often issues permits in ignorance of the existence of irrigation on a stream and once irrigation is "discovered," it is slow to require that permittees comply with irrigation protections. For example, DEQ had information in November of 2004 that, at a minimum, should have made it suspect irrigation was present on SA Creek. *See* Petitioner's Rulemaking Brief, Ex. 37, Memorandum from Eisenhauer to Bohlmann, December 1, 2004, at 3 (reporting that an issue the CBM permittee had "to deal with is if a downstream landowner with a water right makes a call for water. . . . It would appear that this might be an overriding issue for the company and the reason why water was flowing down drainage . . . on SA Creek.") *and* Petitioner's Rulemaking Brief, Ex. 38,

Response to Comments, November 30, 2006, at 2 (responding to comments regarding protection of irrigation on SA Creek and stating that:

> During the course of the first term of this permit, WQD was made aware of downstream irrigation occurring on SA Creek . WQD has since that time begun incorporating effluent limits for protection of irrigation use into SA Creek discharge permits. For renewed permits in this drainage, we are giving operators an interim period to come into compliance before final irrigation effluent limits become effective. For this permit, the final irrigation effluent limits become effective on December 1, 2007.)

Thus, three years after having been made aware of irrigation on SA Creek, DEQ will finally require irrigation protection. In addition to giving this SA Creek discharger an additional year to meet effluent limits that consider protection of irrigation, DEQ has also given the discharger the option of conducting "a site-specific Section 20 analysis that would provide sufficient information for the WYPDES Program to establish site-specific effluent limits for SAR and EC." Presumably, this would include the option in the proposed Appendix H to calculate background water quality based on soil surveys, which soils have now been exposed to several years of CBM discharges.[6]

---

[6] DEQ stated in the draft renewal of the SA Creek permit that:

> [T]his existing facility's water quality is unable to meet effluent limits protective of irrigation at the end of pipe. In order to allow the operator a "window of opportunity" to investigate methodologies that could be utilized to achieve end of pipe effluent limits protective of irrigation uses that are being established in this permit renewal, the permit establishes interim and final effluent limits. The permittee is allowed to discharge produced water for one year after the issuance of this renewal under the SAR and EC effluent limits established in the original permit: EC = 7500 micromohs/cm [sic] and no effective SAR limit. After the initial year following issuance of this renewal, the permittee must meet effluent limits protective of irrigation at the end of pipe (at the outfalls), EC = 1330 micromohs/cm [sic], SAR = 7.5. In leiu [sic] of the default effluent limits described above, the permittee also has the option of performing a site-specific Section 20 analysis that would provide sufficient information for the WYPDES Program to establish site-specific effluent limits for SAR and EC.

Ex. 5 at 4.

It is inexcusable that DEQ permits CBM producers to discharge upstream of irrigated lands without requiring such discharges to be protective of that irrigation. DEQ's response when finally called to the carpet on this practice is to allow the discharger a "'window of opportunity' to investigate methodologies" that would achieve some protection. But DEQ doesn't stop there. It allows the discharger to avoid protective default limits by back calculating a "pre-discharge" water quality based on soils that have been altered by CBM discharges. It's a sweet deal for the discharger. The best strategy for a CBM producer is, apparently, to ignore the downstream irrigation, get a permit, and then to discharge under that permit for some years. Then, if DEQ ever becomes aware of downstream irrigation, you can calculate your own effluent limits based on the soils that your own discharges have impaired.

3. Tier 3 – No Harm Analysis.

The fundamental flaw with Tier 3 is that it is nothing more than an escape hatch to allow poor quality discharges without requiring that they be treated. The presence of Tier 3 in this rule throws a bright light on the real purpose of this policy – to find a way to allow surface discharges despite evidence that they pose a substantial risk to existing agricultural uses. The whole approach is so nebulous that it is difficult to provide substantive comments. *See* Appendix H at H-9, lines 39-40 and H-10, lines 1-3 (stating that "the actual effects of EC and SAR on crop production are variable based upon soil type and chemistry" *and* "because of the very site-specific nature of this approach and the number and complexity of variables that may need to be considered, it is not very useful to specify any particular type of analysis in this policy.").

Presumably, DEQ believes that the default limits in this proposed rule are reasonable and "scientifically defensible." Presumably, DEQ believes that the detailed soil sampling method for calculating effluent limits described in Tier 2 is reasonable and "scientifically defensible." But when faced with a potential discharge that cannot meet effluent limitations determined by either of these reasonable and scientifically defensible methods, DEQ gives the polluter another option – give us something, which we don't really define for you, that gives us some basis to permit your discharge without requiring that you treat it. The Tier 3 approach shows DEQ's topsy-turvy practice of permitting CBM discharges. Rather than asking "What discharge limits are necessary to protect downstream irrigation, given that 'the actual effects of EC and SAR on crop production are variable based upon soil type and chemistry'?" DEQ asks, "What is the quality of the water to be discharged and what is the minimal information we will accept from an applicant to justify its surface discharge?" [7]

B. The end-of-pipe deception.

The proposed rule has inherited the same defective assumption that afflicts all of DEQ's CBM discharge permits – that water quality does not change between the end of the pipe and the point of use. DEQ has been presented with ample evidence that the water chemistry of a CBM discharge in an ephemeral or intermittent stream may change, but it steadfastly refuses to account for this in any of its permitting policies and practices.[8] DEQ can account for dilution that occurs when a discharge is made to a

[7] This is especially true given the warning of experts about the long term effects of sodium buildup resulting from high SAR discharges. *Infra* section E.

[8] *See* Petitioner's Rulemaking Brief at 9-11 for a discussion regarding measured EC values in SA Creek in excess of DEQ's livestock and wildlife standards *See also* Ch. 2

flowing stream (and correspondingly relaxes effluent limits for the permittee) but is apparently unable (or unwilling) to account for the opposite effect (i.e. the concentration of constituents) that occurs in the stream channel downstream of the end of pipe. This dichotomy reveals how DEQ, by taking every opportunity to relax effluent limits for discharges instead of keeping in the forefront its mandate to prevent, reduce and eliminate pollution and to preserve and enhance the air, water and lands of Wyoming has subverted the EQA.

C. DEQ ignores impacts related to flow volume, turbidity, temperature and the hydrograph.

This rule, as proposed, again displays DEQ's myopic vision of what constitutes pollution and of its regulatory authority. DEQ has the authority to regulate pollution, and CBM discharge water is "pollution"

> "Pollution" is defined for purposes of water quality as:
>
> > . . . contamination or alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity or odor of the waters or any discharge of any acid, or toxic material, chemical or chemical compound, whether it be liquid, gaseous, solid, radioactive or other substance, including wastes, into any waters of the state which creates a nuisance or renders any waters harmful, detrimental or injurious to public health, safety or welfare, to domestic commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wildlife or aquatic life, or which degrades the water for its intended use, or adversely affects the environment.

Ex. 35, Patz, et al., *Chemistry of Coalbed Methane Discharge Water Interacting with Semi-Arid Ephemeral Stream Channels*, Journal of the American Water Resources Ass'n, October, 2004, at 1252 (stating that "[s]ignificant changes in CBM discharge water chemistry were observed in flow" of two ephemeral streams and that "[t]he CBM discharge water chemical changes observed . . . can be explained by channel sediment interactions"); Ch. 2 Ex, 2, *IENR Report* at vi (explaining that "CBM water may be of good quality at the wellhead but this quality can degrade when water picks up additional solids or salts after discharge to a streambed or storage in a reservoir designed to allow water to infiltrate through the soils."

WYO. STAT. § 35-11-103(c)(i).

CBM water alters the physical properties of the waters of the state. CBM water is "industrial waste." Northern Plains Resource Council v. Fidelity Exploration and Development Co., 325 F.3d 1155, 1161 (9th Cir. 2003), *cert. denied*, 540 U.S. 967 (2003) ("Because Fidelity is engaged in production of methane gas for commercial sale and because CBM water is an unwanted byproduct of the extraction process, CBM water falls squarely within the ordinary meaning of 'industrial waste.'"); Sierra Club v. Cedar Point Oil Co., 73 F.3d 546, 568 (5th Cir. 1996)(concluding "produced water" is encompassed as "industrial waste"). In addition, CBM water falls under the catchall definition of "waste" by virtue of it being both an "industrial waste" and a "liquid" or "other substance which may pollute any waters of the state."[9]

The EQA specifically recognizes that quantity of water has important environmental impacts that can and should be regulated. That is why, for example, the EQA contains the following language:

> No person, except when authorized by a permit issued pursuant to the provisions of this act, shall:
> . . .
> (iv) Increase the quantity or strength of any discharge. . .

WYO. STAT. § 35-11-301(a).

The Wyoming Attorney General has also recognized that authority. In answer to a question posed by the EQC, the Wyoming Attorney General has opined that the Council has "the authority to regulate the quantity of water produced" from CBM, if the

[9] "Waste" is defined as "sewage, industrial waste and all other liquid, gaseous, solid, radioactive, or other substances which may pollute any waters of the state." WYO. STAT. § 35-11-103(c)(ii). CBM water is a substance which may pollute waters of the state.

Council determines that the produced water is a "nuisance" under the statutory definition of "pollution."

> When considering "nuisance" in context, it is clear that it must be a discharge of any 'acid or toxic material, chemical or chemical compound, whether it be liquid, gaseous, solid, radioactive or other substance, <u>including waste</u> into any water of the state" that creates the nuisance. <u>The Council is granted the authority to regulate the discharge of substances into the waters of the state that create a "nuisance" in that sense.</u>

July 12, 2006 AG letter to EQC at 6 (emphasis added). The AG recognized that "nuisance" includes "waste." "Waste" includes CBM water. When the waste causes harm or injury, it is the DEQ's charge to control the environmental degradation through effective rules that are effectively implemented.

CBM water quality and quantity is creating a nuisance that renders the waters harmful to agricultural (and other) uses. WYO. STAT. § 35-11-103(c)(i). The EQC and the DEQ have the authority, as well as the obligation, to regulate "pollution" – including the quantity, as well as the quality, of water that creates that nuisance. The rule as proposed fails to consider in any manner the detrimental effects related to quantity of flow and timing of discharges to agricultural lands.

An approach that considers both quality and quantity is consistent with the EQA, and does not run afoul of the limitation on interference with the State Engineer jurisdiction, duties or authorities. WYO. STAT. § 35-11-1104. DEQ would not mandate water rights administration, but would leave it as usual to the SEO and Board of Control. DEQ would require permittees to reduce or eliminate pollution; the mechanism for doing so is up to the permittee, who would need to obtain necessary permits from the other agencies as applicable. This is no different than the current structure: many DEQ-issued permits are dependent upon reservoirs in order to meet WYPDES permit terms.

Reservoir permits are then obtained from the SEO, and nobody contends that structure interferes with SEO jurisdiction.

The nature of CBM flows and ephemeral drainages gives a practical basis for the need to regulate all parameters of water quality. Damage to soils and crops occurs as a result of the "quantity and timing" of the flows as well as their water quality.[10] These serious and long-term injuries to crops and soils are the result of the surface discharge of produced waters. They clearly fall under the definition of harm to agricultural interests. There is no basis in the EQA for limiting protections from the damage caused by elevated EC and SAR to irrigated lands. "Soils in the ephemeral channels may have similar characteristics and they may build shallow water tables if the streams are converted to perennial flow." Petitioner's Rulemaking Brief, Ex. 36 at 2.

Damage to vegetation and soils is not purely a function of water quality. Quantity and timing are important factors. For example, the level of salinity that can be tolerated without yield reduction will vary depending upon the ability to adequately leach the soil to keep sodium from building up. Historically in the Powder River Basin, leaching occurred during big runoff events. With the leveling off of runoff hydrographs as a result of CBM development, such leaching events are curtailed. The destruction of vegetation in channel bottoms and floodplains is another example of injury to livestock and wildlife

[10] Ch. 2 Ex. 6, 2/8/2002 letter from Munn at 1. "Some of the ephemeral streams may be converted to year around flow and this may present a situation where ice damming will cause flooding of land along the stream with undiluted product water. Year around flow will also raise the local ground water tables under presently ephemeral channels and may slow infiltration from the channels, increasing runoff from individual storm events;" Ch.2 Ex. 13, Bauder, *Quality and Characteristic of Saline and Sodic Water Affecting Irrigation Suitability* (including discussion of leaching, quantity and timing of water application as factors affecting suitability of saline and sodic waters).

caused by pollution (waste water flooding). It is a situation that DEQ steadfastly refuses to regulate.

The Water Quality Rules and Regulations recognize this quality/quantity interdependence. Chapter 1, Water Quality Standards, Section 35(b) requires that DEQ collect credible data to determine if designated uses on a water body are being attained including "consideration of soil, geology, hydrology, geomorphology, climate, stream succession and the influences of man upon the system." (emphasis added). Chapter 1, Section 11 allows for the altering of numeric quality standards "during periods of low flow," a recognition that flow can alter the impacts of numeric standards. DEQ must expand that recognition to occasions when protection of agricultural use is called for, not just for protection of discharges. Chapter 1, Section 2(b)(xi) defines effluent limitations to mean "any restriction . . . on quantities, rates and concentrations of chemical, physical, biological and other constituents which are discharged from point sources into waters of the state," a recognition that more than just simple controls on constituent concentration are necessary to effectively regulate polluting discharges. DEQ needs to unbind itself and regulate all of the parameters affecting water quality that it has power to regulate.

D. The rule fails to consider long-term impacts of CBM water on agricultural lands

CBM water's elevated SAR damages soil's physical condition and particularly its infiltration rate. (Petitioner's Rulemaking Brief, Ex. 2, *IENR Report* at 20). "Application of salty water to arid and semi-arid soils containing clay minerals with poor drainage may accumulate salts, decrease infiltration, and increase runoff and erosion." (Petitioner's Rulemaking Brief, Ex. 35, Patz, at 1248). The soil breakdown is likely irreversible.

In December, 2005, two University of Wyoming scientists felt compelled to write

to DEQ Director John Corra to point out fundamental mistakes being made by DEQ staff (Petitioner's Rulemaking Brief, Ex. 36, Dec. 5, 2005 Munn and Paige letter to Corra.) An important error pointed out had to do with the misapplication of the Hanson diagram, which "makes no claim to evaluation of long term effects of sodium build up in the soil as a result of long term additions of saline/sodic water. . . and provides absolutely no justification for discharging water to the surface or channels with SAR of greater than 10." (Petitioner's Rulemaking Brief, Ex. 36 at 2, 3.)

The possibility of long-term damage to soils, cost and feasibility of reclamation, and allocation of those costs to the proper parties are not even contemplated in the proposed rule. The protection against pollution that is required by the Wyoming Environmental Quality Act is not met without that consideration.

II. The technical practicability and economic reasonableness of reducing or eliminating the source of pollution

Rather than offer the applicants a way out of meeting effluent limits, DEQ should require that these limits be met. In order to do so, applicants may have to consider alternatives to surface discharge. Industry screams "the sky is falling," but there is no evidence of that. Rather, as the Anadarko pipeline project demonstrates, forward-thinking producers have made the decision it is economically viable to recognize even Wyoming won't allow continued surface discharge forever. (*See* Chapter 2 Exhibit 43, Anadarko website, proclaiming "The Powder River Basin Water Pipeline . . .will significantly reduce water handling expenses, establish a predictable cost structure for future water handling costs, and reduce risk in existing and future CBM projects in the region.") There are a number of technically feasible and economically reasonable

alternatives to the currently permitted manner of surface discharge of CBM produced water that would reduce or eliminate this as a source of pollution. Petitioner's Rulemaking Petition, Ex. 2, *IENR Report*, Table 3 at 23-25. These alternatives can be divided into three general categories:

1. Alternatives that eliminate surface discharge
2. Alternatives that treat the water prior to surface discharge
3. Alternative surface discharge management methods that reduce or eliminate unacceptable impacts on existing uses and the environment.

Technologies that have been or are being used to manage CBM water without surface discharge include:

- Reinjection
- Pipeline transport and reinjection
- Subsurface drip irrigation

Reinjection is being used in a number of locations within the Powder River Basin and Atlantic Rim areas to manage CBM water without resorting to surface discharge. The volumes managed in this fashion are not insignificant. Petitioner's Rulemaking Brief, Exs. 51 (PRB injection volumes), and 52 (Atlantic Rim injection volumes). In the PRB, approximately 24,700,000 barrels (3,183 acre feet) of CBM water was reinjected between 2001 and 2006. Petitioner's Rulemaking Brief, Ex. 51. Recently, a major producer of CBM in the Powder River Basin commissioned a 48-mile pipeline that carries CBM water "to a field location with suitable underground aquifer storage that matches the quality of the produced water." Petitioner's Rulemaking Brief, Ex. 53. The producer claims that the pipeline "will significantly reduce water handling expenses." *Id*. Subsurface drip irrigation is another technology being pursued and has been

demonstrated to be technically feasible and economically reasonable.[11] Petitioner's Rulemaking Brief, Ex. 54.

Water treatment prior to discharge is technically feasible and being used in the PRB. Petitioner's Rulemaking Brief, Ex. 2, *IENR Report*, Table 3 at 25. Treatment technologies currently being used in the PRB include Reverse Osmosis (RO) and Ion Exchange (IX). *Id. See also* Petitioner's Rulemaking Brief, Ex. 55 (Emit Technologies); Petitioner's Rulemaking Brief, Ex. 56 (Powder River Basin Desalination Project Feasibility Report, Surdam et al., Wyoming State Geological Survey). Treatment admittedly adds to the cost of wastewater management, but pollution is reduced by the production of high quality water that is suitable for a variety of other uses. Petitioner's Rulemaking Brief, Ex. 2, *IENR Report*, Table 3 at 25.[12] But while the increased cost to the producer will impact profitability, it will not halt all production. Additionally, it is important to realize that development and implementation of alternative water management technologies is itself likely to generate jobs and wealth. Petitioner's Rulemaking Brief, Ex. 58 at 5. (Coupal, Review of Economic Issues Associated with CBM Development, May, 2005)

[11] The commenters contend that many of the risks to irrigation posed by surface discharge of CBM water are also present with subsurface irrigation. However, as subsurface drip irrigation is highly managed, commenters assume it would be implemented in conjunction with an irrigation waiver or some other assurance that low quality water utilized in this fashion would be confined to the target parcels.

[12] A number of RO and IX cost ranges have been estimated. *See IENR Report*, Table 3 at 25 (estimating RO and IX costs to range from $0.19 to $0.73 per barrel); Ch. 2 Ex. 56 at 11-12 (estimating per barrel costs of between $0.08 and $0.10 for RO treatment of 1.2 MM barrels per day and pipeline transport to various locations in northeastern and central Wyoming); Ch. 2 Ex.57 - Technical Memorandum from Bob Kimball to Eric Hiser (estimating the costs of the same RO and pipeline transport to range from $0.33 to $0.61 per barrel).

Perhaps the most technologically feasible and economically reasonable alternative is simply smart management of the surface discharges. Many of the problems caused by CBM surface discharge result from DEQ's focus on regulation of constituent concentration and its failure to consider the effects of CBM discharge on the stream systems as a whole. Properly managed, surface discharge can provide beneficial use of CBM water. Recognizing that water quality is more than just the concentration of certain parameters and properly managing for all of the parameters that affect water quality would also reduce and eliminate the source of pollution.

III. Conclusion

These commenters contend that Appendix H, as proposed, is a policy gone dangerously awry. Its focus on permitting discharges by whatever means possible subverts the EQA and improperly emphasizes the use of Wyoming's waters for industrial purposes at the expense of the environment and other legitimate, preexisting uses. Industry is fond of saying that the EQA requires that environmental protection under the EQA must be balanced with industrial uses of the environment, but Appendix H, as proposed is an embodiment of how DEQ strikes that balance with its thumb resting heavily on industry's weighing pan. We therefore respectfully request that Appendix H in its present form not be approved. We further request that the EQC adopt the default limits of EC and SAR as set out in Appendix H, notes 1 and 2, as numeric limits on all streams that have the potential for use in agriculture.

Dated this ____ day of February, 2007.

Powder River Basin Resource Council

Kate M. Fox
J. Mark Stewart
Davis & Cannon
422 W. 26th St.
P.O. Box 43
Cheyenne, WY 82003
(307)634-3210