

**BEFORE THE WYOMING
ENVIRONMENTAL QUALITY COUNCIL**

FILED

**IN RE: Willow Creek General Permit,)
Pumpkin Creek General Permit, and)
Four Mile Creek General Plan)**

**Consolidated Docket
Nos. 06-3815, 06-3816,
and 06-3817**

AUG 12 2008

Jim Ruby, Executive Secretary
Environmental Quality Council

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

THIS MATTER came before the Environmental Quality Council (EQC or Council) for hearing on April 28, 2008 through May 1, 2008, with Hearing Examiner, Dennis Boal presiding and Council members Tom Coverdale, John Morris, and Richard Moore, P.E. Ms. Terri Lorenzon, Director and Attorney for the EQC and Ms. Marion Yoder, from the Attorney General's office were present to advise the EQC. At the hearing the Wyoming Outdoor Council (WOC) was represented by Mr. Steve Jones; Yates Petroleum Corporation, Marathon Oil Company (Marathon), and Citation Oil & Gas Corp. (Citation) (collectively Y/M/C) were represented by Mr. Matthew Joy and the Department of Environmental Quality (DEQ) was represented by Mr. Michael Barrash. At the conclusion of the hearing in this matter the EQC directed the parties to submit proposed findings of fact and conclusions of law on or before June 16, 2008.

At a public meeting held on June 28, 2008, in Sundance, Wyoming the EQC members Dennis Boal, presiding officer, Tom Coverdale, John Morris, Tim Flitner and Richard Moore, P.E. considered the evidence presented and being otherwise well advised in the premises, the Council hereby finds as follows:

FINDINGS OF FACT

1. The DEQ issued General Permit WYG280000 (Pumpkin Creek General Permit) on September 11, 2006 for discharges of produced water from coal bed methane (CBM) facilities located in the Pumpkin Creek watershed in the Powder River basin in northeast Wyoming.
2. The DEQ issued General Permit WYG 290000 (Willow Creek General Permit) on September 11, 2006 for discharges of produced water from coal bed methane (CBM) facilities located in the Willow Creek watershed in the Powder River basin in northeast Wyoming.
3. Petitioners Y/M/C filed a Notice of Appeal and Request for Hearing before the EQC on or about November 9, 2006, contesting certain terms and conditions in the Pumpkin Creek General Permit and the Willow Creek General Permit, and also in the Four Mile Creek General Plan.
4. Pursuant to the EQC's April 22, 2008 Prehearing Conference Order, based on agreement of the parties, the Four Mile Creek General Plan is not at issue before the EQC in the present proceeding.

5. Petitioner WOC filed separate Petitions for Review on or about November 9, 2006, contesting certain terms and conditions in the Pumpkin Creek General Permit and the Willow Creek General Permit, respectively.

6. WOC filed a Motion for Summary Judgment on or about July 13, 2007 involving the same three issues raised in both WOC Petitions, and Y/M/C was granted leave to intervene.

7. The EQC consolidated the separate Y/M/C and WOC appeals by Order dated October 4, 2007, and denied WOC's Motion for Summary Judgment on those three particular issues by Order dated November 28, 2007, filed November 30, 2007.

8. The issues remaining to be resolved in this consolidated contested case are identified in the EQC's April 22, 2008 Prehearing Conference Order.

(1) Findings relating to whether the effluent limits in the permits are appropriate

(a) Findings relating to whether the effluent limits for EC and SAR applicable to Category IC discharges located above irrigation are appropriate

9. Water quality standards are regulated pursuant to Chapter 1 of the Wyoming Water Quality Rules & Regulations (WWQRR) establishing numeric and narrative "criteria" to protect designated uses of surface waters of the state.

10. Water quality based effluent limits are numeric permit limits set to meet water quality standards as established in Chapter 1. WWQRR, Chapter 2, Section 3(b) (xcix) (p.2-15).

11. Irrigation and livestock watering are the agricultural uses to be protected.

12. In determining whether the quality of water discharged meets the quality of water historically used for irrigation in that drainage, the result should be no measurable decrease in crop production due to the water quality.

13. There is insufficient data of natural (pre-CBM) water quality in ephemeral systems in the Powder River Basin, such as Pumpkin Creek and Willow Creek.

14. To protect water quality for irrigation use, the important constituents are salinity measured as electrical conductivity (EC) and sodium adsorption ratio (SAR).

15. EC is a measurement of salinity, which can have a direct effect on irrigated crop production by impairing plants' ability to uptake water.

16. SAR is not crop specific, but rather a more general concern regarding damage to

soil structure that will impair the ability of irrigated land to infiltrate water.

17. To set “default” limits for EC, DEQ uses published soil salinity tables from the United States Department of Agriculture (USDA) soil salinity laboratory.

18. The two soil salinity data tables used (Exhibits 8 & 8A) to set Category IC “default” limits for EC in the Pumpkin and Willow Creek General Permits are essentially the same data tables and are the best information available for that purpose.

19. The soil salinity tables list recommended soil salinity thresholds for a variety of crops.

20. Using the 100% threshold numbers from the soil salinity tables to derive default limits assures that the quality of water discharged will not negatively affect the production of crops irrigated with that water.

21. The use of a simple mathematical calculation of dividing the soil salinity (EC_e) from the tables by 1.5 provides the default numeric limits for EC of water (EC_w) available for irrigation,

22. The use of the 1.5 conversion factor to derive default limits for water EC (EC_w) from soil EC values (EC_e) in the soil salinity tables is a fair and commonly used method.

23. First setting the default limit for EC, and then setting the SAR limit in relation to the EC limit up to a cap of 10 for SAR is a sound and reasonable approach to setting the Category IC default limits for EC and SAR to protect irrigation water quality.

24. Category I discharge under both the Pumpkin Creek and Willow Creek General Permits are discharges either directly to stream channels or to on-channel reservoirs with no containment requirements.

25. Subcategory IC discharges under the Pumpkin Creek General Permit are Category I discharges from outfalls located more than 10 miles above the confluence of Pumpkin Creek with the Powder River, and, if located upstream from irrigation, are subject to EC and SAR effluent limits for protection of irrigation uses.

26. Subcategory IC discharges under the Willow Creek General Permit are Category I discharges from outfalls located upstream from existing irrigation uses within the Willow Creek watershed.

27. The Willow Creek General Permit set the following default limits:
- a. EC of 1330 $\mu\text{mho/cm}$ to protect alfalfa
 - b. SAR of 7 to protect alfalfa.

28. The Pumpkin Creek General Permit set Category IC default limits of 2200 umhos/cm for EC and 13 for SAR for irrigation of western wheatgrass.

29. The use of the text “Agricultural Salinity and Drainage” by Blaine Hanson, et al (DEQ Exhibit 8A) to derive Category IC default EC limits to protect irrigation of western wheatgrass in the Pumpkin Creek General Permit, was a fair and reasonable method.

30. To meet the Chapter 1, Section 20 narrative standard of preventing a measurable decrease in irrigated crop production by setting numeric limits based on actual storm water quality data, it is important to consider during which periods of a storm hydrograph irrigators historically would have used the water for irrigation.

31. It is common knowledge among experienced irrigators to let the first flush of water in the hydrograph of a storm event go by before diverting it for irrigation, because that initial rise typically has higher salinity.

32. If there are soluble minerals such as sulfates in the drainage, then water flowing through it, whether CBM or natural runoff, could pick those up.

33. As CBM discharge water flows through a drainage, the salinity may increase and the type of the discharged water may change from a CBM “signature” to a natural signature.

(b) Findings relating to whether all the effluent limits in the general permits meet the requirements of WWQRR Chapter 1, § 20, by protecting all existing and potential agricultural uses

34. Chapter 2, Appendix H (b) (vii) specifies numeric effluent limits for listed constituents (including 7500 umhos/cm for specific conductance (EC)) for discharges of produced water from oil and gas operations, including CBM, to protect water quality for use by livestock and wildlife.

35. Category II discharges under both the Pumpkin and Willow Creek General Permits are discharges from outfalls to on-channel reservoirs capable of containing all CBM effluent in addition to storm water runoff equivalent to a 50 year, 24 hour precipitation event.

36. Category II discharges under both the Pumpkin and Willow Creek General Permits are subject to effluent limits at the outfalls to protect water quality for livestock use, not irrigation use.

37. The concept for the Category II discharge limits is that the water in a reservoir with capacity to contain a 50 year, 24 hour storm event will be available for livestock use, but not for irrigation use.

38. The effluent limits for Category II discharges to protect water quality for livestock use under the Willow Creek General Permit are at least as stringent as the numeric limits for listed constituents specified in Chapter 2, Appendix H (b) (vii) (p.H-2).

39. The effluent limits for Category II discharges to protect water quality for livestock use under the Pumpkin Creek General Permit are at least as stringent as the numeric limits for listed constituents specified in Chapter 2, Appendix H(b)(vii) (p.H-2), except sulfate, which was not included in the Pumpkin Creek General Permit, because it was determined to be a pollutant of non-concern for discharges in that drainage based on available discharge monitoring data showing consistently low sulfate concentrations (discharge sulfate concentrations: average 2.5 mg/l, maximum 44 mg/l compared with 3,000 mg/l limit in Chapter 2, Appendix H(b)(vii)(B).

40. DEQ set effluent limits to protect irrigation use under the Pumpkin Creek and Willow Creek General Permits based on information from landowners at stakeholder meetings during the watershed permitting process for each of those permits.

41. The Pumpkin Creek and Willow Creek General Permits did not impose effluent limits specifically to protect naturally irrigated bottomlands.

42. The size (area) of naturally irrigated bottomlands protected by effluent limits under the Pumpkin Creek and Willow Creek General Permits will vary by specific site.

(2) Findings relating to the appropriate point of compliance for effluent limits

43. The point of compliance for effluent limits for Category IC and Category II discharges under the Pumpkin Creek General Permit is at the outfalls (end of pipe).

44. The point of compliance for effluent limits for Category IC and Category II discharges under the Willow Creek General Permit is at the outfalls (end of pipe).

45. Requiring compliance with effluent limits at the end of pipe (outfalls) aids the enforcement of those limits by reducing problems with commingled discharges and other intervening factors.

46. Chapter 2, Appendix H, WWQRR, requires that all water quality samples collected by discharge permit holders subject to Appendix H shall be taken from the free fall of water from the last treatment unit (or at the outfall, if no treatment units), which is located out of the natural drainage, and the sample *must not be mixed* with waters of any other surface water or with water from another discharge point. WWQRR Chapter 2, Appendix H (b) (x) (p.H-2).

47. The point of outfall is the only point at which it can be assured that the water being tested is from that operator, and eliminates other potential sources (natural and otherwise) that could affect water quality once the water has been discharged from the outfall and travels down the drainage. If the produced water will reach an existing point of use the outfall shall be

the point of compliance for SAR and EC.

48. Pursuant to WWQRR Chapter 2, Section 5(c) (iii) (C) (II) (1) (a) (p.2-42). Mixing zones are taken into account in *establishing* effluent limits.

49. *Dilution* in mixing zones under WWQRR Chapter 1, Section 9 is a consideration in determining *what* “effluent limits” should be permitted for “compliance with water quality standards,” not *where* compliance with effluent limits should be measured. Chapter 1, Section 9 (p.1-15); WWQRR Chapter 2, Section 5(c) (iii) (C) (I) (4) (p.2-41).

50. Mixing zones under WWQRR Chapter 1, Section 9 do not apply to the point of compliance for direct discharges of produced water from oil and gas production facilities in ephemeral systems, which are specifically governed by Chapter 2, Appendix H(b)(x) (p.H-2), which requires that samples “must not be mixed” with surface water or other discharges.

51. Willow Creek and Pumpkin Creek are both ephemeral systems.

52. Mixing zones for direct discharges of CBM produced water in ephemeral systems are not appropriate, because there is usually no natural flow with which to mix.

(3) Findings relating to whether the 50-year, 24-hour storm event containment “requirement” is justifiable, if a permittee selects the Category II “option”

53. As an option to Category IC effluent limits for protection of irrigation use, which apply to direct discharges of CBM produced water under the Pumpkin Creek and Willow Creek General Permits, operators can discharge to reservoirs with freeboard capacity capable of containing up to a 50-year, 24-hour precipitation event, subject to Category II effluent limits for protection of livestock watering use.

54. CBM produced water discharged into on-channel reservoirs having the capacity to contain up to a 50-year, 24-hour precipitation event is subject to Category II effluent limits to protect livestock use, because it is available for livestock use, but is isolated from use for downstream irrigation, except in a statistically rare 50-year, 24-hour precipitation.

55. The 50-year, 24-hour containment “option” does not prohibit discharges to smaller reservoirs, subject to Category IC (irrigation) effluent limits.

56. The 50-year, 24-hour containment for on channel reservoirs will require a relatively large reservoir with a capacity over 20 acre feet and a dam over 20 feet high. Within the Pumpkin Creek drainage there are areas that are appropriate for reservoirs with a capacity of even 40 acre feet or larger.

57. That the construction of off channel reservoirs will require a smaller area of

construction because the off-channel reservoir will not need to contain the flows from the stream itself or other storm water runoff from the surrounding basin area.

58. That an off-channel reservoir because of its smaller area will require less maintenance and restoration efforts in order to prevent harm to livestock, wildlife and the surface owners' use of the land once the CBM produced water is no longer available.

59. That the use of off-channel reservoirs significantly reduces the risk of release of CBM produced waters that do not meet the necessary EC and SAR standards for release downstream.

(4) Findings relating to whether incorporation of the “Wyoming Powder River Assimilative Capacity Allocation and Control Process” in the permits provides fair notice concerning what requirements will be imposed on permittees

60. Assimilative capacity requirements in the Pumpkin Creek and Willow Creek General Permits will ensure that discharges permitted in Wyoming are not going to result in an exceedance of Montana water quality standards downstream at the Montana state line.

61. The General Permits adequately specify and provide fair notice of the methodology to be used to determine the number of credits needed for surface discharges.

62. The General Permits also give fair notice that determination of whether proposed discharges will require use of assimilative capacity credits will be made as part of the authorization process under the General Permits.

63. The authorization process for discharges under a General Permit requires submittal to DEQ of a Notice of Intent (NOI) seeking coverage under the General Permit, including information necessary for adequate program implementation, and then written authorization by the Water Quality Division (WQD) Administrator prior to any discharges under the General Permit.

64. Information necessary for adequate program implementation to be submitted in NOIs for authorization to discharge under the contested General Permits includes information needed from the operator before DEQ can actually allocate credits and determine whether to specify any additional requirements related to assimilative capacity in the written authorization.

65. Written authorization by the WQD Administrator to discharge under these General Permits will allocate the credits and identify any other conditions of such authorization in addition to the conditions specified in the General Permits themselves.

66. The necessary DEQ/WQD written authorizations to discharge will give fair notice of any additional requirements related to assimilative capacity” under §1.2.2.13 of the Pumpkin Creek General Permit and §1.2.2.13 of the Willow Creek General Permit.

(5) Findings relating to whether the erosion control protections set forth in the general permits are adequate to protect the drainage from damage caused by erosion; and (6) whether the requirements in the “Head Cut Monitoring and Mitigation” provisions of the general permits are appropriate

67. The conditions in the Pumpkin Creek and Willow Creek General Permits to control channel erosion and head cuts is to implement the narrative standard for limiting settleable solids rather than to manage erosion per se.

68. The Pumpkin Creek General Permit contains reasonable requirements for erosion control, channel stability and head cut monitoring and mitigation.

69. A channel hydraulic survey conducted by WWC Engineering was used in the process of developing requirements for channel stability and erosion control and monitoring in the Willow Creek General Permit.

70. The Willow Creek General Permit contains reasonable requirements for erosion control, channel stability and head cut monitoring and mitigation.

71. There have not been serious erosion problems resulting from CBM discharges.

72. To the extent that any of the foregoing findings of fact may constitute conclusions of law, they are hereby incorporated as such by this reference.

CONCLUSIONS OF LAW

1. Pursuant to WYO. STAT. ANN. § 35-11-112(a)(iv), the EQC has jurisdiction over the subject matter and the parties in this case, in which Petitioners Y/M/C and WOC are each contesting certain conditions DEQ imposed in the Pumpkin Creek and Willow Creek General Permits.

2. WYO. STAT. ANN. § 35-11-301(a) (i) requires authorization under a permit issued by DEQ for the discharge of any pollution or wastes into the waters of the state.

3. WYO. STAT. ANN. § 35-11-801(a) authorizes the DEQ to impose conditions on permits as necessary to accomplish the purpose of the Wyoming Environmental Quality Act (WEQA) which are “not inconsistent” with existing rules, regulations and standards.

4. For purposes of evaluating the contested permit conditions for compliance with WYO. STAT. ANN. § 35-11-801(a), the “Agricultural Use Protection Policy” discussed at various times during the hearing is not an existing rule, regulation, or standard, and was not an existing rule, regulation, or standard in 2006 when the contested Pumpkin Creek and Willow Creek General Permits were issued. EQC’s “Statement of Principal Reasons” for adoption of WWQRR

Chapter 1 (p.2), dated and filed February 16, 2007.

5. WWQRR Chapter 2, Section 5(c) (iii) (C) (III) (p.2-42) authorizes inclusion of numeric effluent limits for EC (salinity) and SAR (sodicity) in the Pumpkin Creek and Willow Creek General Permits to implement the Chapter 1, Section 20 narrative standard, because those water quality parameters have the potential to cause a measurable decrease in irrigated crop production.

6. WWQRR Chapter 1, Section 20 sets forth a narrative standard to protect water quality for irrigation use. This standard includes effluent limits on EC and SAR.

7. WWQRR Chapter 2, Appendix H(b)(x) (p.H-2), which applies to produced water discharges from oil and gas production facilities, requires that all water quality samples collected by discharge permit holders subject to Appendix H shall be taken from the free fall of water from the last treatment unit (or at the outfall, if no treatment units), which is located out of the natural drainage, and the sample *must not be mixed* with waters of any other surface water or with water from another discharge point; the outfall is the only point at which it can be assured that the water being tested is from that operator, and eliminates other potential sources (natural and otherwise) that could affect water quality once the water has been discharged from the outfall and travels down the drainage.

8. WWQRR Chapter 2, Appendix H(b)(x) (p.H-2) requires that samples from discharges of produced water from oil and gas production facilities “must not be mixed” with surface water or other discharges; there is usually no natural flow in ephemeral systems, such as Willow Creek and Pumpkin Creek, with which to mix.

9. Chapter 2, Section 9(a)(v) (p.2-79) prohibits issuance of a permit or authorization which would authorize any discharge that, after imposition of permit conditions, cannot ensure compliance with the applicable water quality requirements of all affected states; assimilative capacity requirements in the Pumpkin Creek and Willow Creek General Permits are designed to ensure that discharges permitted in Wyoming are not going to result in an exceedance of Montana water quality standards downstream at the Montana state line.

10. WWQRR Chapter 1, Section 15 (p.1-17), provides the regulatory basis for DEQ to impose conditions in the contested general permits to control channel erosion and head cuts to implement the narrative standard for limiting settleable solids rather than to manage erosion per se;

11. Issuance of the contested Pumpkin Creek and Willow Creek General Permits constitute “final actions” of the DEQ Director and WQD Administrator, which are appealable under Chapter I, Section 16(a) of the DEQ Rules of Practice & Procedure, not “orders” of the DEQ, which are appealable under WYO. STAT. ANN. § 35-11-701(c) (ii). As provided in Chapter I, Section 16(a) of the DEQ Rules of Practice & Procedure, Petitioners Y/M/C and WOC both appealed the Pumpkin Creek and Willow Creek General Permits within 60 days after the DEQ

Director and WQD Administrator signed them, but did not appeal them within 10 days as required for contesting DEQ "orders" under WYO. STAT. ANN. § 35-11-701(c) (ii);

ORDER

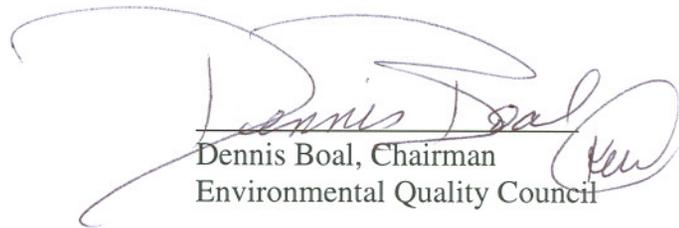
WHEREFORE, The Council finds that General Permit WYG 280000 (Pumpkin Creek) and General Permit WYG 290000 (Willow Creek) should be modified as follows.

1. For Category I waters discharged above land in which alfalfa is grown the effluent limit of EC in the Willow Creek watershed shall not exceed 1330 and the SAR shall not exceed 7.
2. For Category IC direct discharge waters above land in which alfalfa is not grown the effluent limit of EC shall not exceed 2200 and the SAR shall not exceed 10 in the Willow Creek watershed.
3. For waters discharged in the Pumpkin creek watershed the effluent limit of EC shall not exceed 2200 and the SAR shall not exceed 10.
4. All reservoirs/impoundments, constructed to contain discharge waters set forth in General Permits WYG 280000 and 290000, shall be constructed off channel and shall be constructed to be able contain all CBM effluent in addition to storm water runoff equivalent to a 50 year, 24 hour precipitation event.

In all other respects General Permit WYG 280000 and General Permit WYG 290000 are hereby approved.

Pursuant to Chapter II Section 12, the council voted 4 aye and 0 nay on the motion to adopt this Order.

DATED this 12th day of August, 2008.


Dennis Boal, Chairman
Environmental Quality Council

CERTIFICATE OF SERVICE

I, Kim Waring, certify that at Cheyenne, Wyoming, on the 12th day of August, 2008, I served a copy of the foregoing **FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER** by electronic mail to;

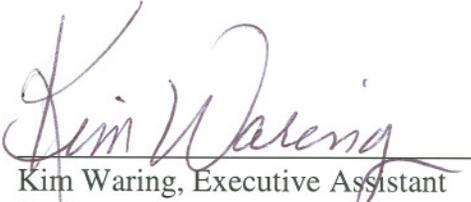
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