

Coal Bed Methane Discharge WET Testing Implementation Approach

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Background

On October 30, 2003 the Wyoming Department of Environmental Quality, Water Quality Division (WQD) released the report "Whole Effluent Toxicity (WET) testing of Coal Bed Methane (CBM) Produced Water in Northeastern Wyoming". The report identifies one area where CBM discharge water exhibits toxicity characteristics for all species tested (fathead minnows, *Ceriodaphnia* and *Daphnia magna*). This area has been defined as the Big George Coal Seam.

There was one sample collected from a discharge in All Night Creek, tributary to the Belle Fourche River with produced water that originates from the Big George coal seam. Discharge water from this outfall did not exhibit characteristics of toxicity and passed the WET tests.

Anadarko Petroleum Corporation and WQD conducted additional studies of outfalls in the Burger Draw area for the purposes of verifying the original 2003 study results, determining the persistence of the toxicity within Burger Draw and determining background toxicity to the study organisms in the Powder River prior to the confluence with Burger Draw. The confirmation study found similar toxicity results for the same outfall as the initial 2003 WQD study. The confirmation study also identified one additional outfall that exhibited similar toxicity characteristics. The toxicity was also found to be persistent in Burger Draw downstream of the sampled outfalls. Samples from the Powder River prior to the confluence with Burger Draw did not exhibit toxicity characteristics.

Conclusions

The WQD has concluded that toxicity issues related to CBM produced water are limited to areas of the Big George coal seam. The extent of the Big George water exhibiting toxicity characteristics is unknown at this time. Based on the results of the toxicity tests conducted on the Big George coal seam produced water, the WQD has also concluded that it is appropriate to incorporate WET testing limits in CBM permits with produced water originating from the Big George coal seam. The Wyoming Geological Survey provided the WQD with a data layer of the Big George Coal. This data layer was used as the foundation for establishing the boundaries for WET testing requirements. Based on existing knowledge that water quality is of similar or poorer quality to the west of the data layer boundaries, WQD concluded that the WET testing requirement boundary should be moved further to the west.

All three species tested exhibited toxicity to the produced water from the Big George coal seam. However, based on available information it was concluded that fathead minnows and *Daphnia magna* were the most appropriate species for CBM discharge toxicity testing. Therefore, it has been determined that acute and chronic WET testing of fathead minnows and acute WET testing for *Daphnia magna* should be conducted during the initial monitoring requirement (IMR) reporting and annually thereafter for new, modified or renewed permits to begin as of May 5, 2004.

Procedures

1. All new, renewed or modified CBM permits meeting the following criteria shall have WET testing limits applied to each outfall in accordance with this document unless otherwise determined to be inappropriate or unnecessary by the NPDES Program Manager.
 - a. Discharges of produced water from wells located within the legal descriptions identified in Table 1; and
 - b. The outfall is within one mile of or directly discharging to any Class 2 or 3 water; and
 - c. Permits WY0038458, WY0042013 and WY0042030 shall have WET testing limits incorporated as a permit condition and shall be public noticed no later than June 2004; and
 - d. Temporary permits for drought relief will not be issued for requests with wells located within the legal descriptions identified in Table 1.

Table 1 - CBM WET Testing Requirement Area

R78WT50N	R77WT50N	R76WT50N	R75WT50N S 29-33
R78WT49N	R77WT49N	R76W49TN	R75WT49N S 3-10, 15-23, 26-35
R78WT48N	R77WT48N	R76W48TN	R75WT48N S 5-8, 31
R78WT47N	R77WT47N	R76W47TN	R75WT47N S 5-9, 16-21, 27-34
R78WT46N	R77WT46N	R76W46TN	R75WT46N S 4-9, 16-20, 29-32
	R77WT45N S 1-3, 12	R76W45TN S1-12, 15-16	R75WT45N S 6

2. WET testing limits shall be established consistent with 40 CFR 136 and EPA Region 8 Implementation Procedures.
3. For discharges directly to or within one mile of Class 2 waters: acute and chronic WET testing limits shall be applied for fathead minnows and acute WET testing limits shall be applied for *Daphnia magna*. If the outfall discharge does not exhibit toxicity characteristics for two consecutive tests, the WET testing requirements will allow for alternating species testing.
4. For discharges to or within one mile of Class 3 waters: acute WET testing limits shall be applied for fathead minnows and *Daphnia magna*. If the outfall discharge does not exhibit toxicity characteristics for two consecutive tests, the WET testing requirements will allow for alternating species testing.

5. The frequency for WET testing shall be established in the permit as follows:
 1. Where IMR testing is required, during the IMR testing
 2. Annually
(If required during IMR testing, the IMR test results shall count as the first annual test)

6. For discharges into drainages where the WQD had determined representative data on WET testing is not available for new, renewed or modified CBM permits the WQD will require acute and chronic WET testing for fathead minnows and acute WET testing for *Daphnia magna* from an outfall representative of the source water. The WET testing requirements will be required to be conducted during the IMR testing or within 60 days of issuance of the permit if IMR testing requirements are not contained in the permit.

Depending upon the results of the WET testing conducted, the permit may be reopened and modified to incorporate WET testing limits into the permit.

Questions regarding these implementation procedures should be directed to Leah Krafft at 307-777-7093 or by email at lkraff@state.wy.us.

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