



July 5, 2019

Jason Thomas
Department of Environmental Quality
Water Quality Division
200 West 17th Street
Cheyenne, WY 82002

Re: Comments on Moneta Divide Gas Field Discharge Permit (WY0002062, Aethon Energy)
Submitted via WDEQ public comment portal and email

Dear Mr. Thomas:

On behalf of more than 1,200 members of Sierra Club Wyoming Chapter (SCWC) and more than 3.5 million members and supporters of the Sierra Club nationwide, we submit the following comments on Aethon Energy's application for renewal of its Moneta Divide Gas Field Discharge Permit, WY0002062.

As America's most enduring and influential grassroots environmental organization, the Sierra Club is dedicated to defending all people's right to live in a healthy world, with clean water, clean air, and access to functional natural ecosystems. Here in Wyoming, we work to help our members, Wyoming residents, and visitors to our state enjoy, explore, and protect our remarkable natural places, and to ensure that our environment remains clean and healthy for people and wildlife.

As stated on the Wyoming Department of Environmental Quality (WDEQ) website, WDEQ is "charged with protecting, conserving, and enhancing Wyoming's land, air and water for the benefit of current and future generations". It is the responsibility of the WDEQ to ensure that proposed industrial activities such as this proposed permit renewal comply with all state and federal laws including the Clean Water Act, National Pollution Discharge Elimination System, Wyoming Environmental Quality Act, and all other applicable law. The WDEQ must ensure that the proposed permit renewal will not adversely affect the health and safety of Wyoming's residents, that it complies with all relevant water quality standards, that it does not excessively harm other natural resources including wildlife and wildlife habitat, that it does not harm recreational users, and that it respects the rights of private property owners, including downstream water users.

After reviewing the permit renewal application and independent third-party expert evaluations of the application and the modeling report submitted by the applicant, we have concluded that the WDEQ must deny the permit renewal because of noncompliance with state and federal laws, potential negative impacts to human health and safety, negative impacts to water quality, unacceptable harm to wildlife and wildlife habitat, unacceptable harm to recreational uses, and general unacceptable environmental degradation.

Aethon Energy has proposed a major expansion of its Moneta Divide field that would approximately quadruple the wells in the field, going from around 900 existing wells to 4,100 wells. The field now discharges about 1 million gallons of wastewater per day, and the proposed expansion would produce an estimated **1.4 million barrels (58 million gallons)** of waste water per day.

1. The Boysen Reservoir Water Quality Model is fatally flawed and cannot be used to evaluate or approve the permit

Without any independent verification, the WDEQ completely relied on the Boysen Reservoir Water Quality Model, developed by the project proponent's contractor Environmental Resources Management (ERM), to erroneously conclude that discharging the proposed level of produced waste water would not violate water quality standards in Boysen Reservoir or the Class 1 segment of the Wind River downstream, harm aquatic life or other wildlife, elevate risk to human health or safety, or harm downstream users.

Having some concern about the impartiality and quality of a model developed by a consultant for the project proponent, the SCWC joined with several other organizations to hire an independent scientific review of the model and its interpretation. The independent review by Hydros Consulting, a firm with no financial interest in this project, of the model and supporting reservoir modeling files, concluded that ERM's report, and the underlying model on which it is based, are fundamentally flawed and cannot be used for regulatory compliance.

Some of the key findings of the review conducted by Hydros Consulting included:

- The model was not developed properly and excluded many important factors.
 - Little to no tributary flow data was collected to ground-truth flow assumptions.
 - Reservoir evaporation effects were completely ignored.
 - Tributary flow estimates were arbitrary and inconsistent.
 - Inflow data from the Wind River was improperly manipulated.
 - Wind speeds were unrealistically limited.
 - Assumptions about water quality in different tributary streams were unsubstantiated.
 - Density changes for inflow water into Badwater Bay were completely ignored.
 - Water released at Boysen Dam into the Wind River was not correlated to inflow density, and there was no differentiation between water released through the low-level outlet and the high-level spillway.
- The model was not properly evaluated or calibrated, and cannot be considered realistic or reliable.
 - The model compared water quality measurements in the Wind River to water quality simulated only in the top two-foot layer of Boysen Reservoir, which completely ignores the facts that the reservoir stratifies, more dense inflows may sink and flow along the floor of the reservoir to the dam, and most of the water released flows through the dam's low-level outlet.
 - High quality, meaningful data was arbitrarily excluded during the calibration and validation process, including data collected during periods of low natural flow and highest percent produced water (for example, in winter months).
- Compliance analysis methodology and conclusions are incorrect.

- Extensive valid and high quality data sets from the US Geological Survey on the Class 1 segment of the Wind River were excluded from analysis of baseline conditions.
- The analysis improperly used monthly averages to incorrectly reduce impacts to the Class 1 segment of the Wind River.
- The analysis used inflated and incorrect statistical values to reach statistically unsupported conclusions.
- An antidegradation analysis for Boysen Reservoir, required by the Clean Water Act and Wyoming Environmental Quality Act, was not conducted.

Please see the attached Hydros report for further explanation and details of their review of ERM's model and report. We hereby incorporate the Hydros report in its entirety into our comments.

2. Existing water quality impairment must be corrected

Current discharge of produced wastewater from the Moneta Divide field already has caused significant and ongoing impairment to both Alkali and Badwater creeks, and increases risk to Boysen Reservoir and the Wind River below Boysen. Allowing additional discharges will only worsen existing damage and further increase risk of unacceptable water quality impairment downstream. To meet its fundamental charge, the WDEQ must not authorize more pollution until existing problems are corrected.

For decades, WDEQ has authorized the discharge of massive quantities of highly saline and contaminated produced water into Alkali and Badwater creeks from nearby oil and gas fields. Even though WDEQ rules explicitly prohibit it from allowing modified effluent limits that would violate water quality standards, they have continued to exempt discharges from water quality standards limiting chlorides, sulfates, conductance and total dissolved solids.

Continuing to exempt discharges from water quality standards violates the Clean Water Act and the Wyoming Environmental Quality Act, and could undermine Wyoming's authority to issue NPDES permits.

Alkali Creek is a Class 3B stream, meaning it is an intermittent tributary stream including adjacent wetlands not known to support fish populations or drinking water supplies, but with sufficient hydrology to normally support and sustain communities of aquatic life including invertebrates, amphibians, or other flora and fauna. The designated use assigned to this classification is "aquatic life other than fish", and the WDEQ is responsible for protecting this designated use including water quality and habitat necessary to sustain populations of organisms other than fish to support diverse aquatic communities.

According to the BLM, oil field wastewater flowing into tributaries of Alkali Creek and Alkali Creek itself has caused disturbance of the drainage beds and destruction of drainage vegetation, leading to accelerated erosion. In Alkali Creek, degradation and scouring have increased downcutting (downward erosion) in tributary channels, inhibiting livestock movement, grazing and watering, and increasing sediment loading in Alkali Creek. According to monitoring done by Aethon as required by its current

discharge permit, Alkali Creek above the point of discharge is well vegetated, stable, and no scour or aggradation has been noted. Downstream from discharge points, channel changes include scour, degradation, and aggradation of sediment, with documented bank loss.

Aquatic life will not be protected by the terms contained in the draft permit, violating Wyoming water quality standards. A report prepared by well known and highly respected aquatic biologists Dr. Harold Bergman, Professor Emeritus, University of Wyoming, and Dr. Joseph Meyer, former UW faculty member and Chief Scientist, Applied Limnology Professionals, in Golden, Colorado, describes numerous critical deficiencies and omissions in the draft permit, and based on aquatic toxicity modeling, concludes that components of Aethon's produced water as proposed in the draft permit would be acutely lethal to aquatic species. Please see the attached Bergman-Meyer report for full details, which we hereby incorporate in its entirety into our comments.

Continuing to allow discharges that do not protect designated uses, and that do not maintain water quality necessary to sustain them, violates the Clean Water Act, the Wyoming Environmental Quality Act, and the WDEQ's rules.

Badwater Creek is a Class 2AB stream, a Tier II, high quality surface water. This designation, according to the Clean Water Act, the Environmental Protection Agency, and WDEQ Water Quality Division Rules and Regulations, requires that water quality in Tier II, high quality surface waters must be maintained to standards that protect existing uses fully. Existing uses include propagation of fish, shellfish, and wildlife and recreation in and on the water.

Unfortunately, the DEQ has failed to meet these standards, in violation of the Clean Water Act, the Wyoming Environmental Protection Act, and its own rules and regulations. The quality of Badwater Creek water is lower than the applicable standards, existing uses of Badwater Creek have not been maintained and protected, and WDEQ's claim in the draft permit that additional discharges will not result in significant degradation of Badwater Creek are laughable. Please see the attached Bergman-Meyer report for supporting details.

Boysen Reservoir is also a Class 2AB body of water, with the same requirements for water quality maintenance as described for Badwater Creek. As previously noted, the WDEQ based all its assumptions and conclusions on the fatally flawed ERM model and report, which cannot be used as the basis of decisions. Please see the attached Hydros report for a full description of the many problems with the ERM model, especially related to inflows into Boysen Reservoir. Notably, ERM failed to conduct an antidegradation analysis for Boysen Reservoir, as is clearly required by the Clean Air Act, the Wyoming Environmental Quality Act, and WDEQ's rules and regulations.

The Wind River below Boysen Dam is a Class I, Tier 3 river, into which no additional water quality degradation by point source discharges other than from dams are allowed. The water quality and biological integrity that existed at the time of designation must be maintained and protected. Again, we direct your attention to the attached Hydros report for a full description of the many problems with the ERM model, especially those related to issues that render any

conclusion about the flow of water through the reservoir from Badwater Bay to the dam and into the Wind River as totally meaningless. An uncalibrated, unverified model that cherry picks data, misuses basic statistical parameters, fails to accurately assess water density, water temperature, wind speed, and other highly influential factors that dictate how water vertically segregates and flows through a reservoir, ignores the effect of evaporation, and fails to differentiate between low- and high-level releases to the river simply cannot be used to support any conclusions about this project. To base a conclusion that this project would not harm water quality of the Wind River on such an incomplete and inaccurate model and report clearly would be illegal on any number of fronts.

4. Wildlife and Human Impacts

The proposed "mixing zone" in Boysen Reservoir, where highly contaminated water would be discharged into the reservoir, is fundamentally inappropriate and unacceptable. Boysen is heavily used during summer months for swimming, boating, and other water sports, and in winter for ice fishing and other winter recreational activities. Badwater Bay, where Badwater Creek flows into the reservoir, is a nursery area for sauger, designated by the Wyoming Game and Fish Department as a sensitive species. WDEQ has not analyzed potential toxicity of Aethon's produced wastewater to this species or other valued sport fishes in Boysen, or to aquatic life in general in Alkali or Badwater creeks. WDEQ has not meaningfully analyzed potential impacts to human health and safety, either in Boysen Reservoir or in the Wind River downstream.

People who use the Wind River further downstream are deeply concerned about this project, and rightly so. Municipalities such as Thermopolis use the water for a number of municipal purposes. Farmers draw from the river for irrigation and livestock use. Elevated salinity, toxic metal contamination, and other harmful substances concern these folks, and their concerns must be taken seriously. Their health and livelihoods are at stake.

The water level in Boysen Reservoir fluctuates seasonally and annually, so polluted water will extend further out into the reservoir during low water periods, and the dilution capacity of the reservoir will decrease during low water periods. Badwater Creek regularly experiences periods of low and sometimes no flow, during dry periods. Conversely, these desert drainages also occasionally experience gully washers when the rains come, which sometimes occur only once every several years. WDEQ has done no analysis of what happens when contaminants in wastewater are deposited and concentrated in streambed soils during dry periods, and then flush out in great surges during storm events. What damage will these pulses of extremely concentrated TDS, chloride, sulfate, and oil field chemicals do to aquatic life in the reservoir and the river, and to the people who recreate on and live along these waterways?

WDEQ's policy on mixing zones clearly states that a proposed mixing zone may be denied due to concerns about designated and existing uses. Such zones also may be denied in biologically important areas such as fish spawning or nursery areas. Clearly, the WDEQ has the authority to deny this permit, and should do so.

5. Conclusion

Draft permit *WY0002062*, *Aethon Energy* violates the Clean Water Act, the Wyoming Environmental Quality Act, and the WDEQ's rules and regulations. Produced wastewater from this facility already has damaged streams, threatens wildlife and wildlife habitat, and puts recreational users and downstream communities at risk. Increasing discharges of contaminated wastewater will only make a bad situation worse. The DEQ should deny the permit, and take immediate steps to correct current damage. Aethon should go back to the drawing board and consider other, less environmental damaging alternatives.

This watershed simply should not be used as a toxic wastewater treatment facility. We don't need to sacrifice this popular reservoir, its inflowing tributaries, or the Wind River below the reservoir, to this type of industrial development. We should enforce existing laws to stop current levels of unlawful pollution from being discharged into these waters, and Aethon should be required to treat all produced wastewater to all applicable water quality standards at the point of discharge, or to dispose of contaminated water by some other legal means.

Sincerely,



Connie Wilbert
Director
Sierra Club Wyoming Chapter
P.O. Box 1736
Laramie, WY 82073
(307)460-8046
connie.wilbert@sierraclub.org

CC: Governor Mark Gordon
Beth Callaway, Policy Advisor
Todd Parfitt, WDEQ Director
Kevin Frederick, WQD Administrator
Darcy O'Connor, EPA Region 8,
Assistant Regional Administrator
Office of Water Protection

Enclosures:

Bergman/Meyer Memorandum
Hydros Report