

Transmitted via the DEQ's Public Comment Portal and Email

July 3, 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)

Dear Mr. Thomas:

These comments are submitted on behalf of the Wyoming Outdoor Council, Powder River Basin Resource Council, Natural Resources Defense Council, and National Audubon Society in response to the State of Wyoming Public Notice dated March 15, 2019, inviting public comments on Aethon Energy's application for a renewal of its Moneta Divide Gas Field Discharge Permit, WY 0002062. Given the complex and technical nature of Aethon's discharge application, we appreciate the DEQ's decision to extend the comment period and hold public meetings in Riverton and Thermopolis.

As discussed in detail below, our review of the application<sup>1</sup> and related materials<sup>2</sup> shows that issuance of the permit would result in unacceptable risks to human health and the environment and must therefore be denied.

## **I. DESCRIPTION OF PARTIES**

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<sup>1</sup> "Wyoming Pollutant Discharge Elimination System Application for Permit to Surface Discharge Produced Water From Oil and Gas Production Unit Discharges," dated August 8, 2016.

<sup>2</sup> The related materials include: ERM, "Water Quality Compliance Analysis for the Long Range Development Plan at Moneta Divide, Wyoming," April 23, 2018; Boysen Reservoir Modeling Study Update (undated); DEQ Statement of Basis ("SOB"); and proposed Authorization to Discharge Under the Wyoming Pollutant Discharge Elimination System ("draft permit").

The mission of the National Audubon Society is to protect birds and the places they need, today and tomorrow.

The Natural Resources Defense Council's purpose is to safeguard the Earth: its people, its plants and animals and the natural systems on which all life depends. We work to restore the integrity of the elements that sustain life—air, land and water—and to defend endangered natural places.

Powder River Basin Resource Council was founded in 1973 by rural landowners and concerned citizens working to protect their land, water, and air. For 45 years our citizen-based organization has been dedicated to civil society and to the stewardship of Wyoming's human and natural resources. We are committed to community organizing, leadership development, and the empowerment of citizens.

Established in 1967, the Wyoming Outdoor Council is the state's oldest and largest independent conservation organization. Our mission is to protect Wyoming's environment and quality of life for future generations.

Our organizations all have members who use and rely on the waters affected by the proposed discharges. We are not opposed to the expansion of the Moneta Divide oil and natural gas field, but believe that any further development must be carried out in a manner that complies with the law, protects the health and safety of Wyoming's residents, meets water quality standards, and respects the rights of downstream water users.

## II. INTRODUCTION

Aethon Energy Operating LLC (“Aethon”), the operator of the Moneta Divide oil and gas field in Fremont and Natrona Counties, Wyoming, filed an application for a renewal of a WYPDES permit WY 0002062 with the Department of Environmental Quality/Water Quality Division (DEQ) on August 8, 2016. The application—available to the public on the DEQ's website—is not signed, contrary to explicit requirements contained in Chapter 2, Section 5(a)(v) and (vi); and Chapter 2, Section 14. As pointed out in our letter to the DEQ/WQD Administrator dated June 19, 2019, the application is also technically incomplete, and the DEQ erred in both issuing a notice of completeness and by initiating review of the incomplete application. We hereby incorporate our June 19, 2019, letter by reference into these comments as if fully set forth below, and request that the issues raised in that letter be considered together with the following issues, questions, and concerns.

Aethon has proposed a significant expansion of the Moneta Divide field that would add 4,100 new oil and gas wells to the roughly 900 that exist in the field today. *See* Bureau of Land Management (“BLM”) Draft Environmental Impact Statement (“DEIS”) for the Moneta Divide Project, available online at <https://www.blm.gov/press-release/blm-releases-draft-analysis-moneta-divide-oil-and-gas-project>. At peak production (year 15 of development), the DEIS estimates that produced water will be discharged at a rate of **1.4 million barrels per day** (508 million barrels per year), greatly exceeding existing discharge rates of about 1 million *gallons* per day. The Statement of Basis (“SOB”) prepared by the DEQ indicates that the renewed permit

would authorize the discharge of up to 8.27 million of gallons per day of untreated and partially treated produced water into surface waters. The permit would authorize an increase in allowable facility-wide load for total dissolved solids (TDS) to **2,161 tons per month** (capped at 908 tons/month in the existing permit) and would add a monthly load limit of 719 tons per month for chloride. The DEQ claims—based on a modeling report prepared by Aethon’s contractor, Environmental Resources Management (ERM)—that this increase would not violate water quality standards. Skeptical of those claims, we commissioned an independent scientific review, which found that the report, and the model on which it is based, are fundamentally flawed and cannot be used for regulatory compliance. The DEQ relied on a flawed model developed by the project proponent’s contractor that it had no internal capacity to independently verify, resulting in erroneous and insupportable findings and determinations regarding water quality impairment in the receiving waters including the Class 1 segment of the Wind River below Boysen Dam.

According to a July 31, 2018 inspection report, only 4 of the 16 outfalls that have been approved are discharging; we assume that is because the load limit for TDS in the existing permit would be exceeded with any additional discharge. The DEQ has not revealed how many of the almost 900 existing oil and gas wells in the Moneta Divide field are responsible for producing the 1 million gallons/day current rate of produced water, but we surmise that many of those wells have been shut in to avoid exceeding the TDS load limits in the existing discharge permit. What volumes of produced water discharge could be expected if all existing wells were operational?

The SOB indicates (at 2) that Aethon currently has the capacity (at its Neptune RO facility) to treat up to 1.64 million gallons of produced water per day, which has the effect of limiting the total discharge of treated and blended water to 4.37 million gallons per day. The SOB also indicates that “[a]dditional treatment capacity would have to be added in order to reach the 8.27 MGD (197,000 barrels) maximum discharge volume analyzed in this permit revision, and comply with the concentration and load limits for all parameters.” SOB at 2.

This begs the question: if new treatment capacity is required to reach 197,000 barrels per day, what is the plan when the Moneta Divide field reaches peak production, and produced water is being discharged at rates 7 times higher, 1.4 million barrels per day? It is clear that the DEQ needs to sit down with BLM and Aethon to figure out a way to deal with these enormous volumes of salty produced water. The previous owner of the field, Encana, proposed to treat all produced water to Class 1 standards and pipe to Boysen Reservoir. *See Moneta Divide DEIS, Appendix K Water Management Plan, June 2014.*<sup>3</sup> Yet the DEQ failed to consider this or any other alternative to the discharge, violating the Environmental Quality Act and its own antidegradation rules in the process. If the DEQ issues this renewal, will it set in motion a series of permit modifications and renewals to accommodate the expanding discharge of produced water that can be expected with expansion of the field?

As discussed below, the existing/current discharge of produce water has caused significant impairment to both Alkali and Badwater creeks. If the DEQ had followed its own rules, this could have been avoided, or at least mitigated. We urge the DEQ to refrain from authorizing greater amounts of pollution until existing problems are dealt with. We outline in

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<sup>3</sup> [https://eplanning.blm.gov/epl-front-office/eplanning/docset\\_view.do?projectId=64352&currentPageId=90686&documentId=170953](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=64352&currentPageId=90686&documentId=170953)

detail numerous flaws in the draft permit, and urge the DEQ and Aethon to go back to the drawing board and look at other options for the management and disposal of produced water from the Moneta Divide field.

### III. LEGAL AND REGULATORY CONTEXT

The Clean Water Act (CWA) aims “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” *PUD No. 1 of Jefferson County v. Wash. Dept. of Ecology*, 511 U.S. 700, 704, 114 S.Ct. 1900, 128 L.Ed.2d 716 (1994) (quoting 33 U.S.C. § 1251(a)). In passing the CWA, Congress sought to eliminate the discharge of pollutants into the nation's navigable waters and to attain “an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife.” 33 U.S.C. § 1251(a)(1)–(2). The centerpiece of the CWA is section 301(a), which prohibits the discharge of any pollutant from a point source into navigable waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. 33 U.S.C. §§ 1311(a), 1342.

The CWA allows for NPDES permits to be issued directly by the EPA Administrator or, if a state’s water quality regulation program has been approved by the Administrator, the EPA may delegate its permitting authority to the state regulatory body. *See* 33 U.S.C. § 1342(a), (b). The U.S. Environmental Protection Agency has delegated responsibility for issuing NPDES permits to the Wyoming DEQ. *See* Wyoming, Discharges of Pollutants to Navigable Waters; Approval of Program, 40 Fed. Reg. 12987, 13026 (Mar. 24, 1975). Like all states that have received this delegation, Wyoming must implement its discharge program consistent with minimum federal requirements. 33 U.S.C. § 1342(b). This includes ensuring that effluent concentration limits established in discharge permits protect water quality standards and meet antidegradation policies, discussed below.

CWA Section 303 requires states to develop comprehensive water quality standards setting forth water quality goals for all intrastate waters. *PUD No. 1 of Jefferson County*, 511 U.S. at 704, 114 S.Ct. 1900, 128 L.Ed.2d 716 (citing 33 U.S.C. §§ 1311(b)(1)(C), 1313). A water quality standard (WQS) consists of designated uses, water quality criteria to protect those uses, and an antidegradation policy, which is “a policy requiring that state standards be sufficient to maintain existing beneficial uses of navigable waters, preventing their further degradation.” *Id.* Regulations promulgated by EPA implementing the CWA require each state to develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy. 40 C.F.R. § 131.12(a) (2015).<sup>4</sup>

The EPA regulations further require that the state’s antidegradation policy and implementation methods must, at a minimum, be consistent with federal standards. These standards establish three levels of water quality protection: Tier 1, Tier 2 and Tier 3. Tier 1 protection establishes the minimum water quality standard and requires that existing instream

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<sup>4</sup> Wyoming’s antidegradation implementation policy is available here: [http://deq.wyoming.gov/media/attachments/Water%20Quality/Surface%20Water%20Quality%20Standards/2013-0924\\_wqd-wpp-surface-water-standards\\_Chapter-1-Implementation-Policies.pdf](http://deq.wyoming.gov/media/attachments/Water%20Quality/Surface%20Water%20Quality%20Standards/2013-0924_wqd-wpp-surface-water-standards_Chapter-1-Implementation-Policies.pdf).

water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. 40 C.F.R. 12(a)(1).<sup>5</sup>

Tier II protection applies when the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. 40 C.F.R. § 131.12(a)(2). For these waters, the regulation requires that their quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State’s continuing planning process, that allowing lower water quality is necessary to accommodate important economic and social development in the area in which the waters are located. 40 C.F.R. § 131.12(a)(2). However, in allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. 40 C.F.R. § 131.12(a)(2).<sup>6</sup>

Finally, Tier III protection provides that where high quality waters constitute an outstanding national resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. 40 C.F.R. § 131.12(a)(3).<sup>7</sup>

Wyoming has established a regulatory program to implement the Clean Water Act, including water quality standards and an antidegradation policy which are contained in Chapter 1 of the Water Quality Division Rules and Regulations, and rules governing the issuance and enforcement of discharge permits, set forth in Chapter 2. The statutory underpinning for both water quality standards and point source discharge permits is contained in the Wyoming’s Environmental Quality Act (“WEQA”), Article 3, Water Quality, §§ 35-11-301 to 35-11-318.

The WEQA authorizes the administrator to develop water quality standards, effluent limitations, and standards for the issuance of discharge permits as authorized under Section 402(b) of the Clean Water Act. Importantly, and especially relevant here, the WEQA provides that:

- (vi) In recommending any standards, rules, regulations, or *permits*, the administrator and advisory board shall consider all the facts and circumstances bearing upon the reasonableness of the pollution involved including:
  - (A) The character and degree of injury to or interference with the health and well-being of the people, animals, wildlife, aquatic life and plant life affected;
  - (B) The social and economic value of the source of pollution;
  - (C) The priority of location in the area involved;
  - (D) The technical practicability and economic reasonableness of reducing or eliminating the source of pollution; and
  - (E) The effect upon the environment.

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<sup>5</sup> Alkali Creek is a Tier 1 surface water.

<sup>6</sup> Badwater Creek and Boysen Reservoir are classified as Tier 2 “high quality waters.”

<sup>7</sup> The Wind River below Boysen Dam until its confluence with “Wedding of the Waters” is a Tier 3 “outstanding national resource water.”

Wyo. Stat. 35-11-302(a) (emphasis added).

Federal regulations prohibit the discharge of oil and gas waste. 40 C.F.R. § 435.52(a). The regulations provide a limited exception for discharges of produced water west of the 98th meridian that is “used for agriculture or wildlife propagation.” 40 C.F.R. § 435.50. Wyoming regulations incorporate these requirements, which are contained in Chapter 2, Appendix H: *Additional Requirements Applicable to Produced Water Discharges from Oil and Gas Production Facilities*.

The term “use in agricultural or wildlife propagation” is defined in both federal and state regulation. To qualify for the exception to the prohibition on discharges, the produced water must be: (1) “of good enough quality to be used for wildlife or livestock watering or other agricultural uses” and (2) “actually put to such use during periods of discharge.” 40 C.F.R. § 435.51(c); Ch. 2, App. H(a)(i).

#### **IV. THE DRAFT PERMIT DOES NOT COMPLY WITH THE WYOMING ENVIRONMENTAL QUALITY ACT.**

As noted earlier, the Wyoming Environmental Quality Act contains explicit requirements governing the content and analysis of discharge permits. Importantly, 35-11-302(a) provides that:

(vi) In recommending any standards, rules, regulations, or *permits*, the administrator and advisory board **shall consider all the facts and circumstances bearing upon the reasonableness of the pollution** involved including:

- (A) The character and degree of injury to or interference with the health and well-being of the people, animals, wildlife, aquatic life and plant life affected;
- (B) The social and economic value of the source of pollution;
- (C) The priority of location in the area involved;
- (D) The technical practicability and economic reasonableness of reducing or eliminating the source of pollution; and
- (E) The effect upon the environment.

Wyo. Stat. § 35-11-302(a) (emphasis added).

Neither the SOB nor the draft permit contain sufficient analysis of these factors because DEQ has not acknowledged the statutory provision and does not proceed with an analysis of each factor. For example, under subsection (c), the rules require an analysis of “[t]he priority of location in the area involved.” *Id.* However, a discussion of the value of Boysen State Park was not included in the SOB. This is a significant omission given the value of Boysen State Park as one of the most visited state parks in Wyoming.

The WEQA contains these requirements for a reason—they should not be ignored by the DEQ.

**V. THE DRAFT PERMIT DOES NOT COMPLY WITH WATER QUALITY DIVISION RULES AND REGULATIONS.**

**A. The Draft Permit Fails to Satisfy the Regulatory Requirements in Appendix H for the Discharge of Produced Water.**

Chapter 2 of the Department of Environmental Quality Water Quality Division's Rules and Regulations regulates point source discharges to waters of the State. Among other things, Chapter 2, Section 5 requires technology-based effluent limitation to be included in all permits. Ch. 2, Section 5(c)(iii)(A). For oil and gas production facilities like Aethon's, Section 5 also requires compliance with technology based effluents "as described in Appendix H." Ch. 2, Sec. 5(c)(iii)(B)(III).

In addition to technology-based limits, Chapter 2 requires water quality based limitations when "necessary to ensure that violations of water quality standards do not occur." Ch. 2, Sec. 5(c)(iii)(C). Water quality based effluent limitations "shall be established for constituents in discharges determined to have a reasonable potential of adversely impacting uses of surface waters of the state or of causing violations of water quality standards." Ch. 2, Sec. 5(c)(iii)(C)(I).

Accordingly, under Wyoming's regulatory scheme, discharges from oil and gas production facilities must not only meet water quality standards and other requirements contained in Chapter 1 and Chapter 2, but also the specific "additional" conditions set forth in Appendix H. Key components of Appendix H that apply to Aethon's facility include:

- The produced water discharged into surface waters of the state shall be of good enough quality to be used for wildlife or livestock watering or other agricultural uses and actually be put to such use during periods of discharge. App. H(a)(i).
- The produced water discharge must not contain toxic materials in concentrations or combinations which are toxic to human, animal or aquatic life. App. H(b)(i).
- Measures must be implemented to minimize erosion of the drainage at the point of discharge. App. H(b)(iv).
- Discharges of produced water must not contain substances that will settle to form sludge, bank or bottom deposits in quantities sufficient to result in significant aesthetic degradation, significant degradation of habitat for aquatic life or adversely affect public water supplies, agricultural or industrial water use, plant life or wildlife. App. H(b)(v).
- Discharges of produced water may not result in the formation of a visible hydrocarbon sheen on the receiving water. App. H(b)(vi).
- An effluent limitation of 10 mg/l for net oil and grease shall apply. App. H(c)(v).
- The discharge of waste pollutants into surface waters of the state from any source (other than produced water) associated with production, field exploration, drilling, well

completion, or well treatment (i.e., drilling muds, drill cuttings, and produced sands) is expressly prohibited. App. H(b)(ix).

In addition, produced water discharges are subject to the following effluent limitations for chloride, sulfate, TDS, specific conductance, and pH:

(A) Chlorides. The chloride content of any produced water discharge shall not exceed 2,000 mg/l in any single properly preserved grab sample except in those cases where a modification is granted in accordance with paragraph (c) of this appendix.

(B) Sulfates. The sulfate content of any produced water discharge shall not exceed 3,000 mg/l in any single properly preserved grab sample except in those cases where a modification is granted in accordance with paragraph (c) of this appendix.

(C) Total dissolved solids and specific conductance. The total dissolved solids content of any produced water discharge shall not exceed 5,000 mg/l for total dissolved solids or 7500  $\mu$ mhos/cm for specific conductance in any single properly preserved grab sample except in those cases where a modification has been granted in accordance with paragraph (c) of this appendix.

(D) pH. In no case shall the pH of any produced water discharge be less than 6.5 or greater than 9.0 standard units as measured by a single grab sample.

Appendix H avers that the above limits are protective for livestock and wildlife consumption, but recognizes that “[l]imitations on additional parameters or limitations more stringent will be imposed when such limitations are necessary to assure compliance with Wyoming Water Quality Rules and Regulations, Chapter 1.” App. H(b)(vii). During the 1978 rulemaking process that led to adoption of Appendix H, the DEQ “took the position that any discharge meeting the [effluent limitations] was suitable for stock and wildlife use, and **assumed** that the water was actually being put to such use.”<sup>8</sup> *Id.* (emphasis added). Since then, new science has emerged that suggests the effluent limitations declared safe for livestock and wildlife may no longer be adequate. The DEQ’s continued reliance on outdated effluent limitations and unsupported assumptions would not only be irresponsible, but also unlawful under the Wyoming Administrative Procedures Act.

Appendix H contains a provision that allows the DEQ to modify, or “grandfather,” previously established effluent limits for chlorides, sulfates, TDS, or pH, if specific **additional** conditions are met:

For existing permits where the original permit application was submitted prior to September 5, 1978, modification of the effluent limits described above may be granted on a case-by-case basis if a signed "letter of beneficial use" from the land owner was provided specifically requesting that the discharge in question be

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<sup>8</sup> Appendix H effluent limits were first promulgated in 1979 and codified in then-existing Chapter 7. See EQC Statement of Principal Reasons in the Matter of Chapters 2, 7, 10 and 18, filed August 30, 2004. <https://eqc.wyo.gov/Public/ViewPublicDocument.aspx?DocumentId=12041>.



allowed to continue; or a signed statement by the Wyoming Game and Fish Department was provided in which it was stated that the discharge in question is of value to fish or wildlife; or documentation was provided by the owner or operator of the discharging facility that, because of extenuating circumstances (volume of discharge, individual chemical constituents, nature of the area in which the discharge occurs, etc.), an exemption should be considered. The user must have indicated the exact beneficial use of the water (stock watering, irrigation, etc.) and the history of such use. No action taken by the department under this paragraph or any other paragraph of these regulations shall be interpreted as the granting of a water right or any other water use authority.

App. H(c)(i).

Appendix H contains a second option for the issuance of a modification. This option requires the preparation of a Use Attainability Analysis to support a modification of an effluent limit.<sup>9</sup>

For discharge permit applications filed after the date of adoption of these regulations, modification of effluent limits described above may be granted on a case-by-case basis. The Water Quality Administrator shall review all requests for modification of effluent limits submitted under this section and make a determination based upon the technical merits of a Use Attainability Analysis. Such requests shall also provide a signed “letter of agricultural or wildlife use” by the land owner specifically requesting that the discharge will serve a specific agricultural or wildlife use.

App. H(c)(ii).

Lastly, and perhaps most importantly, Appendix H contains a critical safeguard to limit the possibility that a modification of an effluent limit granted by the DEQ will violate Wyoming’s water quality standards: “**In no case will a modification of the effluent limit described above be permitted which would result in a violation of Wyoming Water Quality Rules and Regulations, Chapter 1.**” App. H(c)(iii) (emphasis added).

### Discussion

As discussed below, the permit proposed by the DEQ to authorize Aethon to discharge waste water to the surface fails to comply with applicable regulations in Chapter 1, Chapter 2, and Chapter 2 Appendix H. Under these circumstances the DEQ may not lawfully approve Aethon’s proposed discharge permit.

In order for Aethon’s proposed discharge to be lawful, the DEQ must first determine, as a threshold matter, that the produced water: 1) be of good enough quality to be used for wildlife or

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<sup>9</sup> A previous attempt by the DEQ to establish a site-specific chloride standard for Badwater Creek was unsuccessful. The Statement of Basis notes, however, that Badwater Creek remains a “candidate stream segment” for a relaxed chloride standard.

livestock watering or other agricultural uses, *and* 2) is actually put to such use during periods of discharge. App. H(a)(i). If the DEQ cannot demonstrate that both of these two distinct legal requirements are met, the permit cannot issue. Even if those threshold requirements are satisfied, the DEQ must also ensure that 3) the produced water is free of fracking and well completion/stimulation chemicals and other toxic materials,<sup>10</sup> and that 4) water quality standards are met. And in this instance, because the DEQ is proposing modifications to effluent limitations set forth in Appendix H(b)(vii) for chlorides and total dissolved solids, additional restrictions contained in Appendix H(c)(i) apply. Our review shows that the DEQ has failed to satisfy any of the applicable requirements.<sup>11</sup>

**The quality of the water produced from Aethon’s oil and natural gas wells in the Moneta Divide Field is not of good enough quality for wildlife or livestock.**<sup>12</sup> The DEQ’s draft permit has proposed a modification to the effluent limits in Appendix H for chloride and TDS, and the DEQ has presented no information indicating that produced water containing the higher concentrations sought by Aethon is of good enough quality for wildlife and livestock.<sup>13</sup> Appendix H sets the chloride limit at 2,000 mg/L. The draft permit increases the permissible concentration to 2,419 mg/L. Appendix H sets the TDS limit at 5,000 mg/L. The draft permit increases the permissible concentration to 6,400 mg/L. The concentration limitations are applied on a facility wide basis (after mixing), which is unlawful. Aethon SOB at 3, note 1.

We presented information to the DEQ in a letter dated June 19, 2019, indicating that the produced water in Aethon’s discharge may in fact not be of good enough quality for livestock or wildlife. *See Water Quality for Wyoming Livestock and Wildlife, A Review of the Literature Pertaining to Health Effects of Inorganic Contaminants*, available at: <http://www.wyomingextension.org/agpubs/pubs/B1183.pdf>

For example, Table 2 of Aethon’s application shows a TDS concentration of 5940 mg/L as representative of the quality at each of the outfalls. Yet the DEQ’s 2007 water quality report concludes: “We do not recommend relying upon TDS to evaluate water quality for livestock and wildlife; however, if no other information is available, TDS concentrations less than 500 mg/L should ensure safety from almost all inorganic constituents. Above 500 mg/L, the individual constituents contributing to TDS should be identified, quantified, and evaluated.” *See* DEQ Water Quality Report at 50. Despite this warning, the draft permit proposes to grandfather a TDS limit of 6,400 mg/L, more than twelve times greater than the threshold recommended in the

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<sup>10</sup> According to the Statement of Basis, “This permit does not cover activities associated with discharges of drilling fluids, acids, stimulation waters or other fluids derived from the drilling or completion of the wells. SOB at 1.

<sup>11</sup> For additional discussion, please see our June 19, 2019, letter to Kevin Frederick, Administrator, Water Quality Division, requesting deferral of agency action on WYPDES Permit No. WY0002062 (Aethon Energy Operating, LLC). We hereby incorporate that letter by reference as if fully set forth below, and ask that it be considered along with the points and arguments made in this comment letter.

<sup>12</sup> Because livestock and wildlife have easy access to the produced water as it flows from the end of the pipe into unnamed drainages, the effluent limits must be met at the end-of-pipe at each outfall, rather than on a “facility wide basis” after mixing as proposed by the DEQ.

<sup>13</sup> Although the DEQ has purportedly determined that the effluent concentration limits contained in Appendix H (b)(vii) (A–D) are protective for stock and wildlife, no such determination has been made for the modified limits proposed by the DEQ in the draft permit.

DEQ's 2007 report. Because the DEQ is proposing to grandfather TDS concentrations that exceed the Appendix H limits, the agency must demonstrate that the higher levels in the effluent will not harm wildlife or livestock. It has not made such a finding, or even presented information that suggests the higher TDS level in the produced water meets the "of good enough quality" standard.

Similarly, we brought to the DEQ's attention in our June 19, 2019 letter that "a wide range of chemicals are used for hydraulic fracturing operations, including chemicals that are toxic or otherwise hazardous, as well as many chemicals with unknown environmental and public health profiles." June 19, 2019 Letter at 3–4. Many of these chemicals are used for hydraulic fracturing in the Moneta Divide oil and gas field, and may be discharged (unlawfully) into surface waters as flowback despite the prohibition against the discharge of any oil field wastes except those found naturally in the produced water.

The DEQ should heed the advice of the experts it paid to produce this report, and identify, quantify, and evaluate the individual constituents comprising the TDS discharged from Aethon's facility. Based on the findings presented in the DEQ's water quality report, the effluent limits for sulfate and TDS contained in the draft permit may be harmful to livestock and wildlife. Additional information is needed to characterize the TDS in the produced water and evaluate the individual constituents before making a determination as to the suitability of the produced water for livestock and wildlife use.

As to fracking chemicals, Paragraph 13 of the DEQ's application for oil and gas production unit discharges requires the applicant to "[p]rovide a list of all potential pollutants expected to be in the discharge and an explanation of their presence in the discharge." In this instance, Aethon merely indicated that "[t]race amount[s] of Petroleum Hydrocarbons due to oil production and Total Dissolved Solids" would be present, without disclosing any other constituents. The DEQ has a legal obligation to ensure that no chemicals or other pollutants—other than those that occur naturally in the produced water—are discharged into the state's surface waters. 40 C.F.R. § 435.50; Wyo. Rules & Regs. Dep't of Env'tl. Quality, Water Quality, Ch. 2, App. H(b)(ix).<sup>14</sup>

As required by the second prong of the rule, the **DEQ has also failed to demonstrate that the produced water will actually be put to such use during periods of discharge.** There is no information in the application, Statement of Basis or draft permit addressing this requirement.

Even when the two threshold requirements have been met (i.e., good enough quality and actual use), an applicant seeking a modification of an effluent limit is not out of the woods yet. The effluent limitation modification available under Appendix H(b)(vii) may only be granted on

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<sup>14</sup> Aethon has applied for a renewal of a WYPDES permit that authorizes the discharge of produced water to waters of the state. The DEQ defines produced water as "underground water which surfaces through oil and/or gas wells. Ch. 2, Sec. 3(b)(lxxx). Any naturally occurring pollutants in the formation water would be subject to all applicable effluent limitations and would have to comply with water quality standards.

a “case-by-case basis” for a particular “discharge in question” if one or more additional conditions have been satisfied:

- The original permit application was submitted prior to September 5, 1978;<sup>15</sup> *and*
- The modification of the effluent limits described above is considered and granted on a case-by-case basis; *and*
- Any one of the following:
  1. A signed "letter of beneficial use" from the land owner specifically requesting that the discharge in question be allowed to continue; or
  2. A signed statement by the Wyoming Game and Fish Department in which it was stated that the discharge in question is of value to fish or wildlife; or
  3. Documentation from the owner or operator of the discharging facility that, because of extenuating circumstances (volume of discharge, individual chemical constituents, nature of the area in which the discharge occurs, etc.), an exemption should be considered. The user must have indicated the exact beneficial use of the water (stock watering, irrigation, etc.) and the history of such use.

Only when *all* of these conditions are met may the DEQ consider granting a modification of an effluent limitation specified in Appendix H(b)(vii). The June 10, 2002 blanket statement by Wyoming Game and Fish Department that “discharges of produced water from WYPDES-permitted oil production units in Wyoming, *existing as of June 10, 2002*, are being used to enhance wildlife propagation and habitat” does not meet the requirements of 40 CFR Part 435 that requires the determination be made on a case-by-case basis. *See* DEQ Permit Renewal Application at 8. Reliance on a blanket statement is not sufficient to satisfy this case-by-case requirement. This is illustrated by the 2007 Water Quality for Wyoming Livestock and Wildlife published by DEQ, which indicates that produced waters can have negative health effects on wildlife, which is contrary to a blanket statement that produced waters is beneficial to wildlife propagation and habitat. Additionally, the TDS and chloride effluent limits exceed the effluent limits set forth in Appendix H. If Wyoming Game and Fish Department intended a blanket statement in the 2002 letter, the limits for TDS and chloride would have been the Appendix H limits, not the higher limits included in this draft permit.<sup>16</sup> Because DEQ relies on a blanket statement rather than a case-by-case analysis for the beneficial use exception, the DEQ may not lawfully issue the discharge permit.

## **B. The Draft Permit Violates Water Quality Standards.**

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<sup>15</sup> Elsewhere in these comments we argue that any action by the DEQ “grandfathering” effluent limitations contained in the “original” permit application(s) filed before September 5, 1978 would not extend to the pending renewal application for WY0002062.

<sup>16</sup> The DEQ’s failure to comply with water quality standards is discussed in detail, below.

**“No person shall cause, threaten or allow violation of a surface water quality standard contained herein.”**

See Chapter 1, Wyoming Surface Water Quality Standards, Section 1, Authority.

As discussed in detail below, our review shows that effluent limitations and other conditions proposed in Aethon’s draft permit do not ensure compliance with Chapter 1, Wyoming Water Quality Standards. Violations of standards (and other requirements) begin at the outfalls,<sup>17</sup> and continue downstream in Alkali Creek, Badwater Creek, Boysen Reservoir, and in the Class 1 segment of the Wind River below Boysen Dam.

A water quality standard consists of a designated use, water quality criteria to protect the use, and an antidegradation policy. By law, numeric and narrative standards contained in Chapter 1 must be used to establish effluent limitations for point source discharges. Effluent limits must be placed on pollutant discharges to protect designated uses and the water quality necessary to support those uses. The effluent limitations and other restrictions contained in the draft permit are not sufficient to ensure compliance with water quality standards in Alkali Creek, Badwater Creek, Boysen Reservoir, and in the Class 1 segment of the Wind River. Each of these surface waters is discussed below.

i. *Alkali Creek*

Alkali Creek is a Class 3B stream. The designated use assigned to this classification is “aquatic life other than fish.”

Class 3B waters are tributary waters including adjacent wetlands that are not known to support fish populations or drinking water supplies and where those uses are not attainable. Class 3B waters are intermittent and ephemeral streams with sufficient hydrology to normally support and sustain communities of aquatic life including invertebrates, amphibians, or other flora and fauna which inhabit waters of the state at some stage of their life cycles. In general, 3B waters are characterized by frequent linear wetland occurrences or impoundments within or adjacent to the stream channel over its entire length. Such characteristics will be a primary indicator used in identifying Class 3B waters.

Ch. 1, Section 4(ii).

As noted earlier, the DEQ is responsible for protecting designated uses. With respect to “Aquatic life other than fish,” the rules provide that: “This use includes water quality and habitat necessary to sustain populations of organisms other than fish in proportions which make up diverse aquatic communities common to the waters of the state . . .” Ch. 1, Section 3(g).

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<sup>17</sup> We address Chapter 2 Appendix H end-of-pipe requirements elsewhere in our letter.

The Statement of Basis explains that produced water from the outfalls flows into multiple unnamed drainages and then into Alkali Creek. Our review shows that aquatic life will not be protected by the terms contained in the draft permit, resulting in violations of water quality standards. In particular, we reference a Memorandum (“Bergman-Meyer report”) prepared by two renowned aquatic biologists known to many in Wyoming: 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. In their report, the scientists describe numerous critical deficiencies and omissions in the Statement of Basis and draft permit that must be addressed, and project, based on aquatic toxicity modeling developed at the University of Wyoming, acute lethality of aquatic test species in Aethon’s produced water. The Bergman-Meyer report is included with this letter as an Exhibit and we hereby adopt and incorporate the Bergman-Meyer report by reference as if fully set forth below.

Protecting designated uses, and the water quality necessary to sustain those uses—which in the case of Alkali Creek, is “aquatic life other than fish”—is a basic requirement of the Clean Water Act and the Wyoming Environmental Quality Act, yet the use is not and cannot be protected under the terms of the permit. The DEQ is prohibited by its rules from issuing a discharge permit that would “cause, threaten or allow” a violation of a water quality standard, and thus may not proceed with the issuance of the Aethon permit renewal.

ii. *Badwater Creek*<sup>18</sup>

Badwater Creek is a Class 2AB water body. Bergman and Meyer note in their report that “adverse effects on aquatic invertebrate communities in Alkali Creek and adverse effects on fish and invertebrates in Badwater Creek would be expected if untreated produced waters are not adequately diluted with good-quality water.” Report at 8. Unfortunately, it appears that the scientists are correct. Aethon’s modeling report states that “[b]ased on discussions with WDEQ, the stream does not support its classified uses . . .” ERM Report at 24. Given this known and documented impairment (which we understand is related to chloride concentrations that exceed 230 mg/L) the DEQ is forbidden from issuing a discharge permit that would exacerbate the impairment.

iii. *Wind River Below the Dam, Class 1.*

The bulk of the DEQ’s Statement of Basis addresses impacts to the Class 1 segment of the Wind River. The DEQ concludes, based on an over 600-page modeling report prepared by Aethon’s contractor, Environmental Resources Management, that impacts to the Class 1 segment would be insignificant, and that all regulatory requirements would be achieved. As discussed below, the DEQ’s determinations regarding impairment to the Class 1 designation and River are erroneous, and its reliance on the ERM report to justify its determinations is unlawful.<sup>19</sup>

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<sup>18</sup> According to local legend, Badwater Creek was not named due to poor water quality as one might reasonably assume, but rather because Tipis placed by Native Americans along the stream would sometimes be washed away in flood events: hence the name, “Bad Water.”

<sup>19</sup> The ERM report contains a significant disclaimer regarding use of the report. It states: “ERM prepared this report for the sole and exclusive benefit and use by Aethon Energy Operating LLC. Notwithstanding

Wyoming Outdoor Council and other signatories to this letter commissioned an independent review of the modeling report prepared by ERM and the model itself. The results of that investigation demonstrate that, because of significant flaws and omissions, the report cannot be used for purpose of regulatory compliance. The report is attached as an exhibit, and is hereby adopted and incorporated by reference herein, as if fully set forth below.

The draft permit prepared by the DEQ for the Aethon's proposed discharge is incomplete, inadequate, unlawful and utterly irresponsible. The DEQ must deny the permit and start over.

### **C. The Draft Permit Violates Antidegradation Requirements.**

The Statement of Basis (SOB at 9,10) includes a discussion of the antidegradation review required by Chapter 1. Intended to achieve the Clean Water Act's goal of restoring and maintaining water quality, antidegradation is the third and arguably most important component of a water quality standard. Despite the DEQ's claim of regulatory compliance, our review shows that the draft permit violates Wyoming's antidegradation requirements for Alkali Creek (Class 3B) and Badwater Creek (Class 2AB). Although not disclosed in the SOB or draft permit, evidence exists showing existing and ongoing water quality impairment in both Alkali Creek and Badwater Creek. Next, the SOB lacks any analysis whatsoever to support the agency's antidegradation determination regarding Boysen Reservoir. Last, as discussed in the attached Hydros report, due to a number of significant deficiencies in the model, the ERM modeling report cannot be relied upon by the DEQ to support its determinations regarding degradation, or the absence thereof, in the Class 1 segment of the Wind River.

i. Regulatory requirements.

The DEQ's antidegradation requirements are set forth in Chapter 1, Section 8, and provide as follows:

- (a) Water uses in existence on or after November 28, 1975 and the level of water quality necessary to protect those uses shall be maintained and protected. Those surface waters not designated as Class 1, but whose quality is better than the standards contained in these regulations, shall be maintained at that higher quality. However, after full intergovernmental coordination and public participation, the department may issue a permit for or allow any project or development which would constitute a new source of pollution, or an increased source of pollution, to these waters as long as the following conditions are met:
  - (i) The quality is not lowered below these standards;

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delivery of this report by ERM or Aethon Energy to any third party, any copy of this report provided to a third party is provided for informational purposes only, **without the right to rely.**" ERM report at 16 (emphasis added).

- (ii) All existing water uses are fully maintained and protected;
- (iii) The highest statutory and regulatory requirements for all new and existing point sources and all cost effective and reasonable best management practices for nonpoint sources have been achieved; and
- (iv) The lowered water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

(b) The Water Quality Administrator (administrator) may require an applicant to submit additional information, including, but not limited to, an analysis of alternatives to any proposed discharge and relevant economic information before making a determination under this section.

(c) The procedures used to implement this section are described in the Antidegradation Implementation Policy.

ii. Discussion

*Alkali Creek (Class 3B)*. Alkali Creek is the first classified receiving water downstream of the outfall, and is entitled to the Tier 1 “basic” level of antidegradation protection. SOB at 9. *See* 40 CFR 131.12(a)(1). At its core, Tier 1 protection requires the DEQ to protect existing uses—and the quality of water necessary to maintain those uses. The SOB claims that “[t]he effluent limits for protection of this stream are set to the applicable class 3B standards . . .” suggesting (without evidence) that existing instream uses are protected. SOB at 9. This claim is not true.

Alkali Creek has been severely impaired by oil field wastewater, and the impairment has worsened over time as the Moneta Divide field has expanded to its current size of over 800 oil and gas wells. *See* Moneta Divide DEIS at 1-5. Although neither the SOB nor draft permit discuss the condition of this creek, the BLM’s DEIS for the Moneta Divide oil and gas project expansion paints a grim picture regarding the existing condition of this desert stream:

Discharge of produced water from oil and gas production has created perennial flowing tributaries to Alkali Creek and perennial reaches in Alkali Creek. Discharge water has supported wetland establishment and is used by wildlife and for livestock watering purposes. Perennial flows in those formerly ephemeral drainages have caused disturbance of the drainage beds and inundation and destruction of drainage vegetation, which in turn has led to accelerated erosion. In addition, continuously saturated soils have less strength to withstand scour and erosion, and increased freeze/thaw activity has also increased erosion. In the small ephemeral channels below the outfalls, the dominant fluvial process has been largely degradational with lesser areas of deposition distributed throughout the reaches. In Alkali Creek both degradation (scour) and deposition processes are occurring. Over time, these processes have increased downcutting (downward erosion) in tributary channels, which has created site conditions unfavorable to



livestock movement, grazing and watering, and increased sediment loading in Alkali Creek (Oasis Environmental 2010). Some upper reaches of Alkali Creek have springs that create intermittent to perennial pools which contain fish.

Aethon conducts ongoing channel stability, erosion, and streamflow monitoring at several locations in Alkali Creek in accordance with the Wyoming DEQ WYPDES Discharge Permit WY0002062. As indicated in the 2018 monitoring report, the surveyed reach of Alkali Creek above the point of discharge is well vegetated, including in the channel bottom. The surveyed reach has been stable, and no scour or aggradation has been noted. In the assessment reaches downstream from discharge points, channel changes include scour, degradation, and aggradation of sediment. Bank loss has occurred at various points. The largest occurrences of channel scour occur during spring runoff or storm runoff where channel scour is facilitated by saturated soils in the channel and loss of channel vegetation because of permanent discharge.

In 2016 ERM performed a stability study on Alkali Creek using the [U.S. Department of Agriculture CONCEPTS] model. The model indicates that for the modeled reach streambed degradation may lower the streambed up to 1.5 feet under a modeled project discharge of 16 cfs combined with storm events for 8 years. For a modeled project discharge of 6.5 cfs, some sections of the streambed would experience downcutting, while others would experience deposition (ERM 2016).

*See Moneta Divide DEIS, 3.6.2.2 Description of Surface Water Hydrology in Badwater Subbasin, Lower Wind Subbasin East of Boysen Reservoir, and Muskrat Subbasin at 3-59 (internal citations omitted).*

The ongoing modification (“grandfathering”) through multiple permit renewals of TDS and chloride effluent limitations that exceed limits contained in Appendix H are undoubtedly contributing factors, along with increasing volumes of produced water carrying heavier salt loads, and general neglect of the regulatory agencies and the field operators. Given the conditions reported in the BLM’s DEIS, it is disappointing that the DEQ’s on-the-ground inspection of this facility in June, 2018 noted no violations of the discharge permit, despite that fact that compliance with Chapter 2, Appendix H and water quality standards is a core requirement of the permit.<sup>20</sup>

The DEQ inspection report did note odors at all operational outfalls (001, 003, 006, and 009) indicating potential violations of Chapter 1, Section 17’s restriction on detectable odors. And Professor Bergman’s and Dr. Meyer’s June 27, 2019 Memorandum indicate that chloride and TDS concentrations authorized in the existing permit are harmful to aquatic life. Although protection of existing uses is a fundamental requirement of the Clean Water Act, it is clear that high chloride concentrations and other pollutants present in the effluent and in Alkali Creek are

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<sup>20</sup> See Letter from Eric Moore, WDEQ WYPDES Inspector, to Andrea Taylor, HSE and Regulatory Manager (July 31, 2018), re: WYPDES Discharge Permit: WY0002062 - Frenchie Draw Permit #1 (transmitting a copy of the DEQ written inspection report.)

preventing the attainment of designated “aquatic life” uses in violation of Chapter 1. All evidence suggests that the DEQ is failing to meet the “basic” antidegradation requirements for Tier 1 waters. If the DEQ disagrees with this characterization, it is free to modify its antidegradation review and set the record straight.

*Badwater Creek (Class 2AB).* As bad as the problems are in Alkali Creek, they appear worse in Badwater Creek. As noted in the SOB, Badwater Creek is considered a “Tier 2” high quality surface water. For high quality waters, Chapter 1 provides that: “Those surface waters not designated as Class 1, but whose quality is better than the standards contained in these regulations, shall be maintained at that higher quality.” As discussed below, the DEQ has failed not only to maintain the higher water quality required of Tier 2 streams, it has failed to maintain even the most basic Tier 1 level of protection. *See* Ch. 1, Section 8(a). In fact, the agency has failed to comply with every single requirement enumerated in Section 8 for Tier 2 waters:

- The quality of Badwater Creek has in fact been lowered below the applicable standards;
- Existing water uses of Badwater Creek have in fact not been fully maintained and protected;
- The highest statutory and regulatory requirements have in fact not been achieved (indeed, the SOB and draft permit proposed to grandfather chloride and TDS at levels that exceed the minimum regulatory requirements in Appendix H); and
- The DEQ has in fact not made a determination that “lowered water quality is necessary to accommodate important economic or social development in the area in which the waters are located.”

The DEQ’s assertion in the SOB that “continued discharges from this facility will not result in significant degradation of Badwater Creek” is insupportable. For starters, Aethon’s modeling report indicates that, “Based on discussions with WDEQ, the stream does not support its classified uses and did not require assessment of water quality impacts.” ERM at 24.<sup>21</sup> Second, due to chloride concentrations that exceed Chapter 1 Appendix B water quality criteria,<sup>22</sup> Badwater Creek has no assimilative capacity for chloride. And the presence of other pollutants, such as temperature, that exceed Appendix B standards is also likely. Third, the review has failed to consider the fate of the large chloride and TDS mass loads from the produced water discharge (up to 719 tons per month for chloride and 2161 tons per month TDS) as it is transported in Alkali and Badwater Creek and into Badwater Bay. The DEQ did not consider the effects of chloride and TDS mass loading that may catalyze chemical reactions that may result in degradation of water in Alkalai Creek or Badwater Creek that would result in exceedances of Class 2AB standards. *See* Mike Wireman report, Comment #3, attached hereto as an Exhibit and incorporated by reference herein as if fully set forth below..

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<sup>21</sup> We obviously disagree with this conclusion—the DEQ is clearly responsible for ensuring that a point source discharge does not violate a water quality standard.

<sup>22</sup> Rather than including a legally required effluent limitation in the permit, the DEQ has proposed a multi-year compliance schedule to address excessive chloride.

Yet the SOB asserts that “WDEQ’s review has concluded that continued discharges from this facility will not result in significant degradation of Badwater Creek.” Really? The evidence shows that significant degradation—as defined in the DEQ’s antidegradation policy—is already occurring; consequently, the DEQ cannot legally move forward with an action that would further degrade a “high quality” Tier 2 surface water, especially when it is not even meeting the basic Tier 1 level of protection.

Were Badwater Creek not so severely impaired, we might be suggesting that the socioeconomic analysis and evaluation of alternatives described in Chapter 1, Section 8(b) be conducted as part of the permitting process, but we do not want to create the impression that this discharge can be authorized, or the impacts would be lessened, with additional study. Those analyses are triggered under the DEQ’s antidegradation implementation policy and are based on a determination of significance. Section 4(a)(i). The existing level of impairment in Badwater Creek exceeds all measures of significance as defined in this section, and the time for those studies has long since passed.<sup>23</sup>

*Boysen Reservoir (Class 2AB)*. As noted earlier, due to the complex and technical nature of Aethon’s application, we retained the services of a professional engineering firm with considerable experience in the highly specialized field of reservoir water quality modeling. The attached Final Technical Memorandum (July 1, 2019) prepared by Dr. Jean Marie Boyer with Hydros Consulting<sup>24</sup> (hereinafter “Hydros Report”) reveals numerous significant flaws with the model and the 600+ page model report provided to DEQ.<sup>25</sup>

With respect to the possible degradation to Boysen Reservoir from the expanded discharge, the SOB indicates that:

WDEQ has reviewed the expected mixed concentrations of effluent within the Boysen Reservoir system, and has determined that the above condition is maintained. No pollutants from this facility are expected to result in mixed concentrations that consume 20% or more of the available assimilative capacity within the lake. Therefore, WDEQ’s review has concluded that continued discharges from this facility will not result in significant degradation of Boysen Reservoir. In addition, the discharges will not result in any impairments of the

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<sup>23</sup> As the DEQ knows, there are viable alternatives to the proposed discharge to Alkali and Badwater Creeks, and the DEQ is responsible under its rules for evaluating them. As described in the BLM’s Moneta Divide DEIS, “the proposed treatment strategy would treat water to meet or exceed Class I standards [and pipe to Boysen Reservoir]. The quality of the highly treated produced water would be of equal quality, or better, as that of water exiting the Boysen Reservoir.” Moneta Divide DEIS, Appendix K Water Management Plan prepared by Encana Oil & Gas (USA) Inc., dated June 2014, at 9. If Aethon is serious about expanding the Moneta Divide field, we respectfully suggest that it take a close look at Appendix K Water Management Plan prepared by Encana Oil & Gas (USA) Inc., dated June 2014.

<sup>24</sup> Professional licensure in Wyoming pending before the Professional Board of Engineers and Professional Land Surveyors.

<sup>25</sup> We hereby incorporate the Hydros report by reference into our comments as if fully set forth below.

lake, or lowering of water quality below the criteria established in Wyoming's standards.

SOB at 10.

The DEQ has not provided, nor has it referenced in the single paragraph devoted to this topic, any analysis to support its conclusion that the discharge will not result in any impairments, or significant degradation of Boysen Reservoir.<sup>26</sup> The SOB merely contains unsupported “conclusions” and “determinations” without any explanation of how the agency came to its conclusions. The Hydros Report reveals that “ERM failed to conduct an antidegradation analysis for Boysen Reservoir.” Hydros Report at 25. Therefore, the analysis, if it exists, would have to be found in the Statement of Basis. It is not.

Without any discussion of how the DEQ reached its conclusions regarding impairment to Boysen Reservoir, the DEQ's antidegradation determination is deficient on its face and cannot be used to justify or support the agency's findings.

*Wind River Below Boysen Dam (Class 1)*. The Statement of Basis correctly points out that Class 1 waters are “Outstanding waters . . . in which no further water quality degradation by point source discharges other than from dams will be allowed. The water quality and physical and biological integrity which existed on the water at the time of designation will be maintained and protected.” Ch. 1, Section 4(a). Class 1 waters are subject to the highest level of antidegradation protection, “Tier 3.” *Id.*

Despite this clear mandate, the DEQ has determined—through a previously unpublished policy—that “new and expanded discharges to tributaries of Class 1 waters are allowable in Wyoming under certain conditions, as outlined in Section IV of WDEQ's Policy on Establishing Effluent Limits for Permitted Point Source Discharges to Class 1 Water Tributaries (August, 2007).

Based on a modeling report submitted by the applicant,<sup>27</sup> the DEQ determined that the proposed discharge is “consistent with provisions in the above referenced Class 1 policy, and therefore conforms with requirements for achievement of Tier 3 water quality protection in the Wind River below Boysen Dam.”<sup>28</sup>

With respect to potential impairment of the Wind River, we fundamentally disagree with the DEQ's conclusions. The agency's conclusions are based on a deeply flawed study, and the

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<sup>26</sup> We assume that is because no such analysis exists. If an antidegradation analysis was conducted by the DEQ as part of its antidegradation review, the agency has failed to document it and share it with the public for review.

<sup>27</sup> The report was prepared by Environmental Resources Management (ERM) based in Malvern, PA. As others have pointed out, ERM is not licensed to practice in Wyoming and the report does not bear the certificate of a Wyoming- licensed professional engineer.

<sup>28</sup> Beyond its obvious flaws, this internal “interim” DEQ policy was not subject to public notice and comment, and was apparently not approved or even reviewed by the Water Quality Advisory Board, and therefore cannot be relied upon in this circumstance.

application of an internal “interim policy” which, up until this matter, had never before seen the light of day.

The Hydros report identified “several severe and alarming issues” concerning ERM’s antidegradation review for the Class 1 Wind River and described the implications of this flawed document thusly:

- **The Reservoir Model Cannot be Used for Decision Making; and**
- **The Compliance Analysis Methods and Findings are Incorrect.**

Major deficiencies identified by Hydros are listed in the summary section of their report, excerpted below:

### **SUMMARY**

ERM developed a mechanistic hydrodynamic water-quality model of Boysen Reservoir to support permitting and to determine conditions for Aethon’s project that would “protect downstream surface water quality in Badwater Creek, Boysen Reservoir and the downstream Class 1 segment of the Wind River Below Boysen Reservoir, as well as require Aethon to uphold Wyoming’s antidegradation policies.”

There are very serious issues related to the development, evaluation, and use of the Boysen Reservoir Model. Our review of the reservoir model documentation and reservoir model files revealed critical concerns. Highlights include:

#### **The Model was not Developed Properly and Does not Account for Factors Important for this Project**

- Density changes anticipated in the future for water flowing into Badwater Bay, (important for flow patterns) were completely ignored.
- Releases to the Wind River (low-level outlet vs. spills) were not differentiated.
- Releases to the Wind River were not density based.
- Wind speeds were severely and unrealistically reduced without discussion.
- Reservoir evaporation was not considered.
- Several water balance and water quality input assumptions and adjustments were made without justification.

#### **Model Performance was Not Evaluated Appropriately and is Misleadingly Communicated**

- ERM misleadingly claims that the reservoir model is calibrated and adequately simulates Wind River (Class I segment) water quality. This is done by comparing water-quality measurements in the river to water quality simulated in the top two feet of the reservoir. This is disturbing, wrong, and was done even though the reservoir stratifies and has a low-level outlet.

- There are numerous instances of excluding meaningful data during the calibration/validation process (including all non-profile reservoir data and all data during periods of highest percent produced water).
- Information was misleadingly concealed from the reader by only displaying the top portion of profile results and observations.
- The model is not calibrated and the results are poor.

### **“Compliance Analysis” Methods and Findings are Flawed and Incorrect**

- Baseline conditions for the Class I segment excluded valid USGS data.
- Methods used to show compliance for the Class I segment:
  - Used monthly averages, leading to the conclusion of reduced impacts.
  - Used inflated and incorrect values for standard deviation.
  - Relied on favorable assumptions for Category III constituents
- An antidegradation analysis for Boysen Reservoir was not conducted.

Based on how the model was developed and the results, the reservoir model cannot be used for projections or decision making. In addition, even if the model adequately simulated water quality, the methods used to determine compliance are inadequate, sometimes wrong, and several assumptions were made to show favorable results.

According to the WDEQ (2019b), “Model was designed to ensure compliance with WQS applicable to Boysen and to maintain existing quality in the Wind River below Boysen.” Unfortunately, this is not a true statement.

Hydros Report at 25–26.

Based on the thorough review and analysis detailed in the Hydros report, reliance by DEQ on the ERM report to support its antidegradation findings regarding the Class 1 segment of the Wind River is severely misplaced, and continued reliance on such a fundamentally flawed document would be insupportable.

### **D. The DEQ Cannot Lawfully Justify the Practice of “Grandfathering” Harmful Concentrations of Pollutants that Violate Water Quality Standards and Impair Water Quality.**

For several decades, the DEQ has authorized the discharge of massive quantities of salt-laden produced water from the Frenchie Draw field into Alkali and Badwater creeks. Previous discharge permits issued by the DEQ show that volumes of produced water and salt loads discharged from this field peaked in 2009–10, with **TDS loads exceeding 3036 tons per month** and effluent concentrations averaging **7456 mg/L**, well above the **5000 mg/L limit** specified in Appendix H. In a January 1, 2009 permit renewal, the Statement of Basis states as a matter of fact that “this facility is exempt from end-of-pipe effluent limits for chlorides, sulfates, specific conductance and total dissolved solids.”

As discussed elsewhere in this letter, this exemption has caused and continues to cause significant impairment to Alkali and Badwater creeks, and poses an ongoing threat to water quality in Boysen Reservoir and in the Class 1 segment of the Wind River below the dam. Yet it continues, even though the practice is patently unlawful. The DEQ's own rules prohibit it from approving a modified effluent limit that would result in a violation of water quality standards, yet that is exactly what is happening here. Appendix H makes this perfectly clear: "In no case will a modification as described in paragraph (c)(i) or (c)(ii) of this appendix be permitted which would result in a violation of Wyoming Water Quality Rules and Regulations, Chapter 1." *See* Ch. 2, App. H(c)(iii). This abuse of Appendix H's grandfathering provision has caused unnecessary and unlawful impairment in both Alkali Creek and Badwater Creek and must stop now.

EPA has provided clear and unequivocal guidance regarding "grandfathering"; "grandfathering" discharges is impermissible under the CWA. Specifically, EPA has stated in its NPDES state program guidance that "[o]ther States have attempted to 'grandfather' or exempt discharges already in existence . . . [s]uch schemes are inconsistent with the CWA." Chapter Three: Statutory Authority and the Attorney General's Statement, National Pollutant Discharge Elimination System State Program Guidance for Development and Review of State Program Applications and Evaluation of State Legal Authorities (40 CFR Parts 122-125 and 403) Volume One (July 29, 1986) at 3-6-3-7.

Yet the modification was allowed to continue as the oil field expanded through multiple field ownerships, and through multiple renewals and modifications (both major and minor) of the discharge permit. In several 2010-era permit actions, it appeared that the DEQ was committed to reducing TDS loads from this field "to the pre-2009 grandfathered levels" which the DEQ stated was 908 tons per month. *See, e.g.,* Encana Oil and Gas Company, WY0002062, Statement of Basis for Minor Modification, dated 12/14/2010 (containing a compliance schedule to reduce TDS to 908 tons per month by January 1, 2013). But now, the DEQ is proposing to *increase* TDS limits to 2161 tons per month from 908 tons per month, and effluent concentration limits to 6400 mg/L for TDS (compared to Appendix H limit of 5000 mg/L) and 2419 mg/L for chloride (compared to Appendix H limit of 2000 mg/L).

The DEQ cites Appendix H as justification to modify effluent limits for outfalls 001 to 012. Yet Appendix H applies only "where the original permit application was submitted prior to September 5, 1978." Since the DEQ has not provided a copy of the "original permit application" the public is unable to verify that 12 outfalls were authorized in that original permit.

Assuming (for purposes of discussion only) that grandfathering in any form is lawful, the exception can only extend to the outfall(s) and to the discharge(s) that existed prior to September 5, 1978. Were all 12 outfalls permitted and in operation prior to that date? If not, how does the DEQ justify grandfathering discharge permits that were issued after September 5, 1978?

i. History of outfalls.

The DEQ consolidated Encana WY0002062 (single outfall) with eleven other single-outfall permits in a permit "renewal" effective January 1, 2009. *See* Statement of Basis Renewal and Discharge Permit, Encana Oil and Gas Company, signed by the DEQ Director on 12/31/08.

The eleven existing permits that were consolidated with WY0002062 included: WY0002089, WY0002101, WY0025526, WY0025534, WY0025542, WY0027227, WY0027235, WY0027243, WY0027251, and WY0027456. The SOB clearly states that: **“This permit originally established a chloride limit of 230 mg/L at the end of pipe for discharge into Class 3B waters.”** (Emphasis added). If that is the case, what is the basis for grandfathering the much higher effluent limits?

- ii. Outfalls 013, 014, and 015 were not grandfathered when approved and cannot be grandfathered now.

As noted above, in December 2008, 12 outfalls were consolidated into a single permit, WY002062. In December 2010, the DEQ approved a minor modification to the permit that added two new outfalls, 013 and 014, and set effluent limits for those outfalls based on the limits contained in Appendix H. The Statement of Basis for the modification notes that: “Outfalls 013 and 014 include limits of 2000 mg/L of chloride and 3000 mg/L of sulfate, **a requirement of all non-grandfathered oil production unit WYPDES permits.**” (Emphasis added). The modification also added chloride and sulfate monitoring requirements for outfalls 001–012 for “data collection.” This modification added a compliance schedule to ratchet down over a two-year period salt loads from 3036 tons per month to 908 tons per month.

Outfall 015 was added in a Permit Renewal effective 10/21/13, formerly WY0056791, outfall 001. The renewed permit retained Appendix H effluent limits on outfalls 013 and 014, and required the newly added outfall 015 to comply with Appendix H effluent limits for chloride (2000 mg/L); sulfate (3000 mg/L); and specific conductance (7500). In other words, grandfathering was not applied to outfall 015.

- iii. Outfall 016 cannot be grandfathered.

Outfall 016 was approved in a Major Modification to the permit in April 2015.<sup>29</sup> This modification also added the Neptune Treatment Facility, established an interim effluent limit for TDS of 1760 tons per month (nearly doubling the existing 908 tons per month limit) during a four month start-up period, and included a compliance schedule that required the facility to limit TDS to no more than 908 tons per month for outfalls 001–016 effective September 1, 2015. The Statement of Basis for this modification indicates that “the new outfall location is at the stilling well at Pink Lake. Because the water source is largely from the grandfathered per Chapter 2 Appendix H sources, it is treated as such and there are no concentration limits for sulfate, chloride, specific conductance, or total dissolved solids.” SOB at 1. Oddly, despite the preceding sentence, the modification retained Appendix H-based numeric effluent limits for outfalls 013–015, including effluent limits on chloride, sulfate, and specific conductance. As a newly approved outfall, outfall 016 should not have been grandfathered for the same reasons that 013, 014, and 015 were not grandfathered.

In sum, it is clear that outfalls 013, 014, 015, and 016 fail to meet the DEQ’s own requirements for historical grandfathering (pre-September 5, 1978). These outfalls were not

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<sup>29</sup> If Outfall 016 was added in April 2015, why does the DEQ’s March 2019 SOB propose to “Add outfall 016”?



grandfathered when they came on-line, and there is no basis for grandfathering them now. This game of retroactive grandfathering must end. Not only for outfalls 113–016, but also for 001–012.<sup>30</sup>

#### **E. The Proposed Mixing Zone in Badwater Bay is Unlawful and May Not be Approved.**

The SOB indicates that a mixing zone will be established in Badwater Bay. As proposed, the mixing zone violates water quality rules and regulations set forth in Chapter 1, Section 9 of the Wyoming Surface Water Quality Standards.

Notwithstanding the legal violations, we believe that a mixing zone in Boysen Reservoir is fundamentally inappropriate and therefore would recommend that the facility achieve compliance with all applicable water quality standards at the point of discharge. Boysen Reservoir is a popular recreation destination and should not be relegated to oil field wastewater treatment. We encourage the DEQ to study alternatives that would avoid the creation of a mixing zone in the reservoir. However, should the DEQ insist on moving forward with this ill-conceived project, we offer the following comments on the proposal to establish a mixing zone in Badwater Bay.

A description of the proposed mixing zone is contained in the Statement of Basis in a single paragraph which is included below.

Mixing Analysis in Boysen Reservoir: The GEMSS model used a bathymetric (3D) mixing approach to analyze potential impacts from this facility at the confluence of Badwater Creek and Boysen Reservoir. This is not a conventional mixing zone since the discharge facility is located approximately 40 stream miles up from this confluence. However, the permittee was tasked by WDEQ with analyzing potential impacts to the lake itself under worst case scenarios. The model found that complete mixing occurs, even under low natural flow conditions in Badwater Creek, before Badwater Creek fully enters Boysen Reservoir. The mixing area is estimated to be approximately 330 feet long east to west, and 730 feet wide, north to south. The location of this mixing area is at the far east end of Badwater Bay, right at the mouth of Badwater Creek. The mixing area location is not static, however, since the mouth of the creek migrates with lake levels and stream flow conditions. Based on the results of the analysis, WDEQ anticipates that adequate mixing will occur before discharges reach the full body of the lake, and that by setting effluent limits for protection of the Class 1 water below the dam, the water quality within the lake itself is also adequately protected.

SOB at 8.

With respect to regulatory compliance applicable to mixing zones, the DEQ’s mixing zone rule provides that:

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<sup>30</sup> Indeed, in this proposed permit renewal, the DEQ recognizes that the practice of continued grandfathering is improper. The draft permit contains a compliance schedule that would require “full compliance with final chloride effluent limits” of 230 mg/L by July 1, 2023.

Except for acute whole effluent toxicity (WET) values and Sections 14, 15, 16, 17, 28 and 29(b) of these regulations, compliance with water quality standards shall be determined after allowing reasonable time for mixing. Except for the zone of initial dilution, which is the initial 10% of the mixing zone, the mixing zone shall not contain pollutant concentrations that exceed the aquatic life acute values (see Appendix B). In addition, there shall be a zone of passage around the mixing zone which shall not contain pollutant concentrations that exceed the aquatic life chronic values (see Appendix B). Under no circumstance may a mixing zone be established which would allow human health criteria (see Appendix B) to be exceeded within 500 yards of a drinking water supply intake or result in acute lethality to aquatic life. The procedures used to implement this section are described in the *Mixing Zones and Dilution Allowances Implementation Policy*.

#### Chapter 1, Section 9 Mixing Zones.

In examining potential compliance with the above requirements, the following factors should be considered by the DEQ:

Badwater Bay is a nursery area for sauger, a WGFD sensitive species. The DEQ's mixing zone policy is clear that a proposed mixing zone "may be denied due to concerns about designated and existing uses or the following in the area affected in the discharge: (ii) Biologically important areas such as fish spawning or nursery areas." See Section 4(b)(ii).

The DEQ has not analyzed potential toxicity of Aethon's produced water to this species, or to aquatic life in general in Alkali or Badwater creeks. See Attached Memorandum prepared by Harold Bergman, Ph.D and Joseph Meyer, Ph.D. Among other things, the DEQ's failure to consider alkalinity and bicarbonate ion concentration, potassium, and pH in Alkali and Badwater creeks, coupled with the failure to consider actual water chemistry, reveals significant flaws in the permitting process that must be addressed before the DEQ can lawfully authorize the expanded discharge.

The water level in the bay fluctuates from year to year and seasonally, so the mixing zone will: 1) move farther out into the reservoir as water levels drop; and 2) lose dilution capacity as water levels drop. What is the basis for the conclusion that "WDEQ anticipates that adequate mixing will occur before discharges reach the full body of the lake, and that by setting effluent limits for protection of the Class 1 water below the dam, the water quality within the lake itself is also adequately protected"? It should be noted that polluted produced water containing high TDS, chloride, and sulfate will be entering Badwater Bay via Badwater Creek. End-of-pipe effluent limits proposed in the draft permit will exceed not only Appendix H limitations for some constituents, but also result in exceedances of in-stream numeric criteria for chloride (230 mg/L) in Badwater Creek. So, the claim that setting effluent limits that are protective of the Class 1 segment of the Wind River will also protect Badwater Bay is unfounded.

Has the geographic area described as “full body of the lake” been mapped and identified? How far out into the lake would the mixing zone need to migrate before it would reach the “full body of the lake”?

Since no actual water quality or flow data for Badwater Creek has been considered, what is the basis for the DEQ’s conclusion that the mixing zone will comply with the DEQ’s rules? High TDS, chloride, sulfate, and oil field chemicals contained in the existing discharges could already be stressing the sauger and other aquatic life, yet there is no discussion of existing pollution levels or dilution capacity in the receiving waters (i.e., Alkali Creek and Badwater Creek). Section 9 states that “Except for the zone of initial dilution, which is the initial 10% of the mixing zone, the mixing zone shall not contain pollutant concentrations that exceed the aquatic life acute values (see Appendix B)” but that is exactly what will happen in the case of chloride in Badwater Bay, which will exceed 230/mg/L as enters the mixing zone. The ERM modeling report (at 24) indicates that “[b]ased on discussions with WDEQ, the stream does not support its classified uses and did not require assessment of water quality impacts.” It is clear that non-compliant concentrations of pollutants will enter the mixing zone at Badwater Bay, violating the DEQ’s mixing zone rule. And contrary to the DEQ’s claim, an assessment of impacts to Badwater Creek is most definitely required.

With respect to regulatory compliance, we see no reference in the SOB or draft permit to the “zone of initial dilution, which is the initial 10% of the mixing zone.” Where is it? How is it identified? And, what happens when the mixing zones migrates due to low water in the bay? Given that the draft permit contains a monitoring requirement for Badwater Bay, which is “intended to monitor water quality in the lake after mixing,” how will the permit reflect the location of the monitoring station which will undoubtedly migrate along with the mixing zone itself? *See SOB at 9.*

The Statement of Basis indicates that flows in Badwater Creek are reduced or even “approach zero during certain dry times of the year.” SOB at 9. Yet the SOB states that “[t]he model found that complete mixing occurs, even under low natural flow conditions in Badwater Creek, before Badwater Creek fully enters Boysen Reservoir.” This statement strains credulity. How can “complete mixing” occur if there is no natural base flow in Badwater Creek?

Aethon’s modeling report eliminated pH from the analysis as a parameter of interest, claiming that “since the model was designed such that effluent pH from Aethon is in compliance with water quality standards and therefore will not require a mixing zone.” ERM Report at 175. However, water chemistry analysis described in the Bergman-Meyer report explains that the pH of the produced water will likely increase as it flows down Alkali Creek and Badwater Creek, and not remain static. Thus, the failure to consider pH as a factor in the mixing zone study is a fatal flaw in the analysis that must be addressed in a revised permit if Aethon continues to advocate surface discharge into Alkali and Badwater creeks for disposal of produced water.

Regarding the “zone of passage” requirement in Section 9, the Aethon SOB describes a rectangular shaped mixing area “estimated to be approximately 330 feet long east to west, and

750 feet wide, north to south.” Yet the DEQ’s slide<sup>31</sup> clearly shows that water entering the bay disperses in a fan-shaped plume extending bank-to-bank, revealing both no clear passage way and serious fallacies with the argument that the mixing zone will be confined (in defiance of physics) to an arbitrarily drawn rectangle. Given this reality, where is the zone of passage in this mixing zone, and what is the scientific basis to support the DEQ’s conclusions?

The DEQ’s mixing zone implementation policy states that “Mixing zones in lakes shall not exceed 5% of the lake surface area or 200 feet in radius, whichever is more limiting.” Mixing Zone Policy, Section 4(a)(ii). It appears that the mixing zone proposed by Aethon exceeds the “maximum allowable size” and therefore cannot be approved.

The mixing zone is in a popular recreation area, leading to “potential human exposure to pollutants resulting from . . . recreational activities.” Mixing Zone Policy at Section 4(b)(iv). The proposed mixing zone should be rejected due to the potential for human exposure, particularly in children.

#### **F. The Draft Permit’s Whole Effluent Testing Requirements Described are Inadequate.**

The approach described in the Statement of Basis and draft permit for whole effluent toxicity (WET) testing (acute and chronic) is insufficient to ensure compliance with the terms of the permit and other regulatory requirements.

To ensure that Chapter 2 Appendix H requirements are met, including “the produced water shall be of good enough quality to be used for wildlife or livestock watering,” WET testing should be required at the end-of-pipe for each outfall, rather than from a sample consisting of “a flow-weighted composite from all discharging outfalls.” SOB at 11. Wildlife and livestock will have access to the produced water as it flows from the outfalls into unnamed drainages; therefore the “good enough quality” standard must be met at each outfall, and toxicity testing must be done to ensure this and other Appendix H requirements are met (“Unless otherwise stated in the permit, effluent limitations shall be met at the outfall from the final treatment unit prior to admixture with water in the receiving surface waters of the state or with effluent from other outfalls.” Ch. 2 Section 5(c)(iii)(Q)). As we noted in our June 19, 2019 letter, a range of potentially harmful chemicals—naturally occurring and deliberately introduced during the well drilling/completion/fracking process—may be present in the wastewater, and are not removed during the separation process described in the SOB.<sup>32</sup>

In addition to the failure to conduct WET tests at the end-of-pipe at each outfall, the timing and nature of the proposed WET testing fails to meet the requirements of the Clean Water Act. As recommend by Drs. Bergman and Meyers, WET testing should be required quarterly, rather than annually, and should include Ceriodaphnia chronic reproduction.

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<sup>31</sup>[http://deq.state.wy.us/wqd/WYPDES\\_Permitting/WYPDES\\_PNs\\_and\\_appr\\_permits/WYPDES\\_PNs/WYPDES\\_PNs\\_2019/2019-003/Moneta-Public-Meeting-Presentation\\_2019-0521.pdf](http://deq.state.wy.us/wqd/WYPDES_Permitting/WYPDES_PNs_and_appr_permits/WYPDES_PNs/WYPDES_PNs_2019/2019-003/Moneta-Public-Meeting-Presentation_2019-0521.pdf)

<sup>32</sup> The SOB states: “This facility is a gas production treatment unit that separates gas from formation waters at the surface using a gun barrel technology, and skim ponds and tanks.” SOB at 1 (General Description).

EPA Region 8 previously identified deficiencies in WET testing Wyoming has been relying upon in its discharge permits. In July 2015, EPA Region 8 published a National Pollutant Discharge Elimination System (NPDES) Permit Quality Reviews (PQRs) Report for Wyoming, which evaluated a “a select set of NPDES permits to determine whether permits are developed in a manner consistent with applicable requirements established in the Clean Water Act (CWA) and NPDES regulations.” United States Environmental Protection Agency Region 8, Region 8 NPDES Permit Quality Review Wyoming (Jul. 7, 2015), [https://www.epa.gov/sites/production/files/2016-03/documents/final\\_-\\_wy\\_pqr\\_report\\_2013\\_7-17-2015-508.pdf](https://www.epa.gov/sites/production/files/2016-03/documents/final_-_wy_pqr_report_2013_7-17-2015-508.pdf) at 4. In its recommendations, EPA Region 8 made a series of “critical findings” that it describes as “[m]ost [s]ignificant” and that its “[p]roposed action items will address a current deficiency or noncompliance with respect to a federal regulation.” Among these critical findings was that the DEQ’s WET determinations do not comply with the CWA. *See id.* at 45. EPA Region.8 recommends the DEQ “document permitting decisions in fact sheets and administrative records of permits. Provide more information in fact sheets on how; WET RP is determined, acute or chronic requirements are selected, species modifications are approved, and how testing reductions are calculated and approved” in order to comply with the CWA and federal regulations. Yet, DEQ has failed to rectify the deficiencies EPA previously identified

#### **G. DEQ has Not Conducted a Reasonable Potential Evaluation in Violation of DEQ Regulations.**

DEQ must establish water quality based effluent limitations (WQBELs) for all constituents in the permitted discharge that have a “reasonable potential” to adversely impact uses of downstream surface waters or cause violations of established water quality standards.

Thus far, the DEQ has not established WQBELs for several constituents that have a reasonable potential of impacting surface waters and causing violations of standards, including but not limited to the BTEX chemicals (benzene, toluene, ethylbenzene, and xylene), chloride, manganese, and temperature. Several other constituents may also require a reasonable potential analysis. Many potentially harmful constituents appear in high levels in either produced water, the receiving waters, or both, but DEQ does not provide a numerical standard for human health for fish consumption or drinking water for those constituents, so the levels must be evaluated against DEQ’s narrative standards. This list is not exhaustive, and it is DEQ’s responsibility to determine what other constituents may have the reasonable potential to degrade the state’s surface waters.

The DEQ’s regulations require that:

(I) Water quality based effluent limitations shall be established for constituents in discharges determined to have a reasonable potential of adversely impacting uses of surface waters of the state or of causing violations of water quality standards. When making reasonable potential determinations, the administrator shall consider the following:

- (1.) Existing controls on point and non-point sources of pollution;
- (2.) The variability of the pollutant or pollutant parameter in the effluent;

- (3.) For evaluating whole effluent toxicity, the sensitivity of the species to toxicity testing; and
- (4.) Where appropriate, the dilution of the effluent in the receiving water.
- (5.) Applicable designated uses and water quality standards.

Ch. 2, Sec. 5(c)(iii)(C)(I).

The receiving waters have designated uses and water quality standards that must form the basis of a reasonable potential (RP) evaluation. Alkali Creek is a designated Class 3B water, protecting uses including aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value. Ch. 1, Sec. 4(c). Badwater Creek is designated Class 2AB. Class 2 waters support fish and/or drinking water supplies. Badwater Creek's 2AB designation protects its uses as a coldwater game fishery and drinking water source. Ch. 1, Sec. 4 (b)(i). The main stem of the Wind River from the Wedding of the Waters upstream to Boysen is a Class I "Outstanding Water," for which no further water quality degradation by point source discharges other than dams is allowed. Ch. 1, Sec. 4 (a); App. A (a)(iv).

In addition to these narrative standards, DEQ's water quality regulations in Ch. 1, Appendix B establish numerical standards for certain pollutants, listing maximum values that cannot be exceeded in receiving waters. These regulations establish a maximum value for benzene of 2.2 µg/L to support human health including consumption of fish and drinking water uses. They also establish an 860,000 µg/L limit for acute values of chloride and a 230,000 µg/L for chronic values of chloride. DEQ regulations also establish narrative temperature standards for the receiving waters, stating that:

"For Class 1, 2, and 3 waters, pollution attributable to the activities of man shall not change ambient water temperatures to levels which result in harmful acute or chronic effects to aquatic life, or which would not fully support existing and designated uses." Ch. 1, Sec. 25(a).

DEQ's regulations for water temperature also establish numerical temperature increase thresholds when ambient temperatures exceed 60 degrees Fahrenheit. Ch. 1, Sec. 25 (b), (c).

DEQ must conduct an RP evaluation to determine whether any constituents of the permitted produced water discharge may impair these designated uses or cause the established water quality standard for any of these receiving waters to be violated. In determining whether effluent limitations are required, and in establishing WQBELs for these constituents, DEQ must consider all five factors articulated in Ch. 2, Sec. 5(c)(iii)(C)(I).

Several constituents should clearly be evaluated for RP based on their high concentrations in produced water or because insufficient data warrants further investigation. For example, an RP evaluation should analyze BTEX chemicals because high concentrations of hydrocarbons are present in untreated produced water. *See Moneta Divide DEIS, Appendix M: Water Resources Technical Report (January 2018) at pg. 75 (showing average levels of benzene at 2 mg/L, toluene at 30 mg/L, and xylene at 15 mg/L in untreated produced water).* Chloride concentrations are also high in produced water, averaging 3,300 mg/L, well above DEQ's standard for aquatic life. DEQ provides no numerical standard for human health to compare this

level to and must consider the reasonable potential that these levels would contribute to a violation of narrative standards. *Id.* Manganese levels in produced water average 50 µg/L, compared to DEQ's numerical standard of 50 µg/L for human consumption. *Id.* Temperature should be considered as well, because the available data do not clarify whether DEQ's Ch 1, Section 25 temperature standards will be met. An RP evaluation for temperature is particularly important because the water temperature of low natural flows in Alkali Creek and in Badwater Creek in later summer could be affected by greater volumes of warm effluent flowing from the outfalls into those streams.<sup>33</sup> Other constituents that could potentially degrade the receiving waters are not reduced through treatment, such as arsenic and mercury, and should be evaluated as well.

An RP evaluation should be done for potassium. According to Drs. Bergman and Meyer,

– No analyses of K<sup>+</sup> were included in Aethon's Table 2 chemistry results. However, based on a number of aquatic toxicity studies, K<sup>+</sup> can contribute more to aquatic toxicity than other constituents of typical saline produced waters when at similar concentrations (Mount et al., 1997). Thus, the K<sup>+</sup> concentration would be an important determinant for understanding and predicting toxicity of the produced waters to aquatic biota (see Aquatic Toxicity section, below). If K<sup>+</sup> was present in the Table 2 production water (which is highly likely) and its concentration had been reported, the estimated alkalinity and bicarbonate concentrations presented in the previous bullet would be even higher.

Bergman-Meyer Report at 2.

A recent NPDES permit renewal for a produced water outfall within the exterior boundaries of the Wind River Indian Reservation is instructive as to what an RP evaluation should entail. While the EPA regulates discharges into surface waters from reservation sources directly, the applicable tribal surface water classifications are nearly identical to DEQ's surface water classifications, such that the RP evaluation in the tribal permit provides a template that may be useful to DEQ. *See* Statement of Basis, Permit No. WY-0020338 at 3 (“Uses designated [in tribal water quality requirements] on Class 3B waters include aquatic life other than fish, primary contact recreation, wildlife, industrial, agricultural, cultural/traditional and aesthetic uses.” Compare DEQ regulations at Ch. 1, Section 4 (c), described above).

The RP evaluation for the tribal permit renewal considers effluent monitoring data for pollutants believed to be present as well as “biochemical oxygen demand, chemical oxygen demand, total organic carbon, ammonia, temperature, pH, and actual flow.” *Id.* at 7. EPA also reviewed six years of discharge monitoring reports (DMR) for eight pollutants. The RP evaluation includes both a quantitative analysis based on EPA approved water quality standards to ensure designated uses are protected, and a qualitative analysis for constituents with insufficient data.

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<sup>33</sup> The Moneta Divide DEIS indicates that “the portion of the analysis area within the [Lander Field Office] contains thermal springs and aquifers with temperatures that exceed 90 degrees Celsius (about 200 degrees F). DEIS at 3-44.

The quantitative analysis assesses the reasonable potential for pollutants in the effluent discharge to cause or contribute to a violation of water quality standards. This potential “was evaluated for all parameters of concern measured and reported in the permit application, hazard screening, or DMR” after which “the effluent data was compared to applicable acute and chronic aquatic life criteria values . . . after consideration of pollutant variability in the discharge and available dilution in the receiving water.” *Id.* The quantitative analysis applied EPA Region 8’s RP Tool, “which assess RP from effluent data with statistical procedures consistent with EPA’s Technical Support Document for Water Quality Based Toxics Control, March 1991.” That analysis identified six pollutants with reasonable potential to cause exceedances: chloride, sulfate, sulfide, fluoride, cadmium, and mercury. However, for fluoride, cadmium, and mercury, insufficient data were available to determine the pollutant’s reasonable potential to exceed numeric criteria. Thus, a qualitative analysis of RP for those pollutants was necessary.

Accordingly, EPA conducted a qualitative RP analysis, and included effluent limitations in the permit for pollutants that have a reasonable potential of impairing designated uses or violating water quality standards. EPA imposed an effluent limit for sulfide based on this analysis, and required additional monitoring for fluoride, cadmium, and organic compounds. EPA also required additional monitoring for mercury with a clear trigger level that requires a mercury minimization plan if the established threshold is reached. The RP evaluation was critical in establishing these new safeguards, retaining limits from previous permits, and establishing plans for adaptive management with clear triggers and responses.

The DEQ should conduct a similar RP evaluation here, applying best practices from EPA Region 8’s RP Tool. This RP evaluation should identify and review any and all constituents that have a reasonable potential to impair designated uses or contribute to violation of established water quality standards, using quantitative data when available, and qualitative assessment where data is insufficient. The RP analysis must consider all five factors enumerated in DEQ’s regulations for RP evaluations.

#### **H. The DEQ’s Decision to Remove the Initial 230 mg/L Chloride Standard Violates the Clean Water Act’s Anti-Backsliding Provisions.**

The DEQ’s decision to remove the initial 230 mg/L chloride standard in the existing 2008 permit violates the Clean Water Act’s anti-backsliding provisions. The Clean Water Act generally prohibits backsliding, reducing the stringency of established effluent limitations. CWA §402(o)(1) states:

General prohibition –In the case of effluent limitations established on the basis of subsection (a)(1)(B) of this section, *a permit may not be renewed, reissued, or modified* on the basis of effluent guidelines promulgated under section 1314(b) of this title subsequent to the original issuance of such permit, *to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.* In the case of effluent limitations established on the basis of section 1311(b)(1)(C) or section 1313(d) or (e) of this title, a permit may not be renewed, reissued, or modified to contain effluent limitations which are less



stringent than the comparable effluent limitations in the previous permit except in compliance with section 1313(d)(4) of this title.

33 U.S.C. § 1342(o)(1) (emphasis added).

The Act provides two independent exceptions from the general prohibition against backsliding. The first exception is outlined in U.S.C. § 1313(d)(4) and provides for backsliding in very limited circumstances, including demonstrated compliance with the Act's antidegradation rule. That provision does not apply here. Instead, the DEQ's existing 2008 permit claims the second exception, outlined in CWA 402(o)(2). That provision enumerates five statutory exceptions to the general prohibition, specific circumstances in which a permit may be renewed, reissued, or modified with a reduced effluent limitation. In the existing permit, the DEQ cites 402(o)2.B.i to justify completely eliminating the established 230 mg/L chloride limitation:

*Anti-Backsliding Provision: This permit originally established a chloride limit of 230 mg/L at the end of pipe for discharge into Class 3B waters. Since the issuance of the original permit, chloride standards established in Chapter 1 of the Wyoming Water Quality Rules and Regulations have changed to excluding aquatic life standards for chloride in Class 3 waters. Therefore, WDEQ has removed the effluent limit and monitoring requirements for chloride in this permit. It is WDEQ's determination that removing chloride limit from this permit conforms to the anti-backsliding requirements established in Section 402(o).2.B.i of the Clean Water Act.*

WYPDES Permit No. WY0002062 at 2.

However, the DEQ is incorrect in asserting that the permit conforms to the Act's anti-backsliding requirements. In fact, the exception described in 402(o)2.B.i specifically exempts the very basis for backsliding that the DEQ claims. That exception provides:

**(2) Exceptions** - A permit with respect to which paragraph (1) applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant if ... (B)(i) information is available which was not available at the time of permit issuance (*other than revised regulations, guidance, or test methods*) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance

33 U.S.C. §1342(o)(2)(B)(i) (emphasis added).

The DEQ's claim that 402(o)2.B.i exempts chloride effluent limitations from the Clean Water Act's general prohibition against backsliding, and therefore justifies the complete removal of chloride limitations, is fundamentally flawed for three reasons.

First, the DEQ claims that it removed the chloride limit to comport with revisions to Wyoming's Water Quality Standards for Class 3 waters. The DEQ's cited exemption from the general prohibition against backsliding explicitly prohibits renewing, reissuing, or modifying a

permit to include less stringent effluent limits based on a revised regulation. The well-considered parenthetical in 402(o)2.B.i disallowing exemptions on the basis of revised regulations, guidance, or test methods removes the perverse incentive for an agency to make revisions in order to circumvent the Clean Water Act's anti-backsliding requirements. Second, the enumerated exemptions in 402(o)(2) only allow *less stringent* effluent limitations in certain narrow circumstances and make no allowance for completely *eliminating* an existing effluent limitation. Third, 402(o)2.B.i. only allows less stringent effluent limits when new information would have justified the application of less stringent effluent limits *at the time of permit issuance*.

Here, the DEQ claims an exemption to the Clean Water Act's anti-backsliding requirements based on a regulatory revision the department itself made. This defeats the purpose of the parenthetical exception to 402(o)2.B.i and violates federal law. Further, the DEQ used this baseless exemption claim to completely *eliminate* the permit's existing 230 mg/L chloride limit, not to include less stringent standards as the Act provides. Finally, the DEQ offers no evidence that "new information" (presumably the regulatory revision to Wyoming Water Quality Standards that the DEQ itself made) would have justified less stringent standards at the time of permit issuance.

Even if the DEQ were permitted to backslide on its WQBELs under a statutory exception to the anti-backsliding rule, the Clean Water Act contains a backstop that prohibits relaxation of effluent limitations when relaxed limits would result in a violation of the applicable water quality standard. 33 U.S.C. §1342(o)(3). CWA § 402(o)(3) functions as a floor to how far limitations may backslide when backsliding is permitted by either §303(d)(4) or 402(o)(2). Permits may never contain effluent limits that are less stringent than EPA's current effluent limitation guidelines for that pollutant, or limits that would cause the receiving waters to violate state water quality standards. *Id.*

The prohibition against backsliding is critical to restoring and maintaining the integrity of our nation's waters. The DEQ must abide by the law and restore the original 230 mg/L chloride limitation.

## **VII. CONCLUSION**

The draft permit violates the Clean Water Act, the Wyoming Environmental Quality Act, and the Department's rules and regulations implementing those laws. The discharge of produced water from this facility has damaged and continues to damage surface waters of the state and threatens downstream communities with undisclosed health risks. The DEQ should encourage Aethon to consider other, less environmental damaging alternatives to the discharge. For the foregoing reasons the permit should be denied.

Sincerely,



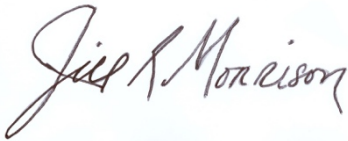
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Enclosures:

Bergman/Meyer Memorandum  
Hydros Report  
Wireman comments