U.S. EPA Region 8
Underground Injection Control Program
AQUIFER EXEMPTION RECORD OF DECISION

This Record of Decision (ROD) provides the EPA's aquifer exemption (AE) decision, background information concerning the AE request, and the bases for the decision to deny the exemption of the Amsden and Madison aquifers.

Primacy Agency: Wyoming Oil and Gas Conservation Commission (WOGCC)

Date of Aquifer Exemption Application Request: Received electronically July 29, 2022.

Operator: Aethon Energy Operating LLC
12377 Merit Drive, Suite 1200
Dallas, Texas 75251

Well Class/Type: Class II Salt Water Disposal (SWD)

Well Names: Marlin 29-21 Water Disposal Well (WDW)

Docket Number: 1711-2020

Well API number: 49-013-23374

Basin: Wind River

Field: Unnamed

Well Location: Qtr: NENW Section: 29 Township: 35 N Range: 90 W 6th PM

Footage Calls (Surface): 660 feet (ft.) from N line; 1,977 ft. from W line

Footage Calls (Bottom Hole): 1,328 ft. from N line; 1,779 ft. from W line

County: Fremont **State**: Wyoming

Surface Latitude: 42.98281 **Surface Longitude:** -107.65234
Bottom Hole Latitude: 42.98098 **Bottom Hole Longitude:** -107.65308

PROJECT BACKGROUND INFORMATION

Aethon Energy Operating LLC (Aethon) proposes the underground disposal of produced water into the Amsden and Madison Formations through the Marlin 29-21 WDW well, which is located in the Wind River Basin about 37 miles (mi.) east of Riverton, Wyoming. The Marlin well is part of the Moneta Divide Natural Gas and Oil Development Project and is located within the Madison Disposal Area about 13 miles south of the Moneta Divide Project's Gun Barrel Unit, which would be the source for most of the underground disposal of the fluids. The Marlin well is not located in a producing oil/gas field within the

Moneta Divide Project Area, and the Madison and Amsden are not hydrocarbon producing intervals in this area.

The Marlin 29-21 WDW was completed to a measured depth (MD) of 15,405 ft. in July 2012 with perforations from 14,448 to 14,766 ft. in the Tensleep Formation and from 14,972 to 15,312 ft. in the Darwin Member of the Amsden Formation and the Madison Formation with the intent of injecting into these formations. The well currently is shut-in with the lower perforated interval squeezed under a cement retainer and the Tensleep perforations open.

An AE request was originally submitted to WOGCC in 2011 by the previous operator, Encana Oil and Gas (USA), Inc. (Encana) for the Nugget, Tensleep, and Madison Formations within a quarter-mile radius of the Marlin well. The request was approved by WOGCC on April 10, 2012 in Docket 438-2011 with the condition that waters in the disposal intervals were proven to have total dissolved solids (TDS) concentrations in excess of 5,000 mg/L. After drilling the well, the operator determined the Nugget was not a prospective injection zone, and the Tensleep did not have the anticipated disposal injection capacity. Water analysis of the Madison indicated TDS concentrations from 910 to 1,200 mg/L, which did not meet the condition for approval set by the WOGCC. Therefore, the 2011 AE was not submitted to the EPA.

On November 19, 2012 (Docket 3-2013), Encana filed a second request to exempt the Madison within a quarter-mile radius of the Marlin on the basis that it "is situated at a depth or location which makes recovery of fresh and potable water economically or technologically impractical" (WOGCC Rules, Ch. 4, Sec. 12(a)(ii)) and requested that the WOGCC reaffirm its Order authorizing the Marlin for injection into the Nugget and Tensleep Formations. From 2013 to 2015, WOGCC held multiple hearings, and Encana engaged Tetra Tech[1,2] to perform additional hydrogeologic analysis, including radiocarbon age dating of Madison groundwater and numerical modeling to estimate the extent of injectate migration.

Aethon acquired the Moneta Divide asset, including the Marlin well, from Encana in April 2015 and requested that the WOGCC set the matter of the Madison AE for a public status hearing and update. The WOCGG denied the Madison AE on May 14, 2019. WOGCC's denial of the Madison AE was based on several reasons. The Commissioners expressed concerns about the model for the Madison Formation and whether the injected water would stay within a reasonable distance of the wellbore or move to a more economical depth (5000 feet or less). They expressed concerns about the structural complexity, including faults and related fractures, reservoir heterogeneity, compartmentalization and different pressure regimes, that were not adequately addressed in particular with regard to water movement in preferential directions related to the geology.[3] The Commission also expressed concerns and questions

[1] Tetra Tech, *Performance and influence of the Marlin 29-21 Water Disposal Well on the Madison Formation in Fremont County, Wyoming*, Prepared for: Encana Oil and Gas (USA) Inc. (2015).
[2] Tetra Tech, *Sampling and analysis for chemical and isotopic content of the Madison Formation in the Marlin 29-21 WDW, Fremont County, Wyoming*, Prepared for Encana Oil and Gas, Inc. (2015) (hereinafter "Tetra Tech Sampling Report 2015").
[3] WOGCC Docket No. 3-2013, Order No. 3, Findings of Fact 12. (May 14, 2019)

regarding proximity to outcrops, radius of injection, containment, and use of the Madison aquifer as a source of water in Gillette.

On August 14, 2020, Aethon submitted the current AE request (Docket 1711-2020) to WOGCC for the Marlin well to inject into the Madison formation, which had been revised from the previous requests. Aethon is requesting an AE with a three-mile radius for the combined Madison and overlying Amsden Formation, and additional hydrogeologic analysis is presented. Specifically, the model was expanded to include the Darwin Sandstone member of the Amsden as a separate layer, the Reservoir Saturation Sigma Log was reprocessed to provide more accurate porosity values, and 2D seismic data were acquired and utilized to refine local structure mapping. However, no additional Madison water-quality data has been gathered since 2014 and no water quality data for the Amsden was included.

At a hearing on November 10, 2020, WOGCC voted (4 to 1) to approve the AE, and the Wyoming Department of Environmental Quality (WDEQ) concurred with the proposed AE on December 4, 2020. The WOGCC issued an Order on July 27, 2022, in which the WOGCC determined that the two (2) aquifers at issue are situated at a depth and location that makes recovery of fresh and potable water technologically and economically impractical, and water in the intervals are not reasonably expected to be used as fresh and potable water. On July 29, 2022, the EPA received a formal request from the WOGCC to approve the proposed AE.

DESCRIPTION OF REQUESTED AQUIFER EXEMPTION

Aquifer(s) Requested for Exemption

Formation: The requested aquifer exemption is for the Amsden and Madison Formations. As explained below, they are likely hydraulically connected. Therefore, the EPA must treat the formations as one for purposes of the aquifer exemption analysis, as any fluid injected into one formation has the potential to migrate into the other. All depths are approximate measured depths (MD) relative to a kelly bushing height of fourteen (14) ft. above ground level.

Top: 14,795 ft. *Bottom:* 15,365 ft. *True Vertical Thickness:* 564 ft.

Lithology: The Amsden Formation is Mississippian to Pennsylvanian in age and predominantly consists of a carbonate, shale, and sandstone sequence. The Amsden at the subject well is about 205 ft. thick (14,795–15,003 ft. MD) and is subdivided into three members, which consist, from top to bottom, of the Ranchester Limestone, Horseshoe Shale, and Darwin Sandstone. At the subject well, the Ranchester occurs from 14,795 to 14,884 ft. MD and is described as consisting of light tan dolomite, off-white limestone, and brick-red shale. The Horseshoe Shale (14,884–14,974 ft. MD) is described as tan dolomite, siltstone, red shale and off-white limestone. The Darwin Sandstone (14,974–15,003 ft. MD) is described as tan to light purple, very-fine-grained sandstone. The Darwin Sandstone likely is hydraulically connected to the underlying Madison Formation. The Madison Formation is Mississippian in age and composed primarily of limestone and dolomite. The Madison at the subject well is about 359 ft. thick (15,003–15,365 ft. MD).

Description and Areal Extent of Aquifer(s) Requested for Exemption

Description: A radial distance of three miles from the wellbore of the subject well

Total area of aquifer(s) proposed for exemption: Approximately 18,096 acres (28.3 square mi.)

Water Quality Data of the Aquifer Requested for Exemption

Water Quality – Total Dissolved Solids (TDS) (mg/L): 910–1,200

Source of WQ Data: Water quality of the zone requested for exemption is based on a number of samples collected from the Madison Formation from July 2012 to May 2014. Most were collected shortly after well completion in July-August 2012, but one sample was collected on May 1–2, 2014. Samples were not collected from the Amsden Formation. However, because it likely is hydraulically connected to the Madison, its water quality is assumed to be similar.

The samples indicate that the water is of high quality. The TDS concentration is very low, with samples averaging about 1,000 mg/L. Review of the data also indicates that there are no significant levels of naturally occurring contaminants. The Marlin 29-21 well was completed on July 2, 2012. While samples collected from the Madison at the subject well shortly after drilling (July 3–9, 2012) exhibited concentrations for some constituents above EPA health-based standards for National Primary Drinking Water Regulations (NPDWR), they were likely introduced or affected by drilling activity and are not representative of naturally occurring concentrations in the Madison Formation. Water samples collected from July 3 to August 7, 2012 show a trend of decreasing concentrations of benzene and other organic compounds, suggesting that the earlier concentrations of benzene and other drilling related constituents were not representative of the Madison aquifer fluids and are likely residual contamination from the well drilling process.[4] This is supported by sundry reports on file with the WOGCC for the Marlin well dated April 2 and 3, 2012, indicating that a diesel-based invert system (oil-based drilling mud) was used to complete drilling of the deeper portion of the well, including through the Amsden and Madison Formations. Diesel-based mud systems are known to contain aromatic hydrocarbons, including benzene, toluene, ethyl benzene and xylene.[5]

The sample collected on May 1–2, 2014 likely indicates the most representative concentrations in the formation because it was not collected shortly after well completion. In addition, sampling procedures

[4] WOGCC AE Submission, Docket 1711-2020, Appendix A, at 99–124, includes the following sampling results for benzene: July 3, 2012 - 110 µg/L; July 5, 2012 - 22 µg/L; July 9, 2012 - 18 µg/L; July 26, 2012 - 12 µg/L; July 27, 2012 - 14 µg/L; July 28, 2012 - 4 µg/L; July 29, 2012 - 6 µg/L; Aug. 1, 2012 - 4 µg/L; Aug. 2, 2012 - 1 µg/L; Aug. 3, 2012 - 6 µg/L; Aug. 4, 2012 - 2 µg/L; Aug. 5, 2012 - 2 µg/L; Aug. 6, 2012 - 2 µg/L; Aug. 7, 2012 - 5 µg/L. A sample collected on May 1, 2014, indicated slight NPDWR exceedances for fluoride, which exhibited a concentration of 4.29 mg/L relative to its MCL of 4.0 mg/L, and for benzene, which exhibited a concentration of 6 µg/L relative to its MCL of 5 µg/L.

[5] Energy Safety Canada, *Controlling Chemical Hazards Guidance Sheet – Oil-Based Mud Systems*, https://www.energysafetycanada.com/EnergySafetyCanada/media/ESC/Resources/Guidance%20Sheets%20-%20Substance/Oil-Based_Mud_Systems.pdf.

and quality-control measures are well documented[6], whereas methods used for the 2012 samples are not evident. The 2014 sample indicated only slight NPDWR exceedances for fluoride, which exhibited a concentration of 4.29 mg/L relative to its maximum contaminant level (MCL) of 4.0 mg/L, and for benzene, which exhibited a concentration of 6 µg/L relative to its MCL of 5 µg/L.

Confining Zones

Upper: The Ranchester Limestone and Horseshoe Shale Members of the Amsden Formation are the 179-ft thick confining zone above the Darwin Sandstone Member and the Madison Formation injection zone and the overlying Tensleep Formation.

Ranchester Limestone	*Lithology*: Dolomite, limestone, and shale	
Top: 14,795 ft.	*Bottom:* 14,884 ft.	*Thickness:* 89 ft
Horseshoe Shale	*Lithology*: Dolomite, siltstone, limestone, and shale	
Top: 14,884 ft.	*Bottom:* 14,974 ft.	*Thickness:* 90 ft
Lower: Gallatin Limestone	*Lithology:* Limestone and shale	
Top: 15,365 ft.	*Bottom:* ~15,635 ft.	*Thickness:* ~300 ft.

The lower confining zone is the Gallatin Limestone. The base of the Gallatin is not reached by the Marlin well, but it is estimated to be about 300 ft. thick based on well information from the Madden Field located about 20 mi. to the north. Density logs show that the Gallatin Limestone has low porosity and significant amounts of shale.

IDENTIFICATION OF OTHER USDWs in the AREA

A search of well records in the Wyoming State Engineer's Office (WYSEO) database for T35N, R90W and surrounding townships was performed April 18, 2023. Records indicate that formations overlying the proposed injection zone provide useable fresh water at depths up to 450 ft. for domestic use and 3,378 ft. for livestock, and there are no public water supply wells in this area. Surficial deposits of alluvium and colluvium in the area may be USDWs, and the Wind River Formation, which is present at ground surface at the Marlin well, is a known USDW. The Shotgun Member of the Fort Union Formation, lower Fort Union Formation, Lance Formation, Cody Shale, Nugget Formation, Tensleep Formation, and Flathead Sandstone have been found to be USDWs. Water-quality data available through the Wyoming State Geological Survey's online Groundwater Atlas of Wyoming indicate the Phosphoria Formation may have a TDS concentration less than 10,000 mg/L, indicating it also may be a USDW.

[6] Tetra Tech Sampling Report 2015, Section 2.0.

INJECTATE INFORMATION

Injectate would consist of fluids produced primarily from the lower Fort Union and Lance Formations by oil and gas production wells owned by Aethon in the area. The produced water will contain native formation fluid, hydraulic fracturing flow-back fluids from each of the newly constructed wells and any pre-existing wells that undergo re-stimulation, and chemicals used in maintenance and oil recovery treatment processes. The chemical composition of the untreated produced water was disclosed for the Moneta Divide Project and contains toxic constituents and multiple chemical contaminants that exceed MCLs for drinking water. Produced water generated in the project area will be a complex mixture, containing known chemicals, as well as naturally occurring formation constituents, and unknown constituents. These constituents include fluoride, barium, copper, lead, benzene, ethyl benzene, toluene, and xylene. It should also be noted that the produced water contained boron in extremely high concentrations. *Climate, Environmental Justice and Tribal Interest Analysis* (*Analysis) at 6.* Produced water samples indicate TDS concentrations ranging from 907 to 18,273 mg/L with an average of 8,037 mg/L. Based on a formation permeability of 3.5 md, the most likely average injection rate would be about 4,500 barrels of water per day (BWPD). If the permeability is at the highest evaluated value of 17 md, the maximum expected injection rate would be 9,900 BWPD.

BASES FOR DECISION

Aethon, through WOGCC and the process at 40 CFR § 144.7, requests an aquifer exemption pursuant to the regulations at 40 CFR § 146.4(a) and (b)(2). This regulation provides the EPA with discretion to approve an aquifer exemption where the aquifer meets the following criteria:

> **40 CFR § 146.4(a):** *It does not currently serve as a source of drinking water; and*
>
> **40 CFR § 146.4(b):** *It cannot now and will not in the future serve as a source of drinking water because: …* **(2)** *It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical.*

I. The EPA Denies the Aquifer Exemption Request Because It Does Not Meet the Regulatory Criteria Under 40 CFR § 146.4(b)(2)

40 CFR § 146.4(a) *It does not currently serve as a source of drinking water*

The Amsden and Madison Formations do not currently serve as a source of drinking water for the area in the proposed aquifer exemption. Records on file with WYSEO indicate no drinking-water wells appear to utilize these formations within the nine-township area surrounding the Marlin 29-21 WDW well, and there are no public water-supply wells within this area. The deepest domestic well and the deepest

stock well in this area extend about 450 ft. and 3,378 ft., respectively, below ground surface, whereas the top of the Amsden Formation is about 14,795 ft. deep at the subject well.

40 CFR § 146.4(b) *It cannot now and will not in the future serve as a source of drinking water because …* ***(2)*** *It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical.*

Based on review of information in the administrative record, the EPA cannot conclude that the Amsden and Madison Formations cannot now and will not in the future serve as a source of drinking water due to the impracticability of recovery. The intent of the Safe Drinking Water Act is to protect underground sources of drinking water, not only currently used sources, but also potential drinking water sources for the future. For the reasons set out below, the EPA finds that the Madison and Amsden Formations are USDWs that should continue to be protected from endangerment due to their potential to serve as sources of drinking water, either now or in the future.

Water quality samples of the Madison Formation water at this location indicate that the water quality is good.

The Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) program is a "preventative program" intended to ensure that drinking water sources, both current and future, are not rendered unfit for use by underground injection of contaminants. House Report 93-1185, 1974 USCCAN 6454, 6480. In a 1984 UIC rulemaking, the EPA explained that "[b]oth the statute and the minimum requirements dictate that the UIC program, whether administered by the EPA or the States, be a preventative one. The approach recognizes that both economically and technologically, *it is easier to prevent an USDW from being contaminated than it is to restore a USDW once contaminated*. Moreover, a preventative program serves to protect human health, the primary aim of the Safe Drinking Water Act." 49 Fed. Reg. 20138, 20152 (May 11, 1984) (Emphasis added). Also, the EPA expressed a preference for protecting USDWs that are not already contaminated. ("For new facilities, the injection zone may not yet be contaminated, which diminishes slightly the argument that the water could never be used.") Id. at 20142.

As indicated above, the Madison aquifer at this site has a TDS concentration between 910 and 1,200 mg/L. Not only is that far below the 10,000 mg/L threshold to qualify as an underground source of drinking water protected by the SDWA, it is within the range of TDS concentrations that can be consumed with little or no treatment. For reference, the EPA has a secondary MCL of 500 mg/L. A secondary MCL is not a health-based standard but is set for aesthetic considerations such as taste, color, and odor. While the TDS concentration in the Madison aquifer is greater than this standard, it is not uncommon for communities to have source water levels above 500 mg/L.[7] Furthermore, waters

[7] See e.g., https://www.phoenix.gov/waterservices/projects/central-az-salinity-study

with greater TDS are allowed to be used for domestic purposes in other states, such as Utah.[8] Generally, water with less than 1,000 mg/L TDS is considered fresh water and can be consumed with little or no treatment.[9]

While treatment technology exists to treat highly saline water,[10] generally, the lower the TDS, the lower the cost to treat the water for salinity for drinking water purposes[11] and the less wastewater to manage for disposal. Therefore, it is important to protect water with lower TDS for drinking water purposes. In fact, the record indicates that the Madison's low TDS at this site has long been of significant interest with regard to previous attempts to exempt the aquifer from protection for this project. In 2012, WOGCC's aquifer exemption approval was conditioned upon the TDS concentration being over 5,000 mg/L, so injection into the Madison aquifer at the Marlin 29-21 site was not approved, and thus the AE request was not submitted to the EPA. In 2019, WOGCC denied Aethon's aquifer exemption request which was submitted under the criterion that the aquifer is situated at a depth or location that makes recovery of fresh and potable water economically or technologically impractical.[12] The record does not expressly state why WOGCC changed its position in 2022.

The record reflects that no additional water quality data has been gathered since 2014. The EPA finds nothing in the record to suggest there was any information countering or otherwise directly addressing the concerns in the record about the low TDS and overall good water quality.

In addition, the Madison aquifer at this site does not contain levels of other natural contaminants that would lead the EPA to conclude that there are other concerns with the water quality of the USDW. As described above, water samples taken at this site exhibit low concentrations of TDS and individual constituents, which indicates groundwater in the Madison can be treated to acceptable drinking water levels by standard treatment methods. While benzene was initially identified as a potential contaminant of concern, subsequent water samples indicate benzene concentrations decreased to levels near or below its MCL. *WOGCC aquifer exemption submission package to the EPA* (July 28, 2020)[13] (*WOGCC AE Submission*)*, Appendix A*, at 99–124. As explained above, based upon the decreasing benzene and other constituents over time, the EPA concludes that it is likely that benzene and other contaminants tested during the July through August 2012 timeframe were influenced by the drilling fluids rather than being

https://www.tceq.texas.gov/agency/subjects-of-interest/water/desalination-for-public-water-systems
https://www.waterboards.ca.gov/water_issues/programs/gama/docs/coc_salinity.pdf

[8] https://deq.utah.gov/drinking-water/utah-drinking-water-standards

[9] See e.g., USGS Quality of Groundwater webpage. https://pubs.usgs.gov/gip/gw/quality.html. (Visited 1/25/2024)

[10] For example, there are many water desalination plants around the globe. California currently has 12 desalination plants, treating seawater for use as drinking water.
https://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/docs/170105_desal_map_existing.pdf

[11] See e.g., Advisian, The Cost of Desalination.

[12] WOGCC Docket No. 3-2013, Order No. 3, Findings of Fact 12. (May 14, 2019).

[13] WOGCC aquifer exemption submission package to the EPA (July 28, 2020), which includes Aethon's AE application, WOGCC's Report of the Examiners and hearing transcript for Docket 1711-2020, public comments, and supplemental information. Page references refer to the page number of the PDF document that Wyoming submitted to the EPA.

naturally occurring. Regardless, the relatively low concentrations of TDS and other constituents can be treated to acceptable drinking water levels by standard treatment methods.[14] If this aquifer exemption were to be approved for the disposal of produced water, this action will render the aquifer in this project area unusable for human consumption and agriculture.

The record does not support a finding that the Madison and Amsden USDWs cannot now and will not serve as a source of drinking water in the future.

The record does not support a finding that the Madison and Amsden aquifers "cannot now" serve as a source of drinking water. The discussion in the following section includes examples of current use of the Madison aquifer in other locations throughout Wyoming and an example from Wyoming of an existing system (Gillette) that developed a Madison water supply at a greater cost than the estimated cost to develop a water system at the existing Marlin site (*see page 11 below*).

The record also includes the following current uses of the Madison aquifer throughout Wyoming, which further diminishes the argument that the Madison aquifer at this site "cannot now" be used as a source of drinking water. The Madison currently supplies drinking water to Worland, Gillette, Buffalo, Greybull, Hulett, Glenrock, Douglas, Newcastle, Sundance, Basin/Manderson, Ten Sleep, Hyattville, Moorcroft, Pine Haven, Kaycee, Afton and most towns in the southern Bighorn Basin.[15] Some of these water supply systems are being expanded to supply drinking water to surrounding rural areas. The Big Horn Regional Joint Powers Board (BHRJPB) provides rural domestic water through a regional system that serves six municipalities and rural water districts in the Big Horn Basin of Wyoming. This large regional water system supplies water to 15 consecutive public water supplies in Big Horn, Washakie, and Hot Springs Counties. The service area covers 800 square miles transmitting Madison Formation groundwater from 8 wells through 100 miles of water transmission pipelines. *Wyoming Water Development Commission Legislative Report (2023) at 47; J Rosenlund, The Big Horn Well Connection Project: Unique Challenges of a Cross-Country Pipeline in Wyoming (2016).* The Madison aquifer also supplies large quantities of groundwater to many ranching operations and rural residents in the Power River Basin and the Black Hills of eastern Wyoming.

While the record reflects that nearby communities currently have adequate sources of drinking water, it also identifies potential threats to current sources of drinking water, which are explained below. These potential threats are relevant to the EPA's assessment of the possibility for USDWs, including the Madison and Amsden aquifers, to be needed as drinking water sources in the future. As noted above in the discussion on water quality, it is preferable to protect USDWs such as the Madison and Amsden that are not already contaminated. At the site of the Marlin 29-21 well, the Madison has among the lowest

[14] U.S. ENV'T PROT. AGENCY, Overview of Drinking Water Treatment Technologies, https://www.epa.gov/sdwa/overview-drinking-water-treatment-technologies (last updated Apr. 13, 2023).
[15] K. Boyce, *The Madison Formation Aquifer*, Wyoming Water Well Contractor's Newsletter (September 2017), http://wwcb.state.wy.us/PDF/Newsletter/September2017NewsLetter.pdf. See also, Wyoming Water Development Commission Legislative Report (2023).

TDS of any of the alternate USDW sources identified as having high or moderate development potential for use as a source of drinking water in the Wind River and Bighorn River Basins (*Analysis at 41)*, with a low TDS concentration and only very slight MCL exceedances for fluoride and benzene.

Current climate conditions and climate change projections in the Wind River Basin informed the EPA's assessment of the potential that the groundwater in the portion of the Madison aquifer requested for exemption may be accessed in the future as a source of drinking water. The NOAA State Climate Summary 2022 for Wyoming indicates a progressive warming trend observed in all seasons with overall temperatures having risen approximately 2.5°F since the beginning of the 20th century. As described in the *Analysis*, Wyoming, like the rest of the Great Plains, is susceptible to droughts, which are occasionally severe. Climate change is projected to intensify this climate trend towards warming in the Wind River Basin. Climate model projection scenarios indicate that the Wyoming climate will grow increasingly warmer in the next two to three decades and temperatures will rise steadily towards the middle of the century. In the Wind River Basin, the number of hot days with temperatures greater than or equal to 95^{o}F is projected to increase, while the number of cold days with temperatures less than or equal to 32^{o}F is projected to decrease. Critical snowpack duration will be shorter, causing snowmelt to occur earlier in the spring season and glacial mass to decline. This overall warming trend will likely jeopardize the late season surface water flows and increase dependency on groundwater in the Wind River Basin.

Climate conditions and projected climate change impacts in the Wind River Basin and throughout the state and region generally indicate a trend toward drier conditions, increasing pressures on surface and groundwater resources. Climate conditions, increasing water demands for agricultural, energy development, and domestic purposes, continuing impacts to surface and groundwater quality and quantity, population growth projections, and climate change projections may further drive the need to access high quality deep groundwater sources in the future, such as the Madison aquifer at the Marlin 29-21 location.

In the *Analysis*, the EPA discusses the vulnerabilities to both surface and groundwater as a result of climate change in the Wind River Basin. Section 4.4.1 describes that projected temperature increases will impact surface water resources in various ways, including by increasing reservoir evaporation rates, and inducing earlier snow melt and glacial recession. These projected impacts may lead to increased future reliance on groundwater resources especially during the summer and early agricultural fall growing season. Section 4.4.2 explains that the Wind River and Quaternary aquifers are the most heavily used sources of groundwater in the Wind River Basin. The Section notes that these aquifers are vulnerable to impacts from climate change and surface contamination, can be unreliable, may not have sustainable quantities of water in the future, and may require treatment technologies that can be expensive. Therefore, communities in the Wind River Basin may need to rely on other sources of water in the future. Consistent with this conclusion, the Northern Arapaho Tribe submitted written comments noting that preservation of groundwater quality on the Wind River Indian Reservation (WRIR) and in surrounding areas is critical to the Tribe's ability to permanently remain on the Reservation. The Tribe

foresees increasing reliance on groundwater for drinking water purposes and anticipates the need to rely on deeper aquifers, such as the Madison aquifer, as the climate changes and water resources grow scarcer. Furthermore, the Tribe stated that it intends to use the Madison aquifer in the future for drinking water. The record supports the conclusion that the Madison and Amsden aquifers can serve as a source of drinking water for these communities in the future.

Consideration of the depth and location of the Madison aquifer at this site does not lead to a conclusion that water is economically or technically impractical to recover.

The technological and economic practicality of utilizing aquifers for drinking water purposes has advanced significantly since the aquifer exemption regulations were promulgated in the 1980s. The technology currently exists to drill and construct wells at the depth and location of the Marlin well at approximately 15,000 feet, as evidenced by the existing well that was drilled November 30, 2011 through May 30, 2012 and the proliferation of other wells drilled to similar depths. For example, as of 1998, over 20,000 wells deeper than 15,000 feet had been drilled for oil and gas production and many thousands more have been drilled since. *Dyman and Kuuskraa, 2001*. The EPA is not aware of any technical limitation to drilling at this depth or location for either production or drinking water purposes. Furthermore, electrical submersible pumps are routinely used in the oil and gas industry to produce fluids at depths at approximately 15,000 feet. *Takacs*, *2018*.

While the Madison at this location is very deep, it is not economically impractical to use it as a source of drinking water. Although deeper wells generally have a higher cost to drill, construct, and extract water, it is not unusual for communities to invest large amounts to ensure safe drinking water when it is needed. The municipal drinking water for the City of Gillette, WY is an example of this. The EPA estimates that the initial construction of the Madison wells and transport pipeline to the City of Gillette cost $265,120,358: $190,120,358 appropriated by the Wyoming legislature and $75,000,000 of matching funds contributed from Campbell County.[16] In addition, the Wyoming Legislature has appropriated $9,092,000 for extensions to the system to connect additional communities. *Wyoming Water Development Commission Legislative Report (2023) at 76-80.*

The cost to drill the Marlin well 29-21 in 2011/2012 was approximately $9.2 million. *WOGCC AE Submission, at 340; hearing Exhibit E-9.* Information in the record on potential costs to develop drinking water at the Marlin 29-21 well include: a 2013 letter from Wyoming Department of Environmental Quality (WDEQ)[17], an Aethon cost estimate (*WOGCC AE Submission at 131-133*), and an independent economic report (*Raucher & Raucher, 2021*). The 2013 letter from WDEQ compared the costs to

[16] *Wyoming Water Development Commission Legislative Report (2023), https://wwdc.state.wy.us/legreport/2022/2022Rept.html at 76; City of Gillette https://www.gillettewy.gov/home/showpublisheddocument/39509/636682836480370000 at 8.*

[17] Wyoming Department of Environmental Quality (WDEQ) letter to WOGCC re *Encana Oil & Gas (USA) Inc., Docket #: 3-2013; Fremont County, Wyoming (Marlin 29-21 WDW; Madison Fm), and, Encana Oil & Gas (USA) Inc.; Docket #: 438-2011; Fremont County, Wyoming (Marlin 29-21 WDW; Madison, Tensleep & Nugget Fms)* (Feb. 11, 2013).

develop and transmit water from the Madison aquifer to the City of Gillette to the estimated cost to develop and transmit water from Madison aquifer in the vicinity of the Marlin 29-21 and concluded that the cost to develop and transmit water from the Marlin 29-21 well would be approximately $169,000,000. This is less expensive than the initial construction costs of $265,120,358 for Gillette's system. Aethon's application includes a cost estimate for shallow water supply, a cost estimate for deep water supply, identification of, and estimates of treatment and transportation expenses to supply water to, nearby population centers. *WOGCC AE Submission, Appendix B at 130*. The EPA also considered a report prepared by Raucher LLC. This report includes information countering the conclusion of Aethon's application and presents expanded analysis to demonstrate that the Madison aquifer at this location is an economically viable and practical future source of drinking water. Raucher & Raucher, 2021 at 6-8. The Raucher report is the only document that analyzed future costs.

The record does not demonstrate that it is economically impractical to recover water at the Marlin 29-21 well. While there can be greater costs to develop deep USDWs as drinking water supplies, the record demonstrates that communities will spend significant amounts for high quality drinking water. As described below, future considerations such as domestic and industrial water needs, population growth, energy development, and ongoing impacts to surface and groundwater including increasing pressures on water resources due to climate change impacts, are projected to further drive economic efficiencies and advancements in deep drilling technologies.

While the technology to drill to the depth of the Madison aquifer already exists, as demonstrated by the Marlin 29-21 well, it is also reasonable to expect further technological advancements as demonstrated by trends in the energy production industry, that could make the water in the Madison aquifer even more economically practicable to recover in the future. For example, drilling technologies have advanced significantly in the past decades, and it is reasonable to project that they will continue to advance to address the growing need for groundwater resources as they already have for other demands, including production of oil and gas for increasing energy needs, carbon sequestration, and geothermal energy. *Teodoriu and Bello, 2021*. Similar to other scenarios where technological advancements drive costs down, it is reasonable to project that deep drilling costs may decrease in the future as energy production and drinking water needs increase. *Tianshou Ma et al, 2016*. The global energy demand has driven significant research and advancement of drilling technologies, and this is especially true in the deep subsurface. *Epelle and Gerogiorgis, 2019*. These advancements include optimization of drilling programs driven by real-time monitoring, control and automation, and application of artificial intelligence to improve drilling practices. Furthermore, there have been improvements to drilling fluids that have resulted in greater wellbore stability, improved cooling, and reduced friction as well as significant improvements in the software used for drilling operations. These advancements have led to significantly faster drilling rates and lower costs. *Id. Sections 2-6*. The industry has also identified opportunities for continued improvements that will further drive costs down. These projected opportunities include improvements to cementing and completion operations, continued improvement to downhole monitoring, and expanded use of artificial intelligence and real-time data to facilitate automation of drilling operations. *Id. Section 7*. In addition to technological improvements, the

costs of drilling dropped as a result of reduced drilling and completion times and increased well performance. The most recent analysis prepared by the U.S. Energy Information Association indicates that onshore oil and gas well completion costs had fallen by 7-22% in 2016 relative to 2014. The analysis also shows that even though overall costs have increased, the drilling costs per foot have decreased from 2012 highs. *U.S. Energy Information Administration, 2016*. Even if drilling costs were to remain at present-day levels, it is reasonable to project that both societal needs and the economic value of high-quality groundwater resources will increase in the future given overall population growth, ongoing impacts to surface and groundwater, and climate change impacts. The high quality of water at the Marlin 29-21 site makes it a more viable resource for future economic investment. Therefore, the EPA concludes that it is technologically and economically feasible and practical to drill to depth to recover high-quality water for surrounding communities from the location of the Marlin 29-21.

The location of the Marlin well is in proximity to communities that can practically be reached by pipelines. Generally, the farther a community is from the location of a well site, the more expensive it will be to construct and maintain water pipelines to reach that community. Nevertheless, it is technologically and economically practical to transport water from the Marlin well location to surrounding communities. Again, the City of Gillette example is relevant. This project provides water regionally to the City of Gillette and to approximately forty-three districts in Campbell County. The water system is supplied with groundwater from 28 wells completed into the Madison Limestone, Fox Hills Sandstone, and Fort Union Formation. *Wyoming Water Development Commission, Active Project Reports, in 2023 Legislative Report (2023) at 76-80; see also City of Gillette Water Division, 2022 Consumer Confidence Report for Annual Drinking Water Quality (2022).* The Madison Formation Well Field includes five initial wells capable of producing 1,400 gallons per minute (GPM) each and 12 new wells that can be developed as water demands increase. The transmission system includes approximately 50 miles of transmission pipeline ranging in size from 36-inch to 42-inch diameter intended to serve a population of 57,562 for the Gillette Regional Area and provide an additional 16,000-gpm (23 MGD) to the regional water system. *Wyoming Water Development Commission, Active Project Reports, in 2023 Legislative Report (2023) at 77.* While the Madison aquifer occurs at a shallower depth at the location where the Gillette project draws water than it is in the vicinity of the Marlin well, the Gillette example demonstrates the technological and economic feasibility and practicality of transporting water by pipeline to communities many miles from the well site.

The EPA expects that the economic practicality of accessing the high-quality Madison aquifer at this location will only increase over time. As detailed above in the discussion on future use and climate change, both current sources of surface water and groundwater supplies are vulnerable to effects from climate change, disrupting their reliability and availability. This means that high quality USDWs not currently being accessed may be necessary for use as drinking water in the future. Climate conditions, increasing water demands for agricultural, energy development, and domestic purposes, continuing impacts to surface and ground water quality and quantity, population growth, and climate change may further drive technological advancements and economically viable methods to access high quality deep groundwater sources in the future, such as the Madison aquifer at the Marlin 29-21 location.

Conclusion

The EPA denies the request to exempt the portion of the Madison aquifer that underlies the Marlin 29-21 well from SDWA protection because the circumstances of this request do not support a finding under 40 CFR § 146.4(b)(2) that the aquifer cannot now and will not in the future serve as a source of drinking water because it is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical.

II. The EPA Denies the Aquifer Exemption Request Based on its Regulatory Discretionary Authority

Aquifer exemption approvals are expressly discretionary under the EPA's regulations and authorize the EPA to consider factors related to the purposes of the SDWA to protect potential sources of drinking water. This discretion and the factors discussed below provide further support and an additional basis for the EPA's denial of the Marlin 29-21 aquifer exemption request.

Final aquifer exemption decisions are made by the EPA even where States or Tribes have UIC primacy, and the EPA maintains discretion to deny an AE request to further the purposes of the SDWA to protect potential sources of drinking water. The SDWA does not include an aquifer exemption provision. The statute directs the EPA to promulgate regulations to prevent underground injection from endangering drinking water sources. 42 USC § 300h. Pursuant to this directive, the EPA established a regulatory framework to protect aquifers that qualify as underground sources of drinking water (USDWs), including aquifers with TDS of less than 10,000 mg/L. The EPA also established an aquifer exemption process by regulation and in doing so, reserved its discretion, stating that an aquifer or a portion thereof that meets the criteria of USDW *may* be determined to be an exempted aquifer if it meets the criteria in 40 CFR § 146.4: "An aquifer of a portion thereof which meets the criteria for an 'underground source of drinking water' in § 146.3 may be determined under § 144.7 of this chapter to be an 'exempted aquifer' for Class I-V wells if it meets the criteria in paragraphs (a) through (c) of this section." The use of the word "may" rather than "shall" expressly reserves Agency discretion in its decision.

The 1984 preamble to amendments to the EPA's regulations set forth the Agency's interpretation of the aquifer exemption regulations affirming the Agency's discretion:

> If an aquifer is not currently being used for drinking water, and meets one of the specified criteria, EPA may exempt the aquifer. **The use of the word "may" reserves to the Agency the discretion to decline to exempt an aquifer, even if it meets one of the criteria, if the Agency believes that other considerations warrant maintaining the USDW classification.**
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> 49 Fed. Reg. 20137, 20142 (May 11, 1984) (emphasis provided).

The SDWA is intended to protect all potential underground sources of drinking water from contamination. The EPA promulgated an aquifer exemption process because the EPA chose a broad

definition of USDW and recognized that the definition would encompass some aquifers that are "contaminated, inaccessible, or otherwise unsuitable or unlikely to be used as drinking water." *Id.* at 20141. As explained in EPA regulations, exempted aquifers are "those which would otherwise qualify as 'underground sources of drinking water' to be protected, but which have no real potential to be used as drinking water sources." 40 C.F.R. 144.1(g).

Water Quality

The high quality of the aquifer at this location is a significant factor in EPA's considerations as discussed above. The Madison aquifer at the Marlin 29-21 location is in sharp contrast to the unsuitable waters the EPA envisioned would qualify for exemption under the UIC regulations. It not only falls within the protected class as a USDW, but given its high quality, could be a valuable source of drinking water in the future in parts of Wyoming and Indian country where it is not already used as a current source of drinking water. While the aquifer at the depth of the Marlin 29-21 may present additional challenges compared to shallower locations, the low TDS and relative high quality of the formation water is a fundamental consideration that warrants maintaining the USDW classification.

Importance of the Madison Aquifer as a Regional Source of Drinking Water

The administrative record for this action reflects that the Madison is currently widely used as a source of drinking water throughout the region. The Madison Formation aquifer is an important source of drinking water in Wyoming and is potentially one of the two most productive water-yielding geologic units on the WRIR. *Daddow, 1996*. For more than 25 years, the Wyoming Water Development Commission (WWDC) has funded exploration and development of the Madison aquifer. More recently the WWDC has drilled one to two Madison wells per year to supply municipalities. Madison groundwater is a favored drinking water source because of high yield potential, minimal treatment requirements (disinfection only), and much of the total aquifer reservoir is not yet appropriated. Development of the Madison Formation aquifer is expected to expand as demands for groundwater increase. Drier conditions and surface water impacts will further drive the need for groundwater resources such as the Madison aquifer that are not directly impacted by climate change, surface contamination, and drought conditions. As discussed in more detail above, the Madison currently supplies drinking water to Worland, Gillette, Buffalo, Greybull, Hulett, Glenrock, Douglas, Newcastle, Sundance, Basin/Manderson, Ten Sleep, Hyattville, Moorcroft, Pine Haven, Kaycee, Afton and most towns in the eastern Bighorn Basin. Some of these water supply systems are being expanded to supply drinking water to surrounding rural areas. *Boyce, 2017*; *see also Wyoming Water Development Commission Legislative Report (2023).*

At the site of the Marlin 29-21 well, the Madison has among the lowest TDS of any of the alternate USDW sources. *Analysis at* 41. Should current sources of drinking water become contaminated, unreliable, or otherwise unavailable, the Madison aquifer has among the highest quality water of the alternate USDWs that could potentially serve these nearby communities, with a low TDS concentration

and only very slight MCL exceedances for fluoride and benzene. The Bureau of Land Management's (BLM) record of decision for the Moneta Divide Natural Gas and Oil Development Project area indicates a plan to drill 4,250 production wells and up to 160 Class II injection wells. *Analysis at 79*. The Moneta Divide project is predicted to yield a high volume of produced water, up to 1.4 million bbls or 58 million gallons per day at full-field development. *Id*. The EPA Region 8 submitted comments during the BLM National Environmental Policy Act (NEPA) process raising concerns about, among other things, the exceptionally high volume of produced water. The EPA noted that the 160 UIC disposal wells would likely involve injection into underground sources of drinking water, requiring an unprecedented number of aquifer exemptions for a single project. *Id*. A project of this scale with the potential for dozens of Class II UIC disposal wells would likely have a major impact on a high quality USDW like the Madison aquifer. Given the importance of the Madison aquifer as a good quality regional source of drinking water, the EPA finds this potential cumulative impact is another compelling reason to continue to protect the Madison and Amsden aquifers at this location.

Climate Change Considerations

Current climate conditions and climate change projections lend further support to the EPA's decision to maintain SDWA protections for this important aquifer, due to the increased likelihood that the water will be needed in the future. Climate conditions in Wyoming and in the Wind River Basin indicate a progressive warming trend observed in all seasons with overall temperatures having risen approximately 2.5°F since the beginning of the 20th century. Wyoming, like the rest of the Great Plains, is susceptible to droughts, which are occasionally severe, as recently experienced on the WRIR. Climate change is projected to intensify this climate trend towards warming in the Wind River Basin. Climate model projection scenarios indicate that the Wyoming climate will grow increasingly warmer over the next two to three decades and temperatures will rise steadily towards the middle of the century. *Analysis Section 4*.

Section 4.4.1 of the *Analysis* documents how this increase in temperature will impact surface water resources, including increasing reservoir evaporation rates and decreasing duration of critical snowpack, causing snowmelt to occur earlier in the spring season and glacial mass to decline. The intensity of future droughts is projected to escalate, even if precipitation amounts increase, due to corresponding accelerated evaporation rates from rising temperatures. This overall warming trend will jeopardize the late season surface water flows and increase dependency on groundwater in the Wind River Basin. Section 4.4.2, explains that the Wind River aquifer is vulnerable to impacts from climate change and surface contamination, can be unreliable, may not have significant quantities of water in the future, and requires treatment technologies that can be expensive. Therefore, these communities may need to rely on other sources of water in the future.

Climate conditions, climate change projections, vulnerability of water resources, and population trends in the Wind River Basin, as described Section 4 of the *Analysis*, indicate increasing pressures on surface and groundwater resources. These factors, in conjunction with the high quality of the groundwater in

the Madison and Amsden USDWs at the Marlin 29-21 well site, support maintaining the existing SDWA protections that apply to the aquifers consistent with Congressional intent to protect both current and potential future sources of drinking water.

Tribal Interest Considerations

Consistent with the unique trust relationship between the federal government and federally recognized Indian tribes, the EPA consulted with, and considered input from, the Northern Arapaho Tribe and the Eastern Shoshone Tribe of the WRIR in making this aquifer exemption decision. Both Tribes oppose the request to exempt the Madison aquifer at the Marlin 29-21 well site from SDWA protections. The concerns raised by the Tribes during consultation discussions and elaborated upon by the Northern Arapaho Tribe in a subsequent letter include: the current and increasing use of the Madison aquifer in the region; the high quality of the groundwater in the Madison aquifer at the Marlin 29-21 site; their respective historic ties to the land and water in the areas throughout the region surrounding the present-day Reservation; Tribal cultural and spiritual interests in protecting water resources; historic and ongoing disproportionate impacts experienced by the Tribes and Tribal members, including with respect to water resources; protection of cultural resources in the Moneta Divide project area and cumulative impacts from the project; climate change impacts and related pressures on water resources; and the Tribes' growing population bases and interest in potentially utilizing groundwater resources outside the WRIR in the future, including at the Marlin 29-21 location. *Analysis* Section 5.2. As described by the Tribes, preservation of groundwater quality on the WRIR and in surrounding areas is critical to their ability to permanently remain on the Reservation. The Tribes foresee increasing reliance on groundwater for drinking water purposes and anticipate that as the climate changes and water resources grow scarcer, there will be a need to drill into deeper aquifers such as the Madison Aquifer. *Id.* The Northern Arapaho Tribe stated that it intends to use the Madison Aquifer in the future for drinking water. *Id*. The EPA also recognizes that preserving potential sources of domestic water supply outside the WRIR may alleviate pressures from off-Reservation sources to utilize on-Reservation water resources such as the Big Wind River.

The EPA recognizes that Indigenous Peoples can experience unique and disproportionate impacts from drought and climate change in part due to their historical and present-day natural resource-based livelihoods and deep cultural and spiritual connections to land and water resources. *Analysis* Section 5.2. Indigenous Peoples can be more vulnerable to health-related climate change impacts than the general population due to higher rates of certain medical conditions placing individuals at increased risk for illness and injury as the climate changes. The EPA also recognizes that long-standing water challenges in Indian country are negatively impacting Indian Tribes, as Tribal communities are more likely than other populations in the United States to lack access to wastewater services and piped drinking water.[18] Section 5 of the *Analysis* describes cumulative impacts to water resources on and

[18] U.S. ENV'T PROT. AGENCY, EPA-823-F-21-003, Strengthening the Nation-To-Nation Relationship with Tribes to Secures a Sustainable Water Future (2021). https://www.epa.gov/system/files/documents/2021-10/2021-ow-tribal-action-plan_508_0.pdf.

around the WRIR disproportionately and adversely affecting the Tribes and communities and contributing to their concerns about the aquifer exemption request.

The Northern Arapaho Tribe and the Eastern Shoshone Tribe hold unique perspectives given their respective historic ties to the land and water resources in the area, their long-term interests as sovereign nations in safeguarding high quality water resources as critical to enabling future generations to permanently persist on the Reservation, and their cultural and spiritual ties to water. The Tribes and Tribal members experience ongoing and historic inequities and disproportionate health and environmental burdens, including cumulative impacts to water resources. Removing the existing statutory and regulatory protections for a potential source of high-quality drinking water for these overburdened communities would further exacerbate existing inequities particularly with respect to adverse and cumulative impacts to water resources and community health. Thus, Tribal interest considerations which also raise EJ and equity considerations, in conjunction with the high quality of the groundwater in the Madison and Amsden USDWs at the Marlin 29-21 well site, support maintaining the existing SDWA protections that apply to the aquifers consistent with Congressional intent to protect both current and potential future sources of drinking water.

Equity and Environmental Justice Considerations

Equity and environmental justice considerations also support the EPA's decision to deny the aquifer exemption request. As discussed in Section 5 of the *Analysis*, the EPA recognizes that communities with equity and environmental justice concerns exist in all areas of the country, including in urban and rural areas and areas within the boundaries of Tribal Nations and U.S. Territories. Addressing inequities in these areas are important considerations in the EPA's evaluation. Communities with environmental justice concerns experience disproportionate and adverse human health or environmental burdens arising from a number of causes, including inequitable access to clean water and underinvestment in basic infrastructure and services, including safe drinking water. Climate conditions and climate change exacerbate disproportionate impacts already being experienced in overburdened communities as those who are already vulnerable due to a range of social, health, economic, historical and political factors often have a lower capacity to prepare for, cope with, and recover from climate change impacts.

The Marlin 29-21 site is in proximity to surrounding communities experiencing disproportionate health and environmental burdens. Section 5 of the *Analysis* identifies equity and environmental justice concerns in Fremont County and on the WRIR, where many of the environmental, socioeconomic, and health indicators are elevated compared to state and national averages. Fremont County is ranked the most heavily burdened county in the state with regard to the "health outcomes" and "health factors" according to the University of Wisconsin Population Health Institute's County Health Rankings & Roadmaps. Equity concerns are heightened in rural areas where people more often reside in underserved communities, including those with drinking water infrastructure challenges and greater reliance on groundwater sources. *Analysis* at 61-62. The disproportionate impacts experienced in

Fremont County are exacerbated on the WRIR where Indigenous Peoples experience historic inequities and disproportionate health and environmental burdens, including cumulative impacts to surface and groundwater. The existing socioeconomic and health vulnerabilities in these communities make them even more susceptible to adverse impacts from climate change including impacts to health and to existing and future water resources. *Id.* Cumulative impacts from the broader Moneta Divide project, including water and air impacts, may further exacerbate these existing disproportionate environmental and health burdens in Fremont County and on the WRIR. The EPA considered the additional challenges these communities face with respect to drinking water infrastructure, impacts to water resources, and the manner in which climate change impacts are and will continue to be exacerbated in these communities. Rural communities and communities with EJ concerns often experience historic inequities, systemic barriers, and disproportionate environmental and health impacts, including with respect to drinking water challenges. Congress has recognized these challenges by enacting legislation to provide additional drinking water infrastructure support to small, underserved, and disadvantaged communities. *Analysis at 60*.

Removing the existing statutory and regulatory protections for a potential source of high-quality drinking water for the rural and overburdened communities in Fremont County and on the WRIR would further exacerbate existing inequities particularly with respect to historic and ongoing adverse and cumulative impacts to water resources and community health. Thus, equity and environmental justice considerations, which include Tribal interest considerations, support maintaining the existing SDWA protections that apply to the aquifers consistent with Congressional intent to protect both current and potential future sources of drinking water.

Public Comments

The submission from WOGCC included comments from 111 separate commenters, public hearing transcripts and the State's response to comments, which are included in the administrative record for the EPA's aquifer exemption decision. The EPA considered these records and comments from the public submitted directly to the EPA in reaching this aquifer exemption decision.

The public comments uniformly oppose approval of an exemption that would allow Aethon to inject oil and gas produced water contaminants into the Madison aquifer. Commenters emphasize the good water quality at the Madison well injection site; the current and potential future viability of the Madison aquifer as a source of drinking water for individuals and communities in the Wind River and Big Horn Basins; potential impacts related to injection of oil and gas wastewater; technological advancements improving the performance and costs of developing and delivering deep groundwater resources; concerns about WOGCC's departure from its previous denials of aquifer exemption requests at this site in 2015 and 2016; concerns with exempting the aquifer from protection in light of climate and climate change concerns; and interests of Indigenous Peoples and the Tribal governments on the WRIR.

Conclusion

These considerations inform EPA's decision to exercise its regulatory discretion to maintain the existing SDWA protections for the Madison and Amsden aquifers at the Marlin 29-21 well. The aquifers at this location are valuable as a potential future source of drinking water for the surrounding communities due to their high quality, the Madison aquifer's importance as a source of drinking water throughout the region, current climate conditions and climate change projections, Tribal interests, and equity and environmental justice considerations.

CONCLUSION AND DECISION

In conclusion, the EPA denies the request to exempt the portion of the Madison and Amsden aquifers that underly the Marlin 29-21 well from SDWA protection. Given the high quality of the aquifers, continued protection of the Madison and Amsden USDWs adheres to Congress' intent to protect both current and potential future drinking water sources. The record before the EPA does not support a finding under 40 CFR § 146.4(b)(2) that the aquifers cannot now and will not in the future serve as a source of drinking water because it is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical. The discretionary nature of the approval of an aquifer exemption, and the factors the EPA accordingly considered, further support and provide an additional basis for the EPA's decision to deny the Marlin 29-21 aquifer exemption request and maintain the statutory and regulatory protections that apply to this underground source of drinking water as a potential future source of drinking water.

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