United States Department of the Interior
Office of Surface Mining Reclamation and Enforcement

Environmental Assessment
Antelope Mine
Converse County, Wyoming
Mining Plan for
Federal Coal Lease WYW-177903

August 2025

Prepared by:
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OSMRE has considered the potential environmental impacts of this proposed action in compliance with the National Environmental Policy Act (NEPA), and this environmental assessment represents OSMRE's good-faith effort to prioritize documentation of the most important considerations required by NEPA within the congressionally mandated page and time limits. This prioritization reflects OSMRE's expert judgment and any considerations addressed briefly or left unaddressed were, in OSMRE's judgment, comparatively not of a substantive nature that meaningfully informs the consideration of potential environmental effects and the resulting decisions on how to proceed.

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Marcelo Calle, Acting Regional Director
Regions 5 & 7-11, OSMRE

Date

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LIST OF ACRONYMS

AQI	Air Quality Index
AQRV	Air Quality Related Value
AQS	Air Quality System
ASLM	Assistant Secretary, Lands and Minerals
AVF	Alluvial Valley Floor
BLM	Bureau of Land Management
CAA	Clean Air Act
CBNG	coal bed natural gas
CEQ	Council on Environmental Quality
CH4	Methane
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO2e	CO2-equivalents
CWA	Clean Water Act
dBA	A-weighted decibel
DM	Departmental Manual
DOI	U.S. Department of the Interior
DR	Decision Record
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
FR	*Federal Register*
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
GRSG	Greater sage-grouse
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
Hg	Mercury
IPaC	Information for Planning and Conservation
IPCC	Intergovernmental Panel on Climate Change
Leq	Equivalent sound level
LM	Lease modification
LOM	Life of Mine
MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act
Mtpy	million tons per year
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO2	Nitrogen Dioxide
NREX	Natural Resource and Energy Explorer
NSPS	National Source Performance Standards
NTEC	Navajo Transitional Energy Corp
N2O	Nitrous Oxide
O3	Ozone
OHA	Office of Hearings and Appeals
OSMRE	Office of Surface Mining Reclamation and Enforcement
PAP	Permit application package
Pb	Lead
PM10	Particulate Matter 10 micron

LIST OF ACRONYMS (Continued)

PM2.5	Particulate Matter 2.5 micron
PRB	Powder River Basin
PSD	Prevention of Significant Deterioration
R2P2	Resource Recovery and Protection Plan
SDWA	Safe Drinking Water Act
SEO	State Engineer's Office
SMCRA	Surface Mining Control and Reclamation Act of 1977
SO2	Sulfur Dioxide
SSP	Shared Socio-economic Pathway
T&E	Threatened and Endangered
TDS	Total Dissolved Solids
UP	Union Pacific
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
W.S.	Wyoming Statute
WAAQS	Wyoming Ambient Air Quality Standards
WDEQ-AQD	Wyoming Department of Environmental Quality, Air Quality Division
WDEQ-LQD	Wyoming Department of Environmental Quality, Land Quality Division
WDEQ-WQD	Wyoming Department of Environmental Quality, Water Quality Division
WDWS	Wyoming Department of Workforce Services
WOGCC	Wyoming Oil and Gas Conservation Commission
WYNDD	Wyoming Natural Diversity Database
WYPDES	Wyoming Pollutant Discharge Elimination System

1.0 Purpose and Need

1.1 Introduction

Navajo Transitional Energy Company, LLC (NTEC) is seeking to modify its current federal mining plan to allow recovery of the additional Federal coal associated with Federal Coal Lease WYW-177903 at the Antelope Mine. This Environmental Assessment (EA) for the Antelope Mine Federal Mining Plan Modification for a portion of Federal Coal Lease WYW-177903 (West Antelope II South Modification tract) has been prepared by the U.S. Department of the Interior (DOI) Office of Surface Mining Reclamation and Enforcement (OSMRE), Interior Regions 5, 7-11. OSMRE is the lead federal agency responsible for development of this EA because, as delegated to OSMRE under the Mineral Leasing Act (MLA), OSMRE is responsible for preparing a mining plan decision document (MPDD) in support of its recommendation to the Assistant Secretary, Land and Minerals Management (ASLM) regarding federal mining plan modifications (OSMRE 1999). The ASLM will ultimately decide whether the mining plan modification is approved, disapproved, or approved with conditions. Using criteria outlined in OSMRE's National Environmental Policy Act (NEPA) Handbook (OSMRE 2019a) and the DOI's Departmental Manual (DM) Part 516 (DOI 2020), OSMRE determined that this EA could incorporate by reference analyses included in the 2008 West Antelope II EIS (hereafter 2008 WAII EIS) and the 2014 West Antelope II South Lease Modification EA (hereafter 2014 WAII South EA) prepared by the Bureau of Land Management (BLM). These documents are publicly available at the following links:

2008 WAII EIS: https://eplanning.blm.gov/eplanning-ui/project/73240/510

2014 WAII South EA:
https://eplanning.blm.gov/public_projects/nepa/67029/82267/97216/FinalEA.pdf.

The 2008 WAII EIS and 2014 WAII South EA were developed as part of the lease application and describe the affected environment and the potential environmental impacts of disturbing the lands associated with the lease. This EA builds from the previous NEPA analyses by describing the rate at which the coal will be extracted and evaluating the environmental effects of that extraction at the specific mining rate. The effects described in this EA are not discernably different from those described in the previous NEPA analyses.

Executive Order (EO) 14154, *Unleashing American Energy* (Jan. 20, 2025), and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (Jan. 21, 2025), require the Department to strictly adhere to NEPA, 42 United States Code (U.S.C.) §§ 4321 *et seq*. Further, that Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with those Orders is no longer necessary. OSMRE verifies that it complied with the requirements of NEPA, consistent with the President's January 2025 Order and Memorandum, DOI's NEPA regulations at 43 Code of Federal Regulations (CFR) part 46, as updated on July 3, 2025 (90 Federal Register (FR) 29498), DOI's NEPA Handbook (516 DM 1, effective June 30, 2025), and other applicable guidance and policies. Information gathered from federal, state, and local agencies, the operator, publicly available literature, and internal OSMRE sources, such as the Antelope Mine Permit Application Package (PAP), were used in the preparation of this EA. On May 29, 2025, the Supreme Court issued a unanimous decision in *Seven County Infrastructure Coalition v. Eagle County, Colorado*, 145 S.Ct. 1497 (2025) (*Seven County*), holding that an agency is entitled to "substantial deference" in determining when an EIS has complied with NEPA "[s]o long as the EIS addresses environmental effects from the project at issue . . . ." and that NEPA does not require an agency to evaluate the environmental effects of projects separate in time or place from the agency's proposed action. The court explained, "The effects from a separate

project may be factually foreseeable, but that does not mean that those effects are relevant to the agency's decisionmaking process or that it is reasonable to hold the agency responsible for those effects." 145 S. Ct. 1497, 1516. Portions of this EA were prepared before the Supreme Court's decision in *Seven County* and contain more analysis of the environmental effects than is required under NEPA. OSMRE determined that it would be an inefficient use of agency resources and would cause an unnecessary permitting delay to remove this unnecessary information from this EA, especially because of the immediate need to address the Nation's inadequate energy supply, *see, e.g.*, EO 14156, *Declaring a National Energy Emergency*. However, OSMRE maintains that, under *Seven County*, no such analysis of these effects, such as the calculation and analysis of greenhouse gas emissions of combustion of the coal that would be produced, is required because the Department has no control over these effects and no law, including the MLA, requires that type of analysis.

1.2 Background

1.2.1 Site History

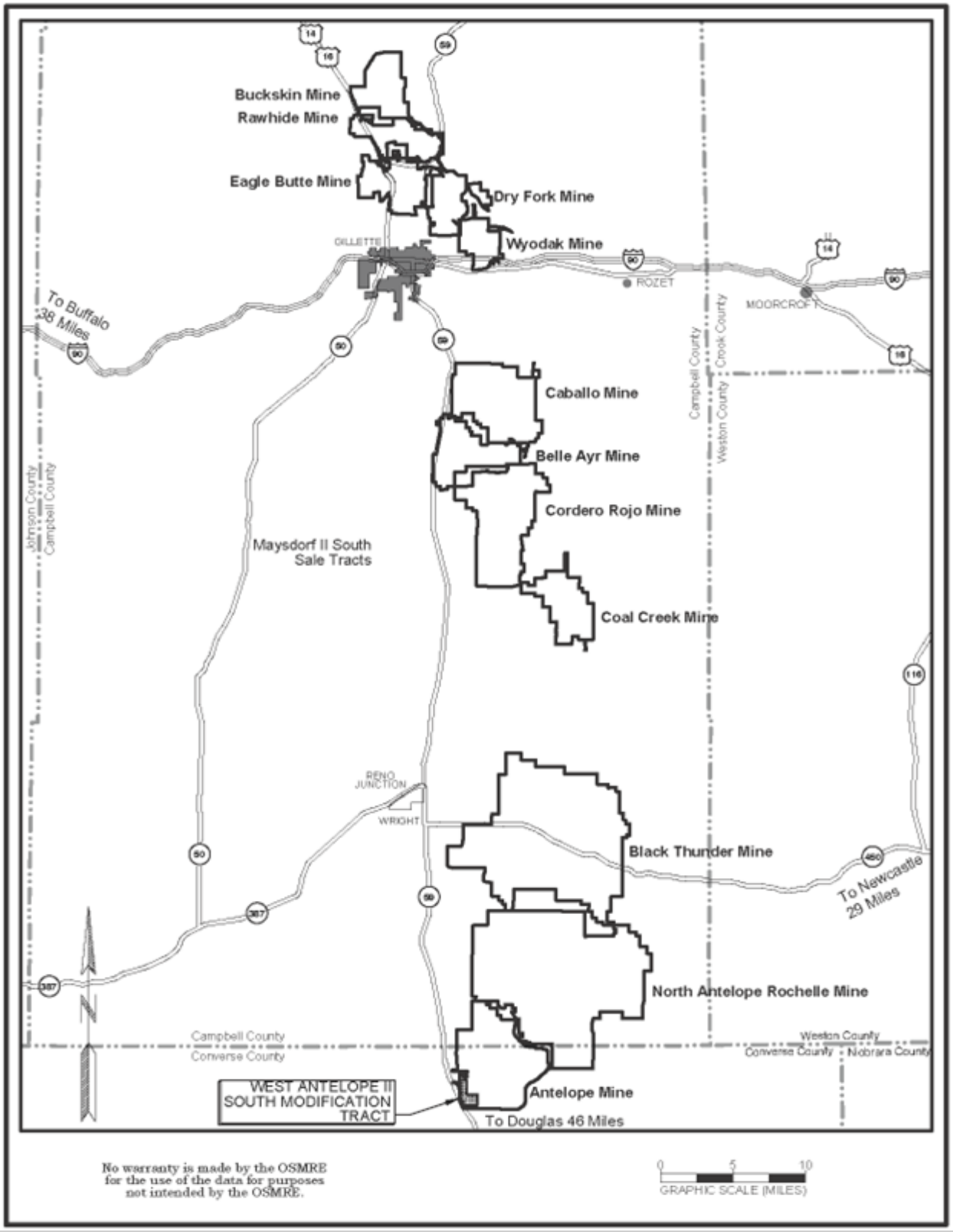
NTEC owns and operates the Antelope Mine. NTEC acquired the lease interests of Antelope Coal, LLC when NTEC acquired substantially all of Antelope Coal, LLC's parent company, Cloud Peak Energy, Inc., through Cloud Peak's bankruptcy proceedings. BLM approved the assignment of the leases to NTEC on May 21, 2021. The mine is located in Campbell and Converse Counties, Wyoming, approximately 20 miles south-southeast of Wright, Wyoming (**Map 1-1**). According to information provided by NTEC, the Antelope Mine is currently authorized to recover coal under four distinct federal, state, and various private coal leases, as indicated below (NTEC 2025a). The federal leases are shown on **Map 1-2.**

NTEC is currently seeking approval from the ASLM to recover coal associated with the modified lease WYW-177903. Antelope Mine filed an application for a coal lease modification with the BLM on November 29, 2012. On February 1, 2018, BLM issued the coal lease modification.

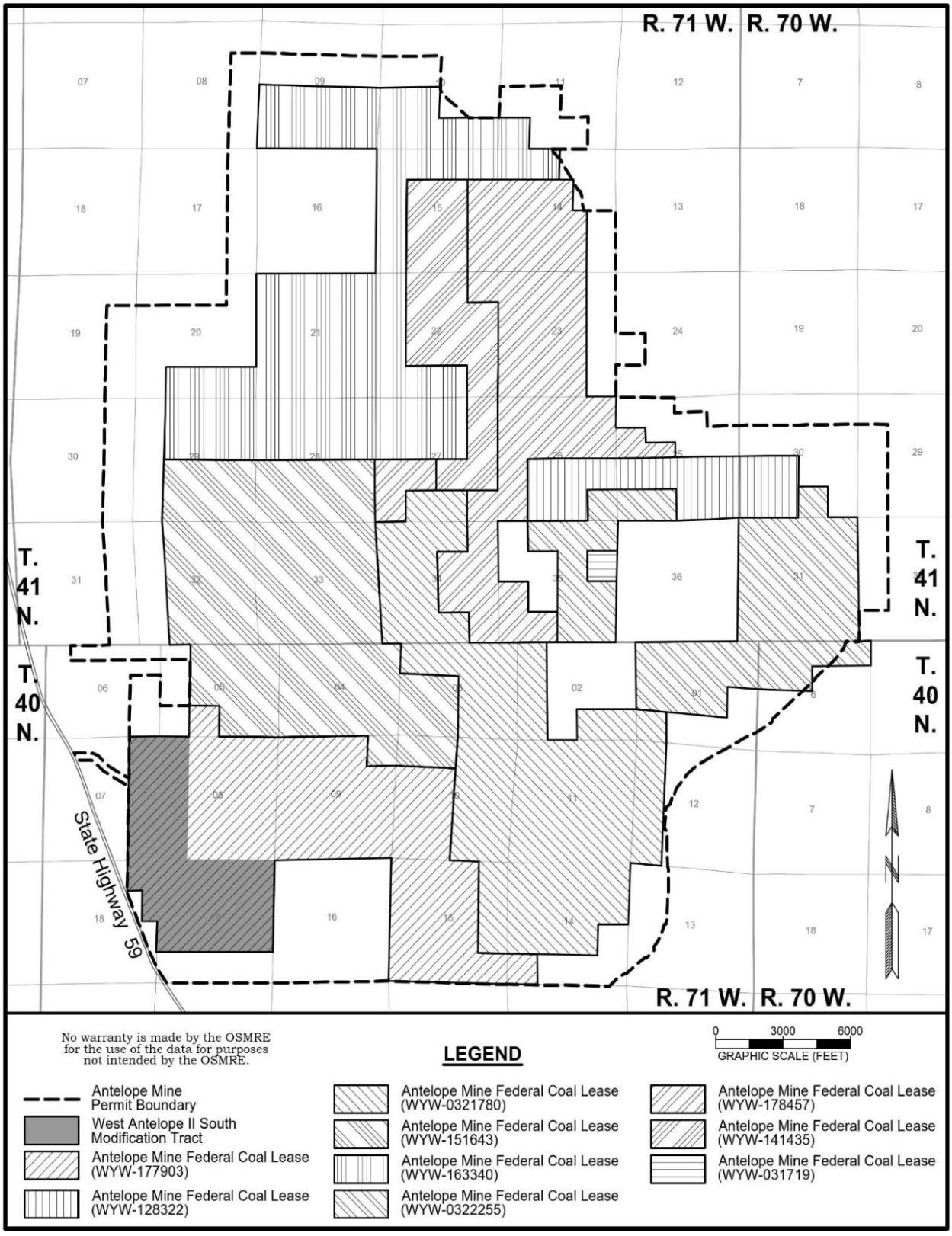
The Antelope Mine is located in the southern portion of Wyoming's Powder River Basin (PRB), a coal basin that spans from northeast Wyoming to southeast Montana. In 2023, Campbell County produced approximately 40 percent of the coal mined in the United States (U.S. Energy Information Administration [EIA] 2025). The region also has been heavily developed for oil and gas recovery, including coal bed natural gas (CBNG). The West Antelope II South Modification tract is within Federal Coal Lease WYW-177903 and is bounded by Antelope Creek to the north, existing leases (federal and state) to the east, pipelines to the south, State Highway 59, and a no coal zone to the west. All the land associated with WYW-177903 is private land, owned by NTEC.

NTEC mines coal at the Antelope Mine using conventional surface mining methods and ships coal from an onsite railroad loading facility to electric utilities and industrial customers in the United States. **Table 1-1** provides a summary of destinations Antelope Mine coal was shipped to between 2017 and 2024.

Due to changes in coal prices and the retirement of power plants across the U.S., the exact destinations of the coal that would be mined under the Proposed Action is unknown. Based on existing Federal coal leases, mining operations (i.e., mining, processing, and transporting coal) could continue at the Antelope Mine through approximately 2037 at a rate of 30 million tons per year (Mtpy). The Proposed Action would extend the Life of Mine (LOM) by about 0.5 year.



Map 1-1. General Location Map



Map 1-2. Antelope Mine's Federal Coal Leases

Table 1-1. Antelope Mine Coal Shipment Destinations, 2017-2024

Year	No. of Customers	No. of Power Plants	No. of States	States
2017	35	70	18	AL, AZ, CO, IA, IL, KS, KY, LA, MD, MI, MN, MO, NE, TN, TX, WA, WI, WY
2018	32	77	18	AL, AR, AZ, CO, IA, IL, KS, KY, LA, MD, MI, MN, MO, NE, TN, TX, WI, WY
2019	29	49	17	AL, AR, AZ, CO, IA, IL, KY, LA, MD, MI, MN, MO, NE, TN, TX, WI, WY
2020	23	38	16	AL, AR, AZ, CO, IA, IL, KS, KY, MI, MN, MO, NE, TN, TX, WI, WY
2021	27	45	18	AL, AR, AZ, CO, IA, IL, KS, KY, LA, MI, MN, MO, NE, OH, TN, TX, WI, WY
2022	27	45	18	AL, AR, AZ, CO, IA, IL, KS, KY, LA, MI, MN, MO, NE, OH, TN, TX, WI, WY
2023	29	50	19	AL, AR, AZ, CO, IA, IL, KS, KY, LA, MI, MN, MO, MT, NE, OH, TN, TX, WI, WY
2024	24	34	18	AL, AR, CO, IA, IL, KS, KY, LA, MI, MO, MT, NE, OH, OK, TN, TX, WI, WY

Source: NTEC 2025

NTEC operates the Antelope Mine under Wyoming Department of Environmental Quality, Land Quality Division (WDEQ-LQD) Permit No. 525 in accordance with the approved Wyoming State Coal Regulatory Program (30 CFR part 950). The approved mine permit boundary includes the entire West Antelope II South Modification tract within Federal Coal Lease WYW-177903. WDEQ-LQD approved the most recent version of Permit No. 525 with the condition that NTEC may not mine coal from any Federal coal lease until it receives approval from the ASLM. The most recent revision to Permit No. 525 was approved by WDEQ-LQD on January 31, 2022. WDEQ-LQD permits are issued based on the LOM plans for the mining operation, under the Wyoming Environmental Quality Act of 1973, and permits must be renewed every 5 years (Wyoming Statute [W.S.]. § 35-11-405 (c)). This EA considers potential effects from mining the West Antelope II South Modification tract and does not reevaluate existing federal mining areas and operation, except for consideration of past, present, and reasonably foreseeable future actions (RFFAs).

The Resource Recovery and Protection Plan (R2P2) that included the West Antelope II South Modification tract was approved by the BLM Casper Field Office, effective May 2018. The R2P2 outlines the mining sequence including specific bench lengths and bench orientations. These specific pit lengths, orientations, and other mine design factors are necessary to optimize the coal haul distances and mining efficiencies. As explained in the R2P2, interruptions to the mine plan sequence will disrupt these strategic decisions, resulting in illogical sequences, more overburden rehandle, longer haul distance, delayed reclamation, and lower coal recovery.

1.2.2 Project Background

In anticipation of acquiring additional coal reserves, NTEC's predecessor in interest filed an application with BLM in 2012 to lease a tract of Federal coal under the lease modification regulations (also known as LM regulations) at 43 CFR § 3432.0-3 and the provisions of the Energy Policy Act of 2005. The tract was applied for as a maintenance tract for the Antelope Mine to maintain operation at the mine's current average annual level of production. BLM prepared the 2014 WAII South EA to satisfy the NEPA requirements for the LM. The 2014 WAII South EA analyzed the potential impacts associated with coal recovery and reclamation of 856.6 acres of additional federal coal associated with

WYW-177903, which would allow the Antelope Mine to continue producing coal at the current rate instead of ceasing production as recoverable coal reserves were nearly exhausted. OSMRE was a cooperating agency on the 2014 WAII South EA. Federal coal lease WYW-177903 as is shown on **Map 1-2**.

BLM's Casper Field Office issued a decision record (DR) on August 15, 2014, recommending modification of Federal coal lease WYW-177903 to add approximately 856.6 acres of Federal coal associated with the Proposed Action (BLM 2019) and the lease of 15.8 Mt of mineable Federal coal. BLM prepared a determination of NEPA adequacy (DNA) in response to the February 7, 2017,

Interior Board of Land Appeals (IBLA) decision, which set aside and remanded the August 15, 2014, DR (*see WildEarth Guardians*, 189 IBLA 274 [2017]). The remand was based on a procedural point associated with the interpretation of BLM's internal delegation of authority. The Director of the Office of Hearings and Appeals (OHA) denied BLM's Petition for Director's Review (52 OHA 204, September 11, 2017), but did not address any substantive challenges to the lease modification decision and, instead, affirmed the IBLA by holding that the High Plains District Manager was not authorized to sign the DR for the lease modification. Therefore, after correcting the delegation issue, BLM issued a new DR on November 30, 2017, signed by the BLM Wyoming Deputy State Director for Minerals and Lands.[1]

1.2.3 Statutory and Regulatory Background

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) is a comprehensive statute designed to establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations. SMCRA establishes a program of cooperative federalism, allowing States to obtain primary jurisdiction (i.e., "primacy") to administer their own regulatory programs on non-federal and non-Indian lands, within limits established by minimum Federal standards, and subject to oversight and enforcement by OSMRE. Section 523 of SMCRA, 30 U.S.C. § 1273, authorizes DOI to enter into a state-federal cooperative agreement with any State with primacy to be the primary regulatory authority over Federal lands within the borders of that State. However, this provision of SMCRA also provides that the approval of mining plans under the MLA cannot be delegated to a primacy state. Thus, for a leased federal coal, an operator or a permittee may not commence mining unless a federal mining plan modification is approved by the ASLM. OSMRE is responsible for preparing and submitting a decision document to the ASLM recommending approval, disapproval, or approval with conditions of a proposed mining plan modification. Pursuant to 30 CFR § 746.13, OSMRE's recommendation is based, at a minimum, upon:

1. The SMCRA Permit Application Package (PAP);
2. Information prepared in compliance with NEPA, including this EA;
3. Documentation assuring compliance with the applicable requirements of federal laws, regulations, and executive orders other than NEPA;
4. Comments and recommendations or concurrence from other federal agencies and the public;
5. Findings and recommendations of the BLM with respect to the R2P2, federal lease requirements, and the MLA;
6. Findings and recommendations of the PSC with respect to the mine permit NACT0201 and the Wyoming State program; and

[1] There are two pending IBLA appeals of the November 30, 2017, decision. *WildEarth Guardians*, IBLA No. 2018 –065, and *Powder River Basin Resource Council*, IBLA No. 2018 –063.

7. The findings and recommendations of OSMRE with respect to the additional requirements of 30 CFR Chapter VII, Subchapter D.

In compliance with other federal laws, regulations, and EOs, OSMRE consults with other agencies before it makes its recommendation to the ASLM. These consultations include consultation with the U.S. Fish and Wildlife Service (USFWS) under section 7 of the Endangered Species Act (ESA) for potential effects on threatened and endangered (T&E) species and consultation with state and tribal historic preservation officers under section 106 of the National Historic Preservation Act (NHPA).

In this EA, OSMRE is not reevaluating all potential impacts previously analyzed as part of the 2014 WAII EA and 2008 WAII EIS, which included analysis of all federal coal lands identified in the proposed mining plan modification. Rather, this EA considers potential changes to the extent or nature of those impacts based on information included in Permit No. 525 (including the current revision) and new information specific to this action.

1.3 Purpose and Need

NTEC's goal is to mine the approximately 15.8 million tons (Mt) of minable coal in the West Antelope II South Modification tract for continued operation of the Antelope Mine. As previously noted, if the 15.8 Mt of Federal coal from the West Antelope II South Modification tract is mined in a continuous manner, it would extend the Antelope Mine LOM by approximately 6 months. The Antelope Mine has historically supplied coal to numerous domestic electric generating facilities across the country.

The purpose for OSMRE's action is to respond to NTEC's request for a modification to the approved federal mining plan that is required before the Federal coal contained within the West Antelope II South Amendment tract can be mined. OSMRE must recommend to the ASLM to approve, disapprove, or approve with conditions NTEC's proposed mining plan as required by the MLA and SMCRA. 30 CFR Parts 740 and 746; 30 U.S.C. § 207(c). The Proposed Action, that OSMRE intends to recommend for ASLM approval, would modify the federal mining plan and authorize NTEC to conduct coal removal on approximately 856.6 acres of Federal coal to recover approximately 14.5 Mt of the 15.8 Mt of mineable Federal coal at Antelope Mine. OSMRE must conduct a thorough analysis of the environmental effects of the proposed mining plan modification to inform its recommendation to the ASLM. The ASLM will consider OSMRE's recommendation when deciding whether the mining plan modification is approved, disapproved, or approved with conditions.

1.4 Regulatory Framework and Necessary Authorizations

The following key laws, as amended, establish the primary authorities, responsibilities, and requirements for developing federal coal resources:

1. MLA,
2. NEPA,
3. Mining and Minerals Policy Act of 1970,
4. Federal Coal Leasing Act Amendment, 1976,
5. Federal Land Policy and Management Act of 1976,
6. Energy Policy Act of 2005;
7. SMCRA,
8. Multiple-Use Sustained Yield Act of 1960,
9. ESA,
10. Clean Air Act (CAA),
11. Clean Water Act (CWA),
12. Safe Drinking Water Act (SDWA),
13. NHPA,

14. American Indian Religious Freedom Act,
15. Paleontological Resources Preservation Act of 2009,
16. Migratory Bird Treaty Act (MBTA), and
17. Bald and Golden Eagle Protection Act of 1940.

SMCRA provides the legal framework for the federal government to regulate coal mining by balancing the need for domestic coal production with the protection of the environment and society, while also ensuring that mined land is reclaimed and returned to beneficial use when mining is finished. OSMRE implements its responsibilities for the MLA and SMCRA under regulations at 30 CFR parts 700 through 955.

SMCRA provides OSMRE with the primary responsibility for administering programs that regulate surface coal mining operations in the United States. Pursuant to section 503 of SMCRA, 30 U.S.C. § 1253, the WDEQ developed, and the Secretary of the Interior approved, Wyoming's permanent regulatory program authorizing WDEQ to regulate surface coal mining operations on private and state lands within Wyoming. Pursuant to section 523 of SMCRA, 30 U.S.C. § 1273, and 30 CFR § 950.20, WDEQ entered into a cooperative agreement with the Secretary of the Interior authorizing the WDEQ to regulate surface coal mining operations on Federal lands within the State.

Pursuant to this cooperative agreement, a federal coal leaseholder must submit a PAP, that includes the R2P2 and State Mining Permit application, to OSMRE and WDEQ for any proposed surface coal mining and reclamation operations on Federal lands within that State. Federal lands include either the federal government's ownership of the surface or mineral interests and can include both. If the permit application complies with the applicable laws, the WDEQ issues a permit to the applicant to conduct coal-mining operations.

OSMRE will then prepare an MPDD in support of its recommendation to the ASLM, who will decide whether to approve the mining plan and whether additional conditions are needed. Pursuant to 30 CFR § 746.13, OSMRE's recommendation will be based on the items identified in Section 1.2.3.

1.5 Outreach and Issues

Following a review of the 2008 WAII EIS and 2014 WAII South EA, OSMRE determined that further analyses were appropriate based on newly available information and changes to the Affected Environment that have occurred since the 2008 and 2014 analyses. Internal discussions within OSMRE identified a preliminary set of issues to be considered during the NEPA analysis. OSMRE published a notice to prepare this EA on the OSMRE website and in the *Gillette News Record* on November 5, 2019, and the *Douglas Budget* on November 6, 2019 (**Appendix A**). This publication initiated a comment period ending on December 3, 2019. OSMRE then considered the substantive comments received as part of its scoping process. The public scoping comment are summarized in **Appendix B**. The substantive comments can be summarized as follows, along with the number of comments that OSMRE received associated with each issue (in parentheses):

1. water resources (1),
2. air quality (1),
3. level of NEPA/NEPA process (1),
4. reclamation (1),
5. climate change/global warming (1), and
6. cumulative impacts (1).

1.6 Crosswalk of Resource Discussions

Appendix C includes a crosswalk that identifies the location of the discussions of each resource presented in the 2008 WAII EIS, 2014 WAII South EA, and their location in this EA, where present. While OSMRE considered all the resources, not every resource has been brought forward for analysis in this EA. OSMRE determined that those resources and potential impacts not brought forward for analysis were sufficiently documented in the 2008 WAII EIS or 2014 WAII South EA or that new information would not affect the decision-making process. Information presented in the 2008 WAII EIS and 2014 WAII South EA that adequately described the affected environment for specific resources is incorporated by reference into this EA.

1.7 Public Involvement

On November 4, 2019, OSMRE initiated a scoping period for the EA that extended from November 4, 2019, through December 3, 2019. OSMRE also published a notice alerting the public of its intent to prepare this EA on the OSMRE website and in the *Gillette News Record* on November 5, 2019, and the *Douglas Budget* on November 6, 2019 (**Appendix A**). This publication initiated a scoping period, ending on December 3, 2019. Public outreach and tribal consultation letters were also sent out to stakeholders and tribes that could be affected by the project. OSMRE received written and e-mailed comments from four entities. Lists of agencies, tribes, and individuals included on mailing lists, and a summary of the public scoping comments received are included in **Appendix B**. OSMRE released the EA and draft finding of no significant impact (FONSI) for a comment period that extended from May 8, 2020, through June 8, 2020. The notification of the comment period was sent by letter to interested parties and tribes and was posted on the OSMRE website. In addition, OSMRE posted public notices in the *Gillette News Record* and *Douglas Budget*. OSMRE received two comments. Responses to comments are included in **Appendix B**. On April 24, 2025, OSMRE mailed tribal consultation letters to the 26 tribes inviting the tribes to engage in government-to-government consultation prior to issuing the final EA and signed FONSI. No tribes requested to engage in government-to-government consultation.

2.0 Proposed Action and Alternatives

Under the requirements of NEPA, an EA must evaluate the environmental impacts of a reasonable range of alternatives that meet the project's purpose and need. NEPA defines reasonable alternatives as those "that are technically and economically feasible and meet the purpose and need of the proposal" (42 U.S.C. § 4332 (2023)). This chapter describes the Proposed Action whose environmental consequences this EA evaluates, and the No Action Alternative. In addition, it identifies alternatives considered but eliminated from detailed analysis.

2.1 Description of Alternatives

The Proposed Action is approval of a federal mining plan modification to add approximately 15.8 Mt of Federal coal to the federal mining plan within the 856.6-acre West Antelope II South Modification tract. **Table 2-1** summarizes coal production, surface disturbance, LOM, and employees for the No Action Alternative and the Proposed Action. The No Action Alternative would leave operations as described in the currently approved federal mining plan. The Proposed Action would add additional coal associated within federal lease WYW-177903.

Table 2-1. Comparison of Coal Production, Surface Disturbance, LOM, and Employees for the No Action Alternative and Proposed Action

Item	No Action Alternative (Existing Mine)	Proposed Action
Mineable Federal Coal	362.6 Mt	378.4 Mt (15.8 Mt added)
Recoverable Federal Coal	337.8 Mt	352.3 Mt (14.5 Mt added)
Coal Lease Area - Federal Coal Leases Only	16,265.8 acres	17,122.4 acres (856.6 acres added)
Total Affected Area	19,602.0 acres	20,481.5 acres (879.5 acres added)[1]
Approved Permit Area	22,538.4 acres	22,538.4 acres (no change)
Average Annual Coal Production	30 Mtpy	30 Mtpy (no change)
LOM of Federal Coal	11.3 years	11.7 years (0.5 year added)
Average Number of Employees	359	359 (no change)

[1] Affected area includes the tract as well as the area between the tract and the permit boundary not currently included in the Antelope Mine affected area boundary.

2.1.1 Proposed Action

The Proposed Action would modify the federal mining plan and authorize NTEC to conduct coal removal on approximately 856.6 acres of Federal coal to recover approximately 14.5 Mt of the 15.8 Mt of mineable Federal coal at Antelope Mine. Approximately 879.5 acres of disturbance would result from the proposed federal mining plan modification. Antelope Mine estimates that at the projected average annual production rate of 30 Mtpy, mining this coal would extend the LOM by about 0.5 year. All the Federal coal included in the Proposed Action would be shipped to electric utilities and industrial customers in the United States (NTEC 2025a). Detailed discussion of where coal has historically been shipped can be found in Section 1.2.1 of this EA.

Under the Proposed Action, the West Antelope II South Modification tract would be mined, along with other parts of the Antelope Mine, and the coal from various areas blended before shipment. Because the tract would be an extension of the existing Antelope Mine, the facilities and infrastructure would be the same as those identified in the WDEQ-LQD Permit No. 525 and the BLM R2P2, described in Section 1.2.1 of this EA. The area included within this proposed mining plan modification would be reclaimed to the approved SMCRA permit. We note that we recently approved a program amendment to Wyoming's State SMCRA program that, if certain procedures are followed, would allow inert decommissioned wind turbine blades and towers to be disposed of in some mine sites. 90

FR 2614 (Jan. 13, 2025). Such disposal is not a part of this Proposed Action and has not been analyzed in this EA.[2]

2.1.2 No Action Alternative

Under the No Action Alternative, OSMRE would not recommend and the ASLM would not approve NTEC's proposed mining plan modification request, and 14.5 Mt of Federal coal related to WYW-177903 would not be recovered. Under this alternative, NTEC would mine its remaining 337.8 Mt of recoverable coal reserves in approximately 11.3 years, at an average annual production rate of approximately 30 Mtpy.

The No Action Alternative describes the continuation of operations under the currently approved federal mining plan and assumes that the additional coal within the tract would not be mined in the foreseeable future. Under the No Action Alternative, NTEC would be limited to recovering the remaining Federal coal reserves associated with existing federal, state, and private leases. Because the existing mining plan approvals already authorize the mining of some Federal coal, the environmental effects from this Federal coal mining, including shipment to electric utilities and industrial customers in the United States, are included in the No Action Alternative.

2.1.3 Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives were considered but eliminated from detailed analysis. The discussions include reasons the alternatives were eliminated from detailed analysis.

2.1.3.1 Underground Mining Alternative

OSMRE considered an alternative that would require NTEC to modify its mining technique to use underground mining methods to extract the coal. WDEQ-LQD approved a surface mining permit for this project using surface mining techniques so this alternative would require NTEC to develop an entirely new application, using different mining techniques, which would likely be costly to the applicant and take a significant amount of time to complete the permitting process again, making it economically infeasible. It is estimated that it would take years for NTEC to design and engineer a new underground mine and for WDEQ-LQD to process a new permit application.

Notwithstanding the delay and redundant permitting that this alternative would necessitate, it is also highly likely that this alternative would be economically infeasible at current permitted production rates. The facilities and equipment needed for underground mining are different from surface mining facilities and equipment and NTEC would have to invest a significant amount of time and resources to construct the infrastructure needed for an underground mining operation. New surface facilities would need to be constructed, including, but not limited to, conveyors, coal stockpiles, a wash plant, and maintenance and support facilities and new underground mining equipment would need to be purchased, such as a long wall mining system, conveyor systems/drives/power stations, vehicles for transporting employees and supplies, continuous miners, shuttle cars, large and small ventilation fans, and roof bolters. Investing in this amount of equipment for an operation to access approximately 15.8 Mt over the course of 0.5 years is not economically feasible.

In conclusion, this alternative was eliminated from further consideration because it is not consistent with the WDEQ-LQD permit and is economically unreasonable.

[2] To the extent such disposal may be requested in the future on Federal lands, including this tract, an additional mining plan modification may be necessary.

2.1.3.2 Low or No Pollutant Emitting Equipment

OSMRE considered an alternative that would require NTEC to change or modify mining related equipment to reduce air emissions. The Antelope Mine is a relatively small contributor of air emissions from engine combustion in the region, as presented in Sections 4.4 and 4.5 of this EA.

The cost to make the switch to equipment powered by a different fuel (such as natural gas or solar powered equipment) for approximately 15.8 Mt of Federal coal would be cost prohibitive for the minimal benefit to the regional air quality. In addition, the use of natural gas-powered engines in mining equipment is relatively new, and some types of equipment would not be available for replacement with natural gas-powered engines. The use of solar power to run large equipment has not been tested and is not considered technologically feasible at this time. Similarly, retrofitting existing equipment with additional emission control devices would be expensive and would have limited effect on regional air emissions.

OSMRE eliminated this alternative from further consideration because requiring natural gas and solar powered engine technology and retrofitting existing equipment is not economically or technically feasible for all equipment at the Antelope Mine.

2.1.3.3 Variable Mining Rate Alternative

OSMRE considered additional mining rates for the Antelope Mine. As described in Section 2.2, under Antelope Mine's Air Permit MD-13361, the maximum permitted coal production rate is limited to 52 Mt of coal per year. OSMRE did not evaluate a 52 Mtpy alternative mining rate in this EA because NTEC indicates that it is not likely that this mining rate will ever occur at the Antelope Mine due to current and future coal markets. Based on the best information currently available, it is possible that actual mining rates at the Antelope Mine may vary between 15 and 30 Mtpy. OSMRE did not analyze an alternative based on the lower potential annual mining rate or the maximum allowed mining rate but instead chose to evaluate an alternative assuming 30 Mtpy, the maximum mining rate within the likely range, because the faster mining rate would disclose the greatest potential air quality and other intensity-related impacts. Regardless of the mining rate, the overall disturbance area would not change under any alternative studying a different mining rate, except that the duration of impacts would vary slightly. Finally, the rate of mining is typically based on some combination of technical ability and economic factors. Dictating a specific rate of mining would likely cause unanticipated economic impacts by making the mine less able to adapt to changing markets and economic drivers. In addition, due to the relatively small quantity of coal associated with this action, the mining rate is insignificant based on the amount of time it adds to the LOM. Therefore, because studying an alternative with a set lower or higher mining rate would not provide a meaningful distinction for a decision-maker and surface impacts would not be substantially different from those described herein for the Proposed Action, OSMRE did not carry this alternative forward for consideration.

2.1.3.4 Partial Mining Alternative

OSMRE considered whether to analyze in detail an alternative that would sunset the mining plan approval for Federal coal after a certain period. When OSMRE has considered this alternative for other mines, the sunset would occur approximately five years after the mining plan approval because, among other things, a five-year timeframe is consistent with the permit approval period under SMCRA. OSMRE did not analyze this alternative here because the Proposed Action would be completely mined within six months; adding a five-year sunset provision would be the same as the Proposed Action. Moreover, while OSMRE could, in theory, choose a shorter sunset term, given the six-month timeframe of the Proposed Action, for such a timeframe to be effective it would have to be less than six months. For other mines, OSMRE has explained that the partial mining alternative

would allow OSMRE to reconsider potential changed circumstances in the energy environment and any potential new information near the end of the term to determine if another mining plan should be approved; however, while such changes are more likely over a five-year term, such changes are unlikely over just a few months. In addition, reconsideration of this matter in such a short timeframe would be an inefficient use of agency resources and is contrary to the national energy emergency outlined in Executive Order (EO) 14516.

2.2 Existing Conditions (Conditions Common to the Proposed Action and the No Action Alternative)

As described in Chapter 1, this EA incorporates by reference the 2008 WAII EIS. The 2008 WAII EIS presented a thorough description of the existing conditions to support the analysis presented therein. The following summary of updated existing conditions, including ongoing permitted mining operations, describes notable changes since the 2008 WAII EIS was prepared. This update is provided to support the evaluation of effects of the Proposed Action contained in Chapter 4 of this EA.

Mining and reclamation activities have continued at the Antelope Mine as approved by WDEQ-LQD Permit No. 525 since the 2008 WAII EIS was prepared and Federal coal lease WYW-177903 was issued. The PAP, including approved revisions, provides the most complete descriptions of mining, environmental protection measures, and reclamation activities within the project area for the LOM and, as such, is used and referenced for the purpose of this EA.

Antelope Mine currently employs 359 people at the Antelope Mine (NTEC 2025a). From 2020-2024, the mine produced an average of 19.5 Mt of coal per year (Wyoming Department of Workforce Services [WDWS] 2020, 2021, 2022, 2023, 2024). In the future, NTEC anticipates being able to mine up to 30 Mt annually, which is under the 52 Mt of coal per year permitted by WDEQ Air Quality Division (AQD) Air Permit MD-13361. Approximately 337.8 Mt of recoverable coal remains in the federal mining plan area after December 31, 2024, excluding the Federal coal identified in Proposed Action. NTEC continues to use conventional surface mining techniques described in Section 2.1 of the 2008 WAII EIS. Coal is shipped from an onsite railroad loading facility to electric utilities and industrial customers in the United States (NTEC 2022, 2025a), detailed discussions of where coal has historically been shipped can be found in Section 1.2.1 of this EA. Due to changes in coal prices and the retirement of power plants across the U.S., the exact destinations of the coal that would be mined under the mining plan modification are unknown.

In 1975, in response to the requirements set forth in the WEQA, WDEQ-LQD published a set of rules and regulations that require coal mine permittees to restore the land to a condition equal to or greater than its highest previous use and required permittees to restore wildlife habitat commensurate with or superior to premining habitat (WDEQ-LQD 2012). WDEQ-LQD later updated their rules and regulations in response to the requirements set forth in SMCRA. Reclamation activities under the Proposed Action would be consistent with those currently used at the Antelope Mine and described in the WDEQ-LQD Permit No. 525 reclamation plan. Mined-out areas would be reclaimed according to an approved postmining land use plan and would be reclaimed to reestablish the drainage system. In-channel stockponds and playas (shallow topographic depressions that are internally drained) would be replaced to provide livestock and wildlife watering sources. All postmining topography, including reconstructed drainages, must be approved by the WDEQ-LQD. After mining, the land would be reclaimed to support the approved postmining land uses of livestock grazing and wildlife habitat.

2.2.1 Current Bonding and Bond Release Status

SMCRA provides that, as a prerequisite for obtaining or modifying a coal mining permit, permittees must post a reclamation bond to ensure that the regulatory authority would have sufficient funds to

reclaim the site according to the approved reclamation plan and all applicable requirements of SMCRA if the permittee fails to complete obligations set forth in the approved reclamation plan (OSMRE 2025). The current bond amount for the Antelope Mine is $112.1 million in the form of a surety bond. It was approved by WDEQ-LQD in September 2024 and includes the West Antelope II South Modification tract as it is located within the permit and affected area boundaries. However, no overburden has been removed from the proposed modification area so only small disturbances like roads and topsoil piles are included in the current bond. The bond is updated annually as part of the annual report required by WDEQ-LQD. The bond would be updated to include reclamation requirements associated with the West Antelope II South Modification tract if approved by ASLM once mining commences.

There are four types of bond release for areas disturbed and coal removed after May 1978 for which mine operators may apply to reduce their reclamation bond. As outlined in WDEQ-LQD Guideline 20 (Bond Release Categories and Submittal Procedures for Coal Mines [WDEQ-LQD 2014a]), these include:

1. Area Bond Release - Rough backfill verification;
1. Phase 1 - Partial Incremental, which includes stream channel reconstruction verification and soil depth verification;
2. Phase 2 - Partial Incremental, which includes vegetation establishment verification, surficial stability verification, and permanent impoundment construction/renovation and Wyoming State Engineer's Office (SEO) approval verification; and
3. Phase 3 - Full Incremental or Final release, which includes mitigation wetlands verification, revegetation success verification, and tree establishment verification.

All reclaimed areas are monitored for a minimum of 10 years to evaluate the success of vegetation growth and the establishment of a variety of plant species before the Phase 3 final release of the reclamation bond. Final bond release on reclaimed lands indicates that the reclamation meeting permit standards has been in place in accordance with permit standards for at least 10 years and that an application for final bond release has been submitted to the WDEQ-LQD. As part of the final bond release, WDEQ-LQD and OSMRE complete an inspection of the site, and WDEQ-LQD issues an inspection report and conclusions that is provided to OSMRE for concurrence. A public notice is then filed and the WDEQ-LQD Director provides a decision.

According to Antelope Mine's 2024 Annual Report (NTEC 2025b), the mine had disturbed approximately 13,094 acres, of which approximately 1,615 acres (12.3 percent) are needed for long-term mining activities and, as such, are considered land not available for reclamation. As of August 28, 2024, the mine had backfilled and graded approximately 7,127 acres. A summary of phased bond release acreages in the project area is provided in Table 2-2.

Table 2-2. Summary of Phased Bond Release Acreages in the Project Area

Phased Bond Releases Status[1]	Mine Wide	Percent
Total Areas Disturbed	13,094	--
Acres of Long-term Mining or Facilities and Percent of Total Disturbance	1,615	12.3
Acres of Active Mining and Percent of Available Acres	4,352	33.2
Acres Backfilled and Graded and Percent of Available Acres	7,127	54.4
Total Areas Reclaimed (Soiled and Seeded/Planted) and Percent of Backfilled and Graded	6,695	51.1
Areas Which Have Achieved Phase 1 Bond Release and Percent of Reclaimed Acres	5,136	39.2
Areas Which Have Achieved Phase 2 Bond Release and Percent of Reclaimed Acres	0	0
Areas Which Have Achieved Phase 3 Bond Release and Percent of Reclaimed Acres	0	0

[1] As of August 28, 2024; Source: NTEC 2025b

Neither state nor federal regulations require a permittee to file for bond release at any prescribed time, and lands that are eligible for a bond release may remain bonded for a variety of reasons unrelated to the reclamation status. Therefore, bond release statistics are not a reliable metric to evaluate reclamation success. Typically, permittees do not file for Phase 2 or Phase 3 bond release until completion of the entire mining operation. As a result, the number of acres released from Phase 2 and Phase 3 bond in Wyoming is relatively small compared to the number of acres regraded, topsoiled, and seeded. The standard for determining if mines are meeting their reclamation obligations is related to compliance with contemporaneous reclamation permit commitments. Contemporaneous reclamation specifically refers to the timeliness in which reclamation is occurring.

3.0 Affected Environment

This chapter discusses the existing conditions of the physical, biological, cultural, and human resources that could be affected by implementation of the alternatives described in **Chapter 2**. **Appendix C** provides a crosswalk table between resource discussions presented in the 2008 WAII EIS, 2014 WAII South EA, and this EA. The determination of adequacy of the description of baseline conditions in the 2008 WAII EIS and 2014 WAII South EA, as related to the West Antelope II South Modification tract, was made if conditions have not substantively changed, no new data are available, or the resource conditions have only been minimally affected as a result of current mining operations, then further presentation of information would not affect the decision-making process. Therefore, baseline information in the 2008 WAII EIS and 2014 WAII South EA that has not substantively changed is incorporated by reference. Updated baseline information is presented in this chapter, when applicable.

3.1 General Setting

The general setting of the West Antelope II South Modification tract is described in Section 3.1 of the 2008 WAII EIS. The tract is located in the Wyoming PRB, which has a semi-arid, high plains environment with relatively large seasonal and diurnal variations in temperature and seasonal variation in precipitation.

3.2 Topography and Physiography

Topography and physiography of the West Antelope II South Modification tract are described in Section 3.2.1 of the 2008 WAII EIS. The structural basin is an elongated, asymmetrical syncline that is bounded in Wyoming by the Black Hills on the northeast; the Casper Arch on the southwest, and the Laramie Mountains on the south. Geologic strata along the eastern limb of the structural PRB dip to the west at 1 to 2 degrees toward the axis of the basin.

3.3 Geology, Mineral Resources, and Paleontology

General geology and coal resources are described in Section 3.3.1 of the 2008 WAII EIS. Stratigraphic units within the West Antelope II South Modification tract include, in descending order, recent (Holocene age) alluvial and eolian deposits, Eocene age Wasatch Formation (overburden), and Paleocene age Fort Union Formation. The targeted coal seam lies within the Tongue River Member of the Fort Union Formation. There are four mineable coal seams in the West Antelope II South Modification tract (referred to by NTEC as the Anderson, Lower Anderson, Canyon/Upper Canyon, and Lower Canyon). Other mineral resources are described in Section 3.3.2 of the 2008 WAII EIS. According to the Wyoming Oil and Gas Conservation Commission (WOGCC), as of April 2025, 23 oil and gas wells are producing and 17 oils wells are waiting on permit approval within 2 miles of the tract (WOGCC 2025). There are no CBNG or oil and gas wells completed within the tract. Paleontology is described in Section 3.3.3 of the 2008 WAII EIS. No significant or unique paleontological resource localities were recorded on Federal lands in the 2008 WAII EIS resource report area. All Class III surveys conducted since the 2008 WAII EIS as part of the WDEQ-LQD permit requirements have included a reconnaissance for outcrops that might contain paleontological remains. No outcrops or paleontological remains within or adjacent to the West Antelope II South Modification tract were identified (2008 WAII EIS, GCM 2009, 2011, 2014, and 2015).

3.4 Air Quality

Air quality regulations applicable to surface coal mining include the National Ambient Air Quality Standards (NAAQS), Wyoming Ambient Air Quality Standards (WAAQS), Prevention of Significant Deterioration (PSD), National Source Performance Standards (NSPS), and the Federal Operating

Permit Program (Title V). These regulatory programs are described in detail in Appendix F of the 2008 WAII EIS.

Air quality information specific to the Antelope Mine is included in Antelope Mine air quality permit MD-13361 (WDEQ-AQD 2012). Section 3.4 of the 2008 WAII EIS includes detailed air quality discussions regarding the leasing and mining of coal related to a portion of the West Antelope II South Modification tract. Additional air quality discussions were included in Section 3.3.1 of the 2014 WAII South EA. The analysis presented herein includes discussion of recent air quality monitoring findings, updated discussions on particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), mercury (Hg), carbon monoxide (CO), lead (Pb), air quality related values (AQRVs), and hazardous air pollutants (HAPs).

3.4.1 Existing Antelope Mine Air Quality Summary

Baseline air quality data for the surface facilities area at the Antelope Mine are found in Section 3.4 of the 2008 WAII EIS and Section 3.3.1 of the 2014 WAII South EA. The climate in the general area is semi-arid with relatively short, warm summers and longer cold winters. Evaporation exceeds annual precipitation. The following discussions include updated (2020-2024) air quality monitoring results. PM_{10}, $PM_{2.5}$, and NO_2 are the only criteria pollutants monitored at the Antelope Mine. Nearby monitors are used to present baseline air quality data for all other criteria pollutants.

3.4.1.1 Air Quality-Monitoring Values

NTEC has monitored particulate matter levels around the mine throughout its life. Current (2025) air monitoring consists of three sites (5 Site, 6 Site, and 7 Site) that monitor continuous concentrations of PM_{10} (**Map 3-1**). **Table 3-1** lists the annual mean and high PM_{10} concentrations for the Antelope Mine from 2020-2024.

Table 3-1. Average Annual and Maximum 24-hr PM_{10} Concentrations ($\mu g/m^3$)

Site Name[1]	2020		2021		2022		2023		2024	
	Avg Annual	Max 24-hr	Avg Annual	Max 24-hr	Avg Annual	Max 24-hr	Avg Annual	Max 24-hr	Avg Annual	Max 24-hr
5 Site	20.9	96.3	20.7	94.0	22.0	133.3	17.7	91.8	21.6	123.3
6 Site	21.2	108.4	19.8	75.7	19.5	86.2	16.7	72.3	23.9	130.6
7 Site	14.2	70.2	15.6	74.2	15.6	109.0	12.3	64.6	15.5	79.8

[1] See **map 3-1** for site locations.
Source: IML Air Science 2020, 2021, 2022; Pace Analytical Services 2023, 2024

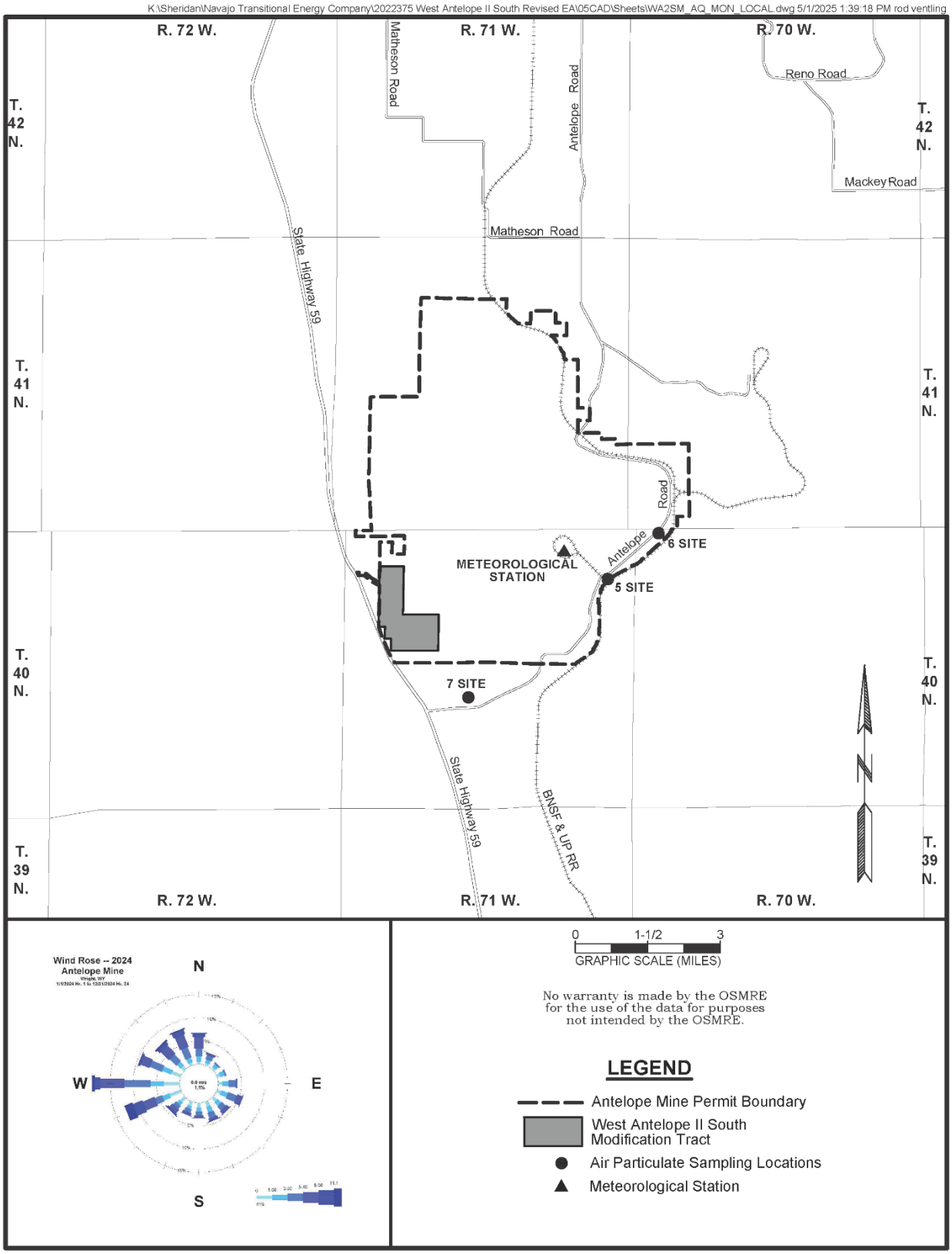
The average annual PM_{10} concentration from 2020-2024 ranged between 12.3 and 23.9 $\mu g/m^3$ (about 25 to 48 percent of the annual WAAQS of 50 $\mu g/m^3$). The 24-hour high PM_{10} was below the WAAQS and NAAQS for the period of 2020-2024.

Antelope Mine measured $PM_{2.5}$ at one site (7 Site) through 2020. **Table 3-2** lists the annual mean and 98th percentile 24-hour $PM_{2.5}$ concentrations for the Antelope Mine from 2017-2020. On-site monitoring demonstrated that ambient concentrations of $PM_{2.5}$, as determined by the 98th percentile 24-hour standard and annual average NAAQS and WAAQS values, were below the established 24-hour (35 $\mu g/m^3$) and annual (12 $\mu g/m^3$) standards.

Table 3-2. Measured $PM_{2.5}$ Concentrations ($\mu g/m^3$)

Site ID[1,2]	Year	24-hour	Annual
Antelope Site 7 (56-009-0009)	2017	20	5.8*
	2018	8	3.4*
	2019	7	2.2
	2020	27	4.7*

[1] See **map 3-1** for location.
[2] Antelope 7 Site began operating February 5, 2015, and shut down on August 27, 2020.
* Indicates the mean does not satisfy minimum data completeness criteria (not enough samples were collected throughout the year)
Source: U.S. Environmental Protection Agency (EPA) 2025a



Map 3-1. Wind Rose and Air Quality and Meteorological Monitoring Stations at the Antelope Mine and Surrounding Mines

3.4.1.2 Other Emissions

NO_2 concentrations (98th percentile, 1-hour) from the nearest Air Quality System (AQS) monitoring sites in Converse County are provided in **Table 3-3**. These monitoring sites are depicted on **Map 3-2**. All monitored NO_2 values were well below the WAAQS of 100 ppb.

Table 3-3. Measured NO_2 Concentrations (ppb)

AQS Site ID[1]	Sampler ID	2020	2021	2022	2023	2024
56-009-0009	Antelope Site 7	23	No data	No data	No data	No data
56-009-0010	Converse County Long-Term	18	13	19	14	13

[1] See **Map 3-2** for site locations. Site 56-009-0009, Antelope Site 7, shut down on August 27, 2020.
Source: EPA 2025a

Under the CAA, EPA has set protective health-based standards for O_3. O_3 monitoring is not required by WDEQ-AQD at Antelope Mine. However, O_3 levels have been monitored at WDEQ-AQD monitoring sites in Campbell County and Converse County. Data (4th-highest daily maximum value) from the nearest WDEQ-AQD sites to the Antelope Mine are provided in **Table 3-4**. An exceedance of the current O_3 8-hour standard occurs if the 4th-highest daily maximum value is above the level of the current NAAQS and WAAQS standard (0.070 ppm). Site 56-009-0010 exceeded the NAAQS and WAAQS 8-hour O_3 standard in 2020 and 2024 and Site 56-005-0123 exceeded the NAAQS and WAAQS 8-hour O_3 standard in 2021.

Table 3-4. Measured O_3 Concentrations ($\mu g/m^3$)

AQS Site ID[1]	Sampler ID	2020	2021	2022	2023	2024
56-005-0123	Thunder Basin Grassland Site	0.062	0.075	0.061	0.060	0.070
56-009-0010	Converse County Long-Term	0.071	0.070	0.059	0.058	0.071

[1] See **Map 3-2** for site locations.
Source: EPA 2025a

SO_2 concentrations (99th percentile, 1-hour) were monitored at one AQS monitoring site in Campbell County and one AQS monitoring site in Converse County (**Table 3-5**). All monitored SO_2 values were well below the NAAQS and WAAQS of 75 ppb.

Table 3-5. Measured SO_2 Concentrations ($\mu g/m^3$)

AQS Site ID[1]	Sampler ID	2017	2018	2019	2020	2021
56-005-0857	Wyodak Site 4	11	No data	No data	No data	No data
56-009-0011	Dave Johnson Air Quality Station	14	16	13	16	No data

[1] See **Map 3-2** for site locations. Site 56-005-0857 shut down on August 31, 2017. Site 56-009-0011 began operation in 2017 and shut down on November 17, 2020. Source: EPA 2025a

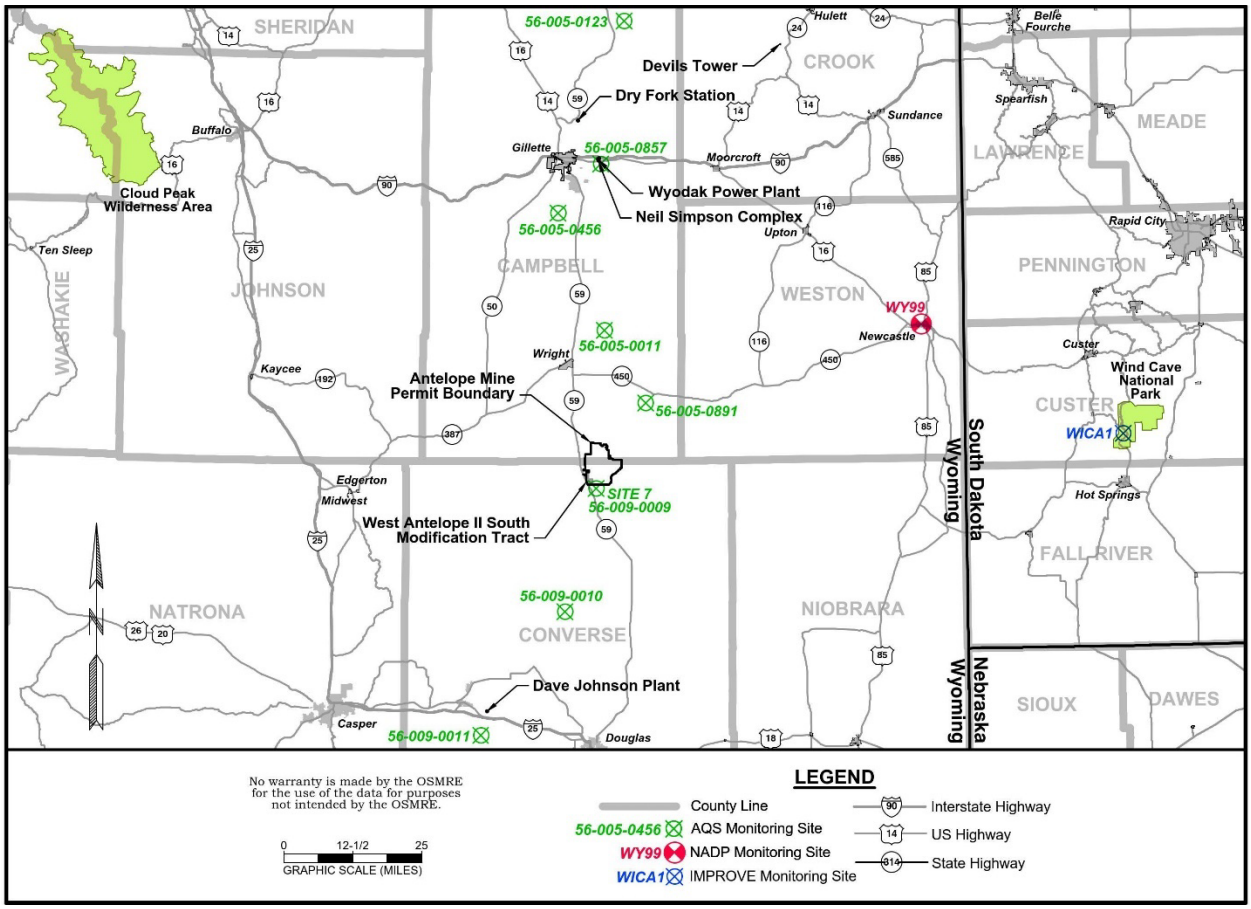
Annual Pb (a criteria pollutant), CO (an indirect greenhouse gas [GHG]), and Hg (a hazardous air pollutant [HAP]) monitoring values are not collected at the Antelope Mine.

Table 3-6 shows the Pb emissions from three coal-fired power plants in Campbell County and one coal-fired power plant in Converse County.

Table 3-6. Measured Annual Pb Air Emissions

Power Station or AQS Site	2019	2020	2021	2022	2023
Campbell County					
Wyodak Plant (pounds)	14.0	16.5	17.6	25.8	23.4
Dry Fork Station (pounds)	9.0	13.0	12.0	11.0	0.0
Neil Simpson Complex (pounds)	24.0	20.0	18.0	18.0	19.0
Converse County					
Dave Johnson Plant (pounds)	103.9	97.4	53.4	44.3	37.6

Source: EPA 2025b



Map 3-2. Regional Air Quality Monitoring Sites

CO is created when carbon-containing fuels are burned incompletely. CO concentrations are currently being monitored at one AQS monitoring site in Converse County (**Table 3-7**). All monitored CO values were well below the 8-hr NAAQS and WAAQS of 9 ppm and the 1-hr NAAQS and WAAQS of 35 ppm.

Table 3-7. Measured CO Concentrations

Site ID[1]	Year	8-hour (ppm)	1-hour (ppm)
Converse County Long-Term 56-009-0010	2020	0.4	0.4
	2021	0.5	0.4
	2022	0.3	0.3
	2023	0.5	0.5
	2024	0.3	0.7

[1] See **map 3-1** for location. Source: EPA 2025a

Table 3-8 shows the Hg emissions from three coal-fired power plants in Campbell County and one coal-fired power plant in Converse County, none of which receive coal from the Antelope Mine. Although Hg is not a criteria pollutant the EPA has finalized standards to reduce mercury from coal- and oil-fired power plants.

Table 3-8. Measured Annual Hg Stack (Air) Emissions (Pounds)

Power Station[1]	2019	2020	2021	2022	2023
Wyodak Plant					
Total Emissions	263.5	196.8	241.8	207.4	249.4
Stack (Air) Emissions	23.1	22.9	23.0	22.6	23.0
Percent of Total Emission Emitted to Air	9%	12%	10%	11%	9%
Dry Fork Station					
Total Emissions	23.0	55.0	52.0	55.0	59.0
Stack (Air) Emissions	21.0	38.0	31.0	32.0	34.0
Percent of Total Emission Emitted to Air	91%	69%	60%	58%	58%
Neil Simpson Complex					
Total Emissions	755.0	692.0	686.0	675.0	680.0
Stack (Air) Emissions	357.0	364.0	328.0	322.0	340.0
Percent of Total Emission Emitted to Air	47%	53%	48%	48%	50%
Total of Three Campbell County Power Stations					
Total Emissions	1,041.5	943.8	979.8	937.4	988.4
Stack (Air) Emissions	401.1	424.9	382.0	376.6	397.0
Percent of Total Emission Emitted to Air	39%	45%	39%	40%	40%
Dave Johnson Plant					
Total Emissions	364.9	311.5	234.7	300.0	479.6
Stack (Air) Emissions	42.5	36.7	31.8	39.0	39.0
Percent of Total Emission Emitted to Air	12%	12%	14%	13%	8%

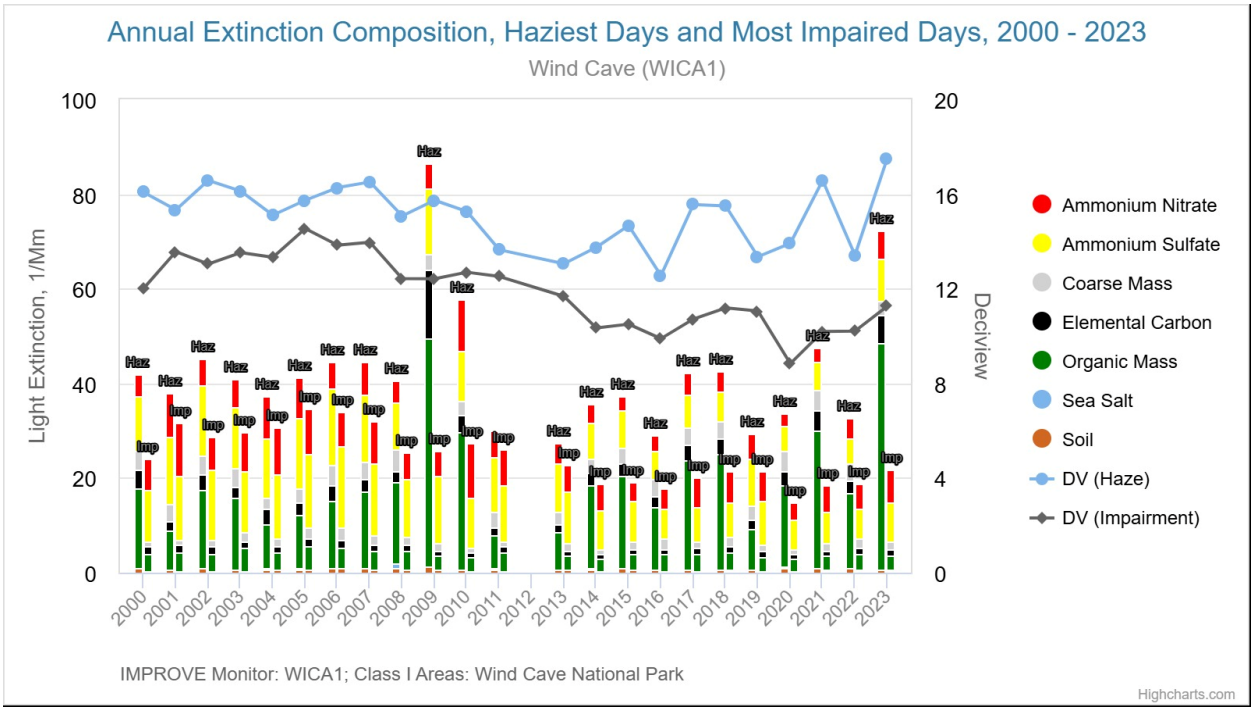
[1] See **map 3-2** for site locations. Source: EPA 2025b

3.4.1.3 Air Quality Related Values (AQRVs)

AQRVs, as related to the West Antelope II South Modification tract, were discussed in Section 3.4.4.1 of the 2008 WAII EIS. Updated information about AQRVs is included below. AQRVs are evaluated by the land management agency responsible for a PSD Class I area, according to the agency's Level of Acceptable Change. These AQRVs include potential air pollutant effects on visibility and the acidification of lakes and streams. The AQRVs, and the associated Level of Acceptable Change, are applied to PSD Class I and Class II areas. They are the land management agency's policy and are not legally enforceable as a standard. WDEQ-AQD WAAQS do include a standard for visibility. Class I areas are afforded specific AQRV protection under the CAA. The Class I designation allows very little deterioration of air quality. The nearest Class I area is approximately 95 miles east of the tract at Wind Cave National Park in South Dakota (**Map 3-2**). The AQRVs associated with this action include visibility and acidification of lakes.

3.4.1.3.1 Visibility

Surface coal mines are not considered to be major emitting facilities in accordance with the WDEQ Rules and Regulations (Chapter 6, Section 4). Therefore, the State of Wyoming does not require mines to evaluate their impacts on Class I areas, although OSMRE considers such issues during the federal mining plan modification review process. Visibility can be defined as the distance one can see and the ability to perceive color, contrast, and detail. $PM_{2.5}$ is the main cause of visibility impairment. Visibility impairment is expressed in terms of deciview. The deciview index was developed as a linear perceived visual change (Pitchford and Malm 1994) and is the unit of measure used in the EPA's Regional Haze Rule to achieve the National Visibility Goal. A change in visibility of 1.0 dv represents a "just noticeable change" by an average person under most circumstances. Increasing deciview values represent proportionately larger perceived visibility impairment. **Figure 3-1** shows the haziest days, and the most impaired days for the Wind Cave monitoring site for 2000-2023. The long-term trend in visibility at Wind Cave National Park appears to be relatively stable.



Source: Federal Land Manager Environmental Database 2025

Figure 3-1. Visibility in the Wind Cave National Park

3.4.1.3.2 AQRVs Related to Coal Combustion and Transport

Emissions that affect air quality also result from combustion of fossil fuels from power plants and locomotive emissions from transporting coal to power plants throughout the country. **Table 3-9** presents the estimated emissions from combustion of coal mined at the Antelope Mine. Combustion emissions are estimated since Antelope Mine supplies coal to coal combustion facilities throughout the U.S, although facilities vary annually based on demand and contracts.

Table 3-9. Estimated Annual Emissions from Combustion of Antelope Mine Coal

Source	Mt Coal Recovered	PM_{10} (Tons)	$PM_{2.5}$ (Tons)	NO_x (Tons)	CO (Tons)	VOC (Tons)	SO_2 (Tons)	VOCs (Tons)
2020-2024 Annual Average Antelope Mine	19.5	2,692	1,008	23,630	1,218	171	21,106	171
2020-2024 Average Annual Campbell County	219	30,259	11,338	265,661	13,694	1,917	237,288	1,917
2020-2023 Average Annual U.S. Coal	571	78,892	29,560	692,633	35,703	4,998	618,657	4,998

Source: WWC 2025, calculations are provided in **Appendix D**

Table 3-10 presents the estimated emissions from locomotive transport of coal mined at the Antelope Mine to power plants throughout the country for power generation.

Table 3-10. Estimated Annual Emissions (Tons) from Locomotive Transport

Year	Mt Coal Transported	Average Rail Miles	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOCs
2020	19.8	1,101	146	142	5,786	4	1,265	233
2021	21.7	1,084	158	153	6,252	5	1,367	251
2022	21.7	1,085	157	153	6,234	5	1,363	251
2023	16.4	1,082	139	135	5,527	4	1,209	222
2024	15.0	1,027	103	100	4,083	3	893	164

Source: WWC 2025, calculations are provided in **Appendix D**

3.4.1.3.3 Acidification of Lakes/Acid Deposition

Acid deposition causes acidification of lakes and streams, which can have direct impacts on aquatic habitats and contribute to the damage of trees at high elevation and many sensitive forest soils. Acid rain is measured as acidity and alkalinity using pH, for which 7.0 is neutral. The lower a substances pH, the more acidic it is. Normal rain has a pH of about 5.6 (EPA 2025c). The National Atmospheric Deposition Program (NADP) monitors precipitation chemistry at various sites around the U.S. The nearest site to the Antelope Mine is Site WY99 (**Map 3-2**), which measures free acidity (H^+ as pH). **Table 3-11** provides the measured pH for 2018-2023. The trend in pH at monitoring site WY99 appears to be relatively stable.

Table 3-11. Measured Hydrogen Ion Concentrations at Monitoring Site WY99

Parameter	2018	2019	2020	2021	2022	2023
pH	5.7	6.0	No Data	6.3	6.3	6.2

Source: NADP 2025

3.5 Greenhouse Gas Emissions

GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride) (EPA 2025d). For consistency between projects, OSMRE describes GHG emissions in terms of "CO_2-equivalents" (CO_2e). For GHG analysis, there is no specific analysis area and project emissions are used as a proxy.

CO_2 is emitted from the combustion of fossil fuels, including coal. CH_4 can be emitted during the production and transport of coal. N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Fluorinated gases are synthetic, powerful GHGs that are emitted from a variety of industrial processes. CO_2 and other GHGs are naturally occurring gases in the atmosphere; their status as a pollutant is not related to their toxicity but instead is due to the added long-term impacts they may have on climate because of their increased incremental levels in the earth's atmosphere. Because they are non-toxic and nonhazardous at normal ambient concentrations, CO_2 and other naturally occurring GHGs do not have applicable ambient standards or emission limits under the major environmental regulatory programs. Each GHG has a different lifetime in the atmosphere and a different ability to trap heat in the atmosphere. To allow different gases to be compared and added together, emissions can be converted into CO_2e emissions using the global warming potential (GWP) concept developed by the Intergovernmental Panel on Climate Change (IPCC). The EPA uses a 100-year time horizon in its Inventory of Greenhouse Gas Emissions and Sinks: 1990-2020 (EPA 2022) and Mandatory Greenhouse Gas Reporting rule. Therefore, project-related emissions are shown based on the 100-year GWP values. Additionally, total CO_2e from the project based on a 20-year time horizon is also shown for reference. The GWPs used to calculate CO_2e emissions presented in this section are based on the IPCC's Synthesis Report of the Sixth Assessment Report (AR6; IPCC 2023).

Estimates related to mining include emissions from all sources, including all types of carbon fuels used in the mining operations, electricity used on site (i.e., lighting for facilities, roads, and operations and electrically powered equipment and conveyors), the mining processes (i.e., blasting, coal fires caused by spontaneous combustion, methane released [vented] from exposed coal seams), and commuter transport. Direct CO_2e emissions include emissions directly related to the recovery of coal. GHG emission factors were obtained from the BLM Miles City Final Supplemental EIS and Proposed RMP Amendment Appendix C (BLM 2024a), which account for mine reclamation, coal extraction, overburden removal, and construction. Although the Antelope Mine has not completed CO_2e emissions inventories resulting from current coal recovery, these emissions were estimated by applying CO_2e emission ratios (CO_2e per Mt of coal produced, per Mt cubic yards of overburden moved, and CO_2e per acre of disturbance) from the Antelope Mine. Average annual direct CO_2e emissions estimates for the Antelope Mine from 2020-2024 are shown in **Table 3-12**

Table 3-12. Estimated Annual Average 2020-2024 Direct and Indirect CO_2e Emissions

Source	100-year Time Horizon	20-year Time Horizon
Mining	270,562	421,512
Commuter Transport	6,603	6,606
Total Estimated CO_2e Production	**277,165**	**428,118**

Source: WWC 2025a, calculations are provided in **Appendix D**

3.6 Water Resources

Sections 3.5.1.1, 3.5.2.1, and 3.5.3.1 of the 2008 WAII EIS include detailed discussions of water resources related to the leasing and mining of coal within the West Antelope II South Modification tract. The analyses included herein serve to update discussions with recent groundwater and surface water quality monitoring results and to update water rights discussions.

3.6.1 Groundwater

Section 3.5.1.1 of the 2008 WAII EIS provides a detailed discussion of the groundwater resources of the West Antelope II South Modification tract. The analysis area contains five water-bearing geologic units that have been directly affected by existing mining activities and would be directly affected by mining the West Antelope II South Modification tract. In descending order, these units are the recent alluvium, the Wasatch Formation overburden, the Anderson coal seam, the Fort Union Formation interburdern (where present), and the Canyon coal seam.

As indicated in the 2008 WAII EIS, the underlying, Tullock Member of the Fort Union Formation is used for water supply at local coal mines within the general area. The only shallow aquifer within the tract is the alluvium of Antelope Creek. Active groundwater monitoring well locations are depicted on **Map 3-3**.

The 2022 Cumulative Hydrologic Impact Assessment (CHIA) of Coal Mining in the Southern Powder River Basin, Wyoming (WDEQ-CHIA-43; WDEQ-LQD 2022) describes groundwater levels for the southern group of mines, including the Antelope Mine. The report used data from 170 coal monitor wells to construct potentiometric surface contours. The data shows that groundwater level elevations for the Anderson coal seam were greater than 4,700 feet along the northeastern sections of Black Thunder Mine, eastern sections of North Antelope Rochelle Mine, and the southern sections of the Antelope Mine. The generalized groundwater direction is from these higher elevations towards the lower groundwater elevations to the west with a regional north-northwest flow component. In addition, the WDEQ-CHIA-43 states that in the northern half of the Antelope Mine permit area there is potential for upward leakage from the underburden to the coal aquifer.

Since the publication of the 2008 WAII EIS, 30 new monitoring wells (six alluvial, one Anderson, two Canyon, three interburden, ten overburden, and eight backfill) have been completed within the Antelope Mine permit boundary and added to the WDEQ Water Quality Division (WQD) approved groundwater monitoring network. Thirty-four monitoring wells (five alluvial, eight Anderson, four Canyon, five interburden, nine overburden, and three underburden) have been removed from the WDEQ-WQD monitoring network since the publication of the 2008 WAII EIS. The removal of these wells resulted from pit advancement and was approved by WDEQ-WQD.

The following discussions on groundwater monitoring were taken from the 2024 Antelope Mine Annual Hydrology Report (WWC Engineering 2025b) and historic monitoring results. **Appendix E** provides a summary of all water quality results for the active wells.

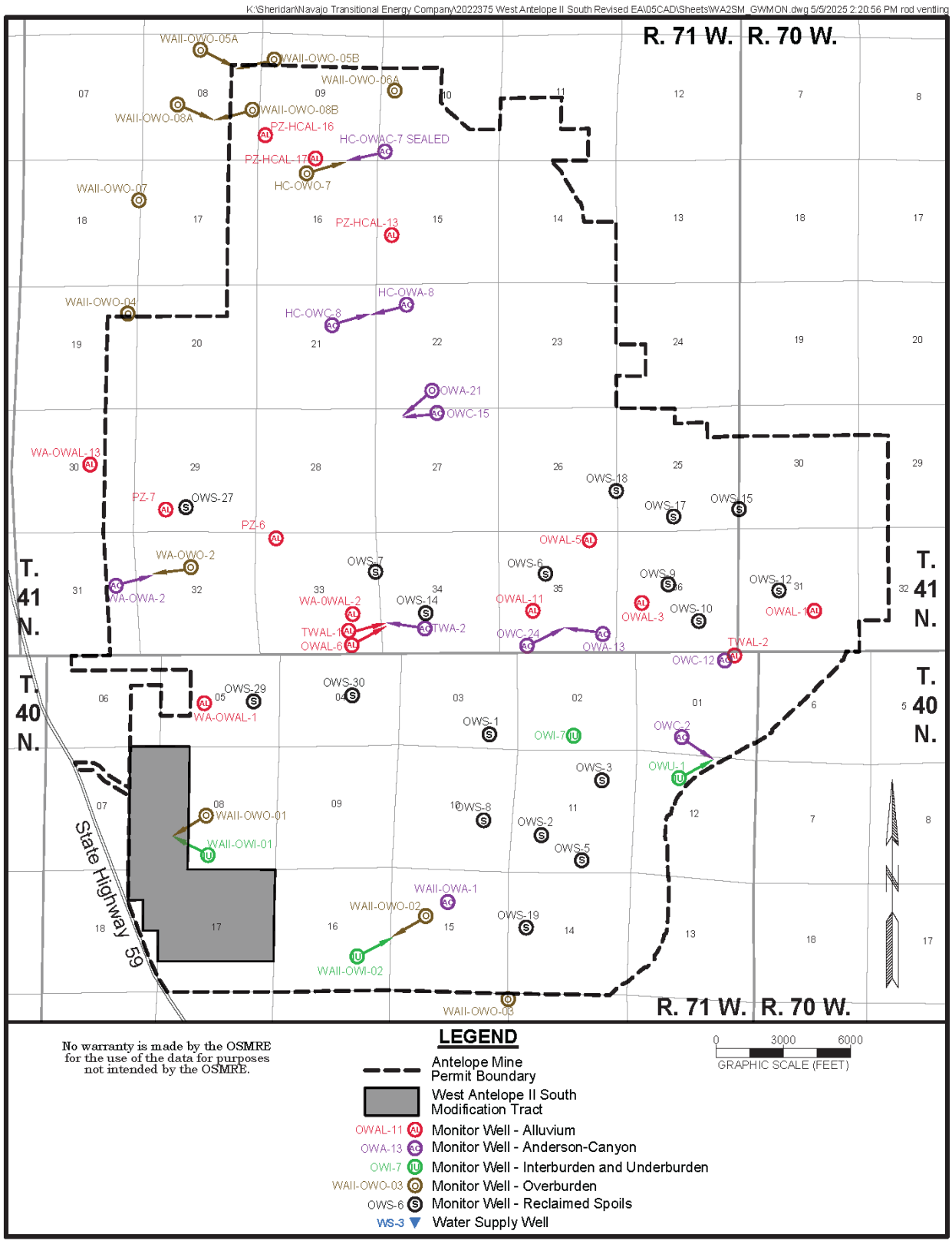
Alluvial Wells – In 2024 groundwater in most alluvial wells experienced slight water level changes attributed to seasonal streamflow variations. Twelve alluvial wells are included in the water quality portion of the Antelope Mine groundwater monitoring program. Long-term trends show alluvial groundwater levels have increased on the east side of AM but have decreased on the north and west sides of the mine. It is theorized that the increase on the east side is due to the backfilling of the NEMA pits. This backfilling slows seepage of water into the open pits. The decrease in the north and west sides is likely due to AM's mining advancements in the Horse Creek and West Antelope areas. Overall, the concentrations from the samples collected in 2024 from seven wells were consistent with historical concentrations. Current and historic parameters that have exceeded WDEQ-WQD Class III livestock standards include cadmium, chromium, manganese, oil and grease, sulfate, and total dissolved solids (TDS).

Overburden Wells – 2024 groundwater levels in the overburden wells were within four feet of 2023 water levels, with no anomalies occurring. Five overburden wells were sampled for water quality during the reporting period. TDS concentrations were consistent with historical concentrations. Current and historic water quality in the overburden wells met WDEQ-WQD Class III livestock standards, with the exception of manganese.

Anderson Coal Wells – Groundwater levels in the Anderson coal seam wells have declined through time due to the advancements of pits at the Antelope and North Antelope Rochelle mines and dewatering related to CBNG production. More recently, water levels in the Anderson wells have increased which is likely a result of CBNG production in the area ceasing. Two Anderson coal wells were sampled for water quality during 2024. TDS concentrations were consistent with historical concentrations. The only water quality parameter that has exceeded WDEQ-WQD Class III livestock standards in the two Anderson coal wells was manganese.

Canyon Coal Wells – Most wells completed in the Canyon coal seam show a downward trend in water levels since 1988. Some of these wells are showing an increase in water levels since CBNG production in the area has ceased. One Canyon coal well (OWC-2) was dry. Two Canyon coal wells were sampled for water quality during 2021. The current and historic water quality water quality in the coal wells exceeded WDEQ-WQD Class III livestock standards for manganese and selenium.

Interburden Wells – Groundwater levels in the interburden wells were similar to those in the Anderson and Canyon coal seams. Water levels in the interburden wells experienced only slight changes (less than 1 foot) between 2023 and 2024. One interburden well (OWI-11) did not produce enough water for sample collection. The only water quality parameter that has exceeded WDEQ-WQD Class III livestock standards in the interburden wells was manganese.



Map 3-3. Active Groundwater Monitoring Locations and Water Supply Wells at the Antelope Mine

Backfill Wells – Spoil wells OWS-7, OWS-27, OWS-29, OWS-30 and PZ-6 were dry during all four quarters in 2023. During this report period, water levels in most of the spoil wells did not change significantly and were within three feet of 2023 levels except for OWS-10, which increased by 3.32 feet. Water levels in most of the spoil wells remained above baseline levels in 2024. Nine backfill wells were sampled for water quality during 2024. The water quality meets WDEQ-WQD Class III livestock standards, with the exception of wells OWS-12 and OWS-15, which have continually exceeded the standard for TDS. TDS in all other backfill wells was consistent with historical concentrations.

3.6.2 Surface Water

A description of surface water related to the West Antelope II South Modification tract is provided in Section 3.5.2.1 of the 2008 WAII EIS. The tract is located within the Antelope Creek drainage, a tributary of the Cheyenne River. Antelope Creek is classified as an intermittent stream. Except for two road crossings, Antelope Creek flows undisturbed from west to east across the permit boundary.

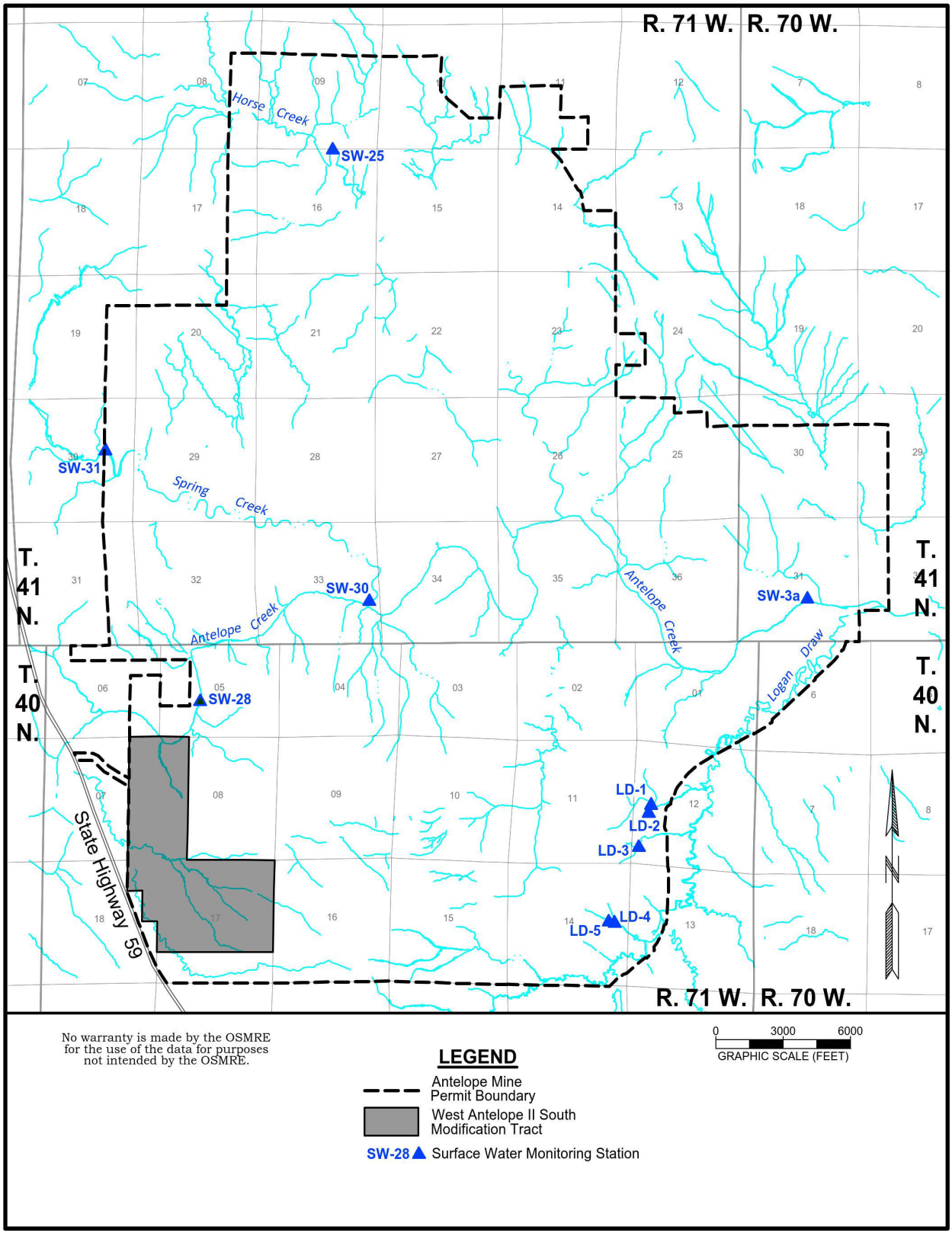
Streamflow and surface water quality associated with the Antelope Mine are currently monitored at five sites, including two sites on Antelope Creek (**Map 3-4**). Surface water site SW-28 is located upstream near the permit boundary, while site SW-3A is located downstream near the permit boundary. Flows and water quality data in Antelope Creek have been and continue to be monitored and reported annually to WDEQ-LQD.

Flow data indicates that stream flow is generally highest with increasing precipitation. The highest flow rates are typically measured in the spring and during precipitation events throughout the summer months. In 2024, site SW-28 was the only site to measure flow. The other sites did not collect data during the 2024 report period due to equipment malfunction. Site SW-28 measured increased flow starting on May 6, 2024, to about 27 cfs, which tapered off to under 1 cfs within approximately one month.

The WDEQ-WQD has classified Antelope Creek as Class 3B water (WDEQ-WQD 2021). Class 3B waters are intermittent and ephemeral streams that do not support fish populations or drinking water supplies. Between 2018 and 2024, four samples were collected from site SW-28, one sample was collected from Site SW-30, and two samples were collected from site SW-3A. The dominant cations at all stations were sodium and calcium and sulfate was the dominant anion. TDS was fairly consistent at all sites and ranged from 1,730 to 3,290 mg/L. Dissolved metal concentrations were very low at all stations, with nearly all values below detection limits. There were no exceedances of WDEQ-WQD standards.

3.6.3 Water Rights

Section 3.5.3.1 of the 2008 WAII EIS provide a detailed discussion of the water rights within and surrounding the West Antelope II South Modification tract. The SEO records indicate that as of April 2025, there were 17 surface-water rights within the 2-mile search area, of which five are owned by U.S. Department of Agriculture, five are owned by a corporation, and the remaining six are owned by private surface owners (SEO 2025). All the surface water rights are permitted for livestock use, with the exception of one that is permitted for industrial use. SEO records indicate that, as of April 2025, there were 51 permitted and complete groundwater wells within the 2-mile search area, of which 28 monitor wells are permitted by NTEC (SEO 2025). The other 26 are permitted for CBNG (4), CBNG and miscellaneous (4), domestic (1), domestic and stock (2), miscellaneous (4), monitoring (2), and stock (11).



Map 3-4. Surface Water Monitoring Sites at the Antelope Mine

3.7 Alluvial Valley Floors

Alluvial valley floors (AVFs) within the West Antelope II South Modification tract are described in Section 3.6.1 of the 2008 WAII EIS. Antelope Creek has been investigated for the presence of AVFs including one mile upstream of the 2008 permit boundary, which included a portion of the West Antelope II South Modification tract. A portion of Antelope Creek has been designated by WDEQ-LQD as "possible subirrigated AVF of minor importance to agriculture." The AVF area lies within the 100-foot buffer zone of Antelope Creek.

3.8 Wetlands

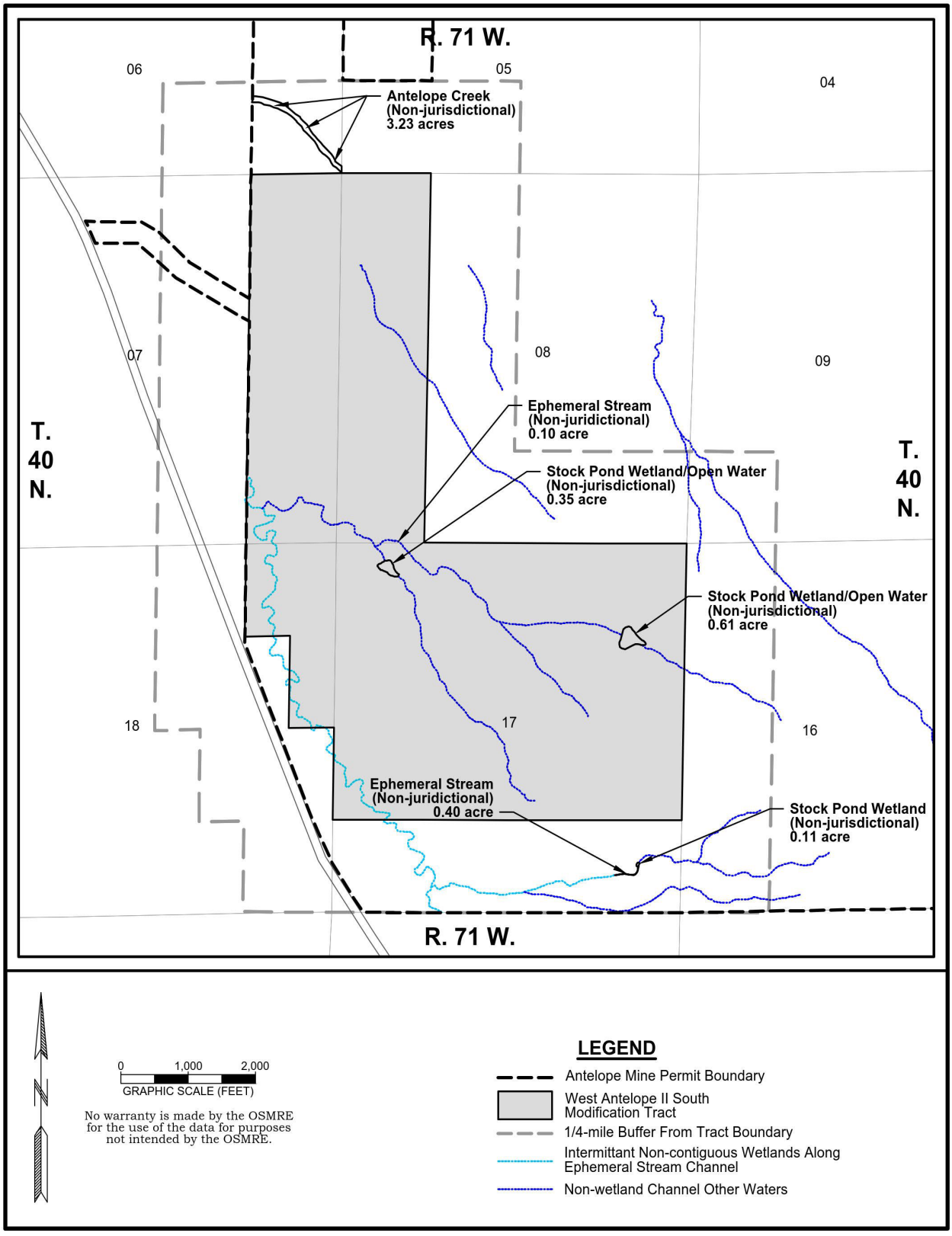
As described in Section 3.7.1 of the 2008 WAII EIS, a portion of the West Antelope II South Modification tract within the permit area was previously delineated for wetlands. The information provided in the 2008 WAII EIS on wetlands was based on preliminary wetlands mapping conducted in 2006-2007 and on a partial wetland delineation. The remaining portion of the tract and an area adjacent to the tract were subsequently surveyed for wetlands (Intermountain Resources 2011) and the U.S. Army Corps of Engineers (USACE) issued a formal wetland determination in 2012 (USACE 2012a and 2012b). The USACE determined that none of the aquatic sites within the Antelope Mine are waters of the United States and therefore agency authorization is not required for coal mining activities at the Antelope Mine (USACE 2012a and 2012b). As shown on **Map 3-5**, there are approximately 4.8 acres of non-jurisdictional aquatic features within and adjacent to the tract (Intermountain Resources 2011). Because jurisdictional determinations are only valid for a five-year period, NTEC will work with the USACE to determine if additional wetland surveys and a new jurisdictional verification are required prior to commencing any construction activities with the West Antelope II South Modification tract.

3.9 Soils

Soils within the West Antelope II South Modification tract are described in Section 3.8.1 of the 2008 WAII EIS. The soil types and depths on the tract are similar to soils currently being salvaged and utilized for reclamation at the Antelope Mine and other nearby mines in the southern PRB. The amount of suitable topsoil that would be available for redistribution on all disturbed acres within the tract has an average depth of 19 inches (1.6 feet). The tract includes approximately 76 acres of prime farmland, if irrigated (NRCS 2019). As of December 2024, 79.9 acres within the tract have been disturbed from mining at the Antelope Mine unrelated to coal recovery within the tract (NTEC 2025a). No overburden has been removed from the tract, but there have been a few small disturbances associated with roads and topsoil piles.

3.10 Vegetation

Vegetation within the West Antelope II South Modification tract is described in Section 3.9.1 of the 2008 WAII EIS. The predominant vegetation types within the tract are blue grama upland (*Bouteloua gracilis*), blue grama roughland (*Bouteloua gracilis*), big sagebrush upland (*Artemisia tridentate*), and birdsfoot sagebrush upland (*Artemisia pedatifida*). As described above, 79.9 acres within the tract have been disturbed from mining at the Antelope Mine unrelated to coal recovery within the tract.



Map 3-5. Wetlands within and surrounding the West Antelope II South Modification Tract

3.10.1 Threatened, Endangered, Proposed, and Candidate Plant Species

Threatened and endangered (T&E) plants protected under the ESA were discussed in Section 3.9.3 and Appendices H and I of the 2008 WAII EIS. The current USFWS list of plant T&E species that may occur in the vicinity of the tract includes the Ute ladies'-tresses (*Spiranthes diluvialis*) (USFWS 2025a). No Ute ladies'-tresses were found during surveys conducted in potential habitats on the Antelope Mine permit area and the tract (AC 2014). In addition, the USFWS has not designated any critical habitat for this species in the vicinity of the Antelope Mine at this time (USFWS 2025a).

OSMRE determined that the Proposed Action "may effect but is not likely to adversely affect" Ute ladies'-tresses. OSMRE submitted a letter to the USFWS on May 8, 2025, requesting written concurrence on the determination of the Ute ladies'-tresses. On May 15, 2025, the USFWS concurred with OSMRE's determination (USFWS 2025c).

3.11 Wildlife

The occurrence of wildlife related to the mining of the Federal coal within the West Antelope II South Modification tract was thoroughly discussed in Section 3.10.1 of the 2008 WAII EIS. The information included in the 2008 WAII EIS was derived from the baseline data and the subsequent studies and WDEQ-LQD annual reports.

No significant changes to wildlife use areas for big game, other mammals, upland game birds (excluding the Greater sage-grouse [GRSG] [*Centrocercus urophasianus*]), other birds, reptiles and amphibians, or aquatic species populations have been noted from the previous discussion presented. There have been updates to raptors, T&E species, and species of special interest; the status of GRSG has also changed since publication of the 2008 WAII EIS. Therefore, these species discussions have been updated in this EA.

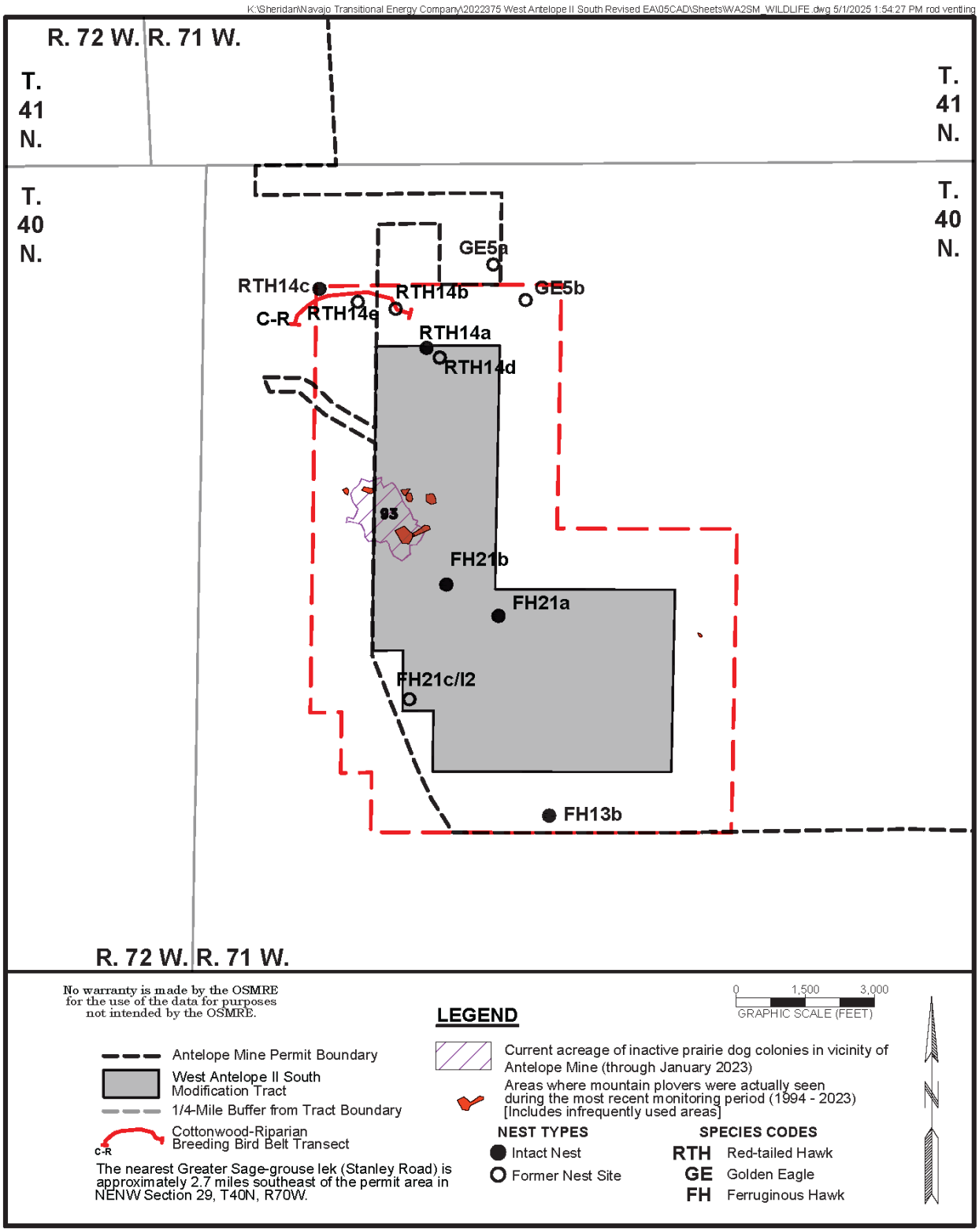
3.11.1 Raptors

The Antelope Mine 2024 Wildlife Monitoring Report identified the location and annual status of raptor nests (ICF 2025). The location and status of raptor nests monitored at the mine are included on **Map 3-6**, including three intact raptor nests within the West Antelope II South Modification tract and two intact nests within 0.25 mile of the tract.

Raptor species that were observed to be active during recent wildlife monitoring efforts were red-tailed hawks (*Buteo jamaicensis*), golden eagles (*Aquila chrysaetos*), and ferruginous hawks (*Buteo regalis*)). Other raptors that could potentially occur in the area include the burrowing owls (*Athene cunicularia),* Coper's hawks (*Accipiter cooperii),* sharp-shinned hawks *(Accipiter striatus),* rough-legged hawks *(Buteo lagopus),* Swainson's hawks (*Buteo swainsoni*), prairie falcons (*Falco mexicanus*), northern harriers (*Circus cyaneus*), osprey (*Pandion haliaetus*), great horned owls (*Bubo virginianus*), short-eared owls (*Asio flammeus*), long-eared owls (*Asio otus*), bald eagles (*Haliaeetus luecocephalus*), and American kestrels (*Falco sparverius*) (**Appendix F**).

3.11.2 Greater Sage-grouse (GRSG)

The State of Wyoming has not designated any core, connectivity, or winter concentration areas for GRSG (EO No. 2019-3; Office of the Governor 2019) in the Antelope Mine permit area or 1.0-mile perimeter. The nearest core area is the Thunder Basin core area, approximately 15 miles southeast of the West Antelope II South Modification tract. According to the BLM Buffalo Field Office Resource Management Plan, the tract is within a general habitat management area for GRSG (BLM 2015). This classification prohibits or restricts surface disturbing and disruptive activities within 0.25 mile of the perimeter of occupied GRSG leks. No GRSG leks occur within 0.25 mile of the tract.



Map 3-6. Raptor Nest Sites within and Adjacent to the West Antelope II South Modification Tract

In 2000, the WDEQ-LQD approved revisions to Permit No. 525 that eliminated surveys for upland game bird broods from the wildlife monitoring program. The revision was based on recommendations made by the WGFD. In 2014, Antelope Mine voluntarily elected to resume annual GRSG brood surveys. Despite the extremely limited historical presence of GRSG in the area, the Antelope Mine searches for GRSG leks in suitable habitat within the monitoring area (permit area and 1.0-mile perimeter). No new GRSG leks were discovered in or within 1.0 mile of the Antelope Mine permit area during 2024 (ICF 2025). The nearest lek (Steckley Road) is approximately 2.7 miles southeast of the permit boundary.

3.11.3 Vertebrate Threatened, Endangered, and Candidate Species and Species of Special Interest

OSMRE submitted a letter to the USFWS on May 8, 2025, requesting consultation on the monarch butterfly and the Suckley's cuckoo bumble bee, species proposed for listing under the ESA. On May 15, 2025, the USFWS concurred with OSMRE's determination that the project is not likely to adversely affect listed species or critical habitat (USFWS 2025c).

The information presented in this section was obtained from the USFWS's Information for Planning and Conservation (IPaC) system and the Natural Resource and Energy Explorer (NREX), which is a web GIS-based software tool that supports pre-planning development considerations that facilitates the assessment of energy, environmental, cultural, socioeconomic and infrastructural assets in Wyoming (NREX 2024).

3.11.3.1 Threatened, Endangered, and Candidate Insect Species

T&E species were discussed in Section 3.10.8 of the 2008 WAII EIS. The current IPaC list includes the monarch butterfly (*Danaus Plexippus*) and the Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*) (USFWS 2025a). The monarch butterfly is listed as proposed threatened through the conterminous United States. Although records of this species in Wyoming are limited, monarch butterflies have been recorded in Campbell and Converse Counties (Wyoming Natural Diversity Database [WYNDD] 2025). During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily Asclepias spp.), and larvae emerge after two to five days. The 2023 wildlife report indicates that there are habitats in the Antelope Mine permit that support monarch butterflies during migration (ICF 2025). Large cottonwoods along Antelope Creek could provide marginal roost locations. Flowers and milkweed, where present in mesic drainages and along pond edges, could provide forage and nesting habitat. No surveys for monarch butterflies have been conducted to date at the Antelope Mine.

The Suckley's cuckoo bumble bee is listed as proposed endangered in 20 states, including Wyoming. As of February 2025, the USFWS is working on developing consultation guidance for the bumble bee. As part of the guidance, the USFWS has indicated it will publish mapped areas (called High Potential Zones) in the future (USFWS 2025b). No surveys for the Suckley's cuckoo bumble bee have been conducted to date at the Antelope Mine.

3.11.3.2 Species of Special Interest

NREX information was utilized for the determination of species of special interest that could occur in the area. For the purposes of this discussion, species of special interest include BLM sensitive species, Wyoming Natural Diversity Database (WYNDD) species of concern (SOC), species protected under the MBTA, and WGFD species of greatest conservation need (SGCN). USFWS T&E species are not included in this category. As determined from the NREX list, 116 species of special interest have the potential of occurring within the West Antelope II South Modification tract.

As shown in **Appendix F**, 100 WGFD SGCN, 23 species protected under the MBTA, 63 WYNDD SOC, 21 BLM sensitive species, and three WGFD-designated Tier I species have the potential of occurring within the West Antelope II South Modification tract. The mountain plover is also listed under the WGFD designated Tier I category. In 2022, mountain plovers were observed on the active prairie dog colony within the tract, as shown on **Map 3-6** (ICF 2025).

3.12 Land Use and Recreation

Land use and recreation on the West Antelope II South Modification tract are described in Section 3.11.1 of the 2008 WAII EIS. All the surface estate on the tract is owned by NTEC. Livestock grazing and wildlife habitat are the primary land uses. Gas production and recreation are the secondary land uses.

3.13 Cultural Resources

Information regarding background cultural resources was included in Section 3.12.1 of the 2008 WAII EIS and Section 3.2 of the 2014 WAII South EA. The West Antelope II South Modification tract and surrounding area has been surveyed for cultural resources at a Class III level. There are 18 cultural sites located within and adjacent to the tract survey area (**Table 3-12**).

Table 3-12. Cultural Sites Within and Adjacent to the West Antelope II South Modification Tract

Site Number	NRHP Status	Author/Org	Report/Project Name	Site Type
48CO0047	NE	OWSA	No Associated Report	P
48CO1709	NE	TRC/Mariah & Associates	WYDOT Linear Survey	H
48CO1710	NE	TRC/Mariah & Associates	WYDOT Linear Survey	H
48CO1716	NE	USFS	Antelope Creek Land Exchange	P
48CO1717	NE	USFS	Antelope Creek Land Exchange	P
48CO1719	NE	USFS	Antelope Creek Land Exchange	P
48CO1720	NE	USFS	Antelope Creek Land Exchange	M
48CO1721	NE	USFS	Antelope Creek Land Exchange	M
48CO1722	NE	USFS	Antelope Creek Land Exchange	P
48CO1723	NE	USFS	Antelope Creek Land Exchange	M
48CO2248	NE	AEC	Antelope Mines Fuel Pipeline	M
48CO2830	NE	GCM Services	West Antelope Drilling Additions	H
48CO2831	NE	GCM Services	West Antelope Drilling Additions	P
48CO2833	NE	GCM Services	West Antelope Drilling Additions	P
48CO2923	NE	GCM Services	West Antelope II & Off Lease Drill	P
48CO3077	E	GCM Services	West Antelope II Buffer	P
48CO3078	E	GCM Services	West Antelope II Buffer	P
48CO3079	NE	GCM Services	West Antelope II Buffer	P

NRHP Status: NE=Not Eligible; E=Eligible, NE (CON)=Not Eligible by Consultant, E (CON)=Eligible by Consultant
Site Type: P=Prehistoric; H=Historic; M=Multi-component
Source: 2008 WAII EIS, GCM 2009, 2011, 2014, and 2015

3.14 Visual Resources

Visual resources on the West Antelope II South Modification tract are described in Section 3.13.1 of the 2008 WAII EIS. According to the most recent BLM Buffalo Field Office Resource Management Plan, the West Antelope II South Modification tract is within visual resource management Class IV (BLM 2015). The objective of Class IV is to provide for management activities that require major modification of the existing character of the landscape. Currently, mine facilities and mining activities

at the Antelope Mine are visible from State Highway 59 and County Road 37 (Antelope Coal Mine Road) in Converse County, and Country Road 4 (Antelope Road) in Campbell County.

3.15 Noise

Noise on the West Antelope II South Modification tract is described in Section 3.14.1 of the 2008 WAII EIS. Existing noise sources in the tract vicinity include coal mining activities, rail traffic, traffic on the nearby state highway, county and access roads, natural gas compressor stations, and wind. The 2008 WAII EIS describes a noise survey at the two occupied locations closest to the Antelope Mine in 2004. The maximum daily time weighted (L_{eq}) noise reading was 51 A-weighted sound levels (dBA) at the Don Jacobs residence, located directly west of the mine. At the Dyno Nobel West Region office, located northeast of the mine on County Road 37, the L_{eq} was 52.6 dBA. These noise levels are equivalent to an average office environment. The nearest occupied residence to the West Antelope II South Modification tract is approximately 1.5 miles to the west-southwest.

3.16 Transportation

Transportation in the vicinity of the West Antelope II South Modification tract is described in Section 3.15.1 of the 2008 WAII EIS. Major roads in the general area of the tract include State Highway 59, County Road 37 (Antelope Coal Mine Road) in Converse County, and Country Road 4 (Antelope Road) in Campbell County. Existing transportation facilities include roads, railroads, and overhead electrical transmission lines associated with the Antelope Mine. All coal mined at the Antelope Mine is transported by rail (BNSF and Union Pacific [UP] trackage) as described in **Section 1.2.1** of this EA.

3.17 Hazardous and Solid Waste

Hazardous and solid waste in the West Antelope II South Modification tract is described in Section 3.16.1 of the 2008 WAII EIS. Potential sources of hazardous or solid waste on the tract include spilled, leaked, or dumped hazardous substances, petroleum products, and/or solid waste associated with coal and oil and gas exploration, oil and gas development, the BNSF and UP railroad, utility line installation and maintenance, or agricultural activities.

3.18 Socioeconomics

This section describes existing socioeconomic conditions in Wyoming, Campbell County, and Converse County specific to the state and local economy, population, and employment. The discussions included in Section 3.17 of the 2008 WAII EIS described socioeconomic conditions associated with the Antelope Mine in 2006. Demographics in the area have not changed considerably since the preparation of the 2008 WAII EIS, therefore housing and local government services are not reevaluated in this EA. The following includes updated discussions on the local economy, population, and employment.

3.18.1 State and Local Economy

Wyoming's coal mines (surface and underground) produced an estimated 190.7 Mt of coal in 2024, a decrease of about 275.6 Mt (41 percent) from the record 466.3 Mt produced in 2008 and lower than the 237.1 Mt produced in 2023 (WDWS 2008, 2023, and 2024). Coal produced from 12 active mines in Campbell County accounted for approximately 97 percent of total statewide coal production in 2024 (WDWS 2024). Coal produced from Antelope Mine in 2024 accounted for approximately 8 percent of the total statewide coal production (WDWS 2024). According to coal production numbers

from the U.S. Energy Information Administration (EIA), the coal from Campbell County accounted for approximately 34 percent of the coal produced in the United States in 2023 (EIA 2025).

The estimated total fiscal impact from coal production in Campbell County to the State of Wyoming in 2024 was calculated based on coal produced from the county in 2024. The sale of coal from Campbell County in 2024 resulted in an estimated $409,348,003 of federal revenues and $512,039,718 in state revenues. (**Appendix G**).

3.18.2 Population

In 2023, Campbell County and Converse County were ranked as the 3rd and 13th most populous of Wyoming's 23 counties, respectively (WDWS 2025). The majority of the Campbell County mine employees and support services reside in Gillette, while the majority of those mine employees and support services from Converse County reside in Douglas. **Table 3-13** presents the population changes for Campbell and Converse counties for 2010 and 2020 and 2023.

Table 3-13. Campbell and Converse Counties Population Change, 2010-2020

	2010	2020	2023 Estimate	2010-2020 Change	2010-2020 Percent Change	2020-2023 Change	2020-2023 Percent Change
Campbell County	46,245	47,026	47,018	781	1.7	-8	-0.02
Converse County	13,823	13,751	13,759	-72	-0.5	8	0.06

Source: U.S. Census Bureau 2025

Employment in mining decreased from 7,788 in the third quarter 2023 to 7,068 in the third quarter 2024 (WDWS 2025). The WDWS indicates that several of the job losses in the mining sector were due to non-economic code changes. Non-economic code changes result when employers are reclassified to better reflect their ownership and/or their industry. **Table 3-14** presents the employment changes for Wyoming, Campbell County, and Converse County for 2017-2023.

Table 3-14. State of Wyoming, Campbell, and Converse Counties Employment Rate Change, 2017-2023

	2017	2018	2019	2020	2021	2022	2023
Wyoming (Number Employed)	280,689	277,820	283,379	276,740	277,375	283,348	287,746
Wyoming (Number Unemployed)	12,234	11,754	11,003	16,985	13,034	10,094	8,639
Wyoming Unemployment Rate	4.2	4.1	3.7	5.8	4.5	3.4	2.9
Campbell County (Number Employed)	21,897	21,883	22,424	21,591	20,842	24,105	24,933
Campbell County (Number Unemployed)	1,121	938	890	1,575	1,158	820	723
Campbell County Unemployment Rate	4.9	4.1	3.8	6.8	5.3	3.4	2.7
Converse County (Number Employed)	7,147	7,276	8,406	7,528	7,132	6,139	6,172
Converse County (Number Unemployed)	333	278	252	472	364	178	142
Converse County Unemployment Rate	4.5	3.7	2.9	5.9	4.9	2.9	2.3

Source: U.S. Bureau of Labor Statistics 2025

4.0 Environmental Consequences

4.1 Introduction

This chapter discusses the potential direct and indirect impacts of the Proposed Action described in **Chapter 2**. As mining activity from other portions of the Antelope Mine would occur under both the Proposed Action and the No Action Alternatives, the No Action Alternative is presented under each resource discussed for reference to display the difference between only continuation of existing permitted mining activity under the No Action Alternative and continuation of existing permitting mining activity that includes the proposed mine plan modification that would occur under the Proposed Action. To provide context for this comparison, this chapter describes the impacts of past, present, and reasonably foreseeable actions (RFFAs) when coupled with the Proposed Action. RFFAs discussed in this chapter consider the other activities and processes in the area including nearby coal mines, scoria pits, oil, gas, and CBNG. These discussions are organized by resource areas in the same order as they are described in **Chapter 3**.

An impact, or effect, is defined as a modification to the environment brought about by an outside action. Impacts vary in significance from no change, or only a slightly discernible change, to a full modification or elimination of the resource. Impacts can be beneficial (positive) or adverse (negative). Impacts are described by their level of significance (i.e., major, moderate, minor, negligible, or no impact). For purposes of discussion and to enable use of a common scale for all resources, resource specialists considered the following impact levels in qualitative terms.

- **Major**: Impacts that potentially could cause significant depletion, change, or stress to resources or stress within the social, cultural, and economic realm.
- **Moderate**: Impacts that potentially could cause some change or stress to an environmental resource, but the impact levels are not considered significant.
- **Minor**: Impacts that potentially could be detectable but slight.
- **Negligible**: Impacts in the lower limit of detection that potentially could cause an insignificant change or stress to an environmental resource or use.
- **No Effect/Impact**: No discernible or measurable impacts.

Impacts can also be defined as direct and indirect. Terminology presented in this analysis includes the following:

- **Direct** impacts are those impacts which are caused by the action and occur at the same time and place.
- **Indirect** impacts are those that are caused by the action and occur later in time or are farther removed in distance but are still reasonably foreseeable.

Impacts of past, present and reasonably foreseeable future actions along with the Proposed Action are also discussed. These impacts result from incremental effects of an action when added to other past, present, and RFFAs regardless of what agency or other entity undertakes such other actions. These impacts occur over a given period when the impacts of past, present, and RFFAs overlap with the period when project impacts would occur (including the coal recovery and reclamation phases).

The duration of impacts is also presented throughout this chapter, as follows:

- **Short-term** impacts generally occur over a short period and revert to pre-disturbance conditions within a few years after mining occurs.

- **Long-term** impacts are defined as those that would remain beyond mining-related activities (including reclamation), generally lasting the life of the alternative being evaluated (e.g., federal mining plan modification approval) and beyond.
- **Permanent** impacts are defined as those that would remain indefinitely (i.e., those impacts that would permanently alter a resource and/or result in permanent loss of a resource).

The direct and indirect effects of the Proposed Action and the circumstances described under the No Action Alternative are comparable to those described in the 2008 WAII EIS, except as noted herein. In addition to addressing the specific issues identified in **Chapter 1**, this updated environmental consequences analysis reflects updated descriptions of the affected environment presented in **Chapter 3** that have taken place since the 2008 WAII EIS and 2014 WAII South EA.

Under the Proposed Action, OSMRE would recommend and the ASLM would approve the federal mining plan modification to mine coal in the West Antelope II South Modification tract. Coal recovery would to continue within Antelope Mine permit area at an estimated annual rate of 30 Mt. The recovery of the approximately 15.8 Mt of Federal coal would continue for approximately 0.5 additional years over the No Action Alternative. New mine facilities would not be required in connection with the Proposed Action; however, there would be an additional disturbance of approximately 879.5 acres over the No Action Alternative.

Under the No Action Alternative, OSMRE would not recommend and the ASLM would not approve the mining plan modification to allow mining of the Federal coal within the West Antelope II South Modification tract. Currently approved mining operations associated with Federal coal would continue for approximately 11.3 years within existing federal leases, at a rate of approximately 30 Mtpy. The disturbance would be similar to those under the Proposed Action although the impacts to approximately 879.5 acres to recover Federal coal within the tract would not occur.

The discussion of past, present and RFFAs in this chapter consider the impacts other activities and processes in the area as reasonably foreseeable environmental trends and planned actions – i.e., the Affected Environment – to provide context for the comparison between the Proposed Action and the No Action Alternatives. Past, present and RFFAs include nearby coal mines, scoria pits, oil, gas, and CBNG. The mines included in the analysis are those in the southern group of PRB mines: Black Thunder Mine and North Antelope Rochelle Mine (NARM). The Black Thunder and NARM are the two largest producing coal mines in Wyoming. In 2024, Black Thunder produced 44.5 Mt and NARM produced 59.8 Mt (WDWS 2024). There are several limited mining scoria operations within Campbell and Converse counties. In addition, there is scoria pit in Converse County that operates under LQD Permit No. PT0825. This operation was approved in 2015. Oil and gas operations have been and will continue in both Campbell and Converse counties. In February 2025, 1,500,969 barrels of oil and 8,813,355 million cubic feet of gas in Campbell County and 3,551,805 barrels of oil and 7,681,518 million cubic feet of gas in Converse County (WOGCC 2025). CBNG production in Campbell County peaked around 2000 and started to decline in 2012. In February 2025, gas production in Campbell County from CBNG was 41,017 mcf. It is expected the CBNG production will continue to decline.

4.2 Topography and Physiography

4.2.1 Direct and Indirect Impacts

4.2.1.1 Proposed Action

The direct and indirect impacts to topography and physiography would not be significantly different from those described in Section 3.2.2.1 of the 2008 WAII EIS but would occur on 879.5 acres within the West Antelope II South Modification tract. After mined-out areas are reclaimed, the land surfaces

would be gentler, with more uniform slopes and restored basic drainage networks. The direct effects on topography and physiography resulting from the Proposed Action would be moderate and permanent. Indirect effects under the Proposed Action would include topographic moderation on wildlife habitat diversity which would be permanent.

4.2.1.2 No Action Alternative

While impacts from the other portions of the Antelope Mine would continue under the No Action Alternative, the No Action Alternative would not authorize NTEC's proposed mining plan modification request, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered, and approximately 879.5 acres would not incur topographic impacts.

4.2.2 Past, Present, and RFFAs

Impacts from the Proposed Action when considered in the context of impacts from past, present, and RFFAs to topography and physiography would not be significantly different from those described in Section 4.2.1 of the 2008 WAII EIS. The impacts would primarily be related to the southern group of mines and would include altering the topography which would result in more uniform slopes and restored drainage networks. Oil and gas development in the area would add to the alteration of topography but would be more discrete and spread out over a larger area. The impact of the Proposed Action when considered in the context of past, present and RFFAs on topography and physiography are expected to be moderate and permanent.

4.2.3 Mitigation Measures

The mined-out area must be restored to approximate original contour or other topographic configuration approved by WDEQ-LQD and consistent with SMCRA.

4.3 Geology, Mineral Resources, and Paleontology

4.3.1 Direct and Indirect Impacts

4.3.1.1 Proposed Action

The direct and indirect impacts to geology would not be different from those described in Section 3.3.1.2.1 of the 2008 WAII EIS. Under the Proposed Action, the geology from the base of the lowest coal seam mined to the land surface would be subject to permanent change after the coal is removed. The replaced overburden and backfill would be a mixture of the geologically distinct layers of sandstone, siltstone, and shale that currently exist. As a result, the physical characteristics of the backfill would be different from the physical characteristics of the existing layered overburden. The Proposed Action would result in the recovery of approximately 14.5 Mt of recoverable federal coal within the Anderson and Canyon coal seams. The direct and indirect impacts on geology are expected to be moderate and permanent on the West Antelope II South Modification tract.

The direct and indirect impacts to other mineral resources would not be different from those described in Section 3.3.2.2.1 of the 2008 WAII EIS. There are no oil and gas wells or CBNG wells located on the tract. The direct impacts on CBNG resources resulting from the Proposed Action would be moderate and permanent on the tract due to the loss of any remaining CBNG within the Anderson and Canyon coal seams. The effects would be minor and short-term for conventional oil and gas due to the surface disturbance that could temporarily prohibit recovery of the resource.

The direct and indirect impacts to paleontology would not be different from those described in Section 3.3.3.2.1 of the 2008 WAII EIS. Fossils with scientific significance could be present on the tract but not exposed at the surface. Should previously unknown, potentially significant paleontological sites be

discovered, BLM imposed lease and permit conditions require that work in that area stop and measures be taken to assess and protect the site. Significant paleontological resource would be mitigated. The impacts on non-significant paleontological resources resulting from the Proposed Action would be moderate and permanent.

4.3.1.2 No Action Alternative

While geological resources would continue to be impacted in other portions of the Antelope Mine, the No Action Alternative would not authorize NTEC's proposed mining plan modification, and 14.5 Mt of Federal coal related to WYW-177903 would not be recovered. Therefore, under this alternative, impacts to geological, including the loss of plant, invertebrate, and vertebrate fossil material which could be used for scientific research and public education, mineral, and paleontological resources would not occur in the West Antelope II area.

4.3.2 Past, Present, and RFFAs

The Past, Present, and RFFAs impacts to geology, mineral resources, and paleontology would not be different from those described in Section 4.2.2 of the 2008 WAII EIS. Within the southern group of mines, overburden and coal would be removed and replaced with backfill, resulting in a permanent change in the geology of the area and a permanent reduction of coal resources.

According to information from the WOGCC (2025), 37,692 CBNG and conventional oil and gas wells have been drilled in Campbell County and 11,787 CBNG and conventional oil and gas wells have been drilled in Converse County. The WOGCC records indicate that the majority of the wells are privately held or state minerals. These figures include wells in a variety of statuses, including plugged and abandoned, dormant, completed, monitoring, and notice of intent to abandon. In 2024, only 5,707 wells in Campbell County and 2,500 wells in Converse County were producing.

Impacts to paleontological resources as a result of the already-approved past, present, and RFFA energy development occurring in the PRB consist of losses of plant, invertebrate, and vertebrate fossil material for scientific research, public education (interpretive programs), and other values. Losses of paleontological resources would continue to result from the destruction, disturbance, or removal of fossil materials from surface-disturbing activities as well as unauthorized collection and vandalism. A beneficial impact of surface mining would be the exposure of fossil materials for scientific examination and collection, which might never occur except as a result of overburden removal, exposure of rock strata, and mineral excavation.

The impact of the Proposed Action when considered in the context of past, present and RFFAs on the geology, mineral resources, and paleontology are expected to be moderate and permanent.

4.3.3 Mitigation Measures

No mitigation measures would be necessary for geology or mineral resources. Should significant paleontological resources be encountered as a result of the Proposed Action, the inadvertent discoveries would be managed in compliance with the PRPA.

4.4 Air Quality

4.4.1 Particulate Matter

4.4.1.1 Direct Impacts (Excluding Coal Combustion)

4.4.1.1.1 Proposed Action

The direct effects to air quality from particulate matter would not be different from those described in Section 3.4.2.2.1 of the 2008 WAII EIS and Section 4.1.3 of the 2014 WAII South EA. Direct emissions from particulate matter from the Proposed Action would include fugitive emissions generated from coal excavation and reclamation activities and tailpipe emissions from equipment. Fugitive particulate emissions would also result from dust being generated during dragline operation, coal haulage, and the operation of bulldozers, scrapers, loaders, baghouse, and other operating equipment at Antelope Mine. The Antelope Mine triennial emission inventory for 2023 was used to estimate direct particulate matter emissions for the Proposed Action at an estimated annual production rate of 30 Mtpy and at the maximum permitted annual production rate of 52 Mtpy. Particulate matter emissions for the Proposed Action and the State of Wyoming are tabulated in **Table 4-1**. **Table 4-1** shows that the Proposed Action would contribute less than 0.7 percent of statewide $PM_{2.5}$ emissions and less than 0.7 percent of statewide PM_{10} emissions. Compared to total Wyoming state emissions, the particulate emissions from the Proposed Action would be minor.

Table 4-1. Comparison of Direct to Wyoming Particulate Matter Emissions

	Proposed Action at 30 Mtpy (tons)	Proposed Action at 52 Mtpy (tons)	2024 Wyoming State Tier 1 (tons)	Anticipated % change to State Emissions from Proposed Action
$PM_{2.5}$	264	458	63,652	0.4% - 0.7%
PM_{10}	1,832	3,175	427,265	0.4% - 0.7%

Source: NTEC 2025a, EPA 2025f

The most recent air quality modeling for the Antelope Mine was completed in 2012 (McVehil-Monnett 2012). The modeling conducted in 2012 provides sufficient information for the assessment of impacts since mining methods have not changed and the projected annual production is less than the annual production used in the 2012 modeling (52 Mtpy modeled versus 30 Mtpy proposed). Existing air quality has likely not changed significantly since the model was completed. The background PM_{10} concentration used in the model was 12.5 $\mu g/m^3$, which is lower than average PM_{10} concentrations measured at the Antelope Mine continuous samplers (Table 3-1), but similar to background PM_{10} concentrations measured at the Converse County Long-Term site (AQS Site ID 56-009-0010). Between 2018 and 2025, the average annual PM_{10} concentration measured at the Converse County Long-Term site was between 11.2 and 22.8 $\mu g/m^3$ and averaged 17.1 $\mu g/m^3$ over the period.

The 2012 PM_{10} inventory for the mining activities at Antelope Mine was prepared for years 2012-2035. Two years were then selected for worst-case dispersion modeling of PM_{10} based on mine plan parameters, emission inventories, and discussions with WDEQ-AQD. Fugitive emission sources and point sources were modeled using the Industrial Source Complex 3 Long-Term dispersion model, which is the model recommended by WDEQ guidance.

The worst-case years for evaluation were based on the highest modeled PM_{10} concentrations. The dispersion model predicted no exceedances of the annual PM_{10} ambient air standard at a 52 Mtpy production rate. At the estimated average annual production rate of 30 Mtpy the particulate matter emissions from the Proposed Action would likely be less than those predicted in the model. The direct impacts from particulate matter emissions resulting from the Proposed Action are expected to be

minor compared to Wyoming state particulate emissions and moderate and short-term on the tract because modeled particulate matter emissions would be below the NAAQS and WAAQS thresholds. The air quality model did not model $PM_{2.5}$ emissions; however, the report noted that $PM_{2.5}$ concentrations would not approach NAAQS based on monitoring data in the PRB (McVehil-Monnett 2012).

4.4.1.1.2 No Action Alternative

Impacts from particulate matter emissions would continue from mining activity occurring at other portions of the Antelope Mine, and, therefore, under this alternative, particulate matter emission impacts in the area would be similar to those under the Proposed Action. However, because the No Action would not authorize NTEC's proposed mining plan modification request to mine 14.5 Mt of Federal coal related to WYW-177903, approximately 128 tons of $PM_{2.5}$ and 885 tons of PM_{10} (proportion of emissions from mineable coal under the Proposed Action based on the **Table 4-1**) would not be emitted.

4.4.1.2 Past, Present, and RFFAs

Concentrations of PM_{10} from monitoring samplers within the southern group of mines are presented in **Table 4-2** for the 2017-2024 period. Results demonstrate that ambient concentrations of PM_{10} were generally within the 24-hour PM_{10} NAAQS/WAAQS standard of 150 $\mu g/m^3$.

Table 4-2. PM_{10} Concentration Values (24-Hr, First Maximum Value - $\mu g/m^3$)

Location/Site Name/AQS Site ID	2017	2018	2019	2020	2021	2022	2023	2024
Black Thunder Site 15/56-005-0015	114	98	97	84	110	149	110	191
Black Thunder Site 3/56-005-0875	45	40	31	36	59	43	69	46
Black Thunder Site 36/56-005-0891	155	179	92	91	113	165	108	148
Black Thunder Site 6/56-005-0014	103	62	59	92	71	80	96	110
School Creek SC-1/56-005-0084	108	88	57	74	99	112	104	121
School Creek SC-2/56-005-0087	143	123	127	142	126	215	139	142
School Creek SC-3/56-005-0086	119	77	98	111	91	118	80	164
NARM NA-9/56-005-0013	107	90	75	--	--	--	--	--
NARM RO-1/56-005-0869	187	292	111	115	164	169	108	--
NARM RO-1/56-005-0018	--	--	--	--	--	--	135	94

-- Indicates that the site was inactive.
Site 56-005-0013 was shutdown on 12/30/2019. Site 56-005-0018 was started 12/4/2023 to replace 56-005-0869.
Source: EPA 2025a

The 2012 model evaluated annual maximum PM_{10} emissions for years 2012-2035 resulting from mining activities at the southern group of mines (McVehil-Monnett 2012). Based on mine plan parameters and highest emissions inventories, the years 2014 and 2018 were selected as the worst-case years for evaluation, since those years had the highest modeled PM_{10} concentrations.

The results of the dispersion modeling are included in **Table 4-3**. The model predicted no future exceedances of the annual PM_{10} WAAQS or NAAQS for the combined emissions at the southern group of mines. Based on the information included in **Section 3.4.1.1**, the Antelope Mine would not cause or contribute to a violation of the annual PM_{10} WAAQS of 50 $\mu g/m^3$. WDEQ-AQD policy does not require that $PM_{2.5}$ impacts be identified and compared to applicable air quality standards; therefore, $PM_{2.5}$ is not modeled.

Table 4-3. Annual PM_{10} Dispersion Modeling Results

Year	Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration[1] ($\mu g/m^3$)	WAAQS ($\mu g/m^3$)
2014	26.50	12.50	39.00	50[2]
2018	36.80	12.50	49.30	50[2]

[1] The total includes modeled concentrations for the Black Thunder, School Creek, North Antelope Rochelle, and Antelope mines plus background.
[2] WAAQS standard only (no annual standard for NAAQS). Violation occurs with more than one expected exceedance per calendar year.
Source: McVehil-Monnett 2012

Background concentrations should capture PM_{10} emissions from nearby activities not associated with the mine, but since the modeling was completed in 2012, the background would not include any additional activities since that time. The only activity that has occurred and is a RFFA is oil and gas development. The regional total impacts from past, present, and RFFAs for annual PM_{10} would be below NAAQS and WAAQS, while the 24-hour PM_{10} would exceed NAAQS and WAAQS due to modeled impacts from fires, biogenics, and windblown dust emissions. Overall, the incremental impacts from the Proposed Action would not lead to any additional PM_{10} exceedances beyond those from other past, present, and RFFAs.

In 2024, the BLM issued a report presenting the results of photochemical modeling used to assess the impacts of oil and gas development and coal production and other cumulative sources on air quality and air quality related values (AQRV) in BLM-administered lands (Ramboll 2024). The photochemical modeling was conducted using a scenario that included coal, oil and gas development, natural and other anthropogenic emissions, representative of the cumulative sources around the year 2032.

Coal mining emissions and production rates were obtained from annual emission inventory reports and the federal and non-federal coal production were obtained from the BLM Wyoming High Plains District Office. The results of the model indicated that in Campbell and Converse Counties, cumulative concentrations will not lead to NAAQS exceedances. Federal coal sources in Campbell County would contribute a maximum concentration of 13 $\mu g/m^3$. In general, the largest contributors to PM_{10} are wildfire sources both inside and outside of Wyoming.

The impacts from the Proposed Action considered in the context of the impacts from past, present, and RFFAs from particulate matter emissions are expected to be moderate and short-term and would be extended by approximately 0.5 year.

4.4.1.3 Mitigation Measures

No mitigation measures beyond those required by the Antelope Mine air quality permit would be required for emissions of particulate matter. Air quality permit MD-13361 requires NTEC to operate and maintain all passive enclosure control systems and coal samplers. In addition, the permit requires NTEC to conduct weekly inspections of the truck dump control systems and demonstrate the effectiveness of the truck dumps using the methodology in 40 CFR § 60.255(h)(l)(i) and (ii) each calendar quarter. The air quality permit also requires treatment of haul roads and compliance with all commitments made in the quality assurance plan for the ambient particulate monitoring network. Antelope Mine strives to exceed the expected lifespan of all equipment to reduce waste and minimize environmental impact. When new equipment is purchased, it meets current emissions standards.

4.4.2 Emissions of Nitrogen Oxides (NO_X) and Ozone (O_3)

4.4.2.1 Direct and Indirect Impacts

4.4.2.1.1 Proposed Action

Direct emissions of NO_x from the Proposed Action would include emissions generated from coal excavation and reclamation activities, tailpipe emissions from equipment, and fugitive emissions. The Antelope Mine triennial emission inventory for 2023 was used to estimate direct NO_x emissions for the Proposed Action. NO_x emissions for the Proposed Action and Wyoming are in **Table 4-4**. Actual NO_x emissions would be less (approximately 471 tons) than those in **Table 4-4** because the tract only includes 14.5 Mt of recoverable coal. Compared to total Wyoming emissions, the direct NO_x emissions from the Proposed Action would be minor.

Table 4-4. Comparison of Direct to Wyoming NO_x Emissions

	Proposed Action at 30 Mtpy (tons)	2024 Wyoming State Tier 1 (tons)	Anticipated % change to State Emissions from Proposed Action
NO_x	974	81,501	1.2%

Source: NTEC 2025a, EPA 2025f

As presented in **Table 3-4**, NO_2 data collected at the currently active AQS monitoring sites in Campbell County and Converse County nearest the Antelope Mine were below the NAAQS and WAAQS, which indicates that ambient air quality within the vicinity of the West Antelope II South Modification tract is currently in compliance with the NO_2 ambient air standard.

The 2012 air quality modeling for Antelope Mine included modeled results for NO_2 emissions for 2012 through 2035. The results of the modeling are included in **table 4-5**. The ISCLT3 model predicted no exceedances of the NO_2 ambient air standards at a 52 Mtpy production rate. At the estimated average annual production rate of 30 Mt, the NO_2 emissions from the Proposed Action would likely be less than those predicted in the model.

Table 4-5. Annual NO_2 Dispersion Modeling Results

Year	Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration[1] ($\mu g/m^3$)	NAAQS/ WAAQS ($\mu g/m^3$)
2014	26.58	14.00	40.58	100
2018	35.07	14.00	49.07	100

[1] The total includes modeled concentrations for the Black Thunder, School Creek, North Antelope Rochelle, and Antelope mines plus background.
Source: McVehil-Monnett 2012

Under the Proposed Action there is potential for public exposure to NO_x emissions caused by surface mining operations. These effects would most likely occur along publicly accessible roads and highways that pass through the area adjacent to mining operations. Occupants of residences in the area could also be affected. The closest public transportation routes are State Highway 59, County Road 37 (Antelope Coal Mine Road) in Converse County, and Country Road 4 (Antelope Road) in Campbell County. The nearest occupied residence is approximately 1.5 miles west-southwest of the tract. There have been no reported events of public exposure to NO_2 from blasting activities at the Antelope Mine through April 2025 (NTEC 2025c).

Impacts from NO_2 emissions resulting from the Proposed Action are expected to be moderate and short-term on the tract because modeled NO_2 emissions would be below the NAAQS and WAAQS thresholds and would end once mining and reclamation is completed.

As indicated in **Section 3.4.1.2**, O_3 monitoring is not required by WDEQ-AQD at PRB mines but levels have been monitored at AQS monitoring sites in Campbell and Converse counties. Few violations of the 8-hour O_3 NAAQS have occurred, and any exceedances were only slightly above the NAAQS and WAAQS.

As stated above, there have been no reported events of public exposure to NO_2 from blasting activities at the Antelope Mine through April 2025 and there have been only a few violations of the NO_2 or O_3 ambient air standards in Campbell and Converse counties. Under the Proposed Action, coal recovery at the Antelope Mine would continue at an estimated annual rate of 30 Mt, which is less than the annual production rate that was used for modeling NO_x. While the results from ongoing monitoring show no violations of NO_x or O_3 NAAQS or WAAQS standards in Campbell and Converse counties, the slight potential for exposure to NO_x and O_3 emissions resulting from the Proposed Action would be moderate for NO_x and minor for O_3. The effects would be short term.

4.4.2.1.2 No Action Alternative

Impacts from NO_x and O_3 emissions would continue from mining activity from other portions of the Antelope Mine, and, therefore, under this alternative, NO_x and O_3 emission impacts in the area would be similar to those under the Proposed Action. However, because the No Action would not authorize NTEC's proposed mining plan modification request to mine 14.5 Mt of Federal coal related to WYW-177903, approximately 471 tons of NO_x would not be emitted (proportion of emissions from mineable coal under the Proposed Action based on **Table 4-4**).

4.4.2.2 Past, Present, and RFFAs

The southern group of mines would contribute NO_x and O_3 emissions to the surrounding area from past, present, and RFFAs. The 2012 model predicted that mining activities at the southern group of mines would not contribute to a violation of the NO_2 NAAQS or WAAQS (McVehil-Monnett 2012). Impacts from NO_x could be higher in the short-term in this area due to coal mining activities if surface inversion occurs in the southern portion of the PRB. This would be temporary, lasting only during the inversion. NO_x impacts would cease to occur after mining and reclamation are complete. As previously discussed, there have been a few exceedances of the O_3 standard at the AQS monitoring sites in Campbell or Converse counties.

Background concentrations should capture NO_x and O_3 emissions from nearby activities not associated with the mine, but since the modeling was completed in 2012 the background would not include any additional activities since that time. The only activity that has occurred and is a RFFA is oil and gas development. The BLM's 2020 EIS for Converse County Oil and Gas Project includes a discussion on air quality impacts (BLM 2020). The regional total impacts from past, present, and RFFAs for 1-hour and annual NO_2 and O_3 would be below NAAQS and WAAQS. Overall, the incremental impacts from the Proposed Action would not lead to any additional NO_2 or O_3 exceedances beyond those from other past, present, and RFFAs.

Overall, the impacts from the Proposed Action when considered in the context of impacts from past, present, and RFFAs on NO_x and O_3 emissions would be moderate and short term.

4.4.2.3 Mitigation Measures

No mitigation measures beyond those required by the Antelope Mine air quality permit would be required for emissions of NO_x or O_3. The air quality permit limits the maximum coal production and requires NTEC to comply with the applicable requirements of 40 CFR Part 60, subparts for combustion engines.

4.4.3 Emissions of Sulfur Dioxide (SO_2), Mercury (Hg), Lead (Pb), and Other Non-Greenhouse Gases (Non-GHG)

4.4.3.1 Direct and Indirect Impacts

4.4.3.1.1 Proposed Action

Direct air emissions for SO_2, Hg, Pb, and other non-GHGs from the Proposed Action would include emissions generated from coal excavation and reclamation activities and tailpipe emissions from equipment. Direct impacts of these emissions would have the potential to effect employees involved in the mining, processing, and handling of coal. SO_2, Hg, Pb, and other non-GHGs can cause respiratory problems (Finkelman, Wolfe and Hendryx 2020). Indirect impacts of these emissions include increased haze and decreased plant growth in the vicinity of the mine.

The Antelope Mine triennial emission inventory for 2023 was used to estimate direct SO_2, Hg, Pb, and other non-GHG emissions for the Proposed Action. SO_2, Hg, Pb, and other non-GHG emissions for the Proposed Action and the State of Wyoming are tabulated in **table 4-6**.

Table 4-6. Comparison of Direct to Wyoming SO_2 and Other Non-GHG Emissions

	Proposed Action at 30 Mtpy (tons)	2024 Wyoming State Tier 1 (tons)	Anticipated % change to State Emissions from Proposed Action
VOC	40	107,200	0.04% - 0.06%
CO	262	216,368	0.1% - 0.2%
SO_2	69	31,984	0.2% - 0.4%
Total HAPs	0.03	NA	-

Source: NTEC 2025a, EPA 2025f

Data presented in **Section 3.4.1.2** show that SO_2 and Pb in Campbell and Converse counties are in compliance with applicable standards. Under the Proposed Action, coal recovery at Antelope Mine would continue at an estimated annual rate of 30 Mt. Because the direct emissions from the Proposed Action would be minor when compared to Wyoming state emissions and given the results of ongoing SO_2 and Pb monitoring in the area that show no exceedances of these parameters, the effects of emissions of SO_2 and Pb from the Proposed Action would be minor and short term.

The EPA limits Hg from combustion facilities and the control mechanisms implemented have also been shown to reduce other non-GHG emissions. The EPA limits would reduce the indirect impacts of coal combustion relative to Hg emissions as the MATS rule would apply to the Domestic Electric Generating Stations to which the Antelope Mine would be supplying coal.

4.4.3.1.2 No Action Alternative

Impacts from SO_2, Hg, Pb, and other non-GHG emissions would continue from mining activity from other portions of the Antelope Mine, and, therefore, under this alternative, SO_2, Hg, Pb, and other non-GHG emission impacts in the area would be similar to those under the Proposed Action. However, because the No Action would not authorize NTEC's proposed mining plan modification request to mine 14.5 Mt of Federal coal related to WYW-177903, there would not be emissions based on Table 4-6.

4.4.3.2 Past, Present, and RFFAs

The adjacent southern group of mines and nearby oil and gas development would contribute additional SO_2, Hg, Pb, and other non-GHG emissions to the surrounding area. Based on past monitoring, the permit modification request would not likely increase SO_2, Hg, Pb, and other non-GHG emission rates, although emissions would be extended by 0.5 year. Impacts associated with past,

present, and RFFAs on SO_2, Hg, Pb, and other non-GHGs would have similar direct and indirect impacts as those described above. The potential for haze could be increased in the southern portion of the PRB; however, impacts would be temporary, lasting only during periods of inversions. Air quality impacts from mining would cease to occur after reclamation is complete. Therefore, the impacts from the Proposed Action when considered in the context of impacts from past, present, and RFFAs on SO_2, Hg, Pb, and other non-GHG emissions are expected to be minor and short-term.

4.4.3.3 Mitigation Measures

No mitigation measures beyond those required by air quality permit MD-13361 would be required for emissions of SO_2, Hg, Pb, and other non-GHGs. Air quality permit requirements for emissions of SO_2, Hg, Pb, and other non-GHGs would be the same as those described in Section 4.4.2.3 of this EA.

4.4.4 Air Quality Related Values (AQRVs)

4.4.4.1 Direct and Indirect Impacts

4.4.4.1.1 Proposed Action

Visibility

All blasting would be conducted in compliance will all applicable local, state, and federal laws and regulations, including WDEQ-LQD Rules and Regulations, Chapter 6. All blasting operations are conducted under the direction of a certified blaster. The direct and indirect effects to visibility from blasting under the Proposed Action would be moderate and short term, since pollutants and particulates that effect visibility would be within the approved air quality permit MD-13361. Direct effects (excluding coal combustion) on visibility from the Proposed Action would be minor and short term.

Because WDEQ-LQD does not require the Antelope Mine to evaluate visibility impacts on Class I areas, the mine does not monitor visibility. Therefore, a direct comparison with the Wyoming standards is not possible. The impacts to visibility from mining the West Antelope II South Modification tract have been inferred from the long-term trend in visibility at the Wind Cave National Park. Since the long-term visibility has been stable, the indirect effects (excluding coal combustion) on visibility from the Proposed Action would be minor and short term.

Acidification of Lakes

Antelope Mine is not required by WDEQ-AQD to monitor H_2S so a direct comparison to WAAQS standards is not possible. Because factors affecting H_2S emissions would not change as a result of the Proposed Action, the direct and indirect effects have been inferred from the currently permitted impacts of mining the existing coal leases at the Antelope Mine. As discussed in **Section 3.4.1.3.3**, the pH trend at monitoring site WY99 appears to be relatively stable with values near the pH of normal rain. Based on this comparison of the current information available, the Proposed Action is not expected to contribute to increased direct or indirect impacts from acidification of lakes.

4.4.4.1.2 No Action Alternative

Impacts to air quality-related values would continue from mining activity from other portions of the Antelope Mine, and, therefore, under this alternative air quality-related values would be similar to those under the Proposed Action. However, because the No Action would not authorize NTEC's proposed mining plan modification request to mine 14.5 Mt of Federal coal related to WYW-177903, mining would end approximately a half year earlier than under the Proposed Action, and

approximately 124 tons of PM_{10}, 120 tons of $PM_{2.5}$, 4 tons of SO_2, 4,917 tons of NO_x, and 198 tons of VOCs would not be emitted (proportion of emissions from mineable coal under the Proposed Action based on **Table 4-8**).

4.4.4.2 Past, Present, and RFFAs

Mines in Campbell County would affect the AQRVs. The air quality index (AQI) for Campbell County is used to evaluate the impacts from past, present, and RFFAs on AQRVs. As described by the AirNow website, the AQI provides an index of how clean or polluted the air is within an area and what associated health effects might be a concern (AirNow 2025). The AQI focuses on health affects experienced within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the CAA: ground-level ozone, particle pollution (also known as particulate matter), CO, SO_2, and NO_2. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health. The AQI evaluates air quality based on six levels (categories) that correspond to a different level of health concern (**Table 4-9)**. The table shows that approximately 97.8 percent of the days in Campbell County between 2020 and 2024 were classified as having a good or moderate AQI and only one day in 2022 was classified as hazardous.

Table 4-9. Average Annual Campbell County Air Quality Index Values

	Days With AQI	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	Hazardous
2020	366	247	116	3	0	0	0
2021	365	218	131	16	0	0	0
2022	365	210	146	7	1	0	1
2023	365	245	113	6	1	0	0
2024	366	232	129	3	2	0	0
Average	--	**244**	**116**	**4**	**1**	**0**	**0**
Percent of Total Average	--	66.8%	31.8%	1.0%	0.2%	0.0%	0.0%

Source: AirNow 2025

Blasting, coal crushing, loading and hauling of coal, moving equipment, and other activities associated with surface coal mining and the combustion of coal at power plants produce particulates that can be released into the air, which could impact AQRVs. The effects of the Proposed Action AQRVs when considered in the context of effects on AQRVs from past, present, and RFFAs are expected to be minor and short-term because estimated emissions would be below the NAAQS and WAAQS thresholds and impacts would only be extended by approximately 0.5 year.

4.4.4.3 Mitigation Measures

No mitigation measures beyond those required by air quality permit MD-13361 would be required to protect AQRVs. Air quality permit requirements would be the same as those described in Sections 4.4.1.3 and 4.4.2.3.

4.5 GHG Emissions

4.5.1 Direct Impacts

4.5.1.1 Proposed Action

It is not possible to track the effects of GHG emissions from a proposed action to climate change effects in a localized manner. Therefore, OSMRE has elected to quantify direct GHG emissions and evaluate these emissions in the context of national GHG emission inventories based on 100-year and

20-year time horizons, as described in **Section 3.5** of this EA, and present this information in the discussion of Past, Present, and Reasonably Foreseeable Future Actions in this section.

Annual CO_2e emissions from combined sources based on annual coal recovered from 2020-2024 at the Antelope Mine were estimated in **Section 3.5** of this EA. The same variables were used to calculate annual CO_2e emissions for the Proposed Action. The estimated annual CO_2e emissions for the Proposed Action were calculated at 30 Mtpy. **Table 4-10** presents the estimated annual CO_2e for the 100-year and 20-year time horizons.

Table 4-10. Estimated Annual Average CO_2e Emissions

Source	100-year Time Horizon	20-year Time Horizon
General		
Mt of coal recovered	30.0	30.0
Direct emission sources[1]		
Mining process	416,490	648,853
Commuter transport	10,164	10,169
Total estimated CO_2e production[1]	**426,654**	**659,022**

[1] In metric tons - see **Appendix D** for calculations
[2] Calculated by WWC 2025

4.5.1.2 No Action Alternative

GHG emissions would continue from the mining activity that has already been authorized on other portions of the Antelope Mine. The only difference in GHG emissions between the No Action Alternative and the Proposed Action would result from an ASLM decision not to approve the proposed mine plan modification under the No Action Alternative, resulting in no extension to authorized mining by approximately 0.5 year. This means that under the No Action Alternative, approximately 0.2 MMT of CO_2e that would be emitted under the Proposed Action would not be emitted (proportion of emissions from mineable coal under the Proposed Action based on **Table 4-10**).

4.5.1.3 Past, Present, and RFFAs

To place in context the GHG emissions resulting from the Proposed Action, this discussion describes the impacts from past, present, and RFFAs on GHG emissions for the project area, and regional-scale projected impacts for the state of Wyoming.

Historically, the coal mined in the PRB has been used as one of the sources of fuel to generate electricity in power plants located throughout the U.S. The electricity sector involves the generation, transmission, and distribution of electricity. **Table 4-11** shows the trend in GHG emissions between 2005 and 2020 and 2023 (the most recent data available).

In 2024, the BLM published a report titled 2023 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends from Coal, Oil, and Gas Exploration and Development on the Federal Mineral Estate (BLM 2024b). The report presents estimated emissions of GHGs from coal, oil, and gas development on lands and mineral estate managed by the BLM. The report also forecasts reasonably foreseeable future GHG emissions by analyzing previously authorized development that has not commenced production and potential new leasing.

The BLM estimated that the short-term (2023) CO_2e emission for the United States is 1,177 Mt, for Federal lands is 434.8 Mt, and for Wyoming is 376.8 Mt. These emissions include processing, transport, and combustion. Similarly, the BLM estimated the short-term emission projections from reasonably foreseeable coal production as 367.3 Mt for Federal lands and 317.4 Mt for Wyoming.

Based on this, the Proposed Action would account for 15.7 percent of the CO_2e emissions on Federal lands and 18.1 percent of the CO_2e emissions in Wyoming.

Table 4-11. Trends in U.S. and Global GHG Emissions and Contributing Factors

Gas/Source	2005	2020	2023	2005-2020 % Change	2005-2023 % Change
Contributing Factors (MMT)					
Coal Produced in the U.S.	1,026.5	535.4	594.2	-48%	-42%
Coal Produced in Wyoming PRB	353.9	211.4	237.5	-40%	-33%
Percent of U.S. Coal from Wyoming PRB	34%	39%	40%	15%	18%
Coal produced at the Antelope Mine	27.2	19.8	21.7	-27%	-20%
Percent of U.S. Coal from the Antelope Mine	3%	4%	4%	33%	33%
Percent of Wyoming PRB Coal from the Antelope Mine	8%	9%	9%	13%	13%
U.S. GHG Emissions (MMT CO_2e)					
Total GHG Emissions	7,124	5,672	5,961	-20%	-16%
Global GHG Emissions (MMT CO_2e)					
Total GHG Emissions	41,297	49,328	52,963	19%	28%

Source: EIA 2025, EDGAR 2024

The 2023 BLM report also includes emission comparisons to provide comparative analyses. Emissions associated with the BLM's authorizing of coal, oil, and gas comprise 0.12 percent of global emission and 1.1 percent of U.S. emissions (BLM 2024b). The total emissions from onshore coal, oil, and gas development and end-use comprise 2.0 percent of global emissions and 16.5 percent of U.S. emissions.

4.6 Water Resources

4.6.1 Groundwater

4.6.1.1 Direct and Indirect Impacts

4.6.1.1.1 Proposed Action

The direct and indirect impacts to groundwater would be the same as those described in Section 3.5.1.2.1 of the 2008 WAII EIS. The general impacts to groundwater as a result of surface coal mining include the following:

1. The removal of the coal aquifer and any overburden and alluvial aquifers within the areas that are mined and the replacement of these aquifers with backfilled overburden material.
2. The lowering of static water levels in the coal and overburden aquifers around the mine due to dewatering associated with removal of these aquifers within the mine boundaries. The reduction in static water levels would be long-term, but not permanent, and recharge to the backfill and adjacent undisturbed aquifers would occur after mined areas are reclaimed.
3. Other groundwater impacts that may or may not occur, or may occur only at specific locations, include changes in water quality (usually deterioration) outside the area that is mined and reclaimed. This would result from communication between the reclaimed aquifer and the unmined aquifer, and changes in recharge-discharge conditions and/or groundwater flow patterns.

Under the Proposed Action, additional alluvium, overburden, and Anderson and Canyon coal aquifers would be removed in the tract during the mining process. These aquifers would be replaced with backfilled overburden materials. The physical characteristics of the reclaimed backfill material would be dependent upon premining overburden lithology.

The Proposed Action would not remove alluvial deposits associated with Antelope Creek since there would be a 100-foot buffer adjacent to the Antelope Creek, as required in Permit No. 525.

Mining in the tract would extend the duration and physical extent of drawdown in the overburden within the Antelope Mine. Monitoring well data used in the 2022 CHIA-43 indicate that predicted drawdown in the overburden aquifer often lie within the permit areas but may extend one-half to one mile from the mine pit. West of the mine pit, the overburden groundwater gradients follow the general topography.

Under the Proposed Action, the duration and physical extent of drawdown in the Anderson and Canyon coal aquifers would also be extended. In 2015, drawdown within the Anderson and Canyon seam aquifer was modeled to determine the extent of drawdown. The modeling included contiguous areas east of the West Antelope II South Modification tract. The extent of drawdown (5-foot contour) in the Anderson and Canyon coal aquifers is depicted in **Map 4-1**.

Groundwater data from the Anderson and Canyon coal aquifers would continue to be monitored in accordance with the Permit No. 525 groundwater monitoring program and included in the annual reports submitted to WDEQ-LQD. Antelope Mine would update the extent of drawdown as mining continues.

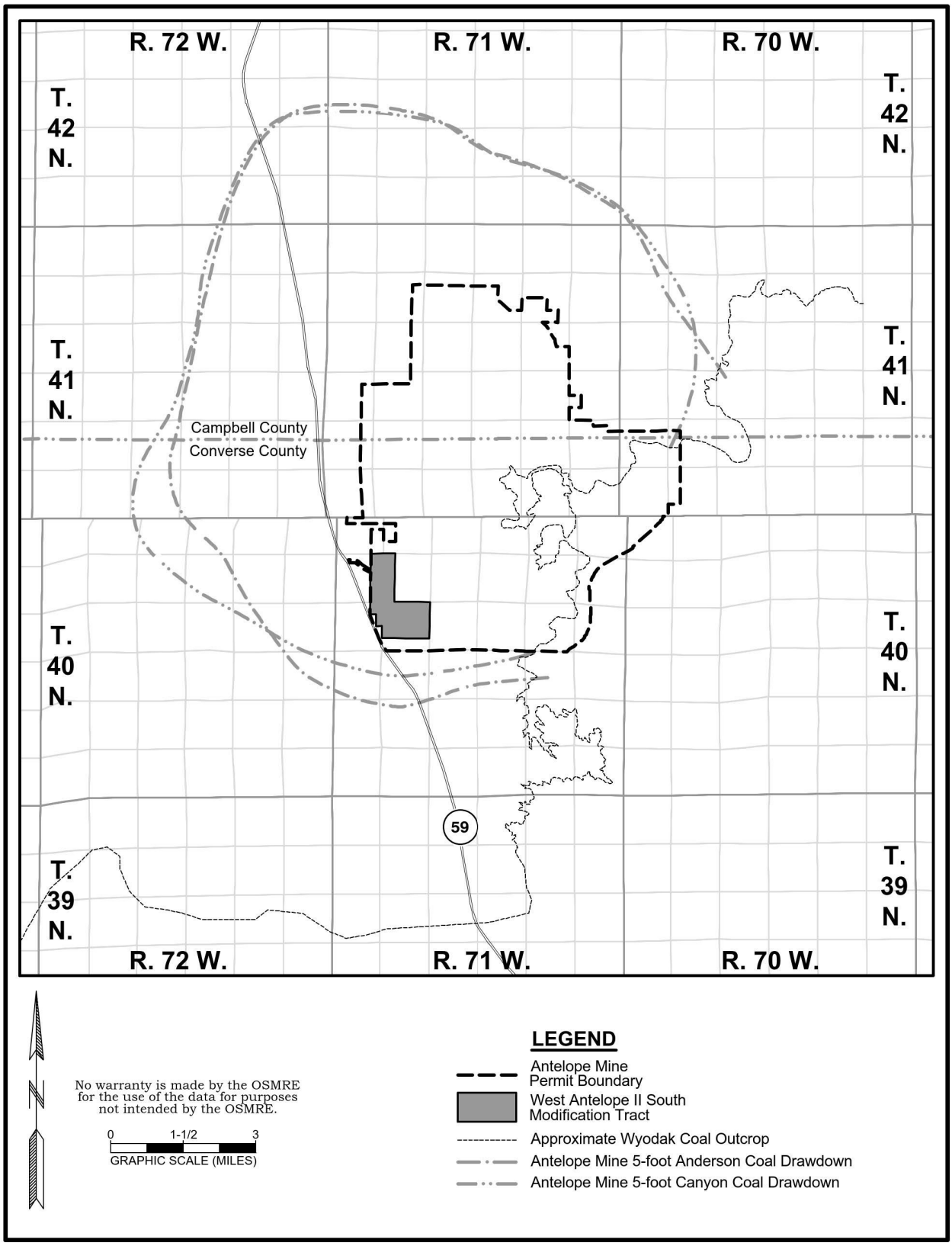
In the 2022 CHIA-43 (WDEQ-LQD 2022), water levels from 66 monitoring wells were used to characterize groundwater levels in the backfill aquifer. Four wells were dry. Eleven wells were discontinued and removed from the monitoring program as of July 2021. Since most of the wells were located in close proximity to the clinker aquifer and streams (both significant recharge sources), the recovery rates and trends observed cannot be approximated for the entire backfill aquifer. This is consistent with **Section 3.5.1**, which indicated that water levels are attributed to the proximity to and recharge from the alluvium of Antelope, Spring, and Horse creeks, as well as variation in annual precipitation.

The underlying Tullock Member of the Fort Union Formation would not be physically disturbed by mining activities due to the depths. The wells completed in these formations for water supply purposes would continue to be used under the Proposed Action. Impacts would not increase from current conditions; however, the duration and physical extent of drawdown resulting from withdrawals from water supply wells in the Tullock Member of the Fort Union Formation would be extended by 0.5 year.

Overall, the direct and indirect impacts to groundwater resources resulting from the Proposed Action would be moderate and long-term due to aquifer removal. Impacts would not increase from current conditions; however, the duration and physical extent of drawdown in the overburden and Anderson and Canyon coal aquifers would be extended. Backfill water levels and groundwater quality indicate that the groundwater would meet WDEQ-WQD Class III standards for livestock use.

4.6.1.1.2 No Action Alternative

While groundwater impacts from the other already-permitted portions of the Antelope Mine would continue under the No Action Alternative, under the No Action Alternative, ASLM would not authorize mining of the tract, and 14.5 Mt of Federal coal related to WYW-177903 would not be recovered. As a result, under the No Action Alternative, approximately 879.5 acres of groundwater aquifer would not be disturbed as a result of the Proposed Action. Under the No Action Alternative, the duration of impacts to groundwater would not be extended.



Map 4-1. Modeled Drawdown for the Anderson and Canyon Coal Seams

4.6.1.2 Past, Present, and RFFAs

The 5-foot drawdown area was selected as the impact area for groundwater since this limit would detect the extent of minor groundwater impacts. This area corresponds to the cumulative impact area (CIA) used in the 2022 CHIA-43. The 2022 CHIA-43 analyzed the Anderson and Canyon coal seams as a single unit referred to as the Wyodak-Anderson coal. The area delineated by the maximum 5-foot drawdown contour in the Wyodak-Anderson coal aquifer for the southern group of mines is included on **Map 4-2**. The effects of removal of the coal and overburden aquifers and replacing them with backfilled overburden are the foremost groundwater concern regarding the impact of the Proposed Action considered in the context of past, present, and RFFAs. Impacts to overburden and coal aquifers have already occurred within the tract that is the subject of the proposed mine plan modification tract due to coal recovery on adjacent coal leases, ongoing mining activities at nearby mines, and CBNG recovery.

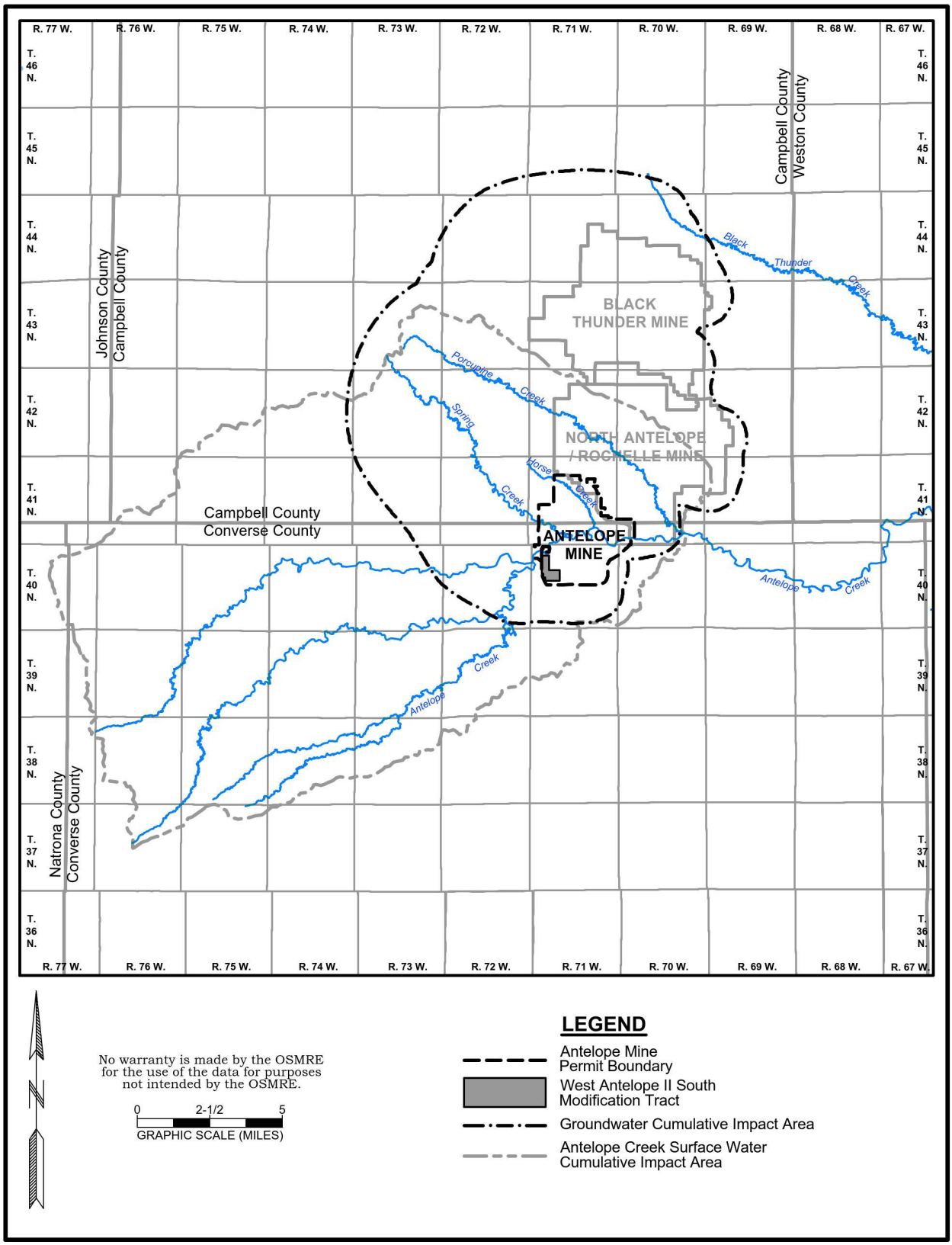
Mining the tract would increase the size of the backfill area in the southern group of mines. The extent of water level drawdown in the coal and shallower aquifers in the area surrounding the mines also would be expected to increase slightly as a result of mining the West Antelope II South Modification tract and from dewatering the active mine pits. Where the effects of pumping from the southern group of mines overlap, additional water level declines would result from concurrent operations.

The 2022 CHIA-43 indicates that as the individual mines tend to impact different sections of discrete alluvial sediments. In addition, the 2022 CHIA-43 states that past, present, and RFFA impacts caused by mining of the overburden aquifer would be limited as the sandstone units are thin, discontinuous, and interbedded with claystones and siltstones. Based on the current available data, the model predictions by the mines, and the area geology, it is expected that the past, present, and RFFA impacts caused by mining on the overburden would be minimal.

Mining impacts to groundwater levels in the Wyodak-Anderson coal aquifer are more extensive than the overburden since the coal seams are mined out and the hydraulic conductivity of the coal aquifer is higher than the overburden and underburden aquifers. As described in the 2022 CHIA-43, CBNG dewatering had more impact on water levels during 2002-2006. If the present trend of CBNG dewatering continues, it is conceivable that the CBNG effects on groundwater in the Wyodak-Anderson coal aquifer would decline over the next several years and the coal mining impacts would be more distinguishable. The 2022 CHIA-43 concluded that the impacts on groundwater levels and groundwater quality in the Wyodak coal aquifer are expected to be minimal and the coal aquifer would be able to support livestock use.

The 2022 CHIA-43 included groundwater quality data for 2018 to 2020 from 36 deeper backfill aquifer wells from the southern group of mines and indicated that from the available data, it is difficult to assess, interpret, and predict the groundwater quality of the deeper backfill with a single hypothesis. It is generally expected that over time the backfill would be flushed by groundwater flowing through the reclaimed material and down gradient to the northwest to the native undisturbed aquifers. Thus, the water quality in the backfill is expected to improve over time. The time to flush backfill and improve the water quality varies considerably based on the permeability of the backfill and groundwater flow rates in the aquifers.

Based on the predictions from the mines and the observed data, it is expected that the backfill aquifer would be a viable supply source to support the WDEQ-LQD approved postmining land use of livestock and wildlife. Outside the southern group of mine permit boundaries the backfill aquifer is not present and the native existing aquifers would remain structurally undisturbed.



Map 4-2. CIA for Potential Surface Water and Groundwater Impacts from WDEQ CHIA-43

The 2022 CHIA-43 states that the drawdown observed near the pits is a good indicator of the maximum drawdown caused by coal mining in the underburden aquifer. Outside of the mined areas, the aquifers overlying the underburden aquifer would remain structurally undisturbed. In addition, the relatively lower hydraulic conductivity of the underburden aquifer supports that coal mining would have limited effects on the underburden groundwater system outside of the mined area and these effects would decline with increasing distance from the coal mine permit boundaries to the west.

The past, present, and RFFA impacts of mining on groundwater levels are being reduced as reclamation progresses and as the backfill aquifer saturates. In addition, backfill water quality would be generally suitable for livestock use and wildlife habitat, which are the planned postmining land uses. Therefore, any effects resulting from the Proposed Action are expected to be moderate and long term, even considered in this context.

4.6.1.3 Mitigation Measures

W.S. 35-11-415(b)(xii) requires surface coal mines to replace in accordance with state law the water supply of an owner of interest in real property who obtains all or part of his supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source where the supply has been affected by contamination, diminution or interruption proximately resulting from the surface coal mine operation. The WDEQ-LQD requires surface coal mine permittees to enhance or restore the hydrologic conditions of disturbed land surfaces and minimize adverse impacts to the hydrologic balance. The recharge capacity of the reclaimed lands would be restored to a condition that minimizes disturbance to prevailing hydrologic balance in the permit area and in adjacent areas (WDEQ-LQD 2012).

Under provisions of Permit No. 525, Antelope Mine is required to monitor water levels and water quality in the alluvium, overburden, coal, interburden, underburden, and backfill. Operational groundwater monitoring programs are dynamic and modified through time as wells are removed by mining, discontinued from monitoring to eliminate redundancy, or added to replace those removed by mining and to facilitate monitoring of future mine expansion areas as mining has progressed. Additional wells have also been installed in the reclaimed backfill to monitor recovering, postmine groundwater conditions. Many groundwater monitoring wells installed by Antelope Mine within and around its current permit area have been used to evaluate groundwater conditions associated with the mine and continue to be monitored to reveal a long term record of groundwater conditions. After the completion of reclamation, a large groundwater monitoring network would remain. This would include not only backfill wells, but also a number of coal, overburden, and alluvial wells in undisturbed areas.

4.6.2 Surface Water

4.6.2.1 Direct and Indirect Impacts

4.6.2.1.1 Proposed Action

Additional discussions about surface water impacts can be found in Section 3.5.2.2.1 of the 2008 WAII EIS. Additional discussions can also be found in the Surface Water portion of the 2022 CHIA-43.

Under the Proposed Action, changes in surface runoff characteristics and sediment discharges would occur because of the mining and reconstruction of drainage channels as mining progresses and because of the use of sediment control structures used to manage discharges of surface water from the mine permit areas. Since the tract would be mined as an extension of the existing Antelope Mine there would not be a significant increase in the size of the area that is disturbed at any given time due to contemporaneous reclamation practices. Reclamation would be ongoing and concurrent with mining. Baseline water quality discussed in Section 3.6.2 indicates that current mining at the Antelope

Mine has had no impact on water quantity and quality within Antelope Creek. Based on this, it is anticipated that the Proposed Action would not result in any additional impacts to surface water quantity and quality.

Under the Proposed Action, the 100-foot buffer along Antelope Creek would limit disturbance and allow drainage. In WDEQ Coal Rules and Regulations, Chapter 1, Section 2(cd), WDEQ-LQD defines material damage to the hydrologic balance as a significant long-term or permanent adverse change to the hydrologic regime (WDEQ-LQD 2014b). WDEQ-LQD Coal Rules and Regulations require surface coal mine permittees to enhance or restore the hydrologic conditions of disturbed land surfaces and minimize adverse impacts to the hydrologic balance (WDEQ-LQD 2012). Based on this and the buffer along Antelope Creek, the direct and indirect impacts to surface water are expected to be moderate until final bond release has been obtained.

4.6.2.1.2 No Action Alternative

While surface water impacts from other portions of the Antelope Mine would continue under the No Action Alternative, this alternative would not authorize mining activities on the proposed tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered. Under the No Action Alternative, surface water impacts would not be extended by 0.5 year.

4.6.2.2 Past, Present, and RFFAs

The surface water CIA (**Map 4-2**) includes the entire Antelope Creek drainage area upstream from USGS Station No. 06364700. The CIA is the area where existing and proposed mining activities may cause measurable changes to the hydrologic environment depending on the characteristics of the surface systems. The 2022 CHIA-43 analyzed the impact of past, present, and RFFAs along with the Antelope Mine to surface water resources within Antelope Creek and concluded that on an annual basis. there is little change in streamflow in Antelope Creek. Mining may impact the groundwater/surface water interactions due to dewatering of the coal aquifers. The prevailing hydraulic gradient is towards the pits where groundwater is discharged. Antelope Mine predicted that the loss of recharge by the coal seams and the reverse gradient act to recharge the backfill via the coal seam subcrops will reduce flows in Antelope Creek by a maximum of 0.97 cfs or 702 ac/ft/yr. Despite these losses, a larger impact to Antelope Creek surface flows may be from the reduced inflow from Spring Creek and Horse Creek since these drainages have had diversions and flood control reservoirs upstream of the mining pits. However, as the baseline and during-mining data demonstrate, a majority of surface flows in and out of the Antelope Mine permit boundary are within the Antelope Creek channel, which will not be disturbed or diverted by mining. Therefore, the past, present, and RFFA impacts to surface water are expected to be minor, and the effects of the Proposed Action considered in this context minor, as well.

4.6.2.3 Mitigation Measures

During mining surface runoff would be controlled by a series of detention berms, diversion ditches, and sedimentation ponds. All necessary hydrologic control facilities would be constructed according to applicable state and federal requirements. All mining related surface water discharges are permitted under a Wyoming Pollutant Discharge Elimination System (WYPDES) program under Permit No. WY0030198, which requires treatment, monitoring, and reporting of all surface discharges.

Permit No. 525 requires NTEC to reestablish the essential hydrologic functions and hydrologic balances as they existed prior to mining within the permit area. NTEC would restore runoff and flow characteristics of the reclaimed area to essentially pre-mining conditions. This objective will be accomplished by reestablishing the surface drainage pattern similar to pre-mining conditions and restoring stock water impoundments for which water rights exist. Restoration of Antelope Creek

would be limited as a result of the buffer zone. In addition, a number of postmining impoundments would be constructed to replace premining features and to provide opportunities for stock and wildlife watering.

4.6.3 Water Rights

4.6.3.1 Direct and Indirect Effects

4.6.3.1.1 Proposed Action

Impacts to water rights would be the same as those described in Section 3.5.3.2.1 of the 2008 WAII EIS. NTEC currently holds the majority of the water rights within 2-miles of the tract.

As stated in section 3.5.3.2.1 of the 2008 WAII EIS, some privately permitted water wells in the vicinity of the West Antelope II South Modification tract have been or would likely be impacted (either by removing the well or by water level drawdown) by mining. Although additional water wells could be affected, under the Proposed Action it is unlikely that any privately permitted water wells would be impacted by water level drawdown to a greater extent than they currently are, although the duration of impacts would be extended.

No changes in normal peak flows downstream of the Antelope Mine is expected under the Proposed Action, since runoff is currently being controlled as a result of mining unrelated to the tract and the 100-foot buffer along Antelope Creek. Therefore, it is unlikely that any of the privately permitted surface water rights would be impacted by removal of surface water features within the tract.

In general, the Proposed Action would contribute to additional, more extensive, mining disturbance that may impact groundwater and surface-water rights in the Antelope Mine permit area. Impacts to groundwater and surface-water rights have already occurred from mining within the Antelope Mine and implementation of the Proposed Action would have negligible effect on increasing the magnitude of impacts. Therefore, the Proposed Action would not result in substantial declines in the groundwater or surface water availability for livestock use and wildlife habitat. Under the Proposed Action impacts to groundwater and surface water rights would be minor and long term.

4.6.3.1.2 No Action Alternative

While surface water and groundwater right impacts from other portions of the Antelope Mine would continue under the No Action Alternative, this alternative would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered.

4.6.3.2 Past, Present, and RFFAs

The CIA for water rights impacts is the same as those described above for groundwater and surface water. The type and number of groundwater and surface-water rights within 2 miles of the tract are discussed in **Section 3.5.3**. While the approval of the federal mining plan modification request would contribute to additional, more extensive mining disturbance in the southern group of mines, there would be minor additional past, present, and RFFA water rights impacts because groundwater systems have already been affected by CBNG removal and ongoing mining and because runoff is currently being controlled by the mines. In addition, as discussed in **Section 4.5.1.3**, W.S. 35-11-415(b)(xii) requires that mines replace, in accordance with state law, the water supply of an owner of interest in real property, who obtains all or part of his supply of water for domestic, agricultural, industrial, or any other legitimate use from an underground or surface source where the supply has been affected by contamination, diminution, or interruption resulting from the surface coal mine operation.

4.6.3.3 Mitigation Measures

Permit No. 525 requires NTEC to contact the owners of these groundwater and surface water appropriations prior to disturbance and will, if necessary, negotiate replacement of or compensation for any appropriated water rights that will be destroyed or diminished in quantity or quality by the mining operation. Generally, this compensation will consist of drilling the appropriator a deeper well outside the mine disturbance area.

4.7 Alluvial Valley Floors

4.7.1 Direct and Indirect Impacts

4.7.1.1 Proposed Action

The direct and indirect impacts to AVFs would not be different from those described in Section 3.6.2.1 of the 2008 WAII EIS. Since the AVFs on Antelope Creek are protected by a 100-foot buffer, there would be no direct and indirect impacts to AVFs.

4.7.1.2 No Action Alternative

The impacts to AVFs associated with existing approved mining would continue to occur; therefore, implementation of the No Action Alternative would not impact AVFs.

4.7.2 Past, Present, and RFFAs

The impacts to AVFs from past, present, and future RFFAs would not be significantly different from those described in Section 4.2.5 of the 2008 WAII EIS. Areas outside of the permitted mines have generally not been surveyed for the presence of AVFs; therefore, the locations and extent of the AVFs outside of the mine permit areas have not been determined. The effects of the Proposed Action, when considered in the context of past, present, and future RFFAs impacts on AVFs are expected to be negligible.

4.7.3 Mitigation Measures

To ensure that AVF areas are not disturbed, NTEC would mark the areas with signs, prior to mining related disturbance.

4.8 Wetlands/Aquatic Features

4.8.1 Direct and Indirect Impacts

4.8.1.1 Proposed Action

The direct and indirect impacts to wetlands would not be different from those described in Section 3.7.2.1 of the 2008 WAII EIS. Follow-up wetlands delineations and USACE determinations have shown that there are no jurisdictional wetlands and only 4.8 acres of wetlands within and adjacent to the West Antelope II South Modification tract. The Proposed Action would result in the loss of approximately 1.6 acres of wetlands since approximately 3.2 acres are associated with Antelope Creek, which would have a 100-foot disturbance buffer. However, as described in Section 3.8, jurisdictional determinations are only valid for a five-year period. NTEC will work with the USACE to determine if additional wetland surveys and a new jurisdictional verification are required prior to commencing any construction activities with the West Antelope II South Modification tract. Disturbed non-jurisdictional aquatic features would be replaced during the reclamation phase of mining. The direct and indirect impacts to aquatic features are expected to be minor and short-term.

4.8.1.2 No Action Alternative

While impacts to non-jurisdictional aquatic features from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered.

4.8.2 Past. Present, and RFFAs

Disturbed jurisdictional and non-jurisdictional features would be restored as required by the authorized federal, state, or private surface landowner, as specified in the mining permits, which are approved by WDEQ-LQD before mining operations would be conducted. Therefore, there would be no net loss of jurisdictional and non-jurisdictional features from the Proposed Action when considered in the context of negligible impacts from past, present, and RFFAs.

4.8.3 Mitigation Measures

Disturbed non-jurisdictional wetlands would be restored as required by the authorized federal, state, or private surface landowner, as specified in the mining permit, which are approved by WDEQ-LQD before mining operations commence. Restoration may include restoring, creating, enhancing, or preserving other wetland areas.

4.9 Soil

4.9.1 Direct and Indirect Impacts

4.9.1.1 Proposed Action

The direct and indirect impacts to soils would not be different from those described in Section 3.8.2.1 of the 2008 WAII EIS. Soils within the West Antelope II South Modification tract would be altered under the Proposed Action. Following reclamation, the replaced topsoil should support a stable and productive native vegetation community adequate in quantity and quality to support planned postmining land uses (i.e., livestock use and wildlife habitat). The direct and indirect impacts related to the Proposed Action to soils would be moderate (879.5 acres of disturbance) and short term.

4.9.1.2 No Action Alternative

While impacts to soils from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered and 879.5 acres would not be disturbed.

4.9.2 Past, Present, and RFFAs

The impacts from past, present, and RFFAs to soils would not be significantly different from those described in Section 4.2.6 of the 2008 WAII EIS. According to the 2022 CHIA-43, from 4Q 2019 to 1Q 2021, the LOM disturbed acreage at the southern group of mines totaled approximately 77,717 acres. Of this total, approximately 30 percent was actively mined, 21 percent was in long-term mining or reclamation facilities, and 49 percent had been backfilled and graded. Areas within active mines are progressively disturbed and would progressively be reclaimed by planting appropriate vegetation species to restore soil productivity and prevent soil erosion. Based on this, the impacts of the Proposed Action when considered in the context of impacts to soils from past, present, and RFFAs would be moderate and short-term.

4.9.3 Mitigation Measures

Suitable soil would be salvaged and stockpiled for use in reclamation. Sediment control structures would be built to trap eroded soil and revegetation would reduce wind erosion. NTEC would replace all salvaged topsoil in a manner which ensures successful revegetation and supports the postmining land uses. Regraded overburden would be sampled to verify suitability as subsoil for compliance with root zone criteria as specified by WDEQ-LQD Guideline No. 1A (Topsoil and Subsoil) (WDEQ-LQD 2024). Unsuitable materials would be removed and either treated, reblended, or replaced with the required depth of suitable overburden material or the affected area would be capped such that a minimum of the required depth of suitable material exists.

4.10 Vegetation

4.10.1 Direct and Indirect Impacts

4.10.1.1 Proposed Action

The direct and indirect impacts to vegetation would not be different from those described in Section 3.9.2.1 of the 2008 WAII EIS. Direct impacts associated with the removal of vegetation from the West Antelope II South Modification tract would include increased soil erosion and habitat loss for wildlife and livestock. The Proposed Action could also cause the spread of invasive species and noxious weed populations within the West Antelope II South Modification tract. During construction, increased soil disturbance and higher traffic volumes could stimulate the introduction and spread of undesirable and invasive, non-native species. Non-native species often out-compete desirable species, rendering an area less productive as a source of forage for livestock and wildlife.

Indirect impacts on reclaimed lands would include loss of habitat for some wildlife species as a result of reduced plant species diversity, particularly big sagebrush. However, grassland-dependent wildlife species and livestock would benefit from the increased grass cover and production. As discussed in **Section 3.10.1**, the Ute ladies'-tresses, which is listed as threatened, is the only plant T&E wildlife species with the potential of occurring in the area. This species was not located within the tract during surveys and there are no critical habitats for this T&E species within the West Antelope II South Modification tract.

Reclamation, including revegetation, would occur contemporaneously with mining on adjacent lands (i.e., reclamation would begin after an area is mined). To support the same type of land use by livestock and wildlife after completion of mining, NTEC would use seed mixes and seeding techniques oriented toward the restoration of upland grassland communities capable of sustained grazing and lowland drainage area grass communities providing winter forage along with special erosion protection. Reestablished vegetation would be dominated by species mandated in the reclamation seed mixtures (approved by WDEQ-LQD). NTEC would apply fertilizer to permanent revegetation areas during the first growing season, as the need is indicated by the topsoil nutrient sampling program. Livestock grazing would be excluded from reclaimed areas for at least two growing seasons following seeding and all revegetated areas would be regularly monitored for weed control. The direct and indirect impacts related to the Proposed Action on vegetation would be moderate and short term.

4.10.1.2 No Action Alternative

While impacts to vegetation from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered and 879.5 acres would not be disturbed.

4.10.2 Past, Present, and RFFAs

Impacts from past, present, and RFFAs would be similar to those described in **Section 4.9.2**. The overall contribution of vegetation impacts the Proposed Action when considered in the context of impacts from past, present, and RFFAs would be minor due to the localized effects and the improved productivity on mined lands that have been reclaimed.

4.10.3 Mitigation Measures

Antelope Mine monitors revegetated areas for noxious weeds for a period of at least five years after initial seeding (NTEC 2025a). Control measures may include cultural, mechanical or chemical treatments and will be evaluated for the most effective, economical method. Specific weed control problems are discussed with the district office of the Wyoming Weed and Pest Control Unit prior to initiation of any action for weed control. If extensive control on reclaimed lands becomes necessary, the program will be submitted to the WDEQ and the USDA - Forest Service for review prior to implementation. Any herbicide use is reported in the Annual Report. Revegetation success would be evaluated until the final reclamation bond is released.

4.11 Wildlife

The direct and indirect impacts to wildlife would not be different from those described in Section 3.10.1.2 of the 2008 WAII EIS and Section 4.1.1 of the 2014 WAII South EA. Impacts to wildlife that would result from mining the West Antelope II South Modification tract have been addressed by the WGFD and WDEQ-LQD when Permit No. 525 was amended to include the tract.

The environmental consequences related to mining the tract for big game, other mammals, upland game birds (excluding the GRSG), other birds, amphibians, reptiles, and aquatic species are not significantly different from those presented in the 2008 WAII EIS and are not presented herein. Updated discussions for raptors, GRSG, T&E species, and species of special interest are included below.

4.11.1 Raptors

4.11.1.1 Direct and Indirect Impacts

4.11.1.1.1 Proposed Action

Intact raptor nests are located within the tract. Long-term data demonstrate that many raptors nesting in the Antelope Mine raptor monitoring area have developed a high tolerance to mine-related disturbances. Several raptor pairs from at least four different species have illustrated this acceptance by repeatedly nesting in the permit area despite ongoing and/or encroaching mine operations. Based on NTEC's approved plans and procedures in place to reduce impacts to raptors, the direct and indirect impacts to the on site-specific raptors would be moderate and short term.

4.11.1.1.2 No Action Alternative

While impacts to raptors from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered and 879.5 acres would not be disturbed.

4.11.1.2 Past, Present, and RFFAs

The impacts related to the Proposed Action considered in the context of the effects of past, present, and RFFAs on regional raptor populations would be moderate and short term.

4.11.1.3 Mitigation Measures

NTEC's general reclamation practices for establishing or enhancing post-mine wildlife habitat are described in the Reclamation Plan of Permit No. 525. NTEC has developed plans and procedures to minimize impacts to nesting raptors and ensure proper reclamation techniques are implemented to enhance habitat in the post-mine landscape for raptors and their primary prey species. In addition, NTEC has worked with the USFWS and the Migratory Bird Permit Office in Denver, CO, to mitigate the take of avian species protected under the MBTA and Bald and Golden Eagle Protection Act by lawful mine activities. NTEC designs overhead power lines to meet or exceed current Avian Power Line Interaction Commission guidelines. In addition, NTEC has developed and adheres to the mine's voluntary Avian Protection Plan.

4.11.2 Greater Sage-grouse (GRSG)

4.11.2.1 Direct and Indirect Impacts

4.11.2.1.1 Proposed Action

As discussed in **Section 3.11.2**, there is an extremely limited historical presence of GRSG in the area. GRSG were last recorded within the Antelope Mine permit area in 2014 (ICF 2025). The closest GRSG core area to the tract is the Thunder Basin core area, which is approximately 15 miles from the Proposed Action, and there are no winter concentration or connectivity areas near the tract. Ongoing operations may adversely impact individual GRSG but are not likely to result in a loss of population viability in the wildlife monitoring area or cause a trend toward federal listing. Potential impacts to GRSG would likely be limited primarily to indirect influences resulting from habitat disturbance though loss of individual birds may occur at times. The use of appropriate timing and spatial buffers, timely implementation of reclamation, and application of targeted conservation measures in suitable habitats both on- and off-property throughout the region are expected to sufficiently reduce overall impacts to maintain a viable population within the area. The direct and indirect effects related to the Proposed Action on GRSG would be minor and short term.

4.11.2.1.2 No Action Alternative

While impacts to GRSG from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered and 879.5 acres would not be disturbed.

4.11.2.2 Past, Present, and RFFAs

The impacts related to the Proposed Action considered in the context of impacts from past, present, and RFFAs on regional GRSG populations related to disturbance at the southern group of mines would be moderate and short-term because the Proposed Action would only extend the LOM by 0.5 year.

4.11.2.3 Mitigation Measures

No mitigation measures specific to GRSG are necessary. NTEC's general reclamation practices for establishing or enhancing post-mining wildlife habitat are described in the Reclamation Plan of Permit No. 525. The Antelope Mine would incorporate methods to enhance reclaimed areas for GRSG, where appropriate. For example, as required by the WDEQ-LQD, the Antelope Mine has been actively establishing new sagebrush stands in reclamation to recreate suitable shrubland habitats for various shrub-dependent species, including GRSG. Stream-side areas are planted in a lowland mix that could provide brood-rearing and summer habitat for GRSG. Such efforts could enhance post-mining habitat for GRSG by providing important sources of food and cover.

4.11.3 Threatened, Endangered, and Candidate Species and Species of Special Interest

4.11.3.1 Direct and Indirect Impacts

4.11.3.1.1 Proposed Action

As discussed in **Section 3.11.3.1**, there are no vertebrate T&E wildlife species with the potential of occurring in the area. The USFWS IPaC indicates that there is potential for the monarch butterfly (proposed threatened) and Suckley's cuckoo bumble bee (proposed endangered) within the Antelope Mine permit area and the surrounding 1.0-mile perimeter. The action area contains habitat that could support monarch butterflies during migration. Little information is available from the USFWS on the Suckley's cuckoo bumble bee as of April 2025.

A discussion of species with special interest that could potentially occur in the area is included in **Section 3.11.3.2** and a list of these species is available in **Appendix F**. This impacts assessment related to the Proposed Action focuses on WGFD Species of Greatest Conservation Need and the WGFD tier ranking. Of the 116 species with special interest that could occur in the tract, 100 are Species of Greatest Conservation Need, all but 13 of which have been observed in the area. Three of these (American goshawk, burrowing owl, and mountain plover) are classified as Tier I species (the highest priority) and have been observed in the area.

Any T&E species or species with special interest within the permit boundary would be temporarily displaced but mitigation measures in place at Antelope Mine would promote the return of these species once reclamation has been completed. In an effort to approximate premining conditions, NTEC would reestablish vegetation types during the reclamation operation that are similar to the premine types. The direct and indirect effects related to the Proposed Action on T&E species and species with special interest would be moderate and short-term.

4.11.3.1.2 No Action Alternative

While impacts to T&E species from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered and 879.5 acres would not be disturbed.

4.11.3.2 Past, Present, and RFFAs

The Proposed Action would occur in a context where the impacts on regional T&E species and other species of special interest populations from past, present, and RFFAs are related to disturbance at the southern group of mines and would be moderate and short-term since these species would only be temporarily displaced. All mines within the southern group of mines have the same reclamation and revegetation requirements as the Antelope Mine. Based on this all mines would be required to reestablish vegetation types during the reclamation operation that are similar to the premine types.

4.11.3.3 Mitigation Measures

No mitigation measures specific to T&E species and species with special interest are necessary. The general reclamation practices for establishing or enhancing postmining wildlife habitat at the Antelope Mine described in the Reclamation Plan of Permit No. 525 are in place.

4.12 Land Use and Recreation

4.12.1 Direct and Indirect Impacts

4.12.1.1 Proposed Action

The direct and indirect impacts to land use and recreation would not be different from those described in Section 3.11.2.1 of the 2008 WAII EIS. Surface ownership within the West Antelope II South Modification tract is private (NTEC) and proposed coal removal is managed by the BLM. The primary land use impacts of the Proposed Action would be reduction of livestock grazing and loss of wildlife habitat. Other mineral development would also be directly affected. Livestock grazing has already been prohibited due to the tract being inside the permit boundary and adjacent to active mine areas. Hunting on the tract is currently not allowed because it is within the mine permit boundary and would continue to be disallowed during mining and reclamation. While non-coal mineral development would be curtailed on the tract, much of the CBNG has been depleted in the shallower production areas. Following reclamation, the land would be suitable for livestock grazing and wildlife uses, which are the historical land uses. Therefore, the direct and indirect impacts related to land use would be negligible and short term.

4.12.1.2 No Action Alternative

While land use and recreation impacts from the other portions of the Antelope Mine would continue under the No Action Alternative, under this alternative ASLM would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not be recovered and 879.5 acres would not be disturbed.

4.12.2 Past, Present, and RFFAs

Impacts from past, present, and RFFAs would be similar to those described in **Section 4.9.2**. The overall contribution to impacts on vegetation from past, present, and RFFAs would be minor due to the localized effects and the improved productivity on mined lands that have been reclaimed.

As described in **Section 4.9.2**, disturbed acreage at the southern group of mines totaled approximately 77,717 acres. Since the mines own or control the surface within their permit boundaries, the loss of agricultural land would not directly impact other landowners in the area. There is also limited recreational use of the area. Following reclamation, the land would be suitable for historical uses of livestock grazing and wildlife uses. Impacts on land use from past, present, and RFFAs when added to the Proposed Action would be negligible.

4.12.3 Mitigation Measures

No mitigation measures specific to land use and recreation are necessary.

4.13 Cultural Resources

4.13.1 Direct and Indirect Impacts

4.13.1.1 Proposed Action

The direct and indirect impacts to cultural resources would not be different from those described in Section 3.12.2.1 of the 2008 WAII EIS. The West Antelope II South Modification tract has been subjected to Class III cultural resource inventories and only one of the two sites has been classified as NRHP eligible. Because this site would not be disturbed under the Proposed Action, no mitigation would be required, and no impacts are anticipated. The direct and indirect effects on cultural resource from the Proposed Action would be negligible, if any, but long-term.

Letters of consultation were sent out to 26 Native American tribes/tribal representatives during the scoping process. OSMRE did not receive any responses. OSMRE consulted with the Wyoming State Historic Preservation Officer (SHPO) and on March 27, 2020, the SHPO concurred with a finding of "historic properties affected." Additional letters of consultation were sent to 26 Native American tribes/tribal representatives on April 24, 2025, during the preparation of the final EA. At the time of this EA, the Northern Arapaho Tribal Historic Preservation Officer (THPO) responded indicating that if traditional cultural properties, rock features, or human remains are found during excavation or ground disturbance, the THPO requests future consultation. OSMRE received no other tribal responses. OSMRE sent additional notice to the SHPO and the SHPO responded indicating that the 2020 concurrence of "no historic properties affected" remains in effect. OSMRE sent a notice to the Advisory Council on Historic Preservation (ACHP) and the ACHP responded to continue to make them aware of any additional information obtained regarding consulting party comments, if project plans change, or if any additional historic properties are discovered.

4.13.1.2 No Action Alternative

Under the No Action Alternative, there would be no recovery of Federal coal within the tract and therefore no disturbance resulting from such any recovery.

4.13.2 Past, Present, and RFFAs

The individual evaluation of cultural resource sites in the southern group of mines suggests that through avoidance of sensitive site types and mitigation through data recovery for all unavoidable disturbance to NRHP eligible sites, the impacts from past, present, and RFFAs to cultural resources have been minimal. Based on this, the impacts on cultural resource from the Proposed Action considered in the context of impacts from past, present, and RFFAs would be negligible.

4.13.3 Mitigation Measures

No mitigation measures specific to cultural resources are necessary.

4.14 Visual Resources

4.14.1 Direct and Indirect Impacts

4.14.1.1 Proposed Action

The direct and indirect impacts to visual resources would not be different from those described in Section 3.13.2.1 of the 2008 WAII EIS. Potential direct impacts would arise from disturbance associated with the Proposed Action and would cease upon reclamation. Potential indirect impacts consist of permanent changes to existing topography and the vegetative component of the area, irrespective of reclamation success. Mining activities would be visible from State Highway 59 and County Road 37 (Antelope Coal Mine Road) in Converse County, and Country Road 4 (Antelope Road) in Campbell County, though the extent and duration of visibility would vary according to the visual perspective from the roads. The nearest occupied residence is approximately 1.5 miles to the west-southwest from the tract boundary. The direct and indirect impacts related to visual resources could affect local residences and are therefore listed as moderate and long-term. Reclaimed terrain would be almost indistinguishable from the surrounding undisturbed terrain.

4.14.1.2 No Action Alternative

Under the No Action Alternative, while visual related to the rest of the Antelope Mine would continue, there would be no disturbance within the tract, meaning that there would not be any direct or indirect visual impacts from the proposed mine plan modification on the approximately 879.5 acres of the modification area.

4.14.2 Past, Present, and RFFAs

Impacts to visual resources from past, present, and RFFAs would be related to disturbance at the southern group of mines and from oil and gas development. Human disturbances include, but are not limited to, agriculture, mining, roads, urban areas, and oil and gas development. Given the fact that moderate visual impacts are currently occurring in the area and that the impacts from the Proposed Action are not significantly greater than current effects, the impacts to visual resources from the Proposed Action considered in the context of the impacts related to the past, present, and RFFAs would be moderate and long-term.

4.14.3 Mitigation Measures

Current best available control technology measures would continue to be employed at the Antelope Mine to control visibility impacts from particulates, which could affect visibility. The Antelope Mine is required to adhere to Air Quality Permit MD-13361, which includes visual observations of truck dumps, chemical dust suppressant and water application on haul roads, temporary vegetative cover on topsoil areas, and operation of a particulate monitoring network (WDEQ-AQD 2012).

4.15 Noise

4.15.1 Direct and Indirect Impacts

4.15.1.1 Proposed Action

The direct and indirect impacts to noise would be the same as those described in Section 3.14.2.1 of the 2008 WAII EIS. Under the Proposed Action, noise levels would not increase but would be extended by 0.5 year. Because of the remoteness of the West Antelope II South Modification tract and because mining is already on going in the area, noise would have few off-site impacts. Wildlife in the immediate vicinity of the tract may be adversely affected by the noise during mining operations; however, anecdotal observations at surface coal mines in the area suggest that some wildlife species may adapt to increased noise associated with coal mining activity. Although noise levels would not significantly change as a result of the Proposed Action, the direct and indirect impacts related to the Proposed Action could affect local residences for a longer period of time and are therefore listed as moderate and long term.

4.15.1.2 No Action Alternative

Noise from mining would continue at the other portions of the Antelope Mine regardless of whether the Proposed Action is approved; however, under the No Action Alternative mining operations would not be extended by 0.5 years on additional acres.

4.15.2 Past, Present, and RFFAs

Impacts from past, present, and RFFAs would be related to mining related activities at the southern group of mines. Potential sources of noise disturbances include, but are not limited to, agriculture, mining, roads, and oil and gas development. Potential impacts would cease upon project completion and successful reclamation in a given area. Recreational users, local residents, and grazing lessees using lands surrounding active mining areas do hear mining-related noise, but this has not been reported to have a substantial impact. The impacts related to noise from the Proposed Action when added to those of past, present, and RFFAs as discerned by the public would be moderate but short term.

4.15.3 Mitigation Measures

No mitigation measures specific to noise impacts are necessary.

4.16 Transportation Facilities

4.16.1 Direct and Indirect Impacts

4.16.1.1 Proposed Action

The direct and indirect impacts to transportation facilities would be the same as those described in Section 3.15.2.1 of the 2008 WAII EIS. The Proposed Action would not result in increased mine related traffic but would extend impacts by 0.5 year.

All of the coal mined at the Antelope Mine would continue to be transported by rail. The variation in coal destinations and multiple rail transportation routes make it speculative to analyze the potential impacts to the entire rail corridor in detail.

The 2008 WAII EIS states that coal dust and fines blowing or sifting from moving, loaded rail cars has been linked to railroad track stability problems resulting in train derailments and to rangeland fires caused by spontaneous combustion of accumulated coal dust. While no specific studies of coal dust impacts have been conducted in the PRB, BNSF has been involved in research regarding the impacts of coal dust escaping from loaded coal cars on rail lines in the PRB. BNSF has determined that coal dust poses a serious threat to the stability of the track structure and the operational integrity of rail lines in, and close to, the mines in the PRB. In response to lawsuits alleging that coal spilled from trains pollute waterways, BNSF Railway agreed to study the use of physical covers for coal trains to reduce the effects of blowing coal particles (Seattle Times 2016). BNSF has cited studies and experience to demonstrated that shippers can take steps in the loading of coal cars using existing, cost-effective technology to substantially reduce coal dusting events. BNSF has a Coal Loading Rule, in effect since October 2011, specifically requiring all shippers loading coal at any Montana or Wyoming mine to take measures to load cars in such a way that ensures coal dust losses in transit are reduced by at least 85% compared to cars where no remedial measures have been taken (BNSF 2015).

Two recent Australian studies involved measuring particle concentrations in the air near a coal haul transport corridor to assess whether coal dust was being emitted from the railcars and whether any such emissions would result in particulate matter concentrations that would be considered potentially harmful to human health. The two reports presented strong evidence that, while particulate levels were elevated for the several minutes during and after trains passed the monitoring station, coal trains did not result in any more emissions than any other freight-hauling trains (Ramboll Environ 2016).

Overall, the added direct and indirect impacts of the Proposed Action on transportation would be minor and short term.

4.16.1.2 No Action Alternative

While transportation impacts from the other portions of the Antelope Mine would continue under the No Action Alternative, this alternative would not authorize proposed mining activities on this tract; thus, 14.5 Mt of Federal coal related to WYW-177903 would not travel.

4.16.2 Past, Present, and RFFAs

Impacts to transportation from past, present, and RFFAs are related to coal production levels. If coal production levels increase, impacts to transportation would increase. Highway traffic accidents and delays at grade crossings could result from train traffic. The transportation facilities for the southern group of mines are already in place and coal production and employment levels would not change. Coal extracted from the existing surface coal mines in the Wyoming PRB is transported in rail cars along the BNSF and UP rail lines. The coal mines south of Gillette, including the Antelope Mine, ship most of their coal via the Gillette to Douglas BNSF and UP joint trackage that runs south through Campbell and Converse counties and then east over separate BNSF and UP mainlines for destinations

in the Midwest. The Proposed Action would extend the duration of mining by approximately 0.5 year at the Antelope Mine, and thus the duration of utilization of BNSF and UP rail lines would be extended by that amount. The impacts related to transportation from the Proposed Action when considered in the context of impacts from past, present, and RFFAs would be minor and short term.

4.16.3 Mitigation Measures

No mitigation measures specific to transportation facilities are necessary.

4.17 Hazardous and Solid Waste

4.17.1 Direct and Indirect Impacts

4.17.1.1 Proposed Action

The direct and indirect impacts to hazardous and solid waste would not be different from those described in Section 3.16.2.1 of the 2008 WAII EIS. Under the Proposed Action hazardous and solid waste would not increase but generation would be extended by 0.5 year. Direct and indirect impacts on hazardous and solid wastes would be minor and short term.

4.17.1.2 No Action Alternative

Under the No Action Alternative, hazardous and solid wastes would continue to be generated at the Antelope Mine, but the duration of the impacts would be reduced by approximately 0.5 year, and no hazardous or solid wastes would be generated as a result of mining the West Antelope II Federal coal because it would not be authorized.

4.17.2 Past, Present, and RFFAs

Hazardous and solid waste impacts from past, present, and RFFAs would be related to mining operations at the southern group of mines. Potential impacts would cease upon project completion and successful reclamation in a given area. Overall, the impacts to hazardous and solid waste from the Proposed Action when considered in the context of past, present, and RFFAs would be minor and short term.

4.17.3 Mitigation Measures

No mitigation measures specific to hazardous and solid wastes are necessary.

4.18 Socioeconomics

4.18.1 Direct and Indirect Impacts

4.18.1.1 Proposed Action

State, counties, cities, school districts, and many other governmental entities across the state receive revenues derived directly and indirectly from taxes and royalties on the production of federal coal, including that at the Antelope Mine. Such revenues include ad valorem taxes, severance taxes, royalty payments, sales and use taxes on equipment and other taxable purchases, and portions of required contributions to the federal AML program and Black Lung Disability Trust Fund. A summary of federal and state revenues generated from recovery of Federal coal from the Antelope Mine and the Proposed Action are provided in **Table 4-13**.

Under the Proposed Action, Wyoming revenues generated from LOM Antelope Mine production could be approximately $860.3 million and federal revenues could be $545.8 million. The primary difference between state and federal revenues is related to the fact that severance, ad valorem, and sales and use taxes are only paid to the state of Wyoming. In addition to impacts in Wyoming, Antelope Mine is an asset of NTEC, which is wholly owned by the Navajo Nation. Antelope Mine, like NTEC's

other assets, supports NTEC and the Navajo Nation. NTEC's economic impact on the Navajo Nation in 2024 was $128,490,000 (NTEC 2025d). The Proposed Action would extend the duration of the positive economic impacts related to mining the Federal coal.

Table 4-13. LOM Federal and State Revenues from Federal Coal Recovery within the Antelope Mine (millions of dollars)

	Total $ Collected[1]		Federal Revenue		State Revenue	
Revenue Source	Antelope Mine	Proposed Action	Antelope Mine	Proposed Action	Antelope Mine	Proposed Action
Federal Mineral Royalties	580.6	24.9	290.3	12.5	290.3	12.5
Abandoned Mine Lands Fund	94.6	4.1	47.3	2.0	47.3	2.0
Severance Tax	240.6	9.7	--[2]	--[2]	240.6	9.7
Bonus Bid Annual Revenues[3]	0.0	0.0	0.0	0.0	0.0	0.0
Ad Valorem Tax	217.7	9.3	--[2]	--[2]	217.7	9.3
Black Lung	185.8	8.0	185.8	8.0	--[2]	--[2]
Sales and Use Tax	29.6	1.3	--[2]	--[2]	29.6	1.3
Totals	**1,348.8**	**57.3**	**523.4**	**22.5**	**825.5**	**34.9**

[1] Total may not equal subtotals due to rounding. 2. No revenues disbursed. 3. No bonus bid revenues collected after 2017.
Source: WWC calculation – provided in **Appendix G**

Mining in the tract would not directly create new jobs and therefore, the availability of housing units would not be impacted. No additional employees are anticipated as a result of the Proposed Action, although the duration of employment for current employees would be extended.

No additional changes in the current socioeconomic situation are anticipated. Direct and indirect impacts on socioeconomics under the Proposed Action would be moderate and short term.

4.18.1.2 No Action Alternative

Under the No Action Alternative, approximately $34.9 million of Wyoming revenues and approximately $22.5 million of federal revenues would not be realized. The selection of the No Action Alternative would likely not result in direct job losses, but any revenue, state program funding, abandoned mine land fees, and black lung fees that might otherwise be generated by extending the LOM by 0.5 year would not be collected. In addition, the duration of employment for current employees would not be extended by 0.5 year.

4.18.2 Past, Present, and RFFAs

Impacts from past, present, and RFFAs would be related to socioeconomic conditions in Campbell and Converse counties. Impacts are not substantially different from those described in **Section 4.18.1.1** because the two counties, Campbell County School District 1, Converse County School District 1 and 2, the City of Gillette, the City of Douglas, and many other governmental entities across the state receive revenues derived directly and indirectly from taxes and royalties on the production of federal coal from the Antelope Mine. The impacts on socioeconomics from the Proposed Action when considered in the context of impacts from past, present, and RFFAs are expected to be moderate and short-term.

4.18.3 Mitigation Measures

No mitigation measures specific to reducing socioeconomic impacts are necessary.

4.19 Unavoidable Adverse Effects

Unavoidable adverse impacts are the effects on natural and human resources that would remain as a result of the Proposed Action after mitigation measures have been applied. These impacts range from negligible to moderate and short to long-term. For the Proposed Action, details regarding these

impacts are presented in the preceding resource sections and the 2008 WAII EIS. Unavoidable adverse effects are summarized in **Table 4-14**.

Table 4-14. Unavoidable Adverse Effects of the Proposed Action

Resource	Unavoidable Adverse Effect
Topography and Physiography	Topographic effects of mining are unavoidable because mining activities such as blasting, excavating, loading and hauling of overburden and coal are required to recover coal in an economical manner.
Geology, Mineral Resources and Paleontology	Geology, mineral resources, and buried paleontological resources may be permanently impacted by mining activities. Such impacts are unavoidable as the resources cannot be avoided during mining.
Air Quality/GHGs	Emissions and associated impacts are unavoidable but are not expected to degrade air quality in the area. Mined coal is primarily used for combustion; therefore, any associated GHG emissions are unavoidable if the Proposed Action is implemented.
Water Resources	Impacts to water resources resulting from coal extraction are unavoidable. However, these impacts would be mitigated through replacement of groundwater or surface water supplies for domestic, agricultural, industrial, or any other legitimate use if such a supply is diminished, interrupted, or contaminated to the extent of precluding use of the water as a result of mining.
Soils	Soil in disturbance areas would exhibit more homogenous textures and may have coarser fragments near the surface following mining. Some soil loss may occur as a result of erosion, prior to stabilization. Microbial and chemical impacts due to accelerated erosion and mixing of soil zones may occur as a result of disturbance.
Vegetation	Vegetation would be eliminated beginning with the initial disturbance and continuing until reclamation is complete. Noxious weeds may be introduced as a result of mining activity, potentially affecting vegetation communities and requiring implementation of control measures in the long term.
Wildlife	Wildlife would be temporarily affected by mine activities, which would alter habitat conditions, particularly in the vicinity of surface disturbance. These impacts would be short term and habitats would be reclaimed following mining.
Visual Resources	Mining activity and associated disturbances and facilities would unavoidably alter the landscape during the mining term, affecting the aesthetic qualities. Some features would be visible from public access points, including State Highway 59.
Noise	Noise would result from mining activities similar to the existing condition.
Transportation Facilities	State Highway 59 would continue to experience similar mine related traffic.
Hazardous and Solid Waste	Coal mining and associated coal processing would yield coal waste.

5.0 Consultation and Coordination

5.1 Public Comment Process

OSMRE has a website that provides a summary of the project and schedule. The website is available at: https://www.osmre.gov/laws-and-regulations/nepa/projects. OSMRE released a public notice to prepare the Antelope Mine West Antelope II South Modification tract EA in the *Gillette News Record* on November 5, 2019, and the *Douglas Budget* on November 6, 2019. Public outreach letters describing the EA and soliciting comments were mailed on November 4, 2019, to a total of 158 recipients, including city governments, adjacent landowners, other interested parties, and 26 tribes/tribal representatives (**Appendix A**). The legal notices and letters invited the public to comment on issues of concern related to the EA. Written comments were solicited until December 3, 2019. **Appendix B** presents a summary of the scoping comments received by the public. Four comment letters were received during the public scoping period, and OSMRE considered those comments during the preparation of this EA. OSMRE released an initial EA and draft FONSI for a comment period that extended from May 8, 2020, through June 8, 2020. OSMRE received two comments. Responses to comments received during the 2020 comment period are included in **Appendix B**.

5.2 National Historic Preservation Act Compliance

Standard procedures for the implementation of section 106 of the NHPA are described at 36 CFR §§ 800.3 through 800.4 for determinations of "no historic properties affected." Letters of consultation were sent out to 26 Native American tribes/tribal representatives during the March 2020 scoping process. OSMRE did not receive any responses. OSMRE consulted with the Wyoming SHPO, and, on March 27, 2020, the SHPO concurred with OSMRE's finding of "no historic properties affected."

OSMRE typically provides multiple opportunities to Indian tribes to comment on actions under section 106 of the NHPA. For this action, even though OSMRE had already received a concurrence on its finding of "no historic properties affected" in 2020, OSMRE decided that additional outreach to tribes and the SHPO could be beneficial given the amount of time between the finalization of the NEPA process and the release of the initial EA and draft unsigned FONSI in 2020. However, given the Administration's declaration of a National Energy Emergency and the fact that approval of this Proposed Action would provide vital domestic coal resources, in March 2025, OSMRE determined that the action was eligible for the emergency procedures at 36 CFR § 800.12(b)(2) under Executive Order 14156: Declaring a National Energy Emergency. Additional letters of consultation were sent to 26 Native American tribes/tribal representatives on April 24, 2025, requesting responses within seven days. The Northern Arapaho Tribal Historic Preservation Officer (THPO) responded indicating that if traditional cultural properties, rock features, or human remains are found during excavation or ground disturbance, the THPO requests future consultation; OSMRE received no other tribal responses. Also, under the 36 CFR § 800.12(b)(2) procedures, OSMRE sent additional notice to the SHPO, and the SHPO responded indicating that the 2020 concurrence of "no historic properties affected" remains in effect. Because OSMRE used the 36 CFR § 800.12(b)(2) procedures, OSMRE sent a notice to the ACHP and the ACHP responded with the request that OSMRE notify it of any additional information obtained regarding consulting party comments, changes to the project plans, or the discovery of any additional historic properties.

5.3 Compliance with Section 7 of the Endangered Species Act

Under ESA section 7(a)(2), a Federal agency that carries out permits, licenses, funds, or otherwise authorizes an activity must consult with the USFWS, as appropriate, to ensure that the preferred alternative is not likely to jeopardize the continued existence of any listed species under the ESA or result in the destruction or adverse modification of designated critical habitat. A USFWS IPaC query

for the Proposed Action was conducted in May 2025 to identify species and other resources that are known or expected to be on or near the action area. OSMRE completed a Biological Assessment which analyzed how the Proposed Action may affect threatened, endangered, and proposed species.

The BA identified one threatened (Ute Ladies'-tresses (*Spiranthes diluvialis*)) and two proposed species (monarch butterfly (*Danaus Plexippus*) and Suckley's cuckoo bumble bee (*Bombus suckleyi*)) as having the potential to occur based on the IPaC report generated for Campbell and Converse counties, WY on in May 2025. (Appendix A). OSMRE began formal consultation with the USFWS on May 8, 2025. After a thorough investigation of the potential effects of the proposed action, OSMRE determined that the approval of the mining plan modification is "not likely to adversely affect" Ute ladies' tresses and "not likely to jeopardize the continued existence" of the monarch butterfly and Suckley's cuckoo bumble bee. On May 15, 2025, the USFWS concurred with OSMRE's determination that the proposed action is not likely to adversely affect species or critical habitat listed under the ESA and not likely to jeopardize the continued existence of two species proposed for listing under the ESA.

5.4 Preparers and Contributors

Table 5-1. OSMRE Personnel

Name	Organization	Project Responsibility
Roberta Martínez-Hernández	OSMRE	Project Lead
Erica Trent	OSMRE	Biological Resources
Charlie Kwak	OSMRE	Hydrology and Air Quality
Jeremy Iliff	OSMRE	Cultural/Historical

Table 5-2. Third Party Contractor Personnel

Name	Organization	Project Responsibility	Education
Beth Wilson	WWC Engineering	Primary Author	B.S. Chemical Engineering
John Berry	WWC Engineering	Author, QAQC	B.S. Wildlife Management
Jeanne Knox	WWC Engineering	Author	B.S. Wildlife Biologist
Wade Filkins	WWC Engineering	Author	B.S. Civil Engineer
Mal McGill	WWC Engineering	AutoCAD	A.S. Engineering
Rodney Ventling	WWC Engineering	AutoCAD	

5.5 Distribution of the EA

This EA will be distributed to individuals who specifically request a copy of the document. It will also be made available electronically on the OSMRE website.

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APPENDIX A

LEGAL NOTICES
FOR FEDERAL LEASE MODIFICATION APPROVAL
WYW-177903

Public Notice
Antelope Mine Federal Mining Plan Modification
Environmental Assessment

The U.S. Department of the Interior (DOI), Office of Surface Mining Reclamation and Enforcement (OSMRE), Western Region Office, will prepare an environmental assessment (EA) for a federal mining plan modification for the Antelope Mine lease by modification (LBM) to federal coal lease WYW-177903 (the Project). In accordance with the Mineral Leasing Act of 1920 (MLA), the DOI Assistant Secretary for Land and Minerals Management (ASLM) must approve the Project before any mining and reclamation can occur on lands containing leased federal coal. The LBM application was filed with the Bureau of Land Management (BLM) by Antelope Coal, LLC (AC) on November 29, 2012. As a result, the BLM prepared EA# WY-060-EA13-147 in cooperation with the OSMRE, which was published in March 2014. BLM subsequently issued a finding of no significant impact for the lease modification and the LBM was issued on February 1, 2018. AC operates the Antelope Mine under Permit No. PT0525 issued by Wyoming Department of Environmental Quality Wyoming Department of Environmental Quality (WDEQ)-Land Quality Division (LQD) in accordance with the approved Wyoming State Coal Regulatory Program (30 CFR Part 950).

OSMRE is preparing an EA to evaluate the environmental impacts resulting from the Project, pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA). The Antelope Mine is located approximately 20 miles south of Wright, Wyoming and 55 miles north of Douglas, Wyoming. Antelope Mine uses a truck and shovel and dragline mining method. The amount of remaining recoverable federal coal authorized for removal within the currently approved federal mining plan is approximately 409.6 million tons (Mt). The Project proposes to add approximately 856.6 acres and 15.8 Mt of mineable federal coal to the approved federal mining plan. The annual production rate used to calculate the environmental impacts resulting from the Proposed Action will be 30 million tons per year (Mtpy), which is the estimated future annual production rate suggested by Antelope Mine and is below the maximum permitted production rate of 52 Mtpy set by WDEQ-Air Quality Division (AQD) air quality permit MD-13361. Antelope Mine started operation in 1982 and the mine will continue to operate until 2039 under the current, approved mining plan. Using the estimated 30 Mtpy production rate, the Project would extend the life of the mine by approximately 0.5 year.

The EA will disclose the potential for direct, indirect, and cumulative effects to the environment from the Project. Further, the EA will update, clarify, and provide new and additional environmental information for the Project. Through the EA process, OSMRE will determine whether or not there are significant environmental impacts. An environmental impact statement will be prepared if the EA identifies significant impacts. If a finding of no significant impact is reached, and pursuant to 30 CFR § 746.13, OSMRE will prepare and submit to the ASLM a mining plan decision document recommending approval, disapproval, or conditional approval of the mining plan modification. The ASLM will approve, disapprove, or conditionally approve the mining plan modification, as required under the Mineral Leasing Act of 1920.
OSMRE is soliciting public comments on the Project. Your comments will help to determine the issues and alternatives that will be evaluated in the environmental analysis. You are invited to direct these comments to:

ATTN: West Antelope II South Modification EA
C/O: Gretchen Pinkham,

OSMRE Western Region
1999 Broadway, Suite 3320,
Denver, CO 80202-3050

Comments may also be emailed to: osm-nepa-wy@osmre.gov, ensure the subject line reads: ATTN: OSMRE, West Antelope II South Modification EA. Comments should be received or postmarked no later than December 3, 2019 to be considered during the preparation of the EA. Comments received, including names and addresses of those who comment, will be considered part of the public record for this project and will be available for public inspection. Additional information regarding the Project may be obtained from Gretchen Pinkham, telephone number (303) 293-5088 and the Project website provided below. When available, the EA and other supporting documentation will be posted at:
http://www.wrcc.osmre.gov/initiatives/westantelopeMine.shtm.

United States Department of the Interior

OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT
Western Region
1999 Broadway St., Suite 3320
Denver, CO 80202-3050

November 4, 2019

Dear Stakeholders and Interested Parties,

The U.S. Department of the Interior (DOI), Office of Surface Mining Reclamation and Enforcement (OSMRE), Western Region Office, will prepare an environmental assessment (EA) for a federal mining plan modification for the Antelope Mine lease by modification (LBM) to federal coal lease WYW-177903 (the Project). In accordance with the Mineral Leasing Act of 1920 (MLA), The DOI Assistant Secretary for Land and Minerals Management (ASLM) must approve the Project before any mining and reclamation can occur on lands containing leased federal coal. The LBM application was filed with the Bureau of Land Management (BLM) by Antelope Coal, LLC (AC) on November 29, 2012. As a result, the BLM prepared EA# WY-060-EA13-147 in cooperation with the OSMRE, which was published in March 2014. BLM subsequently issued a finding of no significant impact for the lease modification and the LBM was issued on February 1, 2018. AC operates the Antelope Mine under Permit No. PT0525 issued by Wyoming Department of Environmental Quality Wyoming Department of Environmental Quality (WDEQ)-Land Quality Division (LQD) in accordance with the approved Wyoming State Coal Regulatory Program (30 CFR Part 950).

OSMRE is preparing an EA to evaluate the environmental impacts resulting from the Project, pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA). The Antelope Mine is located approximately 20 miles south of Wright, Wyoming and 55 miles north of Douglas, Wyoming. Antelope Mine uses a truck and shovel and dragline mining method. The amount of remaining recoverable federal coal authorized for removal within the currently approved federal mining plan is approximately 409.6 million tons (Mt). The Project proposes to add approximately 856.6 acres and 15.8 Mt of mineable federal coal to the approved federal mining plan. The annual production rate used to calculate the environmental impacts resulting from the Proposed Action will be 30 million tons per year (Mtpy), which is the estimated future annual production rate suggested by Antelope Mine and is below the maximum permitted production rate of 52 Mtpy set by WDEQ-Air Quality Division (AQD) air quality permit MD-13361. Antelope Mine started operation in 1982 and the mine will continue to operate until 2039 under the current, approved mining plan. Using the estimated 30 Mtpy production rate, the Project would extend the life of the mine by approximately 0.5 year.

The EA will disclose the potential for direct, indirect, and cumulative effects to the environment from the Project. Further, the EA will update, clarify, and provide new and additional environmental information for the Project. Through the EA process, OSMRE will determine whether or not there are significant environmental impacts. An environmental impact statement will be prepared if the EA identifies significant impacts. If a finding of no significant impact is reached, and pursuant to 30 CFR § 746.13, OSMRE will prepare and submit to the ASLM a mining plan decision document recommending approval, disapproval, or conditional approval of the

mining plan modification. The ASLM will approve, disapprove, or conditionally approve the mining plan modification, as required under the Mineral Leasing Act of 1920.

OSMRE is soliciting public comments on the Project. Your comments will help to determine the issues and alternatives that will be evaluated in the environmental analysis. You are invited to direct these comments to:

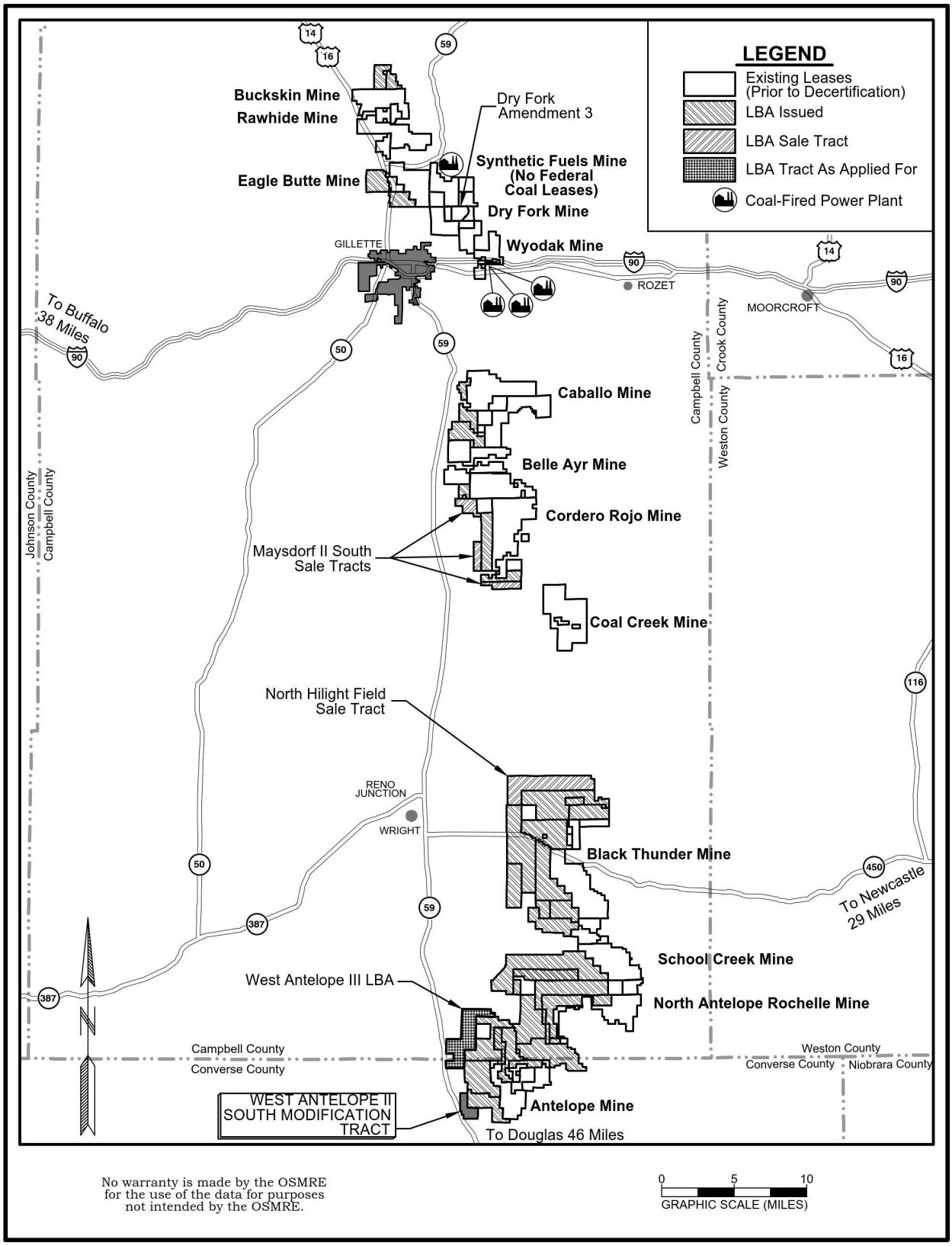
ATTN: West Antelope II South Modification EA
C/O: Gretchen Pinkham,
OSMRE Western Region
1999 Broadway, Suite 3320,
Denver, CO 80202-3050

Comments may also be emailed to: osm-nepa-wy@osmre.gov, ensure the subject line reads: ATTN: OSMRE, West Antelope II South Modification EA. Comments should be received or postmarked no later than December 3, 2019 to be considered during the preparation of the EA. Comments received, including names and addresses of those who comment, will be considered part of the public record for this project and will be available for public inspection. Additional information regarding the Project may be obtained from Gretchen Pinkham, telephone number (303) 293-5088 and the Project website provided below. When available, the EA and other supporting documentation will be posted at:
http://www.wrcc.osmre.gov/initiatives/westantelopeMine.shtm.

Sincerely,

Elizabeth Shaeffer,
Manager
Field Operations Branch

Attachment: Location Map


LEGEND
Existing Leases (Prior to Decertification)
LBA Issued
LBA Sale Tract
LBA Tract As Applied For
Coal-Fired Power Plant
Buckskin Mine
Rawhide Mine
Dry Fork Amendment 3
Synthetic Fuels Mine (No Federal Coal Leases)
Eagle Butte Mine
Dry Fork Mine
Wyodak Mine
GILLETTE
ROZET
MOORCROFT
To Buffalo 38 Miles
Caballo Mine
Belle Ayr Mine
Cordero Rojo Mine
Maysdorf II South Sale Tracts
Coal Creek Mine
North Hilight Field Sale Tract
RENO JUNCTION
WRIGHT
Black Thunder Mine
To Newcastle 29 Miles
School Creek Mine
West Antelope III LBA
North Antelope Rochelle Mine
Campbell County
Converse County
Weston County
Converse County
Niobrara County
WEST ANTELOPE II SOUTH MODIFICATION TRACT
Antelope Mine
To Douglas 46 Miles
Johnson County
Campbell County
Campbell County
Crook County
Weston County
No warranty is made by the OSMRE for the use of the data for purposes not intended by the OSMRE.
0 5 10
GRAPHIC SCALE (MILES)

APPENDIX B

PUBLIC SCOPING AND NOTICE OF AVAILABILITY MAILING LISTS
and
PUBLIC SCOPING COMMENT SUMMARIES
And
EA REVIEW COMMENT SUMMARIES and RESPONSES
(INDIVIDUAL LETTERS RECEIVED HAVE NOT BEEN INCLUDED)

Mailing List

Name	Title	
Tribes		
Darwin St. Clair	Chairman	Eastern Shoshone Business Council
Dean Goggles	Chairman	Northern Arapaho Business Council
Shaun Chapoose	Chairperson	The Ute Tribe of the Uintah and Ouray Reservation
Harold C. Frazier	Chairman	Cheyenne River Sioux Tribal Government
Roxanne Sazue	Chairwoman	Crow Creek Sioux Tribe
Wanda Wells	Cultural Affairs	Crow Creek Sioux Tribe
Anthony Reider	President	Flandreau Santee Sioux Tribe
Michael Jandreau	Chairman	Lower Brule Sioux Tribe
Clair Green	Cultural Resources/Public Affairs	Lower Brule Sioux Tribe
John Yellow Bird Steele	President	Oglala Sioux Tribal Council
William Kindle	President	Rosebud Sioux Tribe
Garryl Rousseau Sr.	Vice-Chairman or Acting Chairman	Sisseton-Wahpeton Oyate Tribes
Robert Flying Hawk	Chairman	Yankton Sioux Tribe
Lyman Guy	Tribal Chairman	Apache Tribe of Oklahoma
Lisa Martin	Tribal Council Coordinator	Cheyenne-Arapaho Tribes of Oklahoma
Wallace Coffey	Chairman	Comanche Nation Tribe
Amber Toppah	Lady Chairman	Kiowa Business Committee
Roger Trudell	Chairman	Santee Sioux Tribe of Nebraska
Mark Fox	Chairman	MHA Nation Tribal Council, Three Affiliated Tribes
Dave Archambault II	Chairman	Standing Rock Sioux Tribe
Vernon Finley	Chairman	Confederated Salish and Kootenai Tribes of the Flathead
Floyd Azure	Chairman	Ft. Peck Assiniboine and Sioux Tribes
Harry Barnes	Chairman	Blackfeet Tribal Business Council
Darrin Old Coyote	Chairman	Crow Tribal Council
Llevando "Cowboy" Fisher Sr.	President	Northern Cheyenne Tribal Council
Blaine Edmo	Chairman	Shoshone-Bannock Tribes of the Fort Hall Reservation
Federal, State, and Local Agencies		
Doug Miyamoto	Director	Wyoming Department of Agriculture
Todd Parfitt	Director	Wyoming Department of Environmental Quality
Mark Rogaczewski		WDEQ Land Quality Division
David Waterstreet	Program Director	WDEQ Natural Resources
Scott Talbott	Director	Wyoming Department of Game and Fish
Mary Hopkins	SHPO	Wyoming Historic Preservation Office, SHPO
Milward Simpson	Director	Wyoming Department of Parks and Cultural Resources
Bridget Hill	Director	Office of State Lands and Investment
Bill Crapser	State Forester	Wyoming Forestry Division
John Cox	Director	Wyoming Department of Transportation
Thomas A. Drean	Director/State Geologist	Wyoming Geological Survey
Dan Noble	Director	Wyoming Department of Revenue
Doug Miyamoto	Director	Wyoming Department of Agriculture
Mark W. Watson	State Oil and Gas Supervisor	Wyoming Oil and Gas Conservation Commission

Name	Title	
Pat Tyrrell		WY State Engineer's Office
Sarah Needles		WY State Historic Pres Office
Kyle Wendtland		Wyoming LQD - DEQ
		Wyoming State Board of Land Commissioners
		WY Dept of Employment Research & Planning
Kelly Bott		WY DEQ Air Quality Division
Milward Simpson		WY Parks & Cultural Res Dept
	Natural Resources & Policy Section	Wyoming Dept of Agriculture
Scott Talbott		Wyoming Game and Fish Department
Al Minier	Chairman	Wyoming Public Service Comm
Thomas A. Drean	Director	Wyoming State Geological Survey
Harry LaBonde		Wyoming Water Dev Comm
Mark Christensen		Campbell County Commissioners
DG Reardon		Campbell County Commissioners
Bob Maul		Campbell County Commissioners
Rusty Bell		Campbell County Commissioners
Del Shelstad		Campbell County Commissioners
		Campbell County Airport
Jed Holder	Chief Building Official	Campbell County Building Division
Kevin King	P.E., Director	Campbell County Engineering Division
Megan Nelms	AICP, County Planner & Zoning	Campbell County Planning & Zoning Division
David King	CCEMA Coordinator	Campbell County Emergency Management
Bill Shank	Fire Chief	Campbell County Fire Department
Dave McCormick	Executive Director	Campbell County Parks and Recreation
Kevin King	P.E., Director	Campbell County Department of Public Works
Kevin F. Geis	P.E., Executive Director	Campbell County Road & Bridge
Quade Schmelzle	Director	Campbell County Weed & Pest
		Campbell County Conservation District
Alex Ayers	Superintendent	Campbell County School District 1
Phil Christopherson	CEO	Energy Capital Economic Development
Jeff Esposito	General Manger	Joint Powers Public Land Board
Robert Short		Converse County Commissioner
Jim Willox		Converse County Commissioner
Mike Colling		Converse County Commissioner
Rick Grant		Converse County Commissioner
Tony Lehner		Converse County Commissioner
Russ Dalgran		Converse County Emergency Management
Jason Wilkinson		Converse County Road and Bridge
Holly S. Richardson		Converse County Special Project
		Converse County Weed & Pest
		Converse County Conservation District
Paige Fenton Hughes		Converse County School District #1
Coley Shadrick		Converse County School District #2

Name	Title	
Annie Mayfield	Planning Services Division Manager	City of Gillette
Louise Carter-King	Mayor	City of Gillette
Shawn Neary	City Council	City of Gillette
Tim Carsurd	City Council	City of Gillette
Nathan McLeland	City Council	City of Gillette
Bruce Brown	City Council	City of Gillette
Billy Montgomery	City Council	City of Gillette
Shay Lundvall	City Council	City of Gillette
Ry Muzzarelli	Development Services Director	City of Gillette
Sawley Wilde	Public Works Director	City of Gillette
Mike Cole	Director of Utilities	City of Gillette
Jim Hloucal	Chief of Police	City of Gillette
Pam Boger	Administrative Services Director	City of Gillette
Patrick Davidson	City Administrator	City of Gillette
		Public Works & Utilities Advisory Committee, City of
		City of Gillette Planning Commission
Jonathan Teichert	City Administrator	City of Douglas
John Harbarger	Public Works Director	City of Douglas
Rene' Kemper	Mayor	City of Douglas
John Bartling	City Council	City of Douglas
Monty Gilbreath	City Council	City of Douglas
Karl E. Hertz	City Council	City of Douglas
Clara Chaffin	Community Development Director	City of Douglas
Mark Gordon	Governor	Wyoming Governor
Representative Scott Clem	District HD31	Wyoming Legislature
Representative Roy Edwards	District HD53	Wyoming Legislature
Representative Bill Pownall	District HD52	Wyoming Legislature
Senator Ogden Driskill	District SD01	Wyoming Legislature
Senator Michael Von Flatern	District SD24	Wyoming Legislature
Darryl LaCounte	Regional Director	Rocky Mountain Regional Office, Bureau of Indian Affairs
Carlie Ronca	Area Manager	Wyoming Area Office, Bureau of Reclamation
		Wyoming Regulatory Office, US Army Corps of Engineers,
Mary Jo Rugwell	State Director	Wyoming State Office, Bureau of Land Management
Stephanie Connolly	High Plains District Manager	High Plains District Office, Bureau of Land Management
Mitchell Leverette	Division Chief	Bureau of Land Management
Duane Spencer		Buffalo Field Office, Bureau of Land Management
Rhen Etzelmiller		Casper Field Office, Bureau of Land Management
		Library, Bureau of Land Management
	Coal Coordinator	Wyoming State Office, Bureau of Land Management
Lawrence S. Roberts	Acting Assistant Secretary	Bureau of Indian Affairs
Mark Sattelberg	Field Supervisor	Wyoming Ecological Services Field Office, US Fish and
Dennis Jaeger	Forest Supervisor's Office	Thunder Basin National Grassland, USDA Forest Service
		Devils Tower National Monument, National Park Service

Name	Title	
Astrid Martinez	State Conservationist	Wyoming State Office, Natural Resources Conservation
	Ecological Services	US Fish and Wildlife Service
	BLM Cooperator Lead	USDA-FS Douglas Ranger District
		US Fish and Wildlife Service, Ecological Services
Businesses and Individuals		
Antelope Coal, LLC	385 Interlocken Cres Ste 400	
H.A. True		President, Belle Fourche Pipeline Company
Mitchell J. Reneau		VP Land, Bill Barrett Corporation
		Biodiversity Conservation Alliance
		BNSF Railway Company
		Buckskin Mine-Kiewit Mining Group
Jason Adrians		Casper Star Tribune
Amy M. Atwood		Center for Biological Diversity
		Navajo Transitional Energy Company, LLC
		Cordero Rojo Mine
		Defenders of Wildlife
		Devils Tower National Monument
Matt Adelman		Publisher, Douglas Budget
		Federation for North American Wild Sheep
Energy Reporter		Gillette News-Record
Scott Child		Interwest Mining Company
Joe Mehl		Kiewit Mining Group Inc
Jim McLeland & Eric Bjordahl		M&K Oil Company Inc
Greg Julian		Mineral Management Service
Hal Quinn		National Mining Association
		National Wildlife Federation
		Natural Resources Defense Council
Shannon Anderson		Powder River Basin Resource Council
Phil Dinsmoor		Powder River Coal Company
James M. Piccone		Resolute Wyoming
Peter Morgan		Sierra Club
Lecia Craft		Thunder Basin Coal Company
Ralph Kingan		Mayor, Town of Wright
Roger Miller		President, Trout Unlimited
Lance Fritz		President, Chief Executive Officer, Union Pacific Railroad
		US West Communications (Qwest Corp.)
Jason M. Ryan		Business Analytics Director, US Western Surface Operations
Wendi Chatman		UW Libraries
Taylor Jones		WildEarth Guardians
Dave Spencer		WY Business Council/NE Region
Bill Schilling		Wyoming Business Alliance
Matt Grant		Wyoming Mining Association
Gary Wilmont		Wyoming Outdoor Council

Name	Title	
Niels Hansen		Wyoming Stock Growers Assoc
Steve Kilpatrick		Wyoming Wildlife Federation
Amy Wallop-Hendrickson		Wyoming Wool Growers Association, Executive Director
Mike McCraken-Publisher		Wyoming-Tribune Eagle
Katie Parker		Yates Petroleum Corp et al

West Antelope II South Modification Tract EA Public Outreach (Scoping) Comments Summary

Comment Date	Water Resources	Air Quality	Level of NEPA/ NEPA Process	Reclamation/ Self Bonding	Climate Change/ Global Warming	Cumulative Impacts	Pro Mining	# of Comments
12/3/19	1	1	1	1	1	I		**6**
12/3/19							1	**1**
12/3/19							1	**1**
11/19/19								**0**
	1	**1**	**1**	**1**	**1**	**1**	**2**	**8**

Commenter: Powder River Basin Resource Council

Comment #1: First, NTEC has previously made broad assertions of sovereign immunity (see, e.g. Dine CARE v. OSMRE, currently pending before the U.S. Supreme Court). Until such time as NTEC completely and absolutely waives sovereign immunity, including waiving it in regard to citizen participation opportunities and legal rights associated with federal mining plans, NTEC is not eligible to obtain a federal coal leases and an associated federal mining plan permit under SMCRA and the Mineral Leasing Act. Second, NTEC cannot lawfully mine the federal coal leases at the Antelope Mine until those leases are made current on royalty payments to the Department of Interior.

Response #1: As stated in Section 1.2.1 of the EA, Antelope Mine operates under Wyoming Department of Environmental Quality, Land Quality Division (WDEQ-LQD) Permit No. 525 in accordance with the approved Wyoming State Coal Regulatory Program (30 CFR part 950). NTEC has been operating the Antelope Mine pursuant to Cloud Peak's WDEQ-LQD permit. In addition, the mine is operating under an approved federal mining plan administered by OSMRE. The permit and federal mining plan ensure that the mine is following state and federal requirements regarding mining.

In the case cited by the commenter, the Supreme Court denied certiorari on June 29, 2020. Importantly, however, NTEC and the state of Wyoming have agreed to a limited waiver of sovereign immunity that ensures the state's ability to regulate NTEC's mining operations. Gov. Mark Gordon accepted the limited waiver agreement on behalf of the state, which allows the State of Wyoming to regulate NTEC's activities at the Antelope Mine.[3] This agreement ensures that Wyoming retains the right and ability to enforce state laws, including administrative procedures and collection of fines. No changes made to EA.

Comment #2: The West Antelope II EIS – and in turn BLM's 2014 EA – are insufficient and outdated and cannot be relied upon for tiering purposes for the NEPA review of this mining plan modification. Additionally, some of the new information itself is already outdated as well. The cumulative hydrologic impact assessment (CHIA) discussed in the EA is from 2014 – six years ago. The air quality analysis is from 2012 – eight years ago. While some of OSMRE's analysis is supplemented by information contained in more recent coal mine annual reports or other mine prepared analyses, reliance on these outdated documents cannot lawfully allow the agency to avoid its obligation to conduct meaningful environmental impact analysis now.

Response #2: The West Antelope II South Modifications EA incorporates by reference information found in the West Antelope II EIS and the BLM's 2014 EA, which are the two most recent documents related to the proposed tract. It is appropriate for the EA to incorporate certain information in these documents by reference because they both contain information related to the mine that is still valid. The EA uses the most current data available including the 2022 Cumulative Hydrologic Impact Assessment (CHIA) of Coal Mining in the Southern Powder River Basin, Wyoming and the 2012 Air Quality Permit Application to Modify the Antelope Mine. Since the 2022 CHIA evaluated historic and predicted future drawdowns and the mining methods at the Antelope Mine have not changed the hydrologic impacts described in these documents and incorporated by reference into the EA are accurate.

Similarly, the 2012 air quality modeling was completed using standard modeling protocol and the protocol for modeling has not changed. The data assumptions used in the 2012 air quality modeling report (e.g., equipment, overburden handling, and blasting) have not changed. The report predicted air quality impacts

[3] Erickson, C. (2020, February 13), Navajo Nation-based firm reaches agreement with state over coal mines. *Casper Star Tribune.*

out to 2035, which is still within the predicted LOM for the Proposed Action. Finally, the 2012 air quality modeling did not predict adverse air impacts based on the assumption that the mine would produce 52 Mtpy. However, current production estimates indicate that the mine is likely to only produce 30 Mtpy, indicating that air impacts are likely to be less than estimated in the 2012 report. Therefore, based on these consideration, the 2012 air quality permit provides sufficient information for the assessment of current air quality impacts. No changes made to EA.

Comment #3: OSMRE's EA says that "the mine will continue to operate until 2039 under the current, approved mining plan." However, the Antelope Mine's future is threatened by an ever-growing list of coal plant retirements around the nation that use Powder River Basin coal. The mine has experienced numerous layoffs just in the last few months in response to systemic reduced demand, coupled with economic conditions caused by the COVID-19 pandemic. For these reasons, a realistic assessment of the operational life of the mine must be addressed as part of this mining plan modification review. Specifically, OSMRE should identify the life of the mine based on current mine customers (data available through EIA) and based on public information regarding coal plant retirements of those customers.

OSMRE should also require a complete mine closure plan as part of the mining plan modification. The closure plan should, in particular, ensure all reclamation and facility decommissioning is complete by the end of the operational life of the mine.

Response #3: NEPA does not require OSMRE to undertake new technical research unless the research is essential to a reasoned choice among alternatives and the overall costs and time frame of obtaining it are not unreasonable. Here, the applicant to provided reasonable estimates on annual Federal coal production and life of mine based on current market trends. Additional market research would be costly and time consuming and would not provide information essential to the Department in making its determination on the proposed mining plan modification. As stated in Section 1.3 of the EA, the purpose of the action is for OSMRE to evaluate NTEC's proposed mining plan modification and make a recommendation to the ASLM and the need for the action is to provide NTEC the opportunity to exercise its valid existing rights granted by the BLM under Federal coal lease WYW-177903 to access and mine the Federal coal reserves located in the tract.

We incorporated the information previously contained within Appendix D into Section 2.2.1 of the EA, which includes the current bond release summary. The EA evaluates the impacts associated with construction, mining, and reclamation as described throughout Chapter 4. As stated in Section 2.2 of the EA, WDEQ-LQD requires coal mine permittees to restore the land to a condition equal to or greater than its highest previous use and requires permittees to restore wildlife habitat commensurate with or superior to premining habitat (WDEQ-LQD 2012). The WDEQ-LQD rules are consistent with requirements set forth in SMCRA. In addition, the mining plan approval requires compliance with all federal laws, including SMCRA. No changes made to EA.

Comment #4: The EA only considers the proposed alternative (full leasing) and the no action alternative (no leasing). There is not a range of reasonable alternatives presented in the EA, in violation of NEPA's mandates.

Response #4: Section 2.1.3 of the EA describes the alternatives that were considered but eliminated from detailed analysis. These alternatives include an underground mining alternative, use of low or no pollutant emitting equipment alternative, variable mining rate alternative, and a partial mining alternative. Each alternative includes the reasons the alternatives were eliminated from detailed analysis in the EA.

According to NEPA guidance in OSMRE's Handbook on Implementing the National Environmental Policy Act, an alternative is considered unreasonable if the "technical, economic, or jurisdictional obstacles make the ability to implement the alternative remote and speculative." The guidance also states that for externally generated actions, the range of alternatives will typically include at least a No Action alternative that would proceed without approval of the proposed action, the applicant proposed alternative (proposed action), and other alternatives that would meet the purpose and need. Because there were no other feasible alternatives that met the purpose and need of the action, no additional alternatives are required. No changes made to EA.

Comment #5: Thank you for the additional information and analysis contained within Appendix D in the EA on reclamation and bond release status at the mine. However, this information is not integrated into and considered by the agency as part of its environmental impact analysis.

Response #5: Section 2.2.1 of the initial EA includes a bond release summary, which is updated annually by NTEC under the requirements of SMCRA and its approved mining and reclamation permit. The EA evaluates the impacts associated with construction, mining, and reclamation as described throughout Chapter 4. As stated in Section 2.2 of the EA, WDEQ-LQD requires coal mine permittees to restore the land to a condition equal to or greater than its highest previous use and requires permittees to restore wildlife habitat commensurate with or superior to premining habitat (WDEQ-LQD 2012). The bond is intended to provide sufficient funds to assure the completion of the reclamation plan if the work had to be performed by the regulatory authority in the event of forfeiture and therefore does not impact the environmental impact of the proposed project because the reclamation plan should be fully implemented regardless of the financial health of the regulated operator. No changes made to EA.

Comment #6: As we discussed in our scoping comments, the southern Powder River Basin is experiencing a major boom in oil and gas development. OSMRE must properly analyze all cumulative impacts reasonably foreseeable to occur in and around the project area. We urge OSMRE to consult with the Wyoming Oil and Gas Conservation Commission as the agency would be able to provide current information regarding drilled and permitted wells, as well as applications for permit to drill pending with the agency. As of November 22, 2019, information on the WOGCC website shows that there are 18,205 permitted horizontal wells in Converse County and 14,810 permitted horizontal wells in Campbell County. There are significant cumulative impacts to air, land, and water resources, as well as socio-economic impacts, from the current and reasonably foreseeable future development of oil and gas resources in and around the project area.

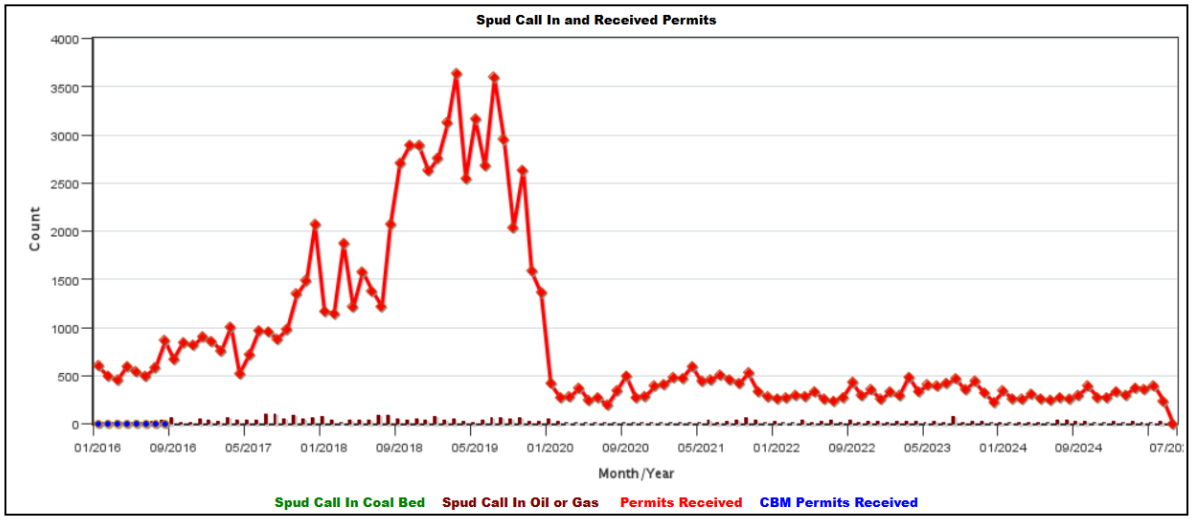
Response #6: The EA discusses the impacts associated with past, present, and RFFAs including oil and gas development in Converse and Campbell counties. Section 4.3.2 of the EA discloses the number of drilled and producing wells in both counties. Although the Powder River Basin has experienced an increase in permitting of oil and gas wells, the majority of permits submitted to the Wyoming Oil and Gas Conservation Commission (WOGCC) are not approved. The following table shows the number of Applications for Permit to Drill (APDs) received by the WOGCC as well as the number of approved APDs. The table shows that although thousands of permits have been received by the WOGCC, only a small portion have been approved.

Applications for Permit to Drill (APDs) Received by the WOGCC and Approved APDs

Year	Type	Campbell County		Converse County	
		Received	Approved	Received	Approved
2016	Oil	1,019	941	3,686	2,911
	Gas	3	11	9	5
2017	Oil	3,320	1,130	4,355	2,637
	Gas	14	6	3	3
2018	Oil	6,062	297	8,520	488
	Gas	4	11	2	1
2019	Oil	7,856	208	7,799	469
	Gas	1	0	2	0
2020	Oil	986	83	1,232	256
	Gas	0	0	0	0
2021	Oil	1,807	115	1,643	223
	Gas	0	0	0	0
2022	Oil	936	183	1,235	241
	Gas	0	0	2	0
2023	Oil	1,289	132	1,641	212
	Gas	0	0	0	0
2024	Oil	1,071	130	1,333	186
	Gas	0	0	0	0

Source: WOGCC 2025

In addition, the graph below shows the number of wells in Wyoming that have been spudded versus the number of APD applications received by the WOGCC.



The WOGCC describes the reason so many permits have been submitted in recent years. The WOGCC website states that "when a company applies for an APD, it does not necessarily mean that they intend to drill the proposed well. The race to file APDs with WOGCC, which has received in excess of 1,000 permits a month, is the result of oil and gas companies wanting to secure their position as the operator in a drilling and spacing unit (DSU). Any party who holds a working interest within a DSU is considered an Owner, defined as a party who has the right to drill and is allowed to file permits. That working interest could be a minority interest or majority interest. Any Owner can file permits within a DSU; however, it is the Owner which files all the authorized spots first that will be granted the opportunity to drill and operate the authorized DSU wells. By doing this, they beat out all the other Owners who filed permits

subsequently and take control over the entire unit. Horizontal and vertical wells can cost several million dollars to drill and complete. When a company secures the right to operate wells in a DSU, they become the operational "decision-maker" on the wells being drilled, completed, and produced. Other non-operating interest-holders help foot the bill for these decisions even though they do not get to take the lead on how those costs are generated."

Since 2019, the BLM has completed 17 different oil and gas lease sales. The public can access the BLM Oil and Gas Lease Sale information by going to: https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/wyoming. Because the oil and gas development is speculative, it is difficult to quantitatively assess impacts.; therefore, the EA qualitatively assesses these impacts. Chapter 4 of the EA acknowledges that oil and gas development would have the potential to increase air, noise, and visual resources impacts. No changes made to EA.

Commenter: Wyoming Game and Fish Department

Comment #1: Minimization measures that reduce or eliminate impacts should be considered for high value or limited habitats and for sensitive wildlife species. For Tier I SGCN we recommend no significant declines in species distribution or abundance or loss of habitat function. For Tier II SGCN and riparian habitat we recommend no net long-term loss of habitat function or species distribution or abundance. For big game, we recommend no large-scale loss or cumulative loss of landscape habitat function.

If not already done, we recommend specific surveys to detect the presence of ferruginous hawk, upland sandpiper, burrowing owl, long-billed curlew, mountain plover, and swift fox before surface disturbance occurs.

We recommend consulting with the U.S. Fish and Wildlife Service regarding protective spatial buffers, stipulations, and other mitigation measures related to raptors and migratory birds.

Reclamation practices should include the use of appropriate topsoil handling; native vegetation seed mixes; and weed prevention, monitoring, and control measures that will be implemented in order to return the area to functional wildlife habitat post-mining.

Response #1: NTEC's wildlife monitoring program complies with Appendix B (Wildlife Monitoring Requirements for Surface Coal Mining Operations) of the WDEQ-LQD Coal Rules and Regulations (WDEQ-LQD 1993). Appendix B outlines wildlife monitoring survey requirements and methods and describes general data presentation procedures. In 2000, the WDEQ-LQD approved revisions to the Antelope Coal Permit (#525) that eliminated surveys for big game and upland game bird broods from the wildlife monitoring program based on recommendations made by the Wyoming Game and Fish Department (WGFD). NTEC voluntarily continued annual winter big game surveys through 2003 and transitioned to alternate-year surveys in 2006 (i.e., 2012, 2014 ,2016, 2018, 2020, and 2022). NTEC voluntarily elected to resume annual greater sage-grouse brood surveys from 2014 through 2020.

As stated in Section 2.2 of the EA, WDEQ-LQD requires coal mine permittees to restore the land to a condition equal to or greater than its highest previous use and requires permittees to restore wildlife habitat commensurate with or superior to premining habitat (WDEQ-LQD 2012). No changes made.

Comment #2: The EA specified that the tract of land being reviewed is located within the Antelope Creek drainage, a tributary of the Cheyenne River. Antelope Creek is classified as an intermittent stream. Except for two road crossings, Antelope Creek flows undisturbed from west to east across the permit boundary. To minimize impacts to the aquatic resources to the Antelope Creek drainage we recommend the following:

- Accepted best management practices be implemented to ensure that all sediments and other pollutants are contained within the boundaries of the work area. Disturbed areas that are contributing sediment to surface waters as a result of project activities should be promptly re-vegetated to maintain water quality.
- Equipment should be serviced and fueled away from streams and riparian areas. Equipment staging areas should be at least 500 feet from riparian areas.
- Preventing the spread of aquatic invasive species (AIS) is a priority for the State of Wyoming, and in many cases, the intentional or unintentional spread of organisms from one body of water to another would be considered a violation of State statute and Wyoming Game and Fish Commission Regulation. To prevent the spread of AIS, the following is required:
- If equipment has been used in a high risk infested water [a water known to contain Dreissenid mussels (zebra/quagga mussels)], the equipment must be inspected by an authorized aquatic invasive species inspector recognized by the state of Wyoming prior to its use in any Wyoming water during all times of year.
- Any equipment entering the state by land from March through November (regardless of where it was last used), must be inspected by an authorized aquatic invasive species inspector prior to its use in any Wyoming water.
- If aquatic invasive species are found, the equipment will need to be decontaminated by an authorized aquatic invasive species decontaminator.
- Any time equipment is moved from one 4th level (8-digit Hydrological Unit Code) watershed to another within Wyoming, the following guidelines are recommended:
- DRAIN: Drain all water from watercraft, gear, equipment, and tanks. Leave wet compartments open to dry.
- CLEAN: Clean all plants, mud, and debris from vehicle, tanks, watercraft, and equipment.
- DRY: Dry everything thoroughly. In Wyoming, we recommend drying for 5 days in summer (June - August); 18 days in Spring (March - May) and Fall (September - November); or 3 days in Winter (December - February) when temperatures are at or below freezing.
- Any equipment used in a Wyoming water that contains AIS, must be inspected before use in another water. Species currently found in Wyoming waters include New Zealand mudsnail, Asian clam, and curly pondweed. Information on currently affected waters can be found at: https://wgfd.wyo.gov/ais.

Response #2: Although the tract is located within the Antelope Creek drainage, Permit No. 525 requires a 100-foot disturbance buffer adjacent to the Antelope Creek. No disturbance except for approved haulroads and conveyor crossings will be allowed in this buffer zone along Antelope Creek, unless prior approval of WDEQ-LQD is received. In addition, Antelope Mine has been mining within the Antelope Creek drainage for several years, and NTEC has implemented best management practices (BMPs) to minimize impacts to aquatic resources. No changes made.

APPENDIX C

CROSSWALK OF RESOURCES

Crosswalk of Resources Analyzed in the 2008 WAII EIS, 2014 WAII South EA, and This EA

	2008 WAII EIS		2014 WAII South EA		This EA	
Resource	**Affected Environment**	**Environmental Consequences**	**Affected Environment**	**Environmental Consequences**	**Affected Environment**	**Environmental Consequences**
General Setting	3.1	3.1	Not evaluated	Not evaluated	3.1	4.1
Topography and Physiography	3.2.1	3.2.2	Not evaluated	Not evaluated	3.2	4.2
Geology, Minerals, and Paleontology	3.3.1.1 3.3.2.1 3.3.3.1	3.3.1.2 3.3.2.2 3.3.3.2	Not evaluated	Not evaluated	3.3	4.3
Air Quality and Climate Change	3.4.2.1 3.4.3.1 3.4.4.1 3.4.5.1	3.4.2.2 3.4.3.2 3.4.4.2 3.4.5.2	3.3	4.1.3	3.4	4.4
Water Resources	3.5.1.1 3.5.2.1 3.5.3.1	3.5.1.2 3.5.2.2 3.5.3.2	Not evaluated	Not evaluated	3.5	4.5
Alluvial Valley Floors	3.6.1	3.6.2	Not evaluated	Not evaluated	3.6	4.6
Wetlands	3.7.1	3.7.2	Not evaluated	Not evaluated	3.7	4.7
Soils	3.8.1	3.8.2	Not evaluated	Not evaluated	3.8	4.8
Vegetation	3.9.1	3.9.2	Not evaluated	Not evaluated	3.9	4.9
Wildlife (including T&E and Special Status Species)	3.10.1.1 3.10.2.1 3.10.3.1 3.10.4.1 3.10.5.1 3.10.6.1 3.10.7.1	3.10.1.2 3.10.2.2 3.10.3.2 3.10.4.2 3.10.5.2 3.10.6.2 3.10.7.2	3.1	4.1.1	3.10	4.10
Land Use and Recreation	3.11.1	3.11.2	Not evaluated	Not evaluated	3.11	4.11
Cultural Resources	3.12.1	3.12.2	3.2	4.1.2	3.12	4.12
Visual Resources	3.13.1	3.13.2	Not evaluated	Not evaluated	3.13	4.13
Noise	3.14.1	3.14.2	Not evaluated	Not evaluated	3.14	4.14
Transportation	3.15.1	3.15.2	Not evaluated	Not evaluated	3.15	4.15
Hazardous and Solid Waste	3.16.1	3.16.2	Not evaluated	Not evaluated	3.16	4.16
Socioeconomics	3.17.1.1 3.17.2.1 3.17.3.1 3.17.4.1 3.17.5.1 3.17.6.1 3.17.7.1	3.17.1.2 3.17.2.2 3.17.3.2 3.17.4.2 3.17.5.2 3.17.6.2 3.17.7.2	Not evaluated	Not evaluated	3.17	4.17

APPENDIX D

EMISSION CALCULATIONS
(Completed by WWC Engineering)

Coal Production

Year	Antelope Mine Production (tons)	Antelope Mine Average Rail Distance (mi)	Campbell County Production (tons)	USA Production (tons)
2020	19,809,826	1,101	211,446,498	535,434,354
2021	21,738,382	1,084	231,304,787	577,431,278
2022	21,656,665	1,085	237,470,895	594,155,282
2023	19,254,551	1,082	230,258,969	577,954,017
2024	14,984,446	1,027	185,029,334	N/A
Avg	**19,488,774**	**1,076**	**219,102,097**	**571,243,733**

Conversion Factors & Constants

Value	Units and Notes
453.6	g/lb
137,000	Btu/gal diesel; diesel fuel energy content (EPA 1995)
2,205	lb/metric ton
453.6	g/lb
2,000	lb/ton

100-Yr Global Warming Potentials (unitless) (IPCC AR6 WGI Chapter 7, Table 7.15)

1	CO2
29.8	CH4
273	N2O

20-Yr Global Warming Potentials (unitless) (IPCC AR6 WGI Chapter 7, Table 7.15)

1	CO2
82.5	CH4
273	N2O

Mining Emissions

CAP Emission Factors (tons pollutant per ton of coal)

PM_{10}	$PM_{2.5}$	NO_x	CO	VOC	SO_2	HAP
1.12E-04	2.62E-05	9.26E-05	7.40E-05	5.08E-06	1.70E-06	5.08E-07

Source: BLM 2024

GHG Emission Factors

Pollutant	kg per ton coal	ton per ton coal
CO2	7.867	7.87E-03
CH4	0.147	1.47E-04
N2O	0.006	6.00E-06

Source: BLM 2024

Baseline CAPs (Tpy)

Source	**Coal Production**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**HAP**
2020-2024 Ant Mine Avg	19,488,774	2,183	511	1,805	1,442	99	33	10
2020-2024 Campbell County Avg	219,102,097	24,539	5,740	20,289	16,214	1,113	372	111
2020-2023 US Avg	571,243,733	63,979	14,967	52,897	42,272	2,902	971	290

Proposed Action/No Action Alternatives (Tpy)

Source	**Coal Production**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**	**HAP**
Proposed Action	30,000,000	3,360	786	2,778	2,220	152	51.0	15.2
Max Air Permit	52,000,000	5,824	1,362	4,815	3,848	264	88.4	26.4
No Action Reduction	14,500,000	1,624	380	1,343	1,073	74	24.7	7.4

Commuter Emissions

Passenger Car	VOC exhaust	CO	NO_x	PM10 exhaust	PM2.5 exhaust	CO2	CH4	N2O	Hg	As
emission factor (grams/mile)[1,2,3]	0.04	1.466	0.039	0.004	0.004	364	0.008	0.004	1.10E-07	2.30E-06
emission factor (grams/gallon)[4]						8887				
mile/gal[5]						24.4				
Diesel Light Truck	VOC exhaust	CO	NO_x	PM10 exhaust	PM2.5 exhaust	CO2	CH4	N2O	Hg	As
emission factor (grams/mile)[1,2,3]	0.141	2.545	0.035	0.003	0.003	572	0	0.001	6.20E-09	2.30E-06
emission factor (grams/gallon)[4]						10180				
mile/gal[5]						17.8				

[2] - MOVES3 Vehicle Operation Emission Factors (Burnham 2021)
[3] - Assumed year 2020 from Argonne 2021 Table 2 and Table 5
[4] Air Toxic Emissions from Onroad Vehicles in MOVES3 (EPA 2020)
[5] Greenhouse Gas Emissions from a Typical Passenger Vehicle (EPA 2024)
[6] Department of Energy Average Fuel Economy by Major Vehicle Category (DOE 2024)

Worker Transport

Total Employees	359	SCM 2024
SCM Coal Production 2023	19.49	Mt (EIA 2024)
Total Employees per Day	269	Assume 75%
No of One-Way Trips per day	539	Assumes 2 one-way trips/day
Passenger Car	269	Assumes 50% use a passenger car to commute
Diesel Light Truck	269	Assumes 50% use a diesel light weight truck to commute
Distance traveled	65	miles (assumes all workers come from Gillette)
Passenger Car Miles per Year	6,387,956	miles/yr
Diesel Light Truck Miles per Year	6,387,956	miles/yr

CAP & HAP Emissions from Worker Transport (tons/yr)

Year	Mt	Workers Required	VOC exhaust	CO	NOx	PM10 exhaust	PM2.5 exhaust	Hg	As
	1	18	0.07	1.45	0.03	0.003	0.003	4.20E-08	1.66E-06
Avg	19.5	359	1.27	28.24	0.52	0.049	0.049	8.18E-07	3.24E-05

Baseline GHG Emissions from Worker Transport (tons/yr)

Year	Mt	Workers Required	CO2	CH4	N2O	100-Yr GWP CO2e	20-Yr GWP CO2e
	1	18	338	0.00	0.00	339	339
Avg	19.5	359	6,592	0.06	0.04	6,603	6,606

Proposed Action Commuter Emissions

Year	Mt	Workers Required	VOC exhaust	CO	NOx	PM10 exhaust	PM2.5 exhaust	Hg	As	CO2	CH4	N2O	100-Yr GWP CO2e	20-Yr GWP CO2e
2025	30.0	553	1.96	43.48	0.80	0.076	0.076	1.26E-06	4.99E-05	10147	0.087	0.054	10,164	10,169

APPENDIX E

GROUNDWATER MONITORING NETWORK
WATER QUALITY SUMMARY

Well: OWAL-01 Date Range: 1/24/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	46	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	59	<5	666	*	*
Alkalinity, Hydroxide		mg/l	15	1	5	4	2
Aluminum, dissolved	5	mg/l	52	<0.1	1.7	*	*
Aluminum, Total		mg/l	3	0.1	21.6	11.3	10.8
Ammonia		mg/l	56	<0.1	1.3	*	*
Anion Sum		meq/L	60	<0	82	*	*
Arsenic (III), Dissolved		mg/l	2	0.005	0.005	0.005	0
Arsenic (III), Total		mg/l	2	0.005	0.007	0.006	0.001
Arsenic, dissolved	0.2	mg/l	25	<0.005	0.03	*	*
Arsenic, Dissolved/Total *100		%	1	36	36	36	
Arsenic, Total		mg/l	1	0.014	0.014	0.014	
Barium, dissolved		mg/l	51	<0.5	0.5	*	*
Barium, Total		mg/l	3	0.5	0.5	0.5	0
Bicarbonate		mg/l	60	<5	813	*	*
Boron, dissolved	5	mg/l	60	<0.1	0.4	*	*
Boron, Total		mg/l	3	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	31	<0.002	0.05	*	*
Cadmium, Total		mg/l	3	0.002	0.002	0.002	0
Calcium		mg/l	60	<5	508	*	*
Carbonate		mg/l	19	<1	9	*	*
Cation Sum		%	7	0	77	34	37
Cation Sum		meq/L	53	<0	72	*	*
Chloride	2000	mg/l	60	<5	117	*	*
Chromium, dissolved	0.05	mg/l	52	<0.01	0.06	*	*
Chromium, Total		mg/l	3	0.02	0.02	0.02	0
Cobalt, Dissolved	1	mg/l	2	0.02	0.02	0.02	0
Cobalt, Total		mg/l	2	0.02	0.02	0.02	0
Coliform, Total		Unknown	2	1	8000	4000.5	5656.2
Copper, dissolved	0.5	mg/l	52	<0.01	0.04	*	*
Copper, Total		mg/l	3	0.1	0.2	0.1	0
Cyanide, Total		mg/l	2	0	0	0	0
Depth to Water		ft	29	5	12	9	2
Dry Well		mg/l	1	1	1	1	
Field Alkalinity		mg/l	7	560	1140	877	220
Field Conductivity		umhos/cm	54	2100	7500	4099	992
Field pH		s.u.	54	5.5	7.9	7.2	0.4
Field turbidity		NTUs	5	57	875	416.6	324.8
Fluoride		mg/l	59	<0.1	1.2	*	*
Hardness (as CaCO3)		mg/l	60	771	1985	1455	278
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron (Ferric)		mg/l	1	0.8	0.8	0.8	
Iron (Ferrous)		mg/l	8	0.1	57.2	25.1	25.5
Iron, dissolved		mg/l	55	<0.05	118	*	*
Iron, total		mg/l	3	29.2	38.8	32.5	5.5
Laboratory conductivity		umhos/cm	59	3010	6380	4432	729
Laboratory pH		s.u.	59	7.1	8.4	7.7	0.3
Lead, dissolved	0.1	mg/l	51	<0.02	0.02	*	*
Lead, Total		mg/l	3	0	0	0	0
Lithium, dissolved		mg/l	1	0	0	0	
Magnesium		mg/l	60	30	264	153	38
Manganese, dissolved	0.00005	mg/l	60	0	2.8	1.2	0.6
Manganese, total		mg/l	3	5	6.5	5.6	0.8
Mercury, dissolved		mg/l	25	<0.001	1	*	*
Mercury, Total		mg/l	3	0.001	0.001	0.001	0
Molybdenum, dissolved		mg/l	48	<0.02	0.02	*	*
Molybdenum, Total		mg/l	3	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	51	<0.01	0.05	*	*
Nickel, Total		mg/l	3	0.01	0.04	0.03	0.02
Nitrate		mg/l	12	0.03	38	3.66	10.85

Well: OWAL-01 Date Range: 1/24/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Nitrate/Nitrite	100	mg/l	43	<0.01	4.3	*	*
Nitrite	10	mg/l	27	<0.1	1	*	*
Oil & Grease Visual		s.u.	1	7.3	7.3	7.3	
Oil and grease	10	mg/l	2	1	158	80	111
Phenol		mg/l	5	1	1	1	0
Phosphorus		mg/l	55	0	46	1	6.2
Phosphorus, Orthophosphate as P		mg/l	2	<0.1	0.1	*	*
Potassium		mg/l	60	7	43	14	5
Selenium, dissolved	0.05	mg/l	26	<0.005	0.017	*	*
Selenium, Total		mg/l	3	0.005	0.005	0.005	0
Silica as SiO2		mg/l	38	4	19	12	4
Silicon		mg/l	22	4	15	6	3
Silicon, total		mg/l	1	43	43	43	
Sodium		mg/l	56	208	924	660	136
Sodium Adsorption Ratio (SAR)		Unknown	57	3	14	7	2
Strontium, Dissolved		mg/l	7	3	13	6	5
Sulfate	3000	mg/l	60	1109	3030	2312	437
Temperature		Deg C	55	6	24	13	4
Temperature, Water (Degrees Fahrenheit)		Deg F	4	0.6	13.1	5.2	5.4
Total Anion/Cation Balance		%	53	0	37	2	5
Total Anion/Cation Balance		meq/L	4	41	64	52	10
Total Dissolved Solids	5000	mg/l	58	350	5410	3670	1089
Total Dissolved Solids (103)		mg/l	5	4480	5560	5176	412
Total Dissolved Solids (calc)		mg/l	6	3213	4430	3837	488

Well: OWAL-03 Date Range: 5/3/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	24	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	33	292	584	434	90
Alkalinity, Hydroxide		mg/l	15	1	5	4	2
Aluminum, dissolved	5	mg/l	27	<0.1	0.3	*	*
Aluminum, Total		mg/l	2	4.3	4.5	4.4	0.1
Ammonia		mg/l	30	<0.1	0.5	*	*
Anion Sum		meq/L	33	10	47	22	8
Arsenic (III), Dissolved		mg/l	1	0.005	0.005	0.005	
Arsenic (III), Total		mg/l	1	0.042	0.042	0.042	
Arsenic, dissolved	0.2	mg/l	19	<0.005	0.005	*	*
Arsenic, Dissolved/Total *100		%	1	10	10	10	
Arsenic, Total		mg/l	1	0.051	0.051	0.051	
Barium, dissolved		mg/l	27	<0.5	0.5	*	*
Barium, Total		mg/l	2	0.5	0.5	0.5	0
Bicarbonate		mg/l	33	356	706	529	109
Boron, dissolved	5	mg/l	33	0	0.2	0.1	0
Boron, Total		mg/l	2	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	20	<0.002	0.002	*	*
Cadmium, Total		mg/l	2	0.002	0.002	0.002	0
Calcium		mg/l	33	24	415	129	87
Carbonate		mg/l	18	<1	7	*	*
Cation Sum		%	6	1	37	26	13
Cation Sum		meq/L	27	10	48	21	8
Chloride	2000	mg/l	33	9	76	38	22
Chromium, dissolved	0.05	mg/l	27	<0.01	0.02	*	*
Chromium, Total		mg/l	2	0.02	0.02	0.02	0
Cobalt, Dissolved	1	mg/l	1	0.02	0.02	0.02	
Cobalt, Total		mg/l	1	0.02	0.02	0.02	
Copper, dissolved	0.5	mg/l	27	<0.01	0.01	*	*
Copper, Total		mg/l	2	0	0.1	0	0
Cyanide, Total		mg/l	1	0	0	0	
Depth to Water		ft	14	7	12	9	1
Dry Well		mg/l	1	1	1	1	
Field Alkalinity		mg/l	6	460	1000	747	204
Field Conductivity		umhos/cm	32	925	3730	1808	645
Field pH		s.u.	32	6.6	8.6	7.4	0.4
Field turbidity		NTUs	1	933	933	933	
Fluoride		mg/l	32	0.3	1.6	0.9	0.3
Hardness (as CaCO3)		mg/l	33	155	1580	527	325
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron (Ferrous)		mg/l	1	0.1	0.1	0.1	
Iron, dissolved		mg/l	32	<0.05	4.08	*	*
Iron, total		mg/l	2	69.3	77.2	73.2	5.6
Laboratory conductivity		umhos/cm	28	1020	3500	1758	604
Laboratory pH		s.u.	33	7.6	2890	377.4	898.1
Lead, dissolved	0.1	mg/l	32	0.02	8.3	1.28	2.97
Lead, Total		mg/l	2	<0.1	0	*	*
Magnesium		mg/l	33	16	133	50	27
Manganese, dissolved	0.00005	mg/l	32	<0.1	4.7	*	*
Manganese, total		mg/l	2	0.8	0.8	0.8	0
Mercury, dissolved		mg/l	20	0.001	0.001	0.001	0
Mercury, Total		mg/l	2	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	27	<0.02	0.02	*	*
Molybdenum, Total		mg/l	2	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	27	<0.01	0.02	*	*
Nickel, Total		mg/l	2	0.01	0.03	0.02	0.01
Nitrate		mg/l	4	0.03	0.6	0.4	0.26
Acidity, Total (As CaCO3)		mg/l	24	<1	5	*	*

Well: OWAL-03 Date Range: 5/3/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Nitrate/Nitrite	100	mg/l	27	<0.01	1.1	*	*
Nitrite	10	mg/l	22	<0.1	4.8	*	*
Oil & Grease Visual		s.u.	1	7.6	7.6	7.6	
Oil and grease	10	mg/l	1	1	1	1	
Phenol		mg/l	1	1	1	1	
Phosphorus		mg/l	26	0	0.4	0.1	0.1
Phosphorus, Orthophosphate as P		mg/l	2	<0.1	0.1	*	*
Potassium		mg/l	33	5	25	14	6
Selenium, dissolved	0.05	mg/l	22	<0.005	0.02	*	*
Selenium, Total		mg/l	2	0.005	0.005	0.005	0
Silica as SiO2		mg/l	9	5	11	9	2
Silicon		mg/l	26	5	16	6	2
Silicon, total		mg/l	1	19	19	19	
Sodium		mg/l	32	151	386	260	58
Sodium Adsorption Ratio (SAR)		Unknown	33	3	7	5	1
Strontium, Dissolved		mg/l	1	0	0	0	
Sulfate	3000	mg/l	33	35	1740	579	405
Temperature		Deg C	32	7	18	13	3
Temperature, Water		Deg F	6	4.1	59.2	13.6	22.3
Total Anion/Cation Balance		%	26	0	5	2	1
Total Anion/Cation Balance		meq/L	1	14	14	14	
Total Dissolved Solids	5000	mg/l	32	223	3170	1312	618
Total Dissolved Solids (103)		mg/l	7	1560	3270	2139	604
Total Dissolved Solids (calc)		mg/l	5	773	3010	1769	800
Water Elevation		fmsl	4	4533	4534	4533	0
Well Purging Volume		Other	1	16	16	16	
Zinc, dissolved	25	mg/l	27	<0.01	0.01	*	*
Zinc, Total		mg/l	2	0.1	0.1	0.1	0

Well: OWAL-05 Date Range: 5/4/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	7	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	13	322	495	405	58
Alkalinity, Hydroxide		mg/l	3	5	5	5	0
Aluminum, dissolved	5	mg/l	7	<0.1	0.1	*	*
Ammonia		mg/l	13	0.1	1.1	0.6	0.3
Anion Sum		meq/L	13	42	58	51	5
Arsenic, dissolved	0.2	mg/l	5	<0.005	0.005	*	*
Barium, dissolved		mg/l	7	<0.5	0.5	*	*
Bicarbonate		mg/l	13	392	604	492	73
Boron, dissolved	5	mg/l	13	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	6	<0.002	0.008	*	*
Calcium		mg/l	13	303	541	455	81
Carbonate		mg/l	5	<1	5	*	*
Cation Sum		%	6	3	60	48	22
Cation Sum		meq/L	7	42	57	49	6
Chloride	2000	mg/l	13	14	51	37	10
Chromium, dissolved	0.05	mg/l	7	<0.01	0.02	*	*
Coliform, Total		Unknown	1	4000	4000	4000	
Copper, dissolved	0.5	mg/l	7	<0.01	0.03	*	*
Cyanide, Total		mg/l	1	0	0	0	
Depth to Water		ft	8	8	10	9	1
Field Conductivity		umhos/cm	12	2200	4110	3678	505
Field pH		s.u.	12	5.5	7.4	6.8	0.5
Field turbidity		NTUs	1	84	84	84	
Fluoride		mg/l	13	0.2	0.6	0.4	0.1
Hardness (as CaCO3)		mg/l	13	1230	2080	1748	284
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron (Ferrous)		mg/l	3	0.1	544	226.7	283.1
Iron, dissolved		mg/l	10	<0.05	23	*	*
Laboratory conductivity		umhos/cm	13	3280	4190	3789	321
Laboratory pH		s.u.	13	7.2	8.2	7.8	0.3
Lead, dissolved	0.1	mg/l	7	<0.02	0.02	*	*
Magnesium		mg/l	13	114	178	149	21
Manganese, dissolved	0.00005	mg/l	13	0.3	3.6	1.9	1.2
Mercury, dissolved		mg/l	5	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	7	<0.02	0.02	*	*
Nickel, dissolved		mg/l	7	<0.01	0.02	*	*
Nitrate		mg/l	1	<0.01	0.7	*	*
Nitrate/Nitrite	100	mg/l	7	<0.01	0.5	*	*
Nitrite	10	mg/l	6	0.1	2.2	0.5	0.9
Oil and grease	10	mg/l	1	1	1	1	
Phenol		mg/l	1	1	1	1	
Phosphorus		mg/l	8	<0.1	1	*	*
Orthophosphate as P		mg/l	2	0.1	0.1	0.1	0
Potassium		mg/l	13	12	26	20	5
Selenium, dissolved	0.05	mg/l	6	<0.005	0.01	*	*
Silica as SiO2		mg/l	3	13	17	15	2
Silicon		mg/l	10	5	7	6	1
Sodium		mg/l	12	291	416	376	31
Sodium Adsorption Ratio (SAR)		Other	13	3	5	4	0
Strontium, Dissolved		mg/l	1	4	4	4	
Sulfate	3000	mg/l	13	1660	2400	2028	201
Temperature		Deg C	13	8	15	11	2
Total Anion/Cation Balance		%	7	0	5	2	2
Total Anion/Cation Balance		meq/L	1	45	45	45	
Total Dissolved Solids	5000	mg/l	13	374	3900	3304	973
Total Dissolved Solids (103)		mg/l	7	3720	4070	3967	125
Total Dissolved Solids (calc)		mg/l	5	3095	3470	3349	148
Water Elevation		fmsl	2	4538	4538	4538	0

Well: OWAL-05 Date Range: 5/4/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Zinc, dissolved	25	mg/l	8	<0.01	0.12	*	*

Well: OWAL-11 Date Range: 5/4/1979-12/5/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	30	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	43	273	495	365	45
Alkalinity, Hydroxide		mg/l	20	1	5	4	1
Aluminum, dissolved	5	mg/l	32	<0.1	0.2	*	*
Aluminum, Total		mg/l	4	0.1	9	3.9	3.8
Ammonia		mg/l	42	<0.1	1.2	*	*
Anion Sum		meq/L	43	11	76	45	11
Arsenic (III), Dissolved		mg/l	2	0.005	0.005	0.005	0
Arsenic (III), Total		mg/l	2	0.005	0.038	0.022	0.023
Arsenic, dissolved	0.2	mg/l	27	<0.005	0.005	*	*
Arsenic, Dissolved/Total *100		%	2	42	100	71	41
Arsenic, Total		mg/l	2	0.005	0.012	0.009	0.005
Barium, dissolved		mg/l	32	<0.5	0.5	*	*
Barium, Total		mg/l	4	0.5	0.5	0.5	0
Bicarbonate		mg/l	43	333	597	445	55
Boron, dissolved	5	mg/l	43	0	0.5	0.1	0.1
Boron, Total		mg/l	4	0	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	29	<0.002	0.002	*	*
Cadmium, Total		mg/l	4	0.002	0.002	0.002	0
Calcium		mg/l	43	12	638	367	105
Carbonate		mg/l	26	<1	5	*	*
Cation Sum		%	11	0	57	40	18
Cation Sum		meq/L	32	29	74	46	10
Chloride	2000	mg/l	43	1	66	28	11
Chromium, dissolved	0.05	mg/l	32	<0.01	0.02	*	*
Chromium, Total		mg/l	4	0.01	0.02	0.02	0.01
Cobalt, Dissolved	1	mg/l	2	0.02	0.02	0.02	0
Cobalt, Total		mg/l	2	0.02	0.02	0.02	0
Copper, dissolved	0.5	mg/l	32	0.01	0.01	0.01	0
Copper, Total		mg/l	4	<0.1	0	*	*
Cyanide, Total		mg/l	1	0	0	0	
Depth to Water		ft	24	0	14	10	3
Dry Well		mg/l	1	0	0	0	
Field Alkalinity		mg/l	13	440	1260	763	242
Field Conductivity		umhos/cm	40	2200	4850	3336	716
Field pH		s.u.	41	6.4	8.7	7.2	0.4
Field turbidity		NTUs	1	246	246	246	
Fluoride		mg/l	42	0.1	2.9	0.5	0.4
Hardness (as CaCO3)		mg/l	43	40	2490	1451	397
Hydroxide as OH		mg/l	4	<5	5	*	*
Iron (Ferrous)		mg/l	1	1	1	1	
Iron, dissolved		mg/l	43	0.06	5.47	2.65	1.74
Iron, total		mg/l	4	12.2	81.4	45.9	31.3
Laboratory conductivity		umhos/cm	43	976	5510	3434	787
Laboratory pH		s.u.	43	7.3	8.4	7.9	0.2
Lead, dissolved	0.1	mg/l	32	<0.02	0.02	*	*
Lead, Total		mg/l	4	0	0	0	0
Magnesium		mg/l	43	2	217	130	34
Manganese, dissolved	0.00005	mg/l	43	0	6.5	1.3	0.9
Manganese, total		mg/l	4	0.1	1.7	1	0.7
Mercury, dissolved		mg/l	29	<0.001	0.001	*	*
Mercury, Total		mg/l	4	0.001	0.001	0.001	0
Molybdenum, dissolved		mg/l	32	<0.02	0.02	*	*
Molybdenum, Total		mg/l	4	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	32	<0.01	0.05	*	*
Nickel, Total		mg/l	4	0.01	0.05	0.03	0.02
Nitrate		mg/l	5	0.03	0.82	0.29	0.3
Nitrate/Nitrite	100	mg/l	27	<0.01	0.22	*	*
Nitrite	10	mg/l	31	<0.1	0.1	*	*

Well: OWAL-11 Date Range: 5/4/1979-12/5/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Oil & Grease Visual		s.u.	1	7.3	7.3	7.3	
Oil and grease	10	mg/l	2	1	1	1	0
Phenol		mg/l	1	1	1	1	
Phosphorus		mg/l	29	0	1	0.2	0.2
Phosphorus, Orthophosphate as P		mg/l	6	<0.1	0.6	*	*
Potassium		mg/l	43	7	24	17	5
Selenium, dissolved	0.05	mg/l	29	<0.005	0.015	*	*
Selenium, Total		mg/l	4	0.005	0.005	0.005	0
Silica as SiO2		mg/l	6	7	16	11	4
Silicon		mg/l	40	5	23	8	3
Silicon, total		mg/l	2	12	26	19	10
Silver, dissolved		mg/l	0				
Sodium		mg/l	42	224	683	366	92
Sodium Adsorption Ratio (SAR)		Unknown	43	3	16	4	2
Strontium, Dissolved		mg/l	1	3	3	3	
Sulfate	3000	mg/l	43	37	3170	1784	512
Temperature		Deg C	41	5	25	13	3
Temperature, Water		Deg F	12	0.7	57.7	12.2	21.3
Total Anion/Cation Balance		%	32	0	5	1	1
Total Anion/Cation Balance		meq/L	1	31	31	31	
Total Dissolved Solids	5000	mg/l	41	238	4880	2980	873
Total Dissolved Solids (103)		mg/l	14	590	3930	3292	889
Total Dissolved Solids (calc)		mg/l	9	600	3530	2613	947
Water Elevation		fmsl	11	4551	4556	4554	2
Well Purging Volume		Other	2	5	18	11	9
Zinc, dissolved	25	mg/l	33	<0.01	0.03	*	*
Zinc, Total		mg/l	4	0	0.1	0	0

Well: PZ-HCAL-13 Date Range: 6/26/1998-4/12/2011

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity		mg/l	15	<1	<5	*	*
Alkalinity (as CaCO3)		mg/l	17	422	780	652.24	98.90
Alkalinity, Hydroxide		mg/l	9	<1	<5	*	*
Aluminum, dissolved	5	mg/l	17	<0.1	<0.1	*	*
Aluminum, Total		mg/l	8	<0.1	7.8	*	*
Ammonia		mg/l	17	0.01	2.4	*	*
Anion Sum		meq/L	17	30.73	80.58	48.76	15.27
Arsenic (III), Dissolved		mg/l	5	<0.005	<0.005	*	*
Arsenic (III), Total		mg/l	5	<0.005	<0.005	*	*
Arsenic, dissolved	0.2	mg/l	12	<0.005	0.005	*	*
Arsenic, Dissolved/Total *100		%	3	<62.5	100	*	*
Arsenic, Total		mg/l	3	<0.005	0.008	*	*
Barium, dissolved		mg/l	17	<0.5	<0.5	*	*
Barium, Total		mg/l	8	<0.5	<0.5	*	*
Bicarbonate		mg/l	17	515	952	799.41	122.12
Boron, dissolved	5	mg/l	17	<0.01	0.2	*	*
Boron, Total		mg/l	8	<0.01	0.41	*	*
Cadmium, dissolved	0.05	mg/l	17	<0.002	<0.002	*	*
Cadmium, Total		mg/l	8	<0.002	0.002	*	*
Calcium		mg/l	17	168.3	510.3	305.87	94.16
Carbonate		mg/l	14	<1	<5	*	*
Cation Sum		meq/L	17	30.45	73.02	45.35	12.33
Chloride	2000	mg/l	17	3.61	23	12.96	4.43
Chromium, dissolved	0.05	mg/l	17	<0.01	<0.02	*	*
Chromium, Total		mg/l	8	<0.02	0.02	*	*
Cobalt, Dissolved	1	mg/l	5	<0.02	0.4	*	*
Cobalt, Total		mg/l	5	<0.02	0.51	*	*
Copper, dissolved	0.5	mg/l	17	<0.01	<0.01	*	*
Copper, Total		mg/l	8	<0.01	0.25	*	*
Depth to Water		ft	7	1.8	4.4	3.22	0.92
Field Alkalinity		mg/l	4	900	1920	1420.00	456.95
Field Conductivity		umhos/cm	16	2.51	4190	2882.41	1180.49
Field pH		s.u.	13	7.1	9.6	7.47	0.65
Fluoride		mg/l	17	0.22	0.8	0.45	0.14
Hardness (as CaCO3)		mg/l	17	921	2690	1504.88	473.88
Iron, dissolved		mg/l	17	<0.05	4.33	*	*
Iron, total		mg/l	8	1.61	35.19	11.50	10.45
Laboratory conductivity		umhos/cm	17	2600	4720	3390.00	667.48
Laboratory pH		s.u.	17	7.04	8.1	7.72	0.32
Lead, dissolved	0.1	mg/l	17	<0.02	<0.02	*	*
Lead, Total		mg/l	8	<0.02	0.88	*	*
Magnesium		mg/l	17	46.56	344.38	180.19	67.94
Manganese, dissolved	0.00005	mg/l	17	0.1	4.66	1.79	1.40
Manganese, total		mg/l	8	0.96	4.04	2.29	1.27
Mercury, dissolved		mg/l	17	<0.001	<0.001	*	*
Mercury, Total		mg/l	8	<0.001	<0.001	*	*
Molybdenum, dissolved		mg/l	17	<0.02	<0.02	*	*
Molybdenum, Total		mg/l	8	<0.02	0.03	*	*
Nickel, dissolved		mg/l	17	<0.01	0.03	*	*
Nickel, Total		mg/l	8	<0.01	0.04	*	*
Nitrate		mg/l	8	<0.03	1.48	*	*
Nitrate/Nitrite	100	mg/l	12	0.04	1.48	*	*
Nitrite	10	mg/l	17	<0.01	<0.1	*	*
Oil & Grease Visual		s.u.	3	6.9	7.3	7.03	0.23
Phosphorus		mg/l	17	<0.05	<0.4	*	*
Potassium		mg/l	17	5.1	12	7.29	1.82
Selenium, dissolved	0.05	mg/l	17	<0.005	0.006	*	*
Selenium, Total		mg/l	8	<0.005	<0.005	*	*
Silica as SiO2		mg/l	5	3.6	5.8	4.50	1.02

Well: PZ-HCAL-13 Date Range: 6/26/1998-4/12/2011

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Silicon		mg/l	17	2.3	11.5	5.71	2.51
Silicon, total		mg/l	3	10.1	22.64	18.04	6.91
Sodium		mg/l	17	252	808	393.15	145.53
Sodium Adsorption Ratio (SAR)		Unknown	17	3.7	7.6	4.64	1.10
Sulfate	3000	mg/l	17	896	3250	1699.65	747.36
Temperature		Deg C	16	6.6	21.9	14.80	5.71
Total Anion/Cation Balance		%	17	0.15	3.36	1.38	1.18
Total Dissolved Solids	5000	mg/l	12	1860	5100	3127.17	923.01
Water Elevation		fmsl	1	4674.78	4674.78	4674.78	*
Well Purging Volume		Other	3	2	4	3.00	1.00
Zinc, dissolved	25	mg/l	17	<0.01	0.36	*	*
Zinc, Total		mg/l	8	0.02	0.95	0.30	0.29

Well: TWAL-01 Date Range: 5/1/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Alkalinity (as CaCO3)		mg/l	50	160	383	244	69
Alkalinity, Hydroxide		mg/l	8	1	5	4	2
Aluminum, dissolved	5	mg/l	41	<0.1	0.3	*	*
Aluminum, Total		mg/l	3	0.1	0.7	0.3	0.3
Ammonia		mg/l	47	<0.1	0.9	*	*
Anion Sum		meq/L	50	30	62	41	10
Arsenic (III), Dissolved		mg/l	2	0.005	0.005	0.005	0
Arsenic (III), Total		mg/l	2	0.005	0.005	0.005	0
Arsenic, dissolved	0.2	mg/l	16	<0.005	0.006	*	*
Arsenic, Dissolved/Total *100		%	1	100	100	100	
Arsenic, Total		mg/l	1	0.005	0.005	0.005	
Barium, dissolved		mg/l	40	<0.5	0.5	*	*
Barium, Total		mg/l	3	0.5	0.5	0.5	0
Bicarbonate		mg/l	50	195	467	297	83
Boron, dissolved	5	mg/l	48	0	0.4	0.1	0.1
Boron, Total		mg/l	3	0	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	19	<0.002	0.009	*	*
Cadmium, Total		mg/l	3	0.002	0.002	0.002	0
Calcium		mg/l	50	219	526	337	61
Carbonate		mg/l	10	<1	7	*	*
Cation Sum		%	1	1	1	1	
Cation Sum		meq/L	49	29	58	41	9
Chloride	2000	mg/l	50	13	65	36	11
Chromium, dissolved	0.05	mg/l	41	<0.01	0.05	*	*
Chromium, Total		mg/l	3	0.02	0.02	0.02	0
Cobalt, Dissolved	1	mg/l	2	0.02	0.02	0.02	0
Cobalt, Total		mg/l	2	0.02	0.02	0.02	0
Copper, dissolved	0.5	mg/l	41	<0.01	0.02	*	*
Copper, Total		mg/l	3	0	0	0	0
Cyanide, Total		mg/l	1	0	0	0	
Depth to Water		ft	19	3	6	4	1
Dry Well		mg/l	1	0	0	0	
Field Alkalinity		mg/l	4	320	680	505	191
Field Conductivity		umhos/cm	46	790	8200	3102	1183
Field pH		s.u.	47	6.7	8.3	7.2	0.3
Field turbidity		NTUs	3	54	62	58.2	4
Fluoride		mg/l	49	0	0.8	0.4	0.1
Hardness (as CaCO3)		mg/l	50	895	1918	1316	243
Iron (Ferric)		mg/l	1	0.3	0.3	0.3	
Iron (Ferrous)		mg/l	7	<0.1	54.4	*	*
Iron, dissolved		mg/l	49	<0.05	13.9	*	*
Iron, total		mg/l	4	0.3	12.4	8.6	5.6
Laboratory conductivity		umhos/cm	50	2160	5150	3085	782
Laboratory pH		s.u.	50	6.9	8.3	7.6	0.4
Laboratory turbidity		NTUs	1	7	7	7	
Lead, dissolved	0.1	mg/l	40	<0.02	0.02	*	*
Lead, Total		mg/l	3	0	0	0	0
Lithium, dissolved		mg/l	1	0	0	0	
Magnesium		mg/l	50	84	180	116	27
Manganese, dissolved	0.00005	mg/l	49	<0.1	3.7	*	*
Manganese, total		mg/l	3	2.4	3.4	3	0.5
Mercury, dissolved		mg/l	16	<0.001	0.001	*	*
Mercury, Total		mg/l	3	0.001	0.001	0.001	0
Molybdenum, dissolved		mg/l	37	<0.02	0.02	*	*
Molybdenum, Total		mg/l	3	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	42	<0.01	0.04	*	*
Nickel, Total		mg/l	3	0.01	0.01	0.01	0
Nitrate	100	mg/l	10	0.03	1	0.21	0.3

Well: TWAL-01 Date Range: 5/1/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Nitrate/Nitrite	10	mg/l	36	<0.01	3.78	*	*
Nitrite		mg/l	18	<0.1	1	*	*
Oil & Grease Visual		s.u.	1	7.3	7.3	7.3	
Oil and grease	10	mg/l	1	1	1	1	
Phenol		mg/l	5	0	2	1	1
Phosphorus		mg/l	47	<0.1	1	*	*
Potassium		mg/l	50	6	25	11	4
Pumping Rate		gal/minute	1	1	1	1	
Selenium, dissolved	0.05	mg/l	16	<0.005	0.028	*	*
Selenium, Total		mg/l	3	0.005	0.005	0.005	0
Silica as SiO2		mg/l	33	5	14	10	3
Silicon		mg/l	18	2	14	5	3
Silicon, total		mg/l	1	6	6	6	
Sodium		mg/l	49	198	606	320	109
Sodium Adsorption Ratio (SAR)		Unknown	50	3	7	4	1
Strontium, Dissolved		mg/l	5	3	3	3	0
Sulfate	3000	mg/l	50	1080	2700	1670	422
Temperature		Deg C	47	2	25	14	6
Temperature, Water		Deg F	7	0.2	58.3	18.9	26.7
Total Anion/Cation Balance		%	44	0	7	1	1
Total Anion/Cation Balance		meq/L	1	33	33	33	
Total Dissolved Solids	5000	mg/l	48	220	4020	2622	713
Total Dissolved Solids (calc)		mg/l	6	2155	3110	2577	453
Total Suspended Solids		mg/l	3	#N/A	#N/A	#N/A	#N/A
Water Elevation		fmsl	17	4574	4575	4574	0
Well Purging Volume		Other	2	2	15	8	10
Zinc, dissolved	25	mg/l	43	0.01	1.13	0.06	0.17
Zinc, Total		mg/l	3	<0.1	0	*	*

Well: TWAL-02 Date Range: 5/4/1979-6/9/2021

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	17	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	27	338	561	435	64
Alkalinity, Hydroxide		mg/l	1	5	5	5	
Aluminum, dissolved	5	mg/l	19	<0.1	0.6	*	*
Ammonia		mg/l	28	0.1	2	0.8	0.6
Anion Sum		meq/L	28	7	63	17	17
Arsenic, dissolved	0.2	mg/l	7	<0.005	0.04	*	*
Barium, dissolved		mg/l	20	<0.5	0.5	*	*
Bicarbonate		mg/l	28	412	685	526	74
Boron, dissolved	5	mg/l	26	0	0.3	0.1	0.1
Cadmium, dissolved	0.05	mg/l	8	<0.002	0.3	*	*
Calcium		mg/l	28	12	473	90	154
Carbonate		mg/l	2	<1	5	*	*
Cation Sum		%	3	0	5	2	3
Cation Sum		meq/L	25	7	62	18	18
Chloride	2000	mg/l	28	8	70	15	12
Chromium, dissolved	0.05	mg/l	19	<0.01	0.1	*	*
Coliform, Total		Unknown	1	10000	10000	10000	
Copper, dissolved	0.5	mg/l	19	<0.01	0.01	*	*
Cyanide, Total		mg/l	1	0	0	0	
Depth to Water		ft	18	5	19	8	4
Field Conductivity		umhos/cm	27	570	5800	1516	1440
Field pH		s.u.	27	6	8.3	7.5	0.5
Field turbidity		NTUs	5	3.1	77	32.5	32.6
Fluoride		mg/l	28	0.5	4.6	2	1
Hardness (as CaCO3)		mg/l	28	58	1960	385	650
Hydroxide as OH		mg/l	1	<5	5	*	*
Iron (Ferrous)		mg/l	8	0.3	255	38.4	88.1
Iron, dissolved		mg/l	26	0.05	29.3	2.81	5.85
Laboratory conductivity		umhos/cm	28	590	4270	1311	1088
Laboratory pH		s.u.	28	7.5	8.2	7.8	0.2
Lead, dissolved	0.1	mg/l	18	<0.02	0.02	*	*
Lithium, dissolved		mg/l	2	0	0	0	0
Magnesium		mg/l	28	5	190	39	65
Manganese, dissolved	0.0005	mg/l	23	0	4.7	0.6	1.2
Mercury, dissolved		mg/l	7	<0.001	0.002	*	*
Molybdenum, dissolved		mg/l	16	<0.02	0.02	*	*
Nickel, dissolved		mg/l	18	<0.01	0.04	*	*
Nitrate		mg/l	8	<0.01	1	*	*
Nitrate/Nitrite	100	mg/l	18	<0.01	0.27	*	*
Nitrite	10	mg/l	7	0.1	1	0.6	0.5
Oil and grease	10	mg/l	1	1	1	1	
Phenol		mg/l	5	0	1	1	0
Phosphorus		mg/l	25	0	1	0.1	0.3
Orthophosphate as P		mg/l	1	<0.1	0.1	*	*
Potassium		mg/l	28	3	21	6	5
Selenium, dissolved	0.05	mg/l	9	<0.005	0.05	*	*
Silica as SiO2		mg/l	25	3	15	10	3
Sodium		mg/l	25	137	717	210	118
Sodium Adsorption Ratio (SAR)		Unknown	28	3	9	7	2
Strontium, Dissolved		mg/l	7	0	1	0	0
Sulfate	3000	mg/l	28	0	2500	370	764
Temperature		Deg C	28	6	18	12	3
Total Anion/Cation Balance		%	23	0	4	1	1
Total Anion/Cation Balance		meq/L	3	9	12	10	2
Total Dissolved Solids	5000	mg/l	28	157	4110	985	1185
Total Dissolved Solids (103)		mg/l	3	3390	3630	3537	129
Total Dissolved Solids (calc)		mg/l	6	497	3310	1841	1410
Water Elevation		fmsl	15	4516	4518	4517	1

Well: TWAL-02 Date Range: 5/4/1979-6/9/2021

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Zinc, dissolved	25	mg/l	20	<0.01	0.06	*	*

Well: WA-OWAL-2 Date Range: 5/26/2004-5/30/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	5	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	10	275	408	331	53
Alkalinity, Hydroxide		mg/l	4	1	5	4	2
Aluminum, dissolved	5	mg/l	6	<0.1	0.1	*	*
Ammonia		mg/l	8	<0.1	0.3	*	*
Anion Sum		meq/L	10	34	71	48	14
Arsenic, dissolved	0.2	mg/l	6	<0.005	0.005	*	*
Barium, dissolved		mg/l	6	<0.5	0.5	*	*
Bicarbonate		mg/l	10	336	498	404	64
Boron, dissolved	5	mg/l	10	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	6	<0.002	0.002	*	*
Calcium		mg/l	10	274	496	371	83
Carbonate		mg/l	6	<1	5	*	*
Cation Sum		meq/L	10	35	65	48	12
Chloride	2000	mg/l	10	20	74	43	20
Chromium, dissolved	0.05	mg/l	6	<0.01	0.01	*	*
Copper, dissolved	0.5	mg/l	6	<0.01	0.01	*	*
Depth to Water		ft	4	12	15	14	1
Field Conductivity		umhos/cm	9	2680	4940	3596	798
Field pH		s.u.	10	6.6	7.4	7	0.2
Fluoride		mg/l	10	0.3	0.6	0.4	0.1
Hardness (as CaCO3)		mg/l	10	1120	2040	1503	356
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron, dissolved		mg/l	8	<0.05	2.08	*	*
Laboratory conductivity		umhos/cm	10	2670	4910	3485	758
Laboratory pH		s.u.	10	7.7	8.3	8	0.2
Lead, dissolved	0.1	mg/l	6	<0.02	0.02	*	*
Magnesium		mg/l	10	103	199	140	38
Manganese, dissolved	0.0005	mg/l	9	<0.1	0.8	*	*
Mercury, dissolved		mg/l	6	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	6	<0.02	0.02	*	*
Nickel, dissolved		mg/l	6	<0.01	0.01	*	*
Nitrate/Nitrite	100	mg/l	7	<0.01	1.2	*	*
Nitrite	10	mg/l	6	<0.1	0.4	*	*
Phosphorus		mg/l	9	<0.1	1.2	*	*
Orthophosphate as P		mg/l	0				
Potassium		mg/l	10	11	18	14	3
Selenium, dissolved	0.05	mg/l	6	<0.005	0.008	*	*
Silicon		mg/l	10	3	5	4	1
Sodium		mg/l	10	274	592	401	115
Sodium Adsorption Ratio (SAR)		Unknown	10	4	6	4	1
Sulfate	3000	mg/l	10	1230	3060	1949	710
Temperature		Deg C	10	2	14	11	4
Total Anion/Cation Balance		%	6	0	5	3	2
Total Dissolved Solids	5000	mg/l	10	2330	4560	3264	847
Total Dissolved Solids (103)		mg/l	6	2420	3460	2957	427
Total Dissolved Solids (calc)		mg/l	4	2170	3050	2655	462
Zinc, dissolved	25	mg/l	6	<0.01	0.01	*	*

Well: WA-OWAL-13 Date Range: 10/5/2004-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	42	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	62	341	455	407	22
Alkalinity, Hydroxide		mg/l	35	5	5	5	0
Aluminum, dissolved	5	mg/l	51	<0.1	2.1	*	*
Ammonia		mg/l	62	0.1	1.6	0.4	0.2
Anion Sum		meq/L	62	53	110	72	10
Arsenic, dissolved	0.2	mg/l	42	<0.005	0.006	*	*
Barium, dissolved		mg/l	42	<0.5	0.5	*	*
Bicarbonate		mg/l	62	416	556	496	28
Boron, dissolved	5	mg/l	62	0	0.4	0.1	0.1
Cadmium, dissolved	0.05	mg/l	42	<0.002	0.002	*	*
Calcium		mg/l	62	302	597	421	60
Carbonate		mg/l	43	<1	13	*	*
Cation Sum		meq/L	62	53	102	71	11
Chloride	2000	mg/l	62	3	80	39	14
Chromium, dissolved	0.05	mg/l	42	<0.01	0.01	*	*
Copper, dissolved	0.5	mg/l	44	<0.01	0.07	*	*
Depth to Water		ft	27	5	9	7	1
Field Alkalinity		mg/l	15	500	1340	941	270
Field Conductivity		umhos/cm	58	2770	9190	5047	1063
Field pH		s.u.	62	6	8.1	7.2	0.4
Fluoride		mg/l	62	0.3	0.8	0.4	0.1
Hardness (as CaCO3)		mg/l	62	1310	2530	1848	292
Hydroxide as OH		mg/l	7	<5	5	*	*
Iron, dissolved		mg/l	62	0.05	4.39	2.02	1.24
Laboratory conductivity		umhos/cm	62	3340	6920	5142	731
Laboratory pH		s.u.	62	7.7	8.4	8	0.1
Lead, dissolved	0.1	mg/l	42	<0.02	0.02	*	*
Magnesium		mg/l	62	135	307	194	37
Manganese, dissolved	0.0005	mg/l	62	0	4.8	1.6	0.7
Mercury, dissolved		mg/l	42	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	42	<0.02	0.02	*	*
Nickel, dissolved		mg/l	42	<0.01	0.01	*	*
Nitrate/Nitrite	100	mg/l	32	<0.01	10	*	*
Nitrite	10	mg/l	42	<0.1	0.5	*	*
Phosphorus		mg/l	35	0.1	0.9	0.1	0.1
Orthophosphate as P		mg/l	11	<0.1	2.5	*	*
Potassium		mg/l	62	9	18	12	2
Selenium, dissolved	0.05	mg/l	42	<0.005	0.009	*	*
Silicon		mg/l	62	4	12	5	1
Sodium		mg/l	62	566	1200	771	127
Sodium Adsorption Ratio (SAR)		Other	62	6	11	8	1
Sulfate	3000	mg/l	62	2100	4810	2993	451
Temperature		Deg C	62	7	19	10	3
Total Anion/Cation Balance		%	42	0	6	3	1
Total Dissolved Solids	5000	mg/l	61	3450	7140	4897	857
Total Dissolved Solids (103)		mg/l	26	5080	6920	5867	485
Total Dissolved Solids (calc)		mg/l	15	4410	5520	4992	393
Zinc, dissolved	25	mg/l	43	<0.01	0.02	*	*

Well: WA-OWO-2 Date Range: 1/27/2004-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	8	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	15	308	326	318	7
Alkalinity, Hydroxide		mg/l	8	1	5	4	2
Aluminum, dissolved	5	mg/l	10	<0.1	0.7	*	*
Ammonia		mg/l	15	0.1	3.7	1.7	0.7
Anion Sum		meq/L	15	36	39	36	3
Arsenic, dissolved	0.2	mg/l	10	<0.005	0.005	*	*
Barium, dissolved		mg/l	10	<0.5	0.5	*	*
Bicarbonate		mg/l	15	376	398	386	13
Boron, dissolved	5	mg/l	15	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	10	<0.002	0.002	*	*
Calcium		mg/l	15	214	258	228	19
Carbonate		mg/l	11	<1	11	*	*
Cation Sum		meq/L	15	34	40	36	2
Chloride	2000	mg/l	15	7	12	8	1
Chromium, dissolved	0.05	mg/l	10	<0.01	0.01	*	*
Copper, dissolved	0.5	mg/l	10	<0.01	0.01	*	*
Depth to Water		ft	8	97	100	99	1
Field Alkalinity		mg/l	2	560	560	560	0
Field Conductivity		umhos/cm	14	2570	3090	2819	194
Field pH		s.u.	15	6.5	7.6	7	0.3
Fluoride		mg/l	14	<0.1	0.2	*	*
Hardness (as CaCO3)		mg/l	15	873	1100	934	87
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron, dissolved		mg/l	15	0.48	0.83	0.56	0.16
Laboratory conductivity		umhos/cm	15	2470	3130	2892	183
Laboratory pH		s.u.	15	7.6	8.4	8	0.2
Lead, dissolved	0.1	mg/l	10	<0.02	0.02	*	*
Magnesium		mg/l	15	82	111	89	11
Manganese, dissolved	0.0005	mg/l	15	0.8	1	0.8	0.1
Mercury, dissolved		mg/l	10	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	10	<0.02	0.02	*	*
Nickel, dissolved		mg/l	10	<0.01	0.05	*	*
Nitrate/Nitrite	100	mg/l	11	<0.01	0.12	*	*
Nitrite	10	mg/l	10	<0.1	1.6	*	*
Phosphorus		mg/l	8	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	3	<0.1	0.3	*	*
Potassium		mg/l	15	9	14	11	1
Pumping Rate		gal/minute	2	2	2	2	0
Selenium, dissolved	0.05	mg/l	10	<0.005	0.005	*	*
Silicon		mg/l	15	4	5	4	0
Sodium		mg/l	15	342	442	390	30
Sodium Adsorption Ratio (SAR)		Other	15	5	7	6	1
Sulfate	3000	mg/l	15	1400	1550	1389	121
Temperature		Deg C	15	12	17	15	4
Total Anion/Cation Balance		%	10	0	4	2	1
Total Dissolved Solids	5000	mg/l	15	2270	2540	2367	109
Total Dissolved Solids (103)		mg/l	7	2580	2610	2434	126
Total Dissolved Solids (calc)		mg/l	4	2310	2380	2263	108
Water Elevation		fmsl	1	4632	4632	4632	
Zinc, dissolved	25	mg/l	11	<0.01	0.13	*	*

Well: OWA-13 Date Range: 5/16/1984-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	31	<1	5	*	*
Acidity, Total (As CaCO3)		mg/l	2	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	38	313	570	405	57
Alkalinity, Hydroxide		mg/l	15	1	5	4	2
Aluminum, dissolved	5	mg/l	33	<0.1	0.1	*	*
Aluminum, Total		mg/l	3	0.1	0.5	0.4	0.2
Ammonia		mg/l	34	<0.1	4.2	*	*
Anion Sum		meq/L	38	20	77	36	13
Arsenic (III), Dissolved		mg/l	2	0.005	0.005	0.005	0
Arsenic (III), Total		mg/l	2	0.005	0.005	0.005	0
Arsenic, dissolved	0.2	mg/l	20	<0.005	0.005	*	*
Arsenic, Dissolved/Total *100		%	1	100	100	100	
Arsenic, Total		mg/l	1	0.005	0.005	0.005	
Barium, dissolved		mg/l	33	<0.5	0.5	*	*
Barium, Total		mg/l	3	0.5	0.5	0.5	0
Bicarbonate		mg/l	38	381	695	493	70
Boron, dissolved	5	mg/l	38	0	0.8	0.3	0.2
Boron, Total		mg/l	3	0	0.4	0.3	0.2
Cadmium, dissolved	0.05	mg/l	22	<0.002	0.002	*	*
Cadmium, Total		mg/l	3	0.002	0.002	0.002	0
Calcium		mg/l	38	138	698	308	120
Carbonate		mg/l	18	<1	5	*	*
Cation Sum		meq/L	38	19	79	36	14
Chloride	2000	mg/l	38	3	116	34	29
Chromium, dissolved	0.05	mg/l	33	<0.01	0.02	*	*
Chromium, Total		mg/l	3	0.02	0.02	0.02	0
Cobalt, Dissolved	1	mg/l	2	0.02	0.02	0.02	0
Cobalt, Total		mg/l	2	0.02	0.02	0.02	0
Copper, dissolved	0.5	mg/l	33	<0.01	0.01	*	*
Copper, Total		mg/l	3	0	0	0	0
Depth to Water		ft	17	31	51	45	6
Dry Well		mg/l	1	0	0	0	
Field Alkalinity		mg/l	7	480	960	749	213
Field Conductivity		umhos/cm	33	1510	5300	2561	799
Field pH		s.u.	32	5.2	71	9.1	11.3
Fluoride		mg/l	37	0.1	0.8	0.5	0.1
Hardness (as CaCO3)		mg/l	38	557	3215	1340	606
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron (Ferric)		mg/l	1	0.2	0.2	0.2	
Iron, dissolved		mg/l	34	<0.05	1.3	*	*
Iron, total		mg/l	3	0.1	0.9	0.6	0.5
Laboratory conductivity		umhos/cm	38	1730	5150	2789	870
Laboratory pH		s.u.	38	7	8.3	7.8	0.3
Lead, dissolved	0.1	mg/l	33	<0.02	0.02	*	*
Lead, Total		mg/l	3	0	0	0	0
Magnesium		mg/l	38	52	511	139	83
Manganese, dissolved	0.00005	mg/l	38	0	1.7	0.8	0.4
Manganese, total		mg/l	3	0	1.6	0.8	0.8
Mercury, dissolved		mg/l	22	<0.001	0.001	*	*
Mercury, Total		mg/l	3	0.001	0.001	0.001	0
Molybdenum, dissolved		mg/l	33	<0.02	0.02	*	*
Molybdenum, Total		mg/l	3	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	33	<0.01	0.02	*	*
Nickel, Total		mg/l	3	0.01	0.01	0.01	0
Nitrate		mg/l	4	14.68	529.04	153.64	250.61
Nitrate/Nitrite	100	mg/l	34	0.01	529.04	20.52	90.4
Nitrite	10	mg/l	23	<0.1	0.1	*	*
Oil & Grease Visual		s.u.	1	7	7	7	

Well: OWA-13 Date Range: 5/16/1984-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Phosphorus		mg/l	33	0	0.4	0.1	0.1
Potassium		mg/l	38	9	30	14	5
Selenium, dissolved	0.05	mg/l	27	<0.005	0.066	*	*
Selenium, Total		mg/l	3	0.005	0.005	0.005	0
Silica as SiO2		mg/l	14	4	15	10	3
Silicon		mg/l	27	1	16	5	3
Silicon, total		mg/l	1	6	6	6	
Sodium		mg/l	38	128	320	209	42
Sodium Adsorption Ratio (SAR)		Unknown	38	2	4	3	0
Sulfate	3000	mg/l	38	513	3333	1261	640
Temperature		Deg C	33	11	21	14	2
Temperature, Water		Deg F	6	0.7	59.5	12	23.3
Total Anion/Cation Balance		%	33	0	13	2	3
Total Dissolved Solids	5000	mg/l	36	1170	4896	2256	858
Total Dissolved Solids (103)		mg/l	7	2140	2570	2419	144
Total Dissolved Solids (calc)		mg/l	4	1920	2220	2075	125
Water Elevation		fmsl	7	4555	4574	4565	7
Well Purging Volume		Other	1	72	72	72	
Zinc, dissolved	25	mg/l	34	<0.01	0.07	*	*

Well: TWA-02 Date Range: 5/1/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	34	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	50	306	438	372	32
Alkalinity, Hydroxide		mg/l	14	1	5	4	2
Aluminum, dissolved	5	mg/l	38	<0.1	0.4	*	*
Aluminum, Total		mg/l	3	0.1	0.2	0.1	0.1
Ammonia		mg/l	50	0	1.8	0.7	0.4
Anion Sum		meq/L	50	24	47	34	4
Arsenic (III), Dissolved		mg/l	2	0.005	0.005	0.005	0
Arsenic (III), Total		mg/l	2	0.005	0.005	0.005	0
Arsenic, dissolved	0.2	mg/l	21	<0.005	0.02	*	*
Arsenic, Dissolved/Total *100		%	1	100	100	100	
Arsenic, Total		mg/l	1	0.005	0.005	0.005	
Barium, dissolved		mg/l	39	<0.5	1.1	*	*
Barium, Total		mg/l	3	0.1	0.5	0.4	0.2
Bicarbonate		mg/l	50	373	534	452	38
Boron, dissolved	5	mg/l	48	0	0.4	0.1	0.1
Boron, Total		mg/l	3	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	24	<0.002	0.04	*	*
Cadmium, Total		mg/l	3	0.002	0.002	0.002	0
Calcium		mg/l	50	125	327	225	35
Carbonate		mg/l	17	<1	5	*	*
Cation Sum		%	3	1	3	2	1
Cation Sum		meq/L	47	25	43	35	3
Chloride	2000	mg/l	50	6	37	23	4
Chromium, dissolved	0.05	mg/l	39	<0.01	0.05	*	*
Chromium, Total		mg/l	3	0.02	0.02	0.02	0
Cobalt, Dissolved	1	mg/l	2	0.02	0.02	0.02	0
Cobalt, Total		mg/l	2	0.02	0.02	0.02	0
Coliform, Total		Unknown	1	26000	26000	26000	
Copper, dissolved	0.5	mg/l	40	<0.01	0.01	*	*
Copper, Total		mg/l	3	0	0	0	0
Cyanide, Total		mg/l	1	0	0	0	
Depth to Water		ft	24	2	18	6	4
Dry Well		mg/l	1	0	0	0	
Field Alkalinity		mg/l	7	480	940	709	182
Field Conductivity		umhos/cm	47	1880	3600	2572	405
Field pH		s.u.	47	6.1	8.1	7	0.3
Field turbidity		NTUs	7	1.1	18.4	5.8	6.2
Fluoride		mg/l	49	0.1	0.6	0.4	0.1
Hardness (as CaCO3)		mg/l	50	564	1340	939	132
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron (Ferrous)		mg/l	8	0	25	3.9	8.6
Iron, dissolved		mg/l	48	0.05	4.4	0.77	0.81
Iron, total		mg/l	3	0.5	0.9	0.7	0.2
Laboratory conductivity		umhos/cm	50	2060	3600	2727	281
Laboratory pH		s.u.	50	7	8.3	7.7	0.3
Lead, dissolved	0.1	mg/l	40	<0.02	0.02	*	*
Lead, Total		mg/l	3	0	0	0	0
Lithium, dissolved		mg/l	3	0.1	0.1	0.1	0
Magnesium		mg/l	50	7	141	92	21
Manganese, dissolved	0.00005	mg/l	49	0	1.4	0.2	0.3
Manganese, total		mg/l	3	0.1	0.1	0.1	0
Mercury, dissolved		mg/l	21	<0.001	0.001	*	*
Mercury, Total		mg/l	3	0.001	0.001	0.001	0
Molybdenum, dissolved		mg/l	36	<0.02	0.02	*	*
Molybdenum, Total		mg/l	3	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	39	<0.01	0.04	*	*
Nickel, Total		mg/l	3	0.01	0.01	0.01	0

Well: TWA-02 Date Range: 5/1/1979-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Nitrate		mg/l	12	0.03	3.7	0.63	0.99
Nitrate/Nitrite	100	mg/l	31	<0.01	3.7	*	*
Nitrite	10	mg/l	27	<0.1	5	*	*
Oil & Grease Visual		s.u.	1	7.5	7.5	7.5	
Oil and grease	10	mg/l	2	1	1	1	0
Phenol		mg/l	5	<0	2	*	*
Phosphorus		mg/l	43	0	2	0.3	0.4
Orthophosphate as P		mg/l	2	0.1	0.1	0.1	0
Potassium		mg/l	50	10	30	14	3
Pumping Rate		gal/minute	1	4	4	4	
Selenium, dissolved	0.05	mg/l	22	<0.005	0.02	*	*
Selenium, Total		mg/l	3	0.005	0.005	0.005	0
Silica as SiO2		mg/l	24	4	15	11	3
Silicon		mg/l	26	4	15	5	3
Silicon, total		mg/l	1	5	5	5	
Silver, dissolved		mg/l	1	0	0	0	
Sodium		mg/l	47	255	392	345	26
Sodium Adsorption Ratio (SAR)		Unknown	50	4	8	5	1
Strontium, Dissolved		mg/l	7	3	338	53	126
Sulfate	3000	mg/l	50	762	1870	1252	179
Temperature		Deg C	47	6	23	14	4
Temperature, Water		Deg F	7	3.4	58.5	19.7	26.5
Thallium, Dissolved		mg/l	0				
Total Anion/Cation Balance		%	41	0	11	2	2
Total Anion/Cation Balance		meq/L	3	23	33	29	5
Total Dissolved Solids	5000	mg/l	48	270	2950	2134	504
Total Dissolved Solids (103)		mg/l	7	2220	2370	2290	70
Total Dissolved Solids (calc)		mg/l	7	1526	2216	1996	225
U-Nat		mg/l	0				
Vanadium, dissolved	0.1	mg/l	0				
Water Elevation		fmsl	15	4574	4576	4575	1
Well Purging Volume		Other	2	103	168	135	46
Zinc, dissolved	25	mg/l	42	<0.01	0.45	*	*

Well: OWI-07 Date Range: 5/15/1984-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	9	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	14	557	881	752	100
Alkalinity, Hydroxide		mg/l	3	5	5	5	0
Aluminum, dissolved	5	mg/l	9	<0.1	0.2	*	*
Ammonia		mg/l	14	0.2	3.6	1.7	1
Anion Sum		meq/L	14	29	45	38	4
Arsenic, dissolved	0.2	mg/l	5	<0.005	0.005	*	*
Barium, dissolved		mg/l	9	<0.5	0.5	*	*
Bicarbonate		mg/l	14	680	1080	918	123
Boron, dissolved	5	mg/l	14	0	0.8	0.3	0.3
Cadmium, dissolved	0.05	mg/l	5	<0.002	0.002	*	*
Calcium		mg/l	14	87	194	140	30
Carbonate		mg/l	5	<1	5	*	*
Cation Sum		meq/L	14	29	45	38	5
Chloride	2000	mg/l	14	5	19	10	4
Chromium, dissolved	0.05	mg/l	9	<0.01	0.02	*	*
Copper, dissolved	0.5	mg/l	11	<0.01	0.01	*	*
Depth to Water		ft	6	57	57	57	0
Field Conductivity		umhos/cm	13	2000	3490	2810	476
Field pH		s.u.	14	5.4	7.3	6.9	0.5
Fluoride		mg/l	14	0.3	0.8	0.4	0.1
Hardness (as CaCO3)		mg/l	14	435	957	719	136
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron, dissolved		mg/l	10	<0.05	0.29	*	*
Laboratory conductivity		umhos/cm	14	2350	3520	3001	324
Laboratory pH		s.u.	14	7.2	8.3	7.9	0.3
Lead, dissolved	0.1	mg/l	9	<0.02	0.02	*	*
Magnesium		mg/l	14	53	115	90	16
Manganese, dissolved	0.0005	mg/l	14	0	0.1	0	0
Mercury, dissolved		mg/l	5	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	9	<0.02	0.02	*	*
Nickel, dissolved		mg/l	10	<0.01	0.04	*	*
Nitrate/Nitrite	100	mg/l	13	<0.01	2.7	*	*
Nitrite	10	mg/l	5	<0.1	0.1	*	*
Phosphorus		mg/l	9	<0.1	0.1	*	*
Potassium		mg/l	14	11	29	23	5
Selenium, dissolved	0.05	mg/l	10	0.005	0.027	0.01	0.007
Silica as SiO2		mg/l	14	4	10	5	3
Sodium		mg/l	14	445	629	532	58
Sodium Adsorption Ratio (SAR)		Other	0				
Sulfate	3000	mg/l	14	835	1380	1087	143
Temperature		Deg C	14	11	17	14	1
Total Anion/Cation Balance		%	9	0	4	1	2
Total Dissolved Solids	5000	mg/l	14	1787	2620	2295	247
Total Dissolved Solids (103)		mg/l	7	2180	2670	2477	189
Total Dissolved Solids (calc)		mg/l	4	2300	2580	2430	146
Zinc, dissolved	25	mg/l	13	<0.01	0.06	*	*
Sodium		mg/l	14	445	629	532	58
Sodium Adsorption Ratio (SAR)		Other	0				
Sulfate	3000	mg/l	14	835	1380	1087	143
Temperature		Deg C	14	11	17	14	1
Total Anion/Cation Balance		%	9	0	4	1	2
Total Dissolved Solids	5000	mg/l	14	1787	2620	2295	247
Total Dissolved Solids (103)		mg/l	7	2180	2670	2477	189
Total Dissolved Solids (calc)		mg/l	4	2300	2580	2430	146
Zinc, dissolved	25	mg/l	13	<0.01	0.06	*	*

Well: OWC-12 Date Range: 8/23/1994-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity		mg/l	5	<1	<5	*	*
Acidity, Total (As CaCO3)		mg/l	2	<5	<5	*	*
Alkalinity (as CaCO3)		mg/l	7	423	570	475.14	45.85
Alkalinity, Hydroxide		mg/l	3	<5	<5	*	*
Aluminum, dissolved	5	mg/l	7	<0.1	0.1	*	*
Ammonia		mg/l	7	1.51	2.8	2.23	0.41
Anion Sum		meq/L	7	12.58	44.68	32.39	10.02
Arsenic, dissolved	0.2	mg/l	5	<0.005	<0.005	*	*
Barium, dissolved		mg/l	7	<0.5	<0.5	*	*
Bicarbonate		mg/l	7	516	696	577.14	57.46
Boron, dissolved	5	mg/l	7	0.04	0.24	0.10	0.08
Cadmium, dissolved	0.05	mg/l	5	<0.002	<0.002	*	*
Calcium		mg/l	7	43	260	160.86	68.42
Carbonate		mg/l	5	<5	9	*	*
Cation Sum		meq/L	7	12.768	40.89	32.25	9.38
Chloride	2000	mg/l	7	10	21	17.00	4.00
Chromium, dissolved	0.05	mg/l	7	<0.01	<0.02	*	*
Copper, dissolved	0.5	mg/l	7	<0.01	<0.01	*	*
Depth to Water		ft	5	26.32	38.69	32.73	5.34
Field Conductivity		umhos/cm	7	600	3330	2382.86	943.68
Field pH		s.u.	7	7.05	7.7	7.40	0.23
Fluoride		mg/l	7	0.8	1.44	1.03	0.21
Hardness (as CaCO3)		mg/l	7	169	1160	724.14	304.21
Hydroxide as OH		mg/l	2	<5	<5	*	*
Iron, dissolved		mg/l	7	<0.05	0.39	*	*
Laboratory conductivity		umhos/cm	7	1130	3140	2634.29	692.65
Laboratory pH		s.u.	7	7.4	8.3	8.04	0.31
Lead, dissolved	0.1	mg/l	7	<0.02	<0.02	*	*
Magnesium		mg/l	7	15	123	78.14	34.77
Manganese, dissolved	0.0005	mg/l	7	0.15	0.61	0.28	0.15
Mercury, dissolved		mg/l	5	<0.001	<0.001	*	*
Molybdenum, dissolved		mg/l	7	<0.02	<0.02	*	*
Nickel, dissolved		mg/l	7	<0.01	<0.01	*	*
Nitrate/Nitrite	100	mg/l	7	<0.01	<0.1	*	*
Nitrite	10	mg/l	5	<0.1	<0.1	*	*
Phosphorus		mg/l	5	0.02	<0.1	*	*
Phosphorus, Orthophosphate as P		mg/l	2	<0.1	<0.1	*	*
Potassium		mg/l	7	6.5	20	14.79	4.41
Selenium, dissolved	0.05	mg/l	5	0.006	0.056	0.02	0.02
Silica as SiO2		mg/l	2	11.29	12.24	11.77	0.67
Silicon		mg/l	5	4.6	6.1	5.44	0.59
Sodium		mg/l	7	212	485	397.43	86.83
Sodium Adsorption Ratio (SAR)		Other	2	7.05	7.43	7.24	0.27
Sodium Adsorption Ratio (SAR)		Unknown	5	5	7.094	6.47	0.86
Sulfate	3000	mg/l	7	127	1670	1075.57	481.39
Temperature		Deg C	7	12.5	14.7	13.21	0.73
Total Anion/Cation Balance		%	7	0.06	4.42	1.36	1.57
Total Dissolved Solids	5000	mg/l	7	717.984	2760	2072.82	661.65
Total Dissolved Solids (103)		mg/l	2	2050	2460	2255.00	289.91
Total Dissolved Solids (calc)		mg/l	2	1930	2170	2050.00	169.71
Zinc, dissolved	25	mg/l	7	<0.01	<0.01	*	*

Well: OWC-24 Date Range: 5/16/1984-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	31	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	38	308	428	354	37
Alkalinity, Hydroxide		mg/l	15	1	5	4	2
Aluminum, dissolved	5	mg/l	33	<0.1	0.2	*	*
Aluminum, Total		mg/l	2	0.2	0.4	0.3	0.1
Ammonia		mg/l	38	0.1	2.1	0.9	0.4
Anion Sum		meq/L	38	6	13	8	2
Arsenic (III), Dissolved		mg/l	2	0.005	0.005	0.005	0
Arsenic (III), Total		mg/l	2	0.005	0.005	0.005	0
Arsenic, dissolved	0.2	mg/l	21	<0.005	0.008	*	*
Arsenic, Dissolved/Total *100		%	1	100	100	100	
Arsenic, Total		mg/l	1	0.005	0.005	0.005	
Barium, dissolved		mg/l	33	<0.5	0.5	*	*
Barium, Total		mg/l	3	0.5	0.5	0.5	0
Bicarbonate		mg/l	38	375	522	428	41
Boron, dissolved	5	mg/l	38	0	0.2	0.1	0
Boron, Total		mg/l	3	0	0.1	0	0
Cadmium, dissolved	0.05	mg/l	22	<0.002	0.002	*	*
Cadmium, Total		mg/l	3	0.002	0.002	0.002	0
Calcium		mg/l	38	1	19	9	3
Carbonate		mg/l	22	<1	15	*	*
Cation Sum		meq/L	38	6	12	8	1
Chloride	2000	mg/l	38	3	23	11	5
Chromium, dissolved	0.05	mg/l	33	<0.01	0.02	*	*
Chromium, Total		mg/l	3	0.02	0.02	0.02	0
Cobalt, Dissolved	1	mg/l	2	0.02	0.02	0.02	0
Cobalt, Total		mg/l	1	0.02	0.02	0.02	
Copper, dissolved	0.5	mg/l	33	<0.01	0.02	*	*
Copper, Total		mg/l	3	0	0	0	0
Depth to Water		ft	16	39	142	109	26
Dry Well		mg/l	1	2	2	2	
Field Alkalinity		mg/l	7	560	920	789	139
Field Conductivity		umhos/cm	35	389	1070	686	158
Field pH		s.u.	35	7	8.2	7.5	0.3
Fluoride		mg/l	37	0.8	2.1	1.6	0.2
Hardness (as CaCO3)		mg/l	38	31	89	46	13
Hydroxide as OH		mg/l	2	<5	5	*	*
Iron, dissolved		mg/l	38	0.05	0.4	0.14	0.08
Iron, total		mg/l	3	1	1.2	1.1	0.1
Laboratory conductivity		umhos/cm	38	580	1110	719	118
Laboratory pH		s.u.	38	7.6	8.7	8.1	0.3
Lead, dissolved	0.1	mg/l	33	<0.02	0.02	*	*
Lead, Total		mg/l	3	0	0	0	0
Magnesium		mg/l	38	3	10	5	2
Manganese, dissolved	0.00005	mg/l	33	<0.1	0.6	*	*
Manganese, total		mg/l	3	0	0	0	0
Mercury, dissolved		mg/l	22	<0.001	0.001	*	*
Mercury, Total		mg/l	3	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	33	<0.02	0.02	*	*
Molybdenum, Total		mg/l	3	0.02	0.02	0.02	0
Nickel, dissolved		mg/l	33	0.01	0.01	0.01	0
Nickel, Total		mg/l	3	0.01	0.03	0.02	0.01
Nitrate		mg/l	4	0.03	2.84	0.73	1.41
Nitrate/Nitrite	100	mg/l	27	<0.01	2.84	*	*
Nitrite	10	mg/l	22	<0.1	0.1	*	*
Oil & Grease Visual		s.u.	1	7.6	7.6	7.6	
Phosphorus	10	mg/l	33	<0.1	0.4	*	*
Potassium		mg/l	38	1	8	5	1

Well: OWC-24 Date Range: 5/16/1984-5/29/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Phosphorus, Orthophosphate as P		mg/l	2	<0.1	<0.1	*	*
Potassium		mg/l	33	0.6	8	4.63	1.38
Pumping Rate		gal/minute	1	6	6	6	
Selenium, dissolved		mg/l	22	<0.005	0.033	*	*
Selenium, Total	0.05	mg/l	3	0.005	0.005	0.005	0
Silica as SiO2		mg/l	14	4	10	8	2
Silicon		mg/l	27	3	12	4	2
Silicon, total		mg/l	1	4	4	4	
Sodium		mg/l	38	123	239	158	29
Sodium Adsorption Ratio (SAR)		Other	38	8	12	10	1
Sulfate	3000	mg/l	33	<5	147	*	*
Temperature		Deg C	35	11	24	16	2
Temperature, Water		Deg F	2	61	64.2	62.6	2.3
Total Anion/Cation Balance		%	33	0	34	3	8
Total Dissolved Solids	5000	mg/l	36	344	700	439	91
Total Dissolved Solids (103)		mg/l	7	460	530	486	21
Total Dissolved Solids (calc)		mg/l	4	440	470	453	13
Water Elevation		fmsl	11	1	4566	2463	2356
Zinc, dissolved	25	mg/l	33	<0.01	0.11	*	*

Well: OWS-06 Date Range: 3/22/2012-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	26	<1	5	*	*
Acidity, Total (As CaCO3)		mg/l	8	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	47	844	1180	965	60
Alkalinity, Hydroxide		mg/l	18	5	5	5	0
Aluminum, dissolved	5	mg/l	26	<0.1	0.3	*	*
Ammonia		mg/l	47	0.5	3.7	3.1	0.6
Anion Sum		meq/L	47	24	40	34	4
Arsenic, dissolved	0.2	mg/l	26	<0.005	0.01	*	*
Barium, dissolved		mg/l	26	<0.5	0.5	*	*
Bicarbonate		mg/l	47	1010	1430	1176	75
Boron, dissolved	5	mg/l	43	0.1	0.4	0.1	0.1
Cadmium, dissolved	0.05	mg/l	26	<0.002	0.002	*	*
Calcium		mg/l	47	74	219	145	30
Carbonate		mg/l	26	<1	16	*	*
Cation Sum		meq/L	47	24	40	35	4
Chloride	2000	mg/l	47	6	48	26	5
Chromium, dissolved	0.05	mg/l	27	<0.01	0.02	*	*
Copper, dissolved	0.5	mg/l	26	<0.01	0.01	*	*
Depth to Water		ft	29	69	89	79	6
Field Conductivity		umhos/cm	43	1520	3433	2651	428
Field pH		s.u.	47	6.3	7.3	6.8	0.2
Fluoride		mg/l	47	0.7	1.2	0.8	0.1
Hardness (as CaCO3)		mg/l	47	377	904	705	136
Hydroxide as OH		mg/l	8	<5	5	*	*
Iron, dissolved		mg/l	47	0.05	2.11	0.97	0.32
Laboratory conductivity		umhos/cm	47	2010	3350	2769	348
Laboratory pH		s.u.	47	7.6	8.3	7.9	0.2
Lead, dissolved	0.1	mg/l	26	<0.02	0.02	*	*
Magnesium		mg/l	47	46	113	84	16
Manganese, dissolved	0.0005	mg/l	45	<0.1	1.2	*	*
Mercury, dissolved		mg/l	26	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	26	<0.02	0.02	*	*
Nickel, dissolved		mg/l	26	<0.01	0.02	*	*
Nitrate/Nitrite	100	mg/l	28	<0.01	0.6	*	*
Nitrite	10	mg/l	27	<0.1	0.2	*	*
Phosphorus		mg/l	18	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	8	<0.1	0.1	*	*
Potassium		mg/l	47	11	33	27	3
Selenium, dissolved	0.05	mg/l	26	<0.005	0.005	*	*
Silicon		mg/l	47	4	11	6	1
Sodium		mg/l	47	350	536	460	44
Sodium Adsorption Ratio (SAR)		Other	29	7	8	8	0
Sulfate	3000	mg/l	47	282	825	662	150
Temperature		Deg C	43	13	21	18	1
Total Anion/Cation Balance		%	26	0	4	2	1
Total Dissolved Solids	5000	mg/l	47	1350	2280	1974	272
Total Dissolved Solids (103)		mg/l	29	1820	2330	2150	149
Total Dissolved Solids (calc)		mg/l	18	2020	2190	2097	52
Zinc, dissolved	25	mg/l	41	<0.01	0.07	*	*

Well: OWS-07 Date Range: 7/25/2016

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity		mg/l	1	<5	<5	<5	*
Alkalinity (as CaCO3)		mg/l	1	601	601	601	*
Alkalinity, Hydroxide		mg/l	1	<5	<5	<5	*
Aluminum, dissolved	5	mg/l	1	0.3	0.3	0.3	*
Ammonia		mg/l	1	1.5	1.5	1.5	*
Anion Sum		meq/L	1	28.37	28.37	28.37	*
Arsenic, dissolved	0.2	mg/l	1	0.007	0.007	0.007	*
Barium, dissolved		mg/l	1	<0.5	<0.5	<0.5	*
Bicarbonate		mg/l	1	733	733	733	*
Boron, dissolved	5	mg/l	1	0.09	0.09	0.09	*
Cadmium, dissolved	0.05	mg/l	1	<0.002	<0.002	<0.002	*
Calcium		mg/l	1	92	92	92	*
Carbonate		mg/l	1	<5	<5	<5	*
Cation Sum		meq/L	1	28.56	28.56	28.56	*
Chloride	2000	mg/l	1	38	38	38	*
Chromium, dissolved	0.05	mg/l	1	<0.01	<0.01	<0.01	*
Copper, dissolved	0.5	mg/l	1	<0.01	<0.01	<0.01	*
Depth to Water		ft	1	96.13	96.13	96.13	*
Field Conductivity		umhos/cm	1	2310	2310	2310	*
Field pH		s.u.	1	7.3	7.3	7.3	*
Fluoride		mg/l	1	0.9	0.9	0.9	*
Hardness (as CaCO3)		mg/l	1	411	411	411	*
Iron, dissolved		mg/l	1	0.08	0.08	0.08	*
Laboratory conductivity		umhos/cm	1	2540	2540	2540	*
Laboratory pH		s.u.	1	8.1	8.1	8.1	*
Lead, dissolved	0.1	mg/l	1	<0.02	<0.02	<0.02	*
Magnesium		mg/l	1	44	44	44	*
Manganese, dissolved	0.0005	mg/l	1	0.21	0.21	0.21	*
Mercury, dissolved		mg/l	1	<0.001	<0.001	<0.001	*
Molybdenum, dissolved		mg/l	1	0.03	0.03	0.03	*
Nickel, dissolved		mg/l	1	<0.01	<0.01	<0.01	*
Nitrate/Nitrite	100	mg/l	1	<0.1	<0.1	<0.1	*
Nitrite	10	mg/l	1	<0.1	<0.1	<0.1	*
Phosphorus		mg/l	1	<0.1	<0.1	<0.1	*
Potassium		mg/l	1	26	26	26	*
Selenium, dissolved	0.05	mg/l	1	<0.005	<0.005	<0.005	*
Silicon		mg/l	1	6.7	6.7	6.7	*
Sodium		mg/l	1	450	450	450	*
Sodium Adsorption Ratio (SAR)		Unknown	1	9.66	9.66	9.66	*
Sulfate	3000	mg/l	1	732	732	732	*
Temperature		Deg C	1	22.6	22.6	22.6	*
Total Anion/Cation Balance		%	1	0.34	0.34	0.34	*
Total Dissolved Solids	5000	mg/l	1	1740	1740	1740	*
Zinc, dissolved	25	mg/l	1	<0.01	<0.01	<0.01	*

Well: OWS-08 Date Range: 4/12/2016-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	10	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	31	627	905	711	54
Alkalinity, Hydroxide		mg/l	3	5	5	5	0
Aluminum, dissolved	5	mg/l	13	<0.1	0.8	*	*
Ammonia		mg/l	31	1.4	3.3	2	0.5
Anion Sum		meq/L	31	31	37	33	1
Arsenic, dissolved	0.2	mg/l	10	<0.005	0.007	*	*
Barium, dissolved		mg/l	10	<0.5	0.5	*	*
Bicarbonate		mg/l	31	753	1100	867	66
Boron, dissolved	5	mg/l	31	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	10	<0.002	0.002	*	*
Calcium		mg/l	31	75	133	86	11
Carbonate		mg/l	12	<1	13	*	*
Cation Sum		meq/L	31	33	39	35	1
Chloride	2000	mg/l	31	7	11	8	1
Chromium, dissolved	0.05	mg/l	10	<0.01	0.01	*	*
Copper, dissolved	0.5	mg/l	11	<0.01	0.05	*	*
Depth to Water		ft	15	86	88	87	0
Field Conductivity		umhos/cm	27	2640	3050	2826	112
Field pH		s.u.	31	4.2	7.1	6.7	0.5
Fluoride		mg/l	31	0.4	0.6	0.5	0
Hardness (as CaCO3)		mg/l	31	334	574	377	42
Hydroxide as OH		mg/l	7	<5	5	*	*
Iron, dissolved		mg/l	30	<0.05	13.4	*	*
Laboratory conductivity		umhos/cm	31	2370	3060	2826	166
Laboratory pH		s.u.	31	7.6	8.3	7.9	0.2
Lead, dissolved	0.1	mg/l	10	<0.02	0.02	*	*
Magnesium		mg/l	31	36	59	40	4
Manganese, dissolved	0.0005	mg/l	31	0.1	1.7	0.3	0.4
Mercury, dissolved		mg/l	10	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	10	<0.02	0.02	*	*
Nickel, dissolved		mg/l	11	<0.01	0.01	*	*
Nitrate/Nitrite	100	mg/l	14	<0.01	0.3	*	*
Nitrite	10	mg/l	12	<0.1	0.2	*	*
Phosphorus		mg/l	3	0.1	0.1	0.1	0
Phosphorus, Orthophosphate as P		mg/l	7	<0.1	0.1	*	*
Potassium		mg/l	31	11	16	13	1
Selenium, dissolved	0.05	mg/l	10	<0.005	0.005	*	*
Silicon		mg/l	31	4	8	5	1
Sodium		mg/l	31	580	666	615	21
Sodium Adsorption Ratio (SAR)		Other	28	13	15	14	1
Sulfate	3000	mg/l	31	803	965	876	35
Temperature		Deg C	31	11	22	14	2
Total Anion/Cation Balance		%	10	0	3	1	1
Total Dissolved Solids	5000	mg/l	31	1970	2270	2085	68
Total Dissolved Solids (103)		mg/l	28	1980	2220	2090	57
Total Dissolved Solids (calc)		mg/l	17	1940	2170	2066	51
Zinc, dissolved	25	mg/l	18	<0.01	0.08	*	*

Well: OWS-09 Date Range: 6/27/2001-8/30/2017

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity		mg/l	51	<1	<5	*	*
Acidity, Total (As CaCO3)		mg/l	3	<5	<5	*	*
Alkalinity (as CaCO3)		mg/l	60	688	1080	832.52	100.22
Alkalinity, Hydroxide		mg/l	53	<1	<5	*	*
Aluminum, dissolved	5	mg/l	60	<0.1	0.6	*	*
Ammonia		mg/l	60	<0.05	5.12	*	*
Anion Sum		meq/L	60	45.64	70.33	56.80	6.06
Arsenic, dissolved	0.2	mg/l	60	<0.005	0.006	*	*
Barium, dissolved		mg/l	60	<0.5	<0.5	*	*
Bicarbonate		mg/l	60	839	1320	1015.70	122.63
Boron, dissolved	5	mg/l	60	0.07	0.26	0.15	0.04
Cadmium, dissolved	0.05	mg/l	60	<0.002	<0.002	*	*
Calcium		mg/l	60	262	428	356.10	44.43
Carbonate		mg/l	56	<1	<5	*	*
Cation Sum		meq/L	60	44.29	66.61	54.67	5.61
Chloride	2000	mg/l	60	39.2	114	58.11	11.74
Chromium, dissolved	0.05	mg/l	60	<0.01	<0.01	*	*
Copper, dissolved	0.5	mg/l	60	<0.01	0.04	*	*
Depth to Water		ft	25	59.72	76.08	68.25	5.79
Field Alkalinity		mg/l	25	1000	2460	1585.60	454.74
Field Conductivity		umhos/cm	59	2570	4690	3903.93	509.91
Field pH		s.u.	59	5.7	7.1	6.46	0.22
Fluoride		mg/l	60	0.1	0.7	0.21	0.07
Hardness (as CaCO3)		mg/l	60	1240	2060	1641.33	201.58
Hydroxide as OH		mg/l	3	<5	<5	*	*
Iron, dissolved		mg/l	60	0.48	5.94	1.63	0.66
Laboratory conductivity		umhos/cm	60	3150	5310	4123.17	395.42
Laboratory pH		s.u.	60	6.7	8.1	7.44	0.28
Lead, dissolved	0.1	mg/l	60	<0.02	<0.02	*	*
Magnesium		mg/l	60	128	240	182.55	23.05
Manganese, dissolved	0.0005	mg/l	60	0.03	0.21	0.11	0.03
Mercury, dissolved		mg/l	60	<0.001	<0.001	*	*
Molybdenum, dissolved		mg/l	60	<0.02	<0.02	*	*
Nickel, dissolved		mg/l	60	<0.01	0.03	*	*
Nitrate/Nitrite	100	mg/l	48	<0.01	0.45	*	*
Nitrite	10	mg/l	60	<0.01	1.9	*	*
Phosphorus		mg/l	57	<0.05	<0.1	*	*
Phosphorus, Orthophosphate as P		mg/l	3	<0.1	<0.1	*	*
Potassium		mg/l	60	23.1	64	49.75	9.40
Pumping Rate		gal/minute	5	3	4	3.80	0.45
Selenium, dissolved	0.05	mg/l	60	<0.005	0.015	*	*
Silicon		mg/l	60	6.05	9.9	8.27	0.61
Sodium		mg/l	60	404	557	472.90	40.20
Sodium Adsorption Ratio (SAR)		Other	3	5.42	5.51	5.45	0.05
Sodium Adsorption Ratio (SAR)		Unknown	57	4.4	6	5.07	0.32
Sulfate	3000	mg/l	60	1460	2300	1848.67	207.53
Temperature		Deg C	59	7.6	23.7	18.75	2.61
Total Anion/Cation Balance		%	60	0.02	5.02	2.19	1.52
Total Dissolved Solids	5000	mg/l	60	2770	4260	3467.00	362.45
Total Dissolved Solids (103)		mg/l	3	3720	4320	3926.67	340.78
Total Dissolved Solids (calc)		mg/l	3	3690	3910	3780.00	115.33
Zinc, dissolved	25	mg/l	60	<0.01	0.11	*	*

Well: OWS-10 Date Range: 6/19/2001-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	57	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	83	505	1400	749	169
Alkalinity, Hydroxide		mg/l	53	1	5	4	2
Aluminum, dissolved	5	mg/l	63	<0.1	1.2	*	*
Ammonia		mg/l	83	0.1	2.1	0.6	0.4
Anion Sum		meq/L	83	30	185	59	33
Arsenic, dissolved	0.2	mg/l	63	<0.005	0.008	*	*
Barium, dissolved		mg/l	63	<0.5	0.5	*	*
Bicarbonate		mg/l	83	616	1710	914	206
Boron, dissolved	5	mg/l	83	0.1	0.7	0.2	0.1
Cadmium, dissolved	0.05	mg/l	63	<0.002	0.002	*	*
Calcium		mg/l	83	112	551	251	115
Carbonate		mg/l	59	<1	5	*	*
Cation Sum		meq/L	83	29	184	59	33
Chloride	2000	mg/l	83	37	264	93	42
Chromium, dissolved	0.05	mg/l	64	<0.01	0.01	*	*
Copper, dissolved	0.5	mg/l	63	<0.01	0.05	*	*
Depth to Water		ft	31	63	93	78	11
Field Alkalinity		mg/l	25	860	1940	1414	384
Field Conductivity		umhos/cm	79	2190	11680	4287	2064
Field pH		s.u.	83	5.8	7.6	6.5	0.3
Fluoride		mg/l	83	0.1	1.9	0.5	0.4
Hardness (as CaCO3)		mg/l	83	594	4730	1440	966
Hydroxide as OH		mg/l	6	<5	5	*	*
Iron, dissolved		mg/l	83	0.05	11.7	0.97	1.89
Laboratory conductivity		umhos/cm	83	2540	11200	4387	1897
Laboratory pH		s.u.	83	6.5	8	7.4	0.3
Lead, dissolved	0.1	mg/l	63	<0.02	0.02	*	*
Magnesium		mg/l	83	66	824	198	169
Manganese, dissolved	0.0005	mg/l	83	0	1.4	0.3	0.4
Mercury, dissolved		mg/l	63	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	63	<0.02	0.02	*	*
Nickel, dissolved		mg/l	63	<0.01	0.07	*	*
Nitrate/Nitrite	100	mg/l	51	<0.01	0.27	*	*
Nitrite	10	mg/l	63	<0.1	0.6	*	*
Phosphorus		mg/l	57	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	6	<0.1	0.1	*	*
Potassium		mg/l	83	14	252	29	26
Pumping Rate		gal/minute	5	<	4	*	*
Selenium, dissolved	0.05	mg/l	63	<0.005	0.008	*	*
Silicon		mg/l	83	3	41	7	4
Sodium		mg/l	83	357	2030	681	325
Sodium Adsorption Ratio (SAR)		Unknown	57	6	10	8	1
Sulfate	3000	mg/l	83	676	7240	1982	1402
Temperature		Deg C	83	8	25	16	2
Total Anion/Cation Balance		%	63	0	5	2	1
Total Dissolved Solids	5000	mg/l	83	1750	12900	3837	2358
Total Dissolved Solids (103)		mg/l	26	4140	13100	5974	3056
Total Dissolved Solids (calc)		mg/l	15	3770	11700	6285	3188
Zinc, dissolved	25	mg/l	81	<0.01	0.13	*	*

Well: OWS-12 Date Range: 6/19/2001-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	59	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	86	850	1120	1002	49
Alkalinity, Hydroxide		mg/l	53	1	5	4	2
Aluminum, dissolved	5	mg/l	74	<0.1	1.9	*	*
Ammonia		mg/l	78	<0.1	3	*	*
Anion Sum		meq/L	86	67	95	83	6
Arsenic, dissolved	0.2	mg/l	65	<0.005	0.009	*	*
Barium, dissolved		mg/l	65	<0.5	0.5	*	*
Bicarbonate		mg/l	86	1040	1360	1222	59
Boron, dissolved	5	mg/l	86	0.3	0.9	0.5	0.1
Cadmium, dissolved	0.05	mg/l	66	<0.002	0.41	*	*
Calcium		mg/l	86	329	696	550	51
Carbonate		mg/l	61	<1	5	*	*
Cation Sum		meq/L	86	64	101	80	6
Chloride	2000	mg/l	86	1	273	131	36
Chromium, dissolved	0.05	mg/l	65	<0.01	0.03	*	*
Copper, dissolved	0.5	mg/l	65	<0.01	0.05	*	*
Depth to Water		ft	34	17	99	96	14
Field Alkalinity		mg/l	23	1220	2840	2050	466
Field Conductivity		umhos/cm	82	2490	6960	5295	704
Field pH		s.u.	86	6.2	7.5	6.8	0.3
Fluoride		mg/l	86	0.8	1.7	1.2	0.2
Hardness (as CaCO3)		mg/l	86	2100	3410	2786	199
Hydroxide as OH		mg/l	8	<5	5	*	*
Iron, dissolved		mg/l	86	0.07	7.87	1.16	1.11
Laboratory conductivity		umhos/cm	86	3680	6430	5485	493
Laboratory pH		s.u.	86	7	8.1	7.7	0.2
Lead, dissolved	0.1	mg/l	65	<0.02	0.02	*	*
Magnesium		mg/l	86	239	406	344	39
Manganese, dissolved	0.0005	mg/l	86	0.3	1.9	1.1	0.3
Mercury, dissolved		mg/l	65	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	65	<0.02	0.02	*	*
Nickel, dissolved		mg/l	73	<0.01	0.1	*	*
Nitrate/Nitrite	100	mg/l	56	<0.01	1.64	*	*
Nitrite	10	mg/l	65	<0.1	0.6	*	*
Phosphorus		mg/l	57	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	9	<0.1	0.2	*	*
Potassium		mg/l	86	12	29	20	4
Pumping Rate		gal/minute	5	1	1	1	0
Selenium, dissolved	0.05	mg/l	65	<0.005	0.033	*	*
Silicon		mg/l	86	6	70	10	7
Sodium		mg/l	86	378	827	547	68
Sodium Adsorption Ratio (SAR)		Unknown	86	3	8	5	1
Sulfate	3000	mg/l	86	2180	3380	2822	222
Temperature		Deg C	86	7	23	16	3
Total Anion/Cation Balance		%	65	0	6	2	2
Total Dissolved Solids	5000	mg/l	86	4290	5820	5207	367
Total Dissolved Solids (103)		mg/l	29	5050	6080	5654	261
Total Dissolved Solids (calc)		mg/l	18	3980	5130	4918	252
Zinc, dissolved	25	mg/l	69	<0.01	0.09	*	*

Well: OWS-14 Date Range: 3/22/2012-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	26	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	47	654	1200	933	169
Alkalinity, Hydroxide		mg/l	18	5	5	5	0
Aluminum, dissolved	5	mg/l	29	<0.1	0.2	*	*
Ammonia		mg/l	47	0.5	1.3	1	0.2
Anion Sum		meq/L	47	25	56	44	11
Arsenic, dissolved	0.2	mg/l	34	<0.005	0.013	*	*
Barium, dissolved		mg/l	26	<0.5	0.5	*	*
Bicarbonate		mg/l	47	798	1460	1138	207
Boron, dissolved	5	mg/l	46	0.1	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	25	<0.002	0.002	*	*
Calcium		mg/l	47	117	341	235	77
Carbonate		mg/l	26	<1	5	*	*
Cation Sum		meq/L	47	27	60	44	12
Chloride	2000	mg/l	47	22	75	45	16
Chromium, dissolved	0.05	mg/l	26	<0.01	0.02	*	*
Copper, dissolved	0.5	mg/l	26	<0.01	0.01	*	*
Depth to Water		ft	29	130	140	137	3
Field Conductivity		umhos/cm	43	1860	4510	3263	849
Field pH		s.u.	47	6.3	7.2	6.8	0.2
Fluoride		mg/l	47	0.6	1.4	0.9	0.2
Hardness (as CaCO3)		mg/l	47	561	1520	1104	341
Hydroxide as OH		mg/l	8	<5	5	*	*
Iron, dissolved		mg/l	46	0.05	8.3	3.85	2.3
Laboratory conductivity		umhos/cm	47	2070	4440	3375	779
Laboratory pH		s.u.	47	7.4	8.2	7.9	0.2
Lead, dissolved	0.1	mg/l	25	<0.02	0.02	*	*
Magnesium		mg/l	47	66	172	126	37
Manganese, dissolved	0.0005	mg/l	46	0.1	1.3	0.6	0.3
Mercury, dissolved		mg/l	25	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	25	<0.02	0.02	*	*
Nickel, dissolved		mg/l	26	<0.01	0.02	*	*
Nitrate/Nitrite	100	mg/l	26	<0.01	0.1	*	*
Nitrite	10	mg/l	26	<0.1	0.1	*	*
Phosphorus		mg/l	18	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	8	<0.1	0.1	*	*
Potassium		mg/l	47	18	43	29	7
Selenium, dissolved	0.05	mg/l	25	<0.005	0.005	*	*
Silicon		mg/l	46	7	11	9	1
Sodium		mg/l	47	333	665	493	109
Sodium Adsorption Ratio (SAR)		Unknown	47	6	7	6	0
Sulfate	3000	mg/l	47	534	1610	1156	371
Temperature		Deg C	47	10	18	16	1
Total Anion/Cation Balance		%	26	0	4	2	1
Total Dissolved Solids	5000	mg/l	47	1500	3600	2678	751
Total Dissolved Solids (103)		mg/l	29	2340	3720	3299	363
Total Dissolved Solids (calc)		mg/l	18	2480	3430	3066	285
Zinc, dissolved	25	mg/l	40	<0.01	0.05	*	*

Well: OWS-15 Date Range: 3/22/2012-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	26	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	47	1050	1520	1338	100
Alkalinity, Hydroxide		mg/l	18	5	5	5	0
Aluminum, dissolved	5	mg/l	33	<0.1	0.4	*	*
Ammonia		mg/l	47	4	9.8	5.6	0.9
Anion Sum		meq/L	47	50	80	72	7
Arsenic, dissolved	0.2	mg/l	26	<0.005	0.005	*	*
Barium, dissolved		mg/l	26	<0.5	0.5	*	*
Bicarbonate		mg/l	47	1280	1850	1632	122
Boron, dissolved	5	mg/l	47	0	0.4	0.1	0.1
Cadmium, dissolved	0.05	mg/l	26	<0.002	0.002	*	*
Calcium		mg/l	47	299	589	462	62
Carbonate		mg/l	26	<1	5	*	*
Cation Sum		meq/L	47	52	85	71	8
Chloride	2000	mg/l	47	24	92	46	9
Chromium, dissolved	0.05	mg/l	26	<0.01	0.03	*	*
Copper, dissolved	0.5	mg/l	26	<0.01	0.01	*	*
Depth to Water		ft	29	182	185	184	1
Field Conductivity		umhos/cm	43	3000	5930	5117	558
Field pH		s.u.	47	6.2	7.4	6.9	0.2
Fluoride		mg/l	47	0.5	1.1	0.6	0.1
Hardness (as CaCO3)		mg/l	47	1390	2840	2147	285
Hydroxide as OH		mg/l	8	<5	5	*	*
Iron, dissolved		mg/l	47	0.05	9.96	5.4	2.56
Laboratory conductivity		umhos/cm	47	3500	5800	5048	587
Laboratory pH		s.u.	47	7.6	8.1	7.8	0.1
Lead, dissolved	0.1	mg/l	26	<0.02	0.02	*	*
Magnesium		mg/l	47	155	372	242	36
Manganese, dissolved	0.0005	mg/l	47	0.4	1.4	0.7	0.2
Mercury, dissolved		mg/l	26	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	26	<0.02	0.02	*	*
Nickel, dissolved		mg/l	26	<0.01	0.02	*	*
Nitrate/Nitrite	100	mg/l	28	<0.01	0.2	*	*
Nitrite	10	mg/l	26	<0.1	0.1	*	*
Phosphorus		mg/l	18	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	8	<0.1	0.1	*	*
Potassium		mg/l	47	15	60	48	8
Selenium, dissolved	0.05	mg/l	26	<0.005	0.089	*	*
Silicon		mg/l	47	6	9	7	1
Sodium		mg/l	47	491	773	619	63
Sodium Adsorption Ratio (SAR)		Other	47	4	7	6	0
Sulfate	3000	mg/l	47	1300	2480	2122	254
Temperature		Deg C	47	10	23	16	3
Total Anion/Cation Balance		%	26	0	6	3	1
Total Dissolved Solids	5000	mg/l	47	3050	5120	4472	549
Total Dissolved Solids (103)		mg/l	29	4140	5500	4969	344
Total Dissolved Solids (calc)		mg/l	18	4200	4770	4527	142
Zinc, dissolved	25	mg/l	34	<0.01	0.04	*	*

Well: OWS-18 Date Range: 4/12/2016-12/4/2024

Parameter	Class III Standard	Units	#	Min	Max	Avg	Std Dev
Acidity, Total (As CaCO3)		mg/l	11	<1	5	*	*
Alkalinity (as CaCO3)		mg/l	32	806	980	873	35
Alkalinity, Hydroxide		mg/l	3	5	5	5	0
Aluminum, dissolved	5	mg/l	11	<0.1	0.2	*	*
Ammonia		mg/l	32	1.5	1.8	1.7	0.1
Anion Sum		meq/L	32	17	20	18	1
Arsenic, dissolved	0.2	mg/l	11	<0.005	0.005	*	*
Barium, dissolved		mg/l	32	0.7	1.1	0.9	0.1
Bicarbonate		mg/l	32	954	1200	1059	41
Boron, dissolved	5	mg/l	32	0	0.1	0.1	0
Cadmium, dissolved	0.05	mg/l	11	<0.002	0.002	*	*
Calcium		mg/l	32	48	62	52	3
Carbonate		mg/l	15	<1	33	*	*
Cation Sum		meq/L	32	17	20	18	1
Chloride	2000	mg/l	32	15	51	20	7
Chromium, dissolved	0.05	mg/l	11	<0.01	0.01	*	*
Copper, dissolved	0.5	mg/l	13	<0.01	0.13	*	*
Depth to Water		ft	16	150	156	154	3
Field Conductivity		umhos/cm	28	1172	1640	1468	90
Field pH		s.u.	32	6.6	7.6	7	0.2
Fluoride		mg/l	32	0.9	1.2	1	0.1
Hardness (as CaCO3)		mg/l	32	230	281	246	12
Hydroxide as OH		mg/l	8	<5	5	*	*
Iron, dissolved		mg/l	32	0.62	1.02	0.72	0.07
Laboratory conductivity		umhos/cm	32	1230	1650	1498	85
Laboratory pH		s.u.	32	7.8	8.5	8.1	0.1
Lead, dissolved	0.1	mg/l	11	<0.02	0.02	*	*
Magnesium		mg/l	32	27	31	29	1
Manganese, dissolved	0.0005	mg/l	11	<0.1	0.1	*	*
Mercury, dissolved		mg/l	11	<0.001	0.001	*	*
Molybdenum, dissolved		mg/l	11	<0.02	0.02	*	*
Nickel, dissolved		mg/l	11	<0.01	0.04	*	*
Nitrate/Nitrite	100	mg/l	14	<0.01	0.3	*	*
Nitrite	10	mg/l	12	<0.1	0.2	*	*
Phosphorus		mg/l	3	0.1	0.1	0.1	0
Orthophosphate as P		mg/l	8	<0.1	0.1	*	*
Potassium		mg/l	32	13	27	15	2
Selenium, dissolved	0.05	mg/l	11	<0.005	0.005	*	*
Silicon		mg/l	32	4	6	5	0
Sodium		mg/l	32	280	333	298	13
Sodium Adsorption Ratio (SAR)		Other	32	8	9	8	0
Sulfate	3000	mg/l	20	<5	3	*	*
Temperature		Deg C	32	15	16	15	0
Total Anion/Cation Balance		%	11	0	3	1	1
Total Dissolved Solids	5000	mg/l	32	790	970	908	38
Total Dissolved Solids (103)		mg/l	29	800	1110	921	51
Total Dissolved Solids (calc)		mg/l	18	900	1010	939	30
Zinc, dissolved	25	mg/l	22	<0.01	0.1	*	*

APPENDIX F

ANTELOPE MINE SPECIAL STATUS SPECIES SUMMARY TABLES
FOR FEDERAL LEASE MODIFICATION APPROVAL - WYW177903

Appendix F

Vertebrate Species of Special Interest Associated with the Antelope Mine Project Area

Taxonomic Group	Common Name	Scientific Name	Status Under the ESA	USFWS Bird of Conservation Concern	BLM Sensitive Species	WYNDD SOC	WGFD SGCN	WGFD SGCN NNS	WGFD SGCN Tier	Observed in the Area
Amphibian	Western Tiger Salamander	*Ambystoma mavortium*				SOPC	Y	NSS4(Bc)	III	2022
Amphibian	Great Plains Toad	*Anaxyrus cognatus*				SOPC	Y	NSSU(U)	II	2023
Amphibian	Northern Leopard Frog	*Lithobates pipiens*	NW		Y	Y	Y	NSS4(Bc)	II	2023
Amphibian	Plains Spadefoot	*Spea bombifrons*				Y	Y	NSS4(Bc)	II	2023
Bird	American Goshawk	*Accipiter atricapillus*			Y	Y	Y	NSSU(U)	I	2020
Bird	Clark's Grebe	*Aechmophorus clarkii*				Y	Y	NSSU(U)	II	2021
Bird	Western Grebe	*Aechmophorus occidentalis*					Y	NSSU(U)	II	2023
Bird	Grasshopper Sparrow	*Ammodramus savannarum*		Y		SOPC	Y	NSS4(Bc)	II	2023
Bird	American Pipit	*Anthus rubescens*					Y	NSS4(Bc)	III	2023
Bird	Woodhouse's Scrub-Jay	*Aphelocoma woodhouseii*				Y	Y	NSS3(Bb)	II	
Bird	Golden Eagle	*Aquila chrysaetos*		Y			Y	NSS4(Bc)	II	2023
Bird	Great Blue Heron	*Ardea herodias*					Y	NSS4(Bc)	II	2023
Bird	Western Cattle Egret	*Ardea ibis*					Y	NSS3(Bb)	II	
Bird	Short-eared Owl	*Asio flammeus*		Y		Y	Y	NSS4(Bc)	II	2023
Bird	Burrowing Owl	*Athene cunicularia*		Y	Y	Y	Y	NSSU(U)	I	2023
Bird	Upland Sandpiper	*Bartramia longicauda*		Y			Y	NSSU(U)	II	2023
Bird	American Bittern	*Botaurus lentiginosus*		Y		Y	Y	NSS3(Bb)	II	2018
Bird	Ferruginous Hawk	*Buteo regalis*	NW	Y	Y	Y	Y	NSS4(Cb)	II	2023
Bird	Swainson's Hawk	*Buteo swainsoni*					Y	NSSU(U)	II	2023
Bird	Chestnut-collared Longspur	*Calcarius ornatus*		Y		Y	Y	NSS4(Bc)	II	2023
Bird	Canyon Wren	*Catherpes mexicanus*				SOPC	Y	NSS4(Bc)	III	2022
Bird	Greater Sage-Grouse	*Centrocercus urophasianus*	NW		Y	Y	Y	NSS4(Bc)	II	2024
Bird	Baird's Sparrow	*Centronyx bairdii*		Y	Y		Y	NSS4(Bc)	II	2023
Bird	Mountain Plover	*Charadrius montanus*	NW	Y	Y	Y	Y	NSSU(U)	I	2023
Bird	Black Tern	*Chlidonias niger*					Y	NSS3(Bb)	II	2023
Bird	Common Nighthawk	*Chordeiles minor*					Y	NSS4(Bc)	III	2023
Bird	Yellow-billed Cuckoo	*Coccyzus americanus*			Y	Y	Y	NSSU(U)	II	1997
Bird	Black-billed Cuckoo	*Coccyzus erythrothalmus*		Y		Y	Y	NSS4(Bc)	II	1993
Bird	Bobolink	*Dolichonyx oryzivorus*				Y	Y	NSS4(Bc)	II	2023
Bird	Snowy Egret	*Egretta thula*				SOPC	Y	NSS3(Bb)	II	2020
Bird	Willow Flycatcher	*Empidonax traillii*					Y	NSS3(Bb)	III	2022
Bird	Merlin	*Falco columbarius*				SOPC	Y	NSSU(U)	III	2023
Bird	Prairie Falcon	*Falco mexicanus*		Y						2023
Bird	Peregrine Falcon	*Falco peregrinus*		Y		Y	Y	NSS3(Bb)	II	2023
Bird	American Kestrel	*Falco sparverius*					Y	NSS4(Bc)	III	2023
Bird	Common Loon	*Gavia immer*				Y	Y	NSS1(Aa)	I	2021
Bird	MacGillivray's Warbler	*Geothlypis tolmiei*					Y	NSS4(Bc)	II	2023
Bird	Common Yellowthroat	*Geothlypis trichas*					Y	NSS4(Bc)	III	2023
Bird	Pinyon Jay	*Gymnorhinus cyanocephalus*		Y						2021
Bird	Bald Eagle	*Haliaeetus leucocephalus*	DM	Y	Y	Y	Y	NSS3(Bb)	II	2024
Bird	Caspian Tern	*Hydroprogne caspia*				Y	Y	NSS3(Bb)	II	2022
Bird	Dark-eyed Junco	*Junco hyemalis*				Y				2023
Bird	White-winged Junco	*Junco hyemalis aikeni*				Y				-
Bird	Gray-headed Junco	*Junco hyemalis caniceps*				Y				2021
Bird	Slate-colored Junco	*Junco hyemalis hyemalis*				Y				-
Bird	Pink-sided Junco	*Junco hyemalis mearnsi*				Y				2023
Bird	Oregon Junco	*Junco hyemalis oreganus*				Y				2023
Bird	Loggerhead Shrike	*Lanius ludovicianus*		Y	Y	Y	Y	NSS4(Bc)	II	2023
Bird	Virginia's Warbler	*Leiothlypis virginiae*				Y	Y	NSSU(U)	II	2022
Bird	Franklin's Gull	*Leucophaeus pipixcan*					Y	NSSU(U)	II	2023

Taxonomic Group	Common Name	Scientific Name	Status Under the ESA	USFWS Bird of Conservation Concern	BLM Sensitive Species	WYNDD SOC	WGFD SGCN	WGFD SGCN NNS	WGFD SGCN Tier	Observed in the Area
Bird	Black Rosy-Finch	*Leucosticte atrata*				Y	Y	NSSU(U)	II	-
Bird	Marbled Godwit	*Limosa fedoa*		Y						2023
Bird	Red Crossbill	*Loxia curvirostra*					Y	NSS4(Bc)	II	2023
Bird	Red-headed Woodpecker	*Melanerpes erythrocephalus*					Y	NSS4(Bc)	II	2023
Bird	Lewis's Woodpecker	*Melanerpes lewis*		Y		Y	Y	NSSU(U)	II	2022
Bird	Ash-throated Flycatcher	*Mylarchus cinerascens*				SOPC	Y	NSS3(Bb)	II	2013
Bird	Clark's Nutcracker	*Nucifraga columbiana*					Y	NSS4(Bc)	II	2023
Bird	Long-billed Curlew	*Numenius americanus*		Y	Y	Y	Y	NSS3(Bb)	II	2023
Bird	Black-crowned Night Heron	*Nycticorax nycticorax*				SOPC	Y	NSS3(Bb)	II	2022
Bird	Sage Thrasher	*Oreoscoptes montanus*		Y	Y	SOPC	Y	NSS4(Bc)	II	2023
Bird	Blue Grosbeak	*Passerina caerulea*				Y	Y	NSS4(Bc)	III	2020
Bird	American White Pelican	*Pelecanus erythrorhynchos*				Y	Y	NSS4(Bc)	II	2023
Bird	Black-backed Woodpecker	*Picoides arcticus*				Y	Y	NSSU(U)	II	-
Bird	American Three-toed Woodpecker	*Picoides dorsalis*				Y				2017
Bird	White-faced Ibis	*Plegadis chihi*			Y	Y	Y	NSS3(Bb)	II	2023
Bird	Blue-gray Gnatcatcher	*Polioptila caerulea*					Y	NSS4(Bc)	III	2023
Bird	Bushtit	*Psaltriparus minimus*				Y	Y	NSS3(Bb)	II	-
Bird	Flammulated Owl	*Otus flammeolus*				SOPC	Y	NSSU(U)	III	1969
Bird	Virginia Rail	*Rallus limicola*				SOPC	Y	NSSU(U)	III	2023
Bird	McCown's Longspur	*Rhynchophanes mccownii*		Y		Y	Y	NSS4(Bc)	II	2023
Bird	Calliope Hummingbird	*Selasphorus calliope*					Y	NSS4(Bc)	II	-
Bird	Rufous Hummingbird	*Selasphorus rufus*					Y	NSS4(Bc)	II	2022
Bird	Black-throated Gray Warbler	*Setophaga nigrescens*				Y	Y	NSS4(Bc)	II	2000
Bird	Pygmy Nuthatch	*Sitta pygmaea*				Y	Y	NSS3(Bb)	II	2023
Bird	Williamson's Sapsucker	*Sphyrapicus thyroideus*				Y	Y	NSS3(Bb)	II	2013
Bird	Dickcissel	*Spiza americana*		Y		SOPC	Y	NSSU(U)	II	2022
Bird	Brewer's Sparrow	*Spizella breweri*		Y	Y	SOPC	Y	NSS4(Bc)	II	2023
Bird	Forster's Tern	*Sterna forsteri*				Y	Y	NSS3(Bb)	II	2023
Bird	Red-eyed Vireo	*Vireo olivaceus*				SOPC	Y	NSS4(Bc)	II	2023
Mammal	Moose	*Alces alces*					Y	NSS4(Bc)	II	2022
Mammal	Pallid Bat	*Antrozous pallidus*				Y	Y	NSS3(Bb)	II	2014
Mammal	Townsend's Big-eared Bat	*Corynorhinus townsendii*			Y	Y	Y	NSS3(Bb)	II	2018
Mammal	White-tailed Prairie Dog	*Cynomys leucurus*			Y	Y	Y	NSS4(Cb)	II	1984
Mammal	Black-tailed Prairie Dog	*Cynomys ludovicianus*	NW		Y	Y	Y	NSS4(Cb)	II	2022
Mammal	Thirteen-lined Ground Squirrel	*Ictidomys tridecemlineatus*				Y				2022
Mammal	Northern Hoary Bat	*Lasiurus cinereus*	UR			SOPC				2018
Mammal	Northern River Otter	*Lontra canadensis*	NW			Y	Y	NSS3(Bb)	II	-
Mammal	Black Hills Yellow-bellied Marmot	*Marmota flaviventris dacota*				Y				-
Mammal	Black-footed Ferret	*Mustela nigripes*				Y	Y	NSS1(Aa)	I	-
Mammal	Least Weasel	*Mustela nivalis*				SOPC	Y	NSSU(U)	III	-
Mammal	Western Small-footed Myotis	*Myotis ciliolabrum*				SOPC	Y	NSS4(Cb)	II	2018
Mammal	Long-eared Myotis	*Myotis evotis*			Y	SOPC	Y	NSS4(Cb)	III	2017
Mammal	Little Brown Myotis	*Myotis lucifugus*	UR			SOPC	Y	NSS3(Bb)	II	2018
Mammal	Northern Long-eared Myotis	*Myotis septentrionalis*	LE			Y	Y	NSS2(Ba)	II	2016
Mammal	Fringed Myotis	*Myotis thysanodes*			Y	Y	Y	NSS3(Bb)	II	2018
Mammal	Long-legged Myotis	*Myotis volans*				SOPC	Y	NSS4(Cb)	III	2017
Mammal	Bighorn Sheep	*Ovis canadensis*				SOPC	Y	NSS4(Bc)	II	1996
Mammal	Olive-backed Pocket Mouse	*Perognathus fasciatus*				SOPC	Y	NSS4(Cb)	III	2023
Mammal	Prairie Shrew	*Sorex haydeni*				Y	Y	NSSU(U)	III	1909

Taxonomic Group	Common Name	Scientific Name	Status Under the ESA	USFWS Bird of Conservation Concern	BLM Sensitive Species	WYNDD SOC	WGFD SGCN	WGFD SGCN NNS	WGFD SGCN Tier	Observed in the Area
Mammal	Dwarf Shrew	*Sorex nanus*				SOPC	Y	NSS3(Bb)	II	1949
Mammal	Plains Spotted Skunk	*Spilogale interrupta*	NW			SOPC	Y	NSSU(U)	III	2017
Mammal	Swift Fox	*Vulpes velox*	NW		Y	Y	Y	NSS4(Cb)	II	2023
Mammal	Northern Meadow Jumping Mouse	*Zapus hudsonius*				Y	Y	NSS4(Bc)	III	2002
Mammal	Preble's Meadow Jumping Mouse	*Zapus hudsonius preblei*	LT		Y	Y	Y	NSS3(Bb)	II	1999
Mammal	South-western Jumping Mouse	*Zapus princeps*				Y				2010
Reptile	Eastern Spiny Softshell	*Apalone spinifera spinifera*				SOPC	Y	NSS2(Ba)	II	2022
Reptile	Six-lined Racer	*Aspidoscelis sexlineata*				Y				-
Reptile	Prairie Racerunner	*Aspidoscelis sexlineata viridis*				Y	Y	NSSU(U)	II	-
Reptile	Western Milksnake	*Lampropeltis gentilis*				SOPC	Y	NSS3(Bb)	II	2023
Reptile	Smooth Greensnake	*Opheodrys vernalis*				Y	Y	NSS3(Bb)	II	2022
Reptile	Many-lined Skink	*Plestiodon multivirgatus*				Y				-
Reptile	Northern Many-lined Skink	*Plestiodon multivirgatus multivirgatus*				Y	Y	NSSU(U)	II	-
Reptile	Prairie Lizard	*Sceloporus consobrinus*				Y	Y	NSSU(U)	II	2023
Reptile	Plains Black-headed Snake	*Tantilla nigriceps*				Y	Y	NSSU(U)	III	-
Reptile	Plains Gartersnake	*Thamnophis radix*					Y	NSSU(U)	III	2019
Reptile	Red-sided Gartersnake	*Thamnophis sirtalis parietalis*				SOPC	Y	NSSU(U)	III	2020

USFWS: ESA – status as a T&E species: NW-not warranted for listing, DM-delisted, UR-petition for listing under review
BCC – status as a USFWS bird of conservation concern
MBTA – protected under the Migratory Birds Treaty Act
BLM: Listed as a sensitive species by BLM
WYNDD: Determined to be a species of concern
WGFD: SGCN-species of greatest conservation concern, which is based upon the Native Species Status (NSS) classification system
Source: WYNDD 2024, NREX 2022, WGFD 2017 (sgcn website)

Species of Special Interest Summary

Amphibians	4
Birds	75
Mammals	26
Retiles	11
Total	116

74	MBTA
23	USFWS BCC
21	BLM Sensitive
63	WYNDD SOC
100	WGFD SGCN
100	NSS

Highest Priority	- Tier I	5
Moderate Priority	- Tier II	73
Lowest Priority	- Tier III	22

NSS Rank and Tier Rank:

NSSU	27	Undetermined	Designated as a Species of Greatest Conservation Need because of limited information; Obtaining information regarding populations and distributions is necessary in order to determine conservation status
NSS1	2	Imperiled/Extreme	Population size or distribution is restricted or declining and extirpation is possible; Limiting factors are severe and continue to increase in severity.
NSS2(Ab)	1	Imperiled/Severe	Population size or distribution is restricted or declining and extirpation is possible; Limiting factors are severe and not increasing significantly.
NSS2(Ba)	1	Vulnerable/Extreme	Population size or distribution is restricted or declining, but extirpation is not imminent; Limiting factors are severe and continue to increase in severity.
NSS3(Bb)	26	Vulnerable/Severe	Population size or distribution is restricted or declining, but extirpation is not imminent; Limiting factors are severe and not increasing significantly.
NSS4(Bc)	35	Vulnerable/Moderate	Population size or distribution is restricted or declining, but extirpation is not imminent; Limiting factors are moderate and appear likely to increase in severity.
NSS4(Cb)	8	Stable/Severe	Population size and distribution is stable, and the species is widely distributed; Limiting factors are moderate and appear likely to increase in severity.

APPENDIX G

REVENUE CALCULATIONS
(Completed by WWC Engineering)

Estimated 2025 Fiscal Revenue from 2024 Coal Production in Campbell Co. (Million U.S. Dollars)

Revenue Source	Total Collected	Federal Revenue	State Revenue
Federal Mineral Royalties	379.3	189.7	149.2
Abandoned Mine Lands Fund	49.1	24.5	28.0
Severance Tax	147.3		122.8
Bonus Bid Annual Revenues	0.0	0.0	0.0
Ad Valorem Tax	141.2		105.7
Black Lung	120.5	120.5	
Sales and Use Tax	19.2		17.2
Totals	**856.6**	**334.7**	**521.9**
$/Ton			**$2.38**

Total Future Revenues from Antelope Mine (No Action Alternative) (Million U.S. Dollars)

Revenue Source	Total Collected	Federal Revenue	State Revenue
Federal Mineral Royalties	580.6	290.3	290.3
Abandoned Mine Lands Fund	94.6	47.3	47.3
Severance Tax	240.6		240.6
Bonus Bid Annual Revenues	0.0	0.0	0.0
Ad Valorem Tax[1]	217.7		217.7
Black Lung	185.8	185.8	
Sales and Use Tax[1]	29.6		29.6
Totals	**1,348.8**	**523.4**	**825.5**
$/Ton			**$2.44**

Future Revenues added by the West Antelope II South Tract only (Million U.S. Dollars)

Revenue Source	Total Collected	Federal Revenue	State Revenue
Federal Mineral Royalties	24.9	12.5	12.5
Abandoned Mine Lands Fund	4.1	2.0	2.0
Severance Tax	9.7		9.7
Bonus Bid Annual Revenues	0.0	0.0	0.0
Ad Valorem Tax[1]	9.3		9.3
Black Lung	8.0	8.0	
Sales and Use Tax[1]	1.3		1.3
Totals	**57.3**	**22.5**	**34.9**
$/Ton			**$2.40**

Total Future Revenues from Antelope Mine (existing mine plus West Antelope II South tract) (Million U.S. Dollars)

Revenue Source	Total Collected	Federal Revenue	State Revenue
Federal Mineral Royalties	605.5	302.8	302.8
Abandoned Mine Lands Fund	98.6	49.3	49.3
Severance Tax	250.3		250.3
Bonus Bid Annual Revenues	0.0	0.0	0.0
Ad Valorem Tax[1]	227.0		227.0
Black Lung	193.8	193.8	
Sales and Use Tax[1]	30.8		30.8
Totals	**1,406.2**	**545.8**	**860.3**
$/Ton			**$2.44**

Difference Between the Antelope Mine No Action Alternative and the Proposed Action (Million U.S. Dollars)

Revenue Source	Total Collected	Federal Revenue	State Revenue
Federal Mineral Royalties	24.9	12.5	12.5
Abandoned Mine Lands Fund	4.1	2.0	2.0
Severance Tax	9.7		9.7
Bonus Bid Annual Revenues	0.0	0.0	0.0
Ad Valorem Tax[1]	9.3		9.3
Black Lung	8.0	8.0	
Sales and Use Tax[1]	1.3		1.3
Totals	**57.3**	**22.5**	**34.9**

Estimated 2025 Campbell Co. Fiscal Revenue (Million U.S. Dollars)

Revenue Source	Total Collected	Federal Revenue	State Revenue
Federal Mineral Royalties	204.3	102.2	102.2
Abandoned Mine Lands Fund	33.3	16.6	16.6
Severance Tax	79.9		79.9
Bonus Bid Annual Revenues	0.0	0.0	0.0
Ad Valorem Tax	76.6		76.6
Black Lung	65.4	65.4	
Sales and Use Tax	10.4		10.4
Totals	**469.9**	**184.2**	**285.7**
$/Ton			**$2.40**

All revenues were calculated using variables presented below

Revenue Variables

Coal Surface #	Units of Taxable Valuation	Taxable Valuation	Taxable Valuation Per Unit	Average Tax Levy (Mills)	Estimated Ad Valorem Tax Levied	Average Tax Per Unit	Sev. Tax Rate %	Estimated Severance Tax Collectible	Average Sev. Tax Per Unit
2020 Wyoming	216,309,387	$1,977,106,920	9.14	59.925	$233,375,081	1.0789	0.07	138,397,484	$0.6398
2020 Campbell Co.	209,255,318	$1,754,836,464	8.39	59.592	$104,574,215	0.4997	0.07	122,838,552	$0.5870
2021 Wyoming	236,540,476	$2,125,943,357	8.99	63.817	$135,671,327	0.5736	0.065	138,186,318	$0.5842
2021 Campbell Co.	231,053,655	$1,928,316,014	8.35	62.553	$120,621,952	0.5221	0.065	125,340,541	$0.5425
2022 Wyoming	244,239,714	$2,646,250,338	10.83	62.357	$165,012,232	0.6756	0.065	172,006,272	$0.7043
2022 Campbell Co.	237,734,772	$2,410,697,462	10.14	63.215	$152,392,240	0.6410	0.065	156,695,335	$0.6591
2023 Wyoming	237,138,033	$2,628,136,153	11.08	63.135	$165,927,376	0.6997	0.065	170,828,850	$0.7204
2023 Campbell Co.	230,335,969	$2,381,895,787	10.34	62.320	$148,439,745	0.6444	0.065	154,823,226	$0.6722
2020 Wyoming	216,309,387	$1,977,106,920	9.14	59.925	$233,375,081	1.0789	0.07	138,397,484	$0.6398
2020 Campbell Co.	209,255,318	$1,754,836,464	8.39	59.592	$104,574,215	0.4997	0.07	122,838,552	$0.5870
2021 Wyoming	236,540,476	$2,125,943,357	8.99	63.817	$135,671,327	0.5736	0.065	138,186,318	$0.5842
2021 Campbell Co.	231,053,655	$1,928,316,014	8.35	62.553	$120,621,952	0.5221	0.065	125,340,541	$0.5425

Source: WDOR 2021, 2022, 2023, 2024

Revenue Calculations Variables

Coal Production (tons)		Campbell	Wyoming
	2024 Tons Produced[1]	219,102,097	304,122,976
	West Antelope II South Tract	(tons mineable)	(tons recoverable)
	No Action Alternative	362,600,00	337,800,000
	Added by Proposed Action	15,800,000	14,500,000
	Average Sales Price ($/ton)		
	2024 Price[2]	$13.85	$15.24
	2024 Price without BLT[3]	$13.30	$14.96
Federal Royalties			
	WY share of FR = 0.5 x FR		
	Federal Royalties[4]	$379,320,505	
	Wyoming Share	$189,660,253	
Abandoned Mine Land Funds[5]			
	AML Total	$49,078,870	
	WY Share[5]	$24,539,435	
Severance Taxes[6]			
	ST Rate/Ton	$0.6722	
	2020 Severance Taxes	$147,272,237	
Lease Bonus Bids (2020 Payments)			
	2024+	$0.00	
	Total 2024+ Bonus Bid Payments	$0.00	
	WY share	$0.00	
Ad Valorem Taxes[6]			
	AVT Rate/ton	$0.64	
	AVT (Total)	$141,200,090	
Black Lung			
	2024 BLT Rate/Ton[7]	$0.55	
	2024 BLT Collected	$120,506,153	
2024 Campbell Co. Employment (mining)[8]			
	Buckskin	179	
	Belle Ayr	268	
	Eagle Butte	268	
	Cordero Rojo	248	
	Antelope	388	
	Caballo	170	
	NARM	1,143	
	Rawhide	114	
	Black Thunder	802	
	Coal Creek	36	
	Dry Fork	70	
	Wyodak	53	
	Total	3,739	
Federal Income Tax			
	Average Earnings (Mining)[9]	$104,566	
	Head of Household income info:		
	22% on taxable income $63,101-$100.500		
	Rate[10]	22%	
	Tax/employee	$23,005	
	Fed Tax	$86,013,900	
Fiscal Year 2024 Sales and Use Tax[11]			
	Coal Mining	$19,183,477	
	$/ton	$0.0876	

[1] Wyoming Department of Workforce Service (WDWS) 2024a
[2] EIA 2024, U.S. Energy Information Administration - Annual Coal Report 2024, Table 30
[3] Black lung tax removed since it is included in the sale price
[4] Calculated - Tons produced x 2024 sales price per ton x 12.5% (25 CFR § 211.43 and Mineral Leasing Act of 1920)
[5] Calculated - AML = $0.224 per ton produced 2022-2034 (OSMRE 2025), WY share = 0.3 x AML (W.S. 35-11-1244)
[6] WDOR 2024a, recalculated using county numbers only
[7] P.L.117-169
[8] WDWS 2024b
[9] WDOE 2024
[10] Calculated using 2020 Head of Household tax rates
[11] WDOR 2024b

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