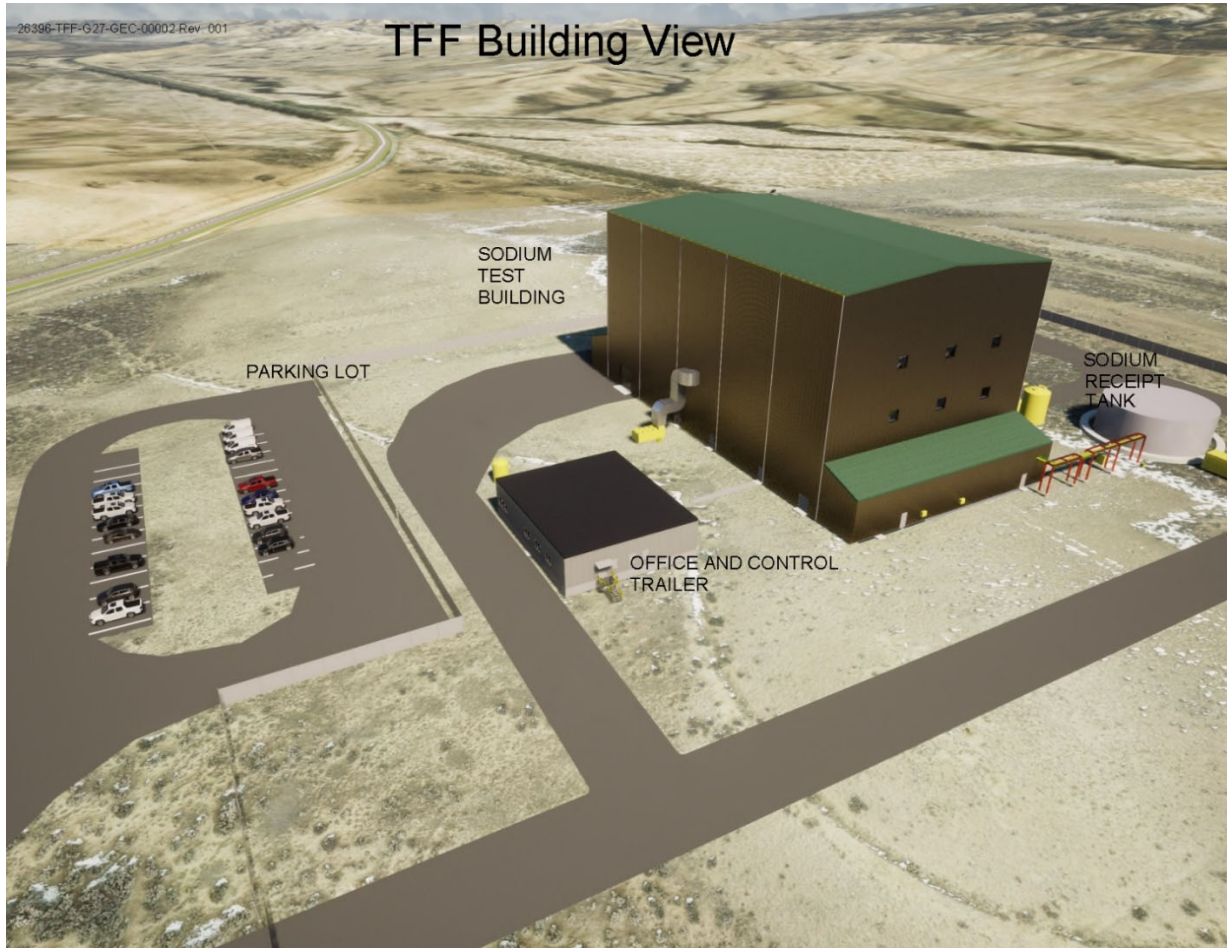

Draft Environmental Assessment
Test and Fill Facility
Kemmerer, Lincoln County, Wyoming



U.S. Department of Energy
Office of Clean Energy Demonstrations



November 2023

SUMMARY

- DOE Proposed Action:** Expenditure of federal funding to support the development, including construction and operation, of a sodium test and fill facility.
- Type of Document:** Draft Environmental Assessment
- Lead Agency:** U.S. Department of Energy
- Cooperating Agencies:** None.
- Project Location:** Kemmerer, Lincoln County, Wyoming
- Comment Opportunities:** DOE is accepting public comments from November 2, 2023, through December 1, 2023, on the draft EA.
- For Further Information:** Provide the following DOE contact information:
U.S. Department of Energy
Office of Clean Energy Demonstrations
OCED.ESH@hq.doe.gov

Summary: TerraPower, LLC’s Natrium commercial demonstration reactor project was competitively selected for a U.S. Department of Energy (DOE) financial assistance award under Funding Opportunity Announcement DE-FOA-000271, Amendment 000003. DOE is requesting public input on the draft Environmental Assessment (EA) for TerraPower, LLC’s (TerraPower) Test and Fill Facility (TFF) Project, located in Lincoln County, Wyoming. DOE is proposing to authorize the expenditure of federal funding by TerraPower to support the construction and operation of the TFF. The TFF would receive, sample, process, store, and deliver liquid sodium to areas where component tests are performed as well as the planned Kemmerer Unit 1. The research from the TFF would serve the sodium reactor community at large as the technology continues to grow and be adopted around the world. This EA evaluates the potential environmental impacts of providing funding to TerraPower to support the development of the TFF (the Proposed Action) and evaluates the impacts that could occur if DOE did not provide funding (the No Action Alternative).

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Appendix A – Socioeconomic Report for the Sodium Test and Fill Facility

ACRONYMS AND ABBREVIATIONS

Acronyms	Definition
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
APE	area of potential effects
ARDP	Advanced Reactor Demonstration Projects
BIL	Bipartisan Infrastructure Law
BMP	Best Management Practice
CEJST	Climate & Economic Justice Screening tool
CEQ	Council on Environmental Quality
CR	County Road
DACs	Disadvantaged Communities
DOE	U.S. Department of Energy
EA	Environmental Assessment
EJI	Environmental Justice Index
EO	Executive Order
EOP	emergency operations plan
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FOA	Funding Opportunity Announcement
GHG	Greenhouse Gas
GPM	Gallons per Minute
HVAC	Heating, Ventilation, and Air Conditioning
IBC	International Building Code
IPaC	Information for Planning and Consultation
I-80	Interstate 80
IR	Isolated Resource
ISO	International Organization for Standardization
LCGP	Large Construction General Permit

NAICS	North American Industrial Classification System
NB	Northbound
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
OCED	Office of Clean Energy Demonstrations
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
ROW	Right of Way
RV	Recreational Vehicle
SB	Southbound
SGCN	Species of Greatest Conservation Need
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasure
SFR	sodium fast reactor
SWPPP	Stormwater Pollution Prevention Plan
TerraPower	TerraPower, LLC
TFF	Sodium Test and Fill Facility
TRL	Technology Readiness Level
ULT	Ute ladies’-tresses
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USFWS	U.S. Fish and Wildlife Service
WEAD	Wyoming Economic Analysis Division
WGFD	Wyoming Game and Fish Department
WOHS	Wyoming Office of Homeland Security
WWDC	Wyoming Water Development Commission
WYDEQ	Wyoming Department of Environmental Quality
WYDOT	Wyoming Department of Transportation

WYNDD	Wyoming Natural Diversity Database
WYPDES	Wyoming Pollutant Discharge Elimination System
WY SHPO	Wyoming State Historic Preservation Office

SECTION 1 INTRODUCTION

The National Environmental Policy Act (NEPA; 42 U.S. Code [USC] 4321 et seq.), the Council on Environmental Quality's (CEQ's) NEPA regulations (40 Code of Federal Regulations [CFR], 1500 to 1508), and the U.S. Department of Energy's (DOE's) NEPA-implementing regulations (10 CFR Part 1021) require that DOE consider the potential environmental impacts of a major federal action. This requirement applies to DOE's decisions about whether to provide federal funding through financial assistance agreements. In compliance with these regulations, this Environmental Assessment (EA):

- Examines the potential environmental impacts of the Proposed Action and the No-Action Alternative;
- Identifies unavoidable adverse environmental impacts of the Proposed Action;
- Describes the relationship between local short-term uses of the human environment and the maintenance and enhancement of long-term productivity; and
- Characterizes any irreversible and irretrievable commitments of resources that would be involved should DOE decide to implement its Proposed Action.

DOE must meet its obligations under NEPA before making a final decision whether to proceed with any proposed federal action that could cause adverse impacts to human health or the environment. This EA provides DOE and other decision makers the information needed to make an informed decision about the Proposed Action and evaluates the potential individual and cumulative impacts of the Proposed Action. An evaluation of a No-Action Alternative is required under DOE NEPA implementing regulations and is evaluated in this EA.

1.1 Background

DOE established the Office of Clean Energy Demonstrations (OCED) in December 2021 as part of the Bipartisan Infrastructure Law (BIL) to accelerate clean energy technologies from the lab to market and fill a critical innovation gap on the path to achieving our nation's climate goals of net-zero emissions by 2050.

OCED's mission is to deliver clean energy demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system.

Advanced nuclear energy systems hold enormous potential to lower emissions, create new jobs and build an even stronger economy. DOE identified that work remains to ensure continued U.S. leadership in the research, design, and development of advanced reactors and to ensure the successful deployment of these reactors in the U.S. and international marketplaces. In support of this mission need, DOE developed the Advanced Reactor Demonstration Program (ARDP) with funding provided through the Fiscal Year 2020 Consolidation Appropriations Act, (H.R. 1865) (PL 116-94, 2019). Although originally the responsibility of the Office of Nuclear Energy, the TerraPower project transferred to OCED in 2022. OCED implements programs, such as the ARDP, in support of its mission to maintain the Nation's technological leadership position in the global nuclear industry and ensure national energy security. ARDP will speed the demonstration of advanced reactors through cost-shared partnerships with U.S. industry. ARDP has three primary goals depending on the Technology Readiness Level (TRL) of a design:

1. Demonstration Pathway: To test, license, and build operational reactors by the end of this decade and requires applicants to provide a minimum of 50 percent cost-share.
2. Risk Reduction Pathway: Solve technical, operational, and regulatory challenges to support demonstrations by 2035 and requires applicants to provide a minimum of 20 percent cost-share.
3. Advanced Reactor Concepts 2020: Solidify concept to mature technology for potential demonstration by mid-2030s and requires applicants to provide a minimum of 20 percent cost-share.

By providing funding, technical assistance, and government coordination to accelerate deployment of these demonstration projects, DOE can help eliminate uncertainties, mitigate risks, and support the private sector in creating a robust Nuclear Energy Industry. DOE is using projects selected under this FOA to achieve national-scale clean energy goals.

DOE selected TerraPower, LLC (TerraPower) to demonstrate the Natrium™ advanced reactor and energy system in October 2020 as part of the Demonstration Pathway goal. DOE and TerraPower entered into a cooperative agreement to execute the demonstration project. The Natrium Demonstration Project is comprised of three separate projects: the Sodium Test and Fill Facility (TFF); a Fuel Fabrication Facility; and the Natrium reactor (Kemmerer Unit 1).

The Natrium reactor, a TerraPower and GE-Hitachi technology, is a pool-type reactor that uses liquid sodium as the coolant instead of light-water. This is a key design feature that differentiates the Natrium design from light-water-cooled reactor technologies. To further the design of the Natrium reactor and associated technologies, TerraPower has deemed it prudent to test prototypes of Natrium equipment to identify possible design improvements ahead of equipment implementation in a Natrium reactor. Therefore, to minimize risk and increase efficiencies, construction of a test facility (the TFF) is planned. TerraPower would build the TFF in advance of, and separate from, Kemmerer Unit 1. The TFF is expected to support the continued evolution of the Natrium reactor design for subsequent Natrium reactor plants. No additional TFFs would be built as part of the development of future Natrium reactor plant sites. The TFF would be used to advance the Natrium technology beyond the construction of the first Natrium reactor plant.

DOE is currently proposing to provide federal funding to TerraPower in support of design, construction and operation of the TFF.

DOE has prepared this EA to evaluate the potential environmental impacts of providing federal funding to TerraPower to support the development, including design, construction, and operation of the TFF (the Proposed Action). This EA also evaluates the impacts that would occur if DOE did not provide funding (No-Action Alternative) as required by 40 CFR 1508.25(b)(1), under which scenario DOE assumes the Proposed Project would not proceed. Although this Proposed Project could proceed if DOE decided not to provide funding, DOE has assumed, for the purposes of comparison in this EA, that the Proposed Project would not proceed without the federal funding. If the Proposed Project proceeded without federal funding, the potential impacts would be essentially identical to those under DOE's Proposed Action.

1.1.1 National Environmental Policy Act Requirements for TerraPower's Natrium Demonstration Project

NEPA (42 USC 4321 et seq.) requires federal agencies to assess the environmental impact of federal actions in their decision-making process. Major federal action means an activity or decision subject to

federal control and responsibility which includes the approval of specific projects. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities.

DOE must conduct a NEPA review prior to authorizing the expenditure of federal funds. The Nuclear Regulatory Commission's (NRC) decision whether to issue a construction permit and operating license for a domestic nuclear plant would be made pursuant to the Atomic Energy Act of 1954, as amended, and the NRC's regulations in Title 10 of the CFR. The NRC's regulations that implement its NEPA reviews are found in 10 CFR Part 51.

In order to ensure that all components of TerraPower's Sodium Demonstration Project, including the TFF, Kemmerer Unit 1, and the Fuel Fabrication Facility are appropriately evaluated under NEPA, DOE and NRC have agreed to the following:

TFF

The TFF is a non-nuclear testing facility that will not result in electric power generation. DOE's proposal to provide federal funding in support of the TFF is a major federal action subject to NEPA review. NRC determined that the construction of the TFF does not constitute "construction" as defined in 10 CFR 50.10(a)(1) and that a construction permit or limited work authorization is not required to construct the TFF (NRC 2022). Thus, the construction and operation of the TFF does not require authorization from NRC and is not subject to NEPA review by NRC. DOE will be the lead federal agency for this EA.

DOE determined that, pursuant to NEPA, an EA is required prior to authorizing the expenditure of project funds for construction and operation of the TFF. Further, DOE has determined that the TFF has independent utility from the construction and operation of Kemmerer Unit 1 and the Fuel Fabrication Facility because the TFF will be used to test Sodium reactor components and provide fill to other Sodium projects across the country and is therefore not a connected action as defined in the CEQ's NEPA implementing regulations at 40 CFR 1501.9(e)(1).

Kemmerer Unit 1

Pursuant to the Atomic Energy Act of 1954, as amended, and Title 10 of the CFR, the NRC is responsible for issuance of construction permits and operating licenses for domestic nuclear plants. Therefore, construction and operation of Kemmerer Unit 1 will require authorization from the NRC. Expenditure of federal funds for the construction and operation of Kemmerer Unit 1 will require authorization from DOE. Both DOE and NRC have actions pursuant to NEPA for the construction and operation of Kemmerer Unit 1.

To ensure both DOE and NRC's NEPA requirements are met for their respective federal actions, the NEPA review for Kemmerer Unit 1 will be completed in two phases.

Kemmerer Unit 1 - Preconstruction

In Phase 1, DOE will evaluate the potential impacts to the human environment that would result from authorizing the expenditure of federal funds for activities defined by NRC regulations as "preconstruction." Preconstruction activities generally include (NRC 2017):

- Preparation of a site for construction of a facility, including clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas.

- Erection of fences and other access control measures that are not safety or security related, and do not pertain to radiological controls.
- Excavation.
- Erection of support buildings (e.g., construction equipment storage sheds, warehouse and shop facilities, utilities, concrete mixing plants, docking and unloading facilities, and office buildings) for use in connection with the construction of the facility.
- Building of service facilities (e.g., paved roads, parking lots, railroad spurs, exterior utility and lighting systems, potable water systems, sanitary sewerage treatment facilities, and transmission lines).

NRC regulations would allow TerraPower to commence preconstruction activities at-risk prior to issuance of a construction permit and prior to NRC’s NEPA process. However, should TerraPower conduct those activities as part of their cooperative agreement with DOE, DOE would be required to comply with NEPA prior to authorizing the expenditure of federal funds.

DOE will be the lead agency completing the NEPA review for Kemmerer Unit 1 preconstruction activities that occur prior to preparation of the NRC Environmental Impact Statement (EIS). A determination on whether the scope would necessitate an EA or EIS is to occur at a later date.

Kemmerer Unit 1 - Construction and Operation

In Phase 2, pursuant to their regulatory authorities, NRC will evaluate the potential impacts to the human environment associated with construction and operation of Kemmerer Unit 1 in an EIS. NRC will be the lead federal agency preparing the EIS. To the extent practical, NRC’s EIS will incorporate analysis from DOE’s NEPA review for the preconstruction activities.

Fuel Fabrication Facility

The Sodium Fuel Fabrication Facility is a proposed expansion to the Global Nuclear Fuel—Americas, LLC (GNF-A) Wilmington, North Carolina facility operating under NRC license No. SNM-1097. NRC prepared an EA for the renewal of SNM-1097 in May 2009 (NRC 2009). In March 2023, GNF-A submitted an Environmental Report Supplement for the Sodium Fuel Fabrication Facility to the NRC pursuant to 10 CFR 51.45, “Environmental Report,” and NUREG-1748.

1.2 Purpose and Need for Action

In compliance with the statutory mandates of the Fiscal Year 2020 Further Consolidated Appropriations Act (H.R. 1685) and the Infrastructure Investment and Jobs Act [1] (H.R. 3682) (BIL), DOE established and is implementing the ARDP to support the demonstration of advanced reactors through cost-shared partnerships (cooperative agreements) with U.S. industry. The BIL appropriates funding for the ARDP through 2027. Further, the ARDP is needed to support the President’s goals of 50-52 percent reduction in greenhouse gas (GHG) emissions from 2005 levels by 2030, a carbon-pollution free power sector by 2035, and achieving a net-zero GHG emissions economy by 2050 (US Department of State and Executive Office of the President 2021). Through the ARDP, DOE competitively selected and has provided initial funding in support of two advanced reactor demonstration projects that would support the design, licensing, construction, and operation of first-of-their-kind advanced reactor designs, as well as the design, licensing, construction, and operation of fuel fabrication facilities. The TerraPower Sodium Demonstration Project is one of the two advanced reactor demonstration projects selected by DOE.

The cost-share partnership would cover the Sodium Demonstration Project, including a proposed TFF.

The TFF would be used to support the liquid sodium reactor industry at large.

DOE's purpose is to select ARDP projects that are:

- advancing the deployment at scale of the next generation of reactors;
- consistent with the goals and timeline of BIL and DOE's mission;
- safe and affordable to design, construct and operate; and,
- supporting improvements in safety, security, economics, and environmental impacts through these first-of-their-kind designs over current nuclear power plant designs.

The need is to respond to TerraPower's request for financial assistance through the cost-shared partnership to design, construct, and operate a TFF in Lincoln County, Wyoming that would further the design of TerraPower's Natrium reactor (and associated technologies) and provide initial sodium fill to Kemmerer Unit 1. The research from the TFF would also serve the sodium reactor community at large as the technology continues to grow and is adopted around the world.

1.3 Scoping, Public Involvement and Issues

NEPA requirements ensure that information is made available to the public during the decision-making process and prior to decisions and actions being taken. The premise of NEPA is that the quality of federal agency decisions will be enhanced if federal agencies provide information to the public, including stakeholders and tribal nations, and involve the public and these entities in the planning process. Stakeholders include federal, state, and local governments, interested organizations, and individuals within and near the Proposed Project.

As part of the NEPA process relevant public agencies will be coordinated with for reviews and comments including but not limited to Wyoming State offices; Wyoming Department of Environmental Quality (WYDEQ), Wyoming Department of Transportation (WYDOT), Wyoming State Historic Preservation Office (WY SHPO) and the NRC.

A notice of scoping (Scoping Notice) was issued on May 23, 2023, to request public input on the scope of the Draft EA for the TFF. The Scoping Notice requested that all comments be provided on or before June 14, 2023.

The Scoping Notice was published on DOE's website, Office of NEPA Policy and Compliance, and in the Kemmerer Gazette and sent to federal, state, and local agencies. A letter with a summary of the Scoping Notice and a link to additional online information was mailed to 13 recipients, including individuals and organizations who had expressed an interest in the TFF. The Scoping Notice was also distributed by email to an additional 41 interested organizations and individuals.

Seven comments were received from private citizens, State Agencies, and non-profit groups. Agency comments were received from the Wyoming Governor's Office, WY SHPO, WYDOT, and WYDEQ. The comments identified a need by the applicant to comply with all federal and state permitting requirements, identified potential alternatives to be considered for analysis, and requested the following issues be analyzed: socioeconomics, land disturbance, wildlife, noise, light pollution, traffic, water consumption, waste disposal, air pollution, climate change, and Justice40 communities. Commenters also requested a discussion of any proposed mitigation measures.

1.3.1 Tribal Consultation

On May 23, 2023, DOE sent letters to 14 tribes describing the Proposed Project, inviting consultation, and seeking input on the Proposed Project. These 14 tribes had previously received letters from DOE regarding their consultation under Section 106 of the National Historic Preservation Act (NHPA). In the weeks after sending the letters, DOE followed up with a phone call to each tribe, again inviting all tribes to engage in consultation.

SECTION 2 PROPOSED ACTION, NO-ACTION ALTERNATIVE, AND CUMULATIVE ACTIVITIES

2.1 Proposed Action

DOE's Proposed Action consists of authorizing the expenditure of federal funding by TerraPower to support the construction and operation of the TFF.

2.1.1 Description of the Proposed Project

The TFF would serve three main missions: (1) to support prototype-scale sodium testing/qualification for the Natrium Demonstration Plant (Kemmerer Unit 1); (2) to advance technologies for future Natrium style reactors; and (3) to provide the initial sodium fill for Kemmerer Unit 1.

The TFF would be a non-nuclear industrial facility. At no time would the TFF have radioactive material or contain nuclear safety related systems. The TFF is classified as a non-safety related commercial structure by the NRC.

The TFF would be built on a parcel of land owned by TerraPower (denoted as the TFF site area in Figure 2.1-1 as a dashed line) located on approximately 35 acres in a portion of Sections 19 and 20, Township 20 North, Range 116 West, P.M, Lincoln County, Wyoming in the vicinity of Kemmerer. The locations of the TFF facilities are shown in Figure 2.1-1.

The TFF project would include the following facilities and components.

Outside Equipment Area

This area would contain the following components:

- Backup diesel generator (approximately 0.4 megawatt) and associated skid and concrete pad.
- Cryogenic liquid argon storage (estimated 6,000 gallons).
- Cryogenic liquid nitrogen storage (estimated 2,000 gallons).
- Any outdoor electrical power supply equipment necessary for the TFF to receive offsite power and power from the backup diesel generator.
- A new service drop (utility pole) would be placed on the east side of US-189. This service would be a three-phase 25 kilovolt and include a junction to support construction power to the TFF. This service drop is expected to be potentially in the WYDOT Right of Way (ROW) and on the TFF project area.
- Heating, Ventilation, and Air Conditioning (HVAC) equipment.
- Sodium to Air (Dump) Heat Exchanger.
- Water Storage Tanks (deionized and wastewater, approximately 20,000 gallons each).

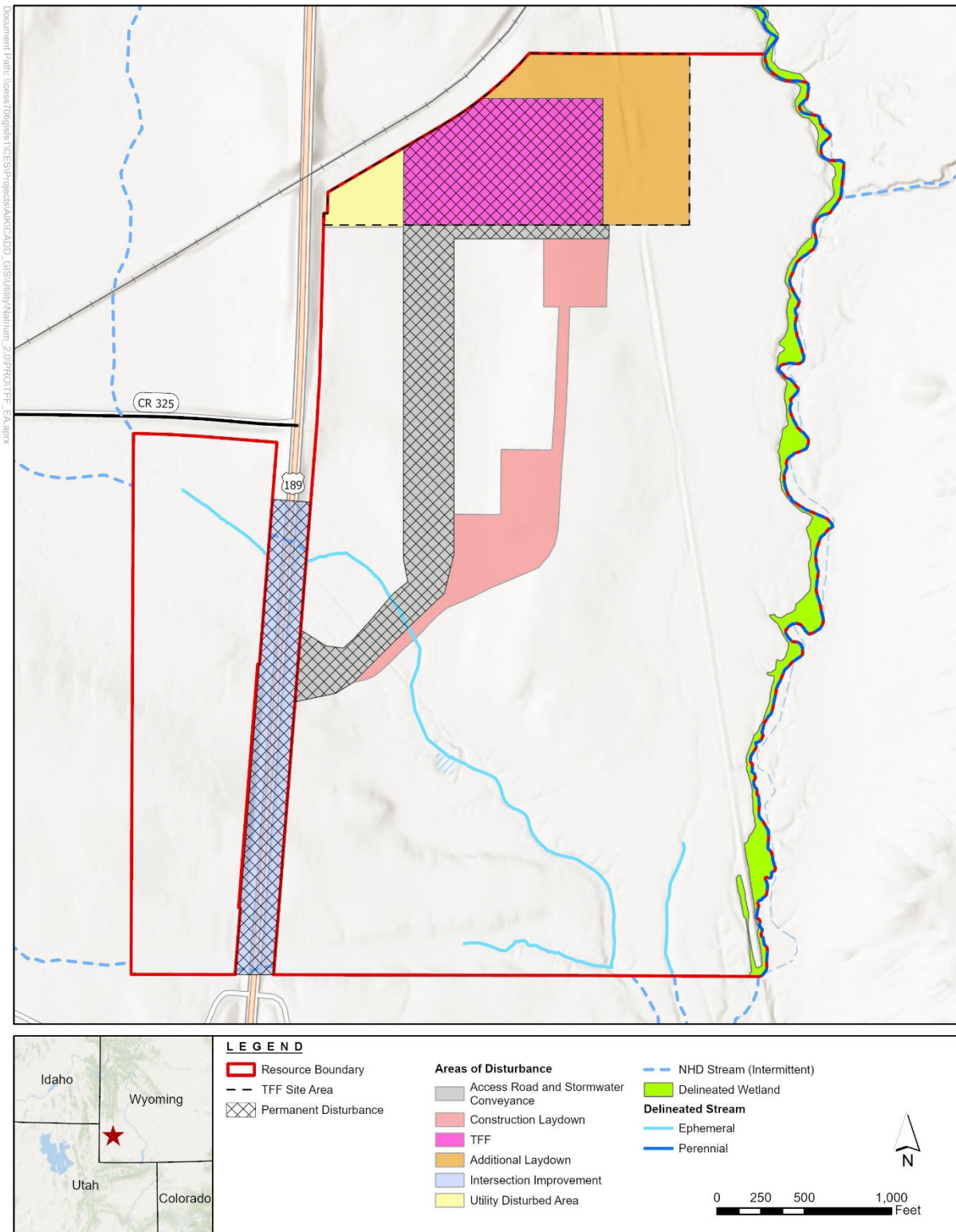


Figure 2.1-1 Locations of the Project Facilities

Office and Control Trailer

The Office and Control Trailer would be an approximately 60 feet by 72 feet prefabricated modular trailer complex to be used as administrative offices for the personnel working at the TFF. The Office and Control Trailer would include workspace accommodation (offices, desks, and workspaces) for testing and support personnel, conference room(s), infrastructure, restrooms, and a break room. The trailer would have self-contained sanitary systems to be serviced by an outside licensed vendor. An outside vendor would also supply water (containerized). No water or sewer hook ups are planned.

Sodium Test Building

The Sodium Test Building would be a pre-engineered metal building approximately 125 feet by 220 feet and approximately 108 feet tall at the highest point. The metal building would be a traditional steel building structure that would include a steel roof deck covered with an insulated membrane roofing system with gutters and downspouts. The Sodium Test Building provides an enclosed, climate-controlled facility sized to accommodate equipment testing. The steel lined shafts housing the sodium test tanks and equipment platforms would be provided where needed for access to equipment and to provide personnel protection. A portion of this building will house the Sodium Receipt equipment consisting of:

- Space for incoming Sodium Iso-Tanker Truck
- Oil heating skid
- Sodium receipt tank
- Sintered metal filter and pump skid
- Cover gas treatment equipment
- Fire protection equipment

Outside Sodium Storage Area

This area would contain the following components:

- External sodium storage tank used for filling operations,
- Pump and sodium cleanup filter skid, and
- Cover gas treatment equipment servicing the external sodium storage tank.

A rendering of the TFF structures is shown in Figure 2.1-2.

2.1.2 Construction

The TFF project would consist of the construction, operation, and the eventual decommissioning of the TFF and supporting infrastructure. The construction phase of the TFF would include a peak workforce of approximately 120 – 150 people and is estimated to take roughly 29 – 35 months to complete. All work would be done in accordance with local, state, and federal regulations and permits and be completed with approved Best Management Practices (BMPs) in place to ensure proper environmental protection. Throughout construction water would be used for dust suppression per permit requirements and site plans,

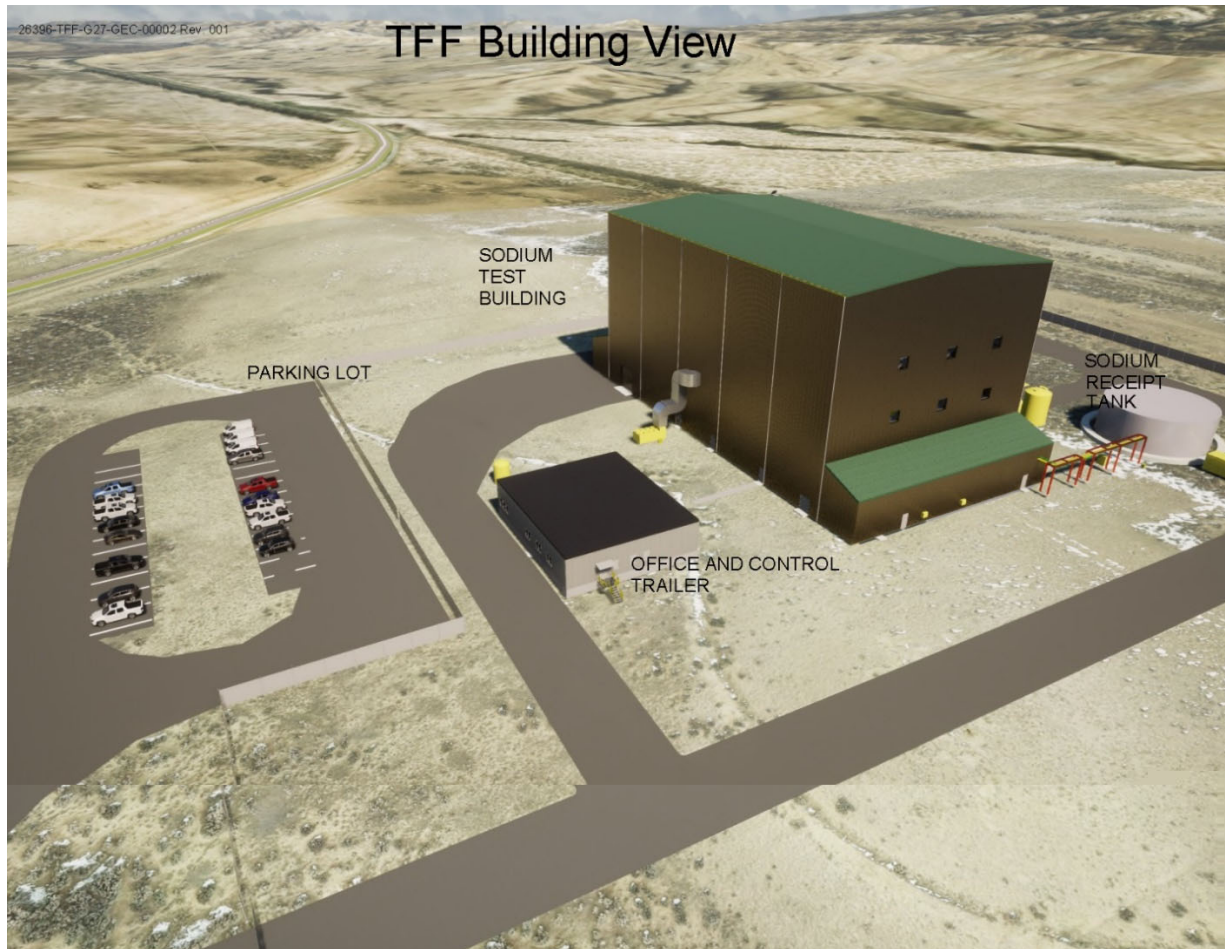


Figure 2.1-2 TFF Building Rendering

and estimated usage is expected to be 3-5 trips a day of 500-gallon water trucks. The project would use recycled water from the dewatering process from the shaft drilling for dust suppression. The anticipated construction sequence for the TFF would be as follows:

- Setting up the site – Setting up items such as field trailers, temporary fencing, laydown areas, chemical storage areas, temporary power, sanitation, and snow removal.
- Earthworks – Setting up erosion controls and environmental protection, setting up areas for removed material to be safely stored for the drilled shafts, installing a sediment basin (that will be converted into a water detention pond during operation and maintenance), culvert, storm drains, duct banks plus any additional cutting and/or backfill. A heat map of the site earthworks is shown in Figures 2.1.2-1 and 2.1.2-2. This would include earth-moving equipment possibly including but not limited to dump trucks, excavators, backhoes, etc.
- Drilled shafts and liners – As many as eight vertically-oriented, cylindrical, subsurface shafts (ranging from approximately 12 to 39 feet in outer diameter) would be drilled in the area located under the metal building to be installed later (described below). Each shaft would have an associated liner that would be installed post drilling.

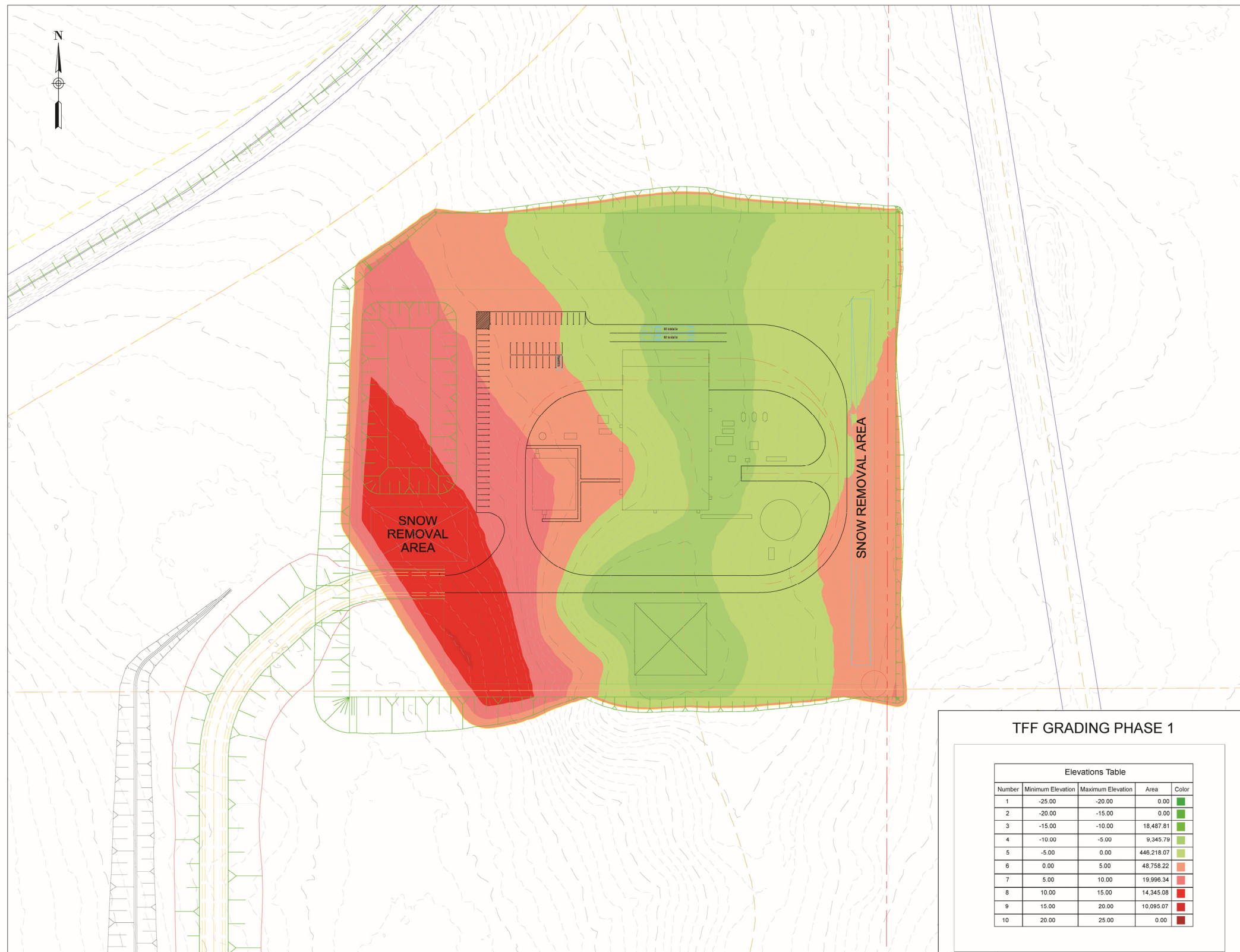
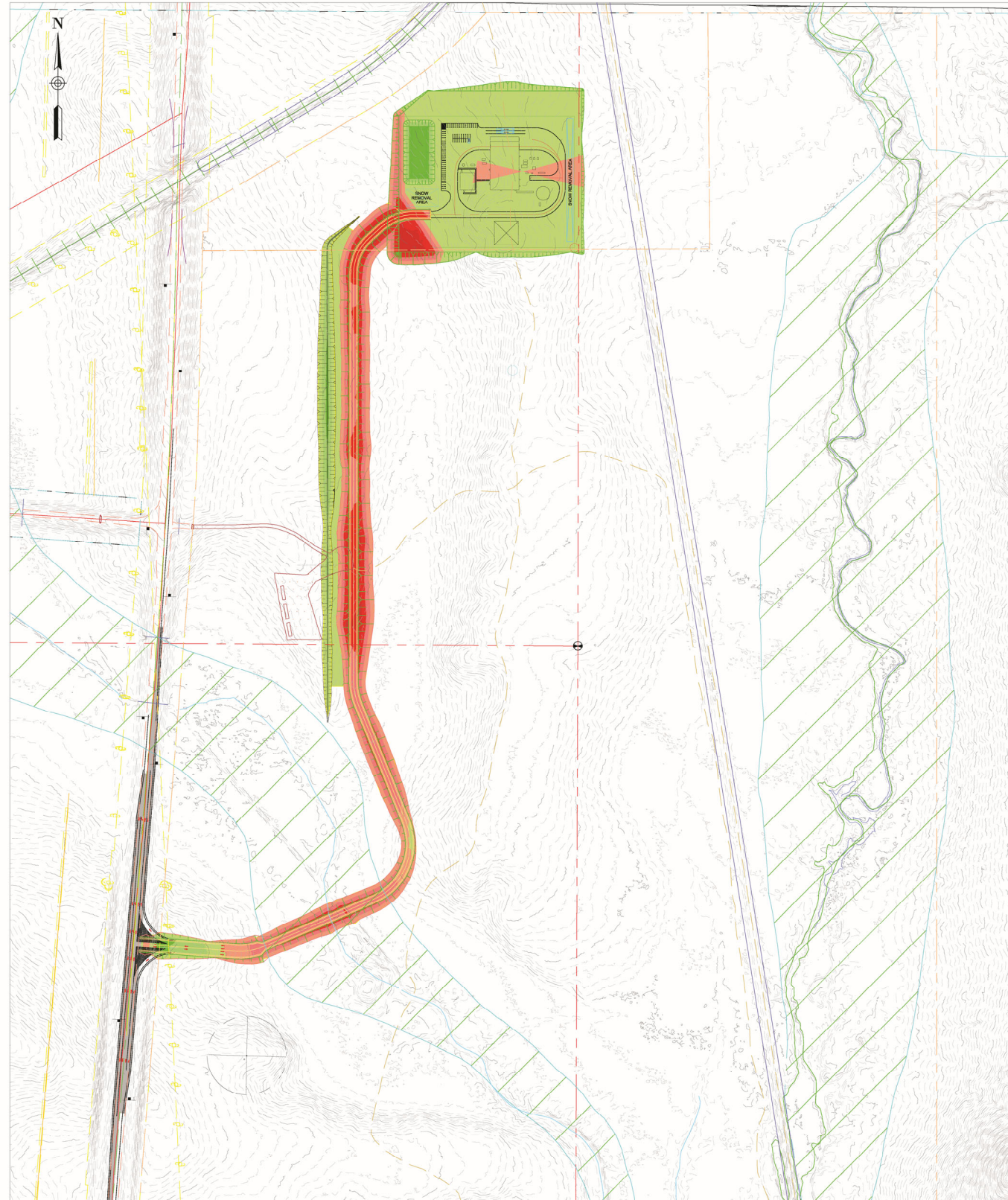


Figure 2.1.2-1 TFF Site heat map (building footprint)



TFF GRADING PHASE 2

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-25.00	-20.00	0.00	Green
2	-20.00	-15.00	0.00	Light Green
3	-15.00	-10.00	18,487.81	Yellow-Green
4	-10.00	-5.00	9,345.79	Yellow
5	-5.00	0.00	446,218.07	Light Orange
6	0.00	5.00	48,758.22	Orange
7	5.00	10.00	19,996.34	Red-Orange
8	10.00	15.00	14,345.08	Red
9	15.00	20.00	10,095.07	Dark Red
10	20.00	25.00	0.00	Dark Red

Figure 2.1.2-2 TFF Site heat map (full view)

Shaft	Depth (ft)	Outer Diameter of Excavation (ft)
1M	56	39
1B	66	22
2	62	16
3	84	28
4	86	12
5	86	12
6	80	12
7	74	12

- Rectangular drilled shaft pit – An approximately 60 feet by 70 feet rectangular pit located above the 39 feet drilled shaft would be excavated.
- Dewatering - Current plans call for dewatering as many as eight shafts for approximately 6 months during construction, until steel liners have been installed and grouted in place. All groundwater pumped from excavations will be used onsite for dust suppression and stored in water tanks onsite. Any water that cannot be used for dust suppression will be held in a tank for either proper disposal or testing and release under an approved permit.
- Building foundations (internal) – A reinforced concrete foundation would be poured prior to erection of the pre-engineered metal building (described below). During the erection of the building, and before the roof is installed, an overhead bridge crane would be installed (and used for subsequent construction activities). Other equipment possibly used would be concrete pump trucks, material flatbeds, concrete vibrators, etc.
- Metal building – A pre-engineered metal building would be erected over the top of the previously poured building foundations. The building would be comprised of a structural steel frame and external insulated siding panels.
- Internal Mechanical, Electrical and Piping – All internal components would be set and fully installed. Examples include tanks, heaters, electrical panels, HVAC equipment, piping, and insulation.
- External equipment foundations – Reinforced concrete pads would be installed prior to placement of electrical and mechanical equipment and tanks to be installed outside of the metal building.
- External Mechanical, Electrical, and Piping – All external components to be installed outside the metal building would be set on the respective equipment pad(s). Examples include a backup diesel generator, tanks, HVAC equipment, piping, tanks, and piping racks.
- Office and Control Trailer – Reinforced concrete foundation would be installed and, subsequently, setting a prefabricated office trailer would be placed and anchored to the foundation and/or ground.
- Final earthworks – Final grading, paving, and industrial fencing would be installed.

- Construction testing – Assurance that all installed components are in appropriate working condition.

The existing road to access the TFF property is at the intersection of Skull Point Road (CR 325) and US-189. This road was previously used for site characterization and environmental monitoring work and is currently restricted to light duty vehicles use only. This existing road would be abandoned in place and replaced by a new, temporary access road located between 1,300 ft and 2,000 ft south of the intersection of CR 325 and US-189. The new access road is proposed to be used from the first quarter of 2024 through completion of the new, permanent access road and corresponding intersection at the same location, anticipated to occur in fourth quarter of 2024. This temporary access road usage would be based on a WYDOT-approved temporary Traffic Impact Study in accordance with WYDOT rules and regulations.

Final access to the TFF property would be from a proposed intersection constructed on US-189, south of CR 325, and north of the Bureau of Land Management (BLM) intersection at the road to Blazon Gap. The proposed intersection is anticipated to be located at the same location as the temporary access road. The peak construction materials and equipment expected to utilize the new permanent access road is 60 shipments per day.

TerraPower has begun discussions with WYDOT on the preliminary design of the proposed intersection. The final intersection design would be based on a WYDOT-approved Traffic Impact Study, performed in accordance with the WYDOT Traffic Program Access Manual. Figure 2.1.2-3 shows the estimated new access to the TFF property subject to changes resulting from the Traffic Impact Study.

The temporary access road concept (located on the east side of the US-189 ROW) includes:

- Two lanes to and from the project area,
- A left turn lane for travel onto US-189 southbound,
- Wider turn radii to accommodate the TFF vehicular traffic (to and from the site), and
- Fencing and cattle guard(s).

The temporary access road concept (located in the US-189 ROW) includes the paved driveway up to the existing edge of pavement.

A temporary traffic control plan will be established and maintained with traffic control devices implemented in phases to allow the safe construction and operation of the temporary access road and construction of the permanent intersection on US-189 while maintaining the flow of traffic on the US-189 through lanes. Temporary traffic control devices include pavement markings, barricades, and signs that are in accordance with WYDOT regulations and the Manual on Uniform Traffic Control Devices for Streets and Highways.

Potential permanent intersection design options and associated potential impacts are available in Sections 3.3.7.1 and 3.3.7.2 and are subject to WYDOT approval and permitting. DOE would identify the final design option for the permanent intersection in the final EA.

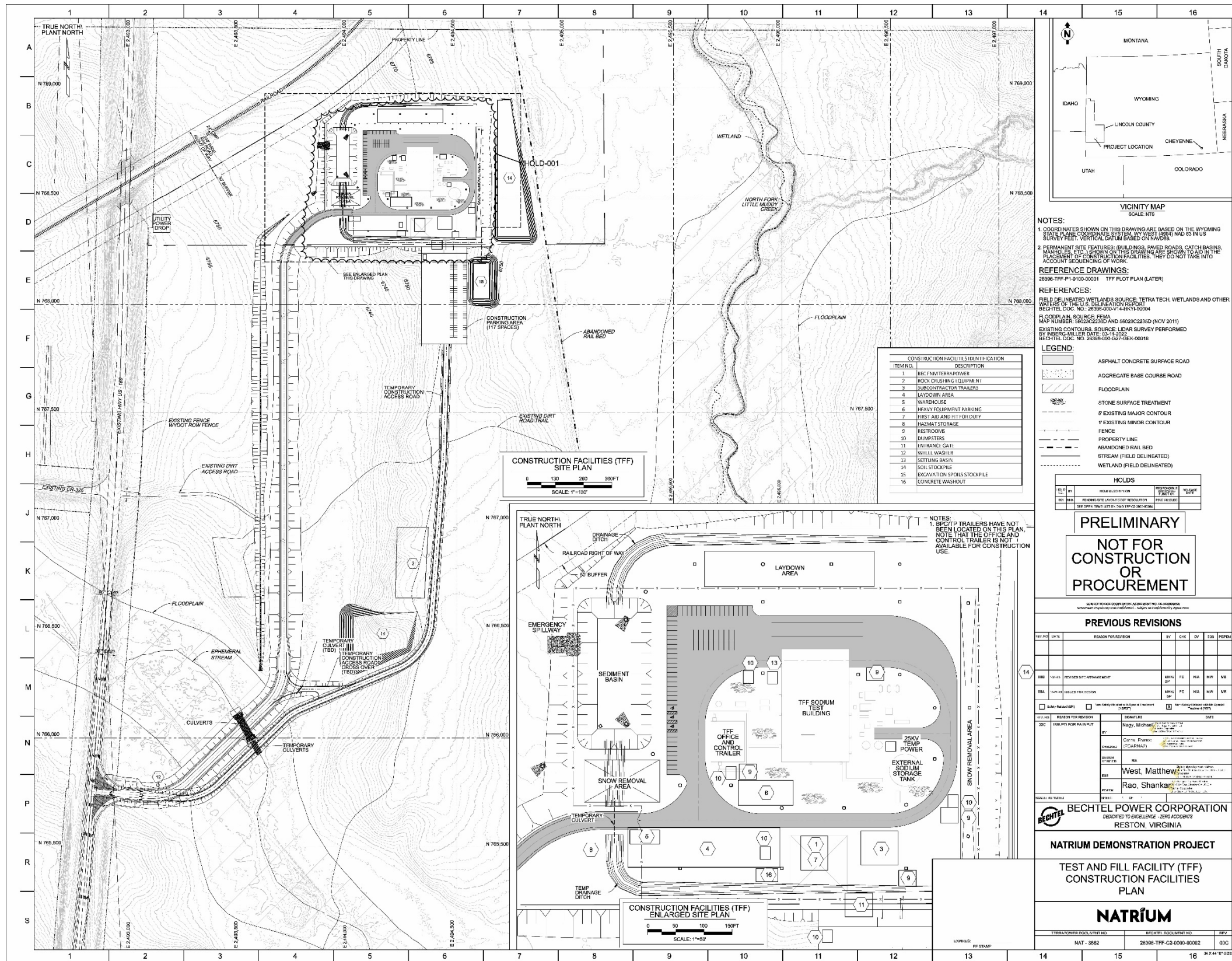


Figure 2.1.2-3 Proposed New Site Access

Stormwater Drainage

Temporary Roadway Drainage

The temporary access road in the WYDOT ROW would be graded to direct stormwater runoff from the US-189 northbound shoulder east to the ephemeral stream and south and south of both the temporary and permanent roadways. The remaining grading within the area of disturbance will maintain the existing stormwater flow paths.

The temporary roadway scope includes culverts centered where the temporary roadway crosses the ephemeral stream. The stream crossing would consist of four corrugated metal pipe-arch culverts that are each approximately 62 feet in length and run parallel to the centerline of the stream, following the stream bed contours. The temporary roadway culverts are designed for a 5-year, 24-hour storm event. This road would be removed after completion of the permanent roadway. A rip rap apron is placed on the inlet and outlet of the culvert serving as a temporary erosion control measure.

Permanent Roadway Drainage

The installation of the permanent intersection in the WYDOT ROW includes widening US-189 to install turning lanes and acceleration and deceleration lanes. The existing drainage under US-189 will be extended where these additional lanes are installed including extending the existing 36-inch diameter Corrugated Metal Pipe culvert that directs the ephemeral stream under US-189 by 16.5 feet under both US-189 southbound and northbound. The existing corrugated metal pipe culvert will be extended 22 feet under US-189 northbound. The grading will be adjusted to maintain the current drainage paths. Culvert extensions will tie into the existing culvert with sizing to match and reinstall/replace the existing flared ends at the inlets and outlets.

The permanent roadway scope includes culverts centered where the permanent roadway crosses the ephemeral stream. The stream crossing consists of five reinforced concrete pipe culverts that are each approximately 99 ft in length and run parallel to the centerline of the stream, following the stream bed contours. The permanent roadway culverts are designed to comply with the floodplain permit conditions from Lincoln County and designed for a 100-year, 24-hour storm event. A rip rap apron is placed on the inlet and outlet of the culvert serving as a permanent erosion control measure.

TFF Site Drainage

The stormwater drainage system on the TFF site collects all stormwater runoff in a single stormwater collection pond which discharges the stormwater to a ditch located on the west side of the entrance road ending at the 100-year floodplain to the ephemeral stream north of the plant road.

2.1.3 Operations

The TFF would perform ongoing testing to increase the TRL of select systems and components planned to be used in the design and operation of new advanced reactor plants using the sodium fast reactor (SFR) environment technology. Additionally, test data would inform safety assessments as well as support equipment qualification programs. The TFF would be used to advance the following Sodium technologies which support the development of SFRs:

- Fuel handling equipment, including the In-vessel Transfer Machine,
- Control Rod Drive Mechanism,

- Primary Sodium Pump (mechanical pump),
- Compact Heat Exchanger development,
- Electro-mechanical pump development,
- Novel waste disposal techniques (no radiological material is to be used),
- Training for sodium handling and operations, and
- Mobile Fill System.

The TFF would test full-scale test pieces and perform its testing function prior to and during operation of Kemmerer Unit 1. The TFF would be capable of operating throughout the expected component test duration without interruption during normal operation. There are expected to be 20–30 permanent employees working, and maintenance activities would occur as necessary throughout the life of the TFF.

The sodium used in the TFF would be from a supplier which is to be determined, established industry source, and transported via truck within the U.S. The sodium transportation and delivery to the TFF would be accomplished by using 20 metric ton International Organization for Standardization (ISO) shipping containers. There would be an estimated 115–130 shipping containers received. The sodium would be loaded in molten, liquid form into the road certified shipping containers, then solidified for transport under an Argon cover gas for safe transportation. The certified shipping container and Argon cover gas combination ensures a safe transport system that prevents sodium from coming into contact and reacting with oxygen or moisture in the environment (CAMEO 2023).

When the sodium container reaches the facility, it would be pulled into a loading dock that has specialized equipment for receipt of sodium. A set of heating coils inside the ISO container enable an applicable heat transfer oil to be passed through and the sodium safely melted. This process would take about 18 hours. Once molten, additional argon would be pumped into the container pushing the sodium into a holding tank. Once a sample has been chemically tested by a qualified vendor for purity, the sodium would be pumped through a filter. The sodium would be stored in a large external tank of approximately 400,000 gallons until enough is stored for sodium fill operations of Kemmerer Unit 1.

During operations, the TFF would collect any wastewater in holding tanks for offsite disposal. There would be no direct utility connections. After large component testing is completed, the equipment would be cleaned using standard sodium cleaning operations. All supply water and wastewater would be stored in the external tanks with fill/removal service provided by vendors. In addition to the steps identified in the document, a spill prevention plan, and any environmental requirements from permitting such as stormwater pollution prevention plan (SWPPP) will be incorporated in operational plans and procedures.

2.1.4 Decommissioning

The TFF would be expected to operate for approximately 20 years with the possibility of extensions to be determined later. Decommissioning would take place under a defined decommissioning plan with appropriate BMPs to complete the work. General steps for decommissioning the TFF may include, but are not limited to:

- Temporary storage areas for dismantled components and material for recycling, disposal, or sale would be established.

- Sodium contaminated equipment would be cleaned, disposed of, or both per regulatory guidelines or purified for resale.
- Any chemicals remaining on site would be reused at other facilities, sold, or disposed of following applicable regulatory guidelines.
- On site access roads, building foundations, and subsurface features no longer needed would be removed and restored if not desired for future use.
- Disturbed areas would be restored to original grade.

2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Any potential beneficial or adverse effects to the physical, natural, or socioeconomic resources would not be realized.

2.3 Alternatives Considered but Eliminated from further Analysis.

2.3.1 Foreign Facilities

Using the ATHENA (Advanced TechNology Experiment Sodium (Na) facility) Test Facility in Japan or the French Test Facilities was considered but eliminated from further analysis as it would not be technically feasible and would not meet the purpose and need. In order to construct the TFF, DOE Order 471.1 Controlled Unclassified Information (DOE 2010) would need to be followed for any export of controlled information reducing the amount of information that could be shared with the project if constructed overseas, adding significant delays. Additionally, per DOE DE-FOA-0002271 Appendix F Waiver Requests: Performance of Work in the U.S. (DOE 2020) all work under DOE funding agreements must be performed in the U.S., unless otherwise waived by DOE. This would have made it unfeasible to complete in alignment with the ARDP schedule requirements and would not meet the purpose and need.

2.3.2 Alternate United States Facilities

Three alternate U.S.-based facility locations were considered but eliminated from further analysis as it would not meet the purpose and need of the project. They were the Idaho National Lab in Idaho, Sandia National Lab in New Mexico, and the Satsop Business Park in Washington.

Part of the federal purpose and need of the project is to “design, construct, and operate a TFF within a reasonable distance that would further the design of TerraPower’s Natrium reactor (and associated technologies)”. A portion of furthering the design of the Natrium reactor and associated technologies relates to the mobile fill operations. The three U.S. based facility locations are a significant distance from the proposed Kemmerer Unit 1 location. Therefore, a fill technology investment for mobile fill operations would be required to support the distance associated with these locations which does not align with the mission of advancing the design through the testing process prior to deployment.

Another part of the federal purpose and need of the project is to provide initial sodium fill to Kemmerer Power Station Unit 1. The three U.S. based alternatives are a significant distance to the proposed Kemmerer Unit 1 location which would require additional transportation for the sodium required to fill Kemmerer Unit 1.

2.4 Alternatives Considered due to Scoping Comments but Eliminated from further Analysis.

2.4.1 Partial Funding

During the scoping period DOE received a comment from the Powder River Basin Resource Council, in their letter they requested that DOE consider an alternative where DOE would grant reduced funding to TerraPower under the ARDP award. The proposed alternative was eliminated from further consideration because it would not meet the purpose and need and is out of scope of the NEPA review because the cooperative agreement was agreed to at the program level outside of the NEPA review process. Currently DOE has discretion to allocate between 0-50 percent cost sharing directly with an ARDP award recipient. Once award terms are agreed upon DOE does not designate which sub-component of the award the recipient allocates the funding to or at what amount. The determined funding allocation would allow TerraPower to meet the purpose and need of the ARDP, in terms of schedule and technical advancement.

2.4.2 Renewable Energy Alternative

During the scoping period DOE received a comment from the Powder River Basin Resource Council, in their letter they requested that DOE consider an alternative where the commenter requested that DOE analyze a renewable energy alternative. The TFF is a proposed test facility that does not generate electricity or power therefore this alternative is out of scope of the NEPA document and does not meet the purpose and need.

The FY2021 appropriations included a new \$230 million sub-account for an ARDP within DOE Nuclear Energy account within the explanatory statement for the FY2020 enacted appropriations measure. Of that funding, \$160 million was provided for DOE to begin two advanced nuclear reactor demonstration projects, with a cost-share of at least 50 percent from non-federal sources. DOE announced awards totaling \$160 million for two advanced reactor demonstrations on October 13, 2020—a molten salt reactor, Natrium, and a high-temperature gas reactor.

A potential renewable energy alternative with the purpose of power generation would not advance nuclear technology or satisfy the federal purpose and need, nor does DOE have discretion to redirect or impound the appropriated funds.

2.5 Past, Present and Future Activities (hereinafter referred to as cumulative activities)

The CEQ's regulations for implementing the procedural provisions of NEPA define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

This TFF EA considers past, present, and reasonably foreseeable short-term and long-term future actions at the TFF. It also considers offsite factors and reasonably foreseeable offsite projects that could result in cumulative impacts. CEQ guidance on considering cumulative effects identifies the steps for assessing cumulative effects and begins with defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider other projects that coincide with the location and timetable of a proposed action and other actions. Cumulative effects analyses must also evaluate the nature of interactions among these actions. Impacts subject to cumulative effects analysis are identified by reference to both the timeframe and geographic extent in which the proposed action would cause effects.

Potential sources of cumulative impacts include:

WYDOT Wildlife Crossing Along US-189: WYDOT submitted a grant package on July 31, 2023, to the DOT Federal Highway Administration for the US-189 Habitat Connectivity Corridor Expansion project, which would consist of several underpasses, high barrier wildlife fencing, and an overpass across US-189. These will be spread over around a 30-mile stretch from US-

189/30 junction north on US-189 to around mile marker 34.5. The Proposed Project would help to minimize the number of wildlife vehicle collisions along the highway as increased development in the project area would likely increase traffic along US-189 in the coming years.

Naughton Power Plant Natural Gas Conversions: PacificCorp (Rocky Mountain Power) will convert Naughton Power Plant Units 1 and 2 to natural gas in 2026. The three Naughton Power Plant units would continue to operate through 2036 (PacifiCorp 2023).

Work Completed on the Existing Access Road: In late 2021, TerraPower completed cultural resource protection measures along the existing access road including placing geotextile fabric and gravel within the boundaries of a National Register eligible historic property (48LN740).

TerraPower Kemmerer Unit 1: TerraPower would construct the Kemmerer Unit 1 Natrium sodium cooled fast reactor (345 MWe) adjacent to the TFF. TerraPower would also construct a training facility for the Kemmerer Unit 1 workforce adjacent to the TFF. NRC would prepare a separate NEPA review for this activity. DOE would prepare a separate NEPA review for the site preparation activities.

Kanata Kemmerer Decarbonization Work: The Kemmerer Decarbonization Work (KDW) would be located at the Kemmerer Mine site and would repurpose feedstock of the existing Naughton generating station. KDW plans to supply net-zero ammonia to serve agriculture and energy needs.

TriSight: TriSight would produce fertilizer and beauty products produced from coal at Kemmerer Mine. They plan to purchase up to 1 million tons per year from Kemmerer Mine to produce their products.

Uinta Wind: Uinta Wind would construct of up to 35 wind turbines capable of generating up to 120 megawatts (MW) in northwest Uinta County. The project is currently going through permitting.

Lincoln Solar I / II: Lincoln Solar I would be a 80 MW photovoltaic solar facility and battery energy storage system near Cokeville Wyoming. Solar II would be a 50 MW photovoltaic solar facility at the same location. Both projects are in the permitting stage with Solar I to be constructed first, followed by Solar II.

Gateway West Transmission Line Project: PacificCorp would be constructing the Gateway West Transmission Line project. Segment D would run 488 miles from Glenrock, Wyoming to Downey, Idaho. Segment D.3 would construct of 230 kV and 500 kV electric transmission traversing Sweetwater County, north of Green River and Rock Springs, and Lincoln County, north of Kemmerer, WY. It is anticipated to be constructed in 2028.

ExxonMobil LaBarge Carbon Capture Facility: ExxonMobil is proposing an expansion at its LaBarge, WY carbon capture and sequestration project at Shute Creek Facility. The expansion would capture up to 1.2 million metric tons of CO₂ in addition to the 6-7 million metric tons of CO₂ that is currently captured at the facility annually.

2.6 Permitting and Authorization Summary

A list of permits anticipated for the project is provided in Table 2.6-1.

Table 2.6-1 Permits and Authorizations

Permit	Agency	Project Phase	Description
USACE CWA Section 404 Permit	U.S. Army Corps of Engineers (USACE)	Construction	Projects involving the discharge of dredged and/or fill material into waters of the U.S. (WOTUS) require authorization from the USACE -- fill material means material placed in WOTUS, where the material has the effect of replacing any portion of a WOTUS with dry land or changing the bottom elevation of any portion of a water. Nationwide Permit (NWP) 14 covers crossings of WOTUS associated with linear transportation projects such as roads.
Wyoming Pollutant Discharge Elimination System (WYPDES) Construction Stormwater Permit	WYDEQ	Construction	The Large Construction General Permit (LCGP) covers storm water discharges from construction activities that disturb 5 or more acres.
General Air Permit- propane heaters; diesel generators	WYDEQ	Construction	Wyoming Air Quality Standards and Regulations Chapter 6, Section 2(a)(i): “Any person who plans to construct any new facility or source, modify any existing facility or source, or to engage in the use of which may cause the issuance of or an increase in the issuance of air contaminants into the air of this state shall obtain a construction permit from the State of Wyoming, Department of Environmental Quality before any actual work is begun on the facility.”
Land Use Application/ Zoning and Development Permit	Lincoln County	Construction	No premises shall be used, or building, or structure constructed within any zoning district, as a conditional use until the owner has obtained a conditional use permit from the Board of County Commissioners.
Driveway Access Permit	Lincoln County	Construction	Permit required for county road access.
Floodplain Development Permit	Lincoln County	Construction	Permit required for development within a regulated floodplain. Executive Order (EO) 11988, <i>Floodplain Management</i> , requires an evaluation of impacts to floodplains for all federal actions and directs federal entities to reduce impacts to floodplains and minimize flood risks to human safety. Further, the DOE is required under 10 CFR § 1022 to determine if a proposed action would be located in a floodplain.

Permit	Agency	Project Phase	Description
Permit to Appropriate Ground Water	State Engineer's Office	Construction	Permit required for any beneficial use (including dust suppression) of any underground water in the state of Wyoming.
Blasting Permit	WYDEQ	Construction	Permit required for construction blasting.

2.7 Applicant Committed Measures

TerraPower has made commitments and project design decisions to avoid or minimize potential impacts that were identified during the development of the Proposed Project and preparation of the EA. These commitments, project design decisions, and any additional measures identified through permitting or Memoranda of Understanding (collectively “measures”), would be incorporated and binding through the DOE funding agreement. The measures below were not necessary to decrease the level of impact below significant (i.e., the impacts may have been less than significant with or without the measures), but the measures are intended to further reduce the likelihood of impacts and to ensure the Proposed Project is carried out in an environmentally responsible manner. As a result of incorporating these measures into the DOE funding agreement, the federal funding would be contingent on TerraPower implementing these measures. These commitments and project design decisions are incorporated into the Proposed Action.

2.7.1 Cultural and Historic Resource Protection

TerraPower has committed to implementing applicable measures to avoid impacts to cultural and historic resources that have been determined eligible for the National Register of Historic Properties (i.e., “historic properties”). Measures include but are not limited to the following:

- Delineating and maintaining the boundaries of historic properties adjacent to construction work or travel areas with durable markers that indicate no entry is permitted.
- Maintaining in good condition existing access road surface protection measures as discussed in Section 3.3.2.1.
- Providing awareness training to construction personnel about historic properties where no entry is permitted.
- Periodically inspecting historic properties to confirm that markers are being maintained and that no unauthorized entry is occurring.
- Continuing to monitor for items of archaeological or cultural significance, suspending work in the vicinity of the find until it can be evaluated, and immediately notifying the appropriate agencies or tribes of discovery of any previously unidentified historic or archaeological remains during construction.

2.7.2 Spill Prevention, Control, and Countermeasure Plan

The TFF would comply with federal and state regulations for management of fluids and fuels, including maintaining and implementing a spill prevention, control, and countermeasure (SPCC) plan. The purpose of a SPCC plan is to help prevent a discharge of oil or oil products into navigable waters or adjoining shorelines (lakes, rivers, or streams), and control a spill if one occurs.

2.7.3 Infrastructure, Traffic and Transportation Measures

General steps TerraPower will take for minimizing transportation impacts include but are not limited to the following:

- A transportation plan for Project construction will be developed in coordination with WYDOT. Transportation will comply with WYDOT and U.S. Department of Transportation requirements, and all necessary permits will be obtained.
- A construction traffic management and traffic control plan shall be prepared in coordination with WYDOT.

2.7.4 Biological Resources Protection

Construction activities including parking, material storage, and equipment laydown will be restricted to designated areas. Plant and animal communities outside of these designated areas are to be avoided. Areas temporarily disturbed during TFF construction will be stabilized and revegetated with native plants (when feasible).

To the extent practicable, vegetation clearing will be carried out in fall, winter, and spring to avoid the avian breeding season, which generally occurs from March 1 through August 31. This is to avoid impacts to migratory birds, protected under the Migratory Bird Treaty Act. Should it be necessary to clear vegetation within the March 1-August 31 timeframe, preconstruction surveys of the areas scheduled to be disturbed will be conducted within seven days of construction. If an active nest (containing eggs or young) of a migratory bird is found, the area within a 300-foot radius of the nest will be conspicuously marked (flagged) and avoided until young birds fledge, or nest failure is apparent. Nest-clearing surveys for the burrowing owl will be conducted in areas with prairie dog burrows in the seven-day period prior to ground disturbance. If active owl nests are discovered, they would be protected with a 0.25-mile buffer zone where no ground disturbance is allowed.

Consistent with a request from the Wyoming Field Office of the U.S. Fish and Wildlife Service (USFWS), TerraPower will conduct eagle and raptor nest surveys for two miles around the TFF before construction begins. Up to a one-mile buffer zone could be required around an active raptor nest, depending on the species.

A LCGP with approved SWPPP will be obtained from WYDEQ prior to groundbreaking. The SWPPP will identify BMPs that will be used to limit construction-related impacts to North Fork Little Muddy Creek water quality and aquatic life. Impacts to North Fork Little Muddy Creek wetlands will also be minimized by the storm water and erosion controls put in place during implementation of the SWPPP.

2.7.5 Health and Safety

In order to assist in reducing the risk of members of the general public from interacting with the hazards associated with ongoing construction activities, the TFF project would be fenced in, as possible, and signage denoting the site would be maintained.

SECTION 3 AFFECTED ENVIRONMENT AND IMPACT ANALYSIS

3.1 Background

Section 3 describes the existing environmental resources associated with the Proposed Project based on best available data for the Proposed Project. The section also analyzes the potential environmental effects of the Proposed Project and the No-Action Alternative on the environmental resources using the best available data for the assessment. Potential environmental effects are analyzed for each of the following phases of the Proposed Project: (1) construction, (2) operations and maintenance, and (3) decommissioning. The evaluation of potential effects or impacts considers the size and scope of this technology demonstration project and describes the effects or impacts in terms of their type (adverse or beneficial); duration (short- or long-term); and intensity. The threshold definitions for the impact intensities used in this analysis are as follows:

- Negligible: Impacts on the resource, although anticipated, would be difficult to observe and are not measurable.
- Minor: Impacts on the resource would be detectable upon scrutiny or would result in small but measurable changes in the resource.
- Moderate: Impacts on the resource would be easily observed and measurable but would be localized or short-term (i.e., equal to or less than 2 years).
- Major: Impacts on the resource would be easily observed and measurable, widespread, and long-term (i.e., more than 2 years)¹.

In addition to these impact thresholds under NEPA, there are effects determinations definitions that are applicable specifically for the Endangered Species Act (ESA). The ESA effects determination for federally listed species are as follows:

- No effect: Federally listed species or critical habitat will not be affected, directly or indirectly.
- May affect but is not likely to adversely affect: All effects on federally listed species or critical habitat are beneficial, insignificant, or discountable.
- May affect and is likely to adversely affect: An adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action and the effect is not: discountable, insignificant, or beneficial.

The implementing regulations for Section 106 define specific criteria for identifying an adverse effect on a historic property:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation

¹ As analyzed in the EA, a major impact would be an impact that is widespread and long term and affects not just individuals within the resource or species but may result in population-level effects to the species itself at a local or regional level.

of the property’s eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative (36 CFR § 800.5(a)(1), *Criteria of Adverse Effects*).

3.2 Identification of Resources Present, Not Present, and Affected

Consistent with NEPA implementing regulations and guidance, DOE focused the analysis in this EA on topics with the greatest potential for environmental impacts (known as the sliding-scale approach [40 CFR 1502.2(b)]).

3.2.1 Environmental Resources Evaluated and Dismissed from Detailed Analysis

Section 3.2.1 and Table 3.2-1 present DOE’s evaluations of the environmental resource areas on which the Proposed Project is expected to have no impact or a negligible impact. These resources are described below but are not carried forward for detailed analysis.

Table 3.2-1 Resources Not Carried Forward for Detailed Analysis

Resource	Not Present	No Potential	Negligible	Considerations
Noise			X	Noise would be generated by construction equipment which would operate for short periods of time. Noise generated during operations is expected to be minimal except during emergency backup power generation exercises which is estimated to generate noise levels of 85 dBA at 3 feet or less in distance. There are no nearby sensitive receptors including homes, schools, places of worship, or hospitals therefore this resource area would not be analyzed in detail. The closest residence is approximately 2 miles away. As a result of the construction noise being short duration; operational noise being minor; and distance to the nearest residence impacts due to noise are anticipated to be negligible.
Light Pollution			X	Light pollution generated by the TFF is expected to be minimal and similar to other existing infrastructure in the area such as the Naughton Power Plant. Additionally, the TFF is not located in an international dark sky area (Dark Sky 2023). The closest residence is approximately 2 miles away. Due to the minimal light pollution expected outside of a designated area with the nearest residence 2 miles away, impacts as a result of light pollution are anticipated to be negligible.
Aesthetic Resources			X	Aesthetic impacts from the TFF would be negligible due to the presence of other industrial facilities in the area (such as the Kemmerer Mine and Naughton Power Plant) as well as other natural landscape features such as

Resource	Not Present	No Potential	Negligible	Considerations
				plateaus and mountains. Visual impacts to cultural resources would be analyzed under the cultural resources section of the EA.
Waste Disposal			X	Chemical waste, hazardous waste, industrial waste, and biological hazards would be generated during the construction and operation and decommissioning of the TFF. Disposal of all materials would be done in accordance with applicable federal, state, and local regulations and would fall in the small quantity generator category. TerraPower would have appropriate personal protective equipment (PPE) for safe handling and would follow spill prevention plans. The waste generation falling into a small quantity generator status makes the impacts as a result of waste generation negligible.
Air Quality and Climate Change			X	<p>Air emissions would be released as part of the construction and operation and decommissioning of the TFF. Emissions from diesel operated construction equipment and back up diesel generator use during operations are expected to be minimal. All emissions would be in compliance with the National Ambient Air Quality Standards.</p> <p>According to the IPCC 2023 report “Estimates of future CO₂ emissions from existing fossil fuel infrastructures without additional abatement already exceed the remaining carbon budget for limiting warming to 1.5°C (50%) (high confidence)”. The TFF would facilitate in the abatement of future fossil fuel emissions by assisting in advancing nuclear technology as an alternative to fossil fuel sources. As a result of this, impacts to climate change are anticipated to be negligible to beneficial.</p> <p>Impacts of climate change on the TFF could include increased risk of wildfire or flooding. The TFF would be constructed to withstand impacts from a 500-year flood event in order to accommodate any changes associated with climate change and therefore, impacts of climate change on the project would be negligible.</p> <p>There is expected to be dust generation because of the construction activities. Appropriate dust control will be employed aligning with the requirements and BMPs outlined in the SWPPP. Impacts to air quality as a result of the Proposed Project are anticipated to be negligible due to the minimal air emission sources and BMPs employed.</p>

Resource	Not Present	No Potential	Negligible	Considerations
Prime and Unique Farmland	X			According to the Natural Resources Conservation Service, the TFF is not located on prime or unique farmland. (NRCS 2020)
Human Health			X	Air emissions are expected to be minimal from construction and operation of the TFF and hazardous materials would be handled in accordance with applicable regulations and spill prevention plans. Shipments of sodium would be completed in accordance with Department of Transportation regulations and would use DOT certified shipping containers. Impacts to human health are anticipated to be negligible.
Recreation		X		The nearest recreation areas are the Kemmerer Reservoir, BLM public lands, and the Fossil Butte National Monument. Recreational use at the Kemmerer Reservoir and BLM lands are considered low. BLM lands are primarily used for primitive camping, hunting, driving, and hiking where permitted. The Project would have no impacts to air quality, visual resources, or traffic patterns and therefore would have no impact to recreational areas.
Effects Abroad		X		The Project is located within the continental U.S. in Kemmerer, WY and the majority of impacts would be located at the TFF site or in the surrounding Lincoln County. Air emissions would have the potential to travel outside of the State of Wyoming however the dispersion rate would be high and the rate of emissions from the construction and operation of the TFF would be minimal. Therefore, the TFF would not significantly affect the environment in the global commons or a foreign nation.
Indigenous Knowledge			X	In accordance with the November 2022 Memorandum from the Executive Office of the President's CEQ on Implementation of Guidance for Federal Departments and Agencies on Indigenous Knowledge DOE has evaluated whether Indigenous Knowledge (IK) should be a resource area evaluated in detail in the EA. The EA does not have any cooperating or participating agencies. However, DOE is consulting with Tribes through the Section 106 process under the NHPA and through government-to-government consultation.

Resource	Not Present	No Potential	Negligible	Considerations
				Based on the current guidance for IK, “Common circumstances in which Indigenous Knowledge may arise include environmental reviews of resource management plans, forest plans, energy resource lease sales, and other Federal authorizations regarding the use of public lands.” DOE’s proposed action includes construction, operation of the TFF near Kemmerer, Wyoming. DOE is not preparing a land management or landscape level NEPA review of the project area. The TFF is located on private land and not located on a Tribal reservation or public lands. DOE has initiated tribal consultation with those tribes who have ancestral ties to the area. Information received from DOE’s tribal consultation is included in the cultural resources section. As DOE and Tribes continue consultation throughout this project, additional information may be included in the cultural resources section.

3.2.2 Summary of Resources Carried Forward

Table 3.2-2 lists a summary of the anticipated environmental impacts from the TFF as described in this EA. Implementing the TFF would result in small adverse impacts to the environment. These impacts, in conjunction with other past, present, and reasonably foreseeable future actions, would not result in discernible cumulative impacts.

Table 3.2-2 Summary of Impacts

Resource Area (listed in order of appearance)	Level of Expected Impact
Ecological Resources	Minor, Short-term and Long-term impacts
Cultural Resources	Negligible to Minor, Long-term impacts
Socioeconomics	Moderate to Negligible, Long-term impacts
Geological Resources	Minor, Short-term and Long-term impacts
Hydrology	Minor, Short-term impacts
Environmental Justice	Negligible to Moderate, Long-term impacts
Infrastructure, Traffic and Transportation	Minor to Moderate, Short-term and Long-term impacts
Accidents and Hazards	Minor to Moderate, Long-term impacts

3.3 Affected Environment and Impacts Analysis

3.3.1 Ecological Resources

The section considers effects of the Proposed Action on ecological resources. The analysis is based in part on surveys of the TFF area conducted in support of the proposed TFF project. These field efforts were

intended to characterize vegetation communities and wildlife and determine if any protected species or their habitats were present.

3.3.1.1 Affected Environment

Terrestrial Communities

Vegetation Communities

The TFF site is in the Wyoming Basin, a vast eco-region that encompasses 50,000 square miles (32 million acres) in Wyoming and smaller portions of Colorado, Utah, Idaho, and Montana. The Wyoming Basin eco-region is a broad basin dominated by arid grasslands and shrublands and surrounded by forested mountains (Hawbaker 2012). Based on field verification of the U.S. Geological Survey Landfire dataset (USGS 2016), the vegetation of the TFF area is mostly Inter-mountain Basins Big Sagebrush Shrubland (83.6 percent), with smaller areas of Inter-mountain Basins Greasewood Flat (16.4 percent). Dominant species in Big Sagebrush Shrubland within the TFF area include big sagebrush (*Artemisia tridentata*), black sagebrush (*Artemisia nova*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), crested wheatgrass (*Agropyron cristatum*), and cheatgrass (*Bromus tectorum*). Greasewood flats have alkaline soils and a shallow water table. The greasewood flat vegetation communities in the project area are associated with ephemeral streams that occasionally flood but remain dry for most of the growing season. Although normally associated with black greasewood (*Sarcobatus vermiculatus*) and other shrubs with herbaceous layer of grasses and forbs, the greasewood flats in the project area are very sparsely vegetated (Tetra Tech 2023a). Sagebrush ecosystems, such as Cumberland Flats within which the proposed TFF lies, are declining and becoming increasingly fragmented because of conifer encroachment, exotic annual grass invasion, and development.

Wildlife

Because of its location adjacent to a highway and rail spur, and historical use as grazing land for sheep, the TFF site contains wildlife habitat that can be characterized as disturbed and degraded. Although less than pristine, the area is used by a variety of songbirds, raptors, small mammals, and larger mammals. Songbirds found in the vicinity of the TFF include song sparrow (*Melospiza melodia*), vesper sparrow (*Pooecetes gramineus*), Say's phoebe (*Sayornis saya*), horned lark (*Eremophila alpestris*), and killdeer (*Charadrius vociferus*) (Tetra Tech 2023b, 2023d). Raptors observed in the vicinity of the TFF include Northern harrier (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*). Small mammals found in the TFF vicinity include least chipmunks (*Tamias minimus*), Uinta ground squirrels (*Spermophilus armatus*), white-tailed jackrabbits (*Lepus townsendii*), and white-tailed prairie dogs (*Cynomys leucurus*). Larger mammals (game animals) that occasionally forage in the TFF area or move through it seasonally include pronghorns (antelope), mule deer, and elk (Tetra Tech 2023b).

Biologists conducting raptor nest surveys in June 2023 found a damaged but active (adult on nest, egg visible) red-tailed hawk nest approximately 320 feet west of the TFF site on a power pole west of US-189 (Tetra Tech 2023c). There was a red-tailed hawk nest in the same location in 2022. While conducting the raptor survey, biologists also discovered cliff swallows nesting under the US-189 overpass crossing the rail spur approximately 160 feet west of the TFF site, a common raven nest on the side of the overpass approximately 150 feet west of the TFF site, and a red-winged blackbird nest in cattails along North Fork Little Muddy Creek approximately 1,575 feet southeast of the TFF site (Tetra Tech 2023d).

Aquatic Communities

The TFF site occupies a slight rise 433 feet west of North Fork Little Muddy Creek, a small intermittent stream (Figure 2.1-1). North Fork Little Muddy Creek flows south and joins Little Muddy Creek, a larger perennial stream, approximately 11 miles from the TFF site. There are no wetlands, streams, or ponds in the TFF site area, and no aquatic life. The proposed entrance road would cross an ephemeral stream that is hydrologically connected to North Fork Little Muddy Creek. Because this tributary of North Fork Little Muddy Creek could potentially be affected by construction of the entrance road and culvert, DOE has included a description of North Fork Little Muddy Creek’s aquatic communities.

Biologists surveyed aquatic communities of North Fork Little Muddy Creek up- and downstream of the TFF site in October 2022. Benthos samples from North Fork Little Muddy Creek were numerically dominated by chironomids, which are generally regarded as indicators of poor water quality; *Callibaetis* mayflies; the gastropod snail *Physella*; and oligochaete worms, also regarded as indicators of poor water quality (BIO-WEST 2023). Although mayflies are normally associated with excellent water quality, *Callibaetis*, the genus that was prevalent in North Fork Little Muddy Creek samples, is relatively pollution tolerant (Hilsenhoff 1987).

Three common cyprinids – speckled dace (*Rhinichthys osculus*), longnose dace (*R. cataractae*), and reidside shiner (*Richardsonius balteatus*) – comprised almost 85 percent of all fish collected in North Fork Little Muddy Creek in October 2022 (BIO-WEST 2023). All three species are hardy minnows that are found across the Inter-mountain West in a variety of habitats, from small, clear, cold-water streams to large, turbid rivers to lakes and reservoirs (Sigler and Sigler 1987; Baxter and Stone 1995). Smaller numbers of mountain suckers (*Catostomus platyrhynchus*), white suckers (*Catostomus commersonii*), and fathead minnows (*Pimephales promelas*) were also collected from North Fork Little Muddy Creek in October 2022 (BIO-WEST 2023).

Threatened and Endangered and Special-status Species

The USFWS Information for Planning and Consultation (IPaC) report for the Project indicated that the following federally listed and candidate species could be “potentially affected by activities at this location” (USFWS 2023a):

- Bonytail (*Gila elegans*); endangered
- Colorado pikeminnow (*Ptychocheilus lucius*); endangered
- Humpback chub (*Gila cypha*); threatened
- Razorback sucker (*Xyrauchen texanus*); endangered
- Yellow-billed cuckoo (*Coccyzus americanus*); threatened
- Monarch butterfly (*Danaus plexippus*); candidate species
- Ute ladies’-tresses (*Spiranthes diluvialis*); threatened

A desktop review of the scientific literature and information on resource agency websites [e.g., the Wyoming Natural Diversity Database (WYNDD)] in conjunction with reconnaissance visits and 2022 surveys suggest that only two of these species – the Monarch butterfly and Ute ladies’-tresses (ULT) – could occur in the TFF vicinity.

Monarch butterflies can be found anywhere within their range where milkweed and other insect-pollinated flowers are common, including in weedy margins between buildings or adjacent to roads. They have been observed across the state of Wyoming but are regarded as rare (WYNDD 2023a). Very little is known about their distribution, abundance, and seasonal movement (timing of migration) in Wyoming. No milkweed or adult monarch butterflies were observed during the June 2022 surveys.

Because the IPaC Project review indicated that ULT could be present, a wetland survey was completed in early September 2022 to determine if any contained ULT or suitable habitat for the species (Tetra Tech 2023c). Individual ULT bloom from late July through September, depending on site conditions and moisture availability (Fertig et al. 2005; WYNDD 2023b). Blooms have been recorded as late as October (57 FR 2048). Based on studies of other *Spiranthes* species, ULT are thought to live as long as 50 years (Heidel 1998). The plant is suited to well-drained, stabilized alluvial terraces and sparsely vegetated floodplains or wet meadows where a perennial water table exists at no greater than 18 inches below the soil surface. Based on surveys conducted in Wyoming and records from the WYNDD (Fertig and Thurston 2003), ULT have not been recorded in Lincoln County. All known occurrences in Wyoming are in the eastern half of the state (WYNDD 2022). According to the recently published *Species Status Assessment for Ute Ladies'-Tresses* (USFWS 2023b), two populations have been discovered in the Upper Green River Analytical Unit (Basin); neither population was in Wyoming.

No ULT or other similar orchid species were observed during the September 2022 habitat assessment and survey (Tetra Tech 2023c). The largest area of potentially suitable habitat in the TFF vicinity was the riparian zone along North Fork Little Muddy Creek. Areas judged to provide potentially suitable habitat for ULT were re-surveyed in mid-August 2023 in accordance with the USFWS's "Interim Survey Requirements for Ute Ladies-tresses Orchid (*Spiranthes diluvialis*)," which calls for three consecutive annual surveys to rule out the presence of the species. No ULT were found during the August 2023 surveys. The areas deemed to have potentially suitable habitat will be re-surveyed during the July 20-August 31 blooming period in 2024.

No federally listed species, species proposed for listing, or candidates for listing were observed by biologists conducting wildlife surveys in June 2022 and June 2023 (Tetra Tech 2023b, 2023d). None has been observed during other (less systematic) reconnaissance surveys of wildlife. None was observed during aquatic and wetland surveys in 2022 (BIO-WEST 2023; Tetra Tech 2023a). DOE has determined there would be no effect on threatened and endangered species because none were observed during surveys and no potentially suitable habitat is located within the project area.

In addition to the federally listed and candidate species, the IPaC report indicated that five Birds of Conservation Concern (BCCs) could be present: Cassin's finch (*Carpodacus cassinii*), golden eagle, rufous hummingbird (*Selasphorus rufus*), Western grebe (*Aechmophorus occidentalis*), and willet (*Tringa semipalmata*). Two golden eagles, an adult and a sub-adult, were observed approximately 1.3 miles north of the TFF site during 2022 surveys and a sub-adult bald eagle was observed outside of the survey area, well north of the TFF site. The willet and Western grebes were observed on a Naughton Power Plant pond approximately 3.5 miles northwest of the TFF site.

Three species designated Species of Greatest Conservation Need (SGCN) by WGFD – Brewer's sparrow (*Spizella breweri*), sage thrasher (*Oreoscoptes montanus*), and white-tailed prairie dog (*Cynomys leucurus*) – were observed in the TFF area by biologists conducting surveys in both 2022 and 2023 (Tetra Tech 2023b, 2023d). These "sagebrush obligate" species rely on contiguous tracts of sagebrush steppe habitat for foraging, escape cover, and nesting. Species of Greatest Conservation Need are those whose conservation status warrants increased management attention, and funding, as well as consideration in

conservation, land use, and development planning in Wyoming (WGFD 2017a). Species of Greatest Conservation Need are not formally protected by the state of Wyoming. Some SGCN – Bald and golden eagles, virtually all migratory birds – receive varying degrees of federal protection by way of the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act.

Although not collected during the fish surveys for the TFF project, one fish designated a SGCN, the roundtail chub (*Gila robusta*), was collected in North Fork Little Muddy Creek by WGFD biologists in 2004 and 2018 (Lockwood 2022). All of the roundtail chubs collected by WGFD were in the lower reaches of the stream, just above its confluence with Little Muddy Creek. It is possible that a culvert in this area is an obstacle to upstream movement (Lockwood 2023).

While no greater sage-grouse (*Centrocercus urophasianus*) were observed during 2022 or 2023 surveys, potential sign (scat) was observed in the TFF area. Based on data received from the WGFD, no greater sage-grouse leks (breeding areas) or core population areas occur in the TFF vicinity (WGFD 2021a; 2021b; 2023). The nearest core population area (“Sage”) is approximately 0.7 miles east of the TFF area (Figure 3.3.1-1). The nearest occupied lek (“G – Little Round Mountain NW”) is approximately 4.3 miles east of the TFF area. There are no Connectivity Areas or Winter Concentration Areas in Lincoln County.

Adult male and female pronghorn “antelope” (*Antilocapra americana*) were not observed during 2022 or 2023 surveys within the TFF area, but they were observed in the vicinity. The TFF site lies in the northern part of a broad valley called Cumberland Flats that extends approximately 26 miles from the Kemmerer area south almost to Interstate 80 (I-80). Most (106 square miles/68,000 acres) of Cumberland Flats has been designated pronghorn crucial winter, year-long range by (WGFD 2023b). No live mule deer or elk were observed during surveys, but their scat and tracks were noted outside the project area.

3.3.1.2 Environmental Impacts Related to Ecological Resources

Construction – Terrestrial

Approximately 31 acres of Inter-mountain Basin Big Sagebrush Shrubland and 7 acres of Inter-mountain Basin Greasewood Flat vegetation would be removed due to clearing and grading activities for the TFF, entrance road, and stormwater conveyance. In addition, another 23 acres of Inter-mountain Basin Big Sagebrush Shrubland vegetation and 8 acres of Inter-mountain Basin Greasewood Flat vegetation would be disturbed for construction laydown areas east and south of the TFF and a utility area immediately west of the TFF.

The area proposed for development (approximately 69 acres) would represent a minor portion of the 32 million acres of shrubland and grassland in the Wyoming Basin. Further, large flocks of sheep have been herded through the project area during fall and spring migrations for generations and its vegetation communities are less than pristine. Based on the 69 acres of native shrubland and grassland that would be affected and the fact that these vegetation communities have been previously disturbed by agricultural activities, construction impacts to vegetation communities would be minor.

Clearing and grading 69 acres within the construction zone is expected to lead to mortality of some small, less-mobile mammals and reptiles, and could (in late spring and summer) directly impact nesting birds with eggs or young. Burrowing animals, like prairie dogs and ground squirrels, are especially vulnerable to heavy equipment impacts and have been observed in the Project vicinity.

Noise, human activity, and movement of heavy equipment tend to displace birds, larger mammals, and some more-mobile reptiles. These animals generally move to areas nearby that offer suitable habitat and

lower levels of disturbance. Depending on the species and individual, some of the displaced animals may return to the area surrounding the facility once construction has been completed. Some species are more sensitive to disturbance than others and may be permanently displaced.

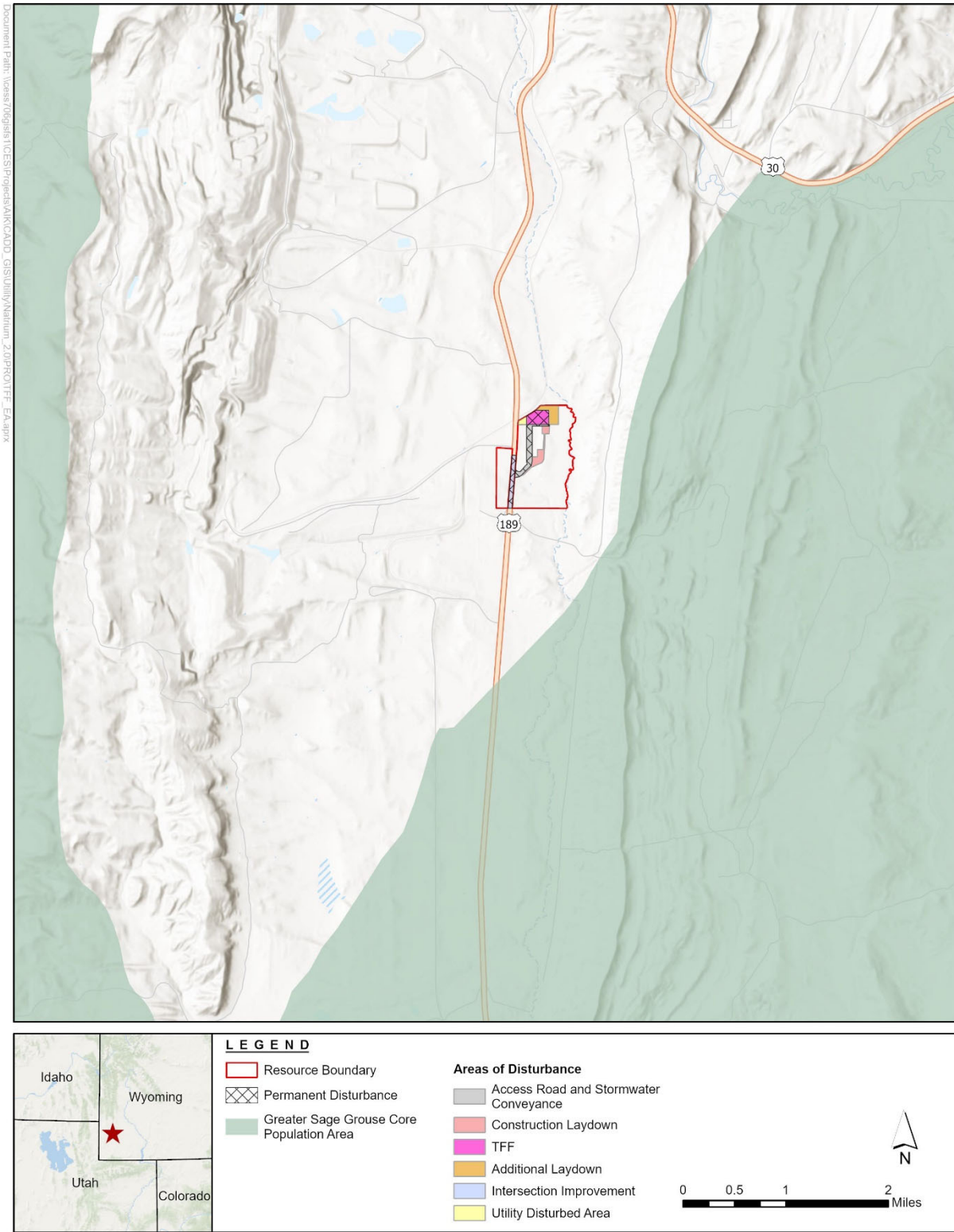


Figure 3.3.1-1 Greater Sage-Grouse Population Area

As noted earlier, the proposed TFF lies in the northeast part of a 68,000-acre area managed as crucial winter range/year-long range for antelope by WGFD. Construction noise and activity could disturb antelope that customarily forage in this part of the range or that move through it during seasonal migrations. Cumberland Flats is approximately four miles wide in the area of the proposed TFF (see Figure 3.3.1-2). Given the large expanse of sagebrush shrubland that surrounds the proposed TFF to which antelope could disperse if disturbed, the impact of construction would be limited to some minor energetic expenses associated with avoiding the noise and activity of the construction area.

The Migratory Bird Treaty Act (MBTA) prohibits the “take” (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS. Preconstruction activities such as grubbing and clearing could impact shrub-nesting birds (e.g., Brewer’s sparrow, sage thrasher), ground-nesting birds (e.g., horned lark, western meadowlark, killdeer), and burrowing owls, which nest in burrows dug by prairie dogs, ground squirrels, and badgers.

To the extent practicable, vegetation clearing will be carried out in fall, winter, and early spring to avoid the avian breeding season, generally March 1 through August 31. Should it be necessary to clear vegetation within the March 1-August 31 timeframe, preconstruction surveys of the areas scheduled to be disturbed will be conducted within seven days of construction. TerraPower would follow conservation measures noted in Section 2.6 of this EA to minimize impacts to wildlife populations.

Based on the 69 acres of native shrubland and grassland that would be affected and the fact that these vegetation communities have been previously disturbed by agricultural activities (grazing livestock), construction impacts to vegetation communities would be minor. Small numbers of burrowing mammals and reptiles could be eliminated by earth-moving equipment, but larger mammals (e.g., pronghorn and mule deer) and non-breeding birds would in most cases simply move to nearby areas with a lower level of disturbance. Impacts to vegetation communities and wildlife from construction would therefore be minor. As noted in the previous paragraph, ground clearing will be carried out in fall, winter, and early spring to the extent practicable to minimize impacts to breeding migratory birds. Should it be necessary to clear vegetation during the nesting period, preconstruction nest surveys will be conducted, and any nests discovered will be flagged and avoided until young birds fledge or nest failure is apparent, as discussed in Section 2.6.4. Impacts to nesting migratory birds would also be minor.

Construction – Aquatic

There are no waterbodies on the TFF site and therefore there would be no direct impacts to aquatic communities. There could be indirect impacts to water quality and aquatic communities if soil disturbed during construction of the TFF or the proposed roads and culverts is carried into North Fork Little Muddy Creek with storm water runoff. However, the distance between the proposed TFF construction area and the stream is more than 1,500 feet, and the stormwater and erosion control BMPs that will be implemented as a condition of the LCGP are expected to minimize these impacts. Similarly, the distance between the proposed culverts and North Fork Little Muddy Creek is approximately one-half mile, and permit-mandated stormwater and erosion control measures should limit impacts to North Fork Little Muddy Creek’s aquatic communities.

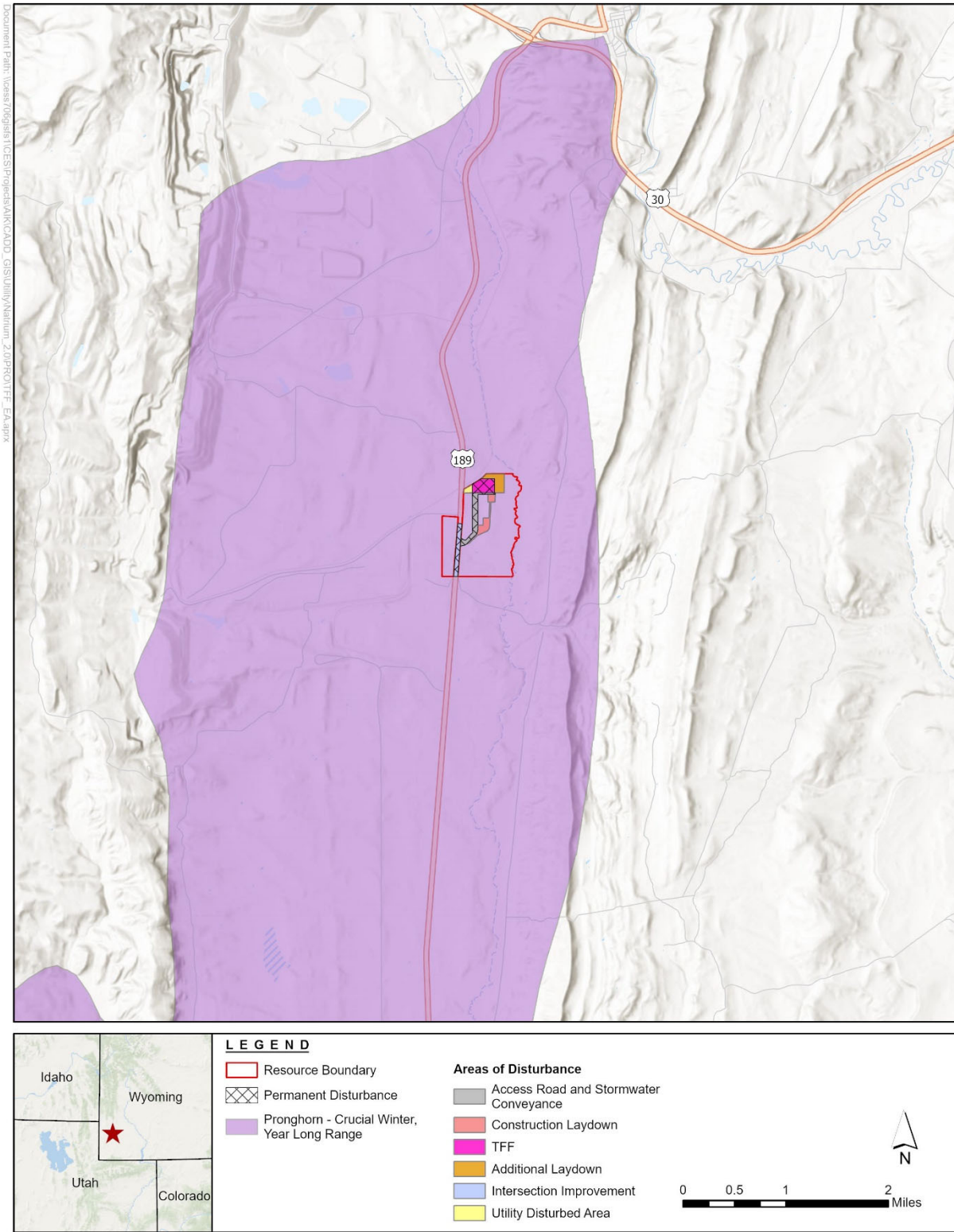


Figure 3.3.1-2 Pronghorn Crucial Winter, Year-Long Range

North Fork Little Muddy Creek, notwithstanding its 3B Surface Water Classification, supports a reasonably diverse fish community, including one Wyoming Species of Greatest Conservation Need, the roundtail chub. TerraPower intends to fully comply with Wyoming's Surface Water Quality Standards, which include (Chapter 1, Section 32) specific protections for aquatic communities:

“Class 1, 2, and 3 waters of the state must be free from substances, whether attributable to human-induced point source discharges or nonpoint source activities...which will adversely alter the structure and function of indigenous or intentionally introduced aquatic communities.”

The aquatic biota of North Fork Little Muddy Creek are hardy, pollution-tolerant taxa adapted to extreme fluctuations in flow, temperature, and levels of both dissolved and suspended solids. Temporary increases in turbidity and sediment loads, if they occur, are expected to have a minor, localized impact on benthic organisms and little or no impacts on fish, beyond a possible avoidance response (moving up- or downstream to a less turbid stream reach).

The proposed temporary access road and entrance road would cross an unnamed ephemeral stream, as shown in Figure 2.1-1. The preliminary design indicates that construction of the proposed roads and culvert crossings would impact this stream. In the event that the stream is determined to be a jurisdictional tributary under the Clean Water Act, the roads- and culvert-building activities would require a preconstruction notification (PCN) to the USACE and be permitted under NWP 14. The Wyoming Regulatory Office's Regional Conditions require specific BMP implementation regarding culvert installation and recommend avoiding disturbance in fish spawning locations to the extent practicable under NWP 14 (USACE 2021). Impacts to North Fork Little Muddy Creek and its aquatic communities would be minor and temporary.

Operations and Maintenance

Operations and maintenance impacts would be limited to minor noise-related disturbance of wildlife in shrublands around the TFF from facility equipment and traffic to and from the facility. The facility would have no liquid discharges, and therefore there would be negligible impacts to North Fork Little Muddy Creek by routine operations. The stormwater pond would be designed at an adequate slope to allow for wildlife to exit should they enter the water therefore impacts would be negligible. Fencing around the TFF would have enough exit points to allow any trapped wildlife to escape therefore impacts would be negligible.

Decommissioning

Decommissioning would entail the removal of all buildings and infrastructure. Once buildings and infrastructure are removed, and excavations filled, the original grade and drainage pattern would be re-established, to the extent feasible. Soil would be de-compacted and amended, as necessary, to ensure rapid establishment of vegetation. Native seed mixes (or specific plant species that provide wildlife habitat) would be planted to re-establish vegetation communities, based on recommendations of state natural resource agencies.

As currently envisioned, there will be no actively managed wildlife habitat on the TFF site. There may be some landscaping around buildings (grasses and shrubs), but nothing that would constitute wildlife habitat. Consequently, there will be no direct impacts to native plant communities or wildlife from decommissioning. Terrestrial impacts from decommissioning would be limited to disturbance of wildlife in areas immediately adjacent to the construction site (from demolition noise, movement of equipment and vehicles, establishment of temporary storage areas).

Because there are no waterbodies in the TFF area, there would be no direct decommissioning impacts on aquatic communities. Decommissioning impacts to down-gradient wetlands and North Fork Little Muddy Creek would be avoided to the extent feasible through the use of BMPs. As discussed in the potential construction impacts section, it would be necessary to obtain a LCGP with approved SWPPP from WYDEQ prior to ground disturbing activities. The SWPPP will identify BMPs that will be used to limit decommissioning-related impacts to North Fork Little Muddy Creek water quality and aquatic life.

3.3.1.3 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Therefore, there would be no construction-related impacts to terrestrial or aquatic communities.

3.3.1.4 Cumulative Impacts

Given proximity, the only existing or Proposed Project expected to have incremental cumulative impacts to the construction of the TFF and entrance road is the proposed Kemmerer Unit 1 project. Kemmerer Unit 1 and support facilities are expected to have a larger footprint than TFF, and a correspondingly larger area of disturbance (anticipated to be more than 200 acres). Roughly three times as many small burrow-dwelling mammals and reptiles would be directly impacted by construction of Kemmerer Unit 1 than by the TFF and entrance road. Expanding the area of disturbance to evaluate cumulative impacts (combining the TFF and Kemmerer Unit 1 areas of disturbance) would not encroach on the habitat of any federally listed species, candidate for federal listing, or species proposed for federal listing, but would mean disturbing relatively more migratory birds in spring and summer. The surrounding area of noise-related disturbance would also be larger, based on the expanded perimeter. Ground disturbing activities would be scheduled to avoid the spring-summer nesting period of migratory birds. If this is infeasible, preconstruction nest surveys would be conducted so that nests in the construction zone can be marked and avoided. Both TFF and Kemmerer Unit 1 are within the Pronghorn Crucial Winter Range/Year-long Range. The total acreage disturbed for both projects is expected to be less than 0.5 percent of the Cumberland Flats pronghorn crucial winter range/year-long range and have little or no impact on its management.

The amount of disturbed soil that would move into North Fork Little Muddy Creek with storm water as a result of Kemmerer Unit 1 construction is likely to be larger than that from TFF and entrance road construction because a larger area is expected to be disturbed. The combined effect of both projects on North Fork Little Muddy Creek's water quality and aquatic communities would still be negligible, however, because of the mitigation measures imposed by the LCGP and, if applicable, USACE NWP 14.

Based on the impact thresholds in Section 3.1, the cumulative impacts of TFF construction and Kemmerer Unit 1 construction on plant and animal communities would be detectable, measurable, and long-term but minor and would not destabilize any wildlife populations. While impacts would be noticeable locally, they would not be evident on a landscape scale (i.e., Upper North Fork Little Muddy Creek watershed) or regional scale (i.e., Wyoming Basin). As noted previously, the TFF site and Kemmerer Unit 1 site are not high-quality wildlife habitats, as they are adjacent to US-189 and have historically been used by the herds of sheep that are moved through the valley in spring and fall.

3.3.2 Cultural Resources

Historic and cultural resources are vestiges of past human activities and include archaeological sites, buildings, structures, districts, and objects that illustrate, embody, or result from human activities. These resources also include traditional cultural properties that are important to a living community of people for maintaining their culture. Historic and cultural resources are regarded as historically significant if they have been listed in or determined eligible for the National Register of Historic Places (NRHP). Such resources are termed historic properties. A resource is eligible for the NRHP if it retains integrity of location, design, setting, materials, workmanship, feeling, and association and meets at least one of four criteria, including (a) association with important historical events; (b) association with important historical persons; (c) representation of an important architectural or cultural design or construction; or (d) having the potential to yield important historical information (36 CFR § 60.4).

In 2022, Tetra Tech conducted a Class III cultural resource inventory of a 1,508-acre study area (Karpinski and Karpinski 2023a). The study area includes the direct effects APE (direct APE) for the TFF, entrance road, and stormwater conveyance channel. The direct APE is the area within which construction-related ground disturbances may occur that could impact archaeological or other cultural resources. The inventory was conducted over four field events: April 26 to May 3, 2022; May 10 to May 17, 2022; July 23 and 24, 2022; and October 19, 2022. A team of three professional archaeologists, accompanied by Tribal Cultural Specialists from the Northern Arapaho Tribe, Comanche Nation, and Arapaho Tribe of Oklahoma, performed the inventory. Due to the relatively sparse vegetation and the generally limited potential in the inventoried area for the accumulation of sediments, the primary survey method was systematic surface inspection. The inventory was accomplished using pedestrian transects spaced no further than 30 meters (100 feet) apart and oriented parallel within the study area, depending on topography.

Potential indirect effects are those that are distant in time or space from the project. There are various types of indirect effects that could affect historic properties, including visual, auditory, vibratory, and changes in land use, but, given the local environment and the types of historic properties in the area, it was determined that only visual indirect effects are of concern. These effects would result from the result of a change in the visual setting of a historic property due to the construction of Project buildings and structures. An analysis of the potential indirect effects of the TFF identified individual resources that meet the WY SHPO's definition of visually sensitive resources—i.e., historic properties whose eligibility to the NRHP rest in part on the visual setting within which they are located—within a 5-mile radius of the TFF building, which comprises the indirect APE for the Proposed Project. The analysis then collected field data at the visually sensitive resources to confirm intervisibility (or the ability of two or more objects to be seen from each other) with the TFF and to assess the degree of visual impact on each resource from the project. Fieldwork for the visual effects analysis took place on July 10 and 11, 2023. For the identification stage of the visual impact analysis, Tetra Tech utilized a GIS (geographic information system) -based analysis with the current WY SHPO database layer showing the location of known visually sensitive historic properties and a 10-meter (33-foot) grid resolution digital elevation model DEM augmented by a 1-meter (3.3-foot) vegetation layer. Tetra Tech assumed that the maximum height above grade of the proposed structures of the TFF was 39.6 meters (130 feet). The resulting line-of-sight analysis categorized the indirect APE into “more visible,” “partially visible,” and “not visible” areas from TFF. The known cultural resource layer obtained from the WY SHPO database was then overlain with the line-of-sight analysis to determine which visually sensitive historic properties in the indirect APE would have a view or partial view of the TFF. A field investigation of these properties involved visiting each identified

historic property, verifying intervisibility, and utilizing a standard protocol to assess the visual impact of the proposed construction (Karpinski and Karpinski 2023a, 2023b).

3.3.2.1 Affected Environment

Direct APE

The 2022 cultural resources survey recorded four archaeological sites situated partly or wholly within the direct APE for the Proposed Project. These include two prehistoric period sites, one historic period site, and one multicomponent (prehistoric period and historic period) site (Table 3.3.2-1). The WY SHPO had previously determined that one of the sites is eligible for the NRHP; the site was revisited during the 2022 survey and assessed again for eligibility. The survey recommended that the three other, newly identified sites do not meet the criteria to be eligible to the NRHP.

In its entirety the historic period resource 48LN2697, the Cumberland Branch of the Union Pacific Railroad, was determined as eligible for the NRHP by WY SHPO in the 1990s under Criterion A, due to the rail line’s association with historically important coal mining along Oyster Ridge, east of Cumberland Flats. Segment 4 of the resource, 48LN2697_4 is an abandoned section of the branch line that crosses the eastern side of the TFF project area and continues along the eastern side of the resource boundary. This portion of the resource consists of the engineered grade, but due to loss of key features such as rails, ties, and ballast, the abandoned segment of the rail line is recommended as non-contributing to the property’s NRHP eligibility (Karpinski and Karpinski 2023a).

The three newly identified sites, including two prehistoric resources and one multicomponent resource, are recommended by the 2022 archaeology field team as not eligible for the NRHP. They are not associated with a historically important event or person, do not represent a well-defined style or design or the work of a master, and they have low information potential (Karpinski and Karpinski 2023a).

The 2022 cultural resources survey also identified six Isolated Resources (IRs) in the direct APE. These included five prehistoric period IRs and one historic period IR (Table 3.3.2-1). IRs are not recommended as eligible for the NRHP, because they are not associated with a historically important event or person, do not represent a well-defined style or design or the work of a master, and have low information potential (Karpinski and Karpinski 2023a).

Table 3.3.2-1 Inventoried Historic and Cultural Resources within the Proposed Project’s Direct APE

Resource Number	Resource Type	Recommended NRHP Status
48LN2697_4	Historic period site: abandoned segment of Union Pacific Cumberland Branch railroad alignment.	Entire Cumberland Branch alignment previously determined Eligible under Criterion A for its association with the region’s historically significant coal mining. The segment is non-contributing due to lack of integrity.
48LN8955	Prehistoric site.	Not NRHP eligible.
48LN8975	Prehistoric site.	Not NRHP eligible.
48LN8976	Multicomponent site: historic artifact scatter and feature with low-density prehistoric artifact scatter.	Not NRHP eligible.

Resource Number	Resource Type	Recommended NRHP Status
IR WY 2022 1540	Prehistoric isolate.	Not NRHP eligible.
IR WY 2022 1618	Prehistoric isolate.	Not NRHP eligible.
IR WY 2022 1631	Historic isolate.	Not NRHP eligible.
IR WY 2022 1633	Prehistoric isolate.	Not NRHP eligible.
IR WY 2022 1634	Prehistoric isolate.	Not NRHP eligible.
IR WY 2022 1686	Prehistoric isolate.	Not NRHP eligible.

As of September 2023, consultation between DOE and WYSHPO concerning the recommendations for NRHP eligibility is pending.

Indirect APE

Site 48LN740

Site 48LN740 is a large multicomponent site located between the planned entrance road/drainageway and US-189. It was first identified in the 1980s and was determined eligible because of its potential to provide important information about the prehistory of southwestern Wyoming. A portion of the site was destroyed by construction of the present alignment of US-189, but the adverse effects of construction were mitigated by data recovery. The 2022 survey confirmed the presence of extensive prehistoric period surface deposits outside the highway ROW and indicated that an extant portion of the site may still include intact subsurface deposits. The 2022 survey recommended that the prehistoric archaeological component of the site is extant and remains eligible for the NRHP under Criterion D due to its information potential. The historic component of the site is a low-density trash scatter that does not contribute to the NRHP eligibility of the site (Karpinski and Karpinski 2023a).

An access road off US-189 crosses the southern section of Site 48LN740. This two-track access road has been in existence for several decades and was originally the primary means of accessing the TFF site. At the start of site characterization work in late 2021, TerraPower voluntarily instituted protective measures to avoid impacts to the archaeological resource by traffic using the road. These measures included placement of a geotextile and gravel road fill cover on top of the existing two-track road and installing markers on the edges of the road to prevent traffic from entering adjoining archaeologically sensitive areas. In consultation with DOE, WY SHPO determined that for continued, limited use of the access road, traffic should be restricted to light-duty vehicles only, and efforts should be made to discontinue use of the road. The proposed road, to be located east of Site 48LN740, accomplishes this discontinuation and means that the TFF will have no additional effects on the historic property. DOE will be consulting with WY SHPO on this previous activity separately under Section 106 of the NHPA.

Visual Effects

The identification phase of the visual effects assessment identified six archaeological sites within five miles of the TFF that could potentially be visually impacted by the Proposed Project. The sites have previously been determined eligible for the NRHP by WY SHPO. The settings of these cultural resources contribute to the WY SHPO's determination that they are NRHP eligible (Table 3.3.2-2).

Table 3.3.2-2 Visually Sensitive Historic Properties Visible within a 5-Mile Radius of the TFF

Resource Number	Description	Estimated Distance from TFF to Resource Centroid
48LN317	Prehistoric rock art and camp	3.3 miles
48LN1272	Glencoe Mine	1.1 miles
48LN1273	Lincoln Start Mine	2.2 miles
48LN2739_2	Kemmerer to Cumberland Highway	4.5 miles
48LN4011/ 48LN4428*	Prehistoric artifact scatter and historic Glencoe townsite	0.9 mile
48LN4026	Blazon Railroad Spur	1.9 miles
48LN4428*	Historic Glencoe townsite	0.9 mile

*The contributing portion of 48LN4011 was re-recorded in 2006 as 48LN4428. Environmental Impacts Related to Historic and Cultural Resources

Construction

Construction will entail ground disturbance in the direct APE in both temporarily and permanently impacted areas, including the TFF, laydown areas, the new entrance road and US-189 intersection, and the stormwater conveyance channel (Karpinski and Karpinski 2023b). Tetra Tech used BLM Manual 8431 – *Visual Resource Contrast Rating* (BLM 1986) as the methodology and guidelines to complete the visual impact assessment for visually sensitive cultural resource sites within the Project indirect APE (Karpinski and Karpinski 2023b). Results are shown in Table 3.3.2-3. One historic property could not be accessed, Site 48LN317, and no analysis could be completed. Site 48LN317 is, however, over 3 miles away from the Proposed Project. The analysis indicates that construction of the TFF would have no effect on the remaining five historic properties, and the impact of construction would be negligible. Sections 3.3.7.1 and 3.3.7.2 describe potential US-189 permanent intersection design options. Potential impacts to historic properties associated with each of the intersection design options are presented in Table 3.3.7-5. DOE’s Section 106 consultation with the WY SHPO is ongoing and is anticipated to be a finding of no adverse effect.

Table 3.3.2-3 Contrast Analysis of Visually Sensitive Historic Properties within a 5-Mile Radius of the TFF

Resource No.	Description	Degree of Visual Change	Integrity of Setting	Effect Recommendation
48LN317	Prehistoric rock art and camp	N/A – No Access	Undetermined	Not Evaluated
48LN1272	Glencoe Mine	Strong	Low – Site Altered	No Effect
48LN1273	Lincoln Star Mine	Not Intervisible	N/A	No Effect
48LN2739_1	Kemmerer to Cumberland Highway	Weak	High	No Effect
48LN4011/ 48LN4428	Historic Glencoe townsite	Weak (lower elevation)/Strong (higher elevation)	Low – Site Altered	No Effect
48LN4026	Blazon Railroad Spur	Weak	High	No Effect

Operations and Maintenance

No additional impacts are anticipated in the direct APE during routine operations and maintenance of the TFF and roadway. No ground disturbances will occur in areas not previously subject to ground disturbance during construction.

No additional impacts are anticipated in the indirect APE during routine operations and maintenance of the TFF and roadway. It is not anticipated that any additional structures will be erected during the lifespan of the facility, and it is expected that if replacement or upgrade of buildings, structures, tanks, etc. associated with the TFF is needed, then the replacement or upgrade will be similar in size, location, and exterior appearance to the original construction.

Decommissioning

No additional impacts are anticipated in the direct APE during decommissioning of the TFF and roadway. Ground disturbances will be limited to previously disturbed areas, including staging and laydown areas.

Decommissioning of the TFF and roadway will return the landscape to its approximate preconstruction appearance. Aboveground buildings and structures will be removed, and disturbed areas will be restored to original grade if not needed by subsequent owners. Decommissioning will remove any visual intrusions on historic properties, and restoration of the affected areas will minimize long-term alterations to the landscape. No new impacts will occur.

3.3.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Ongoing land use and existing activities (e.g., grazing) would likely continue. Archaeological sites and IRs within the direct APE would remain undisturbed and subject only to natural site formation processes. There would be no impacts to cultural or historic resources. No potential visual intrusions would occur to historic and cultural resources that are visual receptors in the indirect APE. There would be no impacts to those resources. DOE will consult with WY SHPO regarding the treatment of activities already completed on the existing access road.

3.3.2.3 Cumulative Impacts

The only existing or Proposed Project in the vicinity that could potentially have cumulative impacts with the construction of the TFF and entrance road is the proposed Kemmerer Unit 1 project. If there is concurrence among DOE, WY SHPO, and other parties that construction of the TFF and entrance road will not adversely affect any historic properties and the impact is negligible, then these actions will not contribute cumulatively to any impacts that may result from building Kemmerer Unit 1. Indirect effects of construction of Kemmerer Unit 1 would be to increase the extent of the developed area to the south of the TFF; however, the TFF would remain one of the tallest structures in the developed area. The increase in extent of the developed area and addition of operational features such as the cooling tower plume might mean that visual impacts to some historic properties would be more intense than from the TFF and entrance road alone. However, the analysis of the visual effects of the TFF alone indicate the cumulative impact would remain negligible.

3.3.3 Hydrology

3.3.3.1 Affected Environment

The section considers effects of the TFF on surface and groundwater hydrology resources. The analysis is based in part on surveys and investigations of the Resource area. Water resources are of increasing concern particularly for the western North American regions where increased drought has become more common. For the western region 2000-2021 was the driest 22-year period (Williams et. al. 2022). Although this remains an issue of note for the region the winter of 2022-2023 saw a roughly 117 to 158 percent increase in snow water equivalent (SWE) in southwest Wyoming as shown in Figure 3.3.5-1 (CIRES 2023).

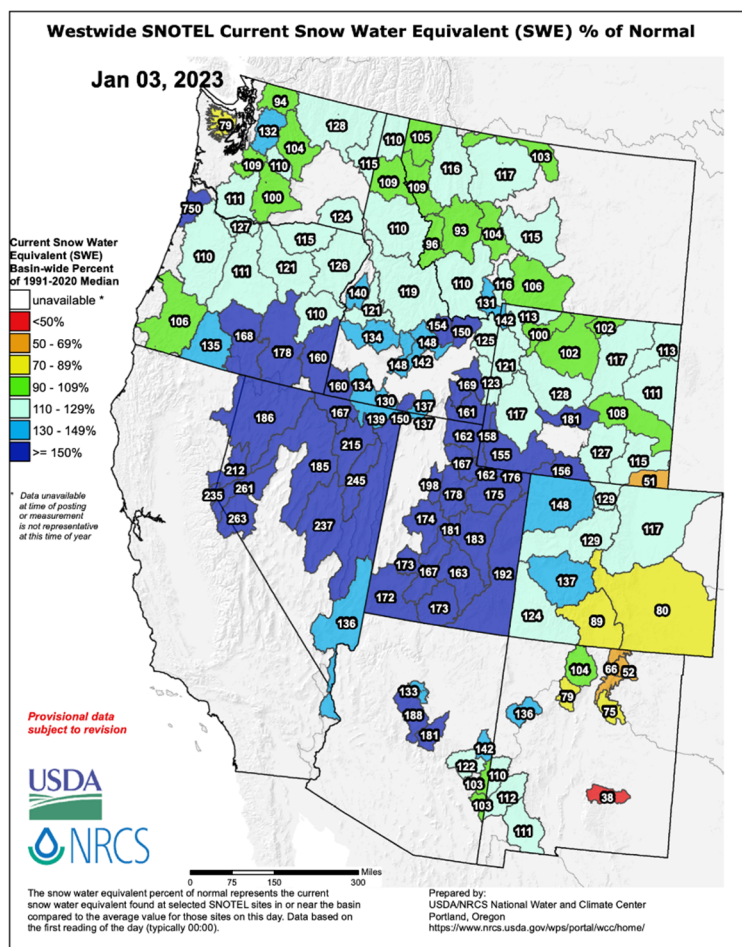


Figure 3.3.5-1 Snow Water Equivalent

Groundwater

The Wyoming Framework Water Plan is a statewide overview of water resources and developed based on work performed by the Wyoming Water Development Commission (WWDC). WWDC has divided the state into seven basins, with each basin providing input to the Water Plan. The TFF is located on the western edge of the Green River Basin, near the town of Kemmerer. According to WWDC, the project is in an area identified as a major aquitard as shown in Figure 3.3.5-2, and therefore not a source of potable

water. Additionally, the TFF is located greater than 5 miles from a sole source aquifer. As described by WWDC (2011):

“These formations are typically poor producers of groundwater, and the water is usually of poor quality. The sedimentary forms of these geologic units are predominantly composed of a high percentage of shale and show little potential for producing useable quantities of groundwater. Many of these low permeability, confining units are composed of thick, laterally extensive sequences of marine shale. Because of their clay content, these rocks are less brittle than sandstone or granite and are thus less susceptible to the permeability enhancement of fractures. These thick confining units act as regional seals between aquifers and greatly decrease permeability for vertical groundwater flow.”

At the Project site, the Hilliard Shale is present beneath the surficial soils and extends to a depth of approximately 1,500 feet. Groundwater testing was conducted at 32.8 to 34.7 feet below ground surface in monitoring well OW-122-Mat which confirms the description provided by WWDC (2011).

Surface Water

The TFF site occupies a slight rise 433 feet west of North Fork Little Muddy Creek, a small intermittent stream (Figure 2.1-1). North Fork Little Muddy Creek flows south and joins Little Muddy Creek, a larger perennial stream, approximately 11 miles from the TFF site. There are no wetlands, streams, municipal storm sewers, or ponds in the TFF site area. There are no surface waters within 2,000 feet of the Project which are listed as impaired by sediment, suspended solids, or turbidity (WYDEQ Undated). A culvert will be installed as a part of the new entrance road construction to ensure water flow ability for the unnamed ephemeral stream in the area.

The 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA) for North Fork Little Muddy Creek as well as its tributaries near the site is presented in Figure 3.3.5-3 (FEMA 2011).

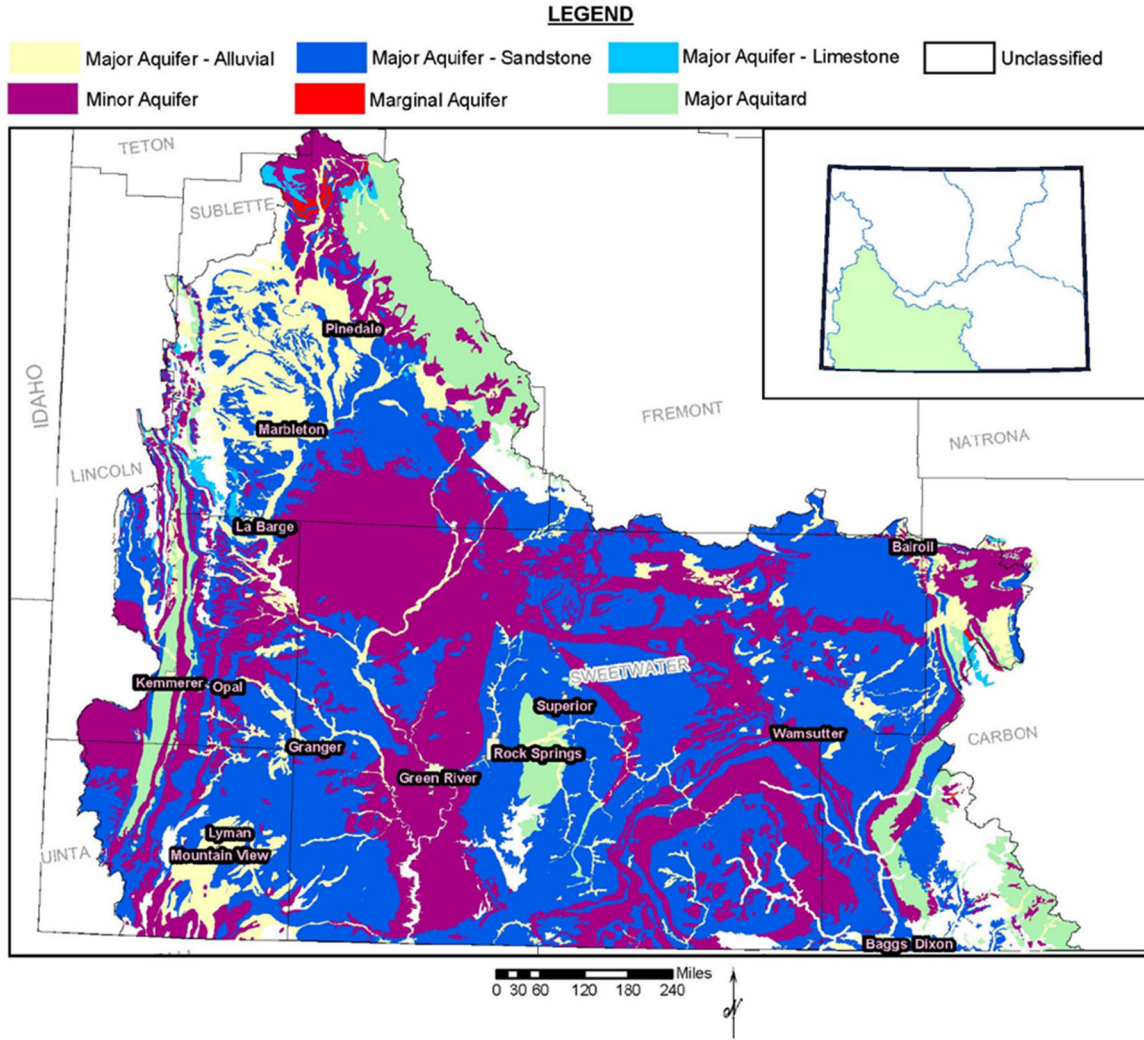


Figure 3.3.5-2 Hydrogeology Map

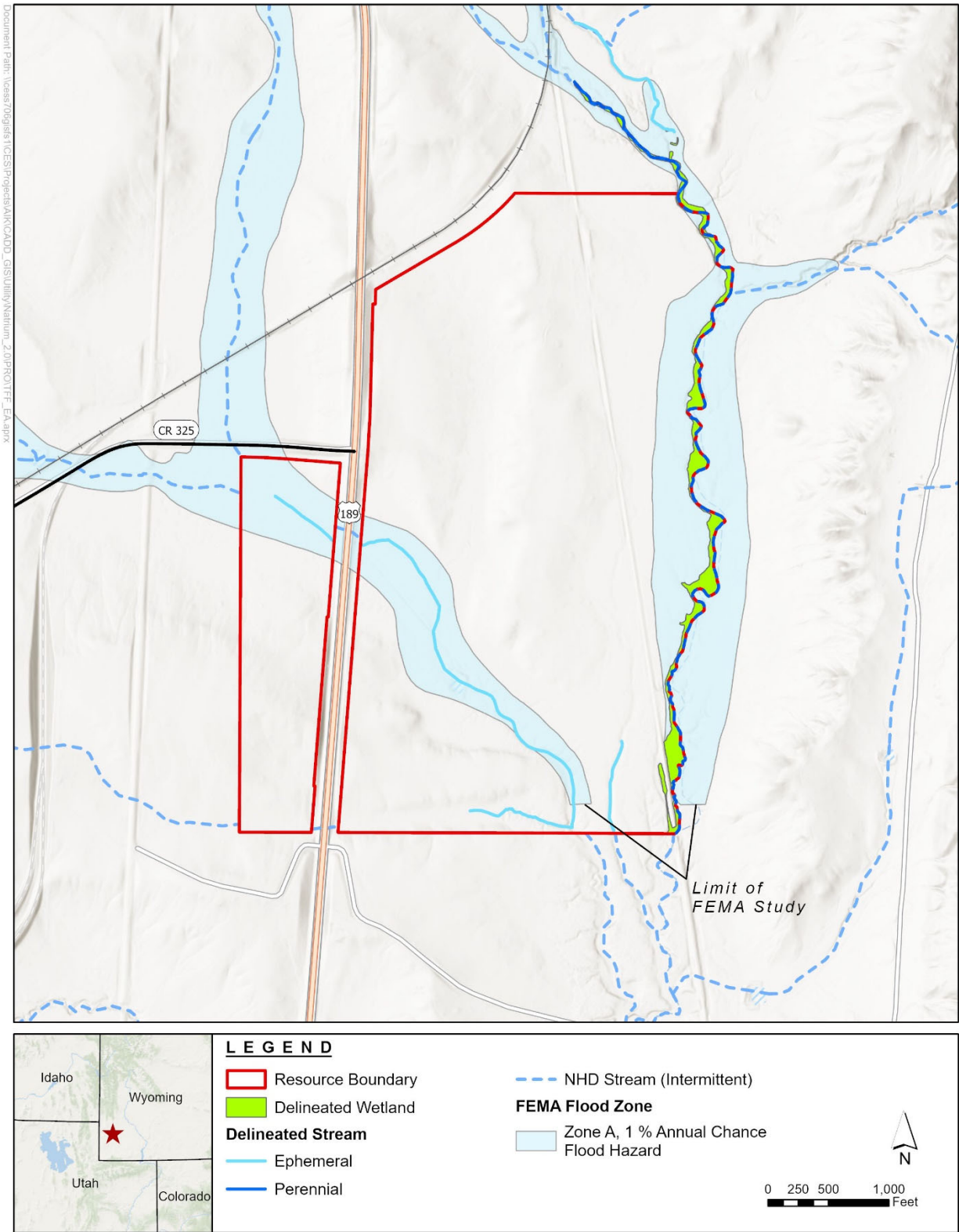


Figure 3.3.5-3 Floodplain Map

3.3.3.2 Environmental Impacts Related to Hydrology

Construction

Groundwater

Excavations for the TFF consist of as many as eight shafts ranging in depth from 56 feet to 86 feet below ground surface. An evaluation of dewatering requirements using hydraulic conductivity values from packer and slug tests, water level measurements from field monitoring and shaft dimensions, indicates that under a conservative scenario with all eight shafts instantaneously excavated, the total dewatering rate would be approximately 43 gallons per minute (GPM). The actual dewatering rate will likely be less than this value as construction scheduling will likely stagger the opening of the excavations. In addition, once the shafts have been excavated a steel liner will be installed and grouted in place, limiting further groundwater inflow to the excavation. As described above, the TFF would be constructed in an area designated by the WWDC as a major aquitard, and therefore no potable groundwater supply exists at the site and the site is not near any sole source aquifers. Impacts resulting from the hydrologic alteration of groundwater from dewatering, if it occurs, would be short-term and minor and groundwater would return to pre-existing conditions.

As described above an evaluation of dewatering requirements indicates that under a conservative scenario with all eight shafts instantaneously excavated, the total dewatering rate would be approximately 43 GPM. The conservative estimate of timeframe to complete that activity is roughly 6 months. The actual dewatering rate will likely be less than this value as construction scheduling will likely stagger the opening of the excavations. In addition, once the shafts have been excavated a steel liner will be installed and grouted in place, limiting further groundwater inflow to the excavation resulting in decreased dewatering.

Groundwater pumped from excavations would be pumped into holding tanks, and the water would then be used onsite for dust suppression. Using the water for dust suppression requires a Permit to Appropriate Groundwater through the State Engineer's Office.

Surface Water

The proposed road would cross the 100-year floodplain and an ephemeral stream that is directly connected to North Fork Little Muddy Creek. The construction of the entrance road across the floodplain could potentially alter the natural flow of water. It may lead to changes in the floodplain's hydrology, such as increased water velocities, changes in water course, or redirection of floodwaters. The proper design of the drainage system (including culverts, bridges, and stormwater management measures) will ensure that water can flow freely without causing any excessive damage to the road and only minor short-term impacts to the floodplain.

There is also a planned basin which for the construction phase of the Project be designed and installed as a sediment basin which will be altered to function as a water detention basin during operations and maintenance of the TFF. Drainage from the pond will be directed south along the entrance road and discharge to the floodplain. Construction of the road across the floodplain and stream could potentially obstruct sediment transport leading to increased erosion upstream and decreased sediment deposition downstream. Measures will be taken to maintain the natural deposition areas and protect against any erosion issues. All surface water will be managed in accordance with the WYDEQ LCGP as well as a floodplain development permit from Lincoln County.

Pre-development sheet flow drainage patterns will be maintained during and after construction activities. The sheet flow runoff from the construction access road is directed towards an unnamed tributary west of the construction site, which discharges to the North Fork Little Muddy Creek at a location south of the construction site. This unnamed tributary is ephemeral, only containing flow during large rainstorm events or during the spring snow melt. Sheet flow runoff from the pad area will flow to the east and to the west. Sheet flows to the west will also discharge to the same unnamed tributary, while sheet flows to the east will discharge to the North Fork Little Muddy Creek. Flows in the North Fork Little Muddy Creek are limited to discharges from the Naughton Power Plant located a few miles upstream. If not for the discharge from the power plant, this creek would also be ephemeral, only containing flows during large rainstorm and snow melt events.

For each of the potential impacts described during construction activities, the appropriate permit –e.g., NWP 14 for new road entrance and General WYPDES permit for large construction activities–would be obtained and requirements complied with to mitigating potential impacts. Work would be performed in accordance with applicable permits. During the design of the new road entrance the existing culvert under US-189 would be extended to be able to handle the required capacity subject to WYDOT approval. Impacts to surface water hydrologic alteration would be minor and short-term for the construction of the TFF.

Further, any spill onsite would be cleaned immediately with appropriate absorbent material. Absorbents used to clean spills will be removed and placed in closed, labelled containers per local, state, and federal regulatory requirements. All applicable local, state, and federal regulatory spill reporting requirements would be followed.

Operations and Maintenance

Groundwater

During operations there is no expected groundwater interaction associated with operations and maintenance of the TFF. The drilled shafts will be fully lined and protected with liners and engineering controls from groundwater intrusion. Individual standard operating procedures (SOPs) will be developed for all areas where sodium is present which includes specialized inspection and maintenance of the shafts ensuring there is no sodium interaction with groundwater and therefore impacts would be negligible.

Surface Water

During operations water for processes would be trucked in and stored in an onsite 20,000-gallon water storage tank. Bottled water would be used for potable water needs. Wastewater would be stored onsite until removed by an outside licensed vendor and transported to a permitted wastewater treatment facility. General site stormwater runoff would sheet flow passively into constructed stormwater features (stormwater pond, culvert). Any spill onsite would be cleaned immediately with appropriate absorbent material. Absorbents used to clean spills will be removed and placed in closed, labelled containers per local, state, and federal regulatory requirements. All applicable local, state, and federal regulatory spill reporting requirements would be followed. There are no expected releases during operation and maintenance expected to impact surface water and therefore impacts would be negligible.

Decommissioning

During decommissioning activity all above ground and subsurface structures would be restored unless otherwise specified. Impacts to groundwater and surface water are expected to be minor and would be associated with stormwater runoff of the site and possible dewatering associated with the restoration of

underground features. Because any discharges would be managed in accordance with BMPs and applicable permit requirements the impacts expected associated with hydrology during decommissioning are minor.

3.3.3.3 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Existing stormwater runoff patterns and groundwater would remain in place uninterrupted and therefore impacts would be negligible.

3.3.3.4 Cumulative Impacts

The nearby existing Naughton Power Plant as well as the proposed Kemmerer Unit 1 project would both have incremental cumulative impacts. The Naughton Power Plant obtains water from nearby upstream water sources, Viva Naughton Reservoir through an intake structure at Hams Fork, and is currently the main source of water flow into North Fork Little Muddy Creek via a discharge from the plant's WYPDES permit.

There could be concurrent ground disturbance with the adjacent Kemmerer Unit 1. Sheet flow runoff from construction areas for Kemmerer Unit 1 would drain west toward an unnamed tributary to the southwest and to the east, discharging to North Fork Little Muddy Creek. Measures will be taken to maintain the natural deposition areas and protect against any erosion issues. All surface water will be managed in accordance with the WYDEQ LCGP, and the cumulative effects of stormwater discharge would be minor.

The proposed Kemmerer Unit 1 is also anticipated to have dewatering impacting the same aquitard although the timing would be staggered and not occurring at the same time as the proposed TFF dewatering. Impacts resulting from the hydrologic alteration of groundwater from dewatering of both the TFF and proposed Kemmerer Unit 1 would be short-term and minor, and groundwater would return to pre-existing conditions.

3.3.4 Socioeconomics

The section considers effects of the Proposed Action on socioeconomic resources. Information provided in this section was obtained primarily from the Socioeconomic Report prepared by Tetra Tech on behalf of TerraPower (Appendix A). Industrial facilities near the TFF site include the PacifiCorp Naughton Power Plant (Naughton Plant) and the Kemmerer Operations coal mine. To predict the residential distribution of the in-migrating TFF workforce, TerraPower used the residential distribution of the employees of the Naughton Plant. Most Naughton Plant employees (88 percent) live in Lincoln or Uinta Counties. The largest cities in each of these counties are Kemmerer/Diamondville (Lincoln County) and Evanston (Uinta County). Only Lincoln County municipalities within a 75-minute commute are included in this analysis: Cokeville, Diamondville, Kemmerer, LaBarge, and Opal. The municipalities in the lower part of Lincoln and all of Uinta County form the area of impact (hereafter known as the Study Area) for this project. Figure 3.3.3-1 depicts the Study Area.



Figure 3.3.3-1 TFF Study Area.

3.3.4.1 Affected Environment

Population

Table 3.3.3-1 presents the U.S. Census Bureau’s (USCB) population projections for the Study Area and its municipalities. The populations of most of the municipalities within the Study Area decreased, from 2010 to 2020. The Study Area population decreased by 0.5 percent. Table 3.3.3-2 presents the Wyoming Economic Analysis Division’s (WEAD) population projections for the Study Area and its municipalities. The population of the Study Area is projected to slowly increase, from 2020 to 2040.

Table 3.3.3-1 Historical Population of the Study Area

Geography	USCB Decennial Census 2010	USCB Decennial Census 2020	Average Annual Percent Growth 2010-2020
Wyoming	563,626	576,851	0.2%
Lincoln County	18,106	19,581	0.8%
Cokeville	535	502	-0.6%
Diamondville	737	520	-3.5%
Kemmerer	2,656	2,415	-1.0%
LaBarge	551	394	-3.4%
Opal	96	64	-4.1%
Uinta County	21,118	20,450	-0.3%
Bear River	518	522	0.1%
Evanston	12,359	11,747	-0.5%
Lyman	2,115	2,135	0.1%
Mountain View	1,286	1,278	-0.1%
Study Area Total ¹	25,693	24,345	-0.5%

Sources: WEAD 2019 and USCB 2020a

¹Study Area population includes Lincoln County municipality populations within daily commuting distance plus total Uinta County population.

Table 3.3.3-2 Population Forecasts for the Study Area

Geography	2030	2040	Average Annual Percent Growth 2030-2040
Lincoln County	21,550	22,490	0.4%
Cokeville	624	651	0.4%
Diamondville	859	897	0.4%
Kemmerer	3,110	3,246	0.4%
LaBarge	639	667	0.4%
Opal	116	121	0.4%

Geography	2030	2040	Average Annual Percent Growth 2030-2040
Uinta County	19,710	19,790	0.04%
Bear River	497	499	0.04%
Evanston	11,435	11,481	0.04%
Lyman	1,986	1,994	0.04%
Mountain View	1,215	1,220	0.04%
Study Area ¹	25,057	25,371	0.12%

Source: WEAD 2019

¹Study Area population includes Lincoln County municipality populations within daily commuting distance plus total Uinta County population.

Economy

The Bureau of Labor Statistics (BLS) reports labor force and employment data at the county level. In 2021, the Study Area counties' labor force totaled 18,346 persons (Lincoln County, at 8,641, and Uinta County, at 10,041), representing about 6.3 percent of the total Wyoming labor force (BLS 2022a). Between 2011 and 2021, the Study Area labor force decreased at an average annual rate of -0.2 percent, while the state's labor force decreased at an average annual rate of -0.4 percent. In 2021, 803 persons in the Study Area were unemployed, an unemployment rate of 4.4 percent. The 2021 unemployment rates in Lincoln County, Uinta County, and Wyoming were 3.8 percent, 5.0 percent, and 4.5 percent, respectively.

The TFF project workforces would resemble those with experience in heavy and civil engineering construction (construction workers) and manufacturing (operations workers). The BLS reports employment data by industry (as defined by the North American Industrial Classification System [NAICS]). In 2021, NAICS Sector 237 Heavy and Civil Engineering Construction employment in Lincoln and Uinta Counties was 161 and 422, respectively, and NAICS Sector 1013 Manufacturing employment was 164 and 279, respectively (BLS 2022b).

Personal income provides a useful means for comparing worker wages in an industry to a county's total personal income. In 2021, Lincoln and Uinta Counties' total annual personal incomes were \$1,248,380,000 and \$911,174,000, respectively (BEA 2022).

Housing

In 2020, there were 1,703 vacant housing units in the Study Area (Uinta County and the southern municipalities of Lincoln County). Of these units, 170 were for rent and 128 were for sale (USCB 2020b and 2020c). In 2022, there were 313 hotel or motel rooms in the Study Area municipalities in Lincoln County and 1,036 hotel or motel rooms in Uinta County (STR 2023a). During the month of July, when the hotel/motel occupancy rate is highest (67.3 percent (STR 2023b)), the corresponding vacancy rate of 32.7 percent indicates that 441 rooms would potentially be available for the Project workforce.

There are an estimated 210 Recreational Vehicle (RV)/tent sites within commuting distance of the TFF Project site in Lincoln County and 199 RV/tent sites in Uinta County (Gunter 2022, Wright 2022, Braband 2022, Julian 2022, BLM Undated a, BLM Undated b, Recreation.gov 2022a, Recreation.gov 2022b, and RV Life 2022). Applying the same vacancy rate as that of the hotels/motels (32.7 percent) to the number of RV/tent sites in Lincoln and Uinta County indicates that 133 sites would potentially be available for the Project workforce.

Adding the vacant rental and for sale units to the available RV park sites and hotel/motel rooms equates to a total of 872 housing units. In addition to the existing housing stock in the Study Area, Kemmerer city officials are reviewing, for approval, plans for construction of a significant number of new housing units. At a minimum, new housing projects appear to number in the hundreds of units (City of Kemmerer 2022).

Local Taxes

There are no individual or corporate income taxes in Wyoming (W.S. 39-12-101).

Wyoming collects a 4 percent sales and use tax. Thirty-one percent of the tax is returned to the county and municipalities where it was collected. Lincoln and Uinta Counties collect a general-purpose county sales and use tax of 1 percent, in addition to the state's 4 percent, for a total of 5 percent (WDOR 2022). Total sales and use tax collections, in Lincoln and Uinta Counties, were \$26,355,168 and \$22,474,796, respectively, in FY 2021 (WEAD 2021). In Kemmerer, FY 2021 sales and use taxes were the largest source of revenues, at \$1,689,508, or 42 percent of total revenues (City of Kemmerer 2021).

Property taxing jurisdictions include the counties, cities, schools, and special districts (WTA 2021). Wyoming no longer levies property taxes for state operations but does levy a property tax to fund the state's School Foundation Program, one of the state's two education equalization programs.

TerraPower has acquired about 35 acres of land for construction of the TFF (parcel # 20161910002800). In 2021, the total levy for this parcel was 65.13 mills, representing 8 taxing jurisdictions. The Lincoln County School District 1 levy represented about 71 percent of the total mill levy. The Lincoln County levy represented about 18 percent of the total mill levy.

Lincoln County School District 1 would be the district hosting the TFF and most of the Project workforce children, as its boundaries encompass most of Kemmerer and Diamondville. The district received a total of \$14,115,177 in operating revenues in 2020-2021 (WDOE 2021). Local revenues, at \$10,748,651, represented the largest source of 2020-2021 total operating revenues (WDOE 2021).

Lincoln County, the county that would host the TFF, received property tax payments and payments in lieu of taxes totaling \$8,867,143, in FY 2021. These payments represented the largest sources of revenue for the county, at 32.4 percent of total revenues (Lincoln County 2021).

3.3.4.2 Environmental Impacts Related to Socioeconomics

Construction of the TFF project would require a peak workforce of 120 to 150 workers. TFF would employ 20-30 workers during the operations phase. The projected workforce by month is shown on Figure 3.3.3-2. For this analysis, DOE assumes 100 percent of the construction and operations workforces would migrate into the Study Area, given the Study Area construction workforce is relatively small, at 2,378 workers, and the unemployment rate is relatively low, at 4.4 percent.

Construction

Population

As shown in Tables 3.3.3-1 and 3.3.3-2, the Study Area's population was 24,345 people in 2020 and the projected 2030 population is 25,057. At the peak of construction, the addition of 120-150 workers and some number of family members to the Study Area would result in a less than 2 percent increase in both the USCB's 2020 population and the WEAD's projected 2030 population. The addition of these workers and family members, at peak construction, would not significantly increase the total population in the Study Area, therefore impacts to the Study Area population would be minor.

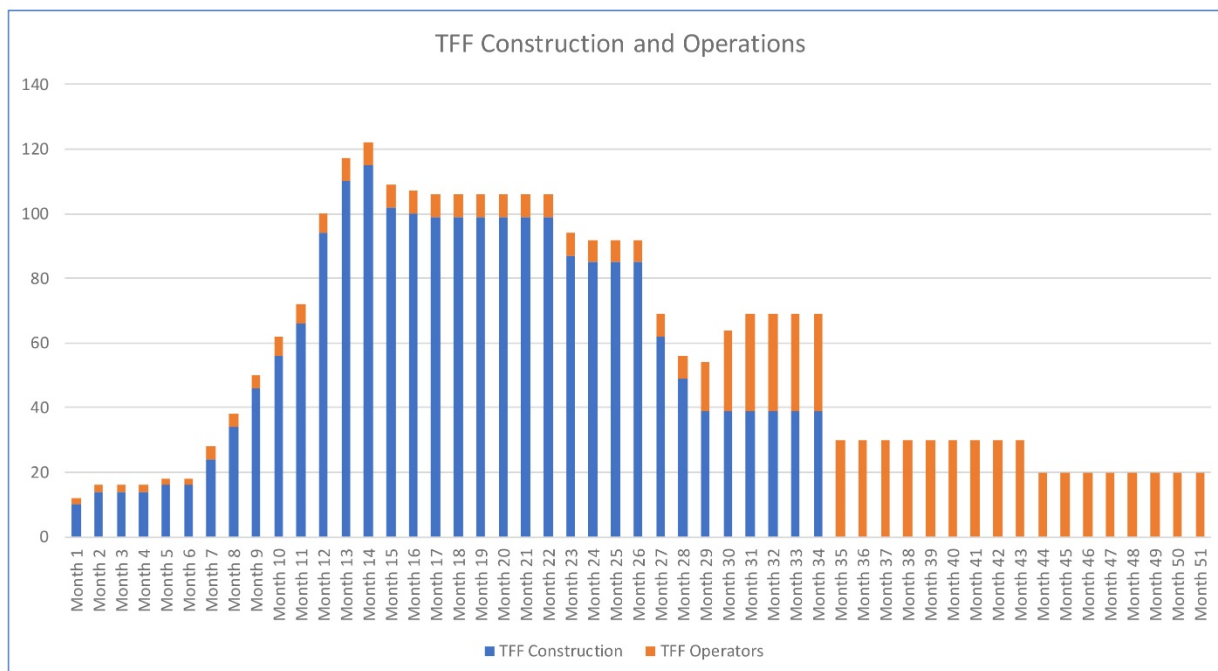


Figure 3.3.3-2 Projected Workforce

Within the Study Area, initial changes in employment and earnings activity caused by the construction of the TFF and its associated projects (direct effects) would result in additional rounds of spending, creating additional employment and earnings (indirect effects). The direct TFF jobs in the area would create indirect jobs in the local businesses that would support the construction and operations workforces (hotels/motels, restaurants, convenience stores, etc.). These indirect jobs would be expected to be filled by some portion of the unemployed workers already residing in the Study Area. Therefore, there would be no commensurate increase in Study Area population from the indirect workforce and no impacts to population.

Employment

The in-migrating workforces directly related to the TFF projects would create employment- and earnings-related changes to the Study Area economy. During the peak of construction, the direct workers employed by the TFF projects would represent a less than 1 percent increase in the Study Area’s 2021 labor force of 18,346 (Section 3.3.3.1). (The indirect workforce is already included in the labor force number.)

TerraPower estimates construction phase wages would total about \$23 million, based on U.S. average weekly wages for heavy and civil engineering construction workers and manufacturing workers. TFF Project wages would represent a 1.1 percent increase in the 2021 combined personal incomes of Lincoln and Uinta Counties (Section 3.3.3.1).

Further, the most wages TerraPower would pay in a single year would be about \$8,000,000. At less than 1 percent of the 2021 combined personal incomes of Lincoln and Uinta Counties, these wages and associated indirect earnings would not significantly increase the total personal income of the Study Area. The impacts of annual direct and indirect earnings from TFF construction to the Study Area’s personal income would be negligible.

Housing

As stated previously, it is assumed that 100 percent of the construction and operations workforces would migrate into the Study Area. Assuming one worker per housing unit, up to 150 workers would occupy about 17 percent of the total number of vacant and available housing units in the Study Area. Most construction workers would be in the Study Area for less than 2 years. Therefore, TFF worker impacts to the housing market in the Study Area would be short-term and moderate.

Moderate impacts would be temporary and resolve within 1 to 2 years. Also, some workers could opt to share housing units if shortages occur.

Local Taxes

TFF construction-related activities, purchases, and workforce expenditures would generate several types of local taxes, the most important of which are sales and use taxes and property taxes.

TerraPower estimates its sales and use tax payments to local taxing jurisdictions attributable to the TFF Project would range from \$8,000 to \$29,000 per year, during the construction phase, if all project-related purchases were made within the Study Area. In the year when Project sales and use tax payments would be highest, the portions of those taxes that would reach the Study Area counties and their municipalities would be negligible, as sales and use tax collections in Lincoln and Uinta Counties totaled \$48,829,964 in FY 2021 (WEAD 2021). In Kemmerer, impacts could be minor and beneficial.

TerraPower estimates the highest amount of wages paid in a single year would be about \$8,000,000. Some percentage of these wages would be spent and taxed within the Study Area, generating sales and use tax revenues for the state and local governments. As an indirect impact, new jobs in the area could also result in higher personal income for current residents in the Study Area, more disposable income, and greater expenditures by individuals and families for items subject to sales or use taxes. Direct and indirect taxable purchases associated with the construction workforce would create negligible, short-term, and beneficial impacts to the Study Area counties and their municipalities.

TerraPower's estimated construction project-generated property tax payments would range from \$19,000 in the first year of construction, to \$225,000, in the final year of construction, with a cumulative total of about \$466,000. In the final year of construction, Lincoln County School District 1 would likely receive about 71 percent of the TFF tax payment, about \$160,000. When compared to the school district's total local revenues in 2020-2021, the TFF payment would represent about 1.5 percent of those revenues. Lincoln County would receive about 18 percent of the TFF tax payment, about \$41,000. When compared to the county's total property tax and payment in lieu of tax revenues in 2021, the TFF payment would represent less than 1 percent of those revenues. The City of Kemmerer would receive none of the TFF property tax payment as the city is not one of TFF's taxing jurisdictions. Therefore, for the Lincoln County School District 1, the TFF property tax payment would be minor. For Lincoln County and the City of Kemmerer, payments would have a negligible impact.

Most of the construction workforce would reside in the area temporarily and likely not pay property taxes. The few operations workers employed during the construction phase are likely to settle in Lincoln County, in the Kemmerer/Diamondville area. Their property tax payments would be negligible and beneficial to their taxing jurisdictions.

Operations and Maintenance

Population and Employment

The addition of 20-30 operations workers and family members would result in a less than 1 percent increase in the Study Area's 2020 population and projected 2030 population. Indirect jobs are expected to be filled by some portion of the unemployed workers already residing in the Study Area.

The addition of 20-30 operations workers would represent a less than 1 percent increase in the Study Area's 2021 labor force. Collectively, TFF operations worker wages would represent a less than 1 percent increase in the 2021 total personal incomes of Lincoln and Uinta Counties. Impacts to the Study Area population and employment would be negligible and beneficial.

Housing

As presented in Section 3.3.3.1, there were 170 vacant housing units for rent and 128 units for sale in Uinta County, Kemmerer, Diamondville, and LaBarge, combined. As stated previously, TerraPower assumes 100 percent of the operations workforce would migrate into the Study Area. Assuming one worker per housing unit, 20-30 operations workers would occupy 7-10 percent of the total number of vacant housing units for rent or sale in the Study Area. TFF operations worker impacts to the housing market in the Study Area would be minor.

Local Taxes

By the end of construction and the start of operations, TerraPower estimates that TFF operations-related expenditures would result in sales taxes that would amount to a few thousand dollars per year if all purchases were made within the Study Area. In Kemmerer, sales and use taxes collected in FY 2021 were \$1,689,508. The TFF-generated sales and use taxes received by the Study Area counties and their municipalities would be negligible, long-term, and beneficial.

Most operations workers and their families would likely settle in Lincoln County, in the Kemmerer/Diamondville area. Their retail expenditures (housing, restaurants, grocery stores, merchant sales, and other items) would create an increase in sales and use tax revenues. As an indirect impact, new jobs in the area could also result in higher personal income for current residents in the Study Area, more disposable income, and greater expenditures by individuals and families for items subject to sales or use taxes. Direct and indirect taxable purchases associated with the operations workforce would likely generate negligible, long-term, and beneficial impacts to the Study Area counties and their municipalities.

Over time, the TFF's fair market value would be expected to decrease as the facility ages. TerraPower estimates that TFF-related property tax payments would be \$293,000 per year for the first few years of operations. After that, they are expected to gradually decrease.

Lincoln County School District 1 would likely receive about 71 percent of the TFF tax payment, about \$208,000 per year, during the first few years of operations. When compared to the school district's total local revenues in 2020-2021, the TFF payment would represent about 1.9 percent of those revenues.

Lincoln County would receive about 18 percent of the TFF tax payment, about \$53,000. When compared to the county's total property tax and payment in lieu of tax revenues in 2021, the TFF payment would represent less than 1 percent of those revenues.

For Lincoln County School District 1, the TFF property tax payments would be minor and beneficial. For Lincoln County, the payments would be negligible.

Decommissioning

The decommissioning of the Proposed Project would generate employment like construction. Available housing and population at the time of decommissioning is unknown; however, given current trends, it is not expected that decommissioning would have an impact on the housing market, or have a destabilizing effect on renters. Like construction, impacts to local tax revenue during decommissioning would be short-term and minor.

3.3.4.3 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. There would be no direct or indirect impacts on socioeconomic conditions from the project. Current socioeconomic conditions would persist. Minor beneficial impacts of increased job opportunities and tax revenues associated with the Proposed Project would not occur.

3.3.4.4 Cumulative Impacts

A review of publicly available resources indicates several other projects in the surrounding area that would result in cumulative socioeconomic impacts, chiefly housing impacts. Below is a list of these projects.

- Kemmerer Unit 1
- Naughton Plant Units 1 and 2 conversion to natural gas
- Uinta Wind
- Lincoln Solar I and II
- ExxonMobil LaBarge Carbon Capture
- Gateway West Transmission Line Project – Segment D.3
- Kemmerer Decarbonization Works
- TriSight, LLC

Some of the other projects' workforces would likely seek accommodations in communities outside the TFF Study Area, reducing the potential for cumulative impacts. Also, some workers would likely opt to share housing units.

In addition to the existing housing stock in the Study Area, Kemmerer city officials are reviewing, for approval, plans for construction of a significant number of new housing units. At a minimum, new housing projects appear to number in the 100s of units (City of Kemmerer 2022). If new housing units were to become available, housing shortfalls would be reduced. Based on the proposed new housing units, large area for housing availability, and potential for sharing spaces the Project would therefore result in minor to moderate impacts on housing availability

Given the number of other potential projects in the Study Area and uncertainty surrounding potential shortfalls in housing, TerraPower could employ a flexible management approach that could be implemented prior to construction of Kemmerer Unit 1. However, the incremental increase in housing

needs from TFF construction and operations could be met with the existing housing availability in the surrounding counties.

3.3.5 Geological Resources

3.3.5.1 Affected Environment

The section considers effects of the TFF on geological resources. The analysis is based in part on surveys and soil investigations of the TFF area.

The site is in the Central Rocky Mountains physiographic province. Based on the U.S. Department of Agriculture's NRCS Web Soil Survey (NRCS 2021), the site is primarily overlain with soils of the Cumberland-Sandbranch-Poposhia complex with 4 to 15 percent slopes and to a lesser extent with soils of the Sandbranch-Monte complex with 0 to 3 percent slopes. Figure 3.3.4-1 illustrates the soil types encountered at the site.

Soils of the Cumberland-Sandbranch-Poposhia complex are considered well-drained and not subject to flooding or ponding. These soils generally develop in alluvial flats with the alluvium derived from sandstones and shales. They are strongly saline. Calcium carbonate ranges from 13 to 14 percent with gypsum content up to 15 percent.

Soils of the Sandbranch-Monte complex are considered well-drained and not subject to flooding or ponding. These soils generally develop on hillslopes and the parent material slope alluvium derived from shale. They are very slightly saline to slightly saline. Calcium carbonate ranges from 4 to 10 percent.

The pH of the Project soils ranges from about 7.4 to 10.0. The soils are in the Hydrologic Soils Group C and D with slow and very slow infiltration rates, respectively. These soils generally classify as loam, clay loam and sandy clay loam with corresponding Unified Soil Classification System designations of clay (CL) and clayey sand (SC). The erosion factor T, an estimate of the maximum average annual rate of soil erosion by wind and/or water ranges from 2 to 5.

A subsurface investigation was conducted at the site with two borings at the TFF site drilled to a depth of 100 feet. The investigation confirmed the near surface soils consist primarily of residual soils derived from the physical weathering of the underlying bedrock (Hilliard Shale). These soils are primarily characterized as low plasticity clay. The generalized subsurface profile at the site consists of approximately 20 feet of overburden soil underlain by weathered siltstone from 20 to 50 feet followed by fresh siltstone below 50 feet. A published geologic cross section and stratigraphic column, illustrating bedrock conditions of the area, is shown in Figure 3.3.4-2.

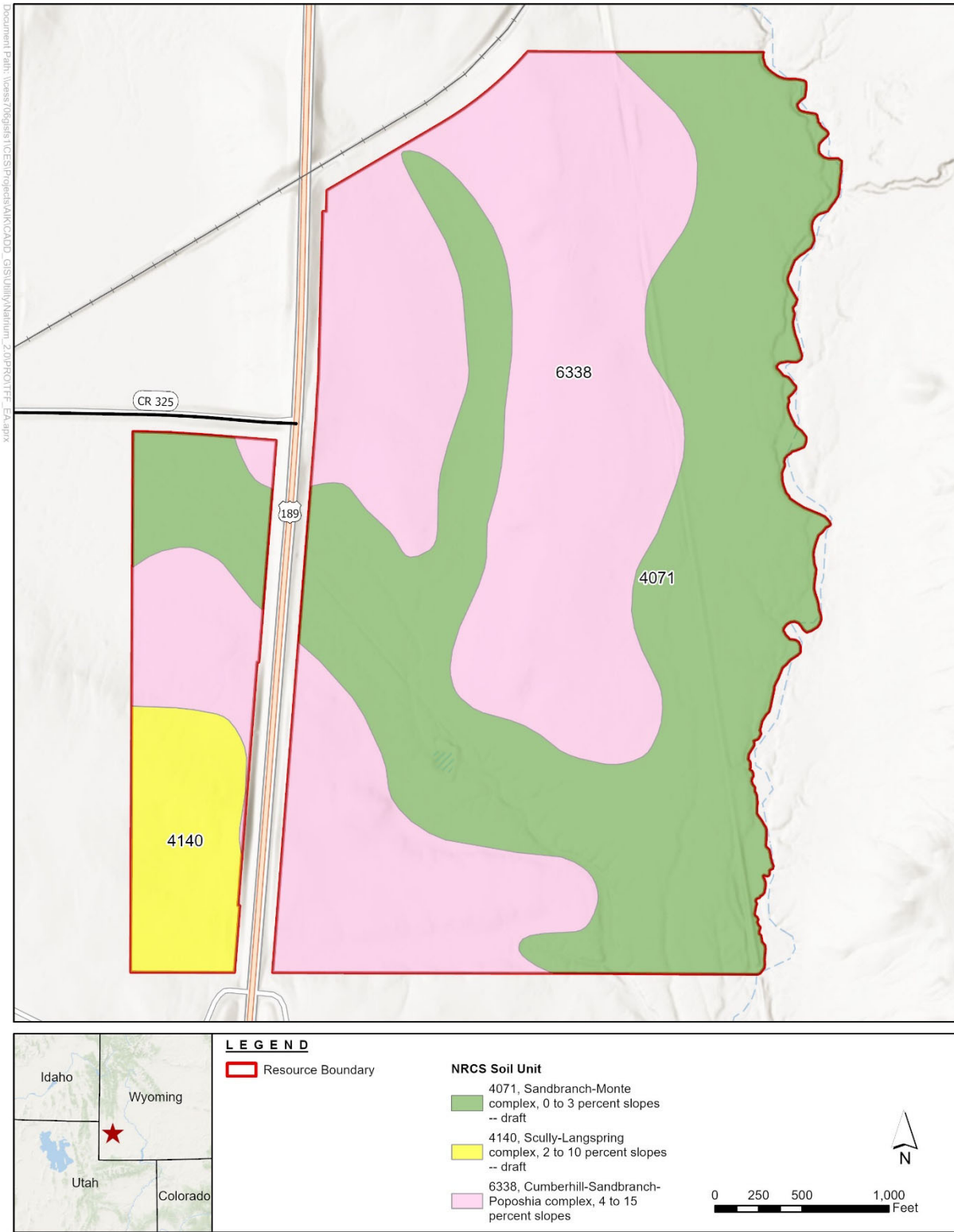


Figure 3.3.4-1 Soils Map

(a)

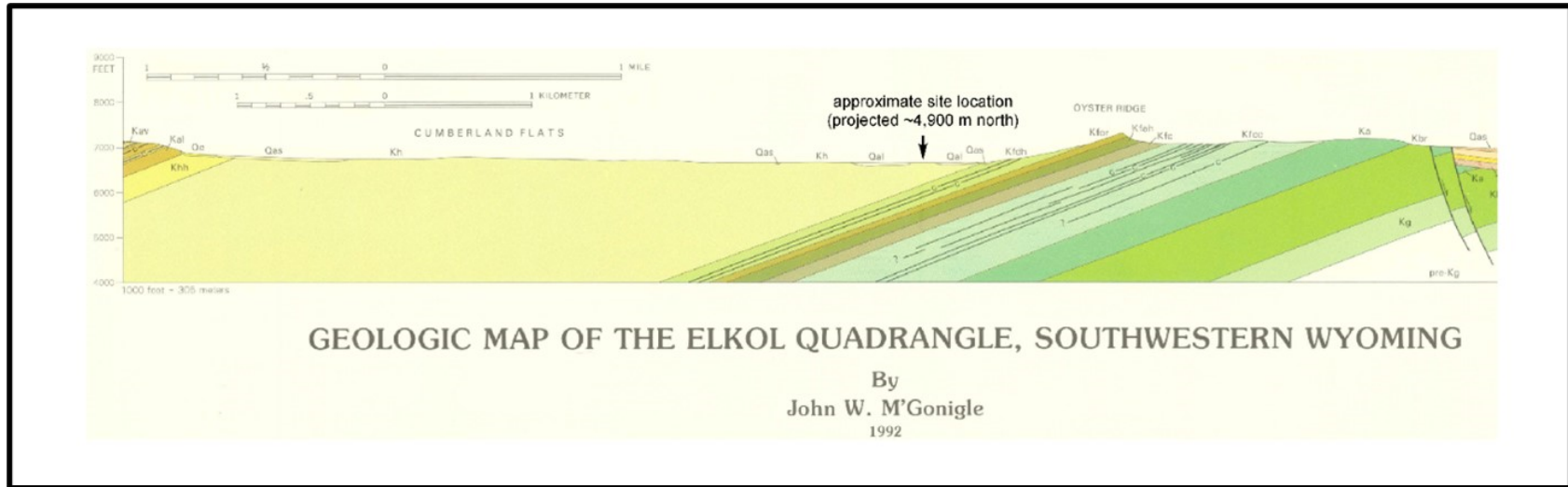


Figure 3.3.4-2a Geologic Cross Section (a) and Stratigraphic Column (b)

(b)

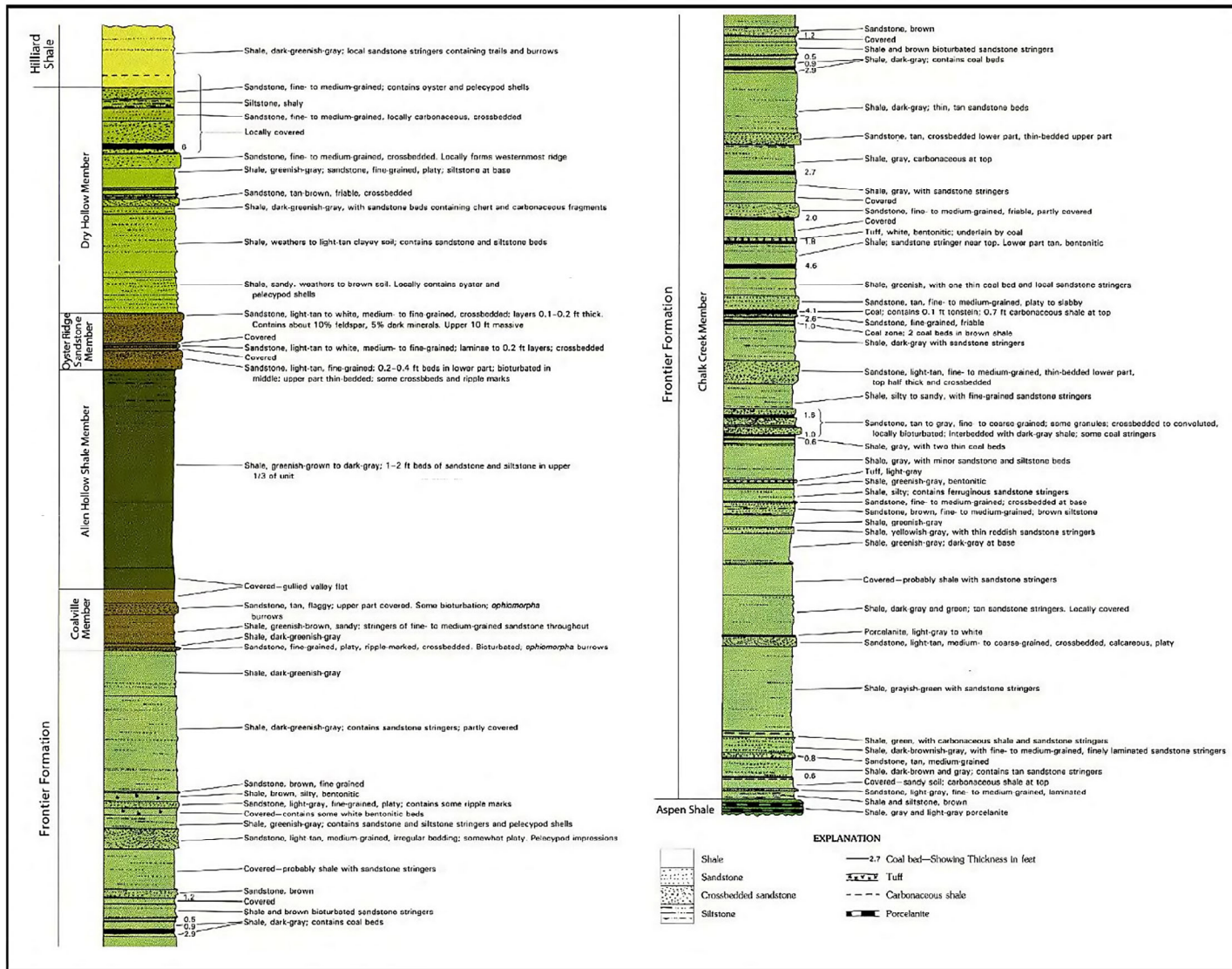


Figure 3.3.4-2 Geologic Cross Section (a) and Stratigraphic Column (b)

3.3.5.2 Environmental Impacts Related to Geological Resources

Construction

During construction, as many as eight vertically-oriented, cylindrical, subsurface shafts (ranging from approximately 10 to 40 feet in diameter) may be constructed at the site. Each shaft would have an associated grouted steel liner that would be installed post drilling to prevent any leakage into the excavations. These shafts are expected to extend into the fresh rock. There is also expected to be an approximately 60 feet by 70 feet rectangular pit excavated above the 30 feet diameter drilled shaft. This pit will be founded in weathered rock. Excavation of the smaller diameter shafts may be made with rotary tools. The near surface portion of the excavation, located in the overburden soils and weathered rock materials will be cased to stabilize the side walls of the excavation. The excavation of larger diameter shafts, in fresh rock, is expected to be made with controlled blasting. The blasting program will be designed to minimize overbreak and disturbance to the adjacent rock. The excavation of the pit is expected to be made with side walls sloped at 2(H):1(V) to ensure stability of the excavation. The ground surface surrounding the shaft and pit excavations will be sloped so that site runoff will flow away from the excavations to minimize soil loss and water flow into the excavations. Due to the planned construction methods for the shafts and pit, and associated control measures impacts to subsurface geological resources are expected to be minor and short-term.

Erosion control measures during construction will consist of placement of permanent seeding or erosion matting on cut and fill slopes; limiting the amount of exposed areas through planning and timing of Project phases; and stabilizing stockpile materials. Dust control during earth-moving activities will be made by pre-applying and re-applying water as necessary to maintain soils in a damp condition. Due to the work sequencing and stabilization methods, impacts to surface geological resources, as a result of construction activities, are expected to be minor and short-term.

Operations and Maintenance

Operation and maintenance of the TFF is not expected to have any ground disturbance associated with activities, therefore impacts are negligible. All testing would occur in controlled environments not exposed to the ground.

Decommissioning

During decommissioning activity all above ground and subsurface structures would be restored unless otherwise specified. Impacts to geological resources are expected to be minimal and would be associated with ground disturbance during restoration and compaction associated with restoration. Any disturbed soil would be managed in accordance with BMP's and applicable permit requirements. The impacts expected associated with geology during decommissioning are minor.

3.3.5.3 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Existing geological features would remain in place uninterrupted therefore impacts would be negligible.

3.3.5.4 Cumulative Impacts

There are no existing industrial developments in the surrounding area that would be impacted by the proposed ground disturbance. The proposed Kemmerer Unit 1 project is the only project with close enough proximity to result in cumulative impacts. As the disturbance for TFF and Kemmerer Unit 1 are expected to be staggered reducing the amount of disturbed ground as well as rotary tools used to reduce ground disturbance the cumulative impact are expected to be negligible.

3.3.6 Environmental Justice

Federal agencies are required to consider potential impacts to environmental justice (EJ) communities from proposed activities in accordance with applicable EOs.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629), directs that each federal agency, to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, shall make achieving EJ part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands. Minority populations are those identified in census data as Native American or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; Hispanic; some other race; or two or more races (CEQ 1997). Low-income populations are those identified as living at or below the U.S. poverty level.

EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice*, was signed on April 21, 2023, which requires environmental reviews under NEPA to analyze the direct, indirect, and cumulative effects of Federal actions on communities with EJ concerns and consider the best available science and information on any potential health effects (including risks) from exposure to pollution, and provide an opportunity for EJ community involvement.

EO 14008, *Tackling the Climate Crisis at Home and Abroad*, established the Justice40 Initiative a government effort to deliver at least 40 percent of the overall benefits from certain federal investments to disadvantaged communities. On July 20, 2021, the Office of Management and Budget (OMB) issued the Interim Implementation Guidance for the Justice40 Initiative, Justice40 Interim Guidance. This guidance supports the administration's comprehensive approach to advancing equity for all people in the United States.

3.3.6.1 Affected Environment

DOE has defined the EJ analysis areas as Lincoln County and the City of Kemmerer, WY because the impacts from the Proposed Action to environmental resource areas, except for socioeconomic resources, would not extend beyond Lincoln County. Socioeconomics were analyzed at the regional and state level (see Section 3.3.4).

In conducting the NEPA EJ analysis, the DOE followed guidance outlined in the DOE EJ Strategy 2017, DOE's Community Guide to EJ and NEPA Methods (DOE 2019), Environmental Justice Interagency Working Group Promising Practices for EJ Methodologies in NEPA Review. The DOE also utilized the Climate & Economic Justice Screening tool (CEJST), EJScreen, DOE Energy Justice Mapping Tool, and the Environmental Justice Index Tool to identify EJ communities and assess EJ considerations. Values

presented below may differentiate between tools due to differences in geographic boundaries and the thresholds being used for a specific criterion. For CEJST, EJScreen, and DOE Energy Justice Mapping Tool, the higher the percentile in a burden indicator, the higher the risk or impact to the community.

The Promising Practices for EJ Methodologies in NEPA Review Report (EPA 2016) provides recommendations and methodologies for integrating EJ considerations into the NEPA processes. It outlines methodologies for identifying minority populations and low-income populations using criteria such as no threshold, meaningfully greater than 50 percent, and low-income threshold. The “no threshold” criterion involves identifying all populations that meet the definition of minority populations or low-income populations, without setting a specific threshold or percentage. The “meaningfully greater than 50 percent” criterion focuses on identifying areas where the minority population or low-income population exceeds 50 percent or a significantly higher proportion. The “low-income threshold” criterion involves using specific income thresholds, such as federal poverty guidelines or other local standards, to identify areas with a concentration of low-income populations (EPA 2016).

The Proposed Action would be in Lincoln County, Wyoming near the City of Kemmerer, Wyoming. Based on recent Census Bureau data, Lincoln County has a population of 20,660, 7.6% of which is low-income and the City of Kemmerer, Wyoming has a population of 2,758, 7.08% of which is low-income. Lincoln County’s population is 9.6% minority population, and the City of Kemmerer, is 6.78% a minority population. Table 3.3.6-1 details the population, median household income, poverty rate and minority population of the State, county, and city. The data presented in the table below is different in some cases from other EJ models and tools due to differences in data sources used and years analyzed. Those differences are described below under each section.

Table 3.3.6-1 Lincoln County and City of Kemmerer, WY Population Data

Data	State of Wyoming	Lincoln County, WY	Kemmerer, WY
Population	576,851 (2022)	20,660 (2022)	2,758 (2020)
Median Household Income	\$65,204	\$74,835	\$63,861
Persons in poverty	11.4%	7.6%	7.08%
Housing Units	271,887	9,962	N/A
Race: White alone	91%	95.8%	91.2%
Race: Black or African American alone	1%	0.6%	0.0725%
Race: American Indian and Alaska Native alone	2.6%	1.1%	0.435%
Race: Asian alone	1%	0.5%	0.689%
Race: Native Hawaiian and Other Pacific Islander alone	0.1%	0.1%	0.0%
Race: Two or More Races	8.2%	1.9%	0.254%

Data	State of Wyoming	Lincoln County, WY	Kemmerer, WY
Race: Hispanic or Latino	3.8%	5.4%	5.33%

N/A = Not Available

(USCB 2022a and Data USA 2022)

As indicated in Table 3.3.6-1, the percentages of minority and low-income residents in the analysis area do not exceed 50 percent, nor do they exceed county or state levels by greater than 20 percentage points. Therefore, according to the EPA’s Promising Practices Guide, no EJ populations reside in the analysis area, meaning negligible disproportionately high and adverse human health or environmental effects are expected from construction, operations, and maintenance, or decommissioning of the Proposed Action (EPA 2016).

3.3.6.2 Environmental Impacts Related to Environmental Justice

According to CEJST and the DOE Energy Justice Mapping Tool, Kemmerer, WY is not considered a Disadvantaged Community (DAC), while the surrounding census tract in Lincoln County is. Lincoln County has a DAC score of 17 and state ranking of 95% (DOE 2023). Energy burden is 5% (82nd percentile), and the county is in the 75th percentile (exceeding a 65th percentile threshold to determine disadvantage) for low income (people in households where income is less than or equal to twice the federal poverty level) (CEQ 2023). Lincoln county is also in the 91st percentile for the share of homes without indoor kitchens or plumbing, and 100% of the area – both in Kemmerer and the surrounding census tract - is considered a food desert (rural populations more than 10 miles from the nearest supermarket) (DOE 2023). PM 2.5 and cancer risk are above the threshold percentile in Lincoln County (DOE 2023). Ozone pollution levels in Lincoln County are at 92% risk for EJ communities. Lincoln County is also home to an abandoned mine, which CEJST identifies as a source of disadvantage (CEQ 2023).

According to EJScreen, 16% of the Lincoln County population has a low life expectancy; however, no data is available on heart disease or asthma rates (EPA 2023). In both Kemmerer and the surrounding census tract, Climate Hazards Loss of Life Estimates (expected annual fatalities and injuries from climate hazards) are almost at the 99th percentile (98.51 and 98.72, respectively) (DOE 2023). EJScreen indicates several 100-year floodplains in the project vicinity and an 82% risk of wildfires and 76% of properties are at risk of floods (EPA 2023).

According to the Environmental Justice Index Tool, Lincoln County, Wyoming has an EJI rank of 0.31, an environmental burden rank of 0.40, and a social vulnerability rank of 0.53 (all scores out of one, indicating percentile relative to the rest of the U.S.). Lincoln County has a ranking of 0 for air pollution (including ozone, PM 2.5, and air toxics cancer risk) and high pre-existing chronic disease prevalence (including asthma, cancer, and high blood pressure), a 0.22 ranking for transportation, 0.26 for water pollution, and 0.43 for socioeconomic status.

- Hazardous & toxic site – ranks at 0.94 overall, 0.90 for treatment, storage, and disposal sites, and 0.83 for coal mines.
- Built environment – ranks 0.88 overall, 0.78 for lack of recreational parks, and 0.96 for lack of walkability.
- Household characteristics – ranks 0.83 overall with 0.82 for age 17 and younger.
- Housing type – ranks 0.80 overall and 0.96 for mobile homes (CDC 2023b).

Construction, Operations and Maintenance, and Decommissioning

Environmental requirements and commitments for air quality, noise, visual resources, and health and safety would apply to the entire residential population in the vicinity of the project, including any minority or low-income residents.

As described above, in accordance with EPA's Promising Practices Guidance, no distinct minority or low-income populations have been identified in the analysis area; therefore, negligible disproportionately high and adverse human health or environmental effects are expected from construction, operations and maintenance, or decommissioning of the Proposed Action (EPA 2016).

The Proposed Action's impacts associated with air quality, climate change, noise, transportation, and human health would be negligible to minor and therefore would not result in disproportionate or adverse impacts to EJ communities.

Air Quality and Climate Change: Air quality was not considered a resource to be analyzed in detail because all emissions would be minimal and below the National Ambient Air Quality Standards. Lincoln County is in attainment for all pollutants. According to the DOE Energy Justice Mapping Tool, PM 2.5 and Cancer risk are above the threshold percentile (DOE 2023). According to EJScreen, ozone pollution levels in Lincoln County are in the 64th percentile when compared to the entire US for EJ communities (EPA 2023). Ozone, primarily composed of Nitrous Oxide (NOx) and Volatile Organic Compounds (VOCs), at ground level is considered smog and is classified as a harmful air pollutant, because of its effects on people and the environment. Lincoln County is in attainment for ozone and PM 2.5, therefore there are no federal or state improvement programs in place to reduce the level of these criteria pollutants in the area. Emissions from diesel operated construction equipment and back up diesel generator use during operations are expected to be minimal. All emissions would be in compliance with the National Ambient Air Quality Standards. The TFF is expected to make a negligible contribution to air quality from low emission sources such as generators, therefore impacts to EJ communities would be negligible.

According to EJScreen, Lincoln County has an 82 percent risk of wildfires and 76 percent of properties are at risk of floods (EPA 2023). For the DOE Energy Justice Mapping Tool, Climate Hazards Loss of Life Estimates are almost at the 99th percentile (98.72) (DOE 2023). Impacts from climate change on the Proposed Action include risk of wildfires and floods. According to the National Oceanic and Atmospheric Administration National Centers for Environmental Information, the State of Wyoming could experience higher spring precipitation events leading to a higher risk of flooding. The evaporation rates due to higher temperatures would also lead to a higher risk of wildfires in the State (NOAA 2022). The Proposed Action would have negligible impacts to CO₂e from construction, operations, and decommissioning. Since the current climate change trends would remain the same and there would be a negligible contribution of CO₂e from the project, impacts to EJ communities would be a negligible change from the Proposed Action's baseline conditions.

Noise: Noise was not considered a resource area to be analyzed in detail because noise would be generated by construction equipment that would operate during the week for short periods of time during normal workday hours and because there are no nearby sensitive receptors, including homes, schools, places of worship, or hospitals. Noise generated during operations is expected to be minimal and temporary except during emergency backup power generation exercises, which are estimated to generate noise levels of 85 dBA at 3 feet or less in distance. The closest residence is approximately 2 miles away, therefore negligible impacts to EJ communities would occur. Traffic levels along major routes near the TFF would increase during peak commuter traffic from the estimated 120 to 150 workers and would

generate increased noise levels along the Highway. Noise impacts from traffic level increases would be negligible to minor because during peak construction an additional 300 round trips and would represent a 4 percent to 29 percent increase in traffic depending on the route taken (see Table 3.3.7-1)

Infrastructure (utilities, transportation and traffic, emergency services): The main transportation route for the Project would run along US-189. Peak commuter traffic is estimated at 120 to 150 workers. Truck deliveries during construction are estimated to peak at 60 vehicles per day. Potential impacts to utilities under the Proposed Action would be minor due to the influx of construction and operations employees, therefore minor impacts to EJ communities would be expected since there is not an identified burden on this resource.

The Project would require a new service drop within the ROW of the highway. A new service drop (power pole) would be placed on the east side of US-189 and a 25 kV line installed to deliver power from the existing electrical distribution line on the west side of US-189 to the TFF construction site. No water or sewer hook ups are planned. According to the various tools DOE consulted, utilities were not identified as a burden for the potentially affected EJ communities. Potential impacts to utilities under the Proposed Action would be minor due to the influx of construction and operations employees therefore minor impacts to EJ communities would be expected since there is not an identified burden on this resource.

The City of Kemmerer has a volunteer fire department and regional hospital. According to the various tools DOE consulted, emergency services were not identified as a burden for the potentially affected EJ communities. Potential impacts to emergency services under the Proposed Action would be negligible due to the influx of construction and operations employees, therefore negligible impacts to EJ communities would be expected since there is not an identified burden on this resource.

Socioeconomics: Benefits to the local economy from the Proposed Action would be anticipated from the short and long-term employment of construction and operation workers and local tax revenue generated. According to CEJST, Lincoln County is in the 75th percentile, over the 65th percentile threshold, for low income. CEJST defines low income as people in households where income is less than or equal to twice the federal poverty level, not including students enrolled in higher education (CEQ 2022). Therefore, minor beneficial impacts from the construction and operation of the TFF would result in minor beneficial impacts to low-income populations. According to EJI Lincoln County ranks 0.80 overall and 0.96 for mobile homes, therefore, impacts to housing availability from the influx of construction and operations employees would be moderate to EJ populations (CDC 2023b).

Human Health and Safety: Human health and safety was not considered a resource to be analyzed in detail because there would be negligible impacts to air quality and hazardous materials would be treated in accordance with applicable regulations, with low-probability, high-risk events only likely in the event of accidents. DOE's Energy Justice Mapping Tool stated that Lincoln County has a cancer risk above the threshold (DOE 2023). EJScreen identifies low life expectancy in the county population is 16 percent with no data available on heart disease or asthma rates (EPA 2023). The Proposed Action would have negligible air quality emissions and would not contribute to increased cancer risk to EJ communities, thus there would be negligible impacts to EJ communities. EJI has Lincoln County with a 0.94 ranking overall for potentially hazardous & toxic sites located within the county including 0.90 for treatment, storage, and disposal sites, and 0.83 for coal mines (CDC 2023b). The Proposed Action would not include coal mining activities and would therefore not be further contributing to the coal mine index within EJI. Disposal of all materials would be done in accordance with applicable federal, state, and local regulations and would fall in the small quantity generator category for permitting and would only be used during. Sodium would be stored at the TFF in large external tanks of approximately 400,000 gallons. Potential safety hazards

from sodium would be reduced by compliance with existing standards and requirements for the safe storage and handling (see Section 3.3.8.2). The likelihood of a sodium accident would be low probability, high-risk incident with potentially moderate impacts. Therefore, impacts to EJ communities would be negligible to moderate for human health and safety.

3.3.6.3 No-Action Alternative

Under the No Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Action. For purposes of this analysis, DOE assumes the Proposed Action would not proceed if DOE does not authorize the expenditure of federal funds. Any potential beneficial or adverse impacts to EJ communities would not be realized and therefore impacts would be negligible.

3.3.6.4 Cumulative Impacts

Future development in Southwest Wyoming would continue to affect housing availability in the region, therefore impacts to EJ communities would be moderate from the potential lack of affordable housing available to members of EJ communities. Construction and operation of Kemmerer Unit 1 would result in additional traffic, utility use, socioeconomic benefits such as increased local tax revenues, and emergency service usage. The exact number of construction and operational employees for Kemmerer Unit 1 is unknown at this time, however it is anticipated that additional incremental impacts from those employees would result. Therefore, potential impacts to EJ communities from the incremental impacts of Kemmerer Unit 1 are expected to be minor, adverse impacts over the long-term since traffic, utilities, and emergency services are not considered burdens under the various EJ screening tools and therefore it is likely that Lincoln County could accommodate the increased usage during construction and operation of the TFF. Socioeconomic benefits including increased job opportunities and increased local tax revenues would be beneficial, moderate in the long-term impacts. There would be no incremental increase to air quality, climate change, noise, and human health and safety for cumulative impacts.

3.3.7 Infrastructure, Traffic and Transportation

3.3.7.1 Affected Environment

Utilities

No transmission lines or pipelines cross the site. A 25 kV distribution line runs adjacent to US-189. No municipal water or wastewater connections are available for the Project site. The nearest municipal water and wastewater services are found in Diamondville-Kemmerer.

Traffic and Transportation

There are no public roads or railroads, or navigable waterways within the site. As shown in Figure 2.1-1, the TFF site borders US-189 and an existing rail line. This rail line is the Skull Point Spur of the Cumberland Branch of the Union Pacific Railroad. Plans for the Project do not include use of rail; thus, rail transportation impacts are not analyzed.

The closest airport is the Kemmerer Municipal Airport, a public airport operated by the City of Kemmerer which is approximately 7.2 miles north of the Project site. The tallest above grade structure for the TFF is the Sodium Test Building which would be approximately 108 feet tall at the highest point. In accordance with Federal Aviation Administration regulations (14 CFR 77.9), only structures taller than 200 feet or

those within 20,000 feet (3.8 miles) of airports are considered for hazards to airspace. Therefore, air transportation impacts are not analyzed.

The transportation route for both commuters and shipments is US-189 which runs adjacent to the TFF site. An existing unpaved private road currently provides access to the TFF site from US-189 opposite the intersection with CR 325. US-189 is a two-lane rural highway that travels north-south through Lincoln and Uinta Counties. US-189 north of the TFF site and its intersection with US-30 connects the proposed site with the urban and residential areas of Diamondville-Kemmerer. The connection with US-30 is approximately 4.7 miles north of the TFF site. US-189 intersects with I-80 in Uinta County approximately 30 miles south of the TFF site. West of its interchange with US-189, interchanges along I-80 provide access to Evanston. East of its interchange with US-189, interchanges along I-80 provide access to Lyman, Green River, and Rock Springs. West of Evanston, I-80 provides access to Salt Lake City and I-15.

WYDOT publishes the Average Annual Daily Traffic (AADT) vehicle counts for various sections of roads in Lincoln and Uinta counties. Table 3.3.7-1 presents traffic counts for relevant US-189 access points. The site is located on the section of US-189 between the intersection with WY-412 and the intersection with CR 304 (from milepost 21.41 to 32.737) denoted by shading in the table.

Table 3.3.7-1 Average Annual Daily Traffic Counts Near the TFF Site

Road Section	AADT
US-30 west of US-189 at Kemmerer	1575
US-30 east of US-189 junction to WY 240 at Opal	2135
US-189 north of US-30 at Diamondville-Kemmerer	4218
US-189 at US-30 junction south to County Road (CR) 304 West to Elkol	1041
US-189 south of CR 304 to junction with WY 412	1636
US-189 at Lincoln-Uinta County Line	1135
US-189 interchange with I-80	1135
US-189/I-80 at Evanston East interchange	8052
US-189/I-80 at WY 412 interchange (Carter-Mountain View)	6837

Sources: WYDOT 2022a

Site Access

The site access would be located on US-189, which is owned and operated by WYDOT. When proposing a new access onto the highway, an access permit, and a traffic impact study (dependent on the size of the project) would be required. The design of the intersection shall meet the WYDOT requirements and any possible design exceptions would require WYDOT authorization (AASHTO 2018; WYDOT 2014, 2021, 2022b, 2022c)

Below are the operational and geometry possibilities for each turning movement option.

Northbound (NB) Right: Northbound traffic turning from US-189 into the site.

NB-Right Option 1

This design option includes a possible WYDOT design exception for the proposed corner radius of 161 feet, to accommodate large vehicles and allow for free flow traffic to enter the site.

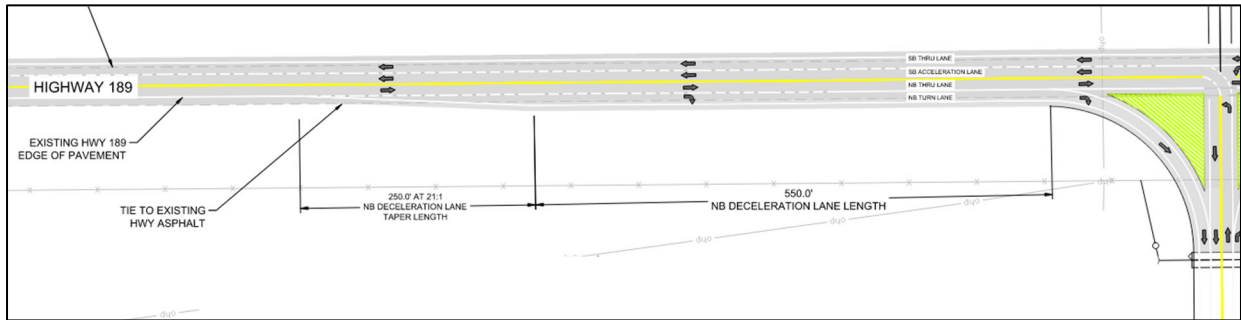


Figure 3.3.7-1 NB-Right Option 1

Southbound (SB) Left: Southbound traffic turning from US-189 into the site

The inclusion of a left turn lane is specified per the WYDOT and American Association of State Highway and Transportation Officials (AASHTO) design criteria. Based on the highway speed of 70 mph, anticipated turning volumes, a deceleration length of 515 feet and storage length of 140 feet is required. To accommodate the through traffic, a taper along the edge of the highway creates a bypass lane, this taper is required to be 300 ft.

SB-Left Option 1

Based on the design including the full deceleration length and storage length, a portion of the highway striping within the cultural area would require new striping to accommodate the intersection modifications. The estimated length in re-striping is 40 feet. A design exception would be proposed requesting the use of the existing shoulder within a 20 linear foot area of the taper (terminating end) to be mitigate the need to expand the shoulder width.

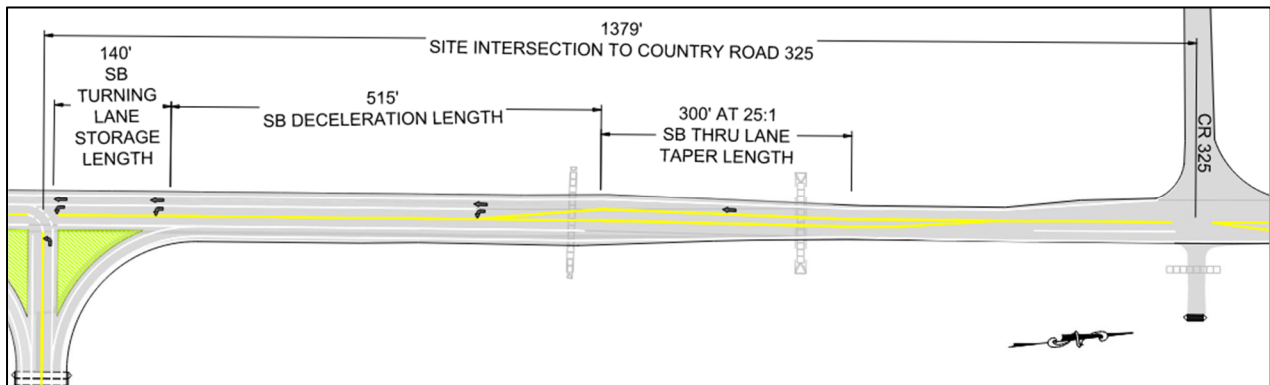


Figure 3.3.7-2 SB-Left Option 1

SB-Left Option 2

This option eliminates the need for a design exception by reducing the storage length by 20 feet. A portion of the highway striping within the cultural area would require new striping to accommodate the intersection modifications. The estimated length of re-striping is 20 feet.

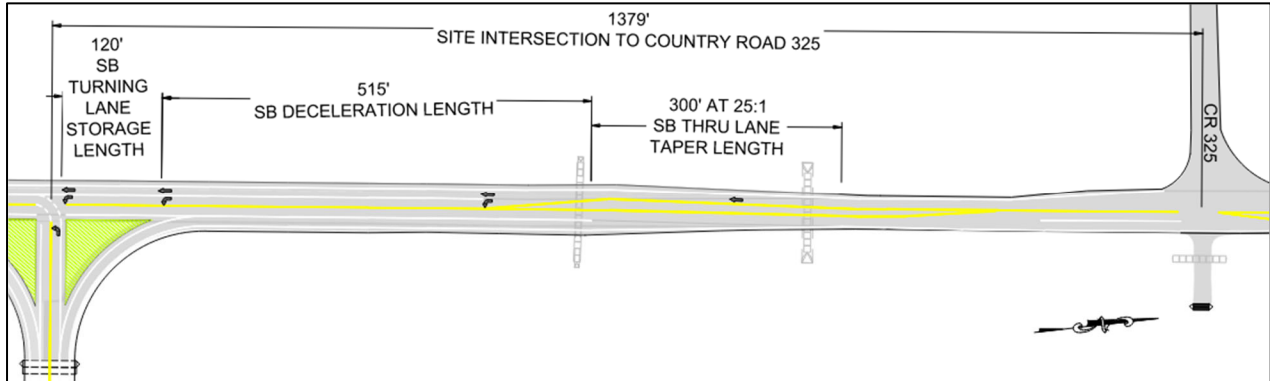


Figure 3.3.7-3 SB-Left Option 2

Northbound Egress: Traffic leaving the site and turning right to travel northbound on US-189

Based on AASHTO acceleration length criteria, the acceleration lane would need to be 1420 feet with an additional 300-foot taper. With a highway speed of 70 mph, this would allow time and distance for vehicles to accelerate to at least 75 percent of the highway speed, equivalent to 52.5 mph, before merging with through traffic (AASHTO, pg. 10-132). This acceleration lane length does not consider the undesired overlap and interference with CR-325 and the cultural site. Based on Highway Capacity Software analysis, vehicles merging with traffic are expected to have a speed of 63.6 mph and the average vehicle density would be 7.3 passenger cars per mile per lane (pc/mi/ln). The northbound turning movements with CR-325 would enter the highway at approximately the same location as the start of the taper for the merge, which could generate confusion and be a potential safety concern. This also overlaps with the cultural site and would require earthwork and surface work to develop an additional travel lane (12 feet width) and shoulder (6 feet width). Based on these concerns TerraPower is proposing the following options with design exceptions to avoid any potential adverse impacts.

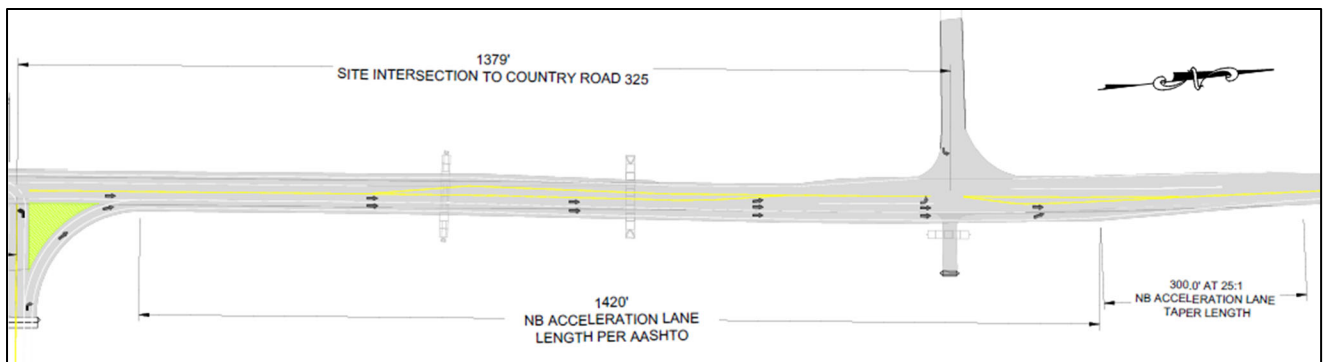


Figure 3.3.7-4 Northbound Egress Per AASHTO Criteria

NB-Egress Option 1

This option includes a free flow turn lane, radius of 161 feet, and an acceleration lane of 766 feet in length, including the taper. This option does not include interference with CR-325 and does not include overlap with the cultural area. The termination of the acceleration lane is at a location near the start of the taper for the southbound through traffic lane. Based on Highway Capacity Software analysis, vehicles merging with traffic would have a speed of 53.5 mph, which exceeds 75 percent of the highway speed, and the average vehicle density would be 8.7 pc/mi/ln. This option would propose a design exemption to decrease the acceleration lane length.

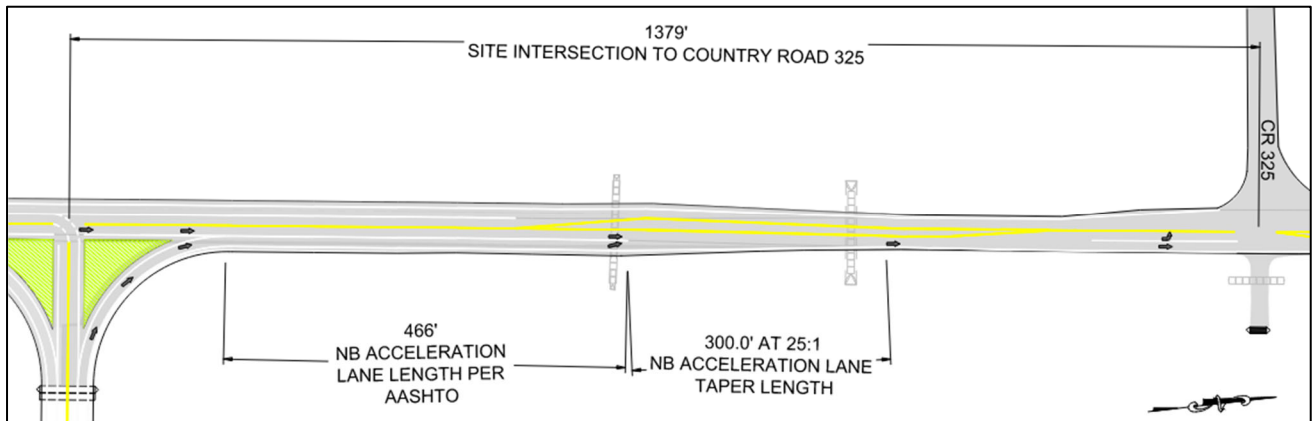


Figure 3.3.7-5 NB-Egress Option 1

NB-Egress Option 2

This option utilizes a stop controlled right turn, radius of 80 feet, and an acceleration lane and taper length of 845 feet. For this condition, vehicles merging with traffic would have a speed of approximately 45 mph, which does not meet 75 percent of the highway speed, necessary by AASHTO. This option would propose a design exemption to decrease the acceleration length.

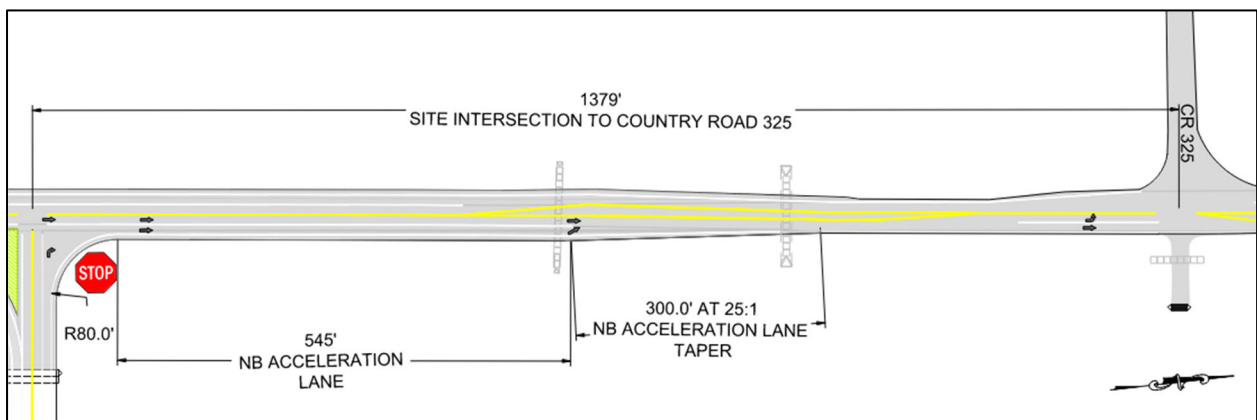


Figure 3.3.7-6 NB-Egress Option 2

NB-Egress Option 3

This option includes a stop controlled right turn, with no acceleration lane within the highway. To mitigate possible safety concerns, a speed reduction to 55 mph may be considered and would be proposed as a design exception.

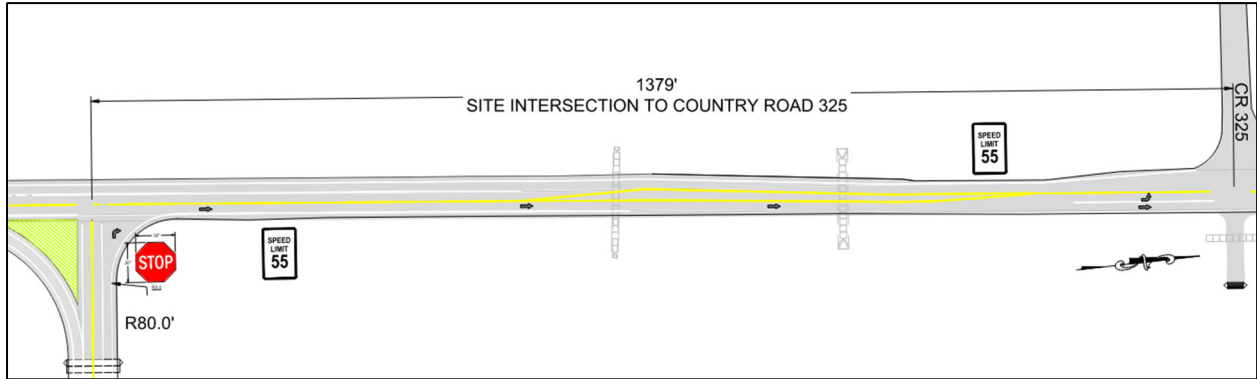


Figure 3.3.7-7 NB-Egress Option 3

Southbound Egress: Traffic leaving the site and turning left to travel southbound on US-189

SB-Egress 1

Based on AASHTO guidelines, 1,620 feet is required for the acceleration lane distance. The taper and merge area would extend into BLM Blazon Gap Road.

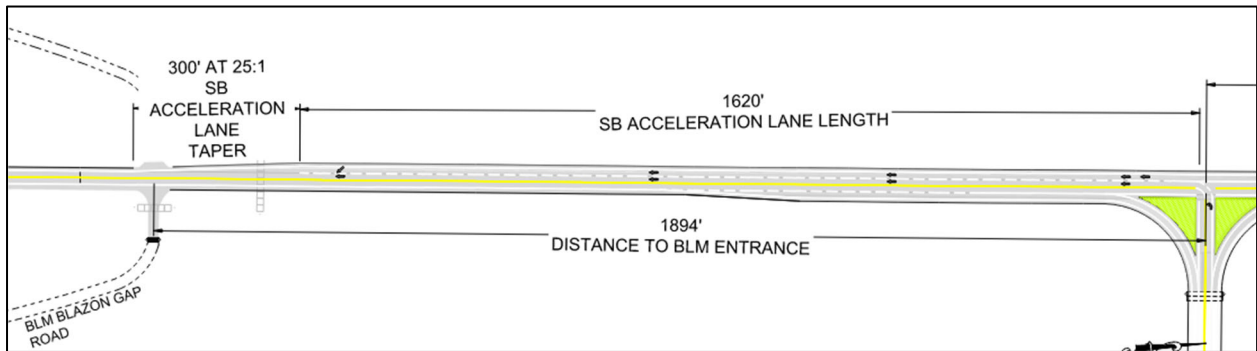


Figure 3.3.7-8 SB-Egress Option 1

SB-Egress 2

Utilize an acceleration lane of 1,510 feet to mitigate potential impact to BLM Blazon Gap Road. The decrease in acceleration length would be proposed as a design exception.

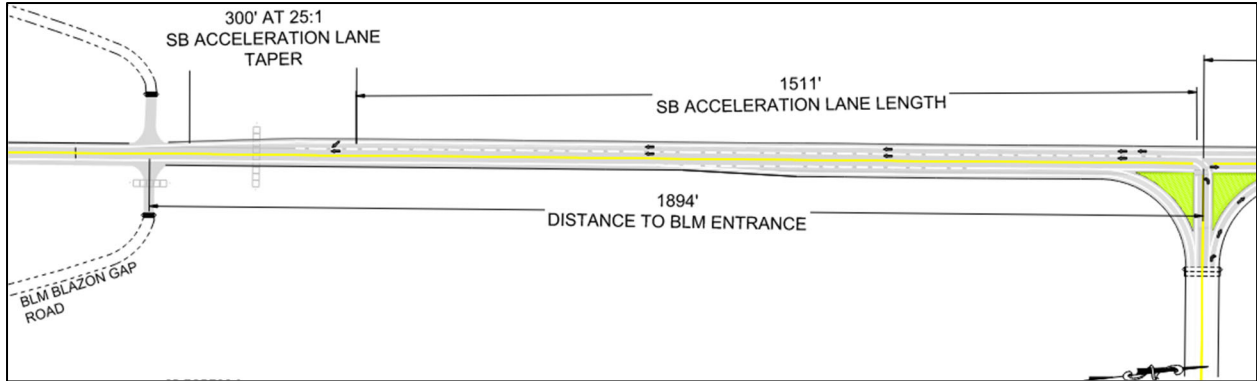


Figure 3.3.7-9 SB-Egress Option 2

SB-Egress Option 3

This option does not include an acceleration lane. Vehicles turning left from the site would need to merge with through traffic upon entering the highway. To mitigate possible safety concerns, a speed reduction to 55 mph may be considered and would be proposed as a design exception.



Figure 3.3.7-10 SB-Egress Option 3

Fire Protection, Emergency Medical Services and Medical

Fire protection, emergency services, and medical services would be necessary for the TFF Project and its construction and operations workforce. It is expected that these services would be provided from within Lincoln and Uinta Counties. The following text describes the available resources for these services within those two counties as it relates to the TFF Project. Table 3.3.7-2 provides 2021 fire protection and emergency medical service (EMS) personnel data for the fire/EMS departments in Lincoln and Uinta County. Table 3.3.7-2 also provides approximate ratios of residents per firefighter and residents per EMS staff person. Collectively, the two counties have a ratio of 186 residents per firefighter and 404 residents per EMS staff person.

There are two major hospitals containing a total of 58 certified beds in Lincoln and Uinta County (Table 3.3.7-2). Depending on the hospital, occupancy rates ranged from 5 to 9 percent in 2021/2022. The two counties had 56 physicians, which equates to 715 residents per physician (Table 3.3.7-4)

Counties and local governments are the state’s “first responders” (WOHS 2019a). Every county in the state has an emergency management coordinator (county coordinator), emergency operations center, and comprehensive emergency management plan (“emergency operations plan” (EOP)) (WOHS 2019b).

Local emergency managers are responsible for planning and mitigation, preparation for emergencies, and disaster response/recovery (LCOEM Undated a).

In the event of a disaster, the county coordinator manages the county and city response and communicates with the Wyoming Office of Homeland Security (WOHS). Should local governments require assistance, the county coordinator can request additional support from the WOHS. Should federal assistance be required, the WOHS can contact the FEMA. In Lincoln County, the coordinator is located at the Lincoln County Office of Emergency Management (LCOEM), a division of the Lincoln County Sheriff's Office (LCOEM Undated a). The LCOEM is currently updating its EOP (LCOEM Undated b). In Uinta County, the coordinator is located at Uinta County Emergency Management (UCEM), a part of the Uinta County Emergency Services department (Uinta County Undated).

In 2004, Wyoming passed a bill called the Wyoming Emergency Response Act (W.S. 35-9-151). The Act enabled the director of Homeland Security to establish eight regional emergency response teams “for the purpose of organizing, equipping, training and responding to hazardous materials, weapons of mass destruction (terrorism) and/or any all-hazards incident impacting a community” (WOHS 2019c). The regional teams are available to supplement local resources when an incident is beyond the first responders’ capabilities (WOHS 2019c). Lincoln, Uinta, and Sweetwater Counties comprise Region 4. The Region 4 Emergency Response Team is located in Rock Springs. Region 4 has a Regional Hazard Mitigation Plan which analyzes hazard risks in the three-county region and recommends mitigation measures to minimize potential losses from disastrous events (Lincoln County 2022).

Table 3.3.7-2 Fire Protection and EMS Personnel, 2021

Fire Department	County	Service Population	Firefighters					EMS Staff				
			Full-Time	Part-Time	Volunteer	Total	Residents per Firefighter	Basic EMTs	Advanced EMTs	Paramedics	Total	Residents per EMS Staff Person
Bear River Fire District/ Cokeville Fire Department	Lincoln	850	0	0	12	12	71	ND	ND	ND	ND	ND
Kemmerer Volunteer Fire Department	Lincoln	5,000	0	0	27	27	185	4	2	0	6	833
La Barge Volunteer Fire Department	Lincoln	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uinta County Fire Protection - Bridger Valley	Uinta	6,000	1	0	34	35	171	4	4	0	8	750
Uinta County Fire Protection - Evanston	Uinta	12,000	4	0	50	54	222	25	20	0	45	267
	Total		5	0	123	128	186	33	26	0	59	404

Source: WDFPES 2021

ND = No Data

EMS = emergency medical staff

EMT = Emergency medical technician

Table 3.3.7-3 Major Hospitals, 2022

Facility Name ^a	City ^a	County	No. of Certified Beds ^{a,b}	Support Personnel (FTEs) ^a	Percent Occupancy ^b
Evanston Regional Hospital	Evanston	Uinta	42	92	9%
South Lincoln Medical Center	Kemmerer	Lincoln	16	60	5%
Total			58	152	

a. DHHS 2022

b. WDOH 2022

FTE = full-time equivalent

Table 3.3.7-4 Physicians

County	Number of Physicians	2020 Decennial Census USCB County Population	Residents per Physician
Lincoln	30	19,581	653
Uinta	26	20,450	787
Total	56	40,031	715

Source: DHHS 2021, USCB 2020a

3.3.7.2 Environmental Impacts Related to Infrastructure, Traffic and Transportation

Construction

Utilities

Electricity would be supplied by an existing distribution line on the west side of US-189 near the TFF property. A new service drop (power pole) would be placed on the east side of US-189 and a 25 kV line installed to deliver power from the existing electrical distribution line on the west side of US-189 to the TFF construction site. The electrical power needs for the construction site would be like other commercial or industrial development of this size. The impact to the existing electrical infrastructure and supply would be minor and not expected to adversely impact the available electricity supply.

No water or sewer hook ups are planned. Water (containerized) would be supplied by an outside vendor. Water for dust suppression during construction would be trucked to the TFF site as needed. Bottled water would be used for potable water needs. Portable sanitary facilities would be used during construction and serviced by an outside licensed vendor who would transport the sanitary wastewater to a permitted wastewater treatment facility.

As discussed in Section 3.3.3.4 (Socioeconomics), TFF in-migrating workers would be expected to temporarily or permanently reside in the surrounding area. These additional residents would be accommodated by existing water supplies and wastewater treatment capacity and therefore impacts to utilities would be minor.

Transportation and Traffic

The proposed new US-189 intersection and entrance road would be designed to comply with WYDOT requirements and meet drivers' expectations. All necessary WYDOT permits and authorizations would be obtained.

The peak commuter traffic is estimated at 120 to 150 workers. Truck deliveries during construction are estimated to peak at 60 vehicles per day. Truck shipment arrivals and departures would be typically outside of peak commuting hours. Materials required for construction would be delivered by a variety of trucks, trailers, or other vehicles capable of transporting large and heavy loads.

The segment of US-189 where the TFF site is located is bracketed by CR 304 to the north and WY 412 to the south. As shown in Table 3.3.7-1, this segment has a 2021 traffic count of 1,636. The up to 150 workers and 60 truck shipments for the construction peak assuming no carpooling would increase the daily traffic experienced along US-189 by up to 400 vehicles. Approximately 70 percent of the construction commuting traffic is assumed to arrive at the Project site traveling north on US-189, 30 percent is assumed to travel south on US-189. TerraPower assumes that the truck deliveries are equally split north and south. Considering the traffic count for US-189 between CR 304 and WY 412 of 1,636, an additional 260 vehicles (70 percent of 300 commuting vehicles plus 50 percent of 60 truck shipments) would increase the traffic count to 1,901. The increased traffic on US-189 both north and of the site would be under that experienced along US-30 east of Kemmerer (2,135). The increase in traffic during peak commuting times could result in traffic slowing and congestion. The proposed new intersection with US-189 would be designed to mitigate impacts to the flow of traffic. Further, some level of carpooling would be expected for construction workers, reducing the number of vehicles traveling to the site. Potential impacts to existing road use during TFF construction are expected to be minor.

The miles driven for commuting and truck shipments would increase the number of vehicle accidents involving injuries and fatalities. Construction workers are assumed to commute 312 days a year. Round trip mileage for construction workers residing in Lincoln County and thus arriving at the site from the north is assumed to be 20 miles (the approximate round-trip distance between the TFF site and midpoint of Kemmerer). Mileage for Uinta County residents who arrive at the site from the south is assumed to be 98 miles (approximate round-trip distance between TFF and the I-80 interchange in Evanston). No carpooling is assumed. The truck deliveries are assumed to have a round trip mileage of 100 miles. The annual commuting mileage during the peak construction period is approximately 5.4 million miles.

Average vehicle crash rates were calculated from WYDOT data for crashes, injuries, and fatalities for 2018-2022 and miles driven. The estimated annual number of accidents, injuries, and fatalities for workers commuting to and from the site and truck shipments is 11, 2.5, and 0.097, respectively. Potential traffic accident impacts are expected to be minor.

Site Access

Table 3.3.7-5 reviews each site access option and potential impact associated with it. The potential impacts associated with all site access options with the assumption that proposed design exemptions are granted are minor to moderate and long term.

Table 3.3.7-5 Site Access Option Impacts

Turning Movement Option	Guiding Criteria for Warrant* and Design	Safety Considerations	Potential Impacts Without Design Exceptions	Design Exception	Cultural Area or Adjacent Intersection Interference	Impact Determination ** (Including Design Exceptions)
NB-Right 1	WYDOT/AASHTO Warrant and design			161 feet corner radius	No	Minor / No Effect
SB-Left 1	WYDOT/AASHTO Warrant and design	No	Cultural Area (shoulder expansion by 1-2 feet for taper 20 feet and bank stabilization in the cultural site)	Use existing shoulder for taper	Cultural Area (Pavement marking would extend approximately 40 feet, into cultural site, surface work only)	Minor/ No Adverse Effect
SB-Left 2	WYDOT/AASHTO Warrant and design	Decrease storage length	Cultural Area (Pavement marking would extend approximately 20 feet, into cultural site, surface work only)		Cultural Area (Pavement marking would extend approximately 20 feet, into cultural site, surface work only)	Minor / No Adverse Effect
NB-Egress 1	No warrant for inclusion; provided in WYDOT manual and design per AASHTO		Cultural Area (additional travel lane of 12 feet width and shoulder of 6 feet width)	Decrease acceleration length 16 feet corner radius	No	Minor / No Effect
NB-Egress 2	No warrant for inclusion; provided in WYDOT manual and design per AASHTO	Merge speed does not meet AASHTO, being less than 75% design speed	Cultural Area (additional travel lane of 12 feet width and shoulder of 6 feet width)	Decrease acceleration length and 80 feet radius	No	Minor / No Effect
NB-Egress 3	No warrant for inclusion; provided in WYDOT manual and design per AASHTO	Vehicles merging into traffic from very low speed	No	Reduce speed limit to 55 mph and 80 ft radius	No	Minor / No Effect
SB Egress 1	No warrant or WYDOT criteria; design per AASHTO	Taper merge point at intersection	BLM Adjacent Intersection Interference		BLM Adjacent Intersection Interference	Moderate for Safety Concerns / No Effect

Turning Movement Option	Guiding Criteria for Warrant* and Design	Safety Considerations	Potential Impacts Without Design Exceptions	Design Exception	Cultural Area or Adjacent Intersection Interference	Impact Determination ** (Including Design Exceptions)
SB Egress 2	No warrant or WYDOT criteria; design per AASHTO		BLM Adjacent Intersection Interference	Decrease acceleration length	No	Minor / No Effect
SB-Egress 3	No warrant criteria, based on WYDOT Pavement Marking Manual	Vehicles merging into traffic from very low speed	No	Reduce speed limit to 55 mph	No	Minor / No Effect

* Warrant—a warrant describes a threshold condition based upon average or normal conditions that, if found to be satisfied as part of an engineering study, shall result in analysis of other traffic conditions or factors to determine whether a traffic control device or other improvement is justified. Warrants are not a substitute for engineering judgment. The fact that a warrant for a particular traffic control device is met is not conclusive justification for the installation of the device (FHA 2022).

**Footnote: These impact determinations are based on Section 3.1 impact definitions for transportation and cultural impacts.

Fire Protection, Emergency Medical Services and Medical

As discussed in Socioeconomics, TFF in-migrating workers would be expected to temporarily or permanently reside in the surrounding area. These additional residents would be accommodated by existing emergency services therefore impacts to local emergency services would be negligible.

Operations and Maintenance***Utilities***

As with construction, the public utility connection for the Project would be limited to electricity. The 25 kV line installed to deliver power during construction would continue to be used for TFF operations. The electricity demand for the operating plant would be greater than that of construction; however, the impact to the existing supply and infrastructure would continue to be minor.

Water for processes would be trucked in and stored in an onsite 20,000-gallon water storage tank. Bottled water would be used for potable water needs. Wastewater would be stored onsite until removed by an outside licensed vendor and transported to a permitted wastewater treatment facility. The Office and Control Trailer would have self-contained sanitary systems to be serviced by an outside licensed vendor who would transport the sanitary wastewater to a permitted wastewater treatment facility.

Transportation and Traffic

The operation phase of the TFF would include a workforce of 20 to 30 operators. The TFF would continue to receive truck shipments for water, wastewater, and fuel throughout the operational life. Cryogenic liquid argon and nitrogen would be delivered via tanker trucks to support TFF operations. These truck shipments and other truck deliveries are estimated at 5 per day. In addition, sodium would be delivered to the TFF via truck in 20 metric ton ISO shipping containers. There would be approximately 100 shipments of sodium received during test and fill operations. Approximately 30 percent of the commuting traffic during operation of TFF is assumed to arrive at the Project site traveling north on US-189, 70 percent is assumed to travel south on US-189. The peak operations workforce and the peak truck shipments would be less than the daily traffic estimated for construction. Potential impacts to existing road use during operations are expected to be minor.

The miles driven for commuting would also increase the risk of vehicle crashes involving injuries and fatalities. Operations workers were assumed to commute 250 days year. Round trip mileage for workers residing in Lincoln County and thus arriving at the site from the north is assumed to be 20 miles (the approximate round-trip distance between the site and midpoint of Kemmerer). Mileage for Uinta County residents who arrive at the site from the south is assumed to be 98 miles (approximate round-trip distance between the site and the I-80 interchange in Evanston). No carpooling is assumed. Truck shipments other than sodium are assumed to be 100 miles round trip. The annual mileage for operations workers and shipments other than sodium and shipments other than sodium is estimated at approximately 460,000 miles.

Average vehicle crash rates were calculated from WYDOT data for crashes, injuries, and fatalities for 2018-2022 and miles driven. The estimated annual number of accidents, injuries, and fatalities for workers commuting to and from the site and shipments other than sodium is 0.92, 0.22, and 0.0084, respectively. There would be approximately 100 sodium shipments as well. These shipments are anticipated to arrive from overseas into a U.S. port of entry and be transported by truck to the TFF. Currently, a maximum of 54 annual shipments are projected. Assuming round trip mileage of

approximately 3,000 miles, the maximum annual crashes, injuries, and fatalities are estimated at 0.32, 0.08, and 0.003, respectively, using the WYDOT rates. Potential traffic accident impacts are expected to be minor.

Fire Protection, Emergency Medical Services and Medical

As discussed in Socioeconomics, TFF in-migrating temporary workers would be expected to permanently reside in the surrounding area. These additional residents would be accommodated by existing emergency services therefore impacts to local emergency services would be negligible.

Decommissioning

The 25 kV transmission line would be removed as part of decommissioning or could remain if there is need for this power connection to service remaining structures.

The US-189 intersection and entrance road which would be used by the proposed Kemmerer Unit 1 power plant would also remain. The number of shipments of dismantled components, material, unused chemicals, and waste for recycling, disposal, or sale would be expected to be bounded by the peak shipments during construction. Potential impacts to existing road use during decommissioning are expected to be minor.

3.3.7.3 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Existing traffic levels, patterns, and trends would likely continue. As land use in the area changes, so would the associated road use. Maintenance and repair of roads would occur based on existing plans therefore impacts would be negligible.

3.3.7.4 Cumulative Impacts

Existing industrial developments in the surrounding area that would rely on the existing utilities and transportation infrastructure, especially US-189, and thereby result in cumulative impacts, include the existing Naughton Power Plant and Kemmerer Mine, the proposed Kanata Kemmerer Decarbonization Works and TriSight facility, and the proposed Kemmerer Unit 1. The Naughton Power Plant and Kemmerer Mine are considered in the traffic counts presented in Table 3.3.7-1 and the Project's impact assessment for construction and operation. The utility and traffic impact of the potential Kanata and TriSight ventures at the mine is not known. In addition to the Naughton Plant's operations workforce, the plant has an additional approximately 300 outage workers onsite for approximately 35 days for 3 out of 4 years.

The Kemmerer Unit 1 reactor construction could rely on the same 25 kV electrical connection as the TFF and construction activities for the reactor, thereby increasing electricity usage. However, the cumulative impact to electricity supply and infrastructure would be expected to be minor. Impacts to other infrastructure and utilities in the region would increase commensurately with the increase in the worker population.

The greatest cumulative impacts to traffic and transportation would occur from TFF operations, peak Kemmerer Unit 1 construction activities, a Naughton Power Plant outage, and ongoing operations at the power plant and activities at the Kemmerer Mine. Among these projects, the largest contributor to

traffic would be the Kemmerer Unit 1 construction workforce. However, the impacts of the increased traffic would be localized to US-189 between Kemmerer and I-80, US-30 near Diamondville-Kemmerer, and WY 412. During that time the four-lane entrance on US-189 would be in place to mitigate the impacts to traffic flow along US-189. Staggering of Kemmerer Unit 1 construction worker shift start and end times would further reduce congestion during peak commuting times and some carpooling would be expected among the construction workers. Cumulative impacts to traffic and transportation would be expected to be moderate with the implementation of a construction traffic management and traffic control plan prepared in coordination with WYDOT. The greatest impacts would occur during commuting hours when the Kemmerer Unit 1 construction workforce is at or near its peak.

3.3.8 Accidents and Hazards

Construction, Operations and Decommissioning of the TFF or the No-Action Alternative would require attention to safety due to site conditions, construction activities, extreme weather conditions, the materials to be stored and processed at the facility, and several activities to be performed that involve some level of risk to workers. The goal of this analysis is to identify the bounding event(s) relating to life safety and property protection for current and proposed activities and TFF. Once established, these bounding events would represent the upper boundary of risk that would be presented by activities proposed for the facility.

3.3.8.1 Affected Environment

Worker Safety

A workplace accident would be the most likely incident associated with the TFF project. According to the BLS construction is the leading industry for fatal injuries and the 6th leading industry for non-fatal workplace injuries or illnesses in the private sector for 2021 as shown in Figures 3.3.8-1 and 3.3.8-2 (BLS 2022a, BLS 2022b). The project location is in Kemmerer Wyoming which frequently experiences very cold temperatures and high winds that have the potential to exacerbate worker safety risks during those times.

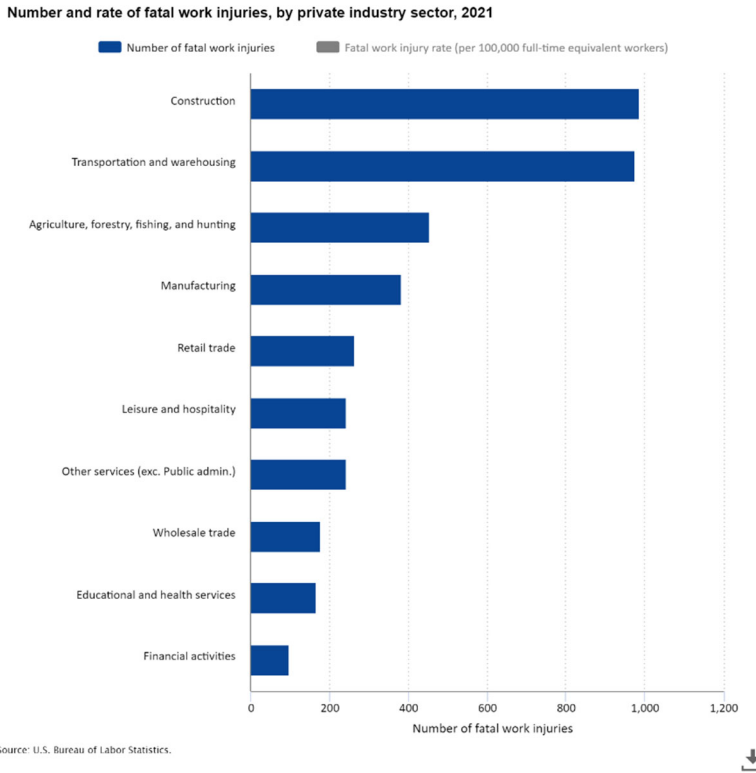


Figure 3.3.8-1 Fatal Workplace Injuries by Industry

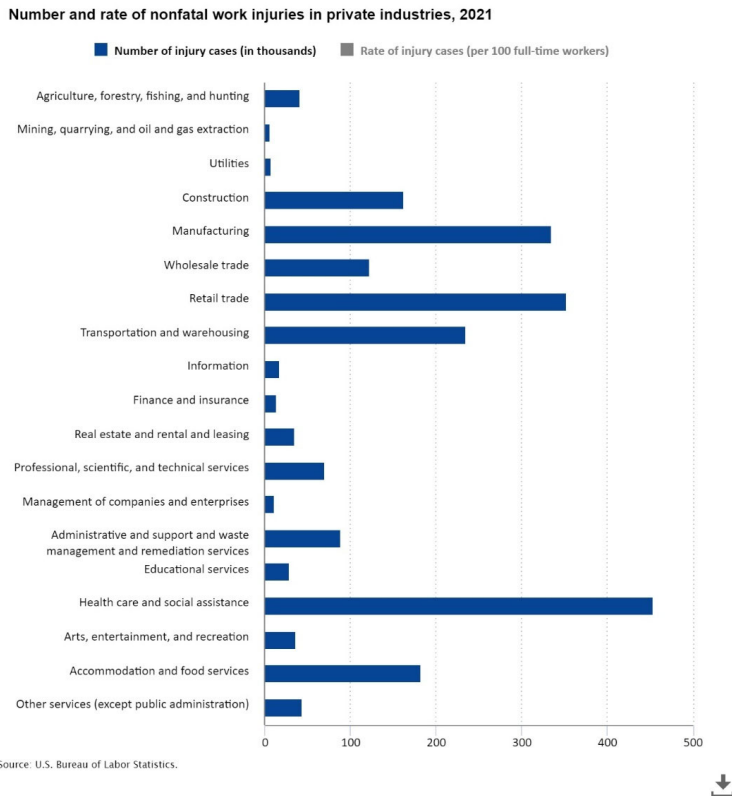


Figure 3.3.8-2 Non-Fatal Workplace Injuries by Industry

Sodium

The hazards associated with the presence and use of sodium in the TFF present the largest significant potential incident occurring due to the reactivity of sodium. The sodium used in the TFF would be from an established industry source and transported via trucks within the U.S. The sodium transportation and delivery to the TFF would be accomplished by using 20 metric ton ISO shipping containers. There would be an estimated 115–130 shipping containers received. The sodium would be loaded in molten, liquid form into the road certified shipping containers, then solidified for transport under an Argon cover gas for safe transportation. The certified shipping container and Argon cover gas combination ensures a safe transport system that prevents sodium from coming into contact and reacting with oxygen or moisture in the environment.

When the sodium container reaches the TFF, it would be pulled into a loading dock with specialized equipment for receipt of sodium. A set of heating coils inside the ISO container enable an applicable heat transfer oil to be passed through and the sodium safely melted. This process would take about 18 hours. Once molten, additional argon would be pumped into the container pushing the sodium into a holding tank. Once a sample has been chemically tested for purity by a qualified vendor, the sodium would be pumped through a filter. The sodium would be stored in a large external tank of approximately 400,000 gallons until enough is stored for sodium fill operations of Kemmerer Unit 1. The sodium not used in the fill operations for Kemmerer Unit 1 would be loaded into the drilled shafts for use testing full size components using SFR technology.

Argon

Argon will be used as a cover gas for sodium on the TFF. Argon is a colorless noncombustible gas that is heavier than air and therefore can asphyxiate by displacement of air (CAMEO 2023). To mitigate risks of utilizing argon in the TFF process the cryogenic storage for the argon supply will be located outdoors. Argon utilized inside the TFF building would be located in contained piping structures with detectors located around the building to alarm if there is a leak. Below grade drilled shaft locations have been designed to reduce the need for human occupancy to the greatest extent possible. Any entrance into these areas would be done under OSHA 1910 confined space requirements which may include controls such as, but not limited to, argon and oxygen monitoring, ventilation, permitting, and supplemental equipment for the entrant.

3.3.8.2 Environmental Impacts Related to Accidents and Hazards

Construction

Worker Safety

Potential health and safety impacts would be most relevant to those working near construction equipment and materials or are exposed to construction-related hazards daily. The risk would be reduced by daily and weekly safety meetings and Project communications; regular training for all employees specific to their job duties; and the use of appropriate safety equipment. The hierarchy of controls to reduce workplace hazards will also be followed and is seen in Figure 3.3.8-3 (CDC 2023a). The TFF would meet or exceed minimum worker safety standards set forth by OSHA during construction.

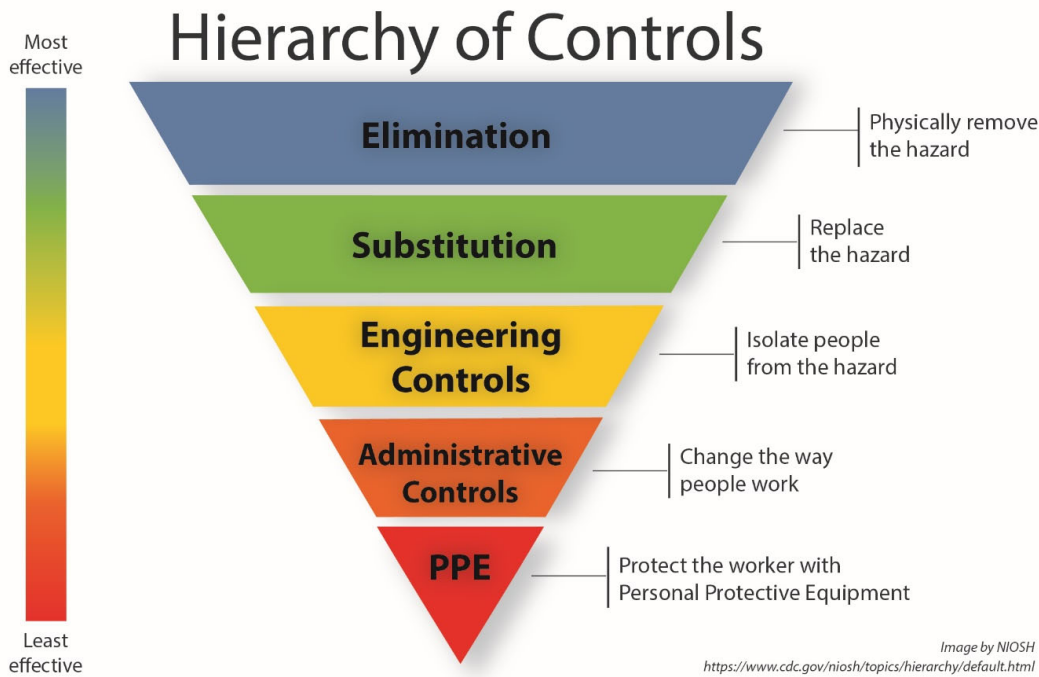


Figure 3.3.8-3 Hierarchy of Controls

The general public may be exposed to construction-related hazards from unauthorized access to work sites (on foot or by motor vehicle). This would be a highly unlikely scenario due to the rural nature of the work site and protective measures put in place to reduce this risk such as fencing or signage.

Adverse impacts to health and safety from the Proposed Project would be minimized during construction through established health and safety policies and procedures, providing notice to the public, and providing training to appropriate emergency response personnel and therefore minor.

Operations and Maintenance

Worker Safety

Potential health and safety impacts would be less prevalent during operations than in the construction phase. These would be mitigated through regular safety meetings, briefings, and communication with workers. There would be regular training for employees pertaining to their job duties and all relevant OSHA standards would be met. The risk of normal operational worker safety unrelated to sodium handling and use is minor during operations.

Intentional Destructive Acts

Installation and operation of the TFF would not involve the transportation, storage, or use of radioactive materials. The Proposed Project would not be located near any national defense infrastructure or in the immediate vicinity of other substantial national structures (DOD 2023). The sodium used in the TFF is not a target for theft or destruction. The Proposed Project would not be considered to offer any targets for intentional destructive acts.

Sodium

Operation of the TFF includes the storage and use of sodium for full size equipment testing and storage for mobile fill of the proposed Kemmerer Unit 1 project. The hazards of handling and storing sodium are illustrated by National Fire Protection Association (NFPA) 704 ranking. This is shown in Figure 3.3.8-4 (CAMEO 2023).

NFPA 704

Diamond	Hazard	Value	Description
	Health	3	Can cause serious or permanent injury.
	Flammability	3	Can be ignited under almost all ambient temperature conditions.
	Instability	2	Readily undergoes violent chemical changes at elevated temperatures and pressures.
	Special	W	Reacts violently or explosively with water.

Figure 3.3.8-4 NFPA 704 Hazard Identification for Sodium

TerraPower would comply with existing NFPA standards and requirements by using the hierarchy of controls shown in Figure 3.3.8-3 to reduce the risks associated with sodium storage and handling. The TFF procedures and processes will meet the NFPA 484 Standard for Combustible Metals. The TFF design and construction will meet the International Building Code (IBC) H-3 subclassification for buildings that contain hazardous materials that readily support combustion or that pose a physical hazard (NFPA 2022).

Utilizing the hierarchy of controls approach, the use of sodium onsite is integral to the SFR test environment and therefore cannot be eliminated or substituted. As no elimination or substitution can be undertaken, engineering controls are the most significant barriers to incident occurrence. All sodium is designed to be stored and utilized under an Argon cover gas to eliminate exposure to the environment and kept in steel lined shafts to eliminate exposure with the environment. During the design of the TFF each below grade loop containing sodium is engineered to have a below grade drain tank for emergency use. The largest loop will be equipped with an emergency drain tank and annulus between the drain tank and metal pit liner will be filled with vermiculite intended to smother any potential leaks from the drain tank when sodium enters it by reducing the oxygen interaction potential. The smaller loops will contain below grade drain tanks and shaft covers to close off the shaft in the event of an emergency thereby smothering any potential fire and extinguishing and suppressing the continued reaction. The external tank intended for use for initial fill of the proposed Kemmerer Unit 1 facility will be stored below self-ignition temperature, be equipped with a cover gas, and contain secondary containment to reduce the possibility of a sodium ignition event.

Administrative controls would also be implemented to further reduce the possibility of a sodium ignition event at the TFF. All processes, area, and action related to sodium storage, handling, transportation, and use would have an individual SOP developed covering the following areas:

- Prevent: Lowering the probability of sodium leaks and implementing leak detection/mitigation rely heavily on multiple design factors, but operational standards is a close second and will be an integral part of the prevention plan. The design phase of a sodium system includes application of design features to minimize the possibility of a leak, enhance leak detection, and integrate the system with other Systems, Structures, or Components to assure leaks will be mitigated appropriately. Operation procedures and controls in applying these practices also minimize the probability of sodium leaks.

- Detect: The sodium system designs are focused on zero leakage using proven design and operational methods as well as materials selection and installation. However, the operational and safety envelopes must consider that sodium leakage may occur in the life of the facility so leak detection and mitigation approaches are also required to adhere to the as low as reasonably achievable philosophy. These approaches use the “leak before break” logic and focus on detection of small leaks.
- Mitigate: Confirmation of a sodium leak early in the event will ensure proper operator and system responses. The mitigation method employed will depend on the specific system involved in the event. Items such as the operating temperature and pressure of the sodium as well as the type of leak will be considered.
- Suppress: A sodium reaction combustion consequence depends on factors such as sodium temperature, quantity of sodium, surrounding materials. Fire detection and alarm systems shall be provided in accordance with the requirements of the IBC and NFPA (NFPA 2022). Suppression of liquid sodium fires in an air atmosphere is most effectively performed by an oxygen-depriving system for large spill fires. Suppression of small fires can include manual firefighting efforts utilizing portable fire extinguishers (Class D) and manually applied extinguishants distributed throughout the buildings. Specific system requirements and sodium reaction type would be taken into account for the most appropriate suppression method.

In addition to this all-sodium handling operations and processes will have specific procedures that outline proper procedure for use, inspection, and testing. This could include but not limited to:

- Training requirements
- Tools and equipment
- Safety Precautions
- Pre and Post Job Briefs
- Prerequisite Actions
- Test Steps
- Post Performance Actions

PPE and materials will also be employed to ensure proper handling and storage of sodium in line with NFPA requirements and standard TerraPower operating requirements.

In addition to these steps local fire protection resources from Lincoln and Uinta Counties would be engaged throughout the operation of the plant to ensure additional risk of sodium is understood and that they have the ability and capability to respond if necessary. This risk would be new and unique to the Project requiring additional training, equipment, and material to be obtained and maintained by local fire department representatives. As this is a unique risk associated with the Project Terra Power will be providing the necessary training to those individuals who need it. Terra Power will also be housing and inspecting the necessary firefighting material and equipment specific to sodium on the TFF site to ensure its availability in the case of emergency. While there is expected to be a new type of risk to fire fighters in the area there will be increased training opportunities providing a beneficial impact to the

local fire fighters. Therefore, a sodium accident would be a low probability but high-risk incident with moderate impacts.

Decommissioning

Decommissioning risks would be like the construction risks associated with the build of the TFF project. A similar workforce and health and safety risks would be expected for the workforce and general public and therefore the impacts would be minor.

3.3.8.3 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the expenditure of federal funds by TerraPower in support of the Proposed Project. For purposes of this analysis, DOE assumes the Proposed Project would not proceed if DOE does not authorize the expenditure of federal funds. Therefore, the impacts would be negligible to potential construction, operation, decommissioning employees, or the general public.

3.3.8.4 Cumulative Impacts

The proposed Kemmerer Unit 1 project is the only project with close enough proximity to result in cumulative impacts related to accidents and hazards. Kemmerer Unit 1 is anticipated to be a SFR nuclear facility. The combined cumulative impacts related to accidents and hazards could be major due to the risks associated with the presence and use of nuclear material and sodium involved. The review of the proposed Kemmerer Unit 1 accidents and hazards and cumulative impacts will be the subject of a later EIS that will be completed by the NRC through the submission of the Kemmerer Unit 1 construction permit and license application. NRC and other applicable regulatory agencies would provide safety oversight and regulatory oversight to ensure the continued safety of the facility.

SECTION 4 LIST OF AGENCIES AND PERSONS CONSULTED AND PREPARERS

Table 4-1. List of Agencies, Tribes, and Persons Consulted

Name	Title	Organization	Role
Section 106 Consultation			
Sara Needles	State Historic Preservation Officer	Wyoming State Historic Preservation Office	Section 106 Consultation
Damian Kirkwood	WYCRO Manager	Wyoming State Historic Preservation Office	Section 106 Consultation
Richard Currit	Senior Archaeologist	Wyoming State Historic Preservation Office	Section 106 Consultation
Federal Highways Administration			
Bob Bonds	Area Engineer	Federal Highway Administration	Project consultation
Wyoming Department of Transportation			
Scott Gamo	Environmental Services Manager	Wyoming Department of Transportation	Project consultation
Darin Kaufman	WYDOT District 3 Traffic Engineer	Wyoming Department of Transportation	Project consultation
Wyoming Department of Environmental Quality			
Alan Edwards	Administrator of Industrial Siting Division/Deputy Director	Industrial Siting Division, Wyoming Department of Environmental Quality	Project consultation
Christopher Toalson	Economist	Industrial Siting Division, Wyoming Department of Environmental Quality	Project consultation
Jenny Staeben	Attorney	Industrial Siting Division, Wyoming Department of Environmental Quality	Project consultation
Tribes			
Nathan Small	Chairman	Shoshone-Bannock Tribes of the Fort Hall Reservation	Government-to-government consultation
Carolyn Smith	Section 106 Lead	Shoshone-Bannock Tribes of the Fort Hall Reservation	Section 106 consultation
Mark Woommavovah	Chairman	Comanche Nation of Oklahoma	Government-to-government consultation
Theodore Villicana	Section 106	Comanche Nation of Oklahoma	Section 106 consultation
Jeffrey Stiffarm	President	Fort Belknap	Government-to-government

References

		Reservation	consultation
Michael Blackwolf	Section 106	Fort Belknap Reservation	Section 106 consultation
Frank White Clay	Chairman	Crow Tribe of Indians	Government-to-government consultation
Aaron Brien	CTHPO Director	Crow Tribe of Indians	Section 106 consultation
Peter Lengkeek	Chairman	Crow Creek Sioux	Government-to-government consultation
Merle Marks	Tribal Historic Preservation Officer (THPO)	Crow Creek Sioux	Section 106 consultation
Luke Duncan	Whiteriver Band Representative	Northern Ute	Government-to-government consultation
John St. Clair	Chairman	Eastern Shoshone Tribe	Government-to-government consultation
Joshua Mann	THPO	Eastern Shoshone Tribe	Section 106 consultation
Lloyd Googles	Chairman	Northern Arapaho	Government-to-government consultation
Ben Ridgley	NATHPO Director	Northern Arapaho	Section 106 consultation
Durell Cooper	Chairman & THPO	Apache Tribe of Oklahoma	Government-to-government consultation and Section 106 consultation
Dennis Alex	Chairman	Northwestern Band of the Shoshone Nation	Government-to-government consultation
Patty Timbimboo-Madsen	Cultural Resources Director	Northwestern Band of the Shoshone Nation	Section 106 consultation
Reggie Wassana	Governor	Cheyenne and Arapaho Tribes of Oklahoma	Government-to-government consultation
Max Bear	Director, Cultural, Acting THPO	Cheyenne and Arapaho Tribes of Oklahoma	Section 106 consultation
Sheila Urais	Tribal Secretary	Skull Valley Band of Goshute Indians	Government-to-government consultation and Section 106 consultation
Shaun Chapoose	Chairman	Ute Indian Tribe of the Uintah & Ouray Reservation	Government-to-government consultation
Betsy Chapoose	THPO	Ute Indian Tribe of the Uintah & Ouray Reservation	Section 106 consultation
Rupert Steele	Chairman	Confederated Tribes of the Goshute Reservation	Government-to-government consultation
Genevieve Fields	THPO	Confederated Tribes of the Goshute Reservation	Section 106 consultation
U.S. Army Corps of Engineers			
Alex Kostra	Senior Project Manager	Wyoming Regulatory Office, U.S. Army Corps of Engineers	Project consultation

Table 4-2. List of EA Content Preparers

Name	Title	Organization	Role
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Nathan Howard	Advanced Reactor Demonstration Program	Department of Energy – Office of Clean Energy Demonstrations	Subject Matter Expert
Rasheed Auguste	Advanced Reactor Demonstration Program	Department of Energy – Office of Clean Energy Demonstrations	Subject Matter Expert
Jill Capotosto	Energy Justice Manager	Department of Energy – Office of Clean Energy Demonstrations	Environmental Justice Subject Matter Expert
Brian O’Donnchadha	Tribal Liaison	Department of Energy – Office of Clean Energy Demonstrations	Tribal Subject Matter Expert Section 106
Joe Trnka	Architectural Historian	Department of Energy – Office of Clean Energy Demonstrations (CONTR)	Tribal Subject Matter Expert Section 106
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Mary Richmond	Chief Environmental Engineer	Bechtel Corporation	TFF NEPA Specialist
Gabrielle Smyly	Environmental Engineer	Bechtel Corporation	TFF NEPA Specialist
Lynn Van-Derpoel	Senior Licensing Engineer	Bechtel Corporation	TFF Licensing Support
Matthew West	Civil / Structural / Architectural Deputy Engineer Supervisor	Bechtel Corporation	Civil Engineering Subject Matter Expert
Matthew Waterman	Geologic and Hydraulic Engineering Manager	Bechtel Corporation	Geology and Hydrology Subject Matter Expert

References

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Periandros Samothrakis	Senior Hydraulic and Hydrology Engineer	Bechtel Corporation	Geology and Hydrology Subject Matter Expert
Lisa Matis	Project Manager	Tetra Tech	NEPA Specialist, Senior Technical Reviewer
Phil Moore	Senior Consulting Scientist	Tetra Tech	Ecology, Senior Technical Reviewer
Chandler Dangle	Consulting Scientist	Tetra Tech	Ecology, GIS
Nicole Hill	Socioeconomist	Tetra Tech	Socioeconomics
Mary Hoganson	Senior Consulting Scientist	Tetra Tech	Utilities, Traffic, and Transportation
Chris Borstel	Historic Preservation Specialist / Archaeologist	Tetra Tech	Cultural Resources

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APPENDICES

**APPENDIX A - SOCIOECONOMIC REPORT
FOR THE SODIUM TEST AND FILL FACILITY**

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November 2023

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ACRONYMS AND ABBREVIATIONS

Acronyms	Definition
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
NAICS	North American Industrial Classification System
RV	recreational vehicle
SFP	School Foundation Program
TerraPower	TerraPower, LLC
TFF	Sodium Test and Fill Facility
USCB	U.S. Census Bureau
WDOR	Wyoming Department of Revenue
WEAD	Wyoming Economic Analysis Division's

1.0 INTRODUCTION

This socioeconomic report is prepared in support of the proposed Sodium Test and Fill Facility (TFF) in Lincoln County, Wyoming. The focus of this report is to assess the potential socioeconomic impacts of the TFF on the local municipalities and associated counties.

The TFF site is located 5 to 10 miles south of the city of Kemmerer and town of Diamondville. Industrial facilities near the TFF site include the PacifiCorp Naughton Power Plant (Naughton Plant) and the Kemmerer Operations coal mine. To predict the residential distribution of the in-migrating TFF workforce, TerraPower, LLC (TerraPower) used the residential distribution of the employees of the Naughton Plant. Most Naughton Plant employees (88 percent) live in Lincoln or Uinta Counties. The largest cities in each of these counties are Kemmerer/Diamondville (Lincoln County) and Evanston (Uinta County). Note: the northern part of Lincoln County is beyond daily commuting distance to the TFF site and not included in the Study Area. Figure 1 illustrates regional commute times from various municipalities in the Study Area to the TFF site. Only Lincoln County municipalities within a 75-minute commute are included in this analysis. The municipalities in the southern part of Lincoln and all of Uinta County form the area of impact (hereafter known as the Study Area) for this project.

Throughout this socioeconomic analysis, data are presented for the most current year available. Depending on the source of the data, the most current year may vary. The United States continues to recover from the Covid-19 virus pandemic and consequent economic disruptions (e.g., large decreases and increases in employment, high inflation, etc.). The most current data used in these analyses may reflect the economic disruptions and data collection complications caused by the pandemic. Where appropriate, 2019 data are included in the analysis to provide a pre-Covid baseline, against which, 2020 through 2023 data can be compared.

Most population and housing-related data are from the U.S. Census Bureau (USCB). As of early 2023, the USCB has only released Redistricting Data (PL 94-171) from the 2020 Decennial Census. Redistricting Data files contain high-level population, race, and housing counts, only. In this analysis, 2020 Decennial Census data are used, as available. In their absence, the most current 5-year data from the USCB's American Community Survey are used. Data from the USCB's Population Estimates Program (which is based on the 2020 Decennial Census) are the source for 2021 population estimates.

2.0 CURRENT SOCIOECONOMIC ENVIRONMENT

2.1 Population

In general, Wyoming is a state with geographically large counties and sparse population. Table 1 presents USCB Decennial Census trend data for the Study Area. Table 2 presents the Wyoming Economic Analysis Division's (WEAD) most current population forecasts for the Study Area (which are based on Decennial Census 2010 data).

Based on USCB data, from 2010 to 2020, the populations of Lincoln and Uinta Counties had average annual growth rates of 0.8 percent and -0.3 percent, respectively. Lincoln County's municipalities experienced average annual growth rates ranging from -0.6 percent in Cokeville to -4.05 percent in Opal, for the same period. Uinta County's municipalities experienced average annual growth rates ranging from

0.09 percent in Lyman to -0.5 percent in Evanston, for the same period. The Study Area experienced an average annual growth rate of -0.5 percent. For the purposes of this report, the trends experienced by each county and community are expected to continue regardless of whether or not the proposed TFF is built.

The WEAD forecasts growth rates for the state's counties and municipalities. From 2020 to 2030, Lincoln County and its municipalities are projected to experience average annual growth rates of 0.9 percent. In Uinta County and its municipalities, average annual growth rates are projected to decline by -0.3 percent. From 2030 to 2040, WEAD forecasts show average annual growth rates of 0.4 percent for Lincoln County and its municipalities and 0.04 percent for Uinta County and its municipalities. The Study Area population shows a change in average annual growth rates over the 3 decades (2010-2040) from -0.2 percent, in the first decade, to 0.1 percent, by the third decade. For the same periods, the state of Wyoming population grew at average annual rates of 0.3 percent. Note: WEAD forecasts are based on the 2010 decennial census. At the time the forecasts were calculated, 2020 decennial census results were not available.

2.2 Economy

The Study Area's principal economic centers include: Kemmerer and Diamondville (Lincoln County) and Evanston (Uinta County). The city of Kemmerer and town of Diamondville are adjacent to one another and are commonly considered one economic unit. Evanston is the largest city within the Study Area.

The southern part of Lincoln County, the part within daily commuting distance of the TFF site, is dominated by open plains, grazing and rangelands, and the industrial facilities of the Kemmerer/Diamondville area. The county's economy has dependence on the energy industry: coal, oil, and natural gas mining and production (ZBPF 2012). County residents dub the Kemmerer/Diamondville area "the county's economic engine" (ZBPF 2012).

Uinta County, located south of Lincoln County, is a 90-minute drive from Salt Lake City and has economic linkages to the city. Evanston, the county's largest city, is adjacent to the I-80 corridor, which travels from Salt Lake City to eastern Wyoming and beyond.

Table 3 presents labor force and unemployment trends in the Study Area, as calculated by the Bureau of Labor Statistics (BLS). In 2021, the Study Area labor force totaled 18,346 persons, representing about 6.3 percent of the total Wyoming labor force. Between 2011 and 2021, the Study Area labor force decreased at an average annual rate of -0.2 percent, while the state's labor force decreased at an average annual rate of -0.4 percent. The Study Area labor force is roughly split between Lincoln and Uinta Counties. In 2021, 803 persons in the Study Area were unemployed, reflecting an average annual decline of -5.3 percent from 2011, when unemployment reached 1,381. The 2021 annual unemployment rate in the Study Area was 4.4 percent. The 2021 unemployment rates in Lincoln County, Uinta County, and Wyoming were 3.8 percent, 5.0 percent, and 4.5 percent, respectively.

The Bureau of Economic Analysis (BEA) reports employment data by industry (as defined by the North American Industrial Classification System [NAICS]). Table 4 presents regional and state employment, by industry, for 2019 and 2020. In 2020, local government provided 14.4 percent of jobs in the Study Area, while retail trade provided 11.5 percent. Construction and healthcare/social assistance provided approximately 10.7 and 8.2 percent of jobs, respectively.

At the state level, local government, retail trade, accommodation/food services, and healthcare/social assistance were the largest providers of jobs, at 11.6 percent, 9.6 percent, 8.2 percent, and 7.9 percent, respectively. Real estate/rental/leasing and construction were also important industries.

Notably, wage and salary employment (jobs) in Uinta County and the state of Wyoming declined, from 2019-2020. This is attributed, in part, to the socioeconomic effects of the Covid-19 pandemic. Only Lincoln County remained relatively unchanged, increasing by just nine jobs.

In its Quarterly Census of Employment and Wages, the BLS collects employment and wage data by NAICS industrial sector. Table 5 presents NAICS Sector 237 Heavy and Civil Engineering Construction data and NAICS Sector 1013 Manufacturing data, for 2021, for Lincoln and Uinta Counties, Wyoming, and the U.S. As the table shows, annual average wages, in Heavy and Civil Engineering Construction, were \$59,998 in Lincoln County and \$63,352 in Uinta County, compared to \$72,502 in Wyoming and \$83,590 in the U.S. Annual average wages, in Manufacturing, were \$42,214 in Lincoln County and \$48,966 in Uinta County, compared to \$69,585 in Wyoming and \$76,580 in the U.S.

Wyoming is a "right-to-work" state; workers are not required to join labor unions as a condition of employment. In 2021, approximately 5.7 percent of the Wyoming workforce was unionized (BLS 2022c). Nationally, the greatest concentration of unionized workers is in the governmental (public) sector (BLS 2022c).

Personal income provides a useful means for comparing worker wages in an industry to a county's total personal income. In 2021, Lincoln and Uinta Counties' total annual personal incomes were \$1,248,380,000 and \$911,174,000, respectively (BEA 2022).

2.3 Housing

Housing data are divided into two major categories, permanent housing (housing for permanent residents) and temporary housing (housing for transient workers/visitors).

2.3.1 Permanent Housing

In the Study Area, residential areas are found in cities, towns, and smaller communities. Housing is concentrated in the largest municipalities of each county: Kemmerer/Diamondville (Lincoln County) and Evanston (Uinta County).

Counties

Table 7 presents the number of housing units and housing unit vacancies in the counties in the Study Area, in 2020. Of the 18,628 total units in the Study Area, 18.7 percent were vacant (3,491 units). Vacancy rates for homeowners were 1.3 percent in Uinta County and 2.8 percent in Lincoln County. Vacancy rates among rental units were substantially higher, at 5.6 percent in Lincoln County and 6.6 percent in Uinta County.

Municipalities

Table 8 presents the number of housing units and housing unit vacancies for the largest municipalities in the Study Area, in 2020. Kemmerer/Diamondville had 1,890 units, of which 283 were vacant (15.0 percent). Evanston had 5,402 units, of which, 775 were vacant (14.3 percent). Vacancy rates for

homeowners ranged from 1.2 percent in Diamondville to 3.0 percent in Kemmerer. Vacancy rates among rental units ranged from 0.0 percent in Diamondville to 6.6 percent in Evanston.

Table 9 presents more detail about vacant housing units in the Study Area counties and largest municipalities in Lincoln County, in 2020.

2.3.2 Temporary Housing

Hotels and Motels

In 2022, there were 313 hotel or motel rooms in the Study Area municipalities in Lincoln County and 1,036 hotel or motel rooms in Uinta County (STR 2023a). Averaged over 9 years, monthly hotel/motel occupancy rates for the region ranged from 31.7 percent in the month of December to 67.3 percent in the month of July (STR 2023b). For both counties, there is a gradual increase in occupancy rate, from the winter months to the summer months. During the month of July, when the hotel/motel occupancy rate is highest (67.3 percent), the corresponding vacancy rate of 32.7 percent indicates that 441 rooms would potentially be available for the project workforce.

Recreational Vehicle Parks and Campgrounds

There are recreational vehicle (RV) parks or campgrounds, with full hookups (water, sewer, and electricity) for private recreational vehicles, in the Study Area. There are, at least, 210 RV/tent sites in Lincoln County and 199 RV/tent sites in Uinta County (Gunter 2022, Wright 2022, Braband 2022, Julian 2022, BLM Undated a, Recreation.gov 2022a, BLM Undated b, Recreation.gov 2022b, and RV Life 2022). Applying the vacancy rate occurring during the month with the highest occupancy rate during the year (July, at 32.7 percent) to the number of RV/tent sites in Lincoln and Uinta County (409) indicates that 133 sites would potentially be available for the project workforce.

2.3.3 New Housing

In addition to the existing housing stock in the Study Area, Kemmerer city officials are reviewing, for approval, the construction of a significant number of new permanent and temporary housing units. At a minimum, new housing units are likely to number in the hundreds.. For one new housing development, city officials have been in the process of rezoning roughly 80 to 100 acres of agricultural land to single- and multi-family residential. This change could result in the construction of more than 400 permanent and temporary housing units (City of Kemmerer 2022). Some portion of the new units may be available for the TFF workforces.

2.4 Local Taxes

In Wyoming, local governments receive tax revenues from, both, state and local taxation. Most state revenue distributed to local governments is generated by sales and use taxes, federal mineral royalties, severance taxes, fuel taxes, and lodging taxes. Most local government revenue is generated by sales and use taxes and property taxes (WLSO 2021). Property taxes are the primary source of revenue for most counties' general funds, school districts, and special districts (e.g., hospital districts, irrigation districts, community college districts), while sales and use taxes are the primary source of revenue for most municipal governments (WLSO 2021). (Most lodging taxes are used to promote tourism throughout the state and are not examined in this analysis (WTA 2021)).

Tables 10 and 11 present FY 2021 government revenues for Lincoln County and the city of Kemmerer. In Lincoln County, property taxes are the largest source of revenues, at \$7,271,821, or 26.6 percent of total revenues. In Kemmerer, sales and use taxes are, by far, the largest source of revenues, at \$1,689,508, or 42 percent of total revenues.

Several tax revenue categories would be affected by the construction and operation of the TFF project. Among those are sales and use taxes on construction- and operations-related purchases and personal purchases made by project-related workers; real property taxes related to the construction and operation of the facility; and real property taxes paid by in-migrating project-related workers. The following subsections describe the primary tax categories impacted by the project and their applications in the state of Wyoming; Lincoln and Uinta Counties; and the city of Kemmerer.

2.4.1 Corporate and Individual Income Taxes

There are no individual or corporate income taxes in Wyoming (W.S. 39-12-101).

2.4.2 Sales and Use Taxes

Wyoming imposes a 4 percent, statewide, sales and use tax, of which, 69 percent is directed to the state general fund and the remainder is distributed to the county of origin (WLSO 2021). The distribution between each county and its municipalities is determined using a population-based formula (WEAD 2021). Sales and use taxes are collected by vendors and remitted to the Wyoming Department of Revenue (WDOR) (WTA 2021).

Counties can levy a maximum of 2 percent in sales and use tax for general purposes and a maximum of 2 percent for specific purposes, but the local tax rate cannot exceed 3 percent (W.S. 39-15-204). Optional general purpose tax revenue, less administrative costs, is returned to the county of origin and distributed between the county and its municipalities using the same population-based formula (WEAD 2021).

Both Lincoln and Uinta County and their municipalities collect a general-purpose county tax of 1 percent, in addition to the state's 4 percent sales and use tax. There are no municipalities in the Study Area that impose their own sales or use tax. (WDOR 2022a)

Table 12 presents sales and use tax collections for the two counties and the state, fiscal years 2011 through 2021. The following trends are noted for sales and use tax revenues. Lincoln County sales and use tax revenues grew at an average annual rate of 2 percent per year, from 2011 to 2021, while Wyoming's sales/use tax revenues grew at an average annual rate of 1.4 percent, for the same period. Uinta County revenues also increased, albeit, at a slower rate (0.7 percent average annual increase).

2.4.3 Property Taxes

Property taxing jurisdictions include the state, counties, cities, schools, and special districts (WTA 2021). Each jurisdiction establishes a budget that informs its mill levy for the year. Levies are imposed, as defined by Wyoming statutes. Taxes are distributed, based on the assessed valuation of the property within the geographical boundary of each taxing jurisdiction (WTA 2021).

County tax assessors assess the value of most property, but the WDOR assesses the values of mines, rail car companies, public utilities, pipelines, and tele communications companies. County treasurers collect the taxes and distribute collections to the taxing jurisdictions (WTA 2021).

Real and personal property are assessed using fair market value, less exemptions and exclusions. Fair market value is determined by using one or more of the three following appraisal methods: sales comparison or market; cost (replacement, reproduction, or historical); and income capitalization (WDOR 2016). Current assessment ratios, based on property type, are as follows: minerals and mine products – 100 percent; industrial property, real and personal – 11.5 percent; all other property (including agricultural), real and personal – 9.5 percent (WTA 2021).

Wyoming no longer levies property taxes for state operations. Wyoming does, however, levy a property tax to fund the state’s School Foundation Program (SFP), one of the state’s two education equalization programs. For the SFP, the state can collect a total of 12 mills¹, based on the assessed value of all property in the state. The amount of funding each school district receives from the SFP is a function of the school finance system’s funding model as well as the characteristics of the district’s schools, staff, and students (WLSO 2021). In FY 2021, over \$235 million in revenues were levied for this program (WDOR 2022b).

County governments can assess up to 12 mills on the taxable value of property in the county (WLSO 2021). Cities and towns are limited to 8 mills on the property located within municipal limits. For schools, the county can collect a total of 6 mills on property in the county. A school district must levy 25 mills on the property within the district (WLSO 2021). The largest single source of revenue for K-12 education is local property taxes (WSLO 2021). Special district levy maximums depend on the type of special district².

Table 13 presents tax levy data for Lincoln and Uinta Counties, tax years 2011 and 2019 through 2021. In Lincoln County, average mill levies increased, while total revenues decreased over the 10-year period. In Uinta County, both, average mill levies and total revenues, decreased over the 10-year period.

Table 14 presents school district revenues and sources for the 2019-2020 and 2020-2021 school years for Lincoln County School District 1, the district hosting the TFF and most of the project workforce children, as its boundaries encompass most of Kemmerer and Diamondville. Local property tax revenues represent the largest source of operating revenue funding for this school district.

TerraPower has acquired about 35 acres of land for construction of the TFF (parcel # 20161910002800). The TFF site area was formerly part of a larger parcel (# 20160210001700) owned by PacifiCorp. In 2021, the assessment ratio for the PacifiCorp parcel was 9.5 percent. The total mill levy was 65.13 mills, representing eight taxing jurisdictions.

- Lincoln County School #1: 46.40

¹ Mill means \$1 of taxes for every \$1,000 of assessed value. A mill is applied to the assessed value of property to determine the tax due.

² Pursuant to W.S. 39-13-104(e) and (f), special districts include hospital (6 mill max.), cemetery (3 mill max.), fire protection (3 mill max.), sanitary and improvement (1 mill max.), museum (1 mill max.), solid waste removal (3 mill max.), weed and pest (1 mill max.), water and sewer (8 mill max.), water conservancy (1 mill max.), rural health care (4 mill max.), senior citizen services (2 mill max.), flood control (12 mill max.), and rural county (1 mill max.) districts (WSLO 2021).

- Lincoln County: 12
- South Lincoln Hospital: 4.0
- South Lincoln Special Cemetery District: 0.967
- Weed and Pest: 0.905
- South Lincoln Fire: 0.555
- Kemmerer Senior Ctr: 0.30
- Lincoln Conservation: 0

At 46.6 mills, the Lincoln County School District #1 levy represents about 71 percent of the total mill levy. At 12 mills, the Lincoln County levy represents about 18 percent of the total mill levy. The remaining taxing jurisdictions' mill rates are significantly smaller.

Actual property taxes paid by PacifiCorp for this land are unavailable because the WDOR assessed PacifiCorp's property holdings across the state as one unit. Thus, for this analysis, TerraPower has applied the total mill rate (65.13) to the land's 2021 assessed value for an approximation of the taxes paid for the 35-acre property. The calculated approximation of the payment made by PacifiCorp is less than \$200.

3.0 PROJECT IMPACTS RELATED TO SOCIOECONOMICS

The construction of the TFF, entrance road, and US-189 intersection would require a peak workforce of 120-150 workers and is estimated to take 29-35 months to complete. The operations phase of the TFF would employ 20-30 operations workers throughout the 20-year life of the facility.

TerraPower assumes 100 percent of the construction and operations workforces would migrate into the Study Area. [At 2,378 workers (Table 4), the Study Area construction workforce is relatively small and, at 4.4 percent (Table 3), the Study Area unemployment rate is relatively low.]

3.4 Construction

3.4.1 Population

The USCB's 2010 and 2020 Census population data for the Study Area are presented in Table 1. The total Study Area population equated to 24,345 people in 2020. Table 2 presents the WEAD's projected 2030 population for the Study Area, 25,057.

At peak, the addition of 120-150 construction/operations workers to the Study Area would result in a less than 1 percent increase in the USCB's 2020 Study Area population and the WEAD's projected 2030 population. Should any of the construction workers bring families to the Study Area, the additional population (workers plus family members) would not exceed 2 percent of the Study Area population. In 2021, the average family size in Wyoming was 3.2 people (USCB 2021). If 150 workers were to bring 2.2 family members (based on 3.2 family size) per worker during the peak of construction, 480 people would become new temporary or permanent residents in the Study Area, increasing the Study Area population by 1.9 percent. The addition of 120-150 workers, at peak construction, would not significantly increase the total population in the Study Area.

Within the Study Area, changes (employment and earnings) in economic activity caused by the TFF project (direct effects) would result in additional rounds of spending, creating additional employment and

earnings (indirect effects). This is called the multiplier effect. As an indirect impact, the multiplier effect of the new jobs in the area would result in additional jobs in the local industries that would support the construction and operations workforces (hotels/motels, restaurants, convenience stores, etc.) during the construction period. These indirect jobs are expected to be filled by some portion of the 803 unemployed workers already residing in the Study Area. Therefore, there would be no commensurate increase in population.

3.4.2 Employment

The magnitude of employment-related impacts on local and regional economies depends on: the size of the project's in-migrating workforce, employee-related expenditures in the Study Area, and the size of the Study Area's economy. The construction of the TFF, entrance road, and US-189 intersection would require skilled labor, such as foremen, iron workers, electricians, carpenters, and heavy equipment operators, as well as, unskilled laborers and a small number of facility operators. This workforce would be needed for road construction, site clearing, shaft drilling/lining, foundation and building construction, roadwork, and facility operations.

Within the Study Area, initial changes in economic activity caused by the TFF project would result in additional rounds of spending, creating additional economic benefits. As stated previously, in-migrating workforces directly related to the project would create employment- and earnings-related changes to the Study Area economy. Indirect Study Area employment and household earnings changes can be determined, per unit of change in employment and household earnings in a final-demand industry (direct changes). In this case, there are two final-demand industries, construction and manufacturing.

As stated previously, the TFF is expected to employ up to 120-150 workers over the construction period. During the peak of construction, 120-150 TFF workers and the indirect jobs they would create would represent a less than 1 percent increase in the Study Area's 2021 labor force of 18,346.

As presented in the Economy subsection, Lincoln and Uinta Counties' total annual personal incomes, in 2021, were \$1,248,380,000 and \$911,174,000, respectively (BEA 2022). TerraPower estimates total construction period wages, including TFF, entrance road, and Hwy 189 construction, would equate to about \$23 million, based on U.S. average weekly wages for construction and manufacturing workers. These wages would represent 1.1 percent of the total personal incomes of Lincoln and Uinta Counties, combined, in 2021.

Further, the maximum TFF project wages estimated for a single year is about \$8,000,000. At less than 1 percent of Study Area personal income in 2021, these wages and associated indirect earnings would not significantly increase the total personal income of the Study Area.

3.4.3 Housing

The USCB's 2020 housing data for the Study Area counties and municipalities are presented in Tables 7, 8, and 9. Of most importance are the data in Table 9, which provide the most detail on the vacant permanent housing units in the Study Area. According to Table 9, there were 170 vacant housing units for rent and 128 units for sale in Uinta County and the applicable Lincoln County municipalities (i.e., Kemmerer, Diamondville, and LaBarge), combined.

Also, TerraPower collected RV park and hotel/motel data for the Study Area. The data are presented in the “Temporary Housing” section of this analysis and indicate that, at the height of RV park and hotel/motel occupancy during the year (67.3 percent, in July), there would still be 441 hotel or motel rooms and 133 RV park sites available to the TFF construction and operations workforces.

Adding the vacant rental and for sale units to the available RV park sites and hotel/motel rooms equates to a total of 872 housing units. Also, some portion of the new units proposed for construction could be available for the TFF construction workforce.

As stated previously, TerraPower assumes 100 percent of the construction and operations workforces would migrate into the Study Area. Therefore, assuming one worker per housing unit, 150 construction/operations workers would occupy about 17 percent of the total number of vacant permanent and available temporary housing units in the Study Area. Also, most construction workers would be expected to be in the area for less than 2 years.

At peak, the in-migrating construction and operations workforces would occupy about 17 percent of the vacant permanent and available temporary housing units in the Study Area. While measurable, most impacts would be localized to Kemmerer and Diamondville and most construction workers would be in the area for less than 2 years.

3.4.4 Local Taxes

TFF construction-related activities, purchases, and workforce expenditures would generate several types of local taxes, the most important of which are sales and use taxes and property taxes. Most local government funding comes from sales and use taxes and property taxes.

Tables 10 and 11 present FY 2021 government revenues for Lincoln County and the city of Kemmerer. In Lincoln County, property taxes and payments in lieu of taxes are the largest sources of revenues, at \$8,867,143, or 32.4 percent of total revenues. In Kemmerer, sales and use taxes are, by far, the largest source of revenues, at \$1,689,508, or 42 percent of total revenues.

Sales and Use Taxes

For construction, TerraPower estimates about \$71,000 in sales and use taxes to local jurisdictions and if all purchases were made within the Study Area and estimates \$25,000 for the peak year.

Taxes are collected by vendors and remitted to the WDOR. To each county, the WDOR returns 31 percent of the state’s 4 percent sales and use tax collections in that county plus 100 percent of that county’s 1 percent sales and use tax collections (minus a WDOR service fee). The distribution of those revenues between each county and its municipalities is determined using a population-based formula.

For the peak sales and use taxes (\$29,000), the portions of the taxes that would reach the Study Area counties and their municipalities would represent a minute percent of Lincoln and Uinta Counties’ sales and use tax collections in FY 2021 which totaled \$48,829,964 (Table 12).

TerraPower estimates a peak construction/operations workforce of 120-150. Most of these workers and their families are likely to settle in Lincoln County, in the Kemmerer/Diamondville area. Their retail expenditures (restaurants, hotels, merchant sales, and other items) would yield an increase in sales and use tax revenues. For the peak year, TerraPower estimates TFF project wages at \$8,000,000. Some percentage

of these wages would be spent and taxed within the Study Area, generating sales and use tax revenues for the state and local governments.

As an indirect impact, the multiplier effect of the new jobs in the area would also result in higher personal income for current residents in the Study Area, more disposable income, and greater expenditures by individuals and families for items subject to sales or use taxes.

Property Taxes

As presented in Section 2.4.3, the most recent annual property tax payment attributable to the parcel proposed for development of the TFF was estimated to be less than \$200. During construction, TerraPower would pay an estimated total of \$466,000 in property taxes to local taxing jurisdictions. In the final year of construction, TerraPower would pay \$225,000 in property taxes to its taxing jurisdictions. At 46.6 mills, the Lincoln County School District #1 levy represents about 71 percent of the total mill levy. At 12 mills, the Lincoln County levy represents about 18 percent of the total mill levy. The remaining taxing jurisdictions' mill rates are significantly smaller.

For the 2020-2021 school year, Lincoln County School District 1 received \$10,748,651 in local revenues, most, of which, are from property taxes (Table 14). Wyoming's K-12 education system is primarily funded by state and local property taxes. By state law, Wyoming is responsible for maintaining a public education system that is complete and uniform across the state (Wyoming Constitution, Article 7 §§ 1, 9) (WLSO 2021). To that end, the state generates funding for two education equalization programs, the SFP and the School Capitalization Construction program. Through the SFP, the state guarantees that school districts are appropriately funded to meet their operational and instructional obligations each year ("guarantee"). This is accomplished through the transfer of funds between the state and its school districts. Funding is redirected from school districts that receive revenues in excess of their guarantees to school districts whose revenues are less than their guarantees. The level of funding is a function of the school finance system's funding model and the characteristics of a school district's schools, staff, and students (WLSO 2021). In the 2019-2020 school year, the Lincoln County School District 1 was dependent on the state to supplement its local revenues to meet its guarantee (DeCoria and Company 2020).

Lincoln County School District 1 would likely receive about 71 percent of the TFF tax payment, about \$160,000 in the final year of construction. When compared to the school district's total local revenues in 2020-2021, the TFF payment would represent about 1.5 percent of the school district's total local revenues. Lincoln County would receive about 18 percent of the TFF tax payment, about \$41,000. When compared to the county's total property tax and payment in lieu of tax revenues in 2021, the TFF payment would represent less than 1 percent of the county's total property and payment in lieu of tax revenues. The city of Kemmerer would receive none of the TFF tax payment, as the city is not one of TFF's taxing jurisdictions.

Of TerraPower's peak construction workforce, the great majority would be construction workers who would reside in the area temporarily and likely not pay property taxes. A few would be operations workers, who would likely pay property taxes. Most of these operations workers and their families are likely to settle in Lincoln County, in the Kemmerer/Diamondville area.

3.5 Operations and Maintenance

3.5.1 Population

As stated previously, the total Study Area population equated to 24,345 people in 2020 (Table 1). The Study Area's projected 2030 population is 25,057 (Table 2).

The addition of 20-30 operations workers to the Study Area would result in less than 1 percent increase in the Study Area's 2020 population and projected 2030 population. Should any of the operations workers bring families to the Study Area, the additional population would not exceed 1 percent of the Study Area populations. In 2021, the average family size in Wyoming was 3.2 people (USCB 2021). If 30 workers were to bring 2.2 family members per worker during operations, 96 people would become new permanent residents in the Study Area, increasing the population in the Study Area by less than 1 percent.

As an indirect impact, the multiplier effect of the new jobs in the area would result in additional jobs in the local industries that would support the construction and operations workforces (hotels/motels, restaurants, convenience stores, etc.) during the operations period. These indirect jobs are expected to be filled by some portion of the 803 unemployed workers already residing in the Study Area. Therefore, there would be no additional population attributable to indirect workers.

3.5.2 Employment

As stated previously, the magnitude of employment-related impacts on local and regional economies depends on: the size of the project's in-migrating workforce, employee-related expenditures in the Study Area, and the size of the Study Area's economy.

Within the Study Area, initial changes in economic activity caused by the TFF project would result in additional rounds of spending, creating additional economic benefits. As stated previously, in-migrating workforces directly related to the project would create employment- and earnings-related changes to the Study Area economy. Indirect Study Area employment and household earnings changes can be determined, per unit of change in employment and household earnings in a final-demand industry (direct changes). In this case, the final-demand industry is Manufacturing.

As stated previously, the TFF project is expected to employ approximately 20-30 operations workers over the 20-year life of the operations period. This in-migrating direct workforce would represent a small number of new jobs and small increase in household earnings and personal income in the Study Area.

3.5.3 Housing

According to Table 9, which presents more detail on vacant units in the Study Area, there were 170 vacant housing units for rent and 128 units for sale in Uinta County, Kemmerer, Diamondville, and LaBarge, combined.

As stated previously, TerraPower assumes 100 percent of the operations workforce would migrate into the Study Area. Therefore, assuming one worker per housing unit, 20-30 operations workers would occupy 7 to 10 percent of the total number of vacant housing units for rent or sale in the Study Area.

3.5.4 Local Taxes

As stated previously, most local government funding comes from sales and use taxes and property taxes. Property taxes are the largest sources of revenues for Lincoln County, at \$7,271,821 in property taxes, or 26.6 percent of total revenues (Table 10), in FY 2021. In Kemmerer, sales and use taxes are, by far, the largest source of revenues, at \$1,689,508, or 42 percent of total revenues (Table 11).

Sales and Use Taxes

By the end of construction and the start of operations, TerraPower estimates that TFF operations-related expenditures would result in sales taxes that would amount to a few thousand dollars per year, if all purchases were made in the Study Area.

Most of the operations workers and their families are likely to settle in Lincoln County, in the Kemmerer/Diamondville area. Their retail expenditures (housing, restaurants, grocery stores, merchant sales, and other items) would yield an increase in sales and use tax revenues. As an indirect impact, the multiplier effect of the new jobs in the area would also result in higher earnings/personal income for current residents in the Study Area, more disposable income, and greater expenditures by individuals and families for items subject to sales or use taxes.

Property Taxes

As stated previously, the TFF site's contribution to annual property tax payments was estimated at less than \$200. TerraPower estimates that TFF-related property tax payments during operations would be \$293,000 per year in the first few years of operations.

Throughout the 20 years of operations, the value of the TFF would be expected to change. Periodically, county or state (WDOR) tax assessors would use one or more of the three following appraisal methods to determine the fair market value of the facility: sales comparison or market; cost (replacement, reproduction, or historical); and income capitalization. Over time, the TFF's fair market value is expected to decrease as the facility ages.

The Lincoln County School District #1 levy represents about 71 percent of the TFF's total mill levy. The Lincoln County levy represents about 18 percent of the total mill levy. The remaining taxing jurisdictions' mill rates are significantly smaller.

Wyoming's K-12 education equalization system is primarily funded by state and local property taxes. In the 2019-2020 school year, Lincoln County School District 1 received \$10,748,651 in local revenues, most, of which, would have been from property taxes (Table 14), but was still dependent on the state to supplement its local revenues to meet its guarantee. Lincoln County School District 1 would likely receive about 71 percent of the TFF tax payment, about \$208,000. When compared to the school district's total local revenues in 2020-2021, the TFF payment would represent about 1.9 percent of the school district's total local revenues.

Lincoln County would receive about 18 percent of the TFF tax payment, about \$53,000. When compared to the county's total property tax and payment in lieu of tax revenues in 2021, the TFF payment would represent less than 1 percent of the county's total property and payment in lieu of tax revenues.

Table 1 USCB Population in the Study Area

Geography	2010 USCB Decennial Census	2020 USCB Decennial Census	2010-2020 Average Annual Percent Growth
Wyoming	563,626	576,851	0.2%
Lincoln County	18,106	19,581	0.8%
Cokeville*	535	502	-0.6%
Diamondville*	737	520	-3.5%
Kemmerer*	2,656	2,415	-1.0%
La Barge*	551	394	-3.4%
Opal*	96	64	-4.1%
Uinta County	21,118	20,450	-0.3%
Bear River	518	522	0.1%
Evanston	12,359	11,747	-0.5%
Lyman	2,115	2,135	0.1%
Mountain View	1,286	1,278	-0.1%
Study Area Total**	25,693	24,345	-0.5%

Sources: WEAD 2019 and USCB 2020a

*Lincoln County municipalities within daily commuting distance with populations over 500, except Opal.

**Lincoln County municipality populations within daily commuting distance plus total Uinta County population.

Table 2 Wyoming Economic Analysis Division's Population Forecasts for the Study Area

Geography	USCB Decennial Census 2010	Forecast (based on 2010 Decennial Census) 2020	Average Annual Percent Growth 2010-2020	Forecast (based on 2010 Decennial Census) 2030	Average Annual Percent Growth 2020-2030	Forecast (based on 2010 Decennial Census) 2040	Average Annual Percent Growth 2030-2040
WYOMING	563,626	579,280	0.3%	597,260	0.3%	614,820	0.3%
Lincoln County	18,106	19,760	0.9%	21,550	0.9%	22,490	0.4%
Cokeville*	535	572	0.7%	624	0.9%	651	0.4%
Diamondville*	737	788	0.7%	859	0.9%	897	0.4%
Kemmerer*	2,656	2,852	0.7%	3,110	0.9%	3,246	0.4%
La Barge*	551	586	0.6%	639	0.9%	667	0.4%
Opal*	96	106	1.0%	116	0.9%	121	0.4%
Uinta County	21,118	20,230	-0.4%	19,710	-0.3%	19,790	0.04%
Bear River	518	510	-0.2%	497	-0.3%	499	0.04%
Evanston	12,359	11,736	-0.5%	11,435	-0.3%	11,481	0.04%
Lyman	2,115	2,038	-0.4%	1,986	-0.3%	1,994	0.04%
Mountain View	1,286	1,247	-0.3%	1,215	-0.3%	1,220	0.04%
Study Area**	25,693	25,133	-0.2%	25,057	-0.03%	25,371	0.12%

Source: WEAD 2019

*Cities within daily commuting distance with populations over 500, except Opal.

**Lincoln County municipality populations within commuting distance plus total Uinta County population.

Table 3 Employment Trends

Geography	Labor Force 2011	Labor Force 2021	Labor Force - Average Annual Percent Change	Employment 2011	Employment 2021	Employment - Average Annual Percent Change	Unemployment 2011	Unemployment 2021	Unemployment - Average Annual Percent Change	Unemployment Rate 2011	Unemployment Rate 2021
Wyoming	302,932	290,404	-0.4%	284,273	277,372	-0.2%	18,659	13,032	-3.5%	6.2%	4.5%
Lincoln County	8,641	9,514	1.0%	7,921	9,154	1.5%	720	360	-6.7%	8.3%	3.8%
Uinta County	10,041	8,832	-1.3%	9,380	8,389	-1.1%	661	443	-3.9%	6.6%	5.0%
Study Area	18,682	18,346	-0.2%	17,301	17,543	0.1%	1,381	803	-5.3%	7.4%	4.4%
Study Area, as Percent of Wyoming	6.2%	6.3%		6.1%	6.3%		7.4%	6.2%			

Source: BLS 2022a

Table 4 Employment by Industry (Jobs), 2019 and 2020

Description	Lincoln County 2019	Lincoln County 2020	Uinta County 2019	Uinta County 2020	Study Area Total 2019	Study Area Total 2020	Wyoming 2019	Wyoming 2020
Employment by place of work								
Total employment (number of jobs)	11,172	11,042	11,853	11,233	23,025	22,275	408,143	386,291
								By type
Wage and salary employment	7,021	7,030	8,888	8,376	15,909	15,406	297,409	279,934
Proprietor's employment	4,151	4,012	2,965	2,857	7,116	6,869	110,734	106,357
Farm proprietor's employment	566	565	296	296	862	861	10,669	10,662
Nonfarm proprietor's employment (excludes limited partners)	3,585	3,447	2,669	2,561	6,254	6,008	100,065	95,695
								By industry
Farm employment	706	696	401	394	1,107	1,090	14,781	14,497
Nonfarm employment	10,466	10,346	11,452	10,839	21,918	21,185	393,362	371,794
Private nonfarm employment	8,466	8,361	9,139	8,608	17,605	16,969	318,575	298,573
Forestry, fishing, and related activities	126	126	84	80	210	206	3,279	(D)
Mining, quarrying, and oil and gas extraction	682	664	352	246	1,034	910	24,851	20,296
Utilities	175	166	131	126	306	292	2,583	(D)
Construction	1,283	1,371	1,138	1,007	2,421	2,378	30,913	29,261
Manufacturing	244	241	343	336	587	577	12,380	11,806

Description	Lincoln County 2019	Lincoln County 2020	Uinta County 2019	Uinta County 2020	Study Area Total 2019	Study Area Total 2020	Wyoming 2019	Wyoming 2020
Wholesale trade	150	144	205	180	355	324	9,476	8,729
Retail trade	1,117	1,138	1,419	1,423	2,536	2,561	37,636	37,143
Transportation and warehousing	274	284	526	508	800	792	15,661	14,837
Information	135	128	289	295	424	423	4,433	4,012
Finance and insurance	407	389	421	396	828	785	20,474	19,675
Real estate and rental and leasing	684	667	521	513	1,205	1,180	23,948	22,808
Professional, scientific, and technical services	524	521	503	484	1,027	1,005	18,850	18,300
Management of companies and enterprises	(D)	(D)	65	56	65	56	1,926	1,695
Administrative and support and waste management and remediation services	(D)	(D)	268	242	268	242	14,235	13,693
Educational services	110	105	92	91	202	196	4,424	4,207
Health care and social assistance	609	574	1,291	1,246	1,900	1,820	30,854	30,580
Arts, entertainment, and recreation	149	125	208	189	357	314	8,068	6,932
Accommodation and food services	679	624	793	725	1,472	1,349	36,361	31,696
Other services (except government and government enterprises)	579	564	490	465	1,069	1,029	18,223	17,129
Government and government enterprises	2,000	1,985	2,313	2,231	4,313	4,216	74,787	73,221

Description	Lincoln County 2019	Lincoln County 2020	Uinta County 2019	Uinta County 2020	Study Area Total 2019	Study Area Total 2020	Wyoming 2019	Wyoming 2020
Federal civilian	113	123	73	82	186	205	7,578	7,807
Military	104	105	104	104	208	209	6,139	6,227
State and local	1,783	1,757	2,136	2,045	3,919	3,802	61,070	59,187
State government	121	110	487	493	608	603	14,755	14,373
Local government	1,662	1,647	1,649	1,552	3,311	3,199	46,315	44,814

Source: BEA 2021

(D) Not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

Table 5 Wages by Industry Sector Heavy and Civil Engineering Construction, NAICS Sector 237.

Geography	Annual Establishments	Annual Average Employment	Annual Average Weekly Wage	Annual Wages per Employee
United States	53,917	1,037,052	\$1,607	\$83,590
Wyoming	450	5292	\$1,394	\$72,502
Lincoln County	18	161	\$1,154	\$59,998
Uinta County	20	422	\$1,218	\$63,352

Source: BLS 2022b

Table 6 Wages by Industry Sector Manufacturing, NAICS Sector 1013

Geography	Annual Establishments	Annual Average Employment	Annual Average Weekly Wage	Annual Wages per Employee
United States	366,368	12,302,657	\$1,473	\$76,580
Wyoming	651	9,771	\$1,338	\$69,585
Lincoln County	16	164	\$812	\$42,214
Uinta County	24	279	\$942	\$48,966

Source: BLS 2022b

Table 7 Selected Housing Characteristics in the Study Area, Counties, 2020

Subject	Lincoln County* Estimate	Lincoln County* Percent	Uinta County Estimate	Uinta County Percent	Study Area Total Estimate	Percent of Total
Total Housing Units	9,551	100%	9,077	100%	18,628	100.0%
Occupancy Status						
Occupied Housing Units	7,348	76.9%	7,789	85.8%	15,137	81.3%
Vacant Housing Units	2,203	23.1%	1,288	14.2%	3,491	18.7%
Homeowner Vacancy Rate	2.8%	n/a	1.3%	n/a	n/a	n/a
Rental Vacancy Rate	5.6%	n/a	6.6%	n/a	n/a	n/a
Housing Tenure (Occupied Units)						
Owner-occupied	5,906	80.4%	5,996	77.0%	11,902	78.6%
Renter-occupied	1,442	19.6%	1,793	23.0%	3,235	21.4%
Median Value (owner-occupied units)	253,400	n/a	181,600	n/a	217,229	n/a
Median Rent (renter-occupied units)	710	n/a	685	n/a	696	n/a

Source: USCB 2020b

*Note: A portion of this housing is in the northern part of this county and not within daily commuting distance of the TFF site.

n/a = Not applicable

Table 8 Selected Housing Characteristics in the Study Area, Largest Municipalities, 2020

Subject	Kemmerer Estimate	Kemmerer Percent	Diamondville Estimate	Diamondville Percent	Evanston Estimate	Evanston Percent
Total housing units	1,459	100%	431	100%	5,402	100%
Occupancy Status						
Occupied Housing Units	1,275	87.4%	332	77.0%	4,627	85.7%
Vacant Housing Units	184	12.6%	99	23.0%	775	14.3%
Homeowner Vacancy Rate	3.0%	n/a	1.2%	n/a	1.3%	n/a
Rental Vacancy Rate	4.5%	n/a	0	n/a	6.6%	n/a
Housing Tenure (Occupied Units)						
Owner-occupied	957	75.1%	250	75.3%	3,241	70.0%
Renter-occupied	318	24.9%	82	24.7%	1,386	30.0%
Median Value (owner-occupied units)	143,000	n/a	106,800	n/a	169,300	n/a
Median Rent (renter-occupied units)	622	n/a	807	n/a	652	n/a

Source: USCB 2020b

n/a = Not applicable

Table 9 Vacancy Status in the Study Area, 2020

Type	Lincoln County	Uinta County	Economic Region Total	Percent of Total	Kemmerer	Diamondville	LaBarge
Total Vacant Housing Units:	2,203	1,288	3,491	100.0%	184	99	132
For rent	86	132	218	6.2%	15	0	23
Rented, not occupied	16	62	78	2.2%	0	7	0
For sale only	169	79	248	7.1%	30	3	16
Sold, not occupied	17	15	32	0.9%	0	0	0
For seasonal, recreational, or occasional use	1,289	110	1,399	40.1%	24	8	50
For migrant workers	0	0	0	0.0%	0	0	0
Other vacant	626	890	1,516	43.4%	115	81	43

Source: USCB 2020c

Table 10 Lincoln County Revenues and Expenditures, FY 2021

	Dollars	Percent of Total
Revenues:		
Property taxes	\$7,271,821	26.6%
Payments in lieu of taxes	\$1,595,322	5.8%
Sales and use taxes	\$6,150,208	22.5%
State gas tax	\$1,139,598	4.2%
Vehicle fees	\$886,772	3.2%
Severance tax	\$522,757	1.9%
Other taxes	\$74,849	0.3%
Nonmajor fund taxes	\$76,363	0.3%
Intergovernmental	\$6,635,468	24.2%
Charges for services	\$2,821,782	10.3%
Licenses and permits	\$3,690	0.0%
Interest and investment income	\$67,040	0.2%
Miscellaneous	\$131,979	0.5%
TOTAL REVENUES	\$27,377,649	
Expenditures:		
General government	\$8,293,827	36.0%
Public safety	\$7,181,455	31.2%
Public works	\$3,135,503	13.6%
Health and welfare	\$4,092,071	17.8%
Debt service	\$327,300	1.4%
TOTAL EXPENDITURES	\$23,030,156	

Source: Lincoln County 2021.

Table 11 Kemmerer Revenues and Expenditures, FY 2021

	Dollars	Percent of Total
Revenues:		
Sales and use taxes	\$1,689,508	42.0%
General property taxes	\$133,549	3.3%
Lodging taxes	\$76,098	1.9%
Severance taxes	\$98,151	2.4%
Gas taxes	\$91,960	2.3%
Franchise taxes	\$75,295	1.9%
Motor vehicle taxes	\$86,614	2.2%
Cigarette taxes	\$13,583	0.3%
Charges for services	\$814,104	20.2%
Licenses and permits	\$44,334	1.1%
Intergovernmental	\$796,760	19.8%
Fines and forfeitures	\$26,235	0.7%
Miscellaneous	\$79,927	2.0%
TOTAL REVENUES	\$4,026,118	
Expenditures:		
General government	\$863,882	22.7%
Public safety	\$733,829	19.3%
Streets and highways	\$1,012,845	26.7%
Parks and recreation	\$665,479	17.5%
Sanitation	\$308,216	8.1%
Municipal court	\$28,956	0.8%
Building inspection/zoning	\$9,432	0.2%
South Lincoln Training and Event Center	\$111,913	2.9%
Debt service	\$64,221	1.7%
TOTAL EXPENDITURES	\$3,798,773	

Source: City of Kemmerer 2021.

Table 12 Total Sales and Use Tax Collections in the Study Area and State, FY 2011-2021^a

County	FY 2011 Total Taxes	FY 2011 4% Taxes	FY 2019 Total Taxes	FY 2019 4% Taxes	FY 2020 Total Taxes	FY 2020 4% Taxes	FY 2021 Total Taxes	FY 2021 4% Taxes	Average Annual % Change, FY11 to FY21 Total Taxes	Average Annual % Change, FY11 to FY21 4% Taxes
Lincoln	\$21,568,367	\$17,261,556	\$23,492,091	\$18,766,530	\$21,416,242	\$17,107,382	\$26,355,168	\$21,040,812	2.0%	2.0%
Uinta	\$20,944,926	\$16,755,440	\$20,207,437	\$16,144,547	\$21,195,181	\$16,934,331	\$22,474,796	\$17,951,823	0.7%	0.7%
Wyoming	\$853,588,045	\$670,704,525	\$1,018,916,734	\$767,510,401	\$1,016,113,236	\$765,501,106	\$978,476,265	\$725,646,878	1.4%	0.8%

Sources: WEAD 2021 and WEAD 2011.

a. Includes Economic Impact Assessment payments (Liu 2023)

Table 13 Total Study Area County-Wide Property Tax Levies, Tax Years 2019-2021

Year	County	Municipal	Special District	Total Education ^a	State General Fund ^b	Total	Average Mill Levy
Lincoln							
2011	\$10,588,451	\$649,444	\$4,822,020	\$43,342,687	None	\$59,402,602	62.476
2019	\$9,111,202	\$755,240	\$5,360,168	\$34,197,530	None	\$49,424,140	63.550
2020	\$8,910,569	\$798,120	\$4,617,154	\$33,372,925	None	\$47,698,768	63.209
2021	\$8,726,261	\$870,521	\$5,013,971	\$32,579,974	None	\$47,190,727	64.895
Uinta							
2011	\$6,961,457	\$823,052	\$2,012,652	\$27,486,125	None	\$37,283,286	66.647
2019	\$4,679,240	\$927,845	\$1,392,443	\$17,943,969	None	\$24,943,497	65.431
2020	\$4,179,045	\$939,335	\$1,257,551	\$16,054,941	None	\$22,430,872	65.746
2021	\$3,854,575	\$1,003,446	\$1,149,451	\$14,855,587	None	\$20,863,059	64.951

Sources: WDOR 2011, 2019, 2020, and 2022b.

Includes all school district levies (including the state levy for the School Foundation Program (12 mill cap)) and bond/interest revenue.

The state of Wyoming levies property taxes for the School Foundation Program, only.

Table 14 Lincoln County School District 1 Revenue by Source

2019-2020 Operating Revenue Source	2019-2020 Lincoln School District 1 (Kemmerer)	2020-2021 Operating Revenue Source	2020-2021 Lincoln School District 1 (Kemmerer)
Local	\$11,187,857	Local	\$10,748,651
County	\$915,987	County	\$938,170
State	\$951,426	State	\$1,897,870
Federal	\$311,959	Federal	\$422,486
Other	\$103,000	Other	\$108,000
TOTAL	\$13,470,230	TOTAL	\$14,115,177
Assessed Valuation 7/1/19	403,375,699	Assessed Valuation 7/1/20	371,011,390

Sources: WDOE 2020 and WDOE 2021

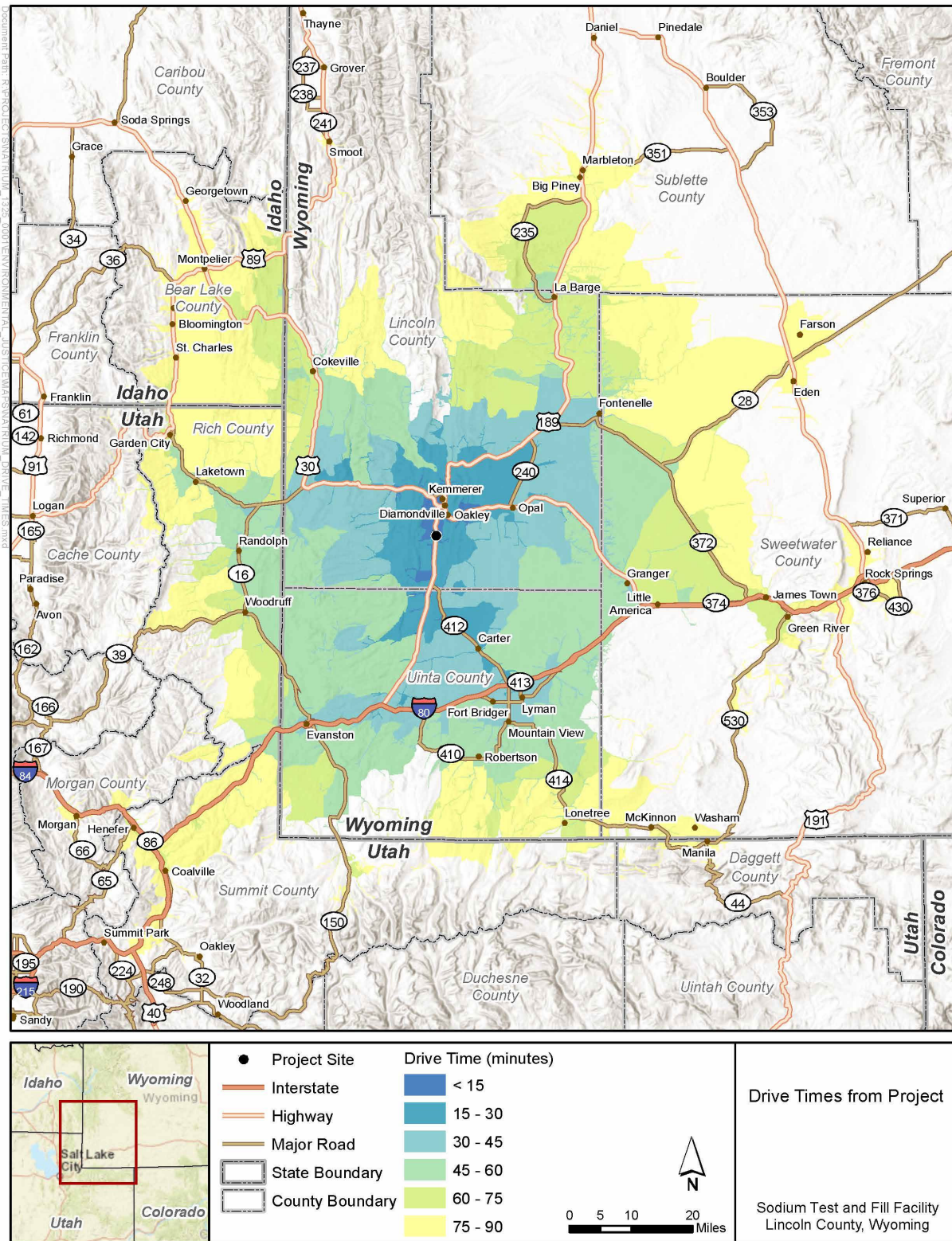


Figure 1 Drive Times for Commuting to TFF Site

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