BIOLOGICAL ASSESSMENT

POWERTECH'S DEWEY-BURDOCK IN-SITU URANIUM RECOVERY PROJECT SITE CUSTER AND FALL RIVER COUNTIES, SOUTH DAKOTA

SAFE DRINKING WATER ACT AQUIFER EXEMPTION AND UNDERGROUND INJECTION CONTROL AREA PERMITS SD31231-00000 and SD52173-00000

LOCATION

Portions of Sections 1-5, 10-12, 14 and 15, Township 7 South, Range 1 East, Fall River County
Sections 20,21, and 27-35, Township 6 South, Range 1 East, Custer County

West Bounding Coordinate: -104.06
East Bounding Coordinate: -103.94
North Bounding Coordinate: 43.52
South Bounding Coordinate: 43.44

PERMIT APPLICANT

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August 4, 2020

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ABBREVIATIONS

BME – Board of Minerals and Environment
BMPs – Best Management Practices (BMPs)
SDDENR – South Dakota Department of Environment and Natural Resources (DENR)
ECOS – U.S. FWS Environmental Conservation Online System
EPA – U.S. Environmental Protection Agency
ESA – Endangered Species Act
GDP – Groundwater Discharge Plan
IPaC – USFWS Information, Planning, and Conservation System
ISR – In Situ Recovery, In Situ Leach Mining
NLEB – Northern Long-Eared Bat
NRC – Nuclear Regulatory Commission
Powertech – Azarga Uranium Corporation, Powertech (USA) Inc.
SDWA – Safe Drinking Water Act
SEIS – Supplemental Environmental Impact Statement
SPAW – U.S. Department of Agriculture Soil-Plant-Atmosphere-Water Model
UIC – Underground Injection Control
USDW – Underground Source of Drinking Water
FWS – Department of the Interior, Fish and Wildlife Service, FWS, U.S. Fish and Wildlife Service
USGS – U.S. Geological Survey

I. INTRODUCTION

The U.S. Environmental Protection Agency (EPA) proposes to act on two Underground Injection Control (UIC) area permit applications and one associated aquifer exemption application under its Safe Drinking Water Act (SDWA) authorities for the Dewey-Burdock uranium in-situ recovery (ISR) site. The Dewey-Burdock site is located near Edgemont, South Dakota, in southwestern Custer County and northwestern Fall River County, on the Wyoming/South Dakota border. The purpose of this Biological Assessment is to analyze, consistent with the requirements of the Endangered Species Act, the potential effects of EPA's proposed actions on endangered or threatened species and their designated critical habitat if any is in the project area.

The EPA has determined that its proposed actions may affect, but is not likely to adversely affect, the following ESA-listed species that have the potential to be in the project area:

Northern Long-eared Bat (*Myotis septentrionalis)*
Rufa Red Knot (*Calidris canutus rufa*)
Whooping Crane (*Grus americana*)

This Biological Assessment is prepared in accordance with 40 C.F.R. §144.4 (c) and Section 7(a)(2), 16 U.S.C. §1536 (a)(2), of the Endangered Species Act, which requires that federal agencies, in consultation with and with the assistance of the Secretary, must ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any federally-listed endangered species or threatened species or result in the destruction or adverse modification of the designated critical habitat of such species.

II. PROJECT DESCRIPTION

The Dewey-Burdock Uranium Project (Project) is a high-grade in-situ recovery (ISR) uranium mine project located in South Dakota. The Project site encompasses 4,282 hectares or 10,580 acres of predominantly private land on the southern edge the of Black Hills. Approximately 2,637 acres are expected to be affected by surface disturbance-related activities including those associated with SDWA UIC Class III and V injection well operations to be permitted by the EPA. The site is approximately 13 miles northwest of Edgemont and 46 miles west of the Pine Ridge Reservation. It straddles the northwest corner of Custer and the southwest corner of Fall River counties between the small towns of Dewey to the northwest and Burdock to the southeast.

The SDWA and its implementing regulations regulate injection into the subsurface to prevent endangerment to underground sources of drinking water (USDWs). Generally, the UIC program prevents endangerment by prohibiting unauthorized injection into USDWs and by authorizing injection by permit or rule with conditions or limitations to ensure protection of USDWs.

Powertech (USA), Inc. (Powertech) has applied to the EPA for SDWA UIC permits for injection, recovery, and monitoring wells in fourteen well fields and up to six wells for wastewater disposal associated with the mining operation. Powertech has applied to the EPA for two different types of UIC permits: a UIC Class III Area Permit for injection wells for the ISR of uranium, that would authorize the injection of a lixiviant into the subsurface to mobilize uranium for the purpose of recovery; and a UIC Class V Area Permit for deep injection wells that will be used to dispose of non-hazardous ISR process waste fluids into the Minnelusa Formation after treatment to meet radioactive waste and hazardous waste standards. The EPA will also

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make a decision on Powertech's aquifer exemption application in connection with the Class III Area Permit, to exempt the uranium-bearing portions of the Inyan Kara Group aquifers.

On March 6, 2017, the EPA public noticed a draft UIC Class III Area Permit for the wells associated with the recovery of uranium in the Inyan Kara Group aquifers, and a draft UIC Class V Area Permit for deep injection wells for disposal of treated ISR waste fluids into the Minnelusa Formation. Based on public comments received, EPA revised the draft permits and proposed aquifer exemption and re-issued them for additional comment on August 26, 2019.

A. RELATED STATE AND FEDERAL PERMIT ACTIONS

Powertech applied to South Dakota Department of Environment and Natural Resources' (DENR) Minerals and Mining Division for a large scale mine permit in October 2012. DENR reviewed the application and supplemental information and recommended conditional approval in April 2013. The Board of Minerals and Environment (BME) delayed a scheduled November 2013 hearing until the Nuclear Regulatory Commission (NRC) and the EPA determined and set federal surety and the state allocated water rights to the project. The NRC issued Powertech a source material license April 8, 2014, authorizing Powertech to extract uranium from the Dewey-Burdock site. Powertech estimates the company will produce one million pounds of uranium oxide (U3O8) over a 20-year period.

B. IN-SITU RECOVERY OF URANIUM – CLASS III UIC WELLS AND ASSOCIATED PRODUCTION AND MONITORING WELLS

The ISR or solution mining process of uranium, which is described below, is suitable when certain geologic and hydrological features prevail including at the Dewey-Burdock project site. The uranium ore body locations for this project are shown in Figure 1. The color of the ore body represents its location within the Inyan Kara aquifers: Lower Fall River (blue), Upper Chilson (green) and Lower/Middle Chilson (red).

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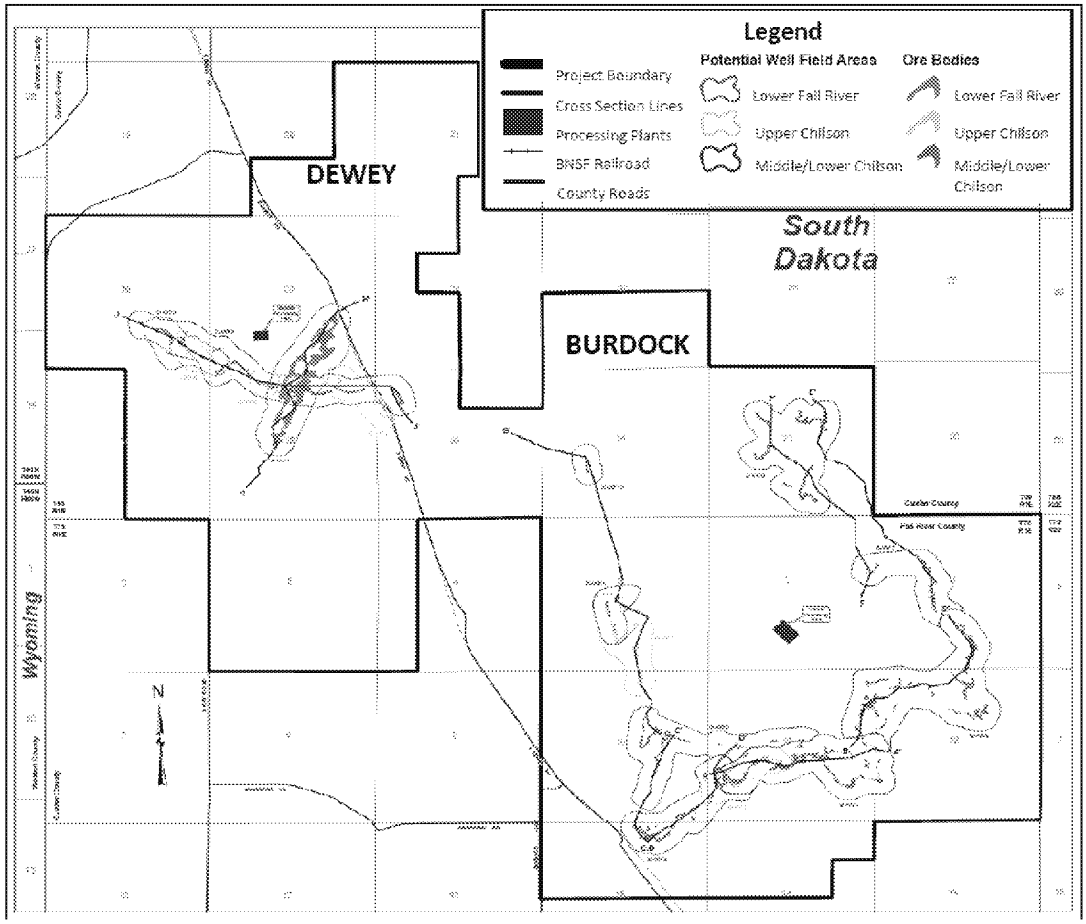

Figure 1. Ore Body Locations Relative to the Aquifer, Dewey-Burdock Permit Area, Processing Facilities

Powertech proposes recovering the uranium from the ore bodies by injecting a liquid medium known as lixiviant into an array of Class III wells constructed in the Inyan Kara Group, more specifically in the Lakota Formation Chilson Sandstone and the overlying Fall River Formation. Figure 2 below shows the geologic formations present in the project area and the location below ground surface of the Lakota and Fall River formations.

The proposed lixiviant uses groundwater from the uranium-bearing aquifer; gaseous oxygen is added to mobilize uranium from the ore bodies into solution, and gaseous carbon dioxide is added to hold the uranium in solution while it flows to production wells. The resulting uranium rich solution is drawn to production wells by pumping and then transferred to a processing facility through a network of underground pipelines.

In order to inject the lixiviant into the subsurface, Powertech is required to get a Class III permit from the EPA prior to construction and operation of the wells. Powertech submitted to the EPA a UIC Class III Permit Application and an aquifer exemption request[1] to develop 14 ISR uranium wellfields on its property in Fall River and Custer counties, South Dakota. Ten wellfields are proposed for the Burdock area and four

[1] An aquifer exemption to exempt the injection formation from protection as a USDW is necessary because the Inyan Kara Group of aquifers are USDWs. Injection of fluids into a USDW via Class III wells is prohibited under 40 CFR § 144.12. Therefore, Powertech has applied for an aquifer exemption under 40 CFR § 146.4.

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for the Dewey area. The Class III Area Permit does not limit the number of injection and production wells Powertech may construct. Each wellfield would have up to several hundred wells operating as production or injection wells. The typical development pattern would have four injection wells operating for every one production well in a "five-spot" square pattern with the production well in the center and four injection wells surrounding it oriented in four corners of the square. The project proposes that the wellfields will be constructed and operated sequentially, not simultaneously. Table 1 enumerates the wellfields. Figure 3 shows their proposed locations within the project areas.

Initial construction includes fourteen Class III wellfields, Class III injection and production wells, up to six Class V injection wells, monitoring wells, two processing plants, and nine wastewater treatment and storage ponds. Land application areas with center pivot irrigation systems and storage ponds would be constructed as needed.

ERATHEM	SYSTEM	ABBREVIATION FOR STRATIGRAPHIC INTERVAL	GEOLOGIC UNIT	THICKNESS IN FEET	DESCRIPTION
CENOZOIC	QUATERNARY & TERTIARY (?)	Qal	[illegible]	0-30	[illegible]
		Tw	WHITE RIVER GROUP	0-300	Light colored clays with sandstone channel fillings and local limestone lenses
	TERTIARY	Ti	INTRUSIVE IGNEOUS ROCKS	--	Includes rhyolite, latite, trachyte, and phonolite
MESOZOIC	CRETACEOUS	Kpr	PIERRE SHALE	1,200-1,700	Principal horizon of limestone lenses giving teepee buttes. Dark-gray shale containing scattered concretions. Widely scattered bentonite seams, giving small teepee buttes. Black basal shale with concretions.
			NIOBRARA FORMATION	[1]50-300	Impure chalk and calcareous shale
			CARLILE SHALE	[1]300-750	Light-gray shale with numerous large concretions and sandy layers. Dark-gray shale
			GREENHORN FORMATION	225-380	Impure chalky limestone. Weathers buff. Dark-gray calcareous shale with the Orman Lake limestone at base
		Kgc (GRANEROS GROUP)	BELLE FOURCHE SHALE	150-650	Gray shale with scattered limestone concretions. Clay spur bentonite at base
			MOWRY SHALE	125-230	Light-gray siliceous shale. Fish scales and thin layers of bentonite
			NEWCASTLE SANDSTONE / SKULL CREEK SANDSTONE	0-150	Brown to light yellow and white sandstone
			SKULL CREEK SHALE	150-230	Dark-gray to black siliceous shale
			[illegible]	[illegible]	[illegible]
		Kd (DAKOTA GROUP)	DAKOTA FORMATION	35-210	Yellow, brown, and reddish-brown massive to thinly bedded sandstone, [illegible] complex-shale, siltstone and claystone. Local fine-grained limestone and coal.
	JURASSIC	[illegible]	[illegible]	[illegible]	[illegible]
			[illegible]	0-225	Massive fine-grained sandstone
			SUNDANCE FORMATION	350-490	Greenish-gray shale, thin limestone lenses. Glauconitic sandstone and sandstone near middle
			GYPSUM SPRING FORMATION	0-45	Red siltstone, gypsum, and limestone.
	TRIASSIC	TRs	SPEARFISH FORMATION	375-800	Red silty shale, soft red sandstone and siltstone with gypsum and thin limestone layers. Gypsum locally near the base
PALEOZOIC	PERMIAN	Pcp	MINNEKAHTA LIMESTONE	100-40	Thin to medium-bedded, fine-grained, pelsparite-gray laminated limestone
		Pp	OPECHE SHALE	90-125	Red shale and siltstone
		PIPu	MINNELUSA FORMATION	[1]875-1,125	Yellowish-red cross-bedded sandstone, limestone, and anhydrite locally at top. Interbedded sandstone, limestone, dolomite, shale, and anhydrite. Red shale with conglomerate, limestone and sandstone at base
	PENNSYLVANIAN				
	MISSISSIPPIAN	Mmc	MADISON (PAHASAPA) LIMESTONE	[1]450-1,000	Massive light-colored limestone. Dolomite in part. Cavernous at upper part.
	DEVONIAN		BIG SNOWY FORMATION	30-80	Pink to buff limestone. Shale locally at base
	ORDOVICIAN	Op	WINNIPEG FORMATION	70-140	Green shale with siltstone
			ANTELOPE CREEK FORMATION	70-140	Buff dolomite and limestone
	CAMBRIAN	Ꞓ	DEADWOOD FORMATION	[1]0-600	Massive to thin-bedded brown to light-gray sandstone. Greenish glauconitic shale, foggy dolomite, and fine-pelsparite limestone conglomerate. Sandstone, with conglomerate locally at the base.
PRECAMBRIAN		pЄu	UNDIFFERENTIATED IGNEOUS AND METAMORPHIC ROCKS		Schist, slate, quartzite, and arkosic grit. Intruded by diorite, medium-grained to porphyritic, and by granite and pegmatite.

[1] Modified based on drillers data

Modified from information furnished by the Department of Geology and Geological Engineering, South Dakota School of Mines and Technology (written commun., January 1984)

Figure 2. Stratigraphic Column Showing the Geologic Formations at the Dewey-Burdock Project Site

Three types of wells will be installed in each wellfield: injection wells, production wells and monitoring wells. After uranium removal, the uranium depleted lixiviant will be re-fortified with oxygen and carbon dioxide, recirculated and reinjected back into the wellfield via the Class III injection wells. During groundwater restoration, these wells will be used to inject clean water into the aquifer. Production wells will extract uranium-bearing lixiviant from the aquifers. During groundwater restoration, the wells will pump groundwater out of the wellfields. In the event of a groundwater sweep during restoration, no fluids will be

injected, and the production wells will pump groundwater out of the wellfield either to a deeper aquifer, an adjacent wellfield where mining is being initiated, or to surface ponds where it can evaporate. Monitoring wells will be placed in the overlying and underlying aquifers to detect the potential vertical migration of lixiviant outside the production zone. These will be located around each wellfield 400 feet from the nearest Class III injection wells. The monitoring wells will be regulated both by the EPA UIC permit and the NRC license.

Wellfield Permit Number	Wellfield Name	Section/Township/Range	County
SD31231-09459	Burdock Wellfield 1	Sections 11 and 12 T7S R1E	Fall River
SD31231-09460	Burdock Wellfield 2	Sections 10, 11, 14 and 15 T7S R1E	Fall River
SD31231-09461	Burdock Wellfield 3	Sections 10 and 11 T7S R1E	Fall River
SD31231-09462	Burdock Wellfield 4	Sections 10 and 11 T7S R1E	Fall River
SD31231-09463	Burdock Wellfield 5	Sections 3 and 10 T7S R1E	Fall River
SD31231-09464	Burdock Wellfield 6	Sections 1, 2, 11 and 12 T7S R1E	Fall River
SD31231-09465	Burdock Wellfield 7	Sections 1 and 2 T7S R1E	Fall River
SD31231-09466	Burdock Wellfield 8	Section 35 T6S R1E	Custer
SD31231-09467	Burdock Wellfield 9	Section 3 T7S R1E	Fall River
SD31231-09470	Burdock Wellfield 10	Section 34 T6S R1E	Custer
SD31231-08351	Dewey Wellfield 1	Sections 29 and 32 T6S R1E	Custer
SD31231-09471	Dewey Wellfield 2	Sections 29, 30, 31, 32 and 33 T6S R1E	Custer
SD31231-09472	Dewey Wellfield 3	Sections 29, 30, 31 and 32 T6S R1E	Custer
SD31231-09473	Dewey Wellfield 4	Sections 29, 30, 31, 32 and 33 T6S R1E	Custer

Table 1. Approximate Locations of the Proposed ISR Wellfields

C. PROCESSING PLANTS

Two processing plants will be constructed: a central processing plant in the Burdock Area and a satellite processing plant in the Dewey Area. **Figure 4** shows the proposed locations for the plants (red rectangles). The central plant will house equipment for all the uranium processing that will be conducted at the project site. Both plants will house the ion exchange columns that will be used to recover uranium from the lixiviant. The uranium-loaded ion exchange resin will be transported by tanker truck from the satellite plant to the central plant or to another licensed facility for processing. Processing involves stripping the uranium from the loaded resin using a saltwater solution. The resulting barren resin will be used again to recover

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more uranium from lixiviant. In the central plant, the uranium-bearing solution will go through a precipitation process which will yield a solid uranium oxide known as yellowcake. The yellowcake will be filtered, washed, dried and packaged in sealed containers for shipment via truck to another site where it will be further processed.

D. WASTEWATER DISPOSAL

Liquid waste generated by the Dewey-Burdock Project will be treated and injected into UIC Class V deep injection wells completed into the Minnelusa Formation. A combination of deep well injection and land disposal may also be considered if the Class V wells do not have the capacity to dispose the full volume of waste fluids.

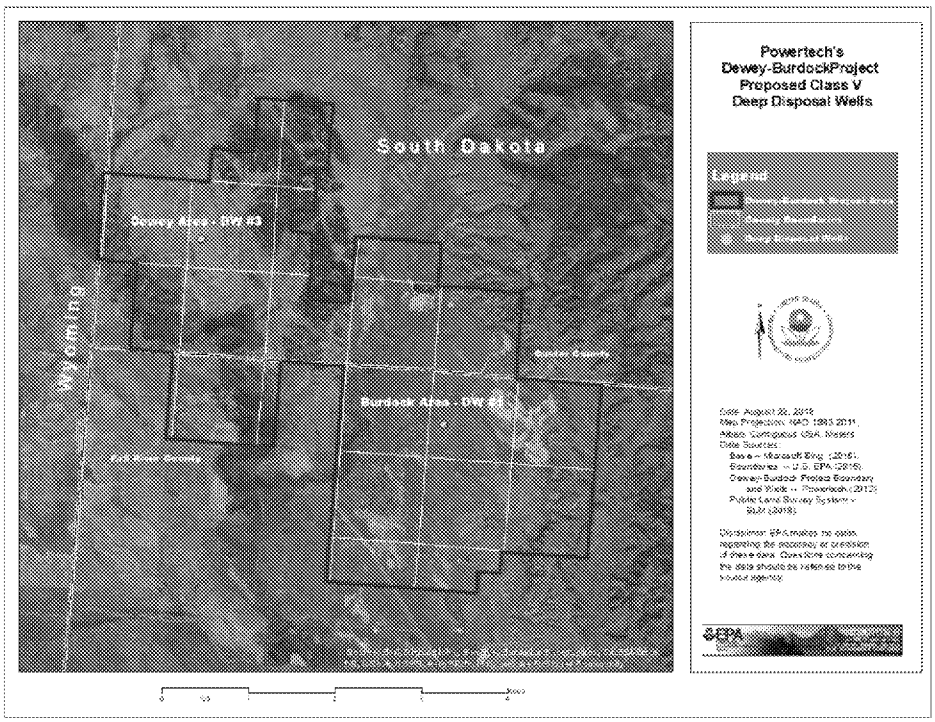

Figure 3. The Proposed Class V Deep Injection Wells.

Well Permit Number	Well Name	Latitude	Longitude	Section/Township/Range	County
SD52173-08764	DW #1	43.469772181	-103.971938654	NENWSW Sec 2 T7S R1E	Fall River
SD52173-08766	DW #3	43.4971737527	-104.031570321	SENWSW Sec 29 T6S R1E	Custer

Settling, spare, outlet, and surge ponds are planned for each processing facility. The central processing facility will have an additional brine pond as shown in Table 2 below. Each of the spare ponds are required to provide emergency containment should any of the ponds fail. The settling and spare ponds have the

capacity for radium removal of the entire project-wide liquid waste stream at the maximum expected wastewater production rate while maintaining a minimum retention time of 13 days. The outlet ponds will be designed to intercept treated water from the settling ponds and to store storm water from the settling ponds. The surge ponds will contain the treated liquid waste that will be pumped to the deep disposal wells. These ponds can accommodate seven days of produced wastewater. The design of these ponds must comply with EPA and NRC requirements. Powertech plans to construct fences around the treatment and storage ponds. The exact locations of the ponds will not be finalized until Powertech submits a construction design plan to EPA's Air Program.

Type of Pond	Size*	Burdock Central Processing Plant Ponds	Dewey Satellite Processing Plant Ponds
Settling	16 acre-feet	1	1
Spare Containment	16 acre-feet	1	1
Outlet	5 acre-feet	1	1
Surge	8 acre-feet	1	1
Spare Brine	16 acre-feet	1	
**One acre-foot equals about 326,000 gallons, or enough water to cover an acre of land, about the size of a football field, one foot deep. Source: https://www.watereducation.org*			

Table 2. Proposed Ponds for the Treatment and Storage of Wastewater

E. LAND APPLICATION

For land application of fluids, Powertech identified the need for additional storage ponds for treated water during the non-irrigation season, and spare storage ponds for emergency containment should any of the storage ponds fail, or portions of the land application system become temporarily inoperable. Powertech plans to construct fences around the additional storage ponds.

Historically, ISR facilities have used evaporation ponds and surface discharge to manage and dispose of liquid wastes. Treated waste would be applied to an estimated maximum of 1,052 acres areas via center-pivot irrigation systems. The designated land application areas are equally divided between the Dewey and Burdock portions of the permit area, as shown in Table 3 and Figures 4 & 5. If needed, Powertech plans to operate these systems 24 hours per day during the growing season from April through October. DENR proposes to restrict land application during periods when soils are frozen or snow-covered, generally November through March. During this time treated liquid waste would be stored temporarily in ponds located near the Burdock central plant and Dewey satellite facility. Runoff from precipitation will be directed to catchment areas downgradient of land application areas and allowed to evaporate or infiltrate.

Powertech used the U.S. Department of Agriculture's Soil-Plant-Atmosphere-Water (SPAW) model to estimate the disposal capacity for the land application option. This model predicted that the average annual application rate would be 310 gallons per minute for each application area. It also predicted that approximately 216 acre-feet storage capacity would be needed during winter months. According to Powertech, 510 acre-feet of storage pond capacity will be available.

The land application areas and irrigation systems would be constructed and operated as needed. All designs associated with this option are required to follow NRC regulations and requirements and will be regulated by DENR under a Groundwater Discharge Plan (GDP).

Land Application Proposal for Irrigation Systems	**DEWEY AREA**	**BURDOCK AREA**
Land application area at any given time	315 acres	315 acres
50-acre normally operating pivots	5	6
25-acre normally operating pivots	2	–
15-acre normally operating pivots	1	1
25-acre standby pivots	2	2
15-acre standby pivots	1	1
Catchment Areas*	yes	yes
**Catchment areas will be downgradient of land application areas to collect runoff from precipitation events and will evaporate or infiltrate into the ground. Powertech estimates that the maximum area for land application of treated wastewater will be 1,052 acres.*		

Table 3. Proposed Plan for the Land Application Systems in the Dewey and Burdock Areas

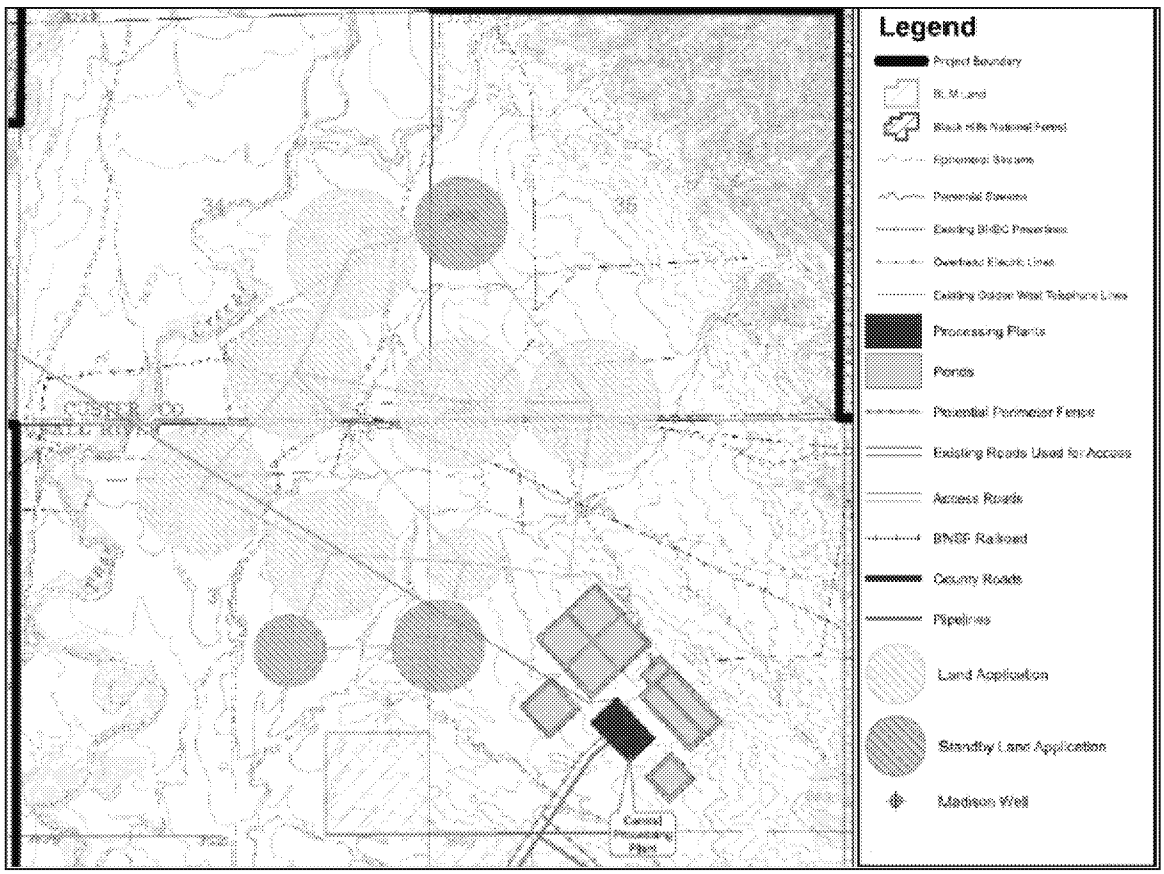

Figure 4. Approximate Location of the Land Application Areas in the Burdock Area

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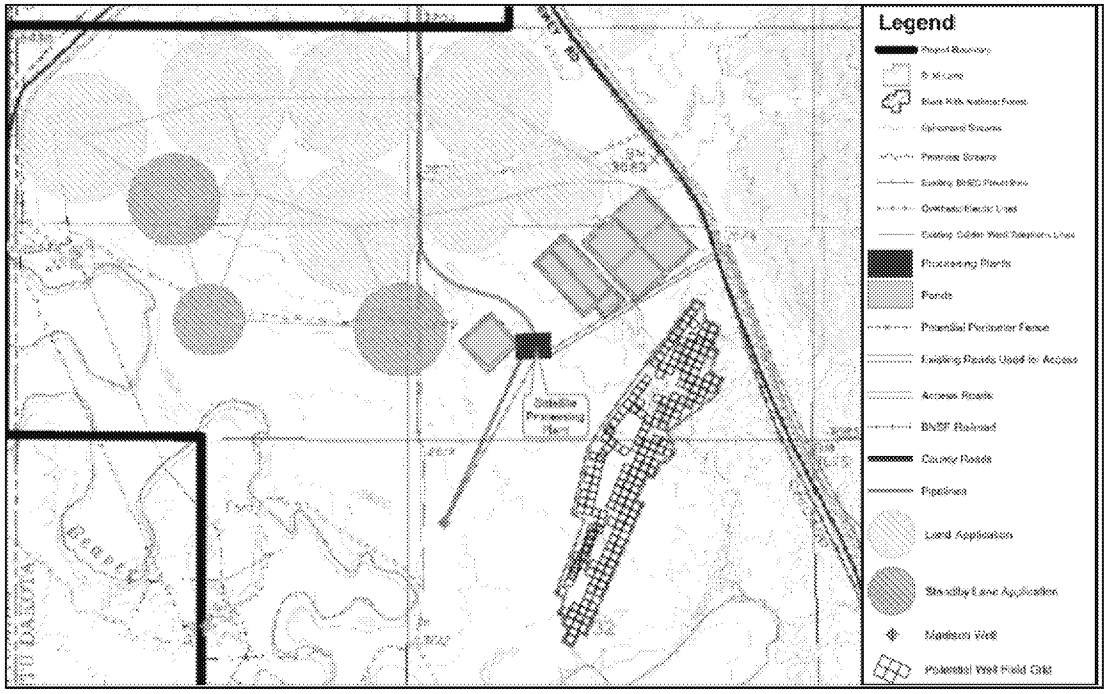

Figure 5. Approximate Location of the Land Application Areas in the Dewey Area

Irrigation areas are situated on flat topography along Pass Creek and its tributaries in the Burdock area and along Beaver Creek and its tributaries in the northwest part of the Dewey area (see Figure 4.5-1(slide #7)). The applicant will apply treated liquid effluents to native vegetation or to existing soil after it has been prepared to grow crops such as alfalfa or salt-tolerant wheatgrass (Powertech, 2012c). Earthmoving activities will not be significant in preparing irrigation areas. Runoff from precipitation events or snowmelt on land application areas will be conveyed to catchment areas downgradient of land application areas and allowed to evaporate or infiltrate (Powertech, 2012c). The soil horizon found throughout most of the project area is clayey (see SEIS Section 3.4.2), which will minimize infiltration and enhance evaporation.

In the license application technical report (Powertech, 2009b, Tables 4.2-7 and 7.3-8) and in its South Dakota GDP (Powertech, 2012c, Table 5.8-2), the applicant described the expected chemical constituents and estimated concentrations in wastewater for the proposed land application activities. The list of chemical constituents includes arsenic, barium, cadmium, chromium, lead, and selenium.

F. ADDITIONAL STRUCTURES

Additional structures necessary for the in-situ process within the permit area include header houses, pipelines, potential water supply wells, access roads, power lines and storage tanks for process chemicals and fuel. All areas where licensed material passes through or is stored will be fenced to limit access. This includes wellfields, treatment ponds, and processing plants.

1. HEADER HOUSES

Header houses distribute injection fluid to injection wells and collect production solution from recovery wells. Typically, one header house will serve up to 20 production wells and 80 injection wells. Additional header houses will be constructed as the wellfield expands. They will be within the fenced wellfields.

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2. PIPELINES

The applicant proposes to install up to eight underground pipelines between the Burdock central processing plant and the Dewey satellite facility to transport various fluids used during ISR operations (Powertech, 2011). Conduits for electronic communication and control purposes will also be installed between the central plant and satellite facility. The plant-to-plant pipelines will transport fluids including barren and pregnant lixiviant, restoration water, reverse osmosis reject brines, wastewater from well drilling and maintenance operations, and supply water from the Madison Formation or other aquifers.

3. POTENTIAL MADISON FORMATION WATER SUPPLY WELLS

Powertech has proposed the construction of up to two Madison Formation water supply wells to replace private and stock water wells that will no longer be a supply source when ISR activities begin. Powertech may plug and abandon some of the private and stock wells to maintain hydraulic control of the wellfields.

4. ACCESS ROADS

Powertech intends to utilize all existing roads and construct new roads only as needed to access proposed facilities such as header houses, wellfields not currently accessible by existing roads, and water supply wells.

5. POWERLINES

Powertech plans to use existing power line corridors. However, they anticipate construction of a new electrical substation and a new corridor along Dewey Road between the Dewey and Burdock Areas in Sections 4 and 9, Township 7 North, Range 1 East, to connect the Dewey Satellite Plant and the Burdock Central Processing Plant. Minimal disturbance to the ground surface is anticipated.

6. STORAGE TANKS

Process chemicals will be located either within the Central Processing Plant or in nearby storage facilities. Outdoor chemical storage tanks will be contained within a curbed area designed to accommodate one and one half the capacity of the largest tank to ensure adequate capacity for containment during a potential precipitation event. Fuel storage tanks will also be contained within concrete lined storage facilities.

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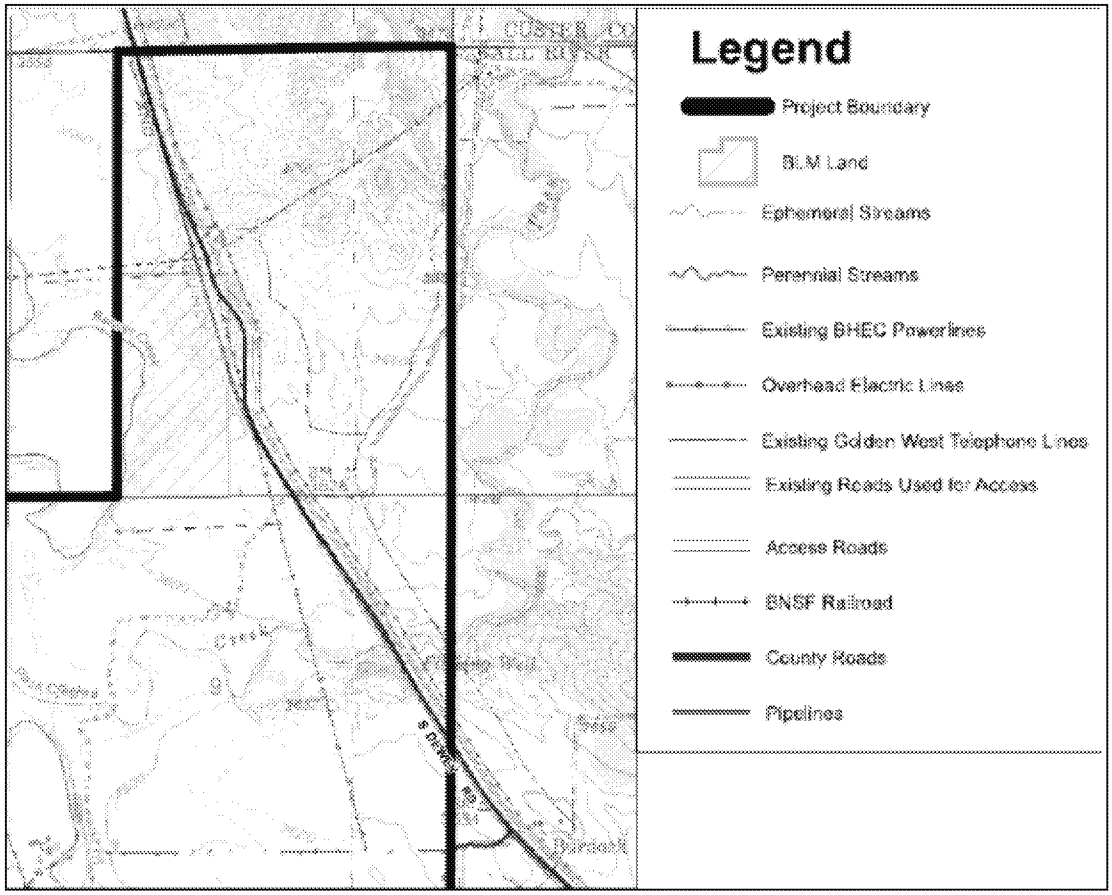

Figure 6. Project-Related Land Disturbance Area for the New Overhead Power Line.

All areas where licensed material passes through or is stored will be fenced to limit access. This includes wellfields and header houses, treatment ponds, and processing plants. Storage tanks and appropriate containment located outside the Central Processing Plant will be enclosed within fenced storage facilities to prevent potential impacts to wildlife.

III. GEOGRAPHIC AREA THAT WILL BE AFFECTED

The proposed Dewey-Burdock ISR Project site is in the Nebraska-South Dakota-Wyoming Uranium Milling Region and occupies 10,580 acres in the southwestern corner of Custer County and northwestern corner of Fall River County, South Dakota. The site is approximately 13 miles north-northwest of the city of Edgemont, 40 miles west of the city of Hot Springs, and 50 miles southwest of the city of Custer. The site is on portions of Sections 1-5, 10-12, 14 and 15, Township 7 South, Range 1 East, Fall River County, and Sections 20,21, and 27-35, Township 6 South, Range 1 East, Custer County. According to Powertech, ISR activities will directly affect approximately 2,637 of this area. The acreage depends upon whether Class V well injection alone or a combination of injection and land application is used for wastewater disposal.

The Dewey-Burdock permit area and surrounding one-mile buffer, is located within the Great Plains physiographic province on the edge of the Black Hills in Custer and Fall River Counties, South Dakota. The area contains 10,580 acres of wildlife habitat which supports medium and small-sized mammals, as well as avian species.
The NRC determined that a one-mile distance from the boundary of the Dewey-Burdock DENR large scale mining permit area would be used to define the action area for the purposes of ESA compliance.

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Powertech's wildlife surveys and the project area proposed in EPA's Class III and V permit applications corresponded to the same area identified by the NRC.

The Darrow/Freezeout/Triangle uranium mine, which was abandoned in the mid-1980s when uranium prices declined, is in the project area as well as seven other uranium mines identified by the U.S. Geological Survey (USGS).

The geographic area that will be affected is shown in Figures 7 below. Figure 4 and 5 on page 10 show where the proposed land applications, processing plants, ponds and pipelines are located. Figure 3 on page 7 show the location of the proposed Class V deep wells.

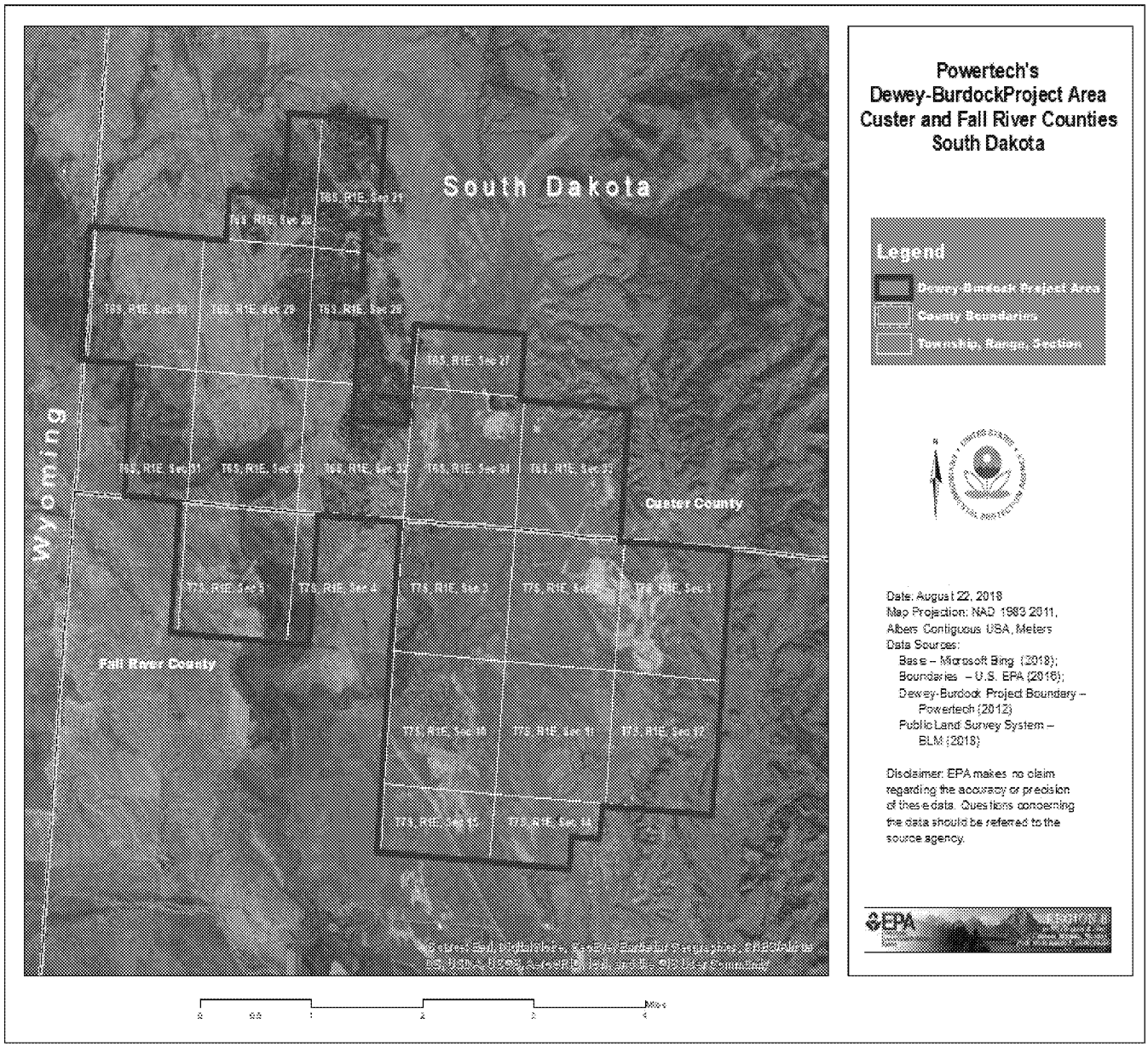

Figure 7. Dewey-Burdock Project Area that will be affected

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IV. SPECIES/CRITICAL HABITAT CONSIDERED

In May of 2019 and again on May 20, 2020, the EPA accessed the United States Fish and Wildlife Service (FWS) Section 7 consultation Information for Planning and Consultation (IPaC) website for a list of federally-listed species and designated critical habitat that may be present within the project area.

Refer To:
Consultation Code: 06E14000-2019-SLI-0318
Event Code: 06E14000-2019-E-00850
Project Name: EPA UIC Dewey-Burdock Permits

The eBird Range map (https://ebird.org) recommended by the FWS website resources section, was also used to research habitat and population for bird species. The EPA confirmed the accuracy of the species list and IPaC report information during a phone conference with FWS on May 27, 2020. The following are the three federally-listed species that may be present inside the project area:

NORTHERN LONG-EARED BAT (NLEB) (MYOTIS SEPTENTRIONALIS) - According to the FWS website, no critical habitat has been designated inside the project area for this species. Our research found no known population reports for this species inside the project area. There are no known caves or active underground mines reported inside the project area. As noted below, there are some inactive underground mines within the project area.

RUFA RED KNOT (CALIDRIS CANUTUS RUFA) - According to the FWS website, no critical habitat has been designated inside the project area for this species. According to the eBird Range Map, there are no reports of this species inside the project area.

WHOOPING CRANE (GRUS AMERICANA) - According to the FWS website, no critical habitat has been designated inside the project area for this species. According to the eBird Range Map, there are no reports of this species inside the project area.

V. GENERAL ENVIRONMENTAL IMPACTS INFORMATION

This section includes information on general environmental impacts related to the project broadly and mitigation measures that Powertech, NRC and the State have documented. To the extent the information in this section addresses potential impacts to non-ESA-listed species, it is for background informational purposes only and is not relevant to this ESA Section 7(a)(c) consultation process that only applies to federally-listed species and their designated critical habitat.

Powertech proposes control erosion, preserve natural vegetation as much as possible, restore disturbed vegetation, and if land application of wastewater is employed, improve drainage patterns in the affected areas. Other conservation measures can be found in the U.S. NRC (2014) SEIS, Section 6.2, "Mitigation Measures Proposed by Powertech" and Powertech's (2012) Appendix 3.9-A, "Baseline Wildlife Report." They include the following:

- Measures to Reduce Land Disturbance: minimize road construction and traffic; construct new infrastructure in existing corridors; minimize areal impacts by sequential construction; and use dust control measures such as spraying water on vegetation to protect foraging vegetation. No woody corridors will be disturbed by the proposed activities, and additional trees are present in the

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cottonwood gallery along the Cheyenne River, located approximately 2 miles south of the permit area, where mining is not projected to occur in the near future. Few non-listed bats were recorded in the proposed permit area despite targeted efforts to observe bats during the baseline surveys. Individuals seen were near water bodies and treed habitats, which are not currently scheduled for disturbance.

- Measures to Limit Access to Ponds and Wellfields: fence facilities and ponds; erect temporary fencing around wellfields; and design fences that won't alter habitat or impede wildlife migration.

- Measures to Reduce Soil Disturbance and Contamination: reestablish disturbed vegetation; employ spill monitoring, prevention and cleanup plans for soil contamination; and treat radiological liquid waste injected or applied to land to comply with 10 CFR Part 20, Appendix B.

- Measures to Provide Uncontaminated Water: monitor water quality in wells that provide water to livestock and wildlife; and provide other sources of water in the event of a drawdown.

- Measures to Protect Wildlife: Use Best Management Practices (BMPs) for constructing power lines to prevent bird injuries and mortalities; enhance habitats by restoring the land, construct brush and rock piles, leave standing, dead or dying trees; follow a raptor monitoring plan to minimize conflicts with active nests; follow regulatory agency determinations for the timing of project activity and the distance needed between active raptor nests and the project activity; allow snakes and lizards to retreat; and educate employees of the wildlife laws and penalties associated with taking or harassing wildlife, the types of wildlife they are likely to encounter and how to avoid collisions.

In Powertech's Baseline Wildlife Report (2012), contained in the large scale mine permit application the company submitted to DENR (Appendix 3.9-A), the following mitigation measures were proposed:

- Enforce speed limits to reduce wildlife injuries and mortality caused by collisions with traffic;
- Restore wildlife habitat by reseeding;
- Adequately cover ponds to prevent access by migrating and breeding waterfowl and shorebirds (whooping crane, rufa red knot);
- Replace any jurisdictional wetlands that were disturbed;
- Use existing right-of-way corridors;
- Use Avian Powerline Interaction Committee (APLIC 2006) recommendations for powerline construction; and
- Conduct construction activities outside of breeding season.

VI. ANALYSIS OF POTENTIAL IMPACTS TO LISTED SPECIES

This section analyzes the potential impacts to the three federally-listed species potentially present in the project area from the EPA's proposed action on the two SDWA UIC permit applications and the associated aquifer exemption.

1. **Surface Disturbances.** Potential effects from surface disturbance will most likely arise during the initial phase of the project, and when additional wellfields are developed over the life of the project, from construction of: two processing plants, well header houses and access roads, surface holding ponds, wellfield drilling, pipelines, and an overhead powerline.

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i. **Traffic Related Impacts**: If listed species are present in the area, they could potentially be affected by increased (e.g., truck) traffic levels associated with these activities as the potential for collisions with construction equipment will increase. This could include injuries and mortalities to one or more species absent mitigation measures addressing these effects. The surface-disturbing activities could also deter listed species that might otherwise fly over or land in the project area. Less traffic is expected during the other phases of the project.

ii. **Air-related Impacts:** There are no adverse impacts expected on these listed species from air emissions associated with traffic or other surface activities. More specifically, EPA has found that the project's cumulative environmental (including air-related) effects will not adversely affect wildlife generally. This includes these three listed species, all of which are mobile and seasonal in their potential occurrence thereby further decreasing the risk of such impacts to a relatively low level.

iii. **Surface Water Related Impacts:** Any water quality impacts to surface water bodies (and inhabiting prey consumed by listed species) would likely be due to sedimentation from surface runoff and/or stormwater primarily during construction. Regulatory controls in place to protect these surface water bodies will include DENR's NPDES permit requirements for both construction and industrial stormwater discharges. These permit requirements will help prevent surface runoff and protect the existing quality of these surface water bodies such that no adverse impacts to these species are anticipated from dermal exposure or in/direct exposure from consuming prey.

iv. **Noise:** Noise from site construction and operations and from increased truck transport could have adverse impacts on listed species near the project site. Generally, man-made noise has the potential to affect avian species by inducing physiological changes, habitat abandonment, or behavioral modifications. Noise may also disrupt communications required for breeding or defense (Larkin 1996). However, avian species may also habituate to man-made noise (Larkin 1996). Much of the available data on noise effects focus on noise sources that are much more extreme and long-term than the project's construction activities, such as aircraft overflights (Efroymson et al. 2000). In comparison, noise from proposed project construction and operations would be relatively temporary and at lower decibels. None of the listed species are known to nest or breed in the project area so there are no anticipated impacts to those activities.

Surface Disturbance Mitigation Measures. Implementing mitigation measures upon the sighting of any of the listed species through temporary cessation of construction activities and minimization of surface operation activities within the localized area would serve as viable measures for minimizing potential adverse effects related to surface disturbance impacts. More specifically, as described in Section VI below, in the event that construction is planned during the whooping crane and rufa red knot migration seasons or the NLEB active season, within five days prior to the initiation of any construction activities, a qualified biologist must conduct pre-construction surveys for these species and training for workers to assist with the identification of all listed species during construction and operation. If the whooping crane, the rufa red knot or the northern long-eared bat are sighted within one-half mile of the well sites or associated facilities during construction or operation, the Permittee must contact EPA and the FWS immediately and all construction work within one-half mile of the species' location must

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temporarily cease. The company is also required to work with the FWS and a qualified biologist to minimize surface operation activities within one-half mile of the species' location.

2. **Wastewater**.
Wastewater exposure could result in adverse impacts, particularly for migratory birds such as the rufa red knot and whooping crane, absent mitigation and/or regulatory controls. When reviewing Powertech's estimated wastewater concentrations of cadmium, chromium, lead, and selenium in ISR wastewater, the NRC found that concentrations of selenium exceeded levels referenced by USFWS (2007) as hazardous to aquatic birds. Exposure to these contaminants in wastewater could occur from one or more of the following:

   i. **Ponds:** The proposed wastewater held in one or more ponds may contain harmful levels of uranium, arsenic, cadmium, lead, molybdenum, and selenium. Concentrations of these chemical constituents may potentially affect ESA listed species via direct exposure should these species come in contact with this wastewater. The ponds could attract listed species that could be affected due to contaminant exposure through ingestion of contaminated water, dermal uptake of contaminated water, and inhalation of airborne contaminants. Mitigation measures in the UIC permit will deter and prevent ESA listed species from coming into contact with wastewater ponds. Additionally, EPA's Class III permit would also enforce Subpart W requirements under its Air Program regulations to ensure construction of surface holding ponds will be protective of soils, groundwater, and any interconnected surface water.

   ii. **Land Application:** As noted above, land application is an option that will only be utilized if deep Class V well injection is not sufficient for management of all ISR-related wastewater. Land application is a disposal technique that uses agricultural irrigation equipment to broadcast wastewater on a relatively large area of land for subsequent infiltration and evaporation. If not treated, this wastewater could adversely impact listed species. To mitigate any potential effects, the DENR's Ground Water Quality Program requires the Permittee to develop a Ground Water Discharge Plan which includes a ground water discharge permit to ensure land applied wastewater meets standards that are protective of human health and, consequently, the health of these species. Specifically, this permit would require ground water monitoring to ensure the existing water quality of local aquifers and any interconnected surface water bodies are protected. This application technique would also require wastewater treatment to meet DENR's NPDES permit requirements in the unlikely event that any runoff leaves the catchment areas since this would be considered a violation of the State's surface water rules.

   iii. **Spills or Leaks.** A release of these contaminants could occur from surface spills or a leak in pipelines transporting wastewater during wellfield operations. The UIC permits include requirements to report spills or leaks of chemicals and other pollutants at the UIC well site. The DENR requires that all such releases of such regulated substances be assessed, contained, and remediated by the responsible party to minimize any environmental impacts. This includes the discharge of any substance that harms, or threatens to harm, wildlife or aquatic life which would include any ESA listed species. All such releases must be reported by calling **605-773-3296** during regular office hours (8 a.m. to 5 p.m. central time) or 605-773-3231 on holidays/weekends. Reporting releases/spills to the DENR does not excuse the permittee/operator from any independent reporting or other obligations to other state, local, or federal agencies. Therefore, the responsible party must also contact local

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authorities to determine the local reporting requirements for releases/spills. The National Response Center (NRC) requires the reporting of certain spills and the DENR also recommends that spills also be reported to the NRC at (800) 424-8802.

Wastewater Mitigation Measures. Direct exposure of the whooping crane or rufa red knot to the wastewater ponds, land application areas and spills or leaks may be unlikely given that the project area is on the far western side of the birds' migration routes. Nevertheless, the constituents present in the wastewater pose a potential risk to listed species that may occur in the project area. Thus, the EPA will include mitigation measures in its permits to minimize such risks. First, the EPA's Class III permit would also enforce Subpart W requirements under its Air Program regulations to ensure construction of surface holding ponds will be protective of soils, groundwater, and any interconnected surface water. Second, the permits will include the requirement that the Permittee must install netting, use bird balls or other acceptable bird deterrent method to prevent birds and bats from accessing all project ponds. This measure is intended to ensure the ponds do not result in adverse impacts to any listed species. Finally, wastewater-related impacts from land application, leaks or spills are appropriately regulated by state, local and federal authorities as described above.

VII. MITIGATION MEASURES

The EPA will incorporate the following measures in the UIC permits to avoid, minimize or mitigate any potential impacts to federally-listed species:

1. In the event that construction is planned during the whooping crane and rufa red knot migration seasons or the NLEB active season, within five days prior to the initiation of any construction activities, a qualified biologist must conduct pre-construction surveys for these species and training for workers to assist with the identification of all listed species during construction and operation.
   A. Whooping Crane Migration Seasons: Migrates through South Dakota April 1 to mid-May and mid-September to mid-November.
   B. Rufa Red Knot Migration Seasons: Migrates through South Dakota mid-April to mid-May and mid-September to October 31.
   C. NLEB Active season: Mid-April to October 31. The critical pup season is June 1 – July 31.

2. If the whooping crane, the rufa red knot or the northern long-eared bat are sighted within one-half mile of the well sites or associated facilities during construction or operation, the Permittee must contact EPA and the FWS immediately and all construction work within one-half mile of the species' location must cease. Powertech will work with the FWS and a qualified biologist to minimize surface operation activities within one-half mile of the species' location. In coordination with the FWS, work may resume after the species leave the area. For this measure and other ESA-related matters related to this project, the Permittee should contact the FWS and EPA by phone, followed up by an e-mail. The contact points are:
   - The FWS South Dakota Field Office – (605) 224-8693, email: southdakotafieldoffice@fws.gov
   - EPA Region 8 UIC Program – (303) 312-6079, email: minter.douglas@epa.gov

3. Any wells, equipment or buildings associated with the UIC wells authorized under the permit with a fixed location within the project area must be constructed to eliminate openings that look like a small cave or hibernacle to avoid the entrance of any northern long-eared bats.

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4. Spills or leaks of chemicals and other pollutants at the UIC well site must be reported to the appropriate regulatory agencies. The procedures of the surface management agency must be followed to contain leaks or spills.

5. If supplemental lighting is used during construction or operation activities, as a protection measure for northern long-eared bat, the lights must be directed and/or sheltered to minimize the amount of light escaping the work or project site.

6. The Permittee shall install netting, use bird balls or other acceptable bird deterrent method to prevent birds and bats from accessing all project ponds.

7. Tree removal activities within the project area must be conducted outside of the northern long-eared bat active season (Mid-April to October 31). This will minimize impacts to the northern long-eared bat, including to NLEB pups during the critical pup season.

8. During the northern long-eared bat active season (Mid-April to October 31), the Permittee shall use a motion-activated camera to monitor the Triangle Mine vertical ventilation shaft located at NWNW Section 35, T6S, R1E for 5 days and nights and determine if bats are entering and exiting. If no bats are observed entering or exiting the shaft, the Permittee shall investigate the shaft to determine if bats are inside the shaft. If no bats are inside the shaft, the Permittee shall cover the entrance to the shaft with finer mesh to prevent bats from entering. If bats are observed in the shaft, the Permittee shall work with South Dakota Game, Fish and Parks to evaluate methods for establishing an appropriate buffer zone around the shaft to prevent tree removal or wellfield construction activity. The buffer zone will need to take into account the fact that the shaft is only a few feet away from a road that is used by local residents and may be improved to use as an access road to the Project Site.

VIII. EFFECTS CONCLUSIONS

A. NORTHERN LONG-EARED BAT *(MYOTIS SEPTENTRIONALIS)*

May Affect, Not Likely to Adversely Affect

The northern long-eared bat is not likely to be found in the project area. There are no known caves or active underground mines in the project area. However, there are inactive underground mines and trees within the project area. The Triangle mine was an open-pit mining operation along the northeastern border of the project area. Immediately east of this open pit was the Triangle underground mine. The Triangle underground mine has been backfilled and partially reclaimed. While inactive underground mines and trees within the project area can provide opportunities for the NLEB to roost and hibernate, there is no designated critical habitat for the NLEB in the project area. According to a Powertech Baseline Wildlife Report (2012):

- No woody corridors will be disturbed by the proposed activities, and additional trees are present in the cottonwood gallery along the Cheyenne River, located approximately 2 miles south of the permit area, where ISR mining is not projected to occur in the near future.
- Few non-listed bats were recorded in the proposed permit area despite targeted efforts to observe bats during the baseline surveys. Individuals seen were near water bodies and treed habitats, which are not currently scheduled for disturbance.

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Although the presence of the NLEB has not been documented in the area, there are inactive underground mines or other potentially suitable habitat in the project area. Therefore, the EPA proposes to require several mitigation measures to minimize potential adverse effects as set forth in Section VI, numbers 1 through 8. Based on the evaluation herein, including the mitigation measures, the EPA has determined that its actions **may affect, but are not likely to adversely affect** the northern long-eared bat.

B. RUFA RED KNOT *(CALIDRIS CANUTUS RUFA)*

May Affect, Not Likely to Adversely Affect

The rufa red knot does not live, nest or breed in the project area. Rufa red knot species were not observed during applicant-conducted surveys and none are reported in the eBirds Range Map inside the project area. The FWS has not designated critical habitat for the species within the project area. The species is not expected in the project area, as their known migration patterns are east of the project area.

Nevertheless, given the potential that individual rufa red knot species may enter the project area, the EPA proposes to require several mitigation measures to minimize potential adverse effects to the species as set forth in Section VI, numbers 1, 2, 4 and 6. Based on the evaluation herein, including the mitigation measures, the EPA has determined that its actions **may affect, but are not likely to adversely affect** the rufa red knot.

C. WHOOPING CRANE *(GRUS AMERICANA)*

May Affect, Not Likely to Adversely Affect

The whooping crane does not live, nest or breed in the project area. Whooping cranes were not observed during applicant-conducted surveys and none are reported in the eBirds Range Map inside the project area. The FWS has not designated critical habitat for the species within the project area. The species is not expected in the project area, as the project area is on the western edge of the species' known migration corridor.

Nevertheless, given the potential that individual whooping crane species may enter the project area, the EPA proposes to require several mitigation measures to minimize potential adverse effects to the species as set forth in Section VI, numbers 1, 2, 4 and 6 in the event that individual species do enter the project area. Based on the evaluation herein, including the mitigation measures, the EPA has determined that its actions **may affect, but are not likely to adversely affect** the whooping crane.

Based on the information in this Biological Assessment, the EPA requests the FWS written concurrence on EPA's determination that its SDWA actions on the two UIC area permit applications and associated aquifer exemption application for the Dewey-Burdock uranium in-situ recovery (ISR) project **may affect, but are not likely to adversely affect**, the northern long-eared bat, the rufa red knot and the whooping crane.

IX. LITERATURE CITED

eBird.org, (2019). eBird Range Map. Retrieved from: https://ebird.org/map/redkno?neg=true&env.minX=-118.05017819856937&env.minY=40.947871674657&env.maxX=-94.93890008186633&env.maxY=47.468352425275704&zh=true&gp=false&ev=Z&mr=1-12&bmo=1&emo=12&yr=all&byr=1900&eyr=2019

Efroymson, R. A., W. H. Rose, S. Nemeth, and G. W. Suter, 2000. Ecological Risk Assessment Framework for Low Altitude Overflights By Fixed-Wing and Rotary-Wing Military Aircraft, ORNL/TM-2000/289, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Larkin, Ronald P. 1996. "Effects of military noise on wildlife: A literature review," USACERL Technical Report 96/21, January 1996, available at: http://nhsbig.inhs.uiuc.edu/bioacoustics/noise_and_wildlife.txt.

Powertech, (2012). Appendix 3.9-A. Baseline Wildlife Report (PDF). (attached)

Powertech, (2013). 2013 Wildlife Monitoring Dewey-Burdock Project. Prepared By: Thunderbird Wildlife Consulting, Inc. Gillette, WY 82718. (attached)

Regulations.gov, (2016). Endangered and Threatened Wildlife and Plants: Northern Long-Eared Bat; Determination that Designation of Critical Habitat is Not Prudent - Docket No. FWS-R3-ES-2016-0052. Retrieved from: https://www.regulations.gov/searchResults?rpp=25&po=0&s=FWS%E2%80%93R3%E2%80%93ES%E2%80%932016%E2%80%930052&fp=true&ns=true

U.S. Fish and Wildlife Service's (USFWS), (n.d.). Environmental Conservation Online System (ECOS). Retrieved from: https://ecos.fws.gov/ecp/

U.S. Fish and Wildlife Service's (USFWS), (n.d.). Information for Planning and Consultation (IPAC) Retrieved from: https://ecos.fws.gov/ipac/

U.S. Geological Survey (USGS), (n.d.). Gap Analysis. Retrieved from: https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap

U.S. NRC, (2014). Environmental Impact Statement for the Dewey-Burdock Project in Custer and Fall River Counties, South Dakota; Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (SEIS); Final Report (PDF). Retrieved from: https://www.nrc.gov/docs/ML1402/ML14024A478.pdf

U.S. NRC, (2003). Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NUREG-1748) (PDF). Retrieved from: https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1748/

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