

**DRAFT AVIAN MONITORING AND MITIGATION PLAN
FOR
POWERTECH (USA) INC.'S DEWEY-BURDOCK PROJECT**



DRAFT

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ACRONYMS

APLIC	Avian Power Line Interaction Committee
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
DENR	Department of Environment and Natural Resources
EPA	U.S. Environmental Protection Agency
ESFO	Ecological Services Field Office
GPS	Global Positioning System
ICF	ICF International, Inc.
ISR	<i>in situ</i> recovery
MBTA	Migratory Bird Treaty Act
NHP	South Dakota Natural Heritage Program
NRC	U.S. Nuclear Regulatory Commission
SDGFP	South Dakota Game, Fish & Parks
TWC	Thunderbird Wildlife Consulting, Inc.
USFWS	U.S. Department of Interior Fish and Wildlife Service

GLOSSARY OF TERMS

Continuous and Ongoing Activities: No work stoppages of more than 2 weeks and occurring regularly for a minimum of 2 months prior to March 1 (nesting) or December 1 (winter roosts) of a given year.

Disturb: “To agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (USFWS 2007)

Stop-Work Authority: Authorization given to the monitoring biologist or Powertech staff to halt operations or activities within a nest buffer that could result in “disturbance” or “take.”

Take: “Pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” (USFWS 2007). In addition to immediate impacts, this definition also covers “impacts that result from human-induced alterations initiated around a previously used nest site

during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.”

1.0 INTRODUCTION

Powertech (USA) Inc. (hereafter, Powertech) has proposed to develop *in situ* recovery (ISR) operations for uranium resources located in Custer and Fall River counties in southwestern South Dakota; i.e., the Dewey-Burdock Project. Biologists with ICF Jones & Stokes (ICF, currently ICF International, Inc.) collected baseline wildlife information for the Dewey-Burdock Project from July 2007 through early August 2008. From 2008 through the 2012 breeding season, supplemental data for nesting bald eagles (*Haliaeetus leucocephalus*) in the permit area were collected incidentally during other field work conducted by Powertech and through occasional site visits from South Dakota Game, Fish and Parks staff (SDGFP, S. Michals).

In October 2012, Powertech contacted Gwyn McKee, Principal Biologist with Thunderbird Wildlife Consulting, Inc. (TWC), to assist with the preparation and implementation of an Avian Monitoring and Mitigation Plan (Avian Plan) to fulfill requirements of its Large Scale Mine Permit Application to the South Dakota Department of Environment and Natural Resources (DENR). Ms. McKee supervised the Dewey-Burdock Project's baseline wildlife surveys for ICF and continues to provide part-time support for that company. Both firms are located in Gillette, Wyoming; Ms. McKee has been associated with these firms since 1994. The baseline wildlife surveys demonstrated that no federally listed threatened or endangered species occur in the wildlife survey area.

On December 28, 2012, representatives from Powertech, SDGFP, DENR, U.S. Fish and Wildlife Service's (USFWS's) South Dakota Ecological Services Field Office (ESFO), WWC Engineering (Powertech's permitting contractor), and TWC met at the ESFO office in Pierre, South Dakota (in person or via conference call) to discuss the format and content of the Avian Plan. Notes from that meeting were provided to all participants in January 2013, along with an opportunity to offer corrections and additional input. This document reflects the compilation of notes from the initial collaborative discussion, as well as follow-up conference calls with the SDGFP and the USFWS. The compiled meeting notes from December 28, 2012 are provided as Attachment 1, and also include additional comments from the subsequent meetings.

2.0 PURPOSE OF THE AVIAN PLAN

The primary purpose of the Avian Plan is to outline strategies for preventing or minimizing the potential for an unauthorized "take" of avian species protected under the

Migratory Bird Treaty Act (MBTA) and/or Bald and Golden Eagle Protection Act (BGEPA). Under the BGEPA, “take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb”; a similar definition of “take” is outlined under the MBTA (USFWS 2007). In addition to immediate impacts, this definition also covers “impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle’s return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.”

Project-related disturbance near an active raptor nest or bald eagle winter roost site has the potential to result in a take unless appropriate measures outlined in this Avian Plan are implemented. Under the BGEPA, “disturb” means “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (USFWS 2007).

Due to its current status as a threatened species for the state of South Dakota, a large portion of the Avian Plan focuses on measures to prevent or minimize the potential for take of nesting bald eagles in the wildlife survey area (permit area and 1.0-mile perimeter). However, as noted, other avian species of concern also are addressed in separate subsections of this document.

The recommendations and proposals described below are based on successful, long-term (since 1980) monitoring and mitigation activities employed at surface coal mines in northeastern Wyoming (near the permit area); coal operations result in levels of disturbance significantly greater than those associated with ISR. The content of the Avian Plan is further supported by the principal biologist’s (Ms. McKee’s) raptor expertise garnered over more than three decades, including more than 20 years of intensive field observations of bald and/or golden eagle nests, as well as several years supervising both the incubation of bald eagle eggs (among other raptor species) and the rearing, hacking (gradual release), and radio-tracking of juvenile bald eagles. The information and expertise gleaned from these long-term, proven experiences, along with site-specific data gathered in the wildlife survey area for the Dewey-Burdock Project, will be used to provide the “best scientific information available” for determining whether a risk of take

exists in any given situation. Further details of relevant experience are provided in Section 9 of this document.

Upon approval by both DENR and SDGFP, this document will become part of Powertech's Large Scale Mine Permit. The South Dakota ESFO will be invited to review and comment on the Avian Plan, though approval from that agency is not required as part of the mine application or permitting process. To facilitate review of the Avian Plan, proposed monitoring and mitigation measures are provided in Sections 6 and 7, respectively.

It is important to note that some topics discussed during the December 28, 2012 meeting (e.g., fence designs to exclude mammals, aquatic monitoring, etc.) are not included in this document, as they do not relate to avian species. These have been addressed in the responses to the technical review comments on the Large Scale Mine Permit Application (Powertech 2013).

In addition to this Avian Plan, the SD ESFO recommended during subsequent phone meetings that Powertech apply for a federal Eagle Take Permit to authorize certain activities to occur within specified boundaries around active bald eagle nests and winter roost sites. The company is in the process of preparing that permit application.

3.0 PERMIT AREA DESCRIPTION

The proposed permit area is located approximately 13 miles north-northwest of Edgemont, South Dakota, near the southwestern extents of the Black Hills. The permit area spans northern Fall River County and southern Custer County in southwestern South Dakota; its northwestern edge abuts the state border with Wyoming. The area includes approximately 10,580 contiguous acres of mostly private surface and encompasses all or portions of T7S, R1E, Sections 1-5, 10-12, and 14-15, and T6S, R1E, Sections 20-21 and 27-35 (Map 1).

The elevation within the permit area ranges from approximately 3,600 feet to 3,900 feet above mean sea level, with the highest elevations along the pine breaks that overlap the eastern boundary. Topography in the western portion of the permit area consists primarily of gently rolling hills, with more varied terrain in the pine breaks and dissected hills found in the eastern portion. The region is characterized as semi-arid continental or steppe, with a dry winter season. The area commonly experiences low precipitation levels, high evaporation rates, low relative humidity, and plentiful sunshine. Yearly precipitation totals average about 16 inches. Approximately one-half of the annual precipitation falls during the months of May, June, and July. As expected, most of the winter precipitation occurs as snow, with an annual average of

38 inches. Thunderstorms are relatively frequent in the permit area during the summer months, averaging 40-45 days per year. Much of the annual rainfall is associated with these events.

The permit area is comprised of a mosaic of five main vegetative communities: Big Sagebrush Shrubland, Greasewood Shrubland, Upland Grassland, Ponderosa Pine Woodland, and Cottonwood Gallery. The largest individual parcels are dominated by Upland Grassland habitats. One large, active black-tailed prairie dog (*Cynomys ludovicianus*) colony is located in the northwestern portion of the permit area. Two other active colonies are present in the south-central and southwestern portions of the 1.0-mile perimeter (Map 1). Some colony boundaries are defined by Beaver Creek or other physical obstacles. Local ranchers have historically used shooting and other control methods to reduce and/or eradicate prairie dogs from the permit area and surrounding private lands.

The wildlife survey area (permit area and surrounding 1.0-mile perimeter for most species) is located within the Cheyenne River watershed. Two main stream channels pass through the permit area: Beaver Creek (perennial) and Pass Creek (ephemeral within the permit area). Pass Creek joins Beaver Creek just south of the permit area, and Beaver Creek flows into the Cheyenne River approximately 3.0 miles south of the confluence with Pass Creek. Several stock dams and historical mine pits are located in the permit area. Many of the impoundments contain water only temporarily following precipitation events or snow melt. No known natural springs exist within the permit area.

Trees are present along the riparian corridors of both primary creeks and on the higher elevation hilltops in the permit area. The plains cottonwood (*Populus deltoides*) is the only species present along the creek channels; cottonwoods are most prevalent in the Pass Creek corridor. Ponderosa pine (*Pinus ponderosa*) dominates the higher elevation hilltops and breaks in the north-central and eastern portions of the permit area, with Rocky Mountain juniper (*Juniperus scopulorum*) present as individual trees or small inclusions in some of the dry drainages.

The permit area is predominately (97.7%) privately owned, with the remaining 2.3% managed by the Bureau of Land Management (BLM). Land use in the permit area includes ranch lands managed primarily for livestock grazing (mostly cattle along with a few horses), with limited areas irrigated for hay production along Beaver Creek. Existing infrastructure within the permit area includes the Burlington Northern-Santa Fe railroad that runs through the

area, South Dewey Road (County Road 6463) that parallels the railroad, several gravel and unimproved (two-track) roads that pass through the permit area and surrounding perimeter, overhead power lines, one occupied residence, and some historical mine pits in the eastern portion of the permit area.

4.0 OPERATIONS SUMMARY

Complete details of Powertech's proposed operations, including drawings, are included in the Large Scale Mine Permit Application. The following description provides a summary of those operations.

Because ISR has a much smaller impact footprint than conventional surface mining, topsoil stripping and potential habitat impacts are reduced to relatively small areas needed for the ISR well fields (including injection, production, and monitoring wells along with associated header houses), processing facilities, ponds, access roads, utility lines, and other supporting infrastructure. Well fields are distributed in a systematic pattern over the ore body.

Following issuance of a U.S. Nuclear Regulatory Commission (NRC) uranium recovery license, DENR large scale mine permit, and other relevant permits, it is anticipated that construction will commence on the first well fields, processing facilities, and associated infrastructure. Well field construction will be phased, with multiple well fields in construction and subsequent operation at the same time. The total duration of well field construction is expected to be approximately 6 years. The total anticipated disturbance area over the life of the project is estimated to be approximately 250 to 440 non-contiguous acres, depending on the wastewater disposal option (i.e., a smaller disturbance area will result if deep disposal wells are used for management of treated wastewater instead of land application [center pivot irrigation]). Due to the phased nature of well field construction, only about 10-15 acres of surface disturbance is expected to occur each year during well field construction after the processing facilities and ponds are built. Some surface disturbance is anticipated in the prairie dog colony located inside the permit boundary through topsoil stripping and associated construction of ISR well fields, ponds, and stormwater catchment areas for the land application systems (if used) in the Dewey portion of the permit area.

In addition to the well fields and two processing facilities, the project will include construction of new and/or improved access roads, underground pipelines, overhead power lines (transmission and distribution lines), and a new electrical substation. That infrastructure will be

consolidated into common corridors to the extent practicable throughout the permit area. The operations staff is anticipated to be approximately 60 individuals, though staff will work in shifts of smaller crews. Visits to well field header houses typically will be conducted by one individual and will occur twice daily. Those activities will be scheduled to occur during daylight hours to the extent practicable to minimize potential impacts to certain wildlife species (especially nesting bald eagles). Each injection and production well will have an emergency cut-off switch with remote monitoring and control to minimize potential impacts from well malfunctions.

As noted, deep disposal wells, land application systems, or a combination of both will be used to dispose treated wastewater resulting from ISR operations and groundwater restoration. Deep disposal wells are the preferred disposal option, and land application will not be used if sufficient capacity is available in deep disposal wells permitted through the U.S. Environmental Protection Agency (EPA). If land application is used, up to 380 non-contiguous acres of center pivot areas (including 315 acres designated as primary center pivot areas and 65 acres designated as standby center pivot areas) will be operated near each of the two processing facilities. Land application water would be applied at a rate of approximately 19 inches per year to prevent runoff. Catchment areas would provide containment of stormwater runoff and snowmelt, but such areas would not be allowed to accumulate land-applied effluent. Again, considerably less acreage would be impacted should deep disposal wells be used for treated wastewater disposal.

The first project disturbance near the primary area of concern (known bald eagle territory in the Dewey portion of the permit area) could occur in fall 2013, after the nesting season (typically mid-January through July).

5.0 AVIAN SPECIES

5.1 *Raptors*

Raptor species observed during the Dewey-Burdock baseline wildlife surveys included the bald eagle, red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), turkey vulture (*Cathartes aura*), Cooper's hawk (*Accipiter cooperii*), rough-legged hawk (*Buteo lagopus*), merlin (*Falco columbarius*), great horned owl (*Bubo virginianus*), and long-eared owl (*Asio otus*). The bald eagle, red-tailed hawk, American kestrel, and northern harrier were the most commonly seen

raptor species in the area. Sightings for those species were recorded with regularity during all four seasons throughout the baseline survey period, though some of those species may leave the area under harsh winter conditions. Refer to the Baseline Wildlife Report (Appendix 3.9-A in the Large Scale Mine Permit Application) for additional details regarding raptors and other avian species.

Raptor sightings were recorded most often in ponderosa pine, cottonwood riparian, and grassland habitats. Observations were most concentrated in proximity to Beaver Creek and Pass Creek, likely due to prey availability associated with prairie dog colonies, creeks, and better vegetative cover along those drainages, and to the ample presence of trees for use as raptor perch sites in those areas. A variety of behavior was recorded, including: hunting; perching in trees, on power poles, and on other topographic features; and tending nests, incubating eggs, and exhibiting nest defense behavior.

5.1.1 Bald Eagles

The USFWS removed (delisted) the bald eagle from protection under the Endangered Species Act in July 2007 (Federal Register, July 9, 2007), and the ruling became effective in August of that year. As noted, the bald eagle is still considered to be a threatened species in South Dakota, though its status is currently under evaluation for removal from the state list. In addition, bald eagles continue to be protected under the MBTA and BGEPA, as well as any other applicable state regulations.

Bald eagles were repeatedly observed along Beaver Creek in the western portion of the permit area during winter roost surveys conducted in winter 2007/2008 and again in winter 2012/2013. However, those sightings typically consisted of only two or three eagles on any given occasion.

Two bald eagle nests have been identified in the permit area since baseline inventories were conducted in 2007 and 2008. Those nests are referred to as BE1a and BE1b (Map 1). That numbering system represents the original nest site and an alternate nest constructed in approximately 2011, respectively. Both nests are in mature, dying cottonwoods along or near Beaver Creek in the western (Dewey) portion of the permit area. Nest BE1a fledged one young in 2008, but the nest was not active the following year. Powertech did not actively monitor either nest site in 2010 or 2011, as project activities were quite limited during this period. However, Powertech personnel did observe bald eagles in nest BE1a in 2010. Personnel first

saw bald eagles in nest BE1b during an alluvial drilling program that was conducted from May 4-5, 2011. SDGFP personnel also observed the bald eagles in nest BE1b around this time period. Powertech personnel reported bald eagles in nest BE1b again in 2012. Observations by Powertech personnel from 2010 through 2012 were limited to noting what appeared to be adult bald eagles in the nests; no records were kept regarding whether young fledged from either nest during that period.

The BE1 pair was active again in 2013 and fledged one young from nest BE1b (Map 1). Alternate, unoccupied nesting habitat is available along numerous other reaches of Beaver Creek within and beyond the permit boundary, as well as in mature cottonwoods along Pass Creek and in the ponderosa pines in and adjacent to the permit area.

5.2.1 Other Nesting Raptors

Eight confirmed or potential intact (i.e., material present) raptor nests were located in the wildlife survey area (permit area and 1.0-mile perimeter) during the 2007-2008 baseline survey period, including the original bald eagle nest. Six additional nests have been documented since then, five of which were first identified in 2013. All 14 nests are listed in Table 1, including their locations, nest substrate, and productivity in both 2008 and 2013; their locations also are shown on Map 1.

In addition to the BE1 pair, four pairs of red-tailed hawks and one pair of burrowing owls (*Athene cunicularia*) showed some level of activity in 2013 (Table 1). The burrowing owls nested in the prairie dog colony within the permit area and fledged at least two young. The red-tailed hawks each brought new material to their respective nests, but none were confirmed incubating. A pair of great horned owls was observed in the GHO1 nest tree twice during the spring, but no evidence (accumulation of droppings, prey remains, etc.) of an active nest was found at the nest site.

5.2 Breeding Birds

Thirty-four avian species were identified within the breeding bird belt transects during baseline surveys conducted in spring 2008. The western meadowlark (*Sturnella neglecta*) was the most common species, followed by the mourning dove (*Zenaida macroura*). The dove was the only species recorded in all habitat types surveyed. Defensive behavior recorded during the

Table 1. Raptor nest locations and activity in the Dewey-Burdock permit area and 1.0-mile perimeter during baseline wildlife surveys conducted from July 2007 through August 2008 and renewed surveys conducted in 2013.

Nest No.	¼ ¼ Section	Township/Range	Nest Substrate	2008 Status	2013 Status
B1	NESW 17	6 South/1 East	Cottonwood	---	I/Fair
BE1a	SESW 30	6 South/1 East	Cottonwood	A,1,1	Alternate nest/Fair
BE1b	NENE 31	6 South/1 East	Cottonwood	---	1 young fledged
BO1	SWSE 30	6 South/1 East	Prairie dog burrow	---	A,2+,2
GHO1	NESE 5	7 South/1 East	Tree	1 adult present, no active nesting confirmed	2 adults present, no active nesting confirmed
LEO1	SESW 33	6 South/1 East	Ponderosa pine	A,1+,1	Destroyed, natural causes
M1	NWSW 36	6 South/1 East	Ponderosa pine	A,?,?	Destroyed, natural causes
RTH1a	SWNE 29	6 South/1 East	Ponderosa pine	A,1+,1	Active-tended (new material, no eggs laid)
RTH1b	SENE 29	6 South/1 East	Ponderosa pine	Alternate	Alternate nest/Fair
RTH2	SESW 34	6 South/1 East	Cottonwood	A,2,2	Active-tended (new material, no eggs laid)
RTH3a	NESE 28	41 North/60 West	Cottonwood	I	Destroyed, natural causes
RTH3b	SWNW 30	6 South/1 East	Cottonwood	---	Inactive/Fair
RTH4	SENW 9	7 South/1 East	Cottonwood	---	Active-tended (new material, no eggs laid)
RTH5	SESE 5	7 South/1 East	Cottonwood	---	Active-tended (new material, no eggs laid)

¹ One adult great horned owl was seen in the nest tree, but no chicks, feathers, droppings, or prey remains were observed in or on the nest, or on the ground below the nest.

Species Codes
 B = Unknown Buteo
 BO = Burrowing Owl
 BE = Bald Eagle
 GHO = Great Horned Owl
 LEO = Long-eared Owl
 M = Merlin
 RTH = Red-tailed Hawk

Status
 A = Active (eggs laid)
 I = Inactive
 ? = Productivity unconfirmed
 --- = Nest not present
 A,#,# = Active, # young hatched, # young fledged
 + = minimum # young hatched

transect surveys indicated that up to three pairs of long-billed curlews (*Numenius americanus*) may have nested near the south-central edge of the proposed permit area that year.

As expected, several species were associated with specific habitat types. For example, the curlew was only seen in the grassland transects. Likewise, several species typically associated with trees were only observed in or immediately adjacent to the cottonwood gallery or ponderosa pine transects: the chipping sparrow (*Spizella passerina*), mountain bluebird (*Sialia currucoides*), black-capped chickadee (*Poecile atricapillus*), and yellow-rumped warbler (*Dendroica coronata*), among others. Similar associations were noted between other species and habitats.

5.3 Waterfowl and Shorebirds

Specific surveys for waterfowl and shorebirds were not required for the Dewey-Burdock Project. Nevertheless, biologists recorded all birds seen during the year-long baseline survey period. Eight species associated specifically with water, wetlands, or other mesic habitats were observed during the baseline inventories: the American white pelican (*Pelecanus erythrorhynchos*), great blue heron (*Ardea herodias*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), American wigeon (*Anas americana*), killdeer (*Charadrius vociferus*), long-billed curlew, and upland sandpiper (*Bartramia longicauda*).

5.4 Tracked Species

Nine avian species tracked by the South Dakota Natural Heritage Program (NHP) were documented during the baseline wildlife surveys: the bald eagle, golden eagle, Cooper's hawk, merlin, long-eared owl, American white pelican, great blue heron, long-billed curlew, and Clark's nutcracker (*Nucifraga columbiana*); the nutcracker was only observed in the 1.0-mile perimeter. The bald eagle, long-eared owl, and long-billed curlew are known or are suspected to have nested in the permit area during the baseline period based on evidence (young present) or persistent defensive behavior. The remaining species were observed perched in or flying over the permit area only once or twice each during the baseline wildlife surveys.

Three tracked species were recorded during field surveys conducted in 2013. The bald eagle and burrowing owl successfully nested in the permit area. A pair of golden eagles was regularly seen soaring, perching, or performing courtship flights just beyond the southwestern edge of the 1.0-mile survey perimeter, but their nesting status was not confirmed.

5.5 *Greater Sage-grouse*

Due to the high level of concern regarding greater sage-grouse (*Centrocercus urophasianus*) populations throughout their range, this species is briefly discussed in the Avian Plan. No sage-grouse (or grouse sign) were observed in the wildlife survey area during baseline inventories (or in subsequent years). The absence of sage-grouse in that area is further documented by the SDGFP in their Greater Sage-grouse Management Plan for South Dakota for 2008-2017 (SDGFP 2008) (excerpt in italics, below).

Western South Dakota is considered the most easterly fringe of the sage grouse range in the United States (Appendix Figure 1). Because sage grouse are sagebrush obligate species, sage grouse are only found in areas where adequate sagebrush is available to meet habitat and biological needs. Within South Dakota, the vast majority of sage grouse are found in Harding and Butte counties, with incidental observations found in the western portions of Perkins and Meade County. Monitoring of a historical lek in Fall River County between Edgemont and the Wyoming border has resulted in only a few birds observed, none of which have been counted since 2006 and those were not counted on the historical lek.

Additionally, this species is not included on the current list of Rare, Threatened or Endangered Animals tracked by the South Dakota NHP (SDGFP 2013).

The nearest known lek site is 5.0 miles west of the permit area (in Wyoming), which is beyond the currently recommended buffer of 4.0 miles for occupied (active in at least 1 of the last 10 years) leks (BLM 2011). The nearest lek in Fall River County is more than 8.0 miles south of the permit area. Therefore, the permit area is not considered to be within occupied sage-grouse habitat.

Due to the documented absence of sage-grouse in the wildlife survey area, annual lek searches will not be conducted for this species. Nevertheless, Powertech is committed to implementing mitigation measures to enhance sage-grouse habitat as described in Section 7.2.

6.0 MONITORING

The proposed monitoring program for avian species of concern is described by group below, and reflects the consensus reached at the December 28, 2012 agency meeting for this project (refer to attached meeting notes).

6.1 *Raptors*

Annual searches for, and monitoring of, raptor nests will be conducted by qualified biologists. The annual survey area will encompass the permit area and 1.0-mile perimeter for bald eagles, with a 0.5-mile perimeter used for other raptor species. The latter distance represents the greatest buffer typically recommended for non-eagle nests. The current condition and status of each nest will be updated in a brief summary report that will be submitted to the SDGFP at the end of each survey year.

During all field work, guidelines recommended by Grier and Fyfe (1987) will be followed to prevent nest abandonment and injury to eggs or young. Early in the breeding season, nests will be observed from a distance with the aid of binoculars and a spotting scope. From February through April (bald eagles) or May (other raptor species), nests will not be approached on foot during regular monitoring. All previously identified nests will be checked during each breeding season until the current year status (active, inactive, or alternate) is confirmed.

Searches for new nests will be conducted in the permit area and appropriate perimeter over several days through late July. Searches will entail slowly driving through the wildlife survey area and stopping frequently to examine typical nesting habitat. Treed areas and other potential nesting habitats will be searched on foot during appropriate months. Biologists also will watch for adult raptors while conducting other surveys. Areas where individuals or pairs are repeatedly seen, or where defensive behavior is observed, will be thoroughly searched for nests. All active nests will be monitored until the pair's breeding attempt fails or young fledge.

All nests will be plotted on 1:24,000 topographic maps using a combination of hand-held Global Positioning System (GPS) technology and visual verification. The status (i.e., active, inactive, or alternate) of nests and production of young at active nests will be recorded and reported annually. Also recorded will be the distance from each intact raptor nest to the nearest occurrence of regular human activity. The type of activity and whether it is visible from the nest also will be noted.

Powertech will conduct training, with assistance from a qualified biologist, to help their personnel identify various avian species of interest or concern that may occur in the wildlife survey area, with an emphasis on bald eagle identification and breeding behavior (e.g., tending nests, nest cup formation, incubation, brooding young, etc.). This training will be provided to new employees who may document supplemental raptor nest activity observations during routine

work activities such as monitoring, well sampling, or header house inspection. Refresher training will be provided annually or as needed. In addition, Powertech may provide the training to contractors or any other persons working in the vicinity of nesting raptors.

6.1.1 Bald Eagles

The proposed bald eagle monitoring program is based on more than 30 years of relevant experience with raptor biology, including bald eagles. The monitoring schedule is based on USFWS recommendations developed for coal mines in northeast transect surveys indicated that up to three pairs of long-billed curlews may have nested near the south-central edge of the proposed permit area that year. Wyoming nearly 30 years ago, and still in place, to monitor mining operations near multiple golden eagle nests and the birds' response to those activities. The schedule may be amended, as needed, to adjust for increases or decreases in project-related activities or in response to agency recommendations. The majority of data will be collected by qualified biologists. However, TWC also provided Powertech staff with a spreadsheet to assist them in recording bald eagle observations during each site visit to supplement the dataset. This approach was approved by all agency personnel at the December 2012 planning meeting for the project.

Preliminary monitoring efforts began in December 2012 and are ongoing. Data gathered during the monitoring program will help define the BE1 pair's home range, and nesting and winter roosting activities (including specific roost sites that may warrant protection), as well as the pair's tolerance for various disturbance activities (both project-related and pre-existing) such as foot traffic, well sampling, small vehicles, large equipment, facility construction, etc. Results from these efforts will contribute to the overall goals of preventing take and retaining nesting bald eagles during operations.

An initial proposed monitoring program to help document whether the BE1 pair has or is developing a tolerance for project activities and to define the parameters of that tolerance is outlined below. This program will be modified as needed to accommodate project schedules, timing of activities, bald eagle behavior, and/or other reasons that could affect the ability to achieve the monitoring goals.

- Pre-disturbance (prior to major site construction), including increased monitoring as needed during sensitive periods.
 - ❖ Goals: Define home range, document existing disturbance activities, eagles' response to those activities, and help develop protective guidelines.
 - Tri-weekly (i.e., every 3 weeks) monitoring (biologist): August 1 – February 28.
 - Bi-weekly monitoring (biologist): March 1 – July 31.
 - Post-storm site visits as soon as practicable if actively nesting (biologist).
 - Supplemental observations during each site visit (Powertech personnel).
 - All observations recorded during each site visit (all personnel).
- Immediately before (< 1 year) and during disturbance, including increased monitoring as needed during sensitive periods.
 - ❖ Goals: Biologist participation in pre-construction planning, document disturbance activities within buffer and eagles' response to those activities, and refine protective guidelines.
 - Bi-weekly monitoring (biologist): December 1 – February 28.
 - Weekly monitoring (biologist): March 1 – May 31.
 - Bi-weekly monitoring (biologist): June 1 – July 31.
 - Tri-weekly monitoring (biologist): August 1 – November 30.
 - Post-storm site visits as soon as practicable if actively nesting (biologist).
 - Supplemental observations during each site visit (Powertech personnel).
 - All observations recorded during each site visit (all personnel).
- Operational Monitoring
 - ❖ Goal: Use existing data to refine monitoring, mitigation, and operations.
 - Biologist participation in annual planning strategies for activities within nest buffer; concurrence from state and federal agencies for actions.
 - Identify/develop/modify screening techniques within buffers.
 - Biologist monitoring during specific activities (with “stop-work” authority).
 - Disturbance restrictions within the nest buffer during precipitation (rain, snow) or other environmental conditions (e.g., strong winds) that represent increased risk to nesting bald eagles.
 - Disturbance restrictions within the nest buffer when temperatures exceed 90 degrees or fall below 20 degrees during incubation or while young are

in the nest (parameters based on principal biologist's extensive field observations and first-hand experience incubating and raising young raptors).

- Stop-work authority means immediate cessation of activities and departure from current buffer zone by all personnel.
- Continued monitoring per schedule, post-storm, and as warranted.

Trail cameras may periodically be placed in the active bald eagle nest tree or other locations to collect additional monitoring information during specific times of the year, provided that such placement does not disrupt nesting or other sensitive activities.

In addition to the monitoring program outlined above, the following activities will occur as needed to maintain a current database for nesting bald eagles in the wildlife survey area.

- Map potential bald eagle nesting habitat within the permit area and surrounding 1.0-mile perimeter to:
 - Identify natural alternate nest sites to supplement bald eagle nesting options.
 - Determine whether artificial nest structures can be created beyond buffer areas to supplement bald eagle nesting options (though bald eagles may not use such structures and no bald eagle nests will be removed or relocated from the permit area).
- Identify and map specific, regular bald eagle winter roost sites to aid in protecting those locations from future disturbance.

6.1.2 Other Nesting Raptors

The proposed monitoring program for raptor species other than the bald eagle includes:

- Annual monitoring of all known raptor nests within the permit area and 0.5-mile perimeter (based on the maximum anticipated buffer distance from any raptor nest of 0.5 mile).
- Annual searches for new nests within 0.5 mile of the current year disturbance and proposed disturbance for the upcoming year.

6.2 Other Avian Species

The proposed monitoring program for migratory birds other than raptor species is described below, and reflects the consensus reached at the December 28, 2012 agency meeting for this project (refer to attached meeting notes).

- Routinely monitor water quality in ponds without avian deterrent systems and catchment areas and implement mitigation measures if trigger values are exceeded.
- If disturbance cannot occur outside of the breeding season, conduct clearance surveys for ground-nesting species prior to disturbance blocks of at least 10 contiguous acres.

6.3 *Prey Abundance*

Lagomorph (hares and rabbits) abundance is known to influence the nesting attempts and success of large raptors such as golden eagles, red-tailed hawks, and great horned owls (Johnsgard 1990). For this reason, biologists will conduct annual nocturnal spotlight surveys for lagomorphs within the permit area to track prey populations. The same basic route and route length will be surveyed in late summer each year, though minor modifications may be needed at times to accommodate facility operations. The route will pass through all major vegetative habitats within the permit area that lagomorphs typically inhabit (i.e., pine stands will not likely be surveyed). Data collected will include the species of lagomorph, number of animals, route segment, and habitat.

Prairie dog colonies also serve as an important food source for numerous raptor species. Physical evidence observed below nest BE1b in the permit area revealed that the bald eagle pair had taken numerous prairie dogs during at least one active year (S. Michals, SDGFP, personal communication). To monitor this important prey population in the permit area, Powertech commits to the actions outlined below.

- Monitor prairie dog colonies in and within 1.0 mile of the permit area annually for activity.
- Map active prairie dog colonies in and within 1.0 mile of the permit area annually.

7.0 MITIGATION

7.1 *Raptors*

7.1.1 Bald Eagles

Buffer Area

As noted above, some operations and/or infrastructure will occur near and within view of one or both known bald eagle nest sites at some point during the project. The National Bald Eagle Management Guidelines (USFWS 2007) recommend a minimum distance of 660 feet and

the use of visual screens (i.e., terrain, trees, or other screening factors) between proposed disturbance activities and bald eagle nest sites (active or inactive) where similar activities do not already occur on a regular basis within 1.0 mile of the nest(s) (as in the case of the Dewey-Burdock Project). However, those guidelines also recommend that disturbance activities are located farther away than 660 feet in areas with open vistas (page 10).

Wyoming's ESFO refers to the USFWS bald eagle information web page for recommended spatial and seasonal buffers (USFWS 2009). That web page links to the USFWS Midwest Region recommendations, which again suggest a buffer of 660 feet due to the common presence of visual screens (i.e., trees and/or terrain) where most bald eagles nest in that region. The Wyoming ESFO itself typically recommends a buffer of 0.5 mile for bald eagle nests from January 15 through July 31 due to the open terrain surrounding most nest sites in that state. That approach is based on similar recommendations for golden eagle nests in Wyoming (USFWS 2009). However, the Wyoming ESFO also regularly authorizes variances to the 0.5-mile buffer for activities in golden eagle territories where nesting eagles have demonstrated a tolerance for disturbance, including major mine operations such as blasting.

Given the recommendation in the national guidelines to use a distance greater than 660 feet from active bald eagle nests in open terrain, such as that found in the Dewey-Burdock permit area, it is expected that the South Dakota ESFO also will recommend a distance greater than 660 feet for this project. As described below, Powertech proposes an initial buffer distance of 0.5 mile through the first nesting season that occurs at, or following, the start of construction to provide maximum assurance that take of an active bald eagle nest will not occur. However, the goal is to decrease that buffer distance over time due to the belief that nesting bald eagles can acclimate to the incremental nature of planned disturbance, much like golden eagles have acclimated to surface coal mine operations in northeastern Wyoming, near the Dewey-Burdock permit area.

For example, numerous pairs of golden eagles have demonstrated a high tolerance for blasting and other heavy mining operations as close as 530 feet (0.1 mile) and 200 feet, respectively, and in view of their active nests. Consequently, the Wyoming ESFO has consistently determined that Eagle Take permits are not necessary to authorize ongoing mine operations to continue to encroach within, and pass through, those active territories. Confirmation of that tolerance is available in long-term annual reports on file with the Wyoming

Department of Environmental Quality-Land Quality Division in Sheridan or Cheyenne, Wyoming.

Like the Dewey-Burdock permit area, northeastern Wyoming is dominated by relatively open terrain. Given the documented ability for nesting golden eagles to acclimate to high levels of mine-related disturbance near their nests, the considerably reduced level of activity and surface disturbance associated with ISR as opposed to surface mining, and the phased timeline under which disturbance will occur in the permit area, all agency personnel at the December 28, 2012 project meeting were in consensus to allow the nesting pair of bald eagles an opportunity to acclimate to project-related activities (refer to attached notes from the December 28, 2012 agency meeting for this project). Powertech's proposal for establishing a buffer is outlined below.

Acclimation Plan

Powertech's primary goal for this management plan is to promote the viability of continued nesting activity through a combination of avoidance and the wildlife management practices described within this document. However, per recommendations by the South Dakota ESFO, Powertech also will pursue the appropriate federal and state permits allowing disturbance activities to occur within the proposed buffer distance during nesting and winter roosting seasons while preventing the unauthorized take of bald eagles. Some project operations are commercially necessary within the proposed initial 0.5-mile buffer area around historically active bald eagle nests (most recently BE1b). Powertech's commitment to seek regulatory approval through both this document and a federal non-purposeful take permit will maximize options for both established and new activities to eventually be conducted at closer distances to an active bald eagle nest while minimizing the potential for unauthorized take of such nests.

Powertech's approach is to minimize the risk of take by incrementally introducing the bald eagle pair to project-related operations to help them acclimate to regular disturbance. The goal will be to gradually reduce the proposed buffer distance based on results from targeted observations and documentation of normal eagle activity, including nesting behavior, during various levels of operations. This incremental acclimation approach has proven successful with nesting golden eagles at nearby surface coal mines in similar habitats and with much greater levels of disturbance than will occur from the Dewey-Burdock Project.

Based on the consensus agreement of USFWS and SDGFP personnel with this gradual acclimation process, given at the December 2012 meeting, Powertech is presenting the proposed approach as follows. Subject to regulatory approval, Powertech proposes to begin the acclimation process prior to the winter 2013/2014 roosting season and continue the approach through the 2014 nesting season, or as soon as possible based on agency approval. This gradual acclimation process will continue beyond 2014, as needed, based on observations of the bald eagle pair.

The proposed process is outlined below. For the purposes of this discussion, the nesting season is defined as January 15 through July 31, and the winter roost season is defined as early morning and late afternoon hours from December 1 through February 28. These date ranges and times are based on recommendations from the Wyoming ESFO, as such guidelines are not readily available from the SD ESFO.

- Powertech and its contractors used a clearly marked 0.5-mile buffer around the active bald eagle nest (BE1b) to prevent take during the 2013 nesting season. The pair successfully fledged one young in 2013, with no evidence of discomfort, disturbance, or other negative reactions to work occurring outside the 0.5-mile buffer, and in view of the active nest.
- After August 1, 2013 (i.e., after the local nesting season), Powertech will resume project-related activities within the 0.5-mile buffer to acclimate the resident bald eagles to operations.
 - Project activities will be delayed as necessary within the existing 0.5-mile buffer of BE1b to accommodate fledged eagles that may still be using the nest site as a staging area in 2013; a similar approach will be used for new activities scheduled to begin after August 1 in future years, as appropriate, though ongoing activities will remain in place, as approved, in those years.
 - Project operations in 2013 will include resumption of limited activities related to certain monitoring tasks that occurred prior to the nesting season, including well sampling, soil sampling, etc., and light duty vehicular traffic.
 - Project activities between the 2013 and 2014 nesting seasons also may include initiation of construction activities within the current 0.5-mile buffer, depending on the schedule of issuance of the large scale mine permit. Such activities may include monitoring well installation, soil sampling, site grading, and/or construction of the Dewey processing facility and associated ponds. However, if such activities are not initiated by December 1, 2013 (start of the winter roost season), activities conducted within the 0.5 mile buffer between December 1 and January 14, 2014 will be restricted to the hours between 0900 and 1500 to avoid disturbing bald eagles at winter roost sites. The 0.5-mile buffer will be used again

for the 2014 nesting season beginning January 15, with the buffer applied to any active nests in the BE1b territory. This approach also will apply in subsequent nesting seasons should construction activities not begin within the buffer area prior to December 1 of each year, until such time as project activities can meet the definition of continuous and ongoing activities prior to important seasons (nesting, winter roosting).

- Prior to each calendar year's construction activity, Powertech will provide a plan of the upcoming year's activities to the DENR, SDGFP, and USFWS. In addition, Powertech will provide courtesy copies to the DENR and SDGFP of the well field data packages that will be prepared for each ISR well field and submitted to NRC for review.
 - Powertech will use a phased approach to ensure that activities and surface disturbance occur nearest an active nest during the non-breeding season and move away from the nest as that time approaches each year. A similar approach will be used during the winter roosting season, as needed (i.e., based on the eagles' responses to activities).
- Project activities will continue to occur prior to the 2014 nesting season to expose the pair to a variety of operations and monitor their response, and allow them to develop a tolerance for increased levels of regular disturbance beyond those already occurring in the area (i.e., road and rail traffic, ranching operations, occupied residences, irrigation maintenance and monitoring, walk-in hunting access). Tolerance will be evident by failure to flush from and/or avoid use of perch sites and/or feeding areas during project-related activities; distances between such activities and eagle use sites/areas will be recorded to develop an appropriate buffer area for various operations and times of year.
- Assuming tolerance is achieved, activities will gradually be allowed to occur within the nest buffer during the breeding season, especially if they have been continuous (i.e., no stoppages greater than 2 weeks) and ongoing (i.e., occurring regularly for a minimum of 2 months prior to March 1 (nesting) or December 1 (winter roosts) of a given year). As stated, these proposed parameters are based on more than 30 years of observations of nesting golden eagles near active coal mines where substantially greater forms of regular disturbance (e.g., blasting) occur than are employed by ISR operations.
- Based on the eagles' response to, and documented tolerance of, various project-related activities, the buffer area (i.e., prohibited access area) around any active nest in the BE1 territory will be reduced to 0.25 mile during the two nesting seasons following initiation of construction activities. That distance exceeds both the recommendations in the National Bald Eagle Management Guidelines (USFWS 2007) and that of the Wyoming ESFO for acclimated golden eagle pairs at active coal mines, but still acknowledges the potential need for a greater buffer to account for the open terrain in the permit area.

- Due to the lengthy timeline needed to apply for and receive a federal eagle permit, and the typical multi-year issuance of such permits, Powertech will propose a 0.25-mile buffer in that application to be honored through at least the next two nesting seasons following initiation of construction activities.
 - Powertech understands that, depending on the eagles' response(s) to various disturbance activities during the non-breeding season, the company may need to honor a 0.5-mile buffer again during the first nesting season following the initiation of construction activities. That determination will be made in collaboration with the USFWS and SDGFP based on field data from the permit area.
- Buffer areas to be used beyond the second nesting season following the initiation of construction activities, and the associated need for state and/or federal permits, will be based on the BE1 pair's level of tolerance for project activities demonstrated through that nesting season, and will be developed in collaboration with the USFWS and SDGFP.
 - Should the bald eagles nest elsewhere without direct cause/effect, then no take will have occurred (regardless of whether or not the nesting effort is successful) and project activities can occur or continue, as appropriate.
 - If the eagle nest fails due to natural causes, even if disturbance is present, then no take will have occurred and project activities can occur or continue, as appropriate, regardless of whether the official stipulation period has ended.
 - Once fledged bald eagles have left the nest area (nest tree and corresponding buffer area), project activities can occur or continue regardless of whether the official stipulation period has ended.
 - No take will have occurred for project activities occurring outside prescribed nesting and winter roost periods but within previously defined buffers even if bald eagles are present during those times; this approach is in keeping with both current agency recommendations for protection from unauthorized "take" and the consensus to allow such activities to occur in order to begin or continue the acclimation process.
 - Additional mitigation measures for bald eagles will be the same as those for other nesting raptors, as described below.
 - Powertech will investigate and, if feasible, construct artificial nest structures beyond buffer areas to supplement bald eagle nesting options (though bald eagles may not use such structures and no bald eagle nests will be removed or relocated from the permit area).

7.1.2 Other Nesting Raptors

Powertech commits to implementing the following mitigation measures for any nesting raptor species in the wildlife survey area during all project phases: exploration, construction, ISR

operations, groundwater restoration, and reclamation/decommissioning. Because they apply to all known raptor nests, nest-specific measures are not necessary at this time. New nests will be incorporated into the measures outlined below as they are discovered. These measures will be updated and the Avian Plan amended, as necessary, to reflect new or changing circumstances. Environmental parameters referred to in the previous section for bald eagles will be applied to other nesting raptors, as needed.

Construction

- Consider nest buffers in building/construction plans.
- Provide as-built or record drawings to SDGFP depicting the locations of the processing facilities, ponds, well fields, header houses, access roads, power lines, and pipelines.
- Consolidate infrastructure (roads, power lines, buildings, etc.) that must be located within raptor nest buffers, where practicable.
- Site header houses at or beyond the outer extent of nest buffer areas where practicable.
 - Position access doors and lighting on the far (opposite) side of the building from nests (i.e., create a visual buffer between structure and nest).
 - Locate employee parking areas on far side of buildings.
- Drill Madison well(s) during the non-breeding season, locate the well(s) outside nest buffer areas, and/or consolidate well site(s) with other infrastructure.
- Minimize use, direction, and intensity of outdoor lighting that falls within nest buffer areas.
- Minimize lights in well fields that fall within nest buffer areas.
- Use current Avian Power Line Interaction Committee (APLIC 2006) recommendations for overhead power line construction to reduce the possibility of electrocution and collision (e.g., markers on lines over water or regular flight corridors, etc.).

Operations

- Schedule project activities within known nest buffer areas to occur during the non-breeding season when practicable.

- Buffer distance will be established for each active nest ranging from 660 feet to 0.5 mile, depending on species and screening options (terrain, trees, etc.).
 - Breeding season for red-tailed hawks in the permit area is generally March 1 through July 31 (TWC unpublished data).
 - Breeding season for great horned owls in the permit area is generally January 15 through July 31 (TWC unpublished data).
 - Breeding season for long-eared owls in the permit area is generally March 1 through July 31 (TWC unpublished data).
 - Breeding season for merlins in the permit area is generally April 1 through July 31 (TWC unpublished data).
 - Breeding season for other nesting raptors to be identified, as needed.
 - Prioritize construction of ponds to be located within buffer areas to be completed during non-breeding season and before other ponds located outside buffer areas.
 - Begin work closest to nest and move away as nesting season approaches, when practicable.
- Even for acclimated pairs, try to schedule operations within the buffer area associated with a known active raptor nest to avoid the most vulnerable periods (nest building, egg-laying, and early incubation).
- In areas where nesting has never been documented, conduct clearance surveys for ground-nesting raptors (e.g., northern harriers) prior to disturbing blocks of at least 10 contiguous acres during the breeding season.
- Conduct under the supervision of a qualified biologist.
 - Conduct no sooner than 1 week prior to disturbance from mid-March through mid-May to minimize opportunity for nesting to be initiated between completion of the search and start of disturbance activities.
 - Intent is to determine whether ground-nesting raptors are present prior to initiating disturbance.
 - If an active raptor ground nest is discovered during the clearance search, stop activities and contact the USFWS for guidance; notify SDGFP of situation.
- Schedule visits to header houses during daylight hours, when practicable (subject to seasonal variability).
- Use deep disposal wells instead of land application of treated wastewater, if sufficient capacity is available, to avoid potential impacts to prairie dogs (prey source for some raptor species).
- Authorize “stop work” authority to biologist if project activities are at risk of impacting nesting raptors.

- Park vehicles between nest(s) and foot traffic to create a visual buffer for activities (e.g., well fields, water monitoring, etc.).
- Encourage landowners to protect riparian corridors (regeneration areas) to promote nesting and winter roost habitat.
- Evaluate potential use of tree plantings/protection at land application catchment areas to promote nesting and winter roost habitat.

7.2 *Breeding Birds and other Avian Species of Interest or Concern*

The proposed mitigation program for migratory birds other than raptor species is described below, and reflects the consensus reached at the December 28, 2012 agency meeting for this project (refer to attached meeting notes).

- Implement an avian deterrent system (hazing system or physical deterrent such as netting or “bird balls”) in ponds with dual synthetic liners (i.e., ponds storing untreated water or used in the water treatment process).
- Provide an avian deterrent system in ponds with single synthetic liners (i.e., ponds storing only treated water) if the water quality exceeds trigger values established in the large scale mine permit.
- Operate land application systems such that applied water does not accumulate in catchment areas during normal operations (i.e., dry conditions).
- Dewater catchment areas associated with land application systems if the water quality exceeds trigger values established in the large scale mine permit.
- Routinely monitor water quality in ponds without avian deterrent systems and catchment areas and implement mitigation measures if trigger values are exceeded.
- Schedule surface disturbance activities during the non-breeding season to the extent practicable.
- If disturbance cannot occur outside of the breeding season, conduct clearance surveys for ground-nesting species prior to disturbance blocks of at least 10 contiguous acres using parameters described above for ground-nesting raptors.
- Design sediment ponds and any areas that could accumulate water to avoid wildlife entrapment.
- Use reclamation standards that, among other things, coincide with current recommendations to enhance sage-grouse habitat, such as: limiting the expansion or dominance of invasive species (cheatgrass, etc.); maintaining or improving soil

stability, hydrologic function, and biological integrity; and complying with vegetative cover and species diversity requirements in the large scale mine permit for reclaimed areas.

7.3 *Prey Abundance*

- Monitor prey populations annually through lagomorph surveys and mapping of active prairie dog colonies within the permit area.
- Avoid use of Rozol for prairie dog control when bald eagles are present in the area, and encourage landowners to minimize/avoid its use for prairie dog management (e.g., use zinc phosphide or other options).
- Track prairie dog management efforts (poisoning, shooting, chemical applications, others) in and within 1.0 mile of the permit area.
- Consider landowner incentives to retain some level of prairie dogs in/near the permit area.
- If land application is used to dispose of treated wastewater, Powertech will sample prairie dogs annually and analyze samples for selenium and other constituents of concern according to a sampling and analysis plan approved by the DENR and SDGFP.

8.0 AVIAN PLAN REVISIONS

Powertech may revise this Avian Plan to incorporate new species or operational changes (facility siting, procedures, etc.) as needed. Powertech will first contact the SDGFP and DENR to solicit their opinion regarding the need to revise the entire plan; the USFWS also may be asked for guidance. If the agencies determine that a full revision is necessary, a revised document will be submitted to the appropriate personnel for approval. A letter documenting approval of the initial Avian Plan and all subsequent revisions will be included in the large scale mine permit.

Minor deviations in monitoring or mitigation strategies outlined in the Avian Plan may be made with written concurrence from the SDGFP and DENR without amending the full document. Such deviations could include the timing and/or location of certain activities or mitigation measures. Deviations of that nature could be necessitated by changes in raptor activity (e.g., discovery of new nesting species) or similar circumstances. An efficient process for addressing the need for minor deviations in monitoring and mitigation strategies will allow Powertech to adapt those measures to changing conditions and best accommodate the affected

species. In the event that such minor deviations are approved by the SDGFP and DENR, documentation of that approval will be included in the large scale mine permit.

All monitoring and mitigation activities will be detailed in annual reports to the appropriate state and/or federal agencies per reporting and permit requirements.

9.0 RELEVANT QUALIFICATIONS OF PRINCIPAL BIOLOGIST

Ms. McKee has an M.S. in Wildlife Management/Ecology from the University of Missouri-Columbia. She has more than 27 years of professional experience, plus several more years of graduate work, spanning the U.S. from Alaska to Florida. The bulk of her experience has focused on raptor biology, management, and mitigation.

Among other things, Ms. McKee has at least 14 years of experience conducting regular time-budget observations at bald eagle and golden eagle nests; 13 of those 14 years have been in northeastern Wyoming and western South Dakota. She also has 9 years of experience supervising the artificial incubation of numerous eggs and hand-rearing of young (using both imprinting and non-imprinting techniques) from various raptor species, many of which were later released as part of state or regional reintroduction programs (also under her direction). Those efforts included 5 years supervising the collection and incubation of more than 100 bald eagle eggs, and rearing of the young eagles for use in a multi-state reintroduction program. The latter duties included collecting eggs from natural nests in Florida and Tennessee, safely transporting the viable eggs by motor home or other overland means to rearing facilities in other states, and ultimately hacking and radio-tracking the young eagles retained for the local reintroduction program. Ms McKee also supervised hacking of young bald eagles in Missouri for 1 season.

In addition to these efforts, Ms. McKee has monitored a wide range of nesting raptor species associated with various energy and/or mineral projects in northeastern Wyoming, southeastern Montana, and western South Dakota for the last 20 years (1994 through 2013). She has participated in numerous raptor mitigation projects since 1994, and has supervised the planning and implementation of mitigation measures for seven different raptor species since 2000 (including acquisition of appropriate state and federal permits). Ms. McKee is often contacted by regional USFWS permitting staff regarding the feasibility of other operator's proposed mitigation measures, and is considered an expert in raptor monitoring and mitigation measures.

10.0 REFERENCES

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ATTACHMENT 1: Compiled notes from December 28, 2012 Agency Meeting

Attendance:

Agency	Name	Email	Phone
USFWS	Charlene "Charlie" Bessken	Charlene_bessken@fws.gov	605-224-8693
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SDGFP	Stan Michals	Stan.Michals@state.sd.us	605-394-2589
SDGFP	Eileen Dowd Stukel	Eileen.dowdstukel@state.sd.us	605-773-4229
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SDDENR	Mike Cepak	Mike.Cepak@state.sd.us	605-73-4201
Powertech	John Mays*	jmays@powertech.com	303-242-4054
Powertech	Mark Hollenbeck	MarkHoll@gwtc.net	605-685-3376
TWC	Gwyn McKee	gwyn@vcn.com	307-686-6178
WWC	Jack Fritz*	jfritz@wwcengineering.com	307-672-0761

* Participated by phone

Summary Notes:

General Operations:

- Header house visits 2x/day (generally could be scheduled during daytime).
- Will try to use deep well vs. pivot irrigation for waste water when possible (land application permit condition will not allow pivot irrigation if sufficient capacity is available in deep wells).
- Pivot irrigation will result in ~1.6 feet (19 inches) of water per year.
- First project disturbance near eagle nests late summer/early fall 2013.
- Some prairie dog impacts/removal via topsoil stripping and in water catchment areas.
- 440 total acres to be disturbed within 10,580 acre project area under land application option; much less acreage affected under deep disposal well option.
- 10-15 acres of "heavy" surface disturbance annually (i.e., well field construction).
- Emergency cut-off switches with remote monitoring/control.

Avian Management Plan (contents, etc.):

- DENR condition of permit will be to have an Avian Monitoring/Mitigation Plan approved by DENR and SDGFP.
 - SD USFWS will also review the plan, but does not have to "approve" it for overall permit condition/approval.
 - Draft plan will be sent to all three agencies for review and input.

- Apply for USFWS Non-purposeful Take Permit to cover bases?
 - SD USFWS recommends both Avian Protection plan and permit application.
 - Allows disturbance to occur within prescribed buffer during nesting season.
 - Identify “benefit” in application. Although it still needs to be determined whether the state of SD will allow a Take permit, the federal permit could be applied for independently, understanding that the federal permit will not be valid unless the state issue is resolved.
- Plan is to be developed regardless of pursuit of federal “Take” permit.
- Avian plan incorporated into Large Scale Mine Application.
- Powertech will need to get landowner cooperation on avian plan.
- Plan will address all project phases (exploration, surveys, construction, production).
- Plan will include commitment to consolidate infrastructure (roads, power lines, buildings, etc.) within bald eagle buffer where practicable.
- Plan will address whether biologists will have “stop work” authority.
- Includes Raptors (subsection for bald eagles) and Migratory Birds.
 - Raptors
 - Bald Eagles
 - Agency consensus is to give the eagles a chance to acclimate to project activities.
 - Confirm SD USFWS requirement for bald eagle nest buffer distance.
 - Plan will NOT include options for nest removal/relocation from project area.
 - Identify/map natural alternate nest sites in and beyond buffer area.
 - Identify and map specific, regular winter roost sites to protect from future disturbance.
 - Create alternate bald eagle nest sites beyond buffer using platforms, although similar efforts elsewhere have apparently not resulted in bald eagle pairs relocating to artificial, alternate sites.
 - Monitoring of bald eagles
 - ❖ Pre-disturbance (1-year or more out)
 - ✓ Increased monitoring during sensitive periods
 - ✓ Monthly monitoring (biologist): August – February
 - ✓ Tri-weekly monitoring (biologist): March – mid-April
 - ✓ Bi-weekly monitoring (biologist): mid-April-July
 - ✓ Post-storm site visits ASAP if actively nesting (biologist)

- ✓ Supplemental observations during each site visit (Powertech personnel)
- ✓ All observations recorded during each site visit (all personnel)
- ✓ Develop protective guidelines
- ❖ Immediately Before (< 1 year out) and During disturbance
 - ✓ Increased monitoring during sensitive periods
 - ✓ Bi-weekly monitoring (biologist): December – Mid-March
 - ✓ Weekly monitoring (biologist): Mid-March – May
 - ✓ Bi-weekly monitoring (biologist): June – August
 - ✓ Monthly monitoring (biologist): September - November
 - ✓ Post-storm site visits ASAP if actively nesting (biologist)
 - ✓ Supplemental observations during each site visit (Powertech personnel)
 - ✓ All observations recorded during each site visit (all personnel)
 - ✓ Participation in preconstruction planning(biologist)
 - ✓ Documentation of activity in buffer
 - ✓ Development protective guidelines
- ❖ Operational Monitoring
 - ✓ Develop/commitment to annual planning strategies for buffer
 - ✓ Screening techniques within buffers
 - ✓ Mitigation
 - ✓ nest monitoring
 - ✓ biologist on site during(specify) activities
 - ✓ biweekly, monthly, storm, incident monitoring protocols
- Trail cams in nest tree?
- Training materials for Powertech personnel (bird books, laminated photos, power point, etc.).
- Other Raptor Species
 - Annual monitoring of all known raptor nests within permit area and 0.5-mile perimeter.
 - Annual searches for new nests within 0.5 mile of current year disturbance and proposed disturbance for following year.
 - Surface disturbance during non-breeding season to extent practicable.
 - If disturbance cannot occur outside breeding season, conduct clearance surveys for ground-nesting species prior to disturbance blocks of at least 10-15 contiguous acres.
- General actions to avoid “take” during raptor nesting, foraging, roosting
 - Timing of surface disturbance.
 - Header houses sited at or beyond buffer area to the extent practicable, with doors and lights opposite nest(s).
 - Timing of house visits (seasonal variations in time of day, etc.).

- Use of vehicles for visual buffer of foot traffic in well fields.
- Madison well can be drilled during non-breeding season and/or well location may be moved out of buffer or closer to other infrastructure for consolidation.
- Use of current APLIC recommendations for overhead power line construction to reduce possibility of electrocution and collision (markers on lines over water, regular flight corridors, etc.).
- Work within buffer during non-breeding season to extent practicable (buffer = 0.125-0.5-mile from nest site, depending on species, terrain, and tree cover).
- Surface disturbance in project area during non-breeding season to extent practicable.
- To extent practicable, begin disturbance closest to nest(s) and move away as nest season approaches.
- Prioritize construction of ponds located within nest buffers to occur during the non-breeding season; ponds outside buffers can be built any time.
- Plant, Header House, and Staging/Construction areas:
 - ❖ Consider nest buffers in all building/construction plans
 - ❖ Employee parking on far side of buildings
 - ❖ Access doors on far side of buildings
 - ❖ Lighting over doors on far side of buildings
 - ❖ No lights in well fields
 - ❖ Minimize direction and intensity of outdoor lighting
 - ❖ Commit to providing as-built plans to SDGFP
- Include all known nest sites in initial plan with mitigation needs and proposed options for each nest, along with commitment to update plan as needed to include new nests found during annual searches.
- Landowner incentives to protect riparian corridor (regeneration area).
- Tree plantings/protection at retention ponds for regenerations.
- Monitor local prey abundance
 - Prairie dogs
 - ❖ Map colonies within 1.0-mile of project area
 - ❖ Avoid use of Rozol by Powertech and work with landowners to minimize/avoid its use for prairie dog management (use zinc phosphide, etc.)
 - ❖ Monitor local populations (active/inactive, burrow density)
 - ❖ Monitor selenium levels
 - ❖ Track management efforts (poisoning, shooting, others)
 - ❖ Landowner incentives to retain some level of prairie dogs in/near project area
 - Other prey species?

- Migratory Birds
 - Work with SDGFP to determine whether avian protection measures are needed and what type of measure will be used for each type of pond (e.g., netting, hazing system, bird balls).
 - Effluent monitoring – commit to extra protection measures to protect birds if monitoring indicates “hot” water in ponds.
 - Surface disturbance during non-breeding season to extent practicable.
 - If disturbance cannot occur outside breeding season, conduct clearance surveys for ground-nesting species prior to disturbance blocks of at least 10-15 contiguous acres (vs. annual breeding bird surveys via belt transects).
 - Include wildlife escape ramps and appropriate (e.g., small mesh near ground) exclusion fences in and around ponds (this information may also be included in the Large Scale Permit application).

MISC Items not included in Avian Plan:

- Bald eagle may be recommended for delisting from SD state list in 2013.
- Consider smaller mesh fencing for bottom 3 feet around ponds to exclude small mammals.
- Draft SEIS is out for review; USFWS is currently reviewing.
- No federal T&E species, so no ESA issues.
- Need SD state concurrence for federal eagle permit.
- If eagles nest elsewhere without direct cause/effect, then no “take” (regardless of whether or not nesting effort is successful).
- If eagle nest fails due to natural causes, even if disturbance present, then no “take.”
- SD Breeding Bird Atlas fieldwork concluded in 2012; analysis and write-up may provide current data for species in project area (follow up on timeline for write-up).
- Aquatic monitoring in response to events on Beaver Creek (fish, invertebrates).