Chokecherry and Sierra Madre Wind Energy Project

Erosion Control Plan

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1.0INTRODUCTION

Power Company of Wyoming LLC (PCW) proposes to construct, operate, maintain and decommission the Chokecherry and Sierra Madre Wind Energy Project (CCSM Project), located in Carbon County, Wyoming. The CCSM Project consists of up to 1,000 wind turbines capable of generating approximately 2,000 to 3,000 megawatts (MW) of clean, renewable wind energy. The primary components of the CCSM Project include the wind turbine generators, an internal road network, a rail facility, a quarry, an internal electrical collection and transmission system, substations, and operations and maintenance buildings.

The CCSM Project is located south of the city of Rawlins, primarily within the bounds of the Overland Trail Ranch (Ranch). The Ranch is owned and operated by PCW affiliate, The Overland Trail Cattle Company LLC (TOTCO). The Ranch is situated within an area of alternating sections of private and federal lands commonly referred to as the "checkerboard." The vast majority of the private lands are owned by TOTCO and the federal lands are administered by the Bureau of Land Management (BLM) Rawlins Field Office (RFO). A small percentage of the land within the Ranch is owned by the State of Wyoming and is administered by the State Board of Land Commissioners. Finally, Anadarko Land Corporation owns some sections located on the periphery of the northwest boundary of the Ranch.

In 2008, PCW applied to BLM for right-of-way grants to construct, operate, maintain and decommission the CCSM Project on federal land within the CCSM Project Site. On June 29, 2012, the Notice of Availability for the Final EIS concerning the CCSM Project was published in the Federal Register (77 FR 63328). On October 9, 2012 the Secretary of the Interior signed the Record of Decision (ROD). In the ROD, BLM determined that over 200,000 acres within the CCSM Project Site are suitable for wind energy development subject to the requirements described under the Selected Alternative in the ROD. The area that was determined to be suitable for wind energy development consists of two wind development areas (WDAs) in which turbines would be located. The northern WDA is known as Chokecherry and the southern WDA is known as Sierra Madre. The WDAs are located approximately 9 miles apart.

Prior to issuing right-of-way grants for the CCSM Project, BLM will conduct subsequent environmental analysis of site-specific plans of development submitted by PCW. The site-specific plans of development will be screened against the analysis conducted in the EIS and the requirements described under the Selected Alternative in the ROD. PCW anticipates submitting five (5) site-specific plans of development to BLM, consisting of the following:

1. Phase I Haul Road and Facilities
2. West Sinclair Rail Facility
3. Road Rock Quarry
4. Phase I Wind Development
5. Phase II Wind Development (including Phase II Haul Road and Facilities)

This Erosion Control Plan (Plan) for the CCSM Project provides an overview of the erosion control goals, standards, methodologies and methods that will be used during the construction,

operation, maintenance and decommissioning of the CCSM Project. PCW will avoid and minimize erosion where possible and will use erosion control measures as needed to meet all applicable rules, regulations, and requirements for the CCSM Project. Upon concurrence from the BLM Authorized Officer, PCW will update and modify this Plan as needed to address the changing conditions and requirements of the CCSM Project.

This Plan defines methodologies for determining erosion potential and options for minimizing erosion. Common procedures, methods, and monitoring and reporting requirements for erosion control are also discussed along with the appropriate use of erosion control measures. Details on how erosion control measures will be applied to each CCSM Project component are provided in the Storm Water Pollution Prevention (SWPP) Plan for each site-specific plan of development.

The CCSM Project will have multiple Wyoming Pollutant Discharge Elimination System (WYPDES) permits and activity-specific SWPP Plans due to the complexity of the CCSM project and the scope of the WYPDES permits. Most of the CCSM Project activities will be authorized under the Wyoming Department of Environmental Quality (WYDEQ) general WYPDES permit WYR10-0000. The Road Rock Quarry will likely be covered under the WYDEQ General Permit WYR320000 for Mineral Mining Activities. Refer to the SWPP Plans included in each site-specific plan of development for additional details.

2.0EXISTING CONDITIONS

The existing conditions on the CCSM Project Site that may affect the potential for erosion include geology, soils, and vegetation. These conditions are described below.

2.1 GEOLOGY

According to Chapman et al. (2004), surface geology in the area of the CCSM Project consists of Quaternary alluvium, colluvium, outwash deposits, and eolian deposits derived from Tertiary and Cretaceous claystone, sandstone, and sedimentary rock (majority of CCSM Project Site); and Quaternary alluvium and colluvium, gravel and fan deposits, and areas of active and stabilized dune sand and loess underlain with Tertiary and Cretaceous siltstone, sandstone, claystone, and areas of shale marlstone (northeast portion of the Chokecherry Wind Development Area). Geologic units underlying the CCSM Project Site include Quaternary alluvium, intermixed Steele Shale and Niobrara formations, Mesa Verde Group, Steele Shale and small amounts of Frontier, Mowry and Thermopolis Shales.

2.2 SOILS

Soils within the CCSM Project Site are primarily derived from sedimentary formations and are predominantly Orthents; soils that are shallow to very deep and medium to fine textured and have a frigid temperature regime, an aridic moisture regime, and mixed or bentonitic mineralogy. The CCSM Project Site is located in an arid environment that contains potentially erosive soils. Surface disturbing activities may result in exposed soils, accelerated soil erosion, and reduced soil productivity.

Soils in the northern third of the CCSM Project Area are derived from shale, sandstone, and weathered remnants (i.e. residual soils) of the Mesaverde Group and Steele Shale. The most commonly encountered soils include the Rentsac, Blazon, and Diamondville series (BLM 2012a). Based on geotechnical testing, soils are very shallow to deep and are generally described as medium dense to very dense or soft to hard with occasional sub-rounded to sub-angular gravel, slight ferrous staining, intermittent sandstone seams and layers, and few sandstone fragments.

Soils within the Sage Creek Basin portion of the CCSM Project Site are composed of alluvium underlain by Upper Cretaceous Aged Steele Shale (Fugro 2013). The most commonly encountered soils include the Wellsville, Echemoor, and Lupinto series (BLM 2012). Based on geotechnical testing, soils are moderately deep to deep and are generally described as soft to hard with occasional sub-rounded to sub-angular gravel and slight ferrous staining.

Soils within lower Miller Hill are generally composed of alluvium while the slopes of Miller Hill are generally composed of highly to slightly weathered sandstone of the Niobrara Formation, shale of the Frontier, Mowry, and Thermopolis Shale, and interbedded sandstone and shale of the Browns Park Formation (Fugro 2013). The most commonly encountered soils include the Wellsville, Echemoor, and Lupinto series (BLM 2012).

2.3 VEGETATION

Vegetation in the CCSM Project Site is characterized by areas of rolling sagebrush steppe, salt desert shrub basins, and foothills shrubland. Aspen-mixed conifer woodland, upland grasslands and sparsely vegetated communities are also present. Plant surveys were conducted in the CCSM Project Site in 2009 and confirmed during 2012 and 2013 survey efforts.

Sagebrush steppe is the most common vegetation type in CCSM Project Site and is the predominant vegetation type in the Nevins Ridge and Upper Miller Hill turbine development areas. Sagebrush steppe is also common in the Lower Miller Hill turbine development area. Scattered sagebrush communities are also present in the flats north of Chokecherry and in the Sage Creek basin where the community is intermixed with salt desert shrub communities and along drainages. Sagebrush habitats in the CCSM Project Site consists of a mosaic of sagebrush, allied shrubs and forbs, and grasses and is dominated or codominated by one or more Artemisia species, such as Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). In higher elevations, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) is present. Sagebrush communities occur across approximately 60% of the CCSM Project site

Salt-desert shrub communities are the second most common vegetation and occur across approximately 20% of the CCSM Project Site. Salt desert shrub communities are characterized by salt tolerant plants with a dominant shrub component of one or more *Atriplex* species such as Gardner's saltbush (*Atriplex gardneri*) or shadscale (*Atriplex confertifolia*) and are often codominant with birdsfoot sagebrush (*Artemisia pedatifida*), black greasewood (*Sarcobatus vermiculatus*), or other allied shrub and herbaceous species. These communities

primarily occur in the northern flats north of the Chokecherry Wind Development Area, in the Sage Creek Basin, and in saline soils in the Lower Miller Hill area. Salt Desert Shrub Communities also occur along the North Platte River water extraction road in the eastern portions of the Chokecherry Wind Development Area.

Sparsely vegetated and barren communities are scattered throughout the CCSM Project area Sparsely vegetated and barren communities occur across 4-5% of the CCSM Project Site. These communities primarily occur in association with salt-desert shrub communities although sparsely vegetated areas also occur in association with sagebrush communities especially in windswept areas or areas with shallow soils. Vegetation is generally characterized by a patchy distribution of upland sedges and cushion plants and mat-forming forbs composed of stemless mock goldenweed and one or more phlox species such as spiny phlox or prickly phlox. Various buckwheat species (*Eriogonum* spp.) and pricklypear (*Opuntia* spp.) often codominate these barren landscapes, but cover is minimal.

Aspen woodlands and mixed-conifer forests occur at elevations greater than 7,500 feet in the southwestern portions of the CCSM Project Site below the rim of Miller Hill. These communities occupy less than 2% of the CCSM Project Site. The predominant overstory vegetation is an open-canopy of quaking aspen, with a dense understory of forbs, grasses, and scattered montane shrubs.

Montane shrublands cover approximately 1% of the CCSM Project Site, predominantly located in the southern and southwestern portions at elevations ranging between 7,200 to 8,100 feet. These systems are typically associated with dry, exposed sites and are often in the uplands adjacent to aspen communities. Inclusions of sagebrush steppe or grassland often occur, but the vegetation is typically dominated by a variety of shrubs including serviceberry, mountain mahogany, common juniper, currant, snowberry, creeping barberry, antelope bitterbrush.

Upland grasslands occur throughout the CCSM Project Site although the Chokecherry Wind Development Area has a greater occurrence of contiguous grassland cover. These communities typically occur between 6,500 to 8,400 feet in elevation and occur across approximately 7% of the CCSM Project Site. The vegetation is characterized as mixed-grass prairie on gentle to moderate slopes (0–20%), growing on drainage terraces, draws, alluvial flats and plains, escarpments, gulches, hillslopes, knobs, knolls, bluffs, and plateaus. Upland grasslands form a matrix with the surrounding sagebrush steppe, creating a mosaic landscape of rolling grasslands interspersed throughout sagebrush communities.

Remaining vegetation communities include lowland mesic grasslands and riparian communities, agricultural pastures and hay meadows, disturbed/developed areas.

3.0DETERMINATION OF EROSION POTENTIAL

Surface-disturbing activities associated with the construction, operation, maintenance and decommissioning of the CCSM Project may result in exposed soils and accelerated soil erosion. PCW has surveyed the CCSM Project Site to identify areas of increased erosion potential (SWCA 2013). Generally, the surveyed areas are stable or have only slight erosion

potential. Areas having moderate, critical, or severe erosion potential are generally associated with steep slopes or unstable areas adjacent to previously developed areas and roadways. More than 1,500 erosion potential data points (Table 1) were collected at turbine locations, road intersections, drainage crossings, or areas of obvious erosion. Of these data, 90.6% were classified as being stable or having only slight erosion potential, 8.6% were classified as having moderate or critical erosion potential, and only 0.8% were classified as having severe or extremely severe erosion potential (Table 2). All areas across the CCSM Project Site generally had stable conditions (Table 1 and Table 2).

This Plan, in conjunction with the measures included in the ROD and the SWPP Plan for each site-specific plan of development, will control erosion to minimize impacts to the soil resource, surrounding watersheds, and rangeland. The SWPP Plans for each site-specific plan of development address the anticipated erosion prevention, sedimentation controls, and runoff controls and designs to mitigate the erosion risk during construction. The SWPP Plans include existing conditions of the CCSM Project Site, the activities associated with the WYPDES permit, and the requirements of federal, state, and local permits. The SWPP Plans include best management practices appropriate for each site and activity.

Table 1. Number of surveyed locations in each development area associated with each erosion potential category.

Development Area	Erosion Potential Category		
	Stable/ Slight	**Moderate/ Critical**	**Severe/ Extremely Severe**
Phase I Haul Road and Facilities	139	15	3
West Sinclair Rail Facility	20	2	0
Road Rock Quarry	12	3	0
Phase I Wind Development	1404	130	13
Phase II Wind Development[2]	TBD	TBD	TBD
Total[1]	**1446**	**137**	**13**

Notes: 1. Total is not the sum of the erosion potential across all sites as presented in the table. Because of overlap in project component locations, some erosion data points were used to characterize multiple development areas.
2. TBD = To be determined, Erosion Potential for the Phase II Wind Development will be evaluated and reported in a subsequent update to this Plan.

Table 2. Percent of surveyed locations in each development area associated with each erosion potential category.

Development Area	Erosion Potential Category		
	Stable/ Slight	**Moderate/ Critical**	**Severe/ Extremely Severe**
Phase I Haul Road and Facilities	88.5%	9.6%	1.9%
West Sinclair Rail Facility	90.9%	9.1%	0.0%
Road Rock Quarry	80.0%	20.0%	0.0%
Phase I Wind Development	90.8%	8.4%	0.8%
Total	**90.6%**	**8.6%**	**0.8%**

4.0EROSION CONTROL MEASURES

PCW will implement the erosion control measures described below, as appropriate, to control erosion on the CCSM Project Site. The SWPP Plan for each site-specific plan of development includes additional information on the application of best management practices for erosion control.

4.1 CCSM PROJECT DESIGN

PCW has designed the CCSM Project to minimize the overall disturbance, as well as to avoid disturbance in unstable areas to the extent practicable. The avoidance and minimization measures applicable to erosion control are described in Appendix D to the ROD. These measures were implemented on the CCSM Project as described in Appendix A to each site-specific plan of development. By minimizing disturbance and avoiding unstable areas, PCW will preserve existing vegetation and reduce the potential for erosion to occur. The limits of disturbance for each CCSM Project feature, such as the roads, rail, laydown yards, turbine pads, etc., are shown on the issued for permit plans included in each site-specific plan of development. Where disturbance could not be avoided, PCW has characterized the erosion potential, as summarized in section 3.0, to identify appropriate erosion control measures. The range of erosion control measures that will be used on the CCSM Project is described in section 4.2 and the implementation of these measures is detailed in the SWPP Plan for each site-specific plan of development.

4.2 EROSION CONTROL MEASURES

The CCSM Project has been designed to avoid potential erosion to the extent practicable. Where erosion risk is unavoidable, PCW has designed the CCSM Project to incorporate erosion control measures commensurate with the level of remaining risk. Table 3 lists erosion control measures that will be used on the CCSM Project, as appropriate. Specific erosion

control measures applied to the CCSM Project components are discussed in the SWPP Plan for each site-specific plan of development.

Table 3. Erosion Control Measures for the CCSM Project

Measure	Common Usage
CCSM Project Design	Minimize soil disturbance, including disturbance of unstable areas
CCSM Project Schedule	Minimize duration of soil exposure prior to stabilization.
Straw Wattles/Biorolls	Place down gradient from disturbed areas to capture suspended sediment.
Silt Fence	Place down gradient from disturbed areas to capture suspended sediment. Options may also include wire backed silt fence where appropriate.
Rock (Aggregate) Surfacing	Install on CCSM Project roads and where construction access intersects public roads.
Riprap	Install at culvert outlets, ditch intersections, and similar drainage points to prevent scour by decelerating water.
Dewatering	Install temporary pumps to remove accumulated water in initial (short-term) disturbance where positive drainage cannot be achieved.
Mulch Cover	Cover reseeded areas with straw or hay to minimize runoff until vegetation established; may require disc-anchoring or use of tackifier.
Erosion Control Blanket	Cover reseeded areas where additional stabilization support is needed (such as steep slopes, ditches, swales).
Rock Cover/Rock Mulch	Install for temporary stabilization of subsoil stockpiles and final stabilization of areas that were too rocky for vegetation in their native condition.
Sediment Basin	Construct to collect stormwater runoff from active portions of the Quarry extraction area to reduce turbidity prior to release.

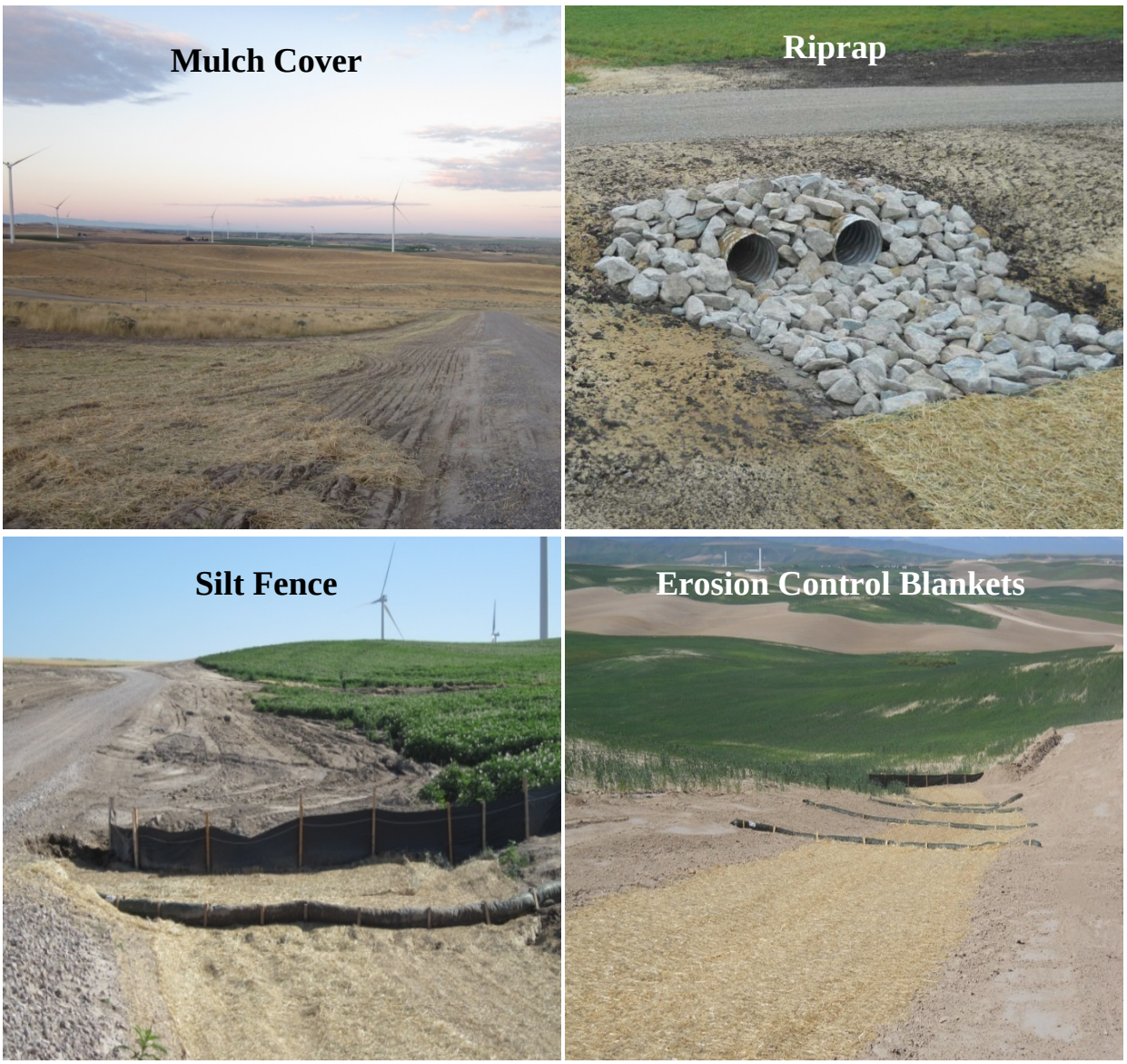

Figure 1. Typical Erosion Control Measures

5.0EROSION MONITORING AND MAINTENANCE

PCW will monitor the CCSM Project Site to insure that erosion control measures are installed as needed and functioning properly, as described in the Environmental Construction and Compliance Plan for the CCSM Project and the SWPP Plan for each site-specific plan of development.

During the CCSM Project's construction, operations, and decommissioning, PCW will continue to monitor the site to identify any new or unforeseen areas of erosion. Additional diligence will be given to locations of greater erosion risk due to steep slopes, sparse vegetation, or highly erosive soils. Should instances of new erosion be observed, PCW will

mitigate the erosion occurrence as soon as practicable utilizing the erosion control techniques contemplated herein in compliance with all applicable plans and permits. The scope of each inspection has been detailed in the Project SWPP Plans.

While erosion control measures are in place, PCW (or its delegate) will perform regular inspections of the erosion control measures. Inspections will be done as detailed in the Project SWPP Plans. Generally the inspections will be performed routinely on 14 day intervals and within 24 hours of a 0.5-inch rainfall occurring within a 24 hour period. The inspections for the quarry are planned on a quarterly basis with an inspection to be completed after larger rainfall events (1.0 inch within 24 hours) within 48 hours after the event. The inspections will be performed by qualified personnel based on their previous experience and project specific training as detailed in the Project SWPP Plans.

Most erosion and sediment control measures require routine maintenance to maintain effectiveness. As part of the inspection of erosion control measures, PCW will perform any necessary maintenance to ensure the measures are operating per their design requirements. Guidelines for when to schedule maintenance based on the condition of the BMP and the necessary timeframes or intervals for maintenance are detailed in the Project SWPP Plans.

Should some measures require extensive or frequent maintenance, PCW may elect to utilize alternative erosion control techniques to better meet the site needs. Any such alternative techniques shall be in compliance with all applicable plans and permits for the CCSM Project.

6.0DETERMINATION OF EROSION CONTROL COMPLETION

As reclamation of the CCSM Project progresses, PCW will phase out the use of erosion control measures where appropriate. Following removal of erosion control measures, monitoring of the CCSM Project Site will continue until stabilization and revegetation have been achieved as defined in the SWPP Plan and WYPDES permit. Once the revegetation requirements of the SWPP Plan are met, inspections and permit coverage for the WYPDES permit will terminate. On federal lands, monitoring of the CCSM Project Site will continue until the requirements of the CCSM Project Master Reclamation Plan and each site-specific Reclamation Plan are met.

7.0 REFERENCES

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