

**OTTER CREEK MINE
BASELINE REPORT 306A
PRIME FARMLAND INVESTIGATION REPORT**

Prepared for:

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BASELINE REPORT 306A
PRIME FARMLAND INVESTIGATION

MDEQ-ARM Cross Reference Checklist:

Baseline Report 306A: Baseline Prime Farmland Investigation Report, Otter Creek Mine

ARM 17.24.306 Subsection:	Location of Required Information:
(1) The application must contain the results of a prime farmland investigation developed in consultation with the U.S. natural resources conservation service to determine whether lands within the proposed permit area are prime farmlands as defined in ARM 17.24.301.	Section 2.1, NRCS Letter, attached
(2) If the lands in question have not "historically been used for cropland" as that term is defined in ARM 17.24.301, the applicant must submit a request for a negative determination for these lands with documentation supporting this request.	Section 2.1 and 2.3
(3) If the lands in question have historically been used for cropland, the applicant shall, in consultation with the Montana state office of the U.S. natural resources conservation service, determine if any soils, characterized and described in accordance with ARM 17.24.304(1)(k), on these lands meet the criteria of prime farmlands as contained in 7 CFR 657;	Section 2.1, NRCS Letter, attached
(a) Whenever a determination is made that the soil survey of lands within the proposed permit area identifies soils that meet the criteria of prime farmlands, the applicant shall indicate the reasons for this determination and shall include materials in the application showing compliance with ARM 17.24.324.	Not Applicable
(b) When the soil survey for lands within the proposed permit area does not identify soils that meet the criteria for designation as prime farmland, the applicant shall submit a request for negative determination for these lands with reasons supporting this conclusion.	Sections 2.1 and 2.3

1.0 Introduction and Methods

Determinations of candidate Prime Farmland soils were derived from existing NRCS Soil Data (NRCS, 2010) and several of the Otter Creek Coal Baseline Reports including: the Soils Baseline (Report 304L), the Land Use Baseline (Report 304M), and the Hydrology Baseline (Report 304E). Information from these sources was used to determine dominant soil properties and land use for soils listed as potential Prime Farmlands by the NRCS. Prime Farmland soils are described under Part 657 of the U.S. Code of Federal Regulations as (GPO, 2012):

“Areas that have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.”

Some valley bottom hayland areas have a naturally enhanced soil moisture regime to varying extent resulting from irregular seasonal inundation as a result of snow melt and/or spring rainfall, a high water table, or both. There are no developed irrigation systems other than spreader dikes in some areas to detain and infiltrate spring runoff. Neither flood irrigation by diversion of stream flow nor sprinkler irrigation is practiced during the growing season. Hence, there is no active application of water during the growing season in and adjacent to the floodplains of Otter Creek and three of its major tributaries - Home Creek, Threemile Creek and Tenmile Creek - in the vicinity of the Otter Creek coal tracts.

The NRCS Service Center office in Miles City, MT was contacted regarding the presence of Prime Farmlands within the Study Area. The soil series shown on Table 1 below were listed as Prime Farmland Soils in the most recent update to the NRCS Powder River Area Soil Survey (NRCS 2010). The soils listed below are classified as Prime Farmland soils if: 1) the areas containing these soils are irrigated through surface applications or via sub-irrigation and 2) have historically been used for cropland.

Table 1. Soils in Study Area listed as Candidate Prime Farmland Soils by the NRCS.

NRCS Soil Map Symbols	Prime Farmland Candidate Soils	Slope
Be	Bew silty clay	2-4%
Fr	Fort Collins silt loam	2-4%
Ha, Hc, Hd, He	Haverson loam, silt loam, silty clay loam and silty clay	Not listed (Generally 0 -4%)
Hh, Hk	Heldt silty clay loam	0-4%
Hn, Ho	Hesper silty clay loam	0-4%
Mc, Md	McRae silt loam	0-4%

2.0 Results

Candidate Prime Farmland soils are located within the Study Area on lower terraces of the Otter Creek, 10-Mile Creek, and Home Creek floodplains (Report 304L, Plate 1). These candidate soils constitute approximately 18% of the Study Area.

2.1 Prime Farmland Soils

All of the soils classified as Prime Farmland soils by the NRCS are classified as such only if irrigated. Some fields within the Study Area contain spreader dikes to distribute floodwaters across the lower stream terraces during spring runoff or other high flow events. There is no active application of water during the growing season. Many of the agricultural fields on lower stream terraces are influenced by sub-irrigation within the rooting depth of floodplain soils. However, the effectiveness of sub-irrigation is limited by elevated salinity (including sodium) in ground water (Baseline Report 304E – Hydrology).

Several soil map units contain soil components that are classified as Prime Farmland candidate soils. The soil map units that contain Prime Farmland candidate soils and are located within agricultural production areas are listed below. The soils potentially meeting the Prime Farmland requirements (i.e. cropped and potentially sub-irrigated) are shown on Plate 1 as Prime Farmlands and listed below on Table 2. Areas containing these same soils that are not cropped or potentially sub-irrigated are shown as Non-Prime Farmland Soils and are not considered Prime Farmlands for purposes of mine planning or reclamation.

Table 2. Candidate Prime Farmland Map Units and Relative Extents within Study Area

Soil Map Unit	Soil Series	Percent of Study Area
Be	Bew silty clay	0.6%
Fr	Fort Collins silt loam	<0.1%
Ha	Haverson loam	0.4%
Hc	Haverson silt loam	2.7%
Hd	Haverson silty clay loam	4.9%
He	Haverson silty clay	<0.1%
Hh	Heldt silty clay loam	1.4%
Hk	Heldt silty clay loam	0.2%
Hn	Hesper silty clay loam	1.3%
Ho	Hesper silty clay loam	1.1%
Mc	McRae silt loam	0.5%
Md	McRae silt loam	4.8%
Total		18.0%

Several of the Prime Farmland soils listed are currently being used for agricultural production, or have been used for agriculture in the past. As previously mentioned, agricultural production fields are limited to lower floodplain terraces. Agricultural soils in the Study Area typically contain desirable properties such as high organic matter concentrations, few rocks, and

permeable textures. However, within the primary rooting zone (upper 40 inches of the soil profile) some soils were found to be highly saline and sodic. These highly saline/sodic conditions are particularly prevalent in potentially sub-irrigated soils where ECs exceeded 17 and SAR exceeded 28.

The Alluvial Valley Floor investigation (Report 325) determined that groundwater is occasionally found within the plant rooting zone; however, the groundwater and corresponding soil horizons exceed allowable thresholds for salinity as measured by electrical conductivity (EC) and sodium adsorption ratio (SAR) for Prime Farmland soils with aridic and ustic moisture regimes. Physical and chemical soil properties for all soils in the Study Area are presented in the Soil Baseline Inventory (Report 304L).

Soils such as Fort Collins and Hesper soils are also distributed in upland areas where they are predominately used for grazing and support native grass and forb vegetation. In uplands these soils are often located in depositional sites and are thus more productive than the shallower soils on adjacent ridges and slopes, however these areas do not qualify as Prime Farmlands as a result of historical land use and lack of irrigation.

Based on the absence of irrigation within the Study Area, presence of highly saline shallow groundwater, and high salinity/sodicity of soils within the rooting depth of many floodplain soils a negative determination of Prime Farmland soils is requested. This request is supported by the attached letter from the NRCS office in Miles City, MT which states that based on land use and existing soil conditions none of the Study Area is considered to contain Prime Farmland soils.

2.2 Non-Prime Farmland Soils

Some of the potential Prime Farmland soils extend into adjacent uplands and are intermittently dispersed on uplands in the Study Area. These soils are located on slopes or upper terraces and are not used for agricultural production. The lack of irrigation and subsequent lack of agriculture on these soils removes them from consideration as Prime Farmland areas.

Other soils of interest in the project area include some soils classified as Farmland of Statewide Importance by the NRCS. These soils and relative abundance are listed in Table 3 below.

Table 3. Farmland of Statewide Importance Map Units and Relative Extents within Study Area

Soil Map Unit	Soil Series	Percent of Study Area
Fm	Farland and Havrelon soils, 4-8% slopes	0.1%
Fn	Fergus-Relan association, 2-8% slopes	0.3%
Hf	Haverson soils, channeled	0.3%
Hm	Heldt silty clay loam, 4-8% slopes	0.3%
Hp	Hesper silty clay loam, 4-8% slopes	3.4%
Me	McRae silt loam, 4-8% slopes	0.4%
Vr	Vona-Remmit fine sandy loam, 4-8% slopes	0.2%
Total		5.0%

Potential impacts to Farmland of Statewide Importance soils would be limited due to the lack of irrigation and sparse nature of these soils in the Study Area.

2.3 Prime Farmland Reclamation Plan

Prime Farmland soils are not located within the proposed mining boundary, although roads or other facilities would be constructed on candidate Prime Farmland soils. Soil salvage and redistribution procedures are described in the Soil Handling Plan (Report 313E).

Based on the input from NRCS and the baseline soils information, Prime Farmlands are not anticipated within the disturbance area, therefore a specific Prime Farmland reclamation plan has not been developed. In the event that Prime Farmlands are designated within the disturbance boundary, a Prime Farmland soil handling plan would be developed and amended to the Soil Handling Plan.

3.0 References

- GPO, 2012. Government Printing Office. Code of Federal Regulations – Title 7 – Subtitle B. 2012 edition. <http://www.gpo.gov/fdsys/pkg/CFR-2012-title7-vol6/pdf/CFR-2012-title7-vol6-subtitleB-chapVI.pdf> Last accessed: June 2012.
- NRCS, 2010. *Soil Survey Geographic (SSURGO) Database for Powder River Area, Montana*. Available online at <http://efotg.sc.egov.usda.gov/treemenu.aspx>. Accessed June 2012.



Natural Resources Conservation Service
Miles City Area Office
3120 Valley Drive East
Miles City, MT 59301-5500

July 21, 2014

To whom it may concern:

Re: Otter Creek Farmland Classification

The National Cooperative Soil Survey (NCSS) is a nationwide partnership of Federal, regional, State, local agencies, private entities, and institutions. This partnership works to cooperatively investigate, inventory, document, classify, interpret, disseminate, and publish information about soils of the United States and its trust territories and commonwealths.

The Natural Resources Conservation Service is responsible for the leadership of soil survey activities of the U.S. Department of Agriculture, for the leadership and coordination of NCSS activities, and for the extension of soil survey technology to global applications.

Soil data and information produced by the National Cooperative Soil Survey is retained in Web Soil Survey (websoilsurvey.nrcs.usda.gov/app/). The Natural Resources Conservation Service updates and maintains this source of soil information.

Web Soil Survey provides customers (producers, agencies, technical service providers, and others) electronic access to relevant soil and related information needed to make wise land use and management decisions.

It is from Web Soil Survey that the ratings for Farmland Classification were obtained. Farmland Classification identifies soil map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No. 21, January 31, 1978.

Ratings for Farmland Classification in the Otter Creek Area can be found in the attached table. While some of the soil map units are rated as "prime farmland if irrigated", at present none of the soils in the area are actively being irrigated, and therefore would not be considered prime farmland. In the Otter Creek Area, 1666 acres or 18% of the area is classified as "prime farmland if irrigated".

A handwritten signature in blue ink, appearing to read "Robert Mitchell", is written over a white background.

Robert Mitchell
Resource Soil Scientist



Map Unit	Map Unit Name	Farmland Classification
Ab	Arvada-Bone complex, 0 to 4 percent slopes	Not prime farmland
Be	Bew silty clay, 2 to 4 percent slopes	Prime farmland if irrigated
Ca	Cabba association, 15 to 50 percent slopes	Not prime farmland
Ce	Cushman-Elso silt loams, 4 to 8 percent slopes	Not prime farmland
Ec	Elso silt loam, 8 to 15 percent slopes	Not prime farmland
El	Elso silt loam, 15 to 45 percent slopes	Not prime farmland
Fm	Farland and Havrelon soils, 4 to 8 percent slopes	Farmland of statewide importance
Fn	Fergus-Relan association, 2 to 8 percent slopes	Farmland of statewide importance
Fr	Fort Collins silt loam, 2 to 4 percent slopes	Prime farmland if irrigated
Ha	Haverson loam	Prime farmland if irrigated
Hc	Haverson silt loam	Prime farmland if irrigated
Hd	Haverson silty clay loam	Prime farmland if irrigated
He	Haverson silty clay	Prime farmland if irrigated
Hf	Haverson soils, channeled	Farmland of statewide importance
Hg	Haverson soils, saline	Not prime farmland
Hh	Heldt silty clay loam, 0 to 2 percent slopes	Prime farmland if irrigated
Hk	Heldt silty clay loam, 2 to 4 percent slopes	Prime farmland if irrigated
Hm	Heldt silty clay loam, 4 to 8 percent slopes	Farmland of statewide importance
Hn	Hesper silty clay loam, 0 to 2 percent slopes	Prime farmland if irrigated
Ho	Hesper silty clay loam, 2 to 4 percent slopes	Prime farmland if irrigated
Hp	Hesper silty clay loam, 4 to 8 percent slopes	Farmland of statewide importance
Mc	McRae silt loam, 0 to 2 percent slopes	Prime farmland if irrigated
Md	McRae silt loam, 2 to 4 percent slopes	Prime farmland if irrigated
Me	McRae silt loam, 4 to 8 percent slopes	Farmland of statewide importance
Mf	Midway silty clay loam, 2 to 8 percent slopes	Not prime farmland
Mg	Midway-Elso association, 8 to 35 percent slopes	Not prime farmland
Mw	Midway and Elso rocky soils, 35 to 75 percent slopes	Not prime farmland
Nh	Nihill-Elso association, 8 to 15 percent slopes	Not prime farmland
Rk	Relan gravelly loam, gravelly variant, 4 to 8 percent slopes	Not prime farmland
Rs	Ringling slaty loam, 20 to 50 percent slopes	Not prime farmland
Rt	Ringling-Cabba association, 15 to 50 percent slopes	Not prime farmland
Ru	Ringling-Relan association, 6 to 25 percent slopes	Not prime farmland
Te	Terrace escarpments	Not prime farmland
Vr	Vona-Remmit fine sandy loam, 4 to 8 percent slopes	Farmland of statewide importance
W	Water	Not prime farmland