

Appendix D. Programmatic Mitigation Measures for Crazy Cat East EA

The following are the BLM's programmatic mitigation measures for the potential developments that may tier to or incorporate by reference the analysis in Environmental Assessment, EA- WY-070-EA13-028, Crazy Cat East. These programmatic mitigation measures received analysis in the EA and, if needed and not incorporated into site-specific design features or operator committed measures may become project programmatic conditions of approval (COAs). This Appendix D includes this brief listing of measures and 3 attachments: Attachment 1, Limited Reclamation Potential; Attachment 2, Detailed Construction - Stabilization, and Reclamation Plan; and Attachment 3, Geotechnical Investigation Requirements.

1. All the programmatic mitigation measures (programmatic COAs) from the Powder River Basin Final Environmental Impact Statement Record of Decision (PRB FEIS ROD) apply to this EA and any projects tiering to this EA or incorporating it by reference.
2. Total surface disturbance for each location (pad, infrastructure site) (top of cut to toe of fill) will not exceed 1.5 times the size of working area of the pad or site.
3. Operator must demonstrate that erosion can be effectively controlled / mitigated and reclamation to BLM program-specific standards would be met.
 - a. In addition to the requirements in Onshore Oil and Gas Order #1, III.D.4, the diagram will include locations of site-specific erosion control measures.
4. BLM may require a geotechnical analysis in areas where naturally occurring slope failures, ground water seeps or springs, limited reclamation potential areas, areas of 25% or more slope, soil suitability is rated poor as construction material (or undetermined) or other obstacles to maintaining slope stability are observed. The geotechnical analysis must be provided, signed, and dated by a professional licensed geotechnical engineer.
5. For interim reclamation the well pad must show a balanced cut/fill design with no excess material.
6. All surface disturbances will avoid limited reclamation potential (LRP) areas and areas with 25% or more of slope. BLM defined LRP areas in Attachment 1 to this appendix. The operator may propose exceptions in areas subject to extensive geotechnical analysis, mitigating design features, and appropriate stabilization methods for the BLM's consideration.
7. Surface disturbances will avoid any changes to the hydrology in potential habitat for Ute Ladies' Tresses Orchid.
8. Operators will submit a plan for maintaining topsoil and its' microbe viability in the event a proposed well pad or infrastructure feature is impacted by a biological timing limitation (stipulation) and in cases of scheduled drilling of more than one well per pad.
9. Construction - Stabilization and Reclamation plan will be submitted at notice of staking (NOS) or application for permit to drill (APD) stage for all disturbances. See Attachment 2 of Appendix D.
10. For multiple well pads, interim reclamation will be implemented within 180 days of the initial well's SPUD date.
11. Construction oversight will be required for all engineered features including roads and pads.
12. APC or operators will submit proposed mitigation to reduce air pollutant trends via sundry notice. Potential mitigation actions could include:
 - a. Increase frequency for water application to transportation system in the area;
 - b. Chemical dust control (magnesium chloride, etc.) on active access roads;
 - c. Installation of vapor recovery units on all storage facilities and treatment equipment;
 - d. Elimination of flaring or venting by installation of a gas gathering system;
 - e. To reduce the volume of truck traffic during stimulation activities, all water used for completion will be piped to from the source to location in temporary surface or permanent buried water lines.
13. BLM will analyze and address mitigation measures in conjunction with the site-specific proposal in manners supporting minimizing of surface disturbances.
14. Mountain plover – BLM will apply the mitigation measures from the PRB FEIS ROD, A-35 to 37 and PRB FEIS, Appendix K-47, T&C23 in areas where surveys find this bird because it is a BLM special status (sensitive) species, even though it is not presently a threatened or candidate species.

15. Greater Sage Grouse - BLM prohibits surface disturbing and/or disruptive activities from March 15–June 30 to protect Greater Sage-Grouse nesting and early brood rearing habitats within 2 miles of the lek or lek perimeter of any occupied lek located outside core or connectivity habitat areas. Where credible data support different timeframes for this restriction, dates may be expanded by 14 days prior or subsequent to the above dates. (IM WY-2012-019). BLM will retain this programmatic mitigation measure until the US Fish and Wildlife Service downgrades this bird from a candidate species or further BLM analysis supports a change of this measure.
16. Migratory birds which are special status (sensitive) species – BLM’s preferred conservation measure for protection of migratory bird sensitive species is to avoid construction in sagebrush stands. If construction in sagebrush stands is unavoidable, then there are 2 options for construction in sagebrush stands consistent with the BLM Special Status (Sensitive) Species Policy (6840), Wyoming BLM Migratory Bird Instruction Memorandum (WY-IM-2013-005), and the Migratory Bird Treaty Act:
 - a) clear the pad area outside the nesting season (nesting season May 1-August 1).
 - b) clear the pad within 1 week of doing a survey with negative results during the nesting season.

Attachment 1, Limited Reclamation Potential (LRP) to Appendix D

The term Limited Reclamation Potential (LRP) came from the Wyoming Statewide Reclamation Policy Instruction Memorandum (IM) WY-2012-032, Wyoming BLM Reclamation Policy. BLM provides the glossary definition and policy discussion below.

Limited Reclamation Potential (LRP) - Areas possessing unique landscape characteristics (e.g., sensitive geologic formations, extremely limiting soil conditions, biological soil crusts, badlands, rock-outcrops, etc.) often make reclamation success impractical and/or unrealistic due to physical, biological, and/or chemical challenges. When disturbed, these areas may require unconventional reclamation strategies to address the ten requirements established by this policy.

(Adapted from various sources) During the NEPA process, alternatives to approving development activities in LRP areas should be carefully analyzed. Alternatives considered should include: avoidance and/or unconventional site specific reclamation requirements. Resource development activities approved in these areas may require additional bonding.

The Buffalo Field Office uses Natural Resource Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) soils data and USDA arc-view extensions to identify areas potentially containing LRP sites. This GIS analysis helps identify potential resource issues the project may impact. Areas identified as LRP areas include but are not limited to: Areas susceptible to mass movement, blown-out areas, and very shallow soils (≤ 10 inches), paralithic and lithic material, chemical properties rated unsuitable in WYDEQ Land Quality topsoil and overburden criteria, and cumulative physical, chemical, and site properties that make reclamation problematic. LRP areas are field verified at the onsite investigation. BLM refines the preliminary SSURGO data analysis during the onsite investigation, and project design review to identify potential impacts to sensitive soils and to assure proper mitigation is applied.

Many of the components defined as LRP areas are identified in the SSURGO data as miscellaneous areas. Miscellaneous areas have essentially no soil and support little or no vegetation. They can result from active erosion, washing by water, unfavorable soil conditions, or human activities. Some miscellaneous areas can be made productive, but only after major reclamation efforts. (430-VI-NSSH, 1996)

The following are a few of the recognized miscellaneous areas identified in the Powder River Basin by NRCS Soil Surveys.

- Badlands. A landscape which is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes with narrow interfluves. Badlands develop on surfaces with little or no vegetative cover, overlying unconsolidated or poorly cemented materials (clays, silts, or in some cases sandstones) sometimes with soluble minerals such as gypsum or halite. (430-VI-NSSH, 1996)
- Dune land. Consists of sand in ridges and intervening troughs that shift with the wind. (430-VI-NSSH, 1996)
- Gullied land. Consists of areas where erosion has cut a network of v-shaped or u-shaped channels. The areas resemble miniature badlands. Generally, gullies are so deep that extensive reshaping is necessary for most uses. (430-VI-NSSH, 1996)
- Rock outcrop. Consists of exposures of bare bedrock. Most rock outcrops are hardrock, but some are soft. (430-VI-NSSH, 1996)
- Subgroups and above level of soil taxonomy. The subgroup level of classification emphasizes processes related to soil development, and has a very broad range of soil characteristics that make

site-specific interpretation difficult to predict. Other areas identified as LRP areas include: Areas susceptible to mass movement, Blown-out Areas, and Very Shallow Soils (≤ 10 inches).

LRP areas are field verified at the notice of staking or onsite investigation. The preliminary SSURGO data analysis is refined during the onsite investigation and project design review to identify potential impacts to sensitive soils and to assure proper mitigation is applied.

Project design needs to include a description of the created site and mitigation provided in the form of design features. While some of these project design features would not be classified as LRP areas, they are identified in the PRB-FEIS as areas which need to be mitigated with the design of the project. The cumulative impact of the created environment needs to be mitigated *and* approved by the AO. Predicted disturbance would expose material deep within the soil material, which may have chemical and physical properties contributing to limited reclamation potential (LRP) properties.

- Amount of bareground, physical and chemical properties, and site conditions potentially create soils classified as highly erosive to wind and water erosion.
- The proposed cut and fill slopes 1½:1 (67%) and 2:1 (50%) slopes are greater than the 25% slope avoidance area identified in the PRB FEIS.
- Suitability of material for projected construction practices may need design mitigation.

Attachment 2, Detailed Construction - Stabilization and Reclamation Plan to Appendix D

Goal: Re-establish a functioning ecosystem that provides and maintains hydrologic function, wildlife habitat, soil stability, domestic livestock grazing, and visual properties to promote final reclamation. Operators will address stabilization and reclamation at each phase of the project; construction/drilling, interim reclamation, and final reclamation.

- a. Construction & Drilling Phase
 - i. Goals:
 1. Provide safe, stable working environment.
 2. Topsoil: salvage, stabilize and protect.
 3. Sediment containment: Prevent soil from leaving site.
 - ii. Design Features:
 1. Engineer design of the pad and any additional requirements identified at the notice of staking (NOS).
 2. Additional information (e.g. geotechnical analysis suitability of material excessive cut/fill stability)
 3. Pad size: adequate size and stability to accommodate operations.
 4. Topsoil: amount of topsoil to be salvaged; how and where will it be stored. Describe how it will be stabilized.
 5. Subsoil and spoil management.
 6. Describe methods used to prevent run-on from the pad to fill slopes.
 7. Method used to stabilize fill materials.
 8. Methods to prevent sediment leaving cut/fill slope and pad area; reduce velocity of any surface flow, and containment of sediment onsite. Monitor and maintain until drilling is complete.
- b. Interim Reclamation Phase
 - i. Goal: Facilitate stable, functioning ecosystem during production, while preparing for final reclamation.
 - ii. Site-specific detail:
 1. Methods used to reduce cut and fill slope length, prevent erosion, promote vegetation establishment, and prevent run-on to the pad working area. (Depending on watershed area, stability and vegetative cover.)
 2. Pad size will be reduced to interim design provided in SUP. Fill slopes will be minimized to a 2:1 or 3:1. Cut slopes will be reduced from 1-1/2:1 to 2:1 using fill slope material to reduce total pad disturbance. Total foot print needs to be reduced and quantified in the MSUP.
 3. Pad stabilization:
 4. Method(s) to reduce slope length, capture and store surface runoff, promote vegetation, and prevent erosion.
 5. Maintenance plan established after each storm event or monthly whichever is more frequent.
 6. Apply topsoil evenly over entire disturbance area not needed for daily maintenance and operation. This will help promote interim and final reclamation success, prevent erosion, and prevent erosion and sedimentation leaving the pad. Maybe mowed if needed, most currently are grazed by domestic livestock and wildlife.
 7. Gravel the working area and travel way of the pad. This will provide for all-weather access, reduce erosion and compaction, and promote reclamation.
 8. Berms designed to channel water from the pad (without concentrating that causes erosion), berms need to have topsoil applied and seeded (how will this be achieved). Berm outlet needs to prevent erosion and gullies from cutting into the fill slopes of the pad, dissipate energy and spreading water on to established vegetation.
 9. Describe seedbed preparation methods that will be implemented that will result in a smooth, firm seedbed.

10. Seeding will be broadcast at double the rate, and provide proper seed soil contact or drill-seeded with the appropriate machine on the contour.
 11. Describe method used to stabilize the site and the seed.
 12. Provide seed mix, BLM or private mix provided by a surface landowner, with appropriate mix of grasses, forbs, and shrubs.
- c. Final Reclamation Phase
- i. Goal: Facilitate eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan.
 1. Describe practices necessary to reclaim all disturbed areas including access roads, pipelines, etc.
 2. The operator may amend this reclamation plan at the time of abandonment.

Attachment 3, Geotechnical Investigation Requirements to Appendix D.

“The operator must include other information required by applicable orders and notices (43 CFR 3162.3-1(d)(4))...The BLM also encourages the operator to submit any additional information that may be helpful in processing the application.” (Onshore Order No. 1).

For sites identified to have uncertain stability will require additional information before they are subjected to load bearing traffic. The Powder River Basin EIS reads, “It may not be feasible or possible to build the road where slopes are steep and the rock or soil material is weak. In these cases, alternative road locations should be considered. Sites judged to be of uncertain stability should be reviewed by a Geotechnical Specialist before they are used. Those sites where emerging ground water, thick organic layers, unstable geology, or other instability factors are present should not be used.” If required by the BLM the operator will submit a geotechnical investigation plan including the location of all borings and any surface disturbance identified on a map to BLM. Prior to initiation of the geotechnical investigation and following review by the BLM ID team, BLM will notify the operator to proceed with the geotechnical analysis.

The extent and detail of the geotechnical investigation required should be determined by a licensed professional engineer competent in geotechnical engineering. The investigation should be submitted to the BLM and consider the following:

- The analysis should include distribution of bedrock and surficial deposits, outcrops, in-situ slope stability, discontinuities, structural features, ground-water occurrence and behavior, potential sliding, current failures, and observed and potential geologic hazards.
- The geotechnical analysis should also include a narrative description of surficial deposits, specifying engineering properties, especially those that can affect design or construction. These descriptions may include, but are not restricted to, soil structure, composition, cohesion, internal friction, the presence of swelling materials, low-density materials, gypsum and other sulfates, caliche, dispersive soils, loose deposits subject to liquefaction or consolidation, and erodible materials.

A minimum of three exploratory holes or test pits will be made per site to a depth suitable to determine geologic conditions affecting slope stability (i.e. bed rock). All drill hole and test pit logs must show moisture condition, soil classification, and depth.

Following completion of the geotechnical investigation and analysis, the operator will submit proper mitigation measures, based on a professional geotechnical engineer’s recommendation, to alleviate the stress that load bearing traffic would impose upon the native materials and prevent slope failure.