

APPENDIX 8

Reclamation Plans

Appendix 8A

Alternative A – Reclamation Plan

Alternative A – Reclamation Plan

The Reclamation Plan for Alternative A is the same as the Reclamation Plan in the PAPA ROD (BLM, 2000b).

Appendix 8B

Alternative B – Reclamation Plan

Alternative B – Reclamation Plan

Prepared by
Ultra Resources, Inc.
Shell Exploration & Production Company
Questar Market Resources

Purpose

Questar Market Resources (Questar), Shell Exploration & Production Company (Shell), and Ultra Resources, Inc. (Ultra), hereinafter collectively referred to as “Proponents”, propose this reclamation plan to supplement the 2000 PAPA ROD reclamation components as provided below.

A high priority of the Proponents is to limit surface disturbance through multiple-well pads, interim reclamation, directional drilling and consolidated development. Use of these multiple-well pads will correspondingly reduce associated development impacts such as roads and pipelines. By concentrating pad locations and operational activities, Proponents will leave large blocks of acreage undisturbed and available for wildlife and livestock use.

The purpose of this plan is to incorporate measures which will support the return of as much of the disturbed acreage to its pre-disturbed state as quickly as feasible upon conclusion of drilling and completion operations from a given surface pad.

Scope

This plan applies to practices within the PAPA to protect vegetation and to ensure proper and timely restoration of disturbed areas to approximate pre-disturbance levels. Monitoring of reclaimed areas and pilot / demonstration reclamation plots will be done to assure successful reclamation occurs.

The Standard Practices as to soils and vegetation which are specified in the 2000 PAPA ROD page 20 – 21 and in Appendix A, pages A-2, A-12 - 15, and A-27 - 30 should be incorporated into the SEIS. In addition, as stated in Appendix A, page A-14, “BLM will continue to allow applicants to use their own expertise in recommending and implementing construction and reclamation projects,” thus permitting new methods and application practices to be implemented to accelerate and improve revegetation.

Proponent Committed Measures to Lessen Disturbance and the Need for Reclamation

1. The proposed concentrated development, multiple-well pad plan will reduce overall vegetation disturbance by 48 percent over development envisioned under the 2000 PAPA ROD, a significant benefit to wildlife and livestock.
2. Proponents will use public and existing roads as much as possible to lessen new surface disturbance and habitat fragmentation. By using multiple-well pads, proponents will be able to eliminate up to 1.16 miles or about 12 acres of roadway and flowline easement per section.

3. Proponents will use existing pads to the extent feasible for infill development to reduce the need for new pads and lessen new surface disturbance.

Proponent Committed Measures for Reclamation

1. Proponents will return as much of the disturbed acreage as possible to its pre-disturbed state as quickly as possible. Final revegetation will begin when the last of the wells on the pad is completed. Drilling and completing all wells on a pad sequentially results in earlier final revegetation and a smaller disturbed area. Proponents propose to use a variety of options and methods, such as the new habitat seed mixture of grasses, shrubs, and forbs and new application method which is in its second year of demonstration. This expedited reclamation will increase habitat patch sizes and reduce habitat fragmentation for sagebrush-obligate species. Proponents estimate that on the larger consolidated pads, approximately 70% of the pad will be reclaimed if pits were on the pad. If there are no reserve pits, the surface disturbance area is smaller and about 50% of that smaller pad would be reclaimed.
2. Proponents will utilize interim reclamation, where reasonable, to return as much of the landscape as possible to a condition usable by wildlife and livestock as quickly as possible. Interim reclamation will increase habitat patch sizes and reduce habitat fragmentation for sagebrush-obligate species.
3. Proponents will continue to monitor reclaimed areas and will encourage review of the monitoring data by BLM, Wyoming Game and Fish Department, and Wyoming Department of Agriculture habitat experts.
4. Proponents will adapt reclamation practices as appropriate based upon monitoring information. Successful reclamation to maintain soil stability and provide habitat function will be measured in stages, as follows:
 - a. The establishment of a viable seedling cover within 1 year of initiation of reclamation. Viable seedling cover shall consist of indigenous species and/or ecologically-comparable species as approved by BLM habitat experts;
 - b. Within 5 years of initiation of reclamation, the operator will establish at least 50% of indigenous vegetative cover and species composition; and,
 - c. Within 8 years of initiation of reclamation establish at least 80% of indigenous vegetative cover and species composition.
5. The initiation of reclamation will commence immediately after the last well scheduled on a pad is put into production, as weather permits. In the event that more than two years will lapse between the drilling and / or completion of wells on a pad, the BLM may require interim reclamation and / or temporary site stabilization measures.
6. Proponents will test and implement, as appropriate, new methods of reclamation, seed mixtures, and application practices to accelerate and improve the revegetation in consultation with BLM and WGFD.

Appendix 8C

Alternative C – Reclamation Plan

Alternative C – Reclamation Plan

Achieving these objectives would, in part, mitigate impact to Land Use/Land Cover, Recreation Resources, Visual Resources, Surface Water, Soil Resources, Vegetation Resources, Grazing Resources, Riparian Resources, Threatened and Endangered Species and Special Status Species, and Wildlife and Aquatic Resources.

Temporary Site Stabilization

1. On existing well pads that would not be fully developed within the upcoming annual cycle, all bare ground would have at least a 75 percent protective cover that may include but not be limited to organic mulch, herbaceous vegetation, jute matting, or other erosion-preventative fabric. Protective cover may be excluded on active work sites (up to the wellhead with production equipment) if justified by the Operator and with concurrence of BLM.
2. During the period when an existing well pad is not being fully developed, there would be no sediment discharge from the existing pad. Operators would modify all existing well pads to achieve zero sediment discharge for a 25-year storm or snowmelt event within 1 year of following authorization by BLM in the SEIS ROD.
3. During the period when an existing well pad is not being fully developed, the well pad would be vegetated prior to the first winter after the ROD to achieve at least 50 percent vegetative cover of desirable herbaceous species by the following spring.
4. If an existing well pad would not be fully developed in 2 or more years after the ROD, desirable vegetation growth on the well pad would be at least 80 percent cover within three growing seasons.
5. Reserve pits on existing pads that would not be fully developed in 2 or more years after the ROD would be reclaimed prior to the first winter after the ROD.
6. Access road(s) leading to the temporarily stabilized well pad would be revegetated to the same levels required on the well pad.
7. Vehicular access on the revegetated road(s) would be on two-tracks established during road revegetation. Two-track access would be sufficient for use by only one vehicle at a time.
8. Pipeline corridor(s) leading to the temporarily stabilized well pad would be revegetated immediately after construction.
9. Vehicular access on the reclaimed, revegetated pipeline corridors would be on two-tracks only if there is no adjacent road. No vehicular access would be allowed on reclaimed, revegetated pipeline corridors. Two-track access, if allowed, would be sufficient for use by only one vehicle at a time.

Full Site Reclamation

1. Once a well pad has been fully developed, full site restoration and reclamation would begin as soon as the ground is not frozen and would be completed before the onset of winter.
2. Full site restoration would require re-grading the pad to conform to the original contours.
3. Full site restoration would require redistributing the original topsoil or transfer and distribution of topsoil from a newly cleared well pad in the same geographic area with similar slope and soil characteristics.
4. Full site restoration would require protection of vegetation until herbivory by wildlife and livestock can be sustained.
5. Access road(s) leading to the fully restored well pad would be reclaimed to conform to the original corridor contours.
6. Access road(s) leading to the fully restored well pad would be revegetated to the same levels required on fully reclaimed well pads.
7. Pipeline corridor(s) leading from the fully restored well pad would be reclaimed to conform to the original corridor contours.
8. Pipeline corridor(s) leading from the fully restored well pad would be revegetated to the same levels required on fully reclaimed well pads.
9. Vehicular access on the reclaimed, revegetated pipeline corridors would be on two-tracks only if there is no adjacent road. No vehicular access would be allowed on reclaimed, revegetated pipeline corridors. Two-track access, if allowed, would be sufficient for use by only one vehicle at a time.

Reclamation Monitoring

Monitoring Responsibilities

1. It is the responsibility of the Operator to monitor reclaimed areas, determine if reclamation criteria are being met, develop and implement remedial actions if success standards are not being met, provide resulting data to the BLM annually, and request concurrence from BLM that success standards have been met and monitoring is no longer required.
2. It is the responsibility of the BLM to evaluate the annual monitoring reports, provide concurrence (or not) with the reclamation assessments as to whether or not success standards are being met and the rationale for the determination.
3. It is the responsibility of the BLM to provide Operators with remedial actions when reclamation success criteria are not being met. The remedial actions may include such things as soil testing, soil amendments, irrigation, and seeding.

Monitoring Methods

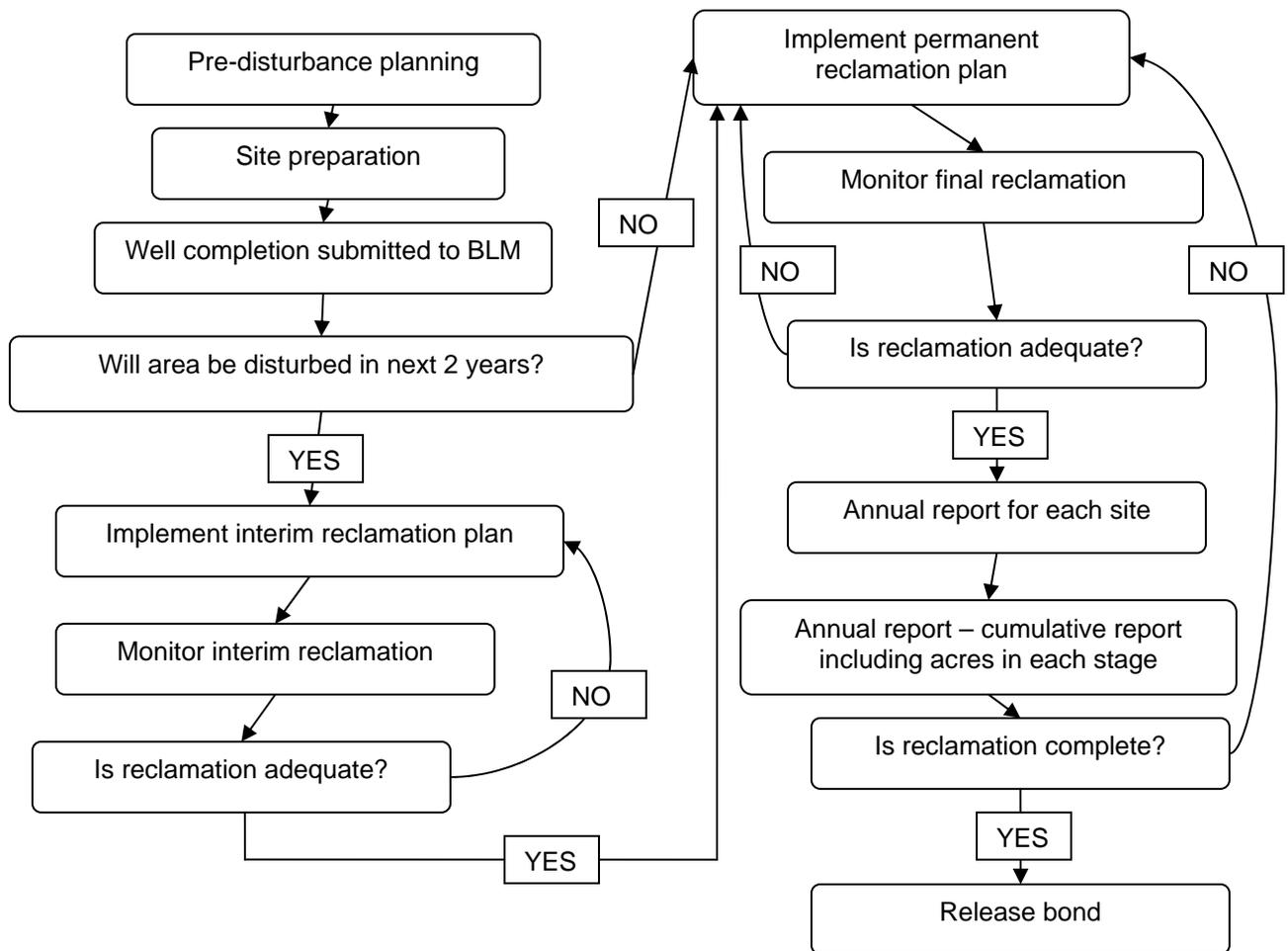
1. Monitoring methods provide the basis for consistent, uniform, and standard vegetation attribute sampling that is economical, repeatable, statistically reliable, and technically adequate. Vegetative monitoring would be conducted using BLM approved monitoring methods. The following guidelines would be used to determine if the site has met final reclamation criteria. Specific guidelines can be found at the BLM Library Sampling Vegetation Attributes, Interagency Technical Reference 1734-4, 1996 <http://www.blm.gov/nstc/library/techref.htm>
 - a. Location of data collection:
 - i. A sample representation of the vegetative population would be used to collect the vegetative data on the reclamation and reference sites.
 - ii. The reference site location would represent the ecological characteristics described in the reclamation criteria.
 - iii. The sites would be permanently marked with a GPS unit for accuracy of future analysis. Precise locations of the site would be noted on a detailed map or aerial photo. The exact location of the study site and the directions for relocating it would also be noted.
 - iv. See Sampling Vegetation Attributes, Chapter III- Study Design and Analysis, part B, for statistical considerations to be used.
 - b. Timing of data collection.
 - i. If at all possible, baseline data should be collected prior to disturbance.
 - ii. Monitoring will occur during the growing season post seeding to determine if seeds have germinated. It is crucial to understand if a viable seed source exists on the reclamation site. If seeds germinate but seedlings do not survive due to weather conditions, the site must be reseeded.
 - iii. Monitoring may require multiple visits to a site within a given year to capture presence of species (especially forbs) that grow at various times during the growing season. In general, most plants are at their peak in June.
2. Data Collection Methods: For accuracy and time effectiveness, systematic sampling would be used to decrease personal bias. A standard procedure would be identified and used in all data collection methods.
 - a. Ground cover and species composition would be evaluated using line-point intercept by plant species method. At a minimum, 200 data points should be collected on each site.
 - b. Line-point intercept techniques result in smaller non-sampling errors than the use of quadrants.
 - c. Nested Frequency Quadrants would be used to measure frequency. At a minimum, 200 frame plots on each site should be used to calculate data.
 - d. The density method as described in Sampling Vegetation Attributes Interagency Technical Reference would be used to measure density. At a minimum, 200 frame plots on each site should be used to calculate data.
 - e. Production measurements would be made using the double sampling method. Data should be collected from a minimum of 20 plots on each site.
 - f. To measure erosion control, a soil surface factor of 1 to 20 percent must be achieved.
3. Photo Points. Permanent photo points would be established on both the pre-disturbed site and the reference site. Photo points should be permanently marked with a GPS.

Photos should be taken yearly (preferably in June) as close to the same time of year previous photos were taken to reduce difference in plant growth characteristics.

- a. Close-up pictures show the soil surface characteristics and the amount of ground surface covered by vegetation and litter. Close-ups would be taken at permanently located photo plots. A 1-meter x 1-meter photo plot is recommended.
- b. General view pictures present a broad view of a site. Pictures depicting north, south, east, and west would also be established and monitored.

4. Stages of reclamation. After evaluating the monitoring data, each site would be categorized into one of four stages to determine landscape trends and reclamation status of the PAPA.

- a. Contouring, soil preparation, seeding (may be different between grasses and forbs/shrubs)
- b. Preliminary evaluation in 1 to 3 years – some criteria could be developed to aid in determining whether or not the seeding is successful so a determination can be made as to whether or not to reseed.
- c. Criteria met or not met – identification of potential plant community in early successional stage that is specific to range site (number of shrubs and forbs important here).
- d. Final Reclamation and bond release – similar composition as above but with greater structure and shrub abundance.



Appendix 8D

Alternatives D and E – Reclamation Plan

Alternatives D and E – Reclamation Plan

The Operators are responsible for the satisfactory and timely reclamation of the land surface disturbed by their operations in accordance with federal regulations and the standards, guidelines, and criteria set forth below. Operators are encouraged to reduce net disturbance utilizing aggressive reclamation techniques that restore wildlife habitat and livestock grazing function. These standards would apply to all surface disturbing activities including but not limited to pads, roads, right-of-way, and all industry associated pipelines.

All surface disturbances will be reclaimed to meet Bureau of Land Management (BLM) standards as described in Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development – The Gold Book, and specific criteria identified in this document. Habitat and livestock grazing reclamation shall be initiated to meet criteria standards on all portions of the well pads, access roads, etc not needed for production operations when the last well on the pad is drilled and completed or when no forecasted drilling (based in existing Wyoming Oil and Gas Conservation Commission permitted spacing or depth limitations) or completion activity is expected within two years, but additional well development activity is planned on the pad. Sites stabilization including seeding will occur during the first appropriate growing season. BLM will coordinate such requests for expansion and reoccupation with Wyoming Game and Fish Department and/or other appropriate agencies through the Application for Permit to Drill (APD) process. Where practical this coordination would occur through the annual meeting, but could occur on a case-by-case basis throughout the year. Proposals to expand or reoccupy a pad after habitat and forage reclamation has been initiated would be approved by Bureau of Land Management.

Reclamation Objectives

The objective of **interim reclamation** is to achieve healthy, biologically active topsoil; control erosion; and restore habitat, visual, and forage function on those portions of the disturbed area not need for production operations for the life of the well or facilities or until final reclamation is initiated.

Interim reclamation may be considered successful when:

- Disturbed areas not needed for long-term production operations or vehicle travel are recontoured, protected from erosion, and revegetated with a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community sufficient to minimize visual impacts, provide habitat and forage, stabilize soils, and impede the invasion of noxious weeds.

The objective of **final reclamation** is to achieve habitat, forage, and hydrologic function the functions that existed prior to disturbance. Including restoration of the original landform or creating a landform that approximates and blends in with the surrounding landform. Final reclamation involves restoring natural vegetative community, hydrologic systems, visual resources, agricultural values and wildlife habitats.

Final reclamation may be considered successful when:

- The original landform is restored for individual disturbed areas including well pads, production facility areas, roads, pipelines, and utility corridors.
- A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community is established on the site, with a density or frequency sufficient to control erosion and

non-native plant invasion and reestablish wildlife habitat and forage production. Sites demonstrate productivity approximately equal to or better than pre-disturbance levels.

- Plants are resilient as evidenced by well-developed root systems, flowers, and seed heads. Sites must exhibit sustainability of desired attributes after the removal of external influences for a period of not less than one year.
- Shrubs are well established and in a “young” age class at a minimum (therefore, not comprised of seedlings that may not survive until the following year).
- In agricultural areas, irrigation systems and soil conditions are reestablished in such a way as to ensure successful cultivation and harvesting of crops.
- Erosion control is sufficient so that water naturally infiltrates into the soil and gullying, headcutting, slumping, and deep or excessive rilling (greater than 3 inches) or excessive sheet erosion is not observed.
- The site is free of federal, state and county-listed noxious weeds, oil field debris, contaminated soil, and equipment.

Reclamation Plan and Annual Reports

The Operators will prepare a detailed Reclamation and Monitoring Plan for the SEIS area within 1 year of the signing of the ROD. The Plan will include appropriate quantitative and qualitative reclamation and monitoring standards, as detailed below.

Site-specific reclamation plans will continue to be included with the section 10 of the 13 point Surface Use Plan of Operations for APD-related surface disturbing activity and in the Plan of Development (POD) for right-of-way related actions. The reclamation plan for surface disturbance should reference and be consistent with the overall Reclamation Plan for the SEIS area and should reference the ecological site type when the site type is available, or will reference general vegetation composition if ecological site type data is not available. The plan will address erosion control measures including wind erosion.

Reclamation standards, objectives, and results will be reviewed during the Annual Planning Meetings. Reclaimed sites should be inspected annually (until release of bond) and evaluated the first and third growing seasons post seeding to determine if desirable plants are establishing. Operators will provide annual ERRP reports indicating reclamation status of all locations (to include extent of reclamation, vegetative composition, density or frequency, cover, resilience, sustainability, diversity and noxious weed presence, and surface stability. Surface disturbance reports will include “as built” GIS data in acceptable form for inclusion into BLM database.

Monitoring and Evaluation

The Operators shall monitor and evaluate reclamation success and shall prepare an annual monitoring and evaluation report to be submitted to BLM and the cooperating agencies a minimum of 3 weeks prior the annual meeting. Sites will be monitored and evaluated by individuals skilled in rangeland or reclamation monitoring (including knowledge of local ecology and plant identification). An interagency-review team will annually review and analyze the annual monitoring results and methods.

Should the success criteria stated below not be met, the operators will be responsible for implementing additional measures as directed by BLM. Wyoming Game and Fish Department (WGFD), Department of Environmental Quality (DEQ) and/or other appropriate agencies may

provide guidance and suggestions to BLM what the additional measures could include, such as: soil amendments, reseeding, inter-seeding, providing precipitation, fencing to isolate plantings from ungulates, and creating snow fences to increase snowfall depth.

Interim or Final Reclamation Criteria

A sample representation of the vegetative population will be used to collect the vegetative data on the reclamation and reference site. The reference site location will represent the ecological characteristics of the well pad prior to disturbance.

Successful reclamation to facilitate restoration of habitat function will be measured in stages as follows:

Within 1 year of initiation of interim or final reclamation sites will demonstrate the establishment of a viable desirable seedling density or frequency. Desirable seedling density or frequency, compared to reference site, shall consist of a vigorous, diverse, native (or otherwise approved) plant community or ecologically comparable species as approved by BLM Authorizing Officer.

Vegetative Criteria for Interim Reclamation

a. Native Forbs: The average density or frequency of desirable forbs must be a minimum of 75% of the reference site within 5 years. Diversity of forbs on a reclaimed site must be equal to or greater than the reference site within 5 years.

b. Native Shrubs: The average density or frequency of the shrub component must be at least 50 % of the reference site within 5 years. This includes both shrubs and half shrubs (e.g. winterfat, fringed sage, etc.). At least 15 % density or frequency of the shrub component must be by the dominant species from reference site. The diversity of shrubs must be equal to or greater than the reference site.

c. Native Grasses: Reclaimed sites must have a minimum of 3 native perennial grass species present, 2 of which must be bunch grass species. These are to be planted at rates appropriate to achieve abundance and diversity characteristics similar to those found on the reference site.

d. Non-Native Weeds: Sites must be free from all species listed on the Wyoming and federal noxious weed lists. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass and other weedy brome grasses are also prohibited in seed mixtures and will be actively treated if are found in the reclaimed areas,

e. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences. A minimum of 1 growing season without external influences (irrigation, mat pads, fences, etc.) may satisfy this requirement.

Full Site Final Reclamation Criteria

1. Ground Cover & Ecological Function

To ensure soil stability and nutrient cycling, ground cover must be equal to or greater than the reference site and vegetative litter must be decomposing into the soil.

2. Vegetative Criteria

a. Native Forbs: The average density or frequency and total diversity of forbs must be equal to or greater than the reference site within 8 years

b. Native Shrubs: The average density or frequency of the shrub component must be at least 80% of the reference site within 8 years. This includes both shrubs and half shrubs (e.g. winterfat, fringed sage, etc.). At least 25% density or frequency of the shrub component must be the dominant species from the reference site. The diversity of shrubs must be equal to or greater than the reference site.

c. Native Grasses: Reclaimed sites must exhibit grass production equal to the reference site. A minimum of 3 native perennial species must be included with at least 2 bunch grass species.

d. Non-Native Weeds: Sites must be free from all species listed on the Wyoming and Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass and other weedy brome grasses are also prohibited.

e. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems and flowers. Shrubs will be well established and in a “young” age class at a minimum (e.g. not comprised of seedlings that may not survive until the following year).

Other Requirements

All seed must be native (or otherwise approved) ecologically suitable species and site-specific. Should available seed mixtures, techniques or other applications be available to enhance the productivity and diversity of the reclaimed area used by wildlife or livestock, these methods should be pursued as approved by the BLM Authorizing Officer.

All topsoil from disturbed sites should be salvaged and stockpiled for later use in reclamation. Stockpiled topsoil will be seeded with native perennial grasses or an appropriate cover crop and soil should be reapplied to a reclaimed area while the topsoil is still viable – usually within 2-5 years.

Any mulch used would be free from mold, fungi, or noxious weed seeds. Mulch may include native hay, small grain straw, wood fiber, live mulch, cotton, jute, biodegradable netting, and rock or otherwise approved media. Straw mulch should contain fibers long enough to facilitate crimping and provide the greatest cover. The grantee or lessee would be responsible for the control of all noxious weed infestations on surface disturbances.

Release Criteria for Suspended and Term NSO Leases (Alternative D only)

A primary goal of reclamation is to restore functioning habitat. Federal suspended and term NSO leases would be considered for release when habitat function is demonstrably restored in the Alternative D Core Area. Successfully reclaimed areas are defined in detail above under Full Site Final Reclamation Criteria. Habitat may qualify as restored when ecological processes are functioning and the land is providing sustainable forage for wildlife and/or livestock as documented by animal use and stable populations based on the Wildlife Monitoring and Mitigation Matrix (Appendix 11 to the Final SEIS). BLM will confer with WGFD prior to releasing the federal suspended and term NSO leases in the flanks. Consistent with their commitment to the BLM, development could proceed on leases held by Anschutz after the primary 5-year term but would be subject to existing seasonal restrictions.