

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

LAND RECLAMATION, CURRENTLY MINED LAND

(Ac.)

CODE 544

DEFINITION

Reclamation of currently mined land to an acceptable form and planned use

PURPOSE

- Prevent negative impacts to soil, water and air resources in and near mined areas
- Restore the quality of the soils to their pre-mining level
- Maintain or improve landscape visual and functional quality

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to currently mined land. It includes the identification, removal, stockpiling and replacement of soil materials, and revegetation. This practice also applies to nearby non-mined areas adversely affected by the mining activities.

CRITERIA

General Criteria Applicable to All Purposes

Plans must comply with all applicable Federal, State and local laws and regulations relating to mining and mined land reclamation. Applicable laws and regulations include but are not limited to the following.

- Rules and Regulations for Colorado Division of Reclamation, Mining and Safety
- Surface Mining Control and Reclamation Act of 1977 (SMCRA), 30 U.S.C. 1201 et seq.
- Federal regulations related to the reclamation of prime farmland, including, 30 CFR 785.17, 816.22, and Part 823
- Federal Register Vol. 64, No. 124, Tuesday, June 29, 1999/Notices, pages 34770-34778
- 30CFR780.15 - Air pollution control plan

- 30CFR701.5 - Definitions: Fugitive dust

Develop a reclamation plan that is consistent with the site capability, the planned land use and the landowner's conservation objectives.

Include the practices necessary to reclaim and stabilize the mined areas to prevent further degradation of soil, water, air, plant and animal resources.

Dust control

Control the generation of particulate matter and fugitive dust during removal and replacement of soil and other materials. Detail the practices and activities necessary for dust control in the plans and specifications. Practices and activities for dust control may include controlling vehicular traffic, modifying soil moisture content, and/or establishment of temporary vegetation as needed.

Site preparation

Properly identify areas for preservation including those containing trees, vegetation, historic structures, stream corridors, natural springs or other important features.

Remove trees, logs, brush, rubbish and other debris from disturbed areas that will interfere with reconstruction and reclamation operations. Dispose of these undesirable materials so they will not create a resource problem or interfere with reclamation activities and the planned land use.

Land shaping and erosion and sediment control

Shape the land surface to provide adequate surface drainage and to blend into the surrounding topography. Use erosion control practices to decrease slope lengths where sheet and rill erosion will exceed acceptable levels.

Use sediment trapping practices such as filter strips, riparian forest buffers, contour buffer strips, sediment basins or similar practices to trap sediment before it leaves the project site. Establish drainage ways with sufficient capacity and stability to carry concentrated runoff from the reclaimed area into receiving streams, without causing erosion.

Vegetation establishment

Plans for vegetation establishment will be consistent with the Colorado Critical Area Planting 342, Conservation Practice Standard.

Select plant materials suitable for the specified end land use according to local climate potential, site conditions and Colorado Plant Materials Technical Note 59, Plant Suitability and Seeding Rates for Conservation Plantings in Colorado.

Complete a CO-ECS-5, Grass Seeding Planned and Applied, for each seed mix included in the plan.

Apply soil amendments and or plant nutrients as appropriate, according to the Colorado Nutrient Management 590, Conservation Practice Standard. If the recommended fertilizer rate exceeds Nutrient Management Standard Criteria, plan appropriate mitigating practices to decrease the risk of nutrient losses from the site.

Complete site preparation, planting and seeding operations at a time and in a manner to ensure survival and growth of the selected species. Identify the criteria for successful establishment of vegetation such as minimum percent ground/canopy cover, percent survival or stand density, in the plans and specifications.

Additional Criteria to Restore the Quality of Soils to Their Pre-mining Level

Removal of soil material for reconstruction

Complete a detailed soil survey of the proposed mine area if suitable soils information is not available. Use the soil survey information to determine the extent and location of prime farmland soils.

Remove all upper soil horizons from the project area that are suitable for reconstruction before blasting, mining or any surface disturbance other than removal of woody plants and debris.

If the area is prime farmland, follow a reclamation plan prepared according to 30 CFR Part 823.

For soils that are not prime farmland, develop a reclamation plan prepared according to 30 CFR Parts 780 and 816.

Separate soils identified with high electrical conductivity, calcium carbonate, sodium or other restrictive properties, and treat if practicable.

Removal of overburden material for use as topsoil

Selected overburden materials can be substituted for or added to the A and B horizons if field observations and or chemical and physical laboratory analyses demonstrate that the material, or a mixture of overburden and original topsoil, is suited to restoring the capability and productivity of the original A and B horizon material. Analyze overburden materials for pH, sulfide content, organic matter, nitrogen, phosphorus, potassium, sodium absorption ratio, electrical conductivity, texture and available water holding capacity. If the overburden material is determined to be suitable for topsoil, remove and separate from other materials and replace according to the requirements for topsoil placement.

Storage of soil materials

Stockpile soil materials to be used as topsoil until they are needed for reclamation. Locate stockpiles to protect against wind and water erosion, dust generation, unnecessary compaction and contamination by noxious weeds, invasive species or other undesirable materials.

Replacement of soil material

When placing cover materials, treat graded areas to eliminate slippage surfaces and promote root penetration before spreading topsoil.

Spread topsoil so the position and thickness of each horizon is equivalent to the undisturbed soil without causing excess compaction.

The moist bulk density and soil strength of the reconstructed soil must support plant growth at a level equivalent to that of a similar layer in undisturbed soil.

Additional Criteria to Maintain or Improve Landscape Visual and Functional Quality

Reclaim the site to maintain or improve visual quality, based on the scenic quality and function of the reclaimed site for the end land use. Plan the reclamation to be compatible with the topography and land cover of the adjacent landscape. Focus on areas of high public visibility, and those offering direct or indirect human and wildlife benefits.

Grade and shape spoil piles and borrow areas to blend with the adjacent landscape topography to the extent practicable.

Develop a planting plan that mimics the species, arrangement, spacing and density of plants growing on adjacent landscapes. Select native species for erosion control and other purposes, where practical. Arrange plantings to screen views, delineate open space, act as windbreaks, serve as parkland, provide wildlife habitat or protect stream corridors.

CONSIDERATIONS

Prior to mining, develop a conservation plan that can be used by the landowner as a guide for the development of a reclamation plan with the mining company.

Improper locations for the storage of soil material, access roads and permanent impoundments can cause serious erosion and sedimentation problems. Locate these activities where runoff and sedimentation can be more easily controlled before it enters streams or leaves the site.

Soil permeability is often a problem on reclaimed soils. Improve soil permeability after placing backfill material by using tillage or deep ripping to decrease compaction, and promote infiltration and root development. Do not plan practices to promote infiltration if seepage through cover materials can increase acid mine drainage.

Overburden materials can be toxic to plants. To determine the best materials to plant, field-site or greenhouse grow-outs should be conducted to determine the feasibility of using overburden materials.

The reclamation of mined lands provides an opportunity to increase carbon sequestration. Choose species such as deep rooted perennial grasses and trees to increase the carbon sequestration potential of the reclaimed site.

Maintenance activities should be completed on a regular basis after the initial reclamation, to ensure success. The construction of stabilized access roads will allow access to the site for maintenance, without causing erosion problems.

Reclaimed mine areas can provide important wildlife habitat. Improve the potential for wildlife habitat by establishing diverse vegetation types, including water in the reclaimed landscape, increasing edge effect and diverse land forms.. Avoid monocultures of vegetation if possible.

Reclaimed soils are often low in organic matter. The use of organic soil amendments such as manure, compost, mulch or sewage sludge can contribute to the success of vegetative establishment by increasing soil organic matter.

Include native, non-invasive vegetative species in the reclamation plan, as appropriate.

Consider washing all equipment utilized in project activities, before leaving the site.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each treatment unit according to the Criteria included in this standard.

Specifications shall describe the requirements for applying this practice to meet the intended purpose.

Plans shall include provisions for the disposal of toxic materials that may be uncovered during earth moving and reclamation activities.

As a minimum, include the following information in the plans and specifications for the reclamation area.

- Location of the reclamation area
- Plans showing the final grading to take place on the reclamation area
- The location of topsoil stockpiles
- The location of erosion and sediment control practices
- Detail information for the installation of erosion and sediment control practices
- Detail information on the soil amendments to be applied to the site
- Detail information on the species and arrangement of plant materials to be planted on the site

OPERATION AND MAINTENANCE

Prepare an Operation and Maintenance plan that provides specific details concerning conservation practices identified in the reclamation plan. As a minimum include the following items in the operation and maintenance plan.

- Monitor the site for areas where settlement may adversely affect drainage and land use
- Monitor the site for bare spots, eroded areas, areas of excessive settlement and other areas where initial attempts to establish vegetation were not successful
- Monitor soil fertility and check vegetation to determine if additional nutrients or soil amendments are needed
- Maintain access roads
- Maintain drainage structures and channels
- Monitor the site for noxious weeds and invasive species
- Control vehicular traffic to minimize disturbance to reclaimed areas

REFERENCES

Colorado FOTG, Section I. Plant Materials Technical Note No. 59. 2002. Plant Suitability and Seeding Rates for Conservation Plantings in Colorado. USDA, NRCS. Lakewood, CO. http://efotg.nrcs.usda.gov/references/public/CO/COPMTN_59.pdf

Colorado FOTG, Section IV. Cover Crop 340 Conservation Practice Standard. 2006. USDA, NRCS. Lakewood, CO. <http://efotg.nrcs.usda.gov/references/public/CO/CO340.pdf>

Colorado FOTG, Section IV. Critical Area Planting 342 Conservation Practice Standard. 2004. USDA, NRCS. Lakewood, CO. <http://efotg.nrcs.usda.gov/references/public/CO/CO342.pdf>

Colorado FOTG, Section IV. Nutrient Management 590 Conservation Practice Standard. 2006. USDA, NRCS. Lakewood, CO. <http://efotg.nrcs.usda.gov/references/public/CO/CO590.pdf>

Colorado FOTG, Section IV. Pest Management 595 Conservation Practice Standard. 2006. USDA, NRCS. Lakewood, CO. <http://efotg.nrcs.usda.gov/references/public/CO/CO595.pdf>

Colorado FOTG, Section IV. Prescribed Grazing 528 Conservation Practice Standard. 2003. USDA, NRCS. Lakewood, CO. <http://efotg.nrcs.usda.gov/references/public/CO/CO528std.pdf>

Colorado FOTG, Section I, Erosion Prediction. Excel WEQ Colorado Guidance Document. 2003. USDA, NRCS. Lakewood, CO. http://efotg.nrcs.usda.gov/references/public/CO/CO_Excel_WEQ_Guidance.pdf

Landscape Design in Mined Land Reclamation, LAN-1, 1983. USDA, NRCS, CED. Washington, D.C.

National Cultural Resources Procedures Handbook. 2003. USDA, NRCS. Washington D.C. http://policy.nrcs.usda.gov/scripts/lpsiis.dll/H/H_190_601_a.pdf

Procedures to Establish Priorities in Landscape Architecture, TR-65, 1978. USDA, NRCS, CED. Washington, D.C. <http://www.info.usda.gov/CED/ftp/CED/tr65.pdf>

Revised Universal Soil Loss Equation, Ver. 2 (Rusle 2). 2004. USDA, NRCS. Washington D.C. http://fargo.nserl.purdue.edu/rusle2_dataweb/R_USLE2_Index.htm

Rules and Regulations for Colorado Division of Reclamation, Mining and Safety. 2006. Colorado Dept. of Natural Resources. Denver, CO. <http://mining.state.co.us/Rules%20and%20Regs.htm>

Soil Survey Division Staff. 1993. Soil survey manual. Pp. 90-92. USDA, SCS. Handbook 18. <http://soils.usda.gov/technical/manual/>