

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.

- 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.

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

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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 reduce 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.

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

Apply soil amendments and or plant nutrients as appropriate, according to the requirements of Conservation Practice Standard 590, Nutrient Management. If the recommended fertilizer rate exceeds the criteria in Conservation Practice Standard (590) Nutrient Management, use appropriate mitigating practices to reduce the risk of nutrient losses from the site.

Select plant materials suitable for the specified end land use according to local climate potential, site conditions and local NRCS criteria. Identify in the plans and specifications the species, rates of seeding or planting, minimum quality of planting stock, such as PLS or stem caliper, and method of establishment. Use only viable, high quality seed or planting stock.

Use local NRCS criteria for seedbed preparation, seeding rates, planting dates, depths and methods.

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 of the reclaimed site as well as the function of the 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. Choose native species of erosion control vegetation and other plant materials where practical. Arrange plantings to screen views, delineate open space, act as windbreaks, serve as parkland, 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 when. Do not plan practices that promote infiltration if seepage through cover materials has the potential to increase acid mine drainage.

Overburden materials are often toxic to plants. To determine the best materials to plant, conduct field-site or greenhouse grow-outs 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 will need to be done on a regular basis after the initial reclamation to ensure success. Include stabilized access roads to allow access to the site 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.

Every effort should be made to utilize native, non-invasive vegetative species. Consideration should be given to washing all equipment utilized in the project activities before leaving the site.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each treatment unit according to the Criteria, Considerations and Operation and Maintenance sections of this standard.

As a minimum include the following information in the plans and specification 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.

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

REFERENCES

Soil Survey Division Staff. 1993. [Soil survey manual](#). Pp. 90-92. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

[National Cultural Resources Procedures Handbook](#). 2003. USDA, Natural Resources Conservation Service, Washington D.C.

[National Agronomy Manual](#), Part 501, Water Erosion. 2002. USDA Natural Resources Conservation Service, Washington D.C.

[National Agronomy Manual](#), Part 502, Wind Erosion. 2002. USDA Natural Resources Conservation Service, Washington D.C.

[Revised Universal Soil Loss Equation, Ver. 2 \(Rusle 2\)](#). 2004. USDA Natural Resources Conservation Service, Washington D.C.

[Wind Erosion Equation \(WEQ\) Guidance Document](#). 2003. USDA Natural Resources Conservation Service, Washington D.C.

[Landscape Design in Mined Land Reclamation](#), LAN-1, 1983, National Technical Information Service, USDA NRCS Conservation Engineering Division, Washington, D.C.

[PROCEDURES TO ESTABLISH PRIORITIES IN LANDSCAPE ARCHITECTURE](#), TR-65, 1978, NATIONAL TECHNICAL INFORMATION SERVICE, USDA NRCS CONSERVATION ENGINEERING DIVISION, WASHINGTON, D.C.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [Field Office Technical Guide](#).