

**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. (regulates coal mining operations)
- Federal regulations 30 CFR 785.17, 816.22, and Part 823 (requirements and standards for surface coal mining and reclamation operations on prime farmland).

- Federal Register Vol. 64, No. 124, Tuesday, June 29, 1999/Notices, pages 34770-34778 (NRCS specifications for soil handling on relation to surface coal mining activities on prime farmland).
- 30CFR780.15 (Air pollution control plan)
- 30CFR701.5 (Definitions: Fugitive dust)
- The California Surface Mining and Reclamation Act of 1975 (SMARA)

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.

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 where estimated rates of sheet and rill erosion exceed acceptable levels.

Use sediment trapping practices such as filter strips, riparian forest buffers, contour buffer strips, sediment basins, or similar practices as appropriate, 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 excessive 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.

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.

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.

Separate soils identified with high electrical conductivity, calcium carbonate, sodium, or other restrictive properties, and treat as appropriate and 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 land owner as a guide for the development of a reclamation plan with the mining company.

Avoid locating soil stockpiles, access roads, impoundments, and other practices in locations where they could trigger excessive runoff, erosion, and/or sedimentation delivered streams and/or offsite.

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 or otherwise negatively impact groundwater quality, or where soil has been compacted to meet strength or stability criteria for engineered measures.

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.

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.

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.

Unless an extensive program is undertaken to change the chemistry of a serpentine site, the site indigenous vegetative species are typically the best choice for rehabilitation of that site. These plants are adapted to the stressful soil environment, but tend to be very slow growing. Consider the need for additional erosion control measures in these situations (Newton and Claassen, 2003.)

Every effort should be made to utilize native, non-invasive vegetative species and control the spread of invasive undesirable species. Where appropriate, wash all equipment utilized in the project activities before leaving the site.

Monitoring and 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

Cultural Resources Considerations

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

<http://www.nrcs.usda.gov/technical/cultural.html> is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

Endangered Species Considerations

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

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. <http://soils.usda.gov/technical/manual/>.

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Revised Universal Soil Loss Equation, Ver. 2 (Rusle 2). 2004. USDA Natural Resources Conservation Service, Washington D.C., http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

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

Surface Mining and Reclamation Act of 1975 and Associated Regulations. Revised January 2007. California Department of Conservation, Office of Mine Reclamation, Sacramento, CA. <http://www.consrv.ca.gov/OMR/smara/>

Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making. 2003. California Geological Survey Special Publication 123 by G.A. Newton and V.P. Claassen, Sacramento, CA. http://www.consrv.ca.gov/OMR/gh_publications.htm