

TENNESSEE FEDERAL PROGRAM (OSM)
Biology/Revegetation Procedure 10.4
Reforestation and Wildlife Habitat Enhancement Initiative

I. Introduction:

Since passage of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) the coal mining industry has made great strides in reclamation practices. Emphasis has been placed on creating stable backfill by using high compaction rates, selection of growth medium suitable for establishment of grasses, and planting highly aggressive ground covers. These practices have resulted in creation of an environment which is very suitable for establishment of grasses and legumes, but not necessarily suitable for the establishment of productive forestland and wildlife habitat. As a result, the trend has been a change in post mining land use (PMLU) selection from those which encourage establishment of trees, to PMLU's which encourage establishment of grasses and legumes.

Recently the Office of Surface Mining (OSM) initiated a nationwide program to promote and enhance the selection of PMLU's which include the planting of trees. A large part of this effort has been to examine current reclamation practices which are not conducive to establishment of forestland, and to identify alternate reclamation practices which will enhance the establishment of productive forestland. Research has shown that minor changes in traditional reclamation practices can create an environment which enhances highly productive forestland, at a cost which can be less than establishment of pastureland or hay land. The establishment of productive forestland will also provide high quality wildlife habitat.

II. Policy and Procedure:

The focus of this reforestation enhancement policy is in the following five areas:

- (1) selection of the appropriate growth medium from the available overburden;
- (2) reduced soil compaction of the growth medium;
- (3) use of less competitive herbaceous ground cover;
- (4) selection of tree and shrub species suitable for approved PMLU; and
- (5) permitting of specific standards for success for tree and shrub stocking, and ground cover rates.

The Knoxville Field Office (KFO) will encourage the selection of PMLU's which include the planting of trees and shrubs by approving use of the following reforestation enhancement reclamation techniques, and permit specific standards for success.

A. Selection of Growth Medium

The best available growth medium should be selected and segregated from the overburden material and placed to a depth of 4 to 6 feet on the final graded slopes. The growth medium should be selected from surface soil and weathered sandstone overburden taken from the top 10 feet, unless other material in the overburden is found to be more suitable for the selected tree species. The ideal growth medium consists of 4 to 6 feet of a sandy loam with slight to moderate acidity. This material should be segregated during overburden removal and stored as a part of the topsoil storage area. Replacement of the growth medium and seedbed preparation should be conducted when soil moisture content is less than moist or when soil is friable.

B. Low Compaction Final Grading

The guidelines and requirements for compaction and final grading are being changed for areas with a PMLU requiring tree and shrub planting. The revised guidelines are recommended for 2:1 (or lesser) slopes and should not be used in steeper slope areas. Final grading will be conducted such that any soil compaction is controlled by minimizing compaction for the last lift of spoil and using very low densities. The dozer operator should limit the number of passes to one or two during final grading. The operator is still required to eliminate the highwalls, to minimize settlement, and to assure that the factor of safety for slope stability can be achieved on backfilled disturbed areas. The final lift will have a minimum lift thickness of 4 feet and a maximum of 6 feet, and should be prepared as a growth medium material to enhance tree growth. The final slopes should be graded to include as much organic material, fragmented rock, and woody debris as possible to create a microtopography similar to the natural forest conditions. These backfilling practices will be acceptable only for PMLU's requiring woody plants.

Drainage is allowed to sheet flow over the recommended slopes only if the watershed is small or if the surface flow is insignificant and will not affect the slope stability. If necessary, a highwall diversion ditch may be required to assure the integrity of the reclaimed slopes. However, the requirement for a highwall diversions will be evaluated on a case-by-case basis.

C. Tree Compatible Ground Cover

Herbaceous ground cover is a necessary component of mined land reclamation to control erosion. Research has proven that excessive competition from herbaceous ground cover inhibits both tree survivability and growth. In order to optimize tree survivability and growth, a balanced seed mixture of permanent grasses, legumes,

temporary plants and small grains/ground cover species should be planted. A balanced seed mixture will allow for short term and long term erosion control, and not inhibit tree survivability or growth. Kentucky-31 Fescue, Sericea Lespedeza, all vetches, clovers (except ladino) and other aggressive or invasive species should be avoided. The use of native species is encouraged.

KFO will review each permit application on a case-by-case basis and work with the permit applicant to select a seed mixture that will produce a ground cover that will control erosion, satisfy the approved postmining land use, and enhance tree growth and survivability. The use of less competitive ground covers will also encourage natural succession which is beneficial to establishment of healthy and productive forestland and wildlife habitat.

D. Tree Selection

Tree, shrub, and nurse tree species selections should be based on the approved PMLU and site specific characteristics such as soil type, soil-moisture, and aspect. It is recommended that the permit applicant work closely with the surface owner in the selection of the tree and shrub species for achieving the postmining land use. OSM does not propose to require specific species or combination of species of trees and shrubs to be planted based on the proposed land use; however, the applicant is encouraged to consider Information Memorandum No. 31, Equivalent Options, to select the species of trees and shrubs to be planted. OSM also recommends that the permit applicant consider the use of native species versus introduced species. Mycorrhizae inoculated seedlings should be used when possible to improve the survival rate of the stocked species.

E. Fertilizer Requirements

It is recommended that fertilizer applications be based on a current soil test. The fertilizer recommendation should have an adequate rate of phosphorus and potassium and a low rate of nitrogen. The testing laboratory should be made aware that the area will be planted in trees in order to provide an appropriate fertilizing rate. In most cases, the nitrogen rate should be limited to 40 pounds/acre. The lower rate of nitrogen reduces the height of the ground cover but not its density, which lowers competition between ground cover and woody plants.

F. Standards for Success and Phase III Bond Release

The programmatic standard for success for forestland is 500 stems/acre as specified in previously issued Field Office Policy Memorandum No.13. However, on areas with a PMLU of non-commercial forest, undeveloped land, wildlife habitat and other PMLU's

requiring tree planting, a lower tree stocking standard for success may be selected on a case-by-case basis and specified in the individual permit during the permitting process. KFO will work with the permit applicant to develop the standard for success based on such factors as type of approved PMLU, landowner desires, woody species to be planted, post mining slopes, and soil characteristics. All woody species compatible with the PMLU, including volunteer species, will be counted toward revegetation success.

The programmatic standard for success for vegetative ground cover is 80 percent on all PMLU's requiring tree planting. This standard is established by regulation and Field Office Policy Memorandum No. 29. However, for areas qualifying for re-mining, the regulations allow that, as a minimum, ground cover shall not be less than the ground cover existing before redisturbance and shall be adequate to control erosion.

Each re-mining area will be evaluated on a case-by-case basis, and lower ground cover standards for success may be approved during the permitting process, based on an evaluation of the existing ground cover. The Bond Release Section will be available to conduct statistical analysis of the existing ground cover on eligible re-mining areas. All herbaceous species compatible with the PMLU, including volunteer species, will be counted toward revegetation success.

G. Erosion Gullies

The formation of stabilized erosion gullies is compatible with most PMLU's requiring tree planting. The formation of stable gullies on backfilled slopes will be allowed and regrading will not be required. Stabilized gullies will not affect Phase III bond release, as long as off site sedimentation is avoided.