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A Guide for the Use of Organic Materials As Mulches in Reclamation of Coal Minesoils in the Eastern United States

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Reasons for Organic Materials on Mined Lands

Mulching has been used for years to protect the soil from erosion and excessive drying in agriculture, highway construction, roadside stabilization, and landscape development. However, mulching has been used in recent years in surface-mine reclamation to help establish optimum vegetative cover for site stability and productivity.

In the East, it has long been recognized that quick revegetation of freshly graded slopes or of any disturbed surface-mine areas is one of the most important means for effective control of excessive runoff, erosion, and sedimentation. However, physical and chemical characteristics of minesoils can cause adverse environmental and microclimatic stress conditions that hinder establishment and growth of plants.

The following stress conditions are the most detrimental to seed germination and subsequent plant growth: erosion, extreme diurnal surface and soil temperatures, lack of available moisture, and extremes in pH. These factors, along with lack of nutrients and organic matter, make it difficult to establish and maintain a diverse productive vegetative cover that will meet reclamation standards. To alleviate these conditions and make the minesoil more favorable for plant establishment and growth, the disturbed area microclimate must be modified. In addition to the usual fertilizers and lime used in the revegetation process, the application of a surface mulch can be used to modify plant growth conditions. The protective layer should maintain soil stability within acceptable levels during the time it takes the seedlings to emerge and become established, and then continue to enhance vegetative growth until the treated area is permanently stabilized. Also, mulches can be used on any disturbed and unprotected mined-surface area for temporary erosion protection. For example, when reclamation grading is completed and planting conditions are unfavorable for seeding, mulch can be used.

Organic mulches stabilize soils, reduce losses to erosion, enhance plant growth conditions, and aid in the construction of an improved minesoil profile. Straw, hay, and some hydromulches are most commonly used. However, recent restrictions on the disposal of various types of organic wastes (crop and wood residues, municipal and industrial wastes) have generated interest in their use as mulches or amendments for surface minesoils. Use of these resources in mine-reclamation systems will help not only to alleviate a disposal problem for the various residues and wastes, but also to control erosion while simultaneously protecting or enhancing the quality of our environment.