# Opportunities for Visual Resource Management in the Southern Appalachian Coal Basin[1]

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Abstract: This paper outlines the opportunities for visual resource management (VRM) in the southern Appalachian coal basin resulting from the Surface Mining Control and Reclamation Act. It focuses upon VRM as a regulatory activity that works to insure the proper enforcement of the law and effective development of its implementation programs. VRM for Appalachian surface mining is directly controlled by the law which can significantly protect the region's visual resources given proper enforcement and program development. However, the full environmental, economic and social costs of achieving the potential visual benefits are not fully known.

## INTRODUCTION

The Tennessee Valley Authority (TVA) has long been concerned with the visual impacts resulting from the surface mined coal the agency purchases. Anticipating a change in Federal and State regulatory roles because of pending legislation, TVA renewed efforts in early 1977 to define the visual impacts of surface coal mining, and develop, test and implement a method enabling the agency to manage the visual resources of the Tennessee Valley and surrounding regions more effectively.

This paper outlines the results of these efforts and the opportunities for visual resource management (VRM) in the southern Appalachian coal basin resulting from the Surface Mining Control and Reclamation Act. It focuses upon VRM as a regulatory activity that works to insure proper enforcement of the law and effective development of its implementation programs. VRM in this context is a regulatory effort aimed at positively influencing, preserving or enhancing the visual resource at a statewide scale for both abandoned mine lands and future mining areas. The paper presents a detailed definition of surface coal mining's visual impacts. In addition, a brief overview of the industry's development and relationship to VRM is included. The paper concludes with VRM recommendations in response to the law and present mining practices.

## THE VISUAL IMPACTS OF SURFACE COAL MINING

Like other resources of the land, the visual resource must be properly managed to maintain acceptable standards of quality. Whether existing quality is enhanced or degraded is a function of the type and extent of change to the landscape. Surface coal mining extensively changes the landscape and can result in severe visual impacts. Many strip mines throughout southern Appalachia have left scars that remain visible for many years to millions of residents and tourists. In the past, little consideration or study has been given to these impacts.

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During stripping operations, huge quantities of earth are removed from the surface, hauled and deposited in adjacent areas, often creating dramatic changes in the natural landscape. Changes in natural landform, color and texture that create contrast between the mine and its surroundings produce surface coal mining's major visual impacts (Figs. 1 and 2). Other visual impacts can include off-site facilities such as tipples and storage areas, and downstream pollution.

These impacts are a function of time-- the amount of time necessary for the area to regenerate itself to the point where it either blends into the original landscape or the modified landscape is visually acceptable. Because the life of an active mine is very short in relationship to the amount of time necessary for the acceptable blending of the mined area into the visual landscape, concern for the visual impacts of active mines should be minimal. Primary concern should be given to the long-term visual impacts of the reclaimed area.

Figure 1 - *Contrast between a mine and its surroundings resulting from early mining-reclamation practices; area mine, Van Buren County, Tennessee.*

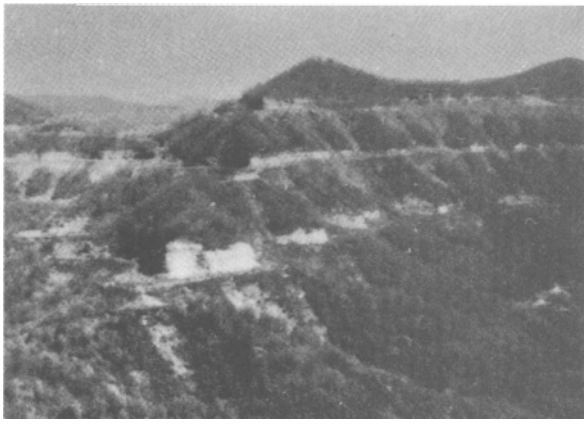

Figure 2 - *Contrast between a mine and its surroundings resulting from early mining-reclamation practices; steep slope mine, St. Charles, Virginia.*

The physical change and contrast between the mine and its surroundings resulting from the mining operation vary over time. The visual impact of that change is dependent upon the viewer's perception of the modified landscape. Discussions of surface mining's visual impacts must, therefore, include the characteristics of both the physical change and the viewer.

## Characteristics of the Physical Change

Surface mining's visual impacts are secondary impacts resulting from a fundamental mining activity and its associated environmental impacts. Improper placement of overburden, toxic materials and topsoil, and inadequate drainage and revegetation can result in many environmental impacts including landslides, erosion, stream siltation and acid mine drainage. These primary impacts create the contrast between the mine and its surroundings that may be perceived by the viewer as visual impacts.

The amount of time necessary for the mined area to become visually acceptable, the duration of the visual impacts, is primarily influenced by the physical characteristics of the mine and the perceptual characteristics of the viewer. The mining-reclamation technique, the soil, overburden and seam characteristics, the post-mining landuse, and the visual absorption capacity of the landscape determine the physical duration of the impact (Figs 3.and 4).

## Perceptual Characteristics

Perceived visual impacts (both magnitude and duration) are greatly effected by the characteristics of the viewer, the viewing location and the view. A resident of Hardburley, Kentucky (Fig. 5), can be expected to form a slightly different aesthetic reaction to a view of a surface mine than a tourist from Cleveland, Ohio (Fig. 6). Their unique perceptions of the same view are equally valid.

Intuitively, many people believe the majority of people feel strip mines are ugly and should not be seen. Most of the literature and thinking on surface mining VRM has been based upon these assumptions. Yet little if any research has been conducted to establish clearly the public's aesthetic perception of surface mines.

Figure 3 - *Improper reclamation of a small area mine, Van Buren County, Tennessee.*

The identification of the public's perception of surface mines is extremely difficult. A person's perception of a mine is intertwined with the perception of the entire surrounding landscape including past mining practices, logging and farming activities. A person's understanding of the industry, whether based on fact or rumor, and that person's involvement with the industry also influence the perception of the mines. Research is necessary to establish the public's aesthetic attitudes on surface mines to enable a strong rationale for VRM efforts.

Intuitively, many people also believe the public's attitudes toward surface mines are greatly influenced (or should be) by the visibility of mines. Contrary to popular belief, most southern Appalachian strip mines are not highly visible from major roads and communities. Most steep slope mining takes place on the upper portion of a mountain. Consequently, the mines usually cannot be seen from roads and communities in the valleys because they are screened by vegetation and the curvature of the mountainside. Area mining on gently rolling slopes is also usually screened by vegetation and topography. Although significant contrast between the mine and its surroundings may exist, the perceived visual impacts of the mine may be minimal if few people see it. The relationship between the magnitude of a mine's visual impact and its visibility is debatable. A person's perception of a mine will also be affected by a) distance from the mine; b) orientation to the mine; c) the importance of the viewing location (state park or an abandoned mine); d) the duration of the view; e) the time of day, weather and season; and f) the condition of the areas surrounding the mine. Accurate generalizations about the magnitude or duration of surface mining's visual impacts are obviously very difficult to formulate.

Figure 4-- *Proper reclamation of a small area mine reduces potential visual impacts, approximately one year after mining; Jamestown, Tennessee.*

## PREVIOUS EFFORTS AT VRM FOR SURFACE COAL MINING

Prior to the implementation of the Surface Mining Control and Reclamation Act, efforts to control the visual impacts of southern Appalachian surface mining were sporadic and inconsistent. The development of the industry can be divided into three phases. The initial phase began immediately following WW II and lasted until the passage of state reclamation laws in the mid-196O's. During this time, improvements in earth-moving capabilities together with changing coal markets stimulated the use of surface mining as an economically feasible and significant means of coal production, but "Unfortunately, the early acceleration of coal surface mining was largely uncontrolled and too often environmentally reckless." (Curry 1977).

Before state reclamation laws, few stripping operations were conducted with regard for the environment and most resulted in severe visual and environmental impacts. Tens of thousands of acres were drastically disturbed in Appalachia with little or no reclamation. Decades will be necessary to hide thousands of miles of exposed highwall, to clean polluted streams, to stabilize landslides and to replenish lost topsoil and vegetation resulting from uncontrolled mining.

VRM efforts during this period centered on cooperative tree-planting programs conducted by various Federal, state and industry groups. These programs were in part aimed at improving the appearance of abandoned mine lands. The programs were small, shortlived and provided little relief to the enormous problem.

Figure 5 - *Perception of surface mines is intertwined with perception of the entire environment; Hardburley, Kentucky.*

Increased public awareness and concern for surface mining's unchecked environmental effects triggered the second phase in the industry's development. Reacting to public pressure, the Appalachian states made enormous efforts between the mid-1960's and the mid-1970's to regulate the mining-reclamation techniques: "In the mid-1960's the reclamation arms of Kentucky and West Virginia, working with other state and Federal agencies and the coal industry, began the first serious efforts to improve surface mining techniques in central Appalachia...The major trust of these early efforts was to keep overburden closer to its original placement" (Curry 1977).

The state mining and reclamation laws reduced some of strip mining's environmental impacts and thus the visual impacts by regulating outslopes and requiring basic revegetation. But, enforcement problems in many areas limited the effectiveness of these laws. Improper handling of topsoil and spoil materials, and slow reclamation work continued to cause major environmental and visual impacts. Even wider strict compliance with these initial reclamation laws, significant visual impacts could still result. The environmental controls alone were inadequate to achieve effective control of the visual impacts.

Figure 6 - *A dramatic view of a surface coal mine visible to millions of tourists; I-75 Northbound, London-Corbin, Kentucky.*

In addition to the initial regulatory efforts at environmental and visual controls, numerous site specific reclamation projects were conducted. These projects clearly established the ability to make productive use of mined lands when proper planning and mining-reclamation techniques were used. However, the majority of initial efforts at controlling visual impacts were after-thoughts rather than integral parts of the mining process and remained linked to environmental controls. Mining continued to devastate the region's visual resources because management efforts did not directly address the causes of the problem at a sufficient scale.

Figure 7 - *Reclamation of a multiple-seam, steep slope mine similar to standards established by the new law; Massengale Mountain, Campbell County, Tennessee.*

WHAT IS VRM FOR APPALACHIAN SURFACE MINING?

Visual resource management for Appalachian surface mining is directly controlled by the Surface Mining Control and Reclamation Act. The act can adequately protect the regional visual resource from the vast majority of surface mining's visual impacts and establishes programs to fund the reclamation of inadequately reclaimed lands and waters. VRM efforts should concentrate primarily on assisting in the development and implementation of state Abandoned Mine Lands Reclamation and Lands Unsuitable for Surface Coal Mining programs. VRM in this context is a large scale, regulatory effort aimed at positively influencing, preserving, or enhancing the visual resource at a statewide scale. Proper enforcement of the law will also do much to alleviate visual impacts and should be facilitated whenever possible.

Because these programs will be specific to the needs, conditions and administration of each state, it is inappropriate to outline standard VRM methods or recommendations for these programs. They are best discussed as portions of a specific state's program, and in response to the state's full surface mining administration and industry.

The secondary emphasis should be on the detailed planning and reclamation design of specific areas either for lands disturbed prior to the law, or special designated areas within the law. VRM at this scale is a site design problem and will vary for each site.

Although the law can satisfactorily control surface mining's visual impacts, effective enforcement of many environmental protection standards, including back-to-contour criteria, may prove difficult. These standards will be continually challenged by landowners and the mining industry. Federal and State administrations will be pressured to grant variances from these standards based upon the landowner's desire to return the land to a "higher or better landuse." It is not clear whether the administrations will deny such petitions on visual criteria.

The Surface Mining Control and Reclamation Act presents the opportunity to protect significantly southern Appalachia's visual resources from surface coal mining given proper enforcement and program development. The full environmental, social and economic costs of achieving the potential visual benefits are not known.

SURFACE MINING CONTROL AND RECLAMATION ACT

In 1967, the U.S. Department of Interior published a national report titled, "Surface Mining and Our Environment,"(USDI 1967) that documented the devastating impacts of surface coal mining. The report was a response to the continued public outcry on the impacts of standard mining practices. It made a strong appeal for more effective controls based on statistical information, and emotional and visual concerns. The report became a starting point for the development of national controls.

These concerns culminated in the enactment of the Surface Mining Control and Reclamation Act in 1977. Through the law, Congress recognized surface coal mining as a fundamental and viable source of energy that must be given an increasingly important role in supplying national energy needs. They also set standards to insure that surface mining will be conducted in an environmentally, socially and visually acceptable manner.

New mining-reclamation standards focus on the requirement that all future mined lands be reclaimed to their "approximate original contour" (Fig. 7). This standard is based primarily on emotional and visual concerns as evidenced by the lack of documentation on the environmental effects of back-to-contour mining. Virtually no conclusive evidence on these impacts existed prior to the law. The law established a strong, new direction for surface mining in order to satisfy the public's emotional and visual reaction to surface mining.

The law's consideration of the visual environment can be divided into two categories: (1) reclamation of lands disturbed by prior mining practices; and (2) regulation of present mining practices. All lands and waters disturbed by prior mining practices and inadequately reclaimed are eligible for reclamation funds distributed through the Federal Office of Surface Mining (OSM). Reclamation of abandoned mine lands will occur primarily through each state's Abandoned Mine Land Reclamation Program and the USDA Soil Conservation Service's Rural Abandoned Mine Program, (R.A.M.P.).

A state Abandoned Mine Land Reclamation Program lets specific reclamation work contracts based upon a statewide reclamation plan and site screening process. The Final OSM Abandoned Mine Lands Program Rules [3/], place highest reclamation priority on lands and waters presenting existing or eminent danger to the public's health, safety and welfare; after reclamation of these areas, priority is given to areas that satisfy a range of objectives concerning general environmental quality and public welfare. Concern for the visual environment is one of the many stated objectives. General ranking of lands to be reclaimed and selection of specific reclamation sites will be in some part determined by visual concerns. These concerns may also be incorporated into the final design of a specific site's reclamation plan.

Concern for the visual environment is also fundamental in portions of the law that regulate present mining. Congress established as national policy that the vast majority of surface coal mining, as regulated by the law, will adequately preserve the nation's visual resource. This they insured by the establishment of environmental protection criteria partially developed because of their effectiveness at protecting the visual resource. These include back-to-contour, proper handling of topsoil and toxic materials and prompt revegetation standards.

Only under special conditions did Congress feel that the visual impacts resulting from the prescribed mining practices will require additional controls to adequately protect the nation's visual resource. Such conditions allow each state to designate certain lands as unsuitable for surface coal mining based in part on visual criteria [4/] this also applies to all Federal lands. Standard permitting procedures and requirements do not specifically consider the visual impacts of the proposed mine although the required reclamation plan may respond to VRM criteria.

It is the author's opinion that the law can adequately protect the visual resources of southern Appalachia through its environment protection criteria, lands unsuitable for surface mining, abandoned mine lands and R.A.M.P. programs. The law strikes an appropriate balance between the preservation of the visual resource and the national need for coal. Administration of the law and program development has been properly placed in each state allowing the necessary response to specific industry, regulatory and administrative practices.

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[3/] See Section 874:13, U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement, Abandoned Mine Land Reclamation Program Final Rules, 43 F.R. 49932, Wednesday, October 25, 1978.

[4/] Le Title V: Control of the Environmental Impacts of Surface Coal Mining, Section 522 - Designating Areas unsuitable for Surface Coal Mining, of the Surface Mining Control and Reclamation Act.

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