
CHAPTER 8

POST-MINING LAND USES

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HANDBOOK FOR SMALL MINE OPERATORS

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PROBLEM & PURPOSE

The performance controls of the Regulations vary in a number of places according to the approved post-mining land-use. This sheet is intended to give the operator an overview of the alternative post-mining uses, and some of the implications of each. The post-mining land use will be a major factor affecting the future hydrology and water quality of the area.

Generally any change in land-use, particularly in cases where it involves obtaining variances from the approximate original contour restoration requirement, is likely to lengthen the application process. However, carefully selected and planned post-mining uses can save operating costs and significantly raise the post-mining value of the land.

APPLICABILITY

All mine operators should carefully consider all the alternative post-mining uses of the site. The choice will depend on a number of factors which will affect the feasibility of each use. For instance, some counties in West Virginia are reported to have only 6% of their land area which is not too steep for urban or agricultural uses (5). In these areas the demand for development land is likely to be high. If the local planning agency approves such a change of use, the RA is likely to grant a variance [785.15]. Generally any change in use must result in a post-mining use which is an equal or better economic or public use.

In some cases, the potential for creating new land-

forms which surface mining offers can be realized. For instance Peabody constructed a 400 m gallon water supply reservoir for the town of Lynnvilleville on one of their surface mining sites (6). In such a case, careful operational planning to make sure that the final cut is located correctly to minimize earthmoving to create the reservoir is essential.

In areas of poor groundwater resources it may also be feasible to create aquifers. Due to fracturing and shifting of the overburden, voids increase and the potential water storage capacity also increases. If the volume is confined by impermeable geologic strata, this can form an underground reservoir (7).

RELEVANT SECTIONS OF THE REGULATIONS

Section 779.22 (Land-use information) requires as part of the requirements for information on environmental resources, a map of the uses of the land at the time of filing the application, and a narrative of the capability and productivity of the land.

Section 779.27 requires the applicant to determine whether any land within the proposed mine area may be prime farmland. If so the special performance standards for prime farmland (Part 823) apply.

Part 780 (Minimum Requirement for Reclamation and Operators Plan) requires:

1. A Fish and Wildlife Plan [780.16]. This is mostly to show how adverse impacts of mining on fish and wildlife can be minimized. For areas where the approved post-mining use of the land is for fish and wildlife, the applicant will need to show how the site is enhanced for this use.
2. Reclamation Plan: Protection of the hydrologic balance [780.21]. This Section is also mostly concerned with minimizing the adverse impacts of mining water resources. But clearly, where enhancement of the water storage capacity of the area is planned, it must be shown in this Section.
3. Reclamation Plan - Post-Mining Land Uses [780.23]. This Section requires a detailed description of the proposed land uses for the site. The operator must show that alternative land uses have been considered and also show that the chosen use is consistent with the land use policies and

plans of the area. In this section it is stated that, "where a land use different from the pre-mining land use is proposed, all materials needed for approval of the alternative use" [816.133] must be provided.

4. Plans of any proposed impoundments which are proposed to be part of the post-mining land use plan must be included as a requirement of Section 780.25.

Part 785 (Requirements for Permits for Special Categories of Mining) included a section [785.14] on Mountaintop Removal mining and a section [785.16] on variances from the "approximate original contour" restoration requirements. These sections may be important for operators wishing to create relatively flat development land in areas of steep terrain.

An important section of the performance controls [Part 816] is Section 816.101 (Backfilling and Grading: General Requirements) which contains the "approximate original contour" requirement. There are also differences in the requirements of Section 816.111 (Revegetation: General Requirements) and Section 816.116 (Revegetation: Standards and Success) according to the approved post-mining land use. Throughout Part 816 there are a number of cases where it is stated that the RA may approve alternative land uses if the proposed use is compatible with adjacent land uses, and if it can be shown that the proposed use is feasible. There are several other conditions.

DISCUSSION & DESIGN GUIDELINES

These "guidelines" are intended as no more than a checklist of post-mining land uses, to provide the

operator with a quick reminder of alternative uses and their implications.

LAND USE	DEMAND	PROBLEMS	COMMENTS
Urban Uses	Industrial, Residential, Commercial, etc. In some areas of steep terrain the lack of level land is a serious constraint to development. Urban uses demand available water and developable land in close proximity. One may be available without the other. Accessibility is necessary.	Variations from the approximate original contour requirement must be obtained. Settlement of spoil mass may cause problems for several years after mining. Creation of developable land must be consistent with land use policy of local planning agency.	The post-mining land value for development land in areas where suitable land is scarce may be more than ten times its pre-mining value. The haphazard creation of areas of flat or gently sloping land in areas of steep terrain may result in an undesirable change in landscape character. In some remote areas accessibility can be improved. There are cases of airstrips on reclaimed mine sites, and improved sections of roads. The clearance of old deep mine dereliction (waste dumps, etc.) in conjunction with on-going surface mine operations has great potential for creation of industrial land and land for other uses.

DISCUSSION & DESIGN GUIDELINES (CONTINUED)

LAND USE	DEMAND	PROBLEMS	COMMENTS
Water Storage Surface Storage	Poor groundwater resources and unreliable or insufficient stream flow makes surface water storage necessary, particularly in parts of Appalachia. Water impoundments may have potential for multi-use for recreation, wildlife, etc.	Supply should be protected. The presence of acid-forming materials may make impoundment unfeasible. Old deep mine workings in the area may cause problems.	Mining operations may have the potential for creating impoundments either by damming or by excavation. In either case careful planning and coordination is essential to minimize the earthmoving required. Creation of an assured water supply and development land may help small communities in mountainous areas achieve some of their long term objectives. There are a number of cases of impoundments in final cuts which are not affected by acid drainage, being used to supplement local water supply. A reliable water supply may attract some processing industries and offset unemployment problems.
Ground Water Storage	In some areas, groundwater yield is very low, usually due to the absence of water-bearing strata (aquifers). The creation of aquifers and reclamation to original contour may be feasible.	Fracturing and shifting of overburden will increase storage capacity but the aquifer must also be confined. Pollution of groundwater by acid drainage may make water unusable.	Surface mining increases void space in cast ground by 15-25%. This increases not only the water storage capacity but also the permeability and hence the recharge rate. Provided that the water in the spoil can be confined by relatively impermeable strata it can be recovered by pumping. The problem of oxygenated water coming into contact with pyrite must of course be recognized.
Agriculture Cropland	Most land suitable for reclamation as cropland will be prime farmland and subject to the special performance standards of Part 823. The creation of prime farmland is likely to cost in the region of \$5000 per acre or more. It may not be possible to justify this in some areas.	In steep areas, slope will be limiting as most probably will the availability of topsoil. Poor drainage is a common problem associated with cropland on reclaimed mine land. Where topsoil substitutes were used to supplement existing topsoil, lack of organic matter and soil microorganism may lead to disappointing results.	There is considerable experience in reclaiming mineland for crops in West Germany and Britain. In the US a growing number of companies prior to the 1977 act were experimenting with reclamation for cropland but with the special requirements of the Regulations covering the reclamation of prime farmland, expertise in the US will grow rapidly. Very careful management for a period following surface mine reclamation is necessary to reestablish the drainage characteristics, the moisture and nutrient availability in the soil, etc. Underdrainage is frequently required on reclaimed sites.
Other Agricultural Uses	Good grazing land can be created on reclaimed sites without incurring heavy costs. Section 816.116 contains specific performance standards for grazing lands. Recently experiments in growing various fruit crops have been carried out.	Good quality pasture will give excellent erosion control on restored sites. When heavy stocking rates are used damage to sod is likely on restored land.	There are many cases of land restored for grazing and forage crops. One of the pioneers in this field has been the Ayrshire Coal Company and their Meadowlark Farms, Inc., operating in Illinois, Indiana and Kentucky. Highly efficient livestock units could be created on reclaimed mine sites, though the site would probably have to exceed 25 acres (3). Experiments in raising fruit on reclaimed mine sites have been conducted in West Virginia with some success (2).

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DISCUSSION & DESIGN GUIDELINES (CONTINUED)

LAND USE	DEMAND	PROBLEMS	COMMENTS
Fish and Wildlife	The demand for wildlife habitat may be from sportsmen, nature conservationists etc.	The impact of surface mining on fish and wildlife may be serious in terms of destruction of habitat, pollution of surface water, etc. However even some orphan land now provides extremely rich habitat and in some areas non-acid impoundments provide extremely rich habitat and in some areas non-acid impoundments provide excellent fishing.	The value of habitat for wildlife depends on several factors, some of which can be varied. The Regulations require the use of native species of the same seasonal variety as pre-mining conditions. Wildlife can make better use of native plants than of introduced species, and natural diversity is an important factor in creating wildlife habitat. Food source, cover, "edge" conditions (hedges, woodland edges, etc.) and the presence of water in various forms are important.
Forestry Commercial	Commercial forest also has multi-use potential (hunting/water catchment).	The requirements for mechanized commercial forestry make accessibility and terrain important factors in developing commercial forest land.	Surface mining can improve accessibility but in some cases where haul roads are to be left permanently, the performance standards contain specific requirements. There are also specific standards for stocking of forest land [816.117].
Recreation	Various recreational uses can be considered for post-mining land use on surface mine sites. Accessibility and the presence of water are often two important factors in choice of recreation areas.	Small mine sites may not have the potential for creation of facilities for some recreational activities.	Mine sites close to existing communities may have great potential for the creation of recreational land alone or in combination with development land.

REFERENCE

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- (4) Riddle, J.M. and Sperstein, L.W., 1978, "Premining Planning to Maximize Effective Land Use and Reclamation," Proc. of Reclamation of Drastically Disturbed Lands, Schaller, F.W. and Sutton, P., (Eds.), ASA, Madison, WI.
- (5) Chironis, N.P., July 1977, "Imaginative Plans Make Mined Land Better Than Ever," Coal Age, pp. 48-51.
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