



POWELL RIVER PROJECT

RECLAMATION GUIDELINES FOR SURFACE MINED LAND

Reclaiming Mined Lands as Industrial Sites

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Introduction

With the decline of coal-mining jobs in Virginia's coalfields, availability of local employment in high-wage industries is a major concern. One factor that hinders high-wage manufacturing industries from locating in the coalfield region is a shortage of suitable industrial sites. In some cases, coal surface mines can create sites suitable for industry as a post-mining land use while meeting all Surface Mining Control and Reclamation Act (SMCRA) requirements.

Reclamation of mined areas to support use by industry provides many benefits. First of all, suitability for industrial use will increase the mined land's market value, compared to the woodlands and pastures typically established on reclaimed mines in Virginia's coalfields. An increase in the reclaimed land's market value will benefit the landowner.

Also, it is reasonable to expect that the value of land near the industrial site will also increase, especially if it is suitable for residential or commercial development or for use by supporting industries.



Figure 1. A portion of the Southern Gap Development Area in Buchanan County after reclamation but prior to building development. This site was prepared for industrial use by the mining and reclamation operations; thus, the spoil compaction and road development were cost effective. The paving and utility accesses necessary to enable the site to serve an industrial use were completed as a cooperative effort by the mining contractor and Virginia Coalfield Economic Development Authority (CEDA).



Figure 2. The Sykes Enterprises building at the Southern Gap Development Area in Buchanan County (see figure 1) in winter, prior to initiating operations. Because the site was compacted thoroughly and effectively during reclamation operations, the firm was able to install modern communications equipment that is sensitive to ground movement, as on a natural site.

If a mine site is being reclaimed to serve an industrial use, the mining operator may be able to obtain quicker release from performance bonding requirements. For example, SMCRA's five-year requirement for vegetative persistence with no augmentation would not apply if the mine were being reclaimed for industrial use. And finally, such sites can enhance prospects for location of new industry in the Virginia coalfields.

This publication provides guidelines for use by the Virginia coal-mining industry in reclaiming mined land to support industrial development.

Guidelines for Reclaiming Mined Land as Industrial Sites

If a mining company or landowner is considering an opportunity to mine coal on a site where the reclaimed land might be suitable for industrial development, we recommend the following procedures.

1. Determine the Site's Potential Suitability for Industrial Use

This can be accomplished most easily by contacting a local economic development agency. Several agencies serve in this role, including county industrial development authorities, the Lenowisco and Cumberland Plateau Planning District Commissions, and the Virginia Coalfield Economic Development Authority (CEDA).

If a mine operator has serious intentions to produce a reclaimed area suitable for industrial development, we

recommend contacting CEDA as early in the process as possible. The initial contact should occur prior to filing the mining permit. When mining is completed, acceptance of the reclaimed site by CEDA into its industrial site inventory will allow the Virginia Department of Mines, Minerals and Energy (DMME) to conclude that SMCRA's post-mining, land-use requirements have been met and – when all other SMCRA requirements have been satisfied – to release the operator's performance bond.

CEDA works closely with Virginia DMME; the mine developer can contact CEDA directly or by working through DMME. Upon request by either the permit applicant or the property owner, Virginia DMME will communicate an industrial development interest to CEDA. Virginia DMME or the mine operator may arrange a meeting of CEDA representatives with the property owner, the permit applicant, or both to discuss the site's potential for industrial use. Such a meeting can take place at the site itself, at Virginia DMME offices, or at another location. At such a meeting, the operator can discuss the site's industrial development potential with DMME and CEDA.

Proximity to major roads and utilities will be considered by CEDA and DMME in their assessment of a mine site's post-mining, industrial-use potential. If CEDA and DMME determine that the site can be made suitable for industrial use, CEDA will issue a letter to the permit applicant and/or the property owner to that effect. In its review of a permit application, Virginia DMME will consider such a letter to be evidence of the site's industrial-use potential.

If CEDA determines that a site's potential to serve an industrial use immediately after mining is not favorable, it may still be possible for the mine operator to develop a reclamation plan to enable the site to be suitable for industrial use at a future time (see below).

2. Establish a Post-Mining Land-Use Strategy

There are at least two major strategies available to a mine operator who wants to reclaim land to establish an industrial site.

Short term: If the site's location and reclamation potential are favorable for industrial use, the reclamation plan and permit development process should be conducted in close coordination with CEDA – especially if the operator wishes to take advantage of CEDA's ability to provide spoil-placement cost-share funding. In this case, the mine permit should specify that the post-mining land use is industrial.

Long term: If the mine operator does not foresee the site being useful for industrial development purposes immediately after mining, we would not recommend writing the permit to specify an industrial post-mining land use. An alternative strategy would be to write the permit to specify a nonindustrial post-mining land use that is compatible with future conversion to industrial use, should such a conversion become feasible.

In many cases, it may be necessary for the mine operator to obtain a variance from the approximate original contour (AOC) requirement in order for the site to be suitable for industrial post-mining land use. If the mining permit specifies an industrial post-mining land use, the permit may also include a variance from SMCRA's AOC requirements.

If the mine developer takes a long-term strategy approach, approval by DMME of either agricultural or commercial forestry post-mining land use may allow the operator to obtain an AOC variance. If the mining operation will be conducted as mountaintop removal, an agricultural post-mining land use (including hayland/pasture) will allow the operator to obtain variance from the AOC. Under the Virginia regulatory program, commercial forestry is defined as a commercial land use and thus is eligible for variance from the AOC.

In order to request an AOC variance in Virginia, the permit applicant must complete a Need and Market Survey form with the required documentation and submit it to

Virginia DMME. The Need and Market Survey form can be obtained from DMME. For sites with industrial-use potential, Virginia CEDA can assist the operator in preparing and filing this documentation.

3. Develop a Reclamation Plan

In order for a reclaimed mine site to be suitable for industrial use, several features are necessary, as described below:

Relatively flat surface configuration: The ideal land-form surface will have a slope of about 2 percent.

Developable area of suitable size: The amount of land necessary for a site to be suitable for industrial development will vary, depending on location and other factors. Generally, at least 25 acres of developable land will be necessary, while sites of 100 acres or larger will be ideal. At a location close to a major road and accessible to utilities, a site as small as 10 acres may be suitable. In locations away from major roads but with good public road access, at least 100 developable acres may be necessary for an industrial use to be a realistic possibility.

Road and utility access: It is critical that the reclamation plan establish a good road coming from a state-maintained highway. Depending on the situation, a road may be needed to allow movement of coal from



Figure 3. An aerial view of Lonesome Pine Regional Business and Technology Park in Wise County. Because the surface-mined site where the park is located was not compacted as needed to support industrial facilities during reclamation, the site was compacted to a more stable configuration after mining and reclamation were complete. The post-reclamation compaction operations are more costly and less effective than compaction that is applied during reclamation, when spoil and rock materials are being placed. Nonetheless, post-reclamation compaction operations were able to stabilize this mine site, and it now supports a variety of public and industrial facilities and operations.

the mining operation to processing and/or loading facilities. If coal must be hauled from the mine site to a public road, we recommend that the coal-haul road be built to dimensions that will support conversion to an industrial access road at some future date. For haul-road planning purposes, a 50- to 60-foot right-of-way with room for 25 to 30 feet of pavement plus drainage, would be adequate in most cases. Utility access (power, water, sewer, and communications) should also be planned.

Spoil-placement procedures to support a stable land surface: If the mine permit specifies an industrial post-mining land use, spoil-placement procedures should be developed in consultation with CEDA and a geotechnical engineer. If the site is intended to be suitable for industrial use immediately after mining, it is critical that spoils are placed in a manner that will minimize post-mining settlement and that those procedures be professionally verified and documented. Such procedures typically include spoil-composition control and in-place spoil compaction. Placement of decomposable materials – such as brush or woody debris – in the spoils that underlie the future industrial site must be avoided, as industrial clients usually require assurance that site settlement will not be a problem.

The procedures required to stabilize a reclaimed mine site are described in *Stabilizing Reclaimed Mines to Support Buildings and Development*, Virginia Cooperative Extension (VCE) publication 460-130. The spoil-placement procedures required to produce a reclaimed landform with minimal settlement potential will be more costly than loose dumping. If the property will be in public ownership after the completion of the reclamation, CEDA may be willing to reimburse a mine operator for the additional spoil-placement costs that are required to assure site stabilization. If the mining operator or landowner has an interest in such reimbursement, CEDA should be contacted as early in the mine planning process as possible.

If the mine planner chooses a longer-term, industrial-use strategy, it is unlikely that CEDA would be willing to share the cost of site stabilization. Thus, a less-costly, site-stabilization procedure will be desirable. In such situations, a post-mining, surface-stabilization procedure such as deep dynamic compaction (see VCE publication 460-130) may be necessary at some future time to make the site suitable for high-value industrial development. Placement of a spoil stockpile that is accessible to the intended industrial site and potentially available



Figure 4. Lonesome Pine Technology Center, at Lonesome Pine Business and Technology Park in Wise County. This building was constructed on a reclaimed surface mine, as described in figure 3.

for use in surface regrading will reduce the future cost of deep dynamic compaction, should this procedure prove necessary. Such a stockpile should contain spoil that is free of large boulders, easily handled and graded, and suitable for revegetation.

In either case, the reclamation plan should include the following elements:

- The fill should be constructed so as to assure adequate internal drainage. Typically, this can be achieved by placing a layer of durable rock boulders at the bottom of the filled area.
- Material placed in the fill should be more-or-less uniform in nature. Placement of woody debris in the fill must be avoided.
- A layer of fine material lacking large boulders, at least 10 feet deep, should be placed on the surface. This material should be suitable for revegetation and should enable ditching for burial of underground utilities to occur at low cost during site development.
- If the site is permitted to serve a nonindustrial, post-mining land use immediately after mining but is intended to be suitable for industrial use over the longer term, the surface spoils must be suitable for the permitted post-mining land use at the conclusion of mining.

4. Implement Declared Post-Mining Land Use at the Conclusion of Mining

If the mine is permitted to achieve an industrial post-mining land use, the operator should maintain contact with CEDA to assure entry of the site into CEDA's

industrial site inventory. Once CEDA accepts the site into its industrial site inventory, Virginia DMME will consider the post-mining, land-use requirement to have been met.

If the permitted post-mining land use is commercial forestry, suitable timber species should be established, the mining operator must conduct reclamation in a manner that assures a high level of forest productivity (see *Restoring the Value of Forests on Reclaimed Mined Land*, VCE publication 460-138), and the mine operator or landowner should be prepared to manage that species in a manner that is consistent with DMME's commercial forestry land-use requirements. If the permitted post-mining land use is an agricultural use such as livestock grazing, the mining operator and/or landowner should be prepared to comply with relevant SMCRA and DMME requirements.

Experimental Practice

Section 711 of SMCRA allows experimental practices, variances from SMCRA's general requirements, "to encourage advances in mining and reclamation practices, or to allow post-mining land use for industrial, commercial, residential, or public use." In some states, experimental practice variances from SMCRA's AOC and highwall-elimination requirements have been approved as a means of achieving an industrial post-mining land use. Mining operators who believe an experimental practice variance is necessary to allow a mining site to serve an industrial post-mining land use may discuss this possibility with Virginia DMME.

Conclusion

This bulletin outlines procedures for use in preparing a reclaimed mine site to support an industrial post-mining land use. Reclamation of mine sites to serve industrial uses can benefit the landowner and the community.

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References

Powell River Project/Virginia Cooperative Extension publications: Available from Powell River Project (www.cses.vt.edu/PRP/) and Virginia Cooperative Extension (www.ext.vt.edu).

Burger, J. A., and C. E. Zipper. Revised 2009. *Restoring the Value of Forests on Reclaimed Mined Land*. VCE publication 460-138. <http://pubs.ext.vt.edu/460-138>.

Zipper, C. E., and S. Winter. Revised 2009. *Stabilizing Reclaimed Mines to Support Buildings and Development*. VCE publication 460-130. <http://pubs.ext.vt.edu/460-130>.