VIRGINIA DEPARTMENT OF ENERGY
MINED LAND REPURPOSING

GUIDANCE MEMORANDUM[1] No. 4-02
Issue Date: March 22, 2002
Subject: Approximate Original Contour Guidelines

The Virginia Department of Energy, Mined Land Repurposing (MLR) program through this guidance memorandum is implementing the following guidelines concerning approximate original contour on steep-slope surface mine operations while providing a means for determining excess spoil quantities.

It is intended to improve consistency in the final configuration of areas restored to a usable and productive post mining land use.

The basis of AOC lies in the federal **Surface Mining Control and Reclamation Act of 1977**. The federal Act requires that a mine site be regraded to AOC. The federal Office of Surface Mining (OSM) recognizes that, in primacy states, the state regulatory authority is primarily responsible for interpreting what constitutes AOC at a given mine site. Virginia's requirements are set out in the **Virginia Coal Surface Mining Control and Reclamation Act of 1979** (Act), as amended, and the **Coal Surface Mining Reclamation Regulations** (4 VAC 25-130).

Virginia Requirements for Approximate Original Contour

Approximate original contour (AOC) is defined under Section 4 VAC 25-130-700.5 of the regulations as –

> "that surface reconfiguration achieved by backfilling and grading of the mined areas so that the reclaimed areas including any terracing or access roads closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls, spoil piles, and coal refuse piles eliminated."

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[1] This Memorandum is to be considered a guideline issued under the authority of § 45.1-230.A1 of the Code of Virginia which reads:

"In addition to the adoption of regulations under this chapter, the Director may at his discretion issue or distribute to the public interpretative, advisory or procedural bulletins or guidelines pertaining to permit applications or to matters reasonably related thereto without following any of the procedures set forth in the Administrative Process Act (§ 2.2-4000 et seq.). The materials shall be clearly designated as to their nature, shall be solely for purposes of public information and education, and shall not have the force of regulations under this chapter or under any other provision of this Code."

Sections 4 VAC 25-130-816.102(a) and 4 VAC 25-130-817.102(a) of the regulations provide backfilling and regrading standards for all disturbed areas of a permit. The AOC standards must be achieved for all disturbed areas, except as allowed by subsection (k) of the aforementioned regulations, when:

(1) the standards for thin overburden are met in 4VAC 25-130-816.104,
(2) the standards for thick overburden are met in 4VAC 25-130-816.105, or
(3) Approval is obtained from the MLR for:
    (a) Mountaintop removal operations in accordance with 4 VAC 25-130-785.14
    (b) A variance from AOC in accordance with 4 VAC 25-130-785.16: or
    (c) Incomplete elimination of highwalls in previously mined areas per 4 VAC 25-
    130-816.106

AOC is to be met whenever there is no variance clearly defined in the approved permit package.

To help decide if AOC is achieved in the permit proposal, MLR considers, at a minimum, the following three criteria:

(1) Surface configuration
(2) Drainage patterns
(3) Highwalls and spoil pile elimination

The Act requires that post mining areas have all highwalls and spoil piles eliminated. Static safety factors of 1.3 or greater are required.

In reviewing a permit application, this static safety factor requirement can be considered achieved by post mining slopes that are 2h:1v. The post mining slopes may also match pre-mining slopes that are steeper or flatter than 2h:1v, as long as the minimum 1.3 static safety factor is met. Access roads for the post mining land use should be limited to a 20 feet width. The MLR may approve greater access road width if it can be demonstrated that it supports the post mining land use. Drainage controls and berms should be included and approved in the plans. In order to determine if a proposed grading plan achieves AOC, both the pre-mining and post mining cross sections should be submitted. These pre-mining and post mining cross sections should match and be provided for all critical slope areas (i.e. finger ridges, significant slope changes, etc.).

The following figures are provided to demonstrate some applications of these guidelines. Three typical mining examples are presented. In each situation, the reclaimed configuration is established by initiating backfilling operations at the location of the outcrop at the lowest seam to be mined. A flat area may be left for an access road and drainage control. After these allowances,

the slope is then started upward on a 2h:lv slope (or equivalent premining slope), as long as the 1.3 static safety factor is met.

- **Figure 1** demonstrates a steep slope/mountaintop mining operation that has been returned to AOC.

- **Figure 2** demonstrates a typical steep slope contour mine returned to AOC. In all cases the highwalls must be eliminated. This may require slopes steeper than 2h:lv.

- **Figures 3** and **4** demonstrate a finger ridge removal operation that has been returned to AOC. For long finger ridge removal, cross sections should be provided transversely through the length of the finger ridge showing a profile of the ridge and perpendicular to the profile (i.e. parallel to the proposed highwall from outcrop to outcrop). In all cases, highwalls have to be eliminated. Generally for long finger ridges, the cross sections from crop to crop are used to establish the post-reclamation profiles.

The boundary of the mined area is determined by vertically projecting a line from the outcrop of the lowest coal seam mined. The mined area is shown on the following figures. Individual mining areas within each permit area should be established. For contiguous mining operations the mining should be considered one operation (**Figure 5**).

Again, although the two mined areas are combined for reclamation purposes, in order to meet AOC, the Act requires each individual highwall be eliminated.

Final elevations are not controlling factors in determining whether an area has been restored to AOC. The area need not be restored to the original elevations. The reclaimed area may be somewhat lower or even higher than the original elevations. The key component in determining AOC is the proposed configuration of the backfill. This configuration needs to comply with the provisions detailed above.

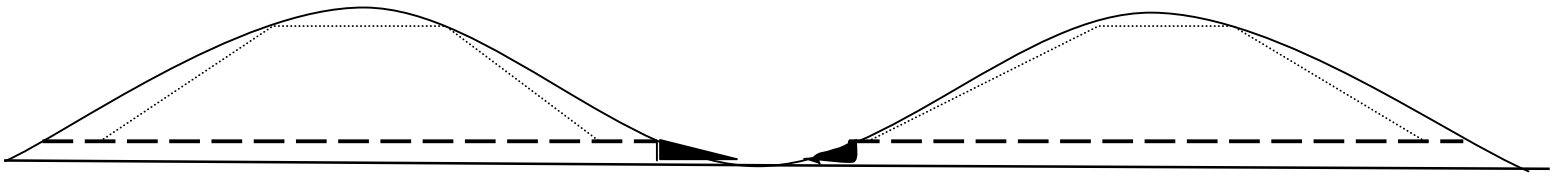
Once the final proposed configuration is determined, the applicant should include detailed spoil volume calculations based on site-specific materials, so that swell shrinkage and bulking can be accurately predicted. The total spoil volume is calculated for the site. Next the volume of material required to backfill the site to the approved AOC configuration is determined. By definition, any excess material not required to return the site to AOC is excess spoil and may be placed in approved excess spoil disposal sites.

An additional option for AOC includes **landform grading**. In this situation, the permittee may use variations in slope to create contours that reflect more natural slopes. For example, a permittee may place additional material on the bench area and reduce the slope of the contour as long as he can show stability in that area. The operator may use excess spoil to produce irregular shapes of natural stable slopes. These slopes would be characterized by a continuous series of concave and convex forms, interspersed with swales and berms that blend

with natural slopes. Landform grading may be employed as long as the volume of excess spoil initially determined is not exceeded.

Slope drainage devices would follow natural slope drop lines to re-create natural original drainage patterns. All spoil piles should be used in the grading. The surface configuration criterion for meeting AOC will be met if the landforms constructed closely match undisturbed areas, with curvilinear contours. Again, documentation of the mine area prior to disturbance is essential for the support of the rationale for the post-mining configuration of landform grading. As long as these landform-graded areas meet the criteria for AOC and the determined excess spoil volumes are not exceeded, they would be accepted as AOC.

Typical Mountaintop Operation



Premining Section

Postmining Section

Lowest seam to be mined

Typical postmining slopes are 2h: 1v
Drainage structure may be left
Terraces are acceptable

Figure 1

Fill Area

Typical Contour

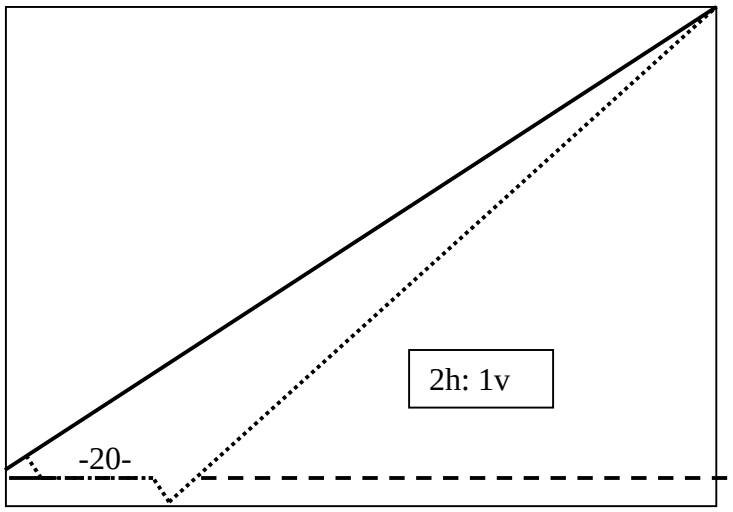
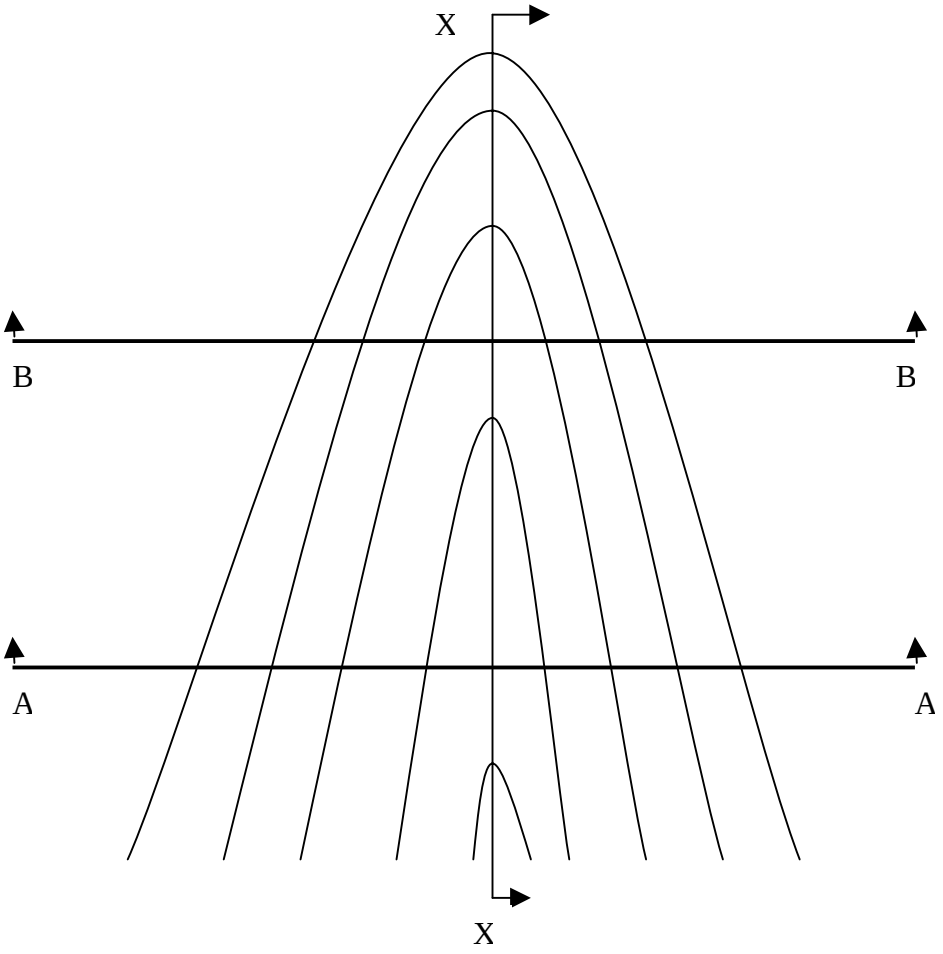


Figure 2

Premining Cross Section

Postmining Cross Section

Lowest coal seam to be mined



Plan View

1”=50’

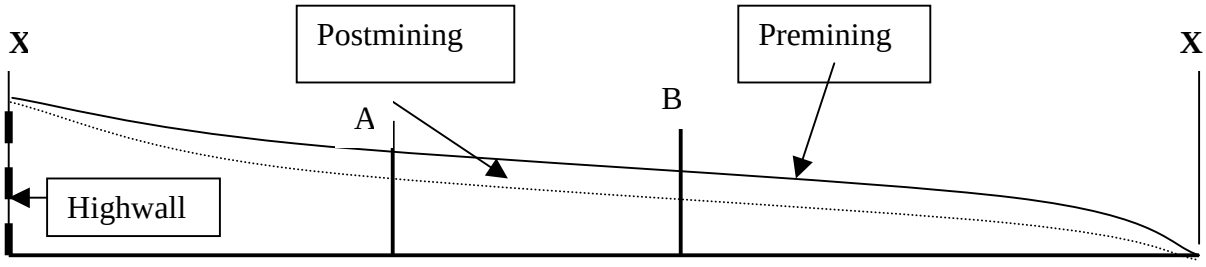
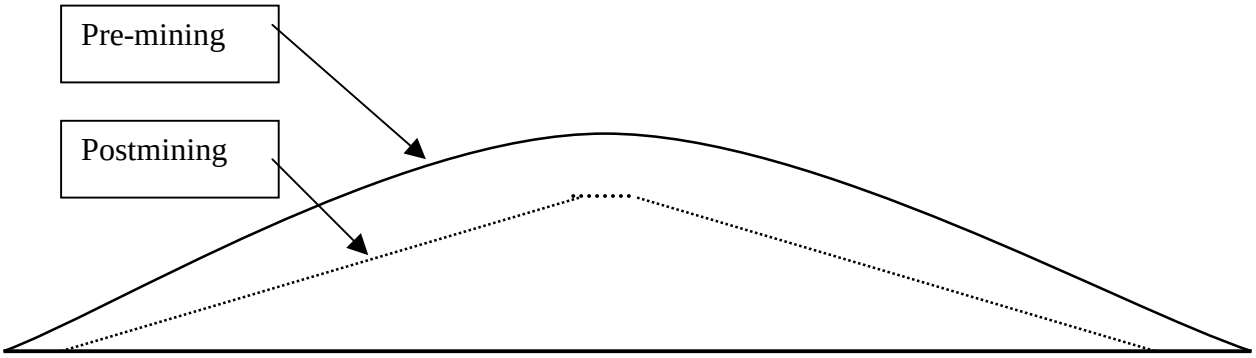
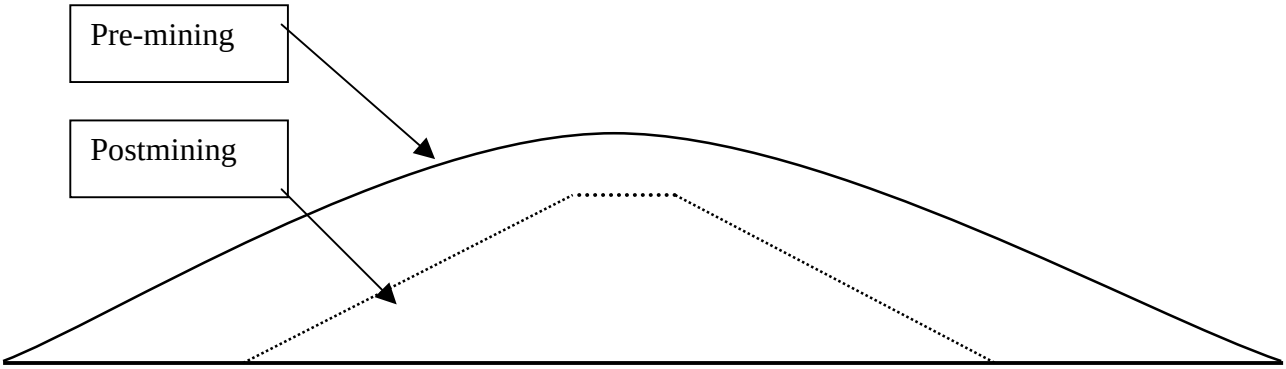


Figure 3

Typical Cross Sections

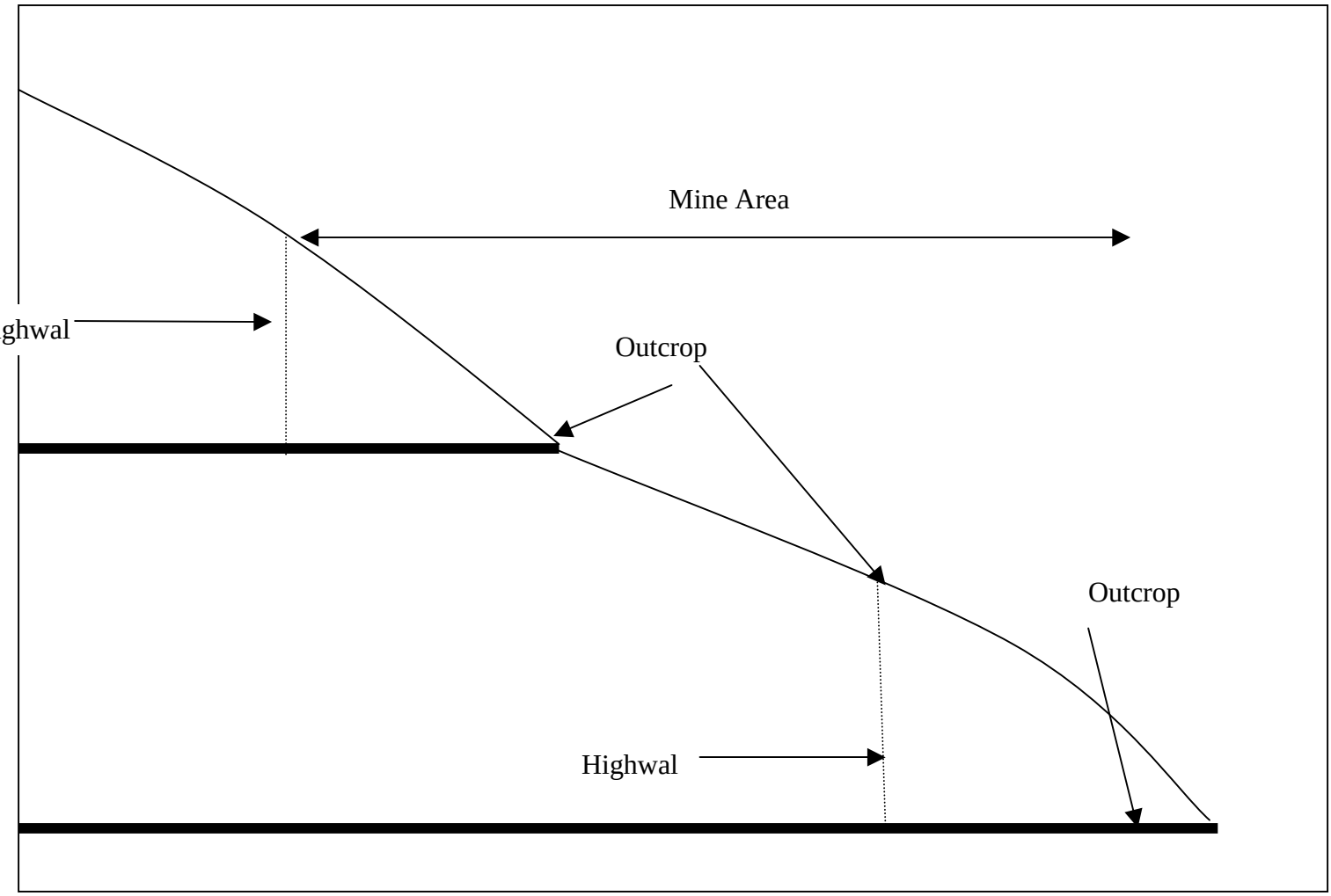


A-A 1”=50’)



B-B (1”=50’)

Figure 4



For contiguous operations the mined area will be combined for multiple seams when the horizontal distances between the highwall of the lower operations and the outcrop of the higher operation is less then 25 feet.

Figure 5