



## **Economic Impact Analysis Virginia Department of Planning and Budget**

---

### **4 VAC 25-125 – Regulations Governing Coal Stockpiles and Bulk Storage and Handling Facilities**

**Virginia Department of Mines, Minerals, and Energy**

April 30, 2003

---

The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 2.2-4007.G of the Administrative Process Act and Executive Order Number 21 (02). Section 2.2-4007.G requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. The analysis presented below represents DPB's best estimate of these economic impacts.

### **Summary of the Proposed Regulation**

The General Assembly mandates in §45.1-161.254 and §45.1-161.106 of the Code of Virginia that the Chief of the Department of Mines, Minerals, and Energy (DMME), in consultation with the Virginia Coal Mine Safety Board, promulgate regulations necessary to ensure safe and healthy working conditions at all surface and underground mines in Virginia.

The proposed regulation establishes minimum standards to ensure the safe use of heavy equipment on coal stockpiles and in facilities that store, handle, and transport unconsolidated bulk materials. The proposed regulation only applies to coal stockpiles and facilities storing, handling, or transporting unconsolidated bulk materials directly related to coal mining activities.

(i) The regulation establishes general safety requirements for coal stockpiles, including those with underlying feeders. The requirements include visual examination of stockpiles and stockpile dumping locations before the commencement of work (with ground conditions

determining the frequency of subsequent examinations), provision of sufficient illumination such that safe working conditions are maintained, and hazard training for all employees who work on or around coal stockpiles. (ii) The regulation establishes specific work safety procedures and equipment safety requirements for coal stockpiles with underlying feeders. Required work safety procedures include maintaining communication between equipment operators working on stockpiles and individuals operating feeders and other equipment drawing from the stockpiles, limiting the movement of individuals on foot on areas of stockpiles directly over underlying feeders, and having an approved stockpile safety plan in place before allowing the operation of equipment directly over areas where underlying feeders are in place. The new equipment safety requirements include enclosing the cab of all mobile equipment operated on a stockpile, fitting equipment cabs with two self-contained self rescuer packages to be used in the event of the equipment falling into a cavity, and equipping underlying feeders with gates or other controls such that material is not inadvertently discharged when the feeder is not activated. (iii) The regulation establishes safety provisions for storage bins, bunkers, hoppers, and silos where unconsolidated bulk materials are stored, handled, or transported. These provisions require bins, bunkers, hoppers, and silos are equipped to ensure that during normal operations workers are not required to enter or work in areas where there is a potential for being trapped by caving or sliding material. The provisions include equipping these facilities with supply and discharge operating controls such that spills and overruns do not endanger workers, constructing suitable walkways and passageways for the movement of workers around or over areas where unconsolidated bulk materials are stored, handled, or transported, and having adequate safety procedures and equipment should workers be required to enter these areas.

## **Estimated Economic Impact**

### *Description of the Regulation:*

The proposed regulation establishes safety standards for workers and equipment when working on or around coal stockpiles and at facilities storing, handling, and transporting unconsolidated bulk material. The regulation applies to stockpiles and facilities directly related to coal mining activities.

The regulation establishes general safety requirements for coal stockpiles. Stockpile design and management are to be such that the coal is safely stored and handled. Any actual or

potential instability in a coal stockpile is to be immediately reported to the foreman and corrective action is to be taken promptly. Stockpiles and stockpile dumping locations are to be visually examined before the start of work. Subsequent examinations are to be done based on ground conditions. Sufficient illumination is to be provided in order to ensure safe working conditions and employees who work on or around coal stockpiles are to be trained and knowledgeable about the potential hazards.

The regulation establishes specific safety requirements for working on or around coal stockpiles with underlying feeders. It establishes safety procedures to be followed by workers and coal mine operators. It also establishes safety standards for equipment being used and operated on coal stockpiles with underlying feeders.

- The proposed regulation establishes a number of safety procedures to be followed by workers and coal mine operators working on coal stockpiles with underlying feeders. Telephone or two-way communication is to be maintained as necessary between equipment operators working on stockpiles and individuals operating conveyors, feeders, hoppers, or load-out facilities drawing from those stockpiles. Equipment operators are to keep the doors and windows of the equipment cab shut while the equipment is in operation on a stockpile. No equipment is to be operated on areas of stockpiles directly over underlying feeders unless a DMME-approved stockpile safety plan is in place. No worker is to walk over areas of stockpiles that have underlying feeders in place unless under the provisions of the approved stockpile safety plan or in the case of an emergency (and then only when supervised by a foreman, secured by a safety line, and with the underlying feeders shut down). The regulation lays out the necessary elements of a stockpile safety plan. The regulation also lays out the procedure to be followed when pushing materials over the crest of a stockpile or draw-hole.
- The proposed regulation establishes a number safety requirements for equipment used and operated on coal stockpiles with underlying feeders. All mobile equipment manually operated on these stockpiles are to be equipped with an enclosed cab and the glass and frames used to enclose the cab are required to meet certain safety standards. The cab is to be fitted with two self-contained self-rescuers (that provide oxygen) in case of the worker becoming engulfed within a stockpile during an accident. The equipment is also required

to have a primary two-way communications system and a back-up communications system supplied by an independent power source. Mobile equipment operators are to be provided with a remote control device that is capable of stopping the flow of coal coming onto and being taken off the stockpile. Mobile equipment operators are also to be provided with emergency lighting. Underlying free-flowing feeders are to be equipped with gates or other controls such that material is not inadvertently discharged when the feeder is not activated. Warning signs are to be posted at the entrance to coal stockpiles with underlying feeders and the location of each draw-off point is to be clearly indicated by a marker suspended over the underlying feeder. Visual indicators are to be used to indicate to the mobile equipment operator which feeders are being used.

The proposed regulation establishes safety requirements for facilities that store, handle, or transport unconsolidated bulk materials including coal. Storage bins, bunkers, hoppers, and silos are to be equipped with mechanical devices and other means of handling materials such that workers are not required to enter these areas during normal operations. These facilities are also to be equipped with supply and discharge operating controls such that spills or overruns do not endanger the workers. Suitable walkways are to be provided in areas where workers are required to move on or over bins, bunkers, hoppers, or silos. Ladders, platforms, or landings are to be provided for workers entering these facilities for maintenance and inspection purposes. Moreover, workers entering the facility are required to follow safety procedures as specified in the proposed regulation.

*Rationale:*

The proposed regulation is intended to protect coal mine workers from potential health and safety hazards associated with working on coal stockpiles and at facilities that store, handle, or transport unconsolidated bulk materials. According to the Mine Safety and Health Administration (MSHA), between 1980 and 1999, nationwide there have been 14 stockpile accidents resulting in 18 fatalities and numerous injuries. Of the 14 accidents, 13 occurred when a void created in the coal stockpile collapsed, engulfing the bulldozer operator working on it. A majority of stockpile accidents have occurred at mines in a handful of states, including Virginia. The most recent stockpile-related fatality in Virginia occurred in 1998 at a mine near Norton, Virginia. In that incident, a coal miner was killed when his mobile equipment was engulfed in a

void over a feeder. Other states such as West Virginia, Indiana, and Kentucky have also had a number of fatal accidents involving individuals working on coal stockpiles.

According to DMME, the potential for the creation of cavities and voids in stockpiles with underlying feeders poses a serious threat to workers. Cavities and voids within a stockpile serve to make it unstable and increase the chances of a worker falling into one and becoming engulfed. Moreover, according to a 1999 MSHA report, factors such as changing pile conditions, and working with insufficient illumination and in adverse weather pose additional dangers to individuals working on coal stockpiles.

Current MSHA requirements do not specifically address the issue of worker safety on coal stockpiles. Rather than promulgate new federal standards, MSHA recommended that states with coal stockpile safety problems develop regulations that address the issue. Pennsylvania issued guidelines for stockpile and surge-pile safety. In 1998, Kentucky adopted a regulation that addressed some of the safety concerns relating to coal stockpile safety. In 2001, West Virginia, working with MSHA, developed and adopted a regulation that established safety precautions to be taken on coal stockpiles (eight of the 18 fatalities between 1980 and 1999 occurred at West Virginia mines). The regulation promulgated by West Virginia was largely based on safety measures suggested by MSHA. The coal stockpile safety standards being proposed in Virginia are also based on MSHA recommendations and are similar in content to those adopted in West Virginia.

However, in addition to the safety precautions for coal stockpiles, the proposed regulation includes additional safety precautions for facilities storing, handling, or transporting unconsolidated bulk coal and non-coal materials related to coal mining. These requirements are identical to those being implemented by MSHA on such facilities under their jurisdiction. DMME believes that most facilities storing, handling, and transporting unconsolidated bulk materials already have much, if not all, of the equipment required to comply with the proposed regulation.

*Estimated Economic Impact:*

The proposed regulation imposes a significant cost on coal mining businesses in Virginia. DMME estimates that the proposed regulation will impose a one-time cost of approximately \$800,000 on coal mining companies under DMME jurisdiction. Costs imposed on individual

companies could vary from \$50,000 to \$320,000. According to DMME, the proposed regulation will affect 6 coal companies under DMME jurisdiction. While each requirement being proposed will impose some additional cost, the requirements to retrofit existing equipment and to install new equipment or safety features on coal stockpiles with underlying feeders are likely to account for much of the estimated compliance cost. Most of the companies affected by the proposed regulation are likely to be medium- to large-sized coal companies. These companies are more likely to operate stockpiles with underlying feeders than the smaller coal companies. Coal companies affected by the regulation range in size from companies that produced 232 thousand tons of coal and earned revenues of a little over \$6.5 million in 2002 to companies that produced 2.9 million tons and earned revenues of over \$81 million in 2002.

According to the Virginia Coal Association, DMME has consulted almost everyone in the regulated community about the proposed regulatory action. In an informal survey of their members, the association did not hear any significant complaints regarding the proposed regulation and its financial impact on coal companies. According to a member of the Coal Mine Safety Board, the major impact of the proposed regulation would be on the larger coal companies that were more likely to operate underlying feeders and that they were also more likely to have many of the requirements of the regulation in place already. He did not believe that smaller coal companies such as the one he worked for were going to be significantly affected by the regulation.

Unsafe and/or inadequate equipment has been a major cause of coal stockpiles accidents. Recent accidents in Virginia in 1998 and in West Virginia in 1999 resulted in the death of two bulldozer operators when their equipment fell into a cavity above a feeder and became engulfed. In both cases, coal filled the cab when the windows of the bulldozer broke or were pushed out of their gaskets. A 1999 MSHA report recommended that, “while safety measures should be in place to minimize the formation of hidden cavities and to prevent equipment from being exposed to the danger of such cavities, as a back-up safety measure either cabs of surge-pile equipment should be made strong enough to resist burial pressures or remote-control equipment should be used”.

Most of the substantive changes being proposed are intended either to prevent workers and equipment from falling into voids and or to minimize fatalities in the event that they do fall

into a void. DMME determined that requiring the use of remote controlled equipment to handle coal stockpiles would be prohibitively expensive and would not provide any substantial improvement in safety over the standards being proposed in this regulation. Safety requirements such as reinforcing the cab of mobile equipment operated on stockpiles, equipping the cab with self-contained self rescuers, and providing mobile equipment operators with a two-way communications system have been shown to prevented fatalities. In a 2002 accident at an Alabama mine, a bulldozer slipped into a hidden void. Safety precautions such as those mentioned above allowed the bulldozer operator to be successfully rescued from his equipment.

The proposed regulation is intended to enhance worker safety at coal stockpiles and at facilities storing, handling, or transporting unconsolidated bulk materials directly related to coal mining activities. There are no significant environmental or public health and safety issues being addressed by the proposed regulation.

While the proposed regulation imposes significant costs on coal companies under DMME jurisdiction, it is expected to prevent injuries and save lives. Work place accidents generate losses for companies through time lost to injuries and fatalities, damage to equipment and cost incurred in repairing or replacing it, increased insurance costs, and higher wage and salary costs required to compensate workers for the increased risk of death or injury. In order to avoid the risk and hence the costs associated with accidents at the work place, many companies tend to have safety measures in place that are over and above those required by law.

If the expected benefits from reducing the risk of injuries and fatalities on coal stockpiles and at facilities storing, handling, and transporting unconsolidated bulk materials outweigh the costs of doing so, coal companies would voluntarily choose to implement such standards and the need for such a regulation would be moot. According to DMME, while some companies have voluntarily implemented the more substantive aspects of the proposed regulation, such as retrofitting existing equipment and installing new equipment and safety features, others have chosen not to do so. Companies would choose not to implement these safety standards if the benefits they expect from doing so are outweighed by costs. There could be two reasons why expected costs are higher than expected benefits: the costs imposed by the regulation are higher than warranted by the risk of injury and death or that the benefits firms expect from implementing the standards are not large enough to justify doing it.

*Expected Costs:* If the standards proposed in the regulation and the cost associated with implementing them are disproportionately high given the risks faced by workers, the proposed regulation is likely to have a negative economic impact.

The requirements of this regulation are very similar to those adopted by West Virginia in 2001. West Virginia has a worse record than Virginia on safety at coal stockpiles and at facilities storing, handling, and transporting unconsolidated bulk materials. Between 1985 and 2000, West Virginia's coal production averaged 154.9 million short tons of coal per year<sup>1</sup>. On average, Virginia produced approximately 34.2 million short tons of coal per year over the same period. Assuming this to be the average coal production per year in West Virginia and Virginia between 1980 and 1999, there were 2.58 deaths per billion short tons of coal produced in West Virginia and 1.27 death per billion short tons of coal produced in Virginia (nationwide there were 0.89 deaths per billion short tons of coal produced). Thus, imposing similar standards and hence, similar costs to those imposed in West Virginia may not be appropriate.

Moreover, the rate of fatality has been declining during the 1990s, with 12 of the 18 fatalities reported between 1980 and 1999 occurring in the 1980s. The United States produced a little under 9 billion short tons of coal in the 1980s and a little over 10 billion short tons of coal in the 1990s<sup>2</sup>. Thus, the number of deaths per billion short tons of coal in the 1980s was more than twice the number in the 1990s. Thus, developing safety standards based on the total number of fatalities between 1980 and 1999 may not accurately reflect the risk currently posed to workers and may impose unnecessarily high costs on coal companies in Virginia. Moreover, since a number of facilities have voluntarily installed safety equipment, it may be expected that future death rates will be lower still.

The cost effectiveness of the regulation will depend on the number of lives saved and injuries prevented in the future as a direct result of the regulation. Virginia has had one fatality related to coal stockpiles in the last two decades. The risk of another fatality in the next two decades is lower than in the past two because of the declining fatality rate and the voluntary adoption of safety standards by some companies. However, assuming the same risk as in the last two decades, Virginia could expect to have another fatality in the next 20 years. Spending

---

<sup>1</sup> U.S. Coal Production by State, Energy Information Administration

<sup>2</sup> Annual U.S. Coal Production, Energy Information Administration



\$800,000 today would be justified if the value of a life saved ten years from is worth greater than or equal to \$1.42 million (assuming a discount rate of 5.9%, the average yield on ten-year treasury bonds between 1993 and 2002). Should the fatality rate continue to fall, as it has recently, a higher value for a life saved would be required to justify the \$800,000 expenditure. However, this range of values for a life saved is well within the range commonly used to justify expenditures on reducing mortality. Thus, there is no reason to conclude that the costs imposed by this rule are excessive, especially as compared to other life-saving policies implemented by state and federal governments.

*Expected Benefits:* If, on the other hand, we assume that the safety standards and hence the costs imposed by the proposed regulation constitute minimum safety standards given the risk of injury or death, companies are not voluntarily enforcing these standards because the expected benefits from implementing the standards are less than the costs of doing so.

By having employees work on coal stockpiles and other facilities storing, handling, and transporting unconsolidated bulk materials, coal companies are putting their employees in a potentially hazardous situation. Market forces (through various costs such as time lost to injuries and fatalities, damage to equipment as a result of accidents, and wage and insurance costs) work to ensure that these companies provide a certain minimum level of protection to their workers. If expected benefits are outweighed by the expected costs of meeting the proposed standards, companies would not voluntarily choose to enforce these standards.

Expected benefits could be low because the level of risk deemed acceptable by the market is higher than what is provided under this regulation. For example, the insurance and compensation (wages and benefits) costs incurred by companies might reflect the cost of reducing the risk of death or injury to workers to a level considered appropriate by the market. However, the standards proposed by this regulation might seek to reduce the risk even further. Under these circumstances, companies would prefer to incur the additional insurance and compensation costs rather than incur the costs of voluntarily meeting the safety standards.

Expected benefits could also be low because the potential benefits of meeting these safety requirements are not an accurate reflection of the actual benefits. Compensation costs and insurance costs faced by these companies may not accurately reflect the risk of injury or death to workers and hence companies' perception of the risk posed to workers is likely to be lower than

the actual risk. Under these circumstances, voluntarily implemented safety standards would not reduce the risk to a level that would be considered appropriate by the market and/or provided for under this regulation.

Thus, if the safety requirements being proposed in the regulation are minimum safety standards required in order to reduce the risk of injuries and fatalities to a level deemed appropriate, the proposed regulation is likely to have a positive economic impact.

*Conclusion:* The proposed regulation will impose no significant additional costs on coal companies voluntarily complying with the more substantive changes being proposed in the regulation. However, it is likely to impose a significant one-time cost on coal companies not currently complying with these requirements. The proposed regulation is likely to have significant economic benefits by preventing future injuries and fatalities among workers operating on coal stockpiles and at facilities storing, handling, and transporting unconsolidated bulk materials. These benefits include less time lost to injuries and fatalities, less damage to equipment and lower costs incurred in replacing or repairing it, and lower insurance and compensation costs.

The net economic impact of the proposed regulation will depend on whether the standards being proposed in the regulation are excessive or constitute minimum safety standards in order to provide workers operating on coal stockpiles and at facilities storing, handling, and transporting unconsolidated bulk materials with a level of protection that is deemed adequate. If the standards being proposed are excessive, the proposed regulation will impose unnecessary costs on coal companies and have a net negative economic impact. If, on the other hand, these standards are the minimum safety standards required in order to provide a reasonable degree of protection to workers against injuries and fatalities, the proposed regulation is likely to have a positive economic impact. The cost of implementing the regulation appears to be broadly consistent with expenditures made to prevent morbidity and mortality in other industrial sectors.

## **Businesses and Entities Affected**

The proposed regulation will affect 6 businesses involved in coal mining that operate coal stockpiles and facilities that store, handle, and transport unconsolidated bulk materials. For businesses voluntarily enforcing the more substantive aspects of the proposed regulation, the proposed regulation is not likely to impose significant additional costs. However, businesses not

currently enforcing any of the required safety standards are likely to incur significant costs in meeting the requirements of the regulation.

The proposed regulation will benefit individuals operating coal stockpiles and at facilities that store, handle, and transport unconsolidated bulk materials. For individuals working at coal companies that are voluntarily enforcing the more substantive changes proposed by the regulation, the benefits are likely to be less significant than for individuals working for companies not currently enforcing these standards.

### **Localities Particularly Affected**

The proposed regulation will affect all localities in Virginia. However, localities dependent on the coal mining industry will be particularly affected.

### **Projected Impact on Employment**

The proposed regulation could have a negative impact on employment in the coal mining industry in Virginia. The requirements of the regulation could force coal companies not currently meeting the more substantive changes proposed in the regulation to reduce their labor force, or to exit the industry altogether, resulting in job losses.

### **Effects on the Use and Value of Private Property**

The proposed regulation is likely to have a negative impact on the use and value of private property by imposing additional safety standards on coal mining companies operating under DMME jurisdiction. The additional standards impose additional costs and lower the asset value of these companies. However, these costs have to be balanced against the benefit to the coal mining industry of having a reputation for safe operation plus any additional savings on insurance costs and labor compensation costs.