

Regulatory Economic Analysis
For
High-Voltage Continuous Mining Machine
Final Rule

(RIN 1219-AB34)

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I. EXECUTIVE SUMMARY

INTRODUCTION

For underground coal mine operators, the final rule establishes: (1) design requirements for high-voltage continuous mining machines (HVCMMs) that operate in permissible areas of a mine; and (2) new electrical safety standards for the installation, use, and maintenance of HVCMMs. As a result of the final rule, underground coal mine operators no longer need to file for a Petition for Modification (PFM) of existing 30 CFR § 75.1002 (Installation of electric equipment and conductors; permissibility) in order to use HVCMMs. In addition, the final rule provides enhanced safety protection to miners using HVCMMs.

BACKGROUND

Electrical equipment horsepower in mines has increased over the years. The voltages required to operate this equipment have also increased to accommodate the design of safe, practical, and efficient equipment. The improvement in the design and manufacture of high voltage components has made the use of HVCMMs more desirable to the mining industry due to the ability to increase coal production provided the coal can be hauled away from the face. Despite the increased cost, the HVCMMs operating to date have achieved a lower life cycle cost than the lower-voltage machines they replace. However, MSHA's existing standard does not permit mine operators to use HVCMMs in permissible areas of a mine. The existing standard allows use of only low- and medium-voltage continuous mining machines to extract coal. To allow mine operators to use HVCMMs in a safe manner in permissible areas of an underground coal mine, MSHA has granted PFMs of existing 30 CFR § 75.1002. As noted above, the final rule eliminates the need to file PFMs.

On July 16, 2004, MSHA published the HVCMM proposed rule (69 FR 42812). Four hearings were held in November 2004. The post-hearing comment period closed on December 10, 2004. Three proposed provisions (§§ 18.54(f)(4), 75.828(a), and 75.833) were re-proposed on March 28, 2006 (71 FR 15359). No hearings were held on these three provisions, and the comment period closed on May 30, 2006. The final rule addresses the proposal and re-proposal.

MINING SECTORS COVERED BY THE FINAL RULE

The final rule covers 583 underground coal mines in the United States that reported production in 2008, and the approximately 44,450 miners that they employ.

BENEFITS

The final rule allows HVCMMs to be safely used as a result of better design and construction criteria (such as the option to use either single-jacketed or double-jacketed cables); improved ground-fault protection; handling of lighter cables; and increased safety requirements for work practices. These design and work practice requirements

offer protection against electrical shock, cable overheating, fire hazards, and back injuries and other sprains caused by handling trailing cables.

COST SUMMARY

The final rule results in a total estimated yearly net compliance cost of approximately \$50,100 for underground coal mine operators that use HVCMMs to extract coal.

For underground coal mine operators with 20-500 employees, yearly compliance costs are estimated to be \$85,875 and yearly compliance cost savings are estimated to be \$45,200, yielding a yearly net cost of approximately \$40,675. For underground coal mine operators with 501+ employees, yearly compliance costs are estimated to be approximately \$16,225 and yearly compliance cost savings are estimated to be \$6,800, yielding a yearly net cost of approximately \$9,425. Table IV-1 in Chapter IV of this document shows, by mine size, a summary of the estimated costs and savings for underground coal mine operators.

Mine operators cost of the final rule consists of cost to: install an interlocking switch on a power center that supplies power to a HVCMM, inspect high-voltage trailing cables, and additional recorkkeeping. Cost Savings for mine operators include savings for no longer having to file for a PFM to use a HVCMM, and from the use of cable handling tools to handle HVCMM trailing cables.

EXECUTIVE ORDER 12866 AND THE REGULATORY FLEXIBILITY ACT

Executive Order 12866 requires that regulatory agencies assess the costs and benefits of intended regulations. MSHA has fulfilled this requirement for the HVCMM final rule and, based on its analysis of compliance costs, the Agency has determined that the final rule is not an economically significant regulatory action under to §3(f)(1) of Executive Order 12866.

The Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), requires regulatory agencies to consider a rule's economic impact on small entities. For rulemaking purposes, the Agency has traditionally defined a small mine to be one employing 1-19 employees and a large mine to be one employing 20 or more employees. However, to comply with the requirements of the SBREFA amendments to the RFA, MSHA also uses SBA's definition for a small entity when determining a rule's economic impact. For the mining industry, SBA defines a small mine as one with 1-500 employees and a large mine as one with 501+ employees.

In accordance with § 605 of the RFA, MSHA certifies that the final rule does not have a significant economic impact on a substantial number of small entities. Under the SBREFA amendments to the RFA, MSHA must include in the final rule a factual basis for this certification. The analysis that provides the factual basis for this certification is discussed in Chapter V of this document and in the preamble to the final rule published in the *Federal Register*. MSHA has consulted with the Small Business Administration's (SBA) Office of Advocacy and believes that the analysis provides a reasonable basis for this certification.

II. INDUSTRY PROFILE

INTRODUCTION

This chapter provides information concerning the structure and economic characteristics of the underground coal mining industry, including the number of mines and employees by type and size of mine. These data are from the U.S. Department of Labor, Mine Safety and Health Administration, Office of Program Evaluation and Information Resources (PEIR), 2008 data.¹

The value of the coal output of the U.S. underground coal mining sector was estimated to be approximately \$18.4 billion in 2008. The average open market U.S. sales price of underground coal for 2008 is from the Department of Energy (DOE), Energy Information Administration (EIA), *Annual Coal Report 2008*, October 2009, Table 28.

STRUCTURE OF THE MINING INDUSTRY

MSHA divides the mining industry into two major sectors based on commodity: (1) coal mines and (2) metal and nonmetal mines. Each sector is further divided by type of operation (e.g., underground mines or surface mines). The Agency maintains data on the number of mines and on mining employment by mine type and size. MSHA also collects data on the number of independent contractor firms and their employees. Each independent contractor is issued one MSHA contractor identification number but may work at any mine.

STRUCTURE OF THE COAL MINING INDUSTRY

In calendar year 2008, there were 657 underground coal mines reporting employment underground and/or on the surface of an underground coal mine. The 657 mines had 44,950 employees, excluding office workers. Of the 657 mines, only 631 mines reported employment underground. The 631 mines had 44,832 employees, excluding office workers. There were 583 underground coal mines reporting production in 2008. The 583 mines had 44,456 employees, excluding office workers. Table II-1 presents the 583 underground coal mines, by employment size, excluding contractors.

**Table II-1: Underground Coal Mines and Miners (Excluding Contractors),
For Mines Reporting Production in 2008
by Employment Size**

Size of Mine	No. of Underground Mines Reporting Production	No. of Employees, Excluding Office Workers, Working Underground in Mines Reporting Production
1-19 Employees	155	1,901
20-500 Employees	416	35,058
501+ Employees	12	7,497
Total	583	44,456

¹ Based on January 2009 data run.

In calendar year 2008, there were 1,089 underground coal contractors reporting employment underground and/or on the surface of an underground coal mine. The 1,089 contractors had 19,703 employees, excluding office workers. Of the 1,089 contractors 343 contractors reported employing 9,979 employees underground.

ECONOMIC CHARACTERISTICS OF THE COAL MINING INDUSTRY

MSHA classifies the U.S. coal mining sector into three major commodity groups: bituminous, lignite, and anthracite.² Bituminous operations represent approximately 97% of coal mining operations and approximately 99% of coal miners and total coal production. Anthracite operations represent approximately 2% of coal mining operations and less than 1% of coal miners and total coal production. Lignite operations represent less than 1% of coal mining operations, coal miners, and total coal production.

The U.S. underground coal sector produced an estimated 358 million short tons of coal in 2008. The average price of coal in underground mines in 2008 was \$51.37 per ton.

CONTINUOUS MINING MACHINES IN UNDERGROUND COAL MINES

The continuous mining machine cuts and loads coal into shuttle cars or onto conveyor belts, which then remove the coal from the mine. The continuous mining machine is powered from an electrical power center, with cables running from the power center to the machine. These cables are moved by miners as the continuous mining machine progresses in cutting the coal. As high-voltage electric equipment design has become safer and more efficient, the underground coal mining community has been moving toward the use of HVCMMs. In 2008, continuous mining machines accounted for approximately 49 percent of all underground coal production.³ There are 446 mines where the primary method of mining is done by a continuous miner, of which 8 mines currently use HVCMMs.

The amount of energy used to operate electrical equipment in underground coal mines e.g., voltage, has increased over the years as higher voltage electric equipment design has become safer and more efficient. The underground coal mining community has been moving toward the use of HVCMMs to increase productivity and improve cable handling safety. A study performed by the Illinois Clean Coal Institute (ICCI) reports that a HVCMM can increase production by 30 percent over a low- or medium-voltage continuous mining machine, provided that coal can be hauled away from the face, and the roof bolting cycle keeps up with the cutting cycle.⁴

² This categorization is based on MSHA-collected data grouped by Standard Industrial Classification (SIC) code description. Some publications of the U.S. Department of Energy further divide the bituminous group into bituminous coal and sub-bituminous coal.

³ DOE, EIA, *Annual Coal Report 2008*, October 2009, Table 3.

⁴ Hookham, Marian, *High-voltage continuous miners proven more productive*, International Longwall News, December 8, 2008.

<http://www.longwalls.com/StoryView.asp?StoryID=20550>

The increased performance potential is due to reduced voltage drop (for a given current) occurring in a trailing cable when using higher voltage. Since motor torque varies with the square of the voltage, any decrease in machine voltage has a drastic effect on motor performance. Furthermore, using higher voltage machinery improves voltage regulation which leads to reduced heating of cables, motors and electrical components, that improves maintenance and repair costs. There are increased capital expenses inherent in producing HVCMMs, such as, more complex motors, switchgears, and cables, as well as increased machine mass and higher capacity gear trains. However, despite these increased costs, the HVCMMs operating to date have achieved a lower life cycle cost than the lower voltage units they replace.⁵

Existing MSHA regulation 30 CFR § 75.1002, Installation of electric equipment and conductors; permissibility, prohibits the use of HVCMMs in permissible areas of the mine. In order to allow the use of these machines in these areas, MSHA has granted PFMs. The PFM process results in safety procedures that apply only to an individual mine. Once MSHA reviews and grants a PFM, the conditions in the PFM become new standards for the mine. During regular inspections at the mine, the Agency checks compliance with the conditions in the granted petition.

Fifty-two PFMs have been granted since 1997, however, due to mines being abandoned, production stoppages, or granted PFM being revoked, not all HVCMMs associated with granted PFMs are operating today.

⁵ Willison, John, *High Voltage Continuous Miners*, Coal Leader, 2003.
http://www.coalleader.com/2003/high_volt_cont_miners.htm

III. BENEFITS

INTRODUCTION

MSHA has determined that the final rule will allow HVCMMs to operate safely in underground coal mines. In this chapter the Agency reviews the technical aspects of high-voltage and low- and medium-voltage continuous mining machines in order to evaluate their relative safety characteristics.

BENEFITS TO MINERS

The safeguards and protections included in the final rule will make the use of HVCMMs just as safe as low- and medium-voltage machines. The provisions of the final rule will enable mines to utilize HVCMMs with enhanced safety protection against fires, explosions, and shock hazards. In addition, the use of high-voltage machines will reduce cable handling injuries.

Benefits of Using High-Voltage Systems

The safeguards contained in the final rule protect miners by providing enhanced protection from potential high-voltage electrical hazards. For example, a well designed high-voltage system segregates high voltages from lower voltages, has interlocked compartment covers to prevent access to energized high-voltage conductors, and has circuits designed to facilitate safer operation and testing procedures.

Commenters have suggested that a single-jacketed cable constructed of thermoplastic polyurethane (TPU) be allowed to be used with an HVCMM, as an alternative to the double-jacketed cable. Like the double-jacketed cable, the single-jacketed TPU cable recommended by commenters includes semi-conductor shielding and grounded braided metal shielding around each conductor. In addition, the commenters stated that the single-jacketed TPU cable has a tear strength of more than 120 pounds per inch and a tensile strength of more than 5,000 pounds per square inch. One commenter stated that at least one PFM permitted the use of a TPU jacket as an alternative to the double-jacket requirement. The commenter further noted that this type of single-jacketed cable had been used at a mine on two HVCMMs and on shuttle cars for over two years without any problems. MSHA has verified that the single-jacketed cable is being used by an underground coal mine. MSHA's experience with the granted PFM permitting the use of a single-jacketed cable suggests that the tear and tensile strength values, noted above, protect the cable from damage, thereby protecting miners from shock hazards. In addition, the tear and tensile strengths of the single-jacketed cable exceed those of the double-jacketed cable. Since a more durable cable that is less prone to physical damage will improve miner safety, the final rule allows the option of using either the single-jacketed cable or the double-jacketed cable.

Also, high-voltage systems have less ground-fault current available than do lower-voltage systems. Less current generates less heat and less damage to cable insulation when ground faults occur. Less heat in the cable decreases the likelihood that the cable is damaged in such a manner that a miner could be shocked or burned by

touching an exposed power conductor. In addition, more sensitive ground-fault relays are used with high-voltage systems. These relays respond to 0.125 amperes instead of 10 to 15 amperes on lower-voltage systems. Thus, the potential shock hazard to miners is lower.

Furthermore, the introduction of higher horsepower continuous mining machines necessitates the use of larger motors to drive these machines. When larger motors are used to power lower voltage machines, voltage regulation problems (voltage fluctuations) occur and reduce the output torque produced by the motor. Reduced torque causes the motor to slow down and draw more current. Increased current leads to overheating of the motor and/or the cable. Using a higher voltage power for the same size motor improves output torque, which lowers current requirements and, thus, reduces the probability of motor failure due to overheating. Reducing current by using higher voltage also decreases heat build-up in the cable, thereby diminishing the danger of cable overheating.

Smaller cables can be used when high voltage replaces low- and medium-voltages. Reduced power cable size and weight decreases the risk of strains and sprains resulting from handling power cables during installation or movement of continuous mining machines. During the period 1998 through 2008, there were approximately 880 miner strain and sprain injuries from handling continuous miner trailing cables that resulted in approximately 40,650 lost work days.⁶ Over this eleven year period, there were at least: 49 strain and sprain injuries per year; and over 2,500 associated days lost per year. On average, 64 percent of injuries per year are back injuries and 64 percent of days lost in underground coal mines are due to such injuries. The smaller cables associated with the use of HVCMMs can help reduce injuries caused by moving or handling cables attached to mining equipment.

Benefits From New Electrical Procedures

Final § 75.825(f) concerns power centers that supply power to HVCMMs and requires that each cover or removable barrier providing access to high-voltage conductors or parts be equipped with at least two interlock switches. Interlock switches cause the high-voltage circuits to be de-energized prior to miners entering the compartments containing such circuits. MSHA's experience with the interlock switches has revealed that they may stick and not operate effectively after exposure to the mine environment. Therefore, at least two switches coupled with the required maintenance under existing 30 CFR § 75.512 (Electric equipment; examination, testing and maintenance) are necessary to protect miners by assuring that the high-voltage circuits are de-energized whenever a cover is removed.

⁶ These figures do not capture all strain and sprain injuries from handling power cables of continuous miners. A short narrative explaining the injury accompanies each miner injury on file with MSHA. To obtain miners' strain and sprain injuries from handling cable attached to continuous miners, the Agency conducted a search by selecting all narratives containing the words "miner cable." If the narrative did not contain these two words, then the injury was not chosen. There are miners' strain and sprain injury reports that involve handling of cables from continuous miners that may not be captured in the search because the narrative may not have used the search words, or the search words may have been inadvertently misspelled in the description of the injury.

Final § 75.828 requires that cable manufacturers' recommended pulling procedures be followed when pulling the trailing cable with equipment other than the continuous mining machine. This requirement has only been in PFMs granted after 2006. Cable manufacturers' recommendations usually include: the proper application of a rope or sling to pull the cable and pulling procedures that do not violate the minimum bending diameter, maximum length of trailing cable that can be safely pulled, and the number of corners that it can be pulled around. The purpose of this requirement is to prevent damage to the cable. For example, when pulling cables with ropes, if a loop smaller than the minimum bending diameters for the size of the trailing cables being pulled is created, the cable can be damaged. Proper pulling procedures will minimize cable damage and protect miners against shock hazards.

Final § 75.829(a)(2) requires that the continuous mining machine not be used to mine or cut coal while being trammed from section to section or in or out of the mine, unless a power center is used in accordance with final §§ 75.823 through 75.828 and final §§ 75.830 through 75.833. This requirement is specified in approximately half of the granted PFMs. Typically the power sources used to tram continuous mining machines do not have the capacity needed for mining or cutting functions while being trammed. If mining or cutting were attempted while the machine was powered by power sources other than those noted in the requirement, overloading and loss of power could occur, creating a safety hazard.

Final § 75.829(a)(4) requires that the energized high-voltage cable be mechanically secured on-board the continuous mining machine when using a step-up transformer or a high-voltage diesel-generator set, as specified in final paragraphs (c)(2) and (c)(3), respectively. This requirement is specified in approximately half of the granted PFMs. The purpose of this requirement is to prevent miners from unnecessarily handling energized cables and to minimize cable damage when the equipment is being trammed.

Prior to tramping the continuous mining machine, final § 75.829(b) requires that ground-fault and ground-wire monitor test circuits on the power sources specified in paragraph (c) of this section be activated to assure that the corresponding circuit-interrupting device opens the circuit. The ground-fault test verifies that the circuit is de-energized when a ground-fault condition exists. Manufacturers of power centers provide circuitry that allows testing to be conducted without subjecting the power system to an actual ground-fault condition. The ground-wire monitor test is used to verify that the circuit will be de-energized if the ground-check or grounding circuit is opened. Ground-wire monitor manufacturers provide a built-in test switch for this purpose. The combination of these two tests protects miners from shock hazards should a fault condition occur.

Concerning the use of insulated cable handling tools as an alternative to high-voltage insulating gloves to handle high-voltage cables, final § 75.833(d) requires that these tools be rated and properly maintained to withstand at least 7,500 volts; designed and manufactured for cable handling; visually examined before each use for signs of damage or defects; and removed from the underground area of the mine or destroyed if damaged or defective. These requirements are set forth to provide

alternative practices that minimize the chances of miners being shocked when using insulated cable handling tools to handle high-voltage cables.

CONCLUSION

MSHA has determined that the final rule does not reduce the safety of miners in underground coal mines. The Agency anticipates that the final rule will prevent high-voltage electrical-related injuries and reduce the potential for other injuries resulting from handling trailing cables, such as strains and sprains.

IV. COMPLIANCE COSTS

INTRODUCTION

Currently, to use an HVCMM an underground coal mine operator must submit a PFM and have it approved by MSHA. As a result of the final rule, underground coal mine operators no longer need a PFM to use an HVCMM.

Most final rule provisions are derived directly from granted PFMs. There are no compliance costs for provisions derived from granted PFMs because, absent the final rule, the underground coal mine operator would still need to comply with the terms and conditions specified in a granted PFM to use an HVCMM. Some final rule provisions include requirements that are not specified in all the granted PFMs, and these requirements impose compliance costs on some underground coal mine operators with granted PFMs. The compliance costs for these provisions are estimated in this chapter.

The final rule also provides some cost savings for underground coal mine operators who decide to use HVCMMs in the future because, when the rule becomes effective, they no longer have to spend the time and expense to file for a PFM. In addition, the final rule reduces certainty related to the petition process, without incurring the expense of going through the petition process. With the requirements to use HVCMMs set forth in 30 CFR, mine operators would know the requirements for using such equipment.

METHODOLOGY

MSHA estimates the following costs (or savings) for the final rule: (1) one-time or intermittent costs; (2) annual costs; and (3) annualized costs. One-time costs are those that are incurred once, usually in the first year of compliance. Intermittent costs are those costs that may recur from time to time, but not annually. Capital expenditures, such as equipment costs, are an example of one-time or intermittent costs. Annual costs are costs that normally occur every year. Two examples of annual costs are maintenance costs and recordkeeping costs. Annualized costs are one-time or intermittent costs that are amortized over the life of the investment using a specified interest (or discount) rate to produce an equivalent constant stream of costs. For this Regulatory Economic Analysis (REA), the Agency used a (real) discount rate of 7 percent, as recommended by the Office of Management and Budget (OMB), using the annualization formula:

$$a = (i * (1 + i)^n) / ((1 + i)^n - 1),$$

where “a” equals the annualization factor, “i” equals the annual discount rate, and “n” equals the economic life of the non-annual recurring investment. In this chapter, annualized costs pertaining to the installation of interlocking devices are derived by multiplying first year costs by 0.186, which reflects a seven-year life for interlocking devices. All other annualized costs are derived by multiplying first year costs by 0.142,

which reflects a ten-year payout stream and a discount rate of 7 percent. Yearly costs are the sum of annual costs and annualized costs.

All future costs are discounted to their present value. The present value factor is derived from the formula $1/(1.07)^{\text{year}-1}$ beginning in year two after the rule takes effect.

The costs and savings in this economic analysis were developed utilizing information received from MSHA's District Offices and Coal Mine Safety Division, industry representatives, and manufacturers of continuous mining machines. All costs and cost savings are presented in 2008 dollars. MSHA used underground coal mine hourly wage rates of: \$76.21 for a mine supervisor, \$38.97 for a mine electrician, \$34.17 for an underground miner, and \$24.17 for a clerical employee.⁷ The wage rates include benefits such as social security, unemployment insurance, and workers' compensation, but they do not reflect shift differentials or overtime pay. For convenience, MSHA refers to miner "compensation" in this REA as "wages," where that term is understood to include benefits.

The baseline used for estimating annual costs and savings is the current requirements contained in granted PFMs to use HVCMMs, and current industry practices. This baseline is compared to the rule's requirements to determine yearly costs and savings. The number of HVCMMs used to determine costs and savings in this REA has been updated from those reported in the Preliminary Regulatory Economic Analysis (PREA). The number of HVCMMs reported in this REA reflects those in operation as of 2009.

Although the rule does apply to mine operators with 1-19 employees that choose to use HVCMMs, MSHA's experience shows that none of these mine operators has ever requested a PFM to use HVCMMs. Therefore, MSHA has assumed that the economic impact of the final rule is limited to underground coal mine operators having 20-500 employees, and those with 501+ employees.

COST SUMMARY

The final rule is estimated to result in a yearly net compliance cost of approximately \$50,100.

For underground coal mine operators with 20-500 employees, yearly compliance costs are estimated to be approximately \$85,875 and yearly compliance cost savings are estimated to be \$45,200, which results in an estimated yearly net cost of approximately \$40,675. For underground coal mine operators with 501+ employees, yearly costs are estimated to be approximately \$16,225 and yearly compliance cost saving are estimated to be \$6,800, which results in an estimated yearly net cost of approximately \$9,425.

Table IV-1 shows, by mine size, a summary of the estimated cost and cost savings for underground coal mine operators due to the final rule.

⁷ Hourly wage rates are derived from InfoMine USA, Inc., *U.S. Coal Mine Salaries, Wages, & Benefits — 2008 Survey Results*.

Table IV-1: Summary of Compliance Cost and Cost Savings

Details	Mine Size Employment											
	20-500				501+				Total			
	First Year Costs	Annual-ized First Year Costs	Annual Costs	Yearly Costs	First Year Costs	Annual-ized First Year Costs	Annual Costs	Yearly Costs	First Year Costs	Annual-ized First Year Costs	Annual Costs	Yearly Costs
Cost	\$1,500	\$250	\$85,625	\$85,875	\$375	\$75	\$16,150	\$16,225	\$1,875	\$325	\$101,775	\$102,100
Cost Savings	\$0	\$0	\$45,200	\$45,200	\$0	\$0	\$6,800	\$6,800	\$0	\$0	\$52,000	\$52,000
Net Cost	\$1,500	\$250	\$40,425	\$40,675	\$375	\$75	\$9,350	\$9,425	\$1,875	\$325	\$49,775	\$50,100

DISCUSSION OF COMPLIANCE COST SAVINGS

Cost Savings Related to Filing a Petition

As a result of the final rule, underground coal mine operators no longer need to file for a PFM to use HVCMMs in their mines. Therefore, the final rule provides a cost savings to those mine operators that, absent the rule, would have had to file a PFM. Based on information from MSHA's technical staff, the Agency estimates that it costs approximately \$1,000 for an underground coal mine operator to prepare and file a PFM to use an HVCMM. There have been, on average, approximately 6 PFMs filed annually from 1996 when the first PFM to use an HVCMM was filed through 2003. However, on average, over the last five years (2004 through 2008) there have been 2 PFMs filed annually, perhaps an indication that mine operators were foregoing the petition process and instead waiting for MSHA to promulgate the final rule. Averaging these two numbers together results in 4 PFMs filed annually (6+2/2).

MSHA believes that this estimate provides a reasonable basis for cost estimation because the final rule reduces the uncertainty related to the petition process. Operators will know the specific requirements related to the use of the HVCMM without going through the expense of filing a petition. Moreover, under the final rule, operators will no longer incur the risk that their petition will be denied. Since PFMs have been filed, two petitions were denied, three petitions were withdrawn by operators with no reason given, and one petition was withdrawn so that the operator could file a new petition which addressed an alternative method of using a HVCMM.

All PFMs to use HVCMMs filed within the last five years and nearly all such PFMs filed since 1996 were made by mines with 20-500 employees. MSHA estimates that on average 4 mines annually, with 20-500 employees, will file a PFM to use an HVCMM. MSHA also estimates that the cost of the petition process is approximately \$1,000 per petition. Therefore, the annual cost savings associated with no longer needing to file for a petition is \$4,000 (4 petitions per yr. x \$1,000 per petition).

Final § 75.833 Handling High-Voltage Trailing Cables

Protective equipment cost

Proposed § 75.833(a) of the July 16, 2004 rule required that underground coal mine operators make available high-voltage insulating gloves to miners that handle energized high-voltage trailing cables. The PREA that accompanied the proposed rule noted that there were two underground coal mine operators that had been granted PFMs that did not require them to purchase high-voltage insulating gloves. In the PREA, the Agency determined compliance costs to purchase gloves for the two underground coal mine operators whose granted petition did not require them to buy gloves. While developing the REA to reflect the final rule, MSHA learned that the operators of these two mines were purchasing gloves even though the terms of their granted PFMs did not require them to do so. Therefore, even though final § 75.833(b) requires that mine operators make high-voltage insulating gloves or insulating cable handling tools available to miners handling energized high-voltage trailing cables, this REA does not include any compliance costs for mine operators to purchase such gloves for the reason noted above.

Final § 75.833(a) requires that miners not handle energized trailing cables unless they are wearing high-voltage insulating gloves or are using insulated cable handling tools. In implementing the final rule, MSHA does not expect that underground coal mine operators will stop purchasing gloves altogether, but rather that they will decrease the number of high-voltage insulating gloves they now purchase and increase their use of insulated cable handling tools (such as hooks).

The PREA that accompanied the proposed rule noted that the proper type of high-voltage insulating gloves to handle high-voltage trailing cables includes a pair of rubber insulating gloves and a pair of leather gloves. The rubber gloves are put on first; then the leather gloves are put over the rubber gloves in order to provide protection for the miner. In the PREA, MSHA estimated that the cost of a pair of rubber insulating gloves, lasting six months, was approximately \$70 per pair and that the cost of a pair of leather gloves, lasting one month, was approximately \$30. In this REA, the cost of a pair of rubber insulating gloves has been updated to \$75 per pair. Thus, annually, one miner will need two pairs of rubber insulating gloves and 12 pairs of leather gloves costing \$510 $[(\$75 \times 2) + (\$30 \times 12)]$ per year. When high-voltage insulating gloves are used, final § 75.833(c) requires that the rubber gloves be tested every 30 days. Based on testing cost of \$10 per pair of rubber gloves, the annual cost to test a pair of rubber gloves is estimated to be \$120 $(\$10 \times 12)$. Underground coal mine operators that provide insulating cable handling tools, rather than high-voltage insulating gloves, are assumed to provide a hook that, on average, costs approximately \$145.

Since the proposed rule would have required underground coal mine operators to purchase high-voltage insulating gloves, MSHA estimated in the accompanying PREA that there would be five persons, each needing a pair of rubber insulating gloves and leather gloves, for every section in which an HVCMM operated. Since final § 75.833(b) allows underground coal mine operators to provide insulating cable handling tools or insulating gloves to handle high-voltage cables, the Agency estimates that for each section where an HVCMM operates, the operator will decrease the purchase and testing of insulating gloves from 5 to 3 pairs and increase the purchase of insulating cable

handling tools. MSHA also estimates that the underground coal mine operator will purchase 2 hooks per year for every section in which an HVCMM operates.

MSHA therefore estimates that each affected mine derives a net cost savings of \$970 for each section in which a HVCMM is used [(((\$510 annual gloves cost per person x 2 pairs) + (\$120 to test rubber gloves/yr. x 2 pairs)) – (\$145 cost per hook x 2 hooks per year)]. For underground coal mine operators with granted PFMs, 20 HVCMMs are in 6 mines with 20-500 employees, and 7 HVCMMs are in 2 mines with 501+ employees. Two additional underground coal mine operators, with 20-500 employees, are estimated to use 4 HVCMMs annually (2 machines per mine). Thus, in the first year 24 HVCMMs are affected (20 HVCMMs in 6 mines with 20-500 employees + 4 HVCMMs in 2 additional mines with 20-500 employees). Every year thereafter a net of 4 HVCMMs in 2 mines with 20-500 employees is added. For example, 28 HVCMMs are affected in the second year (24 HVCMMs from the first year +4 HVCMMs from the second year).

For mines with 20-500 employees, the annual cost savings related to personal protective equipment is approximately \$23,000 (24 HVCMMs x \$970 net cost savings per yr.). Since the numbers of HVCMMs change from year to year due to the addition of HVCMMs in new mines, the summation of the present value of annual cost savings over a 10 year period is approximately \$290,000. The \$290,000 is multiplied by a 10 year annualization factor of 0.142 to arrive at annualized per year cost savings of approximately \$41,200. For mine with 501+ employees, the annual cost savings related to personal protective equipment is approximately \$6,800 (7 HVCMMs x \$970 net cost savings per yr.).

Accelerated Production

In the PREA for the proposed rule, the Agency noted that there are occasions when a mine operator has a granted PFM to use a HVCMM in a mine, but after using the machine for a period of time, the operator decides to switch the HVCMM to another mine. Under existing regulations, the mine operator would need to obtain another PFM to switch the HVCMM to another mine. Usually mine operators can anticipate when equipment needs to be switched from one mine to another and can synchronize the granting of a PFM with the movement of the equipment. However, in the PREA, the Agency noted that a circumstance might occur where the mine operator cannot coordinate the desired movement of equipment with the granting of a PFM. As a result, there would be a delay in production because the transferred HVCMM would not be available for use in the mine until a PFM was granted. The PREA contained an annual cost savings associated with the elimination of this possible production delay. At this time, the Agency is not confident that this event will occur with sufficient regularity that would justify the cost savings being quantified in this analysis because over the years mine operators have improved their ability to time the availability of the HVCMMs to the granting of the PFM. Nevertheless, MSHA anticipates that the decrease in uncertainty of the petition process will benefit mine operators.

Summary of Cost Savings

MSHA estimates total cost savings of approximately \$52,000. Of this amount, \$4,000 is related to savings from no longer having to file for a petition, and \$48,000 is related to saving for using insulated handling tools.

DISCUSSION OF COMPLIANCE COSTS

PART 18 - ELECTRIC MOTOR-DRIVEN MINE EQUIPMENT AND ACCESSORIES

Final § 18.54 sets forth design, construction, and performance specifications for HVCMM approval for use in gassy underground mines. These specifications are necessary to prevent the following hazards: (1) high-voltage arcing; (2) ignition of a methane-air mixture surrounding the HVCMM if an arc or methane explosion occurs within the explosion-proof enclosure; (3) enclosure failure from an increased pressure rise if an arc or methane explosion occurs within the explosion-proof enclosure; and (4) electrical shock hazards to miners when working with or around a HVCMM. The specifications set forth in final § 18.54 have been addressed by MSHA in granted PFMs and manufacturers have been complying with them in designing and constructing HVCMMs. Thus, setting forth design, construction, and performance standards for HVCMMs in 30 CFR through the requirements of final § 18.54 will not result in changes to the HVCMMs. So there should be no cost impacts for either manufacturers of HVCMMs or mine operators that will use such machines.

Proposed § 18.54(f)(4), from the July 16, 2004 rulemaking, stated that high-voltage trailing cables must be constructed with two reinforced layers of jacket (double-jacketed): an outer and inner layer. Comments were received in favor of revising paragraph (f)(4) to allow for a single-jacketed high-voltage trailing cable made of thermoplastic polyurethane. These commenters noted that the single-jacketed cable has physical properties that exceed those of the double-jacketed cable when considering the tensile strength and tear resistance of the cable and therefore should not be prohibited by the final rule. A durable cable that is less prone to physical damage benefits the industry and improves miner safety. Based on the characteristics of the single-jacketed cable comments received and MSHA's experience with these cables, the Agency has revised proposed paragraph (f)(4) to allow, under final paragraph (f)(4), as an alternative to double-jacketed cable, the use of a single-jacketed cable with an HVCMM, when the cable has a tear strength of more than 100 pounds per inch thickness and a tensile strength exceeding 4,000 pounds per square inch.

Although the cost of the single-jacketed cable is approximately 15 percent higher than the double-jacketed cable, there are no compliance costs associated with final paragraph (f)(4)(ii) because the total cost of ownership (purchase price over its service life plus maintenance) is about the same for both types as the single-jacketed cables are more durable. In addition, the paragraph provides mine operators with the option of using either a double-jacketed or a single-jacketed trailing cable, so they are free to

choose the type of cable that would have the lower life time cost in their specific situation.

PART 75, SUBPART I – UNDERGROUND HIGH-VOLTAGE DISTRIBUTION

Final § 75.825 Power Centers

Cost for interlocking device

With regard to power centers that are supplying power to HVCMMs, final § 75.825(f) requires that each cover or removable barrier providing access to energized high-voltage conductors or parts be equipped with at least two interlock switches. Currently, all power centers in underground coal mines have at least 1 interlocking device. MSHA estimates that roughly half of all power centers have more than 1 interlocking device. Further, the Agency estimates that a mine electrician, earning \$38.97 per hour, takes 2 hours to install an interlocking device that costs approximately \$45 and last seven years.

There are 27 HVCMMs in 8 underground coal mines that had been granted PFMs and were active as of 2009. Six of these mines have 20-500 employees and use a total of 20 HVCMMs. The 2 remaining mines have 501+ employees and use a total of 7 HVCMMs. MSHA assumes that there is a power center for every HVCMM and that approximately 10 power centers in mines with 20-500 employees and 3 power centers in the 2 mines with 501+ employees need to install a second interlocking device.

MSHA estimates that the first year cost for operators with granted PFMs to install a second interlocking device on power centers is approximately \$1,625. Of this amount, mines with 20-500 are responsible for approximately \$1,250 [10 interlock switches x ((2 hrs. x \$38.97 hourly wage) + \$45 cost of device)], and mines with 501+ employees are responsible for approximately \$375 [3 interlock switches x ((2 hrs. x \$38.97 hourly wage) + \$45 cost of device)]. Based on a estimated seven year life for an interlock switch, first year costs were multiplied by an annualization factor of 0.186 to arrive at annualized costs of approximately \$325 (\$250 for mines with 20-500 employees and \$75 for mines with 501+ employees).

On average, there have been approximately 4 PFMs granted per year to use an HVCMM. Currently there are 8 underground coal mines that used HCVMMs. There are several reasons why the number of mines currently using HVCMMs is significantly less than the number of PFMs that have been granted to use such equipment since 1997. First, a PFM is mine-specific. A company may have a granted PFM to use an HVCMM in Mine A. After some time the company may want to move the machine to Mine B. Before the movement of equipment can occur, a new PFM has to be obtained for Mine B. Second, a granted PFM is also equipment-specific. For example, even if a mine already has a granted PFM, it would need another granted PFM if it wanted to obtain a second HVCMM with a different design from the machine it is currently using. Third, in some cases the company may have been granted a PFM and then decided not to open the mine

or not to purchase the machine. Fourth, some mines that have been granted a PFM are currently abandoned or not producing coal.

MSHA estimates that, on average, annually, 2 additional underground coal mines will produce coal using HVCMMs. Since 6 of the 8 mines that currently operate HVCMMs have 20-500 employees and nearly all mines that have been granted a PFM to use a HVCMMs had 20-500 employees, the Agency assumes that the 2 additional mines per year that choose to add such machines will have 20-500 employees.

Mines with 20-500 employees that have been granted a PFM to use HVCMMs have, on average, approximately 2 HVCMMs per mine. Therefore, MSHA assumes that each of the 2 additional mines has 2 HVCMMs (a total of 4 machines in the 2 additional mines). Assuming a power center for each machine and that half of them need a second interlocking device, then 2 power centers (4 power centers / 2) need the device in the 2 additional mines that choose to use HVCMMs annually.

MSHA estimates that the annual cost for new mine operators with 20-500 employees to install a second interlocking device on power centers is approximately \$250 [2 interlock switches x ((2 hrs. x \$38.97 hourly wage) + \$45 cost of device)].

Final §75.829 Trammig Continuous Mining Machines in and out of the Mine, and from Section to Section

Cost to make a §75.829(b)(1) record and countersign

Final § 75.829(b)(1) requires that, prior to trammig the HVCMM, a qualified person must activate the ground-fault and ground-wire monitor test circuits of the power sources specified in paragraph (c) of this section. Thus, the power sources must pass a functional test of the ground-fault and ground-wire monitor circuits. Final § 75.829(b)(2) requires that a person designated by the mine operator activate the test circuit for the grounded-phase detection circuit on the machine to assure that the detection circuit is functioning properly. These tests are being conducted under granted PFM. In accordance with §§ 75.832(g)(1) and (2), certification by signature and date must be made after the test required by § 75.829(b)(1) is conducted. Also, any unsafe condition found must be recorded along with any corrective action taken. No record is required for the test under final § 75.829(b)(2).

Additionally, final § 75.832(g)(3) requires that the record made pursuant to final § 75.829(b)(1) be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or the equivalent mine official's next regularly scheduled shift. Final § 75.832(g)(3) was not previously included in granted PFMs and is therefore a new cost for mine operators with granted petitions and for mine operators that use HVCMMs in the future.

MSHA estimates that the tests will be conducted once every six months (or twice a year) per HVCMM, and that only once per year test results will show that corrective action is required. MSHA estimates that a mine electrician, earning \$38.97 per hour, takes, on average, 0.1 hours (6 minutes) to make a record for each machine. Furthermore, MSHA estimates that a mine foreman or equivalent mine official, earning

\$76.21 per hour, takes an additional 0.1 hours (6 minutes) to countersign the record. Thus, the cost to make a record and countersign it is estimated to be approximately \$12 [(\$38.97 mine electrician hourly wage rate x 0.1 hrs. to make a record) + (\$76.21 mine official hourly wage rate x 0.1 hrs. to countersign record)].

For underground coal mine operators with granted PFMs, 20 HVCMMs are in 6 mines with 20-500 employees, and 7 HVCMMs are in 2 mines with 501+ employees. Two additional underground coal mine operators, with 20-500 employees, are estimated to use 4 HVCMMs annually (2 machines per mine). Thus, in the first year 24 HVCMMs are affected (20 HVCMMs in 6 mines with 20-500 employees + 4 HVCMMs in 2 additional mines with 20-500 employees). Every year thereafter a net of 4 HVCMMs in 2 mines with 20-500 employees is added. For example, 28 HVCMMs are affected in the second year (24 HVCMMs from the first year + 4 HVCMMs from the second year).

The annual costs in the first year for mines with 20-500 employees to make a record and countersign it are approximately \$600 (24 HVCMMs x \$12 to make a record and countersign x 2 records per yr.). Since the numbers of HVCMMs change from year to year due to the addition of HVCMMs in new mines, the summation of the present value of annual costs over a 10 year period is approximately \$7,200. The \$7,200 is multiplied by a 10 year annualization factor of 0.142 to arrive at annualized per year cost of approximately \$1,000. The annual costs for mines with 501+ employees to make a record and countersign it are approximately \$200 (7 HVCMMs x \$12 to make a record and countersign x 2 records per yr.).

Cost for corrective action taken under § 75.829(b)

Final § 75.829(b)(1) requires corrective action to be taken if testing the ground-fault and ground-wire monitor test circuits of the power sources specified in paragraph (c) shows that such action is needed. Paragraph (b)(2) requires corrective action to be taken if testing of the test circuits for the grounded-phase detection circuit shows that such action is needed.

MSHA estimates that one corrective action of each type per HVCMM per year will be needed as a result of the testing required under paragraphs (b)(1) and (b)(2). Annually, MSHA estimates that it takes a total of 0.5 hours (30 minutes) to perform the corrective actions [15 minutes to perform the corrective action required by paragraph (b)(1) and 15 minutes to perform the corrective action required by paragraph (b)(2)]. A mine electrician, earning \$38.97 per hour, will perform the corrective actions.

For underground coal mine operators with granted PFMs, 20 HVCMMs are in 6 mines with 20-500 employees, and 7 HVCMMs are in the 2 mines with 501+ employees. In addition, a net increase of 2 additional underground coal mine operators, with 20-500 employees, is estimated to use 4 HVCMMs annually (2 machines per mine). Thus, in the first year 24 HVCMMs are affected (20 HVCMMs in 6 mines with 20-500 employees + 4 HVCMMs in 2 additional mines with 20-500 employees). Every year thereafter a net of 4 HVCMMs in 2 mines with 20-500 employees is added.

MSHA estimates that the annual costs in the first year for mines with 20-500 employees to take corrective action are approximately \$475 (24 HVCMMs x 0.5 hrs. to take corrective action x 1 corrective action per yr. x \$38.97 hourly wage). Since the numbers of HVCMMs change from year to year due to the addition of HVCMMs in new mines, the summation of the present value of annual costs over a 10 year period is approximately \$5,825. The \$5,825 is multiplied by a 10 year annualization factor of 0.142 to arrive at annualized per year cost of approximately \$850. MSHA estimates that the annual costs for mines with 501+ employees to take corrective action are approximately \$150 (7 HVCMMs x 0.5 hrs. to take corrective action x 1 corrective action per yr. x \$38.97 hourly wage).

Final § 75.832 Frequency of examinations and recordkeeping

Cost for inspecting high-voltage trailing cable

Final § 75.832(d)(2) requires that, at the beginning of each shift that the continuous mining machine is energized, a person designated by the mine operator de-energize and visually inspect the high-voltage trailing cable for damage to the outer jacket. The inspection must be conducted from the continuous mining machine to the following locations: (i) the last open crosscut; (ii) within 150 feet of the working place during retreat or second mining; or (iii) up to 150 feet of the continuous mining machine when the machine is used in outby areas.

Based on information from MSHA's technical staff, underground coal mine operators using HVCMMs operate 3 shifts per day (2 production shifts and 1 maintenance shift) and work approximately 312 days per year (6 workdays per week x 52 weeks). MSHA assumes that the HVCMM will be energized on all three daily shifts. Also, MSHA estimates that an underground coal miner operating an HVCMM, earning \$34.17 per hour, takes 0.1 hours (6 minutes) to perform the inspection.

There are 2 mines with 20-500 employees that have 5 HVCMMs and have recently been granted PFMs that are in compliance with final § 75.832(d)(2). These 2 mines will not incur compliance costs for final § 75.832(d)(2) .

Two other mines with 20-500 employees have 7 HVCMMs and have been granted PFMs that require that the inspection stated in final § 75.832(d)(2) be performed on each production shift. Since these 2 mines are already conducting the inspection required by final § 75.832(d)(2) on the HVCMM on each of their 2 production shifts, they will incur costs to conduct an additional inspection per day that is required by final § 75.832(d)(2) on the HVCMM during the maintenance shift.

There are also 2 mines with 20-500 employees that have 8 HVCMMs and have been granted PFMs that do not require the inspection stated in final § 75.832(d)(2). Therefore, these 2 mines will incur costs to conduct the inspection required by final § 75.832(d)(2) on all 3 shifts that operate each day (two production shifts and one maintenance shift).

Since recently granted PFMs have included the inspection on each shift as required by final § 75.832(d)(2), MSHA assumes that, every year, the 2 additional mines with 20-500 employees that have a total of 4 HVCMMs would have been granted PFMs

requiring them to perform the inspection as required by final § 75.832(d)(2) on each shift. Therefore, MSHA estimates that, every year, these 2 additional mines would be in compliance with final § 75.832(d)(2).

MSHA estimates that 31 additional inspections per day will occur in mines with 20-500 employees [7 HVCMM in mines that need 1 additional inspection per day + 8 HVCMMs in mines that need 3 additional inspections per day]. MSHA estimates that the annual cost for mines with 20-500 employees to conduct the inspection required by final § 75.832(d)(2) is approximately \$33,050 (31 additional inspections per day x 312 work days per yr. x 0.1 hrs. per inspection x \$34.17 hourly wage rate).

Two mines currently using HVCMMs have 501+ employees. These 2 mines have 7 HVCMMs and have been granted PFMs that require that the inspection stated in final § 75.832(d)(2) be performed on each production shift. Since these 2 mines are already conducting the inspection required by final § 75.832(d)(2) on the HVCMM on each of their 2 production shifts, they will incur costs to conduct an additional inspection per day that is required by final § 75.832(d)(2) on the HVCMM during the maintenance shift. MSHA estimates that the annual cost for mines with 501+ employees to conduct the inspection required by final § 75.832(d)(2) is approximately \$7,475 (7 additional inspections per day x 312 work days per yr. x 0.1 hrs. per inspection x \$34.17 hourly wage rate).

Cost to countersign record

Final §§ 75.832(g) (1) and (2) require that a record be made of examinations and tests identified under final §§ 75.832(a), (b), and (c). In addition, final § 75.832(g) (3) requires that the record be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or the equivalent mine official's next regularly scheduled working shift. The examinations and tests required under final §§ 75.832(a) and (b) are already being conducted and recorded as part of a larger weekly examination of electrical equipment that is required under existing § 75.512. The examinations and tests required under § 75.832(c) are being conducted and recorded pursuant to the terms and conditions of existing high-voltage continuous miner granted PFMs. Therefore, the cost to conduct the examinations and tests under final §§ 75.832(a), (b), and (c) and make a record has already been accounted for. However, the requirement to countersign the records under final §§ 75.832(a), (b), and (c) is not in any existing provision or a requirement in any HVCMM granted PFMs. Therefore, the cost to countersign records under final §§ 75.832(a), (b), and (c), as estimated below, is a cost of this rule.

For underground coal mine operators with granted PFMs, 20 HVCMMs are in 6 mines with 20-500 employees, and 7 HVCMMs are in 2 mines with 501+ employees. In addition, a net increase of 2 additional underground coal mine operators, with 20-500 employees, is estimated to use 4 HVCMMs annually (2 machines per mine). Thus, in the first year 24 HVCMMs are affected (20 HVCMMs in 6 mines with 20-500 employees + 4 HVCMMs in 2 additional mines with 20-500 employees). Every year thereafter a net of 4 HVCMMs in 2 mines with 20-500 employees is added.

MSHA estimates that it takes a mine official, earning \$76.21 per hour, 0.1 hours (6 minutes) to review and countersign the records. Table IV-13 shows the annual cost to

review and countersign records of examinations and tests that are required under §§ 75.832(a), (b), and (c) for underground coal mine operators with 20-500 employees.

MSHA estimates that the annual costs in the first year for mines with 20-500 employees to review and countersign records is approximately \$28,550 (24 HVCMMs x 3 records x 52 wks per yr. x 0.1 hrs. to review and countersign record x \$76.21 hourly wage rate). Since the numbers of HVCMMs change from year to year due to the addition of HVCMMs in new mines, the summation of the present value of annual costs over a 10 year period is approximately \$355,475. The \$355,475 is multiplied by a 10 year annualization factor of 0.142 to arrive at annualized per year cost of approximately \$50,475. MSHA estimates that the annual costs for mines with 501+ employees to review and countersign records is approximately \$8,325 (7 HVCMMs x 3 records x 52 wks per yr. x 0.1 hrs. to review and countersign record x \$76.21 hourly wage rate).

Final § 75.834 Training

Training concerning HVCMMs

Final § 75.834(a) requires that miners who perform maintenance on HVCMMs be trained in high-voltage safety, testing, and maintenance procedures. In addition, final § 75.834(b) requires that personnel who work in the proximity of HVCMMs or who move high-voltage equipment or cables be specially trained in high-voltage safety procedures. This specialized training must be specified in part 48 plans. These two provisions are in the terms and conditions of granted PFMs to use HVCMMs. At the time that the mine operator was granted a PFM, the operator incurred the cost of making the appropriate filings to revise their part 48 plans. Therefore, there are no compliance costs for these provisions.

Table IV-2 shows, by mine size, a summary of costs of the final rule for mines with 20 or more employees.

Table IV-2: Summary of Compliance Costs

Section	Mine Size by Employment											
	20-500				501+				Total			
	First Year Cost	Annual-ized First Year Cost	Annual Cost	Yearly Cost	First Year Cost	Annual-ized First Year Cost	Annual Cost	Yearly Cost	First Year Cost	Annual-ized First Year Cost	Annual Cost	Yearly Cost
§75.825(f)	\$1,500	\$250	\$250	\$500	\$375	\$75	\$0	\$75	\$1,875	\$325	\$250	\$575
§75.829(b) Corrective Action	\$0	\$0	\$850	\$850	\$0	\$0	\$150	\$150	\$0	\$0	\$1,000	\$1,000
§75.829(b) Records & Countersign	\$0	\$0	\$1,000	\$1,000	\$0	\$0	\$200	\$200	\$0	\$0	\$1,200	\$1,200
§75.832(d)(2)	\$0	\$0	\$33,050	\$33,050	\$0	\$0	\$7,475	\$7,475	\$0	\$0	\$40,525	\$40,525
§75.832(g)(3)	\$0	\$0	\$50,475	\$50,475	\$0	\$0	\$8,325	\$8,325	\$0	\$0	\$58,800	\$58,800
Total Cost	\$1,500	\$250	\$85,625	\$85,875	\$375	\$75	\$16,150	\$16,225	\$1,875	\$325	\$101,775	\$102,100

FEASIBILITY

MSHA has concluded that the requirements of the final rule are technologically and economically feasible.

HVCMMs have been used to produce coal in underground coal mines since 1997. Underground coal mine operators that use HVCMMs are currently following most of the provisions of the final rule through conditions set forth in their granted PFMs. Any requirements in the final rule that are different from those currently being followed in granted PFMs can easily be satisfied using available methods and technology.

MSHA has traditionally used a revenue screening test—whether the yearly compliance costs of a regulation are less than 1 percent of revenues—to establish presumptively that compliance with the regulation is economically feasible for the mining industry. As previously estimated in this chapter, the underground coal mining industry will incur a net yearly compliance cost of approximately \$50,100 versus annual revenue of approximately \$18.4 billion per year. No mine operator is required to use HVCMMs. So mine operators will not choose to use HVCMMs and incur the related regulatory costs unless such use has lower cost than lower continuous mining machines using the alternative of lower voltage. On this basis, the Agency concludes that the rule is economically feasible.

V. REGULATORY FLEXIBILITY CERTIFICATION

INTRODUCTION

Pursuant to the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), MSHA has analyzed the impact of the final rule on small entities. Based on that analysis, MSHA certifies that the final rule does not have a significant economic impact on a substantial number of small entities that are covered by this rulemaking. The factual basis for this certification is presented below.

DEFINITION OF A SMALL MINE

Under the RFA, in analyzing the impact of a rule on small entities, MSHA must use the SBA definition for a small entity or, after consultation with the SBA Office of Advocacy, establish an alternative definition for the mining industry by publishing that definition in the Federal Register for notice and comment. MSHA has not taken such an action and, hence, is required to use the SBA definition.

The SBA defines a small entity in the mining industry as an establishment with 1-500 employees (13 CFR 121.201). Almost all of the coal mines affected by the final rule are in this category. Consequently, they can be viewed as sharing the special regulatory concerns which the RFA was designed to address.

Traditionally, MSHA has also looked at the impacts of its rules on a subset of mines with 1-19 employees, which the mining community refers to as “small mines.” These small mines differ from larger mines not only in the number of employees, but also, among other things, in economies of scale in material produced, in the type and amount of production equipment, and in supply inventory. Therefore, the cost to small mines of complying with MSHA rules and the impact of the Agency’s rules on them will also tend to be different.

Although the final rule applies to underground coal mine operators with 1-19 employees that choose to use HVCMMs, the Agency experience is that no underground coal mine operator with 1-19 employees has ever requested a PFM to use HVCMMs. MSHA does not expect any mine operator with 1-19 employees to file a PFM to use an HVCMM. However, this analysis still complies with the legal requirements of the RFA for an analysis of the impacts on “small entities” by examining small entities with 1-500 employees. MSHA concludes that it can certify that the rule does not have a significant economic impact on a substantial number of small entities that are covered by the final rule.

FACTUAL BASIS FOR CERTIFICATION

General Approach

MSHA’s analysis of impacts on “small entities” begins with a “screening” analysis. The screening compares the estimated compliance costs of a rule for small

entities in the sector affected by the rule to the estimated revenues for those small entities. When estimated compliance costs are less than 1 percent of the estimated revenues, or negative, MSHA considers that it is generally appropriate to conclude that there is no significant economic impact on a substantial number of small entities. When estimated compliance costs equal or exceed 1 percent of revenues, it tends to indicate that further analysis may be warranted.

Derivation of Costs and Revenues

The compliance costs noted in this chapter were previously presented in Chapter IV of this document along with an explanation of how they were derived. All underground coal mine operators are covered by the rule. In determining revenues for underground coal mine operators, MSHA multiplied their production data (in tons) by the 2008 price per ton of the commodity (\$51.37 per ton for underground production). The production data were obtained from MSHA's PEIR data,⁸ and the coal price estimate was obtained from the Department of Energy (DOE), Energy Information Administration (EIA).⁹

Results of Screening Analysis

The final rule applies to all underground coal mine operators. Using the SBA definition of small mines, those with 1-500 employees, the final rule's estimated yearly net cost of approximately \$40,675 for underground coal mine operators is substantially less than 1 percent of estimated annual revenue. No mine operator is required to use HVCMMs. So mine operators will not choose to use HVCMMs and incur the related regulatory costs unless such use has lower cost than continuous mining machines using the alternative of lower voltage. Accordingly, MSHA has certified that the final rule does not have a significant economic impact on a substantial number of small entities.

⁸ U. S. DOL, MSHA, PEIR, Calendar Year 2008 data.

⁹ The 2008 coal price per ton was obtained from the U.S. DOE, EIA, *Annual Coal Report 2008*, Table 28, October 2009.

VI. OTHER REGULATORY CONSIDERATIONS

THE UNFUNDED MANDATES REFORM ACT

MSHA has reviewed the final rule under the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1501 *et seq.*). MSHA has determined that this rule does not include any Federal mandate that may result in increased expenditures by State, local, or tribal governments; nor does it increase private sector expenditures by more than \$100 million in any one year or significantly or uniquely affect small governments. Accordingly, the Unfunded Mandates Reform Act of 1995 (2 USC 1501 *et seq.*) requires no further agency action or analysis.

EXECUTIVE ORDER 13132: FEDERALISM

This final rule does not have “federalism implications,” because it does not “have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.” Accordingly, Executive Order 13132, Federalism, requires no further agency action or analysis.

THE TREASURY AND GENERAL GOVERNMENT APPROPRIATIONS ACT OF 1999: ASSESSMENT OF FEDERAL REGULATIONS AND POLICIES ON FAMILIES

Section 654 of the Treasury and General Government Appropriations Act of 1999 (5 U.S.C. 601 note) requires agencies to assess the impact of Agency action on family well-being. MSHA has determined that this final rule has no affect on family stability or safety, marital commitment, parental rights and authority, or income or poverty of families and children. Accordingly, MSHA certifies that this final rule does not impact family well-being.

EXECUTIVE ORDER 12630: GOVERNMENT ACTIONS AND INTERFERENCE WITH CONSTITUTIONALLY PROTECTED PROPERTY RIGHTS

This final rule does not implement a policy with takings implications. Accordingly, E. O. 12630 requires no further Agency action or analysis.

EXECUTIVE ORDER 12988: CIVIL JUSTICE REFORM

This final rule was written to provide a clear legal standard for affected conduct and was carefully reviewed to eliminate drafting errors and ambiguities, so as to minimize litigation and undue burden on the Federal court system. Accordingly, this final rule meets the applicable standards provided in section 3 of E. O. 12988, Civil Justice Reform.

EXECUTIVE ORDER 13045: PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS

This final rule has no adverse impact on children. Accordingly, under E. O. 13045, no further Agency action or analysis is required.

EXECUTIVE ORDER 13175: CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

This final rule does not have “tribal implications,” because it does not “have substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes.” Accordingly, under E. O. 13175, no further Agency action or analysis is required.

EXECUTIVE ORDER 13211: ACTIONS CONCERNING REGULATIONS THAT SIGNIFICANTLY AFFECT ENERGY SUPPLY, DISTRIBUTION, OR USE

Executive Order 13211 requires agencies to publish a statement of energy effects when a rule has a significant energy action that adversely affects energy supply, distribution or use. MSHA has reviewed this final rule for its energy effects because the final rule applies to the underground coal mining sector. Because this final rule results in a yearly net cost of approximately \$50,100 to the underground coal mining industry, relative to annual revenues of \$18.4 billion in 2008, MSHA has concluded that it is not a significant energy action because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Accordingly, no further Agency action or analysis is required.

EXECUTIVE ORDER 13272: PROPER CONSIDERATION OF SMALL ENTITIES IN AGENCY RULEMAKING

MSHA has thoroughly reviewed the final rule to assess and take appropriate account of its potential impact on small businesses, small governmental jurisdictions, and small organizations. MSHA has determined and certified that the final rule does not have a significant economic impact on a substantial number of small entities.

VII. PAPERWORK REDUCTION ACT OF 1995

INTRODUCTION

The purpose of this chapter is to show the estimated paperwork burden hours and related cost to be borne by underground coal mine operators as a result of the final rule. In this chapter, the burden hours and related cost are estimated for final §§ 75.829, 75.831, and 75.832.

In addition, as a result of the final rule, underground coal mine operators no longer need a PFM of existing 30 CFR § 75.1002 in order to use an HVCMM to extract coal. Existing OMB information collection package 1219-0065 currently includes annual burden hours and cost related to the time it takes mine operators to prepare and file petitions with MSHA, including PFMs to use an HVCMM. Therefore, underground coal mine operators' burden hours and cost related to preparing and filing a PFM to use an HVCMM will be eliminated from OMB information collection package 1219-0065 once the final rule becomes effective.

SUMMARY OF PAPERWORK BURDEN HOURS AND RELATED COSTS

Final §§ 75.829, 75.831, and 75.832 result in a total of 819 annual burden hours and related cost of approximately \$50,200. Also, for underground coal mine operators there are 48 burden hours and related cost of approximately \$3,700 that will be eliminated from existing OMB information collection package 1219-0065.

Table VII-1 shows a summary of the first year burden hours and cost discussed above.

Table VII-1: Summary of First Year Burden Hours and Costs

	Total	
	Hours	Cost
Rule Burden		
§75.829	12	\$691
§75.831	242	\$9,431
§75.832	565	\$40,043
Total	819	\$50,165
Burden Eliminated		
Filed PFMs	48	\$3,668

Below is a discussion of how the burden hour and cost in Table VII-1 were derived.

Final § 75.829 Record and Countersigning Burden

Final § 75.829(b)(1) requires that, prior to tramming the HVCMM, a qualified person must activate the ground-fault and ground-wire monitor test circuits of the power sources specified in paragraph (c) of this section. Thus, the power sources must pass a functional test of the ground-fault and ground-wire monitor circuits. In accordance with §§ 75.832(g)(1) and (2), certification by signature and date must be made after the test required by § 75.829(b)(1) is conducted. Also, any unsafe condition found must be recorded along with any corrective action taken. Final § 75.832(g)(3) requires that the record be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or the equivalent mine official's next regularly scheduled shift.

MSHA estimates that a record needs to be made twice a year. MSHA estimates that a mine electrician, earning \$38.97 per hour, takes, on average, 0.1 hours (6 minutes) to make a record. Furthermore, MSHA estimates that a mine foreman or equivalent mine official, earning \$76.21 per hour, takes an additional 0.1 hours (6 minutes) to countersign the record.

In the first year, there are 20 HVCMMs in 6 existing mines with 20-500 employees, and 7 HVCMMs in 2 existing mines with 501+ employees. Furthermore, each year, beginning in the first year, 2 additional underground coal mine operators, with 20-500 employees, are estimated to choose to use 4 HVCMMs (2 machines per mine). Thus, in the first year 31 HVCMMs are affected (24 HVCMMs in mines with 20-500 employees + 7 HVCMMs in mines with 501+ employees). In the second year, there are 35 HVCMMs (28 HVCMMs in mines with 20-500 employees + 7 HVCMMs in mines with 501+ employees). In the third year, there are 39 HVCMMs (32 HVCMMs in mines with 20-500 employees + 7 HVCMMs in mines with 501+ employees).

MSHA estimates that there are 12 burden hours in the first year, of which 6 hours account for making a record (31 HVCMMs x 2 records per yr. x 0.1 hrs. to make record), and 6 hours account for review and countersign (31 HVCMMs x 2 records per yr. x 0.1 hrs. to review and countersign). First year burden costs are \$691 [(6 hrs. x \$38.97 hourly wage) + (6 hrs. x \$76.21)]. In the second year, using 35 HVCMMs generates 14 burden hours and costs of \$806 [(7 hrs. x \$38.97 hourly wage) + (7 hrs. x \$76.21)]. In the third year, using 39 HVCMMs generates 16 burden hours and costs of \$921 [(8 hrs. x \$38.97 hourly wage) + (8 hrs. x \$76.21)].

Final § 75.831 Burden Related to Tagging Equipment

Final § 75.831 requires tagging prior to: performing electrical work on high-voltage trailing cables or the continuous mining machine (under paragraph (a)); troubleshooting and testing trailing cables (under paragraph (b)); and work that is performed inside any compartment of the power center (under paragraph (d)). Although these tagging requirements were part of the granted PFMs, an information collection burden was not developed. The burden is developed below.

On average, MSHA estimates that, for at least one of these requirements, tagging occurs once for each of the 312 workdays per year. On average, MSHA estimates that tagging, by a mine electrician earning \$38.97 per hour, takes 0.025 hours (1.5 minutes). As stated

earlier, there are: 31 HVCMMs affected in the first year; 35 HVCMMs affected in the second year; and 39 HVCMMs in the third year.

MSHA estimates that there are 242 burden hours in the first year (31 HVCMMs x 0.025 hrs. for the time to tag x 1 tag per work day x 312 workdays). First year burden costs are \$9,431 (242 x \$38.97). In the second year, using 35 HVCMMs generates 273 burden hours and costs of \$10,639. In the third year, 39 HVCMMs generates 304 burden hours and costs of \$11,847.

Final § 75.832 Record Burden of Test Required by § 75.832(c)

Paragraphs (a), (b), and (c) of final § 75.832 require that exams and tests be conducted at least once every seven days and paragraph (g)(1) and (g)(2) require that a record be made of these exams or tests. The record consists of certifying by signature and date that the exams and tests were conducted, noting any unsafe conditions, and any corrective action taken.

Paragraph (a) requires that each HVCMM be examined to verify that electrical protection, equipment grounding, permissibility, cable insulation, and control devices are properly installed and maintained. Paragraph (b) requires that, prior to tramming the HVCMM, each HVCMM ground-wire monitor circuit be examined and tested to verify that it causes the corresponding circuit-interrupting device to open. The examinations of the HVCMM required by paragraphs (a) and (b) are already being conducted as part of a larger weekly examination of electrical equipment that is required under existing § 75.512 (Electrical equipment; examination, testing and maintenance). Existing § 75.512 also requires that a record be made of exams and tests. Thus, the burden associated with examinations and records under final §§ 75.832 (a) and (b) is already accounted for under existing § 75.512, and is included in existing paperwork package 1219-0116. Therefore, this burden does not need to be included in the paperwork package accompanying the rule.

Paragraph (c) requires a test of the ground-wire monitor circuit at least once every seven days. This requirement is contained in granted PFMs; however, an information collection burden was never developed. The burden for making a record is developed below. The ground-wire monitor test, noted in paragraph (c), is conducted on the power station. MSHA assumes that there is 1 power station per HVCMM. MSHA estimates that, on average, a mine electrician, earning \$38.97 per hour, takes 0.05 hours (3 minutes) to make a record. The test is performed at least once every seven days.

As stated earlier, there are: 31 HVCMMs affected in the first year; 35 HVCMMs affected in the second year; and 39 HVCMMs in the third year. MSHA estimates that there are 81 burden hours in the first year (31 HVCMMs x 0.05 hrs. for time to make record x 52 wks. per yr.). First year burden costs are \$3,157 (81 x \$38.97). In the second year, using 35 HVCMMs generates 91 burden hours and costs of \$3,546. In the third year, 39 HVCMMs generates 101 burden hours and costs of \$3,936.

Final § 75.832 Burden Related to Countersigning Record

In addition to making records, final § 75.832(g)(3) requires that records be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or the equivalent mine official's next regularly scheduled working shift. Although the examinations and tests required by §§ 75.832(a) and (b) are already being conducted under existing § 75.512, there is no requirement for countersigning records under existing § 75.512. Similarly, although the examinations and tests required under § 75.832(c) are being conducted pursuant to the terms and conditions of existing HVCMM granted PFMs, there is no requirement for countersigning records in granted PFMs. MSHA estimates that it takes a mine official, earning \$76.21 per hour, 0.1 hours (6 minutes) to review and countersign the records.

As stated earlier, there are: 31 HVCMMs affected in the first year; 35 HVCMMs affected in the second year; and 39 HVCMMs in the third year. MSHA estimates that there are 484 burden hours in the first year (31 HVCMMs x 0.1 hrs. to countersign record x 3 records to be countersigned x 52 wks. per yr.). First year burden costs are \$36,886 (484 x \$76.21). In the second year, using 35 HVCMMs generates 546 burden hours and costs of \$41,611. In the third year, 39 HVCMMs generates 608 burden hours and costs of \$46,336.

Final § 75.825 Caution Labels

Final § 75.825(i) requires that all compartments providing access to energized high-voltage conductors and parts display a caution label to warn the miner against entering the compartment(s) before de-energizing incoming high-voltage circuits. Manufacturers currently place such caution labels on the compartments they make. This is a normal business practice of manufacturers that make these compartments. Hence, there is no paperwork burden associated with this provision.

Final § 75.834 Training concerning HVCMMs

Final § 75.834(a) requires that miners who perform maintenance on HVCMMs be trained in high-voltage safety, testing, and maintenance procedures. In addition, final § 75.834(b) requires that personnel who work in the proximity of HVCMMs or who move high-voltage equipment or cables be specially trained in high-voltage safety procedures. This specialized training must be specified in part 48 plans. These two provisions are in the terms and conditions of granted PFMs to use HVCMMs. At the time that the mine operator was granted a PFM, the operator incurred the cost of making the appropriate filings to revise their part 48 plans. Burden associated with these training requirements is included in the information collection requirements applicable to part 48.

Elimination of Burden in OMB Information Collection Package 1219-0065

As a result of the rule, mine operators no longer have to obtain PFMs of existing 30 CFR § 75.1002 (Installation of electric equipment and conductors; permissibility) in order to use an HVCMM in an underground coal mine. Existing OMB information collection package 1219-0065 includes annual burden hours and related cost for the time it takes mine operators to prepare and file petitions with MSHA, including PFMs to use

an HVCMM. When the rule becomes effective, the burden hours and cost in existing OMB information collection package 1219-0065, which relate to the time it takes operators to prepare and file petitions, need to be reduced to reflect the fact that PFMs to use an HVCMM are no longer needed.

MSHA estimates that 4 underground coal mines file PFMs to use an HVCMM annually. Also, MSHA estimates that a mine supervisor, earning \$76.21 per hour, takes 12 hours to prepare a petition, and a clerical employee, earning \$24.17 per hour, takes 0.1 hours (6 minutes) to copy and mail a petition. MSHA estimates 48 annual burden hours to be eliminated [4 PFMs x (12 hrs. supervisor time to prepare PFM + 0.1 hrs. clerical time to copy and send PFM to MSHA)]. Annual burden cost to be eliminated are \$3,668 [4 PFMs x ((12 hrs. x \$76.21 hourly wage) + (0.1 hrs. x \$24.17 hourly wage))].

VIII. REFERENCES

1. U.S. Department of Energy, Energy Information Administration, *Annual Coal Report 2008*, October 2009.
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3. InfoMine USA, Inc., *U.S. Coal Mine Salaries, Wages and Benefits – 2008 Survey Results, 2008*.
4. U.S. Department of Labor, Mine Safety and Health Administration, Coal Safety Division, 2009 data.