REGULATORY ECONOMIC ANALYSIS

FOR

FLAME-RESISTANT CONVEYOR BELT, FIRE PREVENTION AND DETECTION, AND USE OF AIR FROM THE BELT ENTRY

FINAL RULE

RIN 1219-AB59

U.S. Department of Labor
Mine Safety and Health Administration
Office of Standards, Regulations, and Variances

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I. EXECUTIVE SUMMARY

INTRODUCTION

The Regulatory Economic Analysis (REA) examines the costs and benefits of MSHA's final rule on Flame-Resistant Conveyor Belt, Fire Prevention and Detection, and Use of Air from the Belt Entry. The final rule includes requirements for improved flame-resistant conveyor belts, fire prevention and detection, and approval of the use of air from the belt entry to ventilate the working sections of underground coal mines. The final rule implements Section 11 of the Mine Improvement and New Emergency Response (MINER) Act of 2006.

MINE SECTOR AFFECTED

The final rule applies to all underground coal mines in the United States. As of 2007, MSHA data reveal that there were 624 underground coal mines, employing 42,207 miners, operating in the U.S.

BENEFITS

MSHA has qualitatively evaluated the benefits of the final rule. From 1980 to 2007, there were 65 reportable conveyor belt entry fires. These fires caused more than two dozen injuries and three deaths. The final requirements on improved flame-resistant conveyor belt will reduce conveyor belt fires in underground coal mines and prevent related fatalities and injuries. The final rule also enhances miner safety and health by including improved requirements on fire prevention and detection, for the use of air from the belt entry, and belt maintenance. These improved requirements include: replacement of point-type heat sensors with carbon monoxide sensors for fire detection along belt conveyors; approval required to use air from the belt entry to ventilate working sections; improved maintenance of belt conveyors and belt conveyor entries; training of Atmospheric Monitoring System (AMS) operators; requirements for escapeways; limits on respirable dust in the belt entry; maximum and minimum air velocities in the belt entry; standardized signals for lifelines; and use of smoke sensors in mines using air from the belt entry.

COMPLIANCE COST

MSHA estimates the total yearly costs of the final rule to be $51.5 million for underground mine operators and $100,000 for conveyor belt manufacturers.

REGULATORY FLEXIBILITY CERTIFICATION AND ANALYSIS

In accordance with § 605 of the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), MSHA certifies that the final rule will not have a significant economic impact on a substantial number of small entities. Under SBREFA, MSHA must include with the final rule a factual basis for the certification. The Agency must also publish the regulatory flexibility certification statement in the *Federal Register*, along with the factual basis. The analysis that provides the factual basis for the certification is discussed in the Regulatory Flexibility Certification chapter of

the REA and in the preamble to the final rule. MSHA has consulted with the Small Business Administration's (SBA's) 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 the number of miners and contractors by type and size of mine. The data for 2007 are from the U.S. Department of Labor, Mine Safety and Health Administration, Office of Program Evaluation and Information Resources (PEIR), 2007 data. MSHA estimates the value of coal output of the underground coal mining sector to be $14.0 billion in 2007.

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 (i.e., underground or surface mines). The Agency collects 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.

STRUCTURE OF THE COAL MINING INDUSTRY

Table II-1 presents data on underground coal mines, by employment size, excluding contractors. Total employment at underground coal mines in 2007 was approximately 43,500 (42,200 miners and 1,300 office employees). There were approximately 37,800 miners working underground and 4,400 miners employed on the surface.

Table II-1: Underground Coal Mines
by Employment Size (Excluding Contractors), 2007

Size of Mine	Number of Mines	Number of Miners	Office Employment	Number of Mines with Miners Underground	Number of Miners Working Underground
1-19 Employees	223	2,300	100	212	1,900
20-500 Employees	391	33,500	1,000	391	30,300
501+ Employees	10	6,400	200	10	5,600
All Underground Coal Mines	624	42,200	1,300	613	37,800

Table II-2 presents data on independent contractors who worked in underground coal mines in 2007. There were approximately 5,100 contractors working underground.

Table II-2: Underground Coal Contractors
by Employment Size, 2007

Size of Contractor	Number of Firms	Non-Office Employment	Office Employment	Non-Office Employment Working Underground
1-19 Employees	211	1,300	100	600
20-500 Employees	96	7,900	150	4,500
501+ Employees	0	0	0	0
All Underground Coal Contractors	307	9,200	250	5,100

ECONOMIC CHARACTERISTICS OF THE COAL MINING INDUSTRY

MSHA classifies the coal mining sector into three major commodity groups: bituminous, lignite, and anthracite. Bituminous operations represent approximately 91 percent of coal mining operations, employ 94 percent of all coal miners, and account for 93 percent of total coal production. Lignite operations represent approximately 1 percent of coal mining operations, employ 5 percent of all coal miners, and account for 7 percent of total coal production. Anthracite operations represent approximately 8 percent of coal mining operations, employ 1 percent of all coal miners, and account for 0.1 percent of total coal production.

The underground coal sector produced an estimated 349 million tons of coal in 2007 at an average price of $40.29 per ton.

III. BENEFITS

The final rule implements Section 11 of the MINER Act. MSHA has qualitatively evaluated the benefits of the final rule. Benefits are separately discussed below: requirements for improved flame-resistant conveyor belts; and, requirements for fire prevention and detection and approval of the use of air from the belt entry to ventilate working sections.

BENEFITS OF FINAL RULE ON IMPROVED FLAME-RESISTANT CONVEYOR BELTS

The requirements for improved flame-resistant conveyor belts will reduce fires in the belt entry of underground coal mines and prevent related fatalities and injuries. From 1980 to 2007, there were 65 reportable belt entry fires. Almost all involved the conveyor belt. These fires caused over two dozen injuries and three deaths – one in 1986 at the Florence No. 1 Mine, and two in 2006 at the Aracoma Alma No. 1 Mine. The Technical Study Panel (Panel) noted that the number of belt fires had decreased over the past decade, but that the rate (i.e., number of fires per thousand mines) has remained constant. The Panel also noted that during this same period, although underground coal production increased so that the number of belt fires per 100 million tons decreased, there was high variability from year to year. The final rule will prevent conveyor belt fires and, in turn, reduce accidents, injuries, and deaths caused by fires in the conveyor belt entry.

Fire Hazards of Conveyor Belts

Nearly all underground coal mines use conveyor belts to transport coal. Conveyor belt entries contain large amounts of combustible materials including the conveyor belt itself, coal and coal dust, grease and oil, and roof and rib supports. The major ignition sources for conveyor belt fires are frictional heating at the belt drive or along the belt, electrical equipment, hot rollers or bearings, and cutting and welding equipment. The conveyor belt is the principal fuel for flame propagation in the conveyor entry because it acts as a continuous filament of combustible material extending the length of the mine entry. Tests show that the conveyor belt ignites much more easily than either the coal or the wood used for timber, lagging, or other construction.

The intensity of a conveyor belt fire can build quickly and become lethal. A conveyor belt that has poor flame resistance will spread flames along the exposed surfaces of the belt and eventually ignite other combustibles such as the coal. When conveyor belt fires reach the propagation state, they produce more fire gases and spread faster than the fires of surrounding coal surfaces. As the conveyor belt fire progresses and extends to other combustibles, the concentrations of toxic gases increase to potentially lethal levels. The mine ventilation system can be disrupted due to the spreading conveyor belt fire. The disruption of air flow through the mine can introduce a threat of explosion from the accumulation of methane and the release of flammable gases.

Once started, a conveyor belt fire can jeopardize the lives of persons working in the mine and participating in rescue and recovery work. The most common hazards of conveyor belt fires are: (1) heat and toxic fumes, such as carbon monoxide, encountered by persons

near the fire or in distant inby areas of the mine; (2) smoke, which obscures vision and disorients miners attempting to evacuate the mine; (3) roof falls that occur while the fire is being fought or the affected area or mine is being sealed; and (4) ignition and/or explosion of a flammable gas or coal dust atmosphere.

Description of Specific Conveyor Belt Fires

To illustrate the potential impact of a conveyor belt fire, MSHA describes below four belt entry fires out of the 65 that have occurred since 1980: Aracoma Alma Mine No. 1, Marianna Mine, Florence No. 1 Mine, and Beatrice Mine.

Aracoma Alma Mine No. 1

On January 19, 2006, a fire occurred in the Aracoma Alma Mine No. 1, in Logan County, West Virginia. According to the MSHA Investigation Report, the fire occurred as a result of frictional heating when the longwall conveyor belt became misaligned.[1] This frictional heating ignited accumulated coal dust, grease, oil, belt shavings, and other combustible materials. Twenty-nine miners were working in the mine at the time. Two of the twelve miners on one crew became separated from the remainder of the crew as they were evacuating the mine. The two miners died as a result of the fire. All the other miners escaped safely.

MSHA conducted an evaluation of the flame resistance of samples of two different conveyor belts recovered from the Aracoma Alma Mine No. 1 fire using the existing flame test and the Belt Evaluation Laboratory Test (BELT) method required by the final rule. Both samples from the two different conveyor belts passed the existing flame test, but failed the BELT method.

Marianna Mine

On March 7, 1988, a fire started at a belt drive in the Marianna Mine in Washington County, Pennsylvania. The MSHA report of the fire indicated that loose coal probably spilled onto the lower belt and accumulated in the drive rollers, where it was ground into coal dust.[2] This, in turn, caused belt slippage and frictional heating, which ignited the coal and the belt. The fire quickly propagated down the belt, ignited other combustibles, and totally engulfed parts of the belt entry. Eventually it burned over the top of a stopping to the track entry, where it ignited coal, cribs, and guard boards.

Miners at the five working sections of the mine were evacuated within 90 minutes of the discovery of the fire, but five miners were sent to a hospital for smoke inhalation.

Florence No. 1 Mine

On November 27, 1986, at about 2:00 a.m., a conveyor belt fire occurred at the Florence No. 1 Mine, Indiana County, Pennsylvania. Two section foremen and one pumper were present at the mine. According to the MSHA Investigation Report, the fire was caused by the accumulation of coal dust and a defective bottom roller on the tight side of the belt

[1] U.S. Department of Labor, Mine Safety and Health Administration, *Aracoma Alma #1*, 2007, p. 2.

[2] U.S. Department of Labor, Mine Safety and Health Administration, *Marianna Mine No. 58*, 1990, pp. 18-19.

entry.[3] The two section foremen discovered the fire. After fighting the fire for some time, the two section foremen left the mine and were taken to a hospital where they were treated for smoke inhalation. The pumper returned to the fire with the mine foreman and a general assistant who had arrived at the mine. During the firefighting activities, the mine foreman suffered a fatal heart attack.

The belt continued to burn until the fire reached the belt drive, a distance of about 1,200 feet. The fire suppression system at the belt drive activated automatically and extinguished the fire.

Beatrice Mine

On November 25, 1981, a conveyor belt fire occurred on the longwall panel in Beatrice Mine, Buchanan County, Virginia. MSHA investigators determined that the fire originated at the dolly car, a part of the belt take-up that serves as a belt storage system.[4] A small flame ignited coal dust, loose coal spillage, grease, and other combustible materials, which, in turn, ignited the belt. Approximately 2,000 feet of belt burned.

BENEFITS OF FINAL RULE ON FIRE PREVENTION AND DETECTION AND APPROVAL OF THE USE OF AIR FROM THE BELT ENTRY TO VENTILATE THE WORKING SECTIONS

The requirements for fire prevention and detection and approval of the use of air from the belt entry in underground coal mines will improve miner safety. The requirement addressing maintenance of the belt conveyor and belt conveyor entry will improve safety to miners by requiring fire hazards to be corrected when found. These fire hazards, known to be sources of belt fire ignitions, include damaged and missing rollers and belt misalignment. For example, the MSHA Investigation Report of the Aracoma Alma Mine # 1 fire determined that the fire occurred as a result of the frictional heating due to a misaligned belt.[5] The rule also requires that other damaged belt components be removed or replaced and that materials not be allowed in the belt conveyor entry where that material may contribute to a frictional heating hazard.

The requirement to replace point-type heat sensors with carbon monoxide sensors for fire detection along belt conveyors in all underground coal mines enhances miner safety because carbon monoxide sensors provide earlier detection of a fire. Earlier detection of a fire allows miners to better address the problem and/or evacuate the area. MSHA's research and accident investigation reports indicate that carbon monoxide sensors are superior to point-type heat sensors. For example, in the 1992 Dilworth mine fire, the point-type heat sensors were no more than 27 feet away, but the carbon monoxide sensor that actually detected the fire was 1,400 feet downwind of the fire. Based on MSHA's research and experience, replacing point-type heat sensors with carbon monoxide sensors is a significant improvement in early fire warning detection and an enhancement in miner safety.

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[3] U.S. Department of Labor, Mine Safety and Health Administration, *Florence No. 1 –Robinson Portal*, 1987.

[4] U.S. Department of Labor, Mine Safety and Health Administration, *Beatrice Mine*, 1982.

[5] U.S. Department of Labor, Mine Safety and Health Administration, *Aracoma Alma #1*, 2007, p. 2.

Inadequate Atmospheric Monitoring System (AMS) operator training was identified as a contributing factor in the two fatalities in the Aracoma fire. Accident investigators found all miners assigned the duties of an AMS operator at the mine needed additional training to properly respond to alert, alarm, and malfunction signals generated by the AMS. The requirements for AMS operator training improve safety for miners by assuring that AMS operators have the knowledge to respond properly to AMS signals. MSHA approves the task training program. The annual retraining requirements assure that AMS operators retain knowledge needed to perform specific duties and are familiar with underground mining systems such as coal haulage, transportation, ventilation, and escape facilities.

The requirement for a higher ventilating pressure in the primary escapeway than the belt entry assures that air leakage moves from this escapeway to the belt entry. If a fire were to occur in the belt entry, the primary escapeway would not become contaminated with smoke and carbon monoxide, thus maintaining the integrity of the escapeway and providing a safe means of egress for miners.

The requirement for lifelines to be marked with standardized signals aids miners evacuating the mine where visibility is obscured by smoke. New standardized signals must: identify the locations where personnel doors are installed in adjacent crosscuts; and identify the location of refuge alternatives and SCSR caches. Existing signals for direction of travel must also be standardized. Standardization of these signals allows for consistent understanding of the signals so that miners who transfer between mines will not need to learn new signal systems, and generally reduces the possibility of confusion, delay, or injury in an emergency.

Additional requirements of the final rule also enhance miner safety and health, including: approval for the use of air from the belt entry; limits on respirable dust in the belt entry; maximum and minimum air velocities in the belt entry; use of smoke sensors in mines using air from the belt entry; airlocks on personnel doors along escapeways; and additional sensors installed in the intake 1,000 feet from the regulator.

CONCLUSION

From 1980 through 2007, 65 reportable fires in the belt entry of underground coal mines claimed the lives of three miners, injured more than two dozen miners, and came perilously close to claiming the lives of entire sections of miners. Conveyor belt fires have also caused extensive property damage that resulted in substantial rehabilitation costs, lost production, and lost revenue.

The final rule will reduce the risk of conveyor belt fires. The requirements for improved flame-resistance of conveyor belts will significantly reduce the ease of ignition and flame propagation of a conveyor belt. The requirement for replacement of point-type heat sensors with carbon monoxide sensors will provide earlier detection and warning of fire. The final rule also enhances miner safety and health by improving fire prevention and detection in the belt entry and by allowing use of air from the belt entry to ventilate working sections only where it is as safe as or safer than not using air from the belt entry.

IV. COST OF COMPLIANCE

MSHA analyzes the cost of the final rule in three parts. Part A summarizes the total cost, part B estimates the cost of the final requirements for improved flame resistance of conveyor belts, and part C estimates the cost of final requirements for fire protection and detection and approval of the use of air from the belt entry to ventilate working sections.

MSHA estimates the costs of the final rule based on the Agency's knowledge, experience, and available information. In some cases, the estimates may appear to deviate slightly from the sum or product of the components due to rounding.

PART A: SUMMARY OF TOTAL COST OF FINAL RULE

MSHA estimates the total yearly costs of the final rule to be $51.5 million for underground mine operators and $100,000 for conveyor belt manufacturers.

The total yearly cost of the final rule includes the amortized value of the first-year costs. The first-year cost (starting in the second year) for improved flame-resistant conveyor belts is approximately $44 million. The first-year cost (starting in the first year) for fire protection and detection and approval of the use of air from the belt entry to ventilate working sections is approximately $21 million. Combining these two costs, the total first-year cost is approximately $65 million for the final rule.

Table IV-1 presents MSHA's estimate of the total yearly costs of the final rule, by mine size, and by major requirement of the final rule. Estimated yearly costs are: mines with 1-19 employees, $4.7 million; mines with 20-500 employees, $42.6 million; and mines with 501+ employees, $4.1 million. MSHA estimates that the yearly cost to mine operators for smoke sensors as $460,000; however, this amount is based on the cost of existing smoke sensors and may not reflect their actual cost when approved for underground mine use. Therefore, MSHA does not include this cost in its estimate of total yearly costs.

Table IV-1. Summary of Yearly Costs,
by Mine Size and by Cost

Cost	1-19 Employees	20-500 Employees	501+ Employees	TOTAL
Improved Flame Resistant Belt	$3.3 million	$33.4 million	$3.8 million	$40.4 million
Improved Flame Resistant Belt (Manufacturers)	n/a	n/a	n/a	$100,000
Carbon Monoxide Sensors	$660,000	$5.5 million	$180,000	$6.3 million
Maintenance of Belts and Belt Entries	$750,000	$2.6 million	$130,000	$3.5 million
AMS Operator Duties	$57,000	$960,000	$29,000	$1.0 million
Lifeline Signals	$16,000	$130,000	$7,300	$150,000
Other Requirements *	$1,500	$64,000	$7,800	$73,000
TOTAL	$4.7 million	$42.6 million	$4.1 million	$51.6 million

*Other requirements include installing air locks on personnel doors between adjacent escapeways where static pressure exceeds 125 pounds, maintaining higher ventilation pressure in the primary escapeway than the belt entry or submitting an approved alternative, and, in mines using air from the belt entry to ventilate working sections, and installing an additional carbon monoxide sensor and alarm unit on point-feeds.

Table IV-2 shows the estimated average yearly cost of the final rule per underground coal mine, by mine size.

Table IV-2. Average Yearly Cost* per Mine, by Mine Size

Mine Size	Yearly Cost of Final Rule	Number of Mines	Yearly Cost per Mine
1-19 employees	$4.7 million	223	$21,000
20-500 employees	$42.6 million	391	$110,000
501+ employees	$4.1 million	10	$410,000
All Mines	$51.5 million	624	$83,000

*Excludes belt manufacturer costs.

Methodology

For the final rule, MSHA estimates the following costs: (1) one-time or intermittent costs; (2) annual costs; and (3) annualized costs. One-time costs are those that are incurred only 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 can be a one-time cost, for example, when equipment is purchased only one time. Capital expenditures can be intermittent costs when equipment is purchased periodically, for example, every five years. 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 the REA, the Agency uses a (real) discount rate of 7 percent, as recommended by the Office of Management and Budget (OMB), using the annualization formula:

$$a = (i + d) / (1 + i),$$

where "a" is the annualization factor, "i" is the annual discount rate, and "d" is the depreciation rate of the non-annual recurring investment. Yearly costs are the sum of annual costs and annualized costs.

MSHA uses two depreciation rates in the REA. The first is 20 percent per year, to reflect a five-year life, for carbon monoxide sensors and related hardware. Under the 7 percent discount rate and 20 percent depreciation rate, $100 of initial cost amounts to a perpetual yearly cost of $25.23, which is an annualization factor of 0.252. The second depreciation rate is 10 percent per year, to reflect a ten-year life, for the coal mines. Under the 7 percent discount rate and 10 percent depreciation rate, $100 of initial cost amounts to a perpetual yearly cost of $15.89, which is an annualization factor of 0.159.

MSHA uses hourly compensation rates of $26.37 for a clerical worker, $33.70 for a miner, $85.14 for a supervisor, and $50.00 for a mine engineer.[6] For convenience, MSHA will refer to these hourly compensation rates as "wages," where that term is understood to include benefits such as social security, unemployment insurance, and workers' compensation, but not shift differentials or overtime pay. MSHA reports these wages and all other costs in 2007 dollars.

PART B: COST FOR IMPROVED FLAME RESISTANCE OF CONVEYOR BELTS

Final § 75.1108 requires that, effective one year after publication of the final rule, all conveyor belts placed in service in underground coal mines be approved by MSHA as flame resistant under final 30 CFR part 14, Requirements for the Approval of Flame-Resistant Conveyor Belts. Part B of the cost section of the REA addresses the cost for underground coal mine operators and the cost for manufacturers of conveyor belt.

Cost of Compliance for Underground Coal Mine Operators

MSHA determined the costs of the final requirement for conveyor belts by estimating incremental costs of underground conveyor belts under the final versus existing standard. To

[6]Data derived from *U.S. Coal Mine Salaries, Wages, and Benefits: 2006 Survey Results*, Spokane Valley, Washington: InfoMine USA, Inc., 2007.

estimate baseline costs under the existing standard, MSHA first developed estimates of use and replacement of existing belt.

Conveyor belts vary in width, thickness, strength, and length. To develop its cost estimate, MSHA separated belts into three categories by width: (1) belts less than 48 inches (narrow belts); (2) belts 48 inches or wider, but less than 72 inches (medium belts); and (3) belts 72 inches or more (wide belts). Narrow belts are generally used on the section and, for many small mines, on the main line. Medium belts are used as section belts at larger mines and on the main line at both small and large mines. Wide belts are generally used on the main line of large longwall mines.

Based on 2008 MSHA data, there are approximately 2,300 miles, or 24.5 million linear feet, of conveyor belt in underground coal mines. Of this, approximately 12.0 million feet are narrow belt, 10.1 million feet are medium belt, and 2.5 million feet are wide belt. Approximately 2.2 million feet are in mines with 1-19 employees, 20.3 million feet are in mines with 20-500 employees, and 2.0 million feet are in mines with 501+ employees. Approximately 14.7 million feet are in the main lines and 9.8 million feet are in the sections. Table IV-3 provides details.

Table IV-3. Length of Conveyor Belt in Underground Coal Mines in Feet By Mine Size, Belt Width, and Location

All Conveyor Belts				
	Mine Size			
Belt Width	1-19	20-500	501+	All Mines
Less Than 48"	2.2 million	9.7 million	0.1 million	12.0 million
48" to 66"	0	8.6 million	1.4 million	10.1 million
72" or Wider	0	2.0 million	0.5 million	2.5 million
Total	2.2 million	20.3 million	2.0 million	24.5 million

Belts on Main Lines				
	Mine Size			
Belt Width	1-19	20-500	501+	All Mines
Less Than 48”	1.1 million	1.6 million	0	2.7 million
48” to 66”	0	8.6 million	0.9 million	9.5 million
72” or Wider	0	2.0 million	0.5 million	2.5 million
Total	1.1 million	12.2 million	1.4 million	14.7 million

Belts on Sections				
	Mine Size			
Belt Width	1-19	20-500	501+	All Mines
Less Than 48"	1.1 million	8.1 million	0.1 million	9.3 million
48" to 66"	0	0	0.5 million	0.5 million
72" or Wider	0	0	0	0
Total	1.1 million	8.1 million	0.6 million	9.8 million

MSHA estimated an average cost per linear foot for existing belt of $34 for narrow belts, $44 for medium width belts, and $64 for wide belts. MSHA estimated that the cost for new belts will be 35 percent higher than the cost of existing belt. The Agency estimated that the average cost per linear foot for new belt will be $46 for narrow belts, $60 for medium width belts, and $86 for wide belts. MSHA used information from belt manufacturers to develop these cost estimates.

A commenter suggested that the proposed rule could increase the cost of 36-inch wide belt by as much as two or three times its current cost. MSHA has reviewed the estimated costs used in the PREA for belts approved under part 14, and believes that the costs in the PREA are reflective of costs of belts that will be needed to meet the requirements of the final rule.

MSHA assumes that belts passing the Belt Evaluation Laboratory Test (BELT) method will have the same service life as existing belts. MSHA estimates the average service life of belts to be 10 years for belts used on the main lines and 6 years for belts used on the sections. Using this projection, 10 percent of belts on the main lines, or 1.5 million

linear feet, and 17 percent of belts on the sections, or 1.6 million linear feet, are replaced each year. In total, 3.1 million linear feet of belt are replaced each year.

The cost of replacing 3.1 million linear feet of belt each year is approximately $123.5 million under the existing rule. Under the final rule, MSHA estimated the cost of replacing 3.1 million linear feet of belt to be approximately $166.7 million. The incremental cost of replacing this belt with new belt approved under the final rule is approximately $43.2 million each year.

Commenters on the proposal expressed concerns that mine operators might try to purchase and stockpile existing belt during the one-year transition period allowed for purchases of existing belt and continue to use existing belt for many more years. To address these concerns, the final rule requires that all conveyor belt placed in service after a one-year transition period must be approved under the final rule. Under the final rule, after ten years all conveyor belts used in underground mines must be the new belt approved under the final rule. After reviewing the comments, MSHA did not change any cost estimate.

In developing its estimate, MSHA divides total conveyor belt length for each belt width by the belt service life, and applies the appropriate estimated cost increase between existing belt and belt required by the final rule. MSHA estimated the annual replacement of narrow belts as 2.7 million linear feet on the main lines divided by 10, plus 9.3 million linear feet on the sections divided by 6, for a total of 1.8 million linear feet of narrow belts replaced each year. The increased cost for narrow belts under the final rule is $12 per linear foot ($46 minus $34) multiplied by 1.8 million linear feet of narrow belt replaced per year, for an incremental cost to replace narrow belt of $21.5 million per year.

MSHA estimated the annual replacement of medium belts as 9.5 million linear feet on the main lines divided by 10, plus 540,000 linear feet on the sections divided by 6, for a total of 1.0 million linear feet of medium belts replaced each year. The increased cost for medium belts under the final rule is $16 per linear foot ($60 minus $44) multiplied by 1.0 million linear feet of medium belt replaced per year, for an incremental cost to replace medium belt of $16.2 million per year.

MSHA estimated the annual replacement of wide belts as 2.5 million linear feet on the main lines divided by 10, for a total of 250,000 linear feet of wide belts replaced each year. The increased cost for wide belts under the final rule is $22 per linear foot ($86 minus $64) multiplied by 250,000 linear feet of wide belt replaced per year, for an incremental cost to replace wide belt of $5.5 million per year.

The total incremental yearly cost of replacing existing belt with belt approved under the final rule is the sum of $21.5 million for narrow belt, $16.2 million for medium belt, and $5.5 million for wide belt, or approximately $43.2 million per year. Because the final rule includes a one-year transition for the use of flame-resistant belt under the final rule, this annual cost is annualized using a 7 percent discount rate to obtain the yearly cost of approximately $40.4 million.

Costs of Compliance for Conveyor Belt Manufacturers

Final part 14 contains requirements for the BELT method that MSHA uses to approve a flame-resistant conveyor belt.

The costs of this requirement are separated into three categories: first-year costs, second-year costs, and annual costs beginning in the third year. No capital costs are estimated to be incurred; manufacturers are expected to be able to use existing equipment and facilities to develop formulations and construct belts that meet the flame test under the final rule.

The costs to conveyor belt manufacturers include costs for application fees, materials, and labor. MSHA's testing and evaluation fees for applications are published in the *Federal Register*. Labor costs for professional and technical personnel are based on estimated costs to the manufacturers. The average fringe benefits are estimated to be 42 percent of average wages and salaries.

The Agency's estimated cost to belt manufacturers for meeting the requirements of the final rule is $800,000 for the first year, $75,000 for the second year, and $49,000 for the third year and each succeeding year. The estimated annualized yearly cost is $100,000.

§ 14.1 Purpose and Effective Date for Approval Holders

Final § 14.1 establishes the flame resistance requirements for MSHA approval of conveyor belts for use in underground coal mines. Applications for approval or extension of approval submitted after the date of publication in the *Federal Register* must meet the requirements of this Part. MSHA includes costs related to this paragraph under separate sections below.

§14.2 Definitions

Final § 14.2 establishes definitions applicable to the approval of conveyor belts. MSHA estimates that there will be no additional costs from this requirement.

§14.3 Observers at Tests and Evaluations

Final § 14.3 permits representatives of the applicant, and other persons as agreed upon by MSHA and the applicant, to be present during testing and evaluation. This requirement is intended to protect proprietary information. In addition, MSHA may consider requests from others to observe tests. MSHA estimates that there will be no additional costs from this requirement.

§ 14.4 Application Procedures and Requirements

Final § 14.4 specifies the procedures an applicant must follow to apply for approval or extensions of approval of a conveyor belt under final part 14. In addition, it outlines information required in the application. There are several direct and indirect costs associated with this section. These are: (1) research and development costs to produce belts that will pass the flame test required by the final rule; (2) costs to prepare the applications; and (3) fees imposed by MSHA for testing and evaluation. These costs are discussed separately.

Research and Development Costs

MSHA anticipates that flame-resistant conveyor belts to be approved under final part 14, in many cases, would consist of formulations of polyvinyl chloride (PVC) or rubber different from those used in the belts under the existing requirement for flame testing of

conveyor belting. Research and development costs are incurred by the manufacturers as they develop formulations for conveyor belt that will pass the flame test required under the final rule. MSHA projects that some conveyor belts currently manufactured for use in underground coal mines, especially belts used internationally, should pass the flame test required under the final rule, but others will not.

MSHA expects manufacturers' research and development costs to range from a modest cost per belt to more than $125,000, if the conveyor belt needs major reformulations. MSHA estimates, on average, an initial cost of $65,000 per manufacturer to conduct research and development on formulations for conveyor belts that pass the flame test required under the final rule. This amount reflects the salaries and benefits of professional and technical personnel who will develop formulations for belts; the raw materials to produce a sufficient sample for the manufacturer's testing; and the costs, including labor, of producing sample belts. It also includes the costs of formulating some belts that will be considered unacceptable by the manufacturer.

MSHA expects the research and development costs to occur only during the first year. After that, MSHA assumes that manufacturers will be sufficiently familiar with formulations necessary for belt that will pass the flame test required under the final rule. MSHA estimates that 10 conveyer belt manufacturers will submit approval applications under the final rule. MSHA therefore estimates that the research and development costs for the first year are $650,000 ($65,000 per applicant x 10 applicants).

Costs to Prepare the Applications

Final 14.4(a) provides the addresses where applications may be sent or filed online. Final § 14.4(b)(1) requires that an application for approval include technical information about the construction of the belt, such as the type of compound used in the covers, the thickness of top and bottom covers, the carcass construction, and the type of fabric used. Final § 14.4(b)(2) requires that the application include the name, address, and telephone number of the applicant's representative responsible for answering questions about the application. Final § 14.4(c) permits an approval of similar belt or an extension of approval to be evaluated without testing using the BELT method, if formulation information on the compounds in the belt are specified in the application. Final § 14.4(d), for an extension of approval, requires information on proposed changes to a previous approval.

MSHA estimates that an application for an original approval of a conveyor belt takes 5 hours to prepare, while an application for an approval of a similar belt or for an extension of approval takes 2 hours to prepare. MSHA estimates that an engineer, compensated at $50 per hour, will prepare the applications. The labor cost to prepare an original application for approval of belt, therefore, is approximately $250. The labor cost to prepare an application for approval of a belt similar to a previously-approved belt or an extension of approval is approximately $100.

MSHA expects the number of new applications for approval under the final rule to be substantially greater during the first few years, as manufacturers seek approval for new belt constructions. During the first year, MSHA estimates that applicants will submit 120 applications for conveyor belt approval. Of these, MSHA estimates that 100 will be for original approvals of conveyor belt (at a cost of $250 each or $25,000), while the remaining

20 will be for approvals of belts either similar to those that had already been approved or for extensions of approval (at a cost of $100 each or $2,000), for a total cost in the first year of $27,000.

During the second year, MSHA estimates that applicants will submit 60 applications for conveyor belt approval. Of these, MSHA estimates that 50 will be for original approvals (at a cost of $250 each or $12,500), while the remaining 10 will be for approvals of belts either similar to those that had already been approved or for extensions of approval (at a cost of $100 each or $1,000), for a total cost in the second year of $13,500.

During the third and following years, MSHA estimates that applicants will submit 40 applications for conveyor belt approval. Of these, MSHA estimates that 30 will be for original approvals (at a cost of $250 each or $7,500), while the remaining 10 will be for approvals of belts either similar to those that had already been approved or for extensions of approval (at a cost of $100 each or $1,000), for a total cost in the third and each succeeding year of $8,500.

Final § 14.4(e) permits MSHA to request additional information from the applicant. The above cost estimates include possible requests from MSHA for additional information.

Final § 14.4(f) allows MSHA to accept a non-MSHA product safety standard if it is found to be equivalent in providing protection. MSHA estimates no cost from this requirement.

The total cost to prepare the approval applications is approximately $27,000 the first year, $13,500 the second year, and $8,500 the third year and each succeeding year.

Cost of Application Testing and Evaluation Fees

In addition to the research and development costs and the costs to prepare belt approval applications, belt manufacturers incur costs under MSHA's testing and evaluation fees. The existing fee for testing is $84 per hour.[7] The existing fee for evaluation is $136 per hour ($84 per hour multiplied by a support factor of 1.617). The support factor covers the administrative, clerical, and technical support services involved in evaluating an application.

Final § 14.4(g) requires fees to be submitted in accordance with existing § 5.40, Fee administration. MSHA estimates that there will be testing and evaluation costs for both original applications and applications for approval of similar conveyor belt or extension of approval. MSHA estimates that testing for an original application will take 3 hours, at an hourly fee of $84, for a cost of $250. Evaluating an original application will take 4 hours, at an hourly fee of $136, and multiplied by a support factor of 1.617, for a cost of approximately $540. The estimated cost per original application is the sum of the costs for testing and evaluation, or $800 per application. MSHA estimates that there will be 100 original applications in the first year, 50 in the second year, and 30 in each subsequent year. The total cost for original applications, at $800 per application, is approximately $80,000 in the first year, $40,000 in the second year, and $24,000 in each subsequent year.

[7] "Fee Adjustments for Testing, Evaluation, and Approval of Mining Products," *Federal Register*, December 27, 2007, vol. 72, no. 247, pp. 73380-81.

MSHA estimates that testing an application for approval of similar conveyor belt or extension of approval requires 3 hours, at an hourly fee of $84, for a cost of approximately $250 per application tested. Since MSHA estimates that only 50% of applications for approval of similar conveyor belt or extension of approval will be tested, MSHA estimates that there will be 10 applications for approval of similar conveyor belt or extension of approval tested in the first year, and 5 tested in each subsequent year. The total cost for testing these applications, at $250 per application, is approximately $2,500 in the first year and $1,250 in each subsequent year.

MSHA estimates that the evaluation of an application for approval of similar conveyor belt or extension of approval will take 3 hours, at an hourly fee of $136, for a cost of $410 per application. MSHA estimates that there will be 20 applications for approval of similar conveyor belt or extension of approval in the first year, and 10 in each subsequent year. The total cost for evaluating these applications, at $410 per application, is approximately $8,200 in the first year and $4,100 in each subsequent year.

The total cost of fees for all applications is approximately $90,000 in the first year, $45,000 in the second year, and $29,000 in each subsequent year. Final § 14.4(e) permits MSHA to require additional testing, samples, or material from the applicant. MSHA estimates that additional testing is required for 10 percent of the applications. Accordingly, MSHA adds 10 percent to the above testing and evaluation costs for test samples. The total cost estimate for testing and evaluation therefore increases from $90,000 to $100,000 the first year, from $45,000 to $50,000 the second year, and from $29,000 to approximately $32,000 the third year and each succeeding year.

§ 14.5 Test Samples

Final § 14.5 requires, upon request by MSHA, that applicants submit three 5-foot (long) by 9-inch (wide) samples for testing. MSHA estimates that the material cost is $125 and the shipping cost is $60, for a total cost of $185 for each conveyer belt tested.

MSHA anticipates that applicants will submit three samples for each application. Since all applications for original approvals require testing and approximately one-half of the applications for approval of similar conveyor belt and extensions of approvals require testing, this is 110 sets of three samples during the first year at a total cost of approximately $20,000; 55 sets during the second year at a total cost of approximately $10,000; and 35 sets during the third and following years at a total cost per year of approximately $6,500.

Final § 14.4(e) permits MSHA to require additional testing, samples, or material from the applicant. MSHA estimates that additional samples are required for 10 percent of the applications. Accordingly, MSHA adds 10 percent to the above materials and shipping costs. The total cost estimate for materials and shipping of test samples for approvals, therefore, increases from $20,000 to approximately $22,000 the first year, from $10,000 to approximately $11,000 the second year, and from $6,500 to approximately $7,000 the third year and each succeeding year.

§ 14.6 Issuance of Approval

Final § 14.6(a) states that MSHA will issue an approval or notice of the reasons for denying the approval after completing the evaluation and testing in this part. Final § 14.6(b)

requires applicants to wait for MSHA to issue an approval before representing a conveyor belt as approved. MSHA estimates that there will be no incremental costs from these requirements.

§ 14.7 Approval Marking and Distribution Records

Final § 14.7(a) requires approved conveyor belts to be marketed only under the name specified in the approval. Final § 14.7(b) requires that approved conveyor belt be marked with the assigned MSHA approval number at intervals not to exceed 60 feet and repeated at least once every foot across the width of the belt. Final § 14.7(c) states that other permanent marking may be accepted by MSHA where the construction of a conveyor belt does not permit marking as described above. Final § 14.7(d) requires applicants granted approval to maintain records of the initial sale of each belt having an approval marking and to retain the record for at least five years following the initial sale. MSHA estimates that marking approved conveyor belt does not impose additional cost because accepted conveyor belt must be marked under the existing rule. MSHA estimates that maintaining records of initial sales is a normal business practice and therefore would have a negligible cost.

§ 14.8 Quality Assurance

Final § 14.8 requires that applicants granted an approval to manufacture conveyor belts flame test a sample of conveyor belt or inspect and test certain materials that contribute to its flame resistance. Applicants are also required to calibrate instruments, control production, and notify MSHA immediately when belt has been distributed that does not meet the specifications of the approval. This notification needs to include a description of the nature and extent of the problem, the locations where the conveyer belt has been distributed, and the approval-holder's plan for corrective action, such as recalling the belt, if necessary.

Based on MSHA's experience, belt manufacturers already have sophisticated quality assurance programs in effect. These quality assurance programs include testing of batches, lots, or slabs for various characteristics, such as flame resistance, adhesion, strength, and abrasion resistance. MSHA also expects that the instruments used for these tests are calibrated according to the instrument manufacturers' specifications, using nationally or internationally recognized standards, which are requirements of the final rule. Belts approved under the final rule would be marked with a manufacturer's code or a production date that can be used to identify the belt as coming from a particular run or batch. Manufacturers and their distributors keep records of the customers for that run, so as to be able to identify the mine operators that have purchased a particular belt. MSHA therefore estimates no additional costs for these final requirements.

MSHA expects that distributions of belts that do not meet approval specifications are rare. MSHA estimates that the cost of complying with these requirements is negligible.

§ 14.9 Disclosure of Information

Final § 14.9(a) states that all proprietary information concerning product specifications and performance submitted to MSHA by the applicant will be protected. Final § 14.9(b) states that MSHA will notify the applicant or approval holder of requests for disclosure of information concerning its conveyor belts, and provide an opportunity to present its position prior to any decision on disclosure. MSHA estimates that there will be no additional costs from these requirements.

§ 14.10 Post-Approval Product Audit

Under final § 14.10, approved conveyor belts are subject to periodic audits by MSHA. An approval holder, at MSHA's request, has to make three samples of an approved conveyor belt available for audit, at no cost to MSHA, not more than once a year. In addition, MSHA can audit a manufacturer, for cause, at any time if the Agency believes that the belt is not in compliance with the final rule. MSHA expects that these audits will be rare.

MSHA estimates that 6 belts (18 samples) will be submitted for audit each year, starting with the second year. These audits are necessary to confirm that the belt is being manufactured according to approval requirements. MSHA estimates that the material cost is $125 and the shipping cost is $60, for a total of $185 for each conveyer belt audited. The total costs for materials and shipping of test samples for 6 audits, at a cost of $185 each, therefore are approximately $1,100 in the second year and in each subsequent year.

§ 14.11 Revocation

Final § 14.11 states that MSHA may revoke for cause an approval issued under this part if the conveyor belt fails to meet the technical requirements or creates a danger or hazard when used in a mine. Prior to revoking an approval, MSHA will inform the approval-holder in writing of MSHA's intention to revoke. In addition, the approval-holder will be given the opportunity for a hearing upon request to MSHA. However, if a conveyor belt poses an imminent danger to the safety or health of miners, an approval may be immediately suspended without written notice of the Agency's intention to revoke. MSHA estimates no cost from this requirement.

§ 14.20 Flame Resistance

Final § 14.20 requires conveyor belts used in underground coal mines to be flame-resistant and either tested in accordance with § 14.22 of this part, or tested in accordance with an alternate test determined by MSHA to be an equivalent non-MSHA product safety standard under existing § 6.20 and final § 14.4(f). MSHA estimates no cost from this requirement.

§ 14.21 Laboratory-Scale Flame Test Apparatus

Final § 14.21 outlines requirements for the principal parts of the apparatus used to test for flame resistance of conveyor belts. MSHA estimates no cost from this requirement.

§ 14.22 Test for Flame Resistance of Conveyor Belts

Final § 14.22 outlines the proper procedure for conducting a test using a flame test apparatus meeting the specifications of § 14.21. Each tested sample must exhibit an undamaged portion across its entire width. In addition, MSHA may modify the procedures of the flammability test for belts constructed of thickness more than ¾ inch (1.9 cm). MSHA estimates no cost from this requirement.

§ 14.23 New Technology

Final § 14.23 states that MSHA may approve a conveyor belt that incorporates new technology for which the requirements of this Part are not applicable if the Agency determines that the conveyor belt is as safe as those which meet the requirements of this part. MSHA estimates no cost from this requirement.

PART C: FIRE PROTECTION AND DETECTION AND APPROVAL OF THE USE OF AIR FROM THE BELT ENTRY IN UNDERGROUND COAL MINES

Part C addresses the cost of final requirements for fire protection and detection and approval of the use of air from the belt entry to ventilate the working sections in underground coal mines. Final requirements that have cost impacts include: § 75.156 AMS operator, qualifications; § 75.333 Ventilation controls; § 75.350 Belt air course ventilation; § 75.351 Atmospheric monitoring systems; § 75.371 Mine ventilation plan; contents; § 75.380 Escapeways; bituminous and lignite mines; § 75.381 Escapeways; anthracite mines; § 75.1103-4 Automatic fire sensor and warning device systems; installation; minimum requirements; § 75.1103-5 Automatic fire sensor and warning device systems; actions and response; § 75.1103-8 Automatic fire sensor and warning device systems; examination and test requirements; and § 75.1731 Maintenance of belt conveyors and belt conveyor entries. The remaining sections of the final rule either have no cost or de minimis costs.

Number of Underground Coal Mines That Use an Atmospheric Monitoring System to Comply With Safety Standards

Table IV-4 shows the number of mines in each employment category that use an AMS to comply with safety standards. These include all mines that: use air from the belt entry to ventilate the working sections; monitor electrical installations for fire; or monitor for methane under examination options.

Table IV-4. Number of Underground Coal Mines That Use an AMS to Comply With Safety Standards

Mine Size	Number of Mines That Use an AMS Because of Using Belt Air	Number of Mines That Use an AMS to Comply With Safety Standards, But Not Using Belt Air	Number of Mines That Use an AMS to Comply With Safety Standards
1-19	3	0	3
20-500	45	26	71
501+	1	5	6
All Mines	49	31	80

§ 75.156 AMS Operator, Qualifications

Final § 75.156 requires that AMS operators be trained, and that the AMS operators be able to demonstrate to MSHA that they are trained to perform in their duties. This includes task training as specified under final § 48.27. These final requirements apply to all 80 mines that use an AMS to comply with existing safety standards. MSHA estimates the total number of AMS operators per mine is the sum of 12 (4 each for the 3 mines with 1-19 employees), 426 (6 each for the 71 mines with 20-500 employees), and 48 (8 each for the 6 mines with 501+ employees), for a total of 486 AMS operators that will need to be trained in the first year. MSHA estimates a turnover rate of 7 percent, so that 34 new AMS operators need to be task trained each year.

There are two cost categories for this new requirement. The first cost is the time spent by the AMS operator participating in final § 48.27 task training. MSHA estimates 4 hours at the miner's hourly wage of $33.70, or $135 for each of the 486 AMS operators. MSHA therefore estimates that the first-year cost for all 486 existing AMS operators to receive training, at a cost of $135 per AMS operator, is $66,000. MSHA annualizes this cost to $10,000 using an annualization factor of 0.159. The annual cost for the 34 new AMS operators each year to receive task training, at a cost of $135 per AMS operator, is $4,600. In sum, the estimated yearly cost is $15,000.

The second cost is the cost of instructors. For the first year, MSHA assumes 80 group instruction classes for all AMS operators at each of the 80 mines. Annually, MSHA assumes one instruction class per new AMS operator on an as-needed basis (a separate class for each one of the 34 new AMS operators a year). MSHA estimates 5 hours of instructor's time per class at the supervisor's hourly wage of $85.14, or $426 per instructor for each training class. Therefore, the Agency estimates that the first-year cost for the 80 instructors to train AMS operators, at a cost of $426 per instructor, is $34,000. Applying an annualization factor of 0.159, MSHA annualizes this cost to be $5,400. The estimated annual cost, at a cost of $426 per instructor, to train 34 AMS operators one-on-one is $15,000. In sum, MSHA estimates the yearly cost to be $20,000.

The total estimated yearly cost for these two cost categories is $35,000.

Existing §§ 48.23, 48.29, 75.159 and 75.161(b) relate to final §§ 48.27 and 75.156. Existing § 48.23 requires mine operators to modify training plans for task training of AMS

operators. Each of the 80 mines that use an AMS to comply with safety standards needs to submit a modification to their existing part 48 plan for training and retraining of miners to include an outline of training procedures that will be used and the titles of the personnel conducting the training for AMS operators. Existing § 48.29 requires making a record of the initial task training of AMS operators. Existing § 75.159 requires adding AMS operators to the list of all qualified persons. Existing § 75.161(b) requires mine operators to submit task training plans to MSHA for approval. MSHA estimates that the incremental cost of complying with these existing requirements is negligible.

§ 75.333 Ventilation Controls

Final § 75.333(c)(4) requires mine operators to establish an airlock where the air pressure differential between air courses creates a static force exceeding 125 pounds on closed personnel doors along escapeways. Establishing an airlock is likely to require installation of a second stopping or other ventilation control or device with a personnel door.

MSHA estimated in the PREA that 64 mines will establish a total of 69 airlocks. MSHA received comments indicating this may be an underestimate. One commenter provided results of an informal survey of 14 mines and estimates of required airlocks in these mines, assuming various door sizes. If doors are 30 inches by 30 inches, the commenter estimated these 14 mines would need to establish a total of 49 airlocks. In the REA, MSHA has increased its estimate of the number of needed airlocks.

MSHA estimates that 59 mines with 20-500 employees will need to establish 2 airlocks each, for a total of 118 airlocks; and 5 mines with 501+ employees will need to establish 6 airlocks each, for a total of 30 airlocks. This will result in the sum of 118 and 30, or a total of 148 airlocks being established at the affected mines. MSHA estimates that the materials cost per airlock is $1,000 and that the labor cost to establish each airlock is 8 hours of labor at the miner's hourly wage of $33.70, for a total labor cost of $270. The estimated cost per airlock is the sum of the materials cost of $1,000 and the labor cost of $270, or $1,270 per airlock. The estimated first-year cost for the 148 airlocks, at $1,270 per airlock, is $190,000. After applying an annualization factor of 0.159, MSHA estimates the yearly cost is $30,000.

Proposed § 75.371(yy) would have required that the locations of these airlock doors be included in the mine ventilation plan. MSHA received public comment indicating that approval in the ventilation plan should not be required because the locations of doors are already required on the mine ventilation map. MSHA has not included this requirement in the final rule and, accordingly, there is no associated incremental cost.

§ 75.350 Belt Air Course Ventilation

Final § 75.350(a)(2) requires that air velocity in the belt entry be at least 50 feet per minute. When requested by the mine operator, the district manager may approve lower velocities in the ventilation plan based on specific mine conditions. Air velocities must be compatible with all fire detection systems and fire suppression systems used in the belt entry. Final § 75.371(jj) requires that the mine ventilation plan provide the locations and approved velocities where air velocities in the belt entry are below the limit set forth in § 75.350(a)(2). Under existing § 75.370, mine operators are required to revise and submit the mine

ventilation plan, post all revisions of the mine ventilation plan, and provide copies to the miners' representative, upon request, of any revision to the mine ventilation plan. MSHA estimates that this existing requirement to revise and submit the ventilation plan will take 20 minutes of a supervisor's time at an hourly wage of $85.14, for a cost of $28; 14 minutes of time at the clerical employee's hourly wage of $26.73, for a cost of $6; and $3 for copies and postage. The estimated cost per mine to revise the ventilation plan is the sum of the costs for a supervisor's time, a clerical employee's time, and copy and postage costs, which is $37. The estimated first-year cost for the 240 mines, at $37 per mine, is $9,000. Applying an annualization factor of 0.159, MSHA estimates the yearly cost of this requirement is $1,400. Further explanation of the method for estimating these costs can be found in the discussion for existing § 75.370.

Final § 75.350(b) requires that the use of air from the belt entry to ventilate a working section, or an area where mechanized mining equipment is being installed or removed, be evaluated and approved by the District Manager and justification provided in the mine ventilation plan. The mine operator has to show that use of air from a belt entry would afford at least the same measure of protection as where belt haulage entries are not used to ventilate working places. Under the final rule, mine operators for all 49 existing mines using air from the belt entry to ventilate working sections, that will continue to use air from the belt entry to ventilate working sections, must provide justification in the mine ventilation plan to be approved by the District Manager. Under existing § 75.370, mine operators are required to revise and submit the mine ventilation plan, post all revisions of the mine ventilation plan, and provide copies to the miners' representative, upon request, of any revision to the mine ventilation plan. MSHA estimates that the existing requirement will take 60 minutes of a supervisor's time at an hourly wage of $85.14, for a cost of $85; 14 minutes of time at the clerical employee's hourly wage of $26.73, for a cost of $6; and $3 for copies and postage. The estimated cost per mine to revise the ventilation plan is the sum of the costs for a supervisor's time, a clerical employee's time, and copy and postage costs, which is $94. The estimated first-year cost for the 49 mines, at $94 per mine, is $4,600. Applying an annualization factor of 0.159, MSHA estimates the yearly cost of this requirement is $730. Further explanation of the method for estimating these costs can be found in the discussion for existing § 75.370.

Final § 75.350(b)(3)(i) requires, in mines that use air from the belt entry to ventilate working sections, that the average concentration of respirable dust in the belt air course, when used as a section intake air course, must be maintained at or below 1.0 mg/m^3. There is no cost to this requirement because mines are already in compliance with this requirement.

Final § 75.350(b)(3)(ii) requires, in mines that use air from the belt entry to ventilate working sections, that where miners on the working section are on a reduced standard below 1.0 mg/m^3, the average concentration of respirable dust in the belt entry must be at or below the lowest applicable respirable dust standard on that section. MSHA estimates that the cost of this requirement is negligible.

Final § 75.350(b)(3)(iii) requires, in mines that use air from the belt entry to ventilate working sections, that a permanent designated area (DA) for dust measurements must be established at a point no greater than 50 feet upwind from the section loading point in the belt entry when the belt air flows over the loading point or no greater than 50 feet upwind from the point where belt air is mixed with air from another intake air course near the loading

point. The DA must be specified and approved in the ventilation plan. There is no cost to this requirement because mines are already in compliance with this requirement.

Final § 75.350(b)(7) requires that air velocity in the belt entry be at least 100 feet per minute in mines that use air from the belt entry to ventilate working sections, unless otherwise approved in the mine ventilation plan. Final § 75.371(jj) requires that the mine ventilation plan contain the locations and approved velocities where air velocities in the belt entry are below the limit set forth in § 75.350(b)(7). MSHA estimates that 12 mines using air from the belt entry to ventilate working sections will request approval of a lower air velocity. Under existing § 75.370, mine operators are required to revise and submit the mine ventilation plan, post all revisions of the mine ventilation plan, and provide copies to the miners' representative, upon request, of any revision to the mine ventilation plan. MSHA estimates that the existing requirement will take 20 minutes of a supervisor's time at an hourly wage of $85.14, for a cost of $28; 14 minutes of time at the clerical employee's hourly wage of $26.73, for a cost of $6; and $3 for copies and postage. The estimated cost per mine to revise the ventilation plan is the sum of the costs for a supervisor's time, a clerical employee's time, and copy and postage costs, which is $37. The estimated first-year cost for the 12 mines, at $37 per mine, is $440. Applying an annualization factor of 0.159, MSHA estimates the yearly cost of this requirement is $70. Further explanation of the method for estimating these costs can be found in the discussion for existing § 75.370.

Final § 75.350(b)(8) requires that air velocity in the belt entry not exceed 1,000 feet per minute in mines that use air from the belt entry to ventilate a working section, unless otherwise approved in the mine ventilation plan. Final § 75.371(jj) requires that the mine ventilation plan provide the locations and approved velocities where air velocities in the belt entry are above the limit set forth in § 75.370(b)(8). MSHA estimates that 3 mines using air from the belt entry to ventilate a working section will request approval of a greater air velocity. Under existing § 75.370, mine operators are required to revise and submit the mine ventilation plan, post all revisions of the mine ventilation plan, and provide copies to the miners' representative, upon request, of any revision to the mine ventilation plan. MSHA estimates that the existing requirement will take 20 minutes of a supervisor's time at an hourly wage of $85.14, for a cost of $28; 14 minutes of time at the clerical employee's hourly wage of $26.73, for a cost of $6; and $3 for copies and postage. The estimated cost per mine to revise the ventilation plan is the sum of the costs for a supervisor's time, a clerical employee's time, and copy and postage costs, which is $37. The estimated first-year cost for the 3 mines, at $37 per mine, is $110. Applying an annualization factor of 0.159, MSHA estimates the yearly cost of this requirement is $20. Further explanation of the method for estimating these costs can be found in the discussion for existing § 75.370.

Final § 75.350(d)(1) keeps the language of existing § 75.350(d)(1) which requires that, in mines using air from the belt entry to ventilate working sections, the air current that will pass through the point-feed regulator must be monitored for carbon monoxide or smoke at a point within 50 feet upwind of the point-feed regulator. Since mines are already in compliance with this part of the requirement, there is no additional cost. Final § 75.350(d)(1) also requires, in mines using air from the belt entry to ventilate working sections, that a second point must be monitored 1,000 feet upwind of the point-feed regulator, unless the mine operator requests that a lesser distance be approved by the district manager in the mine ventilation plan based on mine specific conditions. For each of the point-feed regulators, the

estimated cost of a carbon monoxide sensor is $900, and the estimated installation cost is $34 (1 hour at the miner's hourly wage of $33.70), for a total cost of $930 each. MSHA estimates that 2 mines with 1-19 employees, 45 mines with 20-500 employees, and 1 mine with 501+ employees (a total of 48 mines) have point-feed regulators and also use air from the belt entry to ventilate working sections. MSHA estimates the total number of point-feed regulators for these mines is the sum of 2 (1 each for the 2 mines with 1-19 employees), 90 (2 each for the 45 mines with 20-500 employees), and 4 (4 for the 1 mine with 501+ employees), for a total of 96 point-feed regulators. MSHA estimates that the first-year cost of the final requirements to install a carbon monoxide sensor for each of the 96 point-feed regulators, at a cost of $930 each, is $90,000. Applying an annualization factor of 0.252, the Agency estimates the yearly cost to install these 96 additional carbon monoxide sensors is $23,000. MSHA estimates that the annual cost of maintaining the additional carbon monoxide sensors is equal to 2 percent of the initial purchase and installation cost of $90,000, or $1,800 to maintain the carbon monoxide sensors in the 48 mines. The Agency estimates that the yearly cost to purchase, install, and maintain the additional carbon monoxide sensors is the sum of $23,600 and $1,800, or $24,400.

Some mines may be unable to comply with final § 75.350(d)(1) that a second carbon monoxide sensor be placed 1,000 feet upwind of the point-feed regulator. These mines can request approval from the district manager to locate the second carbon monoxide sensor less than 1,000 feet. MSHA estimates that 1 mine using air from the belt entry to ventilate a working section will request a shorter sensor spacing in the ventilation plan. MSHA estimates that the cost of this type of request is negligible.

Proposed § 75.350(d)(7) would have required, in mines using air from the belt entry to ventilate working sections, that where point-feeding air from a primary escapeway to a belt entry designated as an alternate escapeway, point-feed regulators must be equipped with a means to remotely close the regulator or any other means to isolate the two escapeways. It would also have required that the AMS operator, after consultation with the responsible person and section foreman, be capable of performing this function from the designated surface location. Several commenters indicated that closure of a point-feed regulator would be a major ventilation change that could create explosive atmospheres in the working places. After a review of the comments, the Agency determined that the final rule should not include the proposed requirement.

§ 75.351 Atmospheric Monitoring Systems

For the 80 mines that use an AMS to comply with existing safety standards, final § 75.351(b)(2) requires the mine operator to designate an AMS operator who has as a primary duty the responsibility to monitor the malfunction, alert, and alarm signals of the AMS and to notify appropriate personnel of these signals. In response to comments, the final rule is clarified to additionally require that, in the event of an emergency, the sole responsibility of the AMS operator would be to respond to the emergency. MSHA estimates that the largest mines will not incur costs as a result of this final requirement because that responsibility has already been designated as a primary duty of an AMS operator in these mines. However, MSHA estimates that in some smaller mines, as a result of the final requirement, a portion of the duties of the AMS operator must be reassigned to other miners. MSHA estimates that these mines incur additional labor costs of 2 hours per shift at the

miner's hourly wage of $33.70, or approximately $67.40 per shift. MSHA estimates that 3 mines with 1-19 employees and 18 mines with 20-500 employees incur costs from this requirement, for a total of 21 mines. The number of shifts is 1 daily for 260 workdays in each of the 3 mines with 1-19 employees, for at total of 780 shifts; and 2 daily for 312 workdays in each of the 18 mines with 20-500 employees, for a total of approximately 11,200 shifts. The total number of shifts for all 21 mines is the sum of 780 and 11,200, or approximately 12,000 shifts. MSHA estimates the annual cost of this requirement for all 12,000 shifts, at a cost of $67.40 per shift, is $810,000.

Final § 75.351(e)(1) requires any AMS used to monitor belt air courses under §75.350(b) - mines using air from the belt entry to ventilate working sections - must have approved sensors to monitor for carbon monoxide at the locations specified in final § 75.351(e)(1)(i) through (v).

Final § 75.351(e)(1)(i) requires approved carbon monoxide sensors at or near the working section belt tailpiece in the air stream ventilating the belt entry. In longwall mining systems the sensor must be located upwind in the belt entry at a distance no greater than 150 feet from the mixing point where intake air is mixed with the belt air at or near the tailpiece. There is no cost to this requirement because mines are already in compliance with this requirement.

Final § 75.351(e)(1)(ii) requires approved carbon monoxide sensors no more than 50 feet upwind from the point where the belt air course is combined with another air course or splits into multiple air courses. There is no cost to this requirement because mines are already in compliance with this requirement.

Final § 75.351(e)(1)(iii) requires, in mines using air from the belt entry to ventilate working sections, that carbon monoxide at intervals not to exceed 1,000 feet along each belt entry. However, in areas along each belt entry where air velocities are between 50 and 100 feet per minute, spacing of sensors must not exceed 500 feet. In areas along each belt entry where air velocities are less than 50 feet per minute, the sensor spacing must not exceed 350 feet. Mines are already in compliance with this requirement, except for the new requirement that sensors be spaced at intervals no greater than 500 feet in areas along each belt entry where air velocities are between 50 and 100 feet per minute. MSHA estimates that 2 mines with 1-19 employees, 23 mines with 20-500 employees, and 1 mine with 501+ employees are affected by this requirement, for a total of 26 mines. The total number of carbon monoxide sensors needed under the final requirement is the sum of 2 (1 each for the 2 mines with 1-19 employees), 46 (2 each for the 23 mines with 20-500 employees), and 3 (3 for the 1 mine with 501+ employees), for a total of 51 carbon monoxide sensors. MSHA estimates that each carbon monoxide sensor costs $900 and requires one hour of labor, at the miner's hourly wage of $33.70, for installation, for a cost per installed carbon monoxide sensor of $930. The Agency estimates the first-year cost to install the 51 additional carbon monoxide sensors, at a cost of $930 per sensor, is $48,000. Applying an annualization factor of 0.252, the Agency estimates the yearly cost is $12,000. MSHA estimates that the annual cost of maintaining the additional carbon monoxide sensors is equal to 2 percent of the initial purchase and installation cost of $48,000, or $1,000. The Agency estimates the yearly cost to purchase, install, and maintain the additional 51 carbon monoxide sensors is the sum of $12,000 and $1,000, or $13,000.

Final § 75.351(e)(1)(iv) requires, in mines using air from the belt entry to ventilate working sections, that approved carbon monoxide sensors not more than 100 feet downwind of each belt drive unit, each tailpiece, transfer point, and each belt take-up. If the belt drive, tailpiece, and/or take-up for a single transfer point are installed together in the same air course, and the distance between the units is less than 100 feet, they may be monitored with one sensor downwind of the last component. If the distance between the units exceeds 100 feet, additional sensors are required downwind of each belt drive unit, each tailpiece, transfer point, and each belt take-up. Mines are already in compliance with this requirement, except for the new requirement, where the distance between the belt units exceeds 100 feet, that additional sensors be installed downwind of each belt drive unit, each tailpiece, transfer point, and each belt take-up. MSHA estimates that 2 mines with 1-19 employees, 36 mines with 20-500 employees, and 1 mine with 501+ employees are affected by this requirement, for a total of 39 mines. The total number of carbon monoxide sensors needed under the final requirement is the sum of 4 (2 each for the 2 mines with 1-19 employees), 72 (2 each for the 36 mines with 20-500 employees), and 4 (4 for the 1 mine with 501+ employees), for a total of 80 carbon monoxide sensors. MSHA estimates that each carbon monoxide sensor costs $900 and requires one hour of labor, at the miner's hourly wage of $33.70, for installation, for a cost per installed carbon monoxide sensor of $930. The Agency estimates the first-year cost to install the 80 additional carbon monoxide sensors, at a cost of $930 per sensor, is $75,000. Applying an annualization factor of 0.252, the Agency estimates the yearly cost is $19,000. MSHA estimates that the annual cost of maintaining the additional carbon monoxide sensors is equal to 2 percent of the initial purchase and installation cost of $75,000, or $1,500. The Agency estimates the yearly cost to purchase, install, and maintain the additional 51 carbon monoxide sensors is the sum of $19,000 and $1,500, or $20,500.

Final § 75.351(e)(1)(v) requires approved carbon monoxide sensors at other locations in any entry that is part of the belt air course as required and specified in the mine ventilation plan. There is no cost to this requirement because mines are already in compliance with this requirement.

Final § 75.351(e)(2) requires smoke sensors to be installed at or near the working section belt tailpiece in the air stream ventilating the belt entry, and no more than 100 feet downwind of each belt drive unit, tailpiece transfer point, and belt take-up. Smoke sensors also have to be installed at intervals not to exceed 3,000 feet. This final requirement takes effect one year after the Secretary has determined that a smoke sensor is available to reliably detect fire in underground coal mines. Because these sensors are not available, MSHA has not included costs.

Final § 75.351(q)(1) outlines required subjects that must be included in the annual training of an AMS operator. Because existing § 75.351(q) requires all AMS operators to be trained annually, MSHA estimates that there is no additional cost associated with this final requirement.

Final § 75.351(q)(2) requires AMS operators to travel to all working sections every six months. This affects only the 80 mines that use an AMS to comply with existing standards. For the 3 mines with 1-19 employees, MSHA estimates an average of 4 AMS operators per mine and an average of 8 hours annually for each AMS operator to travel to all working sections every six months, for a total of 96 hours (3 mines x 4 AMS operators x 8 hours) annually. For the 71 mines with 20-500 employees, MSHA estimates an average of 6

AMS operators per mine and an average of 12 hours annually for each AMS operator to travel to all working sections every six months, for a total of 5,112 hours (71 mines x 6 AMS operators x 12 hours). For the 6 mines with 501+ employees, MSHA estimates an average of 8 AMS operators per mine and an average of 16 hours annually for each AMS operator to travel to all working sections every six months, for a total of 768 hours (6 mines x 8 AMS operators x 16 hours). The total number of hours required annually to comply with this final requirement is the sum of 96 hours for mines with 1-19 employees, 5,112 hours for mines with 20-500 employees, and 768 hours for mines with 501+ employees, for a total of 5,976 hours. MSHA estimates that the annual cost of the 5,976 hours, at the miner's hourly wage of $33.70, required for all 486 AMS operators to travel to all working sections every six months, is $200,000.

Final § 75.351(q)(3) requires mine operators to maintain a record of the content of the training, the person conducting the training, and the date the training was conducted, at the mine for at least one year. Because mine operators keep training records under the existing standard, MSHA estimates that this requirement has a negligible cost.

§ 75.352 Atmospheric Monitoring System Alarm Units

Final § 75.352(f) requires that if the minimum air velocity is not maintained when required by § 75.350(b)(7), immediate action must be taken to return the ventilation system to proper operation. While the ventilation system is being corrected, operation of the belt may continue only while a trained person(s) patrols and continuously monitors for carbon monoxide or smoke as set forth in §§ 75.352(e)(3) through (7), so that the affected areas will be traveled each hour in their entirety. There is no cost to this requirement because mines are already in compliance with this requirement.

Final § 75.352(g) requires that the AMS must automatically provide both a visual and audible signal in the belt entry at the point-feed regulator location, at affected sections, and at the designated surface location when carbon monoxide concentrations reach: (1) the alert level at both point-feed intake monitoring sensors; or (2) the alarm level at either point-feed intake monitoring sensor. This requires installing an additional alarm unit near the point-feed regulator. For each of the point-feeds, the estimated cost of an alarm unit is $600, and the estimated installation cost is $17 (30 minutes at the miner's hourly wage of $33.70), for a total cost of $620 each. MSHA estimates that 2 mines with 1-19 employees, 45 mines with 20-500 employees, and 1 mine with 501+ employees (a total of 48 mines) have point-feed regulators and also use air from the belt entry to ventilate working sections. MSHA estimates the total number of point-feed regulators for these mines is the sum of 2 (1 each for the 2 mines with 1-19 employees), 90 (2 each for the 45 mines with 20-500 employees), and 4 (4 for the 1 mine with 501+ employees), for a total of 96 point-feed regulators. MSHA estimates that the first-year cost of the final requirements to install an alarm unit for each of the 96 point-feed regulators, at a cost of $620 each, is $59,000. Applying an annualization factor of 0.252, the Agency estimates that the yearly cost to install these 96 additional alarm units is $15,000. MSHA estimates that the annual cost of maintaining the additional alarm units is equal to 2 percent of the initial purchase and installation cost of $59,000, or $1,100 to maintain the alarm units in the 48 mines. MSHA estimates that the yearly cost to purchase, install, and maintain the additional alarm units is the sum of $15,000 and $1,100, or $16,000.

§ 75.370 Mine Ventilation Plan; Submission and Approval

Under existing § 75.370(a)(2), the proposed ventilation plan and any revision to the plan must be submitted to the district manager. Existing § 75.370(a)(3) states that mine operators shall notify the representative of miners at least 5 days prior to submission of a mine ventilation plan and any revision to a mine ventilation plan; if requested, a copy must be made available for inspection by the representative of miners; and a copy of any proposed revision must be posted on the mine bulletin board at the time of submission. Under existing § 75.370(f), the approved ventilation plan and any revisions must be provided upon request to the miners' representative following notification of approval. MSHA estimates that the costs associated with existing § 75.370 are: the cost of a supervisor's time to revise the mine ventilation plan; the cost of a clerical employee's time to submit, copy, and post the ventilation plan; and copy and postage costs.

Existing § 75.370 will require 1,257 revisions to the mine ventilation plan because of the following requirements in the final rule: §§ 75.350(a)(2), minimum air velocity (240 revisions); 75.350(b), justification for use of air from belt entry (49 revisions); 75.350(b)(7), minimum air velocity (12 revisions); 75.350(b)(8), maximum air velocity (3 revisions); 75.380(f)(1) and 75.381(e), escapeway ventilation pressure (474 revisions); and 75.1103-5(a), carbon monoxide ambient level (479 revisions).

MSHA estimates that revising the mine ventilation plan takes 60 minutes of a supervisor's time when justifying the use of belt air (49 hours for 49 revisions), and 20 minutes for all other requirements of the final rule (403 hours for 1,208 revisions), for a total of approximately 452 hours of a supervisor's time. At an hourly rate of $85.14 for supervisors, the cost of the 452 hours is approximately $38,500.

MSHA estimates that 6 minutes of a clerical employee's time is required for each of the three clerical tasks: submitting the mine ventilation plan revisions; posting revisions; and providing copies to the miners' representative. MSHA also estimates that 30 percent of the mine ventilation plan revisions are copied and provided to the miners' representative. The average clerical employee time required to revise the mine ventilation plan, post revisions, and provide copies to the miners' representative is the sum of 6 minutes to revise the mine ventilation plan, 6 minutes to post revisions, and 2 minutes to provide copies to the miners' representative, or a total of approximately 14 minutes per revision. To perform these clerical tasks on 1,257 revisions, at 14 minutes per revision, will take approximately 290 hours. At an hourly rate of $26.37 for clerical employees, the cost of the 290 hours is approximately $7,600.

MSHA estimates that revising the mine ventilation plan and posting revisions will each require 4 pages, and that providing copies to the miners' representatives requires an average of 1 page, for a total of 9 pages. At a cost of $0.15 per page, copy costs will be approximately $1.35. The cost of postage will be approximately $1.50, so the copy and postage cost per revision will be approximately $2.85. The total copy and postage cost for all 1,257 revisions, at $2.85 per revision, is approximately $3,600.

MSHA estimates that the first-year cost of the final rule from requirements impacting mine ventilation plan submission and approval is the sum of $38,500, $7,600, and $3,600, or approximately $50,000. Applying an annualization factor of 0.159, MSHA estimates the

yearly cost to revise the mine ventilation plan, post revisions, and provide copies to the miners' representative is $7,900.

§ 75.371 Mine Ventilation Plan; Contents

Under final § 75.371(mm), the District Manager could require the use of diesel-discriminating sensors in the mine ventilation plan. MSHA estimates that this requirement affects 21 mines: 3 mines with 1-19 employees and 18 mines with 20-500 employees. For the 3 mines with 1-19 employees, MSHA estimates an average of 2 diesel-discriminating sensors per mine, for a total of 6 diesel-discriminating sensors. For the 18 mines with 20-500 employees, MSHA estimates an average of 3 diesel-discriminating sensors per mine, for a total of 54 diesel-discriminating sensors. The total number of diesel-discriminating sensors required under final § 75.371(mm) is the sum of 6 for mines with 1-19 employees and 54 for mines with 20-500 employees, for a total of 60 diesel-discriminating sensors. MSHA estimates that the material cost of a diesel-discriminating sensor is $900, and that the labor cost to install a diesel-discriminating sensor is $34 (one hour of a miner's time at an hourly wage of $33.60), for a total cost of $934 to purchase and install a diesel-discriminating sensor. MSHA estimates that the first-year cost to purchase and install the 60 diesel-discriminating sensors, at a cost of $934 per sensor, is $56,000. Applying an annualization factor of 0.252, the Agency estimates the yearly cost to purchase and install the 60 diesel-discriminating sensors is $14,000. MSHA estimates the annual maintenance for the 60 diesel-discriminating sensors as 2 percent of the first-year cost of $56,000, or $1,000. The Agency estimates the yearly cost of installation and maintenance for the 60 diesel-discriminating sensors is the sum of $14,000 and $1,000, or $15,000.

Final § 75.371(mm) also requires the location of diesel-discriminating sensors that are installed in the belt air course to be included in the mine ventilation plan. MSHA estimates that this requirement has a negligible cost.

Final § 75.371(nn) requires reporting the length of the time delay or other method used to reduce non-fire-related alerts and alarms. MSHA estimates that this reporting requirement has a negligible cost.

§ 75.380 Escapeways; Bituminous and Lignite Mines and § 75.381 Escapeways; Anthracite Mines

Final §§ 75.380(d)(7)(v) and 75.381(c)(5)(v) require that lifelines in escapeways be equipped with directional indicator cones securely attached to the lifeline. One directional indicator cone, signifying the route of escape, must be placed at intervals of no more than 100 feet. Cones must be installed so that the tapered section points inby. MSHA estimates that all mines currently use cones that point inby as directional indicators on lifelines. Accordingly, there is no additional cost for this requirement.

Final §§ 75.380(d)(7)(vi) and 75.381(c)(5)(vi) require that lifelines in escapeways be equipped with one sphere securely attached to the lifeline at each intersection where personnel doors are installed in adjacent crosscuts. These requirements affect all underground coal mines. MSHA estimates that the average number of spheres per mine is 25 each for the 223 mines with 1-19 employees, for a total of approximately 5,600 spheres; 120 each for the 391 mines with 20-500 employees, for a total of approximately 47,000 spheres;

and 240 each for the 10 mines with 501+ employees, for a total of approximately 2,400 spheres. The total number of spheres for all mines is the sum of 5,600, 47,000, and 2,400, for a total of approximately 55,000 spheres. MSHA estimates the cost per sphere is $10 and the labor cost to install each sphere is $3 (5 minutes at a miner's wage of $33.70), for a total of $13 per sphere. The Agency estimates that the first-year cost to purchase and install 55,000 spheres, at $13 per sphere, is $700,000. Applying an annualization factor of 0.159, MSHA estimates the yearly cost is $110,000.

Final §§ 75.380(d)(7)(vii) and 75.381(c)(5)(vii) require that lifelines be equipped with two securely attached cones, installed consecutively with the tapered section pointing inby, to signify an attached branch line is immediately ahead. MSHA estimates that 2,553 branch lines will lead to SCSR caches and 1,142 branch lines will lead to refuge alternatives, for a total of 3,695 branch lines that must be signified by cones attached to the lifeline. The Agency estimates that the first-year cost for cones to signify 3,695 branch lines, at a cost of $20 for each set of two cones, is $74,000. Applying an annualization factor of 0.159, MSHA estimates the yearly cost is $12,000.

Final §§ 75.380(d)(7)(vii)(A) and 75.381(c)(5)(vii)(A) require that a branch line leading from the lifeline to an SCSR cache be marked with four cones with the base sections in contact to form two diamond shapes. The cones must be placed within reach of the lifeline. Based on an economic analysis of the Agency's final rule on emergency mine evacuation, MSHA estimates a total of 2,553 SCSR caches are required in underground coal mines. MSHA estimates a cost of $40 for each set of four cones, a cost of $10 for a 50-foot line to attach from the lifeline to the SCSR cache, and a labor cost of $6 (10 minutes at a miner's wage of $33.70) to attach the cones and the line, for a total cost of $56 to lead a branch line from the lifeline to an SCSR cache. The Agency estimates that the first-year cost of a branch line for all 2,553 SCSR caches, at a cost of $56 each, is $140,000. Applying an annualization factor of 0.159, MSHA estimates the yearly cost is $23,000.

Final §§ 75.380(d)(7)(vii)(B) and 75.381(c)(5)(vii)(B) require that a branch line leading form the lifeline to a refuge alternative be marked with a rigid spiraled coil at least eight inches in length. The spiraled coil must be placed within reach of the lifeline. Based on an economic analysis of the Agency's final rule on refuge alternatives in underground coal mines, MSHA estimates a total of 1,142 refuge alternatives are required in underground coal mines. MSHA estimates a cost of $15 for each rigid spiraled coil, a cost of $10 for a 50-foot line to attach from the lifeline to the refuge alternative, and a labor cost of $6 (10 minutes at a miner's wage of $33.70) to attach the cones, the coil, and the line, for a total cost of $31 to lead a branch line from the lifeline to a refuge alternative. The Agency estimates that the first-year cost of a branch line for all 1,142 refuge alternatives, at a cost of $31 each, is $35,000. Applying an annualization factor of 0.159, MSHA estimates the yearly cost is $5,600.

MSHA estimates that the yearly cost of final requirements for lifeline signals is the sum of $110,000, $12,000, $23,000 and $5,600, or $150,000.

Final §§ 75.380(f) and 75.381(e) require that the primary escapeway have higher ventilation pressure than the belt entry, unless the mine operator submits an alternative in the mine ventilation plan to protect the integrity of the primary escapeway based on mine specific conditions. The alternative must be approved by the District Manager.

MSHA estimates that there are 112 mines with 1-19 employees, 352 mines with 20-500 employees, and all 10 mines with 501+ employees, for a total of 474 mines that will request approval for an alternative. Final § 75.371(yy) requires the mine ventilation plan to include the locations where the pressure differential cannot be maintained from the primary escapeway to the belt entry. Under existing § 75.370, mine operators are required to revise the mine ventilation plan, post all revisions of the mine ventilation plan, and provide copies to the miners' representative, upon request, of any revision to the mine ventilation plan. MSHA estimates that the existing requirement will take 20 minutes of a supervisor's time at an hourly wage of $85.14, for a cost of $28; 14 minutes of time at the clerical employee's hourly wage of $26.73, for a cost of $6; and $3 for copies and postage. The estimated cost per mine to revise the ventilation plan is the sum of the costs for a supervisor's time, a clerical employee's time, and copy and postage costs, which is $37. The Agency estimates that the first-year cost for the 474 mines, at $37 per mine, is $17,500. Applying an annualization factor of 0.159, MSHA estimates the yearly cost of this requirement is $2,800. Further explanation of the method for estimating these costs can be found in the discussion for existing § 75.370.

§ 75.1103-4 Automatic Fire Sensor and Warning Device Systems; Installation; Minimum Requirements

Final § 75.1103-4(a)(1) requires the installation and maintenance of carbon monoxide sensors. Under this requirement, all 479 mines currently using point-type heat sensors have to purchase and install carbon monoxide sensors. MSHA estimates that the cost to purchase and install carbon monoxide sensors is $9,900 each for the 210 mines with 1-19 employees, for a total cost of $2.1 million. MSHA estimates that the cost to purchase and install carbon monoxide sensors is $28,400 each for the 269 mines with 20-500 employees, for a total cost of $7.6 million. MSHA estimates no additional cost for mines with 501+ employees, because these mines currently have carbon monoxide sensors installed to monitor the belt entry. MSHA estimates that the first-year cost to purchase and install carbon monoxide sensors for the 479 mines is the sum of $2.1 million and $7.6 million, or $9.7 million. Applying a 0.252 annualization factor, the Agency estimates the annualized cost is $2.4 million. MSHA estimates that the annual cost of maintaining carbon monoxide sensors for the 479 mines is equal to 2 percent of the initial purchase and installation cost of $9.7 million, or $190,000. The yearly cost is the sum of the annualized cost of $2.4 million and the annual cost of $190,000, or $2.6 million.

Under the final rule, new mines will no longer have to incur the cost to install point-type heat sensors. This partially offsets the cost of purchasing and installing carbon monoxide sensors. Based on an Agency analysis, MSHA estimates that each year there will be 38 new underground coal mines with 1-19 employees that will no longer install point-type heat sensors, and 22 new underground coal mines with 20-500 employees that no longer install point-type heat sensors, for a total of 60 new mines per year that no longer install point-type heat sensors. MSHA estimates that point-type heat sensors cost $22,700 for each of the 38 mines with 1-19 employees, for a total cost of $860,000, and $69,600 for each of the 22 mines with 20-500 employees, for a total cost of $1.5 million. MSHA estimates the partial cost offset is the sum of $860,000 and $1.5 million, or $2.4 million per year.

Final § 75.1103-4(a)(1)(iii) requires that carbon monoxide sensor spacing not exceed 1,000 feet. Where air velocities are less than 50 feet per minute, spacing must not exceed 350 feet. Some existing mines have petitions for modification or equivalent systems that allow carbon monoxide sensor spacing of 2,000 feet. MSHA estimates that there are a total of 65 of these mines: 7 with 1-19 employees; 52 with 20-500 employees; and 6 with 501+ employees. MSHA estimates that the number of additional carbon monoxide sensors needed to meet this requirement is the sum of 14 (2 each for the 7 mines with 1-19 employees); 1,560 (30 each for the 52 mines with 20-500 employees); and 300 (50 each for the 6 mines with 501+ employees), for a total of 1,874 additional carbon monoxide sensors. MSHA estimates that each carbon monoxide sensor costs $900 and requires $34 for installation (one hour of labor at the miner's hourly wage of $33.70). The estimated cost per installed carbon monoxide sensor is the sum of the cost of a sensor and the cost of installation, which is $930. MSHA estimates that the first-year cost for the additional 1,874 carbon monoxide sensors, at a cost of $930 each, is $1.7 million for all 65 mines. Applying a 0.252 annualization factor, the Agency estimates that the annualized cost for the additional 1,874 carbon monoxide sensors for all 65 mines is $440,000. MSHA estimates that the annual cost of maintaining the 1,874 additional carbon monoxide sensors is equal to 2 percent of the initial purchase and installation cost of $1.7 million, or $35,000. MSHA estimates that the yearly cost to purchase, install, and maintain the additional 1,900 carbon monoxide sensors is the sum of $440,000 and $35,000, or $475,000.

Final § 75.1103-4(a)(1)(iv) requires the mine operator to indicate the locations of all carbon monoxide sensors on the mine maps required by §§ 75.1200 and 75.1505. MSHA estimates de minimis cost for this requirement.

Final § 75.1103-4(a)(2) requires that, when used, sensors responding to radiation, smoke, gases, or other indications of fire, be spaced at regular intervals to provide protection equivalent to carbon monoxide sensors, and installed within the time specified in paragraph (a)(3) of this section. MSHA estimates that there is no additional cost for this requirement.

Final § 75.1103-4(a)(3) requires an additional sensor to be installed and put in operation within 24 production shift hours when the distance from the tailpiece at loading points to the first outby sensor reaches the spacing requirements in final § 75.1103-4(a)(1)(iii). Final § 75.1103-4(b) requires automatic fire sensor and warning device systems to be installed so as to minimize the possibility of damage from roof falls and the moving belt and its load. Sensors must be installed near the center in the upper third of the entry, in a manner that does not expose personnel working on the system to unsafe conditions. Sensors must not be located in abnormally high areas or in other locations where air flow patterns do not permit products of combustion to be carried to the sensors. The cost of these requirements is included in the estimate under paragraph (a)(1).

§ 75.1103-5 Automatic Fire Warning Devices; Actions and Response

Final § 75.1103-5(a) requires that when the carbon monoxide level reaches 10 parts per million above the established ambient level at any sensor location, automatic fire sensor and warning device systems must provide an effective warning signal at the following locations: (1) At working sections and other work locations where miners may be endangered from a fire in the belt entry, and (2) At a manned surface location where personnel have an assigned post of duty.

The cost of providing warning signals under final § 75.1103-5(a)(1) is included in the costs of the sensors and related equipment for § 75.1103-4.

Final § 75.1103-5(a)(2) affects all 479 mines that are required to replace point-type heat sensors with carbon monoxide sensors. MSHA estimates that the average amount of additional time needed for a person at a manned surface location to check the carbon monoxide sensor control panel is 10 minutes per shift for the 210 mines with 1-19 employees and 15 minutes per shift for the 269 mines with 20-500 employees. The additional time needed for a person at a manned surface location to check the carbon monoxide sensor control panel is the sum of 9,100 hours (product of 210 mines, 10 minutes per shift, 1 shift per day, and 260 days per year) for the mines with 1-19 employees and 42,000 hours (product of 269 mines, 15 minutes per shift, 2 shifts per day, and 312 days per year) for the mines with 20-500 employees, for a total of approximately 51,000 hours. The annual cost of the additional 51,000 hours needed for a person at a manned surface location to check the carbon monoxide sensor control panel, at the miner's hourly wage of $33.70, is approximately $1.7 million.

Under existing § 75.371(hh), mine operators for all 479 mines that must replace point-type heat sensors with carbon monoxide sensors are required to revise their mine ventilation plan to include carbon monoxide ambient levels for the new carbon monoxide sensors. Under existing § 75.370, mine operators are required to revise the mine ventilation plan, post all revisions of the mine ventilation plan, and provide copies to the miners' representative, upon request, of any revision to the mine ventilation plan. MSHA estimates that the existing requirement will take 20 minutes of a supervisor's time at an hourly wage of $85.14, for a cost of $28; 14 minutes of time at the clerical employee's hourly wage of $26.73, for a cost of $6; and $3 for copies and postage. The estimated cost per mine to revise the ventilation plan is the sum of the costs for a supervisor's time, a clerical employee's time, and copy and postage costs, which is $37. The Agency estimates that the first-year cost for the 479 mines, at $37 per mine, is $17,800. Applying an annualization factor of 0.159, MSHA estimates the yearly cost of this requirement is $2,800. Further explanation of the method for estimating these costs can be found in the discussion for existing § 75.370.

MSHA estimates that, of the 479 mines that are required to install carbon monoxide sensors, 240 will have to determine an ambient level of carbon monoxide in the belt entry because the ambient level is above zero. Under existing § 75.371(hh), these mines need to include in their mine ventilation plans the method for determining the ambient level, including a justification based on a study of conditions present at the mine. MSHA estimates that 8 hours of a supervisor's time, on average, at an hourly wage of $85.14, is required to accomplish this, for a cost per mine of $680. The Agency estimates that the first-year cost for the 240 mines, at $680 per mine, is $163,000. Applying an annualization factor of 0.159, MSHA estimates the yearly cost is $26,000.

Final § 75.1103-5(a)(i) requires that the manned surface location have a telephone or equivalent communication with all miners who may be endangered. The cost of installing and maintaining the carbon monoxide sensors, including communications with the surface, are included in the cost estimates for final § 75.1103-4.

Final § 75.1103-5(a)(2)(ii) affects all 479 mines that are required to install carbon monoxide sensors. The final rule requires a map or schematic showing the locations of

carbon monoxide sensors and the intended direction of air flow. The map or schematic also must be updated within 24 hours of any changes in sensor locations.

The initial cost for the 479 mines to create a map that includes the newly installed carbon monoxide sensors is approximately $25 for labor (30 minutes of labor time at the mine engineer's hourly wage of $50) and $10 to print a map on special mine map paper, for a total cost of approximately $35 per mine. The Agency estimates that the initial cost for the 479 mines, at a cost of $35 per mine, is $17,000. Applying an annualization factor of 0.159, to the initial cost of $17,000 for all 479 mines, MSHA estimates the annualized cost is $2,700.

MSHA estimates the recurring cost to update the maps is 1 hour per year (5 minutes per month) of a mine engineer's time at the hourly wage of $50, for an annual cost per year of $50 per mine. Subsequent costs for printing the mine map are not included, because this is required under the existing standard. For 479 mines, at an annual cost of $50 per mine, this is an annual cost of $24,000. Combining the $2,700 annualized value of the initial cost with the $24,000 annual cost, MSHA estimates the yearly cost of this requirement as $27,000.

Final § 75.1103-5(a)(3) requires that the automatic fire sensor and warning device system be monitored for a period of 4 hours after the belt is stopped, unless an examination for hot rollers and fire is made as prescribed in §75.1103–4(e). Final § 75.1103-5(a)(3) is derived from the existing standard, and has not been changed, except for the numbering.

Final § 75.1103-5(d), (e), and (f) requires procedures to follow when sensors provide malfunction or warning signals. Paragraph (f) specifies actions that must be taken if any carbon monoxide sensor indicates a warning, unless the operator determines that the signal does not present a hazard to miners. The costs of these procedures are analyzed together and apply to the 479 mines that are required to install carbon monoxide sensors. The cost analysis focuses only on warnings or malfunctions that are not related to any hazard.

MSHA expects that many carbon monoxide warning signals will have obvious causes that are immediately known not to present a hazard to miners. These obvious non-hazard signals are more common in mines that use diesel equipment, because diesel equipment emits carbon monoxide. MSHA estimates that these incidents of warning signals with obvious non-hazard causes occur 80 times per year in each of the 106 mines with diesel equipment that are required to install carbon monoxide sensors, for a total of 8,480 times a year for all 106 mines. In mines without diesel equipment, MSHA estimates that these incidents of warning signal with obvious non-hazard sources occur once every two years for the 195 mines with 1-19 employees, for a total of 98 incidents a year; and once a year for each of the 178 mines with 20-500 employees, for a total of 178 incidents a year. The total number of these incidents per year for all 479 mines is the sum of 8,480 for mines with diesel equipment, 98 and 178, for mines without diesel equipment, or 8,756 incidents per year. For each of these incidents, MSHA estimates a cost of $1.12 (2 minutes of a miner's time at an hourly wage of $33.70) to ascertain that the cause is not hazardous. MSHA estimates that the annual cost of miner-hours for the 479 mines to ascertain, in obvious cases, that the cause of a warning signal is not hazardous is the product of the 8,756 incidents and the $1.12 cost per incident, or $9,800.

For warning signals whose causes are not obvious, MSHA estimates that the time spent annually looking for the causes will be 263 hours for the 210 mines with 1-19

employees and 672 hours for the 269 mines with 20-500 employees, for a total of 935 hours. MSHA estimates that the annual cost of the 935 hours, at a miner's hourly wage of $33.70, is $31,500.

For warning signals that are not related to a hazard, miners may need to be withdrawn to a safe location because it cannot be immediately determined that the cause of the signal does not present a hazard. MSHA estimates that the number of times a year miners will be withdrawn for this reason is once every four years for each of the 210 mines with 1-19 employees, for a total of 53 times per year; and once every two years for each of the 269 mines with 20-500 employees, for a total of 135 times per year. The total number of withdrawals annually for all 479 mines is the sum of 52 and 135, or 187 withdrawals per year. MSHA estimates that, on average, each withdrawal lasts for 1 hour for a section of 8 miners, for a total of 8 hours per withdrawal. The cost per worker is 8 hours at a miner's hourly wage of $33.70, or $270 per withdrawal. MSHA estimates that the annual cost for 187 withdrawals, at a cost of $270 per withdrawal, is $50,500.

MSHA expects that carbon monoxide sensor malfunctions will be infrequent. MSHA estimates that the number of carbon monoxide sensor malfunctions is once every two years for each of the 210 mines with 1-19 employees, for a total of 105 malfunctions per year; and once a year for each of the 269 mines with 20-500 employees, for a total of 269 malfunctions a year. The total number of malfunctions a year for all 479 mines is the sum of 105 and 269, or 374 malfunctions a year. MSHA estimates that these malfunctions can be easily corrected and cost, on average, $8 (15 minutes of a miner's time at an hourly wage of $33.70). MSHA estimates that the annual cost of the 374 malfunctions, at a cost of $8 each, is $3,100.

The total estimated annual cost of responding to non-hazard related signals is the sum of $9,800, $31,500, $50,500, and$3,100, for a total of $95,000.

Final § 75.1103-5(g) requires that, if the warning signal will be activated during calibration of sensors, personnel manning the surface location must be notified prior to and upon completion of calibration. Notification must also be provided to affected working sections and other areas where miners may be endangered. This requirement will apply only at mines where calibration of sensors would cause activation of warning signals; many sensors have a calibration mode, where warning signals are blocked during calibration. MSHA estimates negligible cost for this requirement.

Final § 75.1103-5(h) specifies procedures of monitoring or patrolling that may be implemented if one or more sensors malfunction or the sensor system malfunctions and cannot be immediately repaired. MSHA does not anticipate that these procedures would normally be implemented for any long period of time, because it is generally easier to fix a malfunction than to carry out these procedures. For example, it is cheaper to replace a malfunctioning sensor than to station a trained person with a hand-held sensor at the location where an automatic sensor requires replacement. Since mine operators will most likely be carrying an inventory of spare parts, the need to carry out these procedures for an extended period of time will rarely or never arise. MSHA estimates negligible cost for this requirement.

§ 75.1103-6 Automatic Fire Sensors; Actuation of Fire Suppression Systems

Final § 75.1103-6 states that point-type heat sensors or automatic fire sensor and warning device systems may be used to actuate deluge-type water systems, foam generator systems, multipurpose dry-powder systems, or other equivalent automatic fire suppression systems. MSHA estimates that there is no additional cost for this requirement.

§ 75.1103-8 Automatic Fire Sensor and Warning Device Systems; Examination and Test Requirements

Final § 75.1103-8(a) requires automatic fire sensors and warning device systems to be examined at least once each shift when belts are operated as part of a production shift, and requires a functional test of the warning signals at least once every seven days. The examination must be by a qualified person. This requirement affects the 479 mines that are required to install carbon monoxide sensors.

MSHA projects that this examination will be conducted in conjunction with the existing pre-shift and on-shift examinations. MSHA estimates that any additional costs associated with the examination requirement will be offset by a reduction in costs to examine point-type heat sensors.

MSHA estimates the number of warning signals tested per week is 1 for each of the 210 mines with 1-19 employees, for a total of 210 warning signals tested per week; and 2 for each of the 269 mines with 20-500 employees, for a total of 538 warning signals tested per week. For all 479 mines, the number of warning signals tested per week is the sum of 210 and 539, or 748 warning signals tested per week. MSHA estimates that the cost of testing each warning signal is $21 (15 minutes of a supervisor's time at an hourly wage of $85.14). The Agency estimates that the annual cost per warning signal over 52 weeks, at a weekly cost of $21, is $1,100. MSHA estimates that the annual cost for testing all 748 warning signals under this requirement, at an annual cost of $1,100 per warning signal, for all 479 mines is $828,000.

Final § 75.1103-8(b) requires a record of the functional test conducted in accordance with final § 75.1103-8(a) to be maintained by the operator and kept for a period of one year. As stated above, MSHA estimates that 748 warning signals need to be tested per week. MSHA estimates that the labor cost for recordkeeping for each signal tested is $1.14 (one minute of supervisor's time, at an hourly wage of $85.14) per record of warning signal testing. The estimated annual labor cost for recordkeeping per warning signal for 52 weeks, at $1.14 per week, is $59. The estimated annual cost for paper for recordkeeping is $1 (8 pages at $0.15 per page). MSHA estimates that the annual cost to make a record for all warning signals under this requirement for all 748 warning signals, at an annual recordkeeping cost of $60 per warning signal, is $45,000.

Final § 75.1103-8(c) requires that sensors must be calibrated in accordance with the manufacturer's calibration instructions at intervals not to exceed 31 days. The operator must maintain and keep a record of the sensor calibrations for a period of one year. MSHA estimates that there are 1,068 sensors in mines with 1-19 employees, 7,076 sensors in mines with 20-500 employees, and 307 sensors in mines with 501+ employees, for a total of 8,451 sensors. MSHA estimates the labor cost to calibrate a carbon monoxide sensor is $23 (16 minutes per month at the supervisor's hourly wage of $85.14). MSHA estimates that the cost

of a gas cylinder used for calibration is $80 and that each gas cylinder, on average, has sufficient gas for 20 calibrations, for a cost per calibration of $4. The cost per monthly calibration of a carbon monoxide sensor is the sum of the labor cost of $23 and the gas cost of $4, or $27. The estimated annual cost for 12 calibrations per carbon monoxide sensor, at $27 per calibration, is $320. The Agency estimates that the annual cost for calibration of all 8,451 carbon monoxide sensors required under the final rule, at an annual cost of $320 for each carbon monoxide sensor, is $2.7 million.

MSHA estimates the costs of recordkeeping for monthly calibration of a carbon monoxide sensor to be $1.14 for labor (0.8 minutes per record at the supervisor's hourly wage of $85.14), plus $0.02 for material costs (2 percent of labor costs). MSHA estimates that there are a total of 8,451 sensors. The estimated cost to make a record of monthly calibration of a carbon monoxide sensor is the sum of the labor cost of $1.14 and the materials cost of $0.02, for a total of $1.16 per record. The estimated annual cost per carbon monoxide sensor is $14 (12 months x $1.16 per record). MSHA estimates that the annual cost to make a record for 8,451 carbon monoxide sensors, at a cost of $14 per sensor, is $117,000.

This requirement also applies to the estimated 60 diesel-discriminating sensors required under the final rule. The typical diesel-discriminating sensor requires calibration for both carbon monoxide and one additional gas. MSHA estimates that the calibration of each diesel-discriminating sensor costs an additional $1.40 (1 additional minute per month of a supervisor's time at an hourly wage of $85.14). There is no additional recordkeeping cost, because a diesel-discriminating sensor takes the place of a carbon monoxide sensor. MSHA estimates that a gas cylinder for an additional calibration gas costs $80 and can last 20 calibrations, for a cost of $4 per calibration. The incremental cost per monthly calibration is the sum of the labor and gas costs, or $5.40 per calibration. The estimated annual cost for 12 calibrations per diesel-discriminating sensor, at $5.40 per calibration, is $65. MSHA estimates that the annual cost for calibration of all 60 diesel-discriminating sensors, at a cost of $65 per diesel-discriminating sensor, is $3,900.

§ 75.1103-10 Fire Suppression Systems; Additional Requirements

The final rule makes conforming changes to existing § 75.1103-10. The final rule removes the reference to belt that is not fire resistant and to the maximum distance between point-type heat sensors. No substantive changes were made to the existing standard.

§ 75.1731 Maintenance of Belt Conveyors and Belt Conveyor Entries

Final § 75.1731 provides requirements for proper maintenance of belt conveyors and belt entries. These requirements apply to all underground coal mines.

Final § 75.1731(a) requires that damaged rollers, or other damaged belt conveyor components, which pose a fire hazard must be immediately repaired or replaced. All other damaged rollers, or other damaged belt conveyor components, must be repaired or replaced. Final § 75.1731(b) requires that conveyor belts be properly aligned to prevent the moving belt from rubbing against the structure or components. Final § 75.1731(c) requires that materials not be allowed in the belt entry where the material may contribute to a frictional heating hazard. Based on discussions with MSHA personnel, MSHA estimates that the

additional time needed each year to properly maintain belt conveyors and belt entries is, on average, 100 hours for each of the 223 mines with 1-19 employees, for a total of 22,300 hours; 200 hours for each of the 391 mines with 20-500 employees, for a total of 78,200 hours; and 400 hours for each of the 10 mines with 501+ employees, for a total of 4,000 hours. The total number of hours annually for all mines is the sum of 22,300, 78,200, and 4,000, or 105,000 hours. The cost per hour is the miner's hourly wage of $33.70. MSHA estimates that the annual cost for all mines of 105,000 hours for belt conveyor entry maintenance, at a cost of $33.70 per worker, is $3.5 million.

Final § 75.1731(d) requires that splicing of any approved conveyor belt must maintain flame-resistant properties of the belt. There are two methods of splicing. One method uses metal fasteners which are flame resistant. The other method vulcanizes the belt material and is typically used on main line belts. At the request of approval holders or mine operators, MSHA will make a suitability evaluation to determine if a splice kit maintains flame-resistant properties of the belt. MSHA estimates de minimis incremental cost for splice kits and for the suitability evaluations of splice kits.

FEASIBILITY

MSHA concludes that the requirements of the final rule are both technologically and economically feasible.

Technological Feasibility

Except for the final requirement for smoke sensors, compliance with the requirements of the final rule is technologically feasible because the materials, equipment, and methods for implementing these requirements currently exist.

Final § 75.351(e)(2) requires mines that use air from the belt entry to ventilate working sections to install smoke sensors one year after the Secretary has determined that a smoke sensor is available to reliably detect fire in underground coal mines. At this time, NIOSH has not found smoke sensors to be reliable for fire detection in the mine environment. MSHA will notify the public when reliable smoke sensors are available for use in underground coal mining.

Economic Feasibility

The yearly compliance cost of the final rule is approximately $51.5 million for underground coal mines, which is 0.37 percent of annual revenue of $14.0 billion for all underground coal mines. MSHA concludes that the final rule is economically feasible for these mines because the total yearly compliance cost is below one percent of the estimated annual revenue for all underground coal mines.

V. REGULATORY FLEXIBILITY CERTIFICATION AND INITIAL REGULATORY FLEXIBILITY ANALYSIS

INTRODUCTION

Under the Regulatory Flexibility Act (RFA) of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), MSHA 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. The factual basis for the 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 Small Business Administration's (SBA's) 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 established an alternative definition, and hence is required to use the SBA definition. The SBA defines a small entity in the mining industry as an establishment with 500 or fewer employees (13 CFR § 121.201).

MSHA also examined the impact of the final rule on mines with fewer than 20 employees, which MSHA has traditionally referred to as "small mines." These small mines differ from larger mines not only in the number of employees, but also in economies of scale, in material produced, in the type and amount of production equipment, and in supply inventory. Therefore, the costs of complying with MSHA's rules and the impact of the agency's rules on small mines will also be different.

The analysis complies with the legal requirements of the RFA for an analysis of the impact on "small entities" while continuing MSHA's traditional concern for "small mines."

FACTUAL BASIS FOR CERTIFICATION

General Approach

MSHA's analysis of the economic impact on small entities begins with a "screening" analysis. The screening analysis compares the estimated yearly cost of a rule for small entities to their estimated annual revenue. When the estimated cost is less than one percent of the estimated revenue for small entities, MSHA believes it is generally appropriate to conclude that the final rule does not have a significant economic impact on a substantial number of small entities. If estimated cost is equal to or exceeds one percent of revenue, MSHA will investigate whether further analysis is required.

Derivation of Costs and Revenues for Mines

The compliance costs noted in this chapter were previously presented in Chapter IV of the REA along with an explanation of how they were derived. Revenue for underground

coal mines is derived from data on underground coal prices and tonnage. The 2007 price of underground coal was $40.29 per ton.[8] Total underground coal production in 2007 was approximately 7.7 million tons for mines with 1-19 employees. Multiplying tons by the 2007 price per ton, 2007 underground coal revenue was $310 million for mines with 1-19 employees. Total underground coal production in 2007 was approximately 278 million tons for mines with 1-500 employees. Multiplying tons by the 2007 price per ton, 2007 underground coal revenue was $11.2 billion for mines with 1-500 employees. Total underground coal production in 2007 was approximately 349 million tons. Multiplying tons by the 2007 price per ton, total estimated revenue in 2007 for underground coal production was $14.0 billion.

Results of Screening Analysis

Table V-1 below shows the cost of the final rule compared to mine revenue, by mine size. The Agency has provided in Chapter IV of the REA a discussion of the costs of the final rule for each size category of mines.

Table V-1. Cost of Final Rule Compared to Mine Revenue, by Mine Size, for Underground Coal Mine Operators

Employment Size	No. of Mines	Cost of Final Rule	Estimated Revenue	Cost Per Mine	Cost of Final Rule as % of Revenue
1-19 Employees	223	$4.7 million	$310 million	$21,000	1.53%
1-500 Employees	614	$47.4 million	$11.2 billion	$77,000	0.42%
All mines	624	$51.5 million	$14.0 billion	$83,000	0.37%

As shown in Table V-1, the estimated yearly cost of the final rule for underground coal mines with 1-19 employees is approximately $4.7 million, or approximately $21,000 per mine. This is equal to approximately 1.53 percent of annual revenue. MSHA estimates that some mines might experience costs somewhat higher than the average per mine in its size category while others might experience lower costs.

When applying SBA's definition of a small mine, the estimated yearly cost of the final rule for underground coal mines with 1-500 employees is approximately $47.4 million, or approximately $77,000 per mine. This is equal to approximately 0.42 percent of annual revenue. Even though the analysis reflects a range of impacts for different mine sizes, from 0.42 percent to 1.53 percent, the Agency concludes that this is not a significant economic impact on a substantial number of small mines. Since the yearly cost of the final rule is less than one percent of annual revenue for underground coal mines with 1-500 employees, MSHA certifies that the final rule does not have a significant impact on a substantial number of small mining entities, as defined by SBA.

[8] U.S. DOE, EIA, "Annual Coal Report 2007," Table 28, September 2008.

VI. OTHER REGULATORY CONSIDERATIONS

THE UNFUNDED MANDATES REFORM ACT OF 1995

MSHA reviewed the final rule under the Unfunded Mandates Reform Act of 1995 (2 U.S.C. § 1501 et seq.). MSHA determined that the final 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 requires no further agency action or analysis.

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

The final rule has no effect on family well-being or stability, marital commitment, parental rights or authority, or income or poverty of families and children. Accordingly, § 654 of the Treasury and General Government Appropriations Act of 1999 (5 U.S.C. § 601 note) requires no further agency action, analysis, or assessment.

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

The final rule does not implement a policy with takings implications. Accordingly, Executive Order 12630 requires no further agency action or analysis.

EXECUTIVE ORDER 12988: CIVIL JUSTICE REFORM

The 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, the final rule meets the applicable standards provided in § 3 of Executive Order 12988.

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

The final rule has no adverse impact on children. Accordingly, Executive Order 13045 requires no further agency action or analysis.

EXECUTIVE ORDER 13132: FEDERALISM

The 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 requires no further agency action or analysis.

EXECUTIVE ORDER 13175: CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

The 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, Executive Order 13175 requires no further agency action or analysis.

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

MSHA reviewed the final rule for its impact on the supply, distribution, and use of energy because it applies to the coal mining industry. Insofar as the final rule results in yearly costs of approximately $51.5 million to the underground coal mining industry, relative to annual revenues of $14.0 billion in 2007, 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 * * * (including a shortfall in supply, price increases, and increased use of foreign supplies)." Accordingly, Executive Order 13211 requires no further Agency action or analysis.

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

MSHA reviewed the final rule to assess and take appropriate account of its potential impact on small businesses, small governmental jurisdictions, and small organizations. MSHA determined and certifies 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

This chapter shows the estimated paperwork burden hours and related costs to mine operators and manufacturers under the final rule. This chapter provides estimates of the burden hours and related costs in final §§ 14.4 (Application procedures and requirements), 75.350 (Belt air course ventilation), 75.380 (Escapeways; bituminous and lignite mines), 75.381 (Escapeways; anthracite mines), 75.1103-5 (Automatic fire warning devices; actions and responses), and 75.1103-8 (Automatic fire sensor and warning device systems; examination and test requirements), and existing § 75.370 (Mine ventilation plan; submission and approval).

SUMMARY OF PAPERWORK BURDEN HOURS AND RELATED COSTS

As shown in Table VII-1, MSHA estimates burden hours and related cost of: approximately 3,900 burden hours and related cost of approximately $270,000 in the first year that the final rule goes into in effect; approximately 2,600 burden hours and related cost of approximately $200,000 in the second year that the final rule will be in effect; and approximately 2,500 burden hours and related cost of approximately $190,000 in the third year that the final rule goes into effect.

Table VII-1: Summary of Burden Hours and Related Cost of the Final Rule

Requirement	Burden Hours			Burden Cost		
	First Year	Second Year	Third Year	First Year	Second Year	Third Year
§ 14.4	540	270	170	$27,000	$13,500	$8,500
§ 75.350(a)(2)	105	-	-	$7,470	$0	$0
§ 75.350(b)	56	-	-	$4,357	$0	$0
§ 75.350(b)(7)	7	-	-	$479	$0	$0
§ 75.350(b)(8)	2	-	-	$112	$0	$0
§ 75.370(a)(3) & (f)	165	-	-	$4,350	$0	$0
§§ 75.380(f)(1) & 75.381(e)	204	-	-	$14,606	$0	$0
§ 75.1103-5(a)	208	-	-	$14,889	$0	$0
§ 75.1103-5(a)(2)(ii)	719	479	479	$35,950	$23,950	$23,950
§ 75.1103-8(b)	517	517	517	$44,017	$44,017	$44,017
§ 75.1103-8(c)	1,352	1,352	1,352	$115,109	$115,109	$115,109
Total	3,875	2,618	2,518	$268,339	$196,576	$191,576

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