Regulatory Economic Analysis

Emergency Mine Evacuation

Emergency Temporary Standard

RIN 1219-AB46

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Mine Safety and Health Administration
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I. EXECUTIVE SUMMARY

INTRODUCTION

The Mine Safety and Health Administration is issuing an Emergency Temporary Standard (ETS) under §101(b) of the Federal Mine Safety and Health Act of 1977 in response to the grave danger which miners are exposed to during underground coal mine accidents and subsequent evacuations. The January 2006 mine accidents and fatalities demonstrate the need for the Mine Safety and Health Administration to take additional action that protects miners from the grave danger that they face when they must evacuate a mine after an emergency occurs. This emergency temporary standard includes requirements for immediate accident notification applicable to all underground and surface mines. In addition, this ETS contains requirements for new and expanded training, including evacuation drills; self-contained self-rescuer storage, training, and use; and the installation and maintenance of lifelines in underground coal mines.

SCOPE

As of 2004, the entire ETS would apply to the 634 underground coal mine operators employing 33,490 miners and 3,697 contractor workers who work underground in coal mines. The immediate notification provisions of the ETS would apply to the entire mine industry, encompassing in 2004 all 214,450 miners and 72,739 contractor workers who work in the 14,480 U.S. mines.

BENEFITS SUMMARY

To estimate benefits, we focus only on the three accidents where the Agency reasonably expects that miners' lives might have been saved by the ETS. These three accidents occurred at the Wilberg Mine in 1984, at the Sago Mine in 2006, and at the Aracoma Alma No. 1 Mine, also in 2006. In these three accidents, there were, in total, 41 fatalities and one serious injury. We believe that this ETS, if in place at the time of these accidents, could have saved the lives of most or all of these victims. One of the miners died in an initial explosion at the Sago Mine and would have perished even if the ETS had been in force. In quantitative terms, we estimate that perhaps 80% of miners in future accidents of like character could be saved by the ETS. Multiplying 40 by 80% provides an estimate of 32 lives that could have been saved by the ETS.

January 1, 1983 is the starting point for the accident records in MSHA's electronic Teradata database. Starting at January 1, 1983 and ending in early February, 2006 is a time span of 23.1 years. Since these three accidents occurred over a period of 23.1 years, we divide 32 lives saved by 23.1 years to obtain an estimate of 1.39 lives saved per year. A similar calculation provides an estimate of 0.03 serious injuries prevented per year. The actual number of miners' lives saved by the ETS could be much larger.

COMPLIANCE COST SUMMARY

We anticipate that only underground coal mine operators will incur costs to comply with the ETS and that the costs will arise from new requirements in three areas: (1) training; (2) lifelines; and (3) SCSR devices.

The ETS also includes immediate notification provisions, which apply to all mines in the mining industry. These provisions are definitional and clarify existing requirements. We expect that they will impose no additional costs on mine operators.

We estimate that the ETS will result in total yearly costs for the underground coal mining industry of approximately $18.9 million, which include the amortized value of first-year costs of about $54.7 million. Of the yearly costs, $7.9 million would be associated with training requirements; $0.5 million would be associated with lifeline requirements; and $10.5 million would be associated with SCSR devices. Disaggregated by mine size, yearly costs would be $1.2 million (or about $5,100 per mine) for mine operators with fewer than 20 employees; $15.6 million (or about $40,100 per mine) for mine operators with 20-500 employees; and $2.1 million (or about $256,700 per mine) for mine operators with more than 500 employees.

REGULATORY FLEXIBILITY CERTIFICATION AND ANALYSIS

In accordance with §605 of the Regulatory Flexibility Act, we certify that the ETS will not have a significant economic impact on a substantial number of small entities. Under the Small Business Regulatory Enforcement Fairness Act (SBREFA) amendments to the Regulatory Flexibility Act, we must include in the final rule a factual basis for this 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 this certification is discussed in Chapter V of this document and in the preamble to the ETS for publication in the Federal Register. We have consulted with the Small Business Administration's (SBA's) Office of Advocacy and believe that the analysis provides a reasonable basis for this certification.

II. INDUSTRY PROFILE

INTRODUCTION

This industry profile provides information concerning the structure and economic characteristics of the mining industry, which includes data about the number of mines and miners by type and size of mine.

The value of the U.S. mining industry's 2004 coal and metal and nonmetal (M/NM) production was estimated to be about $66.1 billion, or 0.56 percent of 2004 Gross Domestic Product (GDP). Coal mining contributed about $22.1 billion to the GDP,[1] while the M/NM mining sector contributed about $44.0 billion.[2]

STRUCTURE OF THE MINING INDUSTRY

MSHA divides the mining industry into two major sectors based on commodity: (1) coal mines and (2) M/NM mines. These two sectors are further divided by type of operation (e.g., underground mines or surface mines). The Agency maintains its own data on the number of mines and on mining employment by mine type and size. MSHA also collects data on the number of independent contractors and contractor employees by mining sector.

MSHA categorizes mines by size based on employment. For purposes of this ETS, MSHA has categorized mines into three groups. These are mines that employ fewer than 20 workers; 20 to 500 workers; and more than 500 workers. For the past 20 years, for rulemaking purposes, the Agency has consistently defined a small mine to be one employing fewer than 20 employees and a large mine to be one employing 20 or more employees. However, to comply with the requirements of the Small Business Regulatory Enforcement Fairness Act (SBREFA) amendments to the Regulatory Flexibility Act (RFA), MSHA must use the Small Business Administration's (SBA's) criteria for a small entity when determining a rule's economic impact. For the mining industry, SBA defines a small mine as one employing 500 or fewer employees and a large mine as one employing more than 500 workers. Thus, combining the first two MSHA mine categories noted above will meet the SBA's definition of a small mine.

Table II-1 presents the number of small and large coal mines and their employment, excluding contractors, for the coal mining sector by mine type. The table presents the three mine size categories based on employment: (1) fewer than 20 employees (MSHA's traditional small mine definition); (2) 20 to 500 employees; and

[1] Coal production data are from U.S. Department of Labor Mine Safety and Health Administration, Office of Program Evaluation and Information Resources, 2004 data. The average U.S. underground and surface price of coal for 2004 is from the Department of Energy, Energy Information Administration, *Annual Coal Report 2004*, November 2005, Table 29, page 55.

[2] U.S. Department of the Interior, U.S. Geological Survey, *Mineral Commodities Summaries 2005*, January 2005, p. 8.

(3) more than 500 employees. In addition, it shows that, of all coal mines, about 32 percent are underground mines employing about 49 percent of miners, while 68 percent are surface mines employing roughly 51 percent of miners.

Table II-1: Distribution of Coal Operations and Employment (Excluding Contractors) by Mine Type and Size, 2004

Mine Type	Size of Coal Mine*									All Coal Mines		
	<20 Employees			20 to 500 Employees			>500 Employees					
	Mines	Miners	Office Emp.	Mines	Miners	Office Emp.	Mines	Miners	Office Emp.	Mines	Miners	Office Emp.
Underg.	237	2,351	57	389	30,496	904	8	4,694	124	634	37,541	1,085
Surface	912	5,503	463	460	27,949	1,877	3	1,994	39	1,375	35,446	2,379
Total	1,149	7,854	520	849	58,445	2,781	11	6,688	163	2,009	72,987	3,464

*Based on MSHA's traditional definition, small mines are those in the <20 employees category. Based on SBA's definition, small mines are those in the <20 employees and 20 to 500 employees categories.

Source: U.S. Department of Labor Mine Safety and Health Administration, Office of Program Evaluation and Information Resources, 2004 data.

Table II-2 presents corresponding data on the number of independent coal contractors and their employment. Table II-2 shows that, of all coal contractor firms, about 29 percent operate in underground mines and employ about 29 percent of contractor employees (excluding office employment), while 71 percent operate at surface mines and employ 71 percent of contractor employees (excluding office employment).

Table II-2: Distribution of Coal Contractors and Contractor Employment by Size of Operation, 2004

Contr. Type	Size of Coal Contractor*									All Coal Contractors		
	<20 Employees			20 to 500 Employees			>500 Employees					
	Firms	Emp.	Office Emp.	Firms	Emp.	Office Emp.	Firms	Emp.	Office Emp.	Firms	Emp.	Office Emp.
Underg.	632	2,817	186	108	5,949	399	0	0	0	740	8,766	585
Surface	1,546	6,898	456	264	14,564	977	0	0	0	1,811	21,462	1,433
Total	2,178	9,715	642	372	20,513	1,376	0	0	0	2,550	30,228	2,018

* Based on MSHA's traditional definition, small contractors are those in the <20 employees category. Based on SBA's definition, small contractors are those in the <20 employees and 20 to 500 employees categories.

Source: U.S. Department of Labor Mine Safety and Health Administration, Office of Program Evaluation and Information Resources, 2004 data, and U.S. Department of Labor, Mine Safety and Health Administration, 2004 Final Data, CT441 Report, cycle 2004/381.

Table II-3 presents the total number of small and large mines and their employment, excluding contractors, for the M/NM mining segment. The table presents the three mine size categories based on employment: (1) fewer than 20 employees (MSHA's traditional small mine definition); (2) 20 to 500 employees; and (3) more than 500 employees. The M/NM mining segment consists of metal mines (copper, iron ore, gold, silver, etc.) and nonmetal mines (stone including granite, limestone, dolomite, sandstone, slate, and marble; sand and gravel; and others such as clays, potash, soda ash, salt, talc, and pyrophyllite.) As Table II-3 indicates, about 98 percent of all M/NM mines are surface mines, and these mines employ some 97 percent of all M/NM miners, excluding office workers.

Table II-3: Distribution of M/NM Mine Operations and Employment (Excluding Contractors) by Size of Operation, 2004

Mine Type	Size of M/NM Mine*									All M/NM Mines		
	<20 Employees			20 to 500 Employees			>500 Employees					
	Mines	Miners	Office Emp.	Mines	Miners	Office Emp.	Mines	Miners	Office Emp.	Mines	Miners	Office Emp.
Underg.	121	884	172	114	884	172	4	2,771	89	239	4,539	433
Surface	10,647	53,004	10,497	1,567	73,103	12,342	16	10,817	1,655	12,230	136,924	24,494
Total	10,768	53,888	10,669	1,681	73,987	12,514	20	13,588	1,744	12,469	141,463	24,927

* Based on MSHA's traditional definition, small contractors are those in the <20 employees category. Based on SBA's definition, small contractors are those in the <20 employees and 20 to 500 employees categories.

Source: U.S. Department of Labor Mine Safety and Health Administration, Office of Program Evaluation and Information Resources, 2004 data.

Table II-4 presents corresponding data on the number of independent M/NM contractors and their employment. Table II-4 shows that, of all M/NM contractor firms, about 9 percent operate in underground mines and employ about 7 percent of contractor employees (excluding office employment), while 91 percent operate at surface mines and employ 93 percent of contractor employees (excluding office employment).

Table II-4: Distribution of M/NM Mine Contractor Employment by Size of Operation, 2004

Contr. Type	Size of M/NM Contractor*									All M/NM Contractors		
	<20 Employees			20 to 500 Employees			>500 Employees					
	Firms	Emp.	Office Emp.	Firms	Emp.	Office Emp.	Firms	Emp.	Office Emp.	Firms	Emp.	Office Emp.
Underg.	368	1,749	71	46	2,273	126	1	571	0	414	4,594	197
Surface	3,314	15,745	638	411	20,460	1,136	3	1,713	0	3,770	37,917	1,774
Total	3,682	17,494	709	457	22,733	1,262	4	2,284	0	4,143	42,511	1,971

* Based on MSHA's traditional definition, small contractors are those in the <20 employees category. Based on SBA's definition, small contractors are those in the <20 employees and 20 to 500 employees categories.

Source: U.S. Department of Labor Mine Safety and Health Administration, Office of Program Evaluation and Information Resources, 2004 data, and U.S. Department of Labor, Mine Safety and Health Administration, 2004 Preliminary Data, CT441 Report, cycle 2004/381.

STRUCTURE OF THE COAL MINING INDUSTRY

Agency data in Table II-1 indicate that there were 2,011 coal mines that reported production during some portion of calendar year 2004. When applying MSHA's small mine definition (fewer than 20 workers), 1,149 (about 57 percent) were small mines and 862 (about 43 percent) were large mines. Using SBA's small mine definition, 11 mines (0.5 percent) were large mines and the rest were small mines.

Coal mine employment in 2004 was 76,451, of which 72,987 were miners and 3,464 were office workers. Based on MSHA's small mine definition, 7,854 coal miners (11 percent) in 2004 worked at small mines and 65,133 miners (89 percent) worked at large mines. Using SBA's small mine definition, 66,299 coal miners (91 percent) worked at small mines and 6,688 coal miners (9 percent) worked at large mines. Based on the Agency's small mine definition, on average, each small coal mine employs 7 miners and each large coal mine employs 76 miners. Using SBA's small mine definition, on average, each small coal mine employs 33 miners and each large coal mine employs 608 miners.

ECONOMIC CHARACTERISTICS OF THE COAL MINING INDUSTRY

MSHA classifies the U.S. coal mining sector into two major commodity groups: bituminous and anthracite. The former is further divided into sub-bituminous and lignite. Bituminous operations represent about 92% of coal mining operations, employ over 98% of all coal miners, and account for over 99% of total coal production. The remaining 8% of coal mining operations are mostly anthracite.[3]

[3] U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2004*, August 2004, Table 7.2, p. 207.

The U.S. coal sector produced approximately 1.11 billion short tons of coal (0.744 billion tons at surface mines and 0.367 billion tons at underground mines) in 2004. The average price of coal at surface and underground mines was $14.75 and $30.36 per ton, respectively.[4] Surface coal mines accounted for $11.0 billion of revenues and underground coal mines accounted for $11.1 billion, for a total of $22.1 billion. Based on MSHA's definition, small mines produced 28.7 million tons, valued at about $0.585 billion. Based on SBA's definition, small mines produced 896 million tons, valued at $18.1 billion, or about 81% of coal production and about 82% of coal revenues. [5]

Mines east of the Mississippi River accounted for about 44 percent of coal production in 2004. For the period 1949 through 2004, coal production east of the Mississippi River ranged, from a low of 395 million tons in 1954 to a high of 630 million tons in 1990; 2004 production was estimated at 484 million tons. During this same period, however, coal production west of the Mississippi increased each year from a low of 20 million tons in 1959 to an estimated record high of 627 million tons in 2004.[6] Growth in western coal mines is due, in part, to environmental concerns that increase demand for low-sulfur coal, which is abundant in the West. In addition, surface mining, with its higher average productivity, is much more prevalent in the West.

Average domestic coal prices (nominal and real prices) for the period 1950-2004 are presented in Table II-5. The nominal price is the price not adjusted for inflation. The real price is the price of coal after it has been adjusted for inflation by using constant dollars from a particular year (in Table II-5, the real price is in terms of 2000 dollars). During this period the inflation-adjusted, or real, price of coal has generally declined. The only exceptions were a spike in coal prices during the OPEC petroleum price increases in the 1970s and the modest increase in real coal prices since 2000. The real price of coal in 2004 was approximately 42 percent lower than in 1950.[7] The real price of coal per Btu was approximately 28 percent lower in 2004 than in 1950, which has caused coal to become the least expensive of the major fossil fuels in terms of dollars per Btu.[8]

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[4] Coal prices are the average open market sales prices for 2004. U.S. Department of Energy, Energy Information Administration, *Annual Coal Report* 2004, November 2005, Table 28.

[5] Coal production obtained from U.S. Department of Labor, Mine Safety and Health Administration, Directorate of Program Evaluation and Information Resources, 2004 data. Average U.S. coal price estimates obtained from the Department of Energy, Energy Information Administration, *Annual Coal Report* 2004, November 2005, Table 29, p. 52. Underground and surface coal revenues are separately computed, then summed to obtain total coal revenue.

[6] Ibid.

[7] US Department of Energy, Energy Information Administration, *Annual Energy Review 2004*, August 2005, Table 7.8, p. 215.

[8] US Department of Energy, Energy Information Administration, *Annual Energy Review 2004*, August 2005, Table 3.1, p. 71. Coal energy (per Btu) was more expensive than natural gas energy in 1950, but was less expensive in 2001. Both coal and gas energy were less expensive than crude oil energy in 1950 and 2001.

Table II.-5: Coal Prices 1950-2004
(Dollars per Short Ton and Dollars per Million BTU)

Year	Nominal Price (Dollars/Short Ton)	Real Price (2000 Dollars/Short Ton)	Nominal Price (Dollars/10^6 BTU)	Real Price (2000 Dollars/10^6 BTU)
1950	5.19	31.40	0.21	1.25
1955	4.69	25.02	0.19	0.99
1960	4.83	22.96	0.19	0.92
1965	4.55	20.19	0.18	0.82
1970	6.34	23.03	0.27	0.87
1975	19.35	50.92	0.85	2.22
1980	24.65	45.61	1.10	2.04
1985	25.20	36.15	1.15	1.65
1990	21.76	26.67	1.00	1.22
1991	21.49	25.45	0.99	1.17
1992	21.03	24.34	0.97	1.12
1993	19.85	22.46	0.93	1.05
1994	19.41	21.50	0.91	1.01
1995	18.83	20.44	0.88	0.96
1996	18.50	19.71	0.97	0.92
1997	18.14	19.01	0.95	0.89
1998	17.67	18.32	0.83	0.86
1999	16.63	16.99	0.79	0.81
2000	16.78	16.78	0.80	0.80
2001	17.38	16.97	0.83	0.82
2002	17.98	17.27	0.87	0.84
2003	17.85	16.84	0.87	0.82
2004	19.85	18.34	0.97	0.90

Source: US Department of Energy, Energy Information Administration, *Annual Energy Review2004*, August 2005, Table 7.8, p. 219; Table 3.1, p.67.

COAL MINING INDUSTRY OUTLOOK

The U.S. coal industry has enjoyed a fairly constant domestic demand. About 90 percent of U.S. coal demand was accounted for by electric power producers in 2004.[9] Domestic coal demand is projected to increase because of growth in coal use for electricity generation. Coal consumption for electricity generation is projected to increase as the utilization of existing coal-fired generation capacity increases and as new capacity is added. The average utilization rate is projected to increase from 69 percent in 2001 to 83 percent in 2025. The amount of U.S coal exported in 2001 was 49 million tons (about 5 percent of production). These exports are projected to decline in the future, to about 26 million tons by 2025.[10]

[9] U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2004*, August 2005, Table 7.3, p. 209.

[10] U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2004*. January 2004, pp. 89, 90.

THE STRUCTURE OF THE METAL/NONMETAL MINING INDUSTRY

The M/NM mining sector consists of about 80 different commodities including industrial minerals. There were 12,469 M/NM mines in the U.S. in 2004, of which 10,768 (86%) were small mines and 1,701 (14%) were large mines, using MSHA's traditional definition of small and large mines. Based on SBA's definition, however, only 20 M/NM mines (0.16%) were large mines.[11]

The data in Table II-3 indicate that employment at M/NM mines in 2004 was 166,390, of which 64,557 workers (39%) were employed by small mines and 101,833 workers (61%) were employed by large mines (excluding contractor workers), using MSHA's definition. Based on SBA's definition, however, 151,058 workers (91%) were employed by small mines and 13,588 workers (9%) were employed by large mines (excluding contractor workers). Using MSHA's definition, the average employment is 6 workers at a small M/NM mine and 60 workers at a large M/NM mine. Using SBA's definition, there is an average of 12 workers in each small M/NM mine and 767 workers in each large M/NM mine.[12]

Metal Mining

There are about 24 metal commodities mined in the U.S. Underground metal mines use a few basic mining methods, such as room and pillar and block caving, but all these mines, small and large, rely heavily on diesel-powered production and support equipment.

Surface metal mines normally include drilling, blasting, loading, and hauling; these processes are typical in all surface mines, irrespective of commodity types. Surface metal mines in the U.S. rank among some of the largest mines in the world.

Metal mines constitute 2 percent of all M/NM mines and employ 17 percent of all M/NM miners. Under MSHA's traditional definition of a small mine, 54 percent of metal mines are small, and these mines employ 3 percent of all miners working in metal mines. Using SBA's definition, 93 percent of metal mines are small, and they employ 54 percent of all miners working in metal mines.[13]

Stone Mining

In the stone mining subsector, there are eight different stone commodities, of which seven are further classified as either dimension stone or crushed and broken stone. Stone mining in the U.S. is predominantly done by quarrying, with only a few slight variations. Crushed stone mines typically drill and blast, while dimension stone mines

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[11] U.S. Department of Labor Mine Safety and Health Administration, Directorate of Program Evaluation and Information Resources, calendar year 2004 data.

[12] Ibid.

[13] Ibid.

generally use channel burners, drills, or wire saws. Diesel powered-haulage is used to transfer the broken rock from the quarry to the mill where crushing and sizing are done.

Stone mines constitute 35 percent of all M/NM mines, and they employ 45 percent of all M/NM miners. Using MSHA's definition of a small mine, 75 percent of stone mines are small, and these mines employ 31 percent of all miners working in stone mines. Using SBA's definition, 99.98 percent of stone mines are small, and they employ 99 percent of all miners working in stone mines.[14]

Sand & Gravel Mining

Sand and gravel, for construction, is generally extracted from surface deposits using dredges or draglines. Further preparation involves washing and screening. As in other surface mining operations, sand and gravel uses diesel-driven machines, such as front-end loaders, trucks, and bulldozers, for haulage. The preparation of industrial sand and silica flour involves the use of crushers, ball mills, vibrating screens, and classifiers.

The sand and gravel subsector represents the single largest commodity group in the U.S. mining industry based on the number of mining operations. Sand and gravel mines comprise 57 percent of all M/NM mines, and they employ 27 percent of all M/NM miners. Using MSHA's definition of a small mine, 95 percent of sand and gravel mines are small, and these mines employ 77 percent of all miners working in sand and gravel mines. Using SBA's definition, 100 percent of sand and gravel mines are small, and they employ approximately 44,592 miners.[15]

Nonmetal Mining

For enforcement and statistical purposes, MSHA separates stone and sand and gravel mining from other nonmetal mining. There are about 35 nonmetal commodities, not including stone, and sand and gravel. Nonmetal mining uses a wide variety of underground mining methods such as continuous mining (similar to coal mining), in-situ retorting, block caving, and room and pillar. The mining method is dependent on the geologic characteristics of the ore and host rock. Some nonmetal operations use kilns and dryers in ore processing. Ore crushing and milling are processes common to both nonmetal and metal mining.

As with underground mining, there is a wide range of mining methods utilized in extracting minerals by surface mining. In addition to drilling and blasting, other mining methods, such as evaporation and dredging, are also utilized, depending on the ore formation.

Nonmetal mines comprise 6 percent of all M/NM mines, and they employ 14 percent of all M/NM miners. Using MSHA's definition of a small mine, 69 percent of other nonmetal mines are small, and they employ 14 percent of all miners working in these nonmetal mines. Using SBA's definition, 99.7 percent of other nonmetal mines are small, and they employ 93 percent of all miners working in these nonmetal mines.[16]

[14] Ibid.

[15] Ibid.

[16] Ibid.

ECONOMIC CHARACTERISTICS OF THE METAL/NONMETAL MINING INDUSTRY

The value of all M/NM mining output in 2004 was estimated at $44 billion. Metal mines, which include copper, gold, iron, lead, silver, tin, and zinc mines, contributed $10.8 billion.[17] Nonmetal production was valued at $33.2 billion: $10 billion from stone mining, $6.9 billion from sand and gravel, and $16.3 billion from other nonmetals such as potash, clay, and salt. [18]

The end uses of M/NM mining output are diverse. For example, iron and aluminum are used to produce vehicles and other heavy duty equipment, as well as consumer goods such as household equipment and soft drink cans. Other metals, such as uranium and titanium, have more limited uses. Nonmetals, like cement, are used in construction while salt is used as a food additive and for road de-icing in the winter. Soda ash, phosphate rock, and potash also have a wide variety of commercial uses. Stone and sand and gravel are used in numerous industries and extensively in the construction industry.

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[17] U.S. Department of Interior, U.S. Geological Survey, *Mineral Commodity Summaries 2005*, January 6, 2005, p. 8.

[18] Ibid., pp.142, 144, 158, 160.

III. BENEFITS

BACKGROUND

During the past twenty-three years, at least 40 underground coal miners have died in accidents involving explosion or fire, because they were not able to escape through air contaminated with smoke. In addition, there have been numerous nonfatal accidents in which miners did successfully escape. Two of these nonfatal accidents (Mathies Mine, 1990; Willow Creek Mine, 1998) placed as many as 20 miners at risk.

There were 56 reported fires in underground coal mines during the ten-year period from February 1, 1996 through February 1, 2006. A reportable fire is an unplanned mine fire not extinguished within 30 minutes of discovery. During this same ten-year period there were over 650 ignitions or explosions of methane or coal dust. Any of these events potentially could have created a mine fire that would have endangered miners' lives.

We briefly mention here three mine accidents where this ETS could have saved lives:

Wilberg Mine

On December 19, 1984, a fire on the longwall panel of the Wilberg mine near Orangeville, Utah claimed the life of 27 miners. Although several of the victims had donned SCSR devices, many of the victims appeared to be lost or disoriented in the thick smoke. A main finding from the investigation was that there was inadequate training on the self-rescuers.

Sago Mine

On January 2, 2006, an explosion in the Sago mine near Buchannon, West Virginia directly killed one miner. Subsequent carbon monoxide poisoning resulted in the death of eleven more miners and the severe injury of one miner. Preliminary information reveals that twelve miners had donned SCSR devices and barricaded themselves on the 2 Left working section. Only one of the twelve miners was found alive in the barricade. The surviving miner still suffers from severe carbon monoxide poisoning.

Aracoma Alma No. 1 Mine

On January 19, 2006, a conveyor belt entry fire at the Aracoma Alma No. 1 mine near Stollings, West Virginia resulted in the deaths of two miners. Although a crew of ten miners donned SCSR devices and successfully evacuated the mine, the two victims became separated from the larger group and were found near the fire area.

BENEFITS OF THE EMERGENCY TEMPORARY STANDARD

This ETS was designed to increase the chances of survival in a dangerous fire situation. The potential for fire is ever-present in an underground coal mine, because the coal mine contains highly flammable fuel (coal, coal dust, and methane). The ETS

specifically addresses the situation where a smoky, contaminated atmosphere hinders the miner's route of escape.

In a situation where an uncontrolled fire is present, the coal miner's best chance for survival is through escape. The ETS focuses on four areas to assist in the successful evacuation of an underground coal mine. This ETS requires lifelines that provide tactile directions on the correct route of escape, additional SCSRs to provide miners with additional oxygen with which to successfully escape, training in how to use multiple SCSRs consecutively, and immediate notification of MSHA within 15 minutes of ascertaining an accident, so that MSHA and others in the mining community can assist in rescue efforts.

For each of the historical incidents in which lives were lost, we estimate the probability that the ETS might have saved lives, and how many. These estimates of probability are inherently subjective, but are based on expert opinion. These subjective estimates can be expressed in numerical terms. From these numerical estimates, we can derive an estimate of the expected number of lives that might be saved by the ETS.

Since January 1, 1983 there have been 21 separate fire or explosion events with at least one fatality. These 21 events caused a total of 103 deaths in underground coal mines. The potential for death from fire or explosion continues to be an ever-present possibility. For purposes of estimating the benefits from this ETS, we focus on only three of these events because after examining the circumstances of these accidents, MSHA determined that better preparation or more successful evacuation procedures would have significantly improved the outcome of these accidents.

These three accidents, where we reasonably expect that miners' lives might have been saved by the ETS, occurred at the Wilberg Mine in 1984, at the Sago Mine in 2006, and at the Aracoma Alma No. 1 Mine, also in 2006. In these three accidents, there were, in total, 41 fatalities and one serious injury. We believe that this ETS, if in place at the time of these accidents, could have saved the lives of most or all of these victims. One of the miners at Sago Mine died in an initial explosion and would have perished even if the ETS had been in force. In quantitative terms, we estimate that perhaps 70% to 90% of miners in future accidents of like character could be saved by the ETS, with a mid-range estimate of 80%. Multiplying 40 by 80% provides a mid-range estimate of 32 lives that could have been saved by the ETS. Multiplying 40 by 70% and 90% provides a full-range estimate of 28 to 36 lives that could have been saved by the ETS.

January 1, 1983 is the starting point for the accident records in MSHA's electronic Teradata database. Starting at January 1, 1983 and ending in early February, 2006 is a time span of 23.1 years. Since these three accidents occurred over a period of 23.1 years, we divide 32 lives saved by 23.1 years to obtain a mid-range estimate of 1.39 lives saved per year. A similar calculation provides a full-range estimate of 1.21 to 1.56 lives saved per year. Using the same method, we also calculate a mid-range estimate of 0.035 serious injuries prevented per year and a full-range estimate of 0.030 to 0.039 serious injuries prevented per year. These estimates are also displayed in Table III-1. Certainly, the potential exists for further loss of life every day that this ETS is not in effect.

Table III-1: Total Number and Rates Per Year of Fatalities and Severe Injuries at Selected Underground Coal Mine Fires and Explosions.

Mine Name	Year	Fatalities	Severe Injuries[1]
Aracoma Alma #1 Mine	2006	2	0
Sago Mine	2006	12	1
Wilberg Mine	1984	27	0
Total Miners[2]	1983-2006	41	1
Miners Potentially Saved by Evacuation[3]	1983-2006	40	1
Miners Saved by ETS (low estimate)[4]	1983-2006	28	0.7
Miners Saved by ETS (mid-range estimate)[4]	1983-2006	32	0.8
Miners Saved by ETS (high estimate)[4]	1983-2006	36	0.9
Miners Saved by ETS Per Year (low estimate)[5]	1983-2006	1.21	0.030
Miners Saved by ETS Per Year (mid-range estimate)[5]	1983-2006	1.39	0.035
Miners Saved by ETS Per Year (high estimate)[5]	1983-2006	1.56	0.039

[1] The only severe injury listed in this column is severe carbon-monoxide poisoning of one miner who entered a coma. The miner's ultimate condition is not yet known.

[2] (Total Miners) = (Sum of three mines: Alma, Sago, and Wilberg).

[3] (Miners Potentially Saved by Evacuation) = (Total Miners) - (Miners Who Could Not Be Saved by Better Evacuations). One miner fatality is subtracted from "Total Miners" because the miner died in an initial explosion and would not have been saved by the ETS.

[4] (Miners Saved by ETS) = (Miners Potentially Saved by Evacuation) x (Percentage Saved), where (Percentage Saved) = 70% for low estimate, 80% for mid-range estimate, and 90% for high estimate.

[5] (Miners Saved by ETS Per Year) = (Miners Saved by ETS) / (23.1 Years).

SUMMARY

In conclusion, MSHA estimates that this ETS will result in an average of 1.39 miners' lives being saved every year, as well as the prevention of additional injuries. The actual number of miners' lives saved could be much larger.

IV. COMPLIANCE COSTS

INTRODUCTION

In this chapter, we estimate the total cost of the ETS on the mining industry. We anticipate that only underground coal mine operators will incur costs to comply with the ETS and that the costs will arise from new requirements in three areas: (1) training; (2) lifelines; and (3) SCSR devices.

The ETS also includes immediate notification provisions, which apply to all mines in the mining industry. These provisions are definitional and clarify existing requirements. We expect that they will impose no additional costs on mine operators.

We estimate that the ETS will result in total yearly costs for the underground coal mining industry of approximately $18.9 million, which include the amortized value of first-year costs of about $54.7 million. Of the yearly costs, $7.9 million would be associated with training requirements; $0.5 million would be associated with lifeline requirements; and $10.5 million would be associated with SCSR devices. Disaggregated by mine size, yearly costs would be $1.2 million (or about $5,100 per mine) for mine operators with fewer than 20 employees; $15.6 million (or about $40,100 per mine) for mine operators with 20-500 employees; and $2.1 million (or about $256,700 per mine) for mine operators with more than 500 employees. Table IV-1 summarizes the estimated yearly cost of the ETS by mine size and by type of provision.

Table IV-1: Summary of Yearly Costs for ETS *

Provision	<20	20-500	>500	Total
Training (Tables IVA)	$502,319	$6,377,846	$1,016,309	$7,896,474
Lifeline (Tables IVC)	$115,879	$384,073	$13,087	$513,039
SCSR Devices (Tables IV-D)	$603,734	$8,850,665	$1,022,615	$10,477,014
Total Compliance Costs	$1,221,932	$15,612,584	$2,052,011	$18,886,528

* Yearly Costs = annualized costs + annual costs.

All cost estimates in this chapter are presented in 2004 dollars. The total costs reported in Table IV-1, and in all other tables in this chapter, are, to the best of our knowledge, the result of accurate calculations. In some cases, however, the totals may appear to deviate from the sum or product of their component factors, but that is only because the component factors have been rounded in the tables for purposes of readability.

METHODOLOGY

For the ETS, we estimate the following costs: (1) one-time or intermittent costs; (2) annual costs; and (3) annualized costs. One-time costs are those that are incurred once, usually in the first year of compliance, and do not recur. Intermittent costs are those

costs that may recur from time to time, but not annually. Capital expenditures, such as the cost of purchasing compliance equipment, are an example of one-time or intermittent costs. Annual costs are costs that normally occur every year. Two examples of annual costs are maintenance costs and recordkeeping costs. Annualized costs are one-time and intermittent costs that are apportioned over the economic life of the investment using a specified interest (or discount) rate. For this Regulatory Economic Analysis (REA), we used a (real) discount rate of 7 percent, as recommended by the Office of Management and Budget (OMB), using the formula:

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

where (a) equals the annualization factor, (i) equals the annual discount rate, and (n) equals the economic life of the non-annual recurring investment.[19]

We used an hourly compensation rate of $26.55 for an underground coal miner, $57.82 for an underground coal mine supervisor, and $20.55 for a clerical worker.[20] The wage rates include benefits such as social security, unemployment insurance, and workers' compensation, but they do not reflect shift differentials or overtime pay. For convenience, we refer to miner "compensation" in this REA as "wages," where that term is understood to include benefits. We assume that contractor workers receive the same wage as their fellow coal miners.

SCOPE

The cost provisions of the ETS apply to all underground coal mines. Table IV-2 provides the number of underground coal mines by mine size and by state. In this table, the mine size category of 20-500 employees has been disaggregated into three separate categories: 20-49 employees; 50-99 employees; and 100-500 employees. These distinctions within the mine size category for 20-500 employees were needed to take account of differences in the number of shifts and other factors relevant to estimating some ETS costs. The number of underground coal mines has been provided by state in Table IV-2 because, in costing out the lifeline provisions of the ETS, we had to take into account the fact that some of the underground coal mines in Kentucky, West Virginia, and Virginia are already in compliance as a result of the current lifeline requirements in those states. Furthermore, we may need to subtract out other costs of the ETS if we determine that additional ETS requirements have been preceded by equal (or stronger) requirements imposed by one or more states—since the associated costs would then not properly be attributable to the ETS.[21]

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[19] For one-time costs with an infinite, or indefinite, economic life, the annualization factor is equal to the discount rate, here 0.07. For equipment with an economic life of ten years, the annualization factor is equal to 0.1423.

[20] Hourly wage rates are derived from Western Mine Engineering Inc., *U.S. Coal Mine Salaries, Wages, & Benefits – 2004 Survey Results*.

[21] For instance, on January 26, 2006, Governor Manchin of West Virginia signed into law new mining rules that would require, among other things, additional underground oxygen supplies that far exceed the SCSR requirements of the ETS. However, because the effective date of these requirements has,

Table IV-2: Profile of Underground Coal Mines*

Locations of Underground Coal Mines	Category					Total
	1-19	20-49	50-99	100-500	501+	
AL	1	2		5	1	9
AR	1					1
CO		2	1	5		8
IL	1		1	10	1	13
IN		1	2	4		7
KY	99	97	26	19		241
MD		2		1		3
MT		1				1
NM				1		1
OH	2	3	1	3		9
OK		1				1
PA	30	18	7		5	60
TN	7	6				13
UT	1	6	1	6		14
VA	36	34	10	3		83
WV	59	61	26	22	1	169
WY		1				1
Total	237	235	75	79	8	634

* Source: U.S. Department of Labor, Mine Safety and Health Administration, Directorate of Program Evaluation and Information Resources.

Table IV-3 presents the total number of miners and contractors, by mine size, covered by the ETS. The totals differ from the sum of the miners and contractor workers shown in Table II-1 and Table II-2, previously introduced, because the numbers in those tables include surface workers and other workers who do not work in underground portions of underground coal mines.

as of this writing and to our knowledge, not been specified, we have chosen not to subtract out the SCSR costs of the ETS on West Virginia underground coal mines.

Table IV-3: No. of Miners and Contractors Underground in Underground Coal Mines, 2004 *

	<20	20-49	50-99	100-500	>500	Total
Ug. Coal Miners	2,110	6,545	4,339	16,275	4,221	33,490
Ug. Contractors	233	722	479	1,797	466	3,697
Ug. Coal Miners & Ug. Contractors	2,343	7,267	4,818	18,072	4,687	37,187

* Source: Special Teradata run by Program Eavluation and Information Resources (PEIR), excludes office workers.

SECTION-BY-SECTION DISCUSSION

Below we estimate the costs of the ETS by section. Where possible, we have identified the specific data sources that we relied on for our estimates. Where no data source is specified, we relied on estimates provided by technical staff from MSHA's Directorates of Coal Mine Safety and Health; Educational Policy and Development; and Technical Support. These technical staffs have considerable rulemaking and field experience and knowledge in estimating the resources required to comply with program development and training requirements of provisions similar to those in this ETS.

For convenience, we have numbered tables in the section-by-section discussion in this chapter according to the type of provision: IV-A for training provisions; IV-B for immediate notification provisions (no tables needed); IV-C for lifeline provisions; and IV-D for SCSR provisions.

§ 48.3 Training plans; time of submission; information required; time for approval; method for disapproval; commencement of training; approval of instructors.

Paragraph (p) requires each underground coal mine operator to submit a revised training plan to reflect the new requirements in § 48.5 training of new miners, § 48.6 experienced miner training, § 48.8 annual refresher training, and § 48.11 hazard training to the District Manager. It takes approximately—an hour at a small mine; and one and half hours at a large mine—for a safety director to revise it. Table IV-A1 summarizes the costs related to revising training plans.

Table IV-A1: Cost for Underground Coal Mine Operators to Revise Training Plans to Comply with § 48.3

Mine Size	Underground Coal Mines				Total First Year Cost[c]	Total Annualized Cost[d]
	# of Mines	# of Hours Needed to Revise Training Plan[a]	Average Hourly Wage Rate for a Safety Director	Cost to Send in a Training Plan[b]		
Small (< 20)	237	1.0	$ 57.82	$ 4.55	$ 14,781	$ 1,035
Large (20-500)	389	1.5	$ 57.82	$ 7.75	$ 36,751	$ 2,573
Large (> 500)	8	1.5	$ 57.82	$ 7.75	$ 756	$ 53
Total	634				$ 52,288	$ 3,660

[a] It takes approximately--an hour at a small mine; and one and half hours at a large mine--of a safety director's time to revise a training plan.

[b] Cost to send in training plan= [S + (P x $0.15) + ($T_c$ x W_c)], where S is the cost of shipping and handling to send in a training plan (S=$2 for small mines; and S=$3 for large mines); P is the number of sheets in a training plan (P=10 for small mines; and P=20 for large mines); $0.15 is the cost to photocopy a sheet of paper; T_c is the # of hours a clerical worker needs to print a training plan and to prepare mailing (T_c = 3 minutes or 0.05 hours for small mines; T_c=5 minutes or 0.0833 for large mines); and W_c is the hourly wage rate of a clerical worker (W_c=$20.96).

[c] Total first-year cost = {# of mines x [(# of hours needed to revise training plan x average hourly wage rate for a safety director) + cost to send in a training plan]}.

[d] Total annualized cost = total first-year cost x a, where a is the annualization factor (a=0.07).

There will be no cost to new underground coal mines opening after this ETS goes into effect. New mines will incorporate these new training requirements into their training plans; no revision is necessary.

§ 48.5 Training of new miners; minimum courses of instruction; hours of instruction.

Paragraph (b)(2) requires new miners to have a complete donning of self-rescue devices that includes "hands-on" practice in transferring from a self-rescue device to another self-rescue device, and paragraph (b)(5) requires a review of the mine map, escapeways, emergency evacuation, and barricading. There is no economic impact associated with the time to train new miners because mine operators can incorporate these training components into the existing 40 hours of new miner training. However, each mine operator has to purchase extra training units. An average SCSR training unit costs approximately $500. On average, each small mine (< 20) needs about 1 new SCSR training model; each large mine (20-500) needs about 10 SCSR training units; and each large mine (> 500) needs about 12 SCSR training units. From MSHA's experience, the majority of existing underground coal mines have only one type of SCSR. Thus, they do not have to purchase different types of SCSR training units to train their miners in donning other types of SCSRs. Table IV-A2 presents the cost associated with the purchase of extra SCSR training units.

Table IV-A2: Cost for Underground Coal Mine Operators to Purchase Extra SCSR Training Units to Comply with § 48.5

Mine Size	Underground Coal Mines			Total First-Year Cost[a]	Total Annualized Cost[b]
	# of Mines	# of Extra SCSR Training Units per Mine	Average Price of SCSR Training Unit		
Small (< 20)	237	1	$ 500	$ 118,500	$ 8,295
Large (20-500)	389	10	$ 500	$ 1,945,000	$ 136,150
Large (> 500)	8	12	$ 500	$ 48,000	$ 3,360
Total	634			$ 2,111,500	$ 147,805

[a] Total first-year cost = (# of mines x # of extra SCSR training units per mine x average price of SCSR training unit).

[b] Total annualized cost = (total first-year cost x a), where a is the annualization factor (a = 0.07).

Table IV-A3 presents the cost associated with new mines having to purchase extra SCSR training units.

Table IV-A3: Cost for New Underground Coal Mine Operators Starting in Year 2 to Purchase Extra SCSR Training Units to Comply with § 48.5

Mine Size	Underground Coal Mines			Total Annual Cost[b]
	# of New Mines[a]	# of Extra SCSR Training Units Per Mine	Average Price of SCSR Training Unit	
Small (< 20)	47	1	$ 500	$ 22,150
Large (20-500)	35	10	$ 500	$ 163,598
Large (> 500)	0	12	$ 500	$ -
Total	82			$ 185,748

[a] Based on a special data run conducted by MSHA's Office of Program Evaluation and Information Resources (PEIR), the proportion of all underground coal mines that are new each year is about 20 percent for those with fewer than 20 workers; about 9% for those with 20-500 workers; and 0 percent for those with more than 500 workers.

[b] Total annual cost = (# of new mines x # of extra SCSR training units per mine x average price of SCSR training unit) / b, where b is the discount factor (b=1.07) to reflect the fact that these annual costs start in year two.

§ 48.6 Experienced miner training.

Paragraph (b)(12) requires newly employed experienced miners to have a complete donning of self-rescue devices that includes "hands-on" practice in transferring from self-rescue device to self-rescue device used in the mine. They also have to review the mine map, escapeways, emergency evacuation, and barricading under paragraph (b)(5). In addition, newly employed experienced miners also have to review mine maps specified in § 75.1502. Typically when mine operators need to hire experienced miners, they hire them one at a time. Thus, it will take a trainer about 20 minutes to train a newly employed experienced miner. From MSHA's experience, trainers are usually mine supervisors. MSHA expects mine operators to use their existing trainers as approved instructors. There is no cost associated with the training materials because mine operators can use the same training materials for new miners to train newly employed experienced miners. Table IV-A4 summarizes the cost related to training newly employed experienced miners.

Table IV-A4: Annual Cost to Train Newly Employed Experienced Miners in Accordance with § 48.6

Mine Size	Underground Coal Mines				
	# of Newly Employed Experienced Miners[a]	# of Hours Needed for Training[b]	Average Hourly Wage Rate for a Miner	Average Hourly Wage Rate for a Safety Director	Total Annual Cost[c]
Small (< 20)	33	0.67	$ 26.55	$ 57.82	$ 923
Large (20-500)	422	0.67	$ 26.55	$ 57.82	$ 11,874
Large (> 500)	66	0.67	$ 26.55	$ 57.82	$ 1,845
Total	521				$ 14,642

[a] Based on MSHA's data for the last five years, the annual miner turnover rate is about 7 percent for underground coal mines. Based on MSHA's experience, about 20% of newly employed miners are experienced miners.

[b] It would take 20 minutes of a trainer's time to train a newly employed experienced miner and 20 minutes of the newly employed experienced miner to receive the training (for total time of 40 minutes or 0.67 hours).

[c] Total annual cost = (# of newly employed experienced miners x T_m x average hourly wage rate for a miner) + (# of newly employed experienced miners x T_s x average hourly wage rate for a safety director), where T_m is the additional number of hours for a miner to receive self-rescue device training (T_m=0.33 hours or 20 minutes); and T_s is the additional number of hours for a trainer to provide self-rescue device training to a miner (T_s=0.33 hours or 20 minutes).

§ 48.8 Annual refresher training of miners; minimum courses of instruction; hours of instruction.

Paragraph (b)(8) no longer generally applies to coal miners because, in this ETS, the requirements for "hands-on" training in donning self-rescue devices and transferring from self-rescue device to self-rescue device and for the evacuations drills are added to § 75.1502. Underground coal miners will receive refresher training on this skill at least every 90 days. There would not be an associated cost savings because in the absence of paragraph (b)(8), mine operators would still have to provide 8 hours of annual refresher training.

§ 48.11 Hazard training.

Paragraph (a)(4) requires mine operators to provide hands-on training to the miners in transferring from one self-rescue device to another self-rescue device used at the mine for miners defined in § 48.2(a)(2). The requirement in this paragraph does not obligate mine operators to use approved instructors to do hazard training; thus, mine operators can have miners who have proficiency in SCRS training to perform this task.

The category of miners needing training in this paragraph consists mostly of visitors and contractors. This group of miners is not directly employed by the mine operator, but MSHA assumes that their employers will pass on costs for their time spent on hazard training to the mine operators. We assume that the workers receiving hazard training will receive a wage rate similar to what an underground coal miner makes. To train a miner to transfer from one self-rescue device to another self rescue device takes about 15 additional minutes of a trainer's time. Table IV-A5 summarizes the cost related to training miners as defined in § 48.2(a)(2)) in accordance with § 48.11.

Table IV-A5: Cost to Train Miners (Defined in § 48.2(a)(2)) in Accordance with § 48.11

Mine Size	Underground Coal Mines				Total Annual Cost[b]
	# of Mines	Annual # of Times Hazard Training Given[a]	# of Additional Hours Needed for Training	Average Hourly Wage Rate for a Miner	
Small (< 20)	237	10	0.50	$ 26.55	$ 31,462
Large (20-500)	389	20	0.50	$ 26.55	$ 103,280
Large (> 500)	8	30	0.50	$ 26.55	$ 3,186
Total	634				$ 137,927

[a] Based on MSHA's experience.

[b] Total annual cost = [# of mines x (annual # of times hazard training given x # of additional hours needed for training x average hourly wage rate for a miner).

§ 75.1502 Mine emergency evacuation and firefighting program of instruction.

Paragraph (a) requires each underground coal mine operator to include scenarios of various mine emergencies (fires, explosions, or gas or water inundations) and the best options for evacuation under each type of emergency in its approved program of instruction. Typically, a safety director would take (2 hours for a small (< 20) mine; 3 hours for a large (20-500) mine; and 5 hours for a large mine (>500) with the aid of MSHA compliance assistance to include all of the above components into the company's program of instruction. A safety director's hourly wage rate is about the same as a mine supervisor and, on average, a mine supervisor makes about $57.82 an hour. Once the program of instruction is complete, the mine operator is required to send it to the District Manager for approval and instruct miners of any changes: with shipping and handling costs of $2 for a small mine and $3 for a large mine. It takes about 5 minutes of a clerical worker's time to prepare the paperwork for a program of instruction and make copies to post on the mine bulletin board (1 posting for a small mine; and 2 postings for a large

mine). Table IV-A6 summarizes the cost for existing mines related to updating the mine emergency evacuation and firefighting program of instruction.

Table IV-A6: Cost for Mine Operators to Update Program of Instruction in Accordance with § 75.1502

Mine Size	Underground Coal Mines				Total First-Year Cost[c]	Total Annualized Cost[d]
	# of Mines	# of Hours Needed to Update Program of Instruction[a]	Average Hourly Wage Rate for a Safety Director	Cost to Send in Program of Instruction and Inform Miners of Any Update[b]		
Small (< 20)	237	2	$ 57.82	$ 5.25	$ 28,650	$ 2,006
Large (20-500)	389	3	$ 57.82	$ 12.49	$ 72,336	$ 5,064
Large (> 500)	8	5	$ 57.82	$ 12.49	$ 2,413	$ 169
Total	634				$ 103,399	$ 7,238

[a] Updating a program of instruction with MSHA compliance assistance takes about (2 hours for a small mine (<20); 3 hours for a large mine (20-500); and 5 hours for a large mine (>500)) of a safety director's time.

[b] Cost to send in program of instruction and inform miners of any update = [S + (P x C x $0.15) + ($T_c$ x W_c)], where S is the cost of shipping and handling to send in a program of instruction (S=$2 for small mines; and S=$3 for large mines); P is the average number of sheets in a program of instruction (P=10 for small mines; and P=20 for large mines); C is the number of copies to be posted on mine bulletin board (1 for small mines; and 2 for large mines); $0.15 is the cost to photocopy a sheet of paper; T_c is the # of hours a clerical worker needs to prepare mailing in a program of instruction and post it on mine the bulletin boards (T_c =5 minutes or 0.0833 hours for small mines; T_c=10 minutes or 0.1667 for large mines); and W_c is the hourly wage rate of a clerical worker (W_c=$20.96).

[c] Total first-year cost = {# of mines x [(# of hours needed to update a program of instruction x average hourly wage rate for a safety director) + cost to send in program of instruction and inform miners of any update]}.

[d] Total annualized cost = total first-year cost x a, where a is the annualization factor (a=0.07).

There will be no cost to new underground coal mines opening after this ETS goes into effect. New mines will incorporate these new requirements into their programs of instruction; no update is necessary.

The training must be conducted by a person designated by the operator who has the ability, training, knowledge, or experience to provide training to miners in his or her area of expertise. There is no additional cost related to having a trainer because, from MSHA's experience, the existing trainers already possess these skills.

Paragraph (c) requires mine operators to provide more training for miners during four mine evacuation drills each year. The additional training includes locating continuous directional lifelines or equivalent devices, stored SCSRs, and rescue

chambers, and traveling the primary or alternate escapeway to the surface or exits at the bottom of the shaft or slope; hands-on training in the complete donning of all types of SCSRs used at the mine; and the transfer from a self-rescue device to another self-rescue used at the mine. Typically, trainers are also mine supervisors, earning the same amount of compensation as mine supervisors. From MSHA's experience, trainers provide 30 minutes of oral instructions on SCSR training during staff meeting, per shift. Then the trainers will go to each section of the mine to provide 20 minutes of hands-on SCSR training with miners. MSHA estimates that half of the time miners will get one-on-one training, and the other half they will get one-on-five training. In other words, it will take, on average, 6 trainers to train 10 miners (or it will take 0.6 trainers to train 1 miner). In addition, the actual mine evacuation conducted during each drill will take each miner about 30 minutes in a mine with fewer than 20 workers; about 45 minutes in a mine with 20-500 workers; and about 60 minutes in a mine with more than 500 workers. However, MSHA estimates that mine operators already spend about 25 percent of the total time to evacuate the mines during a simulation drill as required in the existing regulation. Therefore, the additional amount of time needed to evacuate the mines is 75 percent.

Under the existing regulation, mine operators are already providing SCSR training to miners as part of their annual refresher training. However, it could not be counted as one of the four SCSR training required in this ETS, because it does not cover the transfer of a self-rescue device to another self-rescue device. There is no cost savings associated with the elimination of SCSR annual refresher training. Mine operators have to provide eight hours of annual refresher training, even if they exclude SCSR training from annual refresher training. However, mine operators have to certify each miner's training once a year; in this ETS, MSHA requires them to certify the training four times a year. Thus, they only have to certify three additional times a year. MSHA estimates that a safety director would take about 6 seconds to certify each miner's training.

Table IV-A7 summarizes mine operators' costs related to SCSR training.

Table IV-A7: Cost for Mine Operators to Train Miners in Accordance with § 75.1502

Mine Size	Underground Coal Mines								Total Annual Cost[d]
	# of Miners	Total Annual # of a Miner's Hours Needed Receive Training[a]	# of Mines	Average # of Shifts	# of Hours for a Trainer to Provide Oral Instructions on Training[b]	# of Hours of a Trainer's Time to Train a Miner[c]	Average Hourly Wage Rate for a Miner	Average Hourly Wage Rate for a Trainer	
Small (< 20)	2,343	4.83	237	1	2	0.80	$ 26.55	$ 57.82	$ 436,450
Large (20-500)	30,157	5.58	389	2	2	0.80	$ 26.55	$ 57.82	$ 5,955,308
Large (> 500)	4,687	6.33	8	3	2	0.80	$ 26.55	$ 57.82	$ 1,007,696
Total	37,187		634						$ 7,399,455

[a] It takes a miner 20 minutes to have hands-on training in donning and transferring from a self-rescue device to another self-rescue device used in the mine. Thus, the total amount of time for a miner to learn how to don SCSRs is 80 minutes (or 1.33 hours) because it has to be done 4 times a year. In addition, miners all receive 30 minutes of oral instruction before the hands-on training. Finally, mine operators have to do 4 evacuation drills a year--small mines take about 30 minutes, large (20-500) take 45 minutes, and large (> 500) take 60 minutes to evacuate. MSHA estimates that mine operators already spend about 25 percent of the total time to evacuate the mines during a simulation drill as required in the existing regulation.

[b] It takes a trainer about 30 minutes, per shift, to provide oral instructions on SCSR training. The trainer has to do it four times a year (total time spent providing instruction on self-rescue device training is 2 hours a year).

[c] It takes 1.33 hours (or 80 minutes) of 0.60 trainer's time to train a miner (1.33 x 0.60 = 0.80).

[d] Total annual cost = [(# of miners x total # of hours needed to train a miner x average hourly wage rate for a miner)] + {[(# of mines x average # of shifts x # of hours for a trainer to provide oral instructions) + (# of miners x # of hours of a trainer's time to train a miner)] x average hourly wage rate for a trainer}.

Table IV-A8 summarizes yearly training costs resulting from this ETS.

Table IV-A8: Summary of Yearly Training Costs to Comply with ETS

Mine Size	Underground Coal Mines					Total Annual Cost
	§ 48.3[a]	§ 48.5[b]	§ 48.6[c]	§ 48.11[d]	§ 75.1502[e]	
Small (< 20)	$ 1,035	$ 30,445	$ 923	$ 31,462	$ 438,455	$ 502,319
Large (20-500)	$ 2,573	$ 299,748	$ 11,874	$103,280	$ 5,960,372	$ 6,377,846
Large (> 500)	$ 53	$ 3,360	$ 1,845	$ 3,186	$ 1,007,865	$ 1,016,309
Total	$ 3,660	$ 333,553	$ 14,642	$137,927	$ 7,406,693	$ 7,896,474

[a] Source: Table IV-A1.

[b] Source: Table IV-A2 and Table IV-A3.

[c] Source: Table IV-A4.

[d] Source: Table IV-A5.

[e] Source: Table IV-A6, and Table IV-A7.

§ 50.10 Immediate notification

This provision, which applies to all mine operators, provides a definitive standard of what is meant by "immediately contact" in existing § 50.10. The ETS provides that, if an accident occurs, the mine must contact its MSHA District Office at once without delay and within 15 minutes of having access to a telephone or other means of communication.

This provision of the ETS is definitional and clarifies existing requirements in § 50.10. As such, we expect that it will impose no additional costs on the mining industry.

§ 75.380 Escapeways; bituminous and lignite mines and § 75.381 Escapeways; anthracite mines.

Paragraphs § 75.380(d)(7) and § 75.381(c)(5) require that directional lifelines be installed in all escapeways. Federal regulation currently requires lifelines to be installed only if a mine is using belt air at the face and is also using the return as an alternate escapeway (§ 75.372(n)). Two states, Kentucky and West Virginia, currently require lifelines in all returns that are used as alternate escapeways. A third state, Virginia, requires lifelines in all primary escapeways.

MSHA estimates that an average of 18,785 feet of lifeline per mine is needed to comply with these provisions. After deducting for lifelines already in place, an average increment of 15,494 feet of lifeline per mine will need to be installed. These deductions are based on estimates of lifeline footage that is already installed. MSHA assumes that lifelines have already been installed in all escapeways where existing federal or state laws and regulations require lifelines. In addition, MSHA assumes that mine operators have voluntarily installed lifelines in 5% of the remaining escapeway footage. Table IV-C1 shows more detail for these estimates.

Table IV-C1: Required and Incremental Lifelines, Feet Per Mine

(1) Mine Size (Number of Employees)	(2) Total Required Lifelines, Feet Per Mine[1]	(3) Incremental Required Lifelines, Feet Per Mine[2]	(4) Ratio of Incremental Required to Total Required[3]
1-19	8,631	7,034	81%
20-500	24,170	19,951	83%
Over 500	57,731	49,410	86%
All Mines	18,785	15,494	82%

[1] All required lifelines under ETS, including lifelines already installed.

[2] Excludes lifelines already installed in mines, either voluntarily or in accordance with federal or state laws and regulations.

[3] (Column 3) / (Column 2).

Initial material costs for lifelines are estimated at $180 for 1,000 feet. This includes the cost of directional cones, reflective material, and hangers, for an average initial materials cost of $2,789 per mine. The initial installation time is assumed to be 5 minutes per 150 feet (or one hour per 1,800 feet) at the miner's wage rate, for a total time cost of $229. MSHA assumes annual maintenance cost equal to 10% of initial material cost plus 10% of initial labor cost. These expected costs per mine to comply with the lifeline provisions of this ETS are shown in Table IV-C2.

Table IV-C2: Incremental Lifeline Costs Per Mine

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mine Size (Number of Employees)	Incremental Lifeline Feet[1]	Initial Materials Cost[2]	Initial Labor Cost[3]	Annual Maintenance Materials Cost[4]	Annual Maintenance Labor Cost[5]	Incremental Initial Cost[6]	Incremental Annual Cost[7]
1-19	7,034	$1,266	$104	$127	$10	$1,370	$137
20-500	19,951	$3,591	$294	$359	$29	$3,885	$389
Over 500	49,410	$8,894	$729	$889	$73	$9,623	$962
All Mines	15,494	$2,789	$229	$279	$23	$3,017	$302

[1] From Table IV-C1, Column 3.

[2] (Column 2) x ($0.18 per foot lifeline material, including directional cones, reflective material, and hangers).

[3] (Column 2) x (1 hour / 1800 feet) x ($26.55/hour).

[4] (Column 2) x (10%).

[5] (Column 3) x (10%).

[6] (Columns 3 + 4).

[7] (Columns 5 + 6).

The costs per mine in Table IV-C2 are multiplied by the number of mines to obtain the total costs for all underground coal mines to comply with the lifeline provisions of this ETS. We also calculate and add in the initial costs for new mines, starting in the second year of the rule. The total yearly cost for lifelines is estimated as $513,039. Details of the calculation are shown in Table IV-C3.

Table IV-C3: Total Costs for All Underground Coal Mines to Comply With Lifeline Requirements of ETS

	Costs Per Mine			Total Lifeline Costs Due to ETS			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mine Size (Number of Employees)	Incremental Initial Cost[1]	Incremental Annual Cost[2]	Number of Mines[3]	Incremental Initial Cost[4]	Incremental Annual Cost[5]	Initial Costs for New Mines[6]	Yearly Cost[7]
1-19	$1,370	$137	237	$324,667	$32,467	$64,933	$115,879
20-500	$3,885	$389	389	$1,511,430	$151,143	$136,029	$384,073
Over 500	$9,623	$962	8	$76,982	$7,698	$0	$13,087
All Mines	$3,017	$302	634	$1,913,079	$191,308	$200,962	$513,039

[1] From Table IV-C2, Column 7.

[2] From Table IV-C2, Column 8.

[3] From Table IV-A1, Column 1.

[4] (Column 2) x (Column 4).

[5] (Column 3) x (Column 4).

[6] The number of new mines each year is assumed to be a percentage of existing mines in each mine size category. These percentages are 20%, 9%, and 0%, respectively, for mines with 1-19 employees, 20-500 employees, and over 500 employees. These percentages are multiplied by the Incremental Initial Cost shown in Column 5.

[7] (Columns 5) x 0.07 + (Column 6) + (Column 7) / 1.07. Column 5 is multiplied by the 7% annualization factor so as to annualize the initial costs. Column 7 is divided by 1.07 to discount the future annual cost of lifelines in new mines, because the new mines appear only in the second and subsequent years.

§ 75.1714-4

Purchase of Additional SCSR Devices

Currently, underground coal miners are required to have one SCSR device under existing §75.1714. This ETS rule states that, in addition to the one SCSR device required under §75.1714, each miner and visitor authorized by the mine operator is required to have at least one additional SCSR device at all times in the mine. Hereinafter, for this part of the cost analysis, the term "miners" refers to both miners and visitors authorized by the mine operator to enter the mine. In order to determine how many additional SCSR devices are needed in order to assure that all miners working on the shift in the mine have at least two SCSR devices, we assume the following. One additional SCSR device will be stored on the mantrip or other mobile equipment that brings miners in and out of the mine.[22] Hereinafter, mantrips and other mobile equipment that bring miners in and out of a mine are defined as mantrips. A certain number of SCSR devices may also need to be stored along the primary escapeway and alternate escapeway.

In order to determine how many additional SCSR devices are needed for each mantrip that brings miners in and out of the mine, we need to estimate the peak number of miners on a shift in a mine. These miners will need to use mantrips to enter and exit the mine. We have data on the average number of miners per shift, which are based on quarterly data. Since the average number of miners working on a shift will be below the peak due to production variations throughout the year and differences in the number of miners working on a production or maintenance shift, our estimated average number of miners on a shift has been adjusted upward to account for seasonal and shift variations.[23] Table IV-D1 shows, by mine size category, the number of SCSR devices estimated to be needed on mantrips.[24]

[22] It is assumed that no stored SCSR devices will be needed at the working section as long as the mantrip stays at the working section. If the mantrip leaves the working section before the shift is over to go somewhere else in the mine, then it is assumed that the box on the mantrip containing the stored additional SCSR devices will be taken off the mantrip and kept at the working section, while a smaller box, with an appropriate number of SCSR devices, will be placed on the mantrip leaving the section.

[23] Visitors are assumed to be scheduled to visit the mine during non-peak production shifts. To estimate peak shift size, we increased the average shift size by 3 percent to account for seasonal variations (which are small in underground coal mines) and by another 12 percent to account for shift variations during the day (for those mines that have more than one shift).

[24] For purposes of estimating the cost of SCSR requirements in this ETS, we broke out the mine size category for 20-500 employees into three separate categories: 20-49 employees; 50-99 employees; and 100-500 employees. These distinctions within the mine size category for 20-500 employees were needed to take account of differences in the number of shifts and other factors relevant to estimating SCSR costs arising from this ETS.

Table IV-D1: Peak Number of Miners and Contractors per Shift per Mine that Need Additional SCSRs on Mantrips Bringing Miners In and Out of the Mine

	<20	20-49	50-99	100-500	>500
Ug. Coal					
No. of Miners	2,343	7,267	4,818	18,072	4,687
No. of Mines	237	235	75	79	8
Avg. No. of Miners per Mine	10	31	64	229	586
Avg. No. of Shift per Mine	1	1	2	3	3
Avg. No. of Miners per Shift	10	31	32	76	195
Adj. Factor	1.03	1.15	1.15	1.15	1.15
Peak No. of Miners per Shift	10	36	37	88	225

We estimate the cost of an SCSR device to be $582. This cost is based on the weighted average of the three different major brands of SCSRs currently being marketed in the United States. Each underground coal mine operator must provide each miner on a shift an additional SCSR device, to be stored on the mantrip. The SCSR devices are assumed to last for 10 years. Table IV-D2 shows, by mine size, the first year and annualized costs to purchase SCSR devices for mantrips.

Table IV-D2: First Year and Annualized Cost of SCSRs on Mantrips or Mobile Equipment Bringing Miners In and Out of the Mine

	<20	20-49	50-99	100-500	>500	Total
Peak No. of Miners per Shift [a]	10	36	37	88	225	
No. of Mines	237	235	75	79	8	634
Total No. of SCSRs for Mantrips / All Mines	2,413	8,357	2,770	6,928	1,797	22,265
Cost Per SCSR	$582	$582	$582	$582	$582	
First Yr. Costs for SCSRs Needed on Mantrips	$1,404,293	$4,862,967	$1,612,067	$4,031,170	$1,045,490	$12,955,988
Factor to Annualize First Yr. Costs	0.1423	0.1423	0.1423	0.1423	0.1423	
First Yr. Costs Annualized	$199,831	$692,000	$229,397	$573,636	$148,773	$1,843,637

[a] Source: Table IV-D1

We next estimate the number of SCSR devices that need to be stored in the primary escapeway and alternate escapeway in mines that take miners more than 1 hour, but less than 2 hours, to escape the mine. In those mines it is assumed that 1 location is needed to store SCSR devices in the primary escapeway and 1 location is needed in the alternate escapeway, for at total of 2 locations for the mine. The number of SCSR devices needed at each location equals the peak number of miners on the shift, to reflect seasonal and production variations, which was derived earlier. Table IV-D3 shows, by mine size, the first year and annualized costs to purchase SCSR devices that are needed in locations in mines where it takes more than 1 hour, but less than 2 hours, to escape the mine.

Table IV-D3: First Year and Annualized Costs for SCSR Devices Needed at Locations Along the Primary & Alternate Escapeways in Mines That Take Miners Between 1 to 2 hrs. to Evacuate the Mine

	<20	20-49	50-99	100-500	>500	Total
Mines That Take 1-2 Hrs. to Escape [a]	0	33	75	18	0	126
Total Locations Needed in Primary & Alternate Escapeways per Mine [b]	2	2	2	2	2	
No. of Escapeway Locations Where SCSRs are Needed	0	66	150	36	0	252
No. of SCSRs Needed at Each Location [c]	0	36	37	88	0	
Total No. of SCSRs for Escapeways 1-2 Hrs. - All Mines	0	2,347	5,541	3,157	0	11,045
Avg. Cost per SCSR	$582	$582	$582	$582	$582	
First Yr. Costs for SCSRs [d]	$0	$1,365,770	$3,224,133	$1,836,989	$0	$6,426,892
Factor to Annualize First Yr. Costs	0.1423	0.1423	0.1423	0.1423	0.1423	
First Yr. Costs Annualized	$0	$194,349	$458,794	$261,404	$0	$914,547

[a] Source: 1998 MSHA self-rescue device study, which examined, among other things, the distance from the working sections to the surface or to a designated safe location.

[b] 2 locations are needed in each mine where it takes a miner >1 hr., but <2 hrs. to escape the mine (1 location in the primary escapeway and 1 location in the alternate escapeway)..

[c] Source: Table IV-D1. The number of SCSR devices needed at each location is assumed to be the same as the peak number of miners on the shift.

[d] First Yr. Costs for SCSRs = Total No. of SCSRs for Escapeways 1-2 Hrs. All Mines (x) Avg. Cost per SCSR.

Next we need to estimate the number of SCSR devices that are stored in the primary escapeway and alternate escapeway in mines that take miners more than 2 hours to escape the mine. In those mines, we assume that 2 locations are needed to store SCSR devices in the primary escapeway and 2 locations are needed in the alternate escapeway, for a total of 4 locations for the mine. The number of SCSR devices needed at each location equals the peak number of miners on the shift, to reflect for seasonal and production variations, which was derived earlier. Table IV-D4 shows, by mine size, the first year and annualized costs to purchase SCSR devices that are needed in locations in mines where it takes more than 2 hours to escape the mine.

Table IV-D4: First Year and Annualized Costs for SCSR Devices Needed at Locations Along the Primary & Alternate Escapeways in Mines That Take Miners over 2 Hrs. to Evacuate the Mine

	<20	20-49	50-99	100-500	>500	Total
Mines That Take 2+ Hrs. to Escape [a]	0	0	0	61	8	69
Total Locations Needed in Primary & Alternate Escapeways per Mine [b]	4	4	4	4	4	
No. of Escapeway Locations Where SCSRs are Needed	0	0	0	244	32	276
No. of SCSRs Needed at Each Location [c]	0	0	0	88	225	
Total No. of SCSRs for Escapeways 2+ Hrs. - All Mines	0	0	0	21,397	7,187	28,583
Avg. Cost per SCSR	$582	$582	$582	$582	$582	
First Yr. Costs for SCSRs [d]	$0	$0	$0	$12,450,704	$4,181,960	$16,632,664
Factor to Annualize First Yr. Costs	0.1423	0.1423	0.1423	0.1423	0.1423	
First Yr. Costs Annualized	$0	$0	$0	$1,771,735	$595,093	$2,366,828

[a] Source: 1998 MSHA self-rescue study, which examined, among other things, the distance from the working sections to the surface or to a designated safe location.

[b] 4 locations are needed in each mine where it takes a miner >1 hr. and <2 hrs. to escape the mine (2 locations in the primary escapeway and 2 locations in the alternate escapeway).

[c] Source: Table IV-D1. The number of SCSR devices needed at each location is assumed to be the same as the peak number of miners on the shift.

[d] First Yr. Costs for SCSRs = Total No. of SCSrs for Escapeways 2+ Hrs. All Mines (x) Avg. Cost per SCSR.

Table IV-D5 shows, by mine size, the total first year and annualized costs to purchase SCSR devices as required by this ETS.

Table IV-D5: Total First Year and Annualized Costs to Purchase SCSR Devices

	<20	20 to 500	>500	Total
	First Year Costs	First Year Costs	First Year Costs	First Year Total Costs
Table IV-2D	$1,404,293	$10,506,205	$1,045,490	$12,955,988
Table IV-3D	$0	$6,426,892	$0	$6,426,892
Table IV-4D	$0	$12,450,704	$4,181,960	$16,632,664
Total	$1,404,293	$29,383,800	$5,227,450	$36,015,544
	Annualized Costs	Annualized Costs	Annualized Costs	Total Annualized Costs
Table IV-2D	$199,831	$1,495,033	$148,773	$1,843,637
Table IV-3D	$0	$914,547	$0	$914,547
Table IV-4D	$0	$1,771,735	$595,093	$2,366,828
Total	$199,831	$4,181,315	$743,866	$5,125,012

Cost to Purchase Boxes for SCSR Devices

On each mantrip, it is estimated that a large storage box can hold 12 SCSR devices. In Table IV-D6 the number of boxes needed for mantrips in all mines in each mine size was multiplied by $900 (the average cost of a padded storage box placed on a mantrip) to arrive at costs. The storage boxes are assumed to have a life of 10 years. Thus, Table IV-D6 shows, by mine size, the first year and annualized cost of storage boxes on mantrips.

Table IV-D6: First Year and Annualized Costs of Storage Boxes to be Placed on Mantrips

	<20	20-49	50-99	100-500	>500	Total
Peak No. of Miners per shift [a]	10	36	37	88	225	
No. of SCSRs That Fit into a Storage Box on a Mantrip	12	12	12	12	12	
No. of Storage Boxes Needed on Mantrips per shift [b]	1	3	4	8	19	
Avg. No. of Mines	237	235	75	79	8	
No. of Boxes Needed for all Mines in Each Mine Size	237	705	300	632	152	2,026
Avg. Cost of Storage Box Placed on Mantrip [c]	$900	$900	$900	$900	$900	
First Yr. Cost of Storage Boxes on Mantrips	$213,300	$634,500	$270,000	$568,800	$136,800	$1,823,400
Factor to Annualize First Yr. Costs	0.1423	0.1423	0.1423	0.1423	0.1423	
First Yr. Costs Annualized	$30,353	$90,289	$38,421	$80,940	$19,467	$259,470

[a] Source: Table IV-D1.

[b] No. of storage boxes needed on mantrip per shift = [no. of SCSRs per shift / 12] rounded up to the next highest integer; the number of SCSRs per shift equals the peak number of miners per shift.

[c] The cost of the storage box was provided by technical staff from MSHA's Directorate of Coal Mine Safety and Health.

With respect to storage locations in escapeways, it is estimated that a medium storage box is sufficient to hold 6 SCSR devices. The numbers of storage boxes needed in all storage locations were derived by multiplying the number of storage boxes needed per storage location by the total number of locations in all affected mines where storage boxes are needed. Then the total number of boxes needed in all affected storage locations was multiplied by $450 (the average cost of a medium storage box at a storage location) to arrive at the total cost of storage boxes at storage locations. In Table IV-D7, the number of storage boxes needed per storage location was rounded upward to make sure that enough boxes were purchased at each storage location. Table IV-D7 shows the first year and annualized costs of storage boxes at storage locations in mines.

Table IV-D7: First Year and Annualized Costs of Storage Boxes to be Placed at Storage Locations in Escapeways

	<20	20-49	50-99	100-500	>500	Total
Peak No. of Miners per Shift [a]	10	36	37	88	225	
No. of SCSRs That Fit into a Storage Box at Storage Locations	6	6	6	6	6	
No. of Storage Boxes Needed Per Storage Location [b]	2	6	7	15	38	
No. of Storage Locations Needed in Mines That Take Miners 1-2 Hours to Evacuate	0	66	150	36	0	252
No. of Storage Locations Needed in Mines That Take Miners 2+ Hours to Evacuate	0	0	0	244	32	276
Total No. of Locations in All Affected Mines Where Storage Boxes are Needed	0	66	150	280	32	528
Total No. of Boxes Needed in All Storage Locations [c]	0	396	1,050	4,200	1,216	6,862
Avg. Cost of Storage Box at Storage Locations [d]	$450	$450	$450	$450	$450	
First Yr. Cost of Storage Boxes at Storage Locations	$0	$178,200	$472,500	$1,890,000	$547,200	$3,087,900
Factor to Annualize First Yr. Costs	0.1423	0.1423	0.1423	0.1423	0.1423	
First Yr. Costs Annualized	$0	$25,358	$67,237	$268,947	$77,867	$439,408

[a] Source: Table IV-D1.

[b] No. of storage boxes needed per storage location = [no. of SCSRs needed per storage location / 6] rounded up to the next highest integer; the number of SCSRs needed per storage location equals the peak number of miners per shift.

[c] No. of Storage Boxes Needed Per Storage Location (x) Total No. of Locations in All Affected Mines Where Storage Boxes are Needed.

[d] The cost of the storage box was privded by technical staff from MSHA's Directorate of Coal Mine Safety and Health.

Costs to Retrofit Mantrips

There are 237 MMUs in mines having fewer than 20 employees; 641 MMUs in mines having 20 to 500 employees; and 53 MMUs in mines having more than 500

employees.[25] We assume that there is one mantrip for each MMU. Currently, not all mantrips in mines will be able to carry large storage boxes needed to hold SCSR devices, and therefore must be retrofitted. We estimate that 50 percent of all mantrips in mines will need to be retrofitted to hold the larger storage boxes. Thus, we estimate that 119 mantrips will need to be retrofitted in mines having fewer than 20 employees (237 x 50%); 321 mantrips will need to be retrofitted in mines having 20 to 500 employees (641 x 50%); and 27 mantrips will need to be retrofitted in mines having more than 500 employees (53 x 50%). Retrofit costs per MMU (including labor costs) are estimated to be $500.

In addition, if a mantrip leaves a working section, during the shift, to go to another area of the mine, then it is assumed that the large storage box will be taken off the mantrip and left on the working section. Some SCSR devices will be taken out of the large storage box and placed into a small box which will be put on the mantrip leaving the working section. MSHA assumes that 50% of the mantrips will sometime during the working shift leave the working section and therefore need a small storage box for SCSR devices. The cost of the smaller box is estimated to be $100.

Thus, for 50 percent of the mantrips, there will be a total cost of $600 per mantrip ($500 retrofit cost plus $100 for small storage box). Both the retrofit and small box are assumed to last for 10 years. Table IV-D8 shows, by mine size, the first year and annualized cost to retrofit mantrips to hold large storage boxes and to purchase small boxes.

Table IV-D8: First Year and Annualized Costs to Retrofit Mantrips and Purchase Small Storage Boxes

	<20	20-500	>500	First Year Costs	Annualized Costs
No. of Mantrips Needing to be Retrofitted	119	321	27		
Costs per Mantrip [a]	$600	$600	$600		
First Year Costs to Retrofit Mantrips	$71,400	$192,600	$16,200	$280,200	
Annualized Costs [b]	$10,160	$27,407	$2,305		$39,872

[a] $600 = $500 for retrofit + $100 cost of small box.

[b] Annualized Costs = (First year costs to retofit mantrips + cost of small box) (x) 0.1423, where 0.1423 is the annualizaiton factor.

Inspection and Recordkeeping Required by Existing §75.1714-3

[25] An MMU is a Mechanized Mining Unit which means: (1) A unit of mining equipment including hand loading equipment used for the production of material; or (2) a specialized unit which utilizes mining equipment other than specified in §70.207(e) (Bimonthly sampling; mechanized mining units).

All stored additional SCSR devices required by this rulemaking must be inspected in accordance with existing §75.1714-3(a) and (d). Accordingly, we estimate that the SCSR devices will be inspected every 90 days (or 4 times per year). The inspection will take 1.5 minutes (0.025 hours) per SCSR device and be conducted by a supervisor earning $57.82 an hour. Table IV-D9 shows, by mine size, the annual cost to inspect the additional SCSR devices required by this ETS.

Table IV-D9: Annual Costs to Inspect SCSRs

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mine Size	Total No. of SCSRs in Storage Locations on Mantrips	Total No. of SCSRs in Storage Locations Excluding Mantrips	Time to Inspect per SCSR	No. of Inspections per Yr.	Supv. Wage Rate per hr.	Annual Costs to Inspect [a]
<20	2,413	0	0.025	4	$57.82	$13,954
20-500	18,055	32,441	0.025	4	$57.82	$291,970
>500	1,797	7,187	0.025	4	$57.82	$51,942
Total	22,265	39,628				$357,865

[a] Annual Cost to Inspect = (col. 2 + col. 3) x col. 4 x col. 5 x col. 6.

MSHA assumes that 0.5 percent of the stored SCSR devices that are inspected will be found to be defective and will need to be replaced. The average cost of an SCSR device is $582. Table IV-D10 shows, by mine size, the annual cost to replace defective SCSR devices found during inspection.

Table IV-D10: Annual Costs to Replace Defective SCSRs Found During Inspections

Mine Size	No. of Defective SCSRs Found During Each Inspection [a]	No. of Inspections per Yr.	SCSR Replace-ment Cost	Annual Costs to Replace SCSRs
<20	12	4	$582	$28,086
20-500	252	4	$582	$587,676
>500	45	4	$582	$104,549
Total	309			$720,311

[a] Table IV-D9 (col. 2 + col.3) x 0.005.

After each inspection the person making the inspection must certify by signature and date that the inspection was performed. Certifying by signature and date is estimated

to take 0.01 hours (36 seconds) per certification. Table IV-D11 shows, by mine size, the annual cost to certify by signature and date that the SCSR inspections was performed.

Table IV-D11: Annual Costs to Certify that SCSR Inspections Were Performed

(1)	(2)	(3)	(4)	(5)	(6)
Mine Size	Total No. of SCSRs Storage Locations on Mantrips	Total No. of SCSRs in Storage Locations Excluding Mantrips	Time to Certify Inspection per Yr. (in hrs.) [a]	Superv. Wage Rate per hr.	Annual Costs to Inspect [b]
<20	2,413	0	0.04	$57.82	$5,581
20-500	18,055	32,441	0.04	$57.82	$116,788
>500	1,797	7,187	0.04	$57.82	$20,777
Total	22,265	39,628			$143,146

[a] 0.04 = 0.01 hrs. to certify an inspection x 4 times per yr.

[b] Annual Costs to Inspect = (col. 2 +col. 3) x col. 4 x col. 5.

For 0.5 percent of the inspections where a defective SCSR device was found a record has to be made of the corrective actions taken. MSHA estimates that it takes a supervisor, earning $57.82 an hour, 1.5 minutes (0.025 hours) to make such a record. Table IV-D12 shows, by mine size, the annual cost to make a corrective action record.

Table IV-D12: Annual Costs to Make Record of Corrective Actions

Mine Size	No. of Defective SCSRs Found During Each Inspection	Annual Inspections per Yr.	Time to Make Each Record	Superv. Wage Rate per Hour	Annual Costs to Make Record
<20	12	4	0.025	$57.82	$70
20-500	252	4	0.025	$57.82	$1,460
>500	45	4	0.025	$57.82	$260
Total	309				$1,789

As a result of this rule, some mines will need to store SCSR devices at locations in the primary escapeway and alternate escapeway. If SCSR devices are stored at these locations, then the mine operator will need an outby SCSR storage plan. Currently, some mines already have a storage plan that may cover some outby areas. However, as a result of this rule, those mines will need to revise their storage plans. Since this rule will have a

major impact on the location of SCSR devices throughout the mine, it is assumed that to revise or to create an outby storage plan to hold SCSR devices will take the same amount of time.

We estimate that it takes 1 hour in mines that have fewer than 20 employees, and 2 hours in mines that have 20 or more employees, to create or revise an outby storage plan. A mine supervisor, earning $57.82 an hour, will revise or create the storage plan. A clerical worker, earning $20.96 per hour will take 0.1 hours (6 minutes) to copy the plan to send to MSHA. Postage costs are estimated to be $2. The cost to copy a plan is estimated to be $2. Table IV-D13 shows, by mine size, the first year and annualized costs to revise or create an outby storage plan.

Table IV-D13: First Year and Annualized Costs to Write Outby SCSR Storage Plan

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mine Size	No. of Mines [a]	Time to Write & Copy Plan per Mine	Adj. Wage Rate per Hour [b]	Postage & Copy Costs per Mailing [c]	First Year Costs to Write a Plan [d]	Annual-ized Costs to Write a Plan [e]
<20	0	1.1	$54.47	$4	$0	$0
20-500	187	2.1	$56.06	$4	$22,765	$3,239
>500	8	2.1	$56.06	$4	$974	$139
Total	195				$23,739	$3,378

[a] Source: Table IV-D3 and Table IV-D4.

[b] For <20 mines = ((1 hr. / 1.1 hrs.) x $57.82 superv. wage/hr.) + ((0.1 hrs. / 1.1 hrs. x $20.96 clerical wage/hr.
For>20 mines = ((2 hr. / 2.1 hrs.) x $57.82 superv. wage/hr.) + ((0.1 hrs. / 2.1 hrs. x $20.96 clerical wage/hr.

[c] $4 = $2 per mailing + ($2 copy costs x 1 plan).

[d] First Year Costs = (col. 2 x (col. 3 x col.4)) + (col. 2 x col. 5).

[e] Annualized Costs = Frist Year Costs (x) 0.07, where 0.07 is the annualization factor.

For mines where it takes miners more than 1 hour to evacuate the mine, a performance test will need to be conducted as part of developing an outby storage plan. This performance test is conducted in order to determine the location for storage boxes that contain SCSR devices. We expect that a typical performance test would be conducted 3 different times and the results then averaged together. Separate performance tests would need to be conducted in the primary escapeway and alternate escapeway. Thus, we estimate each affected mine will conduct a minimum of 6 performance tests (3 tests in the primary escapeway and 3 tests in the alternate escapeway).

On average, in mines that take miners between 1 and 2 hours to evacuate the mine, it is estimated to take 1.5 hours to conduct 1 performance test. Thus, performance tests in a mine where miners take between 1 and 2 hours to evacuate will take 9 hours for one person (1.5 hours per test x 3 tests x 2 escapeways). Since the performance tests are monitored by a supervisor to keep account of the time it takes a miner to travel the escapeways, a total of 18 hours is needed to conduct all three tests (9 hours for the supervisor and 9 hours for the miner).

On average, in mines that take miners 2 or more hours to evacuate the mine, it is estimated to take 3 hours to conduct 1 performance test. Thus, performance tests in a mine where miners take more than 2 hours to evacuate will take 18 hours per person (3 hours per test x 3 tests x 2 escapeways). Again, since the performance tests are conducted on a miner and monitored by a supervisor, a total of 36 hours is needed to conduct all three tests (18 hours for the supervisor and 18 hours for the miner).

A heart rate monitor costing $100, and lasting 10 years, is needed to conduct the tests. The supervisor's hourly wage rate is $57.82 and the miner's hourly wage rate is $26.55. First year costs of the tests are annualized using a 7 percent annualiztion rate. Table IV-D14 shows, by mine size, the first year and annualized costs to conduct performance tests in mines that take miners from 1 to 2 hours to evacuate.

Table IV-D14: First Year and Annualized Costs to Conduct Performance Tests in Mines that Take Miners Between 1-2 Hours to Evacuate

Mine Size	No. of Mines That Take 1-2 Hours to Escape [a]	Time For All Tests in Hrs. [b]	Avg. Wage Rate per Hour [c]	First Year Costs	Annualized Costs [d]
<20	0	18	$42.19	$0	$0
20-500	177	18	$42.19	$134,022	$9,382
>500	0	18	$42.19	$0	$0
Sub-Total	177			$134,022	$9,382
	No. of Mines That Take 1-2 Hours to Escape [a]	Heart Rate Monitor Cost		First Year Costs	Annualized Costs [e]
<20	0	$100		$0	$0
20-500	177	$100		$17,650	$2,512
>500	0	$100		$0	$0
Sub-Total	177			$17,650	$2,512
Total				$151,672	$11,893

[a] Source: Table IV-D1 and Table IV-D3. Includes all mines where miners take 1-2 hrs. to evacuate the mine plus 25% of mines that have 20 to 49 employees that need to verify by the test that miners will not need more than 1 hr. to evacuate the mine.

[b] 18 hrs. = (1.5 hrs per test x 3 tests x 2 escapeways) x 2 persons

[c] $42.19 = ($26.55 miner hourly wage + $57.82 superv. Hourly wage) / 2

[d] Costs annualized using a factor of 0.07

[e] Costs annualized using a factor of 0.1423

Table IV-D15 shows, by mine size, the first year and annualized costs to conduct performance tests in mines that take miners more than 2 hours to evacuate.

Table IV-D15: First Year and Annualized Costs to Conduct Performance Tests in Mines that Take Miners More Than 2 Hours to Evacuate

Mine Size	No. of Mines That Take 2+ Hours to Escape [a]	Time For All Tests in Hrs. [b]	Adjusted Wage Rate Per Hour [c]	First Year Costs	Annualized Costs [d]
<20	0	36	$42.19	$0	$0
20-500	61	36	$42.19	$92,638	$6,485
>500	8	36	$42.19	$12,149	$850
Sub-Total	69			$104,788	$7,335
	No. of Mines That Take 2+ Hours to Escape [a]	Heart Rate Monitor Cost		First Year Costs	Annualized Costs [e]
<20	0	$100		$0	$0
20-500	61	$100		$6,100	$868
>500	8	$100		$800	$114
Sub-Total	69			$6,900	$982
Total				$111,688	$8,317

[a] Source: Table IV-D4.

[b] 36 hrs. = (3 hrs per test x 3 tests x 2 escapeways) x 2 persons

[c] $42.19 = ($26.55 miner hourly wage + $57.82 superv. Hourly wage) / 2

[d] Costs annualized using a factor of 0.07

[e] Costs annualized using a factor of 0.1423

Signs Required by §75.1714-4(e)

Section 75.17-14-4(e) requires that, at each storage location, a sign made of reflective material be conspicuously posted which reads "SELF-RESCUER" or "SELF-RESCUERS." These signs will be posted in the primary escapeway and alternate escapeway. The number of signs needed at storage locations where SCSR devices are stored are: 2 signs in each mine that take miners between 1 and 2 hours to evacuate; and 4 signs in each mine that take miners more than 2 hours to evacuate. MSHA estimates that the cost of a sign placed at a storage location, lasting 10 years, is $50. Table IV-D16 shows, by mine size, the cost of signs that are placed at storage locations.

Table IV-D16: First Year and Annualized Costs For Signs Needed at Storage Locations

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mine Size	No. of Mines That That Take 1-2 Hours to Escape [a]	No. of Signs Needed per Mine That Takes 1-2 Hours to Escape	No. of Mines That That Take 2+ Hours to Escape [b]	No. of Signs Needed per Mine That Takes 1-2 Hours to Escape	Cost per Sign	First Year Costs [c]	Annual-ized Costs [d]
<20	0	2	0	4	$50	$0	$0
20-500	126	2	61	4	$50	$24,800	$3,529
>500	0	2	8	4	$50	$1,600	$228
Total	126		69			$26,400	$3,757

[a] Source: Table IV-D3.

[b] Source: Table IV-D4.

[c] First Year Costs = ((col. 2 x col. 3) + (col. 4 x col. 5)) x col. 6.

[d] Annualized Costs = First Year Costs x 0.1423.

In addition, §75.17-14-4(e) requires that directional signs be placed in the mine to direct miners to storage locations where SCSR devices are stored. It is assumed that two directional signs will be needed for each storage location (directional signs placed somewhere along the escapeway on each side of the storage location leading miners to the SCSRs at the storage location).

We estimate that in mines that take miners between 1 and 2 hours to evacuate the mine 2 storage signs are needed (1 in the primary escapeway and 1 in the alternate escapeway). Thus, in these mines 4 directional signs will be needed. Also, we estimate that in mines that take miners more than 2 hours to evacuate the mine 4 storage signs are needed (2 in the primary escapeway and 2 in the alternate escapeway). Thus, in these mines 8 directional signs will be needed.

MSHA estimates that the cost of a directional sign, lasting 10 years, is $25. Table IV-D17 shows, by mine size, the cost of signs placed in the mine to direct persons to storage locations where SCSRs are stored.

Table IV-D17: First Year and Annualized Costs
For Directional Signs Needed to Locate Storage Areas

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mine Size	No. of Mines That That Take 1-2 Hours to Escape [a]	No. of Directional Signs Needed per Mine That Takes 1-2 Hours to Escape	No. of Mines That That Take 2+ Hours to Escape [b]	No. of Directional Signs Needed per Mine That Takes 1-2 Hours to Escape	Cost per Sign	First Year Costs [c]	Annual-ized Costs [d]
<20	0	4	0	8	$25	$0	$0
20-500	126	4	61	8	$25	$24,800	$3,529
>500	0	4	8	8	$25	$1,600	$228
Total	126		69			$26,400	$3,757

[a] Source: Table IV-D3.

[b] Source: Table IV-D4.

[c] First Year Costs = ((col.2 x col. 3) + (col. 4 x col. 5)) x col.6

[d] Annualized Costs = First Year Costs x 0.1423

Revision of Maps Required by §75.383(a) and §75.1200

Section 75.17-14-4(f) requires the operator to revise the mine evacuation map and the mine map to include the storage locations of all SCSR devices. The mine evacuation map is required by existing §75.383(a) and the mine map is required by existing §75.1200. We estimate that it takes a supervisor 0.25 hours (15 minutes) to revise each map. In addition, the revised mine maps will need to be sent to MSHA. Postage is estimated at $2 per mailing. Furthermore, the revised mine evacuation map required by §75.383(a) will need to be copied twice in order to post one copy on the mine bulletin board, and send another copy to MSHA. The revised mine map required by §75.1200 does not have to be posted and thus only one copy will need to be made to send to MSHA. The cost to copy either map is estimated to be $2. A clerical worker, earning $20.96 per hour, is estimated to take 0.1 hours (6 minutes) to copy and post/mail the mine map. Table IV-D18 shows, by mine size, the first year and annualized cost to revise the mine evacuation map required by§75.383(a) and send it to MSHA.

Table IV-D18: First Year and Annualized Costs to Revise, Copy, Mail, and Post Map, as Required by 75.383(a)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mine Size	No. of Mines [a]	Time to Revise & Post Map in hrs.	Adj. Wage Rate per Hour [b]	Postage & Copy Costs per Mailing [c]	First Year Costs [d]	Annual-ized Costs [e]
20	0	0.35	$47.29	$6	$0	$0
20-500	187	0.35	$47.29	$6	$4,217	$295
>500	8	0.35	$47.29	$6	$180	$13
Total	195				$4,397	$308

[a] Source: Table IV-D13.

[b] ((0.25 hrs. / 0.35 hrs.) x $57.82 supervisor wage/hr.) +((0.1 hrs. / 0.35 hrs.) x $20.96 clerical wage/hr.)

[c] $6 = ($2 per mailing + ($2 copy costs x 2 maps)).

[d] First Year Costs = (col. 2 x (col. 3 x col. 4)) + (col. 2 x col. 5).

[e] Annualized Costs = First Year Costs x 0.07.

Table IV-D19 shows, by mine size, the first year and annualized cost to revise the mine evacuation map required by §75.1200 and send it to MSHA.

Table IV-D19: First Year and Annualized Costs to Revise Map Required by 75.1200

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mine Size	No. of Mines [a]	Time to Revise & Copy Map in hrs.	Adj. Wage Rate per Hour [b]	Postage & Copy Costs per Mailing [c]	First Year Costs [d]	Annual-ized Costs [e]
20	0	0.35	$47.29	$4	$0	$0
20-500	187	0.35	$47.29	$4	$3,843	$269
>500	8	0.35	$47.29	$4	$164	$12
Total	195				$4,007	$281

[a] Source: Table IV-D13.

[b] ((0.25 hrs. / 0.35 hrs.) x $57.82 superv. wage/hr.) + ((0.1 hrs. / 0.35 hrs. x $20.96 clerical wage/hr.

[c] $4 = $2 per mailing + ($2 copy costs x 1 map).

[d] First Year Costs = (col. 2 x (col. 3 x col. 4)) + (col. 2 x col. 5).

[e] Annualized Costs = First Year Costs x 0.07

Costs for New Mines

Based on a five year data run conducted by MSHA's Office of Program Evaluation and Information Resources (PEIR), the proportion of all underground coal mines that are new each year is about 20 percent for those mines having fewer than 20 employees, about 9 percent for mines having 20 to 500 employees, and 0 percent for mines having more than 500 workers. Therefore, we estimate that the costs for new mines each year will be: 20 percent of the first year costs for mines that have fewer than 20 employees; 9 percent of the first year costs for mines that have 20 to 500 employees; and 0 percent of the mines that have more than 500 employees. These costs are assumed to begin in the second year and continue every year thereafter. Table IV-D20 shows, by mine size, the annual costs beginning in year 2 and continuing thereafter for new mines.

Table IV-D20: Annual Costs for New Mines

Provision	<20 [a]	20-500 [b]	>500	Total
Purchase SCSRs (Table IV-D5)	$262,485	$2,471,535	$0	$2,734,019
Storage Boxes on Mantrips (Table IV-D6)	$39,869	$123,922	$0	$163,792
Purchase Storage Boxes for Storage Locations (Table IV-D7)	$0	$213,704	$0	$213,704
Retrofit Mantrips & Purchase Small Storage Boxes (Table IV-D8)	$13,346	$16,200	$0	$29,546
Cost to Write Mine Storage Plan (Table IV-D13)	$0	$1,915	$0	$1,915
Cost of Performance Test for Mine taking 1-2 Hours to Evacuate (Table IV-14)	$0	$127,574	$0	$127,574
Cost of Performance Test for Mine taking 2+ Hours to Evacuate (Table IV-15)	$0	$83,051	$0	$83,051
Cost of Signs at Storage Locations (Table IV-D16)	$0	$2,086	$0	$2,086
Cost of Directonal Signs (Table IV-D17)	$0	$2,086	$0	$2,086
Cost to Revise Map Under 75.383(a) (Table IV-D18)	$0	$355	$0	$355
Cost to Revise Map Under 75.1200 (Table IV-D19)	$0	$323	$0	$323
Total Annual Costs For New Mines	$315,700	$3,042,751	$0	$3,358,450

[a] <20 mines costs = ((First Year costs x 0.20) / 1.07), where 1.07 reflects the fact that annual costs begin in year 2.

[b] 20 to 500 mines costs = ((First Year Costs x 0.09) / 1.07), where 1.07 reflects the fact that annual costs begin in year 2.

Summary of Yearly Costs for §75.1714-4

Table IV-21 provides a summary of the yearly costs for §75.1714-4, which relates to the requirements for additional SCSR devices. Yearly costs are arrived at by adding annualized costs and annual costs.

Table IV-D21: Summary of Yearly Costs for 75.1714 *

Provision	<20	20-500	>500	Total
Purchase SCSRs (Table IV-D5)	$199,831	$4,181,315	$743,866	$5,125,012
Mantrips Storage (Table IV-D6)	$30,353	$209,651	$19,467	$259,470
Storage Locations (Table IV-D7)	$0	$361,542	$77,867	$439,408
Retrofit & Storage (Table IV-D8)	$10,160	$27,407	$2,305	$39,872
Inspection SCSRs (Table IV-D9)	$13,954	$291,970	$51,942	$357,865
Replace SCSRs (Table IV-10)	$28,086	$587,676	$104,549	$720,311
Certification (Table IV-D11)	$5,581	$116,788	$20,777	$143,146
Corrective Record (Table IV-D12)	$70	$1,460	$260	$1,789
Write Plan (Table IV-D13)	$0	$3,239	$139	$3,378
1-2 Hr. Test (Table IV-14)	$0	$11,893	$0	$11,893
2+ Hr. Test (Table IV-15)	$0	$7,353	$964	$8,317
Storage Signs (Table IV-D16)	$0	$3,529	$228	$3,757
Directional Signs (Table IV-D17)	$0	$3,529	$228	$3,757
75.383(a) Map (Table IV-D18)	$0	$295	$13	$308
75.1200 Map (Table IV-D19)	$0	$269	$12	$281
New Mines (Table IV-D20)	$315,700	$3,042,751	$0	$3,358,450
Total Yearly Costs	$603,734	$8,850,665	$1,022,615	$10,477,014

* Yearly Costs = annualized costs + annual costs.

FEASIBILITY

As discussed in the preamble of this emergency temporary standard, we have concluded that the requirements of the ETS are technologically and economically feasible.

Technological Feasibility

The ETS contains immediate notification provisions, which apply to all mines. These provisions are definitional and clarify existing requirements. As such, they are technologically feasible.

The ETS also involves the purchase, installation, and maintenance of and lifelines, as well as evacuation training in the use of this equipment. These requirements, which apply only to underground coal mines, are not technology-forcing and would not involve activities on the frontiers of scientific knowledge. SCSRs and lifelines are proven technologies long available in the marketplace and already installed and used in the underground coal mining industry.

Economic Feasibility

Because the immediate notification provisions of the ETS are definitional and clarify existing requirements, we expect that they will impose no additional costs on the mining industry. We therefore conclude that these provisions are economically feasible for the mining industry.

The yearly compliance costs of the ETS (of $18.9 million) are equal to about 0.2 percent of annual revenues (of $11.1 billion in 2004) for all underground coal mines. Insofar as the total compliance costs are well below one percent of the estimated revenues for all underground coal mines, we conclude that the ETS is economically feasible for these mines.

V. REGULATORY FLEXIBILITY CERTIFICATION

INTRODUCTION

Pursuant to the Regulatory Flexibility Act of 1980 as amended, we have analyzed the impact of the ETS on small businesses. Further, we have made a determination with respect to whether or not the Agency can certify that the rule will not have a significant economic impact on a substantial number of small entities that are covered by this rulemaking. Under the Small Business Regulatory Enforcement Fairness Act (SBREFA) amendments to the Regulatory Flexibility Act (RFA), we must include in the ETS a factual basis for this certification. If the ETS has a significant economic impact on a substantial number of small entities, then we must develop a regulatory flexibility analysis.

DEFINITION OF A SMALL MINE

Under the RFA, in analyzing the impact of a rule on small entities, we must use the SBA definition for a small entity or, after consultation with the SBA Office of Advocacy, establish an alternative definition for the mining industry by publishing that definition in the *Federal Register* for notice and comment. We have not taken such an action and, hence, are 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). Almost all of the underground coal mines affected by this rulemaking fall into this category. Consequently, they can be viewed as sharing the special regulatory concerns which the RFA was designed to address.

Traditionally, MSHA has also looked at the impacts of its rules on a subset of mines with 500 or fewer employees—those with fewer than 20 employees, which the mining community refers to as "small mines." These small mines differ from larger mines not only in the number of employees, but also, among other things, in economies of scale in material produced, in the type and amount of production equipment, and in supply inventory. Therefore, the costs to small mines of complying with our rules and the impact of our rules on them will also tend to be different. It is for this reason that "small mines," as traditionally defined by the mining community, are of special concern to MSHA.

This analysis complies with the legal requirements of the RFA for an analysis of the impacts on "small entities" while continuing MSHA's traditional definition of "small mines." The Agency concludes that it can certify that the ETS would not have a significant economic impact on a substantial number of small entities that are covered by this rulemaking. MSHA has determined that this is the case both for mines affected by this rulemaking with fewer than 20 employees and for mines affected by this rulemaking with 500 or fewer employees.

FACTUAL BASIS FOR CERTIFICATION

General Approach

Our analysis of impacts on "small entities" begins with a "screening" analysis. The screening compares the estimated compliance costs of a rule for small entities in the sector affected by the rule to the estimated revenues for those small entities. When estimated compliance costs are less than 1 percent of the estimated revenues, we consider that it is generally appropriate to conclude that there is no significant economic impact on a substantial number of small entities. When estimated compliance costs equal or exceed 1 percent of revenues, it tends to indicate that further analysis may be warranted.[26]

Derivation of Costs and Revenues

The compliance costs noted in this chapter were previously presented in Chapter IV of this document along with an explanation of how they were derived. All underground coal mine operators are covered by the rule. In determining revenues for underground coal mine operators, we multiplied their production data (in tons) by the 2004 price per ton of the commodity ($30.36 per ton for underground production). The production data were obtained from MSHA's Program Evaluation and Information Resources (PEIR) data,[27] and the coal price estimate was calculated from Department of Energy data.[28]

Results of Screening Analysis

The ETS contains immediate notification provisions, which apply to all mines in the mining industry. These provisions are definitional and clarify existing requirements. We expect that they will impose no additional costs on the mining industry. We therefore conclude that these immediate notification provisions will not have a significant economic impact on a substantial number of small entities in the mining industry.

The rest of the ETS applies to all underground coal mine operators. Table V-1 shows that the estimated yearly cost of the rule as a percentage of yearly revenues is about 0.39 percent for underground coal mines with fewer than 20 employees and about 0.18 percent for underground coal operators with 500 or fewer employees.

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[26] MSHA has traditionally used a revenue screening test—whether the yearly costs of a regulation equal or exceed 1 percent of revenues—to determine whether the regulation might possibly have a significant economic impact on a substantial number of small entities. The Agency recognizes the theoretical usefulness of evaluating the effects of a regulation on profits (rather than on revenues). MSHA is currently investigating the future use of profitability analysis to evaluate whether its rules will have a significant impact on a substantial number of small entities. However, given that the yearly net cost of the ETS are less than 0.5 percent of yearly revenues both for small underground coal mines with fewer than 20 employees and for small underground coal mines with 500 or fewer employees, MSHA is confident that, given the selection and use of any reasonable profitability test, the ETS will not have a significant economic effect on a substantial number of small entities.

[27] U. S. Department of Labor, Mine safety and Health Administration, Program Evaluation and Information Resources, Calendar Year 2004 data.

[28] The 2004 coal price per ton was obtained from the U.S. Department of Energy, Energy Information Administration, *Annual Coal Report 2004*, Table 28, November 2005.

Table V-1: Yearly Cost Relative to Revenue

Mine Size	Yearly Cost of ETS	Estimated Underground Coal Revenue	Cost as Percentage of Revenue
< 20	$ 1,221,932	$ 315,005,038	0.39%
≤ 500	$ 16,834,516	$ 9,488,466,936	0.18%

2004 Underground Coal Production data from U.S. Department of Labor, Mine safety and Health Administration, Program Evaluation and Information Resources, Coal price data from U.S. Department of Energy, Energy Information Administarion, *Annual Coal Report 2004* . Table 28, November 2005.

Using both MSHA's definition and SBA's definition of a small mine, the estimated yearly cost for small underground coal mines to comply with the ETS is substantially less than 1 percent of their estimated yearly revenues, well below the level suggesting that they might have a significant economic impact on a substantial number of small entities. Accordingly, we have certified that the ETS will not have a significant economic impact on a substantial number of small entities that are covered by the ETS.

VI. OTHER REGULATORY CONSIDERATIONS

THE UNFUNDED MANDATES REFORM ACT

This ETS 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 annually, nor does it significantly or uniquely affect small governments. Accordingly, the Unfunded Mandates Reform Act of 1995 (2 USC 1501 *et seq.*) requires no further agency action or analysis.

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

This ETS has no affect on family well-being or stability, marital commitment, parental rights or authority, or income or poverty of families and children. Accordingly, Section 654 of the Treasury and General Government Appropriations Act of 1999 (5 USC 601 note) requires no further agency action, analysis, or assessment.

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

This ETS does not implement a policy with takings implications. Accordingly, Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, requires no further agency action or analysis.

EXECUTIVE ORDER 12988: CIVIL JUSTICE REFORM

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

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

This ETS has no adverse impact on children. Accordingly, Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, as amended by Executive Orders 13229 and 13296, requires no further agency action or analysis.

EXECUTIVE ORDER 13132: FEDERALISM

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

EXECUTIVE ORDER 13175: CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

This ETS 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, Consultation and Coordination with Indian Tribal Governments, requires no further agency action or analysis.

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

We have reviewed this ETS for its impact on the supply, distribution, and use of energy because it applies to the underground coal mining sector. Insofar as this ETS will impose total yearly costs of approximately $18.9 million on the underground coal mining industry, relative to annual revenues of about $11.1 billion (in 2004), we have concluded that the ETS will not significantly reduce the price of coal or increase its price. Consequently, we have concluded that this ETS 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, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, requires no further agency action or analysis.

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

We have thoroughly reviewed this ETS to assess and take appropriate account of its potential impact on small businesses, small governmental jurisdictions, and small organizations. As discussed in Chapter V of this REA, MSHA has determined and certified that this ETS will not have a significant economic impact on a substantial number of small entities. Accordingly, Executive Order 13272, Proper Consideration of Small Entities in Agency Rulemaking, requires no further Agency action or analysis.

VII. PAPERWORK REDUCTION ACT OF 1995

INTRODUCTION

The purpose of this chapter is to show the estimated paperwork burden hours and related costs to be borne by underground coal mine operators as a result of the ETS. In this chapter, the burden hours and related costs in §48.3, §75.1502, §75.1714-3, §75.1714-4, and §75.1714-5 are discussed.

SUMMARY OF PAPERWORK BURDEN HOURS AND RELATED COSTS

This ETS contains the following types of burden: first year burden that only occurs in the first year of the rule; annual burden that occurs in the first year of the rule and continues for every year thereafter; and annual burden that occurs in the second year of the rule and continues for every year thereafter.

We estimate that mine operators will incur 17,547 burden hours and $533,601 of related yearly costs in the first year that the rule is in effect. In the second year that the rule is in effect, and for every year thereafter, we estimate that mine operators will incur 9,226 burden hours and $525,739 of related yearly costs.[29] Table VII-1 shows, by mine size, a summary of the annual burden hours and costs discussed above.

Table VII-1: Summary of Paperwork Burden Hours and Costs [a]

	<20		20 to 500		>500		Total	
Year	Hrs.	Yearly Costs [b]	Hrs.	Yearly Costs [b]	Hrs.	Yearly Costs [b]	Hrs.	Yearly Costs [b]
Burden Hours and Costs [a]								
First Yr.	1,081	$22,529	14,839	$436,877	1,627	$74,195	17,547	$533,601
Second Yr.	339	$19,605	7,625	$433,155	1,262	$72,979	9,226	$525,739
Third Yr.	339	$19,605	7,625	$433,155	1,262	$72,979	9,226	$525,739

[a] Figures from Table VII-A1, Table VII-D10, Table VII-D11, and Table VII-D12

[b] Yearly costs = annualized costs + annual costs. In the second year, and every year thereafter, annualized costs are zero.

Under §48.3(p) underground coal mine operators are required to submit a revised training plan to reflect the new requirements in § 48.5 training of new miners, § 48.6 experienced miner training, § 48.8 annual refresher training, and § 48.11 hazard training. It takes a safety director approximately—an hour at a small mine; and 1.5 hours at a large mine—to revise the training plan. The hourly wage rate for a safety director is about $57.82. In addition, a secretary takes—about 3 minutes at a small mine; and 5 minutes at a large mine—to print the training plan and send it to MSHA. The hourly wage rate for a

[29] Yearly costs in the first year equals first year costs annualized plus annual costs. Since first year costs annualized occur only in the first year, yearly costs in the second year, and for every year thereafter, equals annual costs only.

clerical worker is $20.96. Table VII-A1 shows first-year burden hours, annualized costs, and annual costs related to revising training plans.

In addition, under §75.1502(d) each underground coal mine operator is required to include scenarios of various mine emergencies (fires, explosions, or gas or water inundations) and the best options for evacuation under each type of emergency in its approved program of instruction. It takes a safety director approximately—2 hours at a small mine; 3 hours at a large (20-500) mine; and 5 hours at a large (>500) mine—to update the company's program of instruction. The hourly wage rate for a safety director is about $57.82. In addition, it takes a clerical worker about 5 minutes working at a small mine and 10 minutes working at a large mine to prepare mailing in the updated program of instruction and post it on a mine bulletin board (1 posting at a small mine; and 2 postings at a large mine). Table VII-A1 shows first year and annualized cost.

Table VII-A1: First-Year Only Paperwork Burden for Underground Coal Mines Pertaining to Training

Mine Size	Underground Coal Mines									Total		
	Small (< 20)			Large (20-500)			Large (> 500)					
	Hours	First-Year Cost	Annualized Cost[c]	Hours	First-Year Cost	Annualized Cost[c]	Hours	First-Year Cost	Annualized Cost[c]	Hours	First-Year Cost	Annualized Cost[c]
Revise Training Plan[a]	249	$ 13,952	$ 977	616	$ 34,417	$ 2,409	13	$ 708	$ 50	877	$ 49,077	$ 3,435
Update Program of Instruction[b]	494	$ 27,821	$ 1,947	1,232	$ 68,835	$ 4,818	41	$ 2,341	$ 164	1767	$ 98,996	$ 6,930
Total	743	$ 41,772	$ 2,924	1,848	$103,252	$ 7,228	54	$ 3,049	$ 213	2644	$148,073	$ 10,365

[a] Source: Table IV-A1. It takes a safety director approximately one hour at a small mine and 1.5 hours at a large mine to revise the training plan. The hourly wage rate for a safety director is about $57.82. In addition, a secretary takes about 3 minutes at a small mine and 5 minutes at a large mine to print the training plan and send it to MSHA.

[b] Source: Table IV-A6. To update a program of instruction with MSHA compliance assistance, it takes a safety director about 2 hours for a small mine, 3 hours for a large mine and 5 hours for a large mine. In addition, it takes a secretary about 5 minutes for a small mine, 10 minutes for a large mine to prepare mailing and to post to a mine bulletin board.

[c] annualized cost = (first-year cost x a), where a is the annualized factor (a=0.07).

Under §75.1714-3(e) operators need to inspect SCSR devices. This inspection occurs approximately every 90 days (or 4 times annually) and takes 0.025 hours (1.5 minutes) per inspection, for a supervisor to conduct. Table VII-D1 shows, by mine size, the annual burden hours and costs to inspect SCSR devices.

Table VII-D1: Annual Burden Hours and Costs to Inspect SCSRs Under 75.1714-3(a)

Mine Size	Total No. of SSCRs Storage Locations on Mantrips	Total No. of SSCRs in Storage Locations Excluding Mantrips	Time to Inspect per SCSR	Annual Inspect-ions per Yr.	Annual Burden Hours	Supv. Wage Rate per hr.	Annual Burden Costs
<20	2,413	0	0.025	4	241	$57.82	$13,954
20-500	18,055	32,441	0.025	4	5,050	$57.82	$291,970
>500	1,797	7,187	0.025	4	898	$57.82	$51,942
Total	22,265	39,628			6,189		$357,865

In addition, under §75.1714-3(e), the person inspecting the SCSR devices must certify, by signature and date, that the inspection has been performed. We estimate that it takes 0.01 hours (36 seconds) to certify an SCSR inspection, which will occur 4 times per year. Thus, annually, it will take 0.04 hours to conduct an inspection on a SCSR (0.01 hours x 4 times per year). A supervisor will conduct the inspection. Table VII-D2 shows, by mine size, the annual burden hours and costs for certifying that SCSR inspections were performed.

Table VII-D2: Annual Burden Hours and Costs to Certify that SCSR Inspections Were Performed Under 75.1714-3(e)

Mine Size	Total No. of SSCRs Storage Locations on Mantrips	Total No. of SSCRs in Storage Locations Excluding Mantrips	Time to Certify per Inspection (in hrs.)	Annual Burden Hours	Superv. Wage Rate per hr.	Annual Burden Costs
<20	2,413	0	0.04	97	$57.82	$5,581
20-500	18,055	32,441	0.04	2,020	$57.82	$116,788
>500	1,797	7,187	0.04	359	$57.82	$20,777
Total	22,265	39,628		2,476		$143,146

Also, under §75.1714-3(e) a record has to be made of any inspection that involved corrective action. We estimate that it takes 0.025 hours (1.5 minutes) for a supervisor to make a corrective action record and that only 0.5 percent of SCSRs inspected require

corrective action. Table VII-D3 shows, by mine size, the annual burden hours and costs to make corrective action records.

Table VII-D3: Annual Burden Hours and Costs to Make Record of Corrective Actions Under 75.1714-3(e)

Mine Size	No. of Defective SCSRs Found During Inspection	Annual Inspection per Yr.	Time to Make Each Record	Annual Burden Hours	Superv. Wage Rate per Hour	Annual Burden Costs
<20	12	4	0.025	1	$57.82	$70
20-500	252	4	0.025	25	$57.82	$1,460
>500	45	4	0.025	4	$57.82	$260
Total	309			31		$1,789

Under §75.1714-4(c) an outby storage plan indicating the location of stored SCSR devices will need to be developed. We estimate that it takes 1 hour to write the outby storage plan in mines having fewer than 20 employees, and 2 hours to write the outby storage plan in mines having 20 or more employees. A supervisor will write the outby storage plan. A clerical worker will take 0.1 hours (6 minutes) to copy the plan to send it to MSHA. Table VII-D4 shows, by mine size, the first year hours and costs to write outby storage plans.

Table VII-D4: First Year Burden Hours and Costs to Write Outby Storage Plan Under 75.1714-4(c)

Mine Size	No. of Mines	Time to Write & Copy Plan per Mine	First Year Burden Hours	Adj. Wage Rate per Hour [a]	First Year Costs to Write a Plan	Annual-ized Burden Costs
<20	0	1.1	0	$54.47	$0	$0
20-500	187	2.1	393	$56.06	$22,017	$3,133
>500	8	2.1	17	$56.06	$942	$134
Total	195		410		$22,959	$3,267

[a] For < 20 mines = ((1 hr. / 1.1 hrs.) x $57.82 superv. wage/hr.) + ((0.1 hrs. / 1.1 hrs. x $20.96 clerical wage/hr.

For > 20 mines = ((2 hr. / 2.1 hrs.) x $57.82 superv. wage/hr.) + ((0.1 hrs. / 2.1 hrs. x $20.96 clerical wage/hr.

For mines where it takes miners more than 1 hour to evacuate the mine, a performance test will need to be conducted as part of developing the mine storage plan.

We also expect that mines with 20 to 50 employees will conduct the performance tests to verify and document that they do not need extra SCSR devices. This performance test is conducted in order to determine the location for storage boxes that contain SCSR devices. We expect a typical performance test would be conducted 3 different times and the results then averaged together. Separate performance tests would need to be conducted in the primary escapeway and alternate escapeway. Thus, we estimate each affected mine will conduct a minimum of 6 performance tests (3 tests in the primary escapeway and 3 tests in the alternate escapeway).

On average, in mines that take miners between 1 and 2 hours to evacuate, the mine it is estimated to take 1.5 hours to conduct 1 performance test. Thus, performance tests in a mine where miners take between 1 and 2 hours to evacuate will take 9 hours for one person (1.5 hours per test x 3 tests x 2 escapeways). Since the performance tests are monitored by a supervisor to keep account of the time it takes a miner to travel the escapeways, a total of 18 hours is needed to conduct all three tests (9 hours for the supervisor and 9 hours for the miner).

On average, in mines that take miners more than 2 hours to evacuate it is estimated to take 3 hours to conduct 1 performance test. Thus, performance tests in a mine where miners take more than 2 hours to evacuate will take 18 hours per person (3 hours per test x 3 tests x 2 escapeways). Again, since the performance tests are conducted on a miner and monitored by a supervisor, a total of 36 hours is needed to conduct all three tests (18 hours for the supervisor and 18 hours for the miner).

The supervisor's hourly wage rate is $57.82 and the miner's hourly wage rate is $26.55. Table VII-D5 shows, by mine size, the first year burden and costs to conduct performance tests for mines where miners take between 1 and 2 hours to evacuate.

Table VII-D5: First Year Burden Hours and Costs to Conduct Performance Tests in Mines that Take Miners Between 1-2 Hours to Evacuate Under 75.1714-4(c)

Mine Size	Mines That Take 1-2 Hours to Escape	Time For All Tests in Hrs. [a]	First Year Burden Hours	Adj. Wage Rate Per Hour [b]	First Year Burden Costs	Annualized Burden Costs
<20	0	18	0	$42.19	$0	$0
20-500	177	18	3,177	$42.19	$134,022	$9,382
>500	0	18	0	$42.19	$0	$0
Total	177		3,177		$134,022	$9,382

[a] 18 hrs. = (1.5 hrs. per test x 3 tests x 2 escapeways) x 2 persons.

[b] $42.19 = ($26.55 miner wage/hr. x $57.82 superv. wage/hr.) / 2.

Table VII-D6 shows, by mine size, the first year burden and costs to conduct performance tests for mines where miners take more than 2 hours to evacuate.

Table VII-D6: First Year Burden Hours and Costs to Conduct Performance Tests in Mines that Take Miners More Than 2 Hours to Evacuate Under 75.1714-4(c)

Mine Size	Mines That Take 2+ Hours to Escape	Time For All Tests in Hrs.[a]	First Year Burden Hours	Adj. Wage Rate Per Hour[b]	First Year Costs	Annualized Costs
<20	0	36	0	$42.19	$0	$0
20-500	61	36	2,196	$42.19	$92,638	$6,485
>500	8	36	288	$42.19	$12,149	$850
Total	69		2,484		$104,788	$7,335

[a] 36 hrs. = (3 hrs. per test x 3 tests x 2 escapeways) x 2 persons.

[b] $42.19 = ($26.55 miner wage/hr. x $57.82 superv. wage/hr.) / 2

As a result of the ETS, 75.1714-5 requires that the mine escapeway map under existing §75.383(a) be revised to indicate the location of storage areas that hold SCSR devices. In addition, the revised mine escapeway map has to be posted. We estimate that it takes 0.25 hours (15 minutes) to revise the map and another 0.1 hours (6 minutes) to copy and post it. Thus, we estimate that it takes 0.35 hours to revise and post the map. The revision and posting will be done by a supervisor. Table VII-D7 shows, by mine size, the first year burden and costs to revise mine escapeway maps as required under existing §75.383(a).

Table VII-D7: First Year Burden Hours and Costs to Revise Map Required by 75.383(a) & Post

Mine Size	No. of Mines	Time to Revise & Post Map in hrs.	First Year Burden Hours	Adj. Wage Rate per Hour [a]	First Year Costs	Annual-ized Costs
20	0	0.35	0	$47.29	$0	$0
20-500	187	0.35	65	$47.29	$3,095	$217
>500	8	0.35	3	$47.29	$132	$9
Total	195		68		$3,227	$226

[a] ((0.25 hrs. / 0.35 hrs.) x $57.82 superv. wage/hr.) + (0.1 hrs. / 0.35 hrs. x $20.96 clerical wage.

Also, 75.1714-5 requires that the mine map under existing §75.1200 be revised. The mine map will be revised to indicate the locations where SCSR devices are stored. The mine map required by 75.1200 does not have to be posted. We estimate that it takes 0.25 hours to revise this map. A supervisor will make the revision. A clerical worker is estimated to take 0.1 hours (6 minutes) to copy the map. Table VII-D8 shows, by mine size, the first year burden and costs to revise mine maps required by §75.1200.

Table VII-D8: First Year Burden and Costs to Revise Map Required by 75.1200

Mine Size	No. of Mines	Time to Revise & Copy Map in hrs.	First Year Burden Hours	Adj. Wage Rate per Hour [a]	First Year Costs	Annual-ized Costs
20	0	0.35	0	$47.29	$0	$0
20-500	187	0.35	65	$47.29	$3,095	$217
>500	8	0.35	3	$47.29	$132	$9
Total	195		68		$3,227	$226

[a] ((0.25 hrs. / 0.35 hrs.) x $57.82 superv. wage/hr.) + ((0.1 hrs. / 0.35 hrs. x $20.96 clerical wage/hr.

MSHA estimates that the burden hours and costs for new mines will be: 20 percent of the first year costs for mines that have fewer than 20 employees; 9 percent of the first year costs for mines that have 20 to 500 employees; and 0 percent of the mines that have more than 500 employees. These costs are assumed to begin in the second year and continue every year thereafter. Table VII-D9 shows, by mine size, the annual burden hours and costs that begin in year 2 for new mines.

Table VII-D9: New Mine Annual Burden and Costs Beginning in Second Year and Subsequent Years

Detail	<20		20-500	
	Hrs.	Costs	Hrs.	Costs
75.1714-4(c)				
Write Plan (Table VII-D4)	0	$0	393	22,017
1-2 Hr. Test (Table VII-D5)	0	$0	3,177	$134,022
2+ Hour Test (Table VII-D6)	0	$0	2,196	$92,638
Total	0	$0	5,766	$248,677
New Mines Factor	0.2	0.2	0.09	0.09
New Mines Annual Burden Beginning in Year 2 for 75.1714-4(c)	**0**	**0**	**519**	**$22,381**
75.1714-5				
75.383(a) Map (Table VII-D7	0	$0	65	$3,095
75.1200 Map (Table VII-8)	0	$0	65	$3,095
Total	**0**	**$0**	**131**	**$6,190**
New Mines Factor	0.2	0.2	0.09	0.09
New Mines Annual Burden Beginning in Year 2 for 75.1714-5	**0**	**$0**	**12**	**$557**
Total New Mines Annual Burden Beginning in Year 2	**0**	**$0**	**531**	**$22,938**

Table VII-D10 provides a summary of the annual burden hours and costs that begin in year 1. Table VII-D11 provides a summary of annual burden hours and costs beginning in year 2 (these burden and costs are for new mines only). Table VII-D12 provides a summary of the first year burden and costs. Table VII-D10 through Table VII-D12 show burden hours and costs only for chapter VII-D tables.

Table VII-D10: Summary of Annual Burden Hours and Costs
Beginning in Year 1 and in Subsequent Years
(For Chapter VII-D Tables)

	<20		20-500		>500		Total	
Table	Hrs.	Annual Costs	Hrs.	Annual Costs	Hrs.	Annual Costs	Hrs.	Annual Costs
Table VII-D1	241	$13,954	5,050	$291,970	898	$51,942	6,189	$357,865
Table VII-D2	97	$5,581	2,020	$116,788	359	$20,777	2,476	$143,146
Table VII-D3	1	$70	25	$1,460	4	$260	31	$1,789
Total	339	$19,605	7,095	$410,217	1,262	$72,979	8,696	$502,801

Table VII-D11: Summary of Annual Burden Hours and Costs
Beginning in Year 2 and in Subsequent Years
(For Chapter VII-D Tables)

	<20		20-500		>500		Total	
Table	Hrs.	Annual Costs	Hrs.	Annual Costs	Hrs.	Annual Costs	Hrs.	Annual Costs
Table VII-D9	0	$0	531	$22,938	0	$0	531	$22,938

Table VII-D12: Summary of First Year Burden Only Hours and Costs
(For Chapter VII-D Tables)

	<20			20-500			>500			Total		
Table	Hrs.	FY Costs	Annual-ized Costs	Hrs.	FY Costs	Annual-ized Costs	Hrs.	FY Costs	Annual-ized Costs	Hrs.	FY Costs	Annual-ized Costs
Table VII-D4	0	$0	$0	393	$22,017	$3,133	17	$942	$134	410	$22,959	$3,267
Table VII-D5	0	$0	$0	3,177	$134,022	$9,382	0	$0	$0	3,177	$134,022	$9,382
Table VII-D6	0	$0	$0	2,196	$92,638	$6,485	288	$12,149	$850	2,484	$104,788	$7,335
Table VII-D7	0	$0	$0	65	$3,095	$217	3	$132	$9	68	$3,227	$226
Table VII-D8	0	$0	$0	65	$3,095	$217	3	$132	$9	68	$3,227	$226
Total	0	$0	$0	5,897	$254,867	$19,432	310	$13,356	$1,003	6,207	$268,223	$20,435

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