REGULATORY ECONOMIC ANALYSIS

FOR

SEALING OF ABANDONED AREAS IN UNDERGROUND COAL MINES FINAL RULE

RIN: 1219-AB52

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

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I. EXECUTIVE SUMMARY

INTRODUCTION

This Regulatory Economic Analysis (REA) examines the costs and benefits of MSHA's final rule on the sealing of abandoned areas in underground coal mines. The final rule includes requirements to strengthen the design, construction, maintenance, and repair of seals. It also includes requirements for sampling and controlling atmospheres behind seals.

MINE SECTOR AFFECTED

The final rule applies to all underground coal mines in the United States. Based on MSHA data as of February 5, 2008, there were 624 underground coal mines, employing 42,207 miners, operating in the U.S. in 2007. Based on an MSHA survey conducted in November 2006, 372 underground coal mines used seals. In 2007, these mines employed 32,412 miners, of which 28,009 worked underground.

BENEFITS

The provisions of the final rule will reduce the risk of miner injury and death by (1) reducing the likelihood of explosion; (2) strengthening seals to better withstand explosions; and (3) providing miners more time to react to a situation involving an explosion. From 1993 through 2006, there were 13 explosions in sealed areas in underground coal mines. In 11 of the 13 explosions, seals were damaged or destroyed by the force of the explosion. Two of the 13 explosions resulted in a total of 17 fatalities. Based on historical data, MSHA estimates that the final rule will result in an average of approximately two to six miners' lives saved per year. This is a reduction in lifetime risk of approximately three to nine fatalities per 1,000 miners working in underground coal mines with sealed areas.

COMPLIANCE COSTS

MSHA estimates that the final rule will result in total yearly costs for underground coal mine operators of approximately $45.4 million. Total first year costs will be approximately $46.4 million. For the 372 mines that use seals, disaggregated by mine size, yearly costs will be $2.8 million for the 83 mine operators with fewer than 20 employees; $37.8 million for the 279 mine operators with 20-500 employees; and $4.8 million for the 10 mine operators with more than 500 employees. Most of the compliance costs occur in the mine size category with 20-500 employees because 75 percent of the mines that use seals are in this size category.

REGULATORY FLEXIBILITY CERTIFICATION AND ANALYSIS

In accordance with § 605 of the Regulatory Flexibility Act, MSHA certifies that the final rule does 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, MSHA 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 Regulatory Flexibility Certification section of this document and in the preamble to the final rule. MSHA has consulted with the Small Business Administration's

(SBA's) Office of Advocacy and believes that the analysis provides a reasonable basis for this certification.

II. INDUSTRY PROFILE

INTRODUCTION

This chapter provides information concerning the structure and economic characteristics of the underground coal mining industry, including the number of mines and employees by type and size of mine. These data are from the U.S. Department of Labor, Mine Safety and Health Administration, Office of Program Evaluation and Information Resources (PEIR), 2007 data as of February 5, 2008. The value of the coal output of the U.S. underground coal mining sector was estimated to be approximately $14.1 billion in 2007.

STRUCTURE OF THE MINING INDUSTRY

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

STRUCTURE OF THE COAL MINING INDUSTRY

Table II-1 presents data on underground coal mines, by employment size, excluding contractors. Agency data in Table II-1 indicate that there were 624 underground coal mines that reported employment during some portion of calendar year 2007. Underground coal mine employment in 2007 was 43,464, of which 42,207 were miners and 1,257 were office employees.

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

Size of Underground Coal Mine									All Undergound Coal Mines		
1-19 Employees			20-500 Employees			501+ Employees					
Mines	Miners	Office Empl.	Mines	Miners	Office Empl.	Mines	Miners	Office Empl.	Mines	Miners	Office Empl.
223	2,266	64	391	33,512	1,034	10	6,429	159	624	42,207	1,257

Table II-2 presents data on independent contractors that worked in underground coal mines in 2007.

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

Size of Underground Coal Contractor									All Underground Coal Contractors		
1-19 Employees			20-500 Employees			501+ Employees					
Firms	Non-Office Empl.	Office Emp.	Firms	Non-Office Empl.	Office Emp.	Firms	Non-Office Empl.	Office Emp.	Firms	Non-Office Empl.	Office Emp.
211	1,316	69	96	7,878	177	0	0	0	307	9,194	246

ECONOMIC CHARACTERISTICS OF THE COAL MINING INDUSTRY

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

The U.S. underground coal sector produced an estimated 349 million tons of coal in 2007. The average price of coal in underground mines in 2007 was $40.37 per ton.

III. BENEFITS

THE NEED FOR SEALS IN WORKED-OUT AREAS OF THE MINE

There is an explosion risk in underground coal mines if a methane build-up between 4.5 percent and 17 percent, and oxygen exceeding 10 percent, occurs anywhere in the mine atmosphere. The minimum temperature required to ignite an explosive methane-air mixture is approximately 1,000 degrees Fahrenheit (537° C). An explosive mixture can easily be ignited by an electrical spark, frictional spark, heated surface, or open flame. The amount of energy necessary for ignition varies with the gas concentration; however, as little as 0.3 millijoule of electrical energy is capable of igniting methane. The 0.3 millijoule of electrical energy is equivalent to 1/120,000,000 of the energy used in one second by a 50-horsepower motor or about 1/50 of the static electricity accumulated by an average-sized person walking on a carpeted floor on a dry day.

In order to decrease the risk of a methane explosion in worked-out areas of the mine, existing 30 CFR §75.334 requires underground coal mine operators to either ventilate or seal these areas. For some underground mines, continued ventilation of worked-out areas may be costly and could divert air from other uses. In addition, worked-out areas that are ventilated need to be regularly inspected because those areas can expose miners to multiple hazards. As an alternative to ventilating worked-out areas, an operator may seal off those areas from the active areas with seals constructed from approved materials.

If seals are not constructed properly or if the area around the seal is disturbed, air leakage through the seals may create an explosive atmosphere behind the seals. In rare cases, roof falls can ignite an explosive methane-air mixture within the sealed area, either by generating heat or by releasing piezoelectric energy. It is also possible for lightning to create a spark that could ignite an explosive methane-air mixture in a sealed area of the mine.

A methane explosion in a sealed area can be contained if the seals can withstand the force of the explosion. If, however, the seal is breached, air in active work areas can become contaminated. In addition, the force of the explosion can turn pieces of the seal and mine debris into projectiles. It is therefore important to maintain effective seals. It is also important that persons who construct, repair, and maintain seals be properly trained.

THE BASELINE: HISTORY OF EXPLOSIONS IN SEALED AREAS

From 1993 through 2006 there were 13 explosions in sealed areas in underground coal mines. In 11 of the 13 explosions, seals were damaged or destroyed by the force of the explosion. Two of the 13 explosions resulted in a total of 17 fatalities.

On January 2, 2006, an explosion in the Sago Mine near Buckhannon, West Virginia, resulted in the death of 12 miners. All seals between the worked-out area where the explosion occurred and the active areas of the mine were destroyed. On May 20, 2006, an explosion in the Darby Mine in Middlesboro, Kentucky resulted in the death of 5 miners. Mine rescue teams responding to the accident at the Darby Mine reported that seals failed to withstand the explosion.

In the remaining 11 explosions where seals were damaged or destroyed, no injuries occurred either because miners were far enough away from the initial explosion or because no

one was in the mine. In several of these incidents, areas of the mine far from the initial explosion were damaged. For example, on February 1, 2002, an explosion occurred at the No. 2 Big Ridge Portal Mine in Harrisburg, Illinois. Thirty miners who were in the mine were able to safely evacuate the mine. However, airlock doors approximately 3,600 feet outby the 2nd East seals where the explosion originated were opened by the forces of the explosion. In addition, the nearest active unit was 4,200 feet outby the seals. Miners on that unit felt the forces of the explosion. The resultant forces from the explosion damaged ventilation control devices in the mine, causing a brief air reversal on the mining unit. On May 15, 1996, an explosion occurred at the No. 1 Mine in Quinland, West Virginia. As a result of the explosion, one of the blown-out seals had pieces of the seal scattered outby for a distance of approximately 200 feet. On January 29, 1996, an explosion occurred at the Oak Grove Mine in Adger, Alabama. Investigation of the explosion revealed that 5 seals were destroyed, with pieces being blown 80 to 100 feet outby the explosion. Also, in this explosion some stoppings located approximately 1,500 feet east of the damaged seals were compromised.

REQUIREMENTS OF THE FINAL RULE

Under the final rule, new seals must be constructed with a design strength of 50 psi or greater. Atmospheres behind new and existing seals must be monitored and maintained inert when the seal is designed with a strength of less than 120 psi. Atmospheres behind new seals designed for a strength of 120 psi or greater must be monitored and maintained inert until their design strength is reached. Seals must be constructed and maintained to withstand overpressures greater than 120 psi if the atmosphere is not monitored and is not maintained inert and the area to be sealed is likely to contain: (1) homogeneous mixtures of methane between 4.5 percent and 17.0 percent and oxygen exceeding 17.0 percent throughout the entire area, (2) pressure piling that could result in overpressures greater than 120 psi in the sealed area, or (3) other conditions, such as the likelihood of a detonation in the area to be sealed.

All new seal designs and all seal installations must be certified by a professional engineer. A certified person must directly supervise seal construction. A senior management official must certify that the construction, installation, and materials used to seal were in accordance with the approved ventilation plan. Miners who construct or repair seals, certified persons supervising seal construction, and certified persons who sample the atmosphere behind seals must be trained. In addition, the final rule requires that miners be withdrawn from the mine when dangerous concentration levels of oxygen and methane are reached. These requirements in the final rule will increase miner safety by improving the design, construction, and monitoring of seals, which will minimize explosions behind seals and assure that seals better withstand explosions.

BENEFITS OF THE FINAL RULE

To provide a quantitative estimate of the benefits of the final rule, MSHA analyzed the explosions in sealed areas that have taken place since 1993 including the two accidents in 2006 where the seals failed and fatalities occurred. At the Sago Mine, 12 miners died, and at the Darby Mine, 5 miners died. If the final rule had been in effect, these lives might not have been lost.

For purposes of estimating benefits for this final rule, MSHA attributes the potential saving of the 5 miners' lives from the Darby Mine accident to this final rule. MSHA also

attributes the potential saving of half of the miners' lives from the Sago Mine accident. (MSHA attributes potential saving of the remaining miners' lives from the Sago Mine accident to MSHA's 2006 emergency mine evacuation rule.) The total potential saving is 11 lives attributed to this final rule.

MSHA has data on explosions that occurred in sealed areas. From 1993 through 2006, there were 13 explosions in sealed areas. Of the 13 explosions, 11 caused seal damage and had the potential to cause fatalities or injuries, and two caused fatalities or injuries. If the explosions followed approximately the same distribution as they did since 1993, MSHA estimates that the final rule would save approximately one life per year.

Based on the Agency's knowledge and experience, MSHA determined that the risk from explosions in sealed areas was increasing from 1993 through 2006 because the number of seals being installed was increasing during that period. MSHA estimates that, from 1993 through 2006, the number of mines that used seals was approximately 2/3 of the number of mines that currently use seals. In addition, MSHA estimates that the average number of seals in the mines that used them, from 1993 through 2006, was approximately 2/3 of the number of seals currently in use. After adjusting this estimate to account for the increased risk during that period, this final rule will save approximately 2 lives per year. This is MSHA's best estimate of the number of lives saved per year due to the final rule.

MSHA also developed a higher risk estimate based on the distribution of miners at risk and the characteristics of the explosions. In the Sago and Darby Mine explosions, 35 miners were underground at the time of the explosions, for an average of 18 miners at risk per explosion. In all 13 prior explosions, including at the Sago and Darby Mines, a total of 723 miners were underground for an average of 56 miners at risk per explosion.

If an explosion with the characteristics of the explosions at Sago or Darby were to occur at a large mine, many lives potentially could be lost. Assuming that the characteristics of an explosion in a sealed area does not vary with the size of the mine, and that the number of potential fatalities is proportional to the number of miners working underground, MSHA estimates that approximately 6 lives will be saved per year under the final rule.

MSHA also calculated the cumulative risk over a 45-year working life of a miner. If, under MSHA's best estimate, the final rule saves approximately 2 lives per year, the reduction in the lifetime risk of a fatality from an explosion in a sealed area is approximately 3 per 1,000 miners over a 45-year working lifetime. If the final rule saves 6 lives per year under MSHA's higher estimate, the reduction in the lifetime risk of a fatality from an explosion in a sealed area is approximately 9 per 1,000 miners over a 45-year working lifetime.

CONCLUSION

The provisions of the final rule will reduce the risk of miner injury and death by reducing the likelihood of explosion; strengthening seals to better withstand explosions; and providing miners a better chance to safely exit the mine in situations involving an explosion behind seals. Based on historical data, MSHA estimates that the final rule will result in an average of approximately two to six miners' lives saved per year. This is a reduction in lifetime risk of approximately three to nine fatalities per 1,000 miners working in underground coal mines with sealed areas.

IV. COMPLIANCE COSTS

SUMMARY

In this chapter, MSHA develops estimates of the costs associated with the final rule. Table IV-1 presents a summary of the yearly costs of the final rule, by mine size and by section of the final rule. MSHA estimates that the total cost of the final rule for all underground coal mine operators is approximately $45.4 million per year. Of this total, mines with 1-19 employees incur costs of approximately $2.8 million per year, mines with 20-500 employees incur costs of approximately $37.8 million per year, and mines with 501+ employees incur costs of approximately $4.8 million per year. Table IV-2 displays the estimated average yearly costs of the final rule for underground coal mines, by mine size. All costs are presented in 2006 dollars.

Table IV-1: Summary of Yearly Costs of the Final Rule

Section	Description	Table	Yearly Costs by Mine Size			Total
			1-19	20-500	501+	
§75.335	Seal Strength, Design Applications, & Installation	IV-A16	$2,121,027	$24,844,022	$1,455,665	$28,420,714
§75.336	Seal Monitoring	IV-B16	$490,577	$10,647,511	$3,188,373	$14,326,461
§75.337	Construction & Repair of Seals	IV-C10	$69,882	$1,474,819	$120,872	$1,665,574
§75.338	Training	IV-D6	$166,946	$817,623	$31,424	$1,015,992
	Total Cost		$2,848,432	$37,783,975	$4,796,334	$45,428,742

Table IV-2: Yearly Cost of the Final Rule by Mine Size

Mine Size	Yearly Cost of Final Rule	No. of Mines	Yearly Cost per Mine
1-19	$2,848,432	223	$12,773
20-500	$37,783,975	391	$96,634
501+	$4,796,334	10	$479,633
All Mines	$45,428,742	624	$72,802

The total costs in Table IV-1 and Table IV-2, and in all other tables in this chapter, are MSHA's estimates of the projected costs based on the Agency's knowledge, experience, and available information. In some cases, however, the estimates may appear to deviate slightly from the sum or product of their components due to rounding.

METHODOLOGY

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

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

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

In some cases, MSHA applied an accumulation factor in order to annualize a stream of costs that are increasing each year. For example, for costs involving worked-out areas, the number of worked-out areas in a mine increases arithmetically each year. Based on a discount rate of 7 percent, MSHA used an accumulation factor of 2.865 for a five year period, which reflects the Agency's estimate of the average remaining life of an underground coal mine. To derive the accumulation factor of 2.865, MSHA used 1, 2, 3, 4, and 5 worked-out areas in years 1, 2, 3, 4, and 5, respectively. Each year was discounted by $(1/1.07)^{year}$. The sum of the discounted worked-out areas over 5 years is 11.747. That number was annualized by multiplying it by .2439 (which is the annualization factor to apply to a 5-year period using a 7 percent discount rate) to obtain 2.865.

MSHA used hourly wage rates of $31.66 for an underground coal miner, $71.34 for an underground coal mine supervisor and a certified person, $25.47 for an underground coal clerical employee, $67.96 for an underground coal mining engineer, $92.78 for an underground coal senior mine official, and $125 for a registered professional engineer.[1] The wage rates include benefits such as social security, unemployment insurance, and workers' compensation, but they do not reflect shift differentials or overtime pay. MSHA refers to miner "compensation" in this REA as "wages," where that term is understood to include benefits.

SCOPE

The final rule applies to all 624 underground coal mines, employing 42,207 miners, operating in 2007.

[1] Hourly wage rates are derived from InfoMine USA, Inc., *U.S. Coal Mine Salaries, Wages, & Benefits: 2006 Survey Results.*

SECTION-BY-SECTION ANALYSIS

Below MSHA provides a section-by-section analysis of the estimated costs of the final rule. Where possible, the data sources that MSHA used for its estimates have been identified. Where no data source is specified, MSHA relied on the experience and expertise of its staff.

Tables in the section-by-section analysis in this chapter have been numbered according to the requirement: IV-A provides costs for final § 75.335 (seal purchase and installation, mines that ventilate rather than purchasing and installing seals, and seal design and mine-specific seal installation applications); IV-B provides costs for final § 75.336 (sampling and monitoring requirements); IV-C provides costs for final § 75.337 (construction and repair of seals); and IV-D provides costs for final § 75.338 (training of persons who sample behind seals and persons who construct and repair seals).

Final § 75.335 Seal strengths, design application, and installation

The final rule provides a three-tiered approach to new seal construction. Under final § 75.335(a), seals must be constructed with either 50 pounds per square inch (psi) overpressure, overpressures of 120 psi, or an overpressure greater than 120 psi if certain conditions are present. In this analysis, MSHA estimates the cost of constructing seals at the 50 and 120 psi levels. MSHA has not estimated the cost of constructing seals with an overpressure greater than 120 psi, based on Agency experience under the ETS that conditions necessitating these seals will occur rarely in an underground coal mine.

MSHA's cost estimates are based on the additional cost of constructing new seals under the final rule relative to the cost of constructing them before the ETS became effective. Cost estimates to construct seals include soil and rock drilling, materials and transportation of materials, formwork, pouring of concrete, grouting, and quality control testing. Cost estimates also include: one sampling pipe per seal, under final § 75.337(g)(2); for approximately 5 percent of new seals, adding additional sampling pipes under final § 75.337(g)(4); and one drain pipe per set of seals under final § 75.337(h). MSHA's estimate of the net annual cost to mine operators for constructing seals under the final rule is presented below.

MSHA distinguished the number of mines that will seal from those that will stop sealing new worked-out areas and instead ventilate. MSHA estimates that 313 mines will continue to seal: 66 mines with 1-19 employees; 237 mines with 20-500 employees; and 10 mines with 501+ employees. MSHA estimates that 59 mines will ventilate rather than seal: 17 mines with 1-19 employees; and 42 mines with 20-500 employees.

After determining the number of mines that would seal, MSHA estimated the cost to construct a new seal. MSHA expects seals will be constructed either by a contractor or by in-house employees. MSHA estimates that to construct seals: 80 percent of mines with 1-19 employees will use contractors and 20 percent will use in-house employees; 30 percent of mines with 20-500 employees will use contractors and 70 percent will use in-house employees; and 10 percent of mines with 501+ employees will use contractors and 90 percent will use in-house employees. Based on the weighted average of the costs of constructing a seal either by a contractor or by in-house employees, MSHA estimates costs of: $10,500 for a 50-psi seal and $21,849 for a 120-psi seal for mines with 1-19 employees; $9,055 for a 50-psi seal and $18,830

for a 120-psi seal for mines with 20-500 employees; and $8,477 for a 50-psi seal and $17,623 for a 120-psi seal for mines with 501+ employees.

To compute the cost of constructing a seal under the final rule, MSHA determined that the cost of constructing an existing seal, using the appropriate weighting of costs to reflect the percentage of contractors versus in-house employees, averages $7,442 for mines with 1-19 employees; $6,382 for mines with 20-500 employees; and $5,958 for mines with 501+ employees. MSHA then subtracted the cost to construct an existing seal from the cost to construct a new seal. Using the above figures, the estimated net cost to construct a seal under the final rule is: $3,058 for a 50-psi seal and $14,407 for a 120-psi seal for mines with 1-19 employees; $2,673 for a 50-psi seal and $12,448 for a 120-psi seal for mines with 20-500 employees; and $2,519 for a 50-psi seal and $11,665 for a 120-psi seal for mines with 501+ employees.

Finally, to give an annual cost of constructing a new seal under the final rule, MSHA estimates the number of seals constructed per mine per year is: 3 seals for a mine with 1-19 employees; 9 seals for a mine with 20-500 employees; and 14 seals for a mine with 501+ employees. MSHA also estimates that: in mines with 1-19 and 20-500 employees 50 percent of all seals built will be 50-psi seals and 50 percent will be 120-psi seals; and in mines with 501+ employees, 20 percent of the seals built will be 50-psi seals and the remaining 80 percent will be 120-psi seals. MSHA estimates that 66 mines with 1-19 employees; 237 mines with 20-500 employees; and 10 mines with 501+ employees will continue to seal. Table IV-A1 shows a total annual cost of $19,232,627 to construct new seals under the final rule.

Table IV-A1: Annual Cost to Construct New Seals

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	No. of Mines that Will Seal	Annual No. of New Seals per Mine	Percentage of Mines That Will Construct 50 psi Seals	Net Cost for a 50 psi Seal	Percentage of Mines That Will Construct 120 psi Seals	Net Cost for a 120 psi Seal	Net Cost for Seals of More than 120 psi	Annual Cost[a]
1-19	66	3	50%	$3,058	50%	$14,407	$0	$1,728,995
20-500	237	9	50%	$2,673	50%	$12,448	$0	$16,126,653
501+	10	14	20%	$2,519	80%	$11,665	$0	$1,376,978
Total	313							$19,232,627

[a] Annual Cost = (col. b x col. c) x [(col. d x col. e) + (col. f x col. g)].

Costs of Ventilating Instead of Sealing

As noted earlier, MSHA estimates that 17 mines with 1-19 employees and 42 mines with 20-500 employees will switch from sealing to ventilating new worked-out areas. Mines that switch to ventilating will incur the following costs: weekly examinations, electricity for ventilation system fans, adjustments of fans, purchase and installation of water pumps and drainage pipes, electricity and maintenance for the pumps, and roof support. Ventilation costs,

offset by costs of constructing seals, are estimated below. Most of the costs are first year costs that are annualized by multiplying them by an accumulation factor of 2.865.

Cost of Weekly Examinations under Existing § 75.364(a)

Under existing § 75.364(a), unsealed worked-out areas must be examined at least every 7 days. MSHA estimates that the number of new worked-out areas is: 1 every two years for mines with 1-19 employees and 3 every two years for mines with 20-500 employees. Examining a worked-out area is estimated to take 1.5 hours in mines with 1-19 employees, and 4 hours in mines with 20-500 employees. The additional hours each year to examine a worked-out area are estimated to be:

- 39 hours for a mine with 1-19 employees (0.5 worked-out areas x 1.5 hours x 52 weeks); and
- 312 hours for a mine with 20-500 employees (1.5 worked-out areas x 4 hours x 52 weeks).

A supervisor, earning $71.34 per hour, would perform the weekly exams. Table IV-A2 shows a total annualized cost of $2,813,825 to examine new worked-out areas. First year costs are annualized by multiplying them by an accumulation factor of 2.865.

Table IV-A2: First Year and Annualized Costs for Weekly Examinations of New Worked-Out Areas under §75.364(a)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	Additional Hours to Perform Weekly Exam per Year	Supervisor Hourly Wage Rate	First Year Cost [a]	Annualized Cost
1-19	17	39	$71.34	$47,298	$135,510
20-500	42	312	$71.34	$934,839	$2,678,315
501+	0	n.a.	n.a.	n.a.	n.a.
Total	59			$982,138	$2,813,825

[a] First Year Cost = col. b x col. c x col. d.

Cost for Electricity for Fans

As mines ventilate new worked-out areas, they need to move more air through their ventilation systems and thus will incur cost for additional kilowatt hours (kwh) to operate fans. Annually, MSHA estimates that the additional number of kwh to operate fans for a worked-out area is: 14,441 kwh in a mine with 1-19 employees; and 155,507 kwh in a mine with 20-500

employees. These kwhs are based on a formula which uses the ventilation required for the worked-out area (in cubic feet per minute), the amount of worked-out area created each year, and the water level in the worked-out area. MSHA estimates that the cost per kwh is $0.10. Table IV-A3 shows a total annualized cost of $1,941,553 for the electricity to operate fans to ventilate new worked-out areas. First year costs are annualized by multiplying them by an accumulation factor of 2.865.

Table IV-A3: First Year and Annualized Costs for Electricity for Fans to Ventilate New Worked-Out Areas

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	Annual No. of kwh for Fans in New Worked-Out Areas Required per Mine	Cost per kwh	First Year Cost [a]	Annualized Cost
1-19	17	14,441	$0.10	$24,549	$70,334
20-500	42	155,507	$0.10	$653,131	$1,871,219
501+	0	n.a.	n.a.	n.a.	n.a.
Total	59			$677,680	$1,941,553

[a] First Year Cost = col. b x col. c x col. d.

Cost to Adjust Ventilation System Fans

Each time that a mine chooses to ventilate instead of sealing a new worked-out area, the mine needs to adjust its ventilation system fans. MSHA estimates that to adjust the ventilation system fans takes a supervisor, earning $71.34 per hour, 1 hour in mines with 1-19 employees, and 2 hours in mines with 20-500 employees. Table IV-A4 shows a total annual cost of $9,595 to adjust ventilation system fans.

Table IV-A4: Annual Cost to Adjust Ventilation Fans for New Worked Out Areas

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	Annual No. of New Worked-out Areas	Time to Adjust Ventilating Fans (in hrs.)	Supervisor Hourly Wage Rate	Annual Cost [a]
1-19	17	0.5	1	$71.34	$606
20-500	42	1.5	2	$71.34	$8,989
501+	0	n.a.	n.a.	n.a.	n.a.
Total	59			$143	$9,595

[a] Annual Cost = col. b x col. c x col. d x col. e.

Cost to Purchase and Install Water Pumps and Drainage Piping

In order to maintain new worked-out areas in a safe condition, mines that choose to ventilate rather than seal need to purchase and install additional water pumps and piping for the pumps. MSHA assumes that additional pumps will not have to be purchased every time a new area is worked out because the pumps will typically have sufficient excess capacity to handle additional worked-out areas. MSHA estimates that the purchase and installation cost for a pump along with the additional piping is: $24,500 ($12,500 for a pump and $12,000 for additional piping). The Agency estimates that the number of pumps to be purchased is: 1 pump for a mine with 1-19 employees, and 5 pumps for a mine with 20-500 employees. MSHA estimates that a pump lasts three years.

Table IV-A5 shows a total annualized cost of $2,118,932 to purchase and install additional water pumps and piping for new worked-out areas. First year costs are multiplied by an annualization factor of 0.381 to reflect a three-year service life for water pumps and piping.

Table IV-A5: First Year and Annualized Costs to Purchase and Install Pumps and Piping for New Worked-Out Areas

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	No. of Additional Pumps Needed for New Worked-Out Areas per Mine	Cost for a pump and piping	First Year Cost [a]	Annualized Cost
1-19	17	1	$24,500	$416,500	$158,687
20-500	42	5	$24,500	$5,145,000	$1,960,245
501+	0	n.a.	n.a.	n.a.	n.a.
Total	59			$5,561,500	$2,118,932

[a] First Year Cost = col. b x col. c x col. d.

Cost for Electricity to Operate Pumps

MSHA estimates that mines that choose to ventilate instead of installing seals need 54 kwh of electricity per day for each additional water pump. MSHA assumes that the electricity needed to run the pumps will increase as the number of worked-out areas increase because the pumps will be used more. The additional number of kwh per year that it takes to operate a pump for a worked-out area is 19,710 kwh (54 kwh per day x 365 days). MSHA estimates that the cost per kwh is $0.10. Table IV-A6 shows a total annualized cost of $1,281,850 for electricity to operate water pumps in new worked-out areas for those mines that choose to ventilate instead of sealing. First year costs are annualized by multiplying them by an accumulation factor of 2.865.

Table IV-A6: First Year and Annualized Costs for Electricity for Water Pumps in New Worked-Out Areas

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	No. of Additional Pumps Needed for New Worked Out Areas per Mine	Annual No.of Kilowatt Hours Required per Pump	Cost per Kilowatt Hour	First Year Cost [a]	Annualized Cost
1-19	17	1	19,710	$0.10	$33,507	$95,998
20-500	42	5	19,710	$0.10	$413,910	$1,185,852
501+	0	n.a.	n.a.	n.a.	n.a.	n.a.
Total	59				$447,417	$1,281,850

[a] First Year Cost = col. b x col. c x col. d x col. e.

Cost to Maintain Pumps

Ventilation costs include annual costs for parts and labor to maintain water pumps. MSHA assumes that maintenance costs will increase as the number of worked-out areas increase because the pumps will be used more. MSHA estimates that the annual maintenance cost for a pump is approximately 10 percent of its original purchase price, or $1,250 ($12,500 per pump x 0.10). Table IV-A7 shows a total annualized cost of $812,944 for pump maintenance. First year costs are annualized by multiplying them by an accumulation factor of 2.865.

Table IV-A7: First Year and Annualized Costs to Maintain Pumps in New Worked-Out Areas

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	No. of Additional Pumps Needed for New Worked-Out Areas per Mine	First Year Maintenance Cost per Pump	First Year Cost [a]	Annualized Cost
1-19	17	1	$1,250	$21,250	$60,881
20-500	42	5	$1,250	$262,500	$752,063
501+	0	n.a.	n.a.	n.a.	n.a.
Total	59			$283,750	$812,944

[a] First Year Cost = col. b x col. c x col. d.

Cost for Additional Roof Support

Mining sections that have been worked-out and will be ventilated rather than sealed need additional roof support. Roof support equipment consists of standing supports plus cable bolts. MSHA estimates that $6,000 per year of additional standing supports will be needed for each worked-out area. In addition, the Agency estimates that half of the worked-out areas will need additional cable bolts. The Agency estimates that the cost for additional cable bolts for a worked-out area is $16,875 ($125 per set of cable bolts x 135 sets of cable bolts per worked-out area). A miner, earning $31.66 per hour, is estimated to take 48 hours to install the additional standing supports and 30 hours to install the additional cable bolts, per worked-out area.

MSHA estimates that there will be an average of: 0.5 worked-out areas for mines with 1-19 employees and 1.5 worked-out areas for mines with 20-500 employees. Table IV-A8 shows a total annual cost of $840,679 for mines to install additional roof support.

Table IV-A8: Annual Cost for Additional Standing Supports and Roof Supports in New Worked-Out Areas

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	No. of Worked-Out Areas	Cost for Standing Supports per Worked-Out Area	Cost for Cable Bolts per Worked-Out Area	Hours Needed to Install Standing Support per Worked-Out Area	Hours Needed to Install Cable Bolts per Worked-Out Area	Miner Hourly Wage Rate	Annual Cost [a]
1-19	17	0.5	$6,000	$16,875	48	30	$31.66	$139,673
20-500	42	1.5	$6,000	$16,875	48	30	$31.66	$701,006
501+	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total	59	2						$840,679

[a] Annual Cost = [col. b x col. c x (col. d + (col. f x col. h))] + [col. b x col. c x 0.5 x (col. e + (col. g x col. h))].

Table IV-A9 shows a summary of the $9,819,377 total yearly cost for mine operators to ventilate new worked-out areas rather than seal.

Table IV-A9: Yearly Cost to Ventilate New Worked-Out Areas Rather Than Install Seals

Description	Table	1-19	20-500	501+	Total
Weekly Exams	IV-A2	$135,510	$2,678,315	$0	$2,813,825
Electricity for Fans	IV-A3	$70,334	$1,871,219	$0	$1,941,553
Adjust Fans	IV-A4	$606	$8,989	$0	$9,595
Purchase Pumps & Piping	IV-A5	$158,687	$1,960,245	$0	$2,118,932
Electricity for Pumps	IV-A6	$95,998	$1,185,852	$0	$1,281,850
Maintenance for Pumps	IV-A7	$60,881	$752,063	$0	$812,944
Standing & Roof Supports	IV-A8	$139,673	$701,006	$0	$840,679
Cost to Ventilate Rather than Seal New Worked-Out Areas		$661,688	$9,157,688	$0	$9,819,377

Costs for mine operators that choose to ventilate rather than seal new worked-out areas are partially offset by costs associated with installing seals. Table IV-A10 shows a net yearly cost of $7,027,439 for mines to ventilate new worked-out areas after taking into consideration the cost for installing seals required under the previous rule.

Table IV-A10: Yearly Net Cost to Ventilate New Worked-Out Areas Rather Than Install Seals

(a)	(b)	(c)	(d)	(e)		
Mine Size	No. of Mines that Will Ventilate Instead of Sealing	Annual No. of Seals that Will Not Be Built per Mine	Cost for a 20 psi Seal	Annual Cost Offset [a]	Additional Cost to Ventilate Instead of Sealing [b]	Additional Net Cost of Ventilating Instead of Sealing
1-19	17	3	$7,442	$379,542	$661,688	$282,146
20-500	42	9	$6,382	$2,412,396	$9,157,688	$6,745,292
501+	0	n.a.	n.a.	n.a.	n.a.	n.a.
Total	59			$2,791,938	$9,819,377	$7,027,439

[a] Annual Cost Saving = (col. b x col. c x col. d).

[b] Source: Table IV-A9.

Seal Design Application and Approval

Final § 75.335(b) provides procedures for seal design approval. Typically, manufacturers will submit applications for approval of seal designs. The final rule allows seal design applications to be submitted in two ways: (1) certification of seal design; or (2) full scale explosion testing. Final § 75.335(b)(1)(ii) requires that a professional engineer certify that the

design of the seal is in accordance with current, prudent engineering practices. If the seal design application is based on a full-scale explosion test, then under final § 75.335(b)(2)(i), a professional engineer is required to certify that the testing was done in accordance with current, prudent engineering practices. MSHA anticipates that most applications will be submitted based on certification of the seal design, as opposed to full scale explosion testing.

Table IV-A11 shows that a single seal design approval application costs $12,904. Most of this cost is attributable to 80 hours of a professional engineer's time, priced at $125 per hour, to verify and certify that the seal is designed in accordance with current and prudent engineering practices. MSHA estimates that ten applications will be submitted in the first year and two applications per year in subsequent years. The $33,153 of yearly approval costs, shown in Table IV-A11, was derived by multiplying the cost of approval in the first year ($129,042) by an annualization factor of 0.07 and adding that to the product of the cost of approval per year in subsequent years ($25,808) divided by a discount factor of 1.07.

Table IV-A11: Cost of Applications for Approval of Seal Designs under §75.335(b)

Cost Element	Rate/Hour or Cost/Unit	Hours or Units	Total Cost
Professional Engineer	$125.00	80	$10,000
Materials Testing	$90.00	30	$2,700
Supervisor	$71.34	2	$143
Clerical Worker	$25.47	1	$25
Copies	$10.00	2	$20
Postage	$16.00	1	$16
Cost of Seal Design Application for Approval			$12,904
Cost of Applications for Approval in First Year	$12,904	10	$129,042
Cost of Applications for Approval per Year in Subsequent Yrs.	$12,904	2	$25,808
Yearly Cost of Applications for Approval			$33,153

MSHA assumes that the seal design approval costs, shown in Table IV-A11, are passed on to mine operators who purchase and install the seals. Table IV-A12 allocates the $33,153 of total yearly seal design approval costs to mine operators in proportion to the number of new seals purchased and installed annually.

Table IV-A12: Yearly Design Approval Application Costs Allocated by Mine Size, under §75.335(b)

Mine Size	No. of Mines that Will Seal	New Seals per Year per Mine	No. of New Seals per Year	Manufacturers' Seal Design Application Yearly Cost[a]
1-19	66	3	198	$2,657
20-500	237	9	2,133	$28,618
501+	10	14	140	$1,878
Total	313		2,471	$33,153

[a] Total Manufacturers' Application Yearly Cost from Table IV-A11.

Final § 75.335(c)(2) requires that a professional engineer conduct or have oversight of seal installation and certify that the provisions in the approved seal design have been addressed and are applicable to the conditions at the mine. Final § 75.335(c)(3)(iii) requires that a professional engineer or a professional land surveyor certify the mine map of the sealed area and seal locations. For costing purposes, MSHA assumes that both certifications will be performed by a professional engineer. For these certifications, the professional engineer must examine the locations where seals will be constructed and revise the mine map. MSHA estimates that these activities will take a professional engineer: 24 hours in mines with 1-19 employees; 40 hours in mines with 20-500 employees; and 56 hours in mines with 501+ employees. Table IV-A13 shows a total annual cost of $1,946,500 for a professional engineer to perform these activities.

Table IV-A13: Annual Cost for a Professional Engineer to Examine Mine-Specific Seal Installation and Revise the Mine Map under §75.335(c)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Seal	Average No. of Worked-Out Areas Annually per Mine	Hours to Perform Work per Mine	Wage Rate of Professional Engineer	Annual Cost [a]
1-19	66	0.5	24	$125	$99,000
20-500	237	1.5	40	$125	$1,777,500
501+	10	1	56	$125	$70,000
Total	313				$1,946,500

[a] Annual Cost = col. b x col. c x col. d x col. e.

Final § 75.335(c)(3) requires the mine operator to revise the mine ventilation plan to provide information concerning seal construction. MSHA assumes that mine operators will include with this information a copy of the certifications required by final §§ 75.335(c)(2) and (c)(3)(iii). MSHA assumes that this information will be submitted for each worked-out area of the mine that the mine operator plans to seal.

MSHA estimates that 66 mines with 1-19 employees, 237 mines with 20-500 employees, and 10 mines with 501+ employees will continue to seal. The mine operator will submit the ventilation plan revisions to the District Manager. The Agency assumes that the District Manager, in reviewing the proposed ventilation plan revisions, will require some changes. The mine operator will make changes and resubmit the revised ventilation plan for approval. MSHA estimates that to make initial and subsequent revisions and perform the required certifications will take a supervisor, earning $71.34 per hour: 3 hours in mines with 1-19 employees; 6 hours in mines with 20-500 employees; and 9 hours in mines with 501+ employees. In addition, a clerical employee, earning $25.47 per hour, is estimated to take 0.5 hours (30 minutes) to copy and submit initial and subsequent revisions.

MSHA estimates that the copy and postage costs to revise the ventilation plan are:

- $3.50 for a mine with 1-19 employees [(5 pgs. x $0.15 per pg.) + $1 postage) x 2 submissions] and;
- $5.00 for a mine with 20 or more employees [(10 pgs. x $0.15 per pg.) + $1 postage) x 2 submissions].

Table IV-A14 shows a total annual cost of $172,669 to revise and submit the mine ventilation plan for those mines that will continue to seal.

Table IV-A14: Annual Cost to Certify, Revise, Copy, and Submit Revisions to the Ventilation Plan Concerning Seal Construction

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	No. of Mines that Will Seal	Average No. of Worked-Out Areas Annually per Mine	Time to Revise & Certify Vent Plan (in hrs.)	Time to Copy & Submit Revised Pgs. (in hrs.)	Supervisor Hourly Wage Rate	Clerical Hourly Wage Rate	Cost to Copy & Mail Revised Pages per Mine	Annual Cost [a]
1-19	66	0.5	3	0.5	$71.34	$25.47	$3.50	$7,598
20-500	237	1.5	6	0.5	$71.34	$25.47	$5.00	$158,473
501+	10	1	9	0.5	$71.34	$25.47	$5.00	$6,598
Total	313							$172,669

[a] Annual cost = col. b x col. c x [(col. d x col. f) + (col. e x col. g) + col. h].

Under existing 30 CFR §§ 75.370(a)(3)(iii) and (f), mines that make ventilation plan revisions need to post a copy of the revisions, and upon request provide a copy of the revisions to mines that have a miners' representative. MSHA assumes that 30 percent of the mines that seal will have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it costs $12.74 in wages per mine to copy and post the initial and subsequent revisions of the mine ventilation plan, and also $12.74 in wages to copy and provide a copy of the initial and subsequent revisions of the mine ventilation plan to the miners' representative ($25.47 clerical employee' hourly wage rate x 0.5 hours). The copy cost for the initial and subsequent revisions is estimated to be: $1.50 for a mine with 1-19 employees [(5 pgs. x $0.15 per pg.) x 2 submissions] and; $3.00 for a mine with 20 or more employees [(10 pgs. x $0.15 per pg.) x 2 submissions]. Postage costs are estimated to be $2.00 ($1 postage cost x 2 submissions).

Table IV-A15 shows a total annual cost of $8,326 to copy and post and provide a copy of the revisions to the miners' representative.

Table IV-A15: Annual Cost to Copy and Post Revisions to Ventilation Plan Concerning Seal Construction and Provide a Copy to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	No. of Mines that Will Seal	Average No. of Worked-Out Areas Annually per Mine	Percentage of Mines Providing a Copy of Revisions to Miners' Representative	Cost of Clerical Employee Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative	Copy Cost per Mine	Postage Cost per Mine	Annual Cost [a]
1-19	66	0.5	30%	$12.74	$1.50	$2.00	$630
20-500	237	1.5	30%	$12.74	$3.00	$2.00	$7,485
501+	10	1	30%	$12.74	$3.00	$2.00	$211
Total	313						$8,326

[a] Annual Cost = (col. b x col. c x (col. e + col. f)) + (col. b x col. c x col. d x (col. e + col. f + col. g)).

Table IV-A16 shows a summary of the $28,420,714 total yearly costs for final § 75.335.

Table IV-A16: Summary of Yearly Costs for Seal Strengths, Design Applications, and Installation

Section	Description	Table	Mine Size by Employment			Total
			1-19	20-500	501+	
§75.335(a)	Purchase & Install Seals	IV-A1	$1,728,995	$16,126,653	$1,376,978	$19,232,627
§75.335(a)	Ventilate New Worked-Out Areas Instead of Purchasing & Installing Seals	IV-A10	$282,146	$6,745,292	$0	$7,027,439
§75.335(b)	Seal Design Approval Application Costs	IV-A12	$2,657	$28,618	$1,878	$33,153
§75.335(c)	Examine Mine-Specific Seal Installations	IV-A13	$99,000	$1,777,500	$70,000	$1,946,500
§75.335(c)	Revise Ventilation Plan Concerning Seal Construction	IV-A14	$7,598	$158,473	$6,598	$172,669
§75.335(c)	Provide & Post Revised Ventilation Plan Concerning Seal Construction	IV-A15	$630	$7,485	$211	$8,326
	Total Cost		$2,121,027	$24,844,022	$1,455,665	$28,420,714

Final § 75.336 Sampling and monitoring requirements

Under final § 75.336, the mine operator must monitor methane and oxygen concentrations and maintain an inert atmosphere in the sealed area. Final § 75.336(a) requires a certified person to sample the atmosphere of sealed areas. Under existing MSHA standards, underground coal mine operators have equipment to measure oxygen at the concentration levels specified in the final rule. MSHA's existing standards do not, however, require underground coal mine operators to measure for methane at the levels in the final rule. Therefore, operators that monitor need to purchase a gas detector capable of measuring methane concentrations from 0 to 100 percent by volume.

The estimated numbers of underground coal mines that monitor seals are: 83 mines with 1-19 employees; 279 mines with 20-500 employees; and 10 mines with 501+ employees. MSHA estimates that, on average, the number of methane gas detectors needed per mine is: 1 detector per mine with 1-19 employees; 1.5 detectors per mine with 20-500 employees (1 detector in half of these mines and 2 detectors in the other half of these mines); and 2 detectors per mine with 501+ employees. The cost of a methane detector, including tubing and calibration kit, is approximately $2,114 ($1,775 for detector with carrying case; $8 for ten feet of tubing; and $331 for calibration kit). The methane detector is estimated to last for 5 years. Table IV-B1 shows a total annualized cost of $268,998 for mine operators to purchase methane detectors, including accessories, to perform monitoring. Annualized costs are obtained

by multiplying first year costs by an annualization factor of 0.244, which reflects a 5 year service life of the detector.

Table IV-B1: First Year and Annualized Costs to Purchase Methane Gas Detectors under §75.336

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Sample Seals	No. of Methane Detectors per Mine	Purchase Cost for Methane Detectors plus Accessories	First Year Cost [a]	Annualized Cost
1-19	83	1	$2,114	$175,462	$42,813
20-500	279	1.5	$2,114	$884,709	$215,869
501+	10	2	$2,114	$42,280	$10,316
Total	372			$1,102,451	$268,998

[a] First Year Cost = col. b x col. c x col. d.

Maintenance for the purchased methane gas detector consists of: calibrating the instrument once a month, purchasing a probe filter once per year, and performing a bump test before each use. The annual calibration cost per detector is estimated to be $16.56 ($1.38 per liter of methane x 1 liter per calibration x 12 calibrations per year). In addition, one probe filter, costing $6.25, is needed per detector each year. For the daily bump test, the annual cost per detector is estimated to be: $179.40 ($1.38 per liter x 0.5 liters per bump test x 260 workdays) for mines with 1-19 and 20-500 employees; and $251.85 ($1.38 per liter x 0.5 liters x 365 workdays) for mines with 501+ employees. Therefore, annual maintenance cost per detector is estimated to be approximately: $202 ($16.56 + $6.25 + $179.40) for mines with 500 or fewer employees; and $275 ($16.56 + $6.25 + $251.85) for mines with 501+ employees.

Table IV-B2 shows a total annual cost of $106,902 to maintain the methane gas detectors.

Table IV-B2: Annual Cost to Maintain Methane Gas Detectors under §75.336

(a)	(b)	(c)	(d)	(e)
Mine Size	No. of Mines that Will Sample Seals	No. of Methane Detectors per Mine	Annual Maintenance Cost per Methane Detector	Annual Cost[a]
1-19	83	1	$202	$16,783
20-500	279	1.5	$202	$84,625
501+	10	2	$275	$5,493
Total	372			$106,902

[a] Annual Cost = (col. b x col. c x col. d).

Sampling Existing Seals

For mines with existing seals, final § 75.336(a)(1) requires that sealed areas be sampled at each sampling pipe at least every 24 hours. Final § 75.336(a)(1)(ii) allows the District Manager to approve different sampling locations and frequencies, provided that at least one sample is taken at each set of seals at least every 7 days.

There are 372 mines that use seals (83 mines with 1-19 employees, 279 mines with 20-500 employees, and 10 mines with 501+ employees). For each mine size category, MSHA estimates that 90 percent of mines will sample at each set of seals once a week, and 10 percent of mines will sample at each set of seals seven times per week (one sample a day). On average, MSHA estimates that there are currently: 2 sets of seals per mine in mines with 1-19 employees; 7 sets of seals per mine in mines with 20-500 employees; and 14 sets of seals per mine in mines with 501+ employees. Each time sampling is conducted, 2 samples are taken (1 oxygen sample and 1 methane sample). MSHA estimates that the annual number of samples for mines sampling existing seals is:

- 27,248 for mines with 1-19 employees [(75 mines x sampling 1 time per week) + (8 mines x sampling 7 times per week)] x 2 sets of seals per mine x 2 samples x 52 weeks;
- 325,416 for mines with 20-500 employees [(251 mines x sampling 1 time per week) + (28 mines sampling 7 times per week)] x 7 sets of seals per mine x 2 samples x 52 weeks; and
- 23,296 for mines with 501+ employees [(9 mines x sampling 1 time per week) + (1 mine sampling 7 times per week)] x 14 sets of seals per mine x 2 samples x 52 weeks.

Sampling New Seals before They Reach Their Design Strength

For mines that construct 50-psi seals after the final rule is published, final § 75.336(a)(1)(iii) provides that the District Manager may approve different sampling locations and frequencies after 14 days and when the seal design strength is reached. In addition, final

§ 75.336(a)(1)(i) provides that for mines constructing 120 psi or greater seals, sampling may be discontinued when the design strength is reached. MSHA assumes that, on average, a new seal will reach its design strength in 28 days. Also, final § 75.337(g)(1) requires that one sampling pipe be installed in each new seal. Therefore, 2 samples (1 oxygen and 1 methane sample) will be taken for each of the 28 days, for a total of 56 samples at each new seal.

The estimated number of mines that will continue to seal after the final rule is published is: 66 mines with 1-19 employees, 237 mines with 20-500 employees, and 10 mines with 501+ employees. MSHA estimates that, on average, the number of new seals built annually will be: 3 seals per mine for mines with 1-19 employees, 9 seals per mine for mines with 20-500 employees, and 14 seals per mine for mines with 501+ employees. Annually, the number of samples taken at new seals until design strength is reached is estimated to be:

- 11,088 samples for mines with 1-19 employees (66 mines x 56 samples x 3 seals per mine);
- 119,448 samples for mines with 20-500 employees (237 mines x 56 samples x 9 seals per mine); and
- 7,840 samples for mines with 501+ employees (10 mines x 56 samples x 14 seals per mine).

Sampling new 50-psi seals after they have reached their design strength

Final § 75.336(a)(1)(iii) requires that after new 50-psi seals have reached their design strength, the District Manager may approve a different sampling frequency, provided that at least one sample is taken at each set of seals at least every seven days.

MSHA estimates that after new 50-psi seals have reached their design strength, for each mine size, 90 percent of mines will sample each set of 50-psi seals once a week, and 10 percent of the mines will sample each set of 50-psi seals seven times per week. MSHA assumes that 50 percent of new seals constructed in mines with 500 or fewer employees will be 50-psi seals, and 20 percent of new seals constructed in mines with 501+ employees will be 50-psi seals.

In order to calculate the number of sets of seals sampled, MSHA estimates that mines with 1-19 employees have 6 seals per set of seals; mines with 20-500 employees have 6 seals per set of seals; and mines with 1-19 employees have 5 seals per set of seals. These estimates were derived from actual field data in a November 2006 MSHA dataset. The number of seals in a set, for each mine size, was calculated by dividing the number of seals by the number of sets of seals. From the data, the largest mines had many more sets of seals, but slightly fewer seals, on average, in each set.

In mines with 1-19 employees, MSHA estimates that 99 new 50-psi seals will be constructed annually (3 new seals x 50 percent 50-psi seals x 66 mines). Based on 6 seals in a set of seals, sampling will be conducted at 16.5 sets of 50-psi seals (99 seals / 6 seals per set). Of these 16.5 sets of seals in mines with 1-19 employees, 14.85 sets will be sampled weekly (90 percent of the mines) and 1.65 sets will be sampled daily (10 percent of the mines).

In mines with 20-500 employees, MSHA estimates that 1,034.5 new 50-psi seals will be constructed annually (9 new seals x 50 percent 50-psi seals x 237 mines x 0.97 of seals

constructed to separate the active longwall panel from the longwall panel previously mined). Approximately 3 percent of new 50-psi seals in mines with 20-500 employees are estimated to be seals constructed to separate the active longwall panel from the longwall panel previously mined. Mine operators already sample these types of seals for oxygen and carbon monoxide as noted in their approved ventilation plan, and required by existing § 75.334(f). Based on 6 seals in a set of seals, sampling will be conducted at 172.4 sets of 50-psi seals (1,034.5 seals / 6 seals per set). Of these 172.4 sets of seals in mines with 20-500 employees, 155.16 sets will be sampled weekly (90 percent of the mines) and 17.24 sets will be sampled daily (10 percent of the mines).

In mines with 501+ employees, MSHA estimates that 28 new 50-psi seals are constructed annually (14 new seals x 20 percent being 50-psi seals x 10 mines). Based on 5 seals in a set of seals, sampling will be conducted at 5.6 sets of 50-psi seals (28 seals / 5 seals per set). Of these 5.6 sets of seals in mines with 501+, 5.04 sets will be sampled weekly (90 percent of the mines) and 0.56 sets will be sampled daily (10 percent of the mines).

Based on the preceding assumptions, the number of annual samples at 50-psi seals after the design strength of these seals has been reached is estimated to be:

- 2,746 samples in mines with 1-19 employees [((16.5 sets of seals x .90 x 1 sample) + (16.5 sets of seals x 0.10 x 7 samples)) x 2 samples x 52 weeks];
- 28,690 samples in mines with 20-500 employees [((172.4 sets of seals x .90 x 1 sample) + (172.4 sets of seals x 0.10 x 7 samples)) x 2 samples x 52 weeks]; and
- 932 samples in mines with 501+ employees [((5.6 sets of seals x .90 x 1 sample) + (5.6 sets of seals x 0.10 x 7 samples)) x 2 samples x 52 weeks].

Additional Sampling under Final § 75.336(c)

Under final § 75.336(c), when a sample from the sealed atmosphere with seals of less than 120 psi indicates that the oxygen concentration is 10 percent or greater and methane is between 4.5 percent and 17 percent, the mine operator must take one additional sample. Under final § 75.336(c), when the additional sample is from a sealed atmosphere and the sample indicates the concentration levels noted above, then persons shall be withdrawn from the affected area which is the entire mine or other affected area identified by the operator and approved by the District Manager in the ventilation plan, except those persons referred to in § 104(c) of the Act.

Final § 75.336(b)(2) requires that immediate action be taken when oxygen and methane sample results show that the atmosphere behind seals is not inert as defined by final § 75.336(b)(1). Immediate action also must be taken when mine operators get oxygen and methane sample results that are within the levels stated under final § 75.336(c) because these levels show that the atmosphere behind the seal is not inert as defined by § 75.336(b)(1). MSHA estimates that there will be 82 occurrences where oxygen and/or methane concentration sample results will cause mine operators to take immediate action to restore the atmosphere behind seals to an inert condition.

Of these 82 occurrences, MSHA estimated that 76 occurrences will result in mine operators needing to take additional samples as require by § 75.336(c). These 76 occurrences were determined in the following manner. MSHA has estimated costs under final § 75.336(c)

based on 70 occurrences that result in the mine operator having to withdraw miners from the mine. Thus, an additional methane and oxygen sample would be taken under each of these 70 occurrences where the sample result would cause miners to be withdrawn from the mine. In addition, MSHA estimates that 6 more occurrences will result in obtaining an oxygen and/or methane sample result that falls within the concentration levels of final § 75.336(c). An additional oxygen or methane sample would be taken under each of these 6 occurrences where the additional sample result would show that miners do not need to be withdrawn from the mine. Furthermore, of the 76 occurrences, MSHA estimates that, for 21 of them when miners reenter the mine after being withdrawn, the mine operator will need to take 1 oxygen and 1 methane sample every hour for eight hours.

Thus, MSHA estimates that the total number of samples taken annually under § 75.336(c) is 488 samples [(70 occurrences x 2 samples) + (6 occurrences x 2 samples) + (21 occurrence x 2 samples x 8 times). Of these 488 samples, MSHA estimates that: 22 samples are in mines with 1-19 employees; 396 samples are in mines with 20-500 employees; and 70 samples are in mines with 501+ employees.

Table IV-B3 shows a total of 547,192 samples to be taken annually based on the above discussion.

Table IV-B3: Annual Number of Samples Taken under § 75.336

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	Sampling Performed on Existing Seals	No. of Annual Samples Taken at Seals Before Design Strength Reached	No. of Annual Samples Taken at 50 psi Seals After Design Strength Reached	No. of Additional Samples Taken under §75.336(c) Annually	Annual No. of Samples Taken [a]
1-19	27,248	11,088	2,746	22	41,104
20-500	325,416	119,448	28,690	396	473,950
501+	23,296	7,840	932	70	32,138
Total	375,960	138,376	32,368	488	547,192

[a] Annual No. of Samples Taken = col. b + col. c + col. d + col. e.

MSHA estimates that an oxygen or methane sample takes 0.075 hours (4.5 minutes) to perform. The Agency assumes that a certified person, earning a supervisory wage of $71.34 per hour, will take the samples. Table IV-B4 shows a total annual cost of $2,927,751 to take oxygen and methane samples.

Table IV-B4: Annual Cost of Sampling under § 75.336

(a)	(b)	(c)	(d)	(e)
Mine Size	Total No. of Annual Samples [a]	Time to Take Sample (in hrs.)	Certified Person Hourly Wage Rate	Annual Cost [b]
1-19	41,104	0.075	$71.34	$219,927
20-500	473,950	0.075	$71.34	$2,535,869
501+	32,138	0.075	$71.34	$171,954
Total	547,192			$2,927,751

[a] Source: Table IV-B3.

[b] Annual Cost = (col. b x col. c x col. d).

Under final § 75.336(e), a certified person needs to record each sampling result, including the location of the sampling points and the oxygen and methane concentrations. Also, any hazardous conditions found must be corrected and recorded in accordance with existing § 75.363. MSHA assumes that sample results that show oxygen and methane concentration levels that are specified in final § 75.336(c) will confirm whether a hazardous condition has been found. Annually, MSHA estimates that there will be 100 sample results that show a hazardous condition (4 sample results in a mine with 1-19 employees, 116 sample results in mines with 20-500 employees, and 20 sample results in a mine with 501+ employees).

MSHA estimates that the time to make a record is: 0.05 hours (3 minutes) when there is no hazardous condition and an additional 0.05 hours (3 minutes) when a hazardous condition needs to be recorded. Table IV-B5 shows a total annual cost of $1,952,333 to make a sampling record.

Table IV-B5: Annual Costs to Make a Sampling Record under §75.336(e)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Total No. of Annual Samples	No. of Annual Samples that Involve a Hazardous Condition	Time to Make a Record that Does Not Involve a Hazardous Condition (in hrs.)	Additional Time to Make a Record that Involves a Hazardous Condition (in hrs.)	Certified Person Hourly Wage Rate	Annual Cost [a]
1-19	41,104	4	0.05	0.05	$71.34	$146,632
20-500	473,950	116	0.05	0.05	$71.34	$1,690,993
501+	32,138	20	0.05	0.05	$71.34	$114,708
Total	547,192	140				$1,952,333

[a] Annual Cost = (col. b x col. d x col. f) + (col. c x col. e x col. f).

In the situation where a hazardous condition identified during sampling cannot be corrected immediately, the mine operator needs to post a danger sign. Annually, MSHA estimates that the number of times when a hazardous condition is found from sampling and a danger sign needs to be posted are: 2 times in mines with 1-19 employees, 58 times in mines with 20-500 employees, and 10 times in mines with 501+ employees. MSHA estimates that 2 signs will be posted in each area where a hazardous condition was found through sampling. Estimated cost for a danger sign is $10 (which includes the labor to put up the signs). Table IV-B6 show a total annual cost of $1,400 to post danger signs.

Table IV-B6: Annual Costs to Post Danger Signs under §75.336(e)

(a)	(b)	(c)	(d)	(e)
Mine Size	Annual No. of Times Hazardous Condition Not Corrected Immediately	No. of Signs to Post at Each Sampled Site	Cost per Sign (includes Labor cost)	Annual Cost[a]
1-19	2	2	$10	$40
20-500	58	2	$10	$1,160
501+	10	2	$10	$200
Total	70			$1,400

[a] Annual Cost = (col. b x col. c x col. d).

Final § 75.336(a)(2) requires the mine operator to evaluate the atmosphere in the sealed area to determine whether sampling through the sampling pipes in seals provides appropriate sampling locations of the sealed area. This evaluation will be made for each area that will be sealed by mines that seal. On average, the number of worked-out areas is estimated to be: 1 every 2 years for mines with 1-19 employees; 3 every two years for mines with 20-500 employees; and 1 per year for mines with 501+ employees. On average, MSHA estimates that the time to make an evaluation for a worked-out area is: 2 hours in a mine with 1-19 employees; 7 hours in a mine with 20-500 employees; and 10 hours in a mine with 501+ employees.

MSHA assumes that to make the evaluation some mines will use its own chief engineer while others will contract out the services of a chief engineer. MSHA estimates a chief engineer's hourly wage rate of: $101.94 when the services are contracted out; and $67.96 when the chief engineer is employed by the mine operator. For mines with 1-19 employees, MSHA estimates that 80 percent will contract out a chief engineer's services, and 20 percent will use an in-house chief engineer. For mines with 20-500 employees, MSHA estimates that 10 percent will contract out a chief engineer's services, and 90 percent will use an in-house chief engineer. For mines with 501+ employees, MSHA estimates that 100 percent will use an in-house chief engineer. Thus, the estimated weighted average chief engineer wage is:

- $95.14 per hour for mines with 1-19 employees [($101.94 per hour x 80 percent) + ($67.96 per hour x 20 percent);
- $71.35 per hour for mines with 1-19 employees [($101.94 per hour x 10 percent) + ($67.96 per hour x 90 percent); and
- $67.96 per hour for mines with 501+ employees.

Table IV-B7 shows a total annual cost of $190,655 for mine operators to evaluate the atmosphere in the sealed area.

Table IV-B7: Annual Cost to Evaluate Sealed Atmosphere Under § 75.336(a)(2)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines That Seal	Average No. of Worked-Out Areas Annually per Mine	Time to Make Evaluation (in hrs.)	Engineer Hourly Wage Rate	Annual Cost [a]
1-19	66	0.5	2	$95.14	$6,279
20-500	237	1.5	7	$71.36	$177,579
501+	10	1	10	$67.96	$6,796
Total	313				$190,655

[a] Annual Cost = col. b x col. c x (col. d x col. e).

Also as a result of the evaluation performed under final § 75.336(a)(2), the District Manager may require additional sampling locations and frequencies in the mine ventilation plan. Since the ETS was issued, District Managers have on occasion required a mine to drill a borehole. MSHA estimates that, for mines in each size category that seal, approximately 5 percent will drill boreholes. Annually, 3 mines with 1-19 employees; 12 mines with 20-500 employees; and 1 mine with 501 employees are estimated to drill boreholes. On average, the number of boreholes to be drilled annually is estimated to be: 1 borehole in a mine with 1-19 employees; 2 boreholes in a mine with 20-500 employees; and 4 boreholes in a mine with 501+ employees. The estimated cost to drill a borehole is $5,000 [$10 per foot (including labor) x 500 feet]. Table IV-B8 shows a total annual cost of $155,000 for mine operators to drill boreholes.

Table IV-B8: Annual Cost to Drill Boreholes under §75.336(a)(2)

(a)	(b)	(c)	(d)	(e)
Mine Size	No. of Mines that Will Drill Boreholes	No. of Boreholes Drilled Annually	Cost to Drill a Borehole	Annual Cost [a]
1-19	3	1	$5,000	$15,000
20-500	12	2	$5,000	$120,000
501+	1	4	$5,000	$20,000
Total	16			$155,000

[a] Annual Cost = col. b x col. c x col. d.

Also, under § 75.336(a)(2) the mine operator will need to revise the mine ventilation plan to include the additional sampling locations and frequencies. MSHA assumes that the initial revisions will be sufficient and subsequent revisions will not have to be sent each time to the District Manager. Annually, MSHA estimates the number of revisions is: 3 revisions in mines with 1-19 employees; 12 revisions in mines with 20-500 employees; and 1 revision in a mine with 501+ employees. MSHA estimates that a supervisor, earning $71.34 per hour, takes 0.25 hours (15 minutes) to write up the one page revision, and a secretary, earning $25.47 per hour, takes 0.1 hours (6 minutes) to copy and submit the revision. Copy costs are $0.15 per page and postage costs are $1.00. Table IV-9 shows a total annual cost of $345 to submit revisions to the ventilation plan concerning additional sampling locations and frequencies.

Table IV-B9: Annual Cost to Revise Ventilation Plan for Additional Sampling Locations and Frequencies

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	No. of Revisions to Plan for Sampling Locations	Time to Write Revision	Time to Copy & Submit Revision	Superv. Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Copy and Postage Cost	Annual Cost [a]
1-19	3	0.25	0.1	$71.34	$25.47	$1.15	$65
20-500	12	0.25	0.1	$71.34	$25.47	$1.15	$258
501+	1	0.25	0.1	$71.34	$25.47	$1.15	$22
Total	16						$345

[a] Annual Cost = col. b x [(col. c x col. e) + (col. d x col. f) + col. g].

Under existing §§ 75.370(a)(3)(iii) and (f), mines that make ventilation plan revisions need to post a copy of the revisions; and for those mines that have a miners' representative, a copy of the revisions must be provided, upon request. MSHA assumes that 30 percent of the revisions will be made by mines that have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it costs $6.37 in wages per mine to copy and post the revision of the ventilation plan, and also $6.37 in wages to copy and provide a copy of the revision of the ventilation plan to the miners' representative ($25.47 clerical employee' hourly wage rate x 0.25 hours). Each revision is assumed to be 1 page. Estimated copy costs are $0.15 per page and postage is $1.00. Table IV-B10 shows a total annual cost of $140 to copy and post, and provide a copy of the revision to the miners' representative.

Table IV-B10: Annual Cost to Copy and Post Revisions to the Ventilation Plan Concerning Sampling Locations and Frequencies and to Provide a Copy to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	No. of Revisions to Plan for Sampling Locations	Percentage of Mines Providing a Copy of Revisions to Miners' Representative	Cost of Clerical Employee Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative	Copy Cost	Postage Cost	Annual Cost [a]
1-19	3	30%	$6.37	$0.15	$1.00	$26
20-500	12	30%	$6.37	$0.15	$1.00	$105
501+	1	30%	$6.37	$0.15	$1.00	$9
Total	16					$140

[a] Annual Cost = (col. b x (col. d + col. e)) + (col. b x col. c x (col. d + col. e + col. f)).

Final § 75.336(b)(2) requires that immediate action be taken by the mine operator to restore an inert sealed atmosphere behind seals with less than 120-psi overpressure. MSHA estimates that twice a year 41 mines (approximately 13 percent of mines that will seal) will need to restore the atmosphere behind seals to an inert condition. Thus, of the 82 occurrences (41 mines x 2 occurrences) where mine operators will need to restore an atmosphere to an inert condition MSHA estimates that:

- 2 occurrences are in a mine with 1-19 employees (1 mine x 2 occurrences per year);
- 66 occurrences are in mines with 20-500 employees (33 mines x 2 occurrences per year) and;
- 14 occurrences are in mines with 501+ employees (7 mines x 2 occurrences per year).

In the Regulatory Economic Analysis (REA) that accompanied the ETS, the Agency estimated that some mines would choose to inert by purchasing a boiler system that includes piping running from the surface to the sealed area. Since the ETS was published, the Agency has not been aware of any mine choosing to implement a boiler system for this purpose. As a result, MSHA now expects that mines will not choose a boiler system to inert affected atmospheres. For this analysis, the Agency assumes that mines will incur a combination of the following types of costs when taking immediate action to restore an atmosphere behind a sealed area to an inert condition. Mines will: make ventilation adjustments (including, but not limited to, constructing, tearing down, or adjusting stoppings, overcasts, and regulators); repair cracks and leaky areas in seals and/or drill holes around seals in order to ring grout; and insert nitrogen gas.

Ventilation adjustment costs are estimated to be: $10,000 for a mine with 1-19 employees; $30,000 for a mine with 20-500 employees; and $50,000 for a mine with 501+ employees. Seal repair costs are estimated to be: $5,000 for a mine with 1-19 employees; and $10,000 for a mine with 20 or more employees. The cost for a tank of nitrogen gas is estimated to be $10,000 per tank. Mines with 1-19 employees are estimated to need 1 tank and mines with 20 or more employees are estimated to need 3 tanks.

For the one mine with 1-19 employees, MSHA estimates there will be two occurrences annually: one involving costs for ventilation changes, seal repair, and inerting with nitrogen; and one involving only seal repair costs. For mines with 20 or more employees it is estimated that for 80 percent of the occurrences the mines will incur costs for ventilation changes, seal repair, and inerting with nitrogen; for 10 percent of the occurrences the mines will incur costs for ventilation changes and seal repair; and for the remaining 10 percent of the occurrences the mines will incur only seal repair costs.

Table IV-B11 show a total annual cost of $5,162,000 for mine operators to take immediate action to restore an atmosphere to an inert condition.

Table IV-B11: Annual Cost to Take Immediate Action as Required by §75.336(b)(2)

(a)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
		Probability of Occurrence			Per Occurrence			
Mine Size	Occur-rences per Year	Seal Repair	Seal Repair and Ventilation Changes	Seal Repair, Ventilation Changes, and Inert with Nitrogen	Cost for Seal Repair	Cost to Make Ventilation Changes	Cost to Inert with Nitrogen From Tankers	Annual Cost
1-19	2	50%	0%	50%	$5,000	$10,000	$10,000	$30,000
20-500	66	10%	10%	80%	$10,000	$30,000	$30,000	$4,026,000
501+	14	10%	10%	80%	$10,000	$50,000	$30,000	$1,106,000
Total	82							$5,162,000

Final § 75.336(c) requires that when the additional sample of the sealed atmosphere indicates that the oxygen concentration is 10.0 percent or greater and the methane concentration level is between 4.5 percent and 17.0 percent, persons shall be withdrawn from the affected area which is the entire mine or other affected area identified by the operator and approved by the District Manager in the ventilation plan, except those persons referred to in § 104(c) of the Act. In the REA that accompanied the ETS, MSHA assumed that there would be 9 occurrences annually when miners would need to be withdrawn from the mine. In response to comments and field data with the ETS in effect, the Agency has revised its earlier estimates to an average of 70 instances annually when miners will be withdrawn from the mine under final § 75.336(c). The 70 instances per year are based on an extrapolation to a full year of the number of withdrawals that have occurred since the ETS was published. MSHA recognizes that the number of occurrences may increase due to requirements in the final rule that mine operators sample seals not only when the seal is outgassing but also when it is ingassing. MSHA also recognizes that the number of occurrences may decrease in future years as mine operators adapt to the provisions of the final rule. The Agency's estimate of 70 withdrawals a year, based on actual withdrawals under the ETS, implicitly assumes that the effects of increased withdrawals due to ingassing and decreased withdrawals due to operator experience will approximately offset each other. Each withdrawal is assumed to be for a period of 12 hours, which is 1 ½ shifts.

MSHA projects that the withdrawal of miners imposes two types of costs on the mine operator. One cost is due to 12-hours of delayed production (not permanent production loss). MSHA assumes that the operator will extract the coal that was not produced during the period that miners were withdrawn when the mine is at the end of its production life (which MSHA estimates to be in 5 years). The value, in today's dollars, of a dollar of production 5 years from now is equal to one dollar discounted by 7 percent a year over 5 years (or, equivalently, one dollar multiplied by $(1/1.07)^5$, or $0.713). The cost of the delayed production is equal to the value of 12 hours of production today minus its present value if produced in 5 years. That is, the cost of delayed production is equal to (1 – 0.713) multiplied by P, where P is equal to the value

of eight hours of current production. The second cost for the period when miners are withdrawn is the cost of the labor needed for the delayed 12 hours of coal production (delayed by 5 years). That cost is equal to the labor cost for a shift multiplied by 0.713.

Table IV-B12 shows, by mine size, MSHA's estimate of the value of 12 hours of underground coal production. Table IV-B13 shows a total annual cost of $3,553,496 to mine operators for delayed production, including the extra labor cost.

Table IV-B12: Value of 12 Hours of Underground Coal Production

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	U/G Coal Mine Production	Miner-Hours in U/G Coal Mines	Tons per Miner-Hour [a]	2006 Price of U/G Coal per Ton[b]	No. of Hours Production is Stopped	Avg. No. of Miners Working per Shift	Value of Production for 12 Hours [c]
1-19	7,817,859	3,206,525	2.438	$38.28	12	10	$11,200
20-500	269,816,918	75,846,805	3.557	$38.28	12	39	$63,731
501+	81,059,978	18,095,624	4.480	$38.28	12	192	$395,082

[a] Tons per Miner-Hour = U/G Coal Mine Production / Miner-Hours in U/G Coal Mines. Source: MSHA data from Teradata run on July 11, 2007.

[b] Source: Dept. of the Interior, Energy Information Administration, Annual Coal Report 2006, Table 28.

[c] Value of Production for 12 Hours = col. d x col. e x col. f x col. g.

Table IV-B13: Annual Cost For Withdrawing Miners under §75.336(c)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Withdrawals per Year	Value of Production for 12 Hours [a]	Avg. No. of Miners Working per Shift	Lost Work Time (in hrs.)	Hourly Wage Rate [b]	Annual Cost for Withdrawing Miners[c]
1-19	2	$11,200	10	12	$37.61	$12,865
20-500	58	$63,731	39	12	$37.61	$1,788,831
501+	10	$395,082	192	12	$37.61	$1,751,800
Total	70					$3,553,496

[a] Source: Table IV-B12.

[b] Hourly Wage Rate = ($31.66 miner hourly wage x 0.85) + ($71.34 supervisor hourly wage x 0.15).

[c] Annual Cost for Withdrawing Miners = col. b x [(col. c - (col. c / 1.07^5)) + ((col. f x col. e x col. d) / 1.07^5)].

Final § 75.336(c) requires that before miners reenter the mine, the mine operator must have a ventilation plan revision approved by the District Manager specifying the action to be taken. On average, MSHA estimates that the total time for a supervisor, earning $71.34 per hour, to make initial and subsequent revisions to the ventilation plan is: 0.5 hours (30 minutes) for mines with 1-19 employees, and 1 hour for mines with 20 or more employees. On average, the number of revised pages submitted is estimated to be: 2 pages for mines with 1-19 employees, and 4 pages for mines with 20 or more employees. In addition, MSHA estimates that a clerical employee, earning $25.47 per hour, takes a total of 0.5 hours (30 minutes) to copy and submit the initial and subsequent revisions for all mine sizes. MSHA estimates that the copy and postage costs to make revisions to the ventilation plan are:

- $2.60 for mines with 1-19 employees [(2 pgs. x $0.15) + $1) x 2 submissions] and;
- $3.20 for mines with 20 or more employees [(4 pgs. x $0.15) + $1) x 2 submissions].

Table IV-B14 shows a total annual cost of $5,591 to revise and submit the ventilation plan in order for miners to enter the mine after a withdrawal.

Table IV-B14: Annual Cost to Revise Ventilation Plan to Allow Miners to Reenter the Mine under §75.336(c)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	Plan Revisions Due to Withdraws (per Year)	Time to Make Revisions (in hrs.)	Time to Copy & Submit Revisions	Supervisor Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Copy and Postage Costs	Annual Cost [a]
1-19	2	0.5	0.5	$71.34	$12.74	$2.60	$89
20-500	58	1	0.5	$71.34	$12.74	$3.20	$4,693
501+	10	1	0.5	$71.34	$12.74	$3.20	$809
Total	70						$5,591

[a] Annual Cost = Col. b x [(col. c x col. e) + (col. d x col. f) + col. g].

Under existing §§ 75.370(a)(3)(iii) and (f), mines that make ventilation plan revisions need to post a copy of the revisions; and for those mines that have a miners' representative, a copy of the revisions must be provided, upon request. MSHA assumes that 30 percent of withdrawals occur in mines that have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it costs $12.74 in wages per mine to copy and post the initial and subsequent revisions of the ventilation plan, and also $12.47 in wages to copy and provide a copy of the initial and subsequent revisions of the mine ventilation plan to the miners' representative ($25.47 clerical employee' hourly wage rate x 0.5 hours). The copy cost for the initial and subsequent revisions is estimated to be: $0.60 for a mine with 1-19 employees [(2 pgs. x $0.15 per pg.) x 2 submissions] and; $1.20 for a mine with 20 or more employees

[(4 pgs. x $0.15 per pg.) x 2 submissions]. Postage costs are estimated to be $2.00 ($1 postage cost x 2 submissions). Table IV-B15 shows a total annual cost of $1,309 to copy and post and, when applicable, to provide a copy of the revisions to the miners' representative.

Table IV-B15: Annual Cost to Copy and Post Revisions to the Ventilation Plan Concerning Miners Reentering the Mine and Provide a Copy to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Plan Revisions Due to Withdraws (per Year)	Percentage of Revisions Where a Copy of the Revisions are Provided to Miners' Representative	Cost of Clerical Employee Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative	Copy Cost	Postage Cost	Annual Cost[a]
1-19	2	30%	$12.74	$0.60	$2.00	$36
20-500	58	30%	$12.74	$1.20	$2.00	$1,085
501+	10	30%	$12.74	$1.20	$2.00	$187
Total	70					$1,309

[a] Annual Cost = (col. b x (col. d + col. e)) + (col. b x col. c x (col. d + col. e + col. f)).

After mine operators take additional samples under § 75.336(c), they must immediately notify MSHA. MSHA estimates that there will be 70 occurrences where mine operators will take an additional sample that will result in miners needing to evacuate the mine, and 6 occurrences where mine operators will take an additional sample that will not result in miners evacuating the mine. After the additional sample is taken for each of these 76 occurrences, the mine operator will need to immediately notify MSHA. Of the 76 occurrences, MSHA estimates that: 3 occurrences will be in mines with 1-19 employees; 62 occurrences will be in mines with 20-500 employees; and 11 occurrences will be in mines with 501+ employees. MSHA estimates that a supervisor, earning $71.34 per hour, will take 0.1 hours (6 minutes) to telephone MSHA. Table IV-16 shows a total annual cost of $542 for mine operators to immediately notify MSHA.

Table IV-B16: Annual Cost to Notify MSHA under §75.336(c)

(a)	(b)	(c)	(d)	(e)
Mine Size	Annual No. of Occurrences Where an Addtitonal Sample is Taken	Time to Notify (in hrs.)	Supervisor Hourly Wage Rate	Annual Cost [a]
1-19	3	0.1	$71.34	$21
20-500	62	0.1	$71.34	$442
501+	11	0.1	$71.34	$78
Total	76			$542

[a] Annual Cost = col. b x (col. c x col. d).

Under final § 75.336(d) in sealed areas with a demonstrated history of carbon dioxide or where inert gases have been injected, the District Manager may approve in the ventilation plan an alternative method to determine if the sealed atmosphere is inert and when miners have to be withdrawn from the mine. Specific levels of methane, carbon dioxide, nitrogen and oxygen must be addressed in the alternative method. Although not required by the final rule, several mine operators may choose to propose an alternative method to the one specified in final §§75.336(b) and (c). MSHA assumes that this option would only be chosen if the mine operator believed that the costs of implementing the option would be less than the costs to follow the requirements in final §§ 75.336(b) and (c). Therefore, MSHA has not included an additional cost for this option.

Table IV-B17 shows a summary of the $14,326,461 total yearly costs under final § 75.336.

Table IV-B17: Summary of Yearly Costs for Sampling and Monitoring Requirements

Section	Description	Table	Mine Size by Employment			Total
			1-19	20-500	501+	
§75.336	Purchase Methane Gas Detectors	IV-B1	$42,813	$215,869	$10,316	$268,998
§75.336	Detector Maintenance	IV-B2	$16,783	$84,625	$5,493	$106,902
§75.336(a)	Sampling	IV-B4	$219,927	$2,535,869	$171,954	$2,927,751
§75.336(e)	Sampling Records	IV-B5	$146,632	$1,690,993	$114,708	$1,952,333
§75.336(e)	Post Danger Signs	IV-B6	$40	$1,160	$200	$1,400
§75.335(a)(4)	Evaluation	IV-B7	$6,279	$177,579	$6,796	$190,655
§75.335(a)(4)	Drill Boreholes	IV-B8	$15,000	$120,000	$20,000	$155,000
§75.335(a)(4)	Revise Ventilation Plan Concerning Samling Locations & Frequencies	IV-B9	$65	$258	$22	$345
§75.335(a)(4)	Provide & Post Revised Ventilation Plan Concerning Sampling Locations & Frequencies	IV-B10	$26	$105	$9	$140
§75.336(b)(2)	Take Immediate Action to Inert Atmosphere	IV-B11	$30,000	$4,026,000	$1,106,000	$5,162,000
§75.336(c)	Withdraw Miners	IV-B13	$12,865	$1,788,831	$1,751,800	$3,553,496
§75.336(c)	Revise Ventilation Plan to Allow Miners to Reenter the Mine	IV-B14	$89	$4,693	$809	$5,591
§75.336(c)	Provide & Post Revised Ventilation Plan Concerning Miners Reentering the Mine	IV-B15	$36	$1,085	$187	$1,309
§75.336(c)	Notify MSHA	IV-B16	$21	$442	$78	$542
	Total Cost		$490,577	$10,647,511	$3,188,373	$14,326,461

Final § 75.337 Construction and repair of seals

Final § 75.337(b)(1) requires that insulated cables, batteries, and other potential electric ignition sources be removed from the area to be sealed prior to constructing seals, unless it is not safe to do so. If ignition sources cannot safely be removed, seals must be constructed to at least 120 psi. Final § 75.337(b)(2) requires the removal of metallic objects through or across seals. Final § 75.337(b)(3) requires the breaching or removal of all stoppings in the first crosscut inby the seals immediately prior to sealing the area.

MSHA estimates that: 66 mines with 1-19 employees; 237 mines with 20-500 employees; and 10 mines with 501+ employees will continue to construct seals. Based on the Agency's experience and expertise, MSHA estimates that, on average, the annual number of worked-out areas in a mine to be: 1 worked-out area every two years in mines with 1-19 employees, 3 worked-out areas every two years in mines with 20-500 employees, and 1 worked-out area a year in mines with 501+ employees.

MSHA estimates that to clear a worked-out area as required by final §§ 75.337(b)(1) through (b)(3) takes, on average, 2 miners, earning $31.66 per hour: 6 hours in mines with 1-19 employees; 12 hours in mines with 20-500 employees; and 16 hours in mines with 501+ employees. Table IV-C1 shows a total annual cost of $292,792 to clear worked-out areas before sealing.

Table IV-C1: Annual Cost to Clear Worked-Out Areas Prior to Sealing under §§75.337(b)(1), (b)(2), and (b)(3)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	No. of Mines that Will Seal	Average No. of Worked-Out Areas Annually per Mine	Time to Clear Area to be Sealed (in hrs.)	No. of Miners Needed to Clear Area	Miner Hourly Wage Rate	Annual Cost [a]
1-19	66	0.5	6	2	$31.66	$12,537
20-500	237	1.5	12	2	$31.66	$270,123
501+	10	1	16	2	$31.66	$10,131
Total	313					$292,792

[a] Annual Cost = col. b x col. c x col. d x col. e x col. f.

Under final §§ 75.337(c)(1) through (c)(5), a certified person must perform several tasks during seal construction and repair, and a mine foreman or equivalent mine official must countersign the record that tasks were performed. MSHA estimates that it takes 0.85 hours (51 minutes) to perform these functions. The 0.85 hours consist of: 0.75 hours (45 minutes) for the certified person to perform the requirements under final § 75.337(c)(1) through (c)(5), which include certifying that the tasks were done, and making a record; and 0.1 hours (6 minutes) for a mine foreman or equivalent mine official to countersign the record made by the certified person. The certified person and mine foreman are estimated to earn $71.34 per hour.

Final § 75.337(c) applies to both the construction of seals and the repair of existing seals. MSHA estimates that: 66 mines with 1-19 employees; 237 mines with 20-500 employees; and 10 mines with 501+ employees will seal. With respect to new seals, MSHA estimates that, on average, the annual number of new seals built per mine is: 3 seals in a mine with 1-19 employees; 9 seals in a mine with 20-500 employees; and 14 seals in a mine with 501+ employees. Annually, MSHA estimates that the number of existing seals to be repaired is approximately: 32 seals in mines with 1-19 employees (1,064 existing seals x 0.03); 364 seals in mines with 20-500 employees (12,147 existing seals x 0.03); and 22 seals in mines with 501+ employees (737 existing seals x 0.03). Thus, MSHA estimates that the number of seals to be constructed or repaired annually is:

- 230 seals for mines with 1-19 employees [198 new seals (66 mines x 3 seals built annually per mine)] + 32 existing seals;
- 2,497 seals for mines with 20-500 employees [2,133 new seals (237 mines x 9 seals built annually per mine)] + 364 existing seals; and

- 162 seals for mines with 501+ employees [140 new seals (10 mines x 14 seals built annually per mine)] + 22 existing seals].

The final rule includes a clarifying change to require seals to be constructed to at least 120 psi if ignition sources cannot safely be removed. This clarifying change would result in a marginal increase in costs. MSHA reasonably expects that any additional costs related to this provision would be minimal.

Table IV-C2 shows a total annual cost of $175,186 for mine operators to perform the tasks required by final §§ 75.337(c)(1) through (c)(5).

Table IV-C2: Annual Cost for Certified Person to Examine, Certify, and Record, and for Mine Foreman to Countersign, Seal Construction and Repair under §§75.337(c)(1) through (c)(5)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Annual No. of Seals Built & Repaired	Time to Examine, Certify, & Record (in hrs.)	Time to Counter-sign (in hrs.)	Certified Person Hourly Wage Rate	Mine Foreman Hourly Wage Rate	Annual Cost [a]
1-19	230	0.75	0.1	$71.34	$71.34	$13,947
20-500	2,497	0.75	0.1	$71.34	$71.34	$151,416
501+	162	0.75	0.1	$71.34	$71.34	$9,824
Total	2,889					$175,186

[a] Annual Cost = Col. b x [(col. c x col. e) + (col. d x col. f)].

Also, under final § 75.337(c), a certified person (a supervisor earning $71.34 per hour) must directly supervise the construction and repair of seals. MSHA assumes that in an 8 hour period a certified person can supervise the construction of a group of three seals. As previously stated, a certified person will spend a total of 0.75 hours (45 minutes), performing the specific activities required by final § 75.337(c)(1)-(c)(5) for one seal. Thus, a group of three seals will take 2.25 hours (0.75 hours x 3 seals). The remaining 5.75 hours (8 hours – 2.25 hours) per group of three seals will be spent on general supervision. MSHA estimates that, on average, the remaining time to supervise the construction for every three seals built in a mine will be:

- 5.75 hours in mines with 1-19 employees [5.75 hours x 1 group of 3 seals];
- 17.25 hours in mines with 20-500 employees [5.75 hours x 3 groups of 3 seals]; and
- 26.83 hours in mines with 501+ employees [5.75 hours x 4.67 groups of 3 seals].

The estimated annual number of new seals being constructed is divided by 3 to account for the fact that the hours for general supervision of seal construction applies to a group of 3 seals. Thus, general supervision of seals being constructed applies to the following group of seals: 66 groups of 3 seals in mines with 1-19 employees [(66 mines x 3 seals per mine) / 3);

711 groups of 3 seals in mines with 20-500 employees [(237 mines x 9 seals per mine) / 3]; and 47 groups of 3 seals in mines with 501+ employees [(10 mines x 14 seals per mine) / 3).

In addition, MSHA estimates that, on average, it takes 2.25 hours to supervise the repair of an existing seal. As noted earlier, the annual number of existing seals to be repaired is estimated to be: 32 seals in mines with 1-19 employees; 364 seals in mines with 20-500 employees; and 22 seals in mines with 501+ employees.

Table IV-C3 shows a total annual cost of $1,058,459 to supervise seal construction and repair as required by final § 75.337(c).

Table IV-C3: Annual Cost for Certified Person to Supervise Seal Construction and Repair under §75.337(c)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Annual No. of Seal Groups Supervised	Annual No. of Seals Repaired	Remaining Time to Supervise Seal Construction (in hrs.)	Remaining Time to Supervise Seal Repair (in hrs.)	Certified Person Hourly Wage Rate	Annual Cost [a]
1-19	66	32	5.75	2.25	$71.34	$32,210
20-500	711	364	17.25	2.25	$71.34	$933,395
501+	47	22	26.83	2.25	$71.34	$92,854
Total	824					$1,058,459

[a] Annual Cost = [(col. b x col. d) + (col. c x col. e)] x col.f.

Under final § 75.337(d), upon completion of construction of each seal, a senior mine management official must certify that construction, installation, and materials used were in accordance with the approved ventilation plan. On average, for each new seal, MSHA estimates that a senior mine management official spends 0.5 hours (30 minutes), making sure that the construction, installation and materials used were in accordance with the approved ventilation plan. A senior mine management official is estimated to earn $92.78 per hour. MSHA estimates that the number of new seals annually is: 198 seals in mines with 1-19 employees (3 seals per mine x 66 mines); 2,133 seals in mines with 20-500 employees (9 seals per mine x 237 mines); and 140 seals in mines with 501+ employees (14 seals per mine x 10 mines).

Table IV-C4 shows a total annual cost of $114,630 to mine operators for a senior mine management official to verify that the construction, installation, and materials used in building seals were in accordance with the approved ventilation plan.

Table IV-C4: Annual Costs to Verify That Construction, Installation, and Materials Used in New Seals are in Accordance with the Ventilation Plan under § 75.337(d)

(a)	(b)	(c)	(d)	(e)
Mine Size	No. of New Seals Constructed per Year	Time Spent by Senior Management Official (in hrs.)	Senior Mine Management Official Hourly Wage Rate	Annual Cost [a]
1-19	198	0.5	$92.78	$9,185
20-500	2,133	0.5	$92.78	$98,950
501+	140	0.5	$92.78	$6,495
Total	2,471			$114,630

[a] Annual Cost = Col. b x col. c x col. d.

Also, under final § 75.337(d), the senior mine management must certify that the construction, installation, and materials used were in accordance with the approved ventilation plan. Final § 75.337(e)(2) requires that the certification be submitted to the District Manager. MSHA estimates that a senior mine management official takes 0.05 hours (3 minutes) to make the certification required by final § 75.337(c) and send it to MSHA. The certification is estimated to be one page. Postage is estimated to be $1. Thus, the cost for submitting the certification is $1.15 [(1 pgs. x $0.15 copy cost per pg.) + $1 postage]. Table IV-C5 shows a total annual cost of $14,305 to make the certifications required by final § 75.337(d) and submit them as required by final § 75.337(e)(2).

Table IV-C5: Annual Cost under §§ 75.337(d) and 75.337(e)(2) to Certify, and Submit Certification that Construction, Installation, and Materials Used in Constructing Seals are in Accordance with the Ventilation Plan

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Seals Built per Year	Senior Mine Management Official Time to Certify & Submit (in hrs.)	Senior Mine Management Official Hourly Wage Rate	Cost to Submit	Annual Cost [a]
1-19	198	0.05	$92.78	$1.15	$1,146
20-500	2,133	0.05	$92.78	$1.15	$12,348
501+	140	0.05	$92.78	$1.15	$810
Total	2,471				$14,305

[a] Annual Cost = Col. b x [(col. c x col. d) + col. e].

Under final § 75.337(e), the mine operator must notify MSHA of certain activities concerning the construction of a set of seals. Final § 75.337(e)(1) requires that the mine operator notify the District Manager between 2 and 14 days prior to commencement of seal construction. Final § 75.337(e)(2) requires that the mine operator notify the District Manager, in writing, within five days of completion of a set of seals and provide a copy of the certification required in paragraph (d). The cost to submit a copy of the certification required in § 75.337(e)(2) was previously included when deriving the costs for final § 75.337(d). Final § 75.337(e)(3) requires that a copy of the quality control test results for seal material properties specified by final § 75.335 be submitted within 30 days of completion of such tests.

MSHA estimates that, on average, the number of sets of seals constructed annually is: 0.5 sets of seals in a mine with 1-19 employees, 1.5 sets of seals in a mine with 20-500 employees, and 1 set of seals in a mine with 501+ employees. MSHA estimates that a supervisor, earning $71.34 per hour, takes 0.05 hours (3 minutes) to notify the local MSHA field office between 2 and 14 days prior to commencement of seal construction. Also, MSHA estimates that a clerical employee, earning $25.47 per hour, takes 0.2 hours (12 minutes) to prepare and send a letter notification of the completion of a set of seals and to copy and send the quality control test results.

In addition, a copy of the letter of completion of a set of seals is estimated to be 1 page and a copy of the quality control test results is estimated to be 15 pages. MSHA estimates that copy costs are $0.15 per page and postage costs are $1. Postage will be charged twice because the letter of completion of a set of seals is not sent at the same time as the other material. Thus, total copy and postage cost is estimated to be $4.40 [(16 pg. x $0.15 per pg.) + $2 postage). Table IV-C6 shows a total annual cost of $5,205 to notify and submit material to MSHA concerning the requirements of final § 75.337(d).

Table IV-C6: Annual Cost to Notify MSHA Concerning Constructing Sets of Seals under §75.337(e)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	No. of Mines That Will Seal	Annual No. of Sets of Seals Built per Mine	Time to Notify MSHA per Mine (in hrs.)	Time to Submit Data to MSHA per Mine (in hrs.)	Copying and Postage Cost	Supervisor Hourly Wage Rate	Clerical Hourly Wage Rate	Annual Cost [a]
1-19	66	0.5	0.05	0.2	$4.40	$71.34	$25.47	$431
20-500	237	1.5	0.05	0.2	$4.40	$71.34	$25.47	$4,643
501+	10	1	0.05	0.2	$4.40	$71.34	$25.47	$131
Total	313							$5,205

[a] Annual Cost = col. b x col. c x [(col. d x col. g) + (col. e x col. h) + col. f].

Final § 75.337(f) prohibits welding, cutting, and soldering with an arc or flame within 150 feet of a seal, unless approved by the District Manager in the ventilation plan. Each time mine operators want to perform these activities they will need to submit to the District Manager a revision to the ventilation plan. MSHA assumes that the initial revisions will be sufficient and subsequent revisions will not have to be sent each time to the District Manager. Annually, MSHA estimates that operators will submit the following revisions to the ventilation plan under final § 75.337(f):

- 13 revisions in mines with 1-19 employees [(66 mines x 20 percent) x 1 revision];
- 119 revisions in mines with 20-500 employees [(237 mines x 50 percent) x 1 revision] and;
- 20 revisions in mines with 501+ employees [(10 mines x 100 percent) x 2 revisions].

MSHA estimates that a supervisor takes 0.25 hours (15 minutes) to write the revision and a clerical employee takes 0.1 hours (6 minutes) to copy and submit the revision. For each request, the estimated copy and postage costs are $1.15 [(1 pg. x $0.15 copy cost) + $1 for postage]. Table IV-C7 shows a total annual cost of $3,273 to prepare and submit revisions to the ventilation plan requesting to perform activities stated in final § 75.337(f).

Table IV-C7: Annual Cost to Revise Ventilation Plan to Permit Welding, Cutting, and Soldering Activities under § 75.337(f)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	Revisions to Permit Welding Activities per Year	Supervisor Time to Prepare Revision (in hrs.)	Clerical Employee Time to Submit Revision (in hrs.)	Supervisor Hourly Wage Rate	Clerical Worker Hourly Wage Rate	Copy & Postage Cost	Annual Cost [a]
1-19	13	0.25	0.1	71.34	25.47	$1.15	$280
20-500	119	0.25	0.1	71.34	25.47	$1.15	$2,562
501+	20	0.25	0.1	71.34	25.47	$1.15	$431
Total	152						$3,273

[a] Annual Cost = col. b x [(col. c x col. e) + (col. d x col. f) + col. g].

Under existing §§ 75.370(a)(3)(iii) and (f), mines that make ventilation plan revisions need to post a copy of the revisions; and for those mines that have a miners' representative, a copy of the revisions must be provided, upon request. MSHA assumes that 30 percent of revisions will be made by mines that have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it costs $6.37 in wages per mine to copy and post the initial revision of the ventilation plan, and also $6.37 in wages to copy and provide a copy of the revision of the ventilation plan to the miners' representative ($25.47 clerical employee' hourly wage rate x 0.25 hours). The copy cost for each revision is estimated to be $0.15 (1 pg. x $0.15 per pg.). Postage is estimated to be $1.00. Table IV-C8 shows a total annual cost of $1,333 to copy and post and, when applicable, to provide a copy of the revisions to the miners' representative.

Table IV-C8: Annual Cost to Copy and Post Revisions to the Ventilation Plan Concerning Welding, Cutting, and Soldering and Provide a Copy of to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Plan Revisions Due to Permit Welding Activities (per Year)	Percentage of Revisions Where a Copy of the Revisions are Provided to Miners' Representative	Cost of Clerical Employee Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative	Copy Cost	Postage Cost	Annual Cost[a]
1-19	13	30%	$6.37	$0.15	$1.00	$114
20-500	119	30%	$6.37	$0.15	$1.00	$1,044
501+	20	30%	$6.37	$0.15	$1.00	$175
Total	152					$1,333

[a] Annual Cost = (col. b x (col. d + col. e)) + (col. b x col. c x (col. d + col. e + col. f)).

Final § 75.337(g)(3) requires that sampling pipes be labeled to indicate the location of the sampling point when more than one sampling pipe is installed through a seal. Annually, MSHA estimates that a label will be necessary for 5 percent of all new seals. Thus, the number of sampling pipes to be labeled is:

- 10 sampling pipes in mines with 1-19 employees (66 mines x 3 seals per mine x 5 percent);
- 107 sampling pipes in mines with 20-500 employees (237 mines x 9 seals per mine x 5 percent); and
- 7 sampling pipes in mines with 501+ employees (10 mines x 14 seals per mine x 5 percent).

MSHA estimates that a miner, earning $31.66 per hour, takes 0.1 hours (6 minutes) to label each sampling pipe. Table IV-C9 shows a total annual cost of $393 to label sampling pipes.

Table IV-C9: Annual Cost to Label Sampling Pipes under §75.337(g)(3)

(a)	(b)	(c)	(d)	(e)
Mine Size	No. of Pipes Built per Year That Need to be Labeled	Time to Label Pipes (in Hrs.)	Miner Hourly Wage Rate	Annual Cost [a]
1-19	10	0.1	$31.66	$32
20-500	107	0.1	$31.66	$339
501+	7	0.1	$31.66	$22
Total	124			$393

[a] Annual Cost = col. b x (col. c x col. d)

Table IV-C10 shows a summary of the $1,665,574 total yearly costs for final § 75.337.

Table IV-C10: Summary of Yearly Costs for Construction and Repair of Seals

Section	Description	Table	Mine Size by Employment			Total
			1-19	20-500	501+	
§§75.337(b)(1), (b)(2) & (b)(3)	Clear Worked-Out Areas	IV-C1	$12,537	$270,123	$10,131	$292,792
§75.337(c)	Certified Person to Examine & Record, & Mine Foreman to Countersign, Seal Construction & Repair	IV-C2	$13,947	$151,416	$9,824	$175,186
§75.337(c)	Certified Person to Supervise Seal Construction & Repair	IV-C3	$32,210	$933,395	$92,854	$1,058,459
§75.337(d)	Verify that Construction, Installation, & Materials Used in New Seal are Pursuant to Ventilation Plan	IV-C4	$9,185	$98,950	$6,495	$114,630
§75.337(d) & (e)(2)	Certify that Construction, Installation, & Materials Used in New Seals are Pursuant to Ventilation Plan & Submission of Certifications	IV-C5	$1,146	$12,348	$810	$14,305
§75.337(e)	Notify MSHA of Seal Construction Activities	IV-C6	$431	$4,643	$131	$5,205
§75.337(f)	Revision to Ventilation Plan to Permit Welding, Cutting, etc…	IV-C7	$280	$2,562	$431	$3,273
§75.337(f)	Provide & Post Revised Ventilation Plan Concerning Welding, Cutting, etc…	IV-C8	$114	$1,044	$175	$1,333
§75.337(g)(3)	Label Sampling Pipes	IV-C9	$32	$339	$22	$393
	Total Cost		$69,882	$1,474,819	$120,872	$1,665,574

Final § 75.338 Training

This section estimates the costs for training certified persons to sample atmospheres that are behind seals and the costs for training persons involved in seal construction and repair. The costs to train certified persons in sampling are estimated first, followed by the costs of training persons that perform seal construction and repair. The provisions in final § 75.338 involving training apply to all 372 mines that have seals.

Training Needed for Sampling Seals

Final § 75.338(a) requires that certified persons conducting sampling be trained in the use of appropriate sampling equipment, techniques, location of sampling points, the frequency of sampling, the size and condition of sealed areas, and the use of continuous monitoring systems if applicable, before they conduct sampling, and annually thereafter. The number of mines estimated to train certified persons to sample is: 83 mines with 1-19 employees; 279 mines with 20-500 employees; and 10 mines with 501+ employees. MSHA estimates that the time spent by trainees in training is:

- 4 hours in mines with 1-19 employees (2 certified persons x 2 hours of training per person);
- 8 hours in mines with 20-500 employees (4 certified persons x 2 hours of training per person); and
- 12 hours in mines with 501+ employees (6 certified persons x 2 hours of training per person).

In addition, MSHA estimates that a supervisor takes 2 hours to give the training and 0.1 hours to certify the persons trained. The supervisor providing the training and the certified persons to be trained are estimated to earn a wage of $71.34 per hour.

Due to annual turnover, MSHA estimates that 7 percent of the certified persons need to be trained annually. Thus, annually, the number of certified persons receiving training due to turnover is: 12 certified persons in all mines with 1-19 employees (83 mines x 2 certified persons x 0.07 turnover rate); 78 certified persons in all mines with 20-500 employees (279 mines x 4 certified persons x 0.07 turnover rate); and 4 certified persons in all mines with 501+ employees (10 mines x 6 certified persons x 0.07 turnover rate). In every case where a miner is trained due to turnover, training is assumed to be one-on-one and is estimated to take 2 hours to give the training and 0.1 hours to certify the persons trained.

Table IV-D1 shows a total annualized cost of $60,319 to train and certify persons concerning sampling procedures. First year costs are annualized over a 5 year period by multiplying them by an annualization factor of 0.244. Table IV-D1 also shows a total annual cost of $27,477 to train certified persons to sample due to turnover.

Table IV-D1: First Year and Annualized Costs for Initial Training, and Annual Cost for Turnover Training, for Persons Trained to Sample, and for Certification under §75.338(a)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(g)
Mine Size	No. of Mines Training Certified Persons	Time for Training Certified Persons per Mine (in hrs.)	Superv. Time to Train & Certify per Mine (in hrs.)	Supervisor & Certified Person Hourly Wage Rate	First Year Cost [a]	Annualized Cost	Annual Cost Due to Turnover [b]
1-19	83	4	2.1	$71.34	$36,119	$8,813	$3,399
20-500	279	8	2.1	$71.34	$201,029	$49,051	$22,850
501+	10	12	2.1	$71.34	$10,059	$2,454	$1,228
Total	372				$247,207	$60,319	$27,477

[a] First Year Cost = col. b x (col. c + col. d) x col. e.

[b] Annual Cost Due to Turnover = 0.07 x col. b x (col. c / 2) x (col. d + 2) x col. e.

Final § 75.338(a) also requires that annual retraining be provided for persons initially trained in the sampling procedures. MSHA assumes that yearly retraining will not be as extensive as initial training and estimates that it takes 1 hour to provide the annual retraining. MSHA estimates that the time spent by trainees in annual retraining is:

- 2 hours in mines with 1-19 employees (2 certified persons x 1 hour of training per person);
- 4 hours in mines with 20-500 employees (4 certified persons x 1 hour of training per person); and
- 6 hours in mines with 501+ employees (6 certified persons x 1 hour of training per person).

In addition, MSHA estimates that a supervisor takes 1 hour to give the training and 0.1 hours to certify. The certified persons to be trained and the person providing the training are estimated to earn a supervisor's wage of $71.34 per hour. Table IV-D2 shows a total annual cost of $124,931 to provide annual retraining and certification for certified persons performing sampling.

Table IV-D2: Annual Cost to Provide Sampling Training Yearly under §75.338(a)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Will Sample Seals	Time for Training Certified Persons per Mine (in hrs.)	Superv. Time to Train & Certify per Mine (in hrs.)	Supervisor Hourly Wage Rate	Annual Cost [a]
1-19	83	2	1.1	$71.34	$18,356
20-500	279	4	1.1	$71.34	$101,510
501+	10	6	1.1	$71.34	$5,065
Total	372				$124,931

[a] Annual Cost = col. b x (col. c + col. d) x col. e.

Training Needed for Construction and Repair of Seals

Final § 75.338(b) requires that miners constructing and repairing seals and certified persons noted in final § 75.337(b), as well as senior mine officials noted in final § 75.337(c), be trained prior to constructing a seal, and annually thereafter. The training will address the materials and procedures in the approved seal design and the mine ventilation plan. In addition, the mine operator needs to certify the date and content of training that was given to each person trained. Mines that have seals need to provide the training required by final § 75.338(b) because they will construct new seals in the future and/or maintain existing seals.

The numbers of mines giving the training are estimated to be: 83 mines with 1-19 employees, 279 mines with 20-500 employees, and 10 mines with 501+ employees. MSHA estimates that: for mines with 1-19 employees, 80 percent will contract out training and 20 percent will train in-house; for mines with 20-500 employees, 30 percent will contract out training and 70 percent will train in-house; and for mines with 501+ employees, 10 percent will contract out training and 90 percent will train in-house. For those mines that provide training in-house, MSHA estimates that a chief engineer, earning $67.96 per hour, takes 4 hours to prepare for the training.

Table IV-D3 shows annualized cost of $14,652 to prepare for seal construction and repair training. Annualized cost is derived by multiplying first year cost by 0.244, which reflects a 5 year life.

Table IV-D3: First Year and Annualized Costs to Prepare for Seal Construction and Repair Training under §75.338(b)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	No. of Mines that Build or Repair Seals	Percentage of Mines that will Receive Training In-House	Time to Prepare for Training (in hrs.)	Chief Engineer Hourly Wage Rate	First Year Cost [a]	Annualized Cost
1-19	83	20%	4	$67.96	$4,513	$1,101
20-500	279	70%	4	$67.96	$53,090	$12,954
501+	10	90%	4	$67.96	$2,447	$597
Total	372				$60,049	$14,652

[a] First Year Cost = (col. b x col. c) x col. d x col. e.

The initial training is estimated to take 8 hours. In addition, the Agency estimates that the instructor (a chief engineer) takes 0.1 hours (6 minutes) at each mine to certify the training. The initial training of persons to be trained is assumed to take place at one time by one instructor. The training instructor's hourly wage rate is estimated to be $101.94 when the training is contracted out (which includes the instructor's expenses and per diem), and $67.96 when the training is provided in-house. The training is estimated to be contracted out for: 80 percent of mines with 1-19 employees; 30 percent of mines with 20-500 employees; and 10 percent of mines with 501+ employees.

MSHA estimates that the number of persons trained per mine is: 2 miners, 1 certified person, and 1 senior mine official in mines with 1-19 employees; and 4 miners, 2 certified persons, and 1 senior mine official in mines with 20 or more employees. MSHA estimates that the hourly wage rates for those trained are: $31.66 for the miners, $71.34 for a certified person, and $92.78 for a senior mine official. The cost per training per mine reflects the weighted average of the persons being trained and the wage of the instructor.

Due to annual turnover, MSHA estimates that 7 percent of persons initially trained will be replaced each year, and their replacement will require initial training. Thus, the number of persons receiving training due to turnover is: 23 persons in all mines with 1-19 employees [83 mines x (2 miners + 1 certified person + 1 senior mine official) x 0.07 turnover rate]; 137 persons in all mines with 20-500 employees [279 mines x (4 miners + 2 certified persons + 1 senior mine official) x 0.07 turnover rate]; and 5 persons in mines with 501+ employees [10 mines x (4 miners + 2 certified persons + 1 senior mine official) x 0.07 turnover rate]. In every case where a person is trained due to turnover, training is assumed to be one-on-one and is estimated to take 8 hours for training and 0.1 hours to certify the persons trained.

Table IV-D4 shows a total annualized cost of $301,233 to mine operators for seal construction and repair training and certification. The annualized cost is derived by multiplying first year cost by an annualization factor of 0.244 to reflect a 5 year life. Table IV-D4 also shows a total annual cost of $176,460 to train persons in seal construction and repair due to turnover.

Table IV-D4: First Year and Annualized Costs for Initial Training, and Annual Cost for Turnover Training, for Persons Trained in Seal Construction and Repair, and for Certification under §75.338(b)

(a)	(b)	(c)	(d)	(e)	(f)	(f)
Mine Size	No. of Mines That Build or Repair Seals	Cost for Initial Training per Mine	Instructor Cost to Certify Training	First Year Cost [a]	Annualized Cost	Annual Cost Due to Turnover
1-19	83	$2,581	$9.51	$214,985	$52,456	$28,482
20-500	279	$3,522	$7.82	$984,827	$240,298	$143,118
501+	10	$3,468	$7.14	$34,748	$8,479	$4,860
Total	372			$1,234,561	$301,233	$176,460

[a] First Year Cost = col. b x (col. c + col. d).

Miners trained under final § 75.338(b) need to be trained annually. MSHA assumes that annual retraining takes 2 hours. The instructor's hourly wage rate is estimated to be $101.94 when the training is contracted out (which includes the instructor's expenses and per diem), and $67.96 when annual retraining is provided in-house. MSHA assumes that training is contracted out for: 80 percent of mines with 1-19 employees; 30 percent of mines with 20-500 employees; and 10 percent of mines with 501+ employees. Annual retraining of persons is assumed to take place at one time by one instructor per mine.

MSHA estimates that the number of persons receiving annual retraining is: 2 miners, 1 certified person, and 1 senior mine official in mines with 1-19 employees; and 4 miners, 2 certified persons, and 1 senior mine official in mines with 20 or more employees. MSHA estimates that the hourly wage rates for those trained are: $31.66 for miners, $71.34 for certified persons, and $92.78 for the senior mine official. The training cost per mine reflects the weighted average of the persons being trained and the wage of the instructor.

The Agency estimates that the instructor takes 0.1 hours (6 minutes) at each mine to certify the annual retraining. Table IV-D5 shows a total annual cost of $310,921 to mine operators for seal construction and repair annual retraining and certification.

Table IV-D5: Annual Cost for Seal Construction and Repair Retraining and Certification under §75.338(b)

(a)	(b)	(c)	(d)	(e)
Mine Size	No. of Mines that Build or Repair Seals	Cost to Conduct Training per mine	Instructor Cost to Certify Training	Annual Cost [a]
1-19	83	$645.17	$9.51	$54,339
20-500	279	$880.51	$7.82	$247,842
501+	10	$866.92	$7.14	$8,741
Total	372			$310,921

[a] Annual Cost = col. b x (col. c + col. d).

Table IV-D6 shows a summary of the $1,015,992 total yearly costs for final § 75.338.

Table IV-D6: Summary of Yearly Costs for Training

Section	Description	Table	Mine Size by Employment			Total
			1-19	20-500	501+	
§75.338(a)	Initial Sampling Training	IV-D1	$8,813	$49,051	$2,454	$60,319
§75.338(a)	Sampling Training Due to Turnover	IV-D1	$3,399	$22,850	$1,228	$27,477
§75.338(a)	Annual Sampling Retraining	IV-D2	$18,356	$101,510	$5,065	$124,931
§75.338(b)	Prepare for Seal Construction & Repair Training	IV-D3	$1,101	$12,954	$597	$14,652
§75.338(b)	Initial Seal Construction & Repair Training	IV-D4	$52,456	$240,298	$8,479	$301,233
§75.338(b)	Seal Construction & Repair Training Due to Turnover	IV-D4	$28,482	$143,118	$4,860	$176,460
§75.338(b)	Annual Seal Construction & Repair Retraining	IV-D5	$54,339	$247,842	$8,741	$310,921
	Total Cost		$166,946	$817,623	$31,424	$1,015,992

FEASIBILITY

MSHA has concluded that the requirements of the final rule are technologically and economically feasible. For atmospheres behind seals where the atmosphere will not inert naturally, operators may choose any of the following alternatives for inerting the atmosphere: (1) injecting inert gas; or (2) pressure balance of the ventilation system; or (3) injecting material into the strata surrounding the seals to reduce leakage. Other mines may choose to construct new seals that are 120 psi or greater in front of all existing seals in the sealed area.

Technological Feasibility

MSHA concludes that the final rule is technologically feasible. This conclusion is based on the requirements of the final rule for training, sampling, and construction and repair. Compliance with these requirements is technologically feasible because the materials, equipment, and methods for implementing these requirements currently exist. In addition, this feasibility determination is supported by MSHA's approval of several seal designs at overpressures of 50 psi and 120 psi.

Economic Feasibility

The yearly compliance cost of the final rule is $45.4 million, which is 0.3 percent of annual revenue ($45.4 million/$14.1 billion) for all underground coal mines. MSHA concludes that the final rule is economically feasible because the total yearly compliance cost is well below one percent of the estimated annual revenue for all underground coal mines.

V. REGULATORY FLEXIBILITY CERTIFICATION

INTRODUCTION

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

DEFINITION OF A SMALL MINE

Under the RFA, in analyzing the impact of a rule on small entities, MSHA must use the Small Business Administration's (SBA's) definition for a small entity, or after consultation with the SBA Office of Advocacy, establish an alternative definition for the mining industry by publishing that definition in the Federal Register for notice and comment. MSHA has not established an alternative definition, and hence is required to use the SBA's definition. The SBA defines a small entity in the mining industry as an establishment with 500 or fewer employees (13 CFR 121.201). This analysis complies with the legal requirements of the RFA for an analysis of the impacts on "small entities." MSHA concludes that it can certify that the final rule does not have a significant economic impact on a substantial number of small entities.

FACTUAL BASIS FOR CERTIFICATION

General Approach

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

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. Revenues for underground coal mines are derived from data on underground coal prices and tonnage. Total underground coal production in 2007 was approximately 349 million tons. The 2006 price of underground coal was $38.28 per ton[2]. To estimate the 2007 price, the 2006 price was increased by 5.5 percent to $40.37, using the Bureau of Labor Statistics producer price index for underground bituminous coal. Total estimated revenue in 2007 for underground coal production was

[2] U.S. DOE, EIA, "Annual Coal Report 2006," Table 28, October 2007.

$14.1 billion. Multiplying tons by the 2007 price per ton, 2007 underground coal revenue is $11.2 billion for mines with 1-500 employees.

Results of Screening Analysis

Table V-1 below shows that when dividing the yearly compliance costs by the annual revenues, the cost of the final rule for underground coal mines is 0.36 percent of revenues for mines with 1-500 employees. Table V-1 also shows the cost as a percentage of revenues for all underground coal mines to be 0.32 percent. For underground coal mines, Table V-1 further shows that the final rule results in an average yearly cost per mine of $66,177 for mines with 1-500 employees. The average yearly cost per mine for all underground coal mines is $72,802.

Table V-1: Cost of Proposed Rule Compared to Mine Revenues, by Mine Size

Underground Coal Mines					
Employment Size	No. of Mines	Cost of Proposed Rule	Estimated Revenue (Millions)	Cost Per Mine	Cost of Rule as % of Revenue
1-500 Employees	614	$40,632,407	$11,217	$66,177	0.36%
All mines	624	$45,428,742	$14,077	$72,802	0.32%

As shown in Table V-1, when applying SBA's definition of a small mine, the estimated yearly cost of the final rule is less than one percent of annual revenue, below the level suggesting that the final rule might have a significant economic impact on a substantial number of small entities. Accordingly, MSHA has certified that the final rule does not have a significant economic impact on a substantial number of small entities.

VI. OTHER REGULATORY CONSIDERATIONS

THE UNFUNDED MANDATES REFORM ACT

MSHA has reviewed the final rule under the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1501 et seq). MSHA has determined that this final rule does not include any Federal mandate that may result in increased expenditures by State, local, or tribal governments; nor does it increase private sector expenditures by more than $100 million in any one year or significantly or uniquely affect small governments. Accordingly, the Unfunded Mandates Reform Act of 1995 (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

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

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

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

EXECUTIVE ORDER 12988: CIVIL JUSTICE REFORM

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

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

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

EXECUTIVE ORDER 13132: FEDERALISM

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

EXECUTIVE ORDER 13175: CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

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

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

Executive Order 13211 requires agencies to publish a statement of energy effects when a rule has a significant energy action that adversely affects energy supply, distribution or use. MSHA has reviewed this final rule for its energy effects because the final rule applies to the underground coal mining sector. Because the final rule will result in yearly costs of approximately $45.4 million to the underground coal mining industry, relative to annual revenues of $14.1 billion in 2007, it is not a significant energy action because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Accordingly, under this analysis, no further Agency action or analysis is required.

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

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

VII. PAPERWORK REDUCTION ACT OF 1995

INTRODUCTION

This chapter shows the estimated paperwork burden hours and related costs to mine operators and manufacturers under the final rule. This chapter provides estimates of the burden hours and related costs in final §§ 75.335, 75.336, 75.337, and 75.338.

SUMMARY OF PAPERWORK BURDEN HOURS AND RELATED COSTS

Table VII-1 shows that, in the first year the final rule is in effect, mine operators will incur approximately 33,560 burden hours with related costs of approximately $2.36 million.

Table VII-1 First Year Burden Hours and Costs

Detail	Section	Table	Employment by Mine Size							
			1-19 Empl.		20-500 Empl.		501+ Empl.		Total	
			Hours	Costs	Hours	Costs	Hours	Costs	Hours	Costs
Seal Approval Application	§75.335 (b)	VII-A1							30	$1,682
Revise Ventilation Plan to Address Seal Construction	§75.335 (b)	VII-A2	116	$7,496	2,311	$156,702	95	$6,548	2,522	$170,746
Post Ventilation Plan & Provide Copy to Miners' Representative to Address Seal Construction	§75.335 (b)	VII-A3	21	$535	231	$5,884	7	$178	259	$6,597
Evaluation of Atmosphere	§75.336 (a)(4)	VII-B1	2	$136	320	$21,747	10	$680	332	$22,563
Revise Ventilation Plan to Address Sampling Locations & Frequencies	§75.336 (a)(4)	VII-B2	2	$97	4	$239	2	$97	8	$433
Post Ventilation Plan & Provide Copy to Miners' Representative to Address Sampling Locations & Frequencies	§75.336 (a)(4)	VII-B3	1	$25	4	$102	1	$25	6	$152
Record Sampling Record	§75.336 (e)	VII-B4	2,055	$146,604	23,703	$1,690,972	1,608	$114,715	27,366	$1,952,291
Revise ventilation Plan to Address Miners' Withdrawal	§75.336 (c)	VII-B5	2	$97	87	$4,876	15	$841	104	$5,814
Post Ventilation Plan & Provide Copy to Miners' Representative to Address Miners' Withdrawal	§75.336 (c)	VII-B6	1	$25	38	$968	7	$178	46	$1,171
Notify MSHA	§75.336 (c)	VII-B7	1.0	$71	6	$428	1	$71	8	$570
Certify Exams for Seal Construction & Repair	§75.337 (b)	VII-C1	196	$13,983	2,122	$151,383	138	$9,845	2,456	$175,211
Certify that Construction, Installation, & Materials Used in Building Seals are in Accordance with the Ventilation Plan	§§75.337 (d) & (e)(2)	VII-C2	10	$928	107	$9,927	7	$649	124	$11,504
Notification Concerning Seal Construction	§75.337 (d)	VII-C3	9	$321	89	$3,092	3	$122	101	$3,535
Revise Ventilation Plan to Address Welding, Cutting, & Soldering	§75.337 (f)	VII-C4	4	$239	42	$2,446	7	$408	53	$3,093
Post Ventilation Plan & Provide Copy to Miners' Representative to Address Welding, Cutting, & Soldering	§75.337 (f)	VII-C5	4	$102	39	$993	7	$178	50	$1,273
Label Sampling Pipes	§75.337 (g)(3)	VII-C6	1	$32	11	$348	1	$32	13	$412
Certify Persons Trained Annually in Sampling	§75.338 (a)	VII-D1	8	$571	28	$1,998	1	$71	37	$2,640
Certify Persons Trained in Sampling Due to Turnover	§75.338 (a)	VII-D2	1	$71	8	$571	1	$71	10	$713
Certify Persons Trained Annually in Seal Construction & Repair	§75.338 (b)	VII-D3	2	$136	20	$1,359	1	$68	23	$1,563
Certify Persons Trained in Seal Construction & Repair Due to Turnover	75.338 (b)	VII-D4	1	$68	10	$680	1	$68	12	$816
Total			2,437	$171,537	29,180	$2,054,715	1,913	$134,845	33,560	$2,362,779

The remaining tables in this chapter have been numbered according to the type of paperwork requirement: VII-A concerns seal design applications and revisions to the mine operator ventilation plan; VII-B concerns seal monitoring; VII-C concerns construction and repair of seals; and VII-D concerns training required by the final rule.

Final § 75.335(b) sets forth procedures for the approval of seal designs. MSHA estimates that 10 applications will be filed in the first year of the final rule, and 2 applications in the second year and every year thereafter. On average, MSHA estimates that a supervisor, earning $71.34 per hour, takes 2 hours to prepare each application, and a clerical employee earning $25.47 per hour, takes 1 hour to compile and submit the application. Table VII-A1 shows total burden hours and cost for approval of seal designs for the first year of the final rule and for every year thereafter.

Table VII-A1: Annual Burden Hours and Cost for Preparation & Submission of Seal Approval Applications under §75.335(b)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Year	No. of Seal Applications	Superv. Time (in hrs.)	Clerical Employee Time (in hrs.)	Superv. Annual Burden Hours [a]	Clerical Employee Annual Burden Hours [b]	Superv. Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Annual Burden Cost [c]
First	10	2	1	20	10	$71.34	$25.47	$1,682
Second	2	2	1	4	2	$71.34	$25.47	$336
Third	2	2	1	4	2	$71.34	$25.47	$336

[a] Supervisor Annual Burden Hours = col. b x col. c.

[b] Clerical Employee Annual Burden Hours = col. b x col. d.

[c] Annual Burden Cost = (col. e x col. g) + (col. f x col. h).

Final § 75.335(c)(3) requires the mine operator to revise the ventilation plan in order to provide information concerning seals that will be constructed. The revision is required under existing § 75.370(a)(2). MSHA assumes that the mine operator will include with this information a copy of the certifications required by final §§ 75.335(c)(2) and (c)(3)(iii). MSHA assumes that this information is submitted each time a mine has worked-out an area of the mine that it plans on sealing.

MSHA estimates that 66 mines with 1-19 employees, 237 mines with 20-500 employees, and 10 mines with 501+ employees will seal. The Agency assumes that the District Manager, in reviewing the proposed ventilation plan revisions, will require some changes. The mine operator will need to make those changes and resubmit the revised ventilation plan for approval. MSHA estimates that the initial and subsequent revisions and the required certifications will take a mine supervisor, earning $71.34 per hour: 3 hours in mines with 1-19 employees; 6 hours in mines with 20-500 employees; and 9 hours in mines with 501+ employees. In addition, a clerical employee, earning $25.47 per hour, is estimated to take 0.5 hours (30 minutes) to compile and submit the initial and subsequent revision materials.

Table VII-A2 shows total annual burden hours of 2,522 and cost of $170,746 to revise the mine ventilation plan for those mines that will seal.

Table VII-A2: Annual Burden Hours and Cost to Revise the Ventilation Plan Concerning Seal Construction

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Mine Size	No. of Mines that Seal	Average No. of Worked-Out Areas Annually per Mine	Time to Certify & Revise Vent Plan (in hrs.)	Time to Compile & Submit Revised Pages (in hrs.)	Superv. Annual Burden Hours [a]	Clerical Employee Annual Burden Hours [b]	Superv. Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Annual Burden Cost [c]
1-19	66	0.5	3	0.5	99	17	$71.34	$25.47	$7,496
20-500	237	1.5	6	0.5	2,133	178	$71.34	$25.47	$156,702
501+	10	1	9	0.5	90	5	$71.34	$25.47	$6,548
Total	313				2,322	200			$170,746

[a] Supervisor Annual Burden Hours = col. b x col. c x col. d.

[b] Clerical Employee Annual Burden Hours = col. b x col. c x col. e.

[c] Annual Burden Cost = (col. f x col. h) + (col. g x col. i).

Under existing § 75.370(a)(3)(iii) and (f), mines that make ventilation plan revisions need to post a copy of the revisions, and upon request provide a copy of the revisions to mines that have a miners' representative. MSHA assumes that 30 percent of mines that will seal have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it takes 0.5 hours (30 minutes) to copy and post the initial and subsequent revisions and 0.5 hours to copy and provide the initial and subsequent revisions to the miners' representative. A clerical employee' hourly wage is estimate to be $25.47. Table VII-A3 shows total annual burden hours of 259 and cost of $6,597 to copy and post and, when applicable, to provide a copy of the ventilation plan revisions to the miners' representative.

Table VII-A3: Annual Burden Hours and Cost to Copy and Post Revisions to the Ventilation Plan Concerning Seal Construction and Provide a Copy to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	No. of Mines that Seal	Average No. of Worked-Out Areas Annually per Mine	Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative (in hrs.)	Percentage of Mines Providing a Copy of Revisions to Miners' Rep.	Annual Burden Hours [a]	Clerical Employee Hourly Wage Rate	Annual Burden Cost [b]
1-19	66	0.5	0.5	30%	21	$25.47	$535
20-500	237	1.5	0.5	30%	231	$25.47	$5,884
501+	10	1	0.5	30%	7	$25.47	$178
Total	313				259		$6,597

[a] Annual Burden Hours = (col. b x col. c x col. d) + (col. b x col. c x col. d x col. e).

[b] Annual Burden Cost = col. f x col. g.

Final § 75.336(a)(2) requires the mine operator to evaluate the atmosphere in the sealed area to determine whether sampling through the sampling pipes in seals provides appropriate sampling locations of the sealed area. This evaluation must be made for each area that will be sealed. On average, the annual number of worked-out areas is estimated to be: 0.5 for mines with 1-19 employees; 1.5 for mines with 20-500 employees; and 1 for mines with 501+ employees. MSHA estimates that it will take a chief engineer: 0.25 hours (15 minutes) for mines with 1-19 employees; and 1 hour for mines with 20 or more employees, to write the results of the evaluation.

MSHA estimates a chief engineer's hourly wage rate of $67.96 when the chief engineer is employed by the mine operator. For mines with 1-19 employees, MSHA estimates that 20 percent will use an in-house chief engineer. For mines with 20-500 employees, MSHA estimates that 90 percent will use an in-house chief engineer. For mines with 501+ employees, MSHA estimates that 100 percent will use an in-house chief engineer. Table VII-B1 shows total annual burden hours of 332 and cost of $22,563 for mines to write the evaluation results.

Table VII-B1: Annual Burden Hours and Cost to Write Evaluation Results Under § 75.336(a)(2)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	No. of Mines That Seal	Percent of Mines That Conduct Training in House	Average No. of Worked-Out Areas Annually per Mine	Time to Write Evaluation Results (in hrs.)	Annual Burden Hours [a]	Engineer Hourly Wage Rate	Annual Burden Cost [b]
1-19	66	20%	0.5	0.25	2	$67.96	$136
20-500	237	90%	1.5	1	320	$67.96	$21,747
501+	10	100%	1	1	10	$67.96	$680
Total	313				332		$22,563

[a] Annual Burden Hours = col. b x col. c x col. d x col. e.

[b] Annual Burden Cost = col. f x col. g.

Also, under § 75.336(a)(2) the mine operator must revise the mine ventilation plan to include the additional sampling locations and frequencies. The revision is made under existing § 75.370(a)(2). MSHA assumes that the initial revisions will be sufficient and subsequent revisions will not have to be sent to the District Manager. Annually, MSHA estimates the number of revisions is: 3 revisions in mines with 1-19 employees; 12 revisions in mines with 20-500 employees; and 1 revision in a mine with 501+ employees. MSHA estimates that a supervisor, earning $71.34 per hour, takes 0.25 hours (15 minutes) to write the one page revision, and a secretary, earning $25.47 per hour, takes 0.1 hours (6 minutes) to copy and submit the revision. Table VII-B2 shows total annual burden hours of 8 and cost of $433 to submit revisions to the ventilation plan concerning additional sampling locations and frequencies.

Table VII-B2: Annual Burden Hours and Cost to Revise Ventilation Plan Concerning Sampling Locations and Frequencies

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	Revisions to Plan for Sampling Locations	Time to Make Revisions (in hrs.)	Time to Copy & Submit Revisions (in hrs.)	Supervisor Annual Burden Hours [a]	Clerical Employee Annual Burden Hours[b]	Supervisor Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Annual Cost [c]
1-19	3	0.25	0.1	1	1	$71.34	$25.47	$97
20-500	12	0.25	0.1	3	1	$71.34	$25.47	$239
501+	1	0.25	0.1	1	1	$71.34	$25.47	$97
Total	16			5	3			$433

[a] Supervisor Annual Burden Hours = Col. b x col. c.

[b] Clerical Employee Burden Hours = Col. b x col. d.

[c] Annual Cost = (col. e x col. g) + (col. f x col. h).

Under existing §§ 75.370(a)(3)(iii) and (f), mines that revise ventilation plans must post a copy of the revisions; and for those mines that have a miners' representative, a copy of the revisions must be provided, upon request. MSHA assumes that 30 percent of the revisions will be made by mines that have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it takes 0.25 hours (15 minutes) to copy and post the initial and subsequent revisions and 0.25 hours to copy and provide the initial and subsequent revisions to the miners' representative. A clerical employee's hourly wage is estimate to be $25.47. Table IV-10 shows total annual burden hours of 6 and cost of $152 to copy and post and provide a copy of the revision to the miners' representative.

Table VII-B3: Annual Burden Hours and Cost to Copy and Post Revisions to the Ventilation Plan Concerning Sampling Locations and Frequencies and to Provide a Copy of the Ventilation Plan to the Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Revisions to Plan for Sampling Locations	Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative (in hrs.)	Percentage of Revisions Where a Copy of the Revisions are Provided to Miners' Representative	Annual Burden Hours [a]	Clerical Employee Hourly Wage Rate	Annual Burden Cost [b]
1-19	3	0.25	30%	1	$25.47	$25
20-500	12	0.25	30%	4	$25.47	$102
501+	1	0.25	30%	1	$25.47	$25
Total	16			6		$152

[a] Annual Burden Hours = (col. b x col. c.) + (col. b x col. c. x col. d).

[b] Annual Burden Cost = col. e x col. f.

Under final § 75.336(e), a certified person must record each sampling result, including the location of the sampling points and the oxygen and methane concentrations. Also, any hazardous conditions found must be corrected and recorded in accordance with existing § 75.363. Annually, MSHA estimates that there will be 140 sampling results that show a hazardous condition (4 sampling results in a mine with 1-19 employees, 116 sampling results in mines with 20-500 employees, and 20 sampling results in a mine with 501+ employees).

MSHA estimates that to make a record takes: 0.05 hours (3 minutes) when there is no hazardous condition and an additional 0.05 hours (3 minutes) when a hazardous condition needs to be recorded. Table VII-B4 shows total annual burden hours of 27,367 and cost of $1,952,291 for making a sampling record.

Table VII-B4: Annual Burden Hours and Cost to Make a Sampling Record under §75.336(e)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Mine Size	Total No. of Annual Samples	No. of Annual Samples that Involve a Hazardous Condition	Time to Make a Record that Does Not Involve a Hazardous Condition (in hrs.)	Additional Time to Make a Record that Involves a Hazardous Condition (in hrs.)	Annual Burden Hours [a]	Certified Person Hourly Wage Rate	Annual Burden Cost [b]
1-19	41,104	4	0.05	0.05	2,055	$71.34	$146,604
20-500	473,950	116	0.05	0.05	23,703	$71.34	$1,690,972
501+	32,138	20	0.05	0.05	1,608	$71.34	$114,715
Total	547,192	140			27,366		$1,952,291

[a] Annual Burden Hours = (col. b x col. d) + (col. c x col. e).

[b] Annual Burden Cost = col. f x col. g.

Final § 75.336(c) requires that before miners reenter the mine after a withdrawal, the mine operator must have a ventilation plan revision approved by the District Manager specifying the action to be taken. The revision will be made under existing § 75.370(a)(2). On average, MSHA estimates that the total time for a supervisor, earning $71.34 per hour, to make initial and subsequent revisions to the ventilation plan takes: 0.5 hours (30 minutes) for mines with 1-19 employees, and 1 hour for mines with 20 or more employees. On average, the number of revised pages submitted is estimated to be: 2 pages for mines with 1-19 employees, and 4 pages for mines with 20 or more employees. In addition, MSHA estimates that a clerical employee, earning $25.47 per hour, takes a total of 0.5 hours (30 minutes) to copy and submit the initial and subsequent revisions. Table VII-B5 shows total annual burden hours of 104 and cost of $5,814 to revise and submit the ventilation plan in order for miners to enter the mine after a withdrawal.

Table VII-B5: Annual Burden Hours and Cost to Revise Ventilation Plan to Allow Miners to Reenter the Mine

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	Plan Revisions Due to Withdraws (per Year)	Time to Make Revisions (in hrs.)	Time to Copy & Submit Revisions (in hrs.)	Supervisor Annual Burden Hours [a]	Clerical Employee Annual Burden Hours[b]	Supervisor Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Annual Cost [c]
1-19	2	0.5	0.5	1	1	$71.34	$25.47	$97
20-500	58	1	0.5	58	29	$71.34	$25.47	$4,876
501+	10	1	0.5	10	5	$71.34	$25.47	$841
Total	70			69	35			$5,814

[a] Supervisor Annual Burden Hours = Col. b x col. c.

[b] Clerical Employee Burden Hours = Col. b x col. d.

[c] Annual Cost = (col. e x col. g) + (col. f x col. h).

Under existing §§ 75.370(a)(3)(iii) and (f), mines that revise ventilation plans must post a copy of the revisions. For those mines that have a miners' representative, a copy of the revisions must be provided, upon request. MSHA assumes that 30 percent of withdrawals occur in mines that have a miners' representative, who will request a copy of the revisions.

MSHA estimates that it takes 0.5 hours (30 minutes) to copy and post the initial and subsequent revisions and 0.5 hours to copy and provide the initial and subsequent revisions to the miners' representative. A clerical employee's hourly wage is estimate to be $25.47.
Table VII-B6 shows total annual burden hours of 46 and cost of $1,159 to copy and post and, when applicable, to provide a copy of the revisions to the miners' representative.

Table VII-B6: Annual Burden Hours and Cost to Copy and Post Revisions to the Ventilation Plan Concerning Miners Reentering the Mine and to Provide a Copy to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	Plan Revisions Due to Withdraw (per Year)	Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative (in hrs.)	Percentage of Revisions Where a Copy of the Revisions are Provided Miners' Representative	Annual Burden Hours [a]	Clerical Employee Hourly Wage Rate	Annual Burden Cost [b]
1-19	2	0.5	30%	1	$25.47	$25
20-500	58	0.5	30%	38	$25.47	$968
501+	10	0.5	30%	7	$25.47	$178
Total	70			46		$1,171

[a] Annual Burden Hours = (col. b x col. c.) + (col. b x col. c. x col. d).

[b] Annual Burden Cost = col. e x col. f.

After mine operators take additional samples under § 75.336(c), they must immediately notify MSHA. MSHA estimates that there will be 76 occurrences where mine operators will need to immediately notify MSHA. Of the 76 occurrences, MSHA estimates that: 3 occurrences will be in mines with 1-19 employees; 62 occurrences will be in mines with 20-500 employees; and 11 occurrences will be in mines with 501+ employees. MSHA estimates that a supervisor, earning $71.34 per hour, will take 0.1 hours (6 minutes) to telephone MSHA. Table VII-B7 shows total annual burden hours or 8 and cost of $570 for mine operators to immediately notify MSHA.

Table VII-B7: Annual Burden Hours and Cost to Notify MSHA under §§75.336(c)(1) and (c)(2)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	Annual No. of Occurrences Where an Additional Sample is Taken	Time to Notify (in hrs.)	Annual Burden Hours [a]	Supervisor Hourly Wage Rate	Annual Cost [b]
1-19	3	0.1	1	$71.34	$71
20-500	62	0.1	6	$71.34	$428
501+	11	0.1	1	$71.34	$71
Total	76		8		$570

[a] Annual Cost = col. b x col. c.

[b] Annual Cost = col. d x col. e.

Under final § 75.337(c)(1)-(c)(5), a certified person must perform several tasks during seal construction and repair, and a mine foreman or equivalent mine official must countersign the record. MSHA estimates that it takes 0.85 hours (51 minutes) to perform these functions. The 0.85 hours consists of: 0.75 hours (45 minutes) for the certified person to perform the requirements under final § 75.337(c)(1) through (c)(5), which include certifying that the tasks were done and making a record; and 0.1 hours (6 minutes) for a mine foreman or equivalent mine official to countersign the record made by the certified person. The certified person and mine foreman are estimated to earn $71.34 per hour.

Final § 75.337(c) applies to both the construction of seals and the repair of existing seals. MSHA estimates that: 66 mines with 1-19 employees; 237 mines with 20-500 employees; and 10 mines with 501+ employees will seal. With respect to new seals, MSHA estimates that, on average, the annual number of new seals built per mine is: 3 seals in a mine with 1-19 employees; 9 seals in a mine with 20-500 employees; and 14 seals in a mine with 501+ employees. Annually, MSHA estimates that the number of existing seals to be repaired is approximately: 32 seals in mines with 1-19 employees (1,064 existing seals x 0.03); 364 seals in mines with 20-500 employees (12,147 existing seals x 0.03); and 22 seals in mines with 501+ employees (737 existing seals x 0.03). Thus, MSHA estimates that the number of seals to be constructed or repaired annually is:

- 230 seals for mines with 1-19 employees [198 new seals (66 mines x 3 seals built annually per mine)] + 32 existing seals;
- 2,497 seals for mines with 20-500 employees [2,133 new seals (237 mines x 9 seals built annually per mine)] + 364 existing seals; and
- 162 seals for mines with 501+ employees [140 new seals (10 mines x 14 seals built annually per mine)] + 22 existing seals].

Table VII-C1 shows total annual burden hours of 2,456 and cost of $175,186 for mine operators to certify exams, and make and countersign records, as required by final § 75.337(c).

Table VII-C1: Annual Burden Hours and Cost to Certify Exams, Make Record, and Countersign Seal Construction and Repair Records under §75.337(c)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	Annual No. of Seals Built & Repaired per Mine	Time to Examine, Certify, Record, & Countersign (in hrs.)	Annual Burden Hours [a]	Certified Person Hourly Wage Rate	Annual Burden Cost [b]
1-19	230	0.85	196	$71.34	$13,983
20-500	2,497	0.85	2,122	$71.34	$151,383
501+	162	0.85	138	$71.34	$9,845
Total	2,889		2,456		$175,211

[a] Annual Burden Hours = col. b x col. c.

[b] Annual Burden Cost = col. d x col. e.

Under final § 75.337(d), a senior mine management official must certify that the construction, installation, and materials used were in accordance with the approved ventilation plan. On average, MSHA estimates that certification under final § 75.337(d) and submission of the certification as required by final § 75.337(e)(2) takes a senior mine management official 0.05 hours (3 minutes). Table VII-C2 shows total annual burden hours of 124 and cost of $11,504 related to the time to make the certification required by final § 75.337(d) and submit it.

Table VII-C2: Annual Burden Hours and Cost under §§75.337(d) & (e)(2) to Certify that Construction, Installation, and Materials Used in Constructing Seals are in Accordance with the Ventilation Plan

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of New Seals Built per Year	Senior Management Official Time to Certify & Submit (in hrs.)	Senior Management Official Annual Burden Hours [b]	Senior Mine Management Official Hourly Wage Rate	Annual Cost [c]
1-19	198	0.05	10	$92.78	$928
20-500	2,133	0.05	107	$92.78	$9,927
501+	140	0.05	7	$92.78	$649
Total	2,471		124		$11,504

[a] Senior Management Official Annual Burden Hours = col. b x col. c.

[b] Annual Cost = col. d x col. e.

Under final § 75.337(e), the mine operator must notify MSHA of certain activities concerning the construction of a set of seals. Final § 75.337(e)(1) requires the mine operator to notify the District Manager between 2 and 14 days prior to commencement of seal construction. Final § 75.337(e)(2) requires the mine operator to notify the District Manager, in writing, within five days of completion of a set of seals and provide a copy of the certifications required in paragraph (d). The burden hours and related cost for submitting a copy of the certifications required by paragraph (d) were determined above. Final § 75.337(e)(3) requires the mine operator to submit a copy of the quality control test results for seal material properties specified by final § 75.335 within 30 days of completion of such tests.

MSHA estimated that, on average, the number of sets of seals constructed annually is: 0.5 sets of seals in a mine with 1-19 employees, 1.5 sets of seals in a mine with 20-500 employees, and 1 set of seals in a mine with 501+ employees. MSHA estimates that a supervisor, earning $71.34 per hour, takes 0.05 hours (3 minutes) to notify the District Manager between 2 and 14 days prior to commencement of seal construction. Also, MSHA estimates that a clerical employee, earning $25.47 per hour, takes 0.2 hours (12 minutes) to prepare and send a letter notifying the District Manager of the completion of a set of seals and to copy and send the quality control test results. Table VII-C3 shows total annual burden hours of 101 and cost of $3,535 for mine operators to notify MSHA concerning the requirements in the final § 75.337(e).

Table VII-C3: Annual Burden Hours and Cost to Notify MSHA Concerning Constructing Sets of Seals under §75.337(e)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Mine Size	No. of Mines That Will Seal	Annual No. of Sets of Seals Built per Mine	Time to Notify MSHA per Mine (in hrs.)	Time to Submit Data to MSHA per Mine (in hrs.)	Supervisor Annual Burden Hours [a]	Clerical Employee Annual Burden Hours [b]	Supervisor Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Annual Burden Cost [c]
1-19	66	0.5	0.05	0.2	2	7	$71.34	$25.47	$321
20-500	237	1.5	0.05	0.2	18	71	$71.34	$25.47	$3,092
501+	10	1	0.05	0.2	1	2	$71.34	$25.47	$122
Total	313				21	80			$3,535

[a] Supervisor Annual Burden Hours = col. b x col. c x col. d.

[b] Clerical Burden hours = col. b x col. c x col. e.

[c] Annual Burden Cost = (col. f x col. h) + (col. g x col. i).

Final § 75.337(f) prohibits welding, cutting, and soldering activities within 150 feet of a seal, unless such work is approved by the District Manager in the ventilation plan. The revision is made under § 75.370(a)(2). MSHA estimates that mine operators will submit the following annual requests for a revision to the ventilation plan:

- 13 revisions in mines with 1-19 employees [(66 mines x 20 percent) x 1 revision per year];
- 119 revisions in mines with 20-500 employees [(237 mines x 50 percent) x 1 revision per year] and;
- 20 revisions in mines with 501+ employees [(10 mines x 100 percent) x 2 revisions per year].

MSHA estimates that a supervisor takes 0.25 hours (15 minutes) to write the revision and a clerical employee takes 0.1 hours (6 minutes) to copy and submit the revision. Table VII-C4 shows total annual burden hours of 53 and cost of $3,093 to prepare and submit revisions to the ventilation plan in order to perform activities stated in final § 75.337(f).

Table VII-C4: Annual Burden Hours and Cost to Revise Ventilation Plan to Permit Welding, Cutting, and Soldering Activities

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Mine Size	Revisions to Permit Welding Activities (per Year)	Time to Make Revision (in hrs.)	Time to Submit Revision (in hrs.)	Superv. Annual Burden Hours [a]	Clerical Employee Annual Burden Hours [b]	Superv. Hourly Wage Rate	Clerical Employee Hourly Wage Rate	Annual Burden Cost [c]
1-19	13	0.25	0.1	3	1	$71.34	$25.47	$239
20-500	119	0.25	0.1	30	12	$71.34	$25.47	$2,446
501+	20	0.25	0.1	5	2	$71.34	$25.47	$408
Total	152			38	15			$3,093

[a] Supervisor Annual Burden Hours = col. b x col. c.

[b] Clerical Employee Annual Burden Hours = col. b x col. d.

[c] Annual Burden Costs = (col. e x col. g) + (col. f x col. h).

Under existing §§ 75.370(a)(3)(iii) and (f), mines that revise ventilation plans must post a copy of the revisions. For those mines that have a miners' representative, a copy of the revisions must be provided, upon request. MSHA assumes that 30 percent of revisions will be made by mines that have a miners' representative, who will request a copy of the revisions. MSHA estimates that it takes a clerical employee 0.25 hours (15 minutes) to copy and post the initial revision and 0.25 hours to copy and provide a copy of the revisions to the miners' representative. The clerical employee's hourly wage is $25.47. Table IV-C5 shows total annual burden hours of 50 and cost of $1,273 to copy and post and, when applicable, to provide a copy of the revisions to the miners' representative.

Table VII-C5: Annual Burden Hours and Cost to Copy and Post Revisions to the Ventilation Plan Concerning Welding, Cutting, and Soldering and Provide a Copy to Miners' Representative

(a)	(b)	(c)	(d)	(e)	(f)	(i)
Mine Size	Plan Revisions to Permit Welding Activities (per Year)	Time to Copy & Post or to Copy & Provide Revisions to Miners' Representative (in hrs.)	Percentage of Revisions Where a Copy of the Revisions area Provided Miners' Representative	Annual Burden Hours [a]	Clerical Employee Hourly Wage Rate	Annual Cost [b]
1-19	13	0.25	30%	4	$25.47	$102
20-500	119	0.25	30%	39	$25.47	$993
501+	20	0.25	30%	7	$25.47	$178
Total	152			50		$1,273

[a] Annual Burden Hours = (col. b x col. c) + (col. b x col. c x col. d).

[b] Annual Cost = col. e x col. f.

Final § 75.337(g)(3) requires that sampling pipes be labeled to indicate the location of the sampling point when more than one sampling pipe is installed through a seal. Annually, MSHA estimates that such a label will be necessary for 5 percent of all new seals. The estimated number of sampling pipes to be labeled is:

- 10 seals in mines with 1-19 employees (66 mines x 3 seals per mine x 5 percent);
- 107 seals in mines with 20-500 employees (237 mines x 9 seals per mine x 5 percent); and
- 7 seals in mines with 501+ employees (10 mines x 14 seals per mine x 5 percent).

MSHA estimates that a miner, earning $31.66 per hour, takes 0.1 hours (6 minutes) to label each sampling pipe. Table VII-C6 shows total annual burden hours of 13 and cost of $412 for mine operators to label sampling pipes.

Table VII-C6: Annual Burden Hours and Cost to Label Sampling Pipes under §75.337(g)(3)

(a)	(b)	(c)		(d)	(e)
Mine Size	No. of Pipes to Label (per year)	Time to Label Pipes (in hrs.)	Annual Burden Hours [a]	Miner Hourly Wage Rate	Annual Cost [b]
1-19	10	0.1	1	$31.66	$32
20-500	107	0.1	11	$31.66	$348
501+	7	0.1	1	$31.66	$32
Total	124		13		$412

[a] Annual Burden Hours = col. b x col. c.

[b] Annual Cost = col. d x col. e.

Final § 75.338(a) requires mine operators to certify that persons conducting sampling receive training on the use of appropriate sampling equipment, procedures, location of sampling points, the frequency of sampling, the size and condition of sealed areas, and the use of continuous monitoring systems if applicable, before conducting sampling, and annually thereafter. The number of mines estimated to initially train certified persons to sample is: 83 mines with 1-19 employees; 279 mines with 20-500 employees; and 10 mines with 501+ employees. These include all mines that have seals. MSHA estimates that a supervisor, earning $71.34 per hour, takes 0.1 hours (6 minutes) to certify the training. Table VII-D1 shows total annual burden hours of 37 and cost of $2,640 to certify that persons were trained to sample.

Table VII-D1: Annual Burden Hours and Cost to Certify That Persons Were Trained to Sample under §75.338(a)

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Mines that Sample Seals	Time to Certify (in hrs.)	Annual Burden Hours [a]	Supervisor Hourly Wage Rate	Annual Burden Cost [b]
1-19	83	0.1	8	$71.34	$571
20-500	279	0.1	28	$71.34	$1,998
501+	10	0.1	1	$71.34	$71
Total	372		37		$2,640

[a] Annual Burden Hours = col. b x col. c.

[b] Annual Burden Cost = col. d x col. e.

Due to annual turnover, MSHA estimates that 7 percent of the certified persons need to be trained annually. The estimated number of certified persons receiving training due to turnover is: 12 certified persons in all mines with 1-19 employees (83 mines x 2 certified persons x 0.07 turnover rate); 78 certified persons in all mines with 20-500 employees (279 mines x 4 certified persons x 0.07 turnover rate); and 4 certified persons in all mines with 501+ employees (10 mines x 6 certified persons x 0.07 turnover rate). Where a miner is trained due to turnover, training is assumed to be one-on-one and the certification is estimated to take 0.1 hours (6 minutes) for each person trained. Table VII-D2 shows total annual burden hours of 10 and cost of $713 to certify persons trained to sample due to turnover.

Table VII-D2: Annual Burden Hours and Cost to Certify Miners Trained in Sampling Procedures under §75.338(a) Due to Miner Turnover

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Persons Trained	Time to Certify (in hrs.)	Annual Burden Hours [a]	Supervisor Hourly Wage Rate	Annual Burden Cost [b]
1-19	12	0.1	1	$71.34	$71
20-500	78	0.1	8	$71.34	$571
501+	4	0.1	1	$71.34	$71
Total	94		10		$713

[a] Annual Burden Hours = col. b x col. c.

[b] Annual Burden Cost = col. d x col. e.

MSHA estimates that an instructor takes 0.1 hours (6 minutes) at each mine to certify that persons were trained in seal construction and repair. The initial and annual retraining is assumed to take place at one time by one instructor. The training instructor's hourly wage rate is estimated to be $67.96 when the training is provided in-house. The training is estimated to be done in-house for: 20 percent of mines with 1-19 employees; 70 percent of mines with 20-500 employees; and 90 percent of mines with 501+ employees. Table VII-D3 shows total annual burden hours of 23 and cost of $1,563 for mine operators to certify persons trained initially, and every year thereafter, in seal construction and repair.

Table VII-D3: Annual Burden Hours and Cost to Certify That Persons Were Trained in Seal Construction and Repair under §75.338(b)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Mine Size	No. of Mines that Build or Repair Seals	Percent of Mines That Conduct Training In-House	Time to Certify (in hrs.)	Annual Burden Hours [a]	Instructor Hourly Wage Rate	Annual Burden Cost [b]
1-19	83	20%	0.1	2	$67.96	$136
20-500	279	70%	0.1	20	$67.96	$1,359
501+	10	90%	0.1	1	$67.96	$68
Total	372			23		$1,563

[a] Annual Burden Hours = col. b x col. c col. d.

[b] Annual Burden Cost = col. e x col. f.

Due to annual turnover, MSHA estimates that 7 percent of the persons will need to be trained annually in seal construction and repair. MSHA estimates that in-house training will occur in: 20 percent of mines with 1-19 employees; 70 percent of mines with 20-500 employees; and 90 percent of mines with 501+ employees. The number of persons receiving training due to turnover is: 5 persons in all mines with 1-19 employees [(83 mines x 0.20) x (2 miners + 1 certified person + 1 senior mine official) x 0.07 turnover rate]; 96 persons in all mines with 20-500 employees [(279 mines x 0.70) x (4 miners + 2 certified person + 1 senior mine official) x 0.07 turnover rate]; and 4 persons in all mines with 501+ employees [(10 mines x 0.90) x (4 miners + 2 certified person + 1 senior mine official) x 0.07 turnover rate]. Where a person is trained due to turnover, training is assumed to be one-on-one and certification is estimated to take 0.1 hours (6 minutes). Table VII-D4 shows total annual burden hours of 12 and cost of $816 to certify persons trained in seal construction and repair.

Table VII-D4: Annual Burden Hours and Cost to Certify Persons Trained in Seal Construction and Repair under §75.338(b), Due to Mine Personnel Turnover

(a)	(b)	(c)	(d)	(e)	(f)
Mine Size	No. of Persons Trained	Time to Certify (in hrs.)	Annual Burden Hours [a]	Instructor Hourly Wage Rate	Annual Burden Cost [b]
1-19	5	0.1	1	$67.96	$68
20-500	96	0.1	10	$67.96	$680
501+	4	0.1	1	$67.96	$68
Total	105		12		$816

[a] Annual Burden Hours = col. b x col. c.

[b] Annual Burden Cost = col. d x col. e.

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