

REGULATORY ECONOMIC ANALYSIS

FOR

DIESEL PARTICULATE MATTER EXPOSURE OF UNDERGROUND
METAL AND NONMETAL MINERS

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

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I. EXECUTIVE SUMMARY

INTRODUCTION

The Mine Safety and Health Administration (MSHA) is revising some of the provisions in its existing Diesel Particulate Matter (DPM) rule for underground metal and non-metal mines. This final rule revises § 57.5060 Limit on concentration of diesel particulate matter; § 57.5061 Compliance determinations; § 57.5062 Diesel particulate matter control plan; § 57.5071 Environmental monitoring; and § 57.5075 Diesel particulate records. Sections 101 and 103 of the Federal Mine Safety and Health Act of 1977 provide the authority for this rulemaking.

Based on its analysis of compliance costs, MSHA has determined that this standard would not have an annual effect of \$100 million or more on the economy and, therefore, it is not an economically significant regulatory action pursuant to § 3(f) (1) of Executive Order (E.O.) 12866.

BENEFITS SUMMARY

As discussed in Chapter III of this REA, the amended provisions in this final rule will increase compliance flexibility with the existing final rule, but continue to reduce significant health risks to underground miners. These risks include lung cancer and death from cardiovascular, cardiopulmonary, or respiratory causes, as well as sensory irritations and respiratory symptoms.

COMPLIANCE COST SUMMARY

The final rule results in estimated net cost savings of approximately \$3,634 annually. These cost savings are primarily due to the elimination of the written DPM control plan requirements and the written application to the Secretary for permission to use respiratory protection.

In the December 2000 REA for the existing (January 2001) rule on DPM, we estimated that the total yearly cost for the underground M/NM mining industry would be \$25.1 million. This REA does not retrospectively re-estimate the costs of the existing rule, but only analyzes the costs and cost savings of this final rule relative to the existing rule.

REGULATORY FLEXIBILITY CERTIFICATION AND ANALYSIS

In accordance with section 605 of the Regulatory Flexibility Act, we certify that the final rule would not have a significant economic impact on a substantial number of small entities. Under the Small Business Regulatory Enforcement Fairness Act (SBREFA) amendments to the Regulatory Flexibility Act, we must include in the final rule a factual basis for this certification. The Agency must also publish the regulatory flexibility certification statement in the Federal Register, along with the factual basis, followed by an opportunity for the public to comment. The analysis that provides the factual basis for this certification is discussed in Chapter V of this document and is

included in the preamble to the final rule for publication in the Federal Register. We have consulted with the Small Business Administration's (SBA's) Office of Advocacy and believe that the analysis provides a reasonable basis for this certification.

II. INDUSTRY PROFILE

This industry profile provides background information about the structure and economic characteristics of the mining industry. It also provides data on the number of mines, their size, the number of employees, and the diesel powered equipment used.

THE STRUCTURE OF THE METAL/NONMETAL MINING INDUSTRY

MSHA divides the mining industry into two major segments based on commodity: (1) coal mines and (2) metal and nonmetal (M/NM) mines. These segments are further divided based on type of operation (e.g., underground mines or surface mines). MSHA maintains its own data on mine type, size, and employment, and the Agency also collects data on the number of independent contractors and contractor employees by major industry segment. Since the final rule only affects underground M/NM mines, we are focusing mainly on the underground M/NM mining industry in this chapter.

MSHA categorizes mines by size based on employment. For rulemaking purposes, MSHA has consistently defined a small mine to be one that employs fewer than 20 workers and a large mine to be one that employs 20 or more workers. To comply with the requirements of the Small Business Regulatory Enforcement Fairness Act (SBREFA) amendments to the Regulatory Flexibility Act (RFA), however, an agency must use the Small Business Administration's (SBA's) criteria for a small entity—for mining, 500 or fewer employees—when determining a rule's economic impact on small entities.

Table II-1 presents the total number of small and large mines and the corresponding number of miners, excluding contractors, for the M/NM mining segment. The M/NM mining segment consists of metal mines (copper, iron ore, gold, silver, etc.) and nonmetal mines (stone including granite, limestone, dolomite, sandstone, slate, and marble; sand and gravel; and others such as clays, potash, soda ash, salt, talc, and pyrophyllite.) As Table II-1 indicates, 98 percent of all M/NM mines are surface mines, and these mines employ some 91 percent of all M/NM miners, excluding office workers. Table II-2 presents corresponding data on the number of independent contractors and their employees working in the M/NM mining segment.

TABLE II-1: Distribution of M/NM Mine Operations and Employment (Excluding Contractors), by Mine Type and Size^a

Size of M/NM Mine ^b		Mine Type		Total M/NM
		Underground	Surface	
Fewer Than 20 Employees	Mines	110	10,580	10,690
	Employees	999	61,532	62,531
20 to 500 Employees	Mines	118	1,609	1,727
	Employees	10,176	87,838	98,014
Over 500 Employees	Mines	4	14	18
	Employees	3,184	11,972	15,156
All M/NM Mines	Mines	232	12,203	12,435
	Employees	14,359	161,342	175,701

^a Source: U.S. Department of Labor Mine Safety and Health Administration, Directorate of Program Evaluation and Information Resources, calendar year 2002 data.

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

TABLE II-2: Distribution of M/NM Contractors and Contractor Employment by Size of Operation^a

Size of Contractor ^b		Contractors		Total M/NM
		Underground	Surface	
Fewer Than 20 Employees	Firms	348	3,244	3,592
	Employees	1,182	15,758	16,940
20 to 500 Employees	Firms	39	363	402
	Employees	1,582	21,079	22,661
Over 500 Employees	Firms	0	2	2
	Employees	0	1,114	1,114
Total Contractors	Firms	387	3,609	3,996
	Employees	2,764	37,951	40,715

^a Source: U.S. Department of Labor Mine Safety and Health Administration, Directorate of Program Evaluation and Information Resources, 2002 data, and U.S. Department of Labor, Mine Safety and Health Administration, 2002 Final Data, CT441 Report.

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

The M/NM mining sector consists of about 80 different commodities including industrial minerals. There were 12,435 M/NM mines in the U.S. in 2002, of which 10,690 (86%) were small mines and 1,745 (14%) were large mines, using MSHA's traditional definition of small and large mines. Based on SBA's definition, however, only 18 M/NM mines (0.14%) were large mines.¹

The data in Table II-1 indicate that 175,701 workers were employed at M/NM mines in 2002, including 62,531 workers (36%) in small mines and 113,170 workers (64%) in large mines, using MSHA's definition. Based on SBA's definition, however, 160,545 workers (91%) were employed by small mines and 15,156 workers (9%) were employed by large mines. Using MSHA's definition, the average employment is 6 workers at a small M/NM mine and 65 workers at a large M/NM mine. Using SBA's definition, there is an average of 13 workers in each small M/NM mine and 842 workers in each large M/NM mine.²

Metal Mining

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

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

Metal mines constitute 2 percent of all M/NM mines and employ 16 percent of all M/NM miners. Under MSHA's traditional definition of a small mine, 51 percent of metal mines are small, and these mines employ 3 percent of all miners working in metal mines. Using SBA's definition, 95 percent of metal mines are small, and they employ 57 percent of all miners working in metal mines.³

Stone Mining

In the stone mining subsector, there are eight different stone commodities, of which seven are further classified as either dimension stone or crushed and broken stone. Stone mining in the U.S. is predominantly by quarrying, with only a few slight variations. Crushed stone mines typically drill and blast, while dimension stone mines generally use channel burners, drills, or wire saws. Diesel powered-haulage is used to transfer the rock from the quarry to the mill where crushing or sizing is done.

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

¹ U.S. Department of Labor Mine Safety and Health Administration, Directorate of Program Evaluation and Information Resources, calendar year 2002 data.

² Ibid.

³ Ibid.

mines. Using SBA's definition, 99.98 percent of stone mines are small, and they employ 99 percent of all miners working in stone mines.⁴ Fully 62 percent of underground M/NM mines using diesel equipment are stone mines.

Sand & Gravel Mining

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

The sand and gravel subsector represents the single largest commodity group in the U.S. mining industry based on the number of mining operations. Sand and gravel mines comprise 57 percent of all M/NM mines, and they employ 25 percent of all M/NM miners. Using MSHA's definition of a small mine, 95 percent of sand and gravel mines are small, and these mines employ 75 percent of all miners working in sand and gravel mines. Using SBA's definition, 100 percent of sand and gravel mines are small, and they employ approximately 37,118 miners.⁵

Other Nonmetal Mining

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

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

"Other" nonmetal mines comprise 6 percent of all M/NM mines, and they employ 13 percent of all M/NM miners. Using MSHA's definition of a small mine, 70 percent of other nonmetal mines are small, and they employ 14 percent of all miners working in these nonmetal mines. Using SBA's definition, 99.6 percent of other nonmetal mines are small, and they employ 90 percent of all miners working in these nonmetal mines.⁶

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

ECONOMIC CHARACTERISTICS OF THE METAL/NONMETAL MINING INDUSTRY

The value of all M/NM mining output in 2002 was estimated at \$37.9 billion. Metal mines, which include copper, gold, iron, lead, silver, tin, and zinc mines, contributed \$8.2 billion.⁷ Nonmetal production was valued at \$29.7 billion: \$8.9 billion from stone mining, \$6.3 billion from sand and gravel, and \$14.5 billion from other nonmetals such as potash, clay, and salt.⁸

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

A detailed economic picture of the M/NM mining industry is difficult to develop because most mines are either privately held corporations or sole proprietorships, or subsidiaries of publicly owned companies. Privately held corporations and sole proprietorships are not required to make their financial data available to the public. Parent companies are not required to separate financial data for subsidiaries in their reports to the Securities and Exchange Commission. As a result, financial data are available for only a few M/NM companies, and these data are not representative of the entire industry.

UNDERGROUND M/NM MINES THAT USE DIESEL POWERED EQUIPMENT

The M/NM mine DPM rule applies only to underground M/NM mines that use diesel powered equipment. Because most M/NM mines do not have the risk of explosion, unlike underground coal mines with methane present in the atmosphere, the adoption of diesel powered equipment has been unimpeded. Fully 75 percent of underground M/NM mines use diesel powered equipment. Most of the mines not using diesel powered equipment are small mines with fewer than 20 employees.

In 2002, MSHA conducted an inventory of underground M/NM mines to identify the number of diesel powered machines used in these mines. MSHA inspectors collected data from a total of 177 mines.

Table II-3 shows the number of mines and miners in mines using diesel powered equipment by mine employment size.

⁷ U.S. Department of Interior, U.S. Geological Survey, *Mineral Commodity Summaries 2004*, January 9, 2004, p. 7.

⁸ *Ibid.*, pp. 140, 142, 156, and 158.

TABLE II-3: Underground Metal/Nonmetal Mines and Miners Using Diesel Powered Equipment, by Mine Size Class

	Size of Mine					
	Fewer Than 20 Miners		20 to 500 Miners		More Than 500 Miners	
	Mines	Employees	Mines	Employees	Mines	Employees
Number	66	678	107	9,567	4	3,184
Percentage of All Underground M/NM Mines and Miners in Size Class ^a	60%	68%	91%	94%	100%	100%
Percentage of All Underground M/NM Mines and Miners With Diesel Equipment ^a	37%	5%	60%	71%	2%	24%

^a All percentages in this table are based on 2002 data on underground M/NM mines. See Tables II-1 and II-4 for further details.

Table II-4 shows the number and size distribution for different commodity groups of underground M/NM mines using diesel powered equipment.

TABLE II-4: Underground M/NM Mines Using Diesel Powered Equipment by Commodity Group and Size Class, 2002*

Commodity Group	Size of Mine			Total
	Fewer Than 20 Miners	20 to 500 Miners	Over 500 Miners	
Base Metals ^a	6	9	0	15
Precious Metals ^b	3	17	1	21
Stone ^c	53	56	1	110
Other Nonmetal ^d	4	25	2	31
TOTAL	66	107	4	177

* Based on the 2002 inventory of diesel engines used in underground MNM mines. Data includes all mines reporting at least one diesel engine for the inventory, or reporting that they shared diesel equipment with another mine. Employment data for 2002 are from MSHA's directorate of Program Evaluation and Information Resources. Three of the included mines reported no employment in 2002.

^a Includes Copper Ore, Lead/Zinc, Molybdenum, Uranium, and Miscellaneous.

^b Includes Gold, Platinum, and Silver.

^c Includes Broken Stone, Lime, Limestone, Marble, and Sandstone.

^d Includes Clay, Gemstones, Gypsum, Potash, Salt, Talc, Trona, and Miscellaneous.

INVENTORY OF DIESEL POWERED EQUIPMENT

Table II-5 summarizes diesel powered equipment by mine size class and commodity being mined.

TABLE II-5: Number of Diesel Engines in Underground M/NM Mines by Commodity Group and Mine Size Class, 2002*

Commodity Group ^a	Size of Mine			Total
	Fewer Than 20 Miners	20 to 500 Miners	Over 500 Miners	
Base Metals	363	631	0	994
Precious Metals	27	854	295	1,176
Stone	1,158	2,013	214	3,385
Other Nonmetal	33	1,629	452	2,114
TOTAL	1,581	5,127	961	7,669

* Based on 2002 inventory of diesel engines used in underground MNM mines.

^a See Table II-4 for definitions of commodity groups.

III. BENEFITS

In Chapter III of the Regulatory Economic Analysis in support of the January 19, 2001 final rule (2001 REA), the Agency demonstrated that the DPM final rule for M/NM mines will reduce a significant health risk to underground miners. This risk included the potential for illnesses and premature death, as well as the attendant costs of the risk to the miners' families, to the miners' employers, and to society at large.

Benefits of the January 19, 2001 final rule include continued reductions in lung cancers. In the long run, as the mining population turns over, MSHA estimated that a minimum of 8.5 lung cancer deaths will be avoided per year. MSHA noted that this estimate was a lower bound figure that could significantly underestimate the magnitude of the health benefits. For example, the estimate based on the mean value of all the studies examined in the January 19, 2001 final rule was 49 lung cancer deaths avoided per year.

Other benefits noted in the 2001 REA were reductions in the risk of death from cardiovascular, cardiopulmonary, or respiratory causes and reductions in the risk of sensory irritation and respiratory symptoms. However, MSHA did not include these health benefits in its estimates because the Agency could not make reliable or precise quantitative estimates of them. Nevertheless, the Agency noted that the expected reductions in the risk of death from cardiovascular, cardiopulmonary, or respiratory causes and the expected reductions in the risk of sensory irritation and respiratory symptoms are likely to be substantial.

The amended provisions in this final rule will amend the January 19, 2001 final DPM rule, thereby providing greater compliance flexibility for the mining industry. By improving compliance with the final DPM rule, this final rule will contribute to the realization of the benefits mentioned above.

IV. COST OF COMPLIANCE

INTRODUCTION

This chapter analyzes the changes in the compliance costs associated with the revised provisions in the final DPM rule. Appendices A and B of this REA analyze the compliance costs for two (rejected) regulatory alternatives to the revised provisions of this final DPM rule. Appendix C provides a cost comparison between the compliance costs analyzed in this chapter and the compliance costs of the two (rejected) regulatory alternatives.

Table IV-1 presents the total yearly compliance costs by provision and mine size. The final rule will result in estimated net cost savings (negative costs) for underground metal/nonmetal mine operators of \$3,634 per year. This works out to an average yearly savings of \$20 per mine for the 177 underground metal/non-metal mines that will be affected by this final rule. Of these 177 mines, 66 have fewer than 20 workers, 107 have 20 to 500 workers; and 4 have more than 500 workers. The cost savings per mine for mines with fewer than 20 workers will be \$74. The cost increase per mine for mines having 20 to 500 workers and more than 500 workers will be \$10. All MSHA cost estimates in this REA are presented in 2002 dollars.

Table IV-1: Summary of Costs

Provision	Mine Size			Total
	<20	20-500	>500	
Special Extensions 57.5060 (c)	\$5,672	\$18,088	\$676	\$24,436
Respirator Protection 57.5060 (d)	-\$2,547	-\$4,129	-\$154	-\$6,831
DPM Control Plan 57.5062	-\$7,920	-\$12,839	-\$480	-\$21,239
Total	-\$4,795	\$1,119	\$42	-\$3,634

Source: Tables IV-3, IV-5 and IV-7.

The total costs reported in Table IV-1, and in all other tables in this chapter, are the Agency's best estimates of the projected costs based on our knowledge, experience, and available information. In some cases, however, our estimates may appear to deviate slightly from the sum or product of their component factors due to the fact that the component factors have been rounded in the tables for purposes of readability.

METHODOLOGY

In determining the effects of the final rule, MSHA estimated the following, as appropriate: (1) one-time or intermittent costs; (2) annualized costs (one-time or intermittent costs amortized over a specific number of years); and (3) annual costs. One-time costs are those that are incurred only once and do not recur. Intermittent costs are those that occur from time to time, but not annually. Examples of one-time or

intermittent costs are capital expenditures, such as the cost of purchasing compliance equipment, and the cost of developing and writing a DPM control plan. For the purposes of this analysis, one-time costs have been annualized using a (real) annual discount rate of 7%, as recommended by the U. S. Office of Management and Budget (OMB), over an infinite (or, at least, indefinite) period using the 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 investment. As “n” becomes large, the value of “a” approaches the discount rate. Therefore, for one-time costs with an infinite life, MSHA has applied an annualization factor equal to the annual discount rate of 7% (that is, the annualized cost is equal to 7% of the one-time cost). Unless otherwise specified, all first year costs in this REA were annualized using a 7 percent annualization factor.

Converting one-time costs to annualized costs allows them to be added to annual costs in order to compute the yearly costs of a rule.⁹ Annual costs are costs that normally recur annually. Two examples of annual costs are (annual) refresher training costs and recordkeeping costs.

The labor costs used in this analysis for metal/non-metal miners are based upon their 2002 wage rates. The wage rates used in this analysis are:

\$47.58 per hour for a supervisor;
\$20.51 for a metal/non-metal miner; and
\$19.06 for a clerical worker.¹⁰

These wage rates include benefits (which include social security, unemployment insurance, and workers’ compensation), but do not reflect shift differentials or overtime pay. For convenience, MSHA will refer to miner “compensation” in this REA as “wages,” where that term is understood to include benefits.

We note that many of the assumptions and estimates of cost components in this chapter rely exclusively on MSHA’s own knowledge and experience.

SECTION 57.5060(a) INTERIM PERMISSIBLE EXPOSURE LIMIT (PEL)

The interim PEL in the final rule is 308 micrograms of elemental carbon per cubic meter of air (308_{EC} µg/m³). The existing interim limit, in the 2001 final rule, is 400

⁹ Note that many one-time costs, such as labor and testing costs or small capital costs, would not normally be financed by mine operators. Nevertheless, we have annualized all one-time costs so as to be able to provide a simple, single estimate of the cost of an MSHA regulation: its yearly cost. The yearly cost of a regulation converts all of the costs of a regulation, whenever and however frequently they occur, into an equivalent stream of uniform yearly costs.

¹⁰ Wages are derived from *U.S. Metal and Industrial Mineral Mine Salaries, Wages, and Benefits 2002 Survey Results*, Western Mine Engineering, 2002.

micrograms of total carbon per cubic meter of air ($400_{TC} \mu\text{g}/\text{m}^3$). The new interim limit, expressed in units of elemental carbon, is equivalent to the existing interim limit, which is expressed in units of total carbon. Therefore, this equivalent interim limit does not change the costs of compliance.

SECTION 57.5060(c) SPECIAL EXTENSIONS

Under the existing § 57.5060(c), in the 2001 final rule, a mine operator that requires additional time to come into full compliance with the final concentration limit ($160_{TC} \mu\text{g}/\text{m}^3$), due to technological constraints, would be allowed to file an application for a special extension. This provision provides for no more than one extension lasting no longer than two years. In contrast to this existing provision, the revised § 57.5060(c) requires consideration of economic feasibility, as well as technological feasibility, and allows unlimited applications, each lasting no longer than one year.

Unit Cost Estimate

With the exception of updated price and wage data, MSHA uses the same estimates and assumptions as in the 2001 REA to calculate the unit cost of applying for a special extension:

To prepare and submit an application to MSHA would take a supervisor:

- 16 hours in a mine with 20 or more employees, and
- 8 hours in a mine with fewer than 20 employees.

The application would average 10 pages in length.

Copying and distribution of the application would require 20 minutes of a clerical worker's time, and would involve:

- Making 3 copies of the original application:
 - ◆ One mailed to MSHA,
 - ◆ One distributed to the miners' representative, and
 - ◆ One posted in the mine, and
- Making and posting one copy of the approved application.

Other direct costs include:

- \$.15 per page (\$1.50 per application copy) for copying costs, and
- \$.60 for postage.

Table IV-2 shows the cost per mine for an application for a special extension. The cost of making an application would be \$394 for a small mine and \$774 for a large mine.

**Table IV-2
Revised 57.5060(c) Unit Costs of Special Extension Application**

Mine Size	Activity	Cost Element	Unit Cost	Units	Cost
Fewer Than 20	Prepare	Supervisor	\$47.58	8 hours	\$381
	Copy & Distribute	Clerical Worker	\$19.06	0.33 hours	\$6
		Copying	\$1.50	4 copies	\$6
	Direct Costs	Postage	\$0.60	1 copy	\$1
		Total Cost per Mine			
20 and Over	Prepare	Supervisor	\$47.58	16 hours	\$761
	Copy & Distribute	Clerical Worker	\$19.06	0.33 hours	\$6
		Copying	\$1.50	4 copies	\$6
	Direct Costs	Postage	\$0.60	1 copy	\$1
		Total Cost per Mine			

MSHA assumes that 50 percent, or roughly 89, of the 177 underground metal/non-metal mines that use diesel powered equipment would apply for a special extension to the final limit in the first year. Of these 89 mines half, or roughly 44, would also apply for an extension in the second year and every year thereafter. The other half would have met the final limit by then.

The costs of applying for a special extension to the final limit in the first year are not included in this REA because mine operators are permitted to make a one-time application under existing § 57.5060(c). This adjustment is also made in the last column of table IV-3, which presents the costs of applying for a special extension to the final limit for mines that apply in every year.¹¹

¹¹ The costs of complying with this provision would also be different from those in the 2001 REA because the number of mines predicted to make the application has changed. This change, however, is due to a change in MSHA's assumptions and not to a change in the rule itself. Therefore, the cost effects associated with this change in assumptions are not properly attributable to this final rule.

Table IV-3
Revised 57.5060(c) Costs of Special Extension for Final Limit

Mine Size	Number of Mines	Annual Cost per Mine ^a	Total Annual Cost	Adjusted Total Annual Cost ^b
< 20	16.5	\$394	\$6,494	\$5,672
20 to 500	26.8	\$774	\$20,709	\$18,088
> 500	1.0	\$774	\$774	\$676
Total	44.3		\$27,976	\$24,436

^a See Table IV-2 for a breakdown of these costs.

^b Adjusted Total Cost = (total annual cost) / (1.07)², where (1/1.07)² is the two-year discounting factor using an annual discount rate of 7 percent (the annual costs are discounted for one year because the final limit does not go into effect until one year after the publication of this rule and a second year because mine operators unable to meet the final limit are already able (under the existing rule) to apply for a special extension in the first year only that the final limit takes effect).

SECTION 57.5060(d) RESPIRATORY PROTECTION

Under the 2001 final rule, § 57.5060(d) allows mine operators to apply to the Secretary to permit mine employees to conduct inspection, maintenance, or repair activities in certain areas of a mine where the DPM concentration limit is exceeded while using respiratory protection. This section requires mine operators to apply to the Secretary, as well as to reapply annually. Moreover, the section contains provisions outlining requirements for respiratory equipment, training, fit testing, routine care, and inspections of respirators.

These latter requirements are still included in Section 57.5060(d). However, the section no longer requires operators to apply to the Secretary to use respirators due to requirements for the hierarchy of controls strategy. Therefore, mine operators that use respirators would accrue costs savings equal to the cost of preparing, revising, and submitting applications to the Secretary. Table IV-4 shows MSHA's estimates of these cost savings per mine. The assumptions in Table IV-4 regarding the quantity of inputs necessary to complete the plans are the same as in the January 2001 REA. The prices of these inputs have been updated. Each mine that uses respirators would realize a cost saving (negative change in costs) of \$41 per year for initial applications and \$60 per year for revised applications.

Table IV-4: Unit Costs of Respirator Protection and Exemption Plans

Activity	Cost Element	Unit Cost	Units	Cost Under Old 57.5060(d)	Cost Under New 57.5060(d)	Net Change in Costs
Initial Preparation	Supervisor	\$ 47.58	12 hours	\$571	\$0	-\$571
	Clerical Worker	\$ 19.06	0.5 hours	\$10	\$0	-\$10
	Copying	\$ 1.50	4 copies	\$6	\$0	-\$6
	Postage	\$ 0.84	1 copy	\$1	\$0	-\$1
	Annualized Cost ^a			\$41	\$0	-\$41
Annual Revisions	Supervisor	\$ 47.58	1 hour	\$48	0	-\$48
	Clerical Worker	\$ 19.06	0.5 hours	\$10	\$0	-\$10
	Copying	\$ 1.50	4 copies	\$6	\$0	-\$6
	Postage	\$ 0.84	1 copy	\$1	\$0	-\$1
	Annualized Cost ^b			\$60	\$0	-\$60

^a Using an annualization factor of 0.07.

^b Using a discount rate of 1 / (1.07).

The number of mines that MSHA assumes will use respirators is different from the number assumed in the January 2001 REA. In the January 2001 REA, MSHA assumed all mines would use respirators for inspection, maintenance, or repair activities in certain areas of the mine. In this REA, MSHA uses the baseline sampling data to make new assumptions regarding the number of mines using respirators. MSHA now assumes that the percentage of mines in which the personal samples of mine employees engaged in inspection, maintenance, or repair activities are above the limit would be the same as the percentage of mines that would use respirators. These percentages are 6.9% (12.2 mines) and 37.9% (67.1 mines) for the interim and final limits, respectively. Table IV-5 shows the total cost savings for the metal/non-metal industry based on these numbers of mines.

Table IV-5: Change in Costs Resulting From the Elimination of the Written Respiratory Protection and Exemption Plans

Mine Size	Number of Affected Mines	Cost Per Mine ^a	Annualized Total Cost	Present Value of Annualized Total Cost ^b
For Mines Unable to Meet the Interim Limit				
<20	4.6	-\$41	-\$187	-\$187
20-500	7.4	-\$41	-\$303	-\$303
>500	0.3	-\$41	-\$11	-\$11
Total	12.2		-\$502	-\$502
For Mines Unable to Meet the Final Limit				
<20	25.0	-\$101	-\$2,525	-\$2,360
20-500	40.6	-\$101	-\$4,094	-\$3,826
>500	1.5	-\$101	-\$153	-\$143
Total	67.1		-\$6,772	-\$6,329
Total Yearly Costs Savings				
<20				-\$2,547
20-500				-\$4,129
>500				-\$154
Total				-\$6,831

^aSource: Table IV-4. For the one-year interim limit, the calculation excludes annual revisions. For the final limit, both the initial preparation and annual revisions are included.

^bMines unable to meet the interim limit will incur immediate costs savings. Mines unable to meet the final limit will not incur cost savings until one year after the publication of the rule. Therefore, these latter cost savings are discounted using a discount factor of 1/1.07.

SECTION 57.5061 COMPLIANCE DETERMINATIONS

Under the existing Section 57.5061, compliance determinations are made by analyzing area samples for total carbon. Under the revised Section 57.5061, compliance determinations would be made by analyzing personal samples for elemental carbon. Based on its experience MSHA has concluded that these two sampling and analytical methods do not vary in cost. Therefore, these changes to the rule would not change total compliance costs.

DIESEL PARTICULATE MATTER CONTROL PLAN (57.5062)

Under the January 2001 rule, an underground metal/non-metal mine operator, in violation of Section 57.5060(a) (the interim limit) or Section 57.5060(b) (the final limit), is required to take the following steps:

- establish a written diesel particulate control plan for the mine (or modify the plan if one already exists) that includes a description of the controls the mine operator will utilize to keep the DPM below the limits;
- modify the particulate control plan to reflect changes in mining equipment and circumstances;
- demonstrate the effectiveness of the particulate control plan by monitoring;
- make the control plan and sampling records available to representatives of DOL, DHHS, and the miners; and
- provide the particulate control plan to the district manager upon request.

MSHA used the following estimates and assumption in the 2001 REA to calculate the unit cost of the diesel particulate matter control plan:

- Preparation of a particulate control plan (or modification in the event of a violation) will require an average of 4 hours of a M/NM mine supervisor's time.
- Demonstration of the effectiveness of a particulate control plan will entail (for each violation) taking one verification sample per day for three days in the production area of the mine where the violation occurred.
- To take one sample will require 8 hours of a miner's time.¹²
- Modification of a particulate control plan after changes in equipment or circumstances will require an average of half an hour of a M/NM mine supervisor's time.
- The particulate control plan or modification to the plan will be 10 pages in length.
- Each mine will need to make a total of 4 copies of the plan and two copies of the modification to the plan.
- Copying and distributing the plan will require an average of:
 - Fifteen minutes per mine of a clerical worker's time for an original plan and
 - Ten minutes per mine of a clerical worker's time for modification of a plan.

The unit costs of preparing the initial plan and revising the plan, under these assumptions using updated wages and prices, appear in the third to the last column of Table IV-6.

¹² This assumption corrects the assumption made in the 2001 REA that the sampling would be done by an outside party and did not require any of the miner's time. MSHA now assumes that in most cases the sampling will be done by a mine employee.

Table IV-6: 57.5062 Unit Costs of Diesel Particulate Matter Control Plan

Type of Plan	Cost Element	Cost or Rate/Hour	Hours or Units	Cost Under Old 57.5062	Change in Costs From Removing 57.5062
Initial	Supervisor	\$47.58	4.00	\$190	-\$190
	Clerical Worker	\$19.06	0.25	\$5	-\$5
	Copies	\$1.50	4.00	\$6	-\$6
	Postage	\$0.60	1.00	\$1	-\$1
	Sampling	\$19.81	24.00	\$475	-\$475
	Analysis	\$35.85	3.00	\$108	-\$108
	Total Change in Unit Cost				\$785
Revision	Supervisor	\$47.58	0.50	\$24	-\$24
	Clerical Worker	\$19.06	0.17	\$3	-\$3
	Copies	\$1.50	2.00	\$3	-\$3
	Postage	\$0.60	1.00	\$1	-\$1
	Total Change in Unit Cost				\$31

This final DPM rule removes Section 57.5062. The last column of Table IV-6 shows the cost savings (negative change in costs) accruing to mine operators that will no longer be required to write an initial DPM control plan or revise an existing one.

The number of mines that MSHA assumes would have had to establish and revise a diesel particulate matter control plan is different from the number assumed in the January 2001 REA. In the 2001 REA, MSHA assumed that, in every year, ten mines with 20 or more employees (roughly 8 percent of these mines) and 2 mines with fewer than 20 employees (about 3% of these mines) would receive a violation that triggers DPM control plan requirements.

In this REA, MSHA uses the baseline sampling data to make new assumptions regarding the number of mines that would have had to produce a DPM control plan each year. Roughly thirty percent of the mines in the baseline sampling data were above the interim limit. MSHA assumes that half of these mines (15%) would have had to establish an initial DPM control plan and that half of those establishing an initial plan (7.5%) would have had to revise the DPM control plan. Applying these percentages to the 177 mines affected by this rule implies that 26.6 mines would have had to prepare an initial DPM plan each year and that 13.3 mines would have had to prepare a revised DPM plan each year.

MSHA estimates that the same number of mines annually would be in violation of the final limit, and consequently need to submit a control plan, as would be in violation of the interim limit, even though the final limit is more stringent than the interim limit. This is because mines that anticipate not meeting the final limit may file for special extensions under § 57.5060(c) prior to being sampled and cited for exceeding the DPM limit. Hence, no additional DPM control plans would have been necessary. Table IV-7 shows the total cost savings (negative costs) for the metal/non-metal industry based on these numbers of mines.

**Table IV-7: Annual Change in Compliance Costs
From Removing Diesel Particulate Control Plan**

Type of Plan	Mine Size	Number of Mines	Unit Cost ^a	Total Annual Change in Cost
Initial	< 20	9.9	-\$785	-\$7,768
	20-500	16.1	-\$785	-\$12,594
	> 500	0.6	-\$785	-\$471
	Total	26.6		-\$20,833
Revision	< 20	5.0	-\$31	-\$151
	20-500	8.0	-\$31	-\$245
	> 500	0.3	-\$31	-9
	Total	13.3		-\$406
Total Yearly Change in Cost	< 20			-\$7,920
	20-500			-\$12,839
	> 500			-\$480
Total				-\$21,239

^aSource: Table IV-6.

SECTION 57.5071 EXPOSURE MONITORING

Under the existing Section 57.5071, environmental monitoring is conducted using area samples.¹³ Under the revised Section 57.5071, exposure monitoring would be conducted using personal samples. Based on its experience MSHA has concluded that these two sampling methods do not vary in cost. Therefore, this change to the rule would not change the total compliance cost.

SECTION 57.5075 DIESEL PARTICULATE RECORDS

This provision would provide an updated summary of all recordkeeping requirements of the final rule. There are no costs associated with this provision because the actual recordkeeping costs are included under the applicable provisions.

FEASIBILITY

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

Many devices that would significantly reduce miners' exposures under the final rule are available in the marketplace and have been used either in the U.S. or in the international mining community. MSHA and the mining industry are aware of other

¹³ In the January 2001 rule, this section was titled "Environmental Monitoring."

developing technologies designed to reduce DPM levels in underground mines. MSHA will advise the mining community as these technologies become available. Therefore, we have concluded that this final rule is technologically feasible.

As previously estimated in this chapter, underground metal/nonmetal mines that use diesel powered equipment will accrue net cost savings of approximately \$3,634 per year as the result of this final rule. We believe that this is convincing evidence that the final rule is economically feasible.

Sections of the Preamble to this rule marked “Technical Feasibility” and “Economic Feasibility” discuss the broader issue of whether implementation of the existing rule on DPM, which this final rule modifies, is feasible. This REA only addresses whether this final rule is feasible, under the assumption that the existing rule is feasible.

V. REGULATORY FLEXIBILITY CERTIFICATION

INTRODUCTION

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

DEFINITION OF A SMALL MINE

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

The SBA defines a small entity in the mining industry as an establishment with 500 or fewer employees (13 CFR 121.201). Almost all of the M/NM mines affected by this rulemaking fall into this category and hence can be viewed as sharing the special regulatory concerns that the RFA was designed to address.

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

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

FACTUAL BASIS FOR CERTIFICATION

General Approach

The Agency's analysis of impacts on "small entities" begins with a "screening" analysis. The screening compares the estimated compliance costs of a final rule for small entities in the sector affected by the rule to the estimated revenues for those small entities. When estimated compliance costs are less than 1 percent of the estimated revenues, the Agency believes it is generally appropriate to conclude that there is no significant economic impact on a substantial number of small entities. When estimated compliance costs exceed 1 percent of revenues, it tends to indicate that further analysis may be warranted.¹⁴

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.

In determining revenues for underground M/NM mines, we used data from the *Mining and Quarrying Trends*.¹⁵ Table 1 of this publication provides information for metric tons mined, while Table 3 provides information for average price per metric ton. These figures were multiplied together to obtain an estimate of industry revenue for the underground portion of the M/NM mining industry.¹⁶

Since MSHA does not collect tonnage figures for metal/nonmetal production, but does collect data on hours worked, MSHA estimates the revenues for particular mine-size categories based on hours worked. MSHA estimates that, on average, each hour of work produces \$113.15 worth of ore in the M/NM mining industry.¹⁷

MSHA has assumed that tonnage is proportional to employee hours (rather than employees) because this assumption implicitly adjusts for different shift lengths associated with different sizes of mines. MSHA also determined which mines use diesel equipment, and computed totals for hours worked for those mines only. Mines using diesel equipment account for 75 percent of the mines, 93.3 percent of employment, and

¹⁴ MSHA has traditionally used a revenue screening test—whether the yearly costs of a regulation equal or exceed 1 percent of revenues—to determine whether the regulation might possibly have a significant economic impact on a substantial number of small entities. The Agency recognizes the theoretical usefulness of evaluating the effects of a regulation on profits (rather than on revenues). MSHA is currently investigating the future use of profitability analysis to evaluate whether its rules would have a significant impact on a substantial number of small entities. However, given that the yearly costs of the final DPM rule are miniscule and negative (there are cost savings) for any subset of small mines, MSHA is confident that, given the selection and use of any reasonable profitability test, the final DPM rule would be found not to have a significant economic effect on a substantial number of small entities.

¹⁵ U.S. Department of Interior, U.S. Geological Survey, *Mineral Industry Surveys, Mining and Quarrying Trends, 2002 Annual Review*.

¹⁶ (137 million metric tons) x (\$23.27 average price) ≈ (\$3,188 million revenue).

¹⁷ (\$3,188 million revenue) / (28,174,755 hours) ≈ (\$113.15 revenue per hour).

94.8 percent of hours worked in M/NM underground mines. Smaller mines are less likely to use diesel equipment than larger mines.

Results of Screening Analysis

Table V-1 shows the estimated yearly cost savings (negative costs) of the final DPM rule as a percentage of yearly revenues. This percentage is about -0.00331 percent for mines with fewer than 20 employees and -.00016 percent for mines with 500 or fewer employees.

For both mine size categories, the cost of complying with the final rule will be negative, well below the level (1% of revenue) that suggests that the final rule might have a significant impact on a substantial number of small entities. Accordingly, we have certified that the final rule would not have a significant impact on a substantial number of small underground M/NM mines using diesel equipment.

Table V-1: Estimated Yearly Costs of Final DPM Rule Relative to Yearly Revenues

Mine Size	Yearly Costs	Revenues ^a	Costs as a Percentage of Revenues
< 20 Employees	-\$4,795	\$144,797,785	-0.00331%
≤ 500 Employees	-\$3,675	\$2,352,300,969	-0.00016%

^aData for revenues derived from U.S. Department of Interior, U.S. Geological Survey, *Mineral Industry Surveys, Mining and Quarrying Trends, 2002 Annual Review* and MSHA directorate of Program Evaluation and Information Resources, 2002 data.

VI. OTHER REGULATORY CONSIDERATIONS

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

MSHA has reviewed this final rule in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*), the regulations of the Council on Environmental Quality (40 U.S.C. part 1500), and the Department of Labor's NEPA procedures (29 CFR part 11). This final rule has no significant impact on air, water, or soil quality; plant or animal life; the use of land; or other aspects of the human environment. MSHA solicited public comment concerning the accuracy and completeness of this environmental assessment when this rule was first proposed, and received no comments relevant to this environmental assessment. MSHA finds, therefore, that the final rule has no significant impact on the human environment. Accordingly, MSHA has not provided an environmental impact statement.

THE UNFUNDED MANDATES REFORM ACT OF 1995

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

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

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

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

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

EXECUTIVE ORDER 12988: CIVIL JUSTICE REFORM

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

EXECUTIVE ORDER 13132: FEDERALISM

This 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, Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, requires no further agency action or analysis.

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

Regulation of the metal/nonmetal sector of the mining industry has no significant impact on the supply, distribution, or use of energy. This final rule is not a “significant energy action” because it is not “likely to have a significant adverse effect on the supply, distribution, or use of energy ... (including a shortfall in supply, price increases, and increased use of foreign supplies).” Accordingly, Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, requires no further agency action or analysis.

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

MSHA has thoroughly reviewed this final rule to assess and take appropriate account of its potential impact on small businesses, small governmental jurisdictions, and small organizations. As discussed in Chapter V of this REA, MSHA has determined and certified that this final rule will not have a significant economic impact on a substantial number of small entities. MSHA solicited public comment concerning the accuracy and completeness of this potential impact when the rule was first proposed. The agency took appropriate account of comments received relevant to the rule’s potential impact on small

entities. Accordingly, Executive Order 13272, Proper Consideration of Small Entities in Agency Rulemaking, requires no further agency action or analysis.

VII. THE PAPERWORK REDUCTION ACT OF 1995

INTRODUCTION

The purpose of this chapter is to show the burden hours and related costs which would be borne by underground M/NM mine operators as a result of the final rule. The costs in this chapter are derived from Chapter IV of this REA. However, in this chapter, we estimate costs and savings only in relation to the burden hours that the final rule imposes or eliminates. Therefore, not all costs and savings derived in Chapter IV appear below. Those costs and savings derived in Chapter IV that do not have burden hours related to them do not appear in this chapter.

SUMMARY OF PAPERWORK BURDEN HOURS AND RELATED COSTS

This final rule for underground M/NM mines has two provisions containing paperwork burden requirements. Due to different requirements in these provisions for the interim and final limits, the effective dates vary. There are four summary tables that show burden hours and costs relating to paperwork.

Tables VII-1, VII-2, and VII-3 show the total burden hour savings (negative burden hours) and increases in each year. Tables VII-1 and VII-2 show burden hour savings of 277 hours and 1,011 hours respectively in the first and second years. Table VII-3 shows a burden hour increase of 346 hours in the third and subsequent years.

Table VII-1: Summary of Paperwork Burden Hours for the First Year*

Section	Details	< 20 Employees	20-500 Employees	> 500 Employees	Total
57.5060(d)	No initial plans during interim limit	-56.90	-92.24	-3.45	-152.59
57.5062	No initial DPM control plan	-42.08	-68.21	-2.55	-112.84
57.5062	No revised DPM control plan	-3.30	-5.35	-0.20	-8.85
	Total Hours	-102.27	-165.80	-6.20	-274.27

*Source: Tables VII-6, VII-8, and VII-9.

Table VII-2: Summary of Paperwork Burden Hours for the Second Year*

Section	Details	< 20 Employees	20-500 Employees	> 500 Employees	Total
57.5060(d)	No initial plans during final limit	-312.93	-507.33	-18.97	-839.22
57.5062	No initial DPM control plan	-42.08	-68.21	-2.55	-112.84
57.5062	No revised DPM control plan	-3.30	-5.35	-0.20	-8.85
Total Hours		-358.31	-580.89	-21.72	-960.91

*Source: Tables VII-7, VII-8, and VII-9.

Table VII-3: Summary of Paperwork Burden Hours for the Third and Susequent Years*

Section	Details	< 20 Employees	20-500 Employees	> 500 Employees	Total
57.5060(c)	Special extension to final limit	137.50	436.92	16.33	590.75
57.5060(d)	No revised plans during final limit	-37.55	-60.88	-2.28	-100.71
57.5062	No initial DPM control plan	-42.08	-68.21	-2.55	-112.84
57.5062	No revised DPM control plan	-3.30	-5.35	-0.20	-8.85
Total Hours		54.57	302.47	11.31	368.36

*Source: Tables VII-5, VII-7, VII-8, and VII-9.

Table VII-4 shows the annualized present value of the net costs associated with the burden hours in Tables VII-1, VII-2, and VII-3. This annualized net cost is \$12,250.

Table VII-4: Summary of Annualized Paperwork Burden Costs*

Section	Details	< 20 Employees	20-500 Employees	> 500 Employees	Total
57.5060(c)	Special extension to final limit	\$5,577	\$17,934	\$670	\$24,181
57.5060(d)	No initial plans during interim limit	-\$185	-\$300	-\$11	-\$496
57.5060(d)	No initial plans during final limit	-\$951	-\$1,541	-\$58	-\$2,549
57.5060(d)	No revised plans during final limit	-\$1,249	-\$2,024	-\$76	-\$3,349
57.5062	No initial DPM control plan	-\$1,931	-\$3,131	-\$117	-\$5,179
57.5062	No revised DPM control plan	-\$133	-\$216	-\$8	-\$358
Total Costs		\$1,128	\$10,721	\$401	\$12,250

*Source: Tables VII-5, VII-6, VII-7, VII-8, and VII-9.

Section 57.5060(c) Special Extensions

Under the existing § 57.5060(c), a mine operator that requires additional time to come into full compliance with the final concentration limit (160_{TC} micrograms/m³), due to technological constraints, would be allowed to file an application for a special extension. This provision provides for no more than one extension lasting no longer than two years. In contrast to this existing provision, the revised § 57.5060(c) allows unlimited applications, each lasting no longer than one year.

We estimate that there would be 16.5 applications for special extensions made from mines that employ fewer than 20 workers; 26.8 applications made from mines that employ 20 to 500 workers; and one application made from mines that employ more than 500 workers. For mines with fewer than 20 workers, it would take a mine supervisor, making \$47.58 an hour, 8 hours to prepare an application for a special extension and a clerical worker, making \$19.06 an hour, 0.33 hours (20 minutes) to photocopy and distribute the extension to the miners' representative. For mines with 20 or more workers, it would take a mine supervisor, making \$47.58 an hour, 16 hours to prepare an application for a special extension and a clerical worker, making \$19.06 an hour, 0.33 hours (20 minutes) to photocopy and distribute the extension to the miners' representative. Table VII-5 shows the burden hours and burden costs associated with this section.

Table VII-5: Paperwork Requirement for Special Extension to Final Limit on a Yearly Basis under § 57.5060 (c)

Mine Size	# of Mines Affected	Total Annual Burden Hours ^a	Total Costs for All Mines Starting in Year Three ^b	Total Annualized Burden Costs ^c
Small (< 20)	16.5	137.5	\$6,385	\$5,577
Large (20-500)	26.8	436.9	\$20,532	\$17,934
Large (> 500)	1.0	16.3	\$768	\$670
Total	44.3	590.8	\$27,684	\$24,181

^a Total annual burden hours = $N \times (H_s + H_c)$, where N is the number of mines affected; H_s is the time required for a mine supervisor to prepare for a special extension ($H_s=8$ hours for small mines and $H_s=16$ hours for large mines); and H_c is the time required for a clerical worker to photocopy and distribute a copy to miners' representative ($H_c=0.33$ hours).

^b Total costs for all mines = $N \times [(H_s \times W_s) + (H_c \times W_c)]$, where H_s is the time required for a mine supervisor to prepare for a special extension ($H_s=8$ hours for small mines and $H_s=16$ hours for large mines); W_s is the hourly wage rate for a mine supervisor ($W_s=\$47.58$); H_c is the time required for a clerical worker to photocopy and distribute a copy to miners' representative ($H_c=0.33$ hours); and W_c is the hourly wage rate for a clerical worker ($W_c=\$19.06$).

^c Total annualized burden costs = (total costs for all mines starting in year three) / $(1.07)^2$, where $(1/1.07)^2$ is the two-year discounting factor using an annual discount rate of 7 percent. The annual costs are discounted for one year because the final limit does not go into effect until one year after the publication of this rule and a second year because mine operators unable to meet the final limit were already able (under the existing rule) to apply for a special extension in the first year only that the final limit takes effect.

Section 57.5060(d) Respiratory Protection

The existing § 57.5060(d) allows mine operators to implement an approved plan that permits miners to conduct inspection, maintenance, or repair activities in certain areas of a mine where the DPM concentration limit is exceeded. This section requires mine operators to submit written plans to MSHA, as well as to revise and resubmit these plans annually. The revised § 57.5060(d) would not require written plans. Therefore, these mine operators would no longer have to prepare, revise, and submit these plans.

For the interim limit, we estimate that there would be 4.6 applications made from mines that employ fewer than 20 workers; 7.4 applications made from mines that employ 20 to 500 workers; and 0.3 applications made from mines that employ more than 500 workers. It would take a mine supervisor, making \$47.58 an hour, 12 hours to prepare the plans and a clerical worker, making \$19.06 an hour, 0.5 hours to photocopy, post, and distribute the plans to miners' representatives. Table VII-6 shows the burden hour savings (negative burden hours) and burden cost savings (negative costs) associated with this section.

Table VII-6: Elimination of Paperwork Requirement of Plans for Interim Limit under § 57.5060 (d)

Mine Size	# of Affected Mines	Total First Year Burden Hours for All Mines ^a	Total First Year Costs for All Mines ^b	Total Yearly Burden Costs ^c
Small (< 20)	4.6	-56.9	-\$2,642	-\$185
Large (20-500)	7.4	-92.2	-\$4,283	-\$300
Large (> 500)	0.3	-3.4	-\$160	-\$11
Total	12.2	-152.6	-\$7,085	-\$496

^a Total first year burden hours for all mines = $-N \times (H_s + H_c)$, where N is the number of mines affected; H_s is the time required for a mine supervisor to prepare initial plans ($H_s=12$ hours); and H_c is the time required for a clerical worker to photocopy, post, and distribute initial plans ($H_c=0.5$ hours).

^b Total first year costs for all mines = $-N \times [(H_s \times W_s) + (H_c \times W_c)]$, where W_s is the hourly wage rate for a mine supervisor ($W_s=\$47.58$); W_c is the hourly wage rate for a clerical worker ($W_c=\$19.06$); H_s is the time required for a mine supervisor to prepare initial plans ($H_s=12$ hours); and H_c is the time required for a clerical worker to photocopy, post, and distribute initial plans ($H_c=0.5$ hours) .

^c Total Yearly Burden Costs = (total first year costs for all mines) X (0.07), where 0.07 is the annualization factor.

For the final limit, we estimate that there would be 25.0 applications made from mines that employ fewer than 20 workers; 40.6 applications made from mines that employ 20 to 500 workers; and 1.5 applications made from mines that employ more than 500 workers. It would take a mine supervisor, making \$47.58 an hour, 12 hours to prepare the plans and a half hour of a clerical worker’s time, making \$19.06 an hour, to photocopy, post, and distribute the plans to the miners’ representative. On a yearly basis, it would take another hour of a supervisor’s time to revise and a half hour of a clerical worker’s time to photocopy, post, and distribute the plans to the miners’ representative. Table VII-7 shows the burden hour and burden cost savings associated with this section.

**Table VII-7: Elimination of Paperwork Requirement of Plans
for Final Limit under § 57.5060 (d)**

Mine Size	# of Mines Affected	Total Initial Second Year Burden Hours for All mines ^a	Total Initial Second Year Costs for All Mines ^b	Total Annual Burden Hours Starting in Third Year for All Mines ^c	Total Annual Costs Starting in Third Year for All Mines ^d	Total Yearly Burden Costs ^e
Small (< 20)	25.0	-312.9	-\$14,531	-37.6	-\$1,430	-\$2,199
Large (20-500)	40.6	-507.3	-\$23,558	-60.9	-\$2,318	-\$3,565
Large (> 500)	1.5	-19.0	-\$881	-2.3	-\$87	-\$133
Total	67.1	-839.2	-\$38,969	-100.7	-\$3,834	-\$5,898

^a Total initial second year burden hours for all mines = $-N \times (H_s + H_c)$, where N is the number of mines affected; H_s is the time required for a mine supervisor to prepare initial plans ($H_s=12$ hours); and H_c is the time required for a clerical worker to photocopy, post, and distribute initial plans ($H_c=0.5$ hours).

^b Total initial second year costs for all mines = $-N \times [(H_s \times W_s) + (H_c \times W_c)]$, where W_s is the hourly wage rate for a mine supervisor ($W_s=\$47.58$); W_c is the hourly wage for a clerical worker ($W_c=\$19.06$); H_s is the time required for a mine supervisor to prepare initial plans ($H_s=12$ hours); and H_c is the time required for a clerical worker to photocopy, post, and distribute initial plans ($H_c=0.5$ hours).

^c Total annual burden hours starting in third year for all mines = $-N \times (H_s + H_c)$, where N is the number of mines affected; H_s is the time required for a mine supervisor to revise plans ($H_s=1$ hour); and H_c is the time required for a clerical worker to photocopy, post, and distribute revised plans ($H_c=0.5$ hours).

^d Total annual costs starting in third year for all mines = $-N \times [(H_s \times W_s) + (H_c \times W_c)]$, where N is the number of mines affected; H_s is the time required for a mine supervisor to revise plans ($H_s=1$ hour); W_s is the hourly wage rate for a mine supervisor ($W_s=\$47.58$); H_c is the time required for a clerical worker to photocopy, post, and distribute revised plans ($H_c=0.5$ hours); and W_c is the hourly wage rate for a clerical worker ($W_c=\$19.06$).

^e Total yearly burden costs = $((\text{total initial second year costs for all mines}) \times 0.07 / (1.07)) + (\text{total annual costs starting in third year for all mines}) / (1.07)^2$, where 0.07 is the annualization factor; and because mines that are unable to meet the final limit will not incur cost savings until one or two years after the publication of the rule, these cost savings are discounted using a discount factor of $(1/1.07)$ or $(1/1.07)^2$.

Section 57.5062 Diesel Particulate Matter Control Plan

This final rule removes Section 57.5062 which requires a DPM control plan. Therefore, mine operators will no longer be required to produce, copy and distribute an initial DPM control plan. This will save a mine supervisor 4 hours and a clerical worker 0.25 hours for each plan. This reduction in annual burden hours and costs is summarized in Table VII-8.

**Table VII-8: Section 57.5062
Annual Burden Hours and Costs of Initial DPM Control Plan**

Mine Size	Number of Initial Plans Filed Annually	Total Annual Burden Hours ^a	Annual Burden Cost ^b
Small (< 20)	9.9	-42.1	-\$1,931
Large (20-500)	16.1	-68.2	-\$3,131
Large (> 500)	0.6	-2.6	-\$117
Total	26.6	-112.8	-\$5,179

^a Total annual burden hours = $-N \times (H_s + H_c)$, where N is the number of mines affected; H_s is the time required for a mine supervisor to prepare an initial DPM control plan ($H_s=4$ hours); and H_c is the time required for a clerical worker to photocopy and distribute the DPM control plan ($H_c=0.25$ hours).

^b Annual Burden Cost = $-N \times [(H_s \times W_s) + (H_c \times W_c)]$, where N is the number of mines affected; H_s is the time required for a mine supervisor to prepare an initial DPM control plan ($H_s=4$ hours); W_s is the hourly wage rate for a mine supervisor ($W_s=\$47.58$); H_c is the time required for a clerical worker to photocopy and distribute the DPM control plan ($H_c=0.25$ hours); and W_c is the hourly wage rate for a clerical worker ($W_c=\$19.06$).

Furthermore, mine operators will no longer be required to produce, copy, and distribute a revised DPM control plan. This will save a mine supervisor 30 minutes and a clerical worker 10 minutes for each plan. This reduction in annual burden hours and costs is summarized in Table VII-9.

**Table VII-9: Section 57.5062
Annual Burden Hours and Costs to Revise DPM Control Plan**

Mine Size	Number of Initial Plans Filed Annually	Total Annual Burden Hours ^a	Annual Burden Cost ^b
Small (< 20)	5.0	-3.3	-\$133
Large (20-500)	8.0	-5.4	-\$216
Large (> 500)	0.3	-0.2	-\$8
Total	13.3	-8.9	-\$358

^a Total annual burden hours = $-N \times (H_s + H_c)$, where N is the number of mines affected; H_s is the time required for a mine supervisor to revise a DPM control plan ($H_s=0.5$ hours); and H_c is the time required for a clerical worker to photocopy and distribute the revised DPM control plan ($H_c=0.17$ hours).

^b Annual Burden Cost = $-N \times [(H_s \times W_s) + (H_c \times W_c)]$, where N is the number of mines affected; H_s is the time required for a mine supervisor to revise a DPM control plan ($H_s=0.5$ hours); W_s is the hourly wage rate for a mine supervisor ($W_s=\$47.58$); H_c is the time required for a clerical worker to photocopy and distribute the revised DPM control plan ($H_c=0.17$ hours); and W_c is the hourly wage rate for a clerical worker ($W_c=\$19.06$).

VIII. REFERENCES

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- U.S. Department of Labor, Mine Safety and Health Administration, Office of Standards, Regulations, and Variances, *Final Regulatory Economic Analysis and Final Regulatory Flexibility Analysis, Final Rule on 30 CFR Parts 57, Final Standards and Regulations, Diesel Particulate Matter Exposure of Underground Metal and Nonmetal Miners*, December 2001.
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APPENDIX A. ALTERNATIVE DIESEL PARTICULATE MATTER CONTROL PLAN

An alternative to the final rule, which removes Section 57.5062 entirely, would be to include a modified version of the DPM control plan. Such a plan was proposed in the 2003 proposed rule. That plan would have retained all of the elements of the plan in the January 2001 final rule except that mine operators would no longer be required to demonstrate the plan's effectiveness or to copy and distribute the plan to representatives of DOL, DHHS, MSHA, and the miners' representative.¹⁸ Therefore, these requirements are omitted from calculations of the unit costs of the alternative Section 57.5062, which appear in the second to the last column of Table A-1. The last column in this table presents the net change in the unit costs (relative to the January 2001 final rule) due to this revised section.

Table A-1: 57.5062 Unit Costs of Diesel Particulate Matter Control Plan

Type of Plan	Cost Element	Cost or Rate/Hour	Hours or Units	Cost Under Old 57.5062	Cost Under Alternative 57.5062	Change in Costs
Initial	Supervisor	\$47.58	4.00	\$190	\$190	\$0
	Clerical Worker	\$19.06	0.25	\$5		-\$5
	Copies	\$1.50	4.00	\$6		-\$6
	Postage	\$0.60	1.00	\$1		-\$1
	Sampling	\$19.81	24.00	\$475		-\$475
	Analysis	\$35.85	3.00	\$108		-\$108
	Total Change in Unit Cost				\$785	\$190
Revision	Supervisor	\$47.58	0.50	\$24	\$24	\$0
	Clerical Worker	\$19.06	0.17	\$3		-\$3
	Copies	\$1.50	2.00	\$3		-\$3
	Postage	\$0.60	1.00	\$1		-\$1
	Total Change in Unit Cost				\$31	\$24

The number of mines that MSHA assumes would establish and revise the alternative diesel particulate matter control plan are the same as those used in Chapter IV of this REA (i.e., 27.3 mines would prepare an initial DPM plan each year, and 13.7 mines would prepare a revised DPM plan each year). Table A-2 shows the total cost savings (negative costs) relative to the January 2001 final rule for this alternative for the metal/non-metal industry.

¹⁸ The elements of the original plan, as well as the assumptions used to estimate the cost of the plan, are outlined in Chapter IV of this REA.

**Table A-2: Annual Change in Compliance Costs
Under Alternative Diesel Particulate Control Plan**

Type of Plan	Mine Size	Number of Mines	Unit Cost ^a	Total Annual Change in Cost
Initial	< 20	9.9	-\$594	-\$5,884
	20-500	16.1	-\$594	-\$9,540
	> 500	0.6	-\$594	-\$357
	Total	26.6		-\$15,780
Revision	< 20	5.0	-\$7	-\$34
	20-500	8.0	-\$7	-\$54
	> 500	0.3	-\$7	-2
	Total	13.3		-\$90
Total	< 20			-\$5,918
Yearly	20-500			-\$9,594
Change in	> 500			-\$359
Total				-\$15,870

^aSource: Table A-1.

The costs savings of this alternative are approximately \$5,368 less than those of the final rule, which eliminates the DPM control plan completely.¹⁹ MSHA eliminated the DPM control plan because we believe the plan would provide a negligible amount of additional protection for miners. The DPM rulemaking record contains little, if any, rationalization in support of this alternative. The hierarchy of controls in the final rule ensures that operators employ all means to maintain allowable exposure levels of DPM. MSHA can monitor an operator's good faith efforts and obtain supporting documentation during regular inspections. MSHA believes that the increased cost of the alternative control plan would provide a negligible amount of additional protection for miners.

¹⁹ The cost savings of completely eliminating the DPM control plan are \$21,239. See Table IV-7.

APPENDIX B. ALTERNATIVE RESPIRATORY PROTECTION PROGRAM WITH ADDITIONAL REQUIREMENTS

Another alternative to the final rule would be the inclusion of medical evaluation and transfer requirements in the respiratory protection program.

This alternative would require the mine operator to provide a medical evaluation by a physician or other licensed health care professional (PLHCP) to each miner that wears a respirator. Before the medical evaluation, the mine operator would provide the PLHCP with information regarding the types and weights of the respirator that the miner will use; the duration and frequency of respirator use; the expected physical work effort; additional protective clothing and equipment worn; and temperature and humidity extremes that may be encountered. The operator would also provide the PLHCP with a copy of the respirator protection program. The cost of providing this information to the PLHCP and of providing medical evaluations is based on the following assumptions:

In each year that medical evaluations are given, it would take a mine health and safety specialist, earning \$47.58 per hour, 1 hour to prepare this information.²⁰

In each year that medical evaluations are given, it would take a clerical worker 10 minutes to copy and mail the required information to the PLHCP.

The costs of copying and mailing the required information are \$1.50 and \$0.80, respectively.

The cost of a medical evaluation is \$50.

In mines using respirators with fewer than 20 employees, four miners per mine will use respirators and, therefore, require a medical evaluation in the first year that respirators are used.²¹

In mines using respirators with 20 or more employees, twelve miners per mine will use respirators and, therefore, require a medical evaluation in the first year that respirators are used.²²

After the first year, one additional miner every three years will require a medical evaluation in mines using respirators with fewer than 20 employees.

After the first year, one additional miner every year will require a medical evaluation in mines using respirators with 20 or more employees.²³

The costs for mines that will meet the interim limit, but will be unable to meet the final limit, are discounted using a discount factor of $1/1.07$ because the final limit will not take effect until one year after the publication of the rule.

²⁰ MSHA assumes that the wage of a health and safety specialist is the same as the wage of a mine supervisor.

²¹ This estimate is based on the assumption of two two-person crews for one shift in small mines.

²² This estimate is based on the assumption of three two-person crews for each of two shifts at large mines.

²³ These numbers are based on a turnover rate of 8.33%. $4 \times 0.0833 = 0.333 = \frac{1}{3}$; $12 \times 0.0833 = 1$.

The cost per mine of providing the required information to the PLHCP is shown in Table B-1.

Table B-1: Annual Unit Cost of Providing Information and Respiratory Protection Program to PLHCP

Cost Element	Cost per Unit	Units	Total
Health & Safety Specialist	\$47.58	1.00	\$48
Clerical Worker	\$19.06	0.17	\$3
Copying	\$1.50	1.00	\$2
Postage	\$0.80	1.00	\$1
Total Annual Cost per Mine			\$53

Table B-2 shows the total cost of providing this information to the PLHCP under this alternative. For mines with fewer than 20 employees, this information must be provided in the first year that they use respirators and for new employees approximately once every three years after that. For mines with 20 or more employees, this information must be provided in the first year that they use respirators and for new employees approximately once a year after that. The yearly costs are calculated separately for mines that would use respirators because they are unable to meet the interim limit and mines that would use respirators because they are unable to meet the final limit.

Table B-2: Industry Cost of Providing Information and Respiratory Protection Program to PLHCP

Mine Size	Number of Mines	Number of Times per Year	Unit Cost ^a	Total	Annualized Costs ^b	Adjusted Annualized Costs ^c
First Year Costs For Mines Unable to Meet the Interim Limit						
< 20	4.6	1.00	\$53	\$241	\$17	\$17
20-500	7.4	1.00	\$53	\$392	\$27	\$27
> 500	0.3	1.00	\$53	\$15	\$1	\$1
Total	12.2			\$648	\$45	\$45
First Year Costs For Mines Unable to Meet the Final Limit						
< 20	25.0	1.00	\$53	\$1,328	\$93	\$87
20-500	40.6	1.00	\$53	\$2,153	\$151	\$141
> 500	1.5	1.00	\$53	\$80	\$6	\$5
Total	67.1			\$3,562	\$249	\$233
Annual Costs For Mines Unable to Meet the Interim Limit						
< 20	4.6	0.33	\$53	\$80	\$80	\$80
20-500	7.4	1.00	\$53	\$392	\$392	\$392
> 500	0.3	1.00	\$53	\$15	\$15	\$15
Total	12.2			\$487	\$487	\$487
Annual Costs For Mines Unable to Meet the Final Limit						
< 20	25.0	0.33	\$53	\$443	\$443	\$414
20-500	40.6	1.00	\$53	\$2,153	\$2,153	\$2,012
> 500	1.5	1.00	\$53	\$80	\$80	\$75
Total	67.1			\$2,677	\$2,677	\$2,502
Total Yearly Cost						\$3,267

^aSource Table B-1.

^bUsing an annualization factor of 0.07 for first-year costs.

^cUsing a discount factor of 1/1.07 for mines unable to meet the final limit.

The costs of providing medical evaluations for mines that will use respirators because they are unable to meet the interim limit are shown in Table B-3.

Table B-3: Costs of Medical Evaluations for Mines Unable to Meet the Interim Limit

Mine Size	Number of Mines	Number of Miners per Mine ^a	Cost of Medical Evaluation	Total	Annualized Costs ^b
Costs in First Year					
< 20	4.6	3.67	\$50	\$834	\$58
20-500	7.4	11.00	\$50	\$4,059	\$284
> 500	0.3	11.00	\$50	\$152	\$11
Total	12.2			\$5,045	\$353
Annual Costs					
< 20	4.6	0.33	\$50	\$76	\$76
20-500	7.4	1.00	\$50	\$369	\$369
> 500	0.3	1.00	\$50	\$14	\$14
Total	12.2			\$459	\$459
Total Yearly Costs					\$812

^aFor Costs in first year the number of miners in this column is the number of miners in the first year minus the number of recurring miners in subsequent years.

^bUsing an annualization factor of 0.07 for costs that occur in the first year only.

The costs of providing medical evaluations for mines that will use respirators because they are unable to meet the final limit appear in Table B-4.

Table B-4: Costs of Medical Evaluations for Mines Unable to Meet the Final Limit

Mine Size	Number of Mines	Number of Miners per Mine ^a	Cost of Medical Evaluation	Total	Annualized Costs ^b	Adjusted Annualized Costs ^c
Costs in first year						
< 20	25.0	3.67	\$50	\$4,590	\$321	\$300
20-500	40.6	11.00	\$50	\$22,322	\$1,563	\$1,460
> 500	1.5	11.00	\$50	\$834	\$58	\$55
Total	67.1			\$27,747	\$1,942	\$1,815
Annual Costs						
< 20	25.0	0.33	\$50	\$417	\$417	\$390
20-500	40.6	1.00	\$50	\$2,029	\$2,029	\$1,897
> 500	1.5	1.00	\$50	\$76	\$76	\$71
Total	67.1			\$2,522	\$2,522	\$2,357
Total Yearly Costs						\$4,173

^aUsed to calculate costs for the initial year. This number is the actual number of miners in the initial year minus the number of recurring miners in subsequent years.

^bUsing an annualization factor of 0.07 for costs that occur in the first year only.

^cUsing a discount factor of 1/1.07, since the final limit does not go into effect until one year after this final rule goes into effect.

The alternative provisions would also require the mine operator to provide additional medical evaluations if: a miner or the miner’s supervisor reports medical signs or symptoms related to the miner’s ability to use a respirator; the PLHCP informs the mine operator that the miner needs to be reevaluated; information from the respiratory protection program indicates a need for miner reevaluation; or a change in workplace conditions occurs.

The cost of providing additional medical evaluations is based on the following assumptions:

The cost of a medical reevaluation is \$50.

One miner every three years, in mines that use respirators with fewer than 20 employees, will require an additional medical evaluation.

One miner every year, in mines that use respirators with 20 or more employees, will require an additional medical evaluation.

The costs for mines that will meet the interim limit, but will be unable to meet the final limit, are discounted using a discount factor of 1/1.07 because the final limit will not take effect until one year after the publication of the rule.

Table B-5 shows the costs of additional medical evaluations for mines that will use respirators because they are unable to meet the interim limit.

Table B-5: Costs of Additional Medical Evaluations for Mines Unable to Meet the Interim Limit

Mine Size	Number of Mines	Number of Miners per Mine	Cost of Medical Evaluation	Annual Costs
< 20	4.6	0.33	\$50	\$76
20-500	7.4	1.00	\$50	\$369
> 500	0.3	1.00	\$50	\$14
Total	12.2			\$459

Table B-6 presents the costs of additional medical evaluations for mines that will use respirators because they are unable to meet the final limit.

Table B-6: Costs of Additional Medical Evaluations for Mines Unable to Meet the Final Limit

Mine Size	Number of Mines	Number of Miners per Mine	Cost of Medical Evaluation	Total Annual Costs	Adjusted Annual Costs ^a
< 20	25.0	0.33	\$50	\$417	\$390
20-500	40.6	1.00	\$50	\$2,029	\$1,897
> 500	1.5	1.00	\$50	\$76	\$71
Total	67.1			\$2,522	\$2,357

^aUsing a discount factor of 1/1.07.

This alternative would also require the mine operator to provide a powered air-purifying respirator (PAPR) to a miner if the PLHCP found a medical condition that would place the miner’s health at risk if a respirator was used.

The cost of providing PAPRs is based on the following assumptions:

The PAPR costs \$1,000 and has a useful life of 5 years.

Five percent of miners that use respirators will have a medical condition that requires a PAPR. This works out to 0.20 miners (4 x 5%) in mines with fewer than 20 employees and 0.60 miners (12 x 5%) in mines with 20 or more employees.

An annualization factor of 0.24389 is used to annualize the cost of the PAPR over 5 years.

The costs for mines that will meet the interim limit, but will be unable to meet the final limit, are discounted using a discount factor of 1/1.07 because the final limit will not take effect until one year after the publication of the rule.

The costs of providing PAPRs for mines that will use respirators because they are unable to meet the interim limit are shown in Table B-7.

Table B-7: Costs of PAPRs for Mines Unable to Meet the Interim Limit

Mine Size	Number of Mines	Number of Miners per Mine	Cost of PAPR	Total	Annualized Costs ^a
< 20	4.6	0.20	\$1,000	\$910	\$222
20-500	7.4	0.60	\$1,000	\$4,428	\$1,080
> 500	0.3	0.60	\$1,000	\$166	\$40
Total	12.2			\$5,503	\$1,342

^aUsing an annualization factor of 0.24389, to reflect the annualized costs of a capital investment over a five-year horizon using a 7% discount rate.

The costs of providing PAPRs for mines that will use respirators because they are unable to meet the final limit appear in Table B-8.

Table B-8: Costs of PAPRs for Mines Unable to Meet the Final Limit

Mine Size	Number of Mines	Number of Miners per Mine	Cost of PAPR	Total	Annualized Costs ^a	Adjusted Annualized Costs ^b
< 20	25.0	0.20	\$1,000	\$5,007	\$1,221	\$1,141
20-500	40.6	0.60	\$1,000	\$24,352	\$5,939	\$5,551
> 500	1.5	0.60	\$1,000	\$910	\$222	\$207
Total	67.1			\$30,269	\$7,382	\$6,899

^aUsing an annualization factor of 0.24389.

^bUsing a discount factor of 1/1.07.

The alternative provisions would also require the mine operator to offer the miner a written option to transfer to an existing position where respiratory protection is not required if the PLHCP determines that the miner is unable to wear a respirator. The mine operator would be required to compensate the miner at no less than the regular rate of pay received by the miner immediately before the transfer. The cost of transferring a miner to an existing position where respiratory protection is not required is based on the following assumptions:

It would take the mine supervisor 15 minutes to prepare the written option to transfer.

The average remaining work life of a miner is 20 years.

The normal hourly wage rate in an existing position where respiratory protection is not required averages 20% less than the miner's hourly wage rate.

A miner works 2,000 hours per year on average.

At any point in time a mine will employ a number of transferees equal to ½ % of the number of miners using respirators. This works out to 0.02 miners (4 x 0.5%) in mines with fewer than 20 employees and 0.06 miners (12 x 0.5%) in mines with 20 or more employees.

The costs for mines that will meet the interim limit, but will be unable to meet the final limit, are discounted using a discount factor of 1/1.07 because the final limit will not take effect until one year after the publication of the rule.

Table B-9 shows the total yearly cost to the industry of producing written options to transfer.

Table B-9: Costs to Produce Written Option to Transfer

Mine Size	Number of Mines	Number of Transferees per Mine	Number of Transfers per Year ^a	Cost per Transfer ^b	Total Annual Cost	Adjusted Costs ^c
For Mines Unable to Meet the Interim Limit						
< 20	4.6	0.02	0.0046	\$11.90	\$0.05	\$0.05
20-500	7.4	0.06	0.0221	\$11.90	\$0.26	\$0.26
> 500	0.3	0.06	0.0008	\$11.90	\$0.01	\$0.01
Total	12.2				\$0.33	\$0.33
For Mines Unable to Meet the Final Limit						
< 20	25.0	0.02	0.0250	\$11.90	\$0.30	\$0.28
20-500	40.6	0.06	0.1218	\$11.90	\$1.45	\$1.35
> 500	1.5	0.06	0.0046	\$11.90	\$0.05	\$0.05
Total	67.1				\$1.80	\$1.68
Total Yearly Cost						\$2.01

^aNumber of Transfers per Year = (number of transferees per mine x number of mines) / 20.

^bCost per transfer = (Supervisor's wage/hour) x 0.25 hours.

^cUsing a discount factor of 1/1.07 for mines unable to meet the final limit.

Table B-10 shows the total yearly cost to the industry of transferring miners that are unable to wear respirators for mines that are unable to meet the interim limit.

Table B-10: Costs of Transfers for Mines Unable to Meet the Interim Limit

Mine Size	Number of Mines	Number of Transferees per Mine	Cost of Transfer ^a	Total Annual Cost
< 20	4.6	0.02	\$8,204	\$747
20-500	7.4	0.06	\$8,204	\$3,632
> 500	0.3	0.06	\$8,204	\$136
Total	12.2			\$4,515

^aCost of transfer = (20% x miner wage x 2,000 hours)

Table B-11 presents the total yearly cost to the industry of transferring miners that are unable to wear respirators for mines that are unable to meet the final limit.

**Table B-11: Costs of Transfers
for Mines Unable to Meet the Final Limit**

Mine Size	Number of Mines	Number of Transferees per Mine	Cost of Transfer ^a	Total Annual Cost	Adjusted Annual Costs ^b
< 20	25.0	0.02	\$8,204	\$4,108	\$3,839
20-500	40.6	0.06	\$8,204	\$19,978	\$18,671
> 500	1.5	0.06	\$8,204	\$747	\$698
Total	67.1			\$24,833	\$23,208

^aCost of transfer = (20% x miner wage x 2,000 hours)

^bUsing a discount factor of 1/1.07.

Table B-12 summarizes, by mine size, the costs of adding the medical evaluation and miner transfer provisions to the DPM rule. These costs would be in addition to those already outlined in Chapter IV.

**Table B-12: Summary of the Yearly Costs of Adding
Medical Evaluation and Miner Transfer Provisions
to the DPM rule**

Mine Size	Change in Compliance Costs
< 20	\$7,838
20-500	\$37,783
> 500	\$1,412
Total	\$47,034

Source: Tables B-1 through B-11.

MSHA is relying upon its current experience under the agency's metal and nonmetal air quality standards (30 CFR §§ 56/57.5001-.5006) and the views of the mining industry opposing these alternative measures in rejecting this alternative. Respiratory protection is required to supplement feasible controls that do not reduce a miner's exposure to the permissible level. The air quality standards do not contain a requirement for mine operators to develop written administrative control procedures; nor does MSHA's enforcement policy require a written respiratory protection program when using these control methods to reduce miners' exposures to airborne contaminants. MSHA believes that operators should be afforded similar flexibility of compliance with the DPM standard where such modifications to the standard do not compromise or lower miners' health protection from that provided under the 2001 rule.

APPENDIX C. COMPARISON OF COSTS OF ALTERNATIVES

Table C-1 compares the costs of the three alternatives outlined in Chapter IV, Appendix A and Appendix B.

Table C-1: Summary of Costs of Alternatives

Mine Size	Alternatives		
	Preferred ^a	A ^b	B ^c
< 20	-\$4,795	-\$2,793	\$3,043
20-500	\$1,119	\$4,364	\$38,903
> 500	\$42	\$163	\$1,454
Total	-\$3,634	\$1,735	\$43,400

^aFrom Table IV-1.

^bAlternative A adds \$5,368 to total costs. See Appendix A.

^cAlternative B adds \$47,034 to total costs. See Appendix B.